

What's New in Server 2022

-
- Mike Nelson
 - November 2021



Windows Server 2022

Run business critical workloads in Azure, on-premises and at the edge



Advanced multi-layered security



Hybrid capabilities with Azure



Flexible application platform



Azure innovation for Windows Server

Editions

Windows Server 2022 Editions



\$501



\$1069



\$6155

Windows Server 2022 Essentials Edition	Windows Server 2022 Standard Edition	Windows Server 2022 Datacenter Editions
is ideal for small businesses with up to 25 users and 50 devices	is ideal for customers with physical or minimally virtualized environments	is ideal highly virtualized and software defined datacenter environments.
25 users/50 devices CALs are included	Unlimited, based on CALs	Unlimited, based on CALs
1 physical or virtual ¹	2 VMs	Unlimited VMs
Must be root of domain	2 Hyper-V containers ²	Unlimited Hyper-V containers
Available in ROK and OEM	Available in COEM , ROK, and OEM	Available in COEM , ROK, and OEM

Editions

Windows Server 2022 Datacenter: **Azure Edition**



Latest hybrid
and compute
features



Runs on Azure
cloud & Azure
Stack HCI 21H2

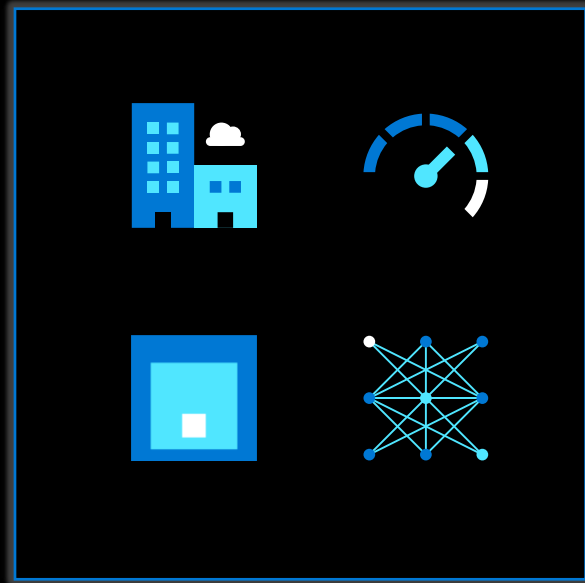


Best Windows
Server VM with
Automanage

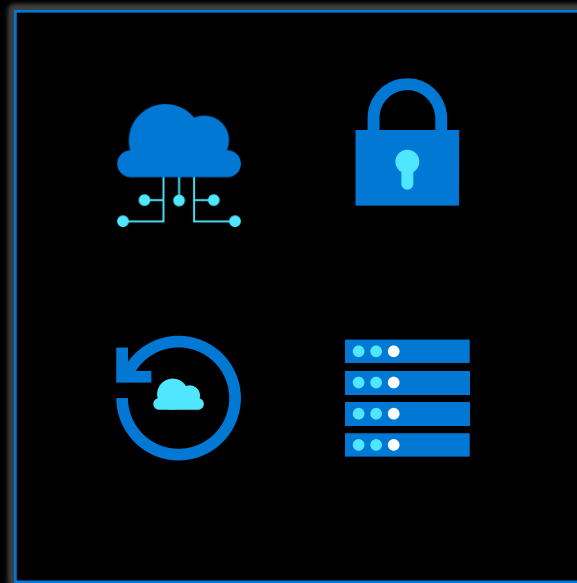


Windows Server 2022 Datacenter: **Azure Edition**

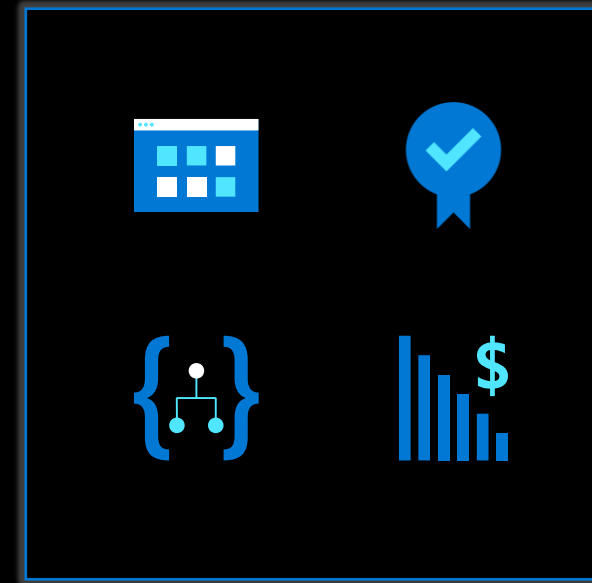
Windows Server 2022 Datacenter: **Azure Edition**



Latest hybrid
and compute
features



Runs on Azure
cloud & Azure
Stack HCI 21H2



Best Windows
Server VM with
Automanage

Windows Server 2022 Datacenter: Azure Edition



Hotpatch with Azure Automanage
(Preview)



SMB over QUIC



Azure Extended Networking

00:00:00.00

Test5-9B-BL on MININT-2B8B5K0 - Virtual Machine Connection

File Action Media View Help

Administrator: C:\windows\system32\cmd.exe

```
C:\Users\Administrator>dism /online /add-package /packagepath:"c:\temp\package\F0r Demo\12B-CP\Windows10.0-KB4592441-x64.cab"
```

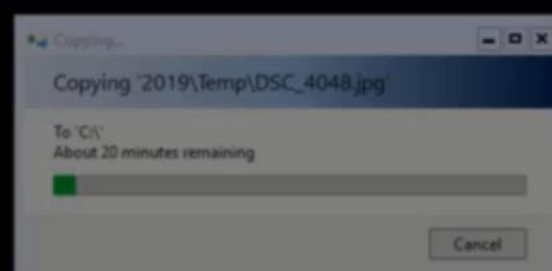
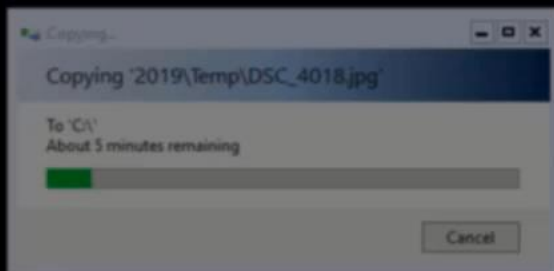
Test4-9B-BL on MININT-2B8B5K0 - Virtual Machine Connection

File Action Media View Help

Administrator: C:\windows\system32\cmd.exe

```
C:\Users\Administrator>dism /online /add-package /packagepath:"c:\temp\package\F0r Demo\11B-HP\Windows10.0-KB4587857-Hotpatch-x64.cab"
```

Hotpatch Demo



Dozens of hospitals and clinics in West Virginia and Ohio are canceling surgeries and diverting ambulances following a ransomware attack that knocked out staff access to IT systems across virtually all of their operations.

CRITICAL CONDITION —

Hospitals hamstrung by ransomware are turning away patients

The ransomware epidemic continues to grow.

