

Modernize your branch offices or retail stores with Azure Stack HCI



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This session

Azure Stack HCI Overview



Hardware configurations
Azure Stack HCI at the edge

Unique features for edge



- Direct interconnected networking
- Nested Resiliency
- Data Deduplication & Compression
- Sneak peak into the future

Hybrid services in Windows Admin Center



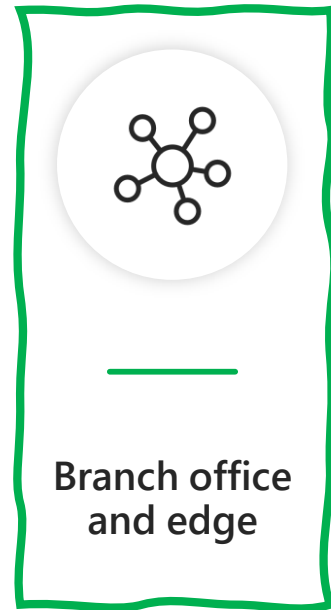
- USB Thumb drive witness
- Email and SMS HCI notifications
- Protect Virtual Machines

DEMO



- Live Migration
- Resiliency
- Data Deduplication
- USB Thumb Drive Witness
- IOPS Performance

When to use Azure Stack HCI



Virtual desktop
infrastructure



High-performance
SQL Server

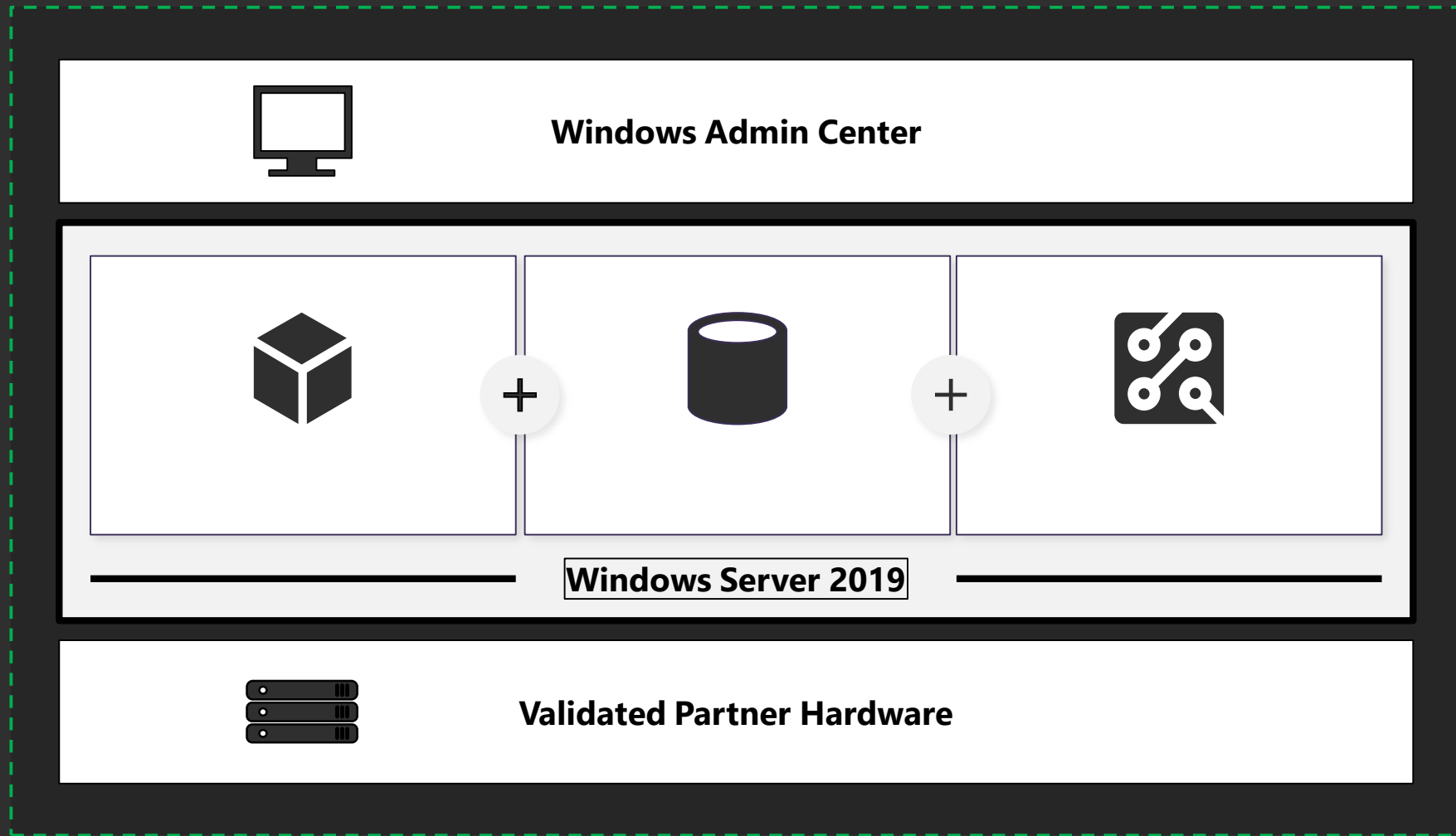


Trusted enterprise
virtualization

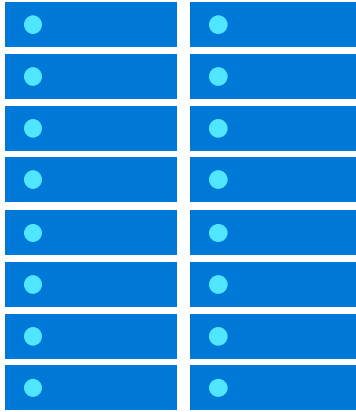


Scale-out
storage

Hyperconverged infrastructure from Microsoft



Microsoft.com/HCI



Box stores and retail

Ships and vehicles

Small businesses

Field sites and installations



Core datacenter

4 to 16 rackmount nodes
100s-1000s of VMs

Edge / ROBO

2 or 3 smaller nodes
Fewer VMs

Broadest Offerings (Intel, AMD, Workload Optimized)



ML350 GEN10

2* - 4 node Hybrid



DL360 GEN10

2* - 4 node Hybrid
2* - 4 node All Flash



DL380 GEN10

2* - 16 node All Flash
2* - 16 node Hybrid
2* - 16 node Hybrid w
Intel Optane DC PMEM



EDGE LINE EL8000

Converged Edge System
2* - 4 nodes All Flash



DL325 GEN10

2* - 4 node Hybrid
2* - 4 node All Flash



DL385 GEN10

2* - 16 node Hybrid
2* - 16 node All Flash



D3610/D3710 JBOD

Supported for use on
DL380/385/360
Apollo 4200 – SAS only



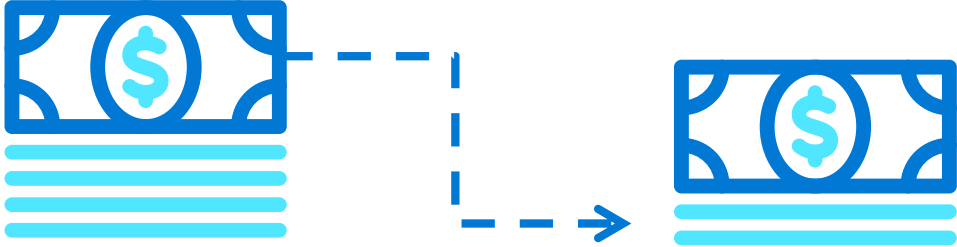
APOLLO 4200 GEN10

2* - 16 node Hybrid
2* - 16 node All Flash



SYNERGY 480 GEN10

2* - 16 node Hybrid
2* - 16 node All Flash



Lower cost

Consolidate with industry-standard hardware and enjoy the flexibility to buy what you need today and seamlessly scale out tomorrow. The only self contained 2-node hyperconverged solution in the industry.

