

# Microsoft Azure Intelligent Edge Brief





# Agenda

- Azure Intelligent Edge Overview and News
- Today's Focus Area:
  - **Azure Stack HCI Overview – Cosmos Darwin, PM**
- Q&A

Karl Rautenstrauch, Intelligent Edge Specialist  
@Kloud\_Karl

# But First - What is the AIEB?

30-minute briefing open to everyone to discuss a specific area within our 'Intelligent Edge' offerings

Not a forum to share NDA information

Using 'regular' Teams for now for easier collaboration (Q&A, discussion, etc.)

Calls will be recorded and posted here: <https://aka.ms/aieb-channel>

# Some quick news...

- Azure Stack Update 1.1906.11.52 released
  - <https://t.co/16VmGR037d?amp=1>
- Azure Stack and Data Box Edge [shout out from Satya](#)
- Amazing Data Box Edge Story (more next time):
  - [https://youtu.be/g-3RG\\_SDbDE](https://youtu.be/g-3RG_SDbDE)

"Azure provides a well-integrated approach to edge computing and Internet of Things (IoT), with offerings that reach from its hyperscale data center out through edge solutions such as Azure Stack and Data Box Edge."

Gartner 2019 MQ for  
Cloud Infrastructure as a Service (IaaS)

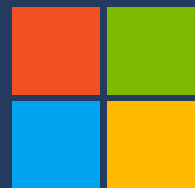
# Introduction to Microsoft Azure Stack HCI



Cosmos Darwin  
Senior PM, Core OS Engineering



@cosmosdarwin



# Microsoft Azure

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Productive + Hybrid + Intelligent + Trusted

# Hybrid platform

Azure meets your workloads where they are

## Azure

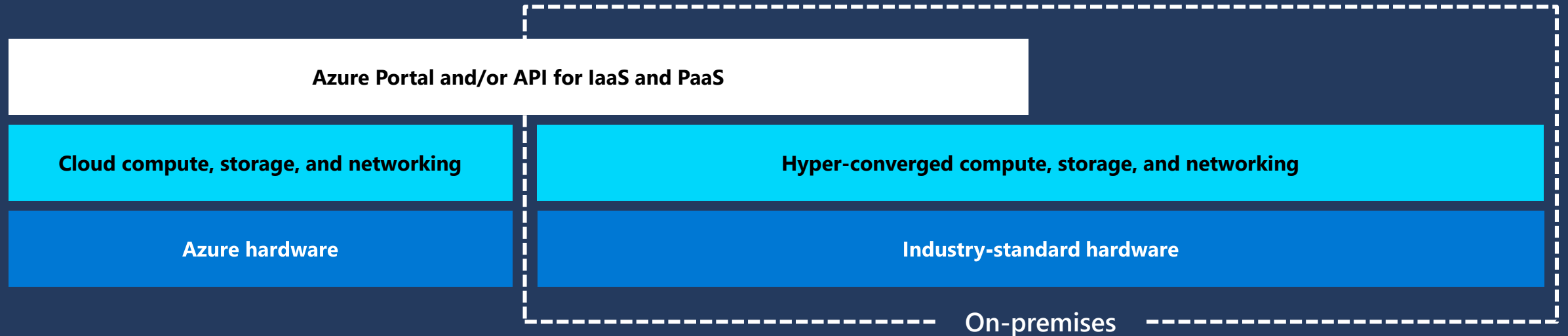
Use public cloud services

## Azure Stack

Operate cloud services on-premises

## Azure Stack HCI

Run virtualized apps on-premises



**Consistent** cloud services  
brought on-premises

Azure Stack



**Connect** on-premises  
resources to public cloud

Azure Stack HCI



# Azure Stack HCI: Connect to Azure



Azure Site  
Recovery



Azure  
Backup



Azure File  
Sync



Azure Update  
Management



Azure  
Monitor



Azure Security  
Center

sme-rs5-2.redmond.corp.microsoft.com

## Tools

Search Tools 🔍

Overview

Azure hybrid services

Azure File Sync

Backup

Certificates

Devices

Events

Files

Firewall

Installed Apps

Local Users &amp; Groups

Network

PowerShell

Processes

Registry

Remote Desktop

Roles &amp; Features

Scheduled Tasks

Services

Settings

## Azure hybrid services

Discover Azure services

## Discover Azure services

**Simplify data protection and protect against ransomware with Azure Backup**

Get cost-effective short- and long-term retention. Restore individual VMs, files, and folders to Azure or on-premises at no additional cost.

[Get an overview of Azure Backup](#) ➞

Set up

**Connect your on-premises server to an Azure vNet with Azure Network Adapter**

Use a streamlined wizard to set up a point-to-site VPN that connects your on-premises server with an Azure vNet.

[Get an overview of Azure Network Adapter](#) ➞

Set up

**Get unified security management and advanced****Sync your file server with the cloud by using Azure File Sync**

Centralize file shares in Azure while caching frequently accessed files on your local file servers.

[Get an overview of Azure File Sync](#) ➞

Set up

**Monitor and receive notifications about server health with Azure Monitor**

Get full observability into your applications infrastructure, and network.

[Get an overview of Azure Monitor](#) ➞

Set up

**Help protect VM workloads from disaster by using Azure Site Recovery**

Deploy replication, failover, and recovery processes to help keep your applications running during planned and unplanned outages.

[Get an overview of Azure Site Recovery](#) ➞

Set up

**Centrally manage updates on all your servers by using Azure Update Management**

Manage operating system updates for your Windows and Linux computers that are deployed on-premises, in Azure, or in other clouds.