DAN GOODIN - 8/16/2021, 12:26 PM



health.mil

Security threats are constant and costly

February 2020

142,000,000

Hotel guests' data
compromised

April 2020

112,000

Employees and patients personal
and medical info compromised

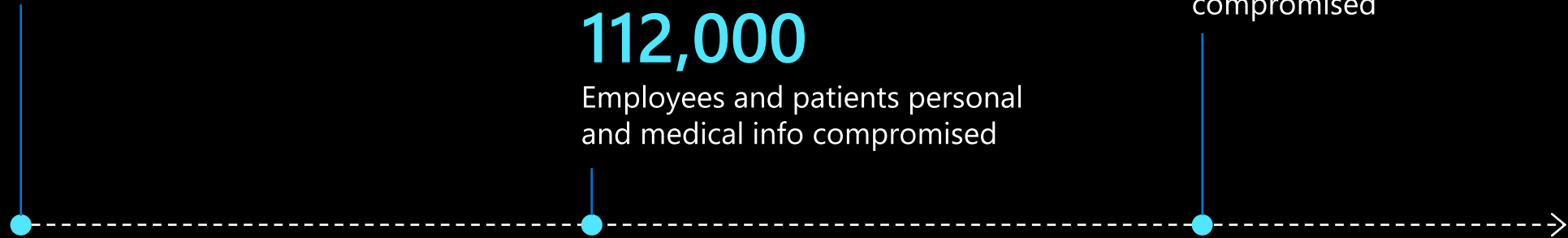
July 2020

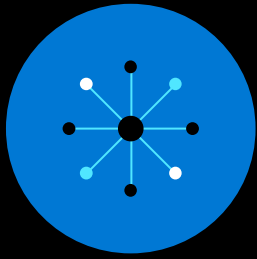
450,000

Residents of Polk County,
Florida's tax collector
compromised

\$3.62M

Average total cost of a data breach





Protect

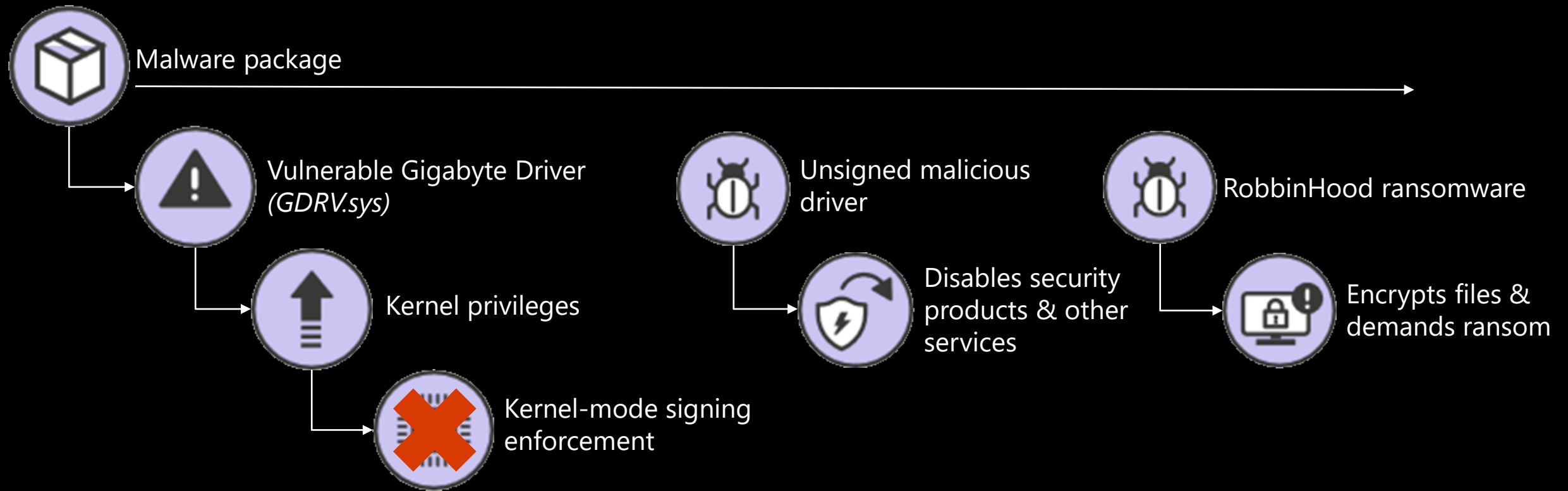


Defend

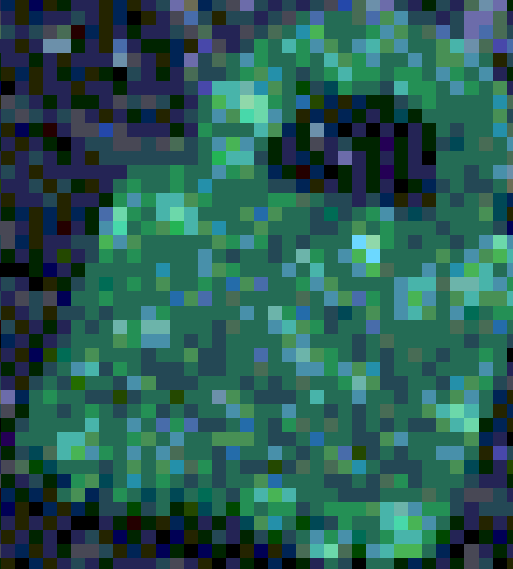


Prevent

Anatomy of a ransomware attack

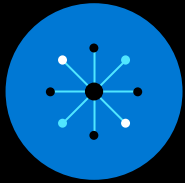


Firmware Protection



Secured-core server

Secure hardware, firmware and OS capabilities to help protect against threats



Protect

at boot-up with hardware root of trust

- Trusted Platform Module 2.0
- Secure cryptographic capabilities to better protect sensitive keys and measurements



Defend

against firmware level attack with validated system integrity

- Windows Defender System Guard to protect, maintain, and validate system integrity
- Dynamic root of trust of measurement (DRTM) to boot up securely and minimize firmware vulnerabilities



Prevent

access to unverified code with Virtualization-based security

- Hypervisor protected code integrity (HVCI) protects from unverified code execution
- Virtualization-based security supports features like Credential Guard to protect enterprise domain credentials

Contoso-securedcore

Tools

- Installed apps
- Local users & groups
- Networks
- Packet monitoring
- Performance Monitor
- PowerShell
- Processes
- Registry
- Remote Desktop
- Roles & features
- Scheduled tasks
- Security (Preview)**
- Services
- Storage
- Storage Migration Service
- Storage Replica
- System Insights
- Updates
- Settings

Security

PREVIEW ⓘ

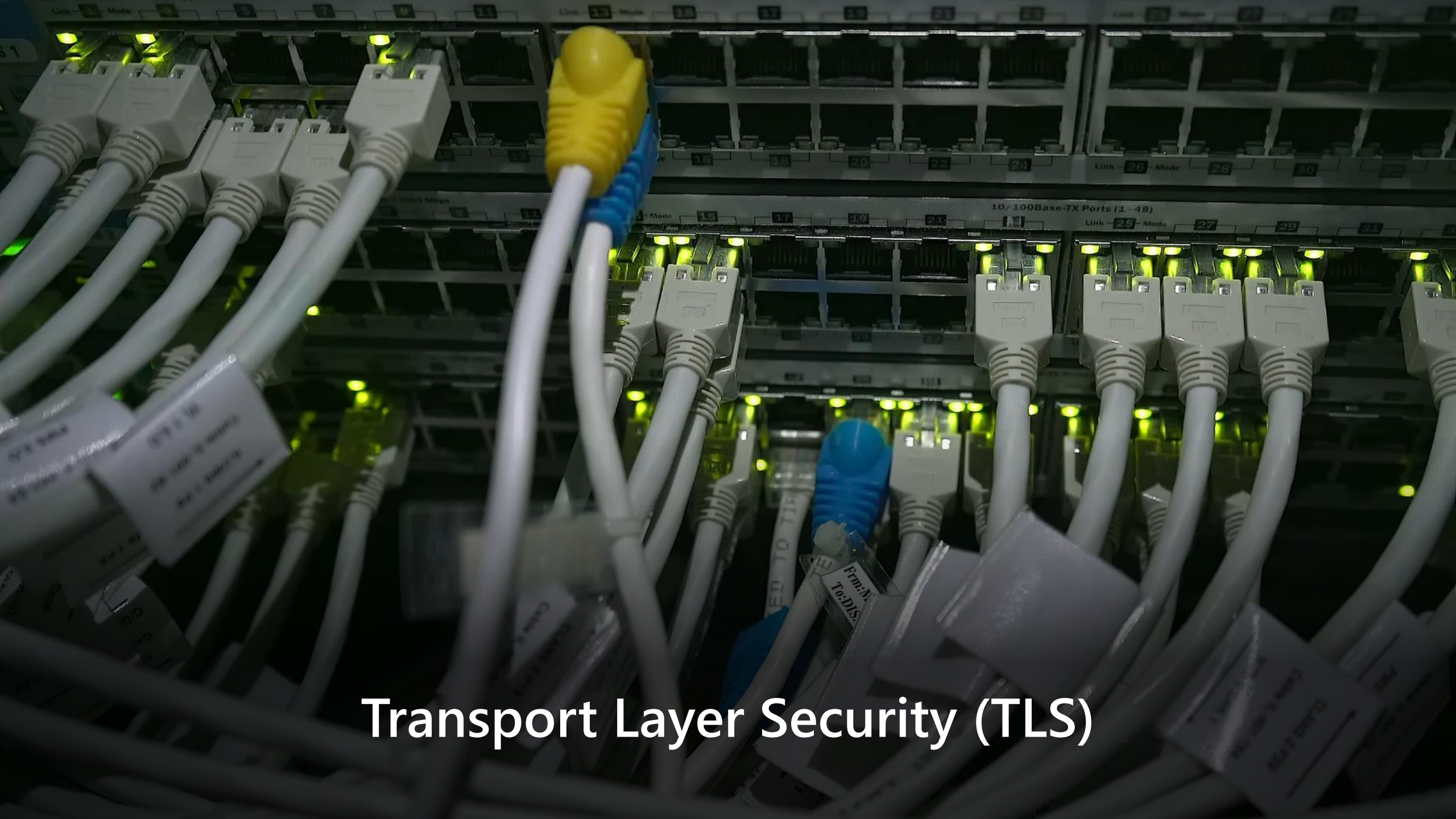
[Summary](#) [Protection history](#) [Secured-core](#)

Your device meets all requirements for Secured-core Server.