Azure Stack HCI is all inclusive:

- Software Defined Compute (Hyper-V)
- Software Defined Storage (Storage Spaces Direct)
- Software Defined Networking

Azure Stack HCI provides:

- Unlimited Windows Server Guests OS Instances
- Unlimited Windows & Linux Containers



Simple operations

Manage your hyper-converged infrastructure with the browser-based Windows Admin Center app. Provision virtual machines and storage, configure networking, monitor health and performance, and install updates with just a few clicks.

Windows Admin Center:

- Elegant browser-based management
- Extensible, plug-ins for hardware & software
- Agentless, nothing to install in the guest OS
- Included with Windows license

Windows Admin Center provides:

- Hyper-Converged Management
- Server Management
- Cluster Management



Hybrid capabilities

Take advantage of the cloud and on-premises working together with the hyper-converged infrastructure platform from a leader in public cloud.

Windows Admin Center can manage Windows Server instances running anywhere:

On-premises: physical or virtual

Cloud: Azure IaaS and others

Windows Admin Center is the hub for hybrid scenarios such as:

Azure Cloud Witness

Azure Monitor

Azure Site Recovery

Why Azure Stack HCI at the edge



Switchless “back-to-back” networking support



Nested resiliency



NEW Lightweight cloud witness – no costly “Witness VM” needed



NEW Using Azure Monitor to get email/SMS alerts



NEW Protect virtual machines using Azure Site Recovery

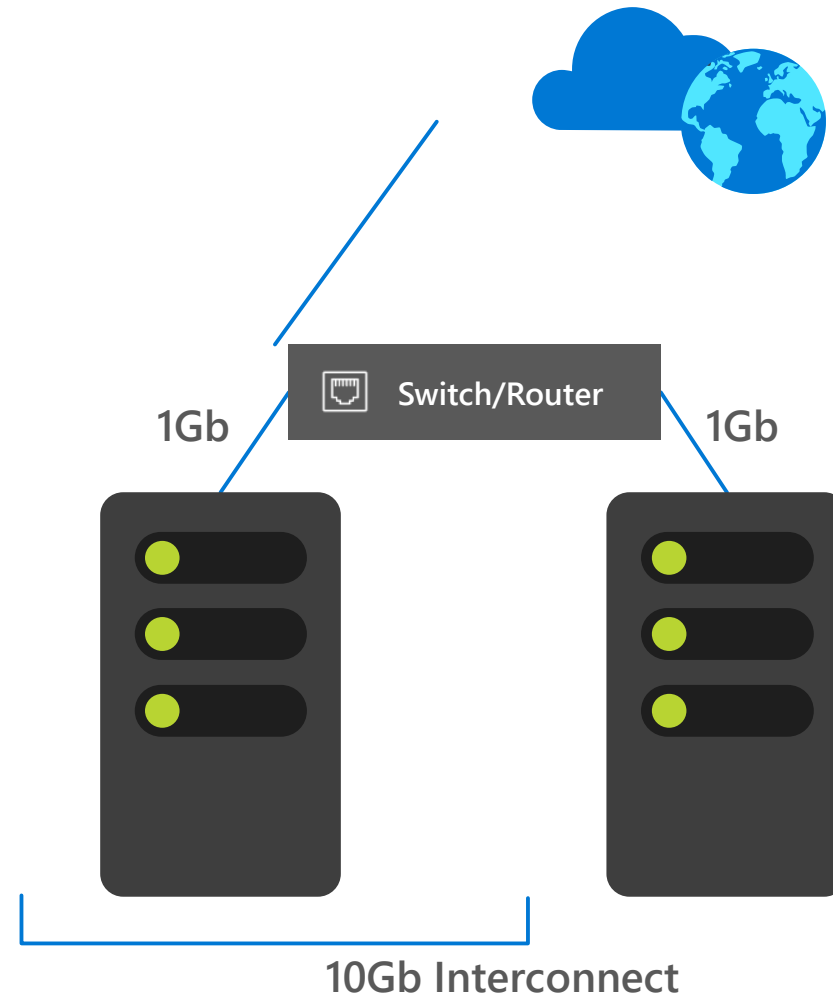
Simplified networking



Direct Connected Interconnects

Minimum for small scale:

- 10 Gbps network interface
- Direct –connect supported
- Thunderbolt for simplicity

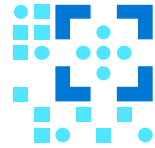


Benefits of switchless networking



Cost

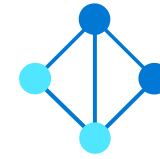
Reduced number of switches or switch ports



Resiliency

Switch configuration mistakes and switch resets

RDMA configuration simplicity (no data center bridging)



Remote office

No fast switch required

Color coded cables to reduce connection mistakes

Storage design choices

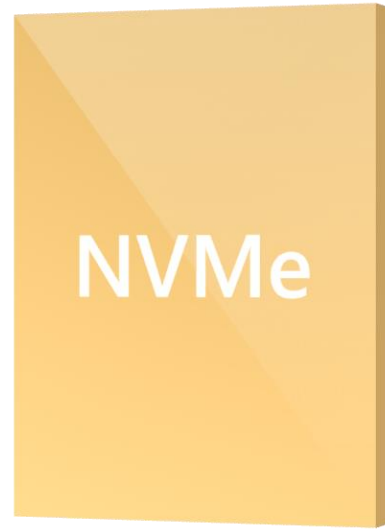


Types of drives



Persistent Memory

NVDIMM-N,
Intel Optane DIMMs
New for WS2019



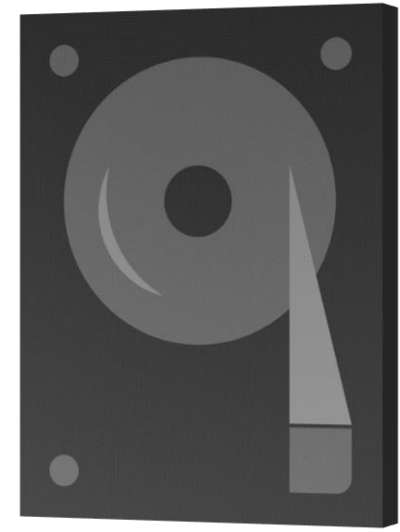
Non-Volatile Memory Express

Connected via PCIe, includes
M.2, U.2, Add-In-Card, and Intel
Optane (3D X-Point)



Solid-State Drive

Any SSD connected via SATA
or SAS, must have power-loss
protection (PLP)



