

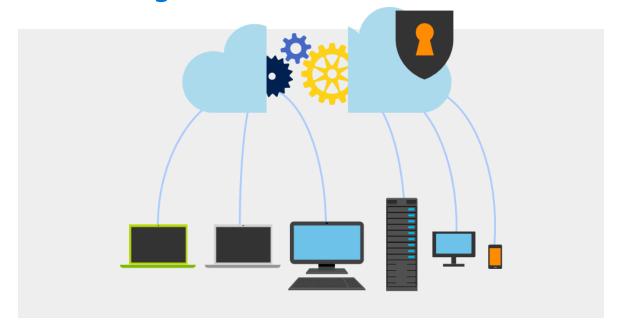
IT is being pulled in two directions

Support business agility and innovation

Provide secure, controlled IT resources

By 2017, 50% of total IT spending will be spent outside of the formal IT organization*





*Source: Gartner Group, 2016

Demands on the overwhelmed IT department

We need to run IT more efficiently.

Where is that compliance report?

Security is top priority. I don't want to be the next headline for a breach.

We need apps that keep us ahead of the competition.

I can't wait for IT to get organized when I can get it done faster outside.

But my app worked great when I handed it off.







Cheaper Better Faster

Windows Server design points

Provide layered security for emerging threats

Build the software-defined datacenter

Accelerate business agility with apps built on Windows Server

1

2

10 reasons you'll love Windows Server 2016

1 Privileged identity

6 Remote Desktop Services (RDS)

2 Security

7 Nano Server

3 Compute

8 Containers

4 Storage

9 PowerShell

5 Network

10 Server management tools

10 reasons you'll love Windows Server 2016

Security

- Privileged identity
- 2 Security

Application platform

- Nano Server
- 8 Containers

SDDC

- 3 Compute
- 4 Storage
- 5 Network
- Remote Desktop Services (RDS)

Management

- 9 PowerShell
- 10 Server management tools

1 Privileged identity



Challenges in protecting credentials



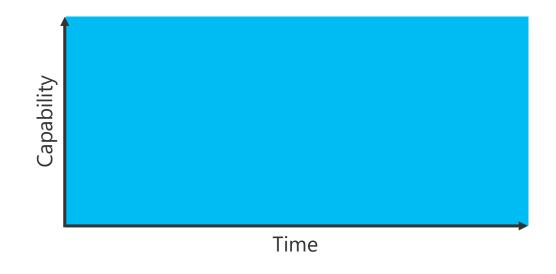
Social engineering leads to credential theft.

Most attacks seek out and leverage administrative credentials.

Administrative credentials often inadvertently provide more privilege than necessary—and for an unlimited time.



Typical administrator



Protecting privileged credentials



Credential Guard

Prevents Pass-the-Hash and Pass-the-Ticket attacks by protecting stored credentials through virtualization-based security.

Remote Credential Guard

Works in conjunction with Credential Guard for RDP sessions to deliver Single Sign-On (SSO), eliminating the need to pass credentials to the RDP host.

Just Enough Administration

Limits administrative privileges to the bare-minimum required set of actions (limited in space).

Just-in-Time Administration

Provides privileged access through a workflow that is audited and limited in time.



Just Enough and Just in Time administration



Help protect Active Directory, admin privileges http://aka.ms/privsec

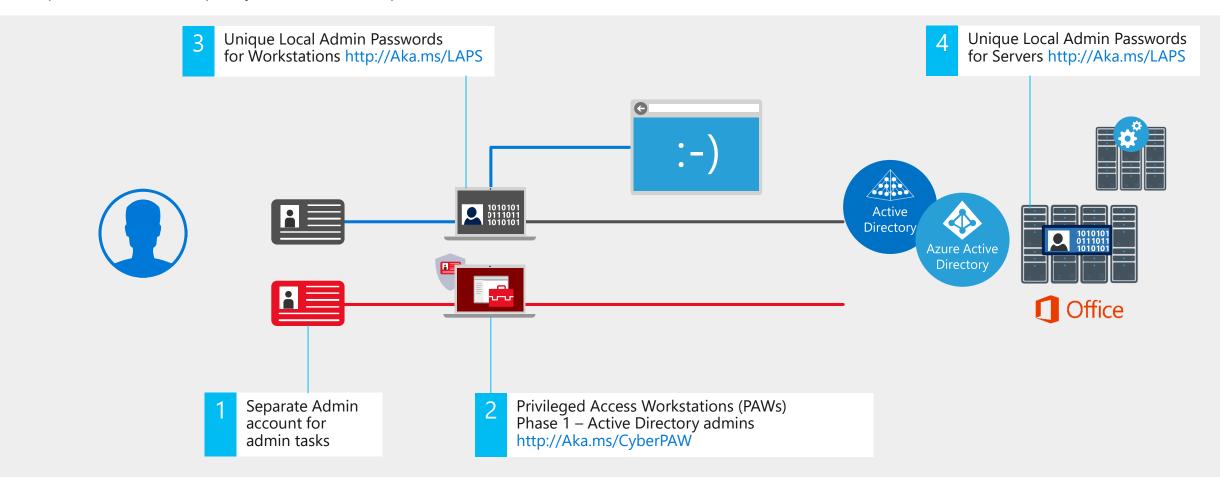


2-4 weeks

1-3 months

6+ months

First response to the most frequently used attack techniques.



Help protect Active Directory, admin privileges http://aka.ms/privsec

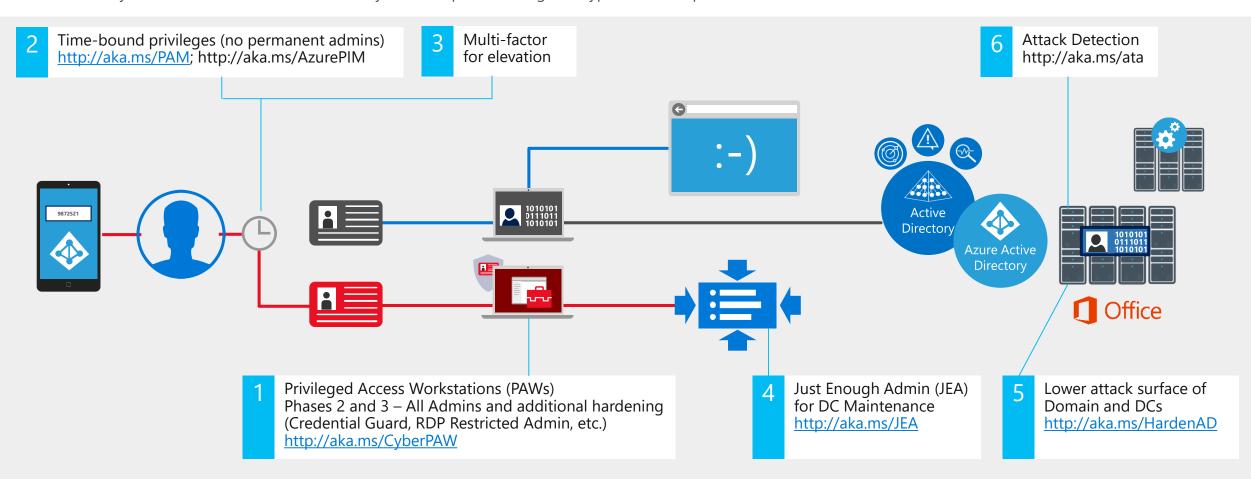


2-4 weeks

1-3 months

6+ months

Build visibility and control of administrator activity, increase protection against typical follow-up attacks.