Security Feature	Status
Hypervisor-Protected Code Integrity (HVCI) ⓘ	✓ On
Boot Direct Memory Access (DMA) Protection ⓘ	✓ On
System Guard ⓘ	✓ On
Secure Boot ⓘ	✓ On
Virtualization-based Security (VBS) ⓘ	✓ On
Trusted Platform Module (TPM) 2.0 ⓘ	✓ On

The background of the image is a dark blue field filled with a complex, interconnected network of white lines and dots. The dots, representing nodes, are of varying sizes and are connected by thin, white lines, creating a web-like structure that extends across the entire frame. The network appears to be a representation of a digital or physical network, with some areas being more densely connected than others. The overall effect is one of a vast, interconnected system.

Network Protection



Transport Layer Security (TLS)

TLS 1.3 - More Secure

- Many of the major vulnerabilities in TLS 1.2 had to do with older cryptographic algorithms that were still supported
- TLS 1.3 drops support for vulnerable cryptographic algorithms such as:
 - RSA key transport: Doesn't provide forward secrecy
 - CBC mode ciphers: BEAST and Lucky 13 attacks
 - RC4 stream cipher: Not secure for use in HTTPS
 - Arbitrary Diffie-Hellman groups: CVE-2016-0701
 - Export ciphers: FREAK and LogJam attacks



TLS 1.3 - Faster

- TLS handshakes in TLS 1.3 only require one round trip (or back-and-forth communication) instead of two, shortening the process by a few milliseconds
- In cases when the client has connected to a website before, the TLS handshake will have zero round trips. This makes HTTPS connections faster, cutting down latency and improving the overall user experience.





SMB Encryption & More

SMB Encryption

- Protects against Man in the Middle attacks
- More Secure
 - Windows Server 2022 & Windows 11 introduce AES-256-GCM and AES-256-CCM cryptographic suites for SMB 3.1.1 encryption
 - Windows will automatically negotiate this more advanced cipher method
- Flexible and Easy to Use:
 - Can be configured per share or entire file server
 - Can be mandated through Group Policy
 - Via PowerShell
 - One checkbox in Windows Admin Center

Share permissions
This shares the folder you select on the network using the SMB protocol.

Folder "public" is shared

Network path
\\WS2022-01\public

Local path
D:\public

Share permissions

Name	Permission
Everyone	Full control

Offline files ⓘ
Manual

☐ Compress data

☐ Enable SMB encryption ⓘ

Advanced Settings

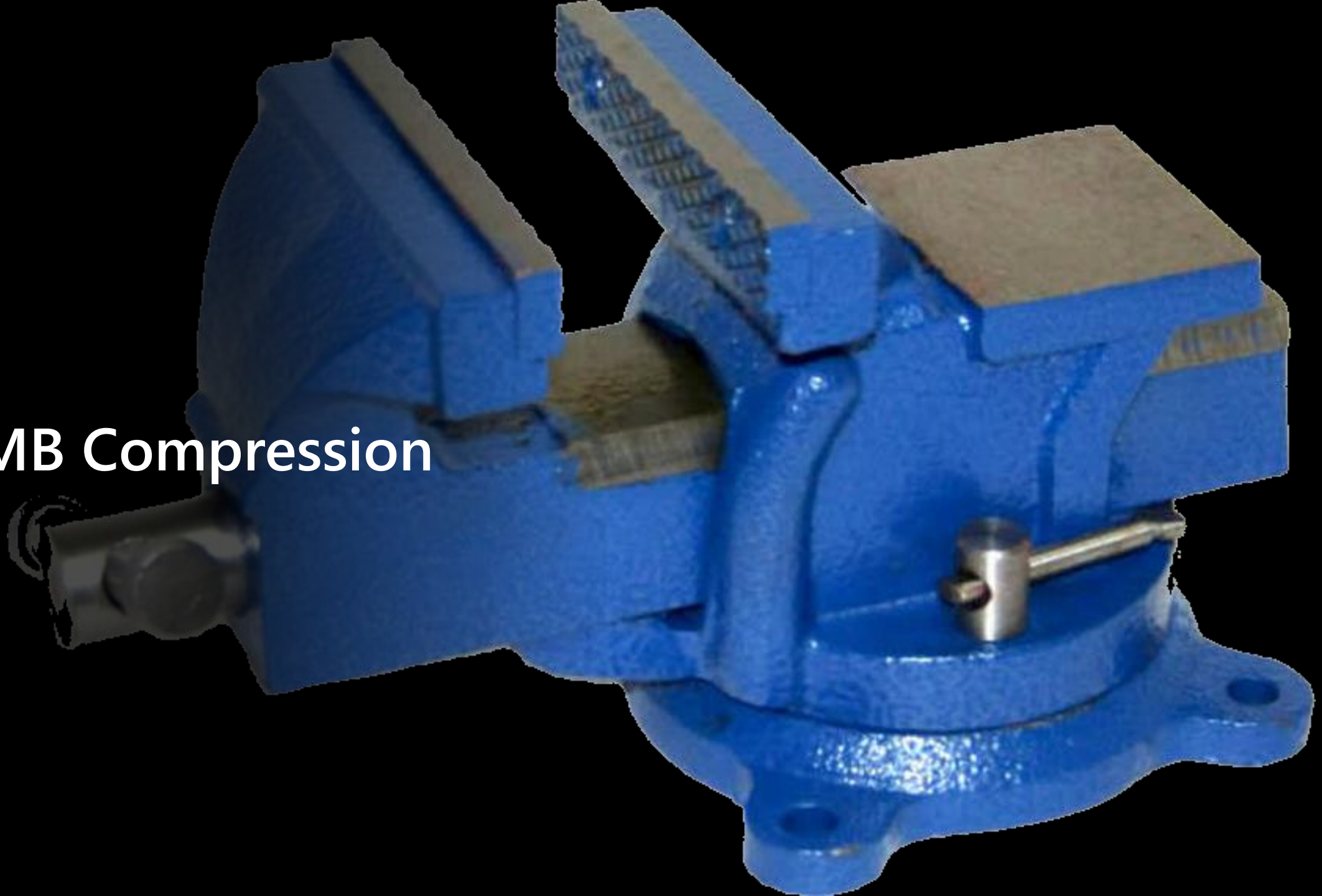
Edit Cancel

SMB Encryption & SMB Direct (RDMA)

- Windows Server 2022 and Windows 11 SMB Direct now supports encryption
- Previously, enabling SMB encryption disabled direct data placement, making RDMA performance as slow as TCP
- Now data is encrypted before placement resulting in security and performance while adding AES-128 and AES-256 protected packet privacy
- You can enable encryption using Windows Admin Center, [Set-SmbServerConfiguration](#), or UNC Hardening group policy



SMB Compression



SMB Compression – Test

20 GB VHD File Copy from Windows 11 to Windows Server 2022 via 1 GbE*

Time (in seconds)




SMB Compression

Enable with one checkbox

Share permissions

This shares the folder you select on the network using the SMB protocol.

