NETWORKING IN VIRTUAL MACHINE MANAGER

Microsoft System Center 2012 SP1

LOGICAL VIEW

Virtual Machine Networking

What you can do:

How VMM does it:

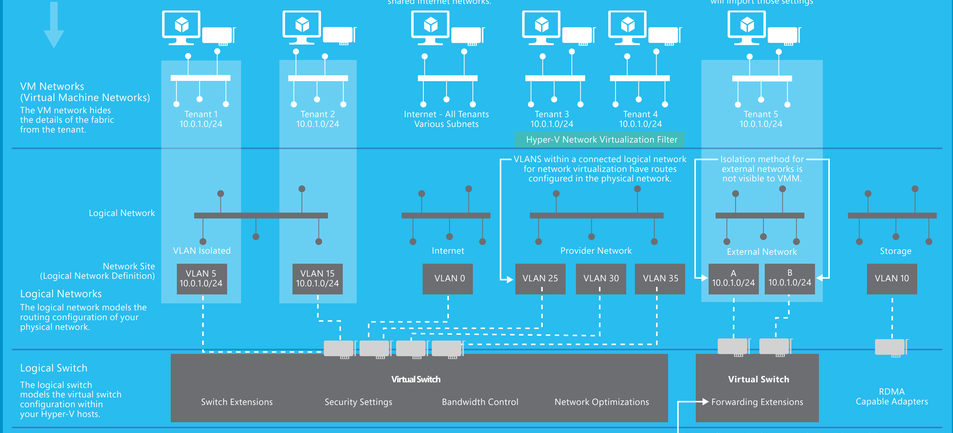
VLAN-based configuration
You can continue to use familiar virtual local area network (VLAN) technology for network isolation.

No isolation
You can get direct access to the logical network with a VM network. Appropriate for a host management or shared Internet networks.

Network virtualization
You can support multiple tenants (also called clients or customers) with their own networks, isolated from the networks of others.

Use external networks
You can use a vendor network-management console that allows you to configure settings on your forwarding extension. VMM will import those settings

No virtual networking
Networks that don't require access by VMs do not use VM networks.



Planning your VMM networks

VMM provides many options when you plan to connect your virtual machines to a physical network. You can use these options on their own or in a mixed environment, depending on your needs.

- **VLAN-based configuration** – You can use familiar virtual local area network (VLAN) technology for network isolation. You can manage those networks as they are, using VMM to simplify the management process.
- **No isolation** – You can get direct access to the logical network with a VM network. This is the simplest configuration, where the VM network is the same as the logical network on which it is configured. This configuration is appropriate for a network through which you will manage a host.
- **Network virtualization** – You can support multiple tenants (also called clients or customers) with their own networks, isolated from the networks of others. With this isolation, your tenants can use any IP addresses that they want for their virtual machines, regardless of the IP addresses that are used on other VM networks. Also, you can allow your tenants to configure some aspects of their own networks, based on limits that you specify. Network virtualization abstracts the physical address space and presents a virtual address space to the tenant.
- **Use external networks** – You can use a vendor network-management console that allows you to configure settings on your forwarding extension, for example, settings for logical networks, network sites, and VM networks. VMM will import those settings.
- **No virtual networking** – Networks that don't require access by VMs do not use VM networks. For example, storage networks.

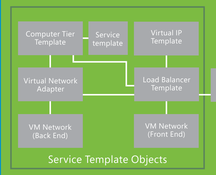
Networking Level	How VMM networking can be used
Physical Fabric	**Fabric administrators** can maintain network hardware (such as network adapters and switches) without requiring other administrators or users to understand it. Fabric administrators can maintain a stable physical network configuration while still being able to provide flexibility to others who need specific IP address spaces for their virtual machines.
Logical Networks and Logical Switches	**Fabric administrators** can create logical networks and logical switches as an underlying configuration that is straightforward to maintain and is not visible to tenant administrators or users.
VM Networks	**Tenant administrators** can create VM networks easily, making it easy to respond when users need additional or different IP address spaces. (Tenant administrators can also control resource usage through user role quotas.)
	Self-service users can create virtual machines and connect them to the VM networks without having to involve tenant administrators.