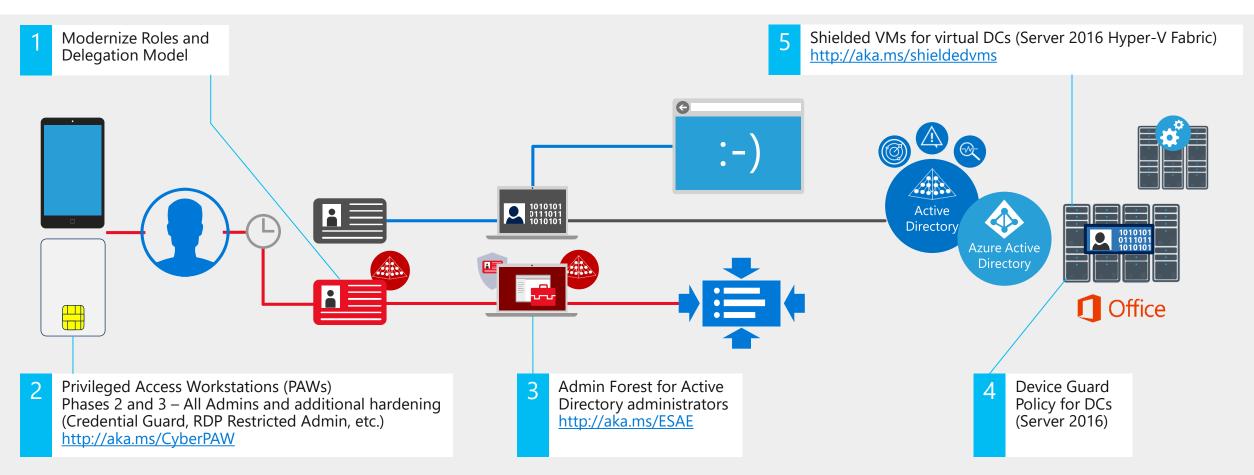


Help protect Active Directory, admin privileges http://aka.ms/privsec



2-4 weeks 1-3 months 6+ months

Build visibility and control of administrator activity, increase protection against typical follow-up attacks.



Works with Azure Multi-factor Authentication



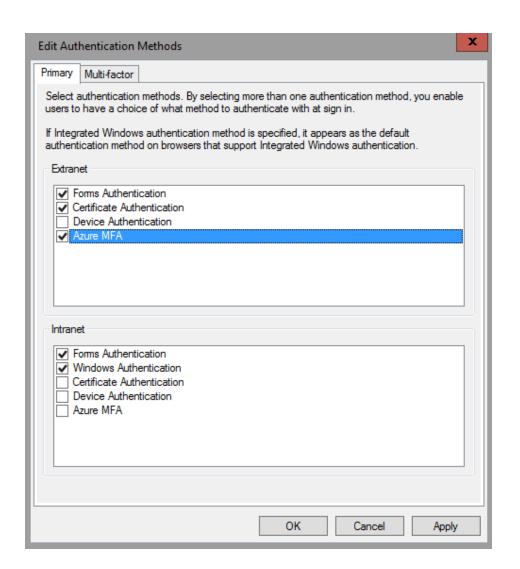
No on-premises Multi-factor Authentication (MFA) server needed.

Use as primary or additional authentication method.

Configure AD FS farm via PSH.

Then enable Azure MFA in AD FS policy (as you would with other providers).

Users must proof up in AAD/O365 (no inline proofing in the AD FS user experience).



2 Security



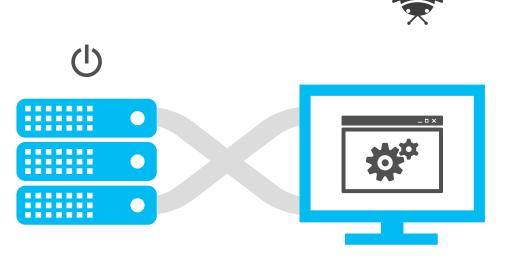
Challenges in protecting the OS



New exploits can attack the OS boot-path all the way up through applications operations.

Known and unknown threats need to be blocked without impacting legitimate workloads.











Features to help protect the OS



Device Guard

Ensure that only permitted binaries can be executed from the moment the OS is booted.

Windows Defender

Actively protects from known malware without impacting workloads.

Control Flow Guard

Protects against unknown vulnerabilities by helping prevent memory corruption attacks.



Challenges protecting virtual machines

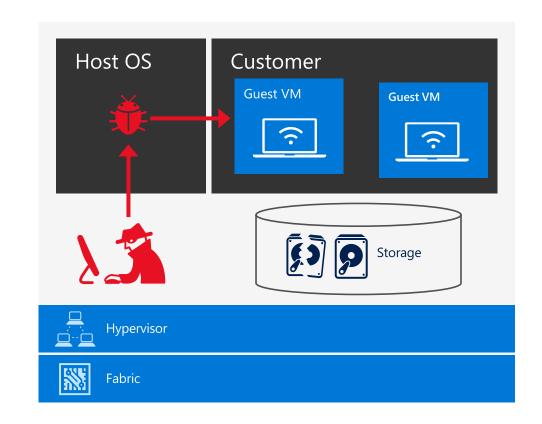


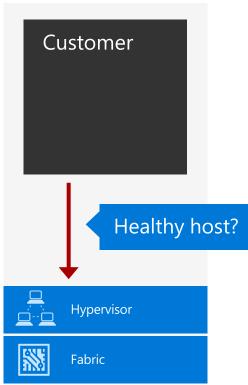
Any compromised or malicious fabric administrators can access guest virtual machines.

Health of hosts not taken into account before running VMs.

Tenant's VMs are exposed to storage and network attacks.

Virtual machines can't take advantage of hardware-rooted security capabilities such as TPMs.





Features to help protect virtual machines



Shielded Virtual Machines

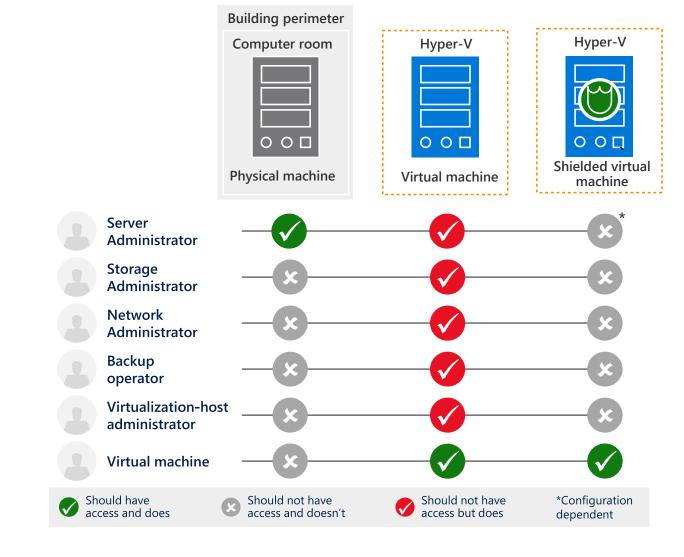
Use BitLocker to encrypt the disk and state of virtual machines protecting secrets from compromised admins and malware.

Host Guardian Service

Attests to host health releasing the keys required to boot or migrate a Shielded VM only to healthy hosts.

Generation 2 VMs

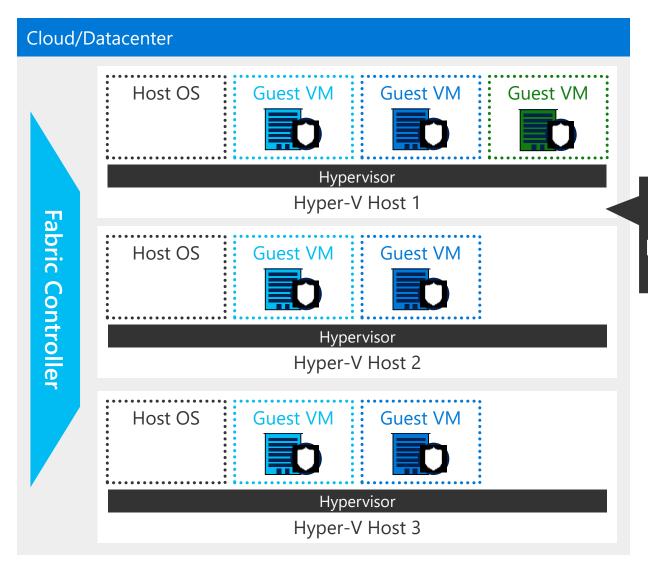
Supports virtualized equivalents of hardware security technologies (e.g., TPMs) enabling BitLocker encryption for Shielded Virtual Machines.