[Get an overview of Azure Update Management](#) ➞

Set up

Close

edgehci.redmond.corp.microsoft.com

Tools

Search Tools

🖨️ Devices

📋 Events

📁 Files

🔥 Firewall

👤 Local Users & Groups

🌐 Network

📄 PowerShell

📊 Processes

🗄️ Registry

🔗 Remote Desktop

🔧 Roles & Features

📅 Scheduled Tasks

⚙️ Services

💾 Storage

🔄 Storage Replica

📦 Updates

🖥️ Virtual Machines

🔌 Virtual Switches

⚙️ Settings

Virtual machines

Summary Inventory

+ New 🗑️ Delete ▶ Start ⏻ Turn off ☐ Shut down 💾 Save

Name ↑	State	CPU usage	Memory pressure
<a href="#">jol-z820-rs5</a>	Running	0 %	82 %
<a href="#">jol-z820-ws16-1</a>	Running	2 %	81 %
<a href="#">jol-z820-ws16-2</a>	Running	0 %	81 %
<a href="#">jol-z820-ws16-3</a>	Running	0 %	59 %
<a href="#">test-vm-1</a>	Stopped	-	-
<a href="#">test-vm-2</a>	Running	0 %	72 %
<b><a href="#">VM-TEST-14</a></b>	Running	0 %	74 %
<a href="#">VM-TEST-15</a>	Running	0 %	39 %
<a href="#">VM-TEST-16</a>	Saved	-	-
<a href="#">VM-TEST-17</a>	Saved	-	-
<a href="#">VM-TEST-18</a>	Running	0 %	72 %
<a href="#">VM-TEST-19</a>	Running	0 %	75 %
<a href="#">VM-TEST-20</a>	Running	0 %	73 %
<a href="#">VM-TEST-21</a>	Running	0 %	74 %
<a href="#">VM-TEST-22</a>	Running	0 %	75 %
<a href="#">VM-TEST-23</a>	Saved	-	-
<a href="#">VM-TEST-24</a>	Running	0 %	75 %
<a href="#">VM-TEST-25</a>	Saved	-	-

More ▾

🗑️ Delete saved state

⏸️ Pause

▶ Resume

↺ Reset

🕒 New checkpoint

⚙️ Settings

✎ Rename

🔗 Connect

⬇️ Download RDP file

🛡️ Protect VM

18 items 🔁 Search...

Uptime	Heartbeat	Disaster Rec...
4:22:30:52	OK	Not protected
4:22:30:53	OK	Not protected
4:22:30:53	OK	Not protected
2:21:51:25	OK	Not protected
-	Unknown	Not protected
4:22:30:53	OK	Not protected
4:22:30:53	OK	Not protected
4:22:30:53	OK	Not protected
-	Unknown	Not protected
-	Unknown	Not protected
4:22:30:53	OK	Not protected
4:22:30:53	OK	Not protected
4:22:30:53	OK	Not protected
4:22:30:53	OK	Not protected
4:22:30:53	OK	Not protected
4:22:30:53	OK	Not protected
4:22:30:53	OK	Not protected
-	Unknown	Not protected
-	Unknown	Not protected

Microsoft Azure Stack HCI is  
Hyper-Converged Infrastructure

# 54%

of organizations expect deploying converged/hyperconverged infrastructure to be among their **most significant** datacenter modernization investments over the **next 12-18 months**

**ESG Data Point of the Week, April 2019**  
<https://www.esg-global.com/data-point-of-the-week-04-29-19>



# +57%

hyperconverged infrastructure investment year-over-year growth  
from Q4 2017 to Q4 2018, to nearly \$2B US per quarter

International Data Corporation (IDC) Worldwide Quarterly Converged Systems Tracker, April 2019

