



System Center 2012R2 VMM

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My Profile

Technology passionate and evangelist; Subject matter expert in cloud, virtualization and management.

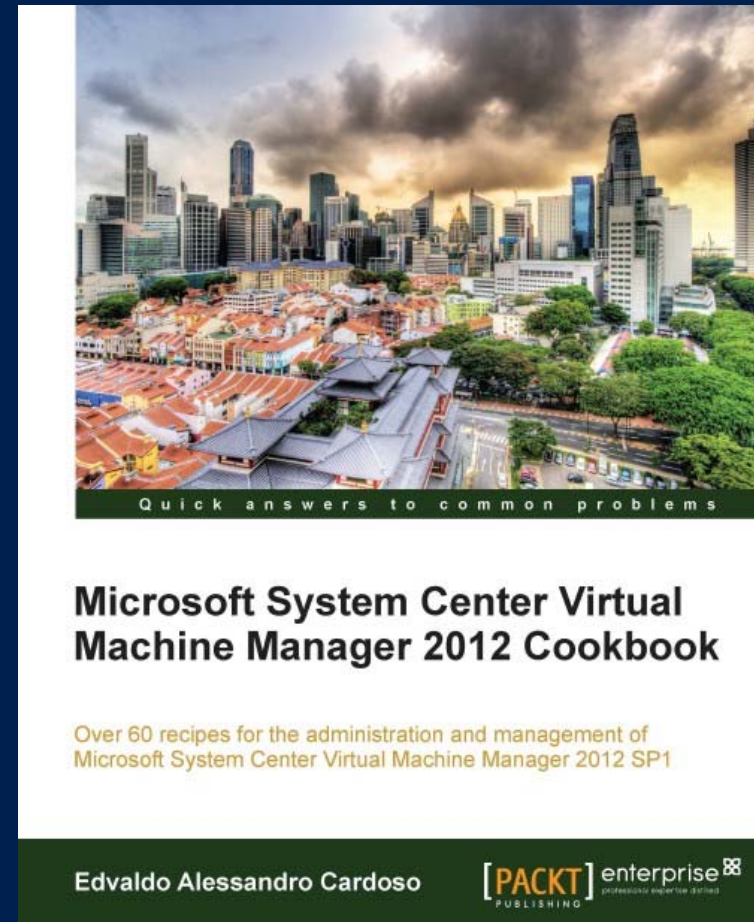
He has experience managing, solutioning, planning, organizing, and leading complex global projects acquired in 20+ years of experience in IT, working in segments spanning from government, health, education and IT sectors.

MVP VM since 2009 and a well-known speaker at IT-related for more than 10 years. Recently wrote the book System Center VMM 2012 <http://wp.me/p15Fu3-mK> and reviewed the following books:

Windows 2012 Hyper-V Cookbook, Windows 2012 Cluster , VMware vSphere 5.1 Cookbook

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Why choose System Center 2012 R2

Enterprise-class



Best-of-breed management for Windows Server and Microsoft workloads

Multitenant virtual networking, including edge gateway provisioning to bridge physical and virtual networks

Support for VM connectivity into virtual Fibre Channel SAN

Multi-hypervisor support, including Hyper-V, VMware, and Citrix

Robust open source support: Dynamic Memory for Linux, Unix/ Linux monitoring and configuration

Unified monitoring for on-premises and Windows Azure infrastructure

Simple and cost-effective



In-box service templates and runbooks for System Center components

Web-based interfaces to System Center capabilities to help integrate existing investments

Standards-based top-of-rack network switch configuration

Windows Server file-based storage and Storage Spaces support

Extensible service management automation and integration

Workload protection & recovery across datacenters with Windows Azure Hyper-V Recovery Manager

Application focused



Easy VM portability and management between Windows Server and Windows Azure

Deep .NET and Java application monitoring and diagnostics

Standardized app provisioning with service templates

Integrated dev-ops with System Center-Visual Studio connector

Cloud-integrated app and workload insight with Global Service Monitor and System Center Advisor

Management Packs with extensive built-in knowledge for Microsoft Exchange, SQL, SharePoint

VMM – Enabling the Cloud



Standardized Services

Delegated Capacity

Cloud Abstraction

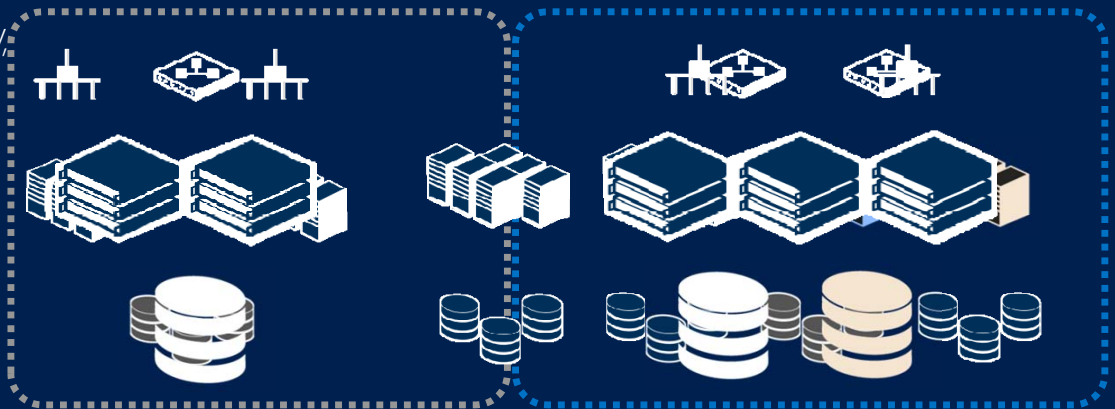
Configure & Deploy

Windows Server 2012/R2//2008 R2 Hyper-V, VMware, Citrix XenServer

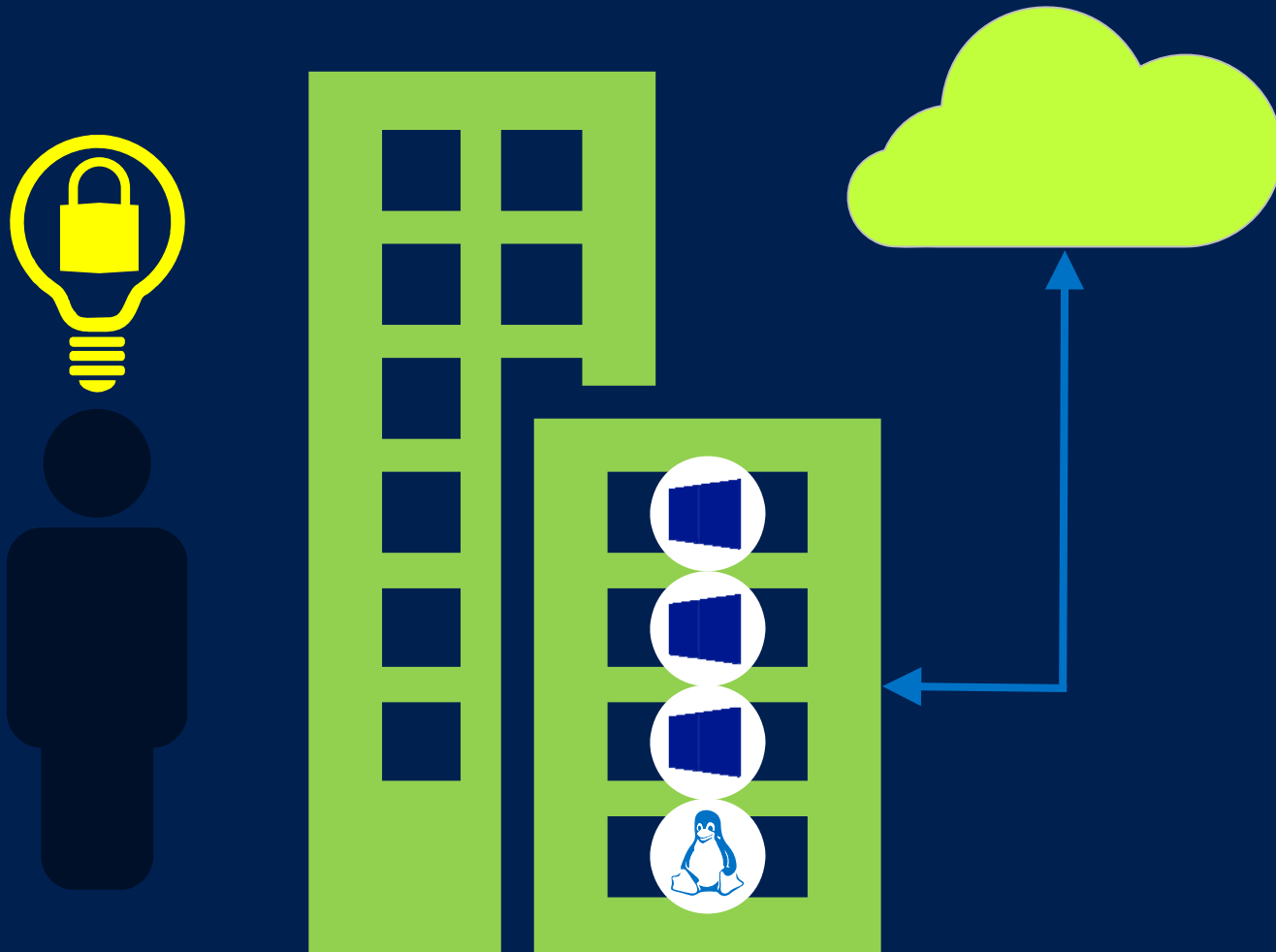
Intel, AMD, OEM hardware

Networks

SMB 3.0, Fiber Channel, iSCSI



Cloud innovation presents challenges for IT



How do I integrate with my existing IT investments?



