

Dell Technologies



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Dell Support Options

<https://www.dell.com/support>

AGENDA



- 09:00 – 09:45 Agenda / LiveOptics / Demo Setup
- 10:00 – 10:45 PowerEdge Server
- 10:45 – 11:00 Pause
- 11:00 – 11:30 Systemadministration am Beispiel Vsphere
- 11:30 – 12:00 Virtualisierung im Vergleich (Azure Local, Nutanix)
- 12:00 – 13:00 Mittagessen
- 13:00 – 13:45 Virtualisierung im Vergleich (Virtuozzo, Proxmox, Openshift)
- 13:45 – 14:00 Pause
- 14:00 – 14:45 Powerstore
- 14:45 – 15:00 Pause
- 15:00 – 15:45 Data Protection
- 15:45 – 16:00 kommerzieller Vergleich



Liveoptics

IT infrastructure planning is too complex

Environment sprawl

Physical assets • Virtual machines • Cloud

Configuration drift

Unknown inventory

OS compliance

Application end-of-life (EOL)



IT infrastructure planning is too complex



Every organization struggles to efficiently plan deployments and right-size IT environments.

What if you could?

1. Simplify and automate IT infrastructure discovery
2. Eliminate assumptions and guesswork to right-size deployments
3. Gain confidence in future planning

Live Optics

Infrastructure planning made simple



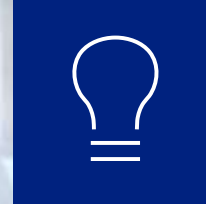
Discover, assess, and modernize your infrastructure everywhere



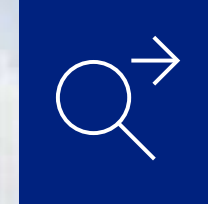
Have fact-based discussions about infrastructure requirements and share the information securely



Eliminate IT planning guesswork and drive right-sized buying decisions



Discover



Assess



Modernize

Complimentary:

- No subscriptions
- No fees
- Unlimited use
- Edge, core, cloud



Multi-vendor support



Agentless



Role-based security permissions sharing



Secure by design



Repeat as needed



Trusted solution for over 20 years

Simplify infrastructure planning



Discover

Gain visibility and clarity

Catalog IT assets and visualize critical performance and utilization metrics from core, to cloud, to edge



Assess

Get insights and control

Rapidly collect infrastructure requirements to enable fact-based discussions and share information with stakeholders securely



Modernize

Ensure right-sized deployments

Simplify infrastructure planning and drive right-sized buying decisions with personalized guidance

Live Optics is universally trusted with **112,600+** global activations

Discover



Gain visibility and clarity

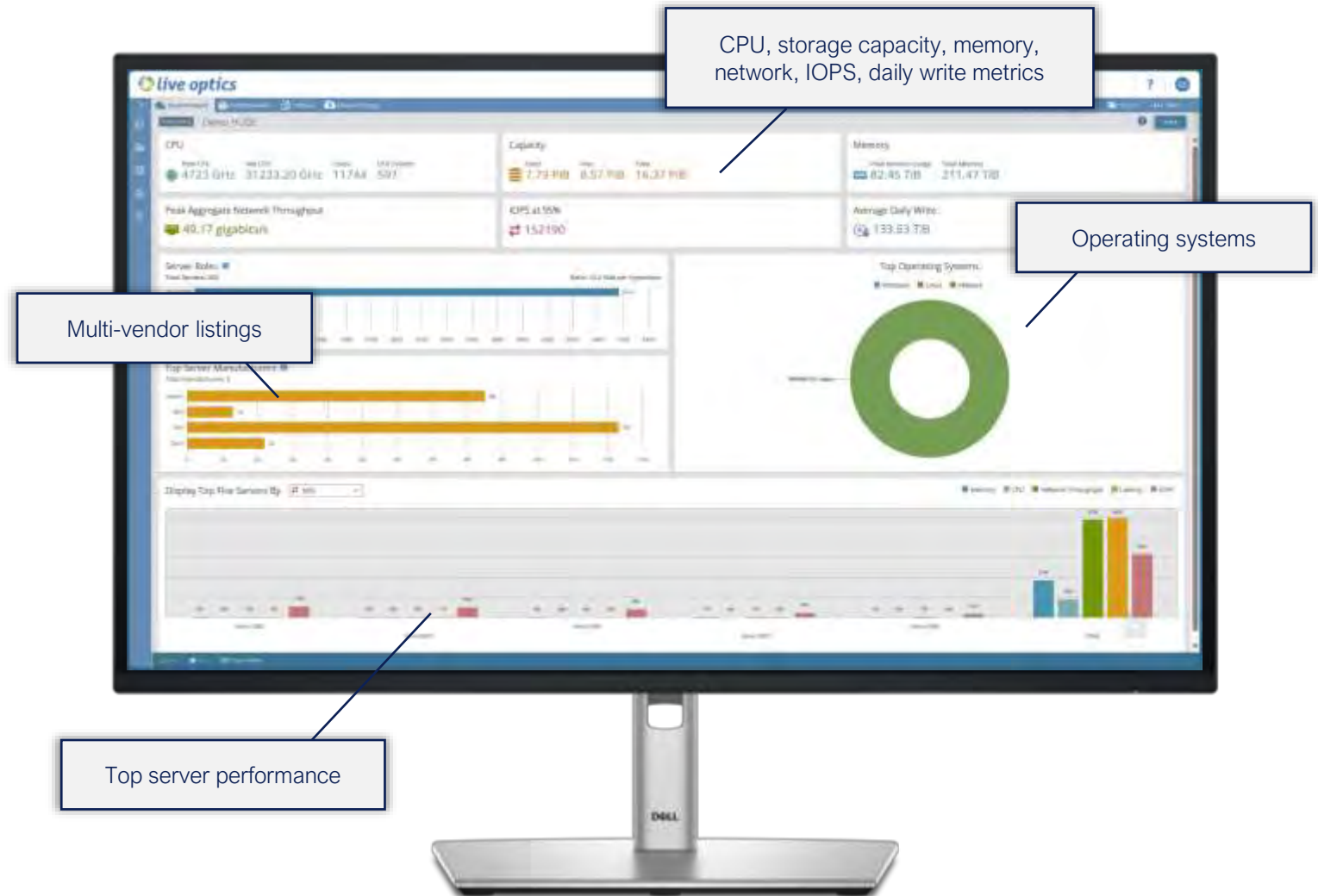
Use the agentless data collector to catalog your IT infrastructure across the core, cloud and edge

Discover assets

Leverage data visualizations across workloads, OS, storage, compute, memory, performance, locations and more

Understand your vendor mix

Gain multi-vendor visibility beyond the Dell ecosystem, including major cloud providers and OEMs



Assess

Analyze your environment

View performance, workload placement and costs to understand your environment

Model and compare options

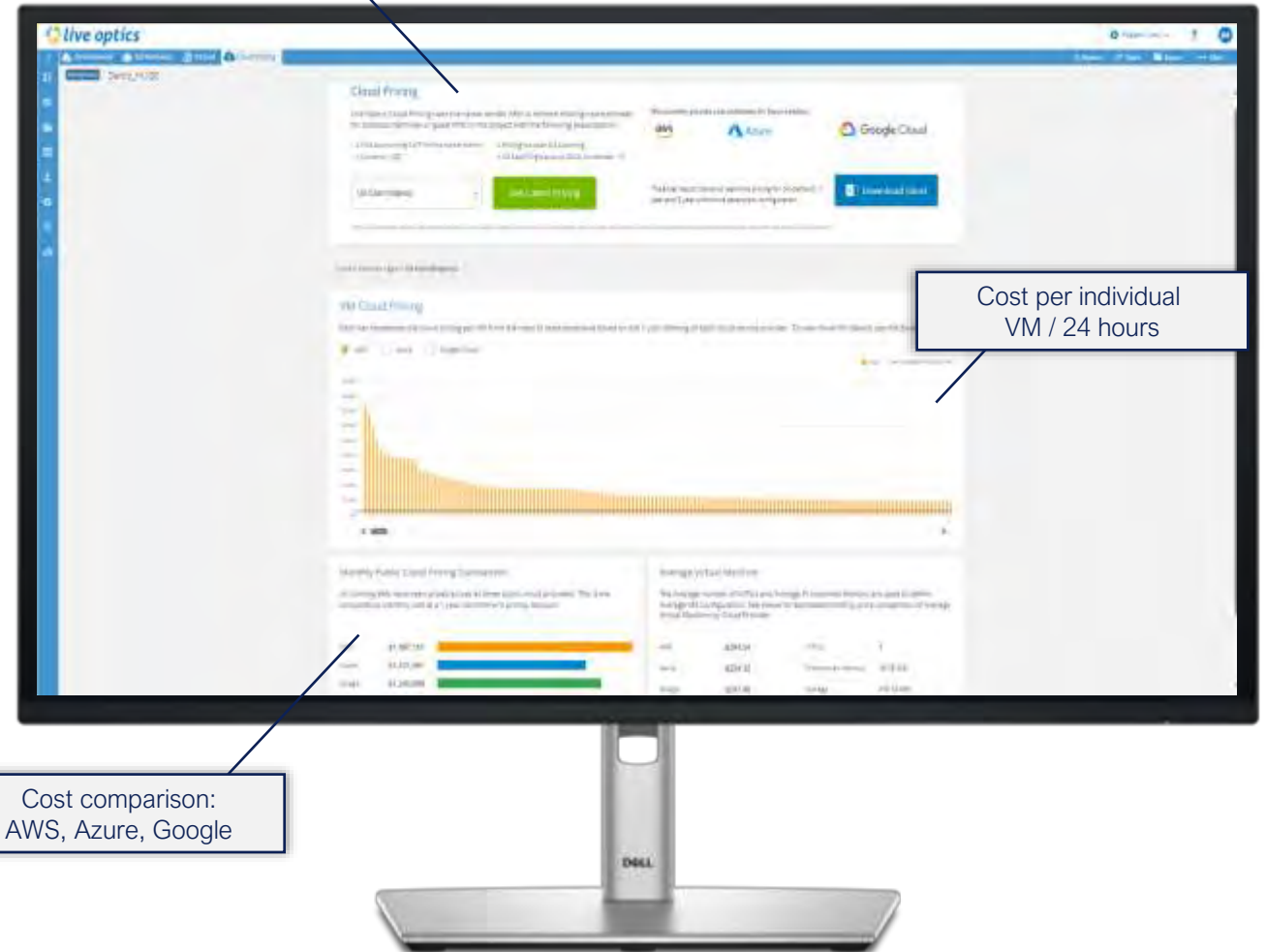
Leverage Live Optics' real-time Cloud Pricing Calculator to pinpoint inefficiencies, cost options and repatriation opportunities

Export secure, standardized reports into business intelligence tools to evaluate performance versus cost comparisons

Align stakeholders

Use Live Optics reports to align key decision makers and multi-vendor partners

Up to date cloud pricing



Cost comparison:
AWS, Azure, Google

Cost per individual
VM / 24 hours

Modernize

Optimize for cost and performance

Determine whether to modernize, repatriate or recalibrate evolving workloads

Make sizing decisions confidently

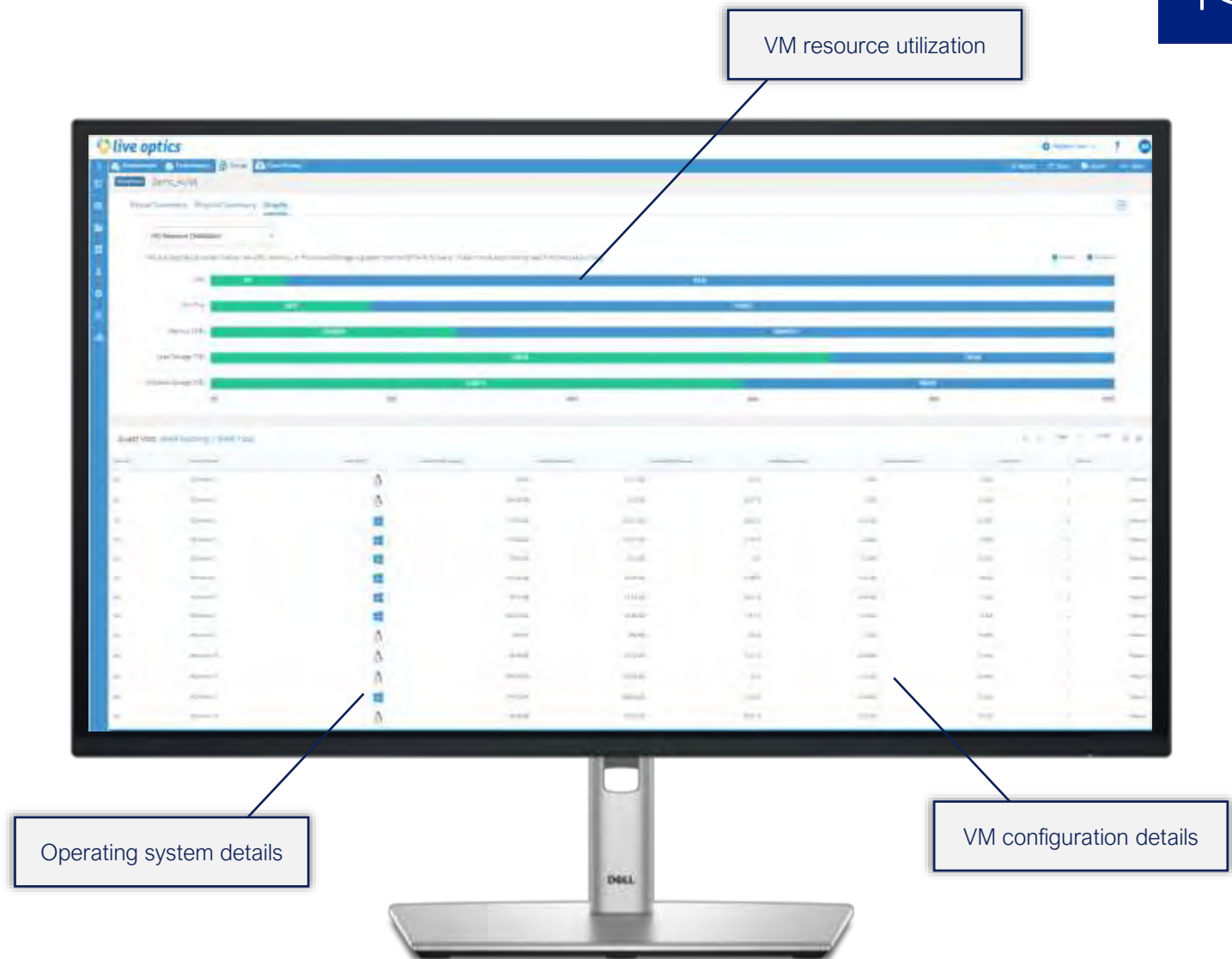
Use actionable data to validate and review workload placement decisions with stakeholders

Manage growth effectively to deliver competitive differentiation and meet strategic objectives

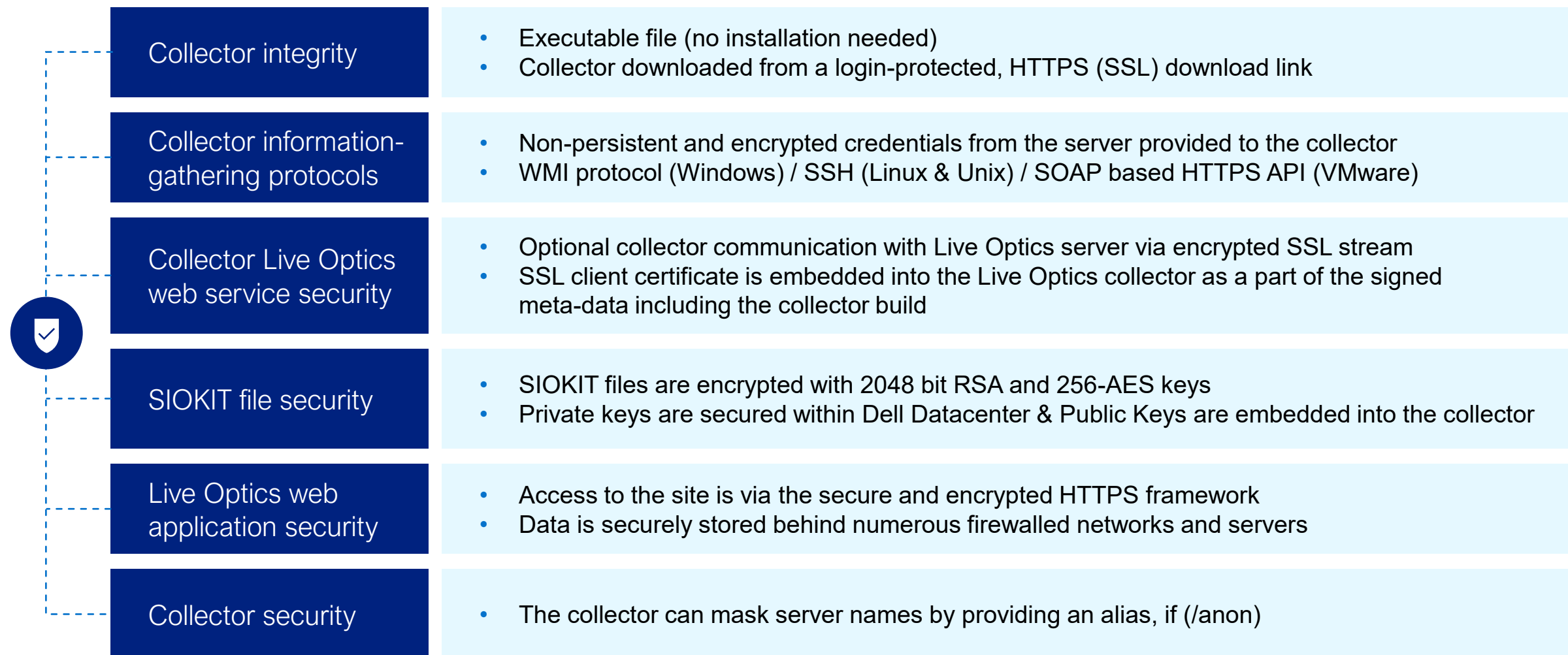
Evolve and modernize infrastructure

Modify plans rapidly as new information, technology and business opportunities emerge

Regular checkups with Live Optics will measure the pulse of IT and track progress against goals



Secure by design



Live Optics by the numbers

The de facto infrastructure planning standard across global industries

99%

Top 100 US companies¹

112,600+

Global activations²



18,200+

Biz/consumer services



17,500+

Manufacturing



11,600+

Education institutions



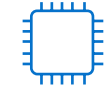
12,300+

Retail firms



10,200+

Financial firms



9,900+

Technology firms



4,900+

Healthcare and life sciences firms



8,400+

Telecom, media and entertainment firms



9,100+

Government



2,950+

Transportation



2,800+

Construction and real estate



2,300+

Energy

¹Internal Dell Technologies: Based on Dell internal analysis, January 2024"

²Industry analysis - Based on Dell internal analysis, January 2024"

Dell's commitment to infrastructure planning software



- Server
- Network
- Storage
- Cloud
- File
- Workloads

Live stream discovery of
install base, configurations
and workload management

14m+
devices/endpoints scanned per year



- Virtual Machines

Offline scan of VMware
environment: Standard
for VMware installs

#1
solution for over
ten years running

2m+
Downloads
historically

200K
downloads per
year (2023)



Virtual Machines

#1

solution for over
ten years running

2m+

Downloads
historically

200K

downloads per
year (2023)

- **Comprehensive Insight:** RVTools connects to your vCenter server using the VI SDK and provides detailed information about your virtual infrastructure.
- **Inventory Overview:** It offers an insightful view of your environment, making it easy to understand the overall health and configuration of your virtual infrastructure.
- **Performance Metrics:** RVTools collects performance metrics, such as CPU usage, memory utilization, and storage statistics.
- **Export Capabilities:** Export the collected data to various formats (such as Excel or CSV). Imports into Live Optics and other BI and monitoring tools.
- **Identify Orphaned Objects:** RVTools can detect orphaned virtual machines, snapshots, and other objects. Cleaning up these orphaned items helps improve efficiency and reduces clutter.
- **Version Compatibility:** It supports various versions of VMware vSphere and vCenter, ensuring compatibility with your specific environment.
- **Free:** RVTools is freely available, making it a cost-effective choice for managing your virtual infrastructure.



File Export Options

VM information Tabs

Individual VM Details

RVTools (147.100.100.7)

File Edit View VM ESX Health Help

vInfo vCPU vMemory vDisk vPartition vNetwork vRoppy vCD vSnapshot vTools vRP vCluster vHost vHBA vNIC vSwitch vPort dvSwitch dvPort vSC+VMK vDatastore vMultiPath vLicense vHealth

VM	Powerstate	Template	Config status	DNS Name	Connection state	Guest state	Heartbeat	Consolidation Needed	PowerOn	Suspend time	Creation date	Change V
VM1	poweredOn	False	green		connected	notRunning	gray	False	2020/03/17 15:44:04		2020/03/17 15:40:24	2020/03/17 15:40:24
VM10	poweredOn	False	green		connected	notRunning	gray	False	2020/03/17 15:45:07		2020/03/17 15:43:53	2020/03/17 15:43:53
VM2	poweredOn	False	green		connected	notRunning	gray	False	2020/03/17 15:44:06		2020/03/17 15:40:50	2020/03/17 15:40:50
VM3	poweredOn	False	green		connected	notRunning	gray	False	2020/03/17 15:44:24		2020/03/17 15:41:12	2020/03/17 15:41:12
VM4	poweredOn	False	green		connected	notRunning	gray	False	2020/03/17 15:45:01		2020/03/17 15:41:32	2020/03/17 15:41:32
VM5	poweredOn	False	green		connected	notRunning	gray	False	2020/03/17 15:44:57		2020/03/17 15:42:08	2020/03/17 15:42:08
VM6	poweredOn	False	green		connected	notRunning	gray	False	2020/03/17 15:44:09		2020/03/17 15:42:28	2020/03/17 15:42:28
VM7	poweredOn	False	green		connected	notRunning	gray	False	2020/03/17 15:44:50		2020/03/17 15:42:48	2020/03/17 15:42:48
VM8	poweredOn	False	green		connected	notRunning	gray	False	2020/03/17 15:44:28		2020/03/17 15:43:09	2020/03/17 15:43:09
VM9	poweredOn	False	green		connected	notRunning	gray	False	2020/03/17 15:44:12		2020/03/17 15:43:28	2020/03/17 15:43:28

Administrator@vsphere.local 147.100.100.7 VMware vCenter Server 6.7.0 build-13638830 VI API 6.7.2 10 rows Last refresh: 2020/03/17 15:45:16

Next steps

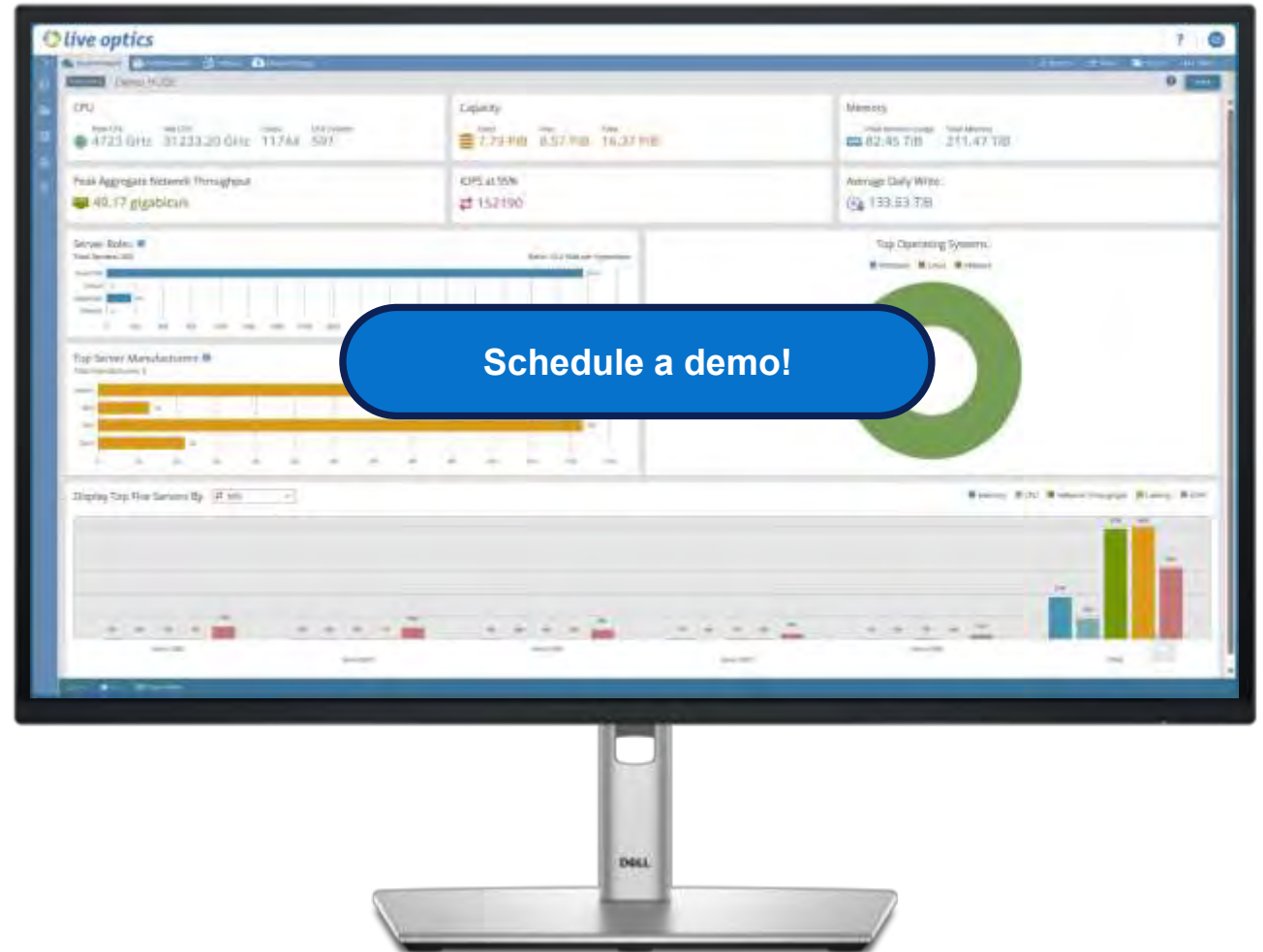
Connect with Dell for a demo

Download and run in your environment LiveOptics.com

Make smarter buying decisions
and right-size your infrastructure

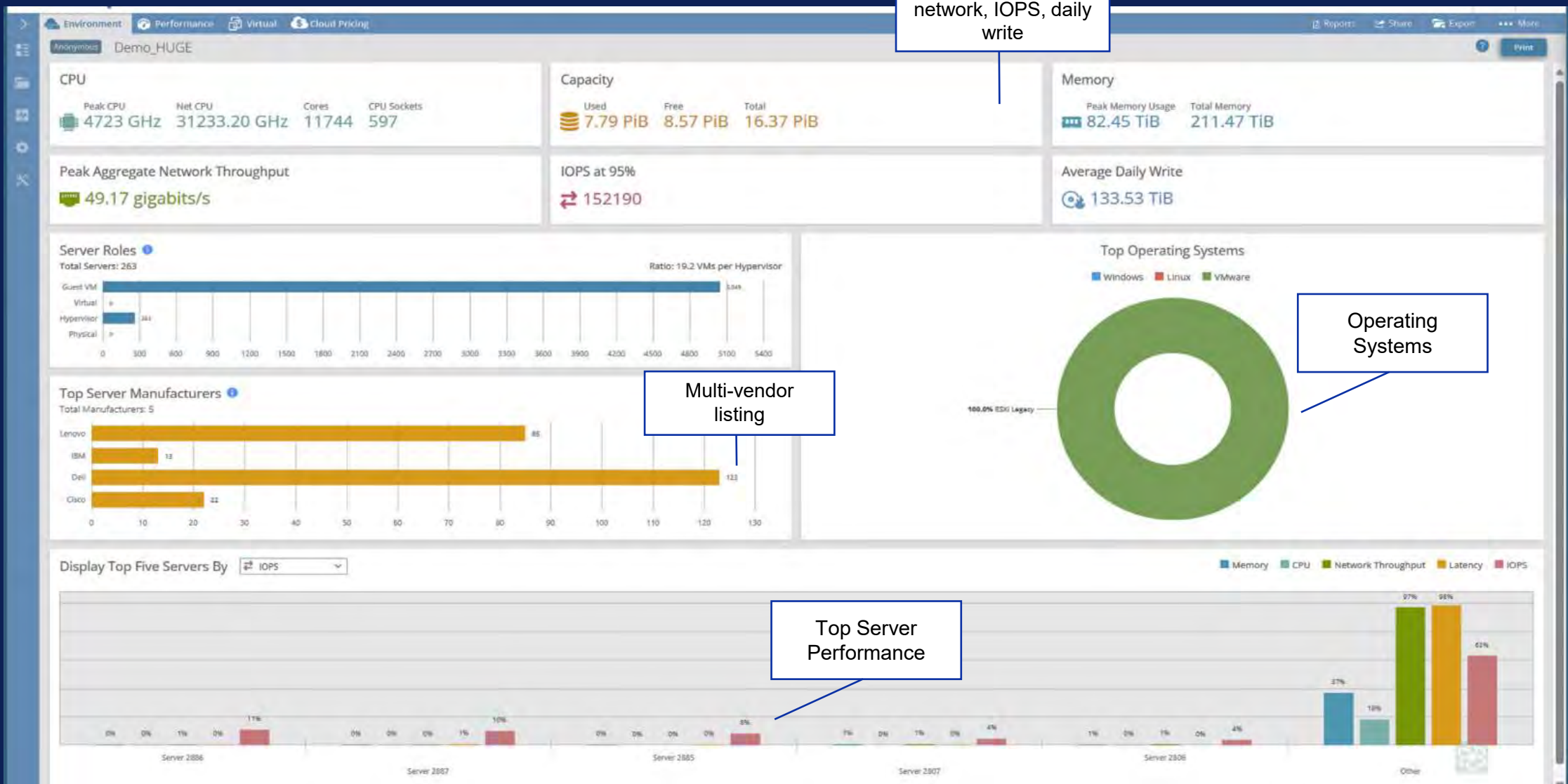
Connect with Dell Live Optics
for a:

- *Free Custom Assessment*
- *Join Tech Advisory Board*



Appendix

Live Optics dashboard



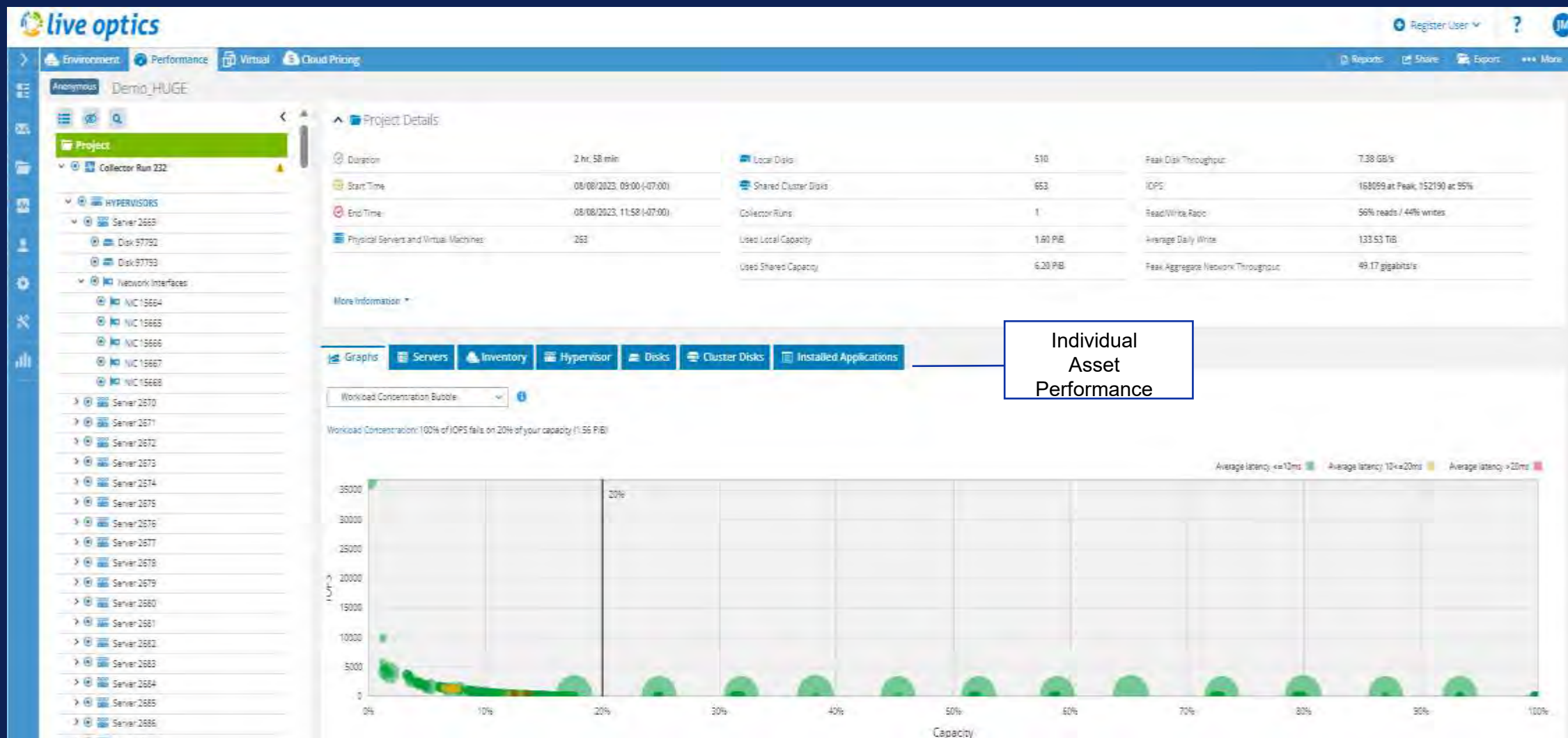
CPU, storage capacity, memory, network, IOPS, daily write

Operating Systems

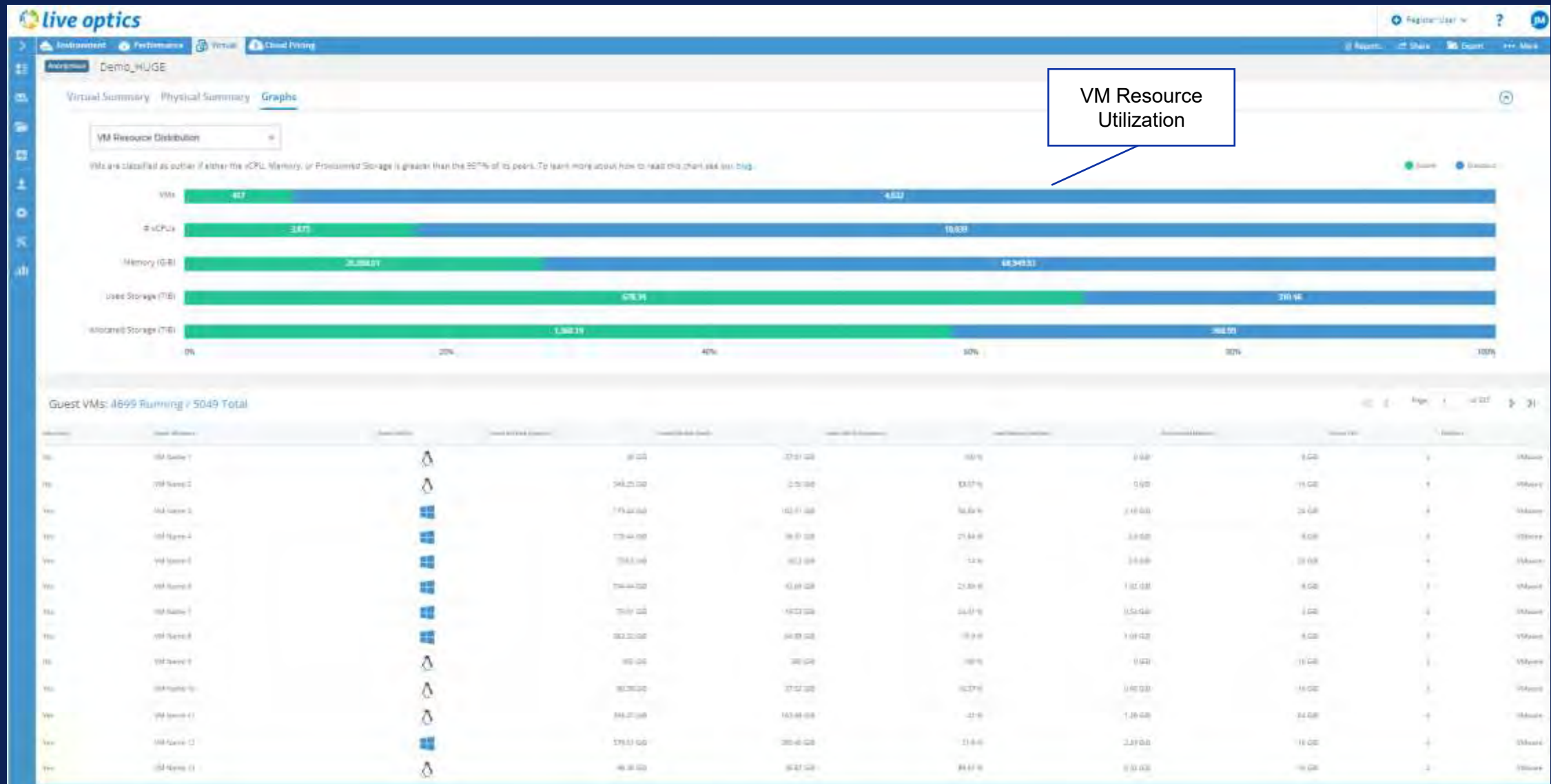
Multi-vendor listing

Top Server Performance

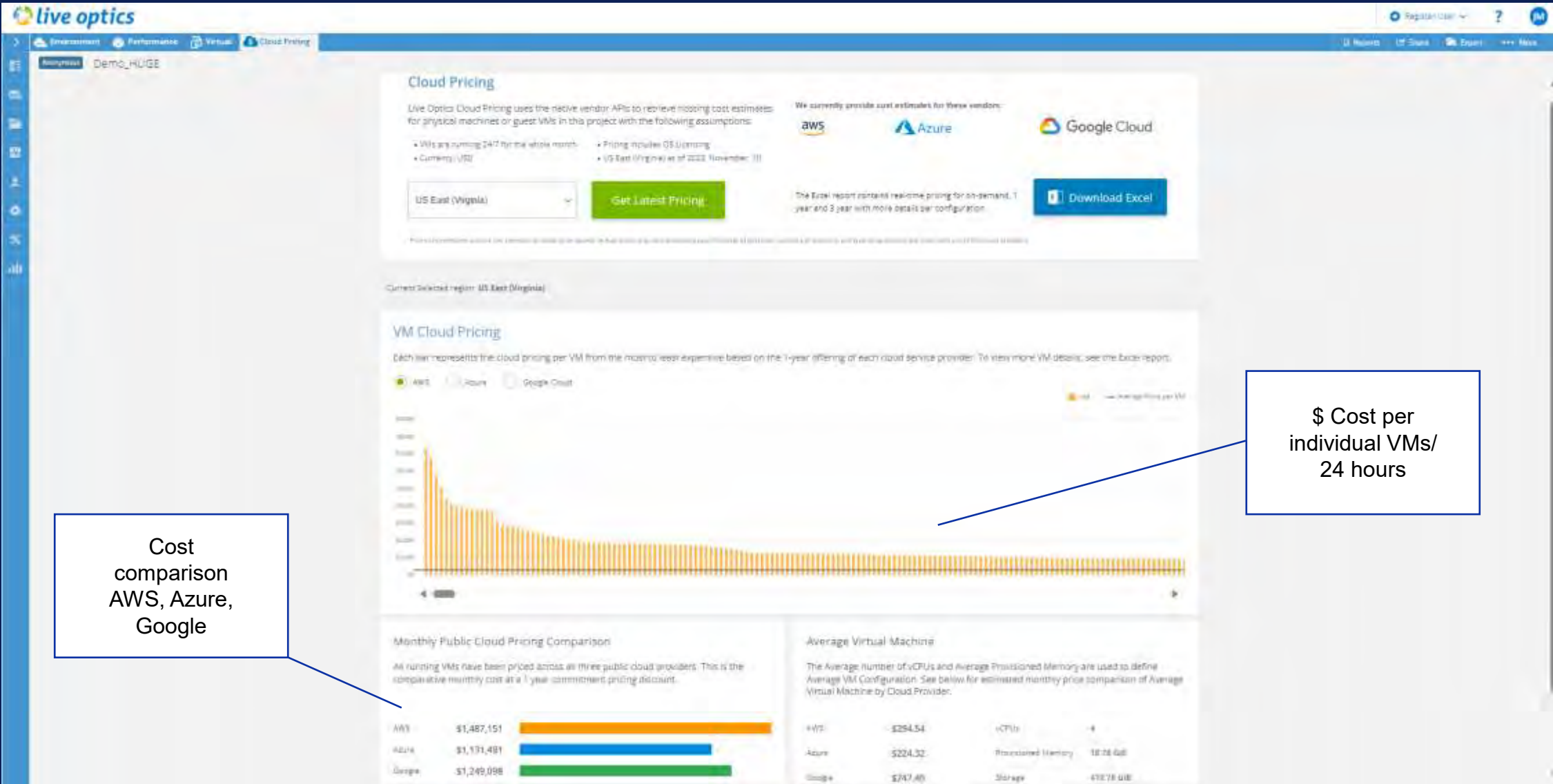
Performance center



Virtual machines



Cloud pricing calculator



Multi-vendor collectors

live optics

Download Collector

Windows

Linux

Download Windows Collector

Download via direct link

System Prerequisites

Requires: .NET V4.7.2+
Supported OS: Windows 7+
Windows 2008R2+
Free Disk Space: 5GB
Memory: 1GB
System Type: x64

Package Information

Version: 24.4.11.138
Published: 1/17/2024 12:25:55 PM (+05:30)
Size: 22.4 MB

About the Collector

Live Optics supports agentless collection of different operating systems, appliances, and applications. Select the version of the Live Optics Collector that you need based on your environment. In most cases, you will want the Windows version of the Live Optics Collector. If your environment does not have a Windows system (which could be a virtual machine), then use the Linux version of the Collector. The Collector is non-invasive, will make no changes to your environment, and only runs for the duration that you choose.