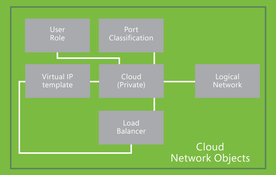
NETWORK OBJECT MODEL

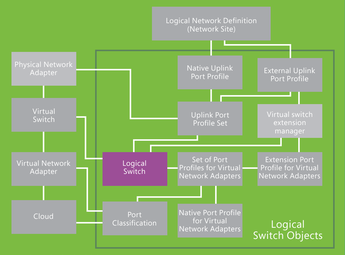
Understanding the model

The network object model for virtual network, fabric network, service template, cloud network, and logical switch objects in VMM shows the relationships between the networking objects within each. This can be especially useful if you are learning about configuring VMM through Windows PowerShell scripts, which directly reflect the network object models.

With these diagrams you can see how changes to one object affect another.







Service Template Objects

Computer Tier Template (Virtual Machine Template) – A set of specifications for deploying a virtual machine as a tier within a service.

Service Template – A set of specifications for deploying multiple virtual machines that work together.

Virtual IP (VIP) Template – A set of load-balancer-related configuration settings for a specific type of network traffic

Load Balancer Template (Virtual Machine Template) – A set of specifications for deploying a virtual machine as a load balancer within a service.

Networking for Clouds Objects

User Role – A role within VMM that defines which objects users can manage and which management operations they can perform.

Port Classification – A name that identifies a type of port profile for virtual network adapters.

Cloud (Private) – A grouping of virtual machine hosts and networking, storage, and library resources that is assigned to users to deploy services.

Logical Switch Objects

Native Uplink Port Profile (Native Port Profile for Uplinks) – A list of logical networks that are available to a physical network adapter.

Extension Uplink Port Profile (Extension Port Profile for Uplinks) – A list of logical networks that are available to a physical network adapter, and that come from a forwarding extension.

Virtual Switch Extension Manager – Software through which a VMM management server connects to a vendor network-management database .

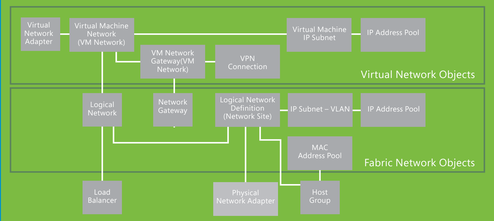
Logical Switch – A container for port settings and extensions that can be applied to network adapters.

Extension Port Profile for Virtual Network Adapters – A collection of capabilities that come from an extension and that can be applied to a virtual network adapter.

Native Port Profile for Virtual Network Adapters – A collection of capabilities that can be applied to a virtual network adapter.

Physical Network Adapter – An adapter in a computer that connects the computer to a network.

Virtual Switch – A virtual version of a physical network switch.



Virtual Network Objects

Virtual Network Adapter – A virtualized adapter that connects a virtual machine to a network.

Virtual Machine Network (VM Network) – A network used by virtual machines that exists as a layer on top of a logical network.

VM Network Gateway – A server or device that connects a VM network with other networks.

VPN Connection – A connection that appears to be part of a private network but encompasses links across a public network.

IP Address Pool – A set of static IP addresses that VMM can automatically assign as needed.

Fabric Network Objects

Logical Network – A named grouping of IP subnets and virtual local area networks (VLANs).

Network Gateway – A server or device that connects one network with other networks.

Logical Network Definition (Network Site) – IP subnet and VLAN information that defines a part of a logical network.

IP Subnet - VLAN – IP subnets, VLANs, or IP subnet/VLAN pairs.

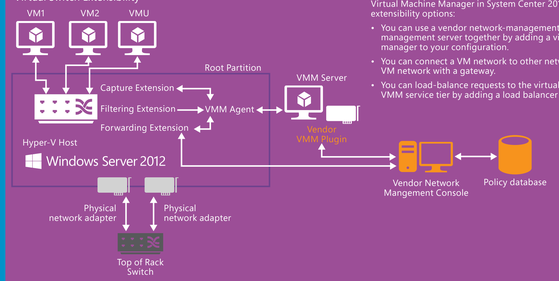
MAC Address Pool – A set of media access control (MAC) addresses that VMM can automatically assign as needed.

Load Balancer – A device or software element that distributes incoming requests among multiple systems.

Host Group – A grou ping of managed host systems in VMM.

