

# ADMINISTRACIJA OPERACIJSKIH SUSTAVA

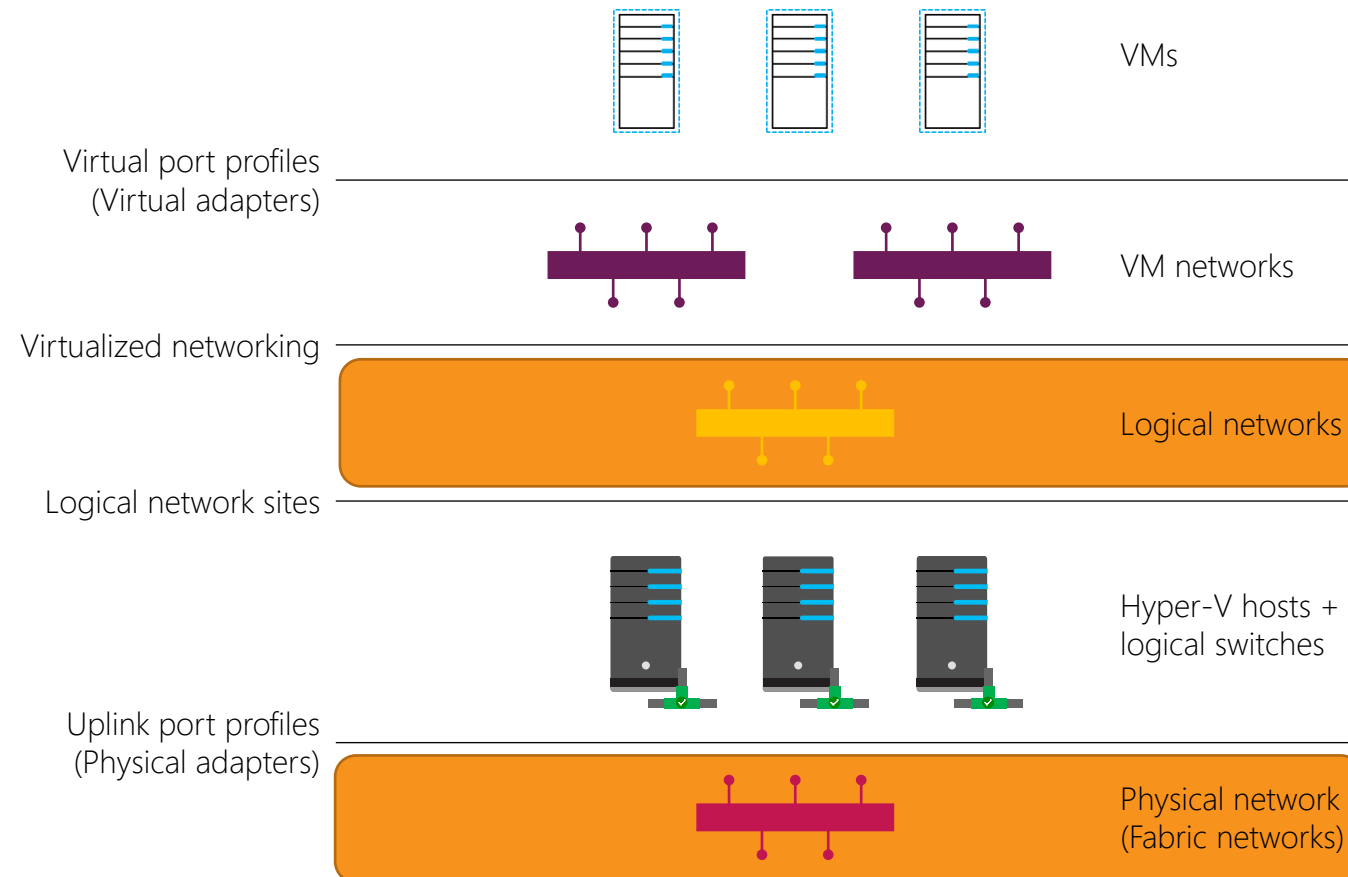
Umrežavanje II



# Lesson 1: Logical networking

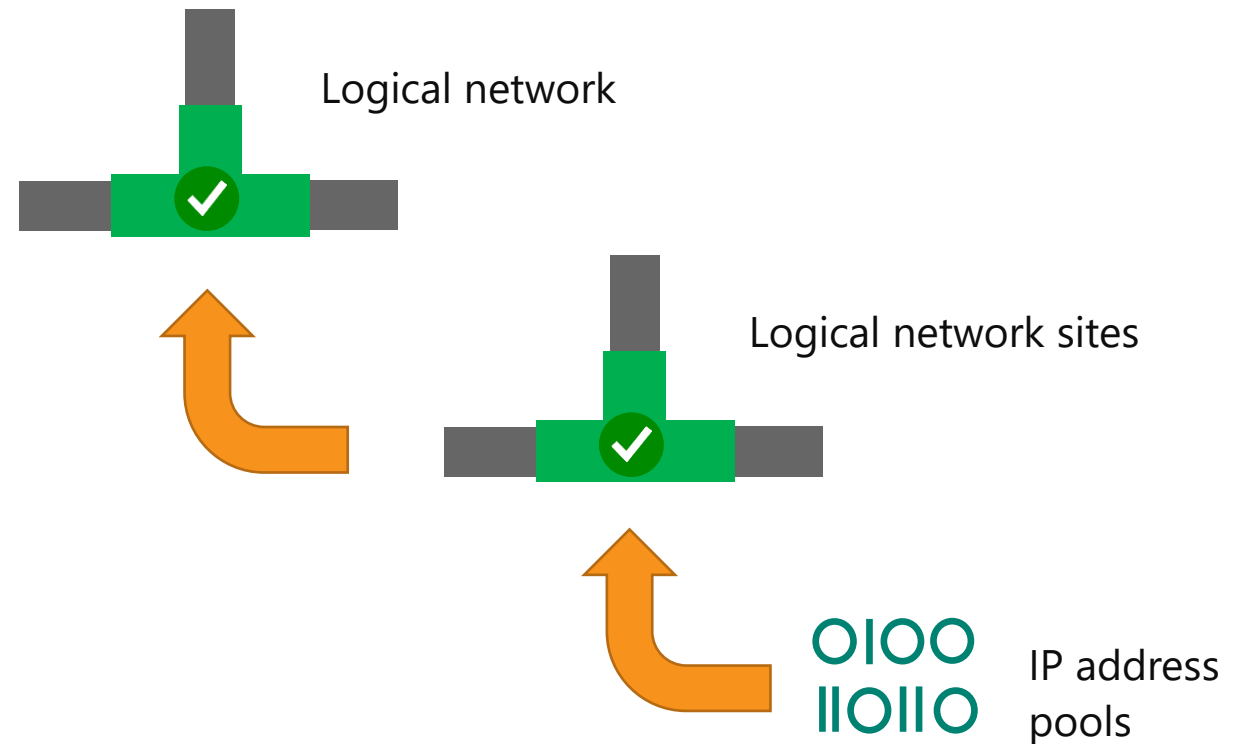
- Creating a logical network
- Creating logical network sites and IP address pools
- Configuring uplink port profiles
- Configuring virtual port profiles
- Creating port classifications
- Relationship between port profiles and logical switches
- Implementing logical switch extensibility
- Configuring logical switches
- Integrating Top-of-Rack switches with VMM
- Deploying Network Controller
- Creating and configuring VM networks

# Overview of logical networks

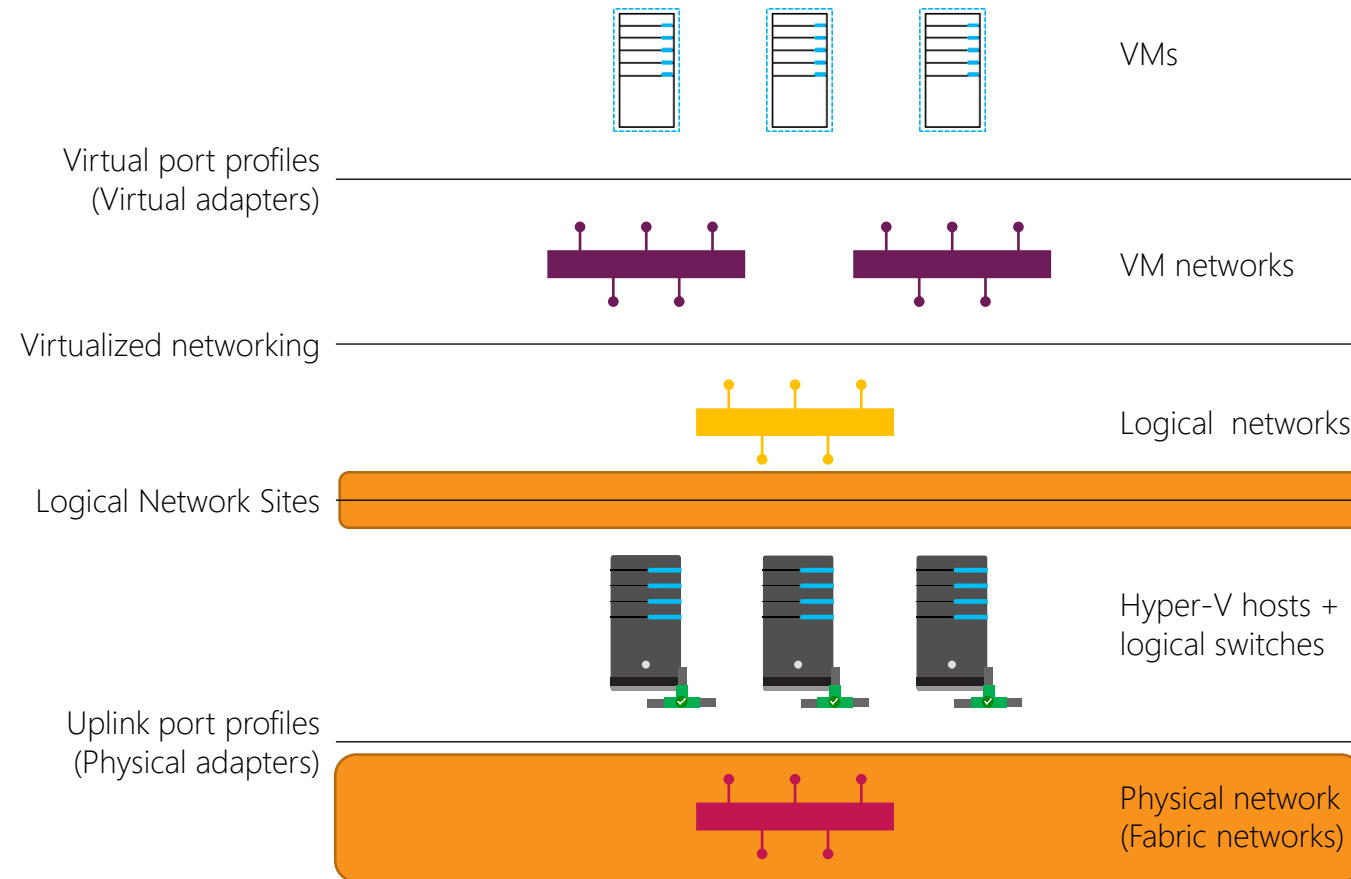


# Overview of logical networks

- Logical networks are the parent object
- A logical network can have several logical network sites
- Each logical network can have multiple IP address pools



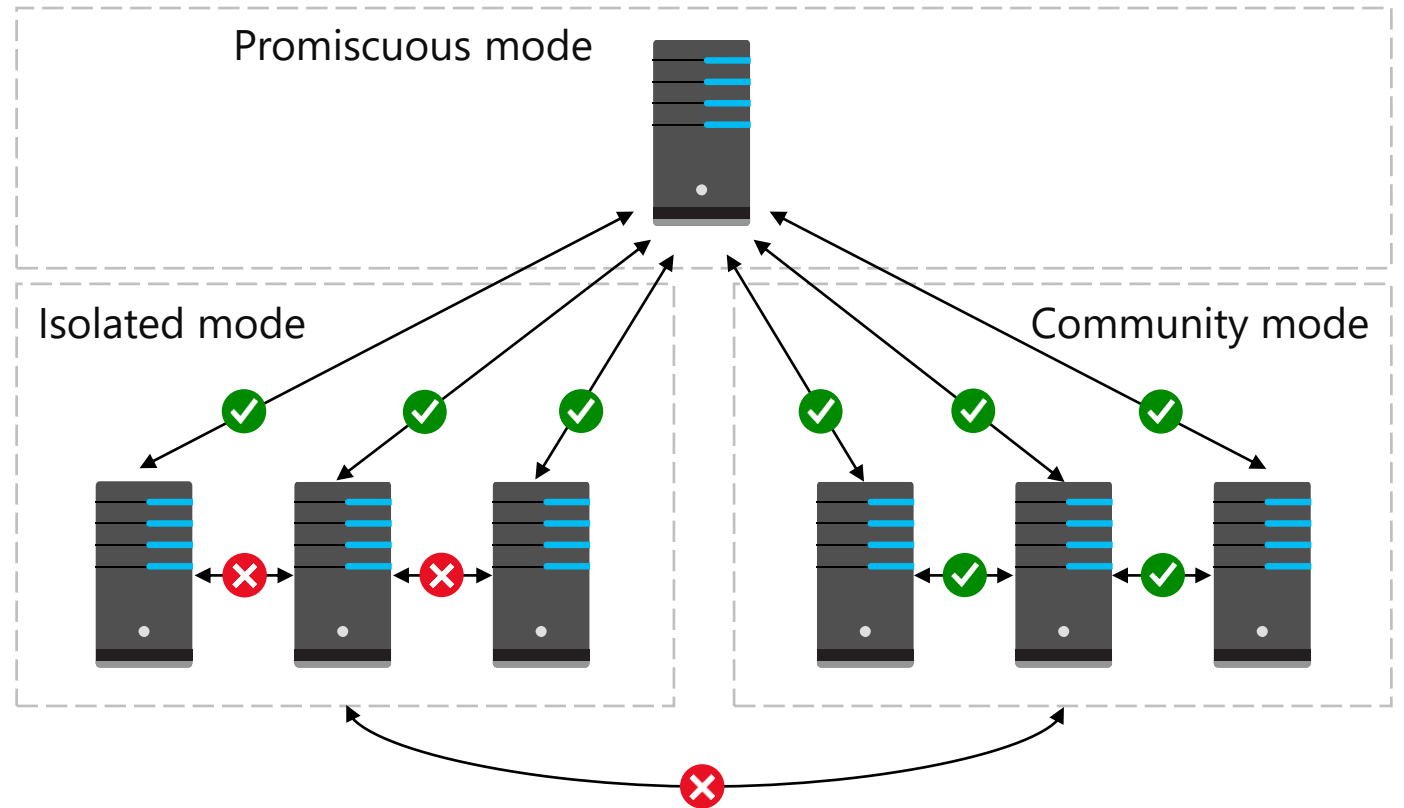
# Overview of VLANs



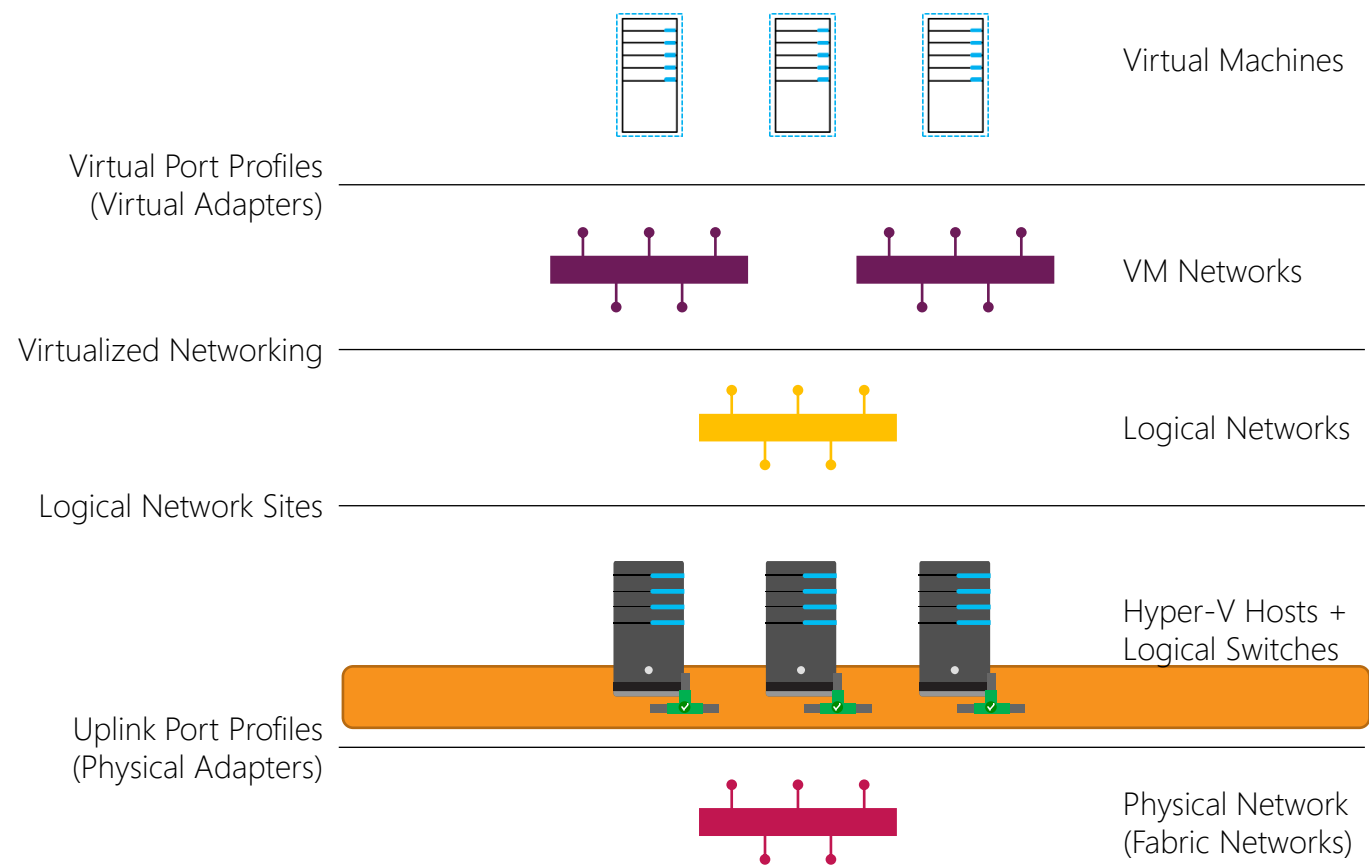
# Overview of PVLANS

A PVLAN has three modes:

- The Promiscuous mode can communicate with anything
- The isolated mode can communicate only with the Promiscuous mode
- The Community mode can communicate with the Community and Promiscuous modes

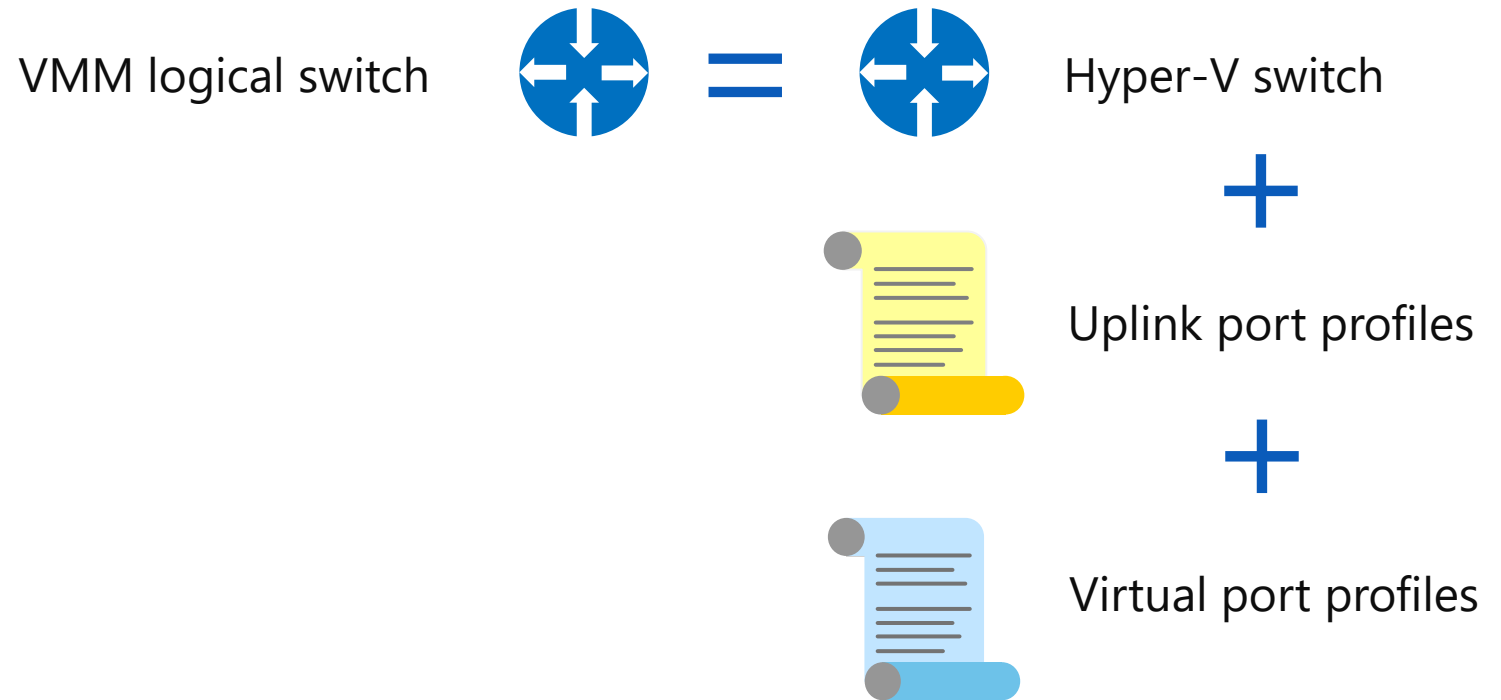


# Overview of logical switches



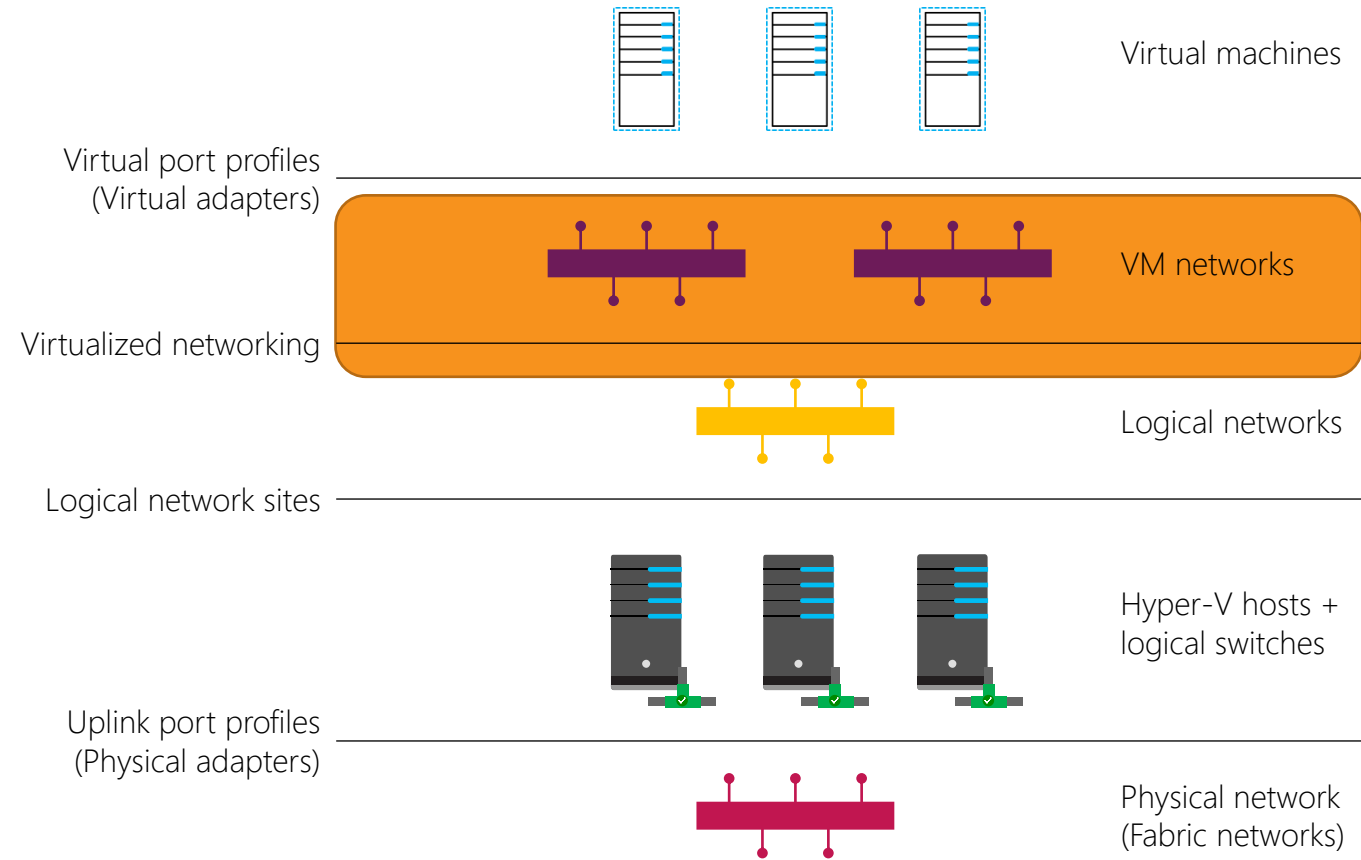
# Overview of logical switches

The VMM logical switch is the Hyper-V switch + uplink port profiles + virtual port profiles



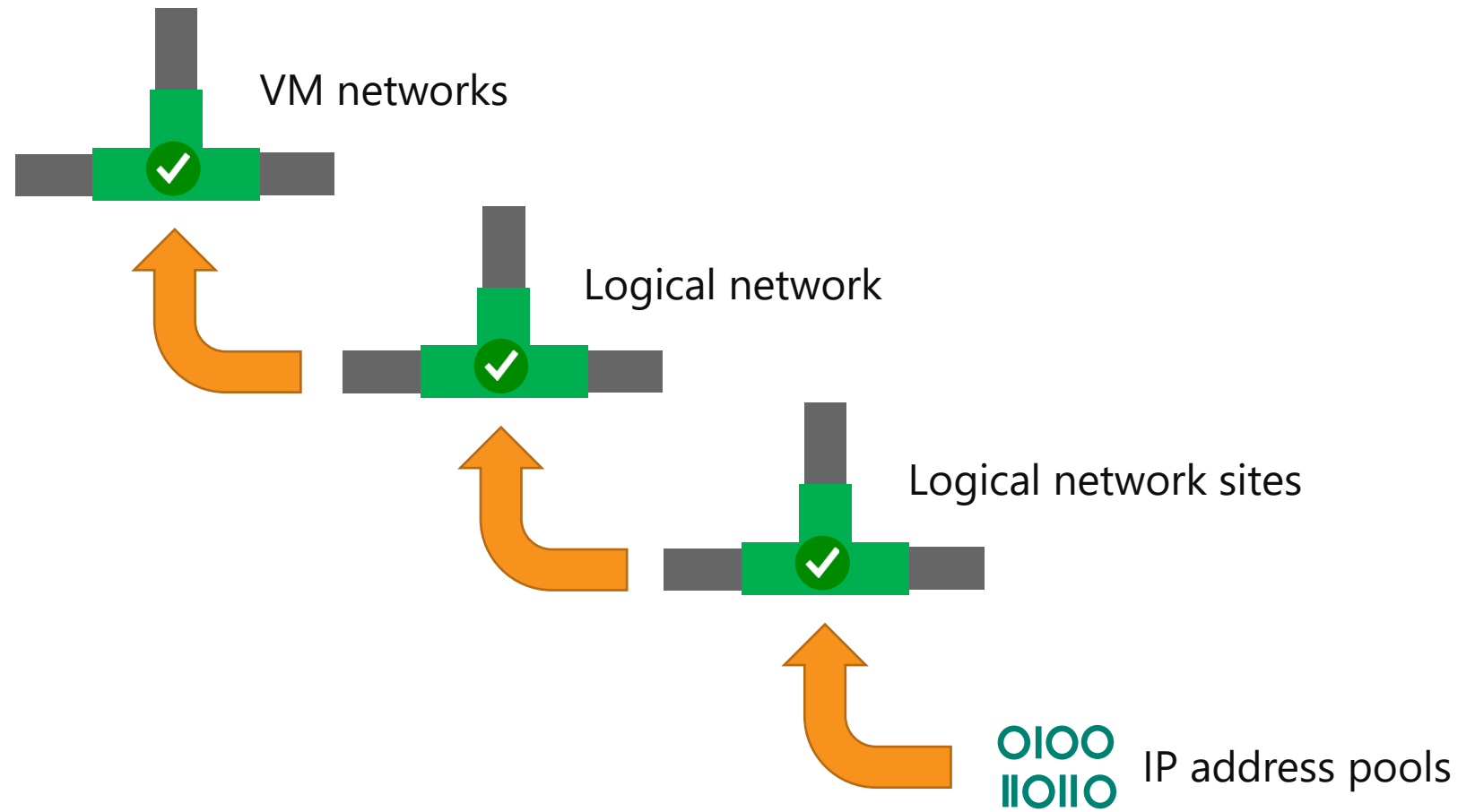


# Overview of VM networks



# Overview of VM networks

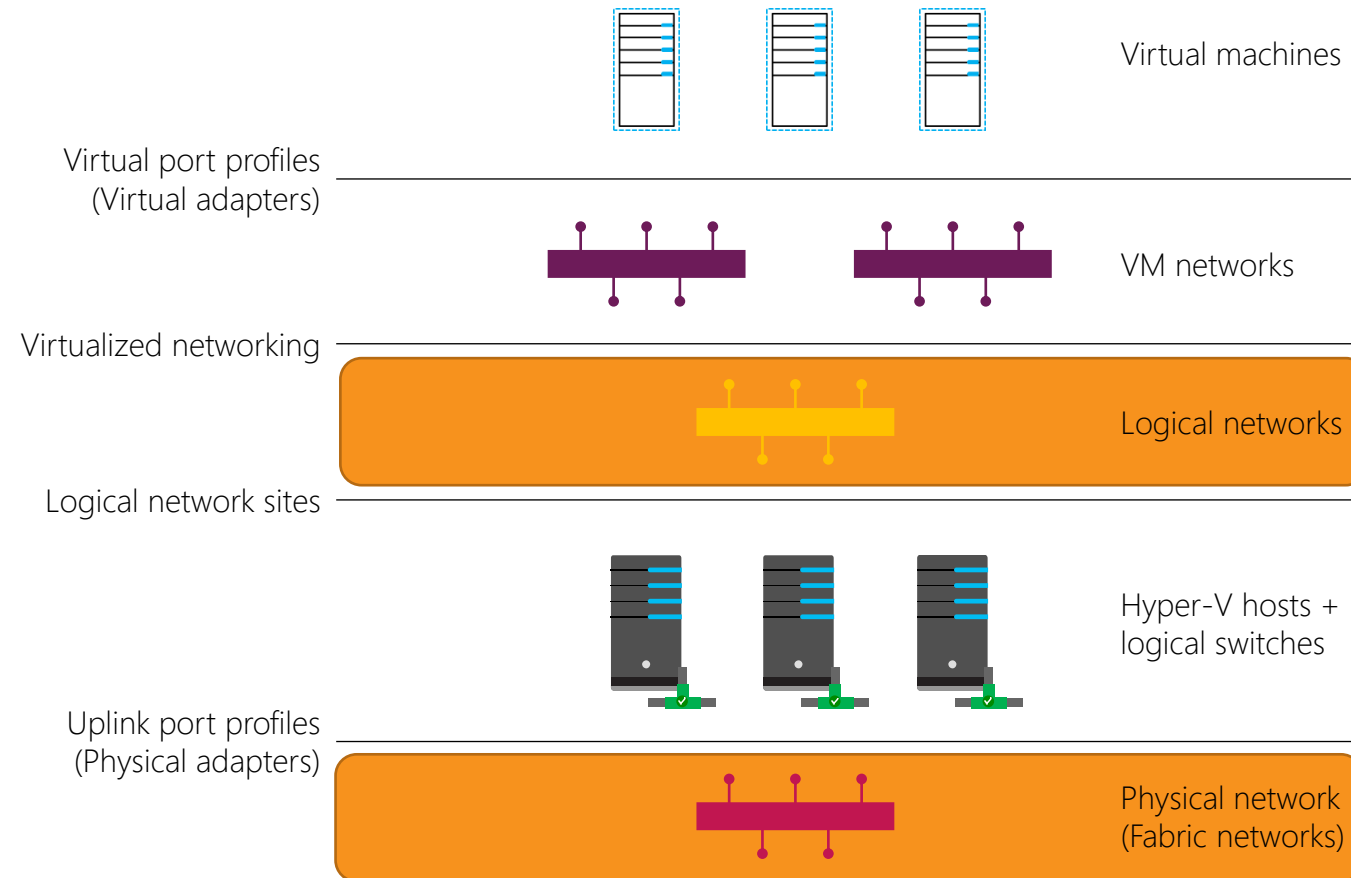
VM networks are hosted within a logical network



# Lesson 2: Managing Software-Defined Networking

- Creating a logical network
- Creating logical network sites and IP address pools
- Configuring uplink port profiles
- Configuring virtual port profiles
- Creating port classifications
- Relationship between port profiles and logical switches
- Implementing logical switch extensibility
- Configuring logical switches
- Integrating Top-of-Rack switches with VMM
- Deploying Network Controller
- Creating and configuring VM networks

# Creating a logical network

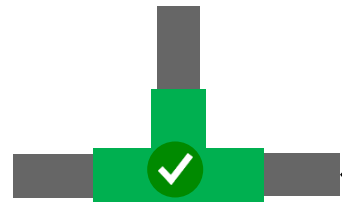


# Creating a logical network

A logical network can be created in one of three ways:

- One connected network
- An isolated VLAN
- An isolated PVLAN

What type of logical network?



