What's New in Microsoft Server 2012? #TECH1

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Agenda

- Windows Server 2102
  - Hyper-V
  - Storage Spaces
  - DirectAccess
  - Dynamic Access Control

Hyper-V

Hyper-V: Top Features

- Configuration & Performance
  - SMB 3.0 cluster support (HA with cheap disk)
  - Dynamic Memory
    - Support for minimum/startup/maximum memory
    - Hyper-V Smart Paging
    - Runtime configuration changes
  - Virtual Fibre Channel Ports/Multi-Path I/O
    - Guest Clustering support
    - Built in adapter teaming

Hyper-V: Top Features

- Management
  - Resource Metering
  - VHDX - Failover resiliency
  - Incremental Backups during Runtime
  - Asynchronous replication to another Hyper-V host

Hyper-V: Top Features

- Management (Cont)
  - Automated load balancing with System Center 2012
  - Hyper-V Replica (unlimited replicas without need for shared storage)
  - Offline VHD File Support
  - Bitlocker support for cluster disks
  - Live Migration (no shared storage requirement)

Hyper-V: Top Features

- Cloud Ready
  - Integration with Windows Azure
  - Create Private/Public clouds
  - Virtual storage (Storage Spaces)
  - Virtual Networking
  - Easily move resources between clouds

Hyper-V: Changes from Server 2008

	Resource	Windows Server 2008 R2 Hyper-V	Windows Server 2012 Hyper-V	Improvement Factor
Host	Logical Processors	64	**320**	**5×**
	Physical Memory	1TB	**4TB**	**4×**
	Virtual CPUs per Host	512	**2,048**	**4×**
VM	Virtual CPUs per VM	4	**64**	**16×**
	Memory per VM	64GB	**1TB**	**16×**
	Active VMs per Host	384	**1,024**	**2.7×**
	Guest NUMA	No	**Yes**	**-**
Cluster	Maximum Nodes	16	**64**	**4×**
	Maximum VMs	1,000	**8,000**	**8×**

Hyper-V: Performance

- Dramatic performance gains over 2008
- Better performance than VMWare for running Windows VMs

Clocking Windows VMs: Sandra 2013 benchmark results				
	Hyper-V 2008 R2	Hyper-V 2012	vSphere 5.0	vSphere 5.1
Cryptographic bandwidth (MBps)	79	597	370	378
Dhrystone integer (GIPS)	12.52	16.86	11.76	12.21
Whetstone double (GFLOPS)	6.92	13.25	6.76	6.89
Intercore bandwidth (GBps)	1.71	1.44	1.15	1.12

*Source: Inforworld

Hyper-V vs VMWare vShphere

	Resource	Windows Server 2012 Hyper-V	VMware vSphere Hypervisor	VMware vSphere 5.1 Enterprise Plus
Host	Logical Processors	**320**	160	160
	Physical Memory	**4TB**	32GB	2TB
	Virtual CPUs per Host	**2,048**	2,048	2,048
VM	Virtual CPUs per VM	**64**	8	64
	Memory per VM	**1TB**	32GB	1TB
	Active VMs per Host	**1,024**	512	512
	Guest NUMA	**Yes**	Yes	Yes
Cluster	Maximum Nodes	**64**	N/A	32
	Maximum VMs	**8,000**	N/A	4,000

Hyper-V vs VMWare vShphere

Capability	Windows Server 2012 Hyper-V	VMware vSphere Hypervisor	VMware vSphere 5.1 Enterprise Plus
Nodes per Cluster	**64**	N/A	32
VMs per Cluster	**8,000**	N/A	4,000
Maximum Guest Cluster Size (iSCSI)	**64 Nodes**	0	16
Maximum Guest Cluster Size (Fiber)	**64 Nodes**	5	5
Maximum Guest Cluster Size (File Based)	**64 Nodes**	0	0
Guest Clustering with Live Migration	**Yes**	N/A	No
Guest Clustering with Dynamic Memory	**Yes**	No	No

Hyper-V vs VMWare vShphere

Capability	Windows Server 2012 Hyper-V	VMware vSphere Hypervisor	VMware vSphere 5.1 Enterprise Plus
Virtual Machine Live Migration	**Yes**	No	Yes
1GigE Simultaneous Live Migrations	**Unlimited**	N/A	4
10GigE Simultaneous Live Migrations	**Unlimited**	N/A	8
Live Storage Migration	**Yes**	No	Yes
Shared-Nothing Live Migration	**Yes**	No	Yes
Network Virtualization	**Yes**	No	VXLAN