What about my heterogeneous, complex IT landscape?



What about security and compliance?

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System Center capabilities



Infrastructure provisioning

Enable enterprise-class multi-tenant infrastructure for hybrid environments



Consumer Self-service

Enable application owner agility while IT retains control



Infrastructure monitoring

Comprehensive monitoring of physical, virtual, and cloud infrastructure



Application performance monitoring

Deep insight into application health



IT service management

Flexible service delivery

VMM investment areas for 2012 R2

Services

VMs

Clouds

Networking

Storage

Infrastructure

Demo

VMM Console

VMM | My tip's

- Dedicate time to DESIGN your solution. The better time you spent in design the better the implementation will be.
- Use the right number of NIC's. I do recommend the use of converged networks
- Check the Network Configuration and create standard names across ALL Hosts.

Cloud ready

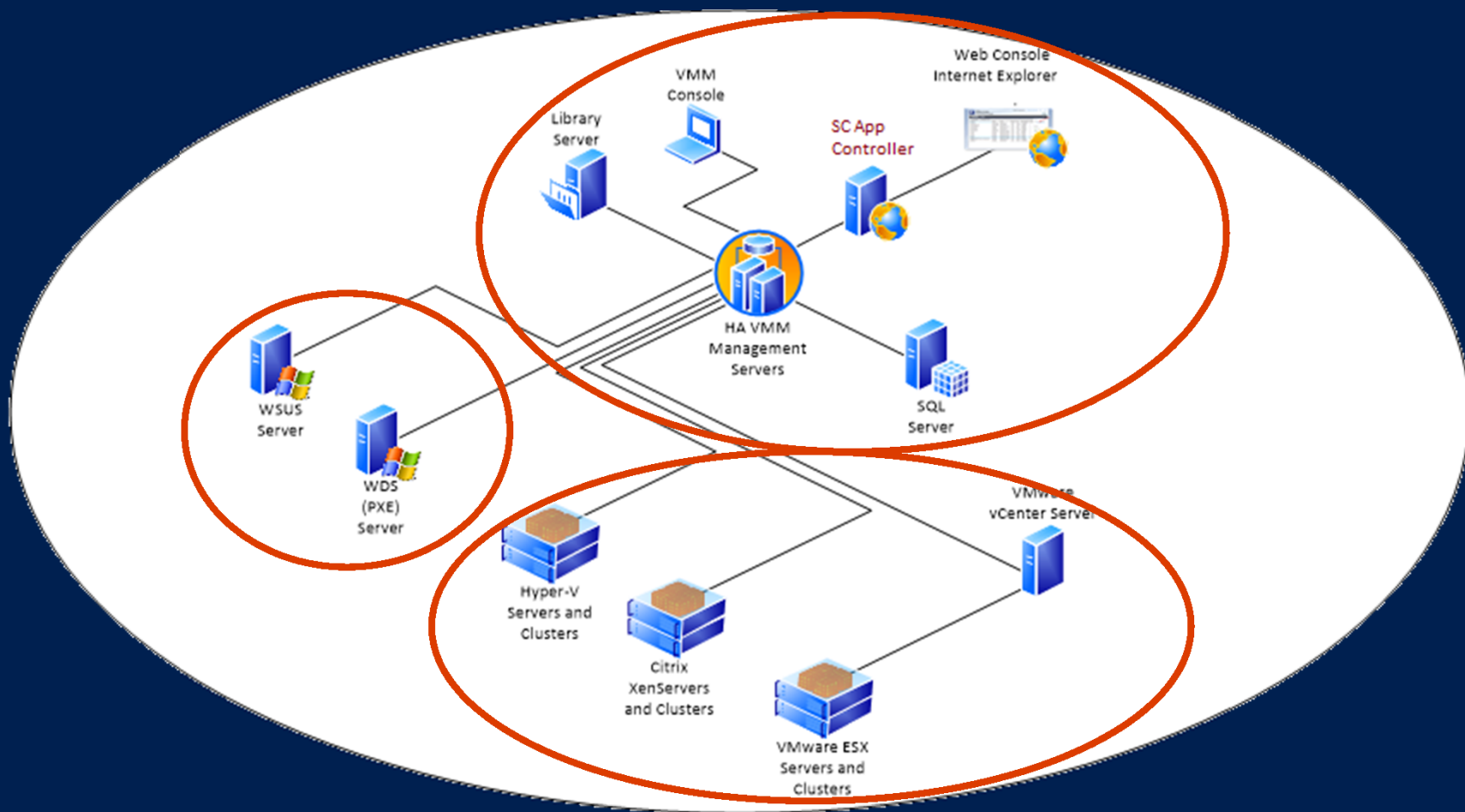
- Multi Tenant
- Pool of compute, storage and networking resources
- Elastic - Allocable on demand to your "customers"
- Automate everything – 540+ PowerShell Cmdlets in VMM
- Usage-based Metering – **Chargeback** / Showback
- Self-Service – Role-based Delegation and Access Control

3rd party storage management

The screenshot displays a storage management interface with a top toolbar containing various actions like 'Create Classification', 'Add Resources', and 'Allocate Capacity'. A left-hand navigation pane shows a tree view with categories such as 'Servers', 'Storage', and 'Fabric'. The main area is titled 'Arrays (20)' and contains a table listing storage arrays with columns for Manufacturer, Model, Name, Total Capacity, and Pools.

Manufacturer	Model	Name	Total Capacity	Pools
Compellent	Storage Center	Storage Center 2783	0 GB	0 (0 managed)
DotHill	AssuredSAN 5720	Dot Hill Systems AssuredSAN 5720	82.15 GB	2 (2 managed)
DotHill	DH4534	Gallium (DH4534)	1,236.07 GB	4 (1 managed)
DotHill	DH4534	Gallium (DH4534)	1,236.07 GB	4 (1 managed)
EMC Corporation	VMAX-1SE	000194900393	19,089.97 GB	5 (2 managed)
EMC Corporation	Rack Mounted VNX5700	APM00114104374	2,133.66 GB	2 (1 managed)
Falconstor Software	Falconstor NSS/CDP Storage Virtualizer	NSS-30770-74	205.06 GB	2 (2 managed)
Hewlett-Packard	HSV400	SNIA-LAB_EVA	0 GB	0 (0 managed)
Hitachi	HDS9570V	HDS9570V@192.168.0.18	245.94 GB	3 (1 managed)
Hitachi	VSP	VSP@10.1.134.252	65,496.04 GB	7 (1 managed)
Hitachi	XP128	XP128@10.1.134.137	2,728.85 GB	18 (1 managed)
Hitachi	AMS2100	AMS2100@10.1.134.253	2,667.73 GB	3 (1 managed)
HITACHI	VSP	StorageSystem:VSP.65422	120,601.87 GB	9 (1 managed)
HP	P2000 G3 iSCSI	HP StorageWorks HP_P2000_1	0 GB	0 (0 managed)
HP 3PAR	InServ F400	3PAR_ARR_1	3,163,246.25...	6 (1 managed)
NetApp Inc.	FAS2020	ntap-fas2020b	786.89 GB	2 (0 managed)
NetApp Inc.	FAS2020	ntap-fas2020a	906.52 GB	1 (0 managed)
NetApp Inc.	FAS3140	ntap-fas3140a	1,361.26 GB	2 (1 managed)
NetApp Inc.	Empty	SNIA_Vserver2	950.00 GB	2 (1 managed)
NetApp Inc.	Empty	SNIA_Vserver1	1,235.00 GB	5 (2 managed)