One connected Network

- Must be used for HNV networks
- Typically used for fabric networks



An isolated VLAN

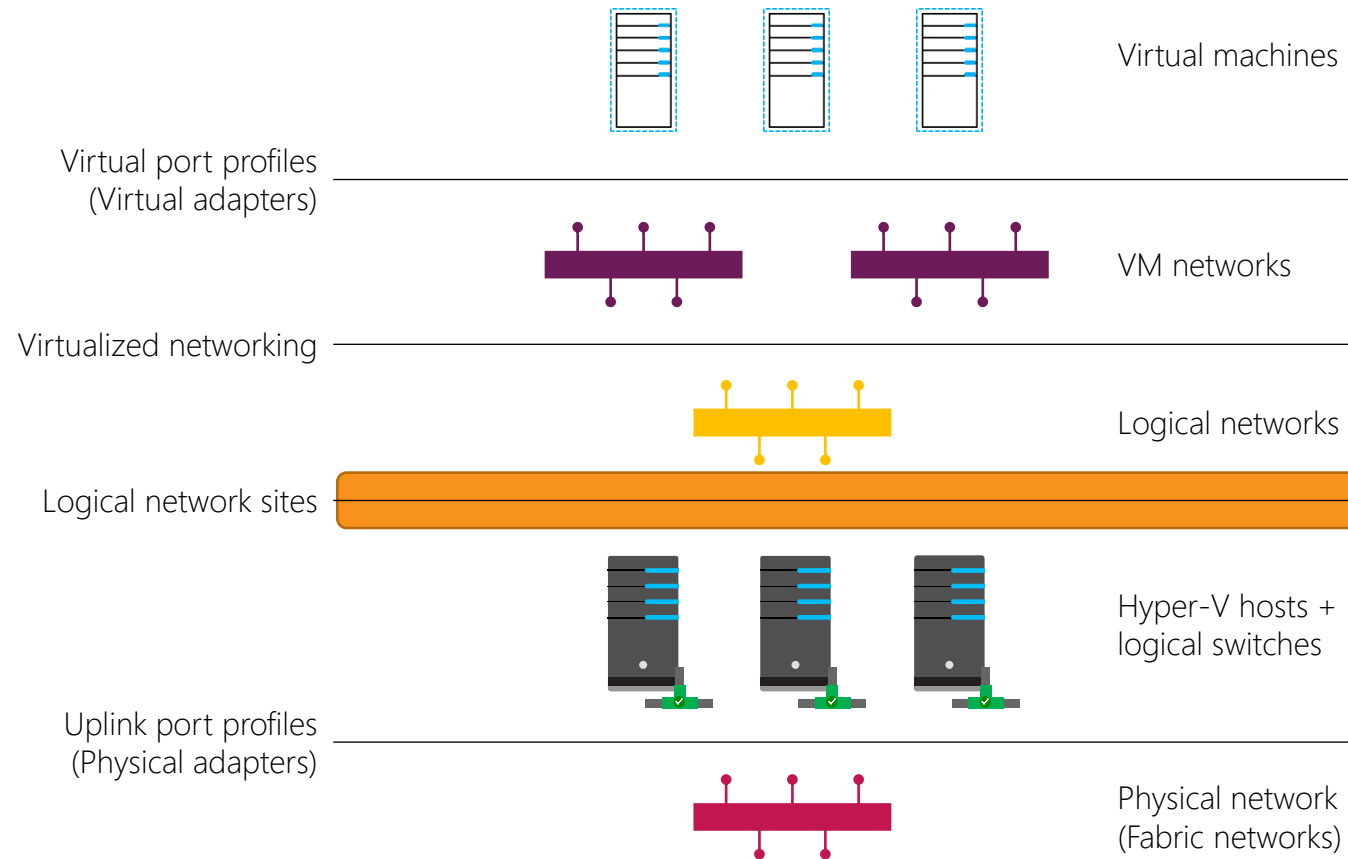
- Each logical network site VLAN/subnet definition is its own VM nNetwork



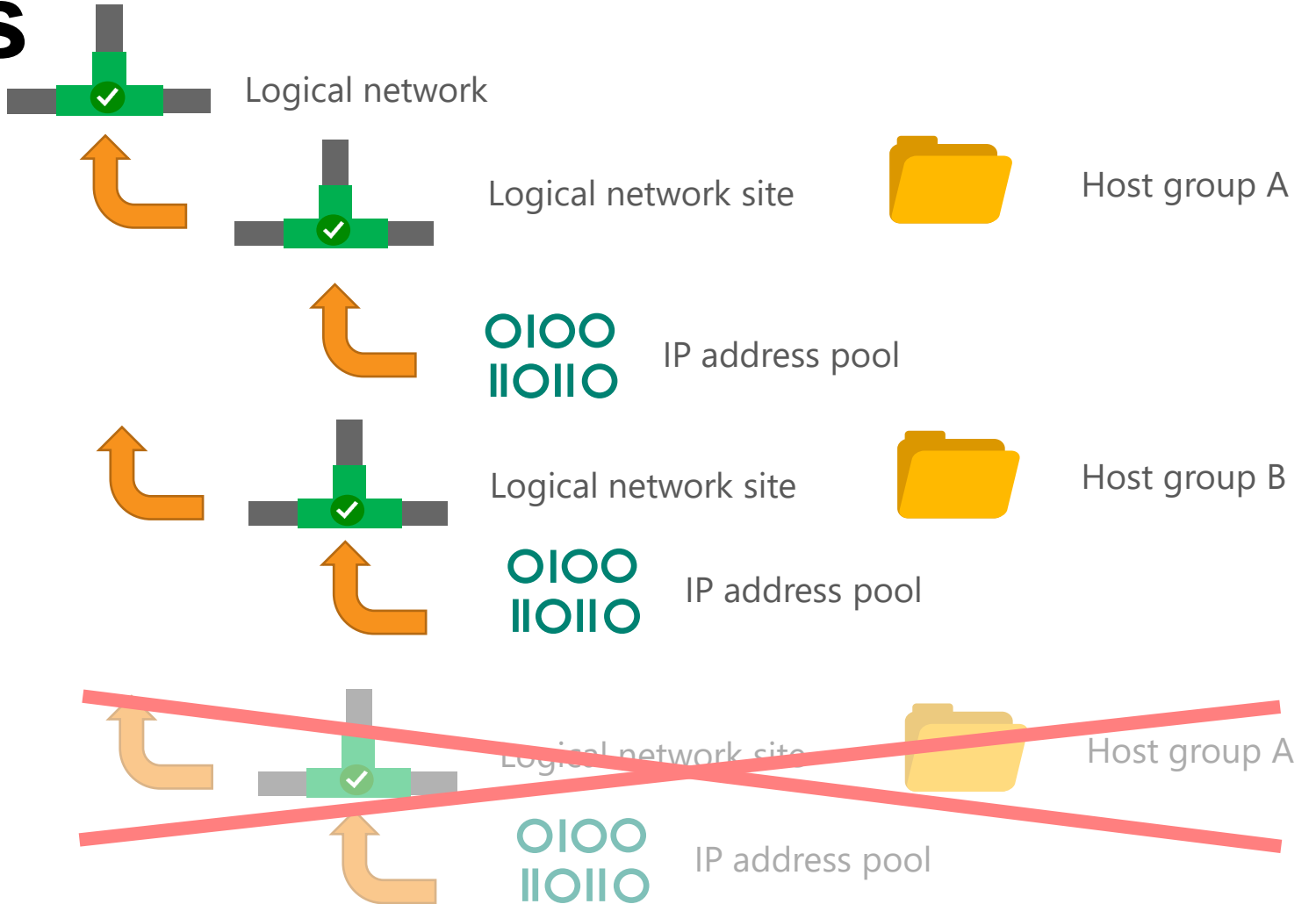
An isolated PVLAN

- Each logical network site VLAN/subnet definition is its own VM network

# Creating logical network sites and IP address pools



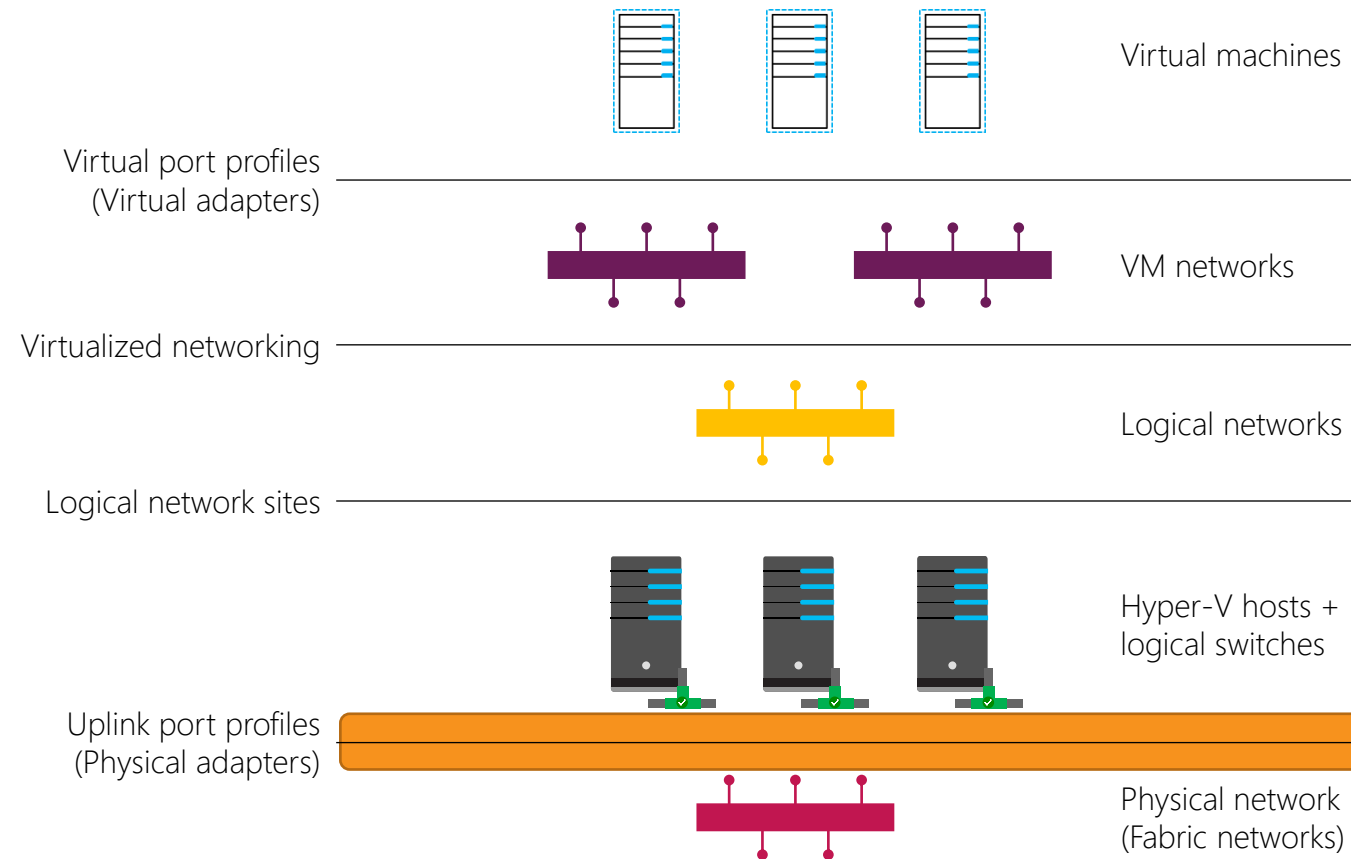
# Creating logical network sites and IP address pools



Each logical network can have multiple logical network sites

Each logical network site must be associated with a host group (you cannot have more than one logical network site per host group per logical network)

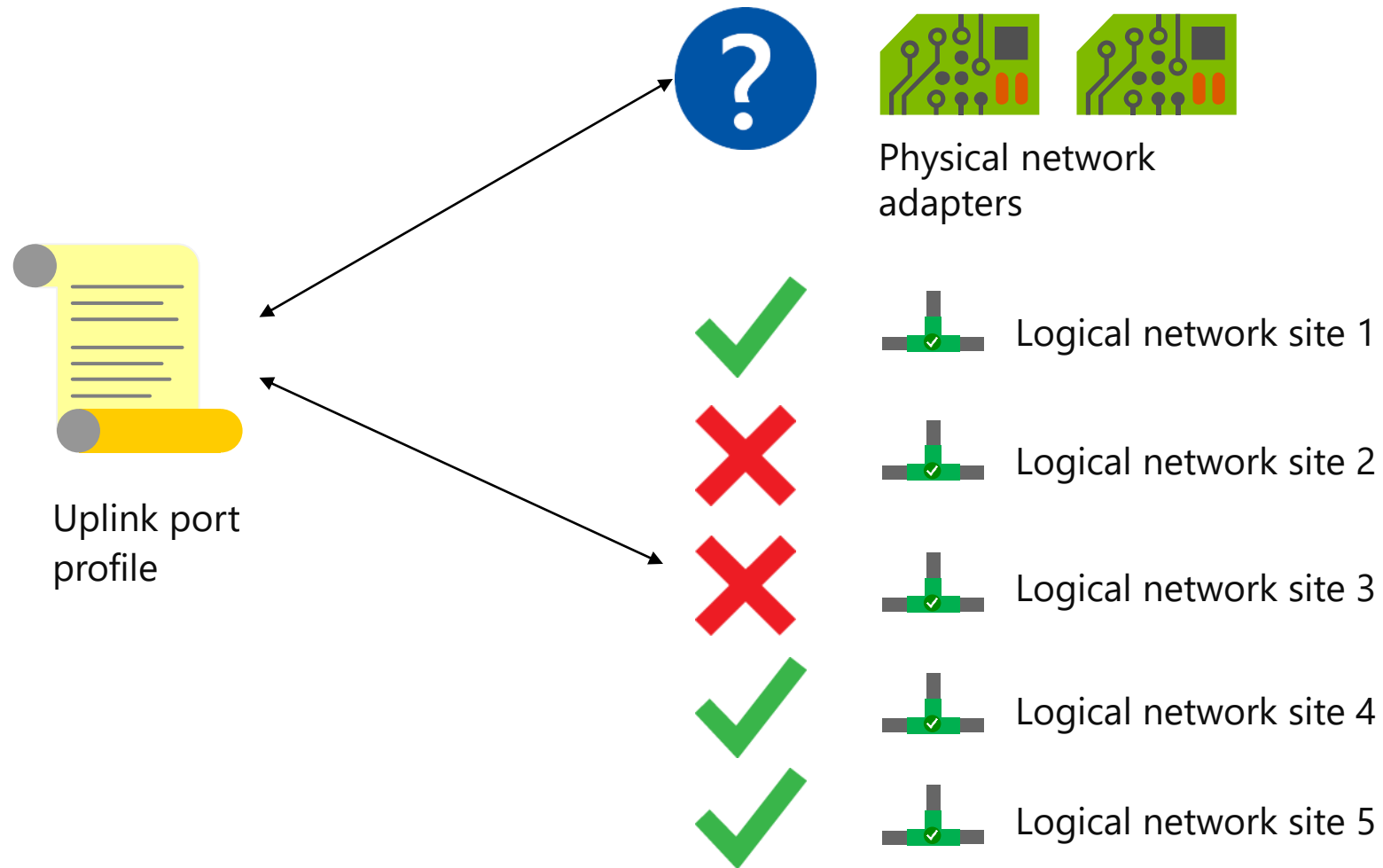
# Configuring uplink port profiles



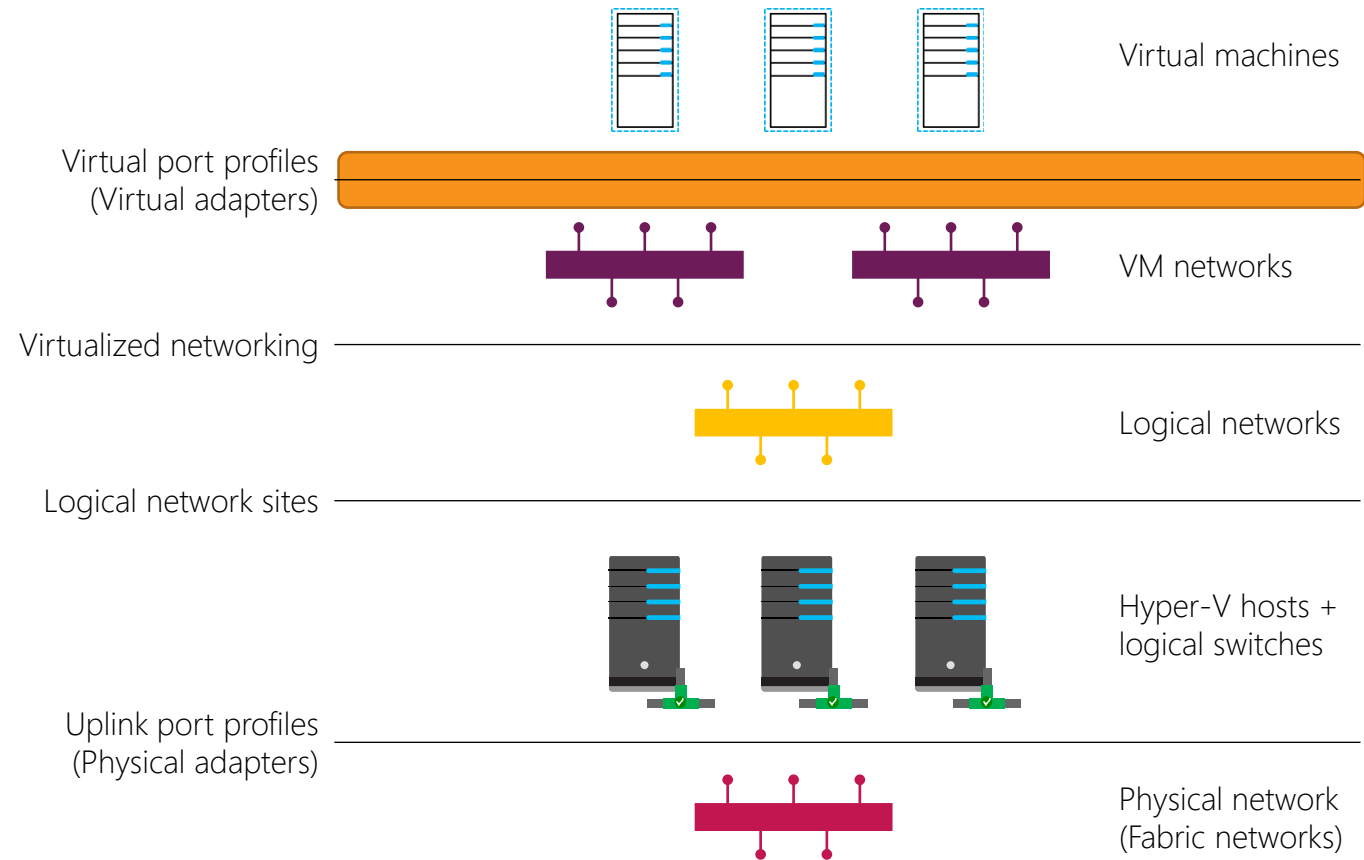


# Configuring uplink port profiles

- Uplink port profiles control the teaming method used
- They also control which logical network sites (and logical networks) are available