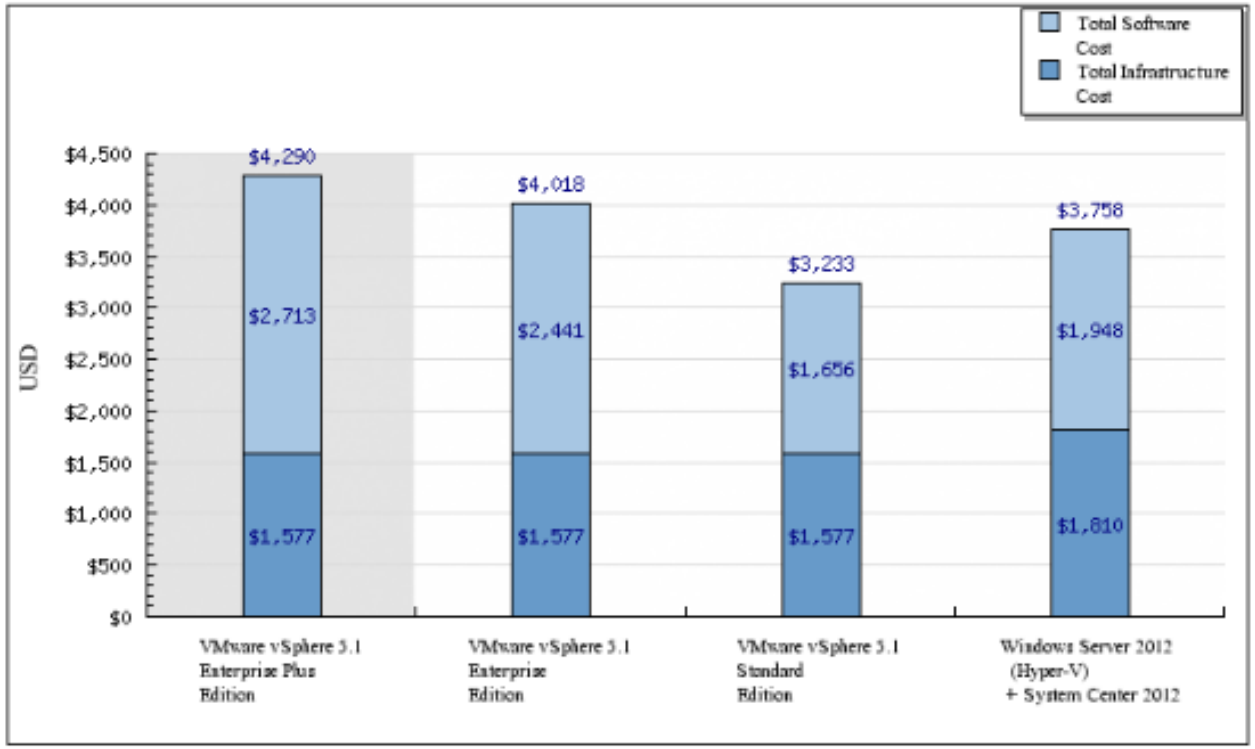
Hyper-V: Licensing

- Two Editions
  - Standard: 2 VMs per CPUs
  - DataCenter: Unlimited VMs per CPU
- Pricing based on number of CPUs
  - One Hyper-V licence per 2 physical processors

Hyper-V vs VMWare vShphere Cost Comparison

	VMware vSphere 5.1			Microsoft
	Enterprise Plus Edition	Enterprise Edition	Standard Edition	Hyper-V + System Center 2012
Number of applications virtualized*	102	102	102	107
Number of VMs per host	7	7	7	6
Number of hosts	15	15	15	18
Infrastructure Costs	$157,723	$157,723	$157,723	$180,973
Software Costs	$271,309	$244,060	$165,563	$194,778
Total Costs	$429,032	$401,783	$323,286	$375,751
Cost-per-application	$4,290	$4,018	$3,233	$3,758
Cost-per-application Savings	-14%	-7%	14%	