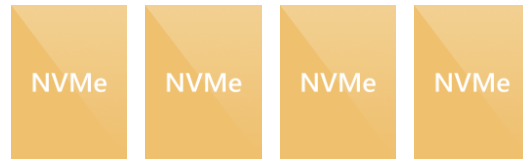
Hard Disk Drive

Any HDD connected via SATA
or SAS, can be any RPM

building a
Performance Optimized
solution



ALL-FLASH



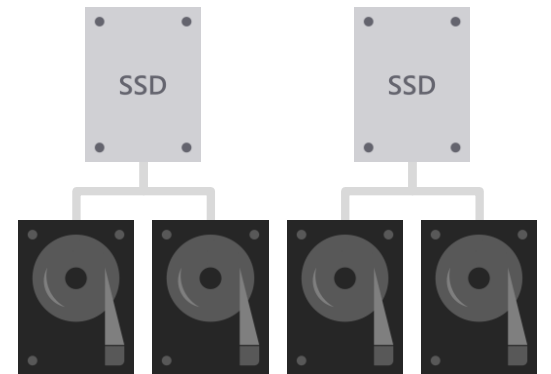
NVMe *for* Capacity



SSD *for* Capacity

Flat design of all flash delivers the best IOPS and throughput

building a
Capacity Optimized
solution



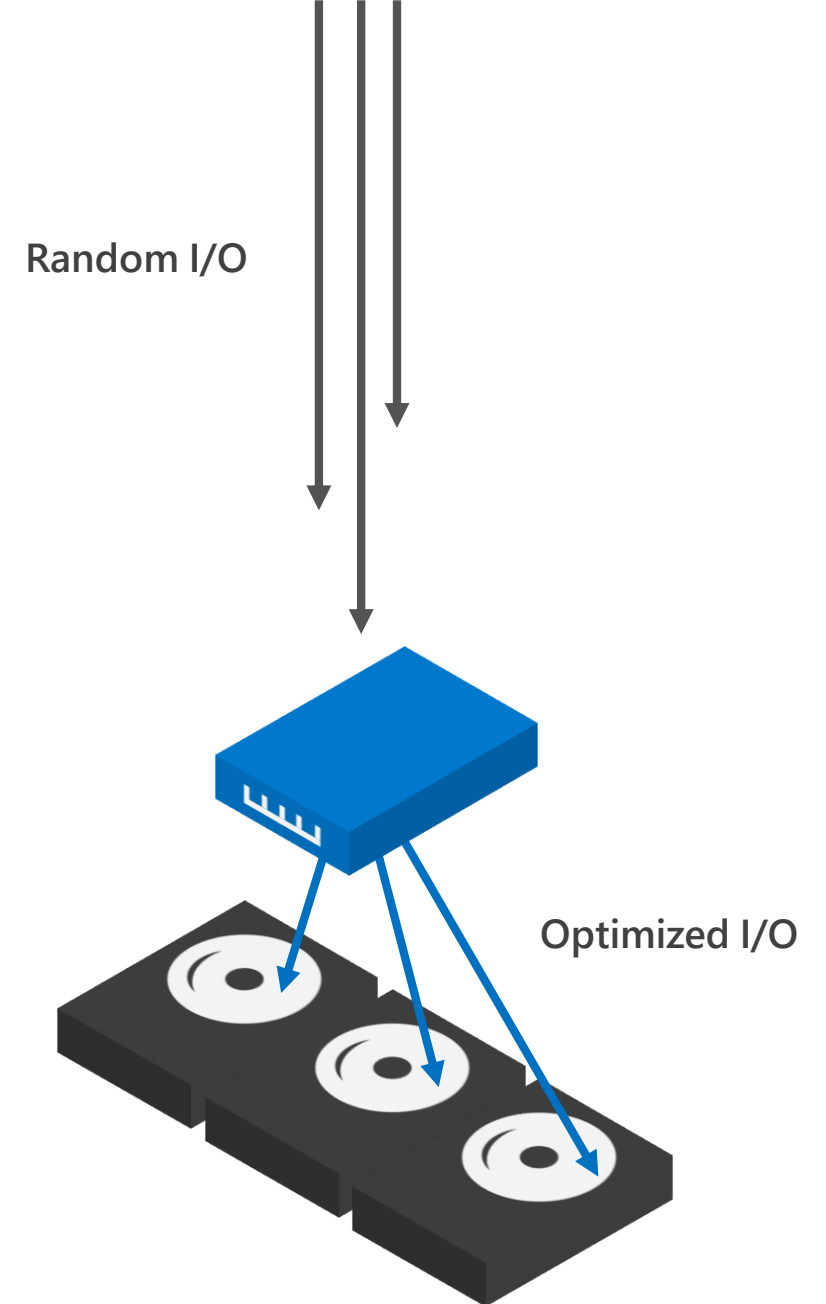
Built-In, Always-On Cache

Fastest media (e.g. SSD) provides caching

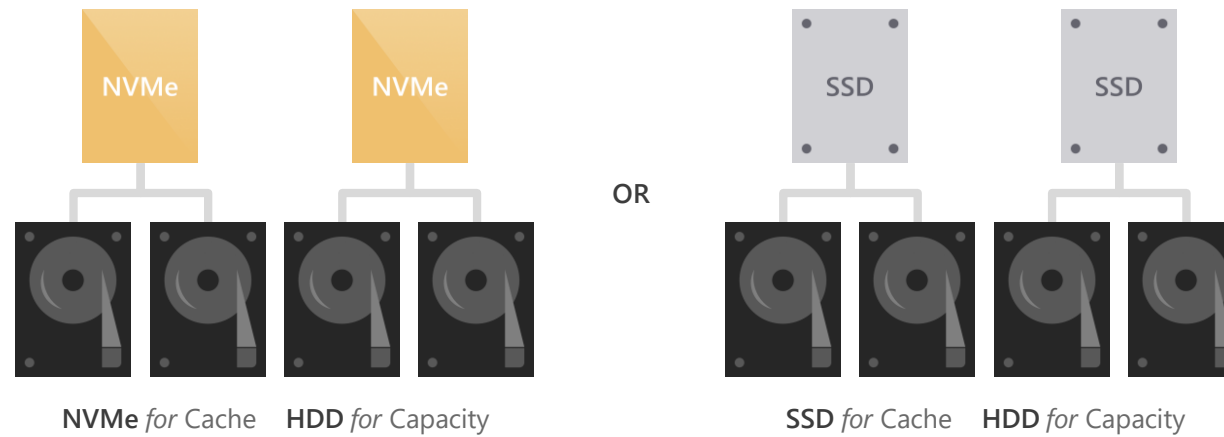
Each flash *dynamically* binds to several HDDs