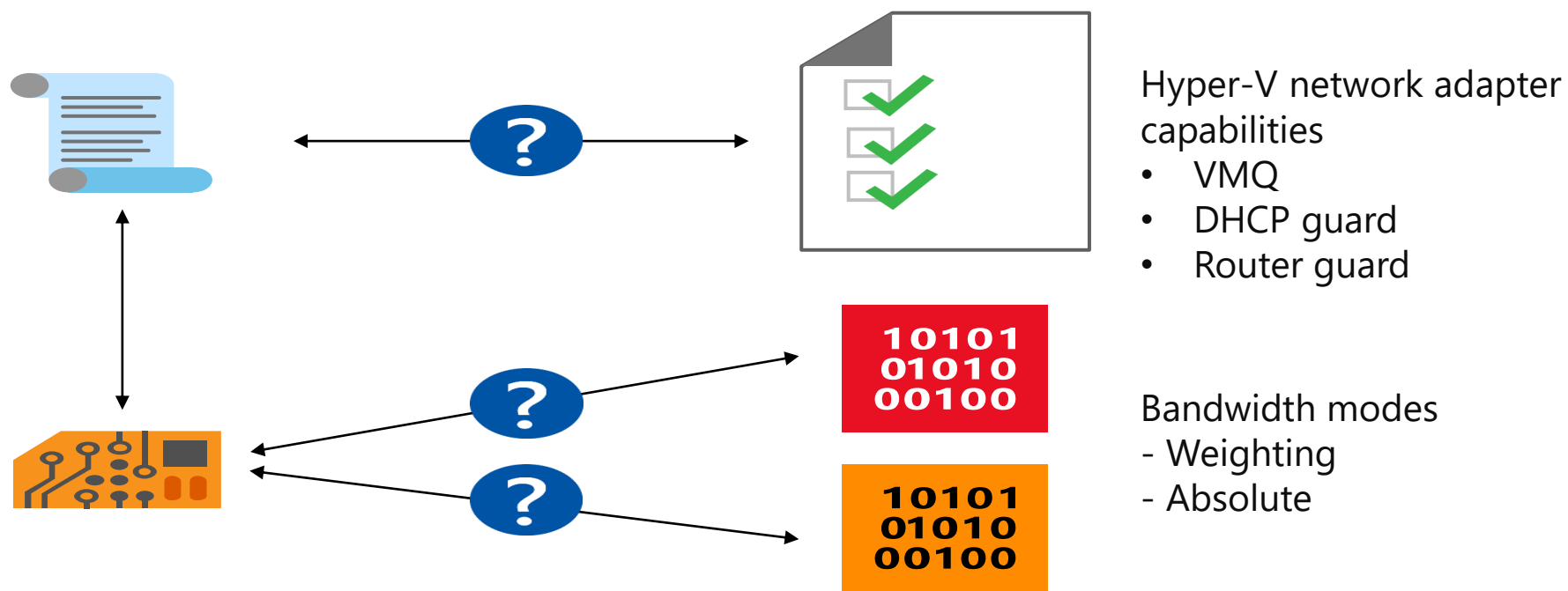


# Configuring virtual port profiles



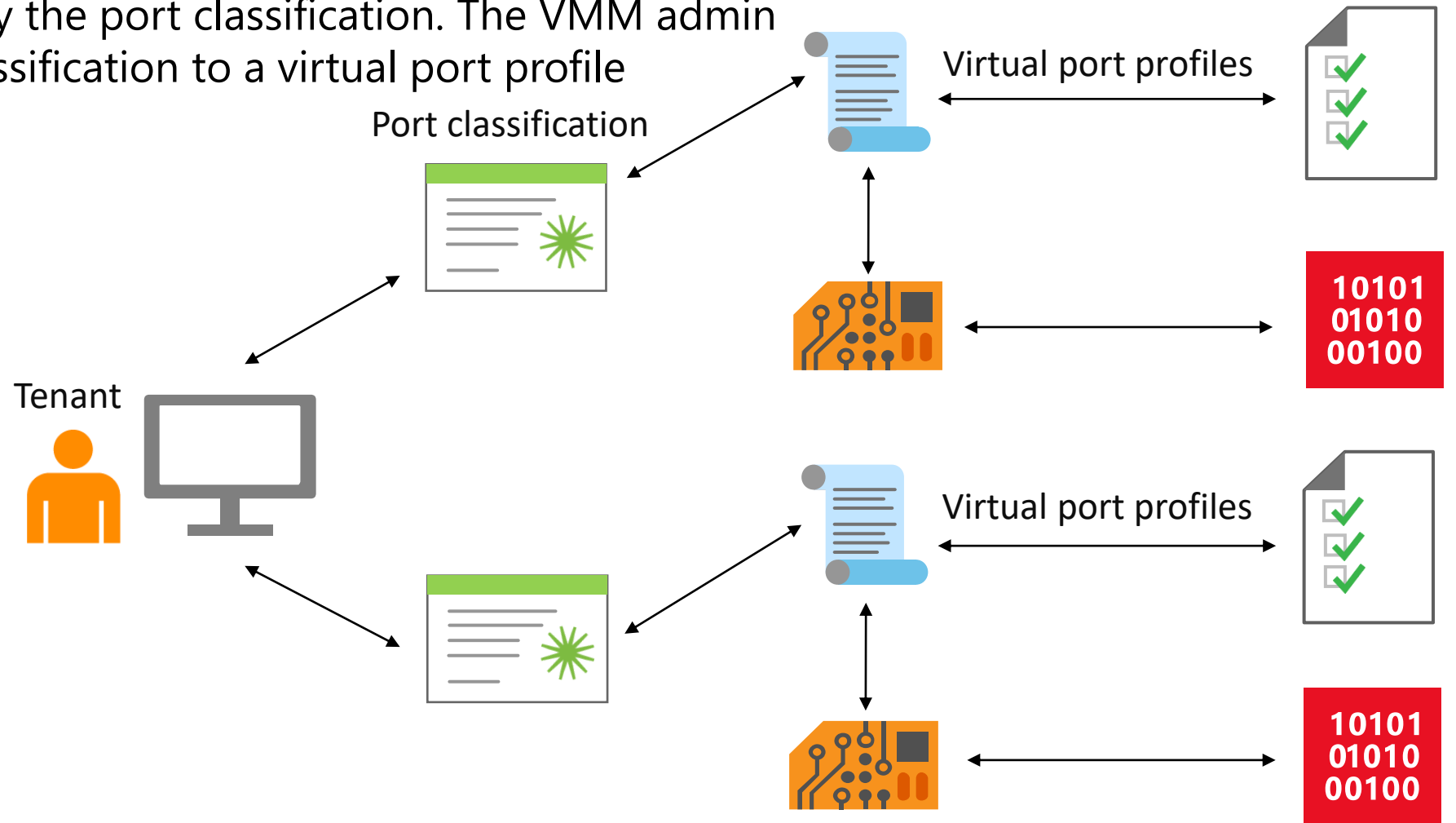
# Configuring virtual port profiles

- What Hyper-V network adapter capabilities do you want included in the virtual port profile?
- Which bandwidth allocation mode do you want to specify?

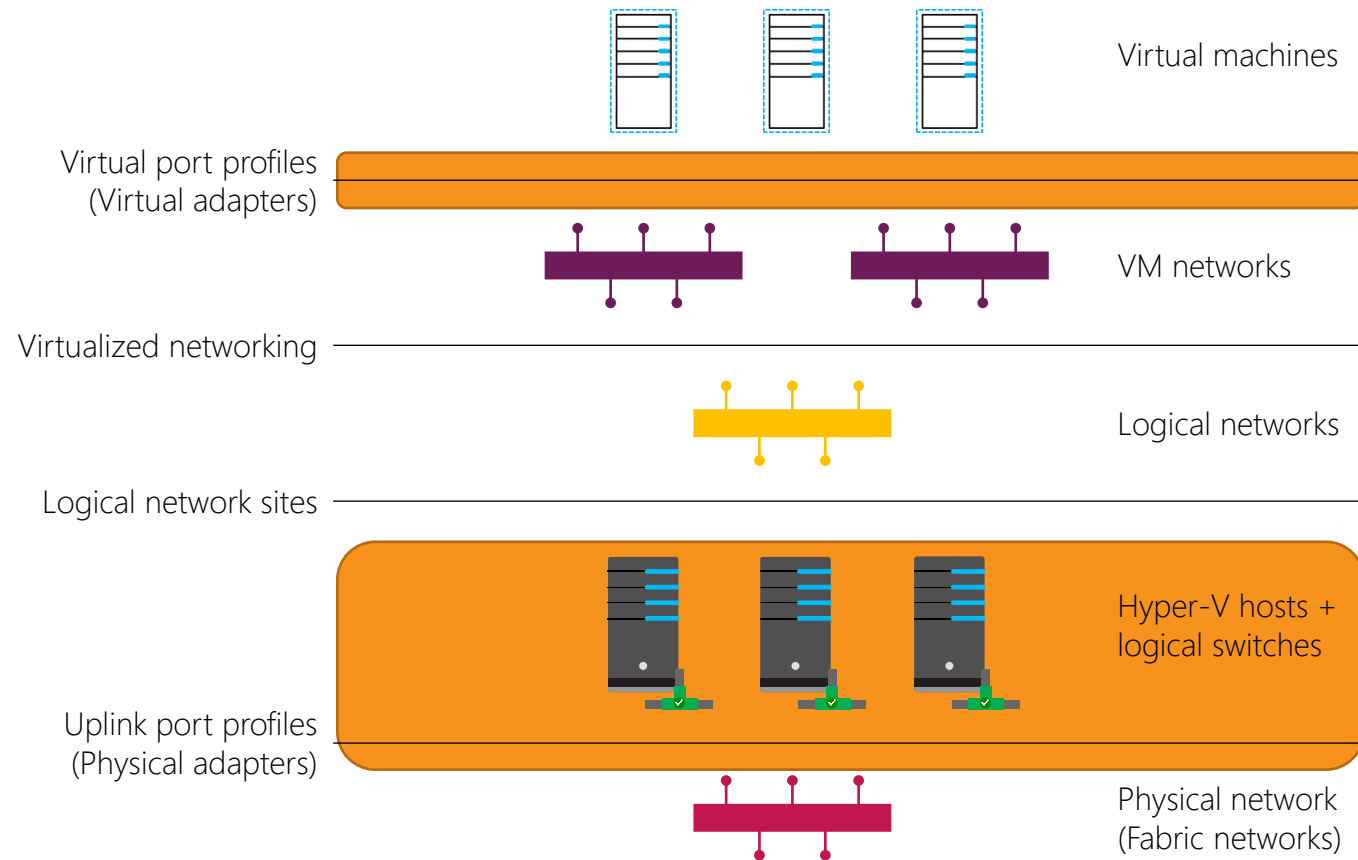


# Creating port classifications

The tenant sees only the port classification. The VMM admin assigns the port classification to a virtual port profile

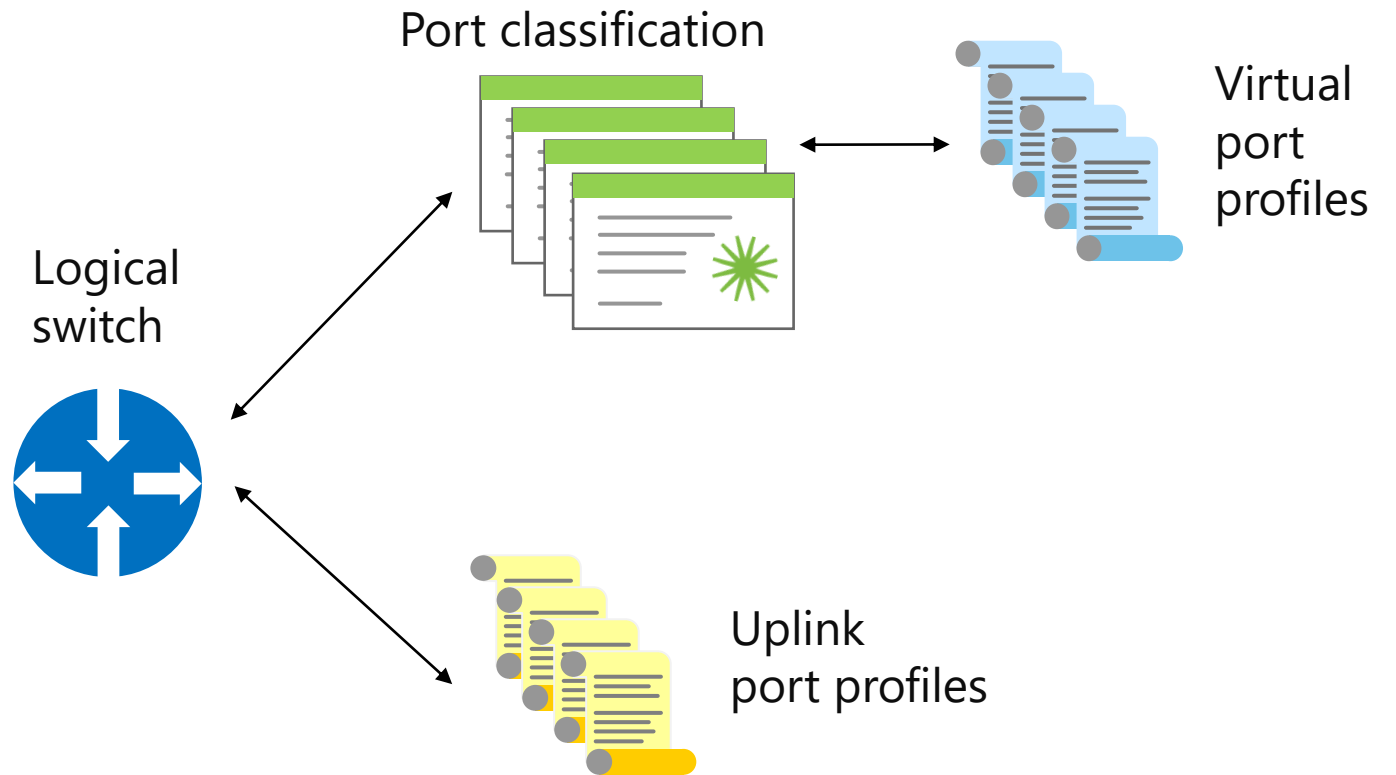


# Relationship between port profiles and logical switches

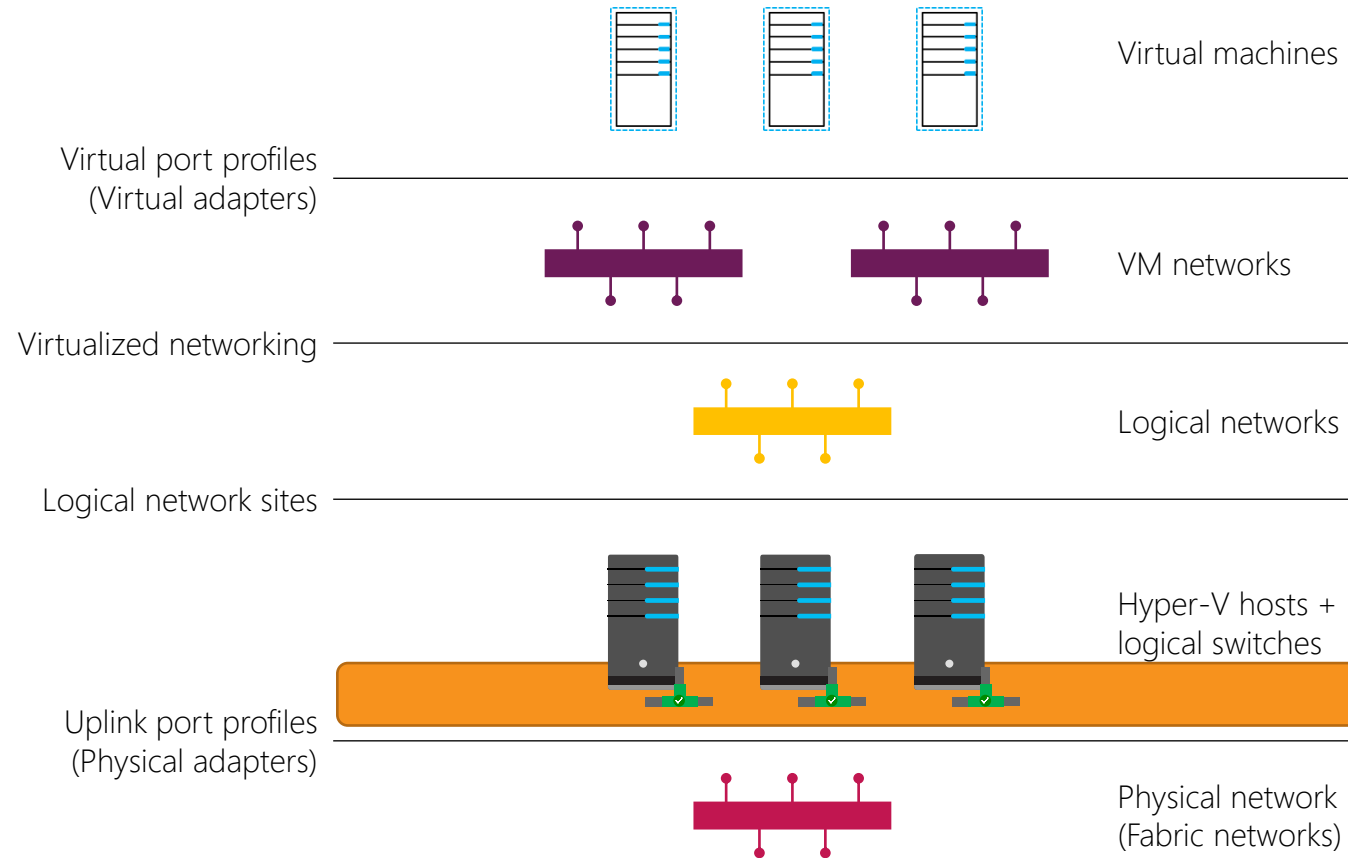


# Relationship between port profiles and logical switches

A logical switch can have multiple uplink port profiles and multiple port classifications (and each port classification can be associated with a virtual port profile)