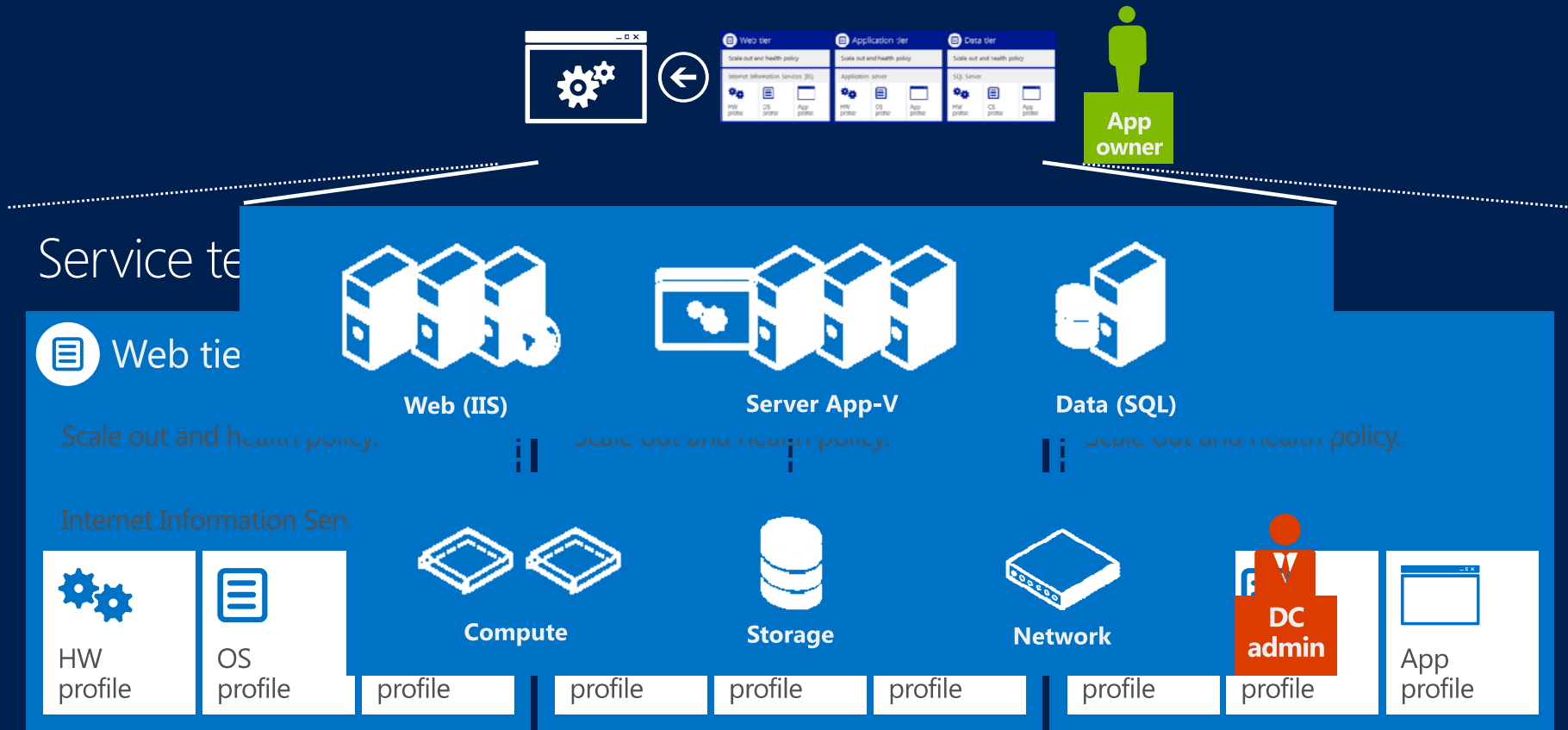
VMM : Components Topology



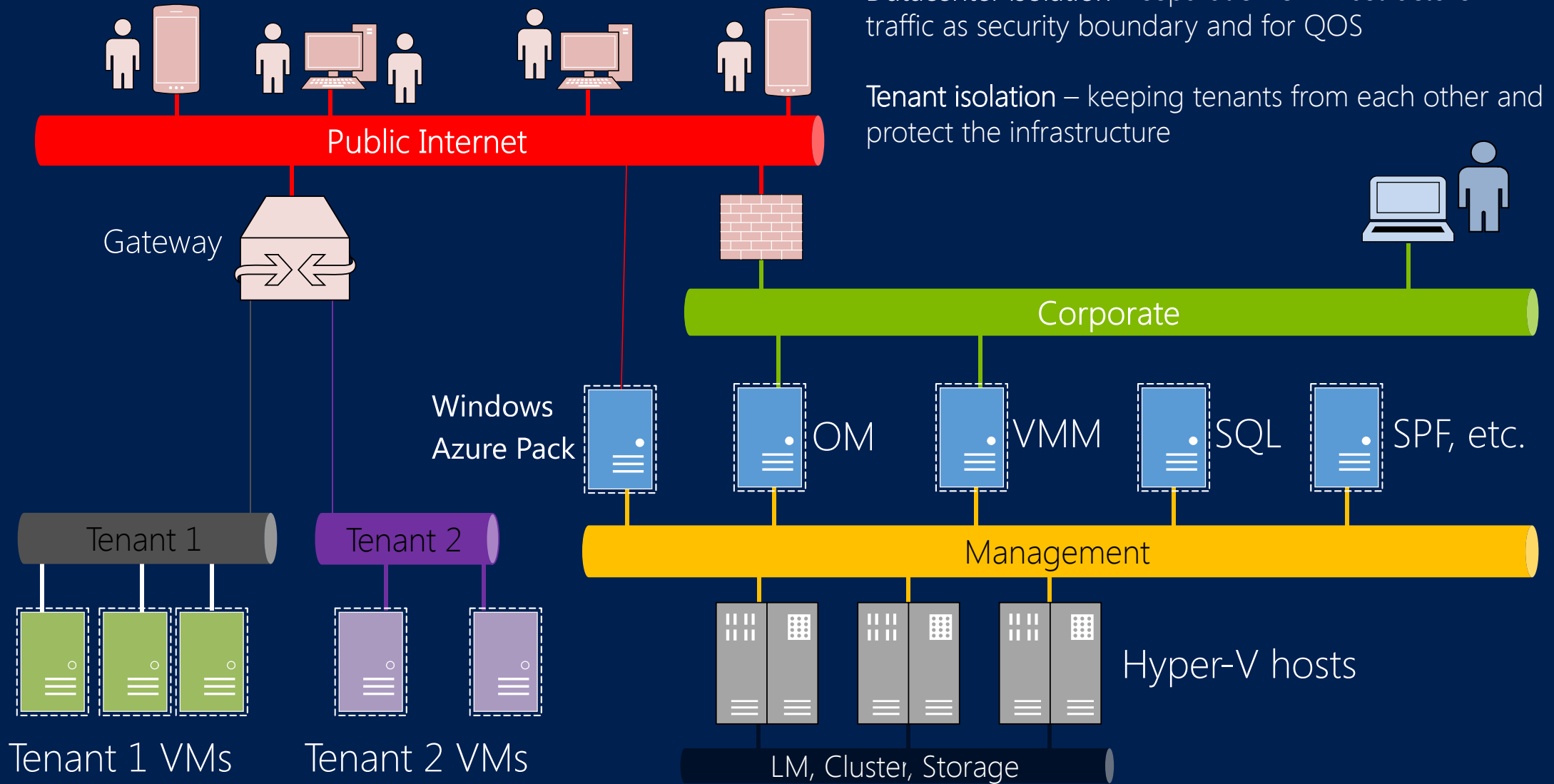
TIP: Bootstrapping a repeatable architecture

- Create a single storage and management infrastructure first
- Use VMM and service templates to deploy other management scale units
- Configure storage, networking and edge scale units
- Deploy more templates

VMM | Standardized application provisioning



Network Overview



Isolation

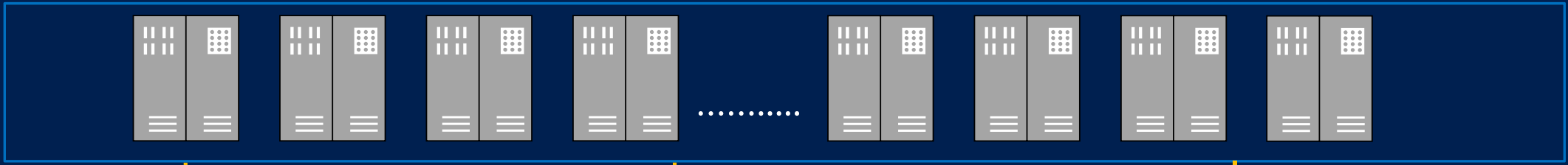
Datcenter isolation – separation of infrastructure traffic as security boundary and for QOS

Tenant isolation – keeping tenants from each other and protect the infrastructure

Storage

VMM (Storage Management)

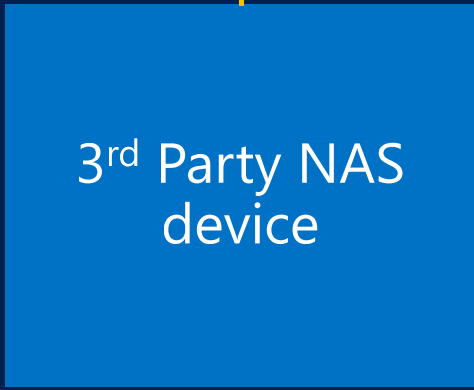
Hyper-V hosts



iSCSI,
Fibre Channel

SMB 3.0

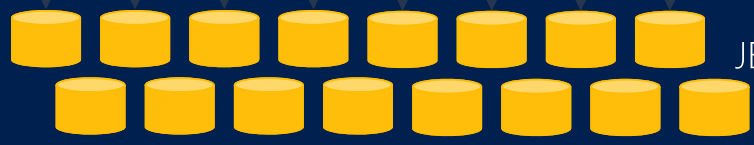
SMB 3.0



Scale Out File Server (SOFS)