<https://www.idc.com/getdoc.jsp?containerId=prUS44987619>



Hyper-V



SDS



SDN

Windows Server 2019



Windows Admin Center



Hyper-V

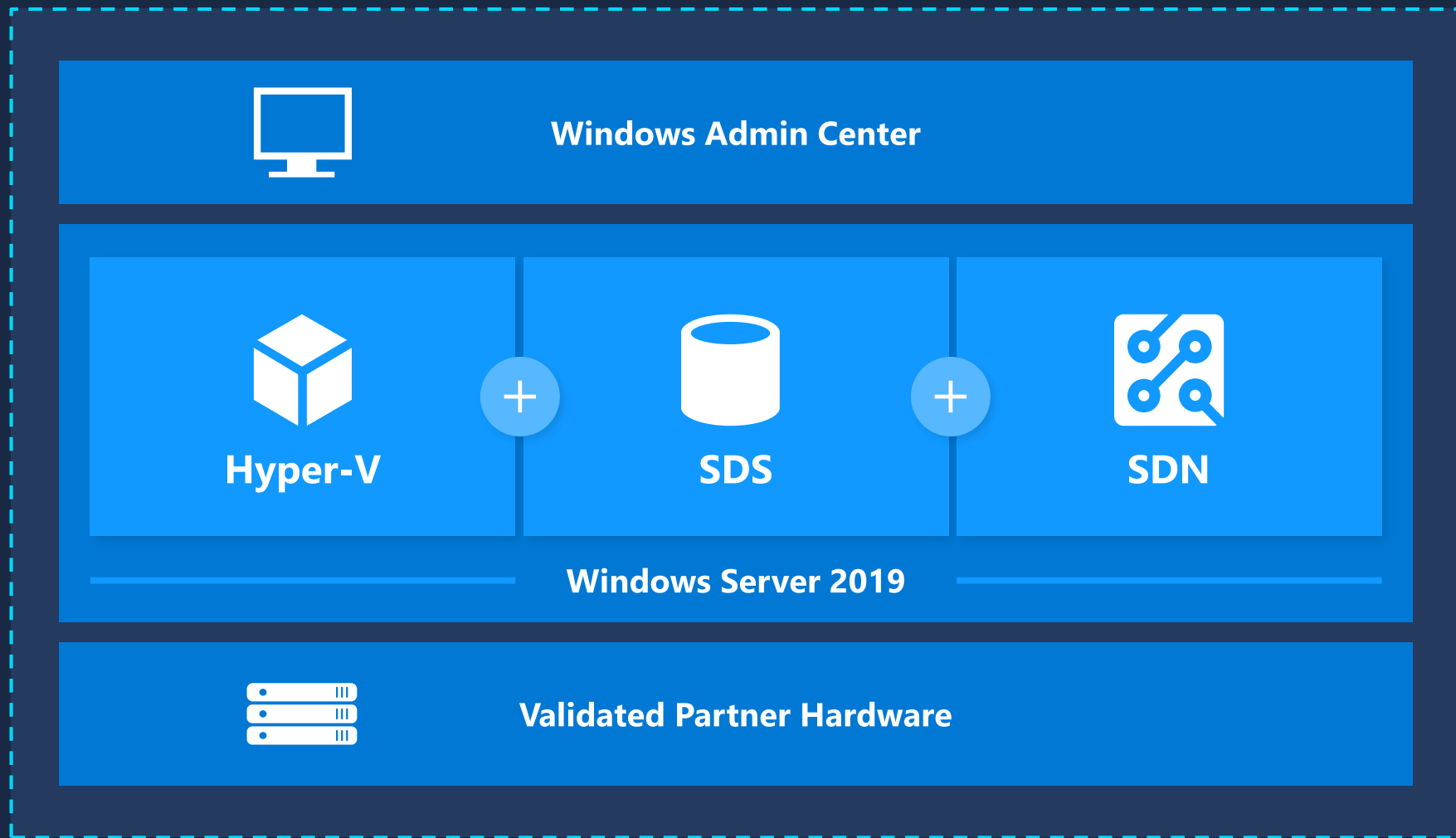


SDS



SDN

Windows Server 2019



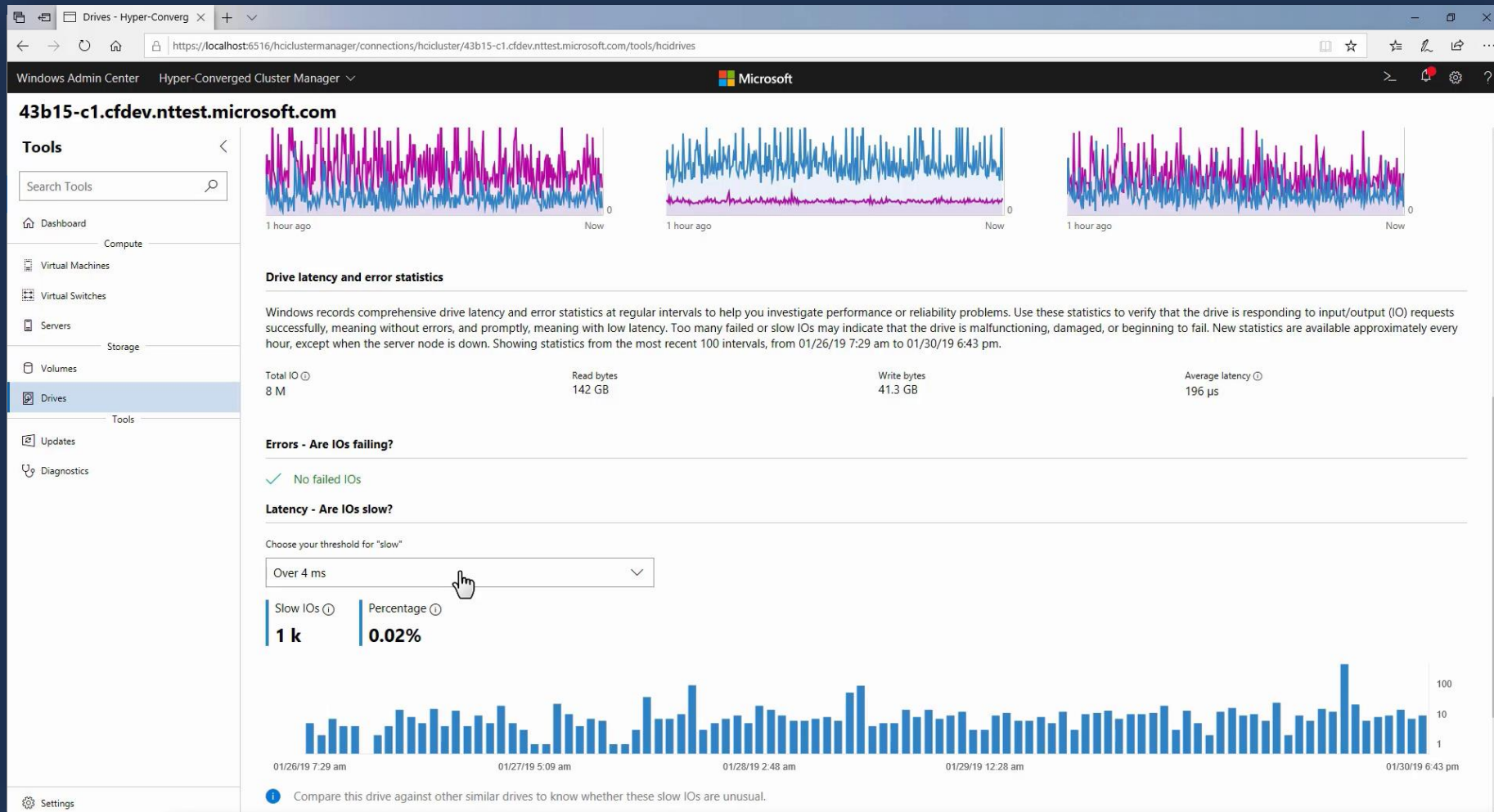
**Azure Stack HCI Solution**

# Included in Windows Server 2019

- ✓ Hypervisor / compute
- ✓ Software-defined storage
- ✓ Software-defined networking
- ✓ Management software
- ✓ Unlimited guest licenses