Shielded Virtual Machines

Works with Host Guardian Service





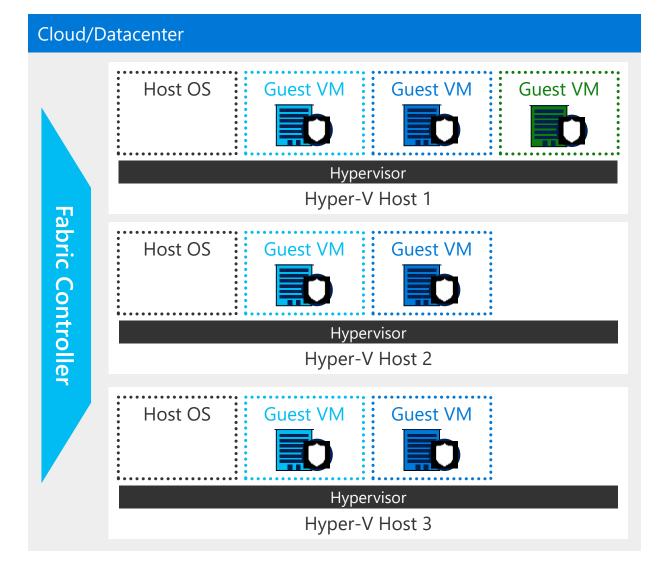
Please sir, may I have some keys?



Host Guardian Service

Shielded Virtual Machines

Works with Host Guardian Service





Key release criteria

(TPM-mode)

- 1. Known physical machines
- 2. Trusted Hyper-V instance
- 3. CI-compliant configuration

Sure, I know you and you look healthy

Key Protection

Host Guardian Service

3 Compute



Challenges customers face





"I need to remove bottlenecks and optimize resource utilization for all my virtual machines."



"I need to perform updates without impacting any workloads, and make sure hardware disruptions don't turn into business disruptions."



"I need to efficiently integrate more operating systems, storage types, and hardware configurations into my solution and manage it seamlessly."

Windows Server 2016 Hyper-V scale limits



Windows Server 2012/2012 R2 Standard and Datacenter		Windows Server 2016 Standard and Datacenter	VMware vSphere 6 Enterprise Plus
Up to 4 TB per physical server		Up to 24 TB per physical server (6x)	Up to 6 TB per physical server (12 TB for specific OEM certified platform)
Up to 320 LPs		Up to 512 LPs	Up to 480 LPs
Up to 1 TB per VM		Up to 12 TB per VM (12x)	Up to 4TB per VM
Up to 64 VPs per VM		Up to 240 VPs per VM (3.75x)	Up to 128 VPs per VM
	Up to 4 TB per physical server Up to 320 LPs Up to 1 TB per VM Up to 64	Up to 4 TB per physical server Up to 320 LPs Up to 1 TB per VM Up to 64	Up to 4 TB per physical server Up to 320 LPs Up to 512 LPs Up to 1 TB per VM Up to 12 TB per VM (12x)

Increase reliability with cluster



Cluster OS Rolling Upgrades

Upgrade your fabric to Windows Server 2016, without downtime to workloads running on Hyper-V virtual machines.

Mixed OS Mode cluster

Provides ability for Windows Server 2012 R2 cluster nodes to operate with Windows Server 2016 nodes.

VM resiliency

Designed for cloud-scale environments, this helps preserve VM session state in the event of transient storage or network disruptions.

Fault domain-aware clusters

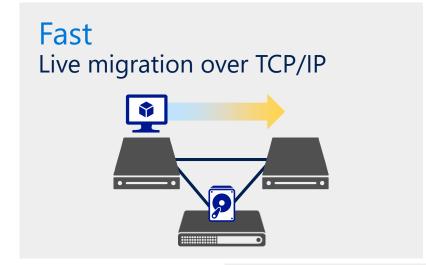
Enhances key operations during cluster lifecycle such as failover behavior, placement policies, heartbeating between nodes, and quorum behavior.

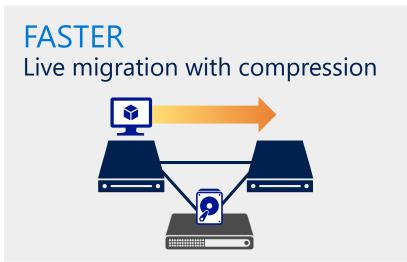


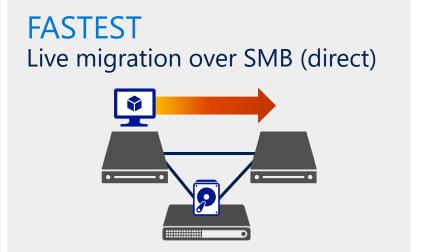
High-performance live migration



Complete virtual machine migration flexibility











Flexibility: Linux support on Hyper-V



Broad support: Run Red Hat, SUSE, OpenSUSE, CentOS, Ubuntu, Debian and Oracle Linux, with full support.

Increased utilization: Run Windows and Linux side-by-side, driving up utilization and reducing hardware costs.

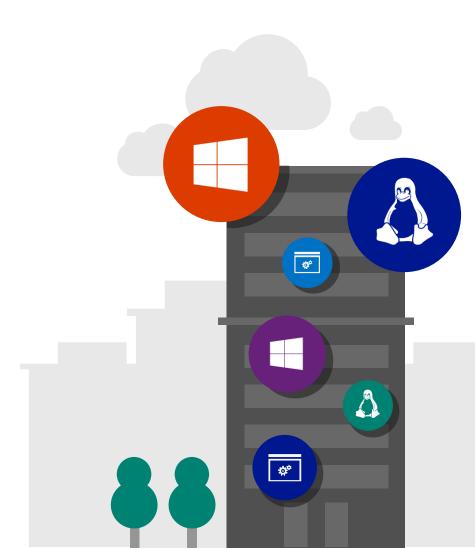
Enhanced networking: Highest levels of networking performance in Linux guests with virtual Receive Side Scaling (vRSS) support.

Storage enhancements: Hot-add and online-resize of storage for enhanced administration flexibility.

Better protection: Better-than-physical backup support for virtualized Linux guests on Hyper-V.

Simplified management: Single experience for managing, monitoring, and operating the infrastructure.

PowerShell support: Use PowerShell Desired State Configuration to declaratively specify the configuration of Linux servers.



4

Storage



Challenges customers face





Move faster

"Data volume grows faster than anything in my datacenter, and I have to be able to move faster than it does. Scaling current storage systems takes a lot of time and energy."



Reduce cost

"Cost structure is too high for purchasing and maintaining SAN and NAS arrays."



Gain flexibility

"I want to assign storage for each application based on priority and budget."

Choice Partner SAN





Cloud-powered SAN

- Azure Site Recovery (ASR) management of hardware replication and cross-site failover.
- Backup of traditional storage array to the cloud.