Independent of pool or volumes, no configuration

Writes are then de-staged to HDDs in optimal order

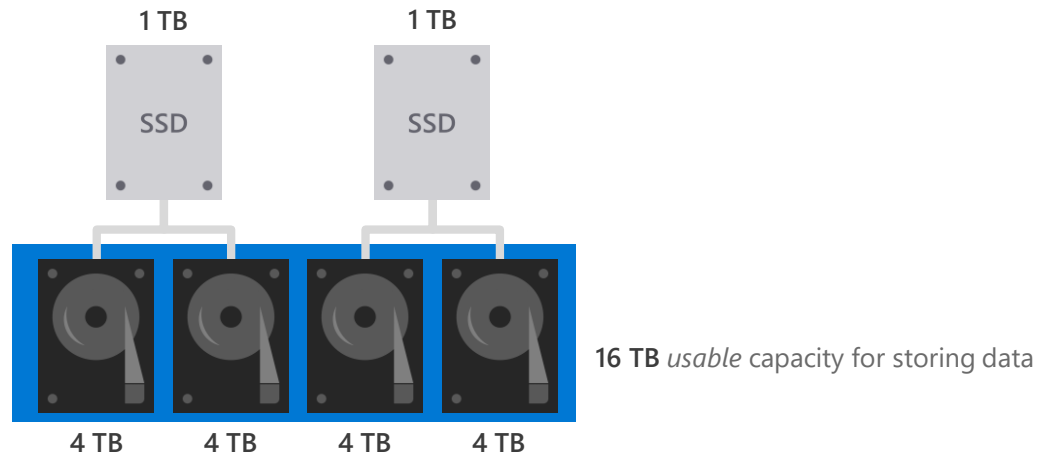


CAPACITY OPTIMIZED



Hybrid design with mix of different classes of devices to reduce costs

CACHE is not CAPACITY



Entire capacity of cache devices is consumed by S2D and not available to system

Broadest Offerings

SWITCHLESS

More affordable, reduce failure points, faster



INTEL OPTANE PERSISTENT MEMORY

Fastest HCI



JBOD

14 CONFIGURATIONS

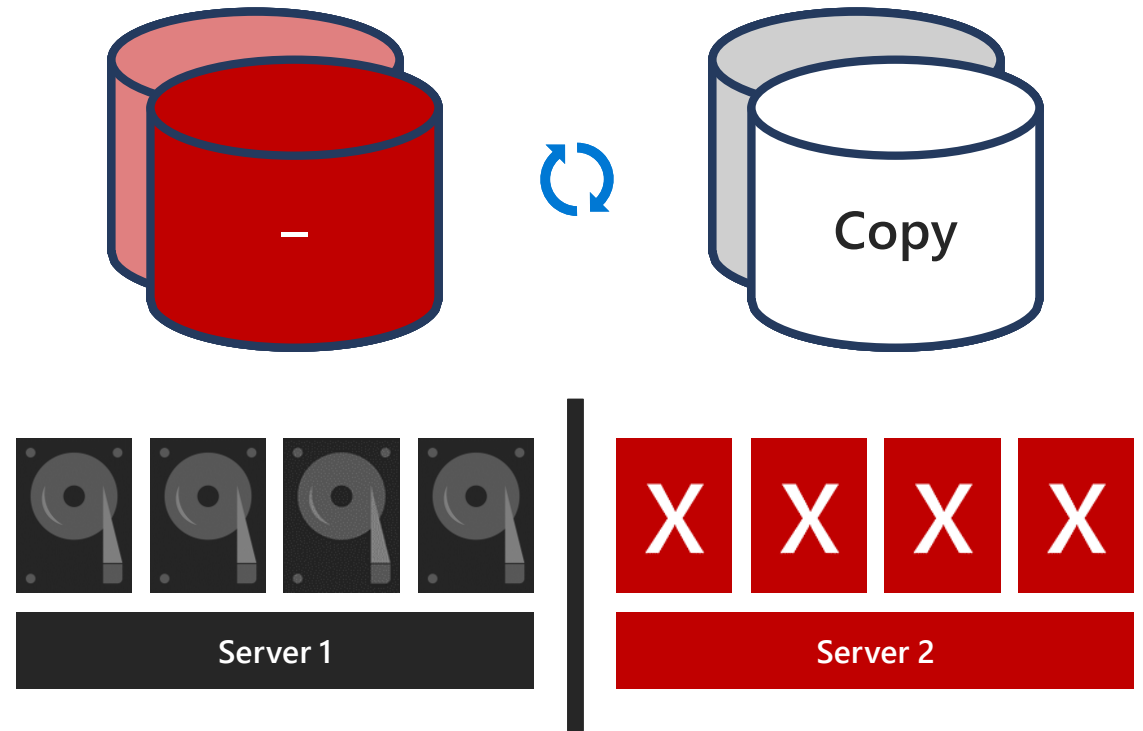


Most affordable storage

Survive multiple failures

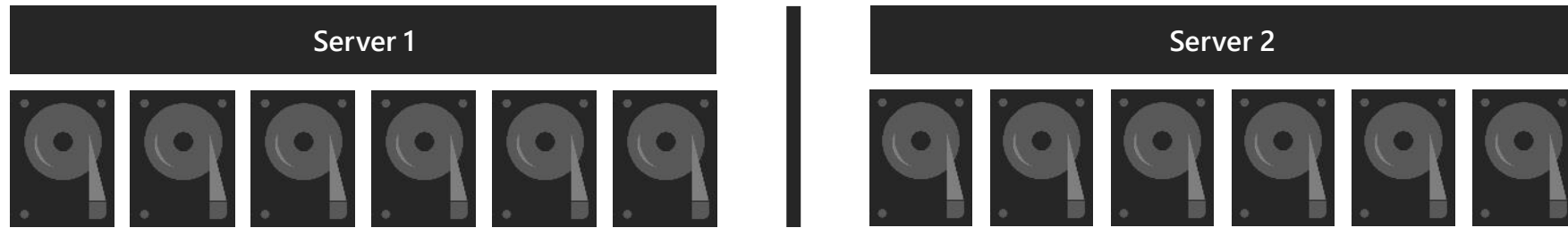


Two-way mirror

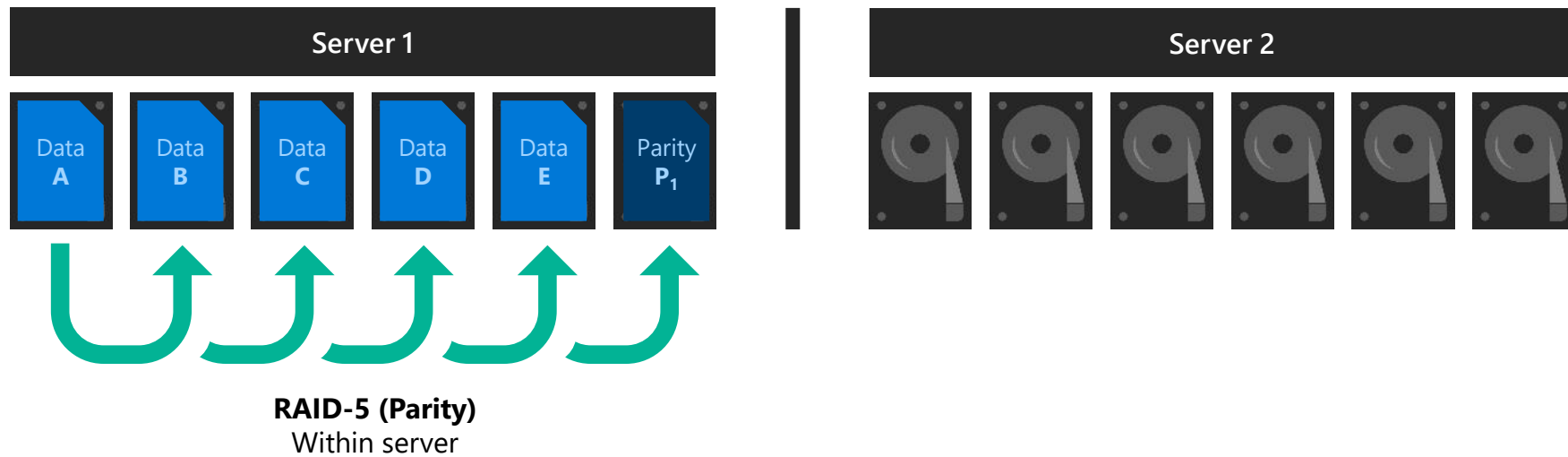