Next Steps for using the Collector

VMware and on the web

Log into the Live Optics portal and view your project

View your logs within the project

Assessments supported by the Windows Collector

Server and Cloud

The Windows Collector supports all of the Live Optics on-premise and cloud assessments.

Optical Prime

Windows
Linux
vSAN
SAN
Virtualize
Hybrid

AWS

Azure
Nutanix
RAPID Discovery

Storage

The Windows Collector can assess each of the following storage systems:

Clarion/VNX
Unity
PowerStore
VMAX
Isilon
SC
NetApp
Storwize
3PAR
Pure
Hitachi
IBM

Data Protection

The Windows Collector can assess each of the following DPS applications:

Avamar
Cohesity
CommVault
Data Domain
IBM Spectrum Protect (TSM)
NetBackup
NetWorker
PowerProtect DD
Veritas

File

The Windows Collector can assess the following file assessments:

Dossier File Assessment

Workloads

The Windows Collector can assess each of the following applications:

SQL Server
Oracle

Data collectors and supported vendors

Collector Options

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DELLTechnologies

Virtual Overview

Hosts

Total Hosts: **89**
Clusters: **18**
Avg Cluster Size: **4.94**

CPU & Memory

Total Sockets: **159**
Total Cores: **3,448**
Total RAM (TB): **58.89**

VM Storage

Provisioned (TB): **432.6**
Consumed (TB): **154.05**

VM Details

Total VMs: **2,013**
vCPUs: **6,979**
vRAM (TB): **30.57**
VM/Physical: **23:1**

Average VM

vCPU: **3**
vRAM (GB): **16**
Used Storage (GB): **78**

Physical Util

Avg CPU: **36.73%**
Avg RAM: **47.83%**
** Point in time snapshot*

Current Environment

Vendor	Model	Count
Cisco System...	UCSB-B200-M5	34
Cisco System...	UCSB-B200-M4	27
Cisco System...	UCSX-210C-M6	6
Cisco System...	HXAF220C-M5SX	4
Cisco System...	UCSC-C240-M6SN	4
Cisco System...	UCSC-C220-M5SX	3
Dell Inc.	VxRail P570F	4
Dell Inc.	PowerEdge R740	3
Other		2

VM Profiling



Powered On VMs **1,912**
Powered Off VMs **101**
Guest iSCSI Present **148**



OS Versions **18 derived OS types**
VM HW Versions **1**



T-Shirt Sizes **97 different vCPU/vRAM VMs combinations**
Unique VMs **19 unique vCPU/vRAM VMs**



WINDOWS
Windows Server 2016 **459**
Windows Server 2012 **178**
Windows Server 2019 **101**
Windows 10 **4**



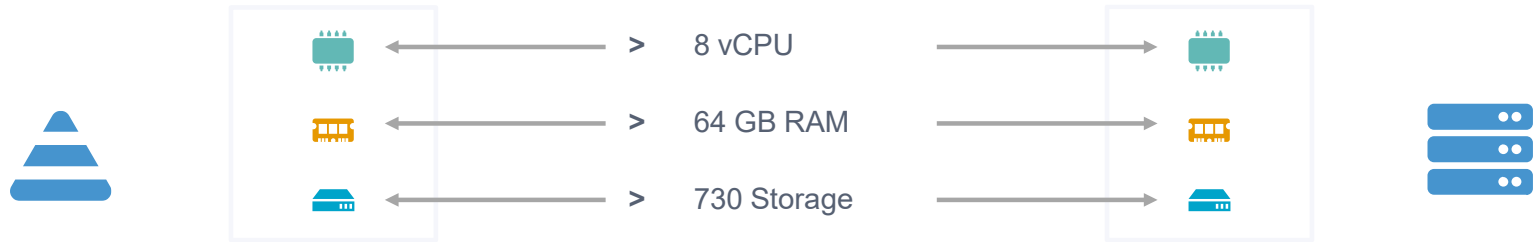
LINUX
Generic Linux **1032**
CentOS **22**
Debian **6**



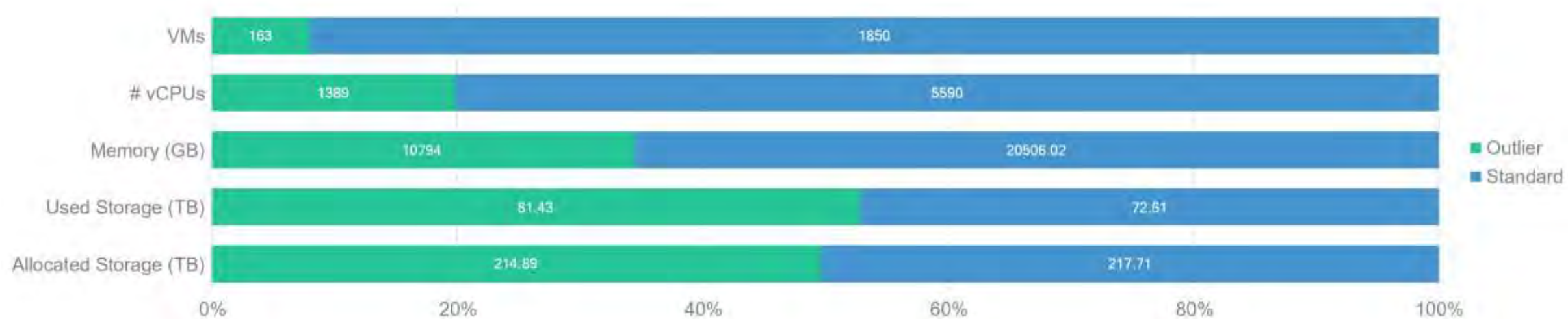
OTHER
Other **211**

VM Resource Distribution

VM Profile	VM Count	Total vCPU	Total RAM (GB)	Storage (TB)	Average vCPU	Average RAM (GB)	Average Storage Provisioned (GB)
STANDARD	1,850	5,590	20,506	218	3	11	121
OUTLIER	163	1,389	10,794	215	9	66	1,350



Thresholds are based on 95% calculations



Please refer to the excel report for information about individual VM performance

Understanding and managing IT infrastructures is challenging

Do you know what your IT infrastructure looks like?



CPU utilization



Storage capacity



Cloud footprint



Brands in use



Compute capability



Memory usage



Workload
performance



Costs

Outside advisors typically default to “just go b g”

- Overprovisioning raises costs
- Compensates for risk aversion
- May integrate cybersecurity
- Assumes business continuity
- Results in analysis paralysis

Trying to manage regulatory compliance is overwhelming

- U.S. and European compliance are in frequent review
- Proof of compliance is difficult
- Compliance plans are time-consuming to develop
- Global compliance concerns



Client Solutions & OEM

Dell Technologies



APEX

Cloud Services
Infrastructure Services
Storage Services

Services

Consulting Services
Deployment Services
Support Services
Managed Services
Education Services
Cloud Services
Financial Services

vmware

Cloud Foundation™
vSphere® / ESX®
vRealize®
NSX® / NSX Cloud™
vSAN™

Site Recovery Mgr.™
vCloud Suite®
vCloud® NFV™
Fusion® / Horizon®
Horizon® FLEX™
Workspace™ ONE™
CloudHealth

SD-WAN by VeloCloud
AppDefense™
Carbon Black Cloud
VMware Tanzu
Tanzu Labs®
(... and many more)

Secureworks

Managed Security
AETD Red Cloak™
Counter Threat Unit™
Security & Risk Cons.

DELL EMC

Infrastructure Solutions



Dell Technologies

Sicherheitsmodelle

Rechtzeitig darauf schauen, daß man es hat, wenn man es braucht

C I A

Confidentiality - Vertrauenswürdigkeit

Zugriff auf Systeme, Applikationen, Daten nur von autorisierten Anwender

Integrity - Integrität

Daten dürfen nicht unbemerkt verändert werden. Änderungen sollten nachvollziehbar sein

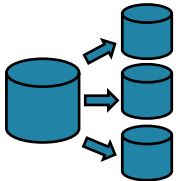
Availability – Verfügbarkeit

Verfügbarkeit von Systemen, Anwendungen und Daten in einem vordefinierten Zeitrahmen (Redundanz, Sicherung,...)

D I E

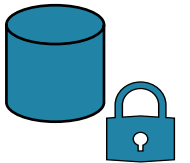
Distributed - Verteilung

Verteilung von Daten auf verschiedene Orte, um das Risiko eines Verlusts oder einer unerkannten Manipulation zu verkleinern



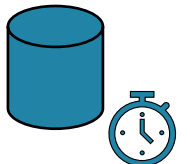
Immutable - Unveränderlichkeit

Daten dürfen nicht (unerkannt) manipuliert werden können



Ephemeral - Vergänglichkeit

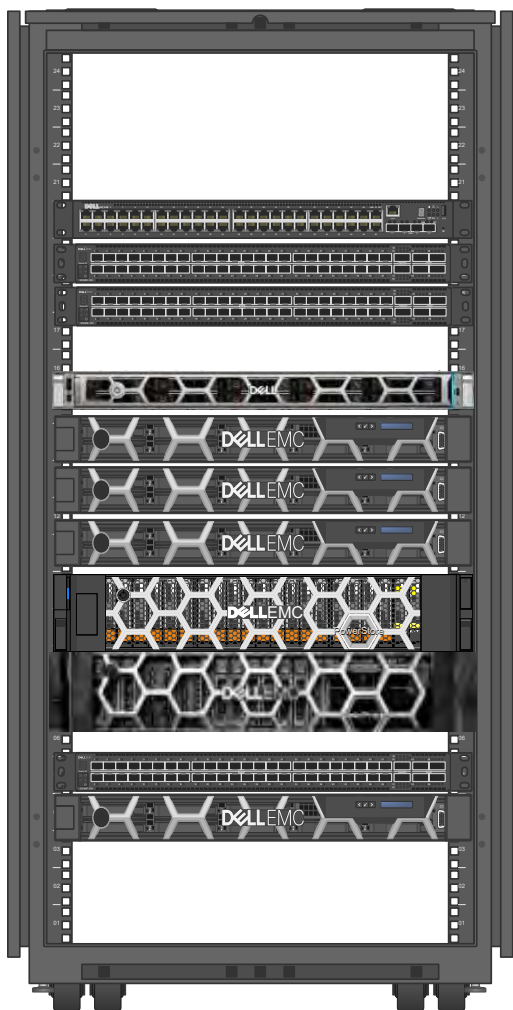
Daten dürfen nur für einen begrenzten Zeitraum existieren, um das Risiko von unbefugtem Zugriff oder Datenmissbrauch zu minimieren





PowerClub Demo Setup

PowerClub Environment



N2224X – 24x1Gb RJ45, 4x25Gb SFP28

2x S5248F – 48x25Gb SFP28, 4x100Gb QSFP28

Test – R6715

1x AMD 9115 16 core 2.6GHz
6x 32GB RAM
2x480GB BOSS + 1x1.92TB E3 NVMe
1x Broadcom 4x25Gb + 1x 4-port 1Gb RJ45

Management Server – R650xs

2x Intel 4309Y 8 core 2.8GHz
4x 16GB RAM
2x240GB BOSS + 2x480GB
2x 2-port Intel E810 10/25Gb

VMWare 3x PowerEdge R650, je

1x Intel Xeon 4309Y 2.8GHz 8C
8x 16GB RDIMM = 128GB
2x240GB BOSS + 1x 480GB SSD
2x 2-port 10/25Gb SFP28

Powerstore 500T

10x 1.92TB NVME
2x 4-port 25Gb SFP28 Mezz + 2x 4-port 25Gb SFP28

PowerProtect DD6400

8TB licensed (32TB total)
4-port 10GbT – 2-port 25Gb

Live Optics

MS SQL Database

Windows Admin Center

Secure Connect
Gateway

APEX AIOps / CloudIQ

Redhat Openshift

Proxmox VE 8.4
(nested)

VSphere ESX 8.03

PowerProtect DataManager

Virtuozzo

Dell Virtual Storage
Integration

Appsync

Prolion Cryptospike

OMEVV Plugin
PowerManager Plugin
Update Management

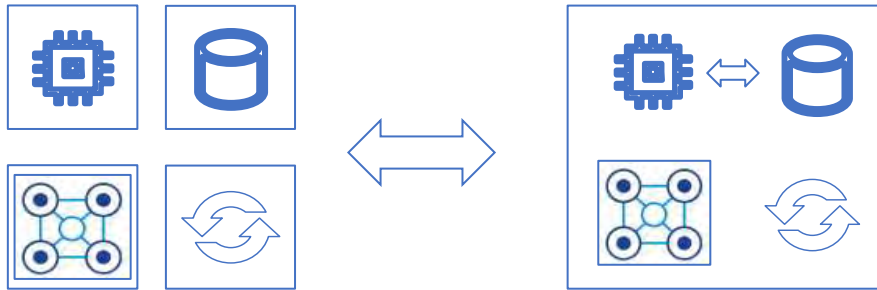
OpenManage Enterprise
Advanced Plus

IDRAC Datacenter

PowerClub – Agenda



LiveOptics: Erfassung und Analyse der Anforderungen

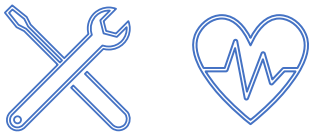


Produkte: Aktuelles von PowerEdge und Powerstore

Technologie: Intel, AMD, Nvidia,...

Virtualisierung: Server/Storage versus Hyper-Converged

Vergleich: VMWare, Hyper-V, Azure Local, Virtuozzo, Proxmox,...



Administration
Life Cycle Management
Support



Backup & Restore
DataDomain und PowerProtect



Cyber Security

AGENDA



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- 15:45 – 16:00 kommerzieller Vergleich



PowerEdge Servers

Dell PowerEdge Lebenszyklus



Stabilität

Wenige und geplante
Änderungen reduzieren den
Aufwand



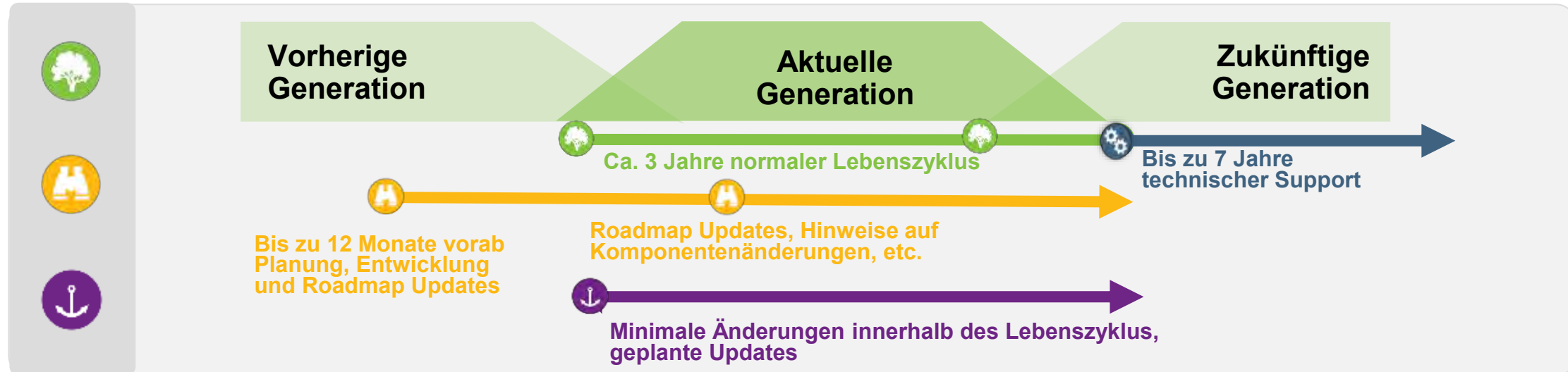
Sichtbarkeit

Keine Überraschungen durch
lange Sichtbarkeit und
Kommunikation von Änderungen



Lebensdauer

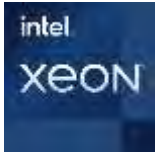
Lange Lebenszyklen, geplante
Transitionen erlauben einen
gesteuerten Übergang



PowerEdge Naming Structure



R 6 5 0



6 7 8 9

Generation Processor



R 7 6 2 5



6 7 8 9

Generation No CPUs Processor

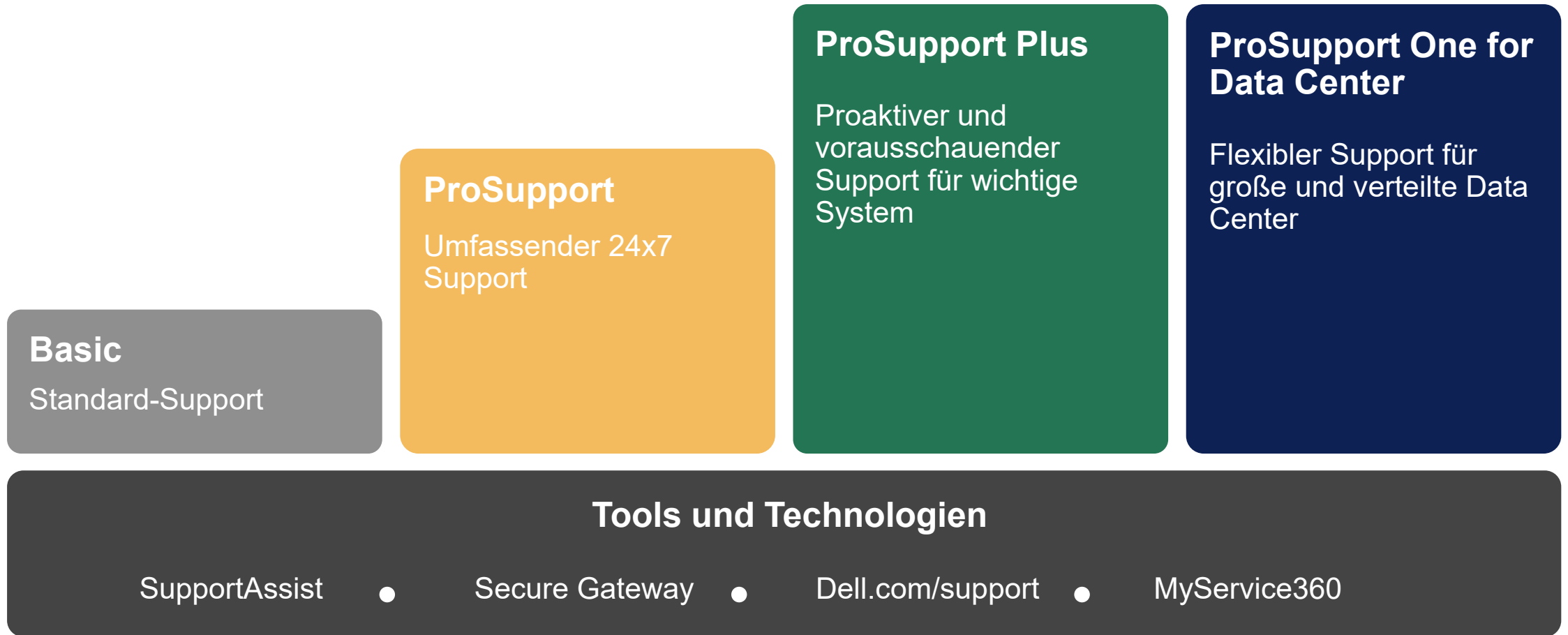


Features der ProSupport Infrastructure Suite

	Basic Hardware Support	ProSupport for Infrastructure	ProSupport Plus for Infrastructure
Verfügbarkeit und Reaktionszeit Technischer Support	9/5, sofort	24/7, sofort	24/7, sofort
Abgedeckte Produkte	Hardware	Hardware & Software	Hardware & Software
Reaktionszeit vor-Ort	Next Business Day (NBD)	NBD oder 4 Stunden	4 Stunden
ProSupport AIOps Plattformen	●	●	●
Dell Security Advisories	●	●	●
<i>Proaktive</i> Problemerkennung und Falleröffnung	●	●	●
<i>Vorausschauende</i> Hardware Anomalie-Erkennung		●	●
Hilfe bei Software Updates		●	●
APEX AIOps Infrastructure Observability Health, Cybersecurity und Sustainability Monitoring & Analysen		●	●
Incident Manager für Severity 1 Fälle		●	●
Erweiterter Mission Critical Support			●
Priorität bei Remote Senior Support Engineers			●
Service Account Manager			●
Proaktive System Maintenance			●
3 rd Party Software Support			●
ProSupport Suite Add-On Services	Optional	Optional	Optional

Availability and terms of Dell Technologies Services and features may vary by region and by product. View service descriptions for more information.
Glossary of features available [here](#).

ProSupport Enterprise Suite



Hilfen für effektives Arbeiten

SupportAssist und ESRS

- Proaktive Überwachung
- Automatische Problemerkennung, Benachrichtigung und Fallerstellung
- Verhinderung von Problemen und Optimierungsempfehlungen

MyService360

- Unmittelbare Erkenntnisse über den Zustand Ihrer globalen Umgebung durch ein echtzeitbasiertes „Heads-Up Display“
- Ergreifen Sie Maßnahmen auf Grundlage klarer, präskriptiver Empfehlungen sowie personalisierter 360°-Ansichten Ihrer Installationsbasis
- Optimieren Sie die Hardware- und Softwarequalität im Unternehmen durch historische Trendberichte und Analysen

TechDirect

- Vereinfachen Sie die Support-Verwaltung durch Anforderung von Support und Self-Dispatches in TechDirect
- Verbinden Sie Ihren Help Desk unter Verwendung der TechDirect-APIs direkt mit unseren Supportsystemen
- Greifen Sie auf Zertifizierungsprüfungen und -ressourcen für Mitarbeiterschulungen zu

SupportAssist und TechDirect sind für ältere Produkte mit Dell-Garantie verfügbar.
ESRS und MyService360 sind für ältere Produkte mit EMC-Garantie verfügbar.

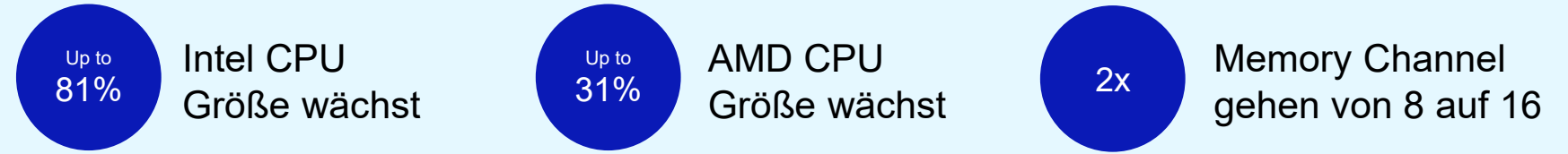


PowerEdge 17G - New

Wachsender Strom- und Platzbedarf

- CPU-Größen und Anzahl der DIMM Channel steigt und damit die Platzprobleme in einem Server
- Höhere GPU TDPs und damit auch die Notwendigkeit neuer Kühllösungen
- Rack-Level Infrastruktur und Super Pods werden als zukünftige Lösungen erwartet

Im Laufe der nächsten beiden Server-Generationen



↑ Max. CPU TDP wird auf bis zu ~500W von ~350W steigen

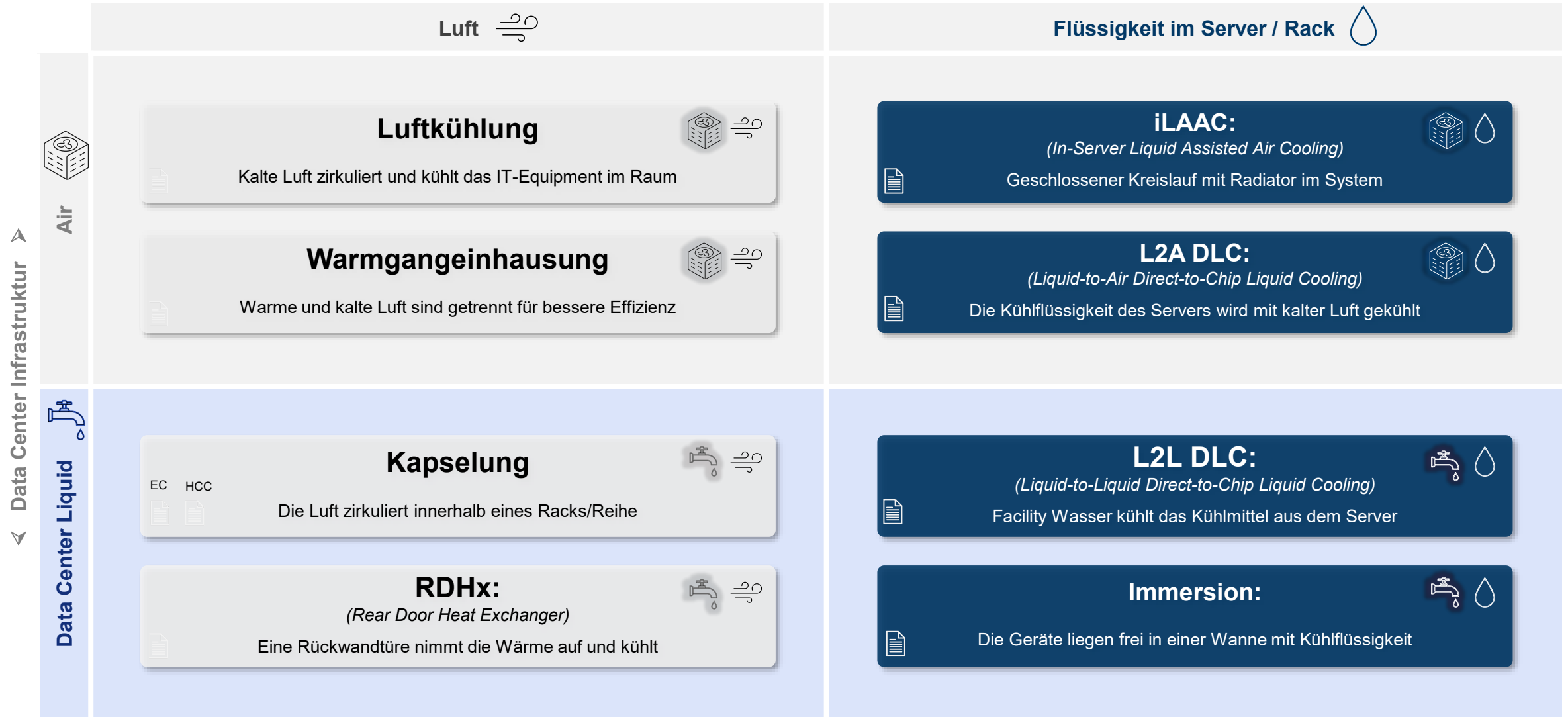
↑ Max. GPU PCIe CEM TDP wird auf bis zu ~900 W von ~350 W steigen

↑ Max. GPU SXM/OAM TDP wird auf bis zu ~1400 W von ~750 W steigen

- Direct Liquid to Chip Cooling für die höchsten TDP GPUs
- Workloads für 8fach SXM/OAM Super Pods verschieben sich zu Multi-Node Scale-Up Systemen
- ORv3-basierte Rack Infrastruktur wird die Wahl für einige Workloads:
 - Sehr große AI-Trainings
 - Dichte High TDP GPU und CPU Compute

Server & Data Center Kühltechnologien

◀ IT Equipment (Server, Storage, Networking, etc.) ▶



IR7000 Infrastruktur

- ORv3 Standard basierte Infrastruktur für High-End AI & Dense Compute
- Entwickelt für mehrere Generationen & heterogene Technologien (CPU, GPU & CPU+GPU)

Rack-Level Lösung für Dense Compute Infrastrukturen

Optimiert für Mainstream & Large-Scale Deployments

- Rack Scale Cluster
- Mehrere Generationen – Zukunfts-sichere Infrastruktur

Auf Standards basierte, skalierbare Infrastruktur

- ORv3 Racks mit 44 OU oder 50 OU
- Skalierbar auf bis zu 480 kW mit zukünftigen Plattformen
- 18 kW Single AC Zugang, 33 kW Dual AC Zugang H1CY25
- Bis zu 10 kW pro OU-Wärmeabführung
- Kompatibel mit Of The Shelf CDUs



Überblick nächste Generation CPUs

Nächste Generation CPUs von AMD und Intel

AMD EPYC Turin

- 1S & 2S
- Bis zu 192 Cores
- Bis zu 500 W TDP
- DDR5 mit bis zu 6000 MT/s
- I/O: bis zu 128 Lanes PCIe 5.0/CXL 2.0
- Multi-Threaded

Intel® Xeon® 6

Intel® Xeon® 6 „Efficient“ E-Cores (Sierra Forest)

- 1S & 2S
- Bis zu 144 Cores
- Bis zu 330 W TDP
- DDR5 mit bis zu 6400 MT/s
- I/O: bis zu 126 Lanes PCIe 5.0/CXL 2.0
- Single Threaded

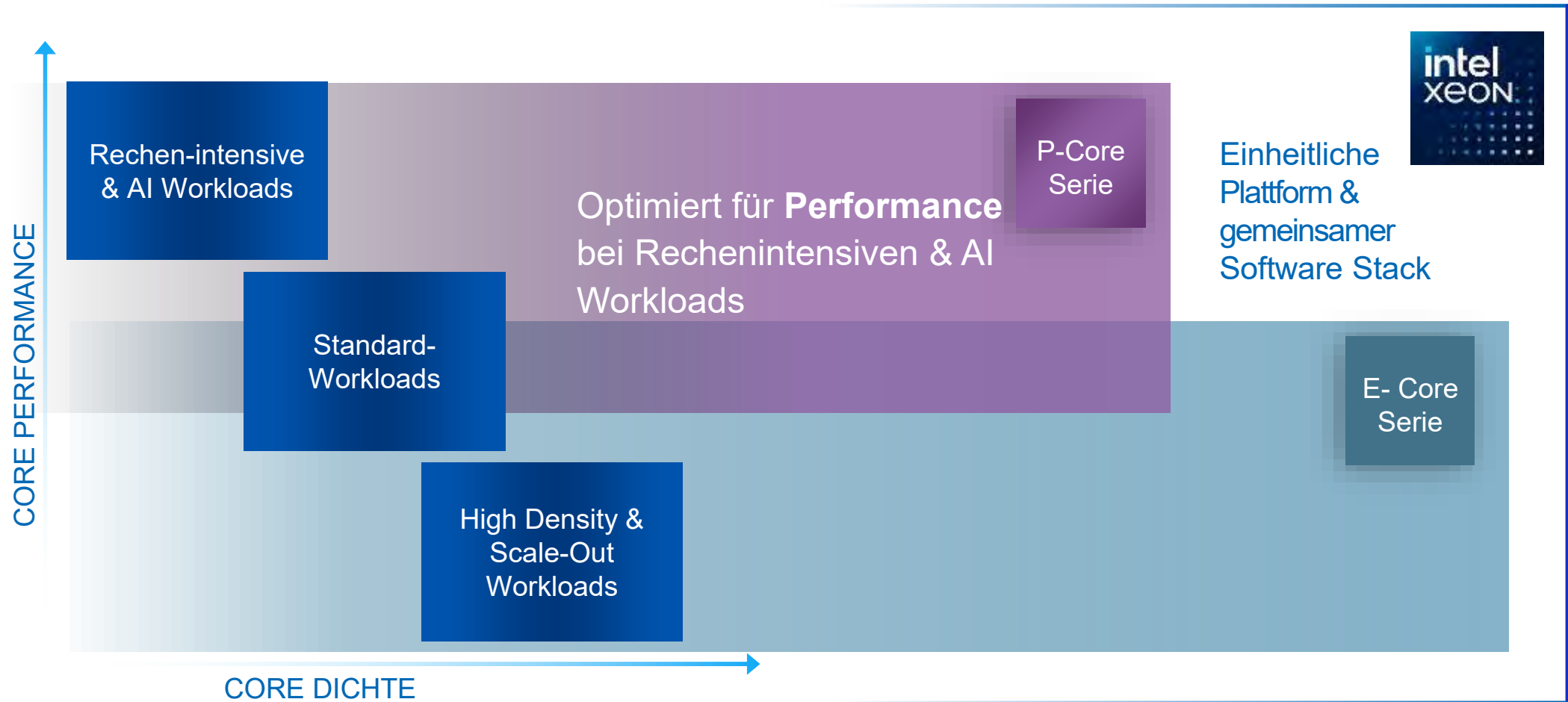
Intel® Xeon® 6 „Performance“ P-Cores (Granite Rapids)

- 1S & 2S
- Bis zu 86 Cores
- Bis zu 350 W TDP
- DDR5 mit bis zu 6400 MT/s
- UPI 2.0
- I/O: bis zu 136 Lanes PCIe 5.0/CXL 2.0
- Multi-Threaded



Intel Birch Stream

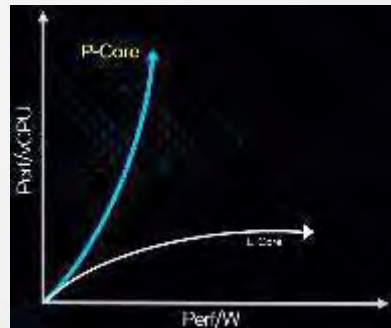
Xeon® Cores entwickelt aufgrund von Kundenwünschen



x86 Cores Optimized for Performance or Efficiency Cores

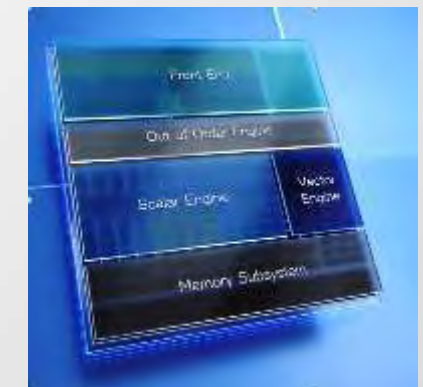
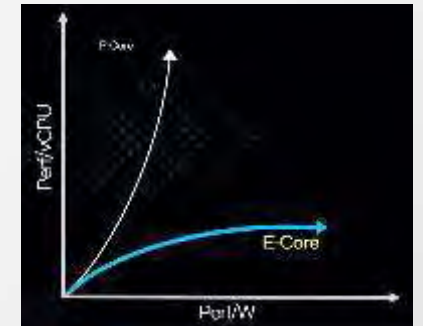
■ Performance Optimized

- Perf/Core optimized
- Multi Threaded
- Data Parallel
- Wider / Deeper uArch
 - Bigger cache
 - Higher BW
 - Wider vectors
- More
 - AI / ML / Analytics
 - Data acceleration
 - Vectorized Code



• Efficiency Optimized

- Perf/W optimized
- Single Threaded
- Task Parallel
- High Core Density
 - More cores at Iso TDP
 - Perf/Area optimized
 - Higher Integer perf per Watt
 - Higher Integer perf per socket
- More
 - Throughput Oriented WLs
 - Scale-out WLs
 - Scalar Code