EXTENSIBILITY OPTIONS

Virtual Switch Extensibility

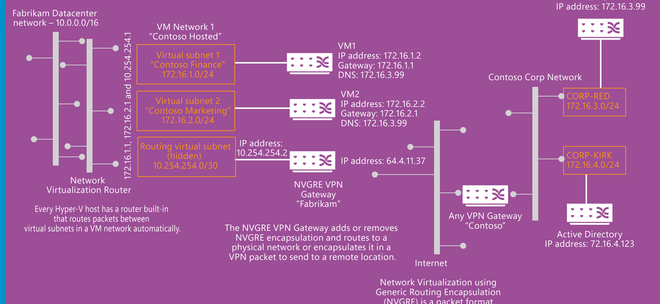


Extending Virtual Machine Manager

Virtual Machine Manager in System Center 2012 SP1 provides multiple extensibility options:

- You can use a vendor network-management console and the VMM management server together by adding a virtual switch extension manager to your configuration.
- You can connect a VM network to other networks by configuring the VM network with a gateway.
- You can load-balance requests to the virtual machines that make up a VMM service tier by adding a load balancer to VMM.

VPN Gateway—Hybrid Cloud

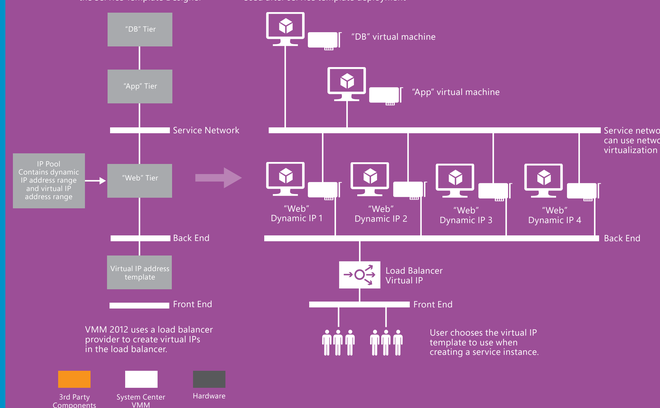


Every Hyper-V host has a router built-in that routes packets between virtual subnets in a VM network automatically.

The NVGRE VPN Gateway adds or removes NVGRE encapsulation and routes to a physical network or encapsulates it in a VPN packet to send to a remote location.

Network Virtualization using Generic Routing Encapsulation (NVGRE) is a packet format.

Load Balancing

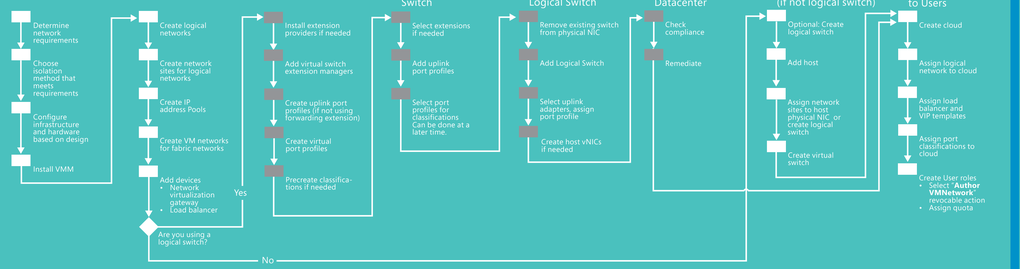


CONFIGURATION STEPS

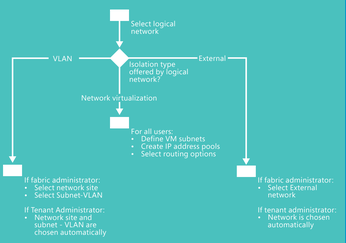
Configuring networking in VMM

These steps show how the fabric administrator can configure network resources and work with a tenant administrator to make those resources available to self-service users. The self-service users can create and configure their own virtual machines and virtual machine networks (VM networks), without needing knowledge of the underlying physical resources.

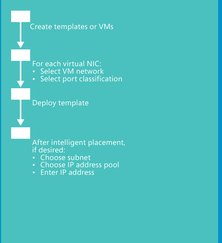
Steps used by a Fabric Administrator



Steps used by a Fabric Administrator or a Tenant Administrator



Steps used by any user or Administrator



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