✓ Drive failure ✓ Server failure ✗ Can't survive 2 failures

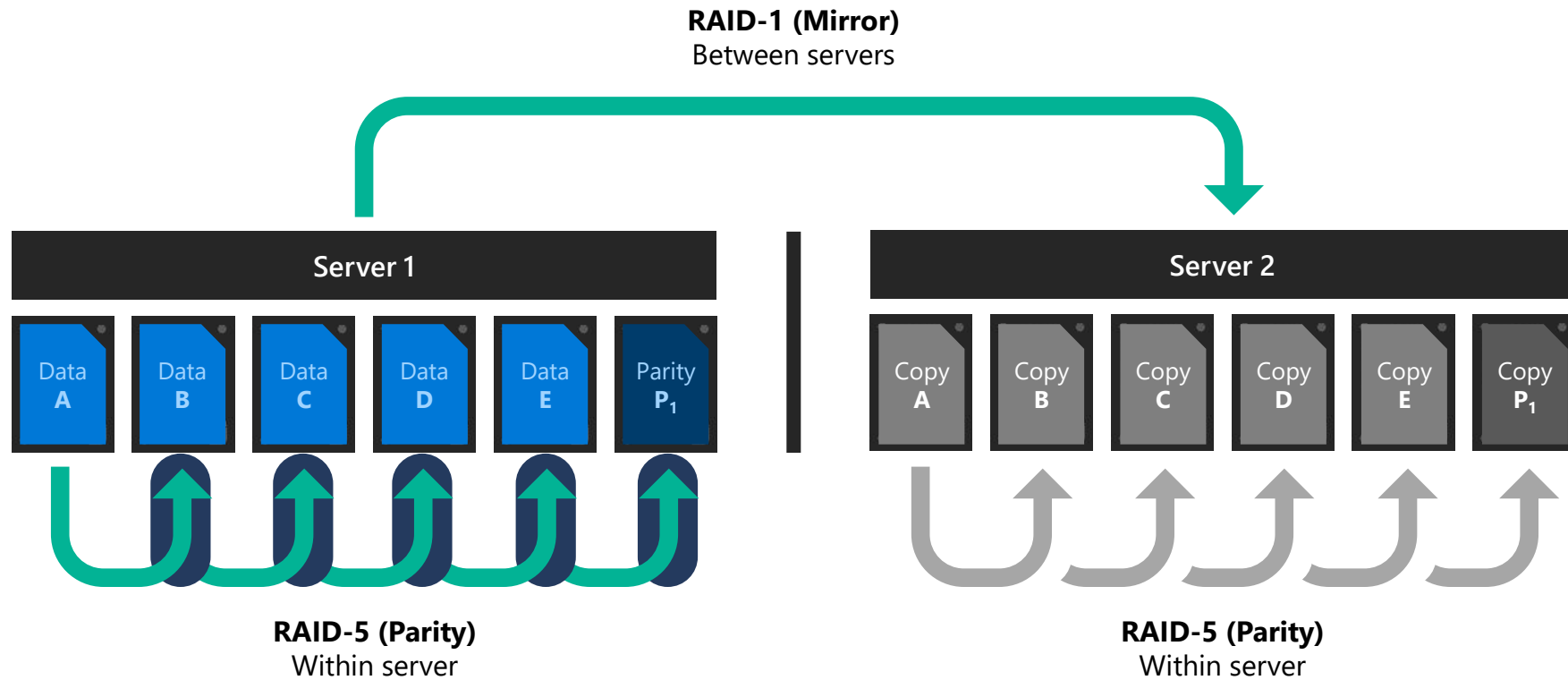
Inspiration: RAID 5 + 1



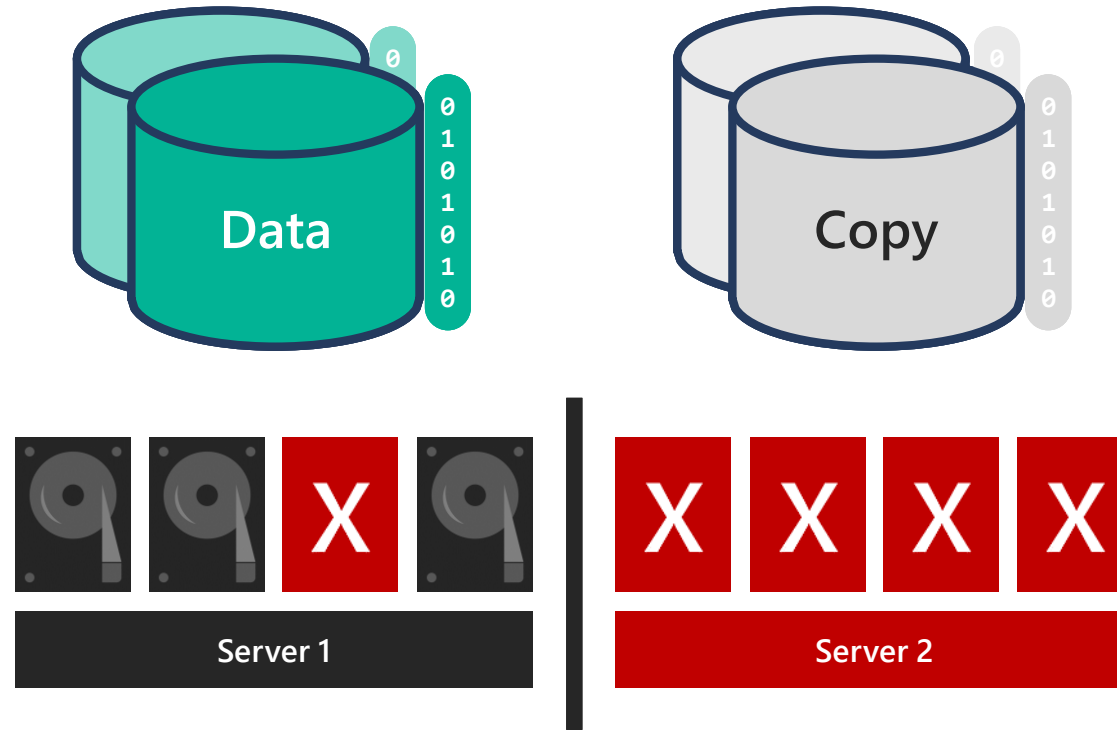
Inspiration: RAID 5 + 1



Inspiration: RAID 5 + 1



Nested resiliency



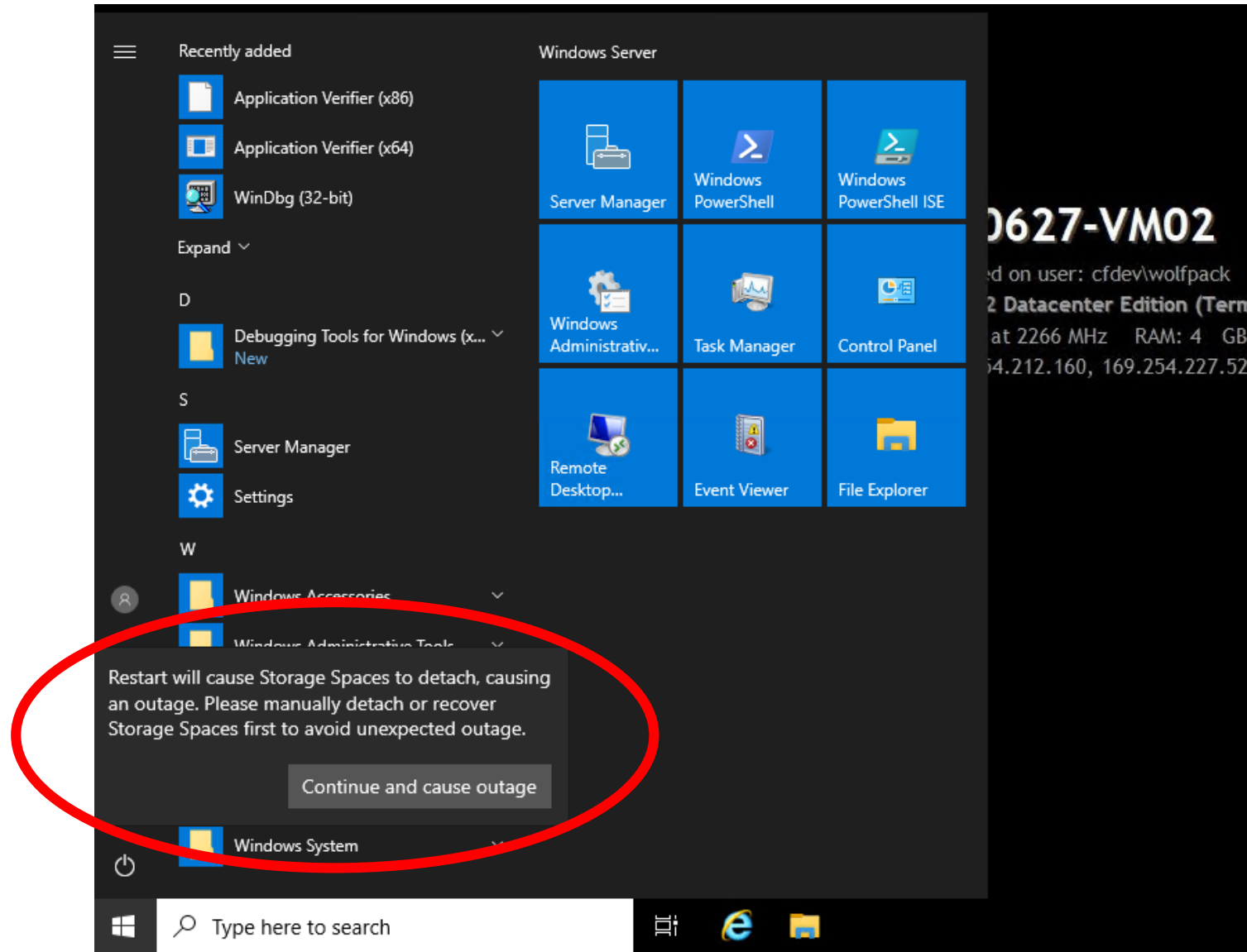
Handle two failures at once

Improving reliability at the edge



Shutdown Safeguards

- Expanding total addressable market
- Checks of virtual disk health and prompts to help prevent downtime
- Building to enable IT generalists

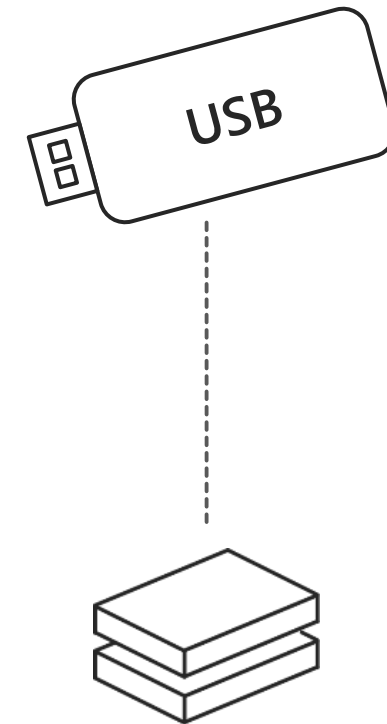


Note: Not final string

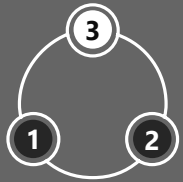
Setup lightweight USB witness using Windows Admin Center