Hyper-V vs VMWare vShphere Cost Comparison



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Hyper-V Summary & Benefits

- Cost Savings
  - Higher density of VMs per Hyper-V host
  - Feature/Cost benefits vs. VMWare
- Increased performance for Windows guest VMs
- Cloud readiness

Storage Spaces

Storage Spaces - Overview

- Dynamic storage pools using JBOD
- Allows Windows to act like a SAN
- Isolates physical storage from application
- Storage pooled across multiple locations
- Continuous availability
- Live/dynamic storage changes

Storage Spaces – Top Features

- Pooling of disks for storage
- Flexibility
- Resiliency
- Data striping
- Enclosure awareness
- Data de-duplication
- Reliance on JBOD: Low Cost/High Performance

Storage Spaces – Potential Cost Savings

- Windows release team example:
  - 720 Pbytes weekly volume
  - 20 file servers
  - 10 GbE connections
  - 20 60-bay JBODs with 3 TB 7200 RPM hard drives
- Cost per terabyte of $450 rather than $1350.
- Storage throughput allowed reduction to 20 file servers from 120

Storage Spaces – Changes in Server 2012 R2

- Tiered storage using mainstream SSDs
- OS automatically moves ‘hot’ data to the SSDs
- New write-back cache
  - Distributes short term ‘spikes’ in random writes for smoother performance

Storage Spaces vs. SAN

Feature	Traditional SAN	Storage Spaces
Tiered Storage	Y	Y (R2)
Data Deduplication	Y	Y
RAID Resiliency	Y	Y
Disk Pooling	Y	Y
High Availability	Y	
Continuous Availability		Y
Persistent write-back cache	Y	Y (R2)
Snapshots	Y	Y

Storage Spaces Summary & Benefits

- Lower cost alternative to SAN
- Excellent performance
- Built in redundancy/reliability
- Simplified re-allocation of storage in the Cloud

Dynamic Access Control

Dynamic Access Control – Overview

- Data Governance for Windows file shares
- Manual and automatic tagging of data based on rules
- Central access policies for data access

Dynamic Access Control – Top Features

- Centralized auditing of file access
- RMS (Rights Management Services Integration) for encrypting files based on rules
- Dynamic/Conditional access to files
- Claims based authentication – validates user, not the application accessing data

Dynamic Access Control Summary & Benefits

- Granular Access Control
- Enables enforcement of Information Governance Policy
  - Auditing
  - Dynamic
  - Role Based

DirectAccess

DirectAccess - Overview

- Clientless VPN for Windows 7/8
- No user interaction
- Auto-enables all applications to work remotely

DirectAccess – Top Features

- Single server/NIC deployment
- Kerberos proxy for client authentication
- Load balancing
- Co-existence behind NAT devices
  - Single NIC deployments
- Multi-Site support

DirectAccess – Summary & Benefits

- Built into Windows 7/8
  - No 3rd party VPN clients requiredPotential Cost Savings
  - Simplified licensing (uses Windows CALs)
- Ease of use
  - No user interaction
- Simplified deployment
- Cost savings

Discussion

Capability	Resource	Windows Server 2012 Hyper-V	VMware vSphere 5.0 Ent Plus
Scalability, Performance, Density	Active Virtual Machines Per Host	1,024	512
	Memory Per Virtual Machine	1 TB	1 TB
	Virtual Processors Per Virtual Machine	64	32
	Maximum Nodes Per Hyper-V Cluster	64	32
	Maximum Virtual Machines Per Hyper-V Cluster	4,000	3,000
	High Performance VM Networking with SR-IOV	Yes	No
Storage	Native 4KB disk support	Yes	No
	Maximum Virtual Disk Size	64 TB	2 TB
	Encrypted Cluster Storage	Yes	No
Secure Multitenancy	Open Extensible Switch	Yes	Closed
	Resource Meeting	Yes	Chargeback Req.
Flexible Infrastructure	1GB simultaneous Live Migrations	Unlimited	4
	10GB Simultaneous Live Migrations	Unlimited	8
	Live Storage Migration	Yes	Yes
	Shared-Nothing Live Migration	Yes	No
	Network Virtualization	Yes	Cisco Req.
High Availability	Virtual machine replication	Yes	SRM Req.
	Guest OS Application Monitoring	Yes	API Only
	Guest Clustering With Live Mig & Dyn Memory	Yes	No