Serial Attached Storage (SAS)



JBOD's

On Premise storage

Management components
(Library)

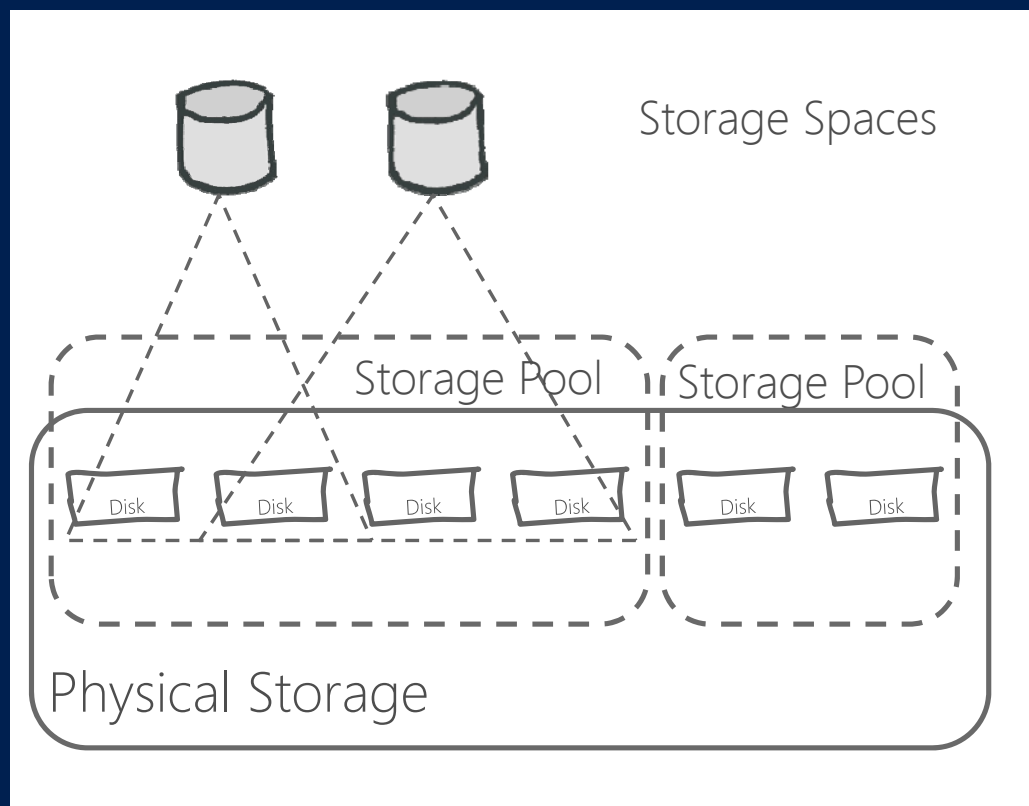
Storage for Compute nodes
Storage Spaces
SMB 3.0

Guest clustering

Fibre channel
Shared VHDX
SMB 3.0

Storage Spaces and SMB 3.0

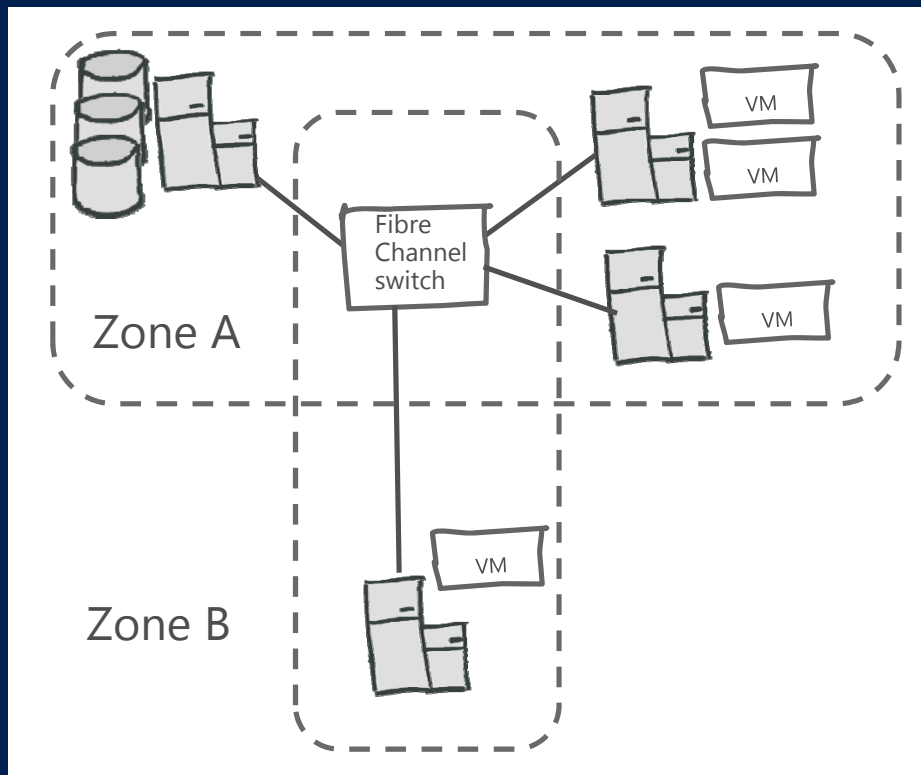
Customers want the features of NAS and SAN, **without the cost**



- Just a Bunch of Disks (JBOD) for inexpensive shared storage
- Storage spaces for resilient tiering
- Flexibility with block and file solutions
- VMM provisions storage
- Consistency across different technologies

Synthetic Fibre Channel in the guest

Customers want to use Fiber Chanel in the Guest OS



- Invested in physical servers with SAN
- Wants simplified zone management
- New VMs need access to shared storage

Demo

Synthetic Fibre Channel

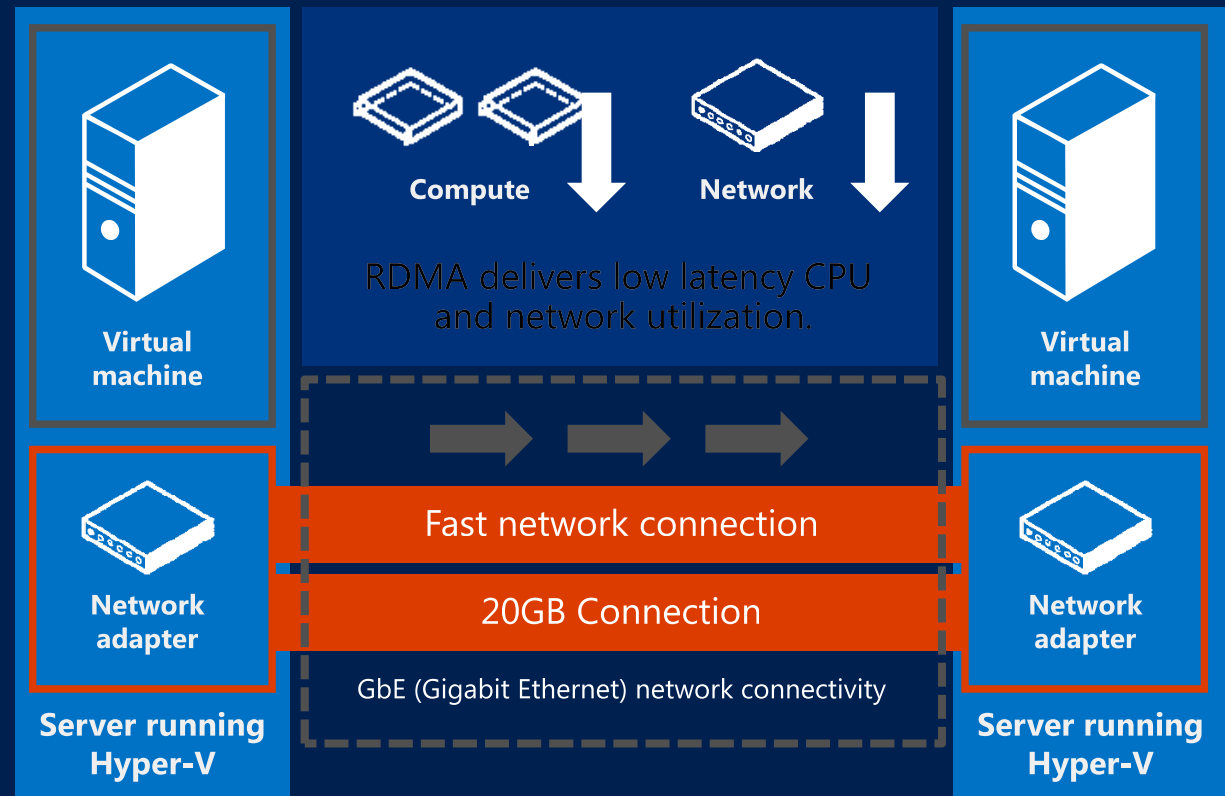
VMM | High-performance live migration

Accelerate live migration performance with compression or RDMA-capable network adapters