USB Witness **New!**

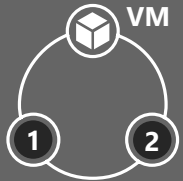
Insert into compatible router/switch



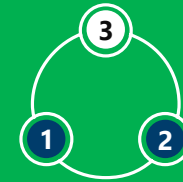
Achieving cluster quorum today



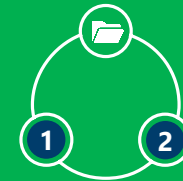
Full third server
Defeats the purpose



"Witness Appliance" VM
High storage and bandwidth requirements



Full third server
Defeats the purpose



File share witness
Minimal storage or bandwidth needed

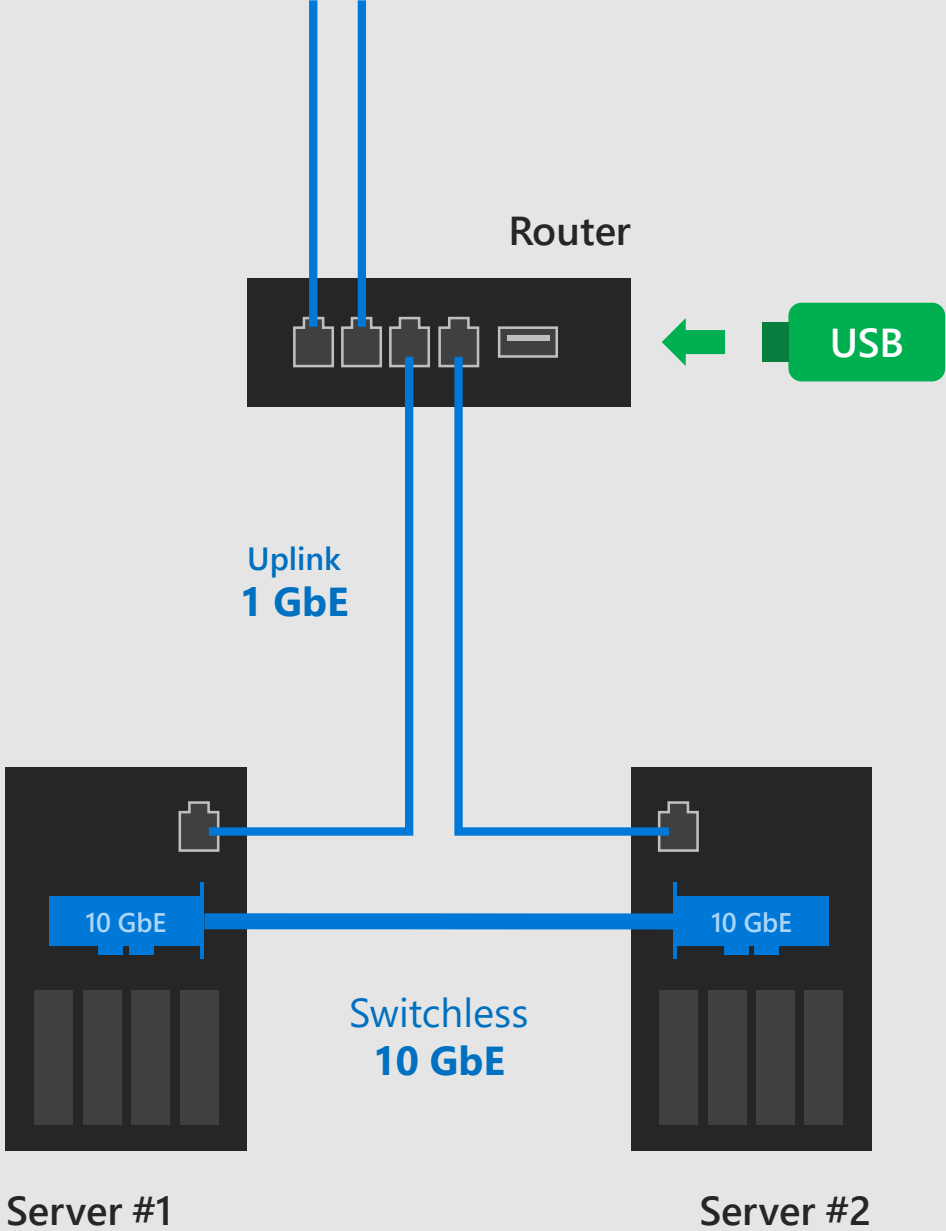
introducing

TRUE TWO-NODE

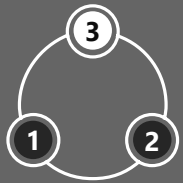
Quorum without another server or virtual machine, without Internet, and even without Active Directory, for under \$5.