 Folder "public" is shared

Network path

\\WS2022-01\public

Local path


D:\public

Share permissions

 Search

Add

Name	Permission	
Everyone	Full control	×

Offline files 

Manual 

☐ Compress data

☐ Enable SMB encryption 

Advanced Settings

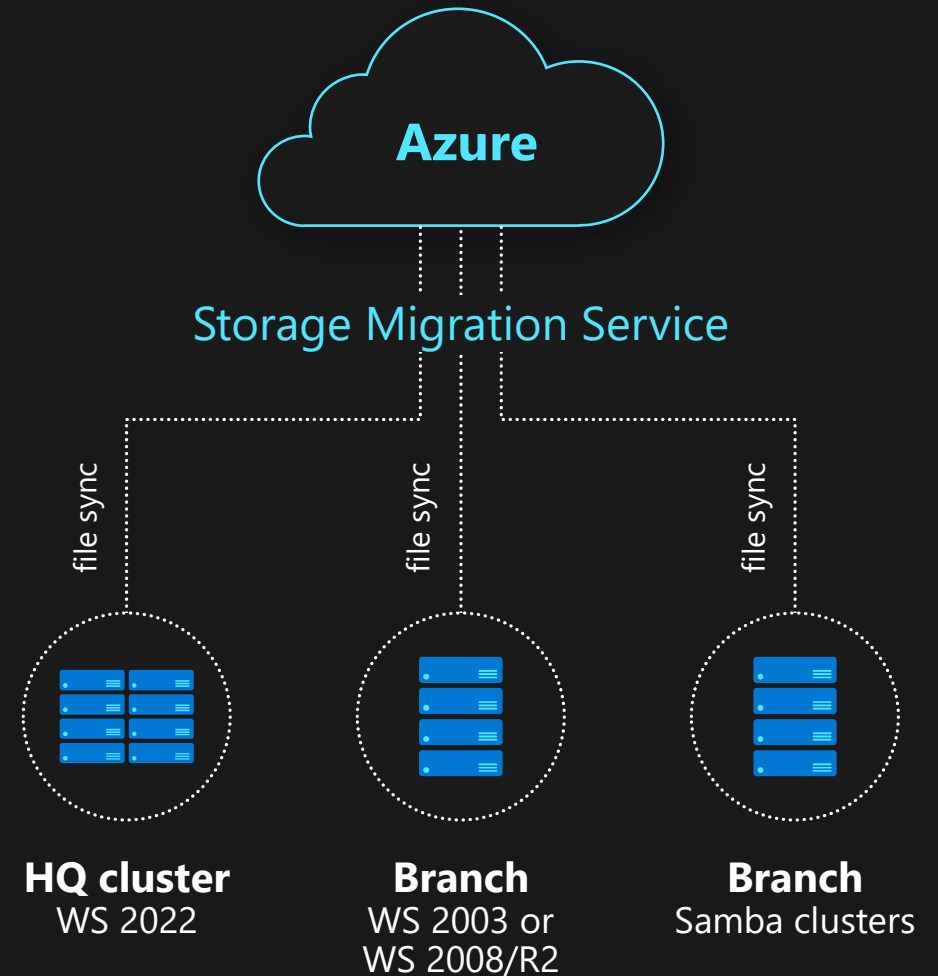
Edit

Cancel

Storage Migration Service

With Windows Server 2022

- **Modernize your File Server and Future Proof On-Prem Storage Costs**
 - SMS will:
 - Automatically use Azure File Sync
 - Sync your data into Azure Files for bottomless storage
 - Migrate all your data to a modern Windows Server
 - On-premises File Server is a hot cache
- **NetApp FAS Migration**
 - Migrate from NetApp FAS to Windows Server or a Windows Server Cluster running in the cloud or on-premises



"S2D rocks. The performance, caching and tiering are AWESOME. It would be great if you could use this in a single node environment for test/dev."