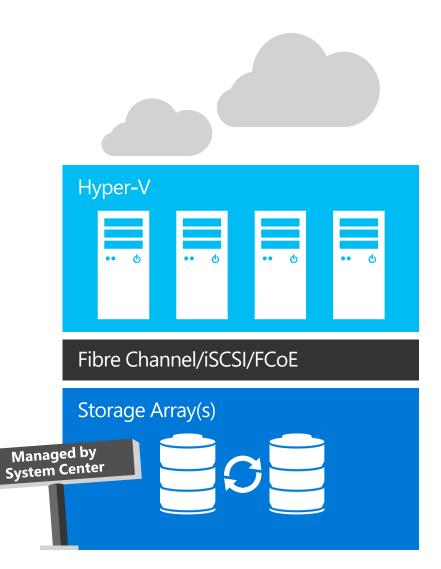
Single-pane-of-glass management

- End-to-end management with SCVMM.
- SMAPI for broad ecosystem interoperability.
- Deep health and availability insight of storage.
- Storage QoS for control of noisy neighbors.



Reducing disaster recovery costs

- In-box software replication with Storage Replica
- Lowering RPO with both sync and async replication
- Lowering RTO with Stretch Cluster and ASR automation



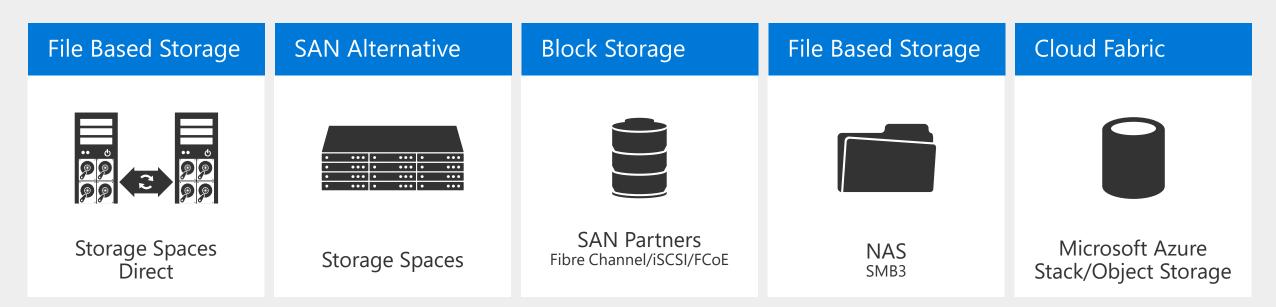
Choice On-premises storage



Microsoft offers industry leading portfolio for building on-premises clouds.

Microsoft embraces your choice of storage.

Microsoft offers solutions to reduce storage costs.

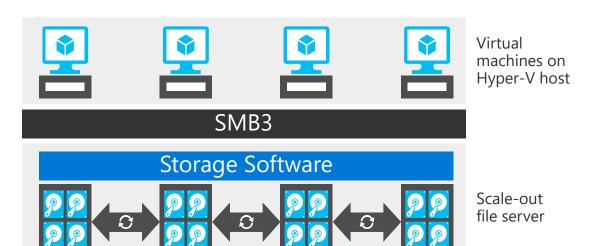


Converged solution

On-premises disaggregated solution

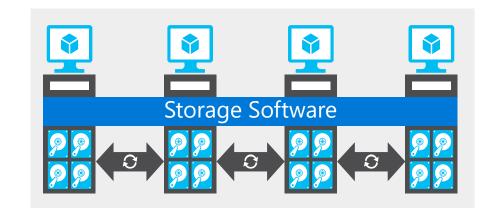
Hyper-converged Scale compute, storage simultaneously





Virtual Machines

Scale-out file server



Scale components separately in this model.

Simultaneous scaling is possible when compute (Hyper-V) and storage components (Storage Spaces Direct) reside on the same cluster.

Storage Replica

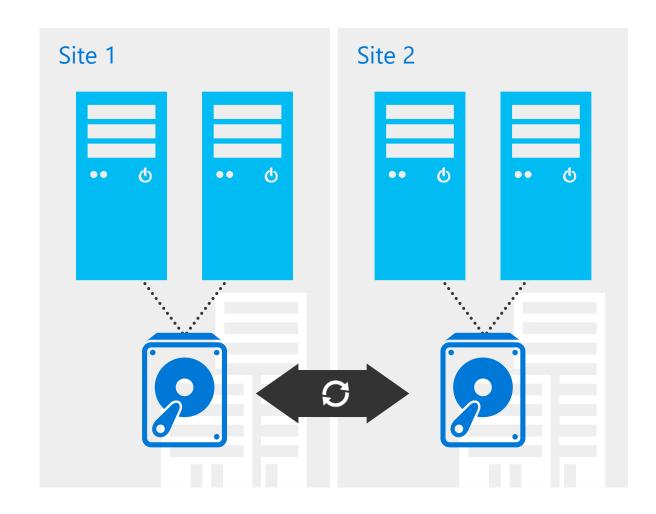


Synchronous replication: Storage agnostic mirroring of data in physical sites with crash-consistent volumes ensuring zero data loss at the volume level.

Increase resilience: Unlocks new scenarios for metrodistance cluster to cluster disaster recovery and stretch failover clusters for automated high availability.

Flexible: Server to server, cluster to cluster, and stretch cluster. Local disks, Storage Spaces Direct, clustered disks. NTFS, REFS, CSVFS. TCP, RDMA. Synchronous and asynchronous.

Streamlined management: Graphical management for individual nodes and clusters through Failover Cluster Manager and Azure Site Recovery. Full PowerShell and SMAPI support.



5

Networking

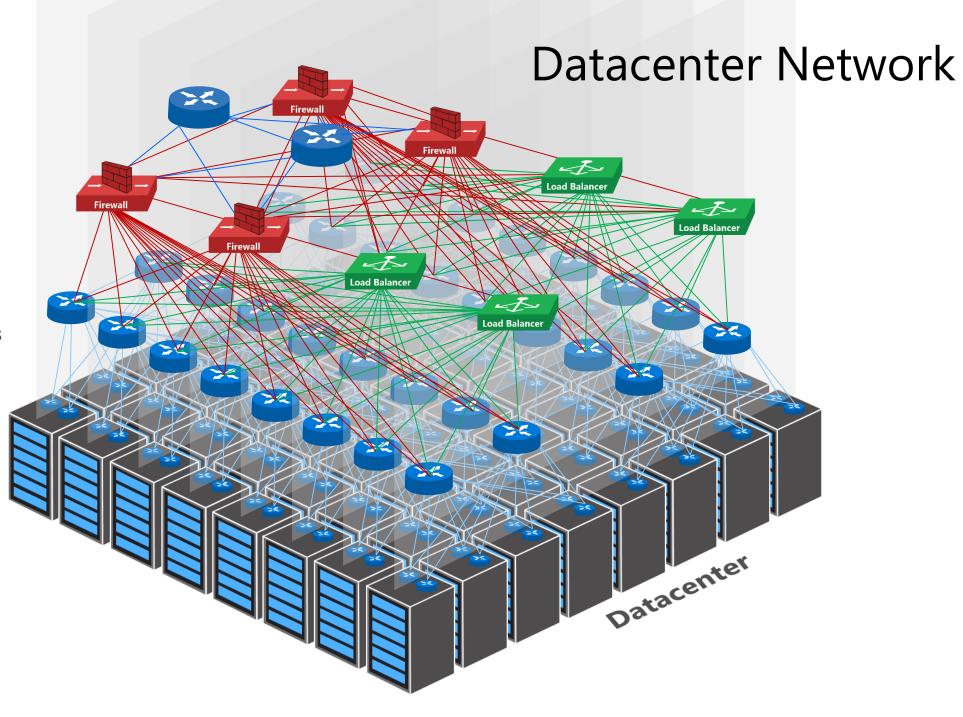


Edge Routers

Fixed-Function Physical Appliances

Spine Switches/Routers

Compute/Storage & TOR Switches



Challenges customers face



Agility

"I need to onboard workloads with complex policies across my own datacenter and/or the public cloud in days – not weeks – to remain competitive."



