System Center VMM 2016
Infrastructure Management.

Jan Marek
Head of System Center Department @ KPCS CZ
Microsoft MVP | MCC | MCT | MCSE | MCSD
marek@kpcs.cz
What’s new in SC 2016

- New Licensing Model
- SC AppController is deprecated
- SC Configuration Manager is not serviced the same way
- What about SCEP on Windows 10?
- It’s RTM now, not GA

- VMM 2016
  - Do you need to upgrade to VMM 2016 when you’re using Hyper-V 2012 R2?
  - Do you need VMM 2016 at all?
  - VMM 2016 and WAP/MAS integration
Supported Scenarios

- Windows Server 2012 R2/2016 Management Server
- MS SQL Server 2012/2014/2016 Database
- Hyper-V 2012 R2/2016 Hosts
- VMware 4.1, 5.0, 5.1, 5.8 Hosts
- No Citrix Support
Complete vInfrastructure Management

- Standalone Hyper-V Hosts
  - Support for Windows Server 2016 Nano
- Hyper-V Clusters
  - Support for CSV2, 64 Cluster Nodes, Availability Sets, Cluster Node Isolation, Rolling Cluster Upgrade
- Direct Storage Management using SMI-S
- Network Management (Physical, Logical and Virtual)
  - Support for Network Controller
- Support for Hyper-V 2016 Operations
  - Static Memory Management
  - Virtual Network Adapter Management
- Support for Azure Site Recovery
- Support for Production Checkpoints
Support for new Hyper-V Security

- Host Guardian Service
- Shielded VM
- TPM
- Key Storage
## Performance Comparison with RTM

<table>
<thead>
<tr>
<th>Category</th>
<th>VMM 2012 R2</th>
<th>VMM 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hosts</td>
<td>1,000</td>
<td>1,500</td>
</tr>
<tr>
<td>VMs</td>
<td>25,000</td>
<td>50,000</td>
</tr>
<tr>
<td>User Roles</td>
<td>1000</td>
<td>1000</td>
</tr>
<tr>
<td>Concurrent Jobs</td>
<td>250</td>
<td>1000</td>
</tr>
<tr>
<td>Concurrent Clients</td>
<td>50</td>
<td>500</td>
</tr>
<tr>
<td>Job History</td>
<td>5 Million</td>
<td>50 Million</td>
</tr>
</tbody>
</table>
Bare Metal Deployment

1. **Authorize PXE boot**
2. **OOB reboot**
3. **Download VHD**
4. **Inject drivers**
5. **Run generic command execution scripts and configure partitions**
6. **Authorize PXE boot**
7. **Run generic command execution scripts and configure partitions**
8. **Host Group**
9. **Customize and domain join**

**Sources:**
- WDS server
- VMM server
- Library server
- Drivers
- VHD
- Host profile

**Targets:**
- contoso
- Host Group
- Hyper-V server

**Notes:**
- Hyper-V server
- Host Group
- Hyper-V server
Host Profiles Improved

Network Adapter Configuration

Host vNIC

Teamed NICs
Automatically Filled out based on Host Profile
You can now see & select disk where the OS will be laid down.
Storage Supported Configurations

- VHDX Format, Shared VHDX, Key Storage
- SMB 3.0 file shares for Hyper-V Hosts and Clusters
  - Full SOFS support and provisioning
- SMI-S for Microsoft iSCSI target
- Virtual Fiber Channel Adapter
- Live Storage Migration with ODX
- Dynamic iSCSI Targets
- Assigning LUNs to VMs using IQN
- Storage QoS Management
- SOFS with S2D Management
- Support for Storage Replica
Virtual Machine Manager

- Discover storage through SMI-S provider
- Create storage classification pools and associate with storage
- Allocate storage to specific host groups
- Assign existing LUNs to hosts and clusters
- Create new LUNs from pool and assign to hosts and clusters

SMI-S Provider

Host Group

Gold

Silver

Source: Microsoft
Create Logical Networks and assign them to the appropriate networking on the hosts.
Virtual Switch
- General Virtual Switch created by Hyper-V Manager

Logical Switch
- VMM Centralized Managed Virtual Switch
- Support for Standard to Logical Switch Migration in VMM 2016

Logical Network
- VM logically connected to desired network (Corp/Test/Dev)

Logical Network Definition
- Logical Network with VLAN and IP Subnet configuration

IP Address Pool

VM Network
Logical Switch

- A single logical representation of the virtual switch instances which exist in a group of hosts
  - Uplink / Uplink Team / SET
  - Virtual Network Adapters (DCB)
  - QoS
  - Security
  - Monitoring
  - Extensions
  - Logical Networks
Logical Network
Logical Network Definition

Logical Network

"Corp"

Logical network definition

"Building 42"

Subnet-VLAN

“10.0.0.0/24”

“VLAN 5”

IP Pool

“StaticSrv”

“10.0.0.1-10.0.0.99”

Host group

“Production”

Physical network adapter

Virtual network adapter

Virtual switch

Source: Microsoft
Pools

- **MAC Address Pool**
  - VM Creation
  - Service Creation
  - Returned on VM deletion

