Module 2

Configuring and Deploying the Private Cloud with Microsoft System Center 2012 R2 Virtual Machine Manager

Module Overview

- Overview of VMM Architecture and Components
- Configuring Advanced Networking in VMM
- Installing and Upgrading VMM
- Configuring VMM Security and Roles
- Understanding Host Groups
Lesson 1: Overview of VMM Architecture and Components

- VMM Architecture
- The VMs and Services Workspace in VMM
- VMM Libraries
- Tenants in VMM
- Network Features in VMM
- Virtual Machines and Clouds
- VMM Fabric Features
- VMM Storage Features
The VMs and Services Workspace in VMM

On the VMs and Services workspace in VMM you can complete the following tasks:

- Add hosts and create host groups
- Create and manage virtual machines
- Create and manage clouds
- Create and manage services

VMM Libraries

The VMM library is a catalog of resources that you use to create and configure virtual machines, services, and clouds in VMM

VMM library:

- Is hosted on a VMM library server
- Can have one or more library shares
- Can be organized by creating subfolders within the main library share
- Content refreshes (indexes) manually, or once per hour by default

The VMM server remains the default library server
Tenants in VMM

- Tenants have the following bounding:
  - Profile
  - Members
  - Scope
  - Quota
  - Networking
  - Resources
  - Permissions

Network Features in VMM

- Network features in VMM include:
  - VM networks
  - Logical networks
  - Port profiles
  - Port classifications
  - Logical switches
Virtual Machines and Clouds

A Cloud in VMM will include the following resources:

- Host Groups
- VMWare Pools
- Logical Networks
- Load Balancers
- VIP Templates
- Port Classifications
- Storage
- Library
- Capacity/Quota
- Capabilities

VMM Fabric Features

On the Fabric workspace of VMM management console, you can manage:

**Servers:**
- Hosts
- Host Groups
- PXE Servers
- Update Servers

**Networking:**
- Logical Networks
- IP Pools
- MAC Pools
- Load Balancers

**Storage:**
- Classifications
- Pools
- Providers
- Arrays
VMM Storage Features

Using the Add Storage Devices Wizard in VMM

Lesson 2: Configuring Advanced Networking in VMM

- Software Defined Networking Overview
- Network Virtualization Architecture (including NVGRE)
- Configuring Advanced Networking in VMM
- Defining and Publishing the Virtual Network
- NVGRE Gateway Overview
- IP Address Management (IPAM)
- Configuring Logical and Physical Networks
- Configuring IP Address Pools and Network Sites
Software Defined Networking Overview

Some of the objectives of Software Defined Networking include:

- Isolate the cloud infrastructure from the physical infrastructure.
- Complete segregation of network and cloud administration.
- Provide scalability and flexibility to address the limitations of VLANs.
- Reduce costs for management and support.
- Enable cloud tenants to keep their IP address scheme.

Network Virtualization Architecture (including NVGRE)

- Networking Virtualization in VMM includes:
  - Network Encapsulation
  - Network Virtualization Stack
  - Network Virtualization Traffic Flow
  - Multi-tenancy
Configuring Advanced Networking in VMM

- Advanced networking in VMM includes:
  - Logical Networks
  - Uplink Port Profile
  - Native Port Profiles
  - Port Classifications
  - IP / MAC Address Pools
  - Logical Switch
  - VM Networks

Defining and Publishing the Virtual Network

- When creating a VM Network you select the Logical Network that it is to be associated with:
NVGRE Gateway Overview

• The multi-tenant gateway supports the following modes:
  • Network Address Translation
  • VPN site-to-site functionality in remote access
  • Forwarding gateway

IP Address Management (IPAM)

• IPAM simplifies administration by providing a central and integrated framework for:
  • Discovering
  • Monitoring
  • Auditing
  • IP address management
Configuring Logical and Physical Networks

• When creating a Logical Network in VMM you can configure:
  • One connected network
  • VLAN-based independent networks
  • Private VLAN (PVLAN) networks
  • Network Sites

Configuring IP Address Pools and Network Sites

• When creating an IP Pool you configure:
  • The Logical Network
  • Network Site
  • IP address range
  • Gateway
  • DNS
  • WINS
### Lesson 3: Installing and Upgrading VMM

- Prerequisites for Installing VMM
- VMM Installation Considerations
- Upgrading VMM from Previous Versions
- Considerations for Deploying a Highly Available VMM Server

#### Prerequisites for Installing VMM

**Software requirements for the VMM Server:**

- Windows Server 2008 R2 or Windows Server 2012
- SQL Server 2008 R2 or SQL Server 2012
- Microsoft .NET Framework 4.5
- Windows AIK
- WinRM 2.0

**Hardware requirements:**

- CPU: Single core CPU 2 GHz
- RAM: 4 – 8 GB
- Disk space: 40 GB – 150 GB

The number of hosts determine hardware requirements
VMM Installation Considerations

**VMM installation considerations:**

- Ensure that you have a supported version of SQL Server installed
- The VMM console is installed automatically with VMM Management Server
- The VMM Management server is cluster-aware
- Setup log file generates for troubleshooting
- Service account should be preconfigured