Security

"I must stop a compromised node from attacking other nodes on my network"



Costs

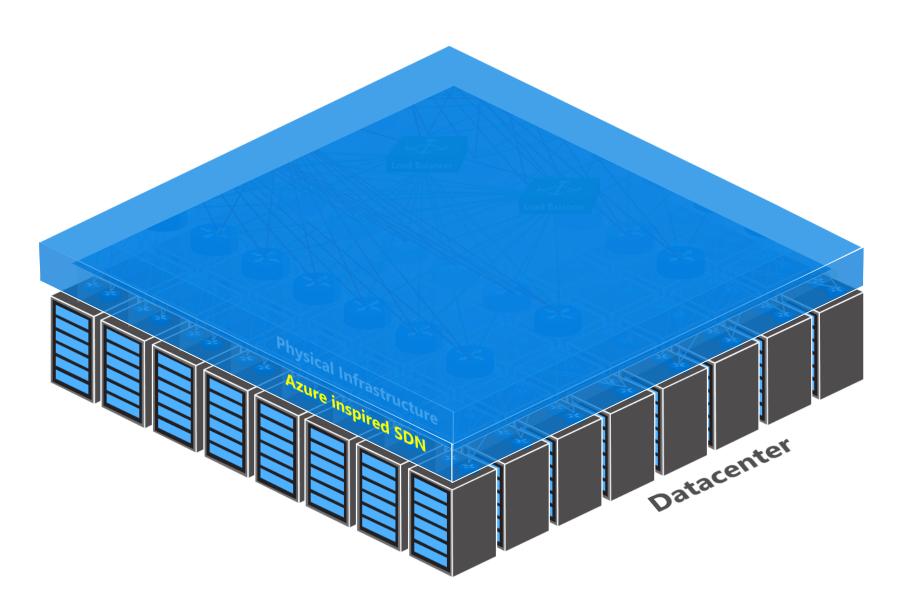
"I need to reduce the number of operator interventions and efficiently meet network growth demands. Current practices just won't scale."



Chris Amaris

Chief Technology Officer Convergent Computing

Azure Inspired SDN



WS 2016 Virtualizes the Entire Customer

Network for Azure Agility

Switching and Routing

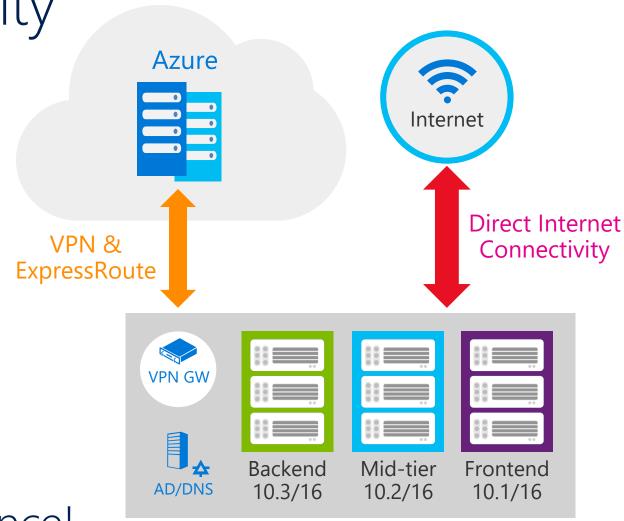
Load Balancers

Firewalls

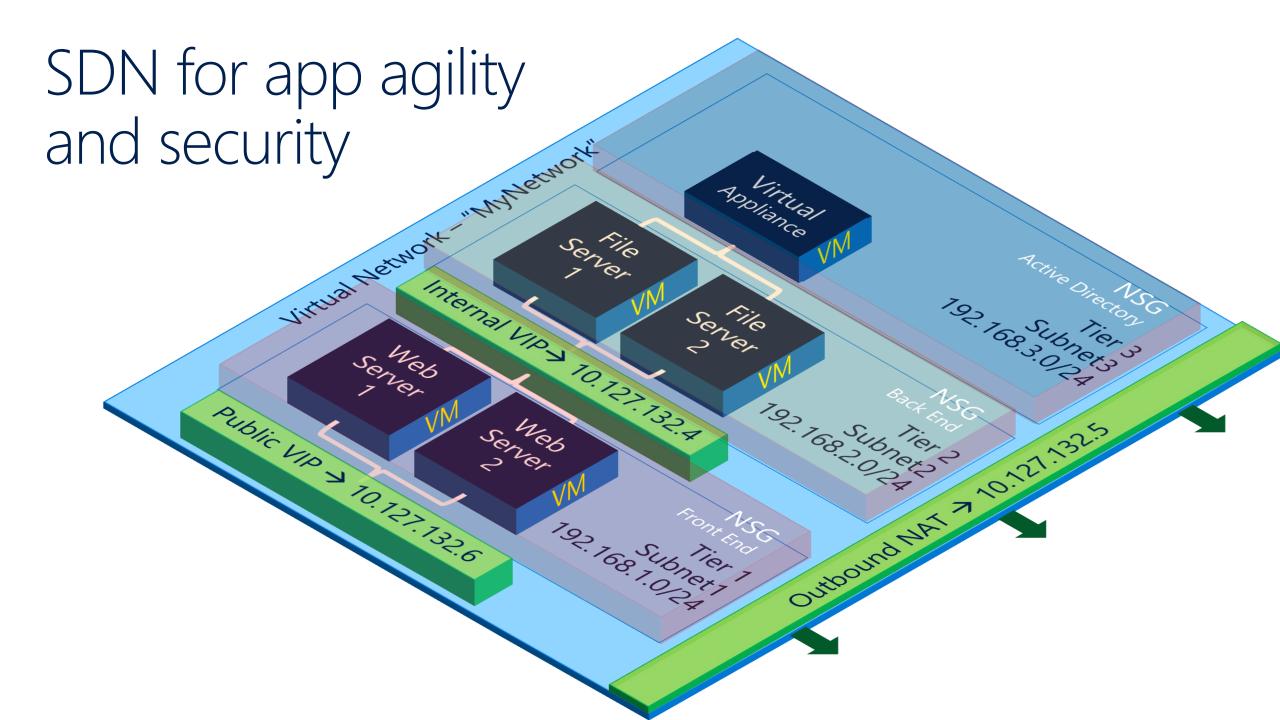
Edge Gateways

Other Physical Appliances

With Cost Optimized Performance!



Virtual Network



Customer Challenges Solved



Agility

With the Cloud Optimized SDN Infrastructure in Windows Server 2016, customers can deploy complex workloads rapidly across any cloud.



Security

With Windows Server 2016, customers can dynamically segment their network to precisely model security needs, while being able to react quickly to breaches.



Costs

It's all built in – the network controller, load balancer, firewall, controller, gateways, – everything is included as part of Windows Server 2016 and System Center 2016

SDN Feature Summary for WS 2016

Network controller [NEW!]

Central control plane

Fault tolerant

Control with System Center VMM, PowerShell, or RESTful API

Virtual networking

BYO address space

Distributed routing

VXLAN [NEW!] and NVGRE

Network security [NEW!]

Micro-Segmentation - Distributed firewall & Network Security Group

BYO virtual appliances via userdefined routing or mirroring

Robust gateways

M:N availability model [NEW!]

Multi-tenancy for all modes of operation

BGP Transit Routing [NEW!]

Software load balancing [NEW!]

L3/L4 load balancing (N-S and E-W) with DSR NAT

For tenants and cloud infra

Performance [NEW!]

Converged NIC for both RDMA and Ethernet traffic

VMMQ for 40G Ethernet perf

QoS for predictable Perf

Consistency with Azure in UI, API, and Services

Remote Desktop Services (RDS)



Challenges with desktop virtualization





Graphic-heavy apps can be slow to load and offer a poor user experience.



Adding cloud-based capacity adds challenges for managing and securing VMs.



Limited connections can lock out users at peak times.