For <10Gbit network connectivity, live migration compression delivers superior performance – 2x acceleration for most workloads

For >10Gbit networks, Remote direct memory access (RDMA) offload delivers the highest performance with low CPU utilization and transfer speeds of up to 56Gb/s

Windows Server 2012 R2 supports RoCE, iWARP and Infiniband RDMA solutions



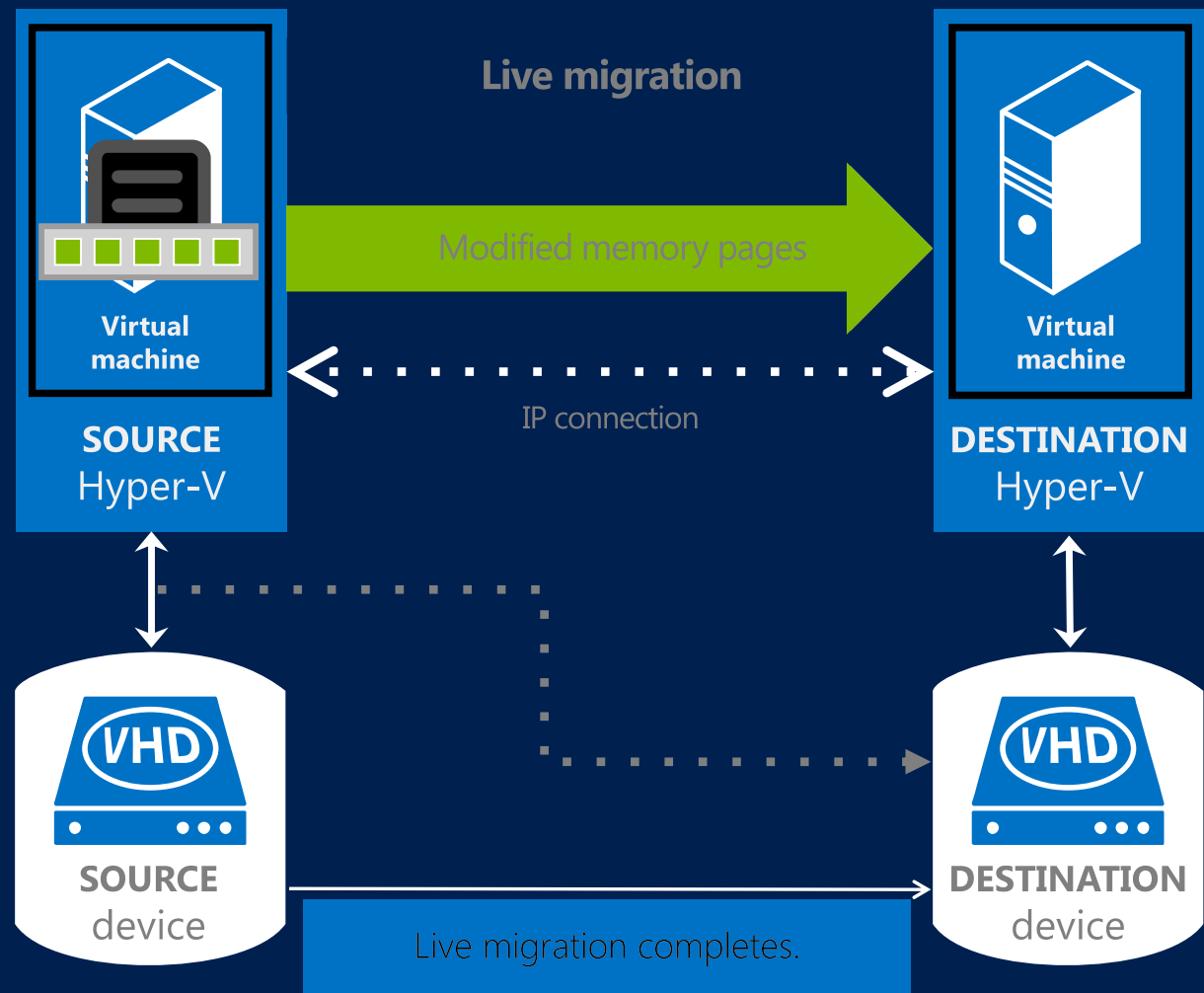
Live migration with RDMA

VMM | Workload mobility

Shared-nothing live migration

Benefits:

- Increase flexibility of virtual machine placement.
- Increase administrator efficiency.
- Reduce downtime for migrations across cluster boundaries.



Demo

Shared Nothing Live Migration

Reduction in provisioning time from VMM

Customers want deployment from VMM to be faster:

Use ODX from VMM library to Hyper-V hosts

Guest Clustering with Shared VHDX

- Introducing Shared VHDX Virtual Disks
 - Virtual disks that can be shared without presenting real LUNs to VM's

VMs/Services



Infrastructure



Compute



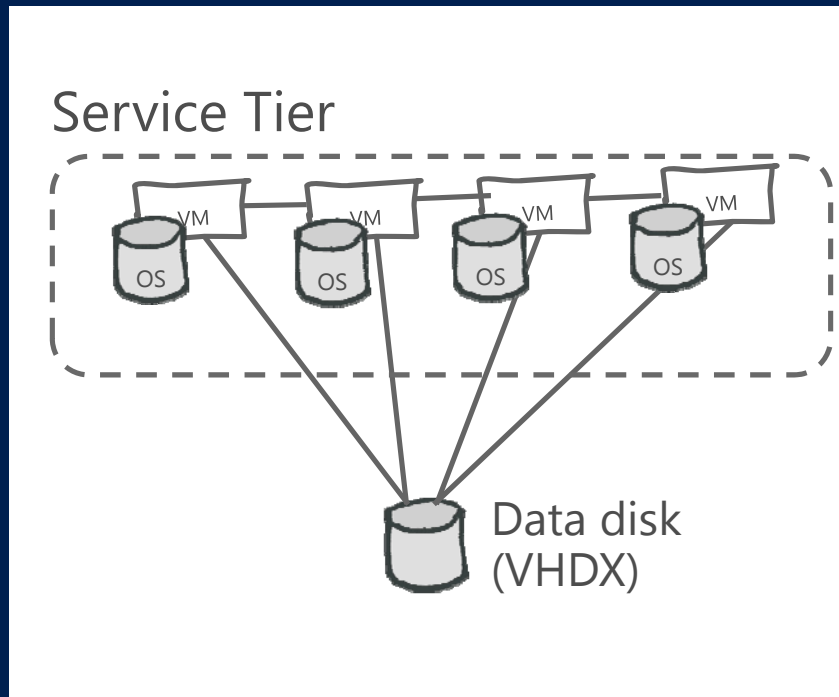
Storage



Networking

Guest clustering with shared VHDX

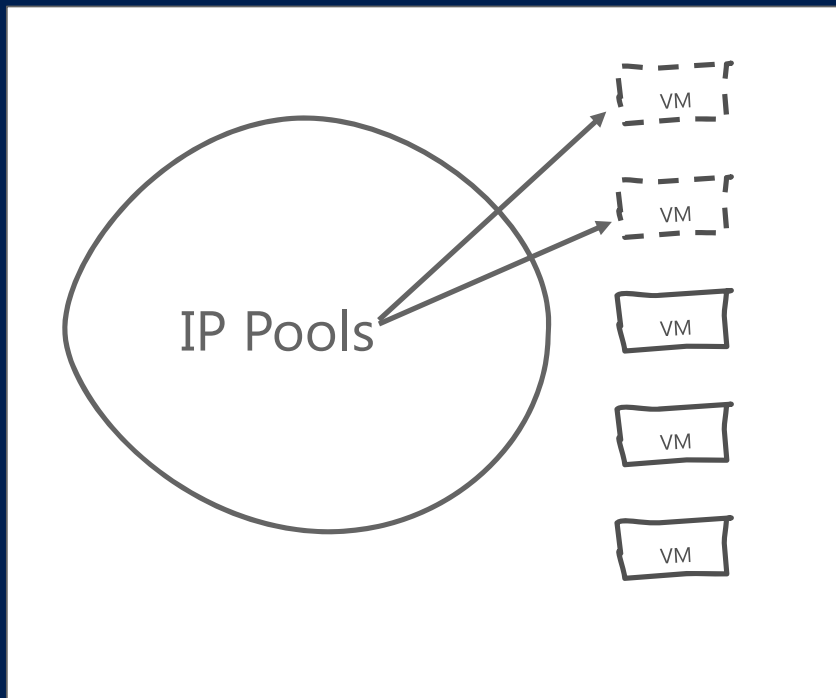
Customers want to deploy a highly available SQL farm



- Create guest clusters using new script options with service templates
- First VM can have its own scripts
- Shared VHDX stored on shared file storage (CSV or File Server)

IP Address Management

Customers need new VMs for the application on their network



- Many VMs require many IP addresses
- Need centralized management of the address space
- Want IPAM and VMM to be integrated

What is Software-defined Networking (SDN)?