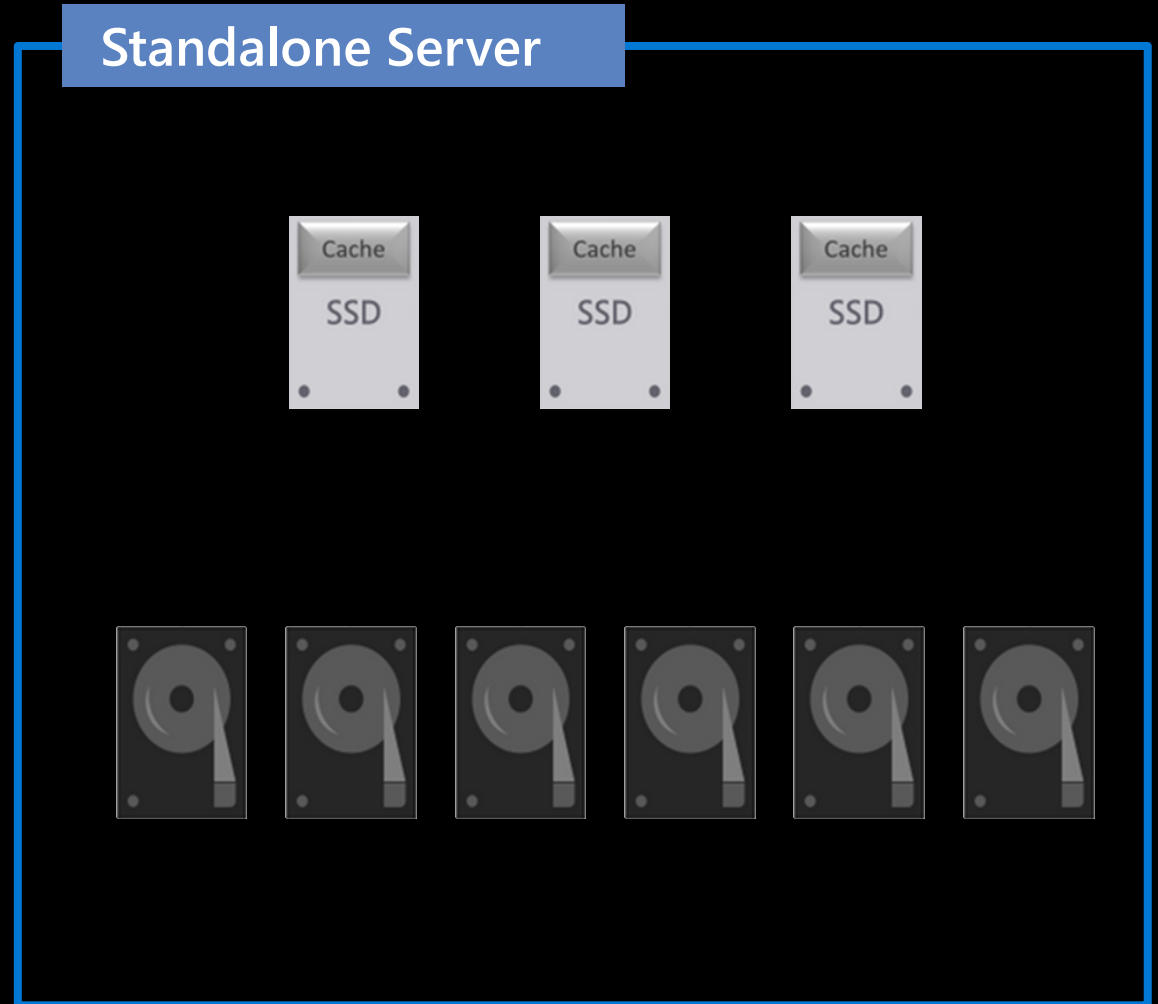
Introducing

Windows Server 2022

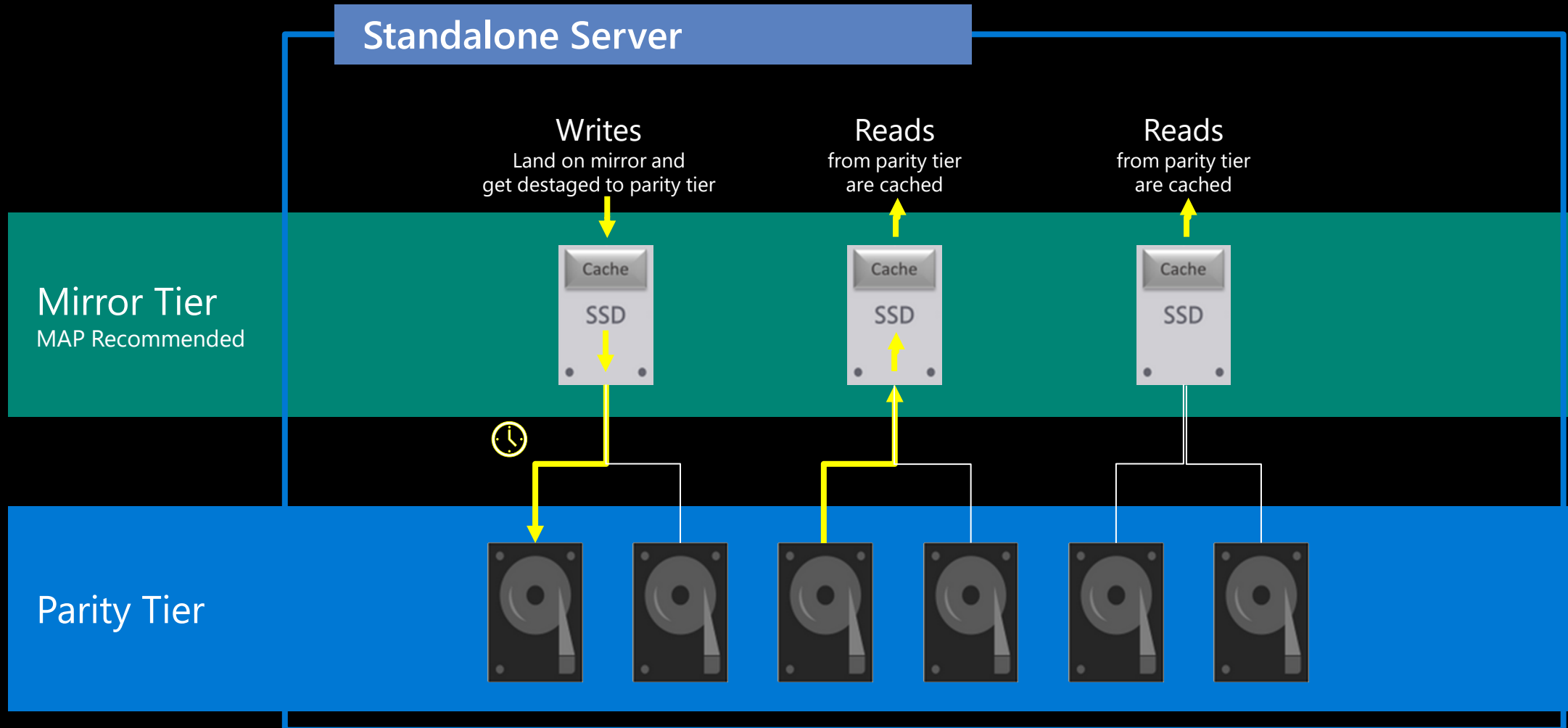
Single Node Caching/Tiering

Windows Server 2022: Single Node Caching/Tiering

- Benefits
 - Great for Random I/O Workloads
- Scenarios
 - SQL Development
 - Container Development
 - File Server (synced with Azure File Sync)
- Important
 - This is **single** node and **not** a high availability solution.
- Requirements
 - Windows Server 2022
 - 2 drive types SSD+HDD or NVMe+HDD



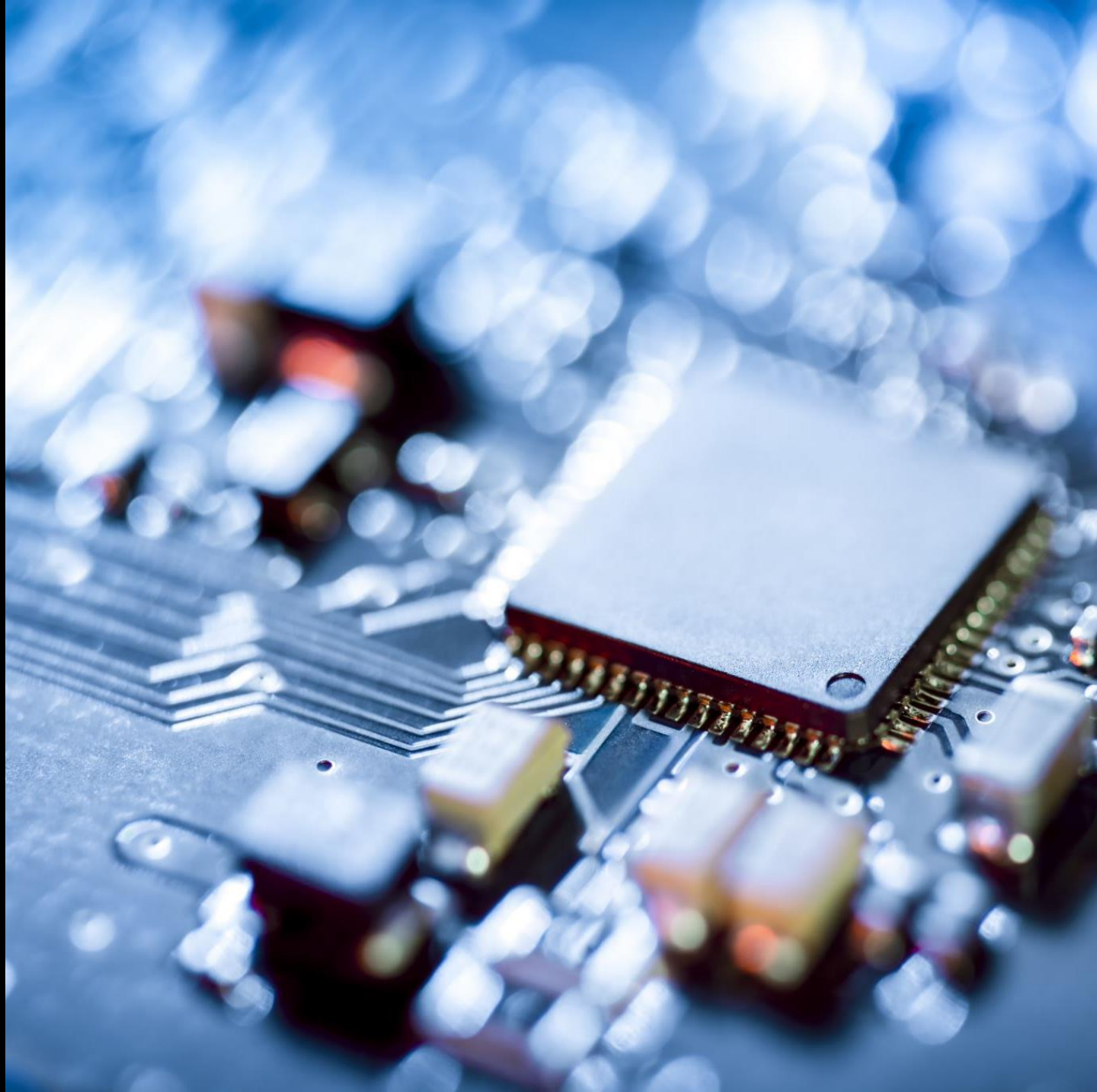
Windows Server 2022: Single Node Caching/Tiering



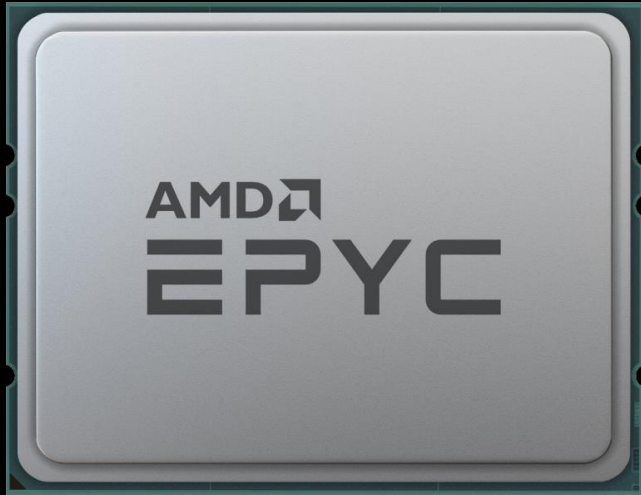
One last note...

The server **must** have the Failover Cluster Feature Enabled.

HOWEVER, the server **cannot** be a member of a Failover Cluster.



Windows Server 2022 & the Latest CPUs



3rd Gen AMD EPYC™ processors



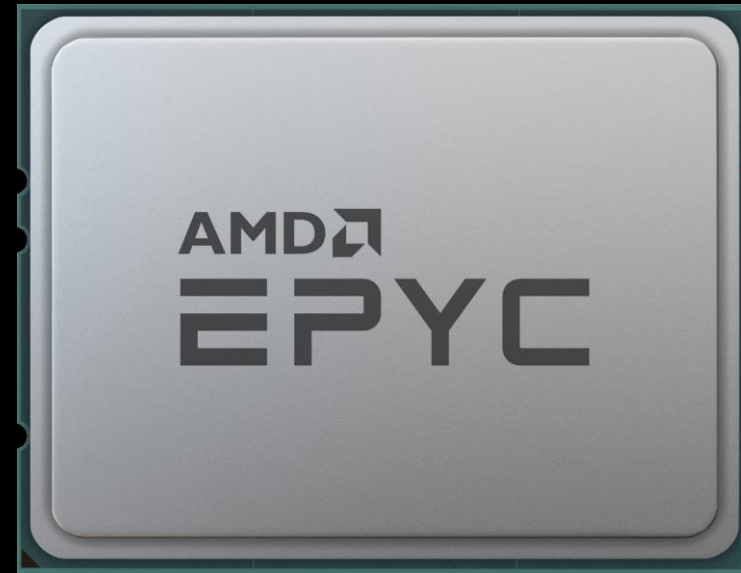
3rd Gen Intel® Xeon® Scalable processors