Upgrading VMM from Previous Versions

**Upgrade limitations:**

- VMM 2008 R2 SP1 is the only supported earlier version that can be upgraded to VMM 2012
- VMM 2012 SP1 is the only supported earlier version that can be upgraded to VMM 2012 R2
- VMM does not support SQL Server Express editions for the VMM database
- VMM requires installation of Windows AIK for Windows Server 2012
- Virtual machine hosts running Microsoft Virtual Server 2005 R2 are no longer supported in VMM
- PRO configurations are not maintained during an upgrade
Considerations for Deploying a Highly Available VMM Server

Considerations for deploying highly available:
- VMM is cluster-aware and can be highly available
- When deploying VMM in a cluster, the service account must be the domain account
- Use Distributed key management for encryption keys
- Make database and library servers highly available
- Use the Failover Cluster Manager to perform a planned failover

Lesson 4: Configuring VMM Security and Roles

- Specifying VMM Service Accounts
- Configuring Distributed Key Management
- What Is a Run As Account?
- User Roles in VMM
Specifying VMM Service Accounts

**Considerations for specifying VMM service accounts:**
- Always use a dedicated account for VMM
- For a VMM in a cluster, you must use a domain account
- For shared ISO images, you must use domain account
- Consider using managed service accounts

Configuring Distributed Key Management

**Considerations for storing encryption keys:**
- If you are installing a highly available VMM management server, you must use distributed key management to store encryption keys in AD DS
- Create an Active Directory container
- Location of container should be specified during installation
  
  Example: CN=VMMDKM,DC=contoso,DC=com
**What Is a Run As Account?**

A Run As account stores and provides credentials that a user enters for any process.

VMM 2012 uses DPAPI to provide operating system-level data protection services during storage and retrieval of the Run As account credentials.

**Using a Run As account, you can:**

- Speed up configuration tasks
- Define various accounts for different tasks

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**User Roles in VMM**

**Administrators:**
- Full access to all actions and all objects
- Can use the Admin console or Windows PowerShell interface

**Fabric Administrators (Delegated Administrators):**
- Full access to most actions by using Admin console or Windows PowerShell
- Scope can be limited by host groups and Library servers

**Read Only Administrators:**
- Can view status, job status, and properties of objects within their assigned scope

**Application Administrators (Self-Service users):**
- Limited access to a subset of actions
- Scope can be limited by host groups and Library share
- Can use the Self-Service Portal or Windows PowerShell
What are Host Groups?

Host groups simplify management tasks by using a single action to apply settings to multiple hosts

**Host group scenarios:**

- Provide basic organization when managing large numbers of hosts
- Reserve resources for use by hosts
- Designate hosts on which a user can create and operate their own virtual machines
- Create private clouds
Configuring Placement Rules

Placement rules:

- Recommend the most appropriate host for virtual machine placement
- Create custom placement rules

Custom placement rules are based on custom properties of virtual machines and hosts

Configuring Host Reservations

You can reserve values for:

- CPU usage
- Memory usage
- Disk I/O
- Disk space
- Network usage

Host reservations are recommended, but not mandatory
Configuring Dynamic Optimization

**Dynamic Optimization:**
- Improves load balancing among hosts and corrects any placement constraint violations for virtual machines
- Can be configured on a host group
- Can be set up for clusters with two or more nodes

**Power Optimization:**
- Enables VMM to evacuate hosts of a balanced cluster and turn them off to save power
- Helps to save energy by turning off hosts that are not needed to meet resource requirements
- Schedules the hours and days of the week for when to perform power optimization

Configuring Networks

**Networking components include:**
- Logical networks
- Network sites
- Static IP address pools
- MAC address pools
- VIP templates
- Load balancer integration
Configuring Storage

Allocate storage to hosts and host groups

Virtual Machine Manager can:
- Discover, classify, and provision remote storage on supported storage arrays through the VMM console
- Use the new Microsoft Storage Management Service

Demonstration: Configuring Networking in Virtual Machine Manager

In this demonstration you will see how to create a Logical Network in Virtual Machine Manager.
Lab: Configuring and Deploying the Private Cloud Infrastructure

- Exercise 1: Configuring Host Groups
- Exercise 2: Configuring User Roles and Run As Accounts
- Exercise 3: Configuring the Library
- Exercise 4: Preparing the Private Cloud Infrastructure
- Exercise 5: Deploying a New Virtual Machine

Logon Information

**Virtual Machines:** 20247D-LON-DC1, 20247D-LON-SQ1, 20247D-LON-VM1

**User Name:** Contoso\Administrator

**Password:** Pa$$w0rd

Estimated Time: 30 minutes
Lab Scenario

You are administrator at Contoso, Ltd. You have just deployed VMM and two physical hosts, and you now want to make basic configuration changes, and then perform a test deployment of a virtual machine.

Lab Review

• Why do you configure host reserves properties?
### Module Review and Takeaways

- Review Question(s)
- Real-world Issues and Scenarios