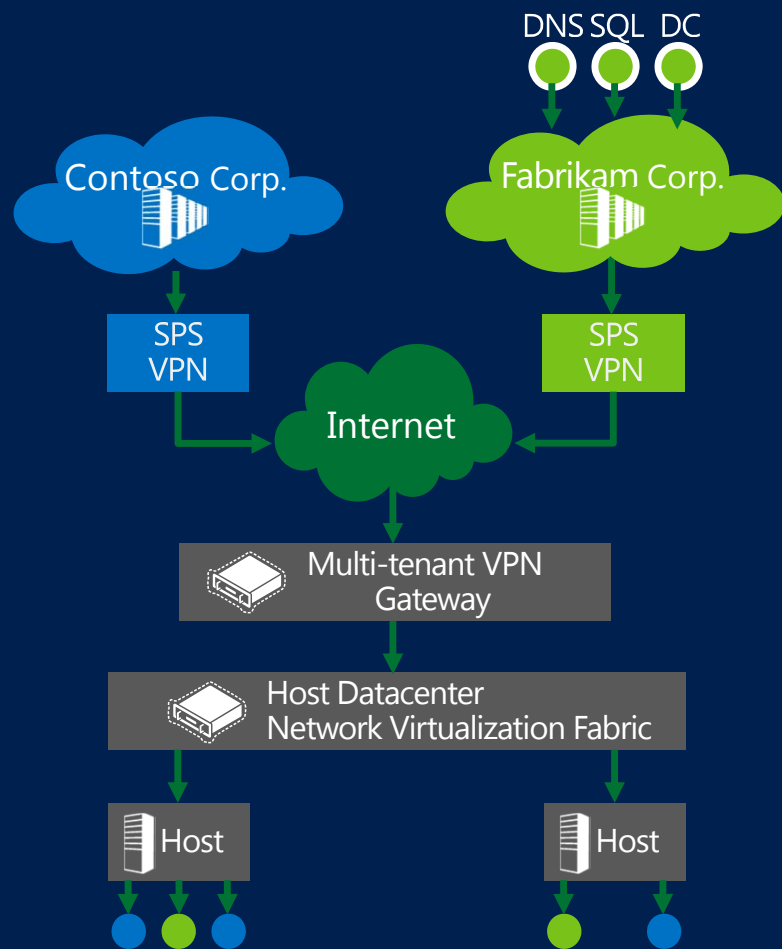
Enables software to dynamically manage the network

Abstracting the physical network with virtual networks

Spanning policies across physical and virtual networks

Controlling datacenter traffic flow

Hyper-V Network Virtualization Concepts



Default Gateway

Routes between VMs on different Virtual Subnets

Built into the HNV Filter running on each host

HNV Gateway

Required to communicate outside a virtual network

Comes in different forms:

VPN for Site-to-Site connectivity

Load Balancing & NAT for Internet access

Forwarding gateway for in datacenter physical machine access

Hyper-V Network Virtualization Benefits

Workload Owners

- Seamless migration to the cloud
- Move n-tier topology to the cloud
- Preserve policies, VM settings, IP addresses

Enterprises

- Private Cloud datacenter consolidation and efficiencies
- Extension of datacenter into hybrid cloud
- Incremental integration of acquired company network infrastructure

Hosters

- Bring Your own IP
- Bring Your network topology
- Scalable multi-tenancy

Private/Public Cloud Datacenter Admins

- Flexible VM placement without reconfiguration
- Decoupling of server and network admin roles increases agility

Multi-tenant cloud infrastructure: virtual networks

Open, extensible and standards-based solution that delivers flexibility, automation and control

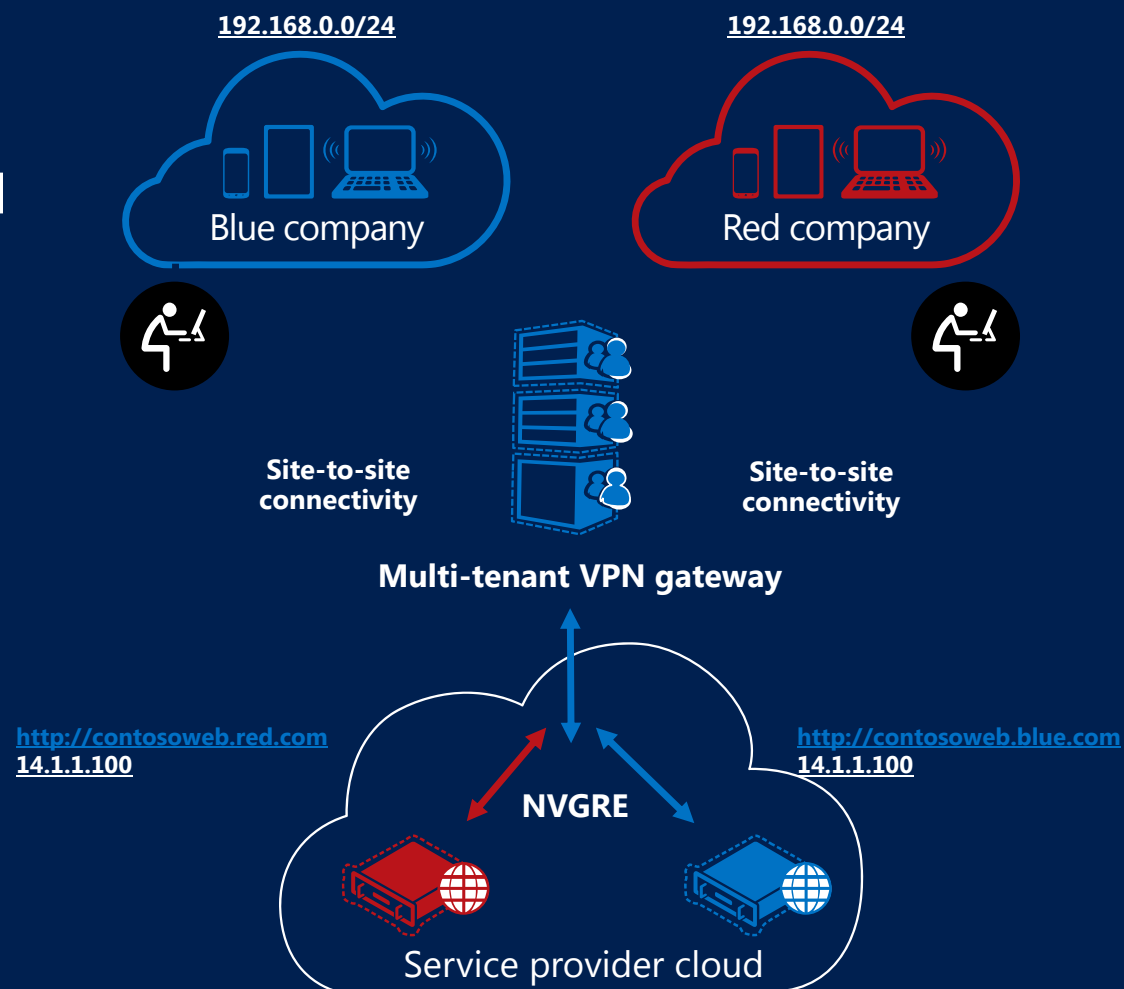
At-scale management of virtual networks on shared physical networks

Provision and configure multi-tenant edge gateway for seamless physical & virtual network connectivity