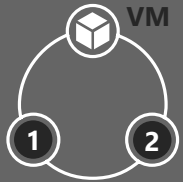
How it works



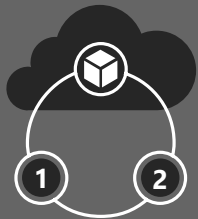
Achieving cluster quorum today



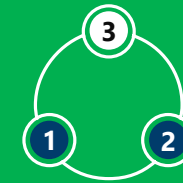
Full third server
Defeats the purpose



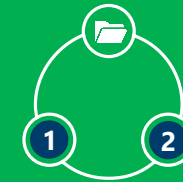
"Witness Appliance" VM
High storage and bandwidth requirements



VM in the cloud
High storage and bandwidth requirements



Full third server
Defeats the purpose



File share witness
Minimal storage or bandwidth needed



Cloud witness
*Minimal storage or bandwidth needed
(uses Azure blob storage)*

Collect Diagnostic Information in Windows Admin Center



Dashboard - Hyper-Cor

https://localhost:6516/hciclustermanager/connections/hcicluster/fractal-s2d.redmond.corp.microsoft.com/tools/hcioverview

Windows Admin CenterHyper-Converged Cluster ManagerMicrosoft

fractal-s2d.redmond.corp.microsoft.com

Tools

Search Tools

Dashboard

Compute

Virtual Machines

Virtual Switches

Servers

Storage

Volumes

Drives

Tools

Updates

Diagnostics

Settings

Dashboard

Alerts (Total 0)

There are no alerts

Servers (Total 2)

All servers healthy

Drives (Total 32)

All drives healthy

Virtual machines (Total 7)

Running6

Off1

Volumes (Total 3)

All volumes healthy

CPU usage

1% of 100%

Memory usage

17% of 1.5 TB

Storage usage

Used569 GB

Available49.5 TB

Total size50 TB

Cluster performance

IOPS

Total 44

Latency

Average 277 μs

Feedback

**With HPE Azure Stack HCI solutions,
Do more with Storage Spaces Direct**

**With HPE Azure Stack HCI solutions,
Enjoy the lowest cost HCI solution**

With HPE Azure Stack HCI solutions,
Reduce networking overhead

**With HPE Azure Stack HCI solutions,
Be more resilient at the edge**

**With HPE Azure Stack HCI solutions,
Unlock best 2-node HCI solution**

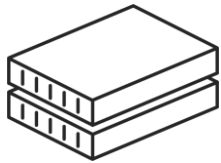
With HPE Azure Stack HCI solutions,
Scale as you grow

**With HPE Azure Stack HCI solutions,
Manage with Windows Admin Center**

**With HPE Azure Stack HCI solutions,
Unlock Azure hybrid services**

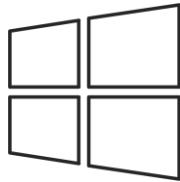
With HPE Azure Stack HCI solutions,
Modernize your datacenter

Get started with Azure Stack HCI



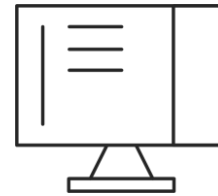
Find solutions from your preferred vendor

Microsoft.com/HCI



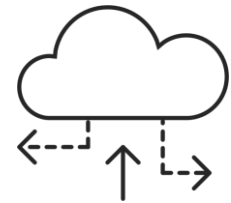
Install Windows Server 2019 if not pre-installed

aka.ms/WindowsServer



Deploy and manage with Windows Admin Center

aka.ms/WindowsAdminCenter



Connect to Azure Arc and hybrid services

Azure.com/Hybrid

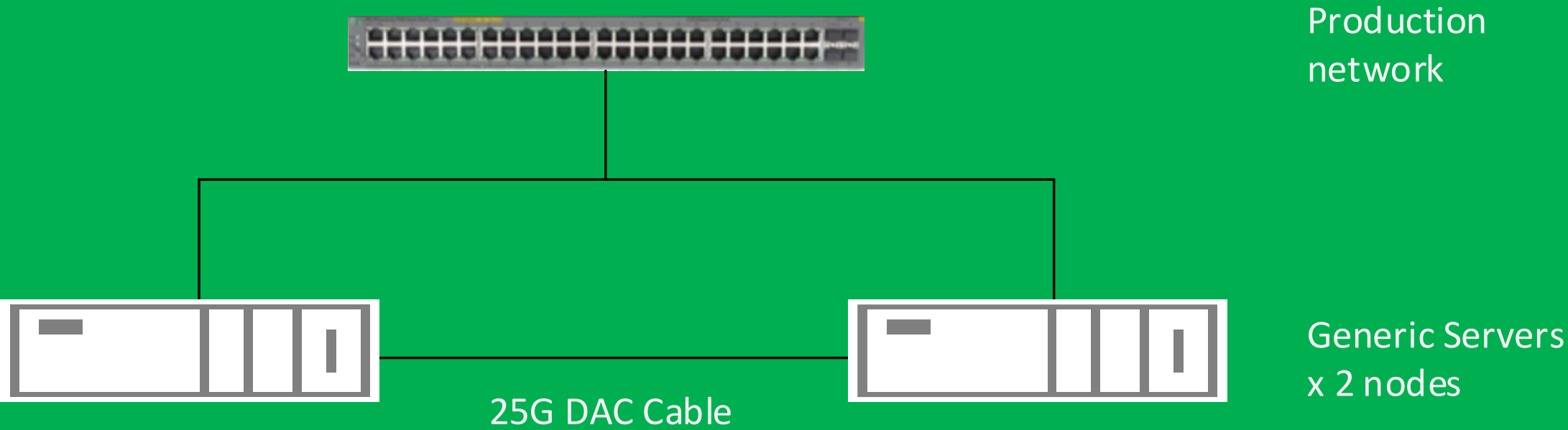
Get started with Azure Stack HCI DEMO's



Demo Agenda

1. Live Migration (uninterrupted experience copying files)
2. Data Deduplication and Compression
3. USB Thumb Drive Witness – Using File Share Technology within USB
4. Resiliency – Nested Scenario
5. iOPS Performance – 2 Nodes Azure Stack HCI Certified Node

Hardware and Connectivity Introduction



	NODE 1	NODE 2
Storage	480GB SSD x 2 = Cache 1TB SAS x 4 = Storage	480GB SSD x 2 = Cache 1TB SAS x 4 = Storage