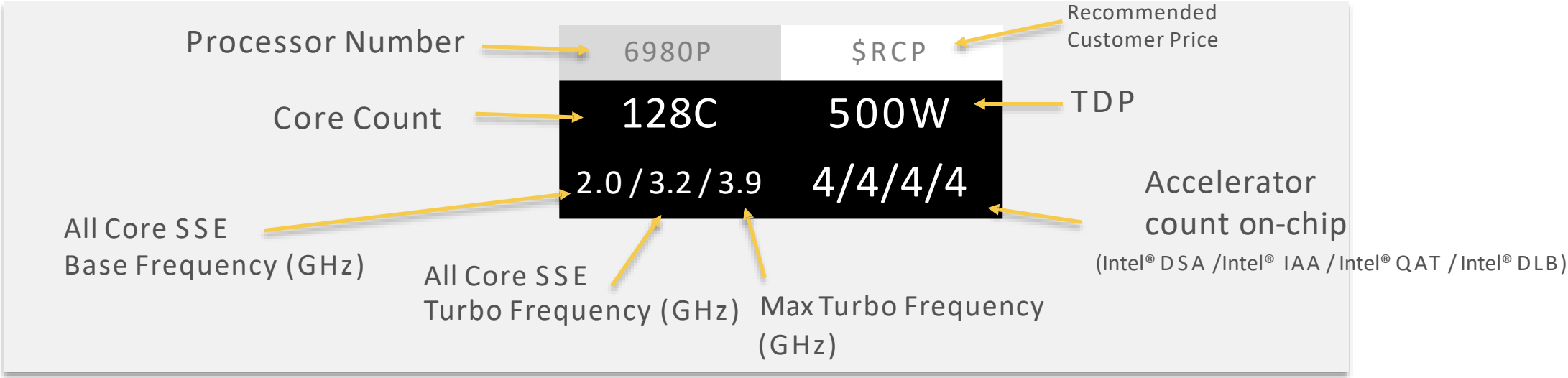
Intel® Xeon® 6 Prozessoren 6700 und 6900

		Socket Support	Max TDP	Mem Channels	PCIe/ CXL	UPI Links
6700 Series	Up to 144 Efficient-cores Up to 86 Performance-cores	1S/2S and 4S/8S (P-core only) support	Up to 350W per CPU	8 channel memory Up to 6400 MT/s DDR5 memory 8000 MT/s MCR DIMM memory (P-core)	Up to 88 lanes PCIe 5.0 /CXL® 2.0 (up to 136 lanes for 1S designs)	4 UPI 2.0 links, up to 24 GT/s
6900 Series	Up to 288 Efficient-cores Up to 128 Performance-cores	1S/2S support	Up to 500W per CPU	12 channel memory Up to 6400 MT/s DDR5 memory 8800 MT/s MCR DIMM memory (P-core)	Up to 96 lanes PCIe 5.0 /CXL® 2.0	6 UPI 2.0 links, up to 24 GT/s
Intel® Software Guard Extensions (Intel® SGX)						
Intel® Trust Domain Extensions (Intel® TDX)						
Intel® Accelerator Engines						
Increased shared LLC						
Common OS and firmware						

Intel® Xeon® 6 Prozessoren 6700 und 6900 Instruktionen

Category	Software Stack Component	Efficient-core (E-core)	Performance-core (P-core)
Instruction Set and Extensions	Base x86 ISA	x	x
	Intel® Advanced Vector Extensions 2 (Intel® AVX2)	x	x
	Intel® Advanced Vector Extensions 512 (Intel® AVX-512)		x
	Intel® Advanced Matrix Extensions (Intel® AMX)		x
OS and Hypervisor	Linux kernel and commercial Linux	x	x
	Windows	x	x
	VMware ESXi	x	x
Applications and Libraries	Database incl. common libraries (ex. ZStd)	x	x
	Network & media incl. common libraries (ex. DPDK)	x	x
	General compute & storage incl. libraries (ex. SPDK)	x	x

Intel® Xeon® 6 Processors SKU Stack Legend



Processor Number



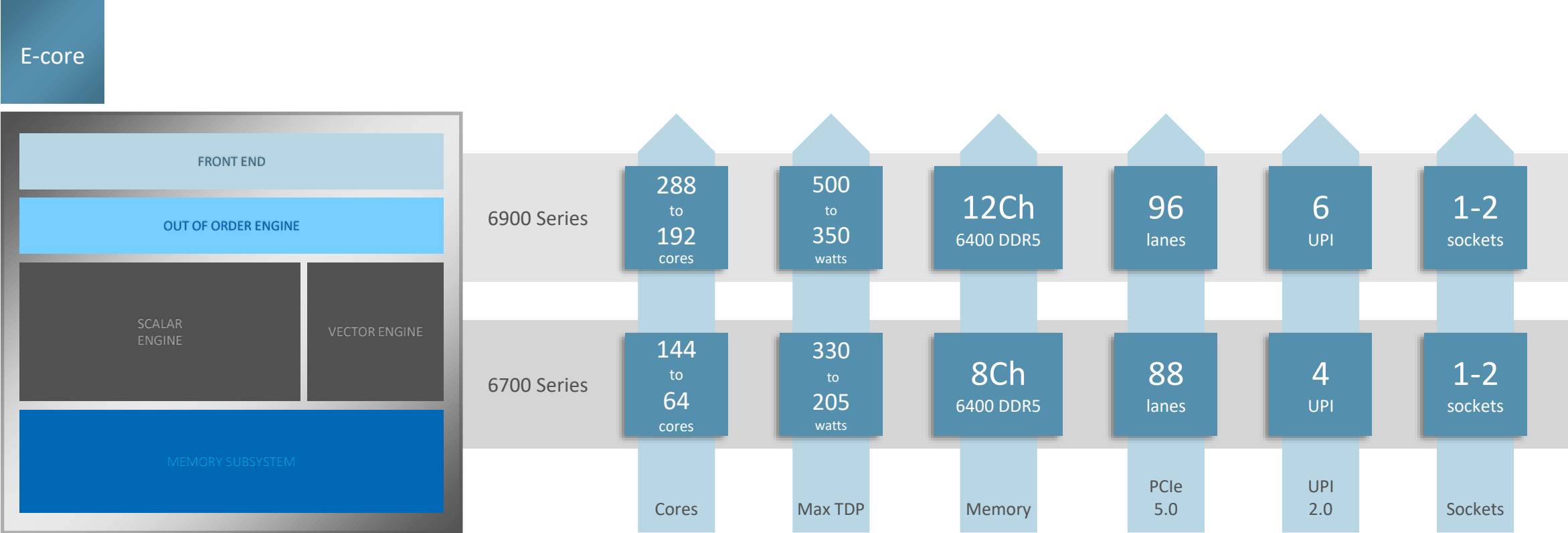
Tier

Intel Xeon 6900-series
Intel Xeon 6700-series
Intel Xeon 6500-series

uArch

P-Core
E-Core

Intel® Xeon® 6 Prozessoren mit E-Cores



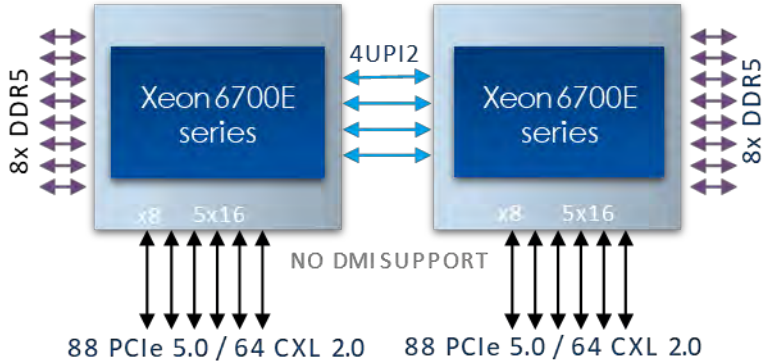
Intel Accelerator Engines

AI & HPC Intel Advanced Vector Extensions 2 (VNNI/INT8) Intel Data Streaming Accelerator	Security Intel Software Guard Extensions Intel Trusted Domain Extensions Intel Crypto Acceleration	Storage & Analytics Intel Data Streaming Accelerator Intel In-Memory Analytics Accelerator Intel QuickAssist Technology	Network Intel QuickAssist Technology Intel Dynamic Load Balancer
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Intel® Xeon® 6700E Serie (Sierra Forest SP)

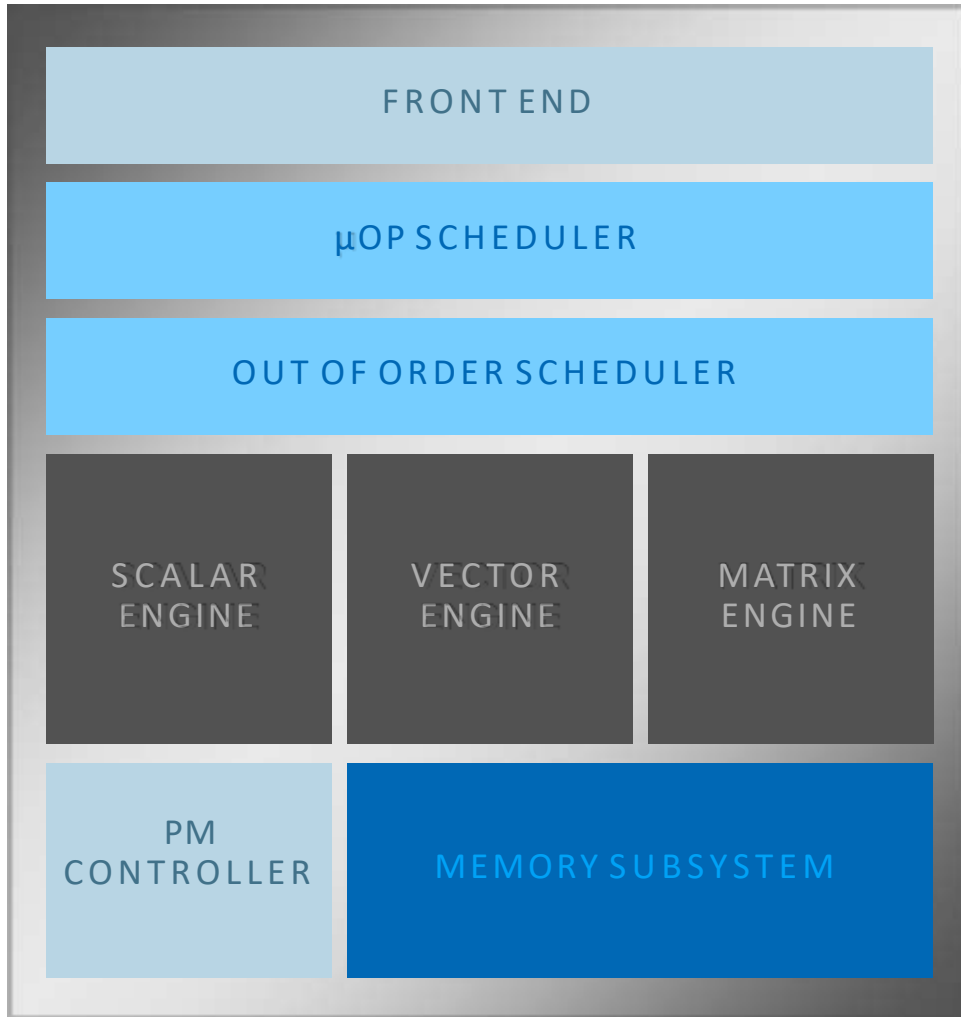
CPU	E-Core 64 bis 144 Cores
Sockel und TDP	Sockel E2 (LGA 4710-2), Kompatibel mit Xeon 6 CPUs mit P-Cores 205 W bis 330 W
Skalierbarkeit	1 S und 2 S
Acceleratoren	Accelerator ISA (AIA), Data Streaming Accelerator (DSA), Quick Assist Technology (QAT), Dynamic Load Balancer (DLB), Analytics Accelerator (IAA)
Memory	8 Channel DDR5 pro CPU DDR5 bis zu 6400 MT/s bei 1DPC und 5200 MT/s bei 2DPC 2DPC / 16 DIMMs pro CPU
UPI 2.0	Bis zu 4 Links pro CPU (x24 Breit) Geschwindigkeit: 16, 20, 24 GT/s
PCIe / CXL	88 PCIe 5.0 Lanes pro CPU (PCIe oder CXL) PCIe Bifurcation: x16, x8, x4, x2 (PCIe Gen 5.0) 64x CXL 2.0 Lanes pro CPU CXL Bifurcation: x16, x8 (Type 3)
Security	Software Guard Extensions (SGX) für Anwendungs-Isolierung - AES 256-bit keys Trust Domain Extensions (TDX) für VM-Isolierung - 1,024 Keys, AES 256-bit Stärke - Link Protection [PCIe (x16, x8, x4), CXL, UPI], PFR 4.0 - Linear Address Space Separation (LASS), Linear Address Masking (LAM)

Scalable Performance Platform



Intel® Xeon® 6 Prozessoren mit P-Cores

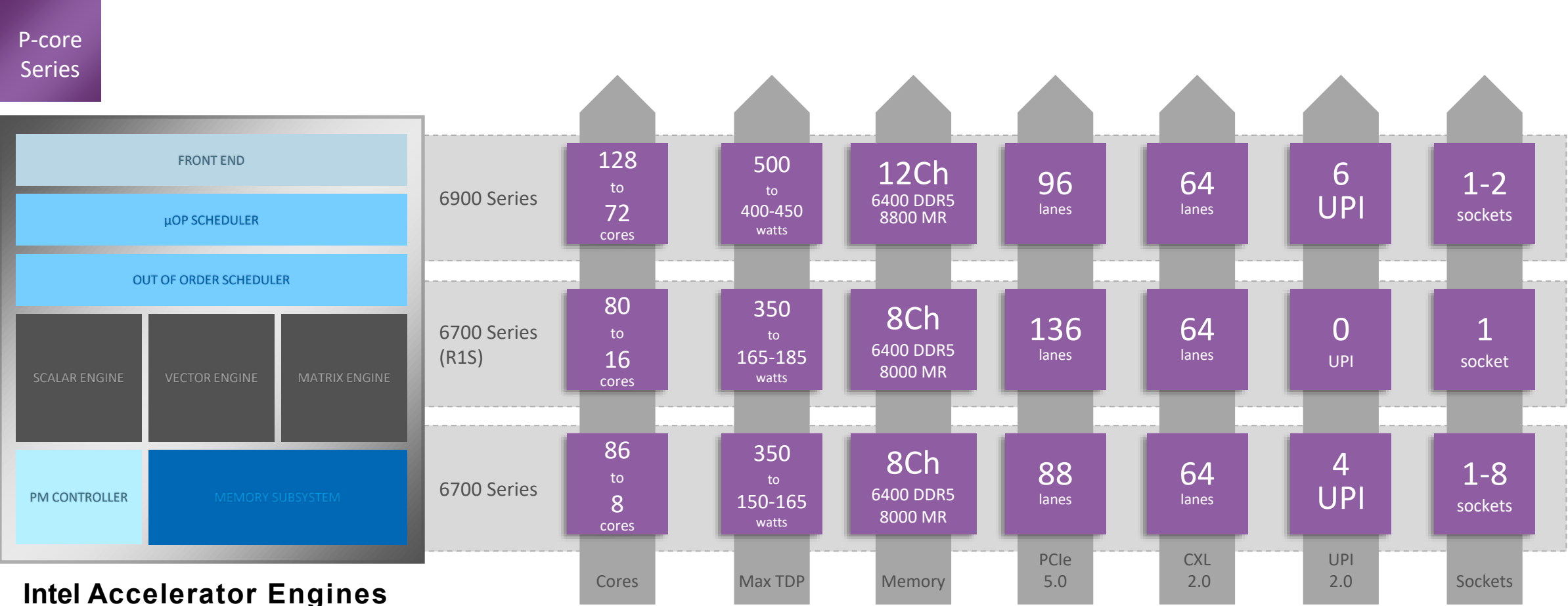
Performance optimierte Cores



Bewährte Intel Architektur

- Optimiert für maximale Leistung
- Gemeinsamer Hard- und Software Stack mit P-Core
- Moderne Intel 3 Prozesstechnologie
- Neue Instruktionen
 - Intel AMX & AVX-512 Matrix Support für AI
 - 256b Memory Encryption mit mehr Keys
 - Code SW Prefetch und Taken Branch Hints
 - Memory Allokation pro Thread
 - L2 Cache Allokation und Coda/Daten Priorisierung
- Verbesserte μArchitektur
 - 64kB, 16-wege I Cache
 - Verbesserte Branch Detection und Miss-Recovery
 - 3-Zyklen Floating-Point Multiplikation

Intel® Xeon® 6 Prozessoren mit P-Cores



Intel Accelerator Engines

AI & HPC
Intel Advanced Matrix Extensions (INT8, BF16, FP16)
Intel Advanced Vector Extensions 512 (VNNI/INT8)

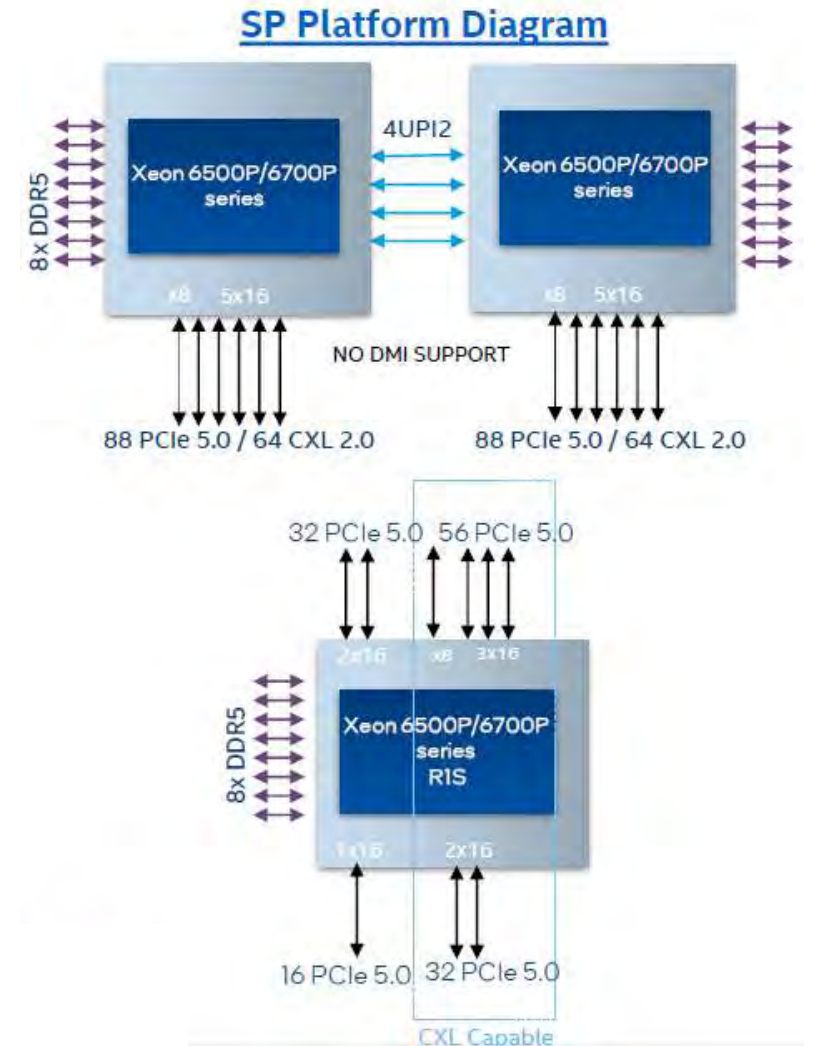
Security
Intel Software Guard Extensions Intel Trusted Domain Extensions Intel Crypto Acceleration

Storage & Analytics
Intel Data Streaming Accelerator Intel In-Memory Analytics Accelerator Intel QuickAssist Technology

Network
Intel QuickAssist Technology Intel Dynamic Load Balancer

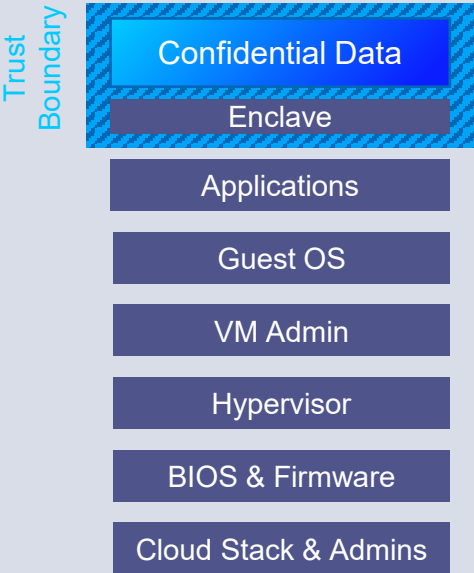
Intel® Xeon® 6500P & 6700P Serie (Granite Rapids SP)

CPU	P-Core 8 bis 86 Cores
Sockel und TDP	Sockel E2 (LGA 4710-2), Kompatibel mit Xeon 6 CPUs mit E-Cores SP: 150-165 W bis 350 W R1S: 165-185 bis 350 W
Skalierbarkeit	1 S, 2 S, 4 S und 8 S Glueless
Acceleratoren	Accelerator ISA (AIA), Data Streaming Accelerator (DSA), Quick Assist Technology (QAT), Dynamic Load Balancer (DLB), Analytics Accelerator (IAA)
Memory	8 Channels DDR5 pro CPU DDR5: bis zu 6400 MT/s 1 DPC / 5200 MT/s 2 DPC 2 DPC / 16 DIMMs pro CPU MRDIMM: bis zu 8000 MT/s 1 DPC (2 Slots pro Channel)
UPI 2.0	Bis zu 4 Links pro CPU (x24 Breit) Geschwindigkeit: 16, 20, 24 GT/s, keiner bei R1S
PCIe / CXL	88 PCIe 5.0 Lanes pro CPU (PCIe oder CXL) PCIe Bifurcation: x16, x8, x4, x2 (PCIe Gen 5.0) 64x CXL 2.0 Lanes pro CPU, CXL Bifurcation: x16, x8 (Type 3) R1S: 136 PCIe Gen5 Lanes max 88 Lanes CXL Support
Security	Software Guard Extensions (SGX) for Application Isolierung - AES 256-bit keys - Trust Domain Extensions (TDX) für VM-Isolierung - 2,048 keys (2S, R1S), 1,024 (4S/8S), AES 256-bit Stark, Link Protection [PCIe (x16, x8, x4), CXL, UPI], PFR 4.0



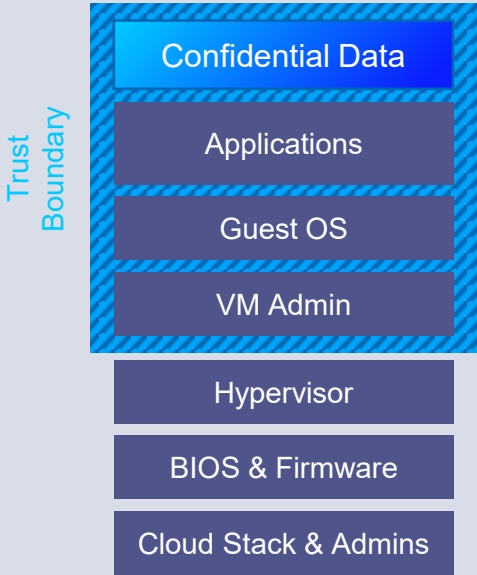
Confidential Computing Additions

App Isolation Intel® SGX



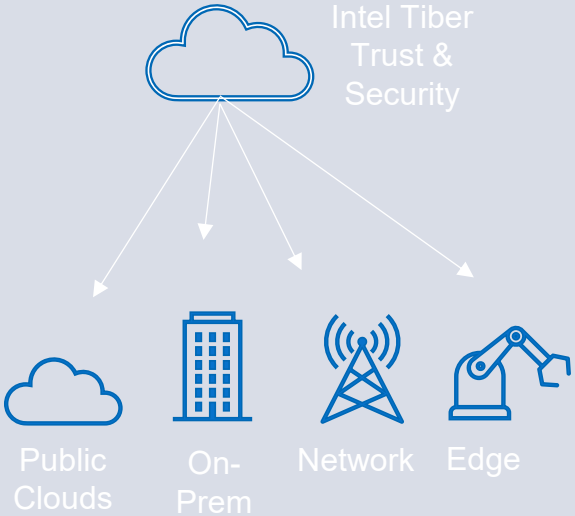
Smallest trust boundary
for greatest data
protection & code integrity

VM Isolation Intel® TDX



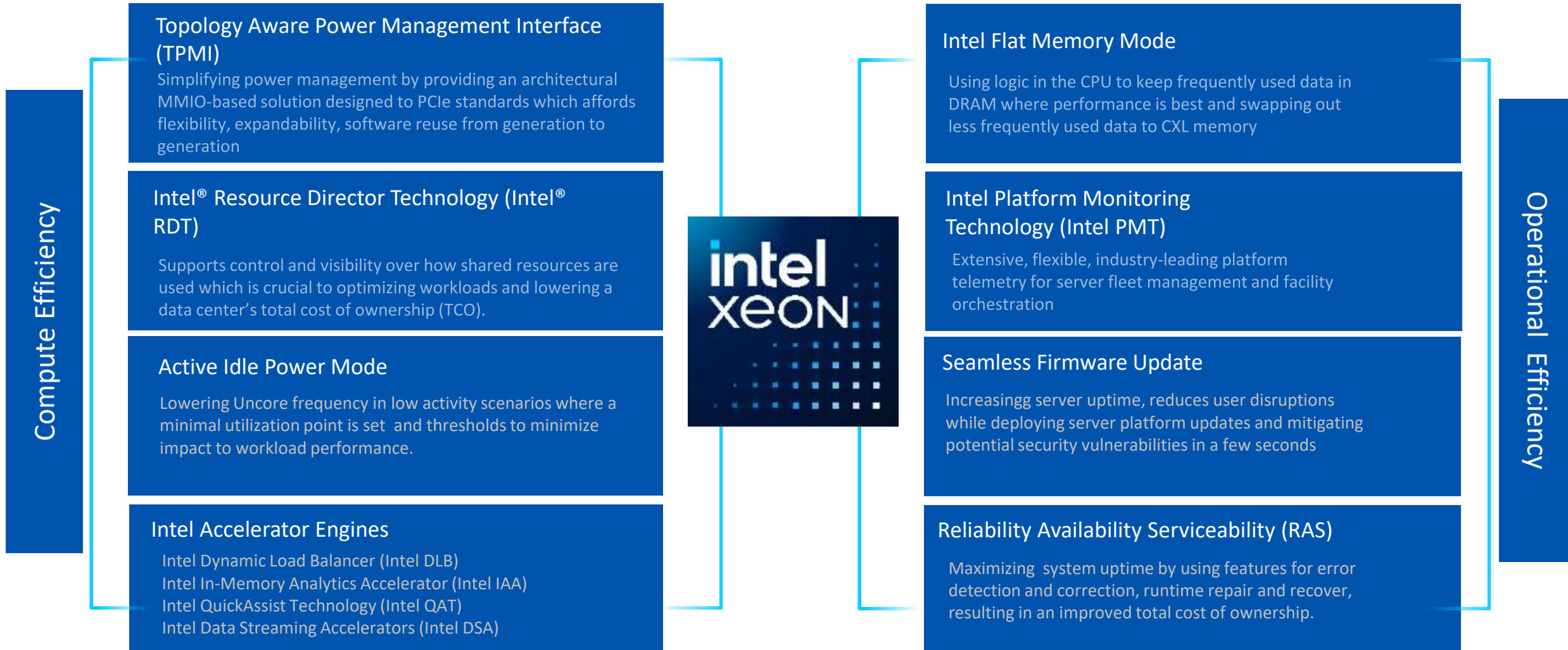
Most straightforward path to
greater security, compliance &
control for legacy apps

Trust Services Intel® Tiber Trust & Security



Uniform, independent
attestation of trustworthy
environments

Intel® Xeon® 6 Prozessoren weitere Features



Intel® Xeon® 6 AP Prozessoren mit P-Cores

PERFORMANCE SKUs														
SKU	CORES	BASE (GHz)	ALL CORE TURBO (GHz)	Max TURBO (GHz)	L3 CACHE (MB)	TDP (Watts)	Max. Scala.	Memory Channels	DDR5 Memory Speed	MRDIMM Speed	Default Accel. Devices	Intel TDX Keys (Per CPU)	UPI Links Enab.	PCIe Lanes
6980P	128	2.0	3.2	3.9	504	500	2S	12	6400	8800	4/4/4/4	1024	6	96
6979P	120	2.1	3.2	3.9	504	500								
6972P	96	2.4	3.5	3.9	480	500								
6952P	96	2.1	3.2	3.9	480	400								
6960P	72	2.7	3.8	3.9	432	500								

Dell Intel Xeon 6500P & 6700P (Granite Rapids) Portfolio

GSP*	CPU	Takt	Turbo	Cache	Cores	Threads	UPI	Memory Takt	Memory Kapazität**	TDP	R470	R570	R670	R770
	6787P	2,0 GHz	3,8 GHz	336 MB	86	172	24 GT/s	6400 MT/s	4 TB	350 W	03/25	03/25	03/25	03/25
	6767P	2,4 GHz	3,9 GHz	336 MB	64	128	24 GT/s	6400 MT/s	4 TB	350 W	03/25	03/25	03/25	03/25
	6760P	2,2 GHz	3,8 GHz	320 MB	64	128	24 GT/s	6400 MT/s	4 TB	330 W			03/25	03/25
	6747P	2,7 GHz	3,9 GHz	288 MB	48	96	24 GT/s	6400 MT/s	4 TB	330 W	03/25	03/25	03/25	03/25
	6740P	2,1 GHz	3,8 GHz	288 MB	48	96	24 GT/s	6400 MT/s	4 TB	270 W			03/25	03/25
	6736P	2,0 GHz	4,1 GHz	144 MB	36	72	24 GT/s	6400 MT/s	4 TB	205 W			03/25	03/25
X	6737P	2,9 GHz	4,0 GHz	144 MB	32	64	24 GT/s	6400 MT/s	4 TB	270 W	05/25	05/25	05/25	05/25
	6730P	2,5 GHz	3,8 GHz	288 MB	32	64	24 GT/s	6400 MT/s	4 TB	250 W	03/25	03/25	03/25	03/25
	6530P	2,3 GHz	4,1 GHz	144 MB	32	64	24 GT/s	6400 MT/s	4 TB	225 W			05/25	05/25
	6527P	3,0 GHz	4,2 GHz	144 MB	24	48	24 GT/s	6400 MT/s	4 TB	255 W	05/25	05/25	05/25	05/25
	6520P	2,4 GHz	4,0 GHz	144 MB	24	48	24 GT/s	6400 MT/s	4 TB	210 W			05/25	05/25
	6724P	3,6 GHz	4,3 GHz	72 MB	16	32	24 GT/s	6400 MT/s	4 TB	210 W	05/25	05/25	05/25	05/25
X	6517P	3,2 GHz	4,2 GHz	72 MB	16	32	24 GT/s	6400 MT/s	4 TB	190 W	05/25	05/25	05/25	05/25
	6515P	2,3 GHz	3,8 GHz	72 MB	16	32	24 GT/s	6400 MT/s	4 TB	150 W			05/25	05/25
X	6505P	2,2 GHz	4,1 GHz	48 MB	12	24	24 GT/s	6400 MT/s	4 TB	150 W	05/25	05/25	05/25	05/25
	6714P	4,0 GHz	4,3 GHz	48 MB	8	16	24 GT/s	6400 MT/s	4 TB	165 W			05/25	05/25
	6507P	3,5 GHz	4,3 GHz	48 MB	8	16	24 GT/s	6400 MT/s	4 TB	150 W	05/25	05/25	05/25	05/25

Plan Stand November 2024

*GSP (Global Standard Platform): weltweit verfügbare Prozessoren, bis zum EOL der Plattform, auch nach einem MLK

**Memory Kapazität pro CPU und abhängig von der Konfiguration und RAM-Typ

Dell Intel Xeon 6700E (Sierra Forest) Portfolio

GSP*	CPU	Takt	Cache	UPI	Cores	Threads	Turbo	Memory Speed	Memory Kapazität**	TDP
	6780E	2,2 GHz	108 MB	24 GT/s	114	114	X	6400 MT/s	4 TB	330 W
	6766E	1,9 GHz	108 MB	24 GT/s	144	144	X	6400 MT/s	4 TB	250 W
	6756E	1,8 GHz	96 MB	24 GT/s	128	128	X	6400 MT/s	4 TB	225 W
	6745E	2,0 GHz	96 MB	24 GT/s	112	112	X	6400 MT/s	4 TB	250 W
	6740E	2,4 GHz	96 MB	24 GT/s	96	96	X	6400 MT/s	4 TB	250 W
X	6710E	2,4 GHz	96 MB	24 GT/s	64	64	X	6400 MT/s	4 TB	205 W
	6731E	2,2 GHz	96 MB	N/A Nur 1S	96	96	X	6400 MT/s	4 TB	250 W

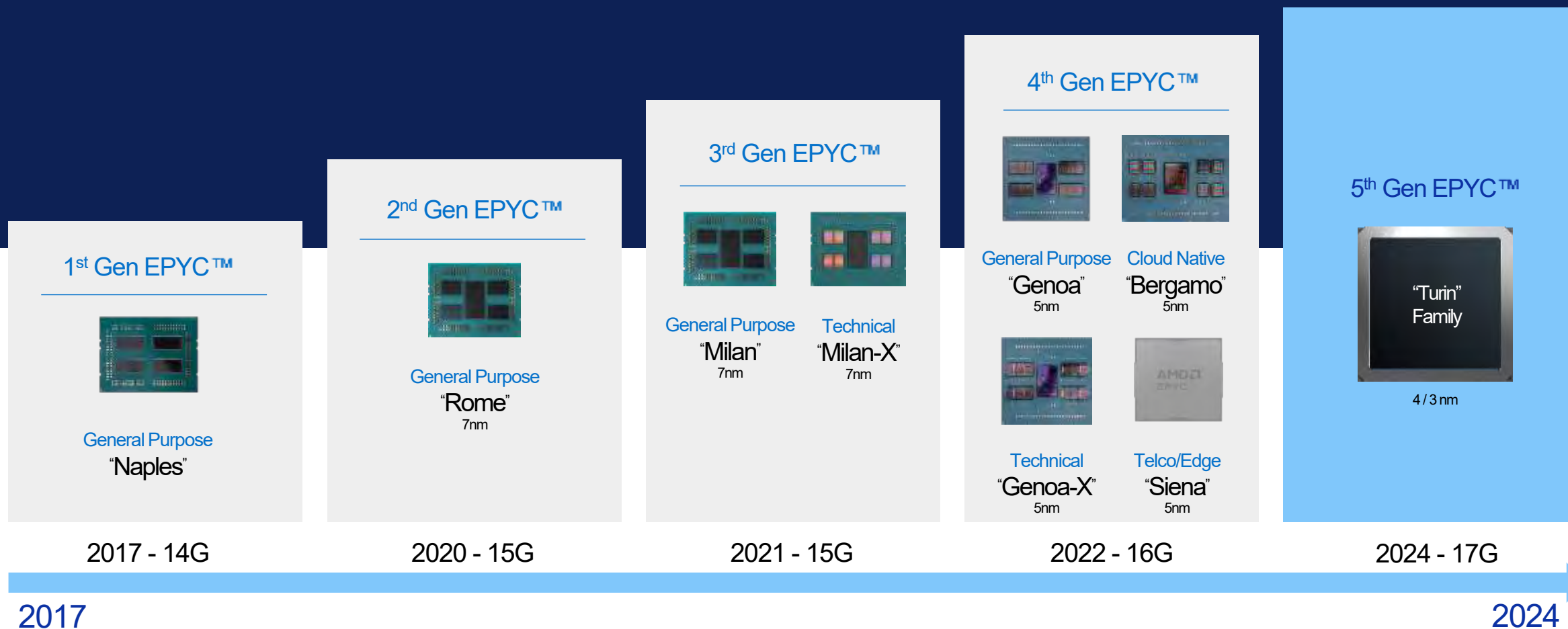
*GSP (Global Standard Platform): weltweit verfügbare Prozessoren, bis zum EOL der Plattform, auch nach einem MLK

**Memory Kapazität pro CPU und abhängig von der Konfiguration und RAM-Typ



AMD Turin

AMD EPYC™ Roadmap



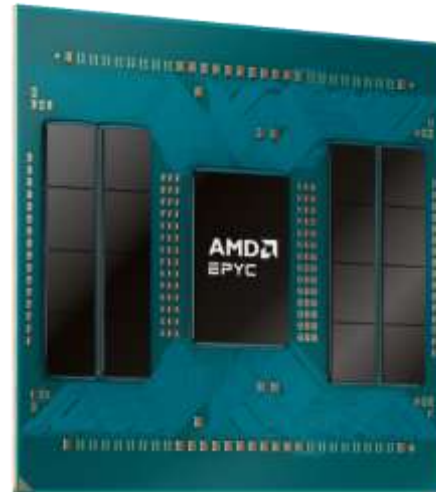
AMD Turin führt die Technologie-Führerschaft fort