Enable easy remote access into virtualized service provider network for tenants

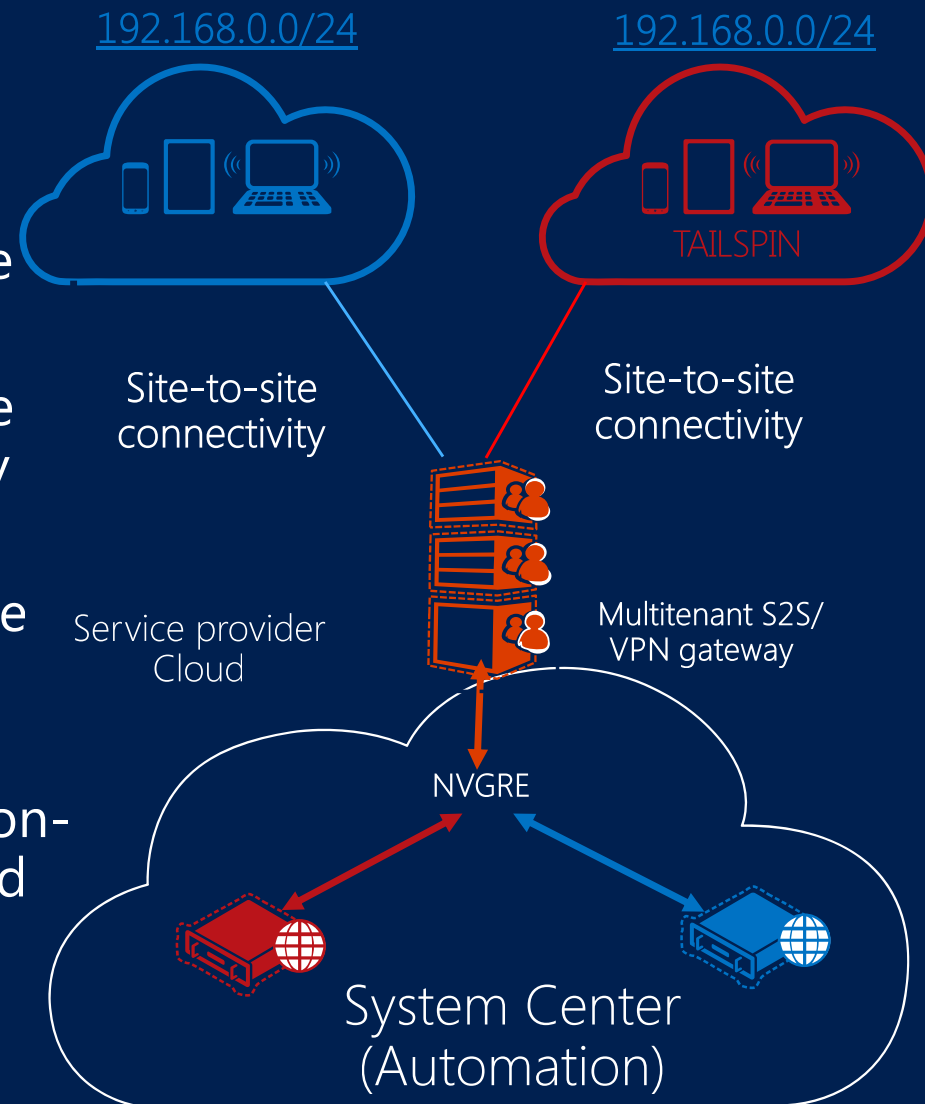
OMI-based plug-in for automated TOR switch configuration

Partner ecosystem support



S2S: Scenarios

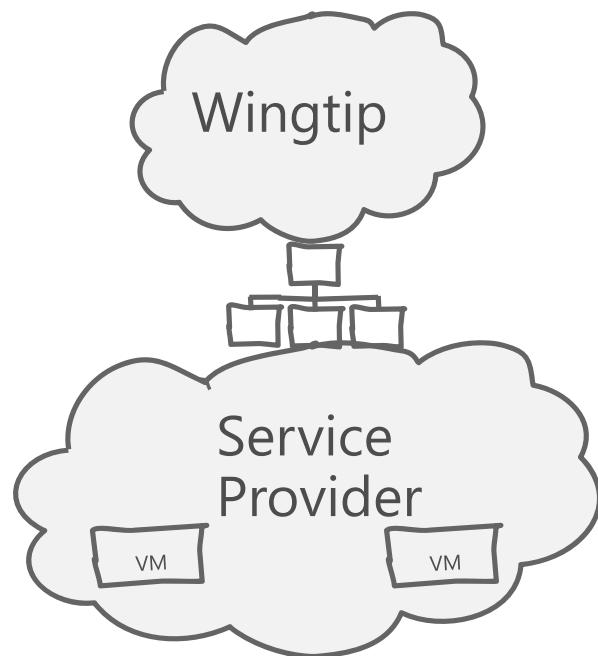
- Customer can connect multiple sites to a service provider
- Service providers can remote access for multiple customers (tenants) on a single site-to-site gateway
- Service providers can allow customers to bring their own IP address and provide them access to the internet directly in addition to a site-to-site connectivity
- When a customer updates routing table on his on-premise datacenter it automatically gets propagated to his virtual network on the service provider data center.



Site to site networking

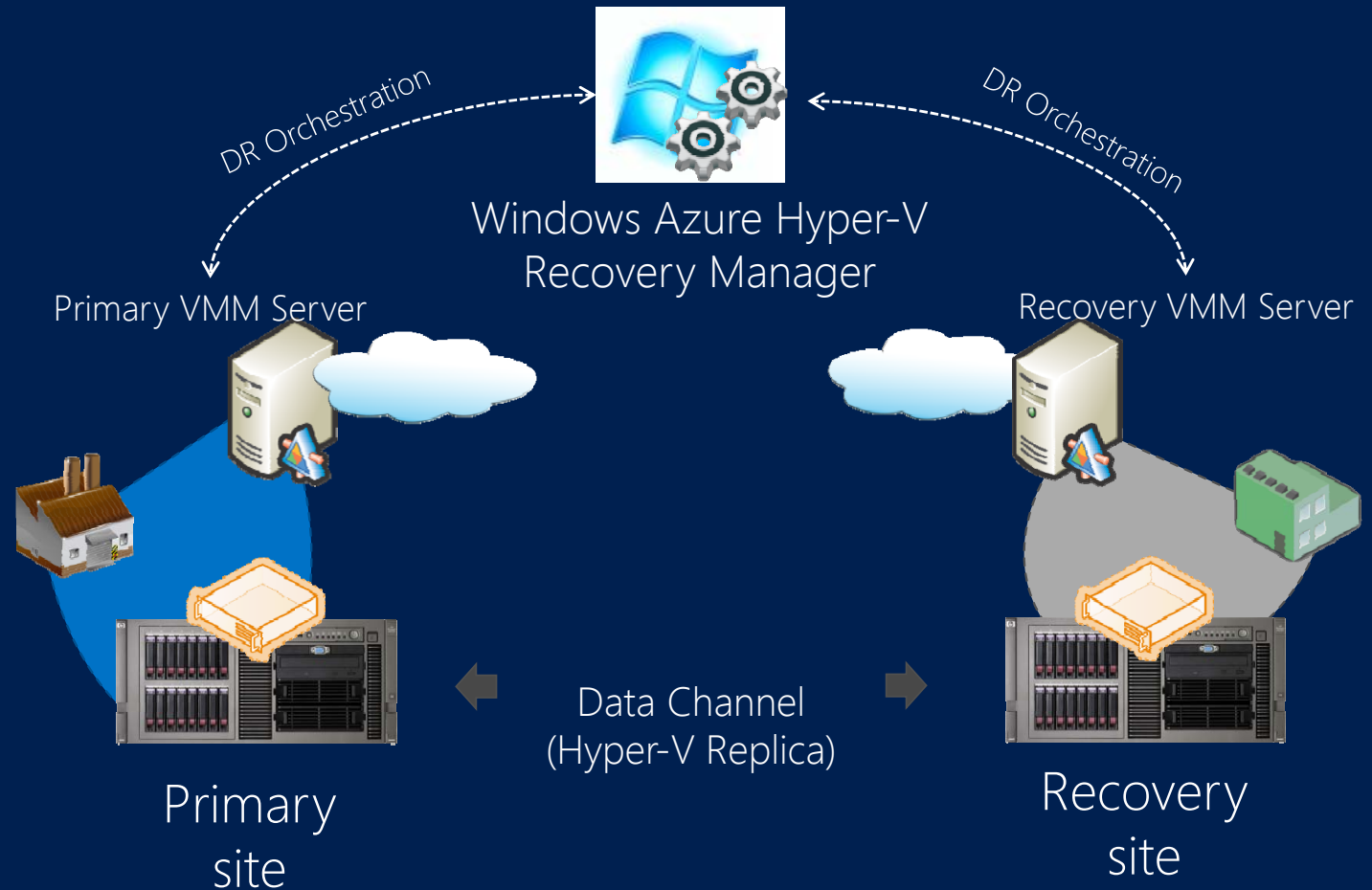
Customer is also testing a business application with a new OS

- Need more capacity
- Do not want to use CapEX or IT time
- VMs need to be in Wingtip's domain
- Wingtip → Contoso Web portal to create networks
- Contoso → VMM automates creation of networks