Source: <https://www.microsoft.com/cloud-platform/windows-server-pricing>

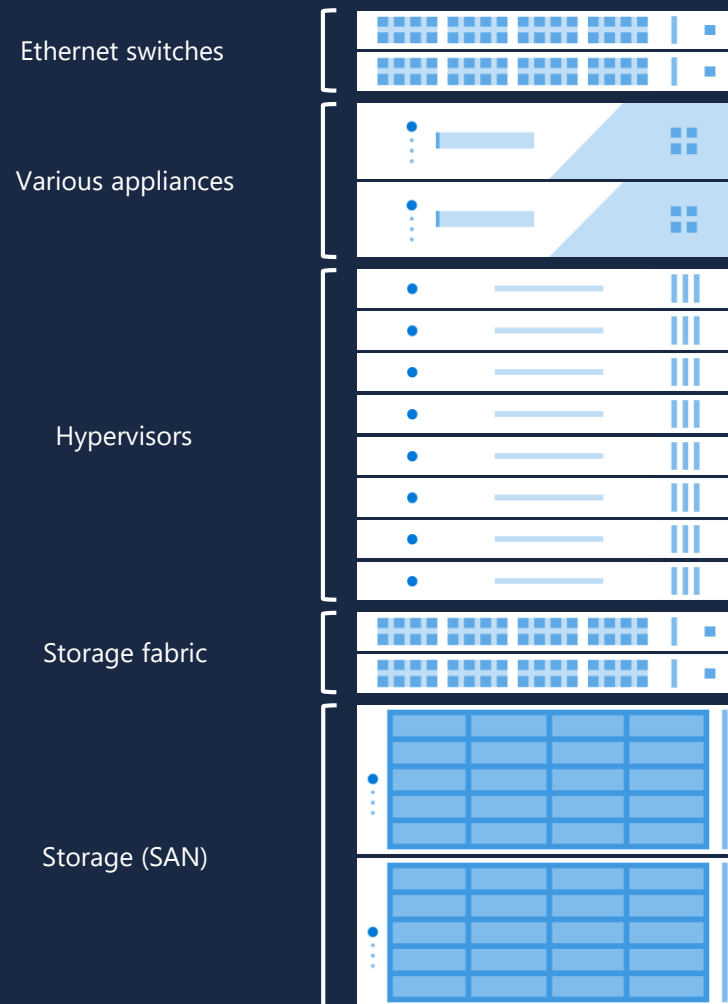




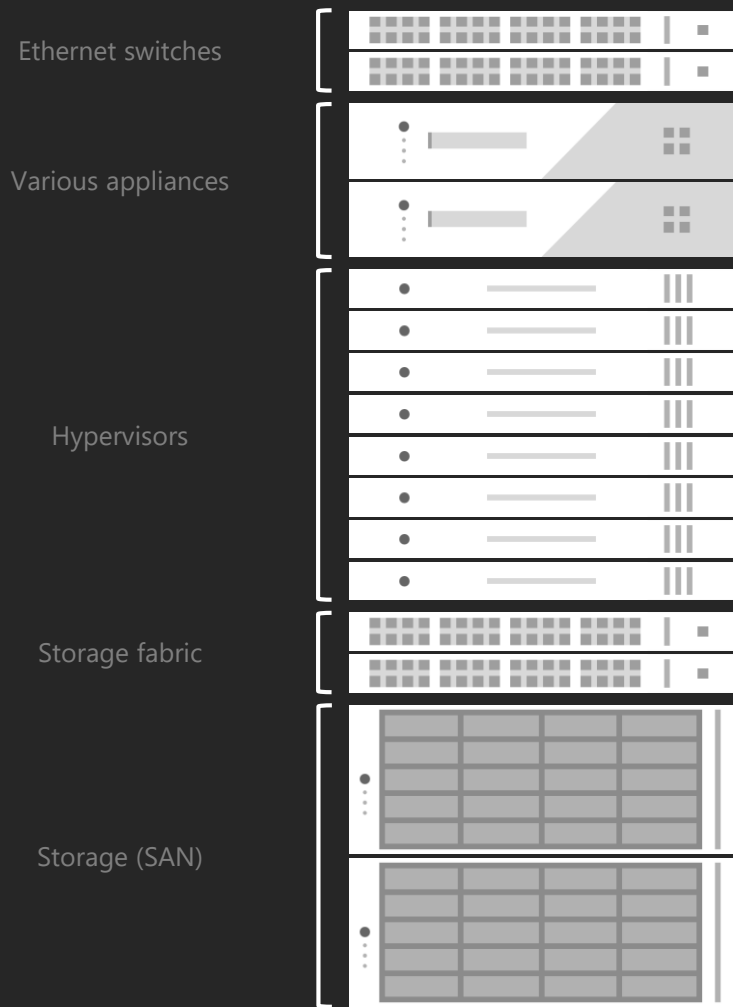
# Windows Admin Center for HCI

Works with 2016 & 2019 | Install in under 5 minutes | No additional cost | [aka.ms/WindowsAdminCenter](https://aka.ms/WindowsAdminCenter)

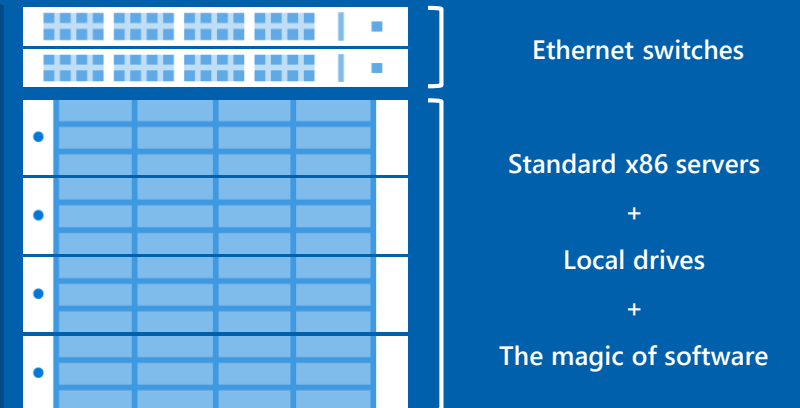
*Why Azure Stack HCI for*  
Datacenter modernization



Legacy “three tier” infrastructure



Legacy "three tier" infrastructure



Hyperconverged infrastructure (HCI)