5. Generation AMD EPYC™

Scale-Up

Bis zu

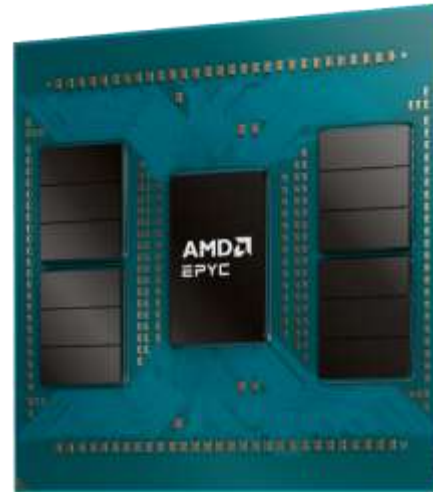
16 “Zen 5” CCDs
128 Cores / 256 Threads



Scale-Out

Bis zu

12 “Zen 5c” CCDs
192 Cores / 384 Threads



Konsistente Features,
ISA & IPC Uplift

SP5 Sockel
“Genoa” Kompatibel

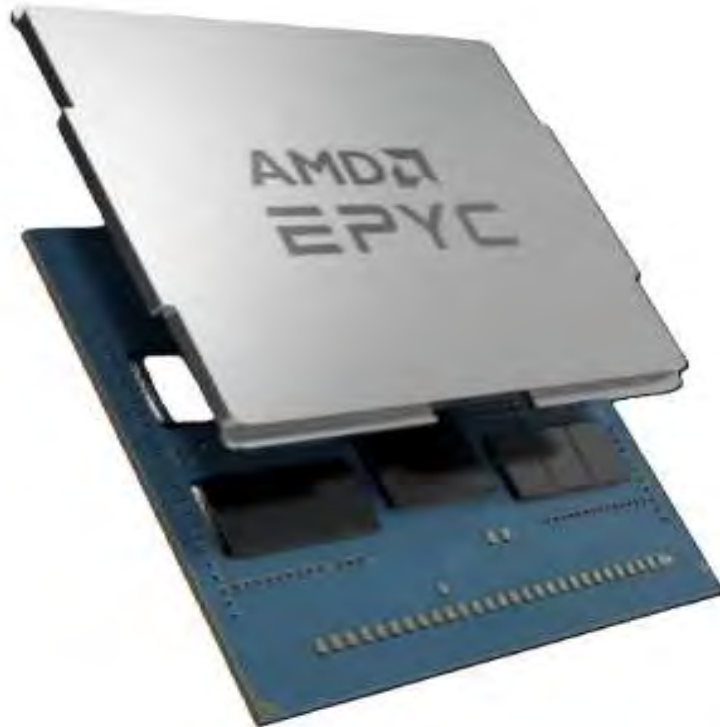
8 bis 192 Cores
155 W bis 500 W

Up to
12 Channel DDR5 6000
128 PCIe 5.0 / CXL 2.0

Confidential Compute
mit Trusted I/O



Turin Family Key Features



Zen5

Up to **192**
cores per socket

New x86 "Zen5" / "Zen5c" cores

Zen5 'Turin classic' optimized for perf-per-core

Zen5c 'Turin dense' optimized for perf-per-watt

Zen5 up to 16 CCDs / 128 cores / 256 threads

Zen5c up to 12 CCDs / 192 cores / 384 threads

128

lanes PCIe Gen 5

Speeds up to 32 Gbps/lane

Support for CXL 2.0 protocol

Support for 32 SATA devices

DDR5

Up to **512MB**
L3 cache

12 DDR5 memory channels with ECC

Up to 6000 MT/s 1DPC

Support for up to 2 DIMMs/channel

1 MB L2 per core

Up to 32 MB shared L3 per CCD

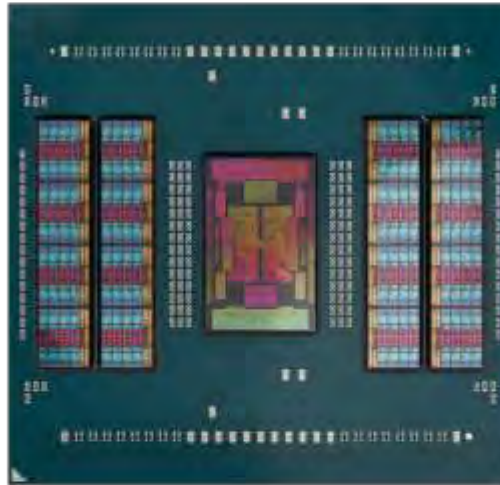
5. Generation AMD EPYC™ Innovationen

Compute

- “Zen5” bis zu **128 Cores** / 256 Threads
- “Zen5c” bis zu **192 Cores** / 384 Threads
- AVX-512 mit **vollem 512b Datenpfad**
- Neue **500 W** Performance Optionen
- Faster **5 GHz** SKUs
- **3/4 nm** Zen Cores

I/O & Plattform

- 2 P und 1 P Konfigurationen
- Bis zu 160 Lanes PCIe® Gen5
- **PCIe Link Encryption**
- SP5 kompatibel mit “**G no a**”
- **CXL® 2.0**



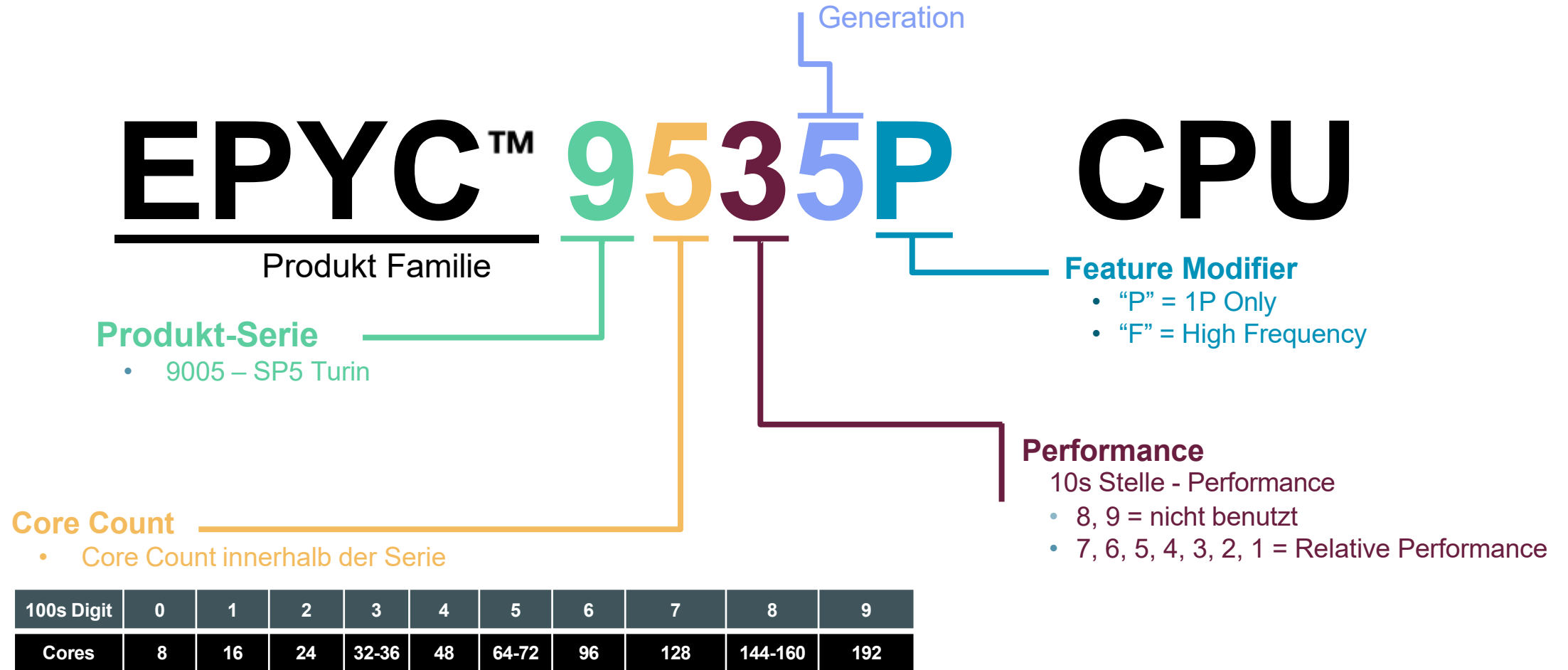
Memory

- 12 Channel DDR5 ECC **bis zu 6400 MT/s**
- Bis zu 2 DIMMs/Channel und bis zu **6 TB/Sockel**
- **Dynamic Post Package Repair** (PPR) für x4 und x8 ECC RDIMMs

Security

- Hardware Root-of-Trust
- **Trusted I/O**
- **FIPS 140-3 in process**

AMD EPYC Zen5 Nomenklatur



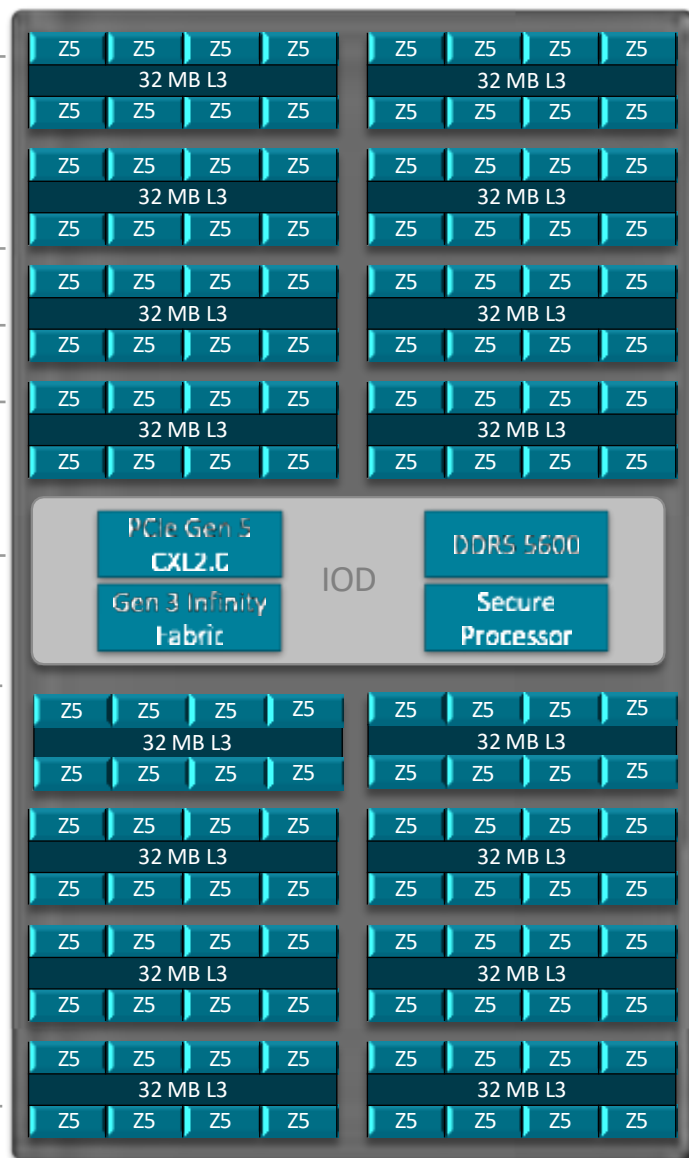
AMD Zen5 “Turin Classic”

COMPUTE

- AMD “Zen5” x86 cores (up to 16 CCDs/ 128 cores / 256 threads)
- 32KB/48KB L1 Instruction/Data per Core, 1MB L2 per Core, 32MB L3 per CCD
- BFLOAT16, VNNI, AVX-512 ISA (512b data path)
- Infinity Fabric: 3rd-gen MCM (32+Gbps die-to-die)
- Dynamic PPR for non-Chipkill DIMMs
- BMC MCA Crash-Dump
- MCA over APML

SP5 PLATFORM

- BIOS Update Required (Dual-BIOS)
- 2P and 1P Configurations
- Up to 4 links of 32Gbps Gen 3 Infinity Fabric
- Compatible with Genoa IRM Groups <=400W
- Option for 500W IRM group with improved power and cooling solutions
- Flexible topology options
- Server Controller Hub (USB, UART, SPI, I2C, etc.)



MEMORY

- 12 channel DDR5 with ECC up to 5600 MT/s
- Support for 2, 4, 6, 8, 10, 12 channel memory interleaving
- RDIMM, 3DS RDIMM, MRDIMM (1:1)**
- Up to 2 DIMMs/channel capacity of 9TB/socket (384GB 3DSDIMMs)

I/O

- 2P: 160 lanes of PCIe Gen5 with speeds up to 32Gbps/lane up to 12 bonus PCIe Gen3 lanes
- 1P: 128 lanes of PCIe Gen5 with speeds up to 32Gbps/lane up to 8 bonus PCIe Gen3 lanes
- PCIe bifurcations supported: x16, x8, x4, x2 and x1
- PCIe link encryption, PCIe hotplug port reconfiguration
- CXL2.0, 4 x16 Capable “P” links; Type 3, Type 1&2*
- Up to 32 IO lanes for SATA
- SDCl (Smart Data Cache Injection)
- SDXI (Smart Data Accelerator Interface)
- QoS

SECURITY

- Secure IO (SEV-TIO)
- Dedicated Security Subsystem with enhancements (ASP)
- Hardware Root-of-Trust

*CXL Type 1 & 2 device support dependent on ecosystem readiness

** MRDIMM target 1st enablement on PC samples, pending ecosystem enablement, with 1DPC support at 5600MT/s and not supported on 2DPC.



AMD EPYC™ 9005 Serie Prozessoren

	Verbesserte Core-Dichte
	Energie-Effizienz
	Breiter CPU-Stack

Cores	AMD EPYC	CCD (Zen5/Zen5c)	Base/Boost (bis zu GHz)	Default TDP (W)	L3 Cache (MB)	Price (1 KU, USD)
192 cores	9965	"Zen5c"	2.25 / 3.7	500W	384	\$14,813
160 cores	9845	"Zen5c"	2.1 / 3.7	390W	320	\$13,564
144 cores	9825	"Zen5c"	2.2 / 3.7	390W	384	\$13,006
128 cores	9755	"Zen5"	2.7 / 4.1	500W	512	\$12,984
	9745	"Zen5c"	2.4 / 3.7	400W	256	\$12,141
96 cores	9655	"Zen5"	2.6 / 4.5	400W	384	\$11,852
	9655P	"Zen5"	2.6 / 4.5	400W	384	\$10,811
	9645*	"Zen5c"	2.3 / 3.7	320W	256	\$11,048
72 cores	9565*	"Zen5"	3.15 / 4.3	400W	384	\$10,486
64 cores	9575F	"Zen5"	3.3 / 5.0	400W	256	\$11,791
	9555	"Zen5"	3.2 / 4.4	360W	256	\$9,826
	9555P	"Zen5"	3.2 / 4.4	360W	256	\$7,983
	9535*	"Zen5"	2.4 / 4.3	300W	256	\$8,992
48 cores	9475F	"Zen5"	3.65 / 4.8	400W	256	\$7,592
	9455*	"Zen5"	3.15 / 4.4	300W	256	\$5,412
	9455P	"Zen5"	3.15 / 4.4	300W	256	\$4,819
36 cores	9365*	"Zen5"	3.4 / 4.3	300W	192	\$4,341
32 cores	9375F	"Zen5"	3.8 / 4.8	320W	256	\$5,306
	9355	"Zen5"	3.55 / 4.4	280W	256	\$3,694
	9355P*	"Zen5"	3.55 / 4.4	280W	256	\$2,998
	9335	"Zen5"	3.0 / 4.4	210W	128	\$3,178
24 cores	9275F	"Zen5"	4.1 / 4.8	320W	256	\$3,439
	9255	"Zen5"	3.25 / 4.3	200W	128	\$2,495
16 cores	9175F	"Zen5"	4.2 / 5.0	320W	512	\$4,256
	9135	"Zen5"	3.65 / 4.3	200W	64	\$1,214
	9115	"Zen5"	2.6 / 4.1	125W	64	\$726
8 cores	9015	"Zen5"	3.6 / 4.1	125W	64	\$527

RTS 11/2024 / HF CPUs / * Not PoR

DELLTechnologies



E3 Formfaktoren für SSDs

*Alle Formfaktoren können ein
x4, x8, x16 oder x16 Interface
nutzen*

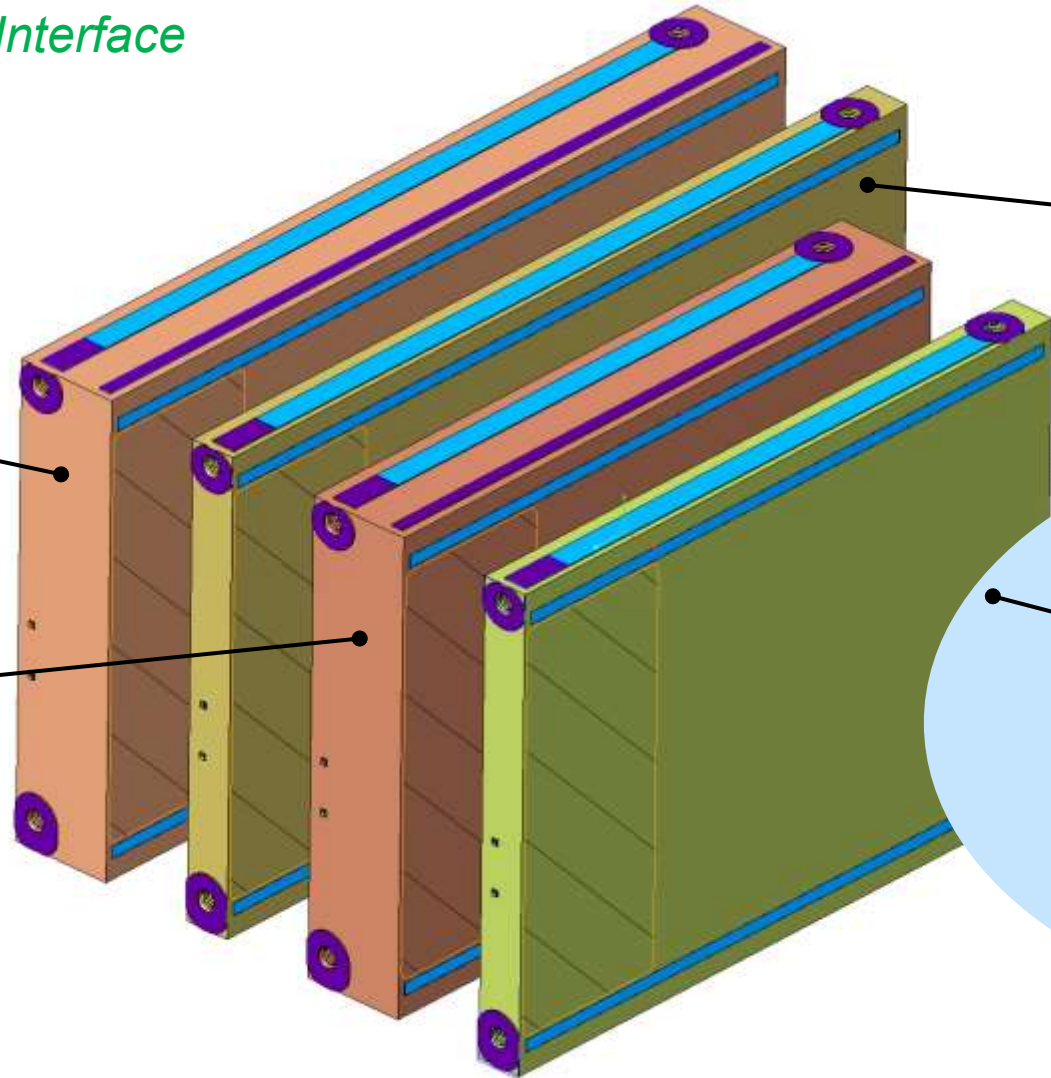
High Power Devices

E3.L 2T - 70 W

- NICs
- Higher End Accelerator
- Computational Storage

E3.S 2T - 40 W

- Hochkapazitives NAND
- Higher End SCM/PM (Memory Device)
- Mid-Range Accelerator
- Computational Storage



Storage Devices

E3.L (long) - 40 W

- Größte Kapazität NAND / SCM (Block Storage Device)
- Dense und Storage optimierte Chassis

16G PowerEdge

E3.S 1T (short) - 25 W

- 1 HE & 2 HE Performance NAND Storage
- Standardmarkt für SCM/PM (Memory Device)
- Modulare und kurze Chassis

EDSFF E3.S

Höhere Performance

Supports PCIe Gen 5; 100 % Verbesserung bei Sequential Reads, 62 % bei Sequential Writes, 60 % bei Random Reads und 33 % bei Random Writes – verglichen mit PCIe Gen4

Bessere Storage Dichte

Gesamtkapazität wächst auf (mit 15,36 TB):

	15G	%Δ	16G	%Δ	17G
1 HE	154 TB	+6 0%	245 TB	+25 %	307 TB
2 HE	368 TB	+33 %	491 TB	+25 %	614 TB

Verbesserte Thermik

- Die Lüftung im Server wird durch die dünneren Medien verbessert

EDSFF E3.S 1T - Ein Formfaktor optimiert für SSDs und die Zukunft von SSD Server Storage

- EDSFF ist eine Familie von Formfaktoren, optimiert für Storage Devices, entwickelt für Interfaces mit höheren Frequenzen wie PCIe Gen5 und Gen6
- PowerEdge wird weiter den E3.S 1T Formfaktor nutzen und ist die Methode für PCIe Gen5 Geschwindigkeit bei NVMe SSDs in 16G & 17G
- E3.S 1T ist ungefähr halb so dick wie eine 2,5" SSD mit Vorteilen bei Dichte, Thermik und bessere Designs bei Servern mit beengtem Platz
- E3.S 1T SSDs haben die gleichen Eigenschaften wie 2,5" SSDs
- Dell erweitert permanent das E3.S 1T PowerEdge Portfolio. Mit 17G kommt eine Data Center Klasse hinzu, zusätzlich zu Enterprise Medien



BOSS N1 für 17G Server

- Plan-RTS: Juli CY'24
- Boot Optimized Storage Solution (BOSS) nutzt 1 oder 2 M.2 Devices für das OS, alle anderen Medien sind für Nutzdaten verfügbar
- Neuer Formfaktor für den Einbau im Server

- BOSS N1 für 17G nutzt den 16G BOSS Chip Marvell NevoX mit einigen neuen Features und einem neuen Formfaktor:
 - Root of Trust – Authentifiziert die Firmware und das BIOS
 - “Flatbread” Formfaktor – BOSS-N1 „Flatbread“ unterstützt das DC-MHS modulare Design
- Key Features:
 - Nur UEFI Boot
 - Secure Firmware Updates
 - Marvell NevoX chip
 - 480 GB und 960GB M.2 2280 NVMe zum Start
 - LKM und SEKM Support für SED und FIPS M.2 NVMe
 - SMCU Root of Trust
 - Support für HW RAID1 und RAID0
 - Hot-Plug Service
 - DC-MHS Modularität

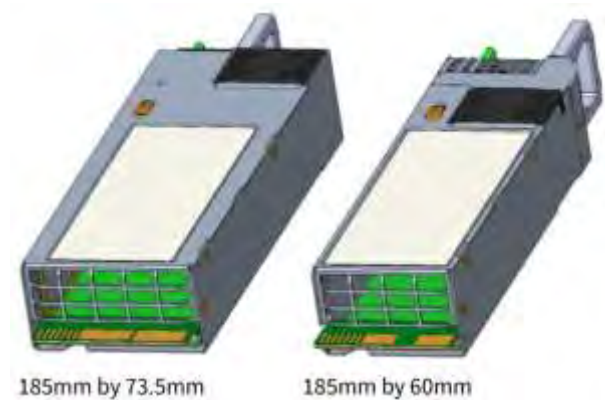


M-CRPS PSU

- Plan-RTS: Juli 2024
 - 1500 W Titanium
 - 1100 W Platinum
 - 800 W Platinum
- Spätere Kapazitäten:
 - 3200 W Titanium
 - 1100 W Titanium
 - 800 W Titanium
 - 1500 W 277Vac
 - 2400 W Titanium
 - 1400 W -48Vdc

M-CRPS PSUs, ein neuer Formfaktor für Server-Netzteile

- M-CRPS Netzteile sind ein Teil des DC-MHS Projektes und werden in 2 Formfaktoren auf den Markt kommen: 73,5 mm und 60 mm (Breite), beziehungsweise 30 % oder 18 % Kleiner als die jeweiligen 15G/16G Netzteile:



- Online Firmware Update – kein Stromlos setzen nötig
- Signierte Firmware Images (Firmware Security)

Netzteil Formfaktoren



Generation	14G			15G & 16G		17G+ M-CRPS (DC-MHS Plattformen)	
Maße (Breite x Länge)	51,3 mm x 240 mm	86 mm x 198 mm	70 mm x 498 mm	60 mm x 220 mm	86 mm x 220 mm	60 mm x 185 mm	73,5 mm x 185 mm
Unterstützte Plattformen	R340, R440, R6515, XR2	Mainstream, 4S, R7515, C6400	MX7000	Mainstream, Telco/Edge	R7, 4S, C6600, XE	1 HE & 2 HE DC-MHS	2 HE DC-MHS

M-CRPS = **M**odular Hardware System **C**ommon **R**edundant **P**ower **S**upply



Platinum und Titanium Effizienz

- Die beste Effizienz (96,3 %) ist bei einer Last von 40 %
- Die Effizienz wird schlechter bei niedrigerer oder höherer Last

PSU Load	5%	10%	15%	20%	25%	30%	40%	50%	60%	70%	80%	90%	100%
Power efficiency (measured)	87.3%	93.8%	95.1%	95.7%	96.0%	96.2%	96.3%	96.2%	96.0%	95.6%	95.2%	94.8%	94.4%
800W PSU load	40W	80W	120W	160W	200W	240W	320W	400W	480W	560W	640W	720W	800W
1100W PSU load	55W	110W	165W	220W	275W	330W	440W	550W	660W	770W	880W	990W	1100W
1500W PSU load	75W	150W	225W	300W	375W	450W	600W	750W	900W	1050W	1200W	1350W	1500W
1800W PSU load	90W	180W	270W	360W	450W	540W	720W	900W	1080W	1260W	1440W	1620W	1800W
2400W PSU load	120W	240W	360W	480W	600W	720W	960W	1200W	1440W	1680W	1920W	2160W	2400W
3200W PSU load	160W	320W	480W	640W	800W	960W	1280W	1600W	1920W	2240W	2560W	2880W	3200W

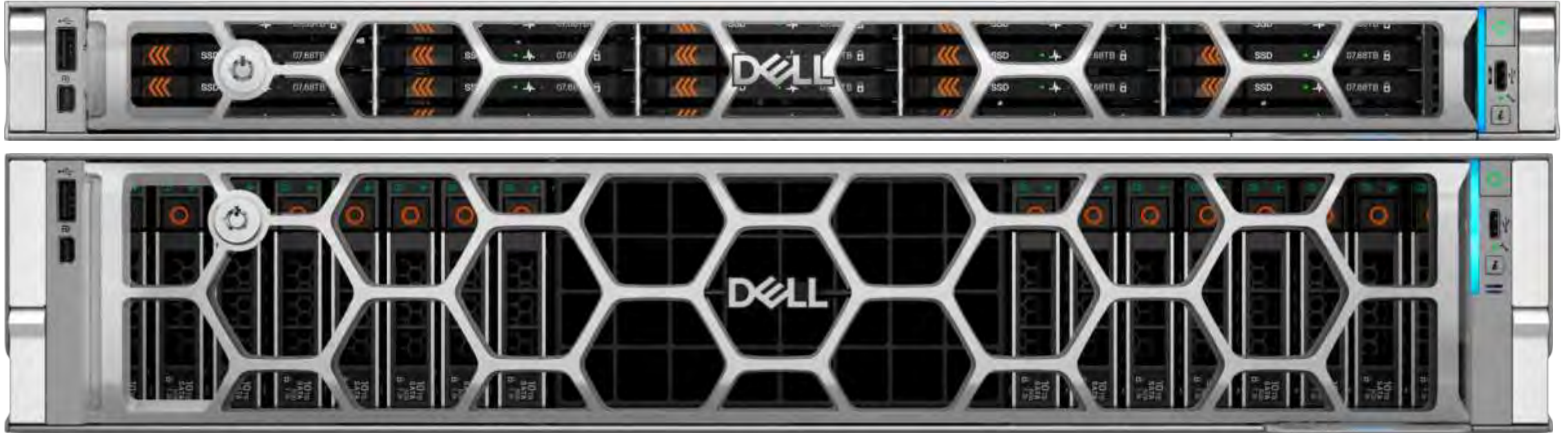
- 1500 W PSU ist bei ~600 W am effizientesten
- 1800 W PSU ist bei ~720 W am effizientesten
- 2400 W PSU ist bei ~960 W am effizientesten

Connector-Typen Wechselstrom



Connector	C13/C14	C15/C16	C19/C20	C21/C22
Unterstützte Spannung	Bis zu 240 VAC		Bis zu 240 VAC	
Unterstützte Leistung	Unter 2000 W		2000 W und mehr	
Erlaubte Temperatur	Bis zu 70° C	Bis zu 120° C	Bis zu 70° C	Bis zu 155° C

PowerEdge 17G Front Bezel Design



PowerEdge 17G Front Design



Linkes Control Panel

- Leer (Default)
- KVM-Modul (Mini DP und USB Typ A (Optional)
- QuickSync Modul (Optional)

Rechtes Control Panel

- Stromschalter
- USB Typ-C Dual-Mode Host oder iDRAC Direct und Modus Indikator
- Status Lightbar
- Lufteinlass für Temperatur-Sensor

Dell PowerEdge Server Portfolio



Tower Server



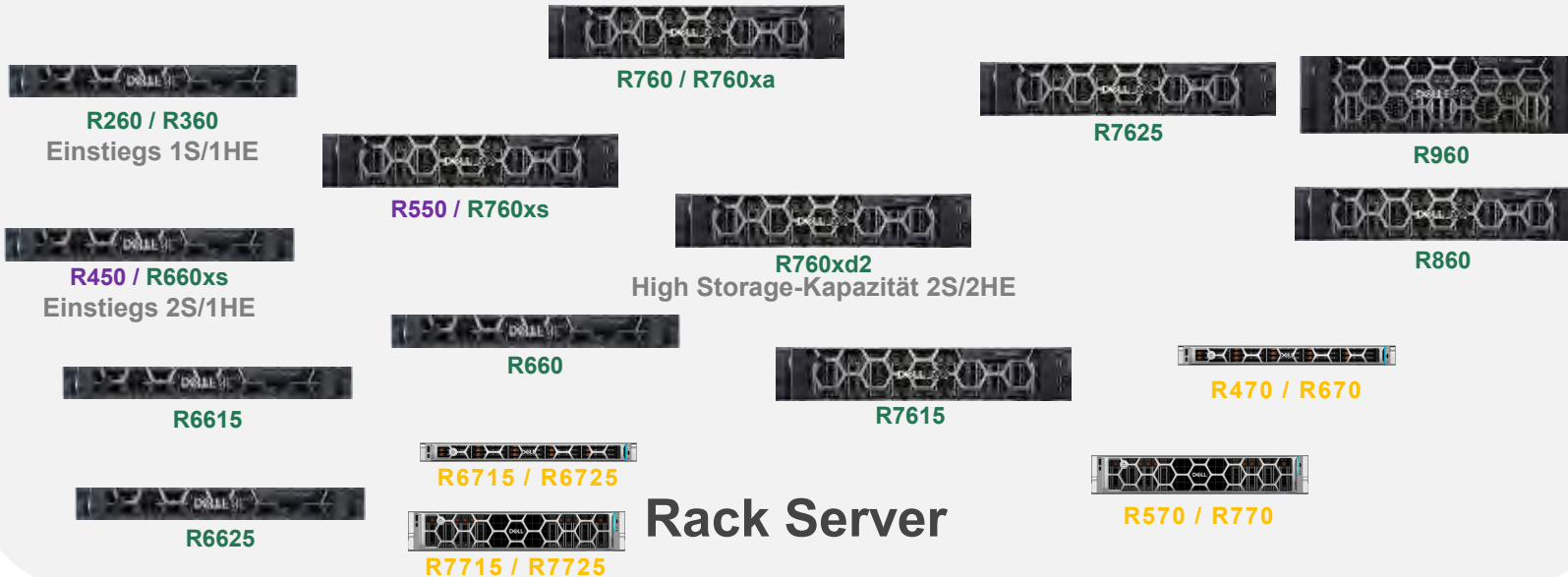
MX7000 mit
MX760c

Modulare Infrastruktur

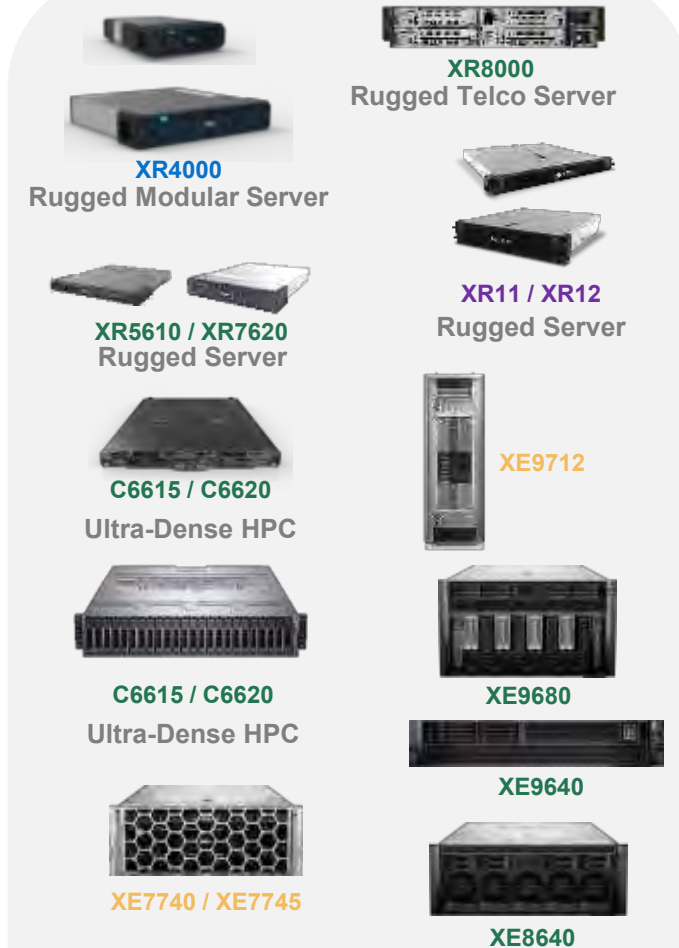


S5408/S5416
8 bis 16S Server
SAP Fokus

SAP



Rack Server



Spezialisierte Server

Farblegende: 14G / 15G / 16G / 17G

PowerEdge .next AMD- basierte Plattformen

- iDRAC10, schnelleres / neues RAM, IO
- Unser Eco-System der Zukunft (DLC-Lösungen, GPU, DPU, Storage, Memory)
- Support für CXL 2.0
- Gestaffelter Start, volles Portfolio im Q2 2025

Höchste Leistung, mehr Cores, schnelleres Memory & I/O

Ein Sockel

PowerEdge R6715

- 1x AMD Turin CPU, bis zu 160 Cores
- 2 DPC mit bis zu 24x DDR5 @ 5200 MT/s
- 3,5"/2,5"/E3.S Medien (bis zu 20x)
- 100% Gen5 I/O, Dual OCP in den meisten Configs



PowerEdge R7715

- 1x AMD Turin CPU, bis zu 160 Cores
- 2 DPC mit bis zu 24x DDR5 @ 5200 MT/s
- 3,5"/2,5"/E3.S Medien (bis zu 40x)
- 100% Gen5 I/O, Dual OCP in den meisten Configs



Zwei Sockel

PowerEdge R6725

- 2x AMD Turin CPUs, bis zu 192 Cores
- 1 DPC mit bis zu 24x DDR5 RDIMMs @6000MT/s
- 3,5"/2,5"/E3.S Medien (bis zu 20x)
- 100% Gen5 I/O, Dual OCP in den meisten Configs



PowerEdge R7725

- 2x AMD Turin CPUs, bis zu 192 Cores
- 1 DPC mit bis zu 24x DDR5 RDIMMs @6000MT/s
- 3,5"/2,5"/E3.S Medien (bis zu 40x)
- 100% Gen5 I/O, Dual OCP in den meisten Configs



PowerEdge R6715

Kompakter 1 HE Server mit 1 CPU und der Leistung eines traditionellen 2 Sockel Servers



Workloads

- Virtualisierung
- HCI
- Remote Site Server

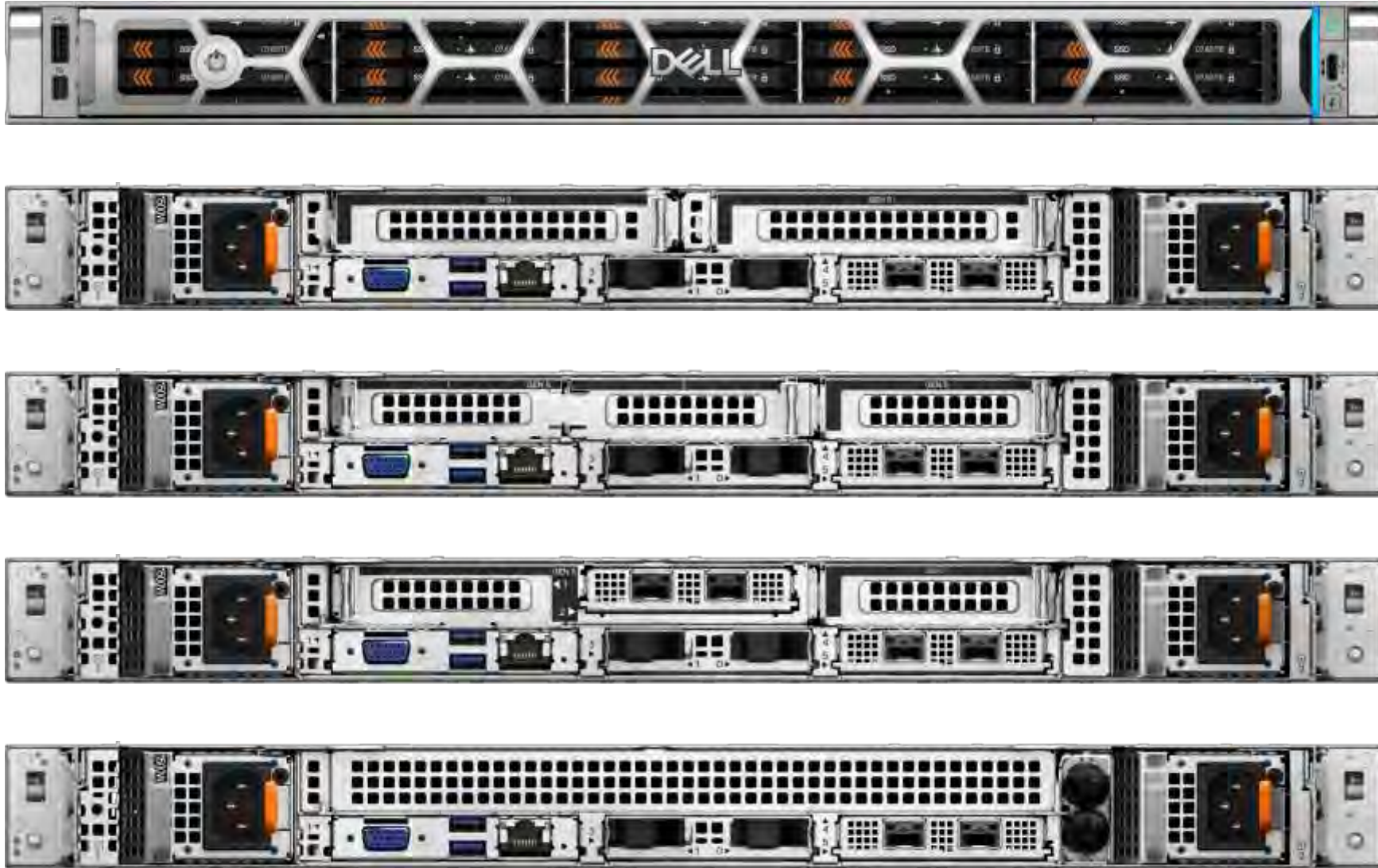
Key Features

- Bis zu 20 E.3S NVMe SSDs oder 10 2,5" Medien
- BOSS-N1 hot-plug boot Device, OCP3 Netzwerkkarte
- Bis zu 160 Cores, ZEN5 Architektur
- 24 DIMM Steckplätze, bis zu 3 TB DDR5 RAM
- Umfangreiches Management und Scripting Support für iDRAC10 mit Lifecycle Controller und Redfish API

HIGHLIGHTS

- 20 Direct Connect E3.S NVMe
- 24 DDR5 DIMM Sockel
- Optionale DLC-Kühlung
- Umfangreiches Dell System Management
- Basis für verschiedene Appliances

PowerEdge R6715 Front- und Rückansichten



PowerEdge R7715

Leistungsfähiger 2 HE Server mit 1 CPU und der Leistung eines traditionellen 2 Sockel Servers