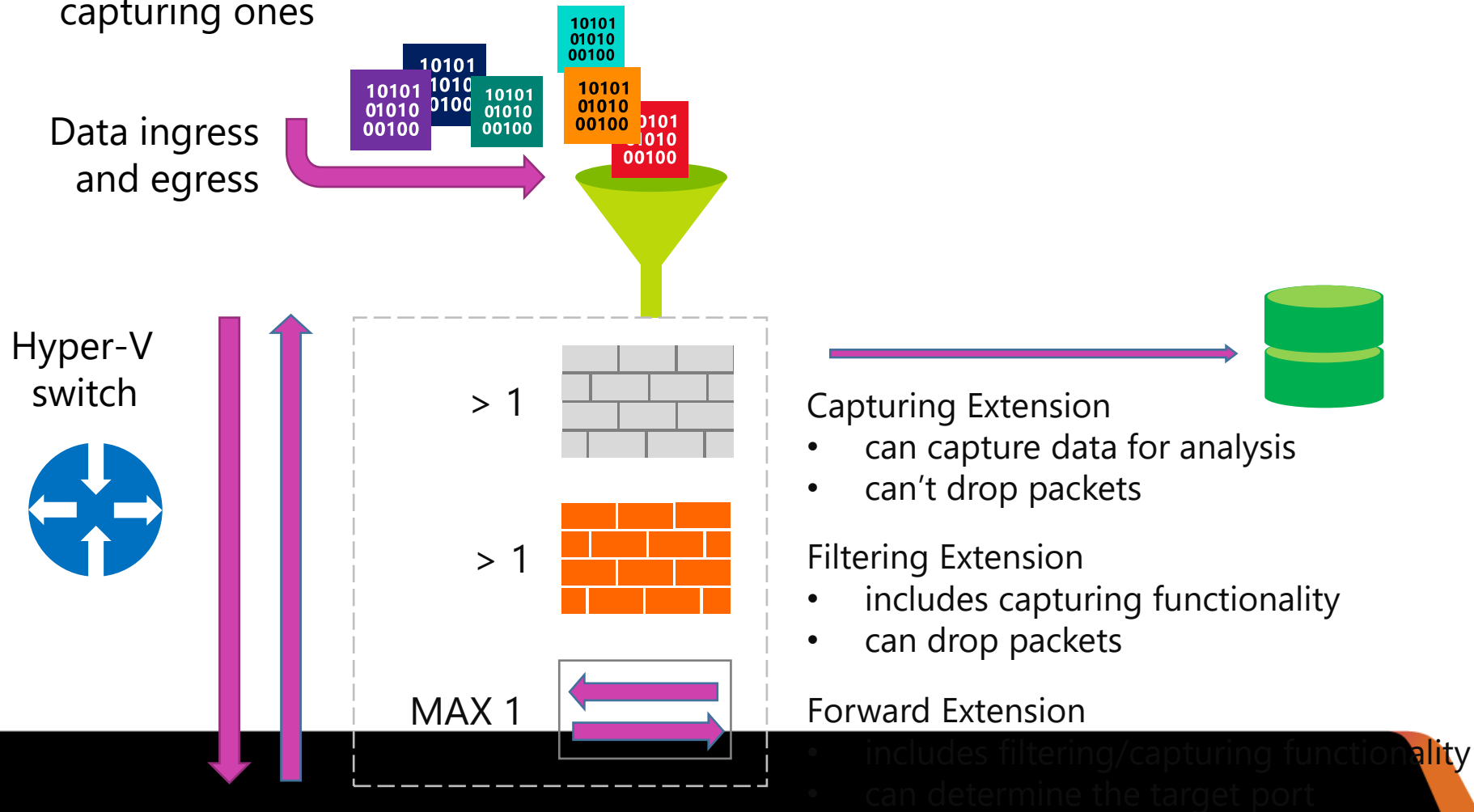


# Implementing logical switch extensibility



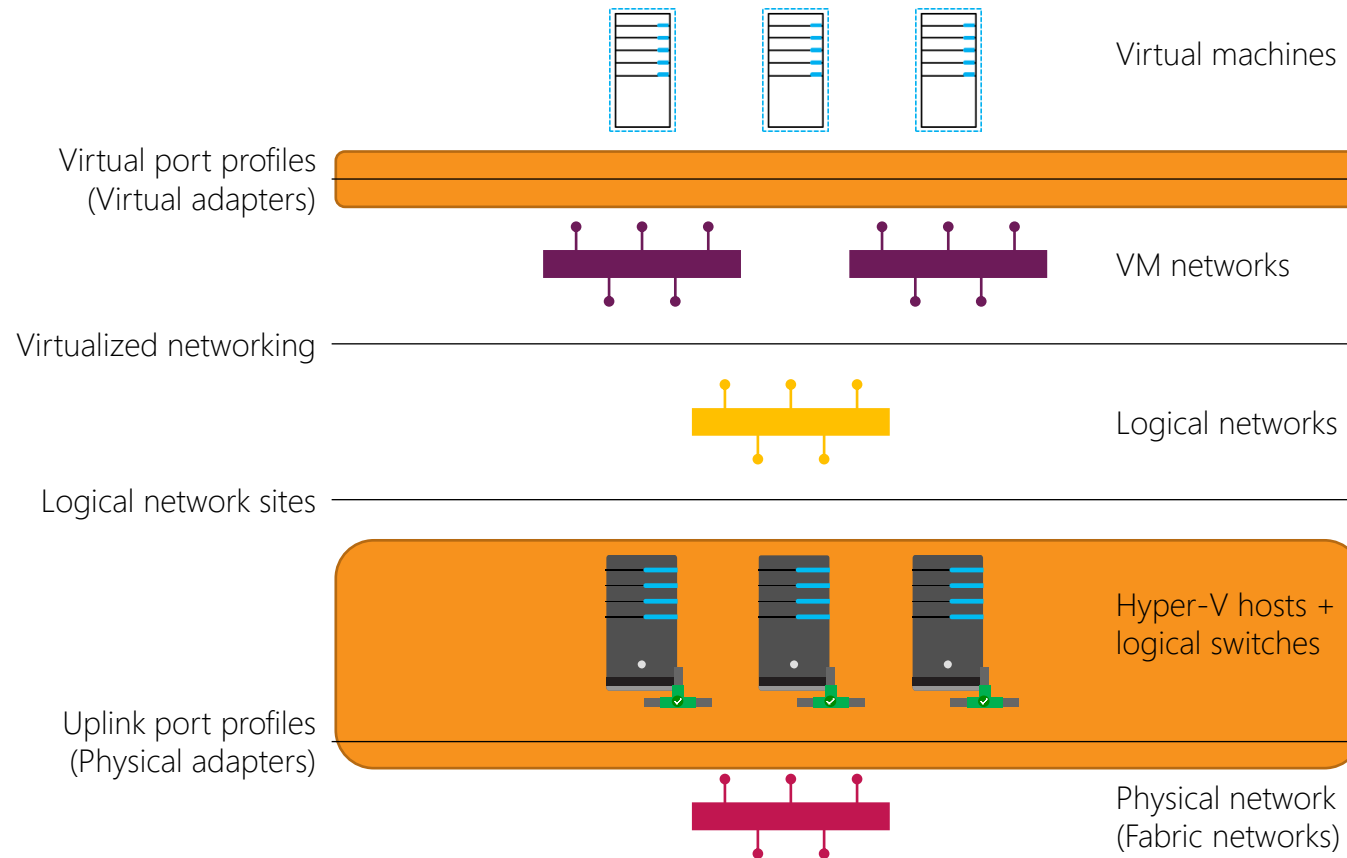
# Implementing logical switch extensibility

- The Hyper-V switch is extensible and has three extension types: capturing, filtering, and forwarding
- A switch can only have one forwarding extension, but multiple filtering or capturing ones

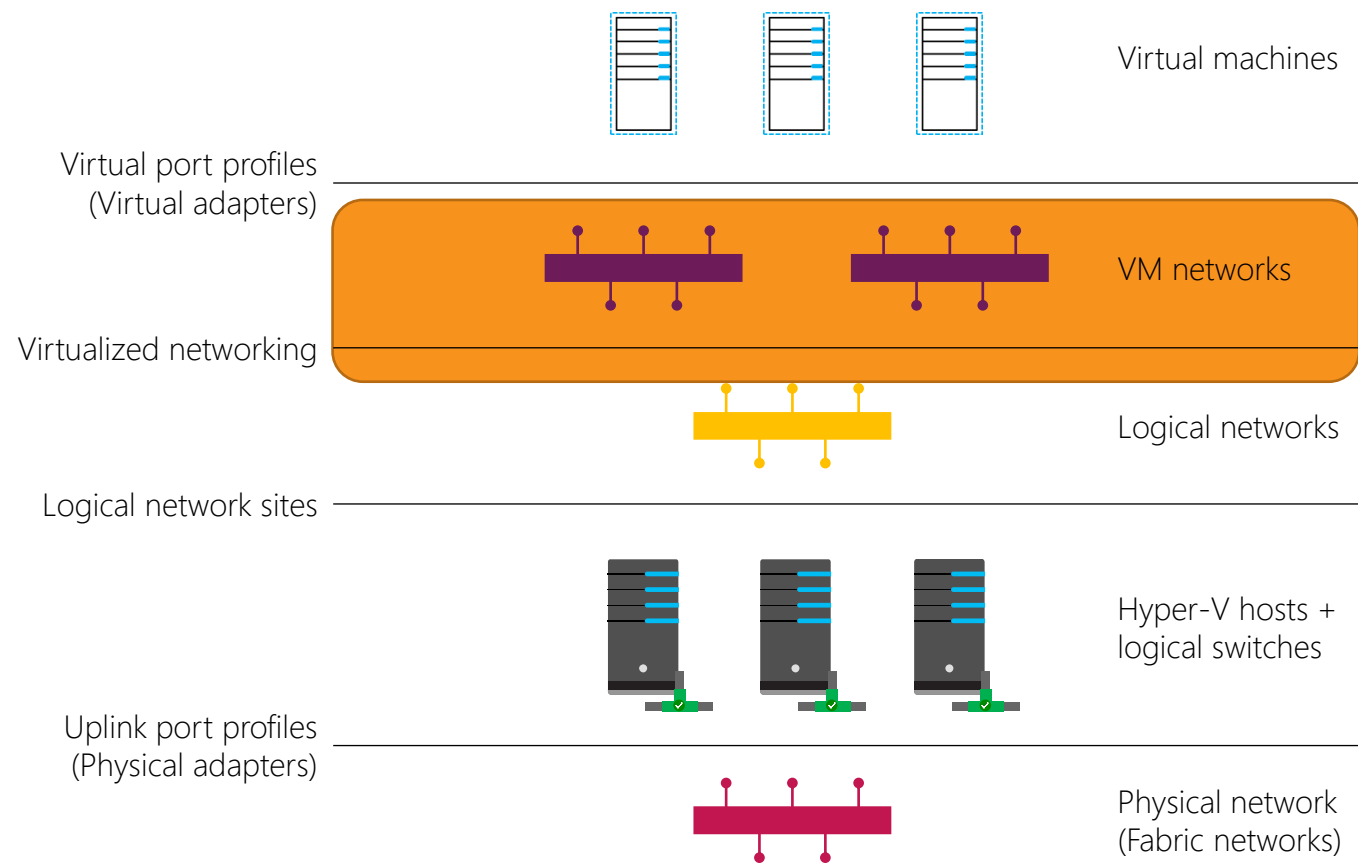




# Configuring logical switches



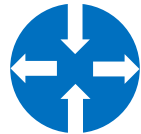
# Creating and configuring VM networks



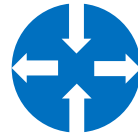
# Configuring logical switches

The logical switch is a reusable component that you can apply to multiple Hyper-V hosts

VMM logical switch



=



Hyper-V switch

+



Uplink port profiles

+

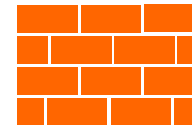


Port classification



Virtual port profiles

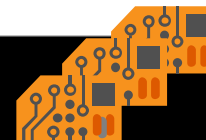
+



Switch extensions (optional)

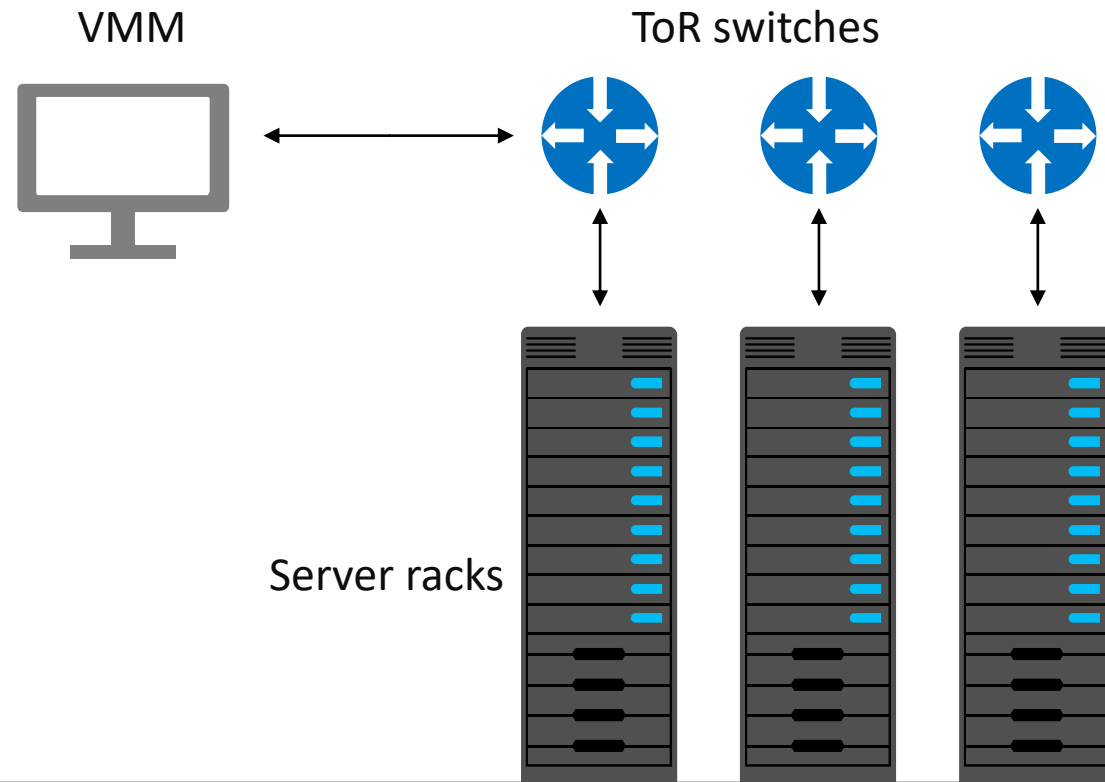
+

Allows converged network via VMM

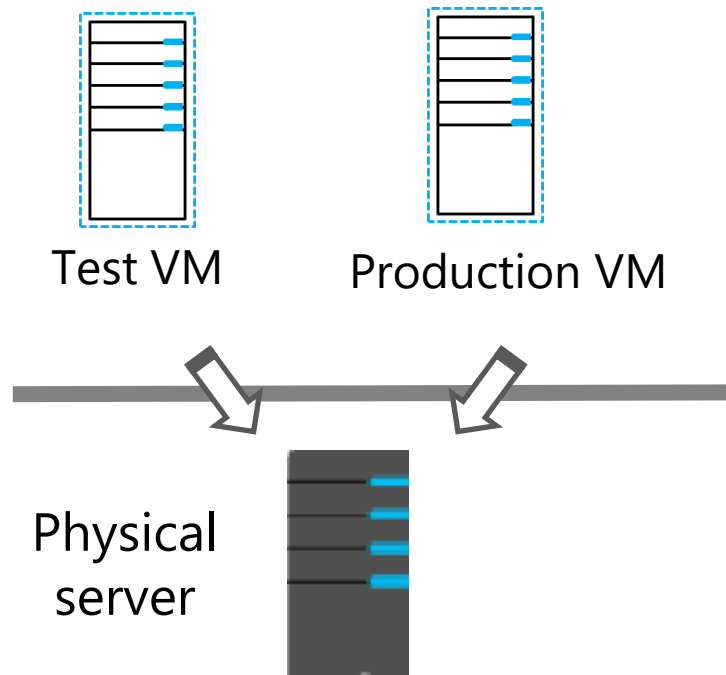


# Integrating Top-of-Rack switches with VMM

VMM can monitor connections between Hyper-V hosts and ToR switches. VMM can identify the switch configuration and evaluate whether the VMM logical switches will function as intended.

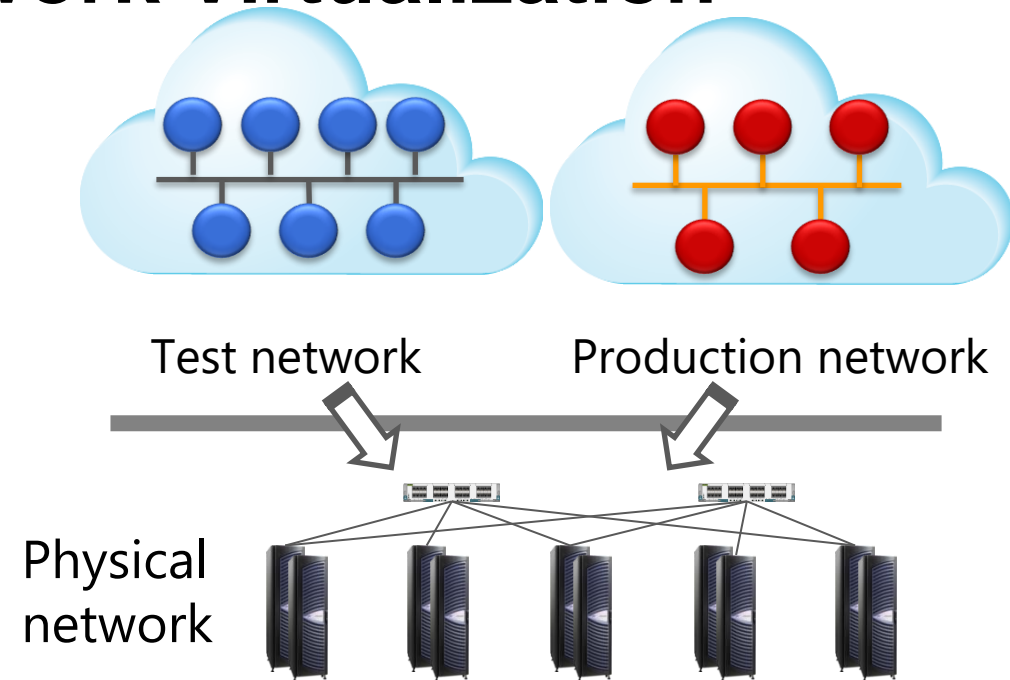


# Overview of Hyper-V Network Virtualization



## Server virtualization

- Multiple VMs exist on the same physical server
- Each VM is isolated from the others

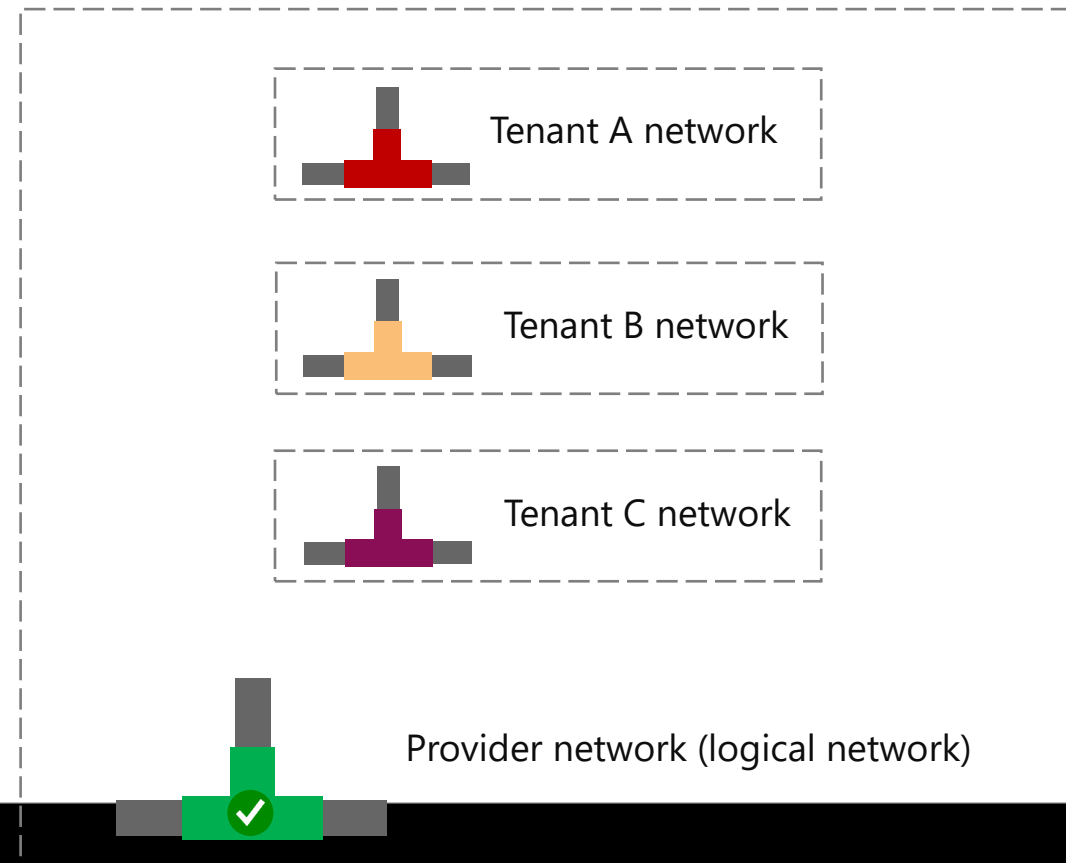


## Network virtualization

- Multiple virtual networks exist on the same physical network
- Each virtual network is isolated from the others