# Enterprise-grade software-defined infrastructure

## Fault Tolerance

- ✓ Drive / server / network fault tolerance
- ✓ Optional rack and chassis awareness
- ✓ Storage replication for BC/DR (sync or async)
- ✓ High and continuous availability

## Software RAID

- ✓ Two- and three-way mirror (RAID-1)
- ✓ Dual parity / erasure coding (RAID-6)
- ✓ Mirror-accelerated parity
- ✓ Nested resiliency
- ✓ Striping (RAID-0)
- ✓ Single parity (RAID-5)
- ✓ S.M.A.R.T. predictive drive failure
- ✓ Drive latency outlier detection
- ✓ Automatic repair and resync

## Software Checksum

- ✓ File integrity checksum
- ✓ Automatic in-line corruption correction
- ✓ Proactive file integrity scrubber

## Encryption

- ✓ Data-at-rest (BitLocker)
- ✓ Data-in-transit (SMB Encryption)

## Efficiency

- ✓ Kernel-embedded architecture
- ✓ Remote direct memory access (RDMA)
- ✓ Data deduplication
- ✓ Compression

## Performance

- ✓ In-memory cache
- ✓ Persistent read/write cache
- ✓ Real-time tiering
- ✓ Hybrid and all-flash support
- ✓ Persistent memory / NVDIMM support
- ✓ Intel® Optane™ NVMe support
- ✓ NVMe, SATA, SAS support
- ✓ Instant VHD creation / expansion
- ✓ Instant VHD checkpoint management

## Scale

- ✓ Up to 4 petabytes scale
- ✓ From 2 to 16 servers
- ✓ From 8 to 400+ drives
- ✓ Seamless scale-up and scale-out
- ✓ Compute and storage balancing
- ✓ Cloud Witness for quorum
- ✓ Dynamic quorum

## Flexibility

- ✓ Hyper-converged infrastructure (Hyper-V)
- ✓ Scale-Out File Server (SoFS)
- ✓ Native SQL Server

## Management

- ✓ Built-In failure and capacity alerting
- ✓ Built-In performance history
- ✓ Per-VM Quality of Service (QoS) IOPS limits
- ✓ 100% scripting-friendly (PowerShell)
- ✓ System Center Integration
- ✓ Windows Admin Center integration



# Azure Stack HCI is on the leading edge



## NVMe

Full support for M.2, U.2,  
Add-In-Card (AIC)



## Intel Xeon® Scalable®

Supported since announcement  
on Windows Server 2016+



## RDMA

Unique to Windows  
software-defined storage



## Intel Thunderbolt™ 3

Blazing the trail for  
switchless networking



## 3D XPoint

Supported since announcement  
on Windows Server 2016+



## Persistent memory

Use as cache or capacity in  
Windows Server 2019

# of x86 hardware innovation

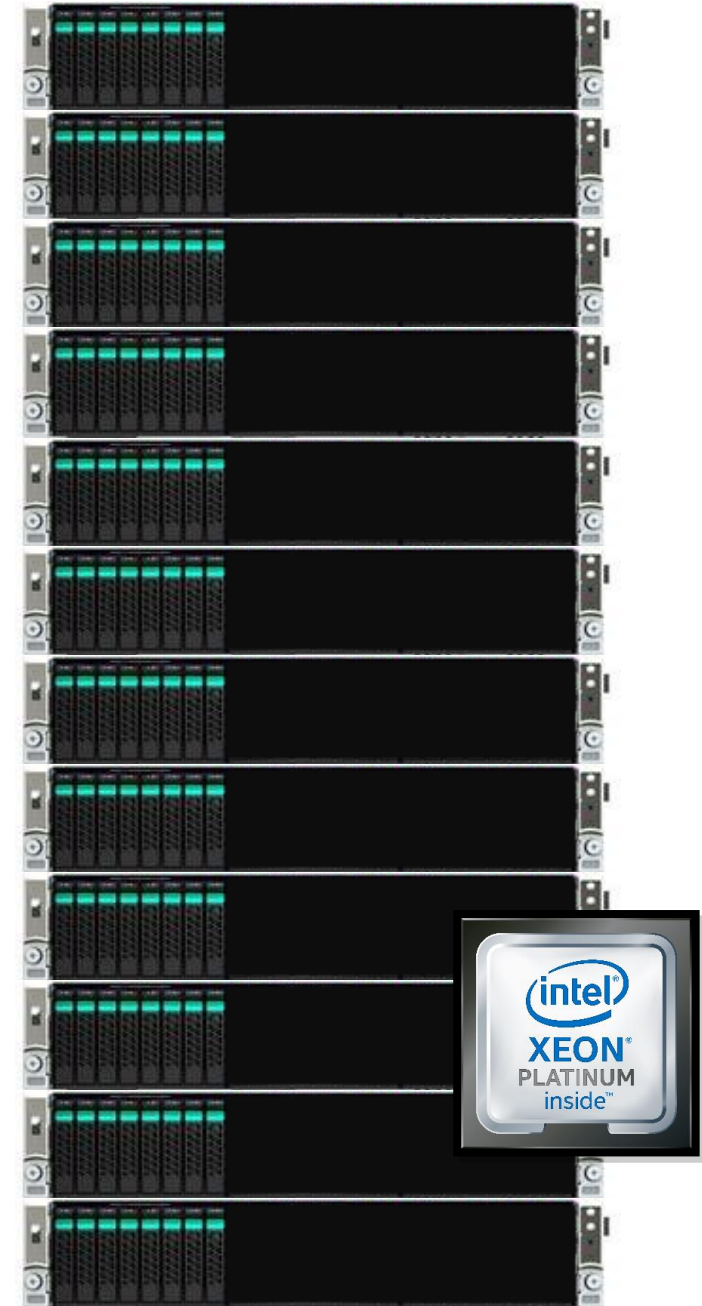
## The very latest from Intel

**12** x Intel® S2600WFT

- ✓ **384 GiB** (12 x 32 GiB) memory
- ✓ **2 x 28-core** future Intel® Xeon® Scalable processor
- ✓ **1.5 TB** Intel® Optane™ DC persistent memory as cache
- ✓ **32 TB** NVMe (4 x 8TB Intel® DC P4510) as capacity
- ✓ **2** x Mellanox ConnectX-4 25 Gbps