Windows Server & SQL Server

Capability	Windows Server 2012/2012 R2 Standard and Datacenter	Windows Server 2016/2019 Standard and Datacenter
Physical (Host) Memory Support	Up to 4 TB per physical server	Up to 24 TB per physical server
Physical (Host) Logical Processor Support	Up to 320 LPs	Up to 512 LPs

Windows Server 2022 Hyper-V

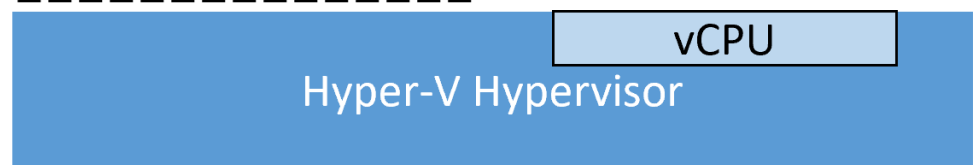
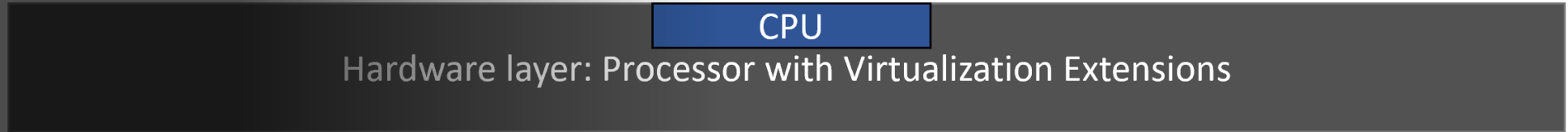
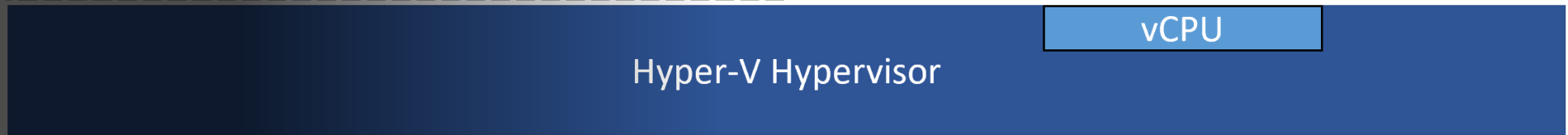
Support for Nested
Virtualization with
AMD EPYC/Ryzen



Level 1

Nested Hyper-V

Level 0



Level 2



Virtualization Extensions

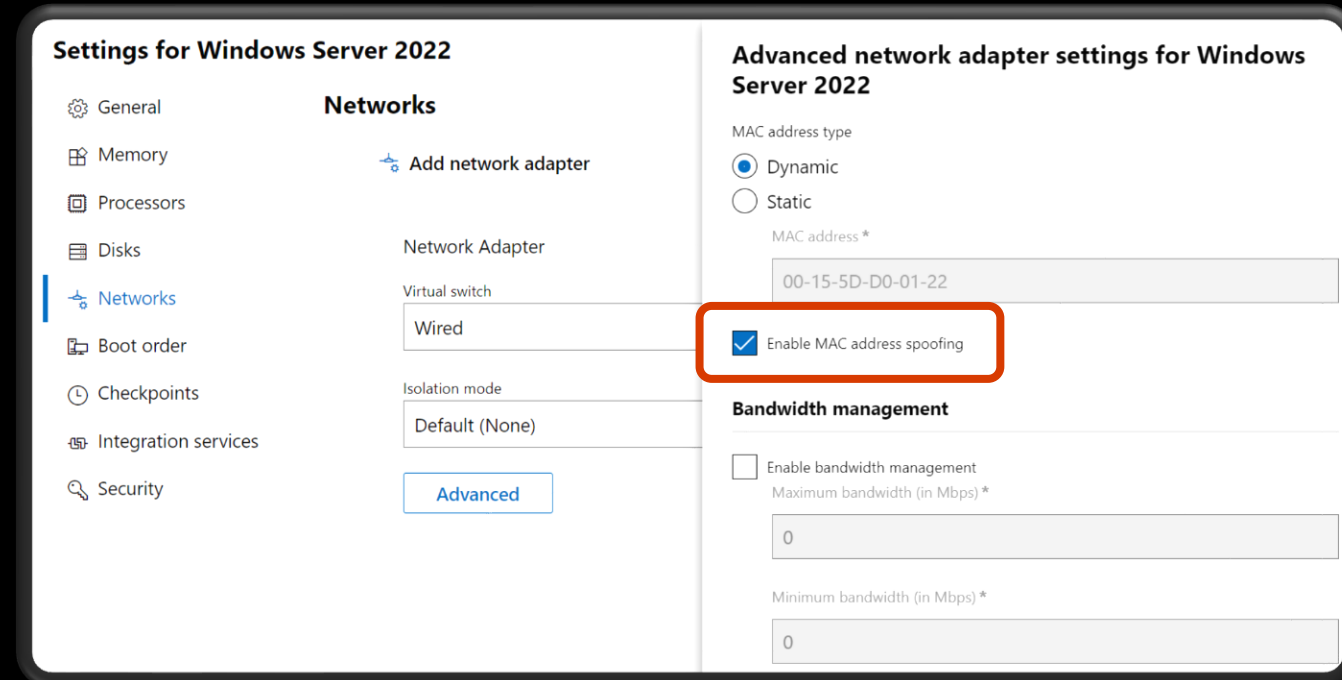


Virtualization Extensions



Nested Hyper-V Considerations

- Within the Nested Hyper-V Environment...
- Static Memory only
 - Dynamic Memory and Hot Add do not work
- Enable MAC Address Spoofing
 - Get-VMNetworkAdapter - VMName <VMName> | Set-VMNetworkAdapter - MacAddressSpoofing On



One Click with Windows Admin Center

Windows Admin Center | Computer Management

Microsoft

optimus-ryzen

Tools

Search Tools

- Overview
- Apps & features
- Azure Monitor
- Azure Security Center
- Certificates
- Containers
- Devices
- File & file sharing
- Local users & groups
- Performance Monitor
- Processes
- Registry
- Scheduled tasks
- Services
- Storage
- Virtual machines**
- Virtual switches
- Extensions
- Security
- Settings

Virtual machines

Inventory Summary

Add Connect Power Manage Edit Tags

Name	State	Virtual processors	CPU usage	Assigned memory
ASHCL1-Node	Saved	1	-	-
Hyper-V Server 2019	Saved	16	-	-
Hyper-V Server 2019	Saved	16	-	-
Win 10 FE 20319	Saved	8	-	-
Windows 11 Preview	Saved	8	-	-
Windows Server 201...	Saved	8	-	-
Windows Server 2016	Saved	8	-	-
Windows Server 2019	Saved	8	-	-
Windows Server 2022	Saved	8	-	-
Windows Server 2022c	Saved	16	-	-

New virtual machine

Name*
Windows Server 2022 Nested

Generation
Generation 2 (Recommended)

Path ⓘ
D:\VMs (Hyper-V Host Setting) [Browse](#)

VM configuration: D:\VMs\Windows Server 2022 Nested

Virtual hard disks: D:\VMs

Virtual processors

Count
2

☒ Enable nested virtualization

Memory

Startup memory* 16 Size unit* GB

☐ Use dynamic memory

Network

Virtual switch
Wired

Isolation mode
Default (None)

Storage

[Create](#) [Cancel](#)



Windows Server 2022 Networking

Networking Performance Improvements

- UDP Performance
 - UDP Segmentation Offload support
 - UDP Receive Side Coalescing
- TCP Performance
 - Support for TCP HyStart++
 - Support for RACK-TLP
- Hyper-V Virtual Switch Receive Side Coalescing
 - Allows the hypervisor network to coalesce packets and process as one larger segment
 - CPU cycles are reduced, and segments will remain coalesced across the entire data path

Windows Server 2022 with Edge

The screenshot shows the Microsoft Docs website (docs.microsoft.com) in a Windows Edge browser. The browser's address bar displays the URL https://docs.microsoft.com/en-us/. The page features a dark blue header with the Microsoft logo and navigation links: Docs, Documentation, Learn, Q&A, and Code Samples. A search bar is located in the top right corner. Below the header, the main content area has a dark blue background with the text "docs.microsoft.com" and "The home for Microsoft documentation and learning for developers and technology professionals." A search bar is also present in the center. Below this, there are four white boxes with blue icons and text: "Documentation" (search for articles, training, and code samples), "Learn" (discover training paths by role, subject matter, or technology), "Q&A" (ask questions and learn from others in the technical community), and "Code Samples" (explore samples and discover the things you can build). Below these boxes, there is a section titled "INDEX Product Directory" with a list of links organized in three columns. The first column includes .NET, ASP.NET, Azure, Azure Architecture Center, Azure DevOps, C++, C#, and Dynamics 365. The second column includes Gaming, Microsoft 365, Microsoft Edge, Microsoft Security, Microsoft Teams, OneDrive, Power Apps, and Power BI. The third column includes Power Platform, PowerShell, SharePoint, SQL Server, Visual Basic, Visual Studio, Windows, and Xamarin. At the bottom of the page, there is a link that says "Don't see what you're looking for? View entire directory".