Key Windows Server 2016 RDS improvements

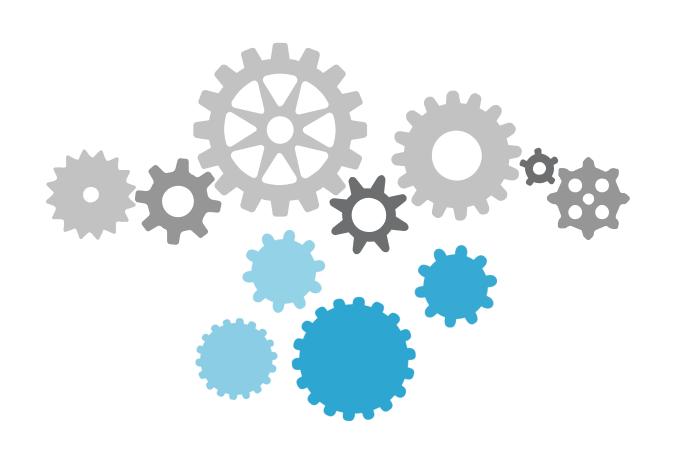


Better graphics experience Increased performance and app compatibility

Enhanced connection broker Scale management, shared SQL connections

More efficient cloud deployment Reduced number of VMs needed

Support for cloud-managed domain services



vGPU evolution



Windows Server 2008 R2

vGPU

- Hyper-V integration
- DX 9 support

Windows Server 2012

vGPU

- DX 11.0
- VM connect with vGPU
- GPU management

Windows Server 2012 R2

vGPU

- DX 11.1 support
- Higher video memory
- 2560 x 1600 resolution
- HCK conformant

Windows Server 2016

vGPU

- OpenGL & OpenCL API
- 1GB dedicated VRAM
- Up to 4k resolution
- Server VM support
- Improved performance

DDA

- Full API Support
- Native GPU driver support
- Maximum Performance

Graphics enhancements – vGPU



Two ways to support vGPUs in WS 2016; DDA is new and differentiated

RemoteFX VGPU

Para-virtualized

OpenGL/OpenCL/DX11

1GB VRAM/ 4K res

~30fps

Best scale

Host: WS 2016, Win 10

Guest: WS 2016, Win 10, Win 7 SP1, Win 8.1

Direct device assignment

1-1 Assignment to GPU

Full API support

Azure's N-Series VMs supported

~60fps

Low scale

Host: WS 2016

Guest: WS 2016, WS 2012r2, Win 10 w/November

update and Linux

Graphics enhancement Codec investments



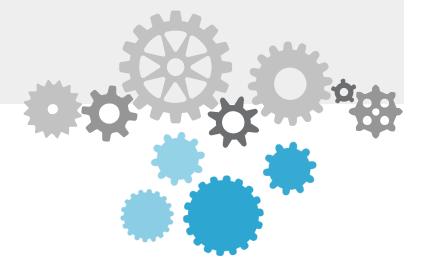
High Quality 4:4:4 mode using standard H.264/AVC 4:2:0 hardware decoders.

Enabled by default for RemoteFX vGPU RDP 10 sessions.

Group Policy to enable on Windows 10 1511 & Windows Server 2016 TP4.

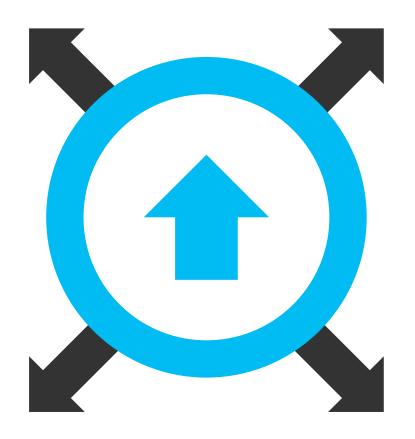
Windows 10 Remote Desktop Clients use Hardware H.264/AVC decoder when available.

Currently MSTSC.EXE only, other Remote Desktop clients to follow.



High availability connection broker





Use existing SQL Server cluster or Azure SQL Database.

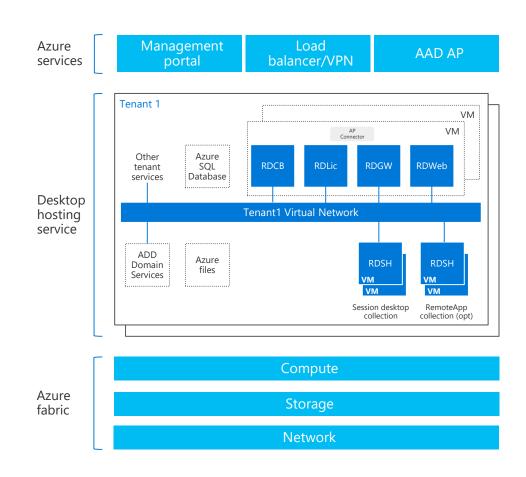
Improved connection handling performance, 10K+concurrent connection requests supported in "log on storm" situations.

Optimized server VM architecture for the cloud



RDS 2012R2 Infrastructure

- 7 Role Services
- 8 VMs



RDS 2016+

- 4 Role Services
- 2 VMs

AAD App Proxy removes external endpoints on RDGW VM so RDCB, RDLic can be combined into one VM since the VM is no longer exposed to the public internet

7

Nano Server



Challenges customers face





Cost

"Reboots impact my business and server images take too long to install and configure."



Security

"I need to shrink my attack surface and minimize OS vulnerabilities."



Density

"My infrastructure requires too many resources; I need more VMs on a single host."

Nano Server installation option Just enough OS



Provides higher density, reduced attack surface and servicing requirements

Ideal for cloud inspired infrastructure

 Smaller image size, smaller attack surface, faster boot time

Ideal for next generation app development

- Built for containers and cloud-native apps
- Full developer experience with Windows SDK and Visual Studio

Third-party applications RDS experience



Existing VM workloads



Containers and modern applications



Nano Server Cloud-ready when you are



Zero-footprint model

Server roles and optional features live outside of Nano Server. Standalone packages that install like applications.

Key roles and features

Hyper-V, Storage (SoFS), clustering IIS and DNS Server available in TP4 Core CLR and ASP.NET 5

Full Windows Server driver support

Anti-malware optional package

System Center VMM and OM agents supported



Manage Nano Server remotely



Not Command Line only

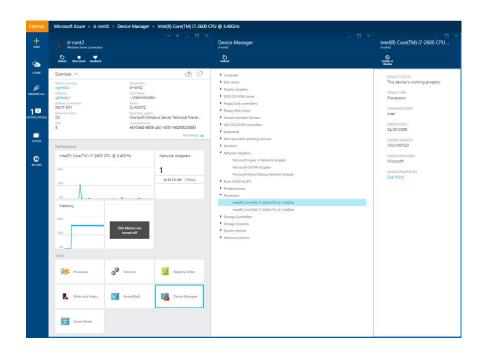
Server Manager

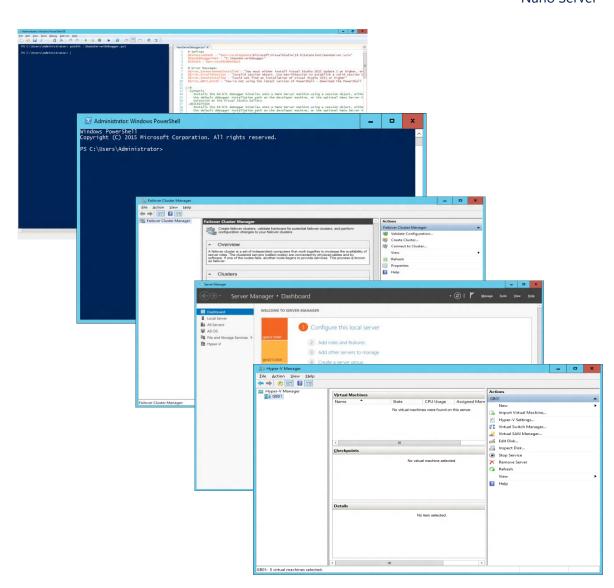
Hyper-V Manager

Failover Cluster Manager

PerfMon, Event Viewer, etc.