Demo **1**

Live Migration - uninterrupted experience
copying files

Demo 2

Data Deduplication and Compression

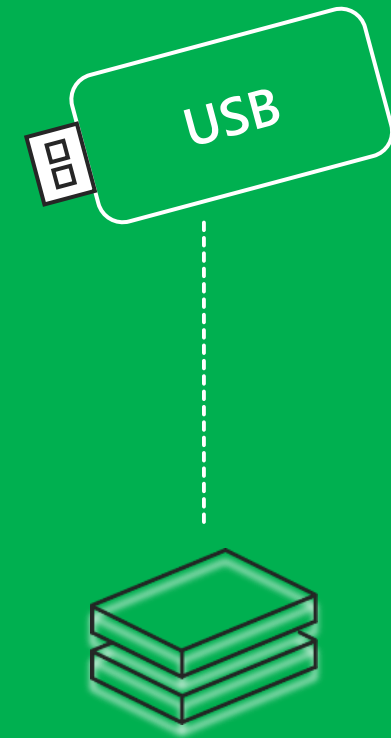
CSV	Actual Size	Dedup Size	Dedup Ratio
VOL-MIRR-DEDUP	7248GB	3500GB	48.29%
VOL-MIRR-NORMAL	3843GB	-	-

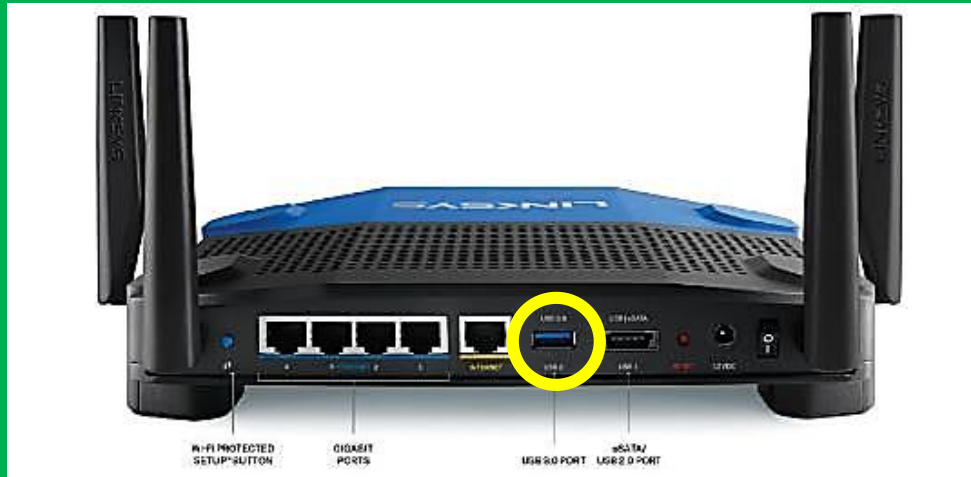
Demo 3

USB Thumb Drive as File Share Witness

USB Witness New!

Insert into compatible router/switch





LinkSys W. Router



TPLink W. Router

Storage Sharing

Service Status: **Started**

☐ Access shared storage with password

Volume	Capacity	Used	Free	Use%	Shared	View
volume1	7.4 GB	1.9 GB	5.5 GB	26%	<input type="button" value="Disable"/>	Open the disk

Volume	Capacity	Used	Free	Use%	Shared
volume1	3.7 GB	3.7 GB	25 MB	99%	<input type="button" value="Enable"/>

File Share Witness Resource

<https://docs.microsoft.com/en-us/windows-server/failover-clustering/file-share-witness>

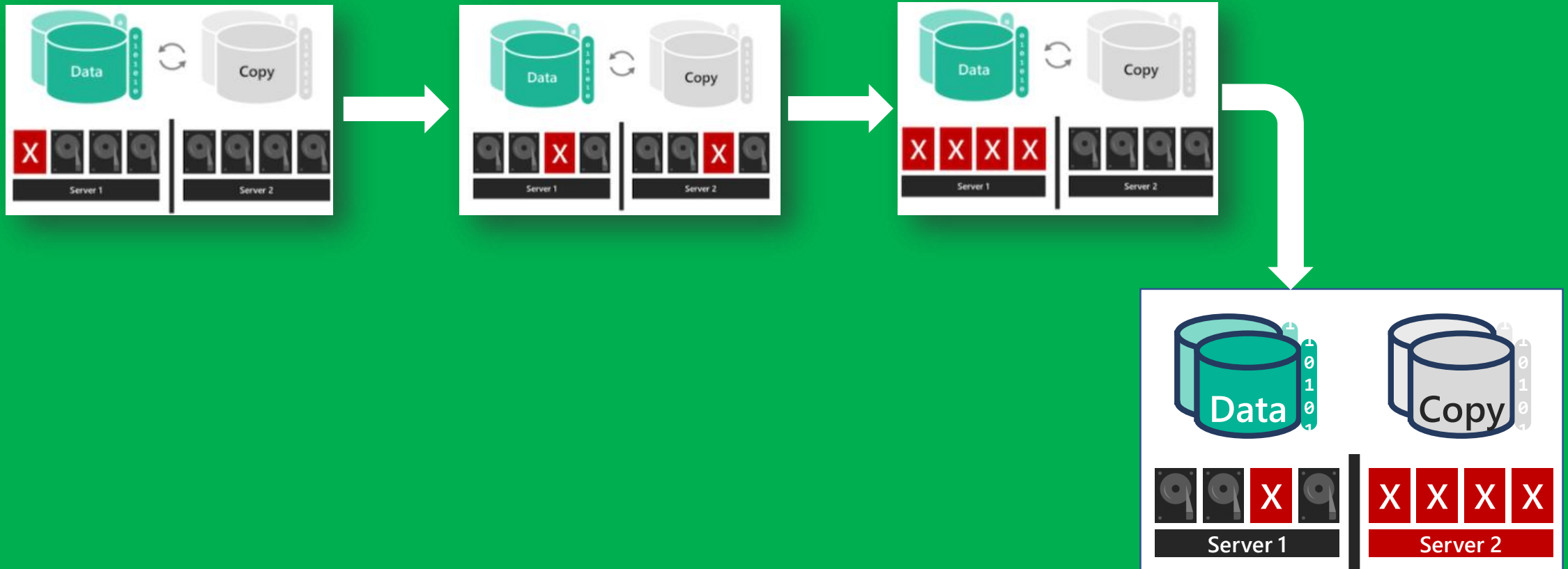
<https://docs.microsoft.com/en-us/windows-server/failover-clustering/manage-cluster-quorum>

<https://www.linksys.com/us/support-article?articleNum=140175>

<https://www.tp-link.com/us/support/faq/253/>

Demo 4

Resiliency – Nested Scenario



Supported for VM under CSV
with NESTED TWO-WAY MIRROR

iOPS Performance – 2 Nodes Azure Stack HCI Certified Node

```
. \Start-Sweep.ps1 -b 4 -t 8 -o 20 -w  
10 -d 60
```

CSV FS	IOPS	Reads	Writes	BW (MB/s)	Read	Write	Read Lat (ms)	Write	Read QAvg
Total	392,212	353,085	39,127	1,600	1,440	160			
NODE1 89.022	199,725	179,922	19,803	813	732	81	0.573	4.495	103.020
NODE2 81.800	192,487	173,163	19,324	788	708	79	0.513	4.233	88.872

```
. \Start-Sweep.ps1 -b 4 -t 8 -o 20 -w 30 -d 60
```

CSV FS	IOPS	Reads	Writes	BW (MB/s)	Read	Write	Read Lat (ms)	Write	Read QAvg
Write									
Total	334,792	234,699	100,093	1,370	960	410			
NODE1 326.603	166,559	116,691	49,868	681	477	204	0.621	6.550	72.445
NODE2 319.733	168,233	118,008	50,225	688	483	206	0.549	6.364	64.751