Developer tools, technical docu... x Windows Server 2022 | Microsoft x +

https://docs.microsoft.com/en-us/


Microsoft | Docs Documentation Learn Q&A Code Samples


Search Sign in


docs.microsoft.com


The home for Microsoft documentation and learning for developers and technology professionals.

Search for articles, training, and code sample Search

**Documentation**
Search our expansive documentation resources for Microsoft products.

**Learn**
Discover training paths by role, subject matter, or technology.

**Q&A**
Ask questions and learn from others in the technical community.

**Code Samples**
Explore our samples and discover the things you can build.

INDEX Product Directory

.NET	Gaming	Power Platform
ASP.NET	Microsoft 365	PowerShell
Azure	Microsoft Edge	SharePoint
Azure Architecture Center	Microsoft Security	SQL Server
Azure DevOps	Microsoft Teams	Visual Basic
C++	OneDrive	Visual Studio
C#	Power Apps	Windows
Dynamics 365	Power BI	Xamarin

Don't see what you're looking for? [View entire directory](#)

```
Administrator: C:\Windows\system32\cmd.exe
WARNING: To stop SConfig from launching at sign-in, type "Set-SConfig -AutoLaunch $false"

=====
                Welcome to Windows Server 2022 Datacenter
=====

1) Domain/workgroup:           Workgroup: WORKGROUP
2) Computer name:             WIN-VSTDUSDTDPG
3) Add local administrator
4) Remote management:         Enabled

5) Update setting:             Download only
6) Install updates
7) Remote desktop:            Disabled

8) Network settings
9) Date and time
10) Telemetry setting:         Required
11) Windows activation

12) Log off user
13) Restart server
14) Shut down server
15) Exit to command line (PowerShell)

Enter number to select an option: _
```

Windows Server 2022 SCONFIG

Windows Server 2016

Initial launch of containers
Process and Hyper-V isolation
Docker EE Basic Included at no additional cost

Windows Server, version 1709

Optimized container images for Nano Server and Server Core
Platform level support for Linux containers
Windows Subsystem for Linux
Networking enhancements for overlays and SDN

Windows Server, version 1803

Optimized Server Core image
App compat improvements
Native command line tools—curl.exe, tar.exe and SSH
Enhancements to the Windows Subsystem for Linux
Networking enhancements for greater density and quicker endpoint creation
Improved network security with Calico Open-source storage plugins for Kubernetes
Platform functionality required for Kubernetes conformance

Windows Server 2019

Optimized Server Core image
App compat improvements
Enhanced Group Managed Service Account support
Platform functionality for Kubernetes and Microsoft Service Fabric
Performance and density improvements
Platform and open-source work on CNI networking plugins such as Calico and Flannel
Enhancements to the Windows Subsystem for Linux
...more on the way...

Application Innovation

"Microsoft, the container features and open-source integration is great. Our org has what we need to run containers with K8s. At this point we need a longer support lifecycle. 18 months isn't enough."