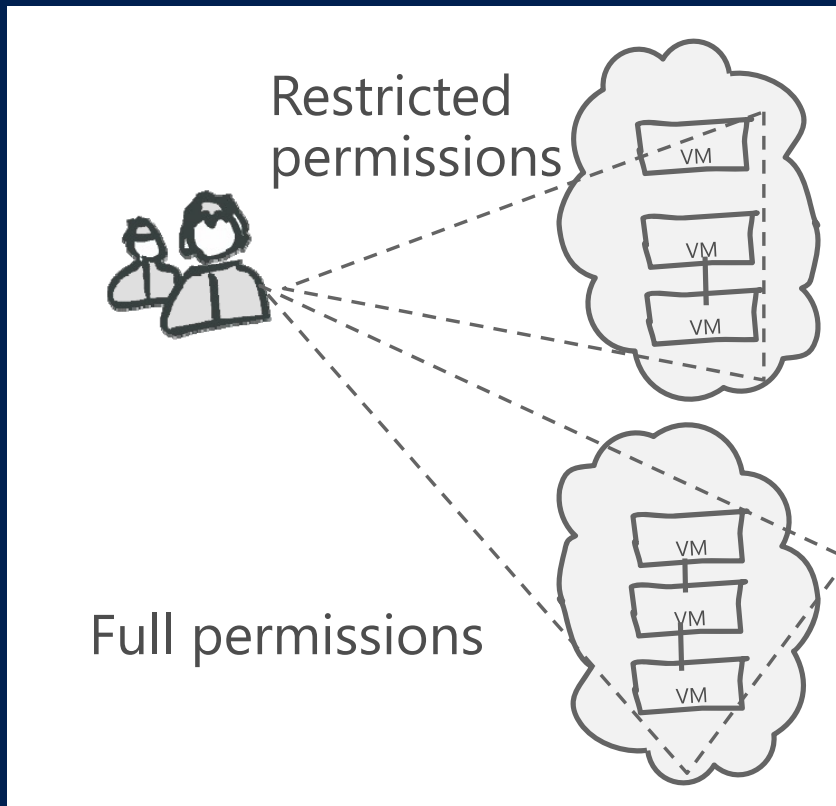
Windows Azure Hyper-V Recovery Manager

- Simple
- Single Console for recovery across different clouds
- Automation



Delegation : Actions per cloud

Customer developers need different permissions for different clouds



- For example:
 - Start and stop for VMs on gold cloud
 - Full permissions for the silver cloud

Demo

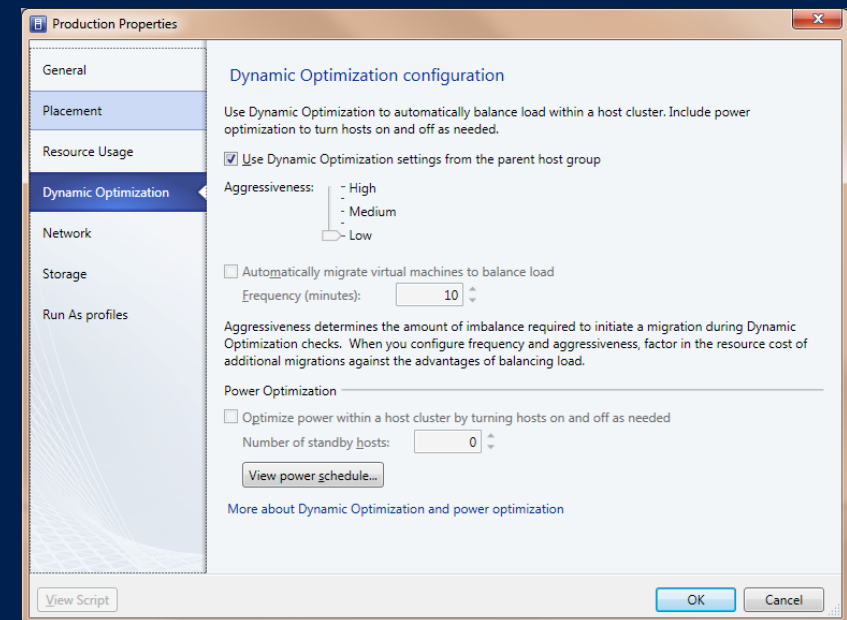
Delegation

Dynamic Optimization

- Feature in VMM 2012
- Rebalances VMs across hosts
- Live migration
 - Keeps cluster balanced
 - Avoids VM downtime
 - Supports heterogeneous clusters
- Managed resources
 - Considers CPU, memory, disk IO, network IO
 - Optimize when above resource threshold
 - Considers entire cluster

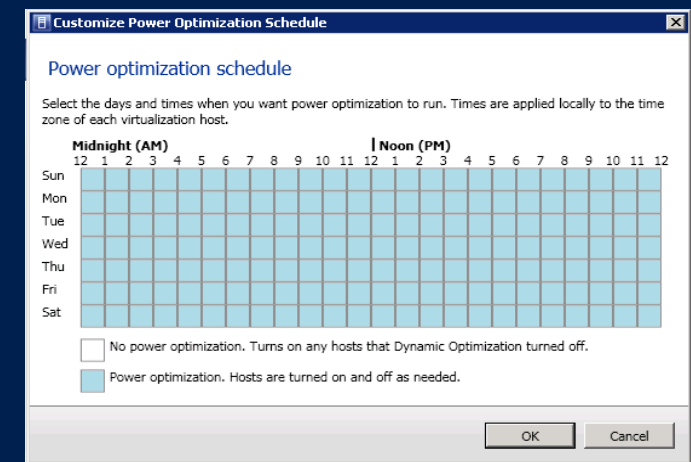
- Options

- Manual or automatic
- User controlled frequency
- Configurable aggressiveness



Power Optimization

- Feature in VMM 2012
- Rebalance the workload and turn off machines when using Dynamic Optimization
- Conserve energy in the data center
- Keeps the cluster balanced, and avoids VM downtime or latency through lack of resources
- Uses out-of-band power management
- User defined schedule



SCApp Controller : Unified management view across clouds

Cloud	System Type	Connection Name	Description	vCPUCapacity	Memory Capacity	Storage Capacity	VM Count
←Cloud System Name: ContosoDC-LAS							
Customer Service	SCVMM 2012	ContosoDC-LAS		6/38	16/100 GB	2037/12176 GB	2/12
Finance	SCVMM 2012	ContosoDC-LAS		4/8	69/71 GB	2532/3633 GB	6/16
Human Resources	SCVMM 2012	ContosoDC-LAS		22/38	62/104 GB	7434/12434 GB	8/14
Marketing	SCVMM 2012	ContosoDC-LAS		40/58	137/198 GB	15299/21962 GB	15/22
Sales	SCVMM 2012	ContosoDC-LAS		21/30	46/66 GB	6082/8686 GB	7/10
←Connection Name: FabrikamHosting							
Gold	SCVMM 2012	FabrikamHosting		40/58	137/198 GB	15299/21962 GB	15/22
Silver	SCVMM 2012	FabrikamHosting		5/52	19/172 GB	2233/19370 GB	2/20
←Cloud System Name: Windows Azure							
Marketing	Windows Azure	Windows Azure					
Sales	Windows Azure	Windows Azure					

Flexible delegation with single sign-on

Self-service visibility for application services across on-premises, service provider, and Windows Azure

Easy VM and workload portability from on-premises to Windows Azure (including SharePoint and SQL)

Services on the Cloud

The screenshot displays the Microsoft System Center 2012 App Controller interface. The top navigation bar includes the Microsoft System Center 2012 logo and the App Controller title with 'Sign out' and 'Help' links. A left-hand navigation pane lists 'Overview', 'Clouds', 'Services', 'Virtual Machines', 'Library', 'Jobs', and 'Settings', with 'Services' selected. The main content area is titled 'All Deployed Services (1) filtered' and contains a table with the following data:

Name	Status	Virtual Machine Status	Cloud Name
MyToDoApplication	Running		My Azure Subscription

Below the table, the details for 'MyToDoApplication' are shown. On the left, a list of properties includes:

- Status: Running
- Service type: Windows Azure
- Cloud service: MMSHOL
- Environment: Production
- Description: New cloud service
- Location: West US
- URL: <http://mmshol.cloudapp.net/>

On the right, a hierarchical diagram shows the service structure:

- CLOUD SERVICE: MMSHOL
 - DEPLOYMENT: MyToDoApplication
 - ROLE: MyToDo.WebRole
 - INSTANCE: MyToDo.WebRole_IN_0

Thank You

Summary

Full list of new features in VMM 2012R2

Infrastructure investments

- Guest and host support for Windows 2012 R2
- Auto-task resume after VMM server failover
- Expanded scope for update management
- Updated management packs:
 - Better integration with chargeback and reporting
 - Additional dashboards

Networking investments

- Site-to-site networking
- IP Address Management (IPAM) integration
- Simplified guest IP management
- Top of rack switch integration
- Making forwarding extensions for Hyper-V extensible switch work with Hyper-V network virtualization (Cisco 1KV and NVGRE)

Storage investments

- Synthetic fibre channel support
- Management of zones
- Offloaded Data Transfer (ODX) support
- Shared VHDX support
- Provision scale-out file server cluster from bare metal
- Integration with differencing disks

Services investments

- Run scripts on first machine on a tier
- Shared VHDx across members of a tier
- Service Setting for Service Topology
- Service deployments work for VMs on Xen

VM and cloud investments

- Differencing disks
- Live cloning
- Online VHDX resize
- Grant permissions to users for each cloud
- Ability to inject files into VM prior to the first boot