# Overview of Hyper-V Network Virtualization

- Tenant networks are VM networks that exist inside a provider network
- Each tenant network is isolated from the others

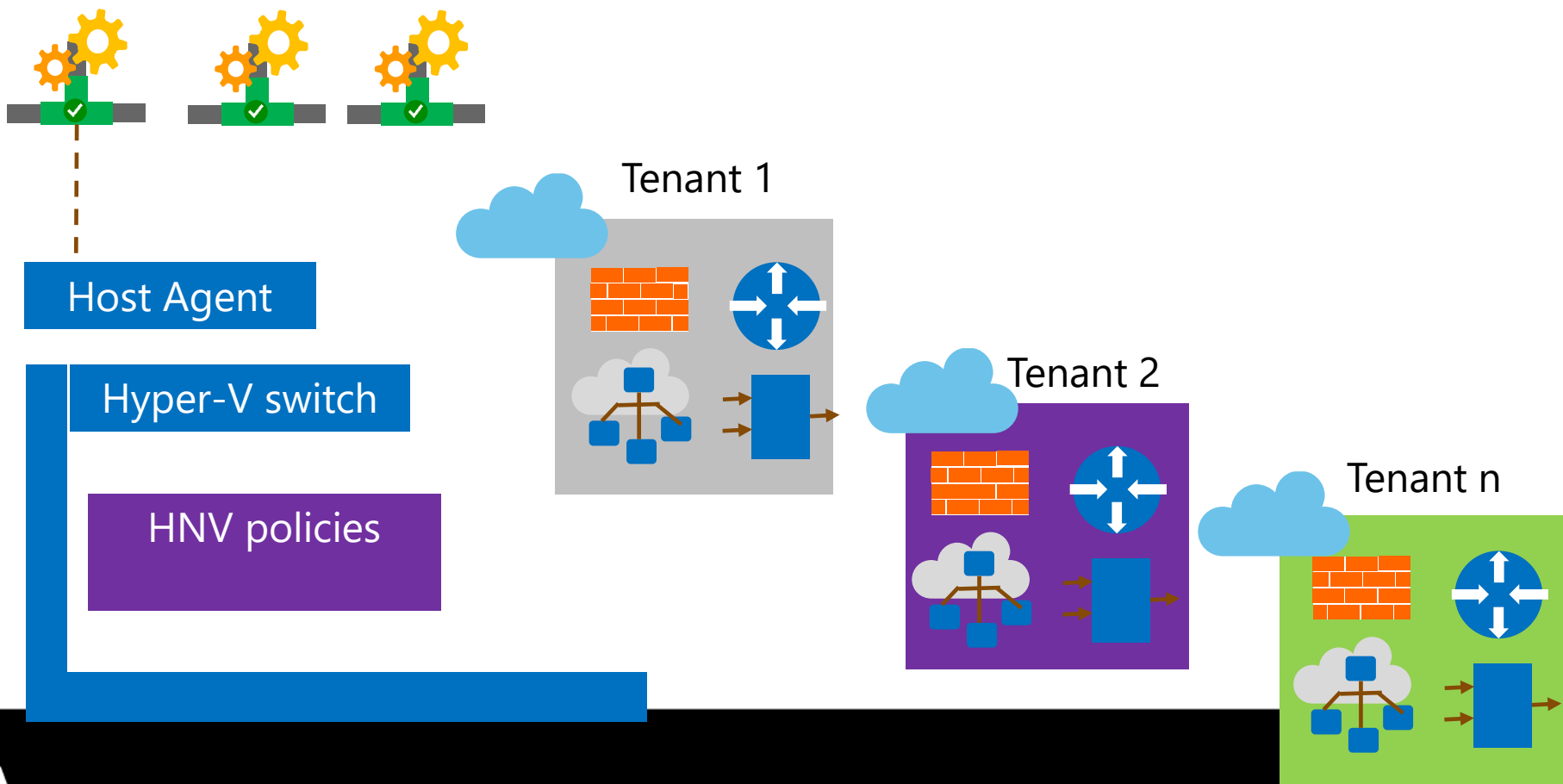


# Benefits of network virtualization

- Flexible VM placement
- Multitenant network isolation without VLANs
- IP address reuse
- Live migration across subnets
- Compatibility with existing network infrastructures
- The transparent moving of VMs to a shared IaaS cloud
- The ability to be configured by using Windows PowerShell

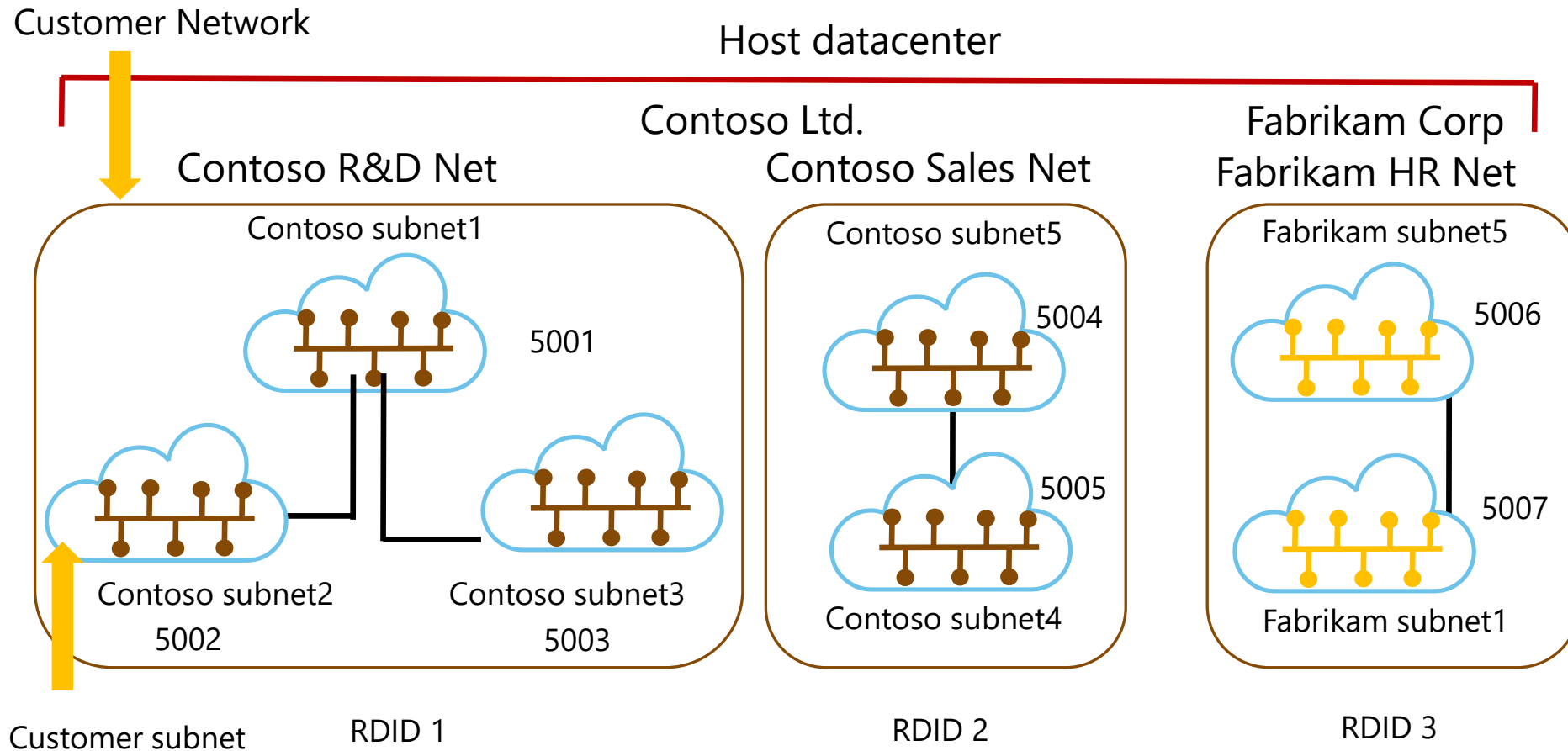
# Network Controller overview

Network controllers





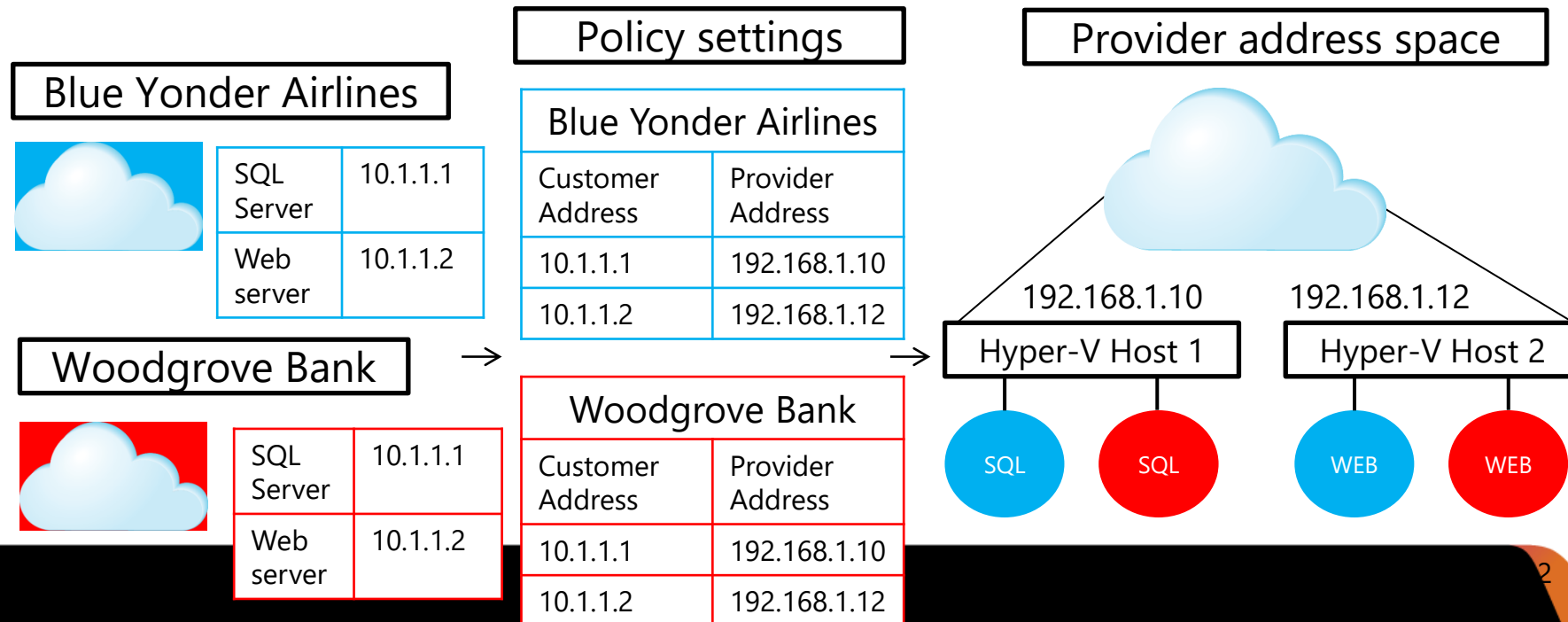
# How does network virtualization work?



# Multitenant deployment of network virtualization

Define customer address-provider address mappings:

- You specify the Hyper-V server that the virtual machines are running on
- Hyper-V vSwitch applies policies by translating the incoming and outgoing packets
- If a VM is moved, policies are modified accordingly, but The VM configuration stays the same



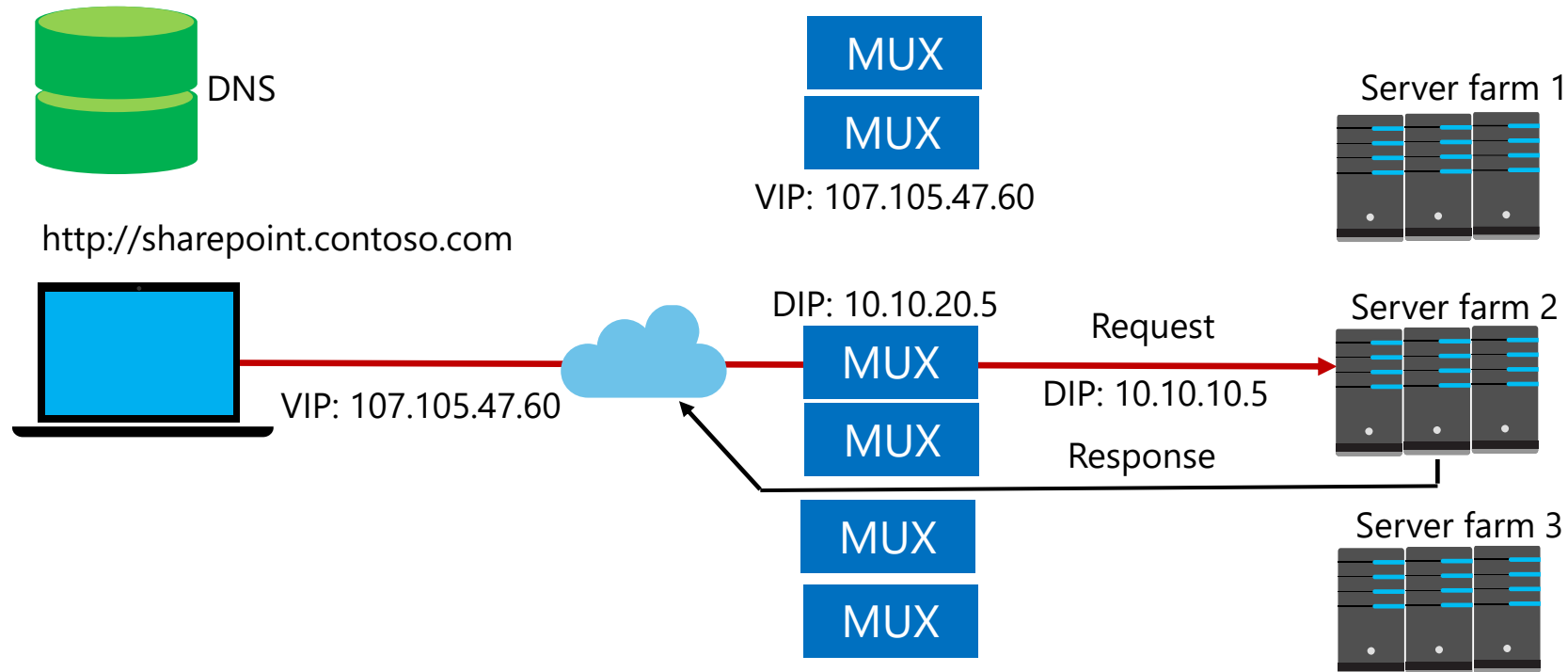
# Deploying Network Controller

1. Create the management logical network
2. Create an IP address pool in the management logical network
3. Create a logical switch
4. Deploy the logical switch
5. Create an SSL certificate
6. Import the Network Controller template into the VMM library
7. Deploy the Network Controller VMM service
8. Add the Network Controller service to VMM

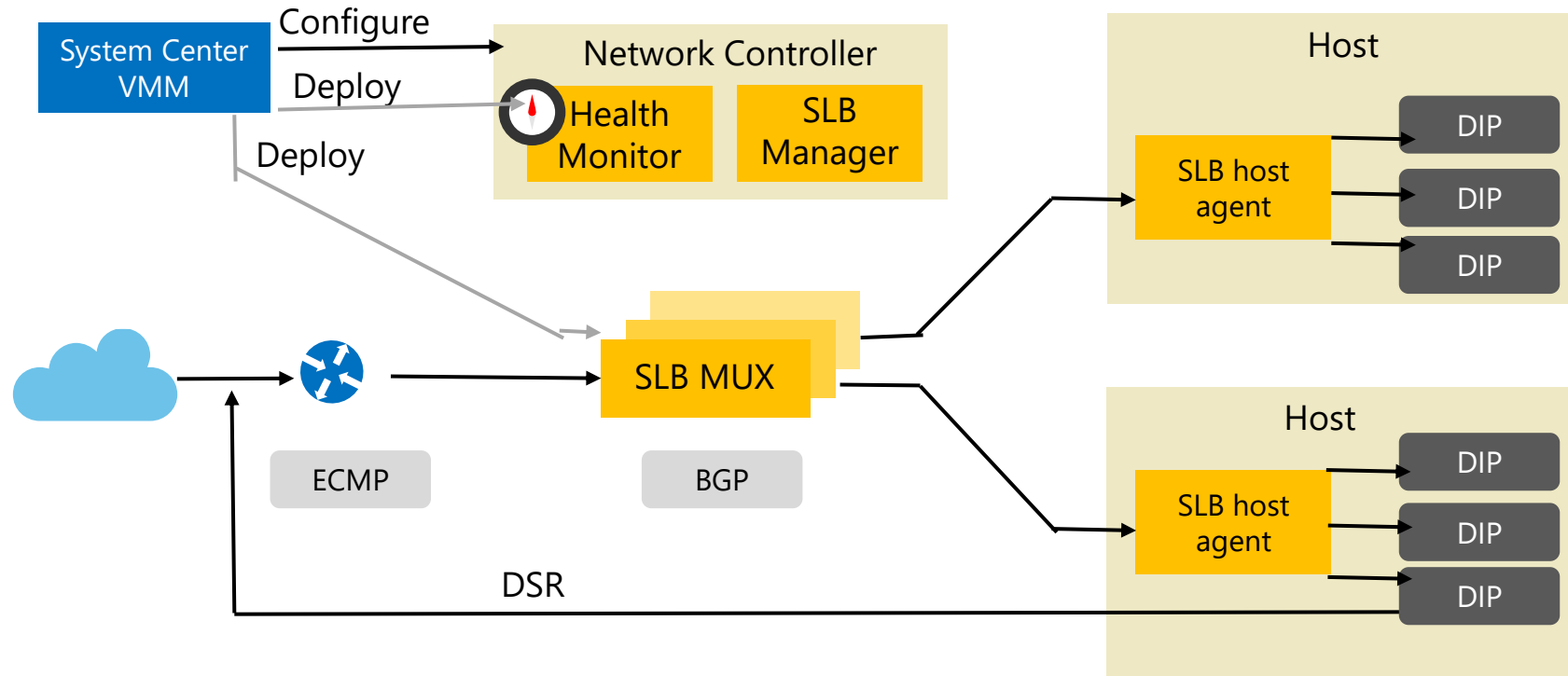
# Lesson 3: Understanding network function virtualization