Workloads

- Software Defined Storage Knoten
- Virtualisierung
- Data Analytics

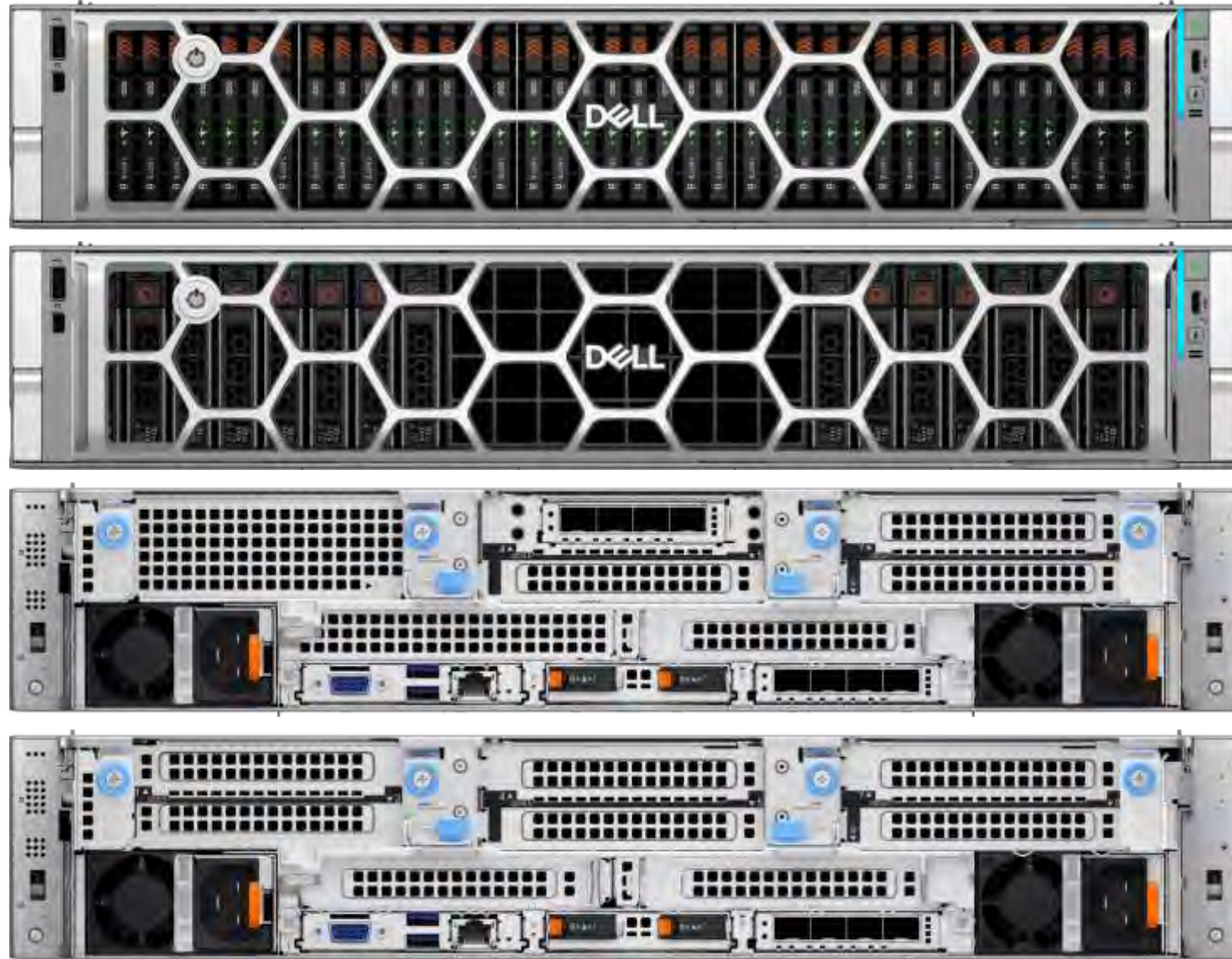
Key Features

- Bis zu 40 E.3S NVMe SSDs oder 24 2,5" Medien
- BOSS-N1 hot-plug boot Device, OCP3 Netzwerkkarte
- Bis zu 160 Cores, ZEN5 Architektur
- 24 DIMM Steckplätze, bis zu 6 TB DDR5 RAM
- Bis zu 3 DW oder 6 SW GPUs
- Umfangreiches Management und Scripting Support für iDRAC10 mit Lifecycle Controller und Redfish API

HIGHLIGHTS

- 40 Direct Connect E3.S NVMe
- 24 DDR5 DIMM Sockel
- Optionale DLC-Kühlung
- Umfangreiches Dell System Management
- Basis für verschiedene Appliances

PowerEdge R7715 Front- und Rückansichten



PowerEdge R6725

Leistungstarker 2 Sockel/1 HE Server, maximale Performance im kompakten Gehäuse



Workloads

- HPC
- Virtualisierung
- VDI Cloud Client Computing
- Applikationsserver

Key Features

- Bis zu 20 E3.S NVMe SSDs oder 10 2,5" Medien
- Bis zu 192 Cores pro CPU mit AMD ZEN5 Architektur
- 24 DIMMs für bis zu 3 TB DDR5 Memory
- BOSS-N1 hot-plug boot Device, OCP3 Netzwerkkarte
- Umfangreiches Management und Scripting Support für iDRAC10 mit Lifecycle Controller und Redfish API

HIGHLIGHTS

- Optionale Flüssigkeitskühlung der CPUs, damit volles Portfolio in einer HE
- 20 Direct Connect E3.S NVMe Medien
- Bis zu 3 GPUs zur Performancesteigerung
- Bis zu 3 TB Memory für Virtualisierung

PowerEdge R7725

Universeller 2 Sockel/2 HE Server mit hoher Speicher- und I/O-Leistung, maximale Anzahl an Cores



Workloads

- HPC
- VDI Cloud Client Computing
- Datenbanken/In-Line Analytics
- Scale-Up Software Defined Umgebungen

Key Features

- Bis zu 40 E3.S NVMe SSDs oder 24 2,5“ oder 12 3,5“ Medien
- Bis zu 192 Cores pro CPU mit AMD ZEN5 Architektur
- 24 DIMMs für bis zu 6 TB DDR5 Memory
- BOSS-N1 hot-plug boot Device, OCP3 Netzwerkkarte
- Umfangreiches Management und Scripting Support für iDRAC10 mit Lifecycle Controller und Redfish API

HIGHLIGHTS

- 40 Direct Connect E3.S NVMe
- Bis zu 2 DW oder 6 SW GPU
- Bis zu 6 TB Memory für BI und Virtualisierung
- iDRAC10 mit umfangreichen Features

PowerEdge .next Xeon 6 Plattformen

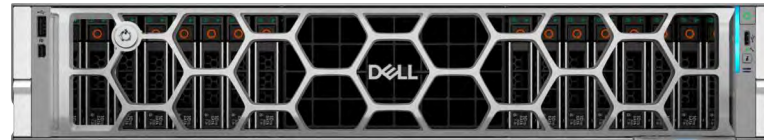
- CSP Edition startet am 24. Juli mit E-Core CPUs und OSM 3.0
- Weitere Configs kommen im Q4 2024 & Q1/Q2 2025
- Technologie Eco-System für mit E-Core & P-Core CPUs, DLC, GPU, DPU, E3 Storage & DDR5-6400
- Advanced Management mit iDRAC 10 und OSM 3.0
- CXL 2.0 Support

Umfangreiches Portfolio für alle Kundenanforderungen

Maximale Performance



R670
2S / 2 DPC / 1 HE

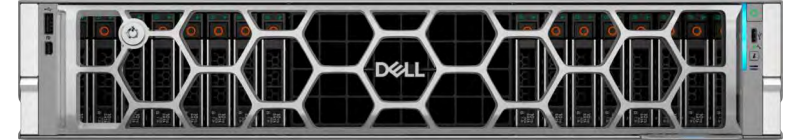


R770
2S / 2 DPC / 2 HE

1S Optimiert



R470
1S / 2 DPC / 1 HE



R570
1S / 2 DPC / 2 HE

Next-gen Features

Xeon SP 6 E-Core und P-Core Prozessoren

Kaltgang Support

OSM 3.0 und iDRAC10* mit erweitertem Funktionsumfang

Industrie-Standard Firmware

DC-MHS Compliant

*CSP Edition mit OSM verfügbar ab Juli 24 und die Mainstream Edition mit iDRAC folgt im H1 2025

PowerEdge R670

Dell PowerEdge R670 (1HE / 2S)

Optimiert für Cloud Service Provider

- **Next-Gen Intel Xeon 6 Processor:**
 - 2 Sockel **E-Core & P-Core** mit max. TDP
- Bis zu 32x RDIMMs
- Bis zu **6400 MT/s DDR5**



I/O

- 2x PCIe FHHL (Gen5 x16) & 2x OCP 3.0 (Gen5 x16)
- **Erweitertes Channel FW Portfolio**

System Management

- Open Server Manager und iDRAC (Zukunft)

Kaltgang Support

- Einfaches Deployment und Service via Kaltgang
 - 2x PCIe FHHL (Gen5 x16) oder 2x OCP 3.0 (Gen5 x16)
 - 8x E3.S NVMe
 - Front Video, Serial, BOSS, iDRAC Direct, mgt LAN

Flexible Storage

- 8x E3.S (Gen5 x4)
- BOSS-N1

Verbesserungen in **Fett**

PowerEdge R770

Universeller 2 Sockel 2 HE Server für alle anfallenden Aufgaben im Data Center und modernster Technologie



Workloads

- VDI: GPU und Storage Optionen
- AI/Machine Learning: Accelerator Karten Support
- Private Cloud: Optimierte Performance

Key Features

- Intel Xeon Scalable Family 6. Generation CPUs
- 32 DIMM DDR5 Sockel mit bis zu 8 TB RAM
- Bis zu 32x E3.S NVMe SSDs oder 24x 2,5" Medien
- Optional GPUs und DPUs zur Leistungssteigerung
- Bis zu 8 PCIe Slots Gen5 und 1x OCP3
- iDRAC10 System Management

HIGHLIGHTS

- Bis zu 32 E3.S oder 24 2,5" Medien in der Front
- Aktuelle Intel Xeon SP 6. Generation CPUs
- 32x DDR5 DIMMs bis zu 8 TB
- Hot-Plug BOSS-N1 Boot Device

PowerEdge R470

Leistungsfähiger 1 Sockel Server mit Intel Xeon 6 CPUs und hoher I/O Leistung



Workloads

- Virtualisierung
- HCI
- Remote Site Server

Key Features

- Eine Intel Xeon Scalable Family 6. Generation CPU
- 16 DIMM DDR5 Sockel mit bis zu 4 TB RAM
- Bis zu 16x E3.S NVMe SSDs oder 10x 2,5" Medien
- Single-Width GPUs zur Performancesteigerung
- Bis zu 3 PCIe Slots Gen5/Gen4 und 1x OCP3
- iDRAC10 System Management

HIGHLIGHTS

- Bis zu 16 E3.S oder 10 2,5" Medien in der Front
- Aktuelle Intel Xeon SP 6. Generation CPUs
- 16x DDR5 DIMMs
- Hot-Plug BOSS-N1 Boot Device

PowerEdge R570

Universeller 1 Sockel 2 HE Server mit beeindruckender Flexibilität und Leistung



Workloads

- VDI: GPU und Storage Optionen
- AI/Machine Learning: Accelerator Karten Support
- Private Cloud: Optimierte Performance

Key Features

- Intel Xeon Scalable Family 6. Generation CPUs
- 16 DIMM DDR5 Sockel mit bis zu 4 TB RAM
- Bis zu 32x E3.S NVMe SSDs oder 24x 2,5" Medien
- Optional GPUs und DPUs zur Leistungssteigerung
- Bis zu 7 PCIe Slots Gen5 und 1x OCP3
- iDRAC10 System Management

HIGHLIGHTS

- Bis zu 32 E3.S oder 24 2,5" Medien in der Front
- Aktuelle Intel Xeon SP 6. Generation CPUs
- 16x DDR5 DIMMs bis zu 4 TB
- Hot-Plug BOSS-N1 Boot Device

PowerEdge XE7740

AMD RTS: 03/2025

Intel RTS: ~ 05/2025

XE774x wird ein breites Portfolio von GPUs in einem luftgekühltem x86 Server Chassis supporten

Flexibler PCIe basierter GPU-Server

2 Sockel Server

- PowerEdge 17G Mainboard
- Intel Granite Rapids CPUs

GPU Optimierte

- Bis zu 8x DW GPUs (600 W)
- Bis zu 16x SW GPUs
- Verschiedene Hersteller



Flexibles I/O

- Bis zu 8x PCIe Gen5 Slots
- 1x OCP 3.0 Slot

Support für bis zu 8 Medien

Nur NVMe Direct Attach

Modernes Memory

- 32x DDR5 DIMMs

- 4 HE Server für PCIe GPUs
- Support für x86 AMD CPUs
- PCIe NIC Ethernet und InfiniBand Networking
- Entwickelt für luftgekühlte Data Center und niedrig bis mittlere PpR (5-40 kW)
- Bis zu 8x High Power DW GPUs oder 16x SW GPUs
- Ein oder zwei 4fach NVLINK Sets

PowerEdge XE9680L

Plan-RTS: ~ 02/2025

Wassergekühlter (DLC)
GPU-Server mit 8fach
SXM5 Block H200 oder
B200

Kompakter flüssigkeitsgekühlter GPU-Server

2 Sockel Server

- PowerEdge 16G Mainboard
- Intel Emerald Rapids CPUs

GPU Optimierte

- 8x SXM5 GPU Block

Flexibles I/O

- Bis zu 12x PCIe Slots
- 1x OCP 3.0 Slot

Support für bis zu 8 Medien

Nur NVMe Direct Attach

Modernes Memory

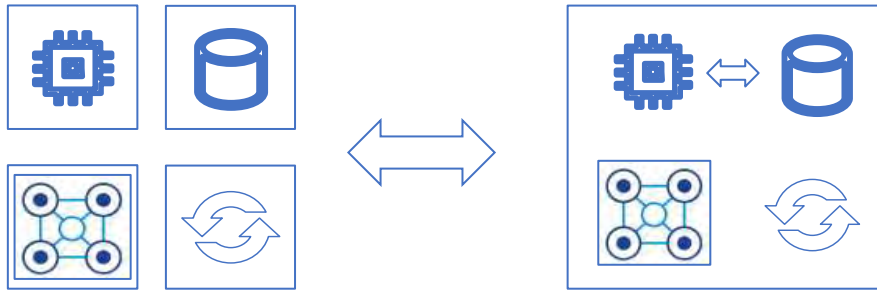
- 32x DDR5 DIMMs

- 4 HE Server für SXM Block mit H200 und B200 GPUs
- DLC-Kühlung für CPUs und GPUs
- PCIe NIC Ethernet und InfiniBand Networking
- 6x 3000 Watt PSUs

PowerClub – Agenda



LiveOptics: Erfassung und Analyse der Anforderungen

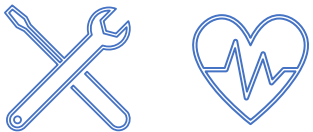


Produkte: Aktuelles von PowerEdge und Powerstore

Technologie: Intel, AMD, Nvidia,...

Virtualisierung: Server/Storage versus Hyper-Converged

Vergleich: VMWare, Hyper-V, Azure Local, Virtuozzo, Proxmox,...



Administration
Life Cycle Management
Support



Backup & Restore
DataDomain und PowerProtect



Cyber Security

AGENDA



- 09:00 – 09:45 Agenda / LiveOptics / Demo Setup
- 09:45 – 10:00 Pause
- 10:00 – 10:45 PowerEdge Server
- 10:45 – 11:00 Pause
- 11:00 – 11:30 Systemadministration am Beispiel Vsphere
- 11:30 – 12:00 Virtualisierung im Vergleich (Azure Local, Nutanix)
- 12:00 – 13:00 Mittagessen
- 13:00 – 13:45 Virtualisierung im Vergleich (Virtuozzo, Proxmox, Openshift)
- 13:45 – 14:00 Pause
- 14:00 – 14:45 Powerstore
- 14:45 – 15:00 Pause
- 15:00 – 15:45 Data Protection
- 15:45 – 16:00 kommerzieller Vergleich

PowerEdge Management Portfolio

iDRAC

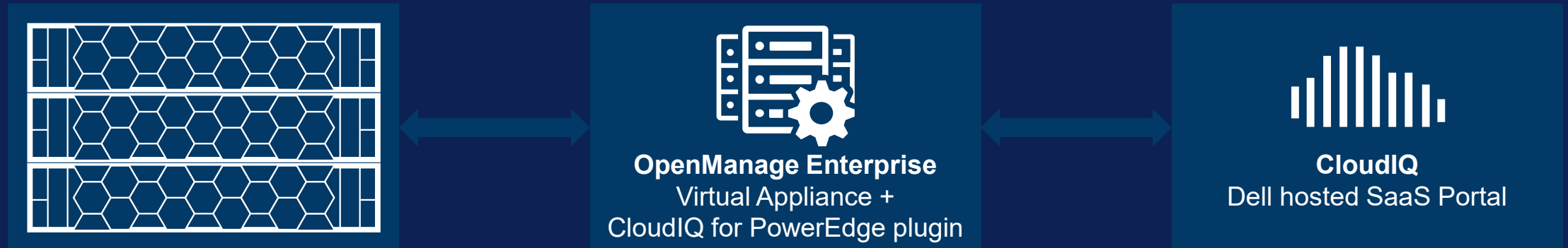
One-to-one out-of-band Baseboard Management Controller on each PowerEdge server.

OpenManage Enterprise

One-to-many on-premises systems management and automation.
Aggregator for CloudIQ data

CloudIQ

A single pain of glass for providing AIOps analytics, recommendations, Cybersecurity policies and management for globally connected Dell infrastructure.



iDRAC

Integrated Dell Remote Access Controller

iDRAC10

Neuer Chip

4 Core 1 GHz Prozessor
vs. 2 Core 800 MHz Prozessor bei
iDRAC9

64 bit Architektur
vs. 32 bit bei iDRAC9

16 GB eMMC Flash Storage
vs. 8 GB bei iDRAC9

2 GB ECC Memory
vs. 1 GB bei iDRAC9

NEON FPUs für integriertes AI

Höhere Security mit dediziertem TIP

Verbesserte Security
Performance

Integrierte Root-of-Trust
(RoT), Device-Level
Attestation & Encryption

Stärkere Verschlüsselungs-
Algorithmen

Verbessertes User Interface

Konsistent über alle Dell
Technologies Konsolen

Optimiertes Interface

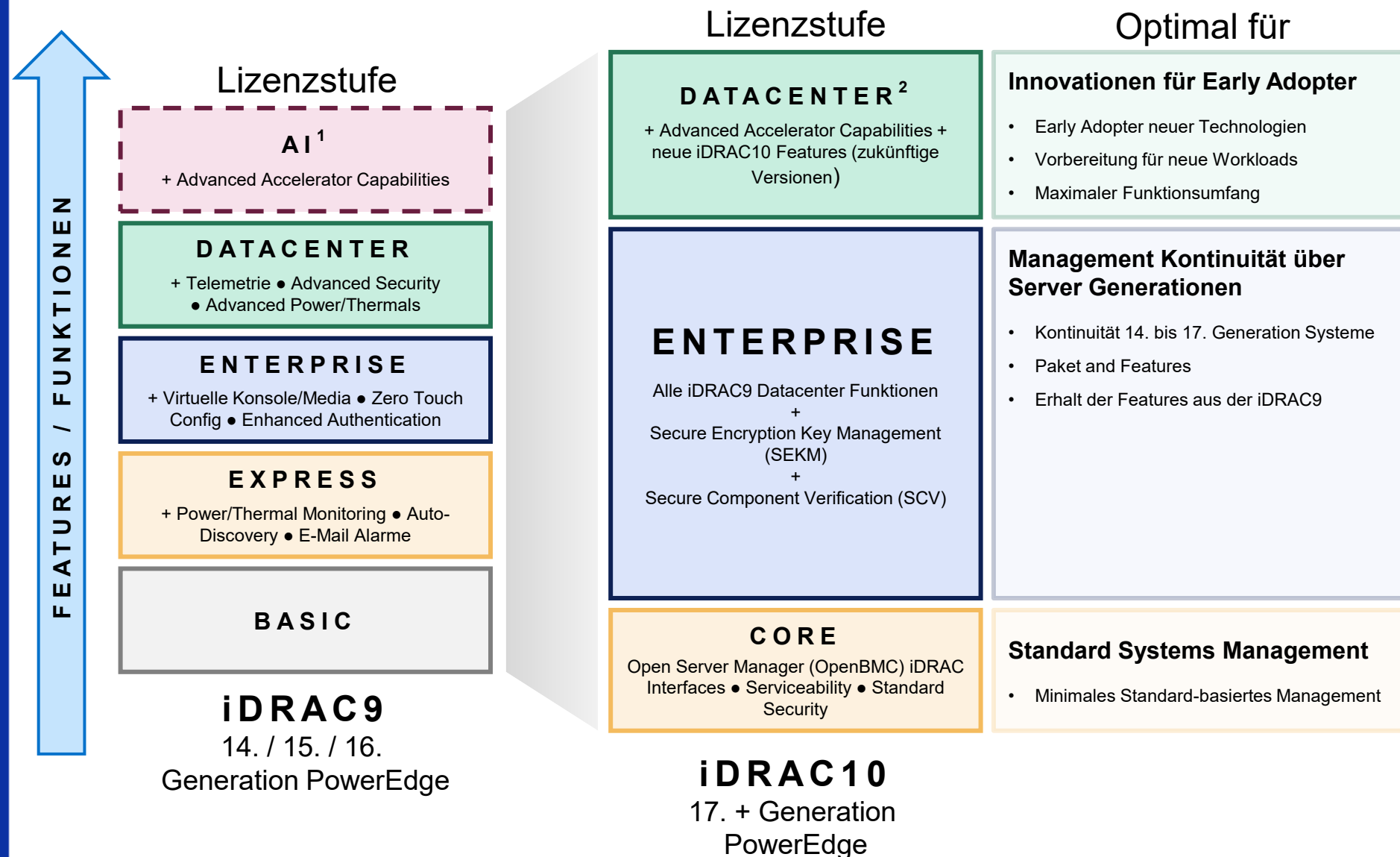
Einfachere Navigation

iDRAC9 zu iDRAC10 Lizenz- Vergleich

Vereinfachte
Lizenzierung

Drei Lizenz-Stufen nach
Anwendung

Bundles



¹ Not generally available. Offered to select customers on select 16th generation platforms

² Standard on 17th generation accelerated (XE) platforms

iDRAC10 Lizenzstufen

iDRAC10 Core

Open Server Manager (OpenBMC)

+

iDRAC Interface

iDRAC Direct • Quick Sync • Web UI

+

iDRAC Serviceability

Alerts • Asset Tracking • Connection View

Crash Screen / Boot Capture

Device Inventory, Monitoring & Firmware Updates

Health Rollup • Secure Erase • Part Replacement

Virtual NMI • Work Notes

+

iDRAC Security

Device RoT • Intrusion Detection • USB Access Control

+

OpenManage Ecosystem Integration

OpenManage Enterprise Basic • Partial iSM Support

iDRAC10 Enterprise

iDRAC 10 Core

+

iDRAC9 Datacenter Features

2FA/MFA • Advanced Thermal Management
Crash Video Capture • Idle Server Detection
Power/Thermal Control • Remote Syslog • SSO
System Lock Down • Telemetry • Virtual Console
Virtual Media • Zero touch Configuration

+

Secure Enterprise Key Management

+

Secure Component Verification

+

OpenManage Ecosystem Integration

Full iSM Support
OME Advanced / Advanced+ (separate licenses required)

iDRAC10 Datacenter

iDRAC 10 Enterprise

+

Accelerated Features

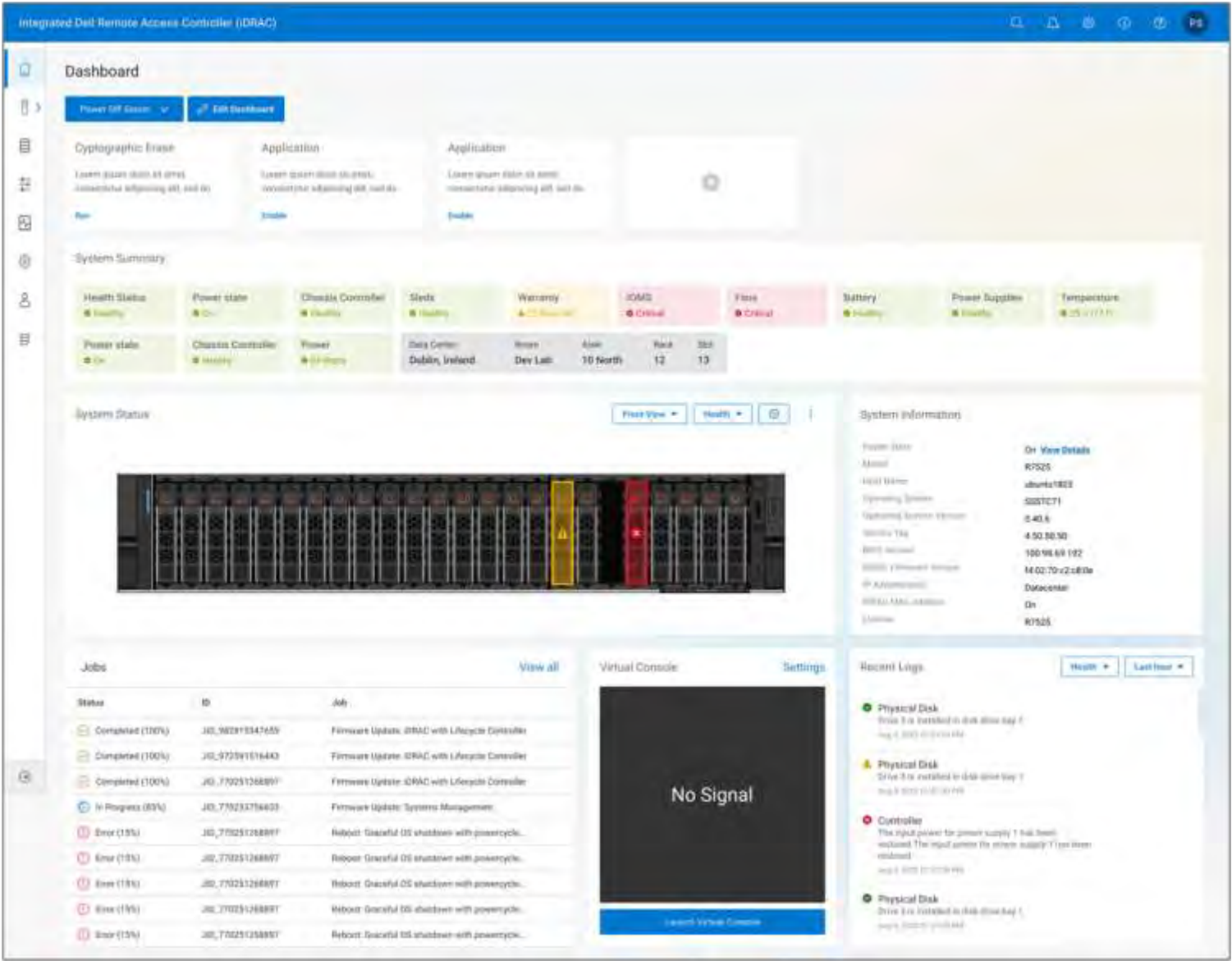
Advanced Power Management
Device-Level Lockdown Mode • DGX Proxy
Discrete GPU Sensor Monitoring
DLC Monitoring & Leak Detection • GPU Telemetry

+

New iDRAC 10 Capabilities

Future Releases

iDRAC10 Screenshot: Dashboard



iDRAC10 Screenshot: Rollen

IDRAC | Datacenter

Search Everything

Dashboard

System

Storage

Security

Configuration

Maintenance

iDRAC Settings

Overview

Connectivity

Services

Users

Settings

/ iDRAC Settings / Users

Local UsersDirectory ServicesRolesSmart CardDefault Password WarningSessionsOpenID

Create Custom RoleDesignEditDeleteSearch

Total: 14

☐	Role	Privileges	Function
☐	Administrator	Login, Configure, Security Configure User, Syste...	Admin
☐	Operator	Login, Configure, Logs, vConsole, vMedia	Operati
☐	Security	Login, Configure, Configure User	Identity
☐	Read Only	Login	Operati
☐	Custom 1	Login, Configure, Configure User	Support
☐	Custom 2	Login, Configure, Configure User	Support
☐	Custom 3	Login, Configure, Configure User	Support

Show: 7 per page

Role Details: Operator

Section Header

ID: S

Role Name: BIOS Admin

Login to iDRAC: Yes

Configure iDRAC: Yes

Configure Users: No

Clear Logs: Yes

Control and Co...: Yes

Access Virtual...: Yes

Access Virtual...: Yes

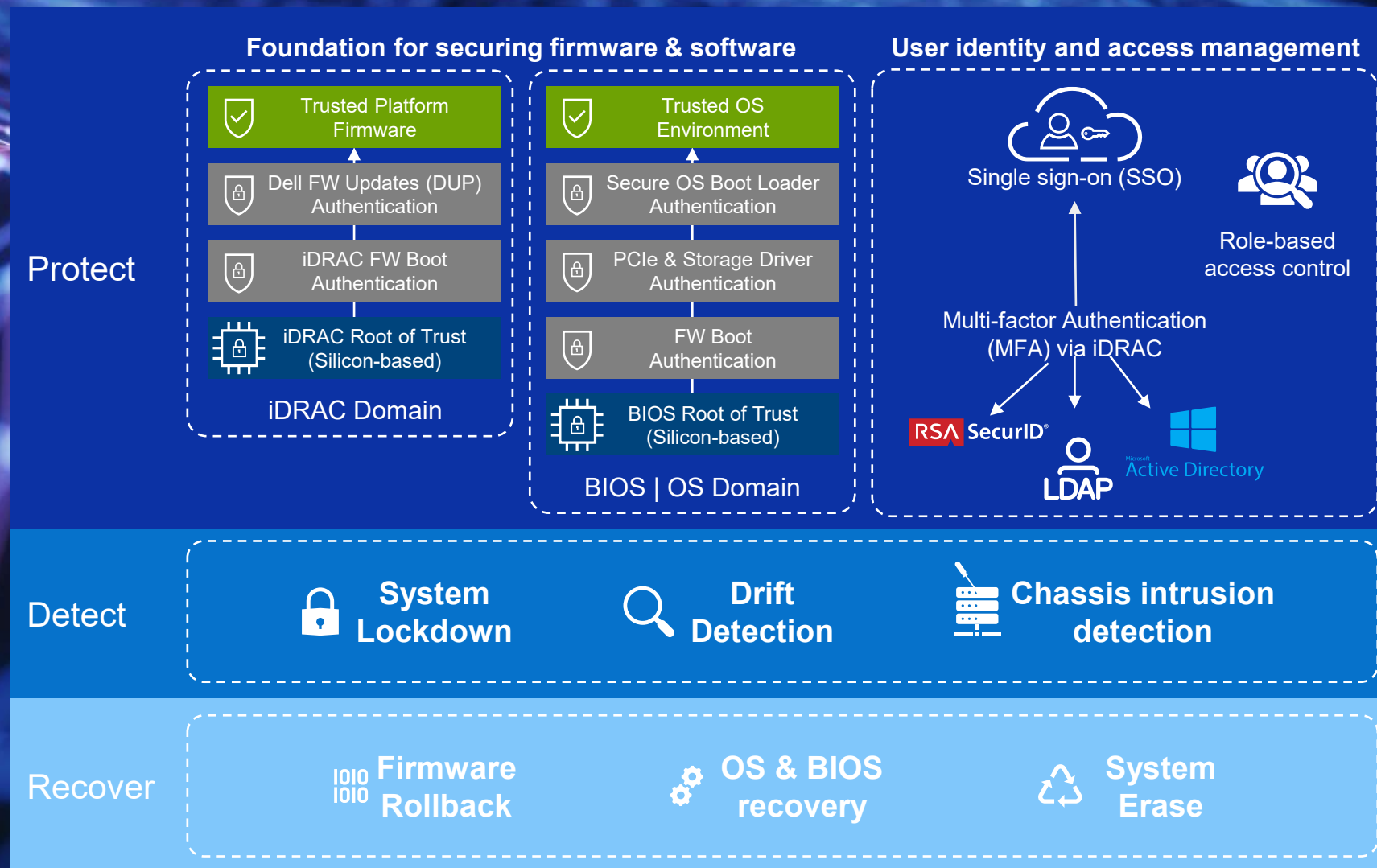
Text Alerts: Yes

Secure By Design

Secure server operations anchored with

- Silicon-based platform Root of Trust
- Multi-factor authentication (MFA)

Meets and exceeds standards in NIST SP800-193 Framework



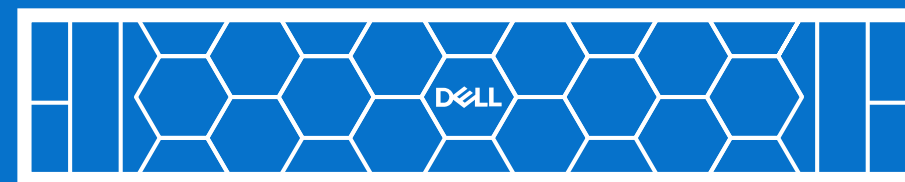
Secure Component Verification

x509 Zertifikat

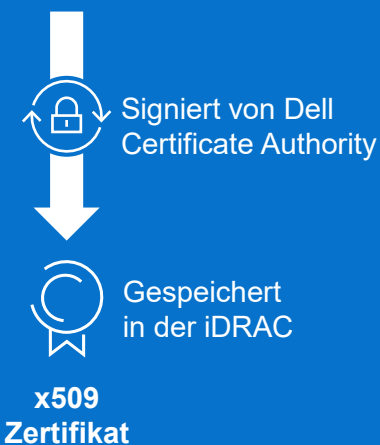
- Angelehnt an Trusted Computing Group (TCG) Platform Zertifikat-Spezifikation

SCV Zertifikate enthalten die Identitäten aller kritischer Komponenten

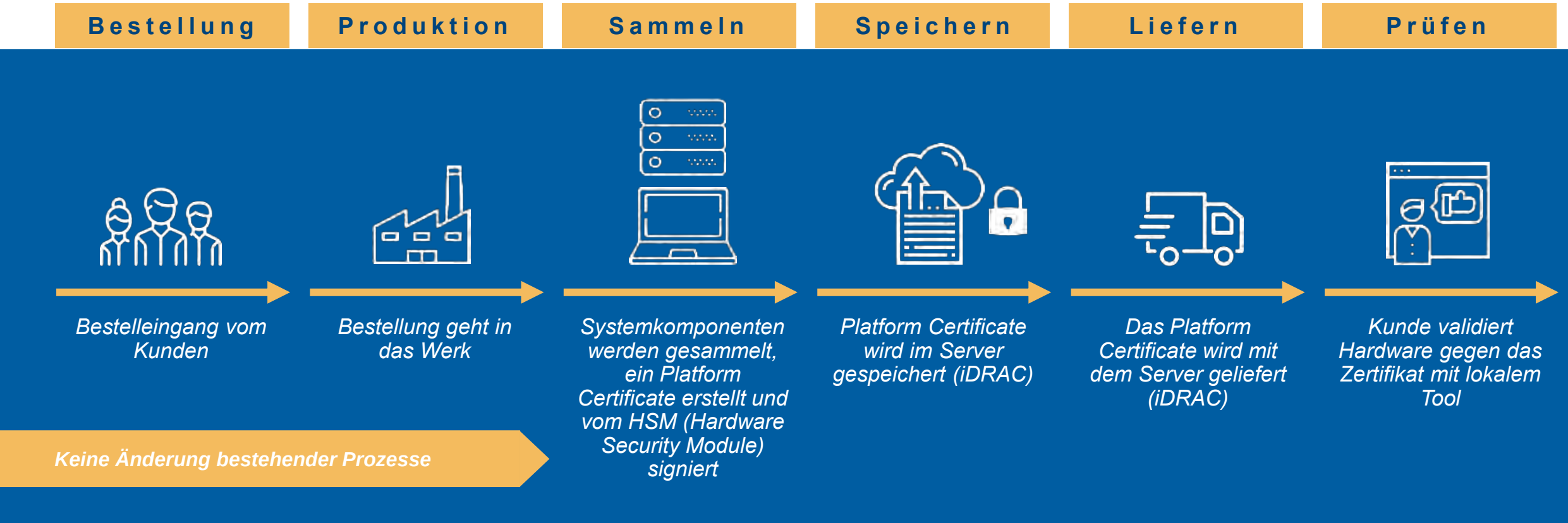
- Damit entsteht eine Unique Identität



Motherboard ID	TPM EK Serial	Memory ID
iDRAC ID	Service Tag	Power Supply ID
CPU ID	HDD ID	Network Card MAC Adresse



Prozess Secure Component Verification (SCV)



Kunden können damit PowerEdge Server mit der Gewissheit installieren, dass keinerlei Modifikationen am System nach Verlassen des Werks vorgenommen wurden

OpenManage Enterprise

Product Overview

Full lifecycle management
of Dell PowerEdge servers

Rack Servers



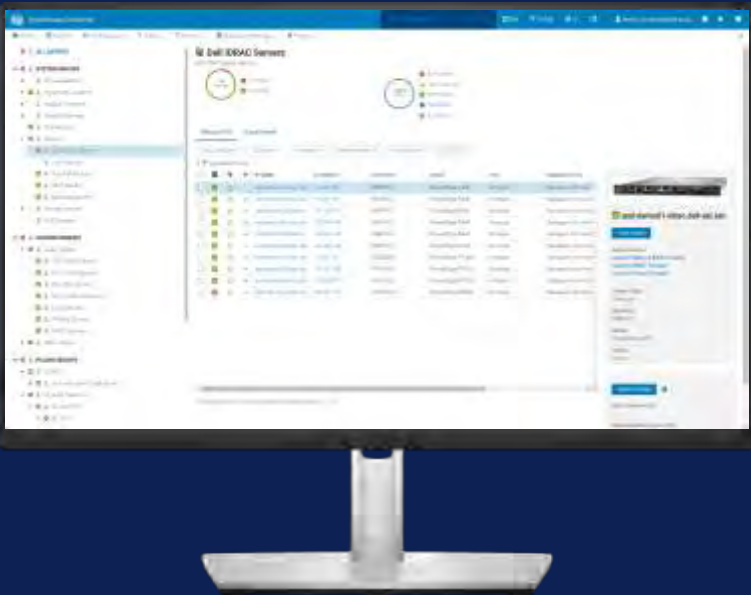
Modular Servers



Edge Servers



Tower Servers



Monitor



Compute



Storage



Networking



3rd party infrastructure

OpenManage Enterprise
Up to 8,000 devices

Full lifecycle management



Discover

Deploy

Update

Monitor

Maintain

Possible System Management Orchestration Time Saving

Create deployment job
to push server
configuration and install
OS, for 250 servers
in **51 seconds**
/ **14 steps**¹