Server Management Tools (SMT) – new web-based remote GUI PowerShell Core





Nano Server Cloud application platform



Born-in-the-cloud application support

Subset of Win32.

.NET Core and ASP.NET Core.

PowerShell Desired State Configuration (DSC).

PackageManagement (aka OneGet).

Open Source Application Frameworks.

Available as OS everywhere

Host OS for physical hardware.

Guest OS in a VM.

Windows Server containers.

Hyper-V containers.



Nano Server Developer experience



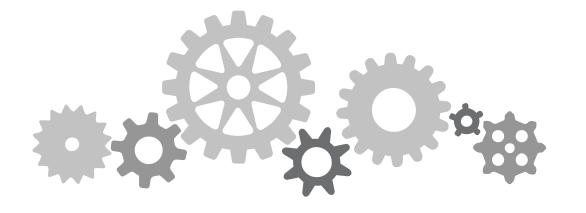
Nano Server has a full developer experience, unlike Server Core.

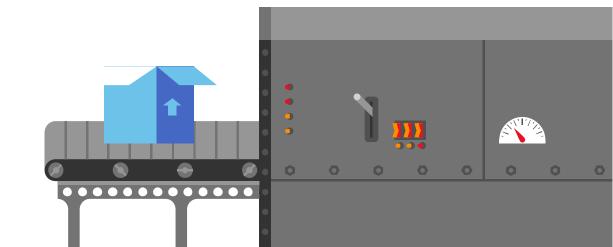
Windows SDK and Visual Studio 2015 target Nano Server.

Rich design-time experience.

Project template, full IntelliSense, error squiggles, etc.

Full remote debugging experience.





Current Branch for Business (CBB)



Nano Server will be CBB only

What does this change?

Nano Server will not have an LTSB with Windows Server 2016 and therefore not have 5+5 years of servicing

Nano Server installations will have to move forward to future CBB releases of Nano Server to continue to be serviced

Licensing Nano Server will require Software Assurance (SA)

What doesn't this change?

The quality, features, and functionality of Nano Server

Installation of new CBBs are always controlled by administrators, no forced upgrades



Containers



Challenges between developers and IT





Developers



I need to create applications at a competitive rate without worrying about IT.



I need to manage servers and maintain compliance with little disruption.

New applications run smoothly on my machines but malfunction on traditional IT server.



I'm unsure of how to integrate unfamiliar applications, and I require help from developers.

My productivity and application innovation become suspended when I have to wait on IT.

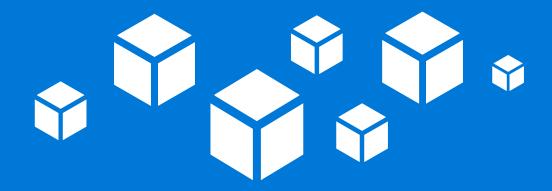


I'm unable to focus on both server protection and application compliance.

Balancing innovation and control



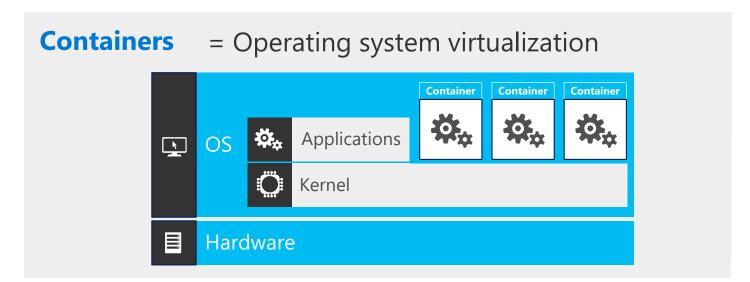
How do you empower developers to create innovative applications at a competitive rate without disrupting IT's ability to manage servers and maintain control?

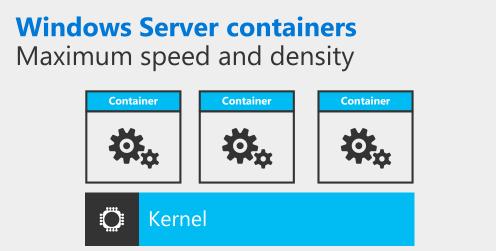


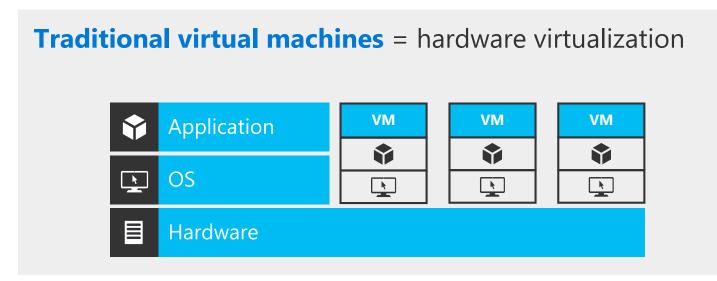


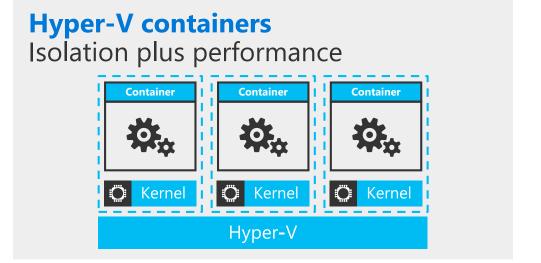
What is a container?











Container benefits



A new approach to build, ship, deploy, and instantiate applications



Applications traditionally built and deployed onto physical systems with 1:1 relationship.

New applications often require new physical systems for isolation of resources.



Physical/ Virtual Package and run apps within **containers**.



Higher consolidation ratios and better utilization.

Faster app deployment than in a traditional, physical environment.

Apps are deployed into VMs with high compatibility success.

Apps benefit from key VM features, such as live migration, HA.

Key benefits

Further accelerate app deployment.

Reduce effort to deploy apps.

Streamline development and testing.

Lower costs associated with app deployment.

Increase server consolidation.

Windows Server containers

Containers

Anatomy and key capabilities

Build: Developers will use familiar development tools, such as Visual Studio, to write apps to run within containers.

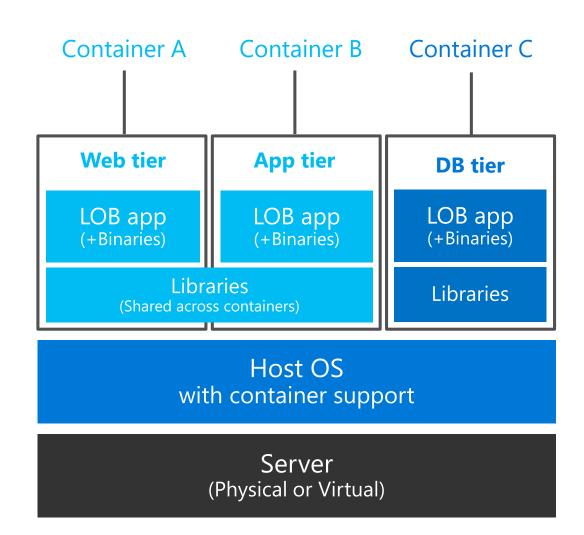
By building modular apps leveraging containers, modules can scale independently, and be updated on independent cadences.

Run: Container capabilities built into Windows Server.

Manage: Deploy and manage containers using PowerShell, or using Docker.

Resources: Define CPU and memory resources per container along with storage and network throughput.

Network: Provide NAT or DHCP/static IP for network connectivity.