- Understanding Software Load Balancing
- Understanding Windows Server Gateway
- Understanding Datacenter Firewall

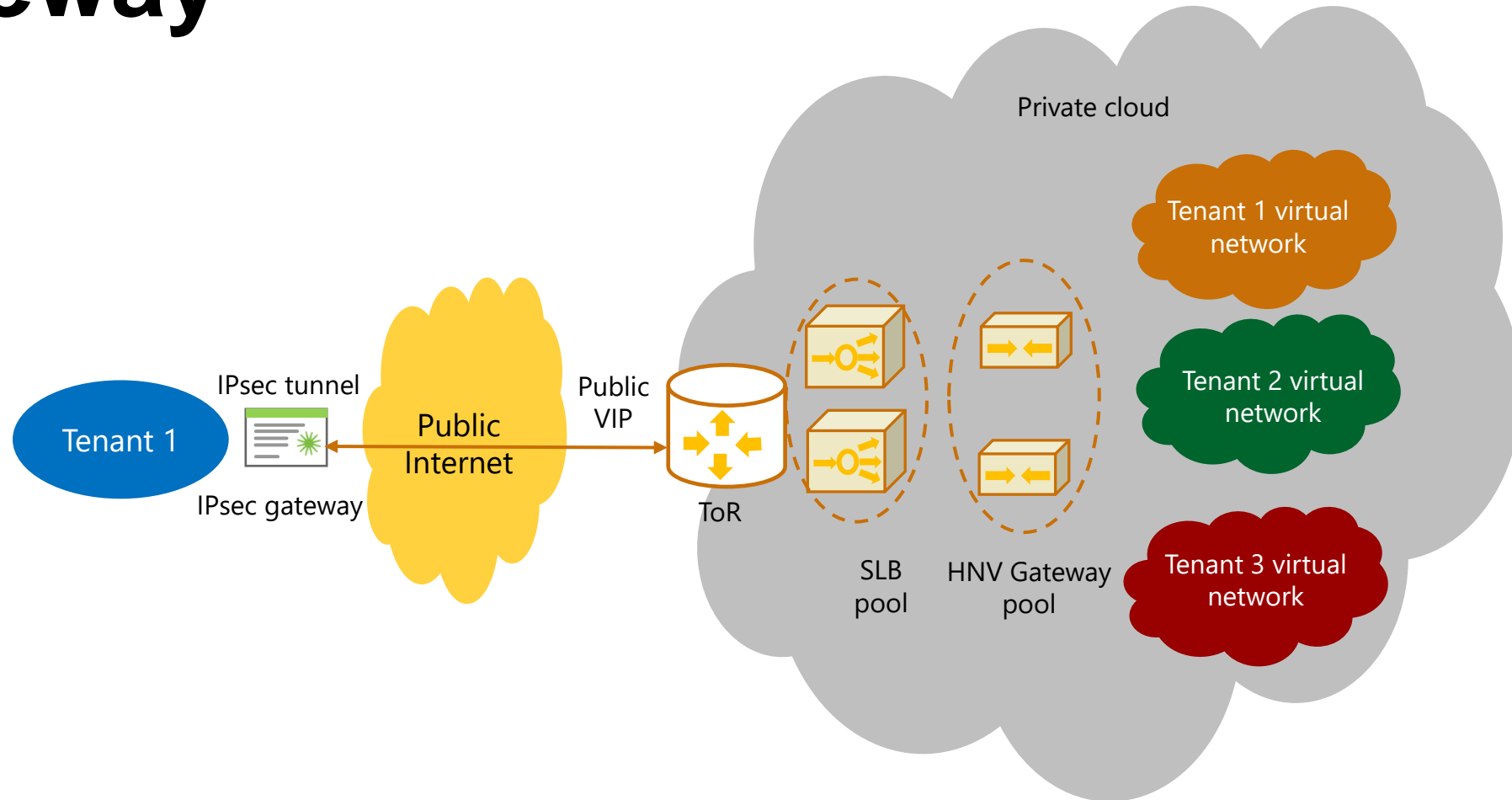
# Understanding Software Load Balancing



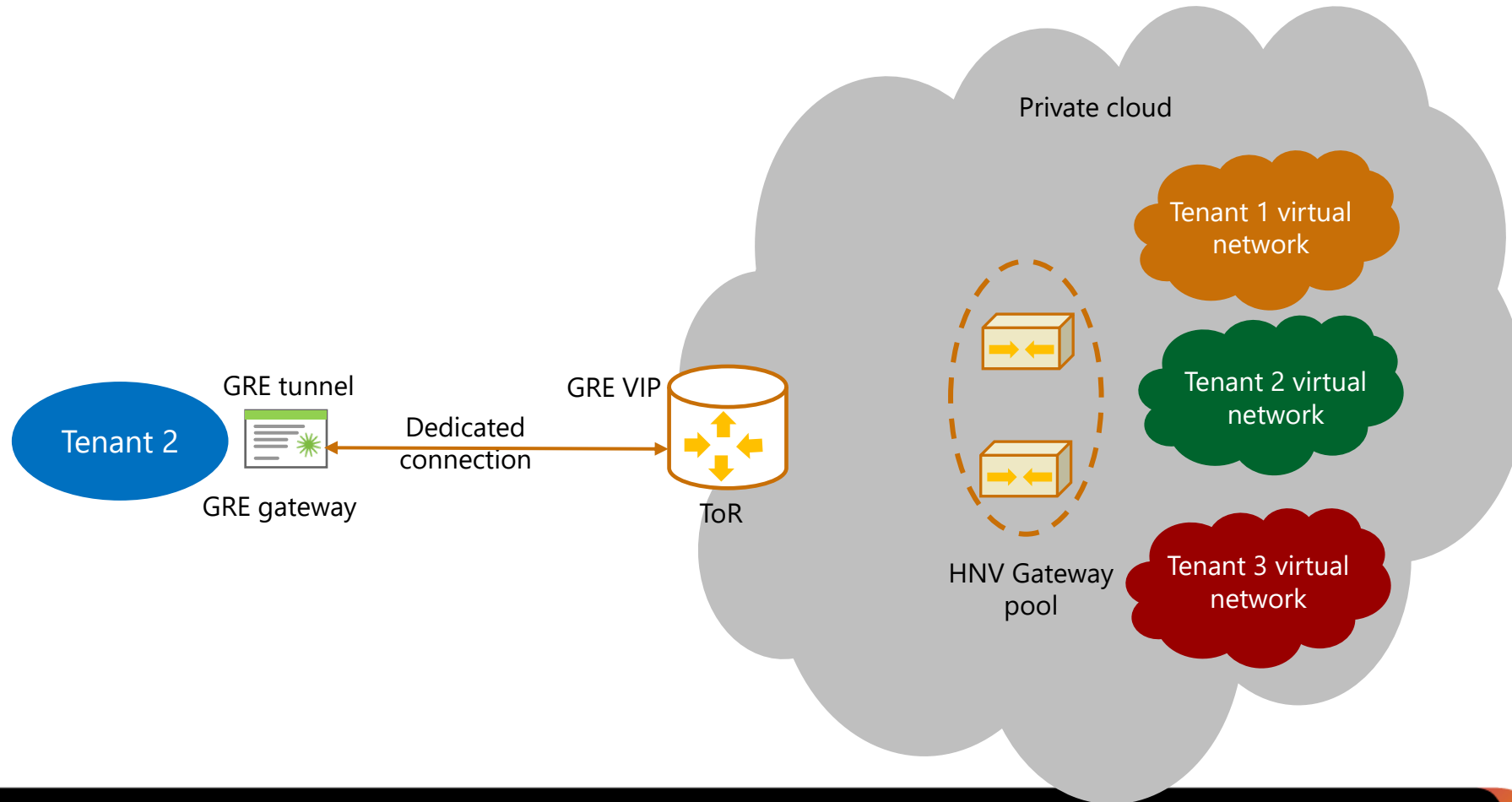
# Understanding Software Load Balancing



# Understanding Windows Server Gateway

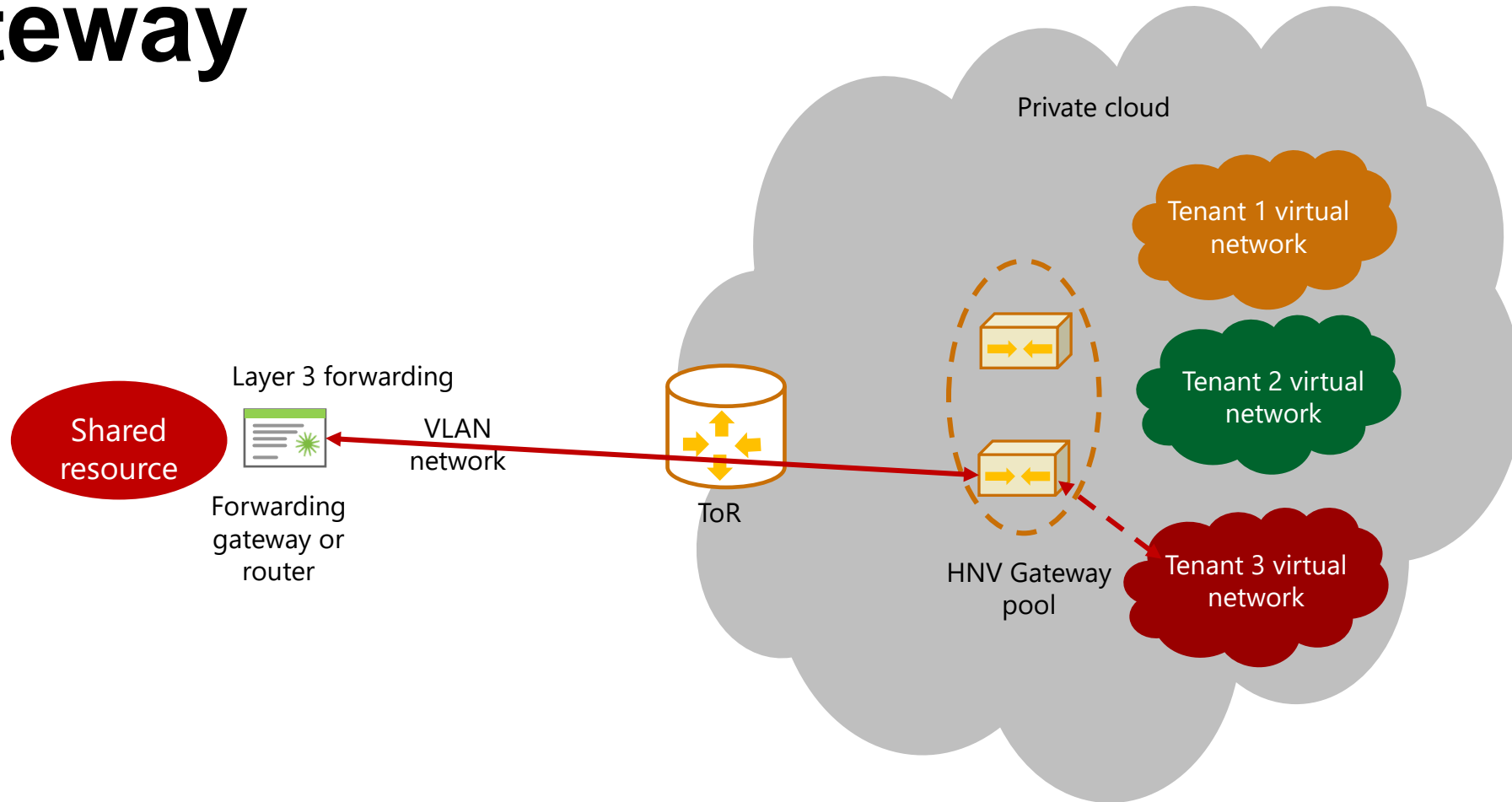


# Understanding Windows Server Gateway

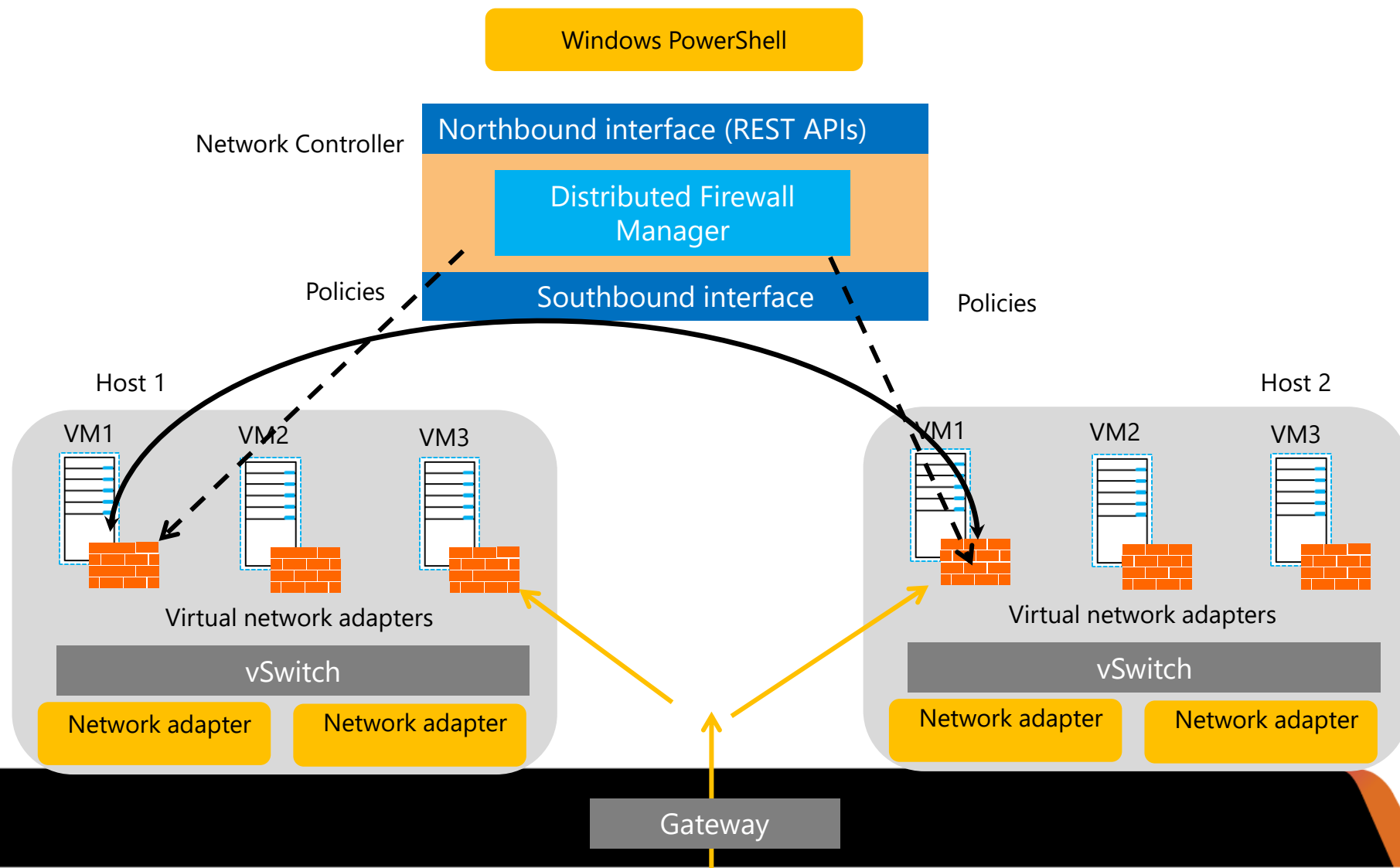




# Understanding Windows Server Gateway

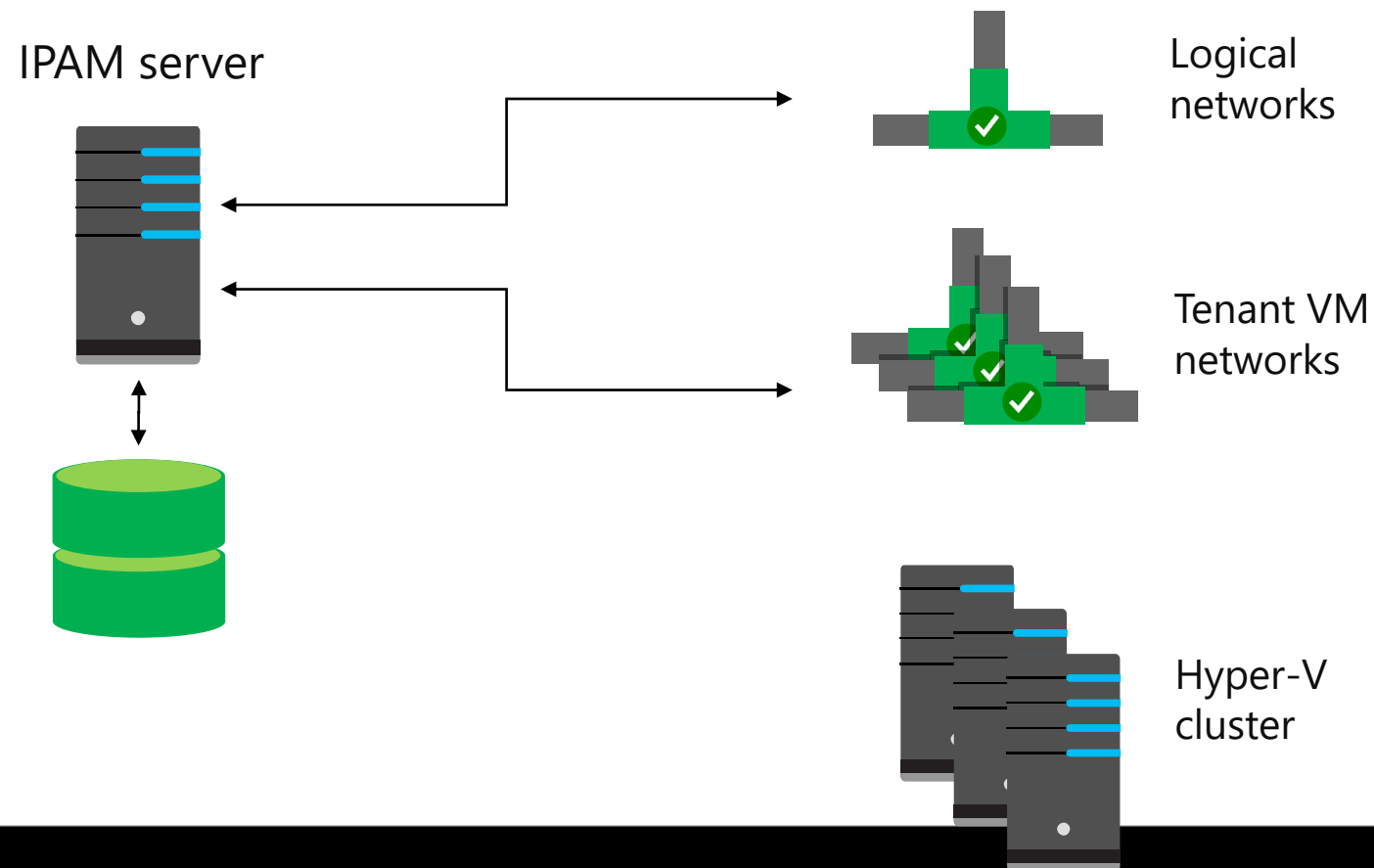


# Understanding Datacenter Firewall



# Integrating IP Address Management and VMM

IPAM tracks the IP address consumption and usage in both physical and virtual workloads