Initiate remediation of
firmware non-
compliance for 1000
servers
in **32 seconds**
and **4 steps**¹

Initiate remediation of
configuration drift for
250 servers
in **20 seconds**
and **3 steps**¹

¹Dell Legal ID#G20000065. Source Independent third-party testing [PT testing](#)

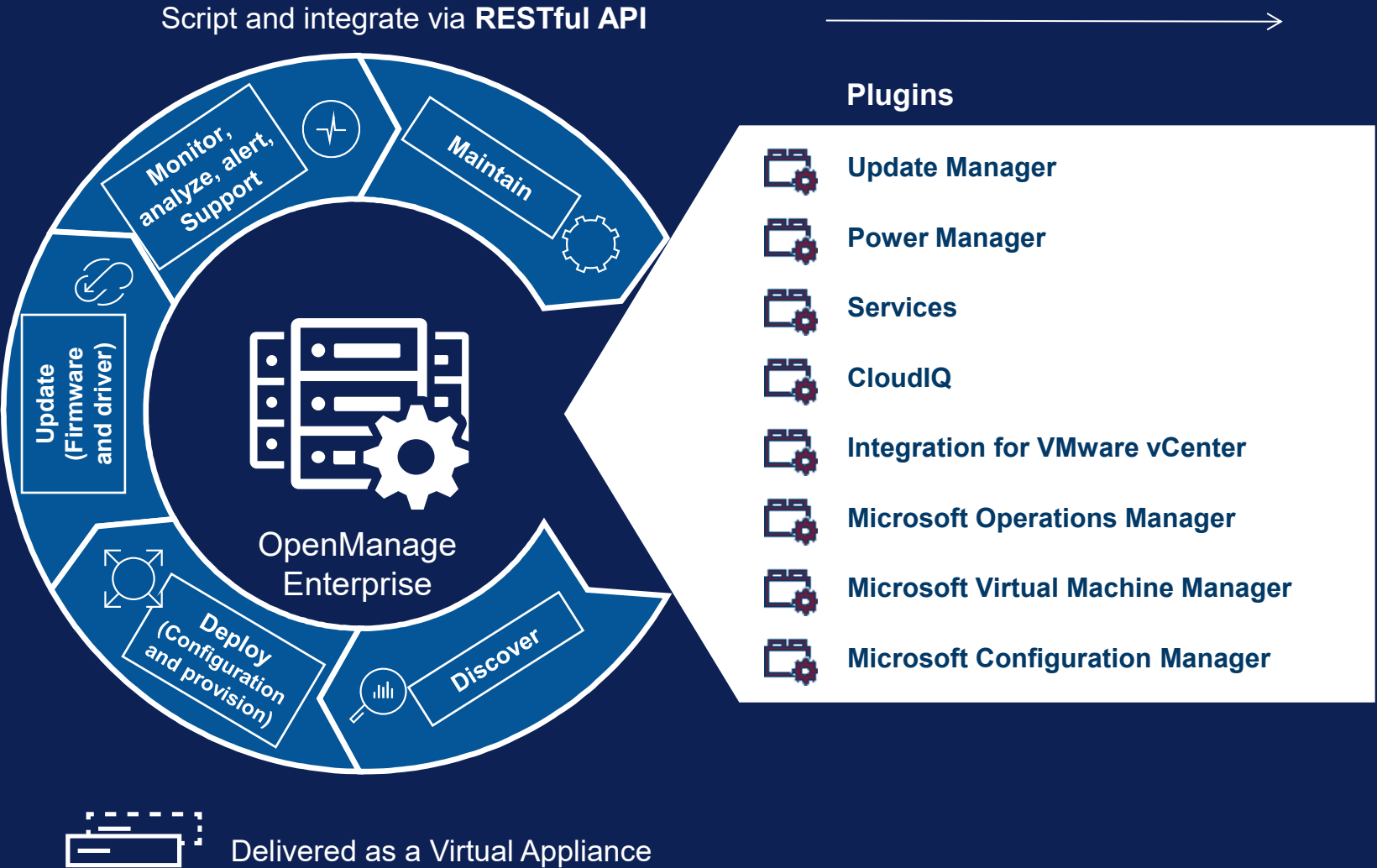
Extending OME with Plugins and Integrations



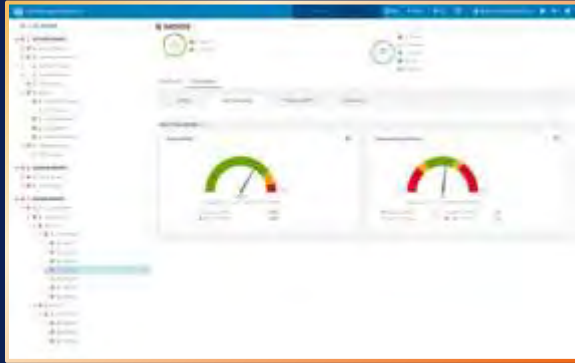
ANSIBLE



OpenManage Mobile



OpenManage Enterprise Power Manager



With OpenManage Enterprise and Power Manager get a grip on power and cooling

Analyze and prevent a server-related power and/or thermal outage

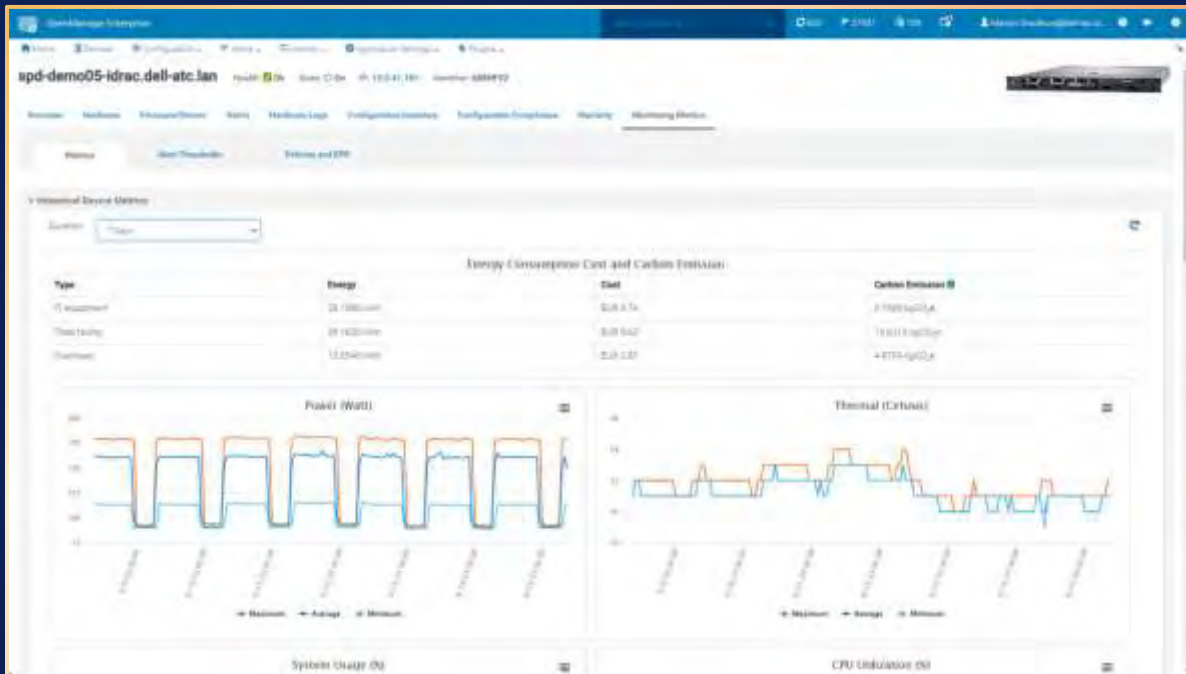
- Analyze historical and present power consumption and thermal readings
- Define power and thermal policy and budgeting

Address sustainability

- Report and reduce carbon footprint
- Easily identify zombie servers
- Reduce server TCO

Get a server into data center production faster

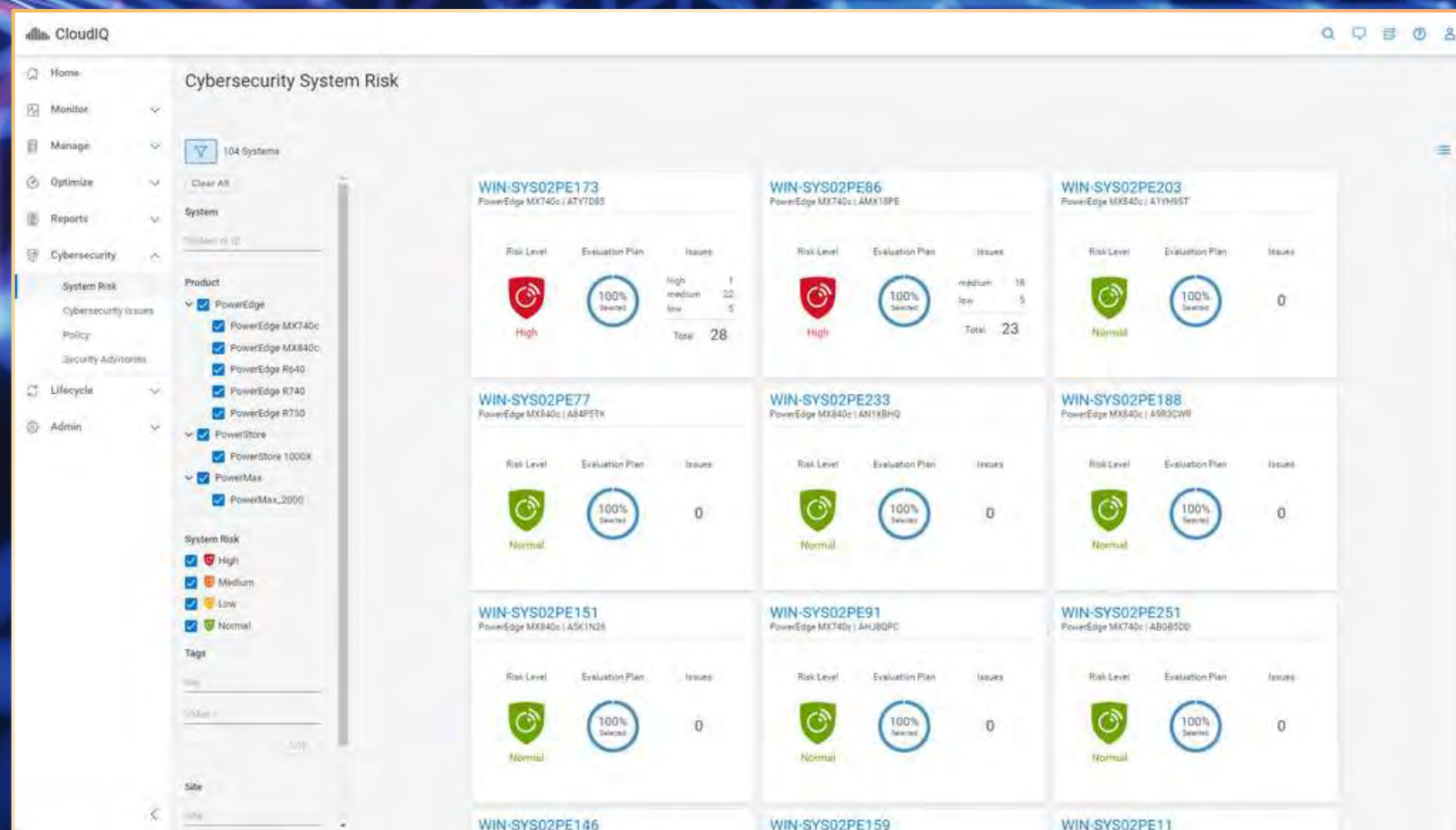
- Know where there is available power/thermal headroom immediately including selected 3rd party servers*
- Provide accurate power consumption & costs for chargeback



* Currently HPE iLO & Lenovo xClarity supported with Redfish

CyberSecurity Risks

- Prebuilt policy rules based on Dell & NIST best practice
- High | Medium | Low risk level assigned
- Remediation action highlighted
- Continuous policy monitoring
- Emailed as part of the Daily Digest
- Crosscheck against relevant CVEs and highlight



OpenManage Integration for VMware vCenter (OMEVV)

Provides monitoring, updates, and management of PowerEdge servers directly into your vCenter administration domain

Physical and virtual in one place

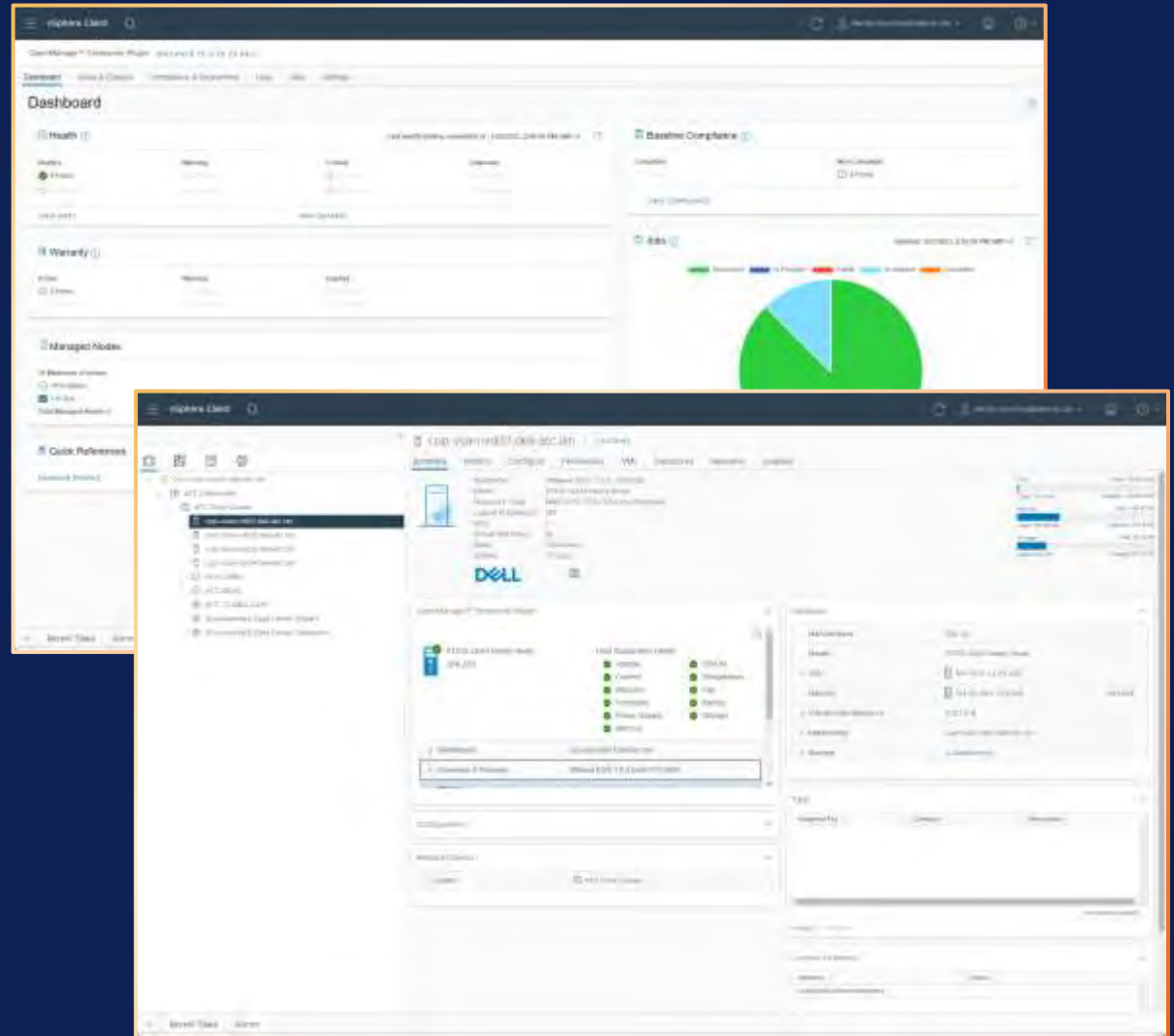
Physical server inventory, monitoring, and alerting directly within vCenter.

Firmware updates managed from vCenter

Ability to deploy BIOS and firmware updates within vCenter, leveraging vSphere Lifecycle Manager (7.0 and higher) and through cluster-aware updates on clusters without it.

Speed up new server deployment

Templates for easy server configuration and ESXi deployment on new servers without PXE boot, dropping them into a nominated VMware cluster with optional VMware host profile.

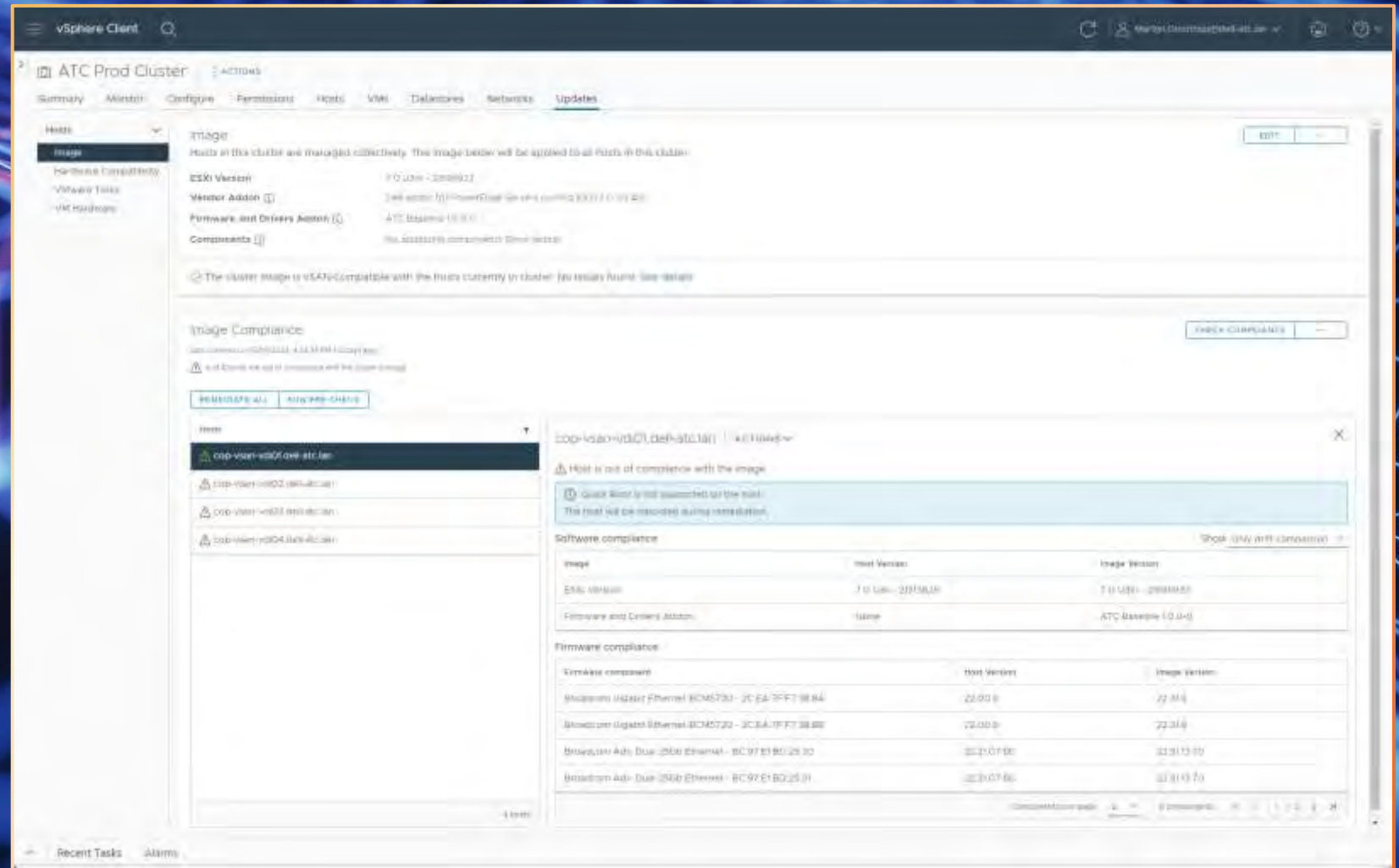


* OMEVV is the successor to OMIVV

DELLTechnologies

Cluster Aware Upgrades

- VMware vSphere Lifecycle Manager allows for a single image upgrade for
 - ESXi Version
 - Vendor Driver Addon
 - Firmware Upgrades
- Consistent experience
- Consolidates relevant information to reduce pre-upgrade planning time
- Helps unify heterogeneous server update process

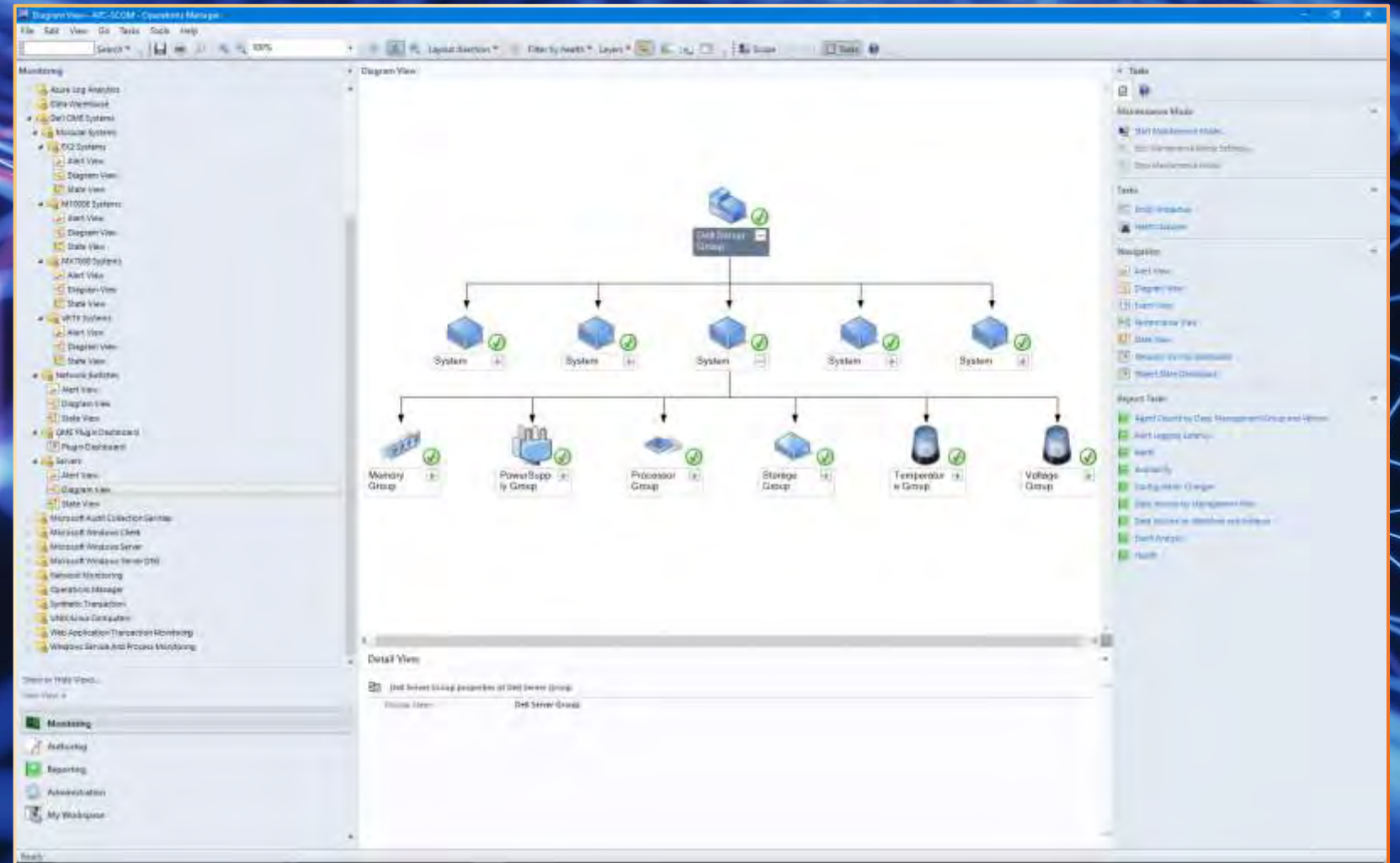


- [Firmware catalog for Dell's vSAN Ready Nodes](#)
- [Firmware catalog for Dell customized VMware ESXi images](#)

Microsoft System Center

Integration for Microsoft Operations Manager that enables the monitoring of the Dell hardware assets that are discovered in OME

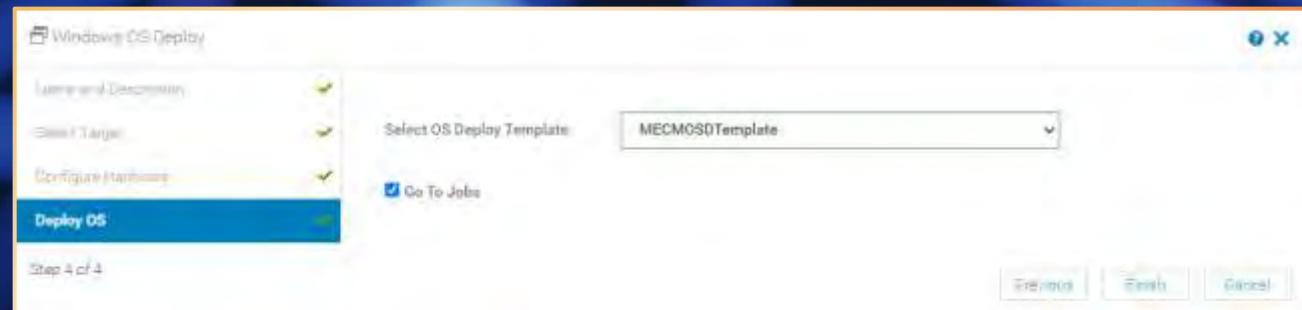
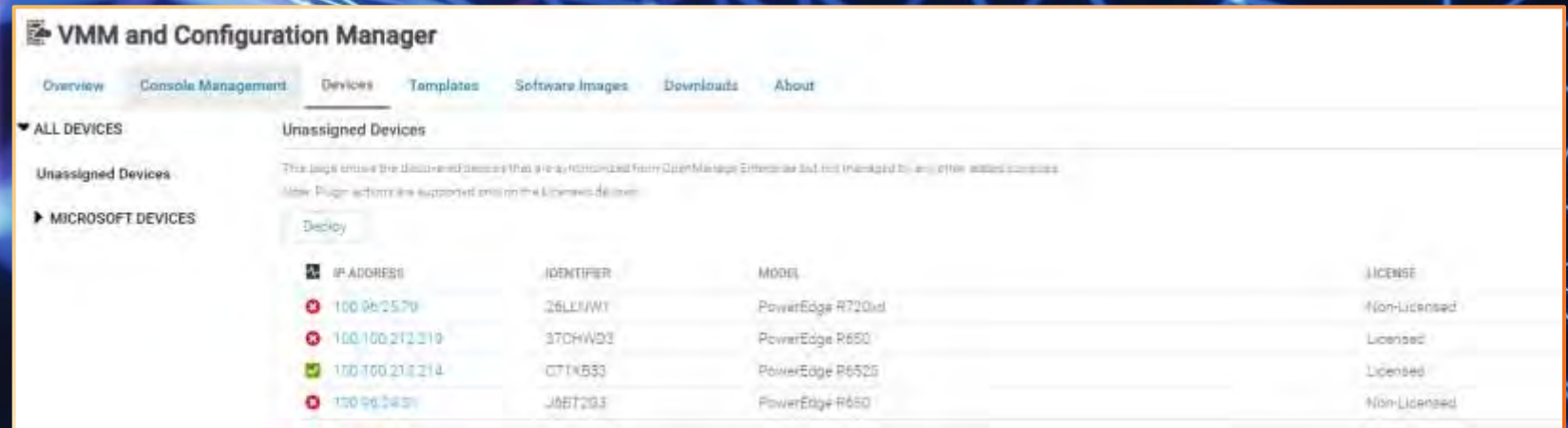
- Inventory
- Health
- Alerts
- Support:
 - Servers
 - Modular Chassis
 - Network Switches



Microsoft System Center

Integration for Microsoft System Center, Microsoft Endpoint Configuration Manager (MECM) and Virtual Machine Manager (VMM).

- OS deployment including Server Configuration
- Cluster Aware Updates by leveraging catalogs that are present in OME



OpenManage Enterprise License

	OME Licenses	Features
 License Upgrade Path	OME Advanced+	• All features of OME Advanced • VMware (OMEVV) as plugin • Microsoft System Center (OMEMSSC) as 2 plugins • ServiceNow license (no plugin) • Support for CyberArk Credential Provider • <i>Any partner plugins in future</i>
	OME Advanced	• All features of OME (No charge) • Power Manager plugin • Advanced configuration such as Bare-metal deployment and cloning, Configuration compliance, Auto-deployment, IOA provisioning and VLAN management, MX profile management • Support for Dell's Internal Password Rotation feature
	OME	• Inventory Monitoring Alerts • Plugins: Update Manager Services CloudIQ • Reporting • Firmware Updates

- All OME licenses, are perpetual and non-transferable tied to the iDRAC.
- License can be deployed via Dell License Manager
- [OpenManage Portfolio Software Licensing Guide](#)
- [OME Trial Licenses](#)

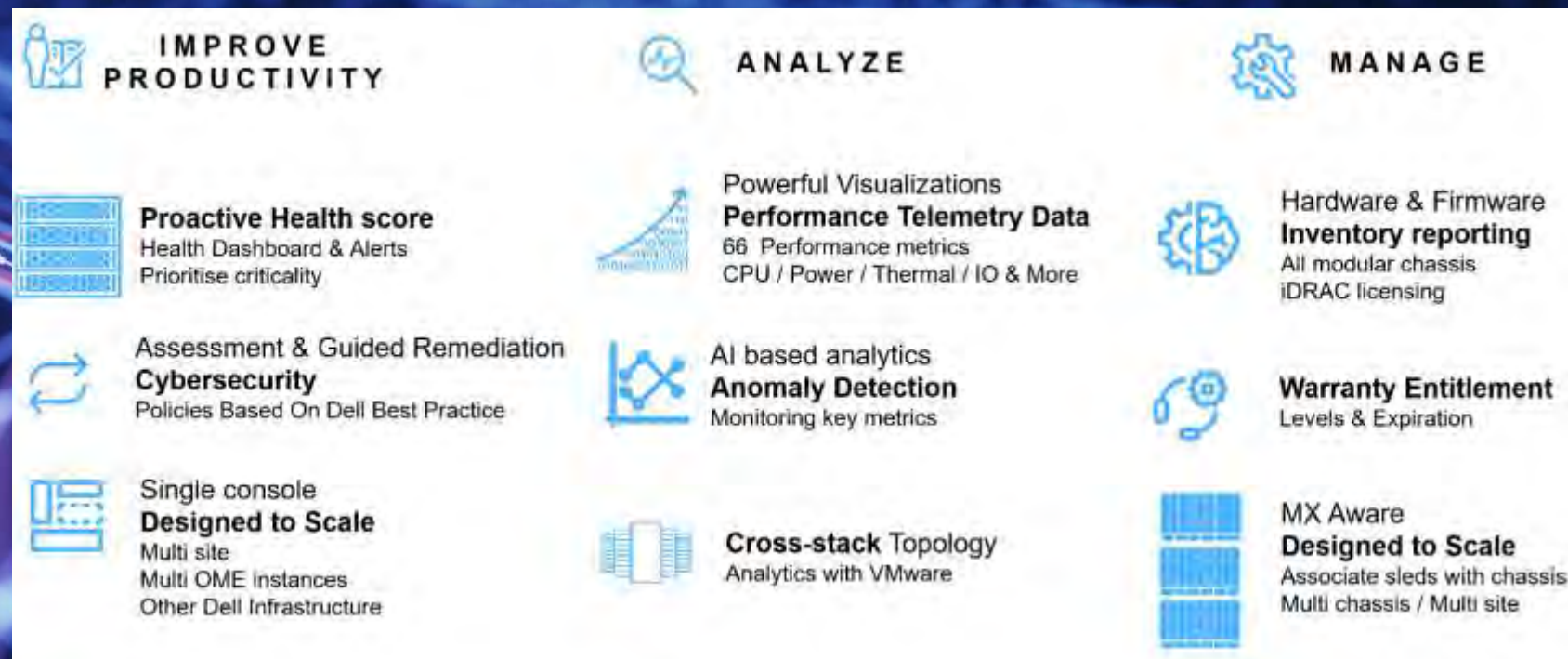
CloudIQ for PowerEdge

One portal for monitoring, analytics & alerts

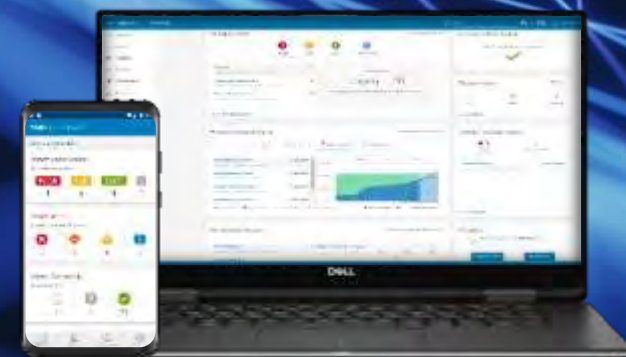
- Cloud-based application
- Intelligent Infrastructure Insights using proactive monitoring and predictive analytics
- New features added with no software update to install

PowerEdge Cybersecurity

Build, implement and continuously monitor security policies based on Dell & NIST best practices with ease.



iDRAC





Secure Connect Gateway

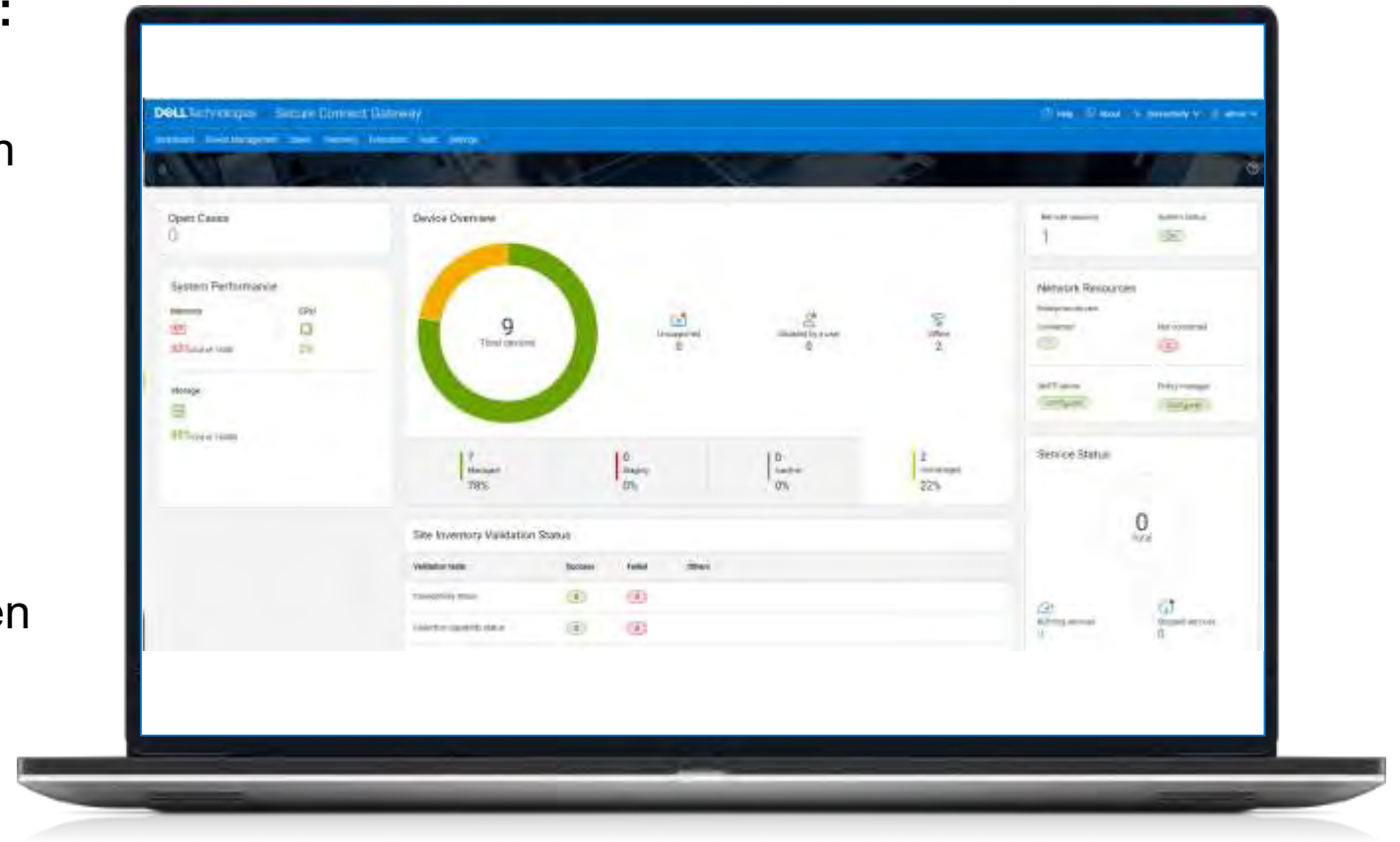
Das Dell Secure Connect Gateway

Dashboard für das On-Premise-Konnektivitätsmanagement des Gateways:

- Erste Schritte mit Ersteinrichtung
- Regelmäßige Anmeldung zum Hinzufügen neuer Geräte und Beheben von Konnektivitätsproblemen

Zu den Funktionen gehören:

- Gerätemanagement
- Fallmanagement
- Audits von Telemetrie und Warnmeldungen
- Management von Einstellungen wie E-Mail-Benachrichtigungen für Warnmeldungen, Aktivierung von Policy Manager



Einfachere Navigation | Weitere Tooltips | Leitfaden für die erstmalige Anmeldung

Dell Secure Connect Gateway V5.0



Eine einzige Lösung für Ihr gesamtes Dell RZ Portfolio

Unterstützt Server, Netzwerke, Storage, Data Protection sowie hyperkonvergente und konvergente Lösungen



Minimale Unterbrechung zur Einführung der Konnektivität der nächsten Generation

Bietet direkte Upgradepfade von unseren vorhandenen Konnektivitätsplattformen: Secure Remote Services 3.x, SupportAssist Enterprise v4.x und v2.x



Flexibilität für kleine und große Umgebungen

Mit virtuellen und anwendungsbasierten Editionen unseres Gateways oder einer direkten Verbindung für Dell RZ Produkte – Sie entscheiden sich für die beste Option



Verbesserte Performance und Skalierbarkeit

Verarbeitet noch mehr Telemetriedaten und -aktionen in der ganzen Dell Enterprise-Umgebung – ohne dass etwas übersehen wird



Fokus auf Sicherheit

Neuer Policy Manager mit erweiterten Audit- und Kontrollfunktionen, dem erstklassigen MQTT-Protokoll und neuen Entwicklungsprozessen



Neue Benutzeroberfläche

Verbessertes Nutzererlebnis mit einer modernen, intuitiven Web-Benutzeroberfläche

Vergleich der Connectivity-Optionen

Management Ihrer gesamten Dell Umgebung im Rechenzentrum

Funktionen für Support und Services	Secure Connect Gateway 5.0	SupportAssist Enterprise v4.x	SupportAssist Enterprise v2.x	Secure Remote Services v3.x**
Verbinden der Startseite für automatisierte Warnmeldungen und sichere Telemetrieübertragung	Ja	Ja	Ja	Ja
Remotekorrekturen, Integritätsprüfungen und Upgrades durch autorisiertes, technisches Supportpersonal	Ja	Ja*	Nein	Ja
Optionaler Policy Manager für Remotezugriffskontrolle und erweiterte Audits	Ja	Ja*	Nein	Ja
Vom Kunden installierbar mit Upgradeaufforderungen und Korrekturen in der App	Ja	Ja	Ja	Ja
Virtuell (keine Hardware- oder BS-Lizenzen erforderlich)	Ja	Ja	Nein	Ja
Analyse der Serviceintegrität und Selfservice für unterstützte Produkte	Ja	Ja	Nein	Ja

Die Funktionen von SupportAssist Enterprise und Secure Remote Services sind jetzt Teil des Secure Connect Gateway

Kunden mit SupportAssist oder Secure Remote Services sollten ein Upgrade auf das Secure Connect Gateway durchführen

*Unter SupportAssist Enterprise v4.x sind diese Funktionen für bestimmte Dell EMC Produkte nicht aktiviert. Bitte unter Dell.com/support stets prüfen, welche Dell EMC Produkte unterstützt werden.