Introducing

5 Year

Container Support

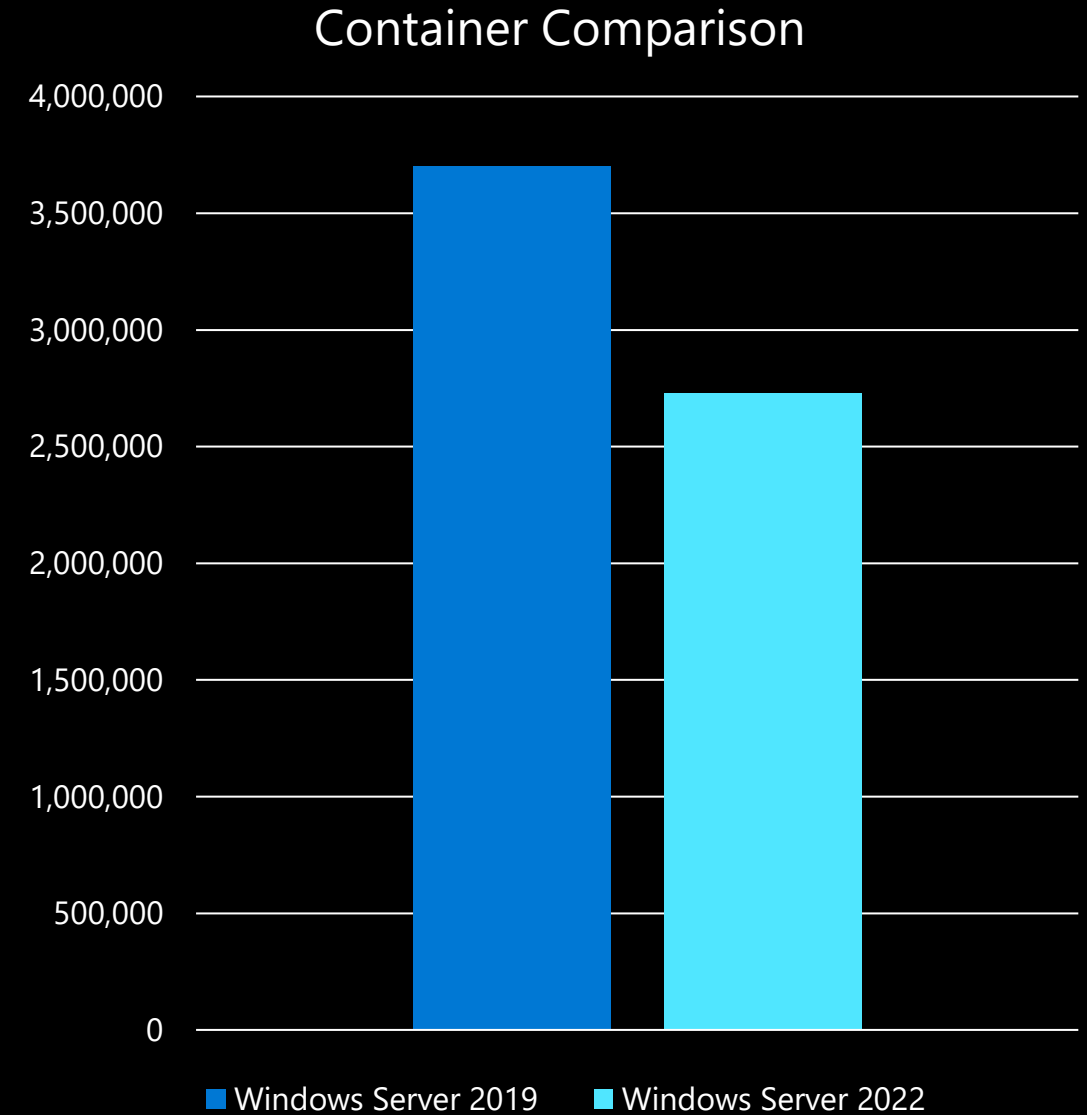
Windows Server 2022 Containers

Nano Server Containers

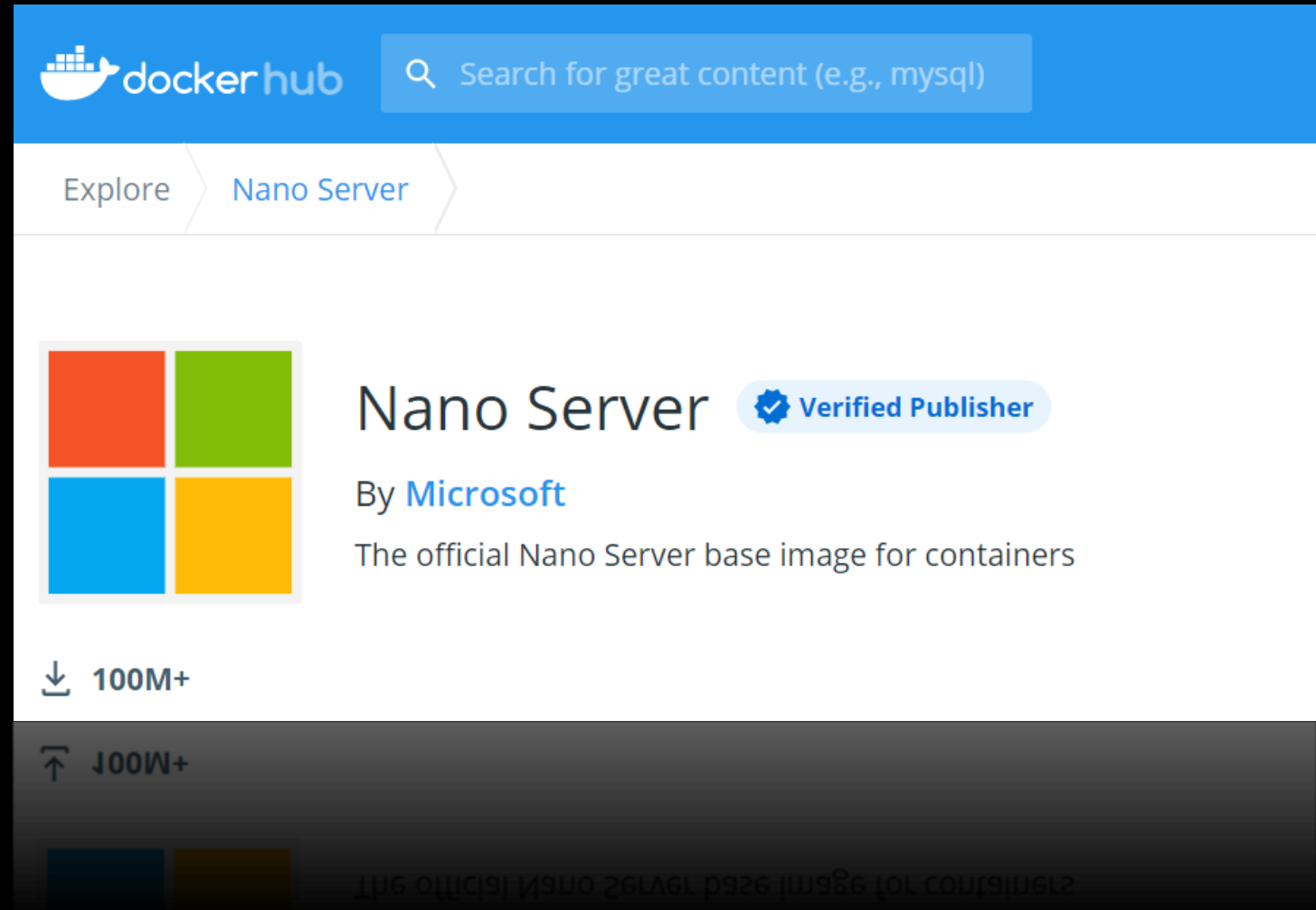
Server Core Containers

- gMSA without domain joined hosts
- Virtualized Time Zone
- CRI-containerd and HCS integration
- Tigera Calico for Windows
- Scalability improvements for overlay networking
- Containerization tooling on Windows Admin Center
- DSR routing for overlay and I2bridge networks
- YAML authoring for AKS and AKS-HCI deployment
- Smaller base container image size
- IPv6 Support for Windows Containers
- Multisubnet support for Kubernetes worker nodes
- Azure Migrate App Containerization

Windows Server Core 2022 Container Size Reduced 1 GB



Windows Server 2022 Nano Server <100 MB




The screenshot shows the Docker Hub interface for the 'Nano Server' image. At the top is the Docker Hub logo and a search bar. Below the navigation bar, the 'Nano Server' image is featured with its four-colored square icon. To the right of the icon, the text 'Nano Server' is displayed, followed by a 'Verified Publisher' badge and 'By Microsoft'. Below this, it states 'The official Nano Server base image for containers'. At the bottom left, download statistics are shown: a download arrow icon followed by '100M+' and an upload arrow icon followed by '100M+'. The bottom portion of the image is darkened.

dockerhub

Search for great content (e.g., mysql)

Explore Nano Server

 Nano Server Verified Publisher

By Microsoft

The official Nano Server base image for containers

↓ 100M+

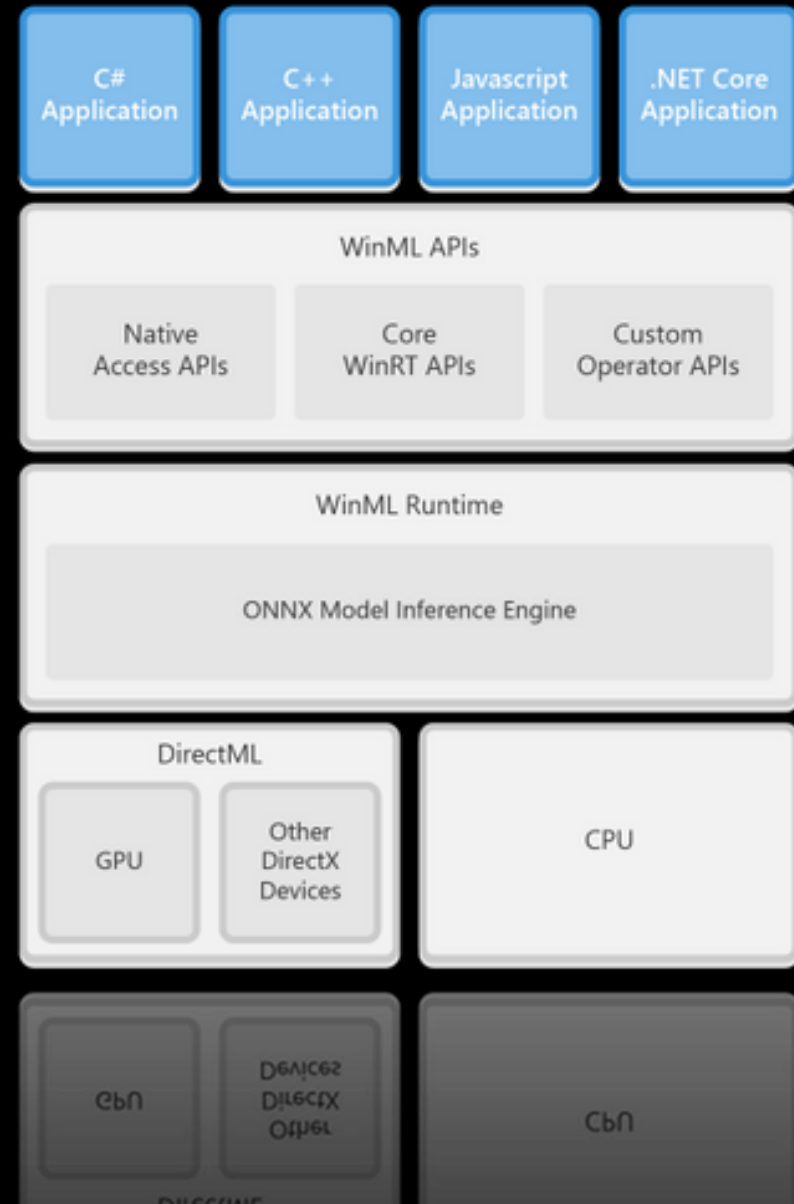
↑ 100M+

The official Nano Server base image for containers

Introducing

Windows Server Base Image

Support for ML and GPU dependent applications via DirectX for Windows Containers



Better tooling for Lift & Shift

Container

Overview

Containers

Images

Networks

Volumes

Azure Container

Azure Container

Create Image

PREVIEW

Create a new container image based on an existing app.

Use an existing docker file ☐

Application Type *

Application source type *

Web deploy package path *

Framework version *

Additional scripts to run

Image name *

Image tag *

Dockerfile preview

```
# escape=
FROM mcr.microsoft.com/dotnet/framework/aspnet:4.8-windowsservercore-ltsc2019
WORKDIR /app
```

Container tool in Windows Admin Center

Dockerfile preview

Image tag *

Azure Migrate

Containerize apps

Azure Migrate: Containerize Apps helper (Preview)

Specify application type

Select the type of application to containerize

Specify application type

Select

Setup prerequisites

Verify and setup containerization prerequisites

Login to Azure

Connect to your Azure account

Perform application discovery

Provide server credentials and run application discovery

Build

Generate Dockerfile and build container image

Deployment specifications

Provide deployment specifications

Azure Migration Containerize App