- **VIP Pool**
  - Service Tiers
  - Reserved within IP Pools

- **IP Address Pool**
  - VMs, vNICs, Hosts, VIPs
  - VM Template Creation
  - VM Creation/Deletion
Load Balancers

- Hardware Providers used to connect to LB
- Can be assigned to Cloud, Host, Groups, Log.Net
- Configured Load Balancing
- Use VIP Templates - LB Method
- Supported:
  - F5 BIG-IP
  - Citrix NetScaler
  - MS NLB / Network Controller
  - Brocade ServerIron ADX
VM Network - No Isolation

- Passthrough to Logical Network
- Paired with Logical Network

Logical Network

- "Corp"
- "Building 42"

Subnet-VLAN

- "10.0.0.0/24"
- "VLAN 5"

IP Pool

- "StaticSrv"
  - "10.0.0.1-10.0.0.99"

Corporate Network

Server Located in Building 42
IP: 10.0.0.35/24
VM Network - VLAN Isolation

- Passthrough to Logical Network
- Paired with Logical Network Definition

Corporate Network
Server Located in Building 42
IP: 10.0.0.35/24, VLAN: 5
Network Virtualization

Server Virtualization
- Run multiple virtual servers on a physical server
- Each VM has illusion it is running as a physical server

Hyper-V Network Virtualization
- Run multiple virtual networks on a physical network
- Each virtual network has illusion it is running as a physical network
Customer Addresses Virtualized

VMM

Virtualization Policy

<table>
<thead>
<tr>
<th>Color</th>
<th>10.0.0.5</th>
<th>10.0.0.7</th>
<th>192.168.4.11</th>
<th>192.168.4.22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue</td>
<td>10.0.0.5</td>
<td>10.0.0.7</td>
<td>192.168.4.11</td>
<td>192.168.4.22</td>
</tr>
<tr>
<td>Red</td>
<td>10.0.0.5</td>
<td>10.0.0.7</td>
<td>192.168.4.11</td>
<td>192.168.4.22</td>
</tr>
</tbody>
</table>

Provider Address Space (PA)

192.168.4.11
192.168.4.22

Datacenter Network

Host 1

<table>
<thead>
<tr>
<th>Color</th>
<th>10.0.0.5</th>
<th>10.0.0.7</th>
<th>192.168.4.11</th>
<th>192.168.4.22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue</td>
<td>10.0.0.5</td>
<td>10.0.0.7</td>
<td>192.168.4.11</td>
<td>192.168.4.22</td>
</tr>
<tr>
<td>Red</td>
<td>10.0.0.5</td>
<td>10.0.0.7</td>
<td>192.168.4.11</td>
<td>192.168.4.22</td>
</tr>
</tbody>
</table>

Host 2

<table>
<thead>
<tr>
<th>Color</th>
<th>10.0.0.5</th>
<th>10.0.0.7</th>
<th>192.168.4.11</th>
<th>192.168.4.22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue</td>
<td>10.0.0.5</td>
<td>10.0.0.7</td>
<td>192.168.4.11</td>
<td>192.168.4.22</td>
</tr>
<tr>
<td>Red</td>
<td>10.0.0.5</td>
<td>10.0.0.7</td>
<td>192.168.4.11</td>
<td>192.168.4.22</td>
</tr>
</tbody>
</table>

Customer Address Space (CA)

10.0.0.5
10.0.0.7

Source: Microsoft
VM Network - Network Virtualization

- Packets encapsulated using NVGRE
- Virtual Subnets / Routing Domains

Logical Network

 remarked: No Isolation

Logical network definition

“Corp”

VM Subnet 192.168.0.0/16

1 - M

1 - M

IP Pool (CA) “192.168.0.2-192.168.0.99”

Customer A Network IP: 192.168.0.35/16

VM Network

IP Pool “StaticSrv” “10.0.0.1-10.0.0.99”

1 - M

1 - M

1 - M

Subnet-VLAN “10.0.0.0/24” “VLAN 5”

VM Subnet 192.168.0.0/16

Logical network definition

“Building 42”

IP Pool

“192.168.0.0/24”

Customer A Network

IP: 192.168.0.35/16

No Isolation

Logical Network

VM Network

Source: Microsoft
Services and Service Templates

- **Service Template**
  - Design of service
  - VM Template and VM Connectivity Requirements
  - Hard Linked to Deployed Services
  - Templates Update causes Service Instance update

- **Service Instance**
  - Group of VMs
  - Virtual Machine configurations including applications
    - Web Applications
    - Virtual Applications
    - Database Applications
Service Designer

Service Template

VM Template
- Application
- OS Roles/Features
- Hardware Configuration
Service Deployment
Deployed Service Instance
Service Update

1. Apps or OS updated outside of VMM
2. Update the machine templates
3. Set the updated template
4. Instance ready for update
5. Deploy update in Maintenance Window
Hyper-V Containers

- Hyper-V Containers are not visible in Hyper-V Manager
- SC VMM 2016 is currently not able to manage container objects
Deprecated Features in VMM 2016

- Server App-V
- Citrix XenServer
Thank You!

Jan Marek

Head of System Center Department @ KPCS CZ

Microsoft MVP | MCC | MCT | MCSE | MCSD | MCSA | MCITP | MCS | CSM

marek@kpcs.cz