**Eine Docker-Edition für Linux-Distributionen steht für Secure Remote Services v3.x zur Verfügung. Das Freigabedatum der Docker-Edition für das sichere Verbindungsgateway v5 wird noch bekanntgegeben.



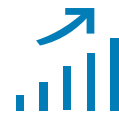
API

Integration mit DevOps und IaC Tools



Höhere Produktivität

Reduzierung des
Zeitaufwands für das
Lifecycle Management



Infrastructure-as-Code & DevOps

Codify Konfiguration,
Deployment und Update
Nahtlose Integration des Server
Lifecycle Managements in
bestehende DevOps Prozesse



Silos zusammenführen

Bare-Metal Server
Konfiguration, Deployment
und Updates in OS,
Containern und SW Stack
Management
Automatisierungs-Workflow



Konsistenz

Verbessern der Security
Compliance in der
gesamten Infrastruktur

Stand API heute

Server

- iDRAC9 - RESTful APIs (Conformant to Redfish DMTF standards), CLI, WSMAN (deprecated)
- OME + Plugins - RESTful APIs modelled after Redfish standards
- OME-M – RESTful APIs
- OMIVV - RESTful APIs modelled after Redfish standards

Networking

- SmartFabric OS10 – RESTful APIs
- Enterprise SONIC – RESTful APIs conformant to OpenConfig standards

Storage

- CloudLink – RESTful APIs
- PowerStore – RESTful APIs, CLI
- PowerMax – RESTful APIs, CLI?
- PowerVault – Perl, Python. Not REST API
- PowerFlex – RESTful APIs
- SDNAS - RESTful APIs (not exposed to customers now)
- ECS – Java, Python, .NET, Scala, Go, REST API??
- Isilon – REST based but have different methods (OneFS API).
- APEX AIOps – REST based (PowerAPI style)
- XtremIO – REST based and CLI
- VPLEX – REST based
- Unity – REST based, CLI
- PowerProtect
 - Data Manager – RESTful APIs
 - DD Series Appliances – RESTful APIs
 - DDMC – RESTful APIs
 - Data Manager – RESTful APIs
 - RecoverPoint for Virtual machines RESTful APIs
 - Cloud Snapshot Manager - RESTful APIs

Beispiele der unterschiedlichen Stile

Example	Products	Current URIs
Local Users	iDRAC	/redfish/v1/AccountService/Accounts/<AccountId>
	OME/OME-M	/api/AccountService/Accounts
	PowerStore	/api/rest/local_user, /api/rest/local_user/<id>
	PowerProtect Data Domain	/api/v2/dd-systems/{SYSTEM-ID}/users /api/v1.0/dd-systems/{SYSTEM-ID}/users/{ID}
	PowerFlex	/api/types/User/instances /api/instances/User::{id} /api/types/User/instances
	OS10	/restconf/data/dell-system:system/user
	SONIC	/restconf/data/openconfig-system:system/aaa/authentication/users/user=<username>
		New URI
	All products	/dtapi/rest/v1/LocalAccounts

API Initiative

Ziel: Eine einheitliche API für alle Dell Data Center Produkte

Developer Portal

Im Dell Digital Design für einheitliche User Experience

- Ein Online Platz / Portal für alles
- Zusammenführen aller Produkte/Systeme
- Compliant mit der OpenAPI Spezifikation
- Einheitliche Dokumentation, Guides und Tutorials

Standardisierung

Einführen von API Standards im gesamten Portfolio

- Bsp.: Security APIs sollten folgenden Kriterien folgen
 - Common ISG APIs Security Specification
 - Common ISG security APIs Resource Definition

AGENDA



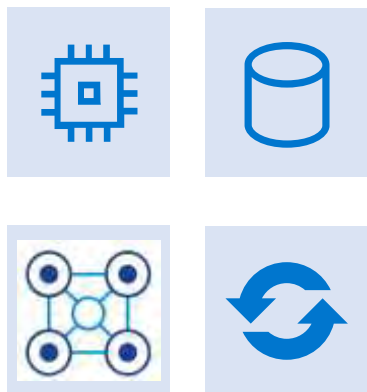
- 09:00 – 09:45 Agenda / LiveOptics / Demo Setup
- 09:45 – 10:00 Pause
- 10:00 – 10:45 PowerEdge Server
- 10:45 – 11:00 Pause
- 11:00 – 11:30 Systemadministration am Beispiel Vsphere
- 11:30 – 12:00 Virtualisierung im Vergleich (Azure Local, Nutanix)
- 12:00 – 13:00 Mittagessen
- 13:00 – 13:45 Virtualisierung im Vergleich (Virtuozzo, Proxmox, Openshift)
- 13:45 – 14:00 Pause
- 14:00 – 14:45 Powerstore
- 14:45 – 15:00 Pause
- 15:00 – 15:45 Data Protection
- 15:45 – 16:00 kommerzieller Vergleich



Virtualisierung im Vergleich

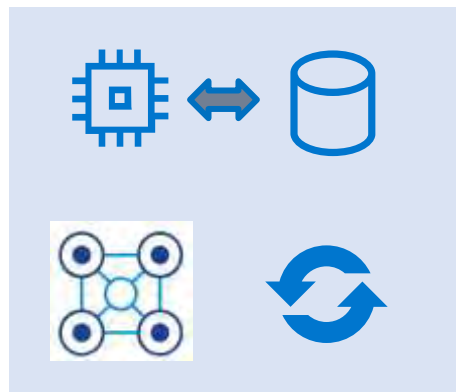
Evolve IT - Hyperconverged

Traditional



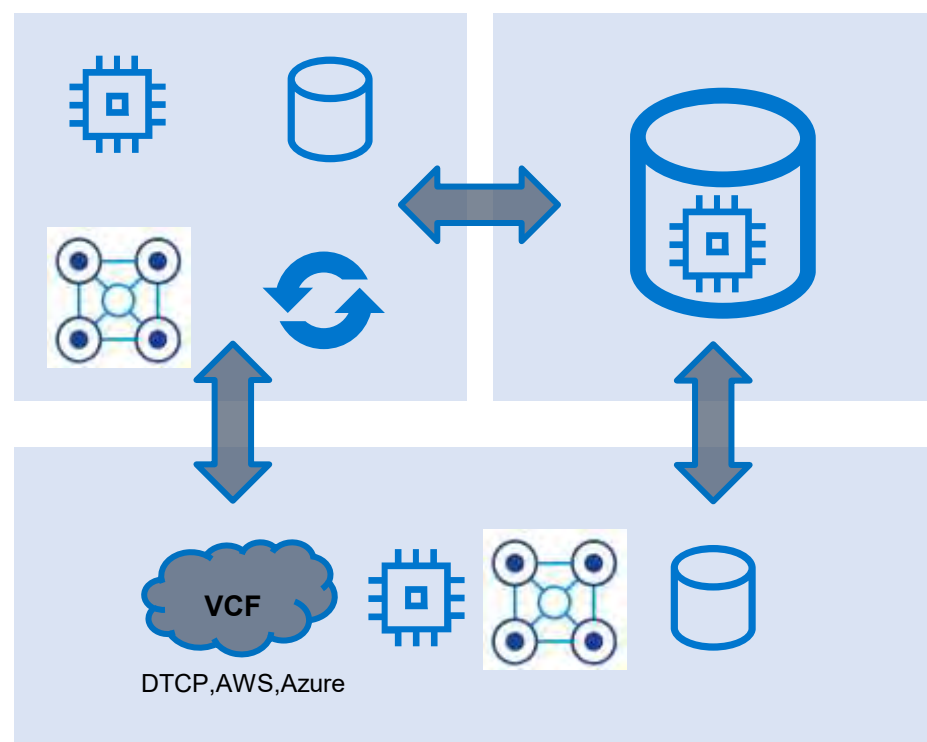
- PowerEdge Server
- Powerstore
- ME5
- Networking S-Series
- OpenManage/CloudIQ

HCI



- VSAN Ready Nodes
- Microsoft Spaces Direct
- Nutanix CI
- Proxmox Ceph
- Virtuozzo

HCI now and next



- VxRail (plus VCF)
- Microsoft Azure Local
- Dell APEX
- Nutanix CP



Azure Local

Windows Server 2025 Hyper-V Scale

Host

Up to 4 Petabytes of RAM*

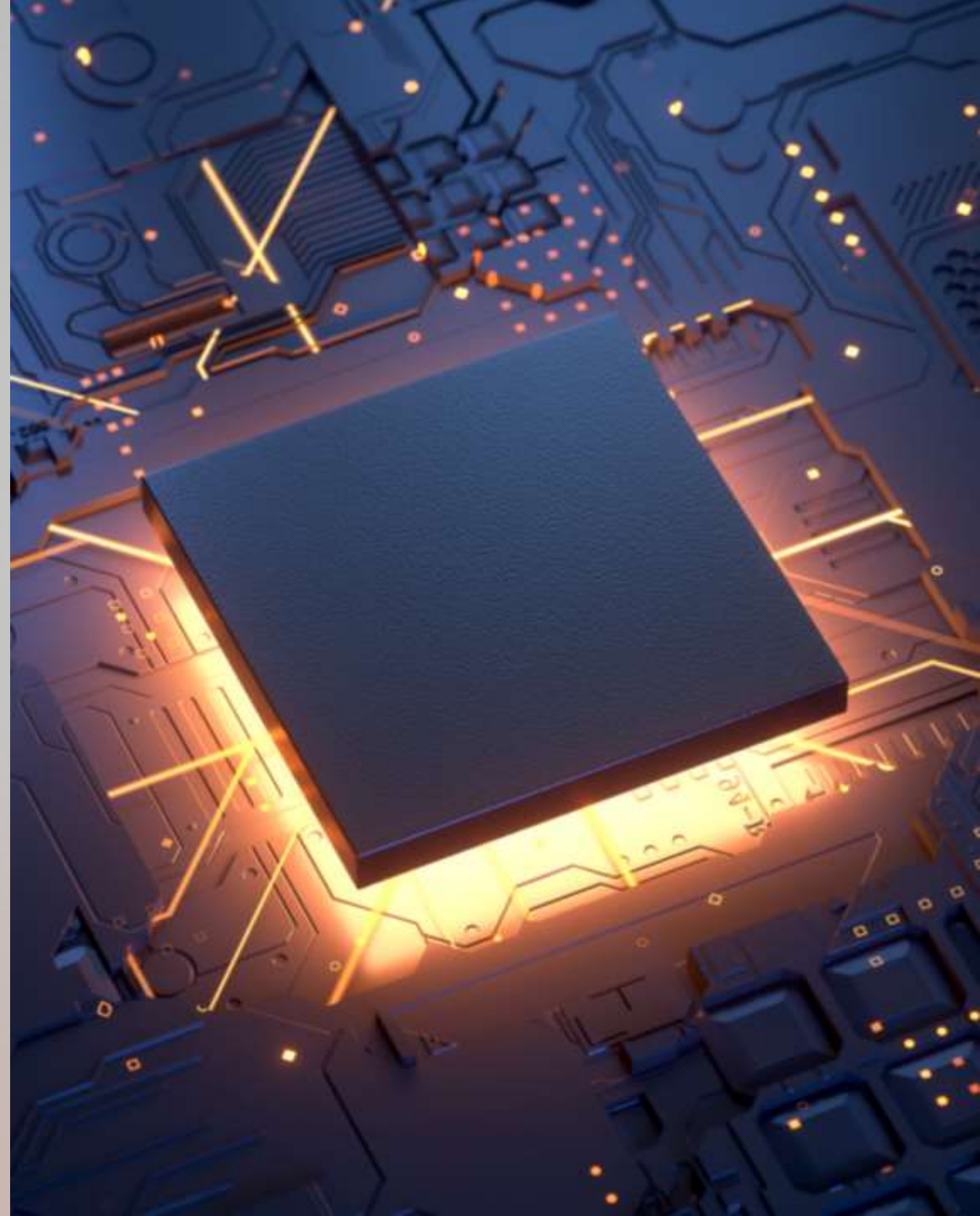
Up to 2048 Logical Processors*

VM

Up to 240 Terabytes RAM per VM*

Up to 2048 Virtual Processors per VM*

*No, these aren't typos



Windows Server 2025

Hyper-V

GPU-Partitioning (GPU-P)

GPU-P with Live Migration

GPU-P with High Availability

GPU Pools for DDA

Dynamic Processor Compatibility

Workgroup Hyper-V Clusters

Native ReFS Deduplication & Compression

Network ATC and Accelerated Networking

Native SDN

Windows Admin Center: VM perf improvements



Azure Local

Cloud infrastructure for distributed locations, enabled by Azure Arc



Operate and scale with
the power of the cloud

Azure-consistent hyperconverged
infrastructure (HCI) solution

Automated, repeatable
cloud deployment

Cloud-driven infrastructure
updates at scale

Centralized visibility
across all locations



Ready for any app: VMs
and containers alike

Azure Kubernetes Service
included at no cost

Streamlined migration from
VMware with Azure Migrate

VM and container
deployment from Azure

Easy on-ramp for
Azure services on-prem



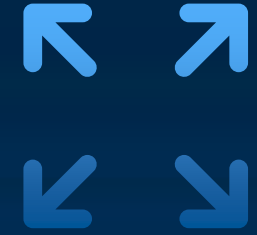
Extend cloud security
to distributed locations

Strong security posture for
apps and infra by default

Enhanced, granular network
security to prevent attacks

Prevent low-level attacks
with Trusted Launch

Deep security visibility with
Microsoft Defender for Cloud



Flexibility to meet
requirements and budget

Flexible scalability
from 1-16 nodes

Broad choice of Dell
hardware options

Option to consume storage
from external storage solution

Flexible payment options

Hybrid capabilities & benefits

Powerful integration with select Azure services

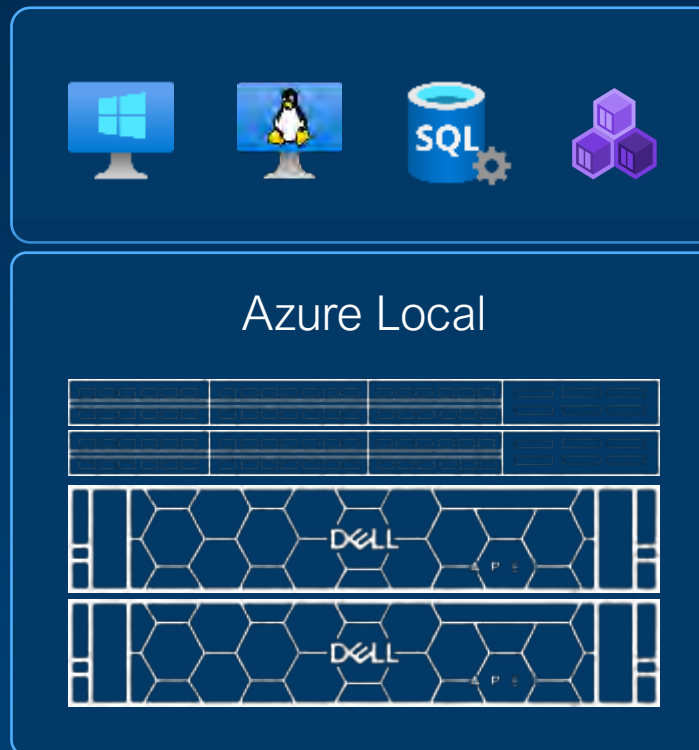
Azure Services

Azure Monitor
Insights on health, performance, and usage

Azure Policy
Ensure compliance & governance at scale

Microsoft Defender for Cloud
Unified infrastructure security management

Azure Site Recovery
Replicate VMs to Azure for Disaster Recovery



Azure Benefits

WS Datacenter: Azure Edition
Azure-only guest OS with latest Windows Server innovations

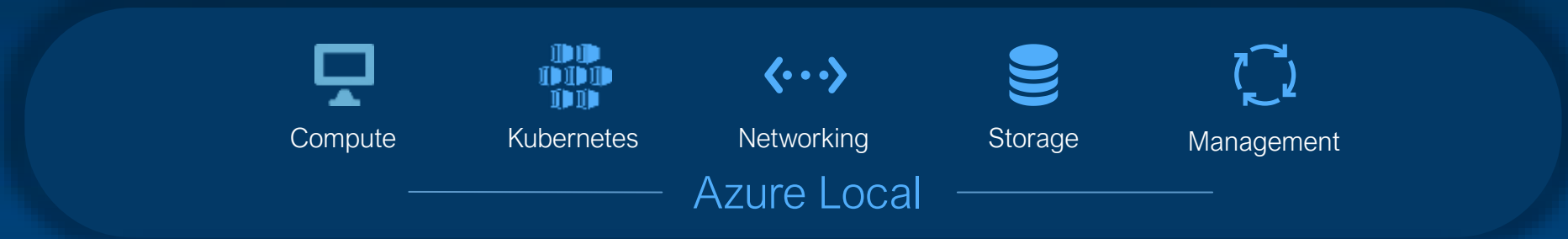
Azure Policy: Guest Config
Audit or configure OS settings as code across host & guests

Azure Update Manager
Free update management for Arc-enabled Azure Local VMs

Extended Security Updates
Free security updates for End of Support SQL Server & Windows Server VMs

Azure Local

Packaging and pricing options



Dell hardware and management solutions available as CapEx or OpEx

¹ \$10 and \$23 (USD) charges assumes systems in operation for 730 hours per month

² Requires VL with active Software Assurance or a CSP subscription

³ Only available at time of hardware purchase

Azure Local solutions

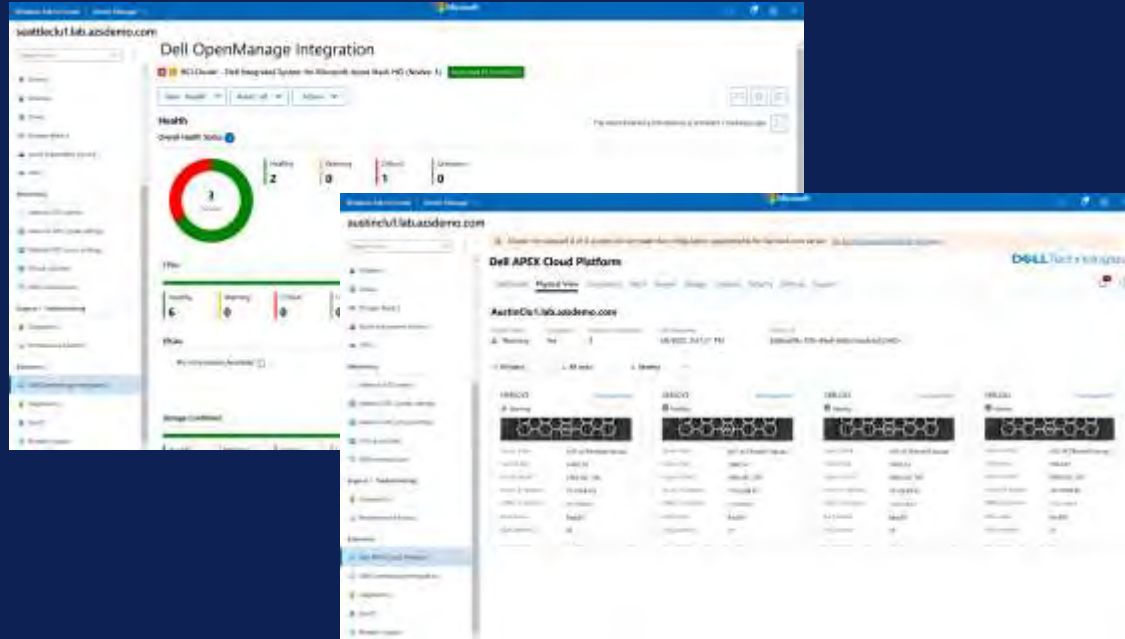
High-level comparison

	Validated Nodes	Dell Integrated System for Microsoft Azure Local	Dell APEX Cloud Platform for Microsoft Azure
Validation	Once	4 times per year	Continuous
Lifecycle management ¹	Manual	Better	Best
End-to-end deployment automation	✗	✗	✓
Enhanced, automated expansion	✗	✗	✓
External storage support	✗	✗	✓
Azure Monitor Insights workbooks	✗	✗	✓
Azure Local pre-installed	✗	✓	✓
Secure by default	✗	✓	✓
Full-stack vendor support	✗	✓	✓
Integrated support queues	✗	✓	✓
Proactive call-home support	✗	✓	✓

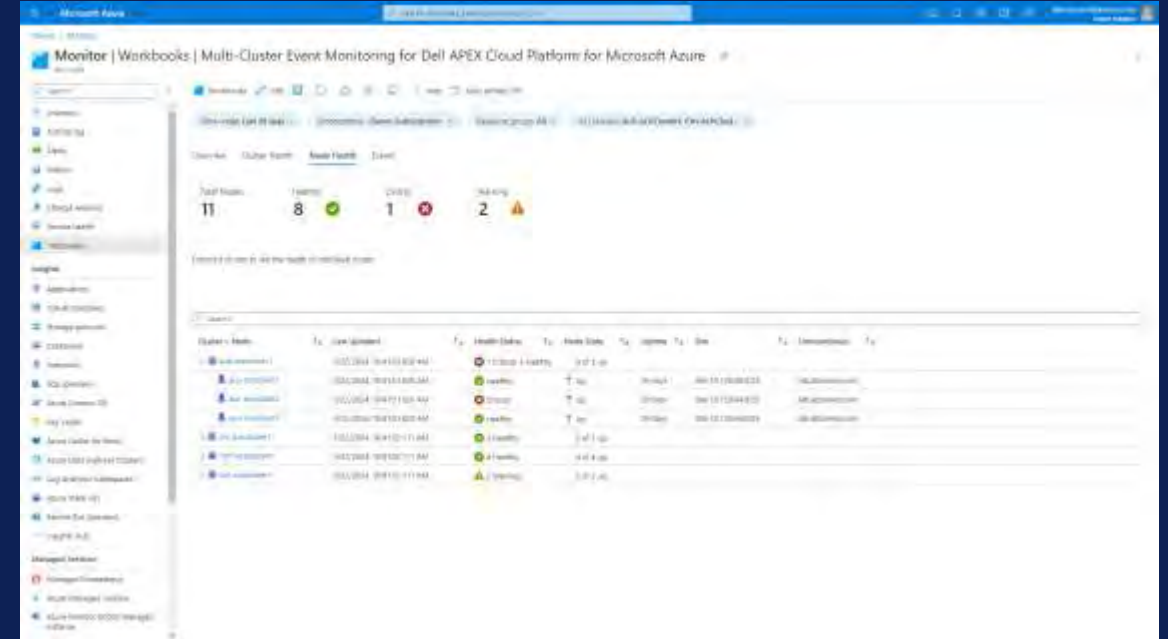
¹Validated node LCM is manual, with separate software and firmware/driver updates. Integrated systems require sideloading of drivers/firmware before full-stack update. Premier solutions orchestrate full-stack updates without additional steps.

Consistent hybrid management experience

Combine the power of Dell software and Azure Arc-enabled infrastructure



Windows Admin Center + Dell extensions for
granular instance-level management



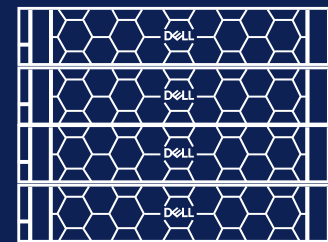
Azure management and governance
services for **fleet management at scale**



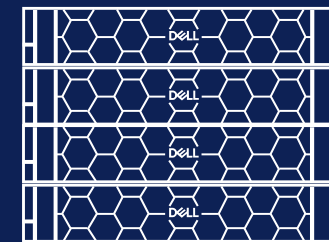
Data Center



Edge



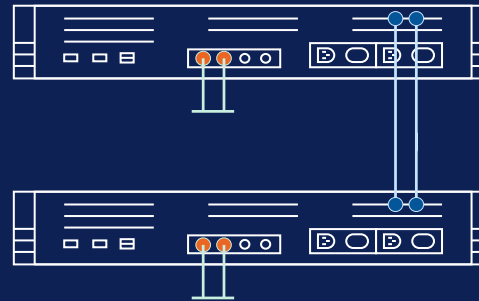
Colo



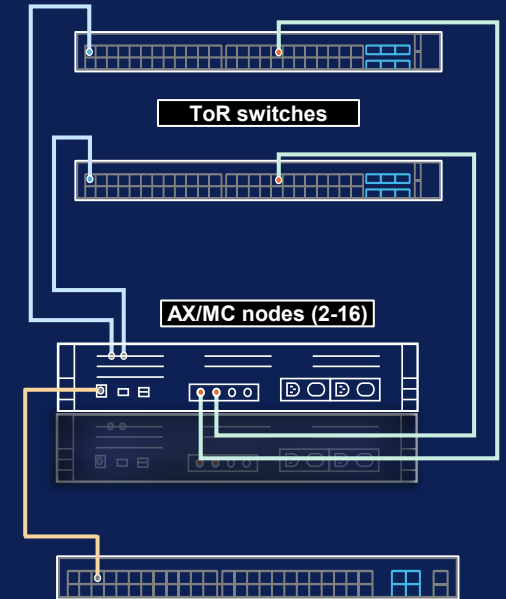
DELLTechnologies

Deployment patterns and expansion scenarios

Start with what you need and scale-up and scale-out* for future growth



— Storage
— Mgmt/VM
— iDRAC



Single-machine instance

- Great fit for remote, edge or branch projects that are cost sensitive and may tolerate single server resiliency.
- Single-machine instances support the same workloads as multi-machine instances.
- Single-machine expansion to multi-machine is supported.

Switchless storage network topology

- Network configuration for smaller instance sizes of 2 or 3 machines.
- Simplifies storage networking using direct connections between instance machines.
- Improves TCO by not requiring switches for storage interconnect.
- instance expansion not supported. However, the instance can first be converted to a scalable storage network topology and then scaled out.

Scalable storage network topology

- Use PowerShell or the APEX Cloud Platform Foundation Software to expand to a maximum instance size of 16 machines.
- Fully converged – RDMA storage, instance management, and VM traffic traverse the same Ethernet connections.
- Non-converged - Separates RDMA storage and host management / VM traffic onto separate network adapter interfaces.

NOTE: Currently, scale-out (Add Node) for the APEX Cloud Platform for Azure requires assistance from Dell ProSupport.

Azure Virtual Desktop

Extends the benefits of cloud VDI to on-premises



Secure anywhere

Run virtualized desktops and apps securely with Entra ID, conditional access, and MFA

Simplify VDI deployment

No need to manage brokers, gateways, or underlying servers and storage



Windows 10 and 11 multi-session

Windows 10 & 11 multi-session or single-session support

Achieve high utilization & lower operation costs



Prime performance

Enjoy optimized Microsoft 365/Teams/Windows App experiences

Run graphic-intensive workloads with GPU support

Built for sensitive low-latency workloads



Full control

Satisfy data locality requirements

On-premises storage and data residency



Scale cloud and on-premises

Manage and scale deployments across both Azure and Azure Local through a single management experience

Use the familiar Azure portal and admin experience



Optimize for cost

Use existing eligible Windows licenses

No need to manage overhead licenses for Remote Desktop Services (RDS)

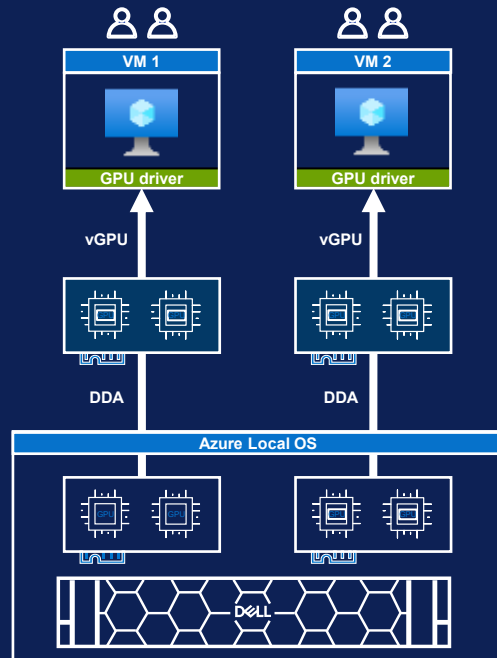
Save with Windows 10 & 11 multi-session support

GPU options on Dell Solutions for Microsoft Azure Local



Discrete Device Assignment

- Target use cases: AI/ML, single VM VDI
- Workloads: AVD, AKS Arc, Percept
- VM gets dedicated GPU (no sharing)
- Provision via PowerShell or Windows Admin Center



Single wide:

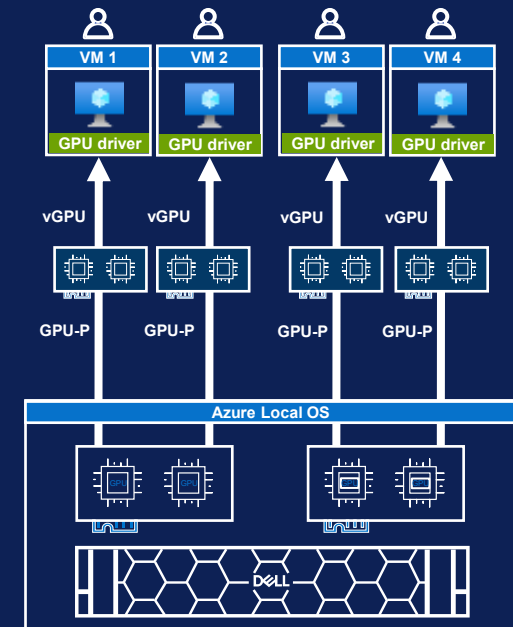
- A2
- L4

Double wide:

- A16
- A30
- A40
- L40
- L40S

GPU-Partitioning

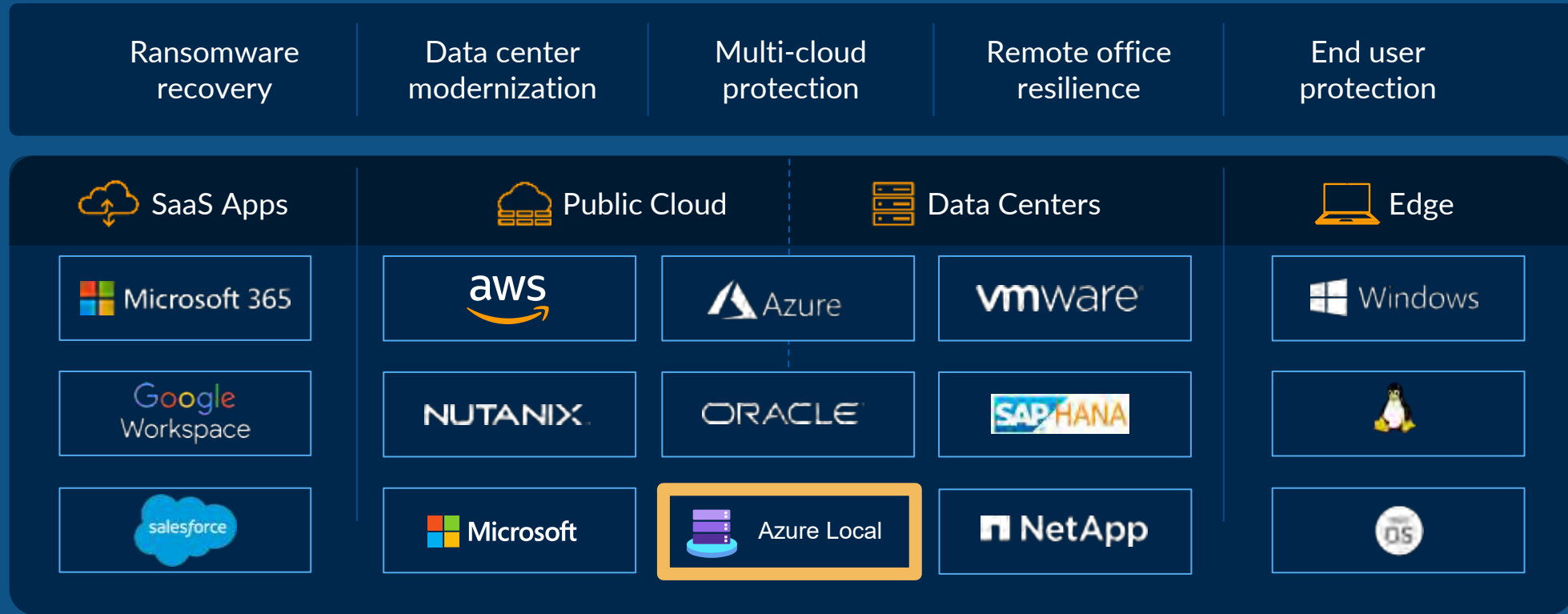
- Target use cases: VDI, AI/ML
- Benefits: Lower TCO, scale and density
- Hardware enforced isolation with SR-IOV
- Supported on A2, A16, A40, L4, L40, L40S



Dell APEX Backup Services – use cases



Wide variety of use cases - start with immediate need and easily expand



Azure Local security features

Designed to be secure by default throughout the platform's lifecycle



Encryption and data protection

- Data-at-rest encryption enabled with **BitLocker** by default
- **Self-Encrypting Drives (SED)** require authentication independent of the OS



Always-on antivirus protection

- **Microsoft Defender Antivirus** enabled by default on instance machines for real-time detection
- Automatic definition updates



Recommended security baseline

- Over 300 security settings enabled out-of-the-box
- Closely meets **CIS benchmark** and **DISA STIG** requirements
- Disables legacy protocols and ciphers



Reduced attack surface

- **Windows Defender Application Control (WDAC)** enabled by default
- WDAC enforces an **explicit list** of applications and code allowed to run

Dell Solutions for Microsoft Azure Local

Deploy

Manage

Support

Decommission

Dell Integrated System for Microsoft Azure Local

Azure
Local

Flexible, factory-ready configurations for datacenter, edge and ROBO



Balanced CPU/Storage for
demanding workloads

AX-760

Form factor:

2U rackmount

Operating
system:

Azure Local
Windows Server

Use cases:

High performance app consolidation
with balance of performance and capacity

CPU:

Dual Intel 4th and 5th Gen Xeon Scalable Processors
Up to 64 cores per processor

Memory:

Up to 8TB

Storage options:

NVMe | SSD | Hybrid

Nvidia GPU:

4 x A2 | L4
2 x A16 | L40 | L40S



Flexible, ruggedized
multi-node edge solution

AX-4000x/45x0x

2U rack or flex mount,
ruggedized multi-node chassis

Azure Local
Windows Server

Compute optimized for space-constrained,
challenging edge and ROBO locations

Single Socket Intel 3rd Gen Xeon D Scalable Processors
Up to 20 cores

Up to 512GB

NVMe

2 x A2 | L4 (Only for AX-4520c)

DELL Technologies

APEX Cloud Platform for Microsoft Azure



CPU-dense nodes
in a small 1U footprint

MC-660



Balanced CPU/Storage for
demanding workloads

MC-760



Flexible, ruggedized
multi-node edge solution

MC-4000x/45x0x

Form factor:

1U rackmount

2U rackmount

2U rack or flex mount,
ruggedized multi-node chassis

Operating
system:

Azure Local

Azure Local

Azure Local

Use cases:

Compute-dense edge, ROBO and core
use cases with moderate storage capacity

High performance app consolidation
with balance of performance and capacity

Compute optimized for space-constrained,
challenging edge and ROBO locations

CPU:

Dual Intel 4th and 5th Gen Xeon Scalable Processors
Up to 52 cores per processor

Dual Intel 4th and 5th Gen Xeon Scalable Processors
Up to 64 cores per processor

Single Socket Intel 3rd Gen Xeon D Scalable Processors
Up to 20 cores

Memory:

Up to 8TB

Up to 8TB

Up to 512GB

Storage options:

NVMe | SSD

NVMe | SSD | Hybrid

NVMe

Nvidia GPU:

2 x A2 | L4

6 x A2
4 x L4
2 x A16 | A30 | A40 | L40 | L40S

2 x A2
1 x A30

Dell XC - Nutanix



Dell XC with Nutanix Cloud Platform

One Platform to Run Apps and Data Anywhere

Enterprise Apps

Modern Apps

Analytics AI/ML

Databases

Desktops

Nutanix Cloud Platform

Prism Central

APIs | LCM

Nutanix Cloud Manager

Intelligent Operations | Self-Service | Cost | Security Operations

Nutanix Cloud Infrastructure

Virtual Storage (AOS) | Compute | Networking | Disaster Recovery | Security

AHV, ESXi

Hardware ecosystem

XC Nodes

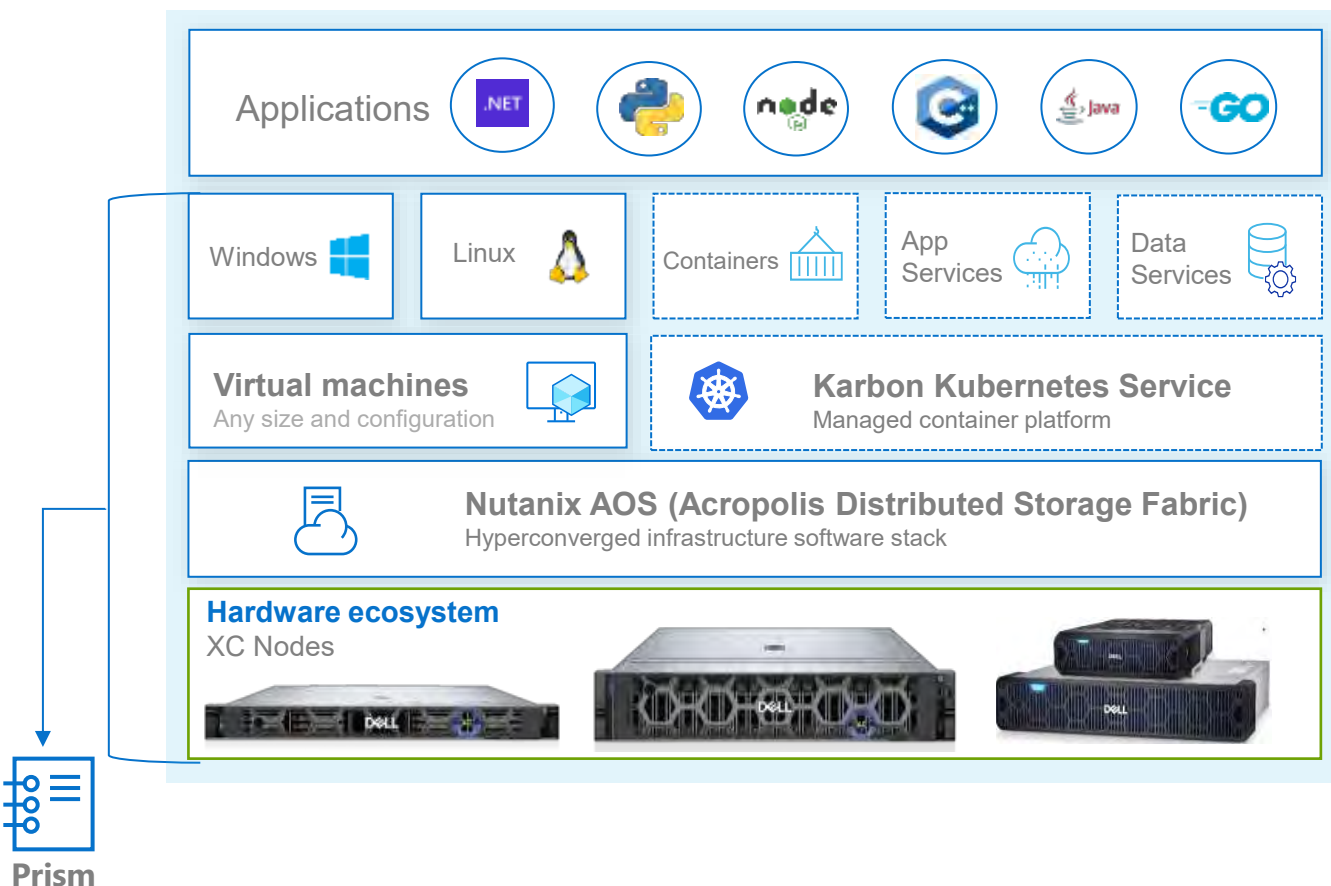


Learn more about Nutanix software options [here](#)

What is Dell XC?