Hyper-V containers Anatomy and key capabilities

Consistency: Hyper-V containers use the same APIs as Windows Server containers ensuring consistency across management and deployment toolsets.

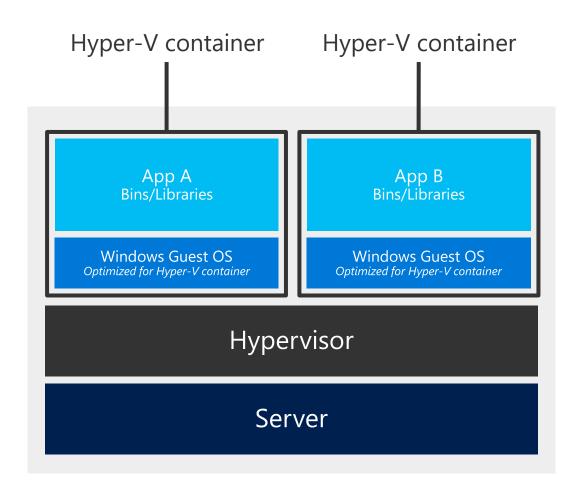
Compatibility: Hyper-V containers use the exact same images as Windows Server containers.

Strong isolation: Each Hyper-V container has its own dedicated copy of the kernel.

Highly trusted: Built with proven Hyper-V virtualization technology.

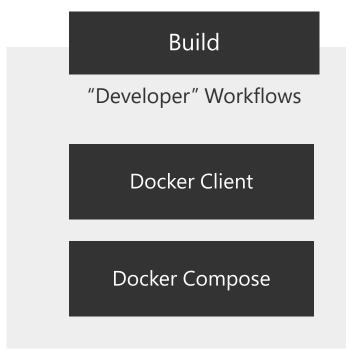
Optimized: The virtualization layer and the operating system have been specifically optimized for containers

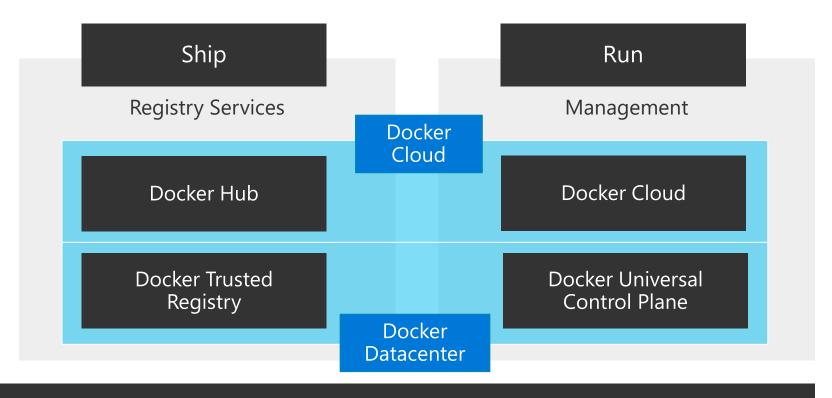




Docker components







Docker Engine

Operating System

Infrastructure

Plugins

9

PowerShell



Challenges customers face





Move faster

"Everything else is moving faster, requiring ever-faster solution delivery."



Flexibility

"Our solutions need to span on-premises, hybrid, and cloud."



Integration

"DevOps methods promise to help, but how do we make the transition?"

Easier, faster automation with PowerShell



Code Sharing: PowerShell Gallery, PowerShellGet, Github.

Editing – ISE improvements.

Debugging – Remote debugging, DSC debugging.

Security – Auditing, Just Enough Administration (JEA).

Improving information.

Delivering doc updates faster via Github.Com/Powershell.

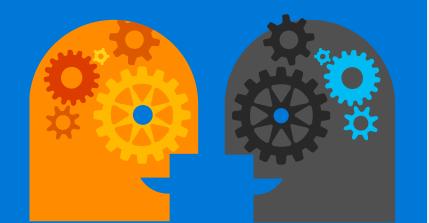
Microsoft.com/PowerShell: the hub for PowerShell information.

Enabling transition to DevOps



DevOps

A set of practices emphasizing collaboration and communication between software developers and IT pros while automating software delivery and infrastructure changes. Leverages tools to automate build, validate, and configure.



PowerShell in Windows Server 2016 provides

Desired State Configuration (DSC) – defining configuration as code.

Security Improvements – Auditing, Just Enough Administration (JEA).

Package Management.

PowerShell classes integrates dev practices configuration and automation.

PowerShell Script Analyzer – best practice analysis tool.

Pester – PowerShell validation.

Same approach, everywhere



PowerShell manages your environment

Gallery contains Dell, Citrix, VMWare, AWS, Azure, SQL cmdlets.

PowerShell DSC runs on Linux.

PowerShell is a platform

Partners include Chef, Puppet, Ansible, Octopus...

PowerShell is on Nano Server

Nano is managed with PowerShell, configured with DSC.

PowerShell 5 ships where you need it

Windows 10, Windows Server 2016,

WMF5.0 for Windows 7, Windows 8.1,

Windows Server 2008r2, 2012, 2012r2.

PowerShell eases moving the cloud

Azure PowerShell cmdlets, Azure DSC Extensions.

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Server management tools



Overview



Nano Server provides "Just Enough" OS to reduce the security and servicing footprint of the OS, but removes the familiar local GUI that many admins use.

Server management tools is a free toolset, hosted in the Azure portal, that enables you to manage any Windows Server 2016 instance remotely, alongside PowerShell or other management tools.

Deployment is as simple as installing a software gateway in your infrastructure, then adding machines into the Azure portal.

Remote Server management tools



Web-based and cross-platform.

Includes replacements for localonly tools, including:

Task Manager

Registry Editor

Event Viewer

Device Manager

Sconfig

Control Panel

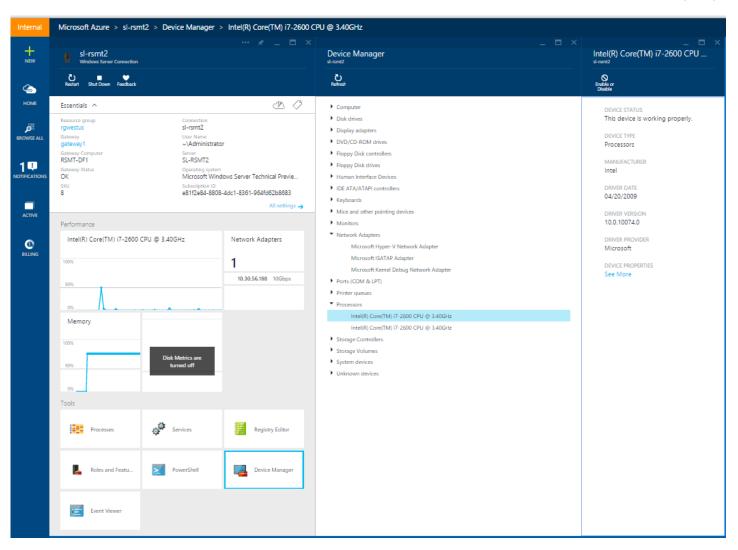
Performance Monitor

Disk Management

Users/Groups Manager

File Explorer

Also manages Server Core and Server with GUI.



Use cases



Single location for visibility to machines on-premises or hosted within Azure, and accessible no matter where the admin is.

Provides management tools for GUI-less Nano Server, ensuring that admins can continue to use familiar UX to manage their machines despite local GUI being removed.

Supports crossplatform management allowing admins to use their client of choice to manage Windows Server. The service will continue to be updated frequently, adding new tools and capabilities without necessitating upgrades to on-premises infrastructure.

Next steps

Take the next step:

www.microsoft.com/WindowsServer2016

Watch in-depth technical videos.

https://channel9.msdn.com/Blogs/windowsserver

Windows Server Blog:

http://blogs.technet.microsoft.com/windowsserver





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