# Lesson 4: Overview of SDN

- What is SDN?
- Benefits of SDN
- Planning for SDN
- Deploying SDN by using scripts

# What is SDN?

- SDN enables you to:
  - Virtualize the network layer in a datacenter
  - Define policies for the physical and virtual networks
  - Manage the virtualized network infrastructure
- The SDN solution includes:
  - Network Controller
  - Hyper-V Network Virtualization
  - Hyper-V Virtual Switch
  - RRAS Multitenant Gateway
  - NIC Teaming
  - Operations Manager

# Benefits of SDN

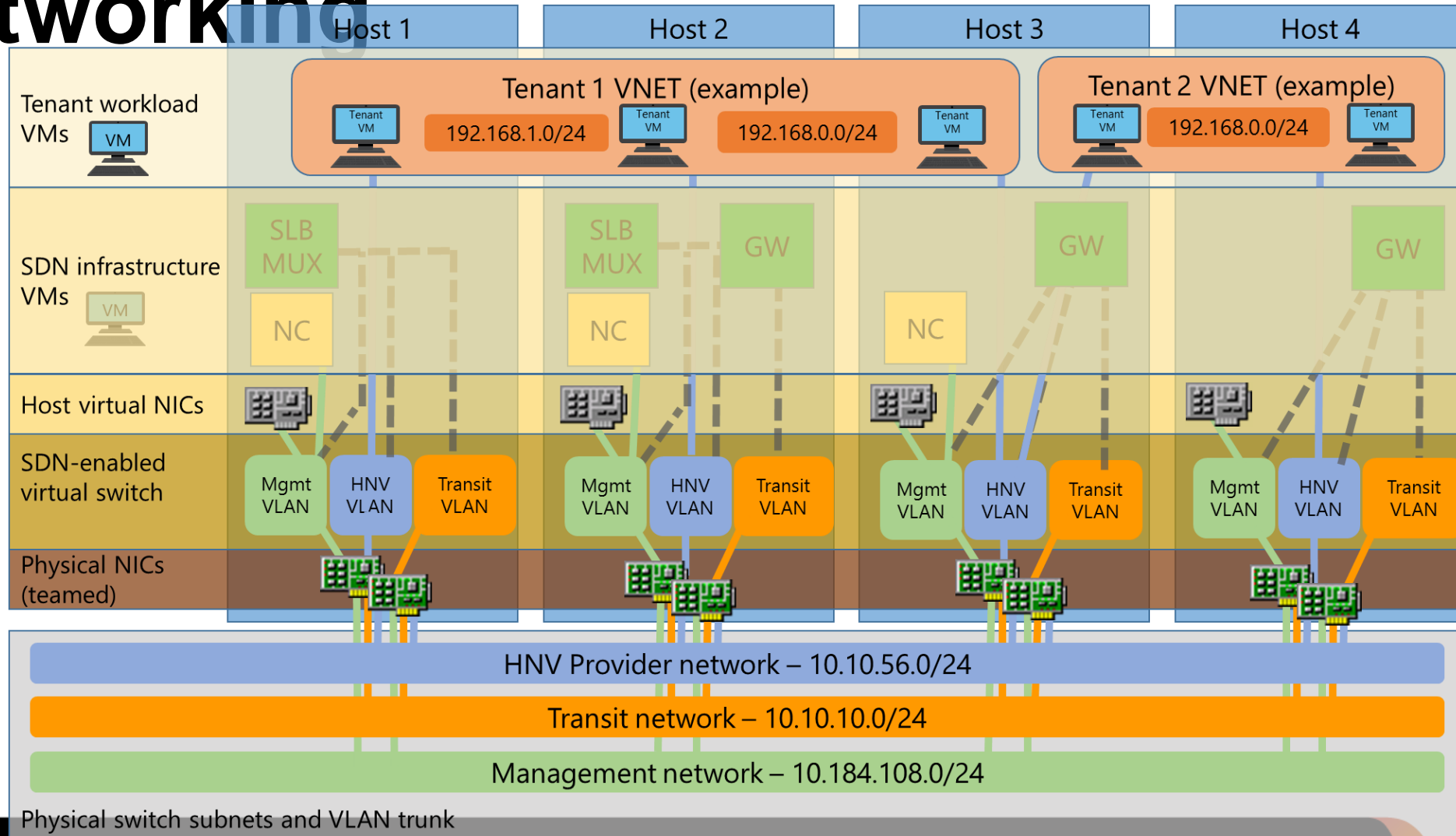
- Challenges faced by many IT departments today include:
  - Resources are finite
  - Resources are inflexible
  - Mistakes are expensive
  - Networks are not always secure
- SDN overcomes these challenges and enables you to be:
  - Flexible
  - Efficient
  - Scalable

# Planning for SDN

You must plan the following aspects of your Software Defined Networking configuration:

- Management and HNV Provider logical networks
- Logical networks for gateways and the SLB
- Logical networks required for RDMA-based storage
- Routing infrastructure
- Default gateways
- Network hardware

# Planning for Software Defined Networking





# Deploying SDN by using scripts

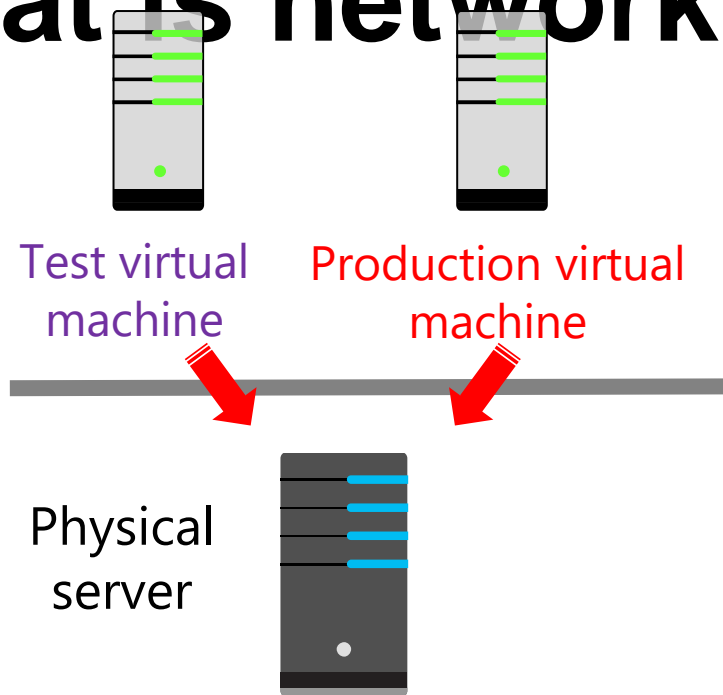
Use the following high-level procedure to deploy SDN:

1. Install host networking and validate the configuration
2. Run SDN Express scripts and validate setup
3. Deploy a sample tenant workload and validate deployment

# Lesson 5: Implementing network virtualization

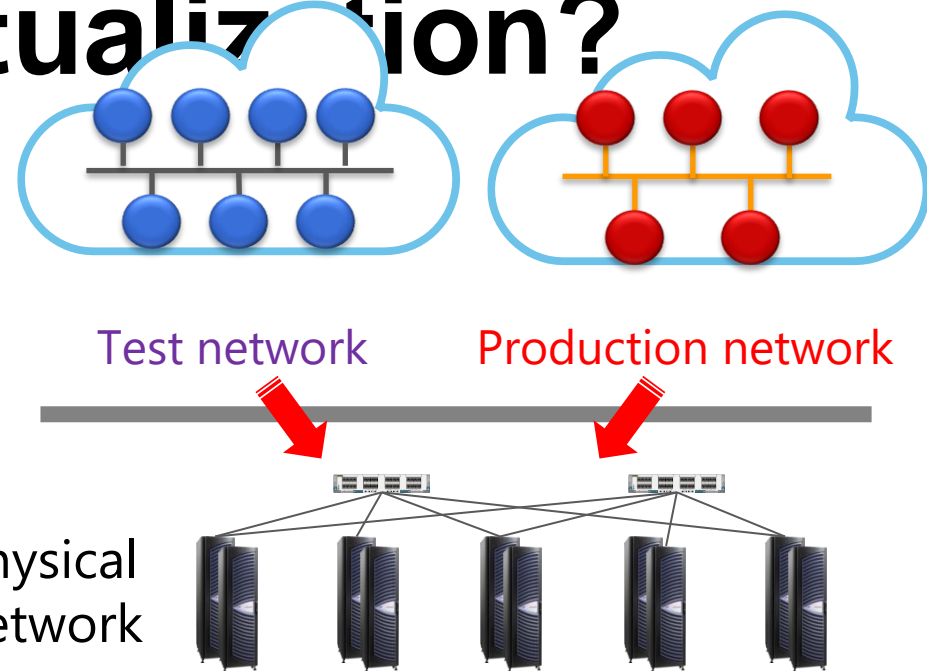
- What is network virtualization?
- Benefits of network virtualization
- What is Generic Route Encapsulation?
- What are network virtualization policies?

# What is network virtualization?



## Server virtualization:

- Multiple virtual machines on the same physical server
- Each virtual machine is isolated from others



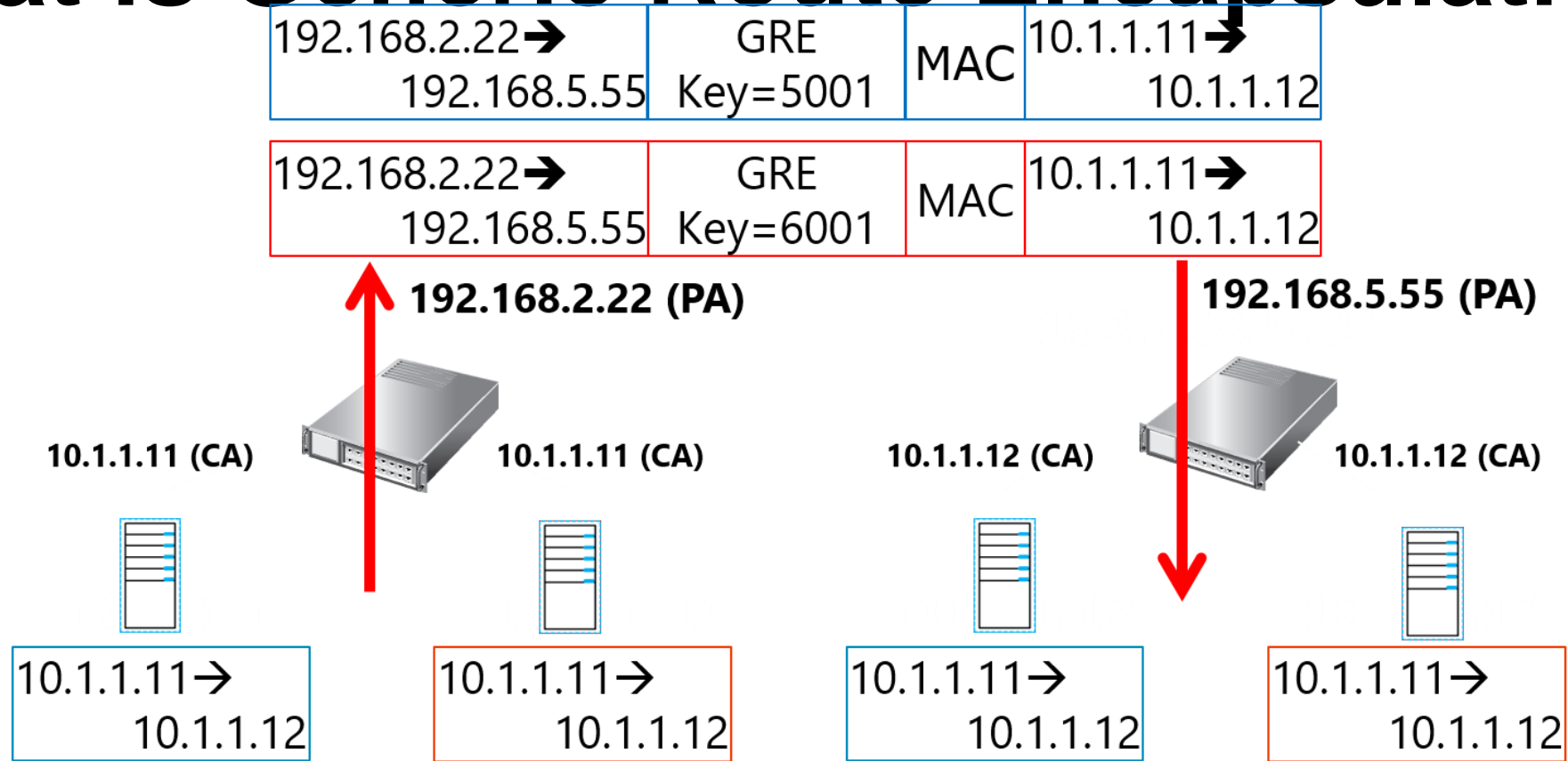
## Network virtualization:

- Multiple virtual networks on the same physical network
- Each virtual network is isolated from others

# Benefits of network virtualization

- Flexible virtual machine placement
- Multitenant network isolation without VLANs
- IP address reuse
- Live migration across subnets
- Compatibility with existing network infrastructure
- Transparent moving of virtual machines to a shared IaaS cloud
- Support for resource metering
- Configuration by using Windows PowerShell or by using Virtual Machine Manager

# What is Generic Route Encapsulation?

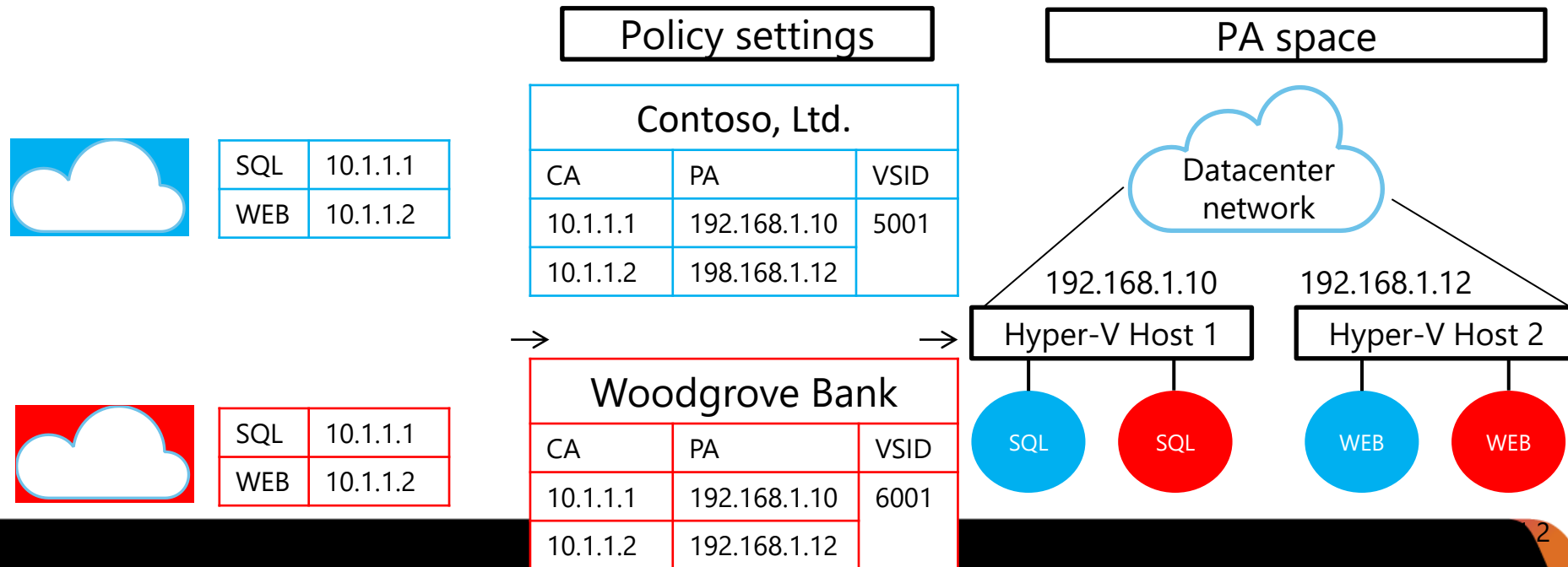


- CA space is based on virtual machine configuration
- Provider address space is based on physical network and is not visible to the virtual machines

# What are network virtualization policies?

Define CA-PA mappings:

- Specify the Hyper-V server on which the virtual machines are running
- Hyper-V implements policies by translating incoming and outgoing packets
- If a virtual machine is moved, policies are modified, but the virtual machine configuration stays the same



**Hvala na pažnji!**