## The very latest from Microsoft

- ✓ **Windows Server 2019 – Insider Preview**
- ✓ Insider Preview, build 17713
- ✓ Hyper-V + Storage Spaces Direct



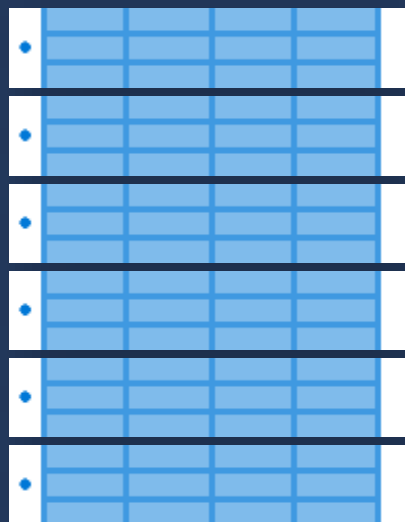
# NEW IOPS RECORD

13,798,674

Monday, September 24, 2018 | Windows Server 2019 with Intel® Optane™ DC persistent memory



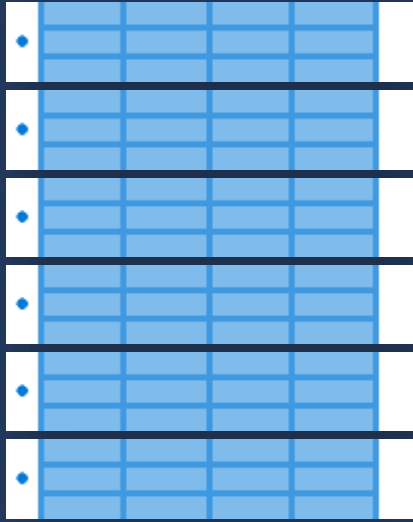
*Why Azure Stack HCI for*  
Remote office / branch office



## Core datacenter

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





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

# Minimum footprint

Start with 2 nodes

No minimum processor and memory

Just (4 SSD) OR (2 SSD + 4 HDD) per server

Direct-attached SATA allowed

Switchless back-to-back networking allowed (minimum 10 Gbps)

Boot from M.2 or SATA DOM allowed



**DataON Kepler-47**



**HPE ProLiant ML350 Gen10**



**Thomas Krenn micro-cluster**



**Lenovo ThinkSystem SR630**



**SecureGUARD blazics 100**

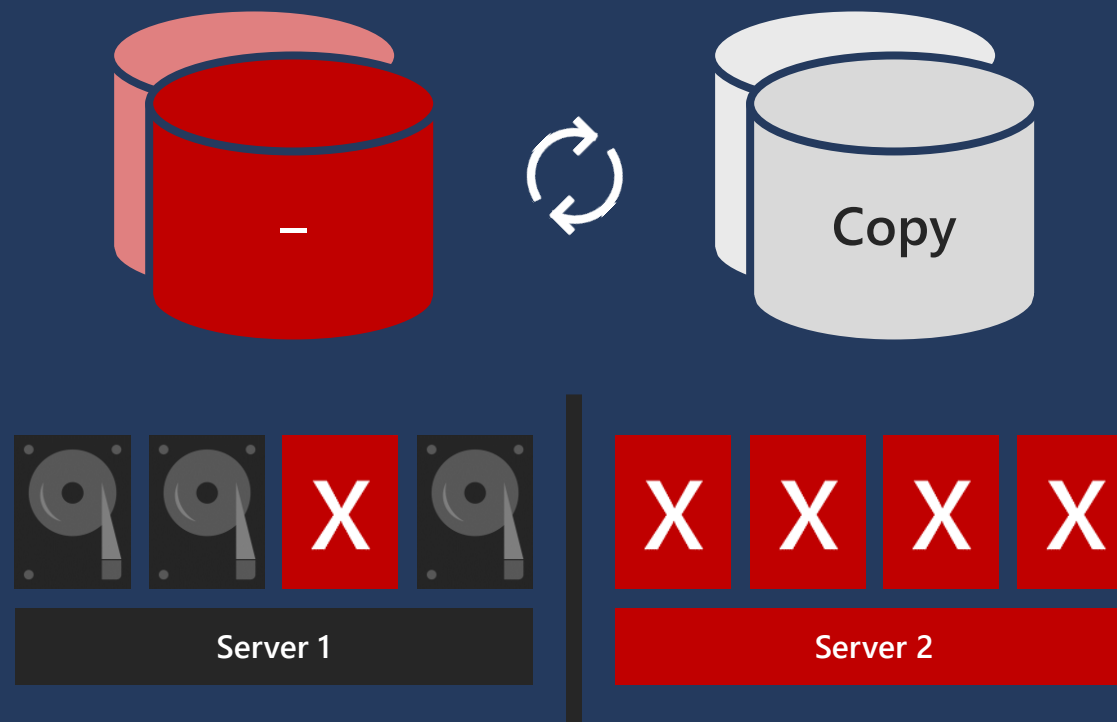


**Supermicro SYS-1029U-TRT-HCI**



**Dell EMC PowerEdge R440**

# Previously: two-way mirror



Drive failure

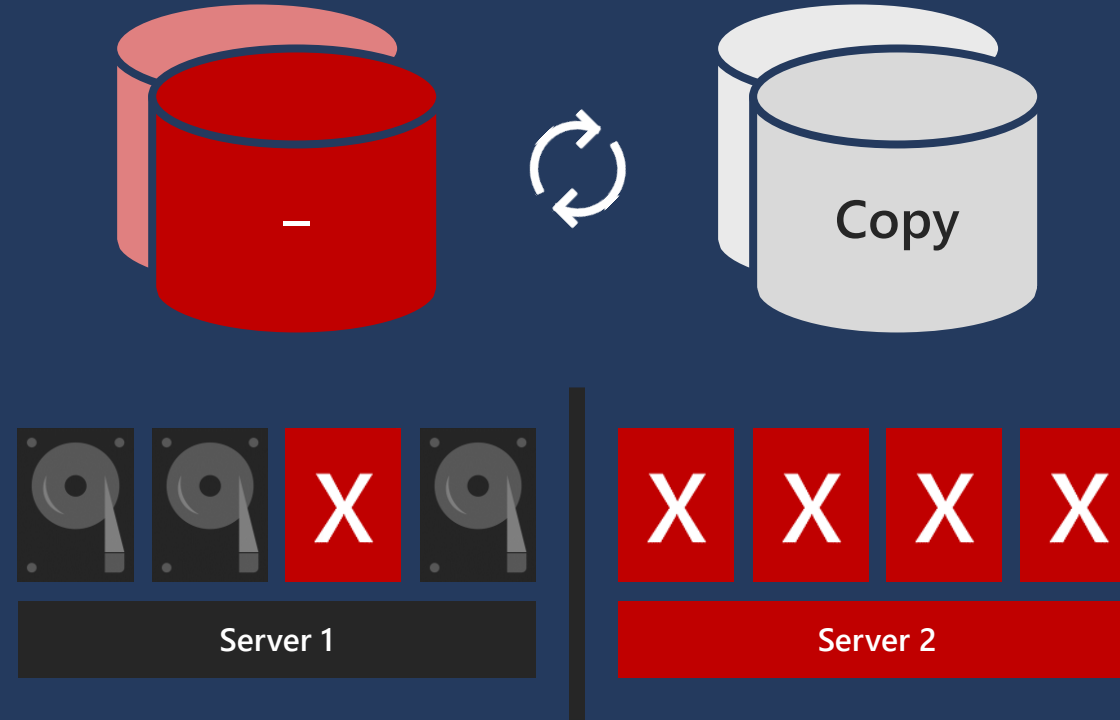


Server failure



Two failures at once

# Previously: two-way mirror



Drive failure



Server failure

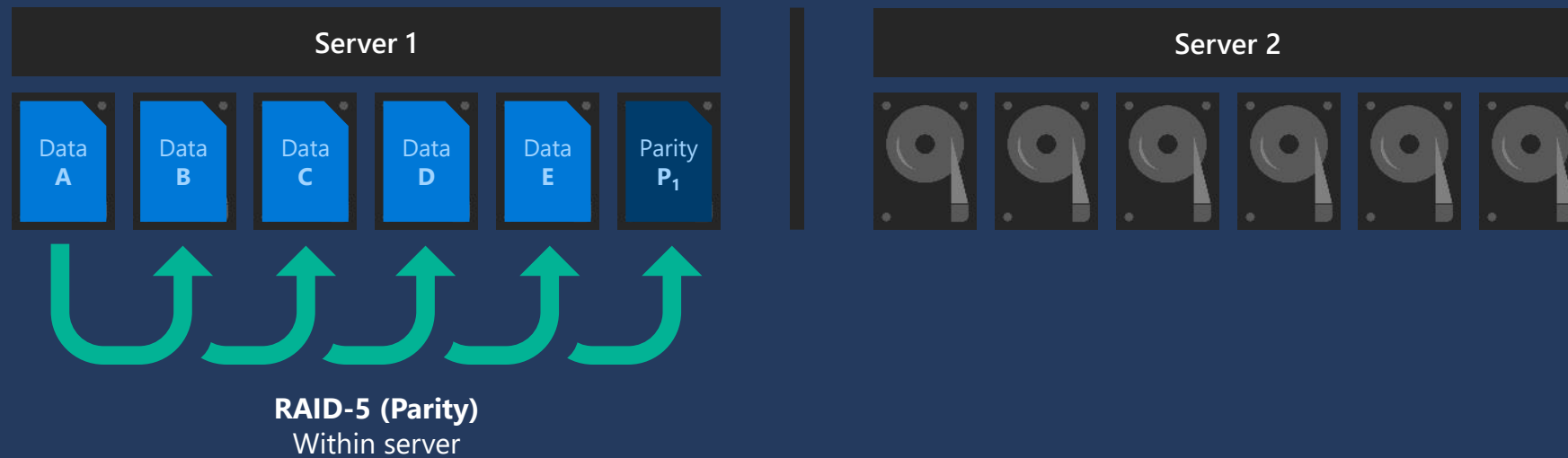


Two failures at once

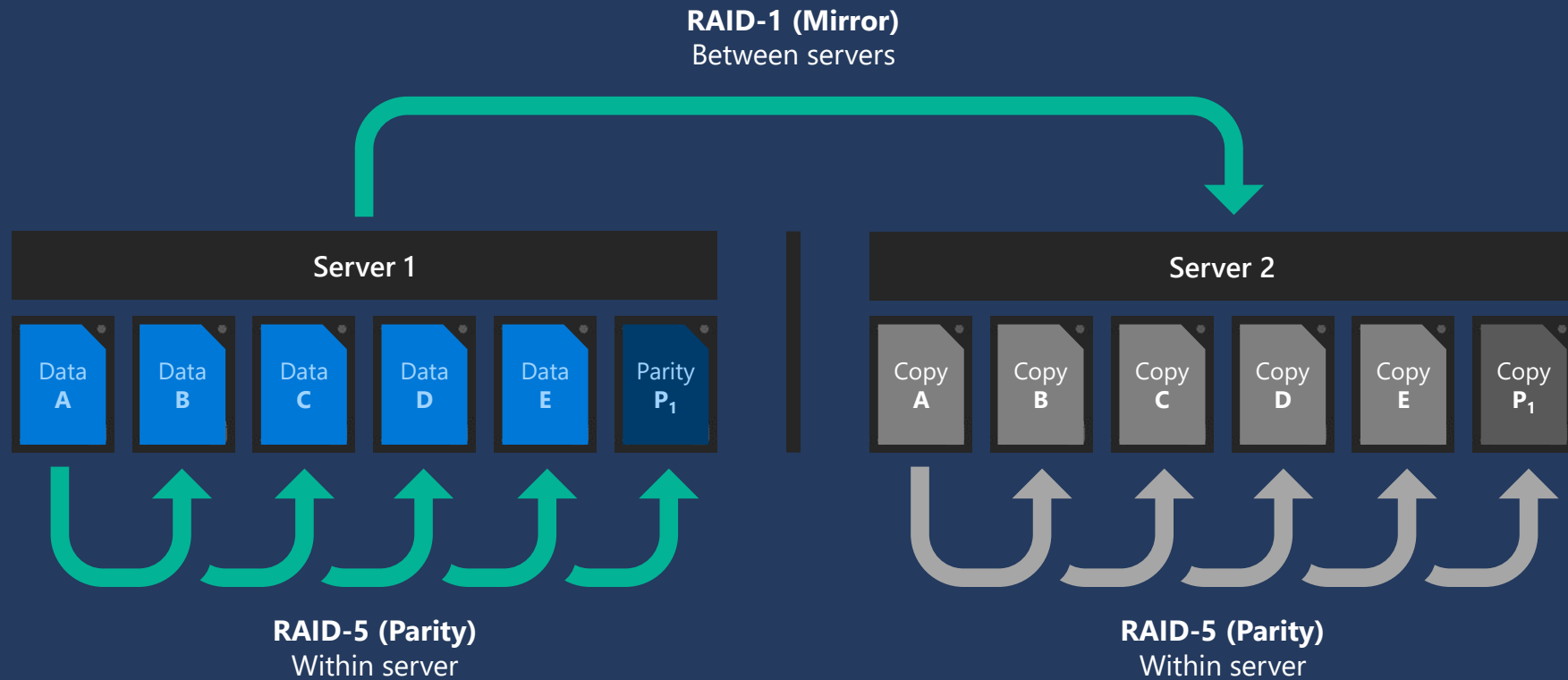
# Inspiration: RAID 5 + 1



# Inspiration: RAID 5 + 1

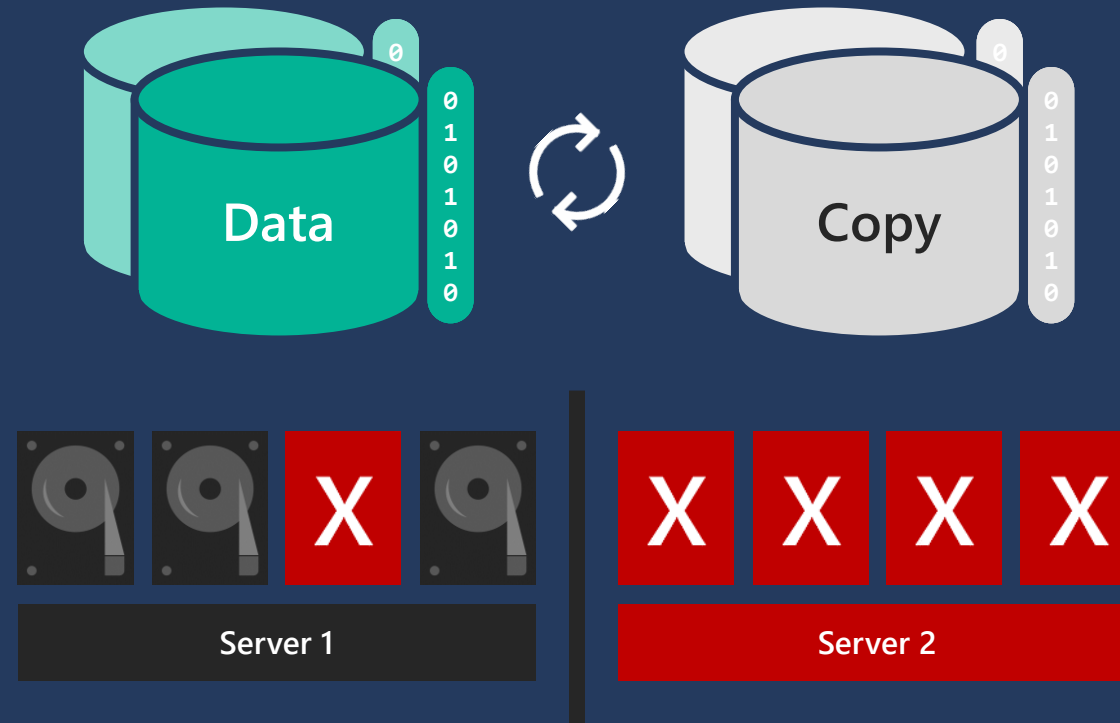


# Inspiration: RAID 5 + 1





# Nested resiliency



Handle two failures at once

**Get started today**

# Find solutions from your preferred vendor

ASUS

AXELLIO

bluechip

CISCO

dataON  
DataON STORAGE

DELL EMC

FUJITSU

HITACHI  
Inspire the Next

Hewlett Packard  
Enterprise

inspur

Lenovo

Orchestrating a brighter world  
NEC

primeLine  
SOLUTIONS

QCT  
Quanta CLOUD TECHNOLOGY

SecureGuard

Sugon

SUPERMICRO

THOMAS  
KRENN

15+

Partners

110+

Total Solutions

**Azure Stack HCI Catalog**  
**[Microsoft.com/HCI](https://microsoft.com/HCI)**



## **Find solutions from your preferred hardware vendor**

[Microsoft.com/HCI](https://Microsoft.com/HCI)



## **Install Windows Server 2019**

[aka.ms/WindowsServer](https://aka.ms/WindowsServer)



## **Manage with Windows Admin Center**

[aka.ms/WindowsAdminCenter](https://aka.ms/WindowsAdminCenter)



## **Connect to Azure hybrid services**

[docs.microsoft.com/windows-server/azure-hybrid-services/](https://docs.microsoft.com/windows-server/azure-hybrid-services/)

# Thanks!



Cosmos Darwin  
Senior PM, Core OS Engineering



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