Dell PowerEdge servers purpose-built for Nutanix

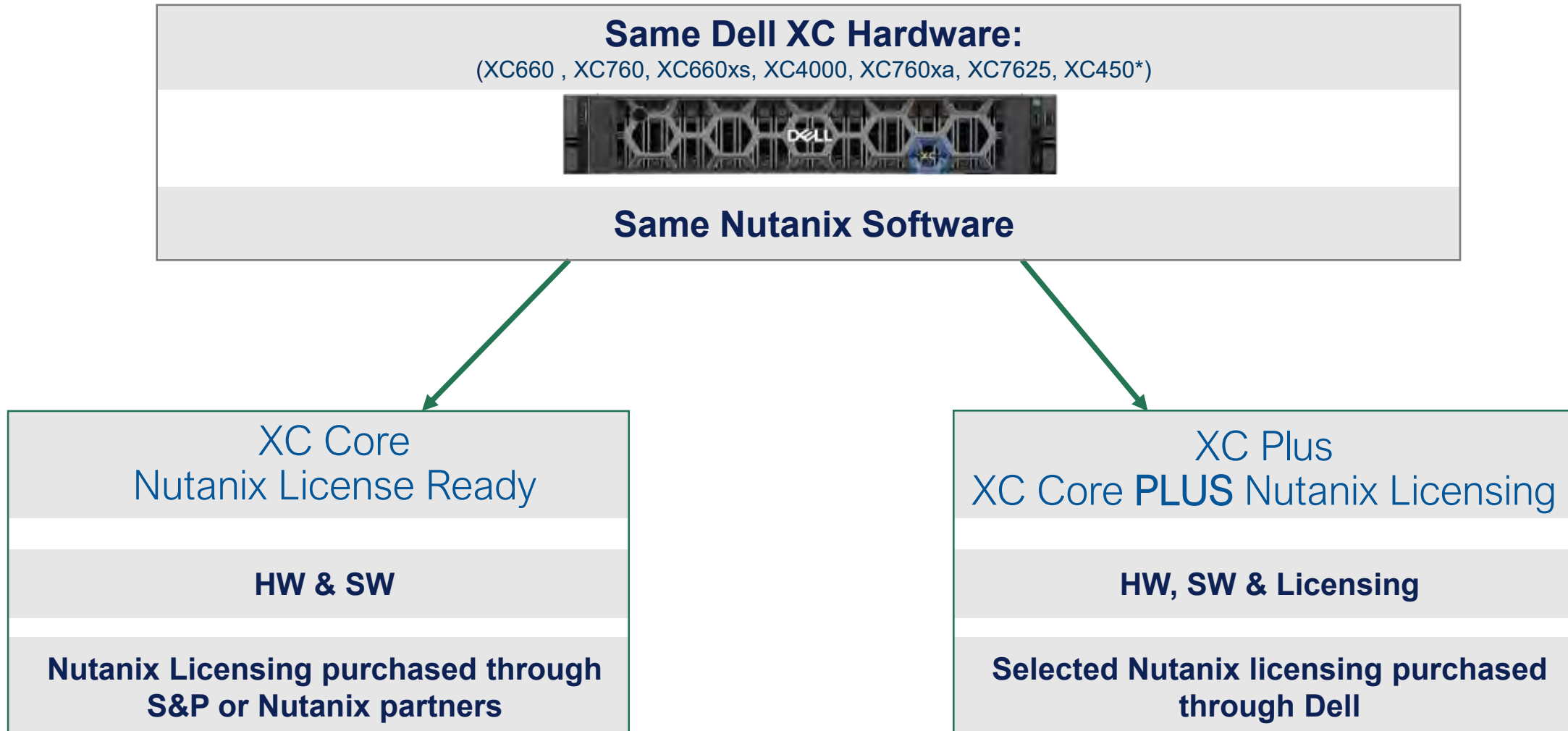
Everything you need to properly run and maintain Nutanix!



- **Dell XC** is a Nutanix-leveraged platform incorporating **Dell PowerEdge servers** and **Nutanix software**
- XC family is a co-Engineered Subset of PowerEdge
- Currently available XC platforms:
 - XC660, XC660xs, XC760, XC760xa, XC7625 and XC4000
- Nutanix "Personality Module" for
 - Nutanix Prism Integration
 - Nutanix "1-Click" LCM Integration with Redfish
- Nutanix AOS Software Pre-Installed
- AHV Hypervisor Pre-Installed
- Custom iDRAC integration with Nutanix LCM enabling automated hardware maintenance updates
- Full LCM through Prism LCM management
- All LCM updates are tested and validated by Dell PowerEdge and XC teams prior to release
- Dedicated "Solution Aware" Support
- Nutanix Certified Parts Replacement

Is there a difference between XC Core and XC “Plus”?

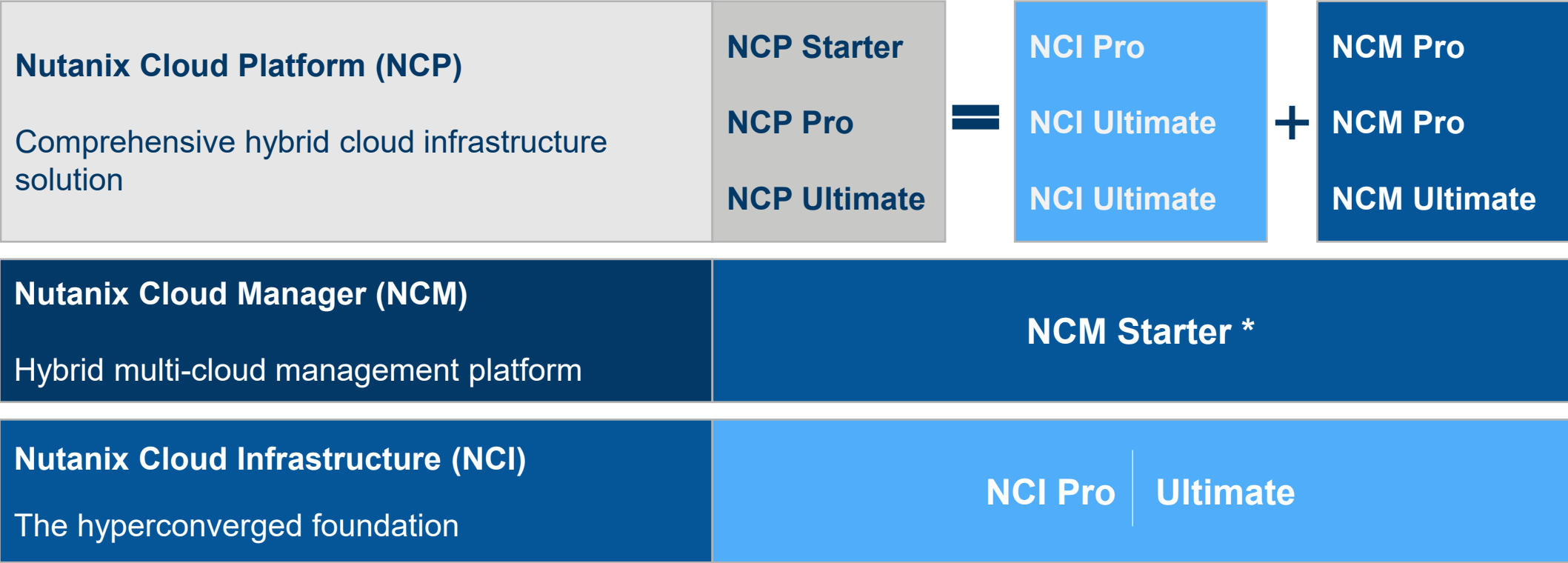
The only difference is how the Nutanix software licensing is procured



*Nutanix licensing for the XC450 cannot be procured through Dell. XC450 goes EOL March CY2025

Nutanix Software Options with XC Plus

Choose the Perfect Bundle for Your Hybrid Cloud Needs



* When ordering NCM Starter stand-alone, NCI must be sold on the same quote

Terms: 1, 3 and 5-year** subscription licensed per core

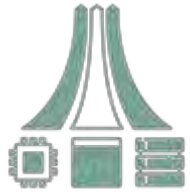
All XC models and configurations available via APEX Subscriptions

**5-year subscription options will be available in Q2 C2026



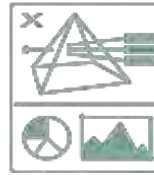
The Nutanix solution

With Dell XC



Acropolis

Dell XC is a turnkey infrastructure platform that converges compute, storage, networking and virtualization



Prism

Consumer-grade application and infrastructure management solution that radically simplifies datacenter operations

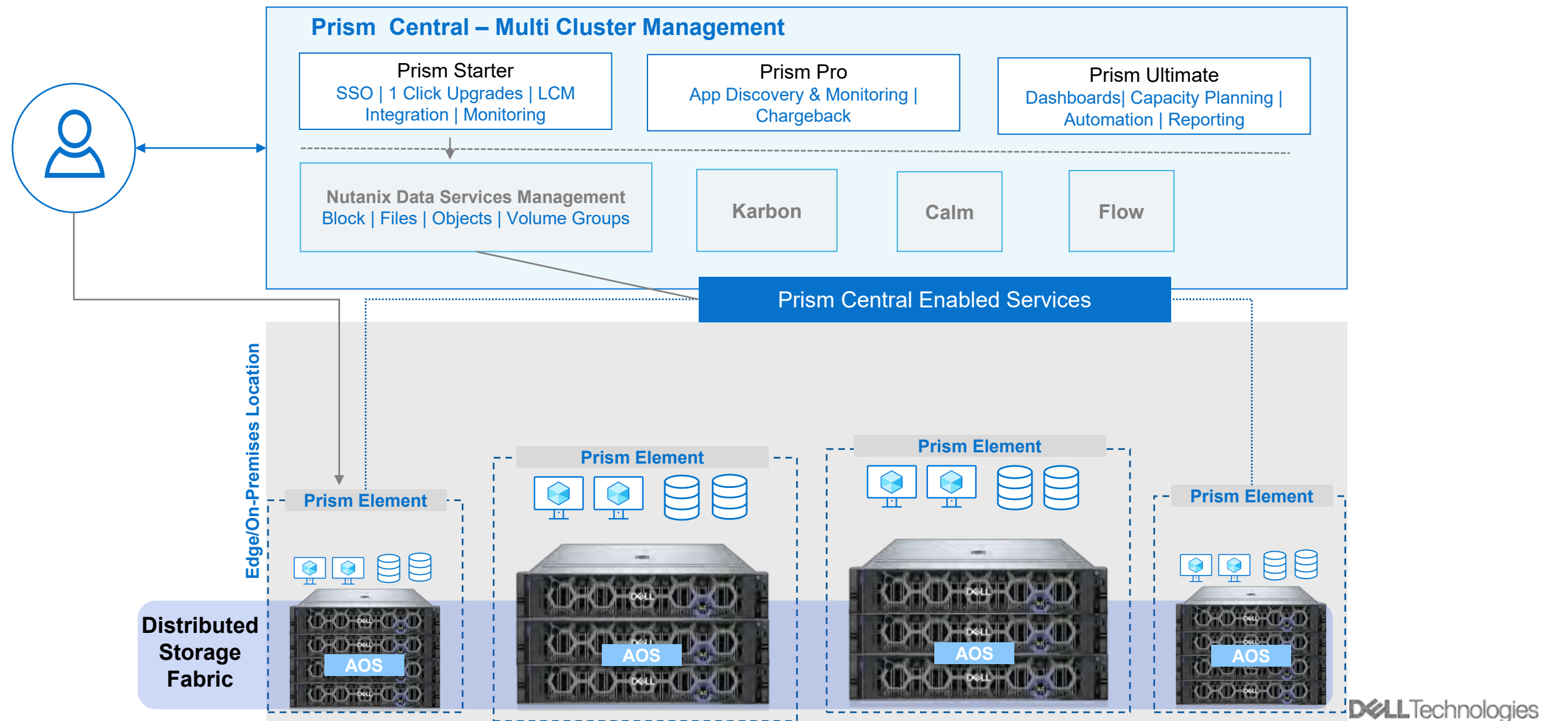


Self-Service

Hybrid Architecture Automation to seamlessly create manage hybrid architecture

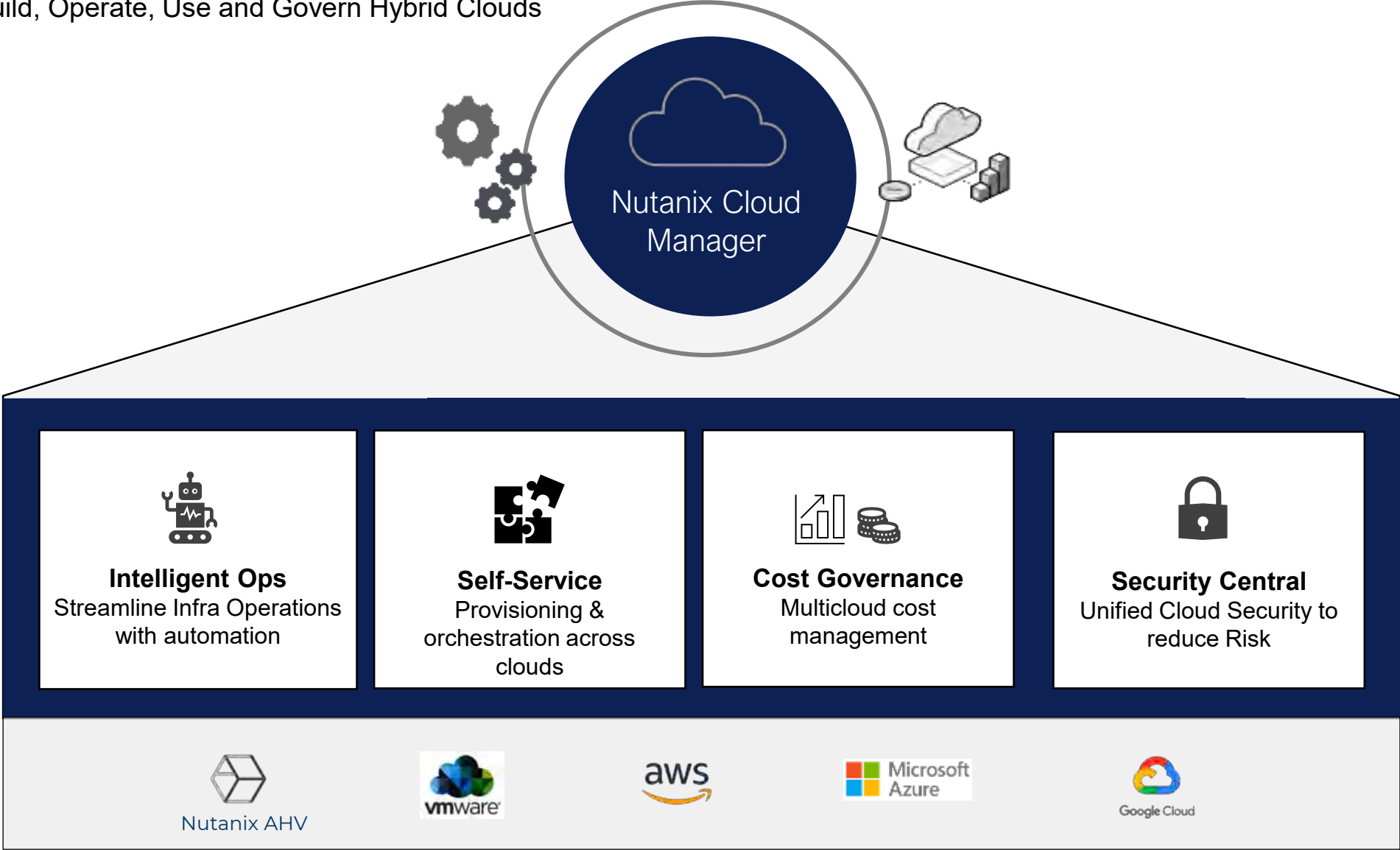


Nutanix HCI solution architecture with Prism



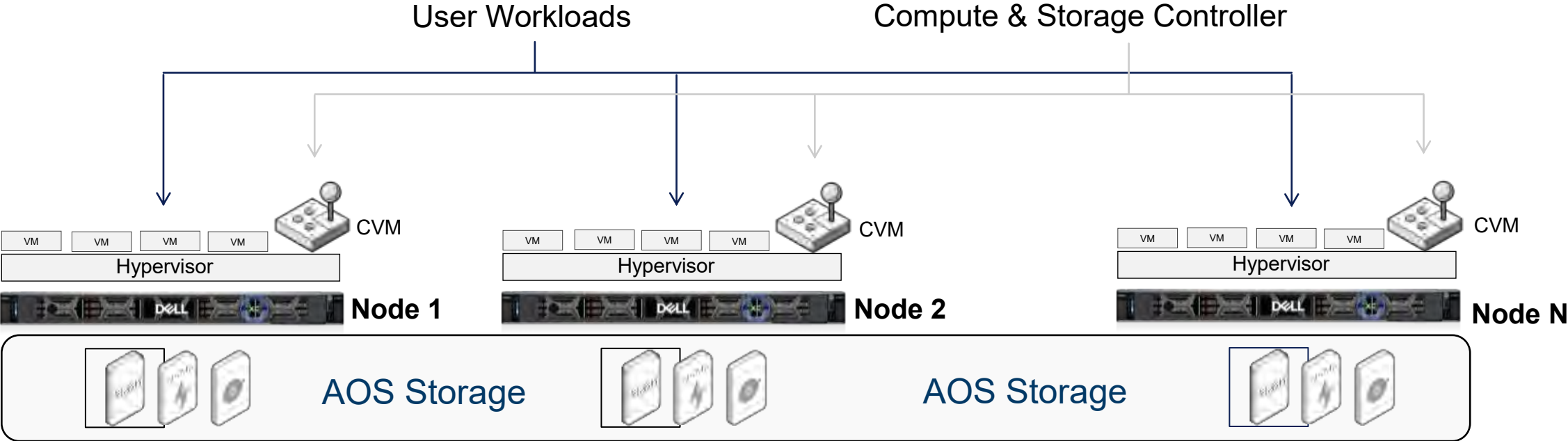
Nutanix Cloud Manager (NCM)

NCM helps Build, Operate, Use and Govern Hybrid Clouds



Hybrid & Multi
Clouds

Nutanix AOS Eliminates the Need for Centralized Storage



True Scale-out

Instant and Linear Scale of Performance
All resources self-heal

Dynamic Data Placement

Granular Meta-data
Data Locality
Flexible fault tolerance

Efficient and Simple

Optimizes Availability
Very efficient in dealing with failures due to design
No Silos of Management

Resilient & Protected Data

Writes always replicated (RF2, RF3)
User Data always protected and rebuilt on failures

Read more about Nutanix AOS [here](#)

Distributed Scale-out Storage with Nutanix AOS

Physical construct

Logical construct

Storage Pool

- Group of physical storage devices (HDD/SSD/NVMe) and spans all/multiple nodes in the cluster
- Recommendation is to use the one (default) storage pool

Storage Container

- Logical segmentation of storage pool and contains a group of VMs/vdisks
- Recommendation is to use the default storage container.
- There are scenarios where multiple containers are useful (selectively applying data reduction)

vDisk

- Subset of available storage in a container that provides storage to a VM
- Most commonly used storage consumption model for VMs on Nutanix clusters

Volume Group

- Collection of logically related vDisks*
- Configured as a separate entity within a container
- Can be directly attached to VMs (AHV) or used as iSCSI target for clients including bare metal

Why Distributed Scale-out Storage matters:



Automated provisioning and scaling

Reduce Operation cost and overhead



Reduce risk and Capex by starting small and growing as required

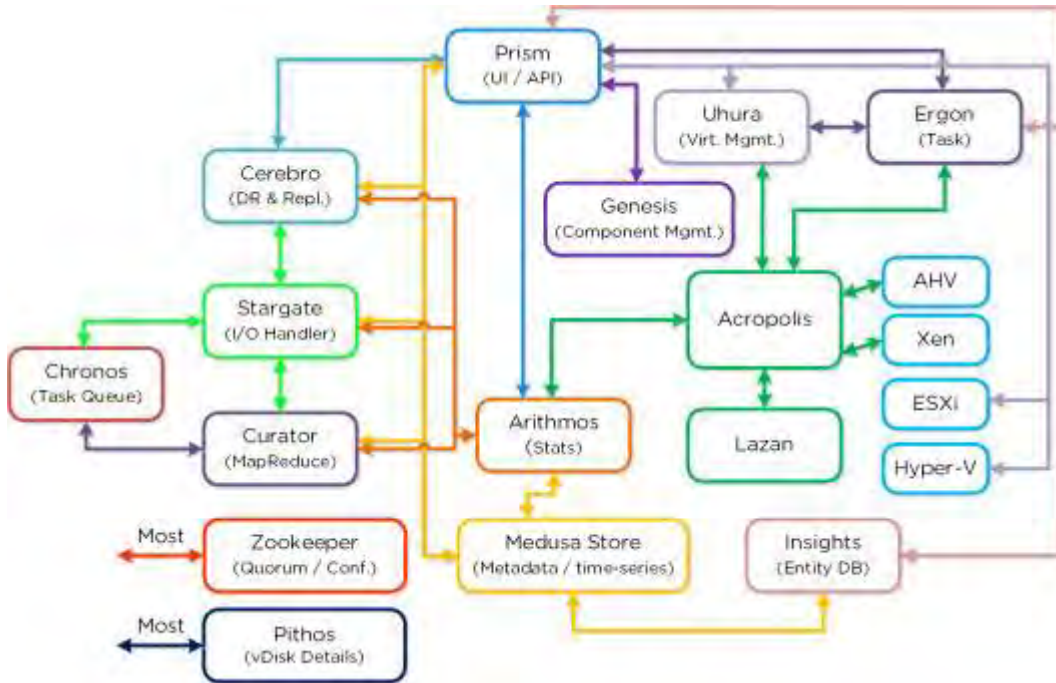
Linear performance scaling with flexible capacity

*All vDisks are thin provisioned by default and thin provisioning is the recommended option (and only option for AHV). Thick provisioning is supported with ESXi.

DELLTechnologies

Controller VM (CVM)

Web-scale microservices architecture



Read more about CVM Field specifications here:
[AOS 7.0 - Controller VM \(CVM\) Specifications](#)

- The CVM is a virtual machine that will run on every node in your Nutanix cluster
- It runs the Nutanix software and serves all I/O for the chosen hypervisor and the VMs running on the host
- Plays a pivotal role in data management within the Nutanix Environment
- Composed of web-scale microservices architecture. If a service crashes on one CVM, other services on other CVMs can respond, and can self-elect a new leader if needed
- Orchestrates critical data services to manage distributed file systems while ensuring data integrity and availability:
 - o Handles user I/O
 - o Data placement
 - o Metadata management
 - o Storage efficiency improvement through data compression, deduplication and erasure coding
 - o Optimizes system performance
 - o Plays a role in data protection mechanism – Snapshots and replication
- Compute resources of the CVM are measured in logical cores and are allocated when AOS is installed from the Foundation.

Dell Data Protection options for AHV



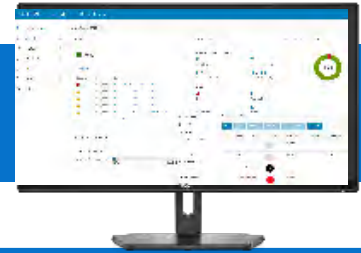
APEX Backup Services

- ✓ AHV image backups and granular recovery
- ✓ Backup direct to cloud with source side data reduction
- ✓ No infrastructure or software to purchase or maintain/upgrade
- ✓ Zero trust platform with Isolation, encryption, and immutability, MFA, RBAC
- ✓ 24x7 SOC, pen testing, and regular patching for platform
- ✓ Single solution to protect data center, cloud, endpoint, and SaaS



PowerProtect DD

- ✓ Purpose built backup appliance integration with HYCU, Veeam, Commvault, and others
- ✓ Industry leading data reduction
- ✓ Hardened linux os, proprietary hashed file system, dual role authorization, NTP tamper prevention, encryption, and immutability
- ✓ Boost protocol provides better security and performance
- ✓ Physical, Virtual, or Cloud optimized



PowerProtect Data Manager

- ✓ AHV support expected in 1H CY25
- ✓ Simple lifecycle management
- ✓ Admin self-service with enterprise visibility
- ✓ Protect modern workloads and databases (K8s, SAP HANA, SQL, Oracle)
- ✓ Protect Windows, Linux, NAS, Exchange, and Active Directory
- ✓ Integrated anomaly detection
- ✓ Deploy on-prem or in-cloud

Read more about Nutanix Disaster Recovery [here](#)

Dell XC Plus – seamless cluster management

One-click upgrades & automated rollouts

Effortlessly upgrade entire clusters with Nutanix Prism's single point of control

Automate and orchestrate hardware maintenance updates with Nutanix LCM and iDRAC

Rapid, risk-free deployments

Save time and minimize errors with automated deployment tools

Ensures a smooth consistent, repeatable, and guided process

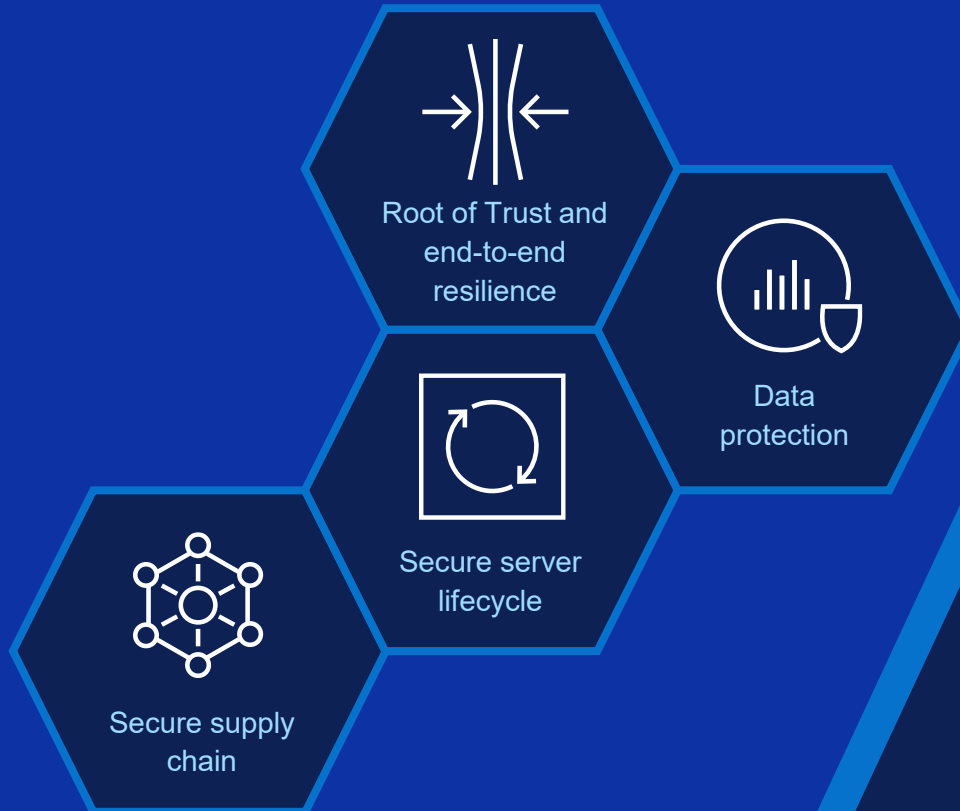
Real-time cluster insights

Gain comprehensive visibility into your HCI environment with a centralized monitoring console

Monitor health status, resource utilization, and performance across nodes and components for proactive troubleshooting

Dell XC Plus security advantage

Safeguard your data and intellectual property with
Cyber Resilient Architecture

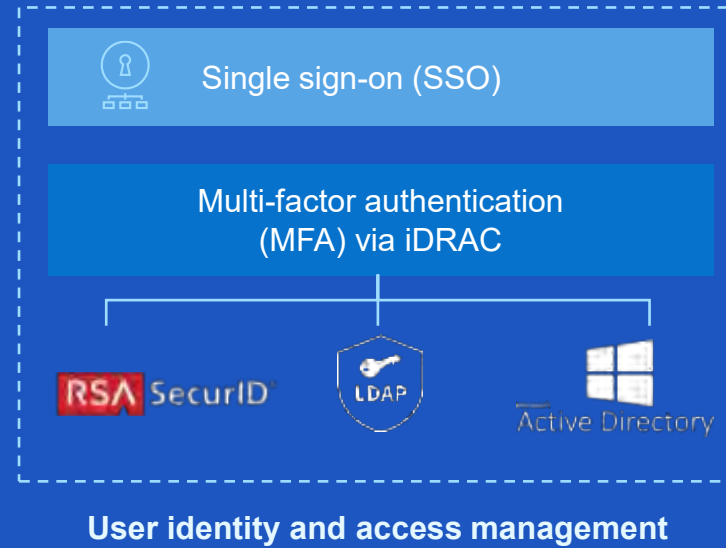
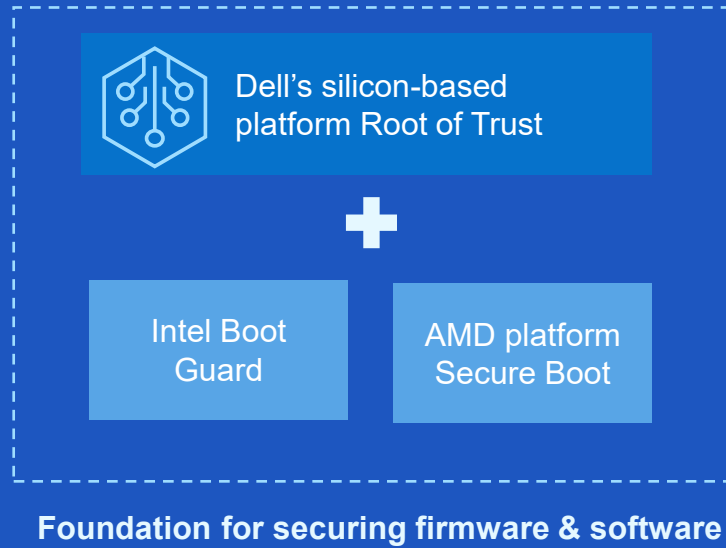


- | **Confidently deploy with built-in cyber-security controls and a **protected supply chain**.**
- | **Continuous security to protect, detect and recover from threats.**
- | **End-to-end boot resilience, anchored with **Root of Trust**, ensures a trusted and protected boot cycle.**
- | **Safeguard sensitive information at all times using **strong encryption** and new confidential compute technologies.**
- | ****Zero trust** is integral to the Dell Technologies infrastructure end-to-end lifecycle.**

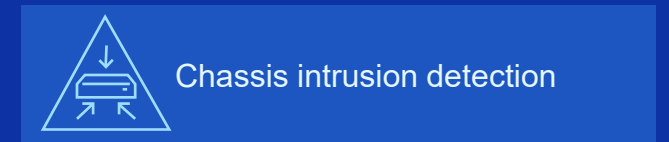
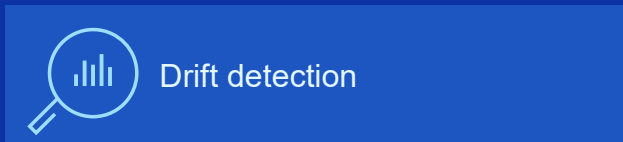
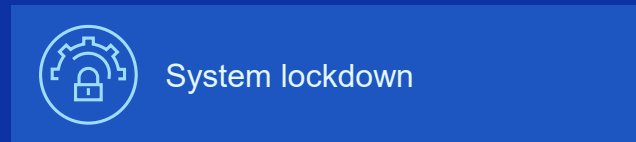
Dell XC Plus Security

End-to-end resilience and integrity

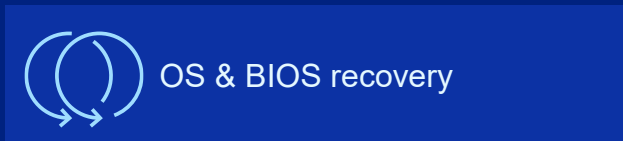
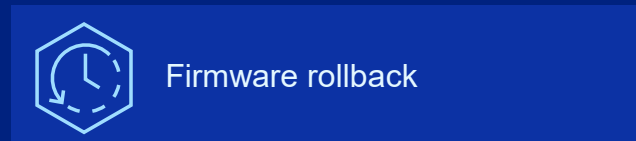
Protect



Detect



Recover



Deployment and expansion scenarios

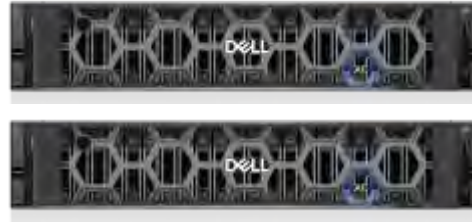
Start with what you need and scale-up and scale-out* for future growth



Single-Node Cluster

- Ideal for customers with remote, edge or branch projects who want to extend the Nutanix benefits beyond the core data center
- Smaller footprint and lower cost than what a 2-node cluster can deliver, and who are also willing to accept a lower level of resiliency.
- Single-node expansion is not supported
- All Dell XC platforms support Single Node deployments

Node Scaling not supported



2-Node Cluster

- Two-node XC node deployments offer the option of a two-node ROBO implementation and other scenarios that require a lower cost yet high resiliency option for customers.
- Simplifies storage networking with option of ToR or using direct connection between cluster nodes.
- Network latency between a 2-node cluster and the Witness VM should not exceed 500ms.
- Cluster expansion not supported for 2-node clusters

Node Scaling not supported



Standard XC cluster (3 nodes and up)

- Scalable clusters that can be expanded from 3-node to maximum cluster size of 32 nodes with AHV (or up to 48 nodes with ESXi)
- Scaled out in 1-node increments
- With every additional appliance, the system proportionately increases compute, storage, virtualization, and management capabilities.
- The one-click integration into an existing cluster enables the automatic rebalancing of resources and workloads, effectively aggregating them into a unified resource pool

Scalable

***NOTE: Liaise with your Dell representative to determine which professional services may be required.**

XC Plus

Offer Overview

- Dell XC platform hardware transacted with Nutanix software through Dell
- Nutanix AHV management and HW updates performed through Nutanix Prism

6 Dell XC Platforms

- XC660 and XC760
- XC660xs
- XC4000
- XC760xa
- XC7625



Nutanix Software

Subscription Options

- Nutanix Cloud Platform (NCP)
- Nutanix Cloud Manager (NCM)
- Nutanix Cloud Infrastructure (NCI)

1- and 3-year subscription licensed per core

Dell XC Plus - Platform options

Optimize your IT with a tailored platform for your environment and use case



XC660xs

Cost optimized entry-level, single-socket or dual socket

Medium density virtualization and Cloud-Native requiring low-medium local storage

Traditional database & scale out database with low-medium local storage



XC660

For core deployments

Specialized for VDI and applications needing balance of high-performance storage and compute

Optional GPUs for AI/ML, HPC workloads



XC4000

Ideal for space-constrained, remote, extreme environments

Can be racked, stacked, or mounted on a wall

VDI, IoT, point of sale, video surveillance, manufacturing, data aggregation/compression

Latest Intel XEON processors

DDR5 memory

PCIe Gen5 capability

Zero Trust approach security

Dell XC Plus - Platform options

Optimize your IT with a tailored platform for your environment and use case



XC760

Capacity and performance optimized platform

Built for high performance database applications (Oracle, Microsoft SQL) and storage heavy enterprise applications (Exchange, Sharepoint)

Optional GPUs to offer the highest throughput on the largest datasets



XC760xa

Designed to boost acceleration performance across the widest range

Maximizes results from AI to Modeling & Simulation applications with maximum flexibility (up to 12 SW GPUs)

AI-ML/DL training and inferencing, Metaverse, Digital Twins modeling, high-performance compute, render farms and virtualization



XC7625

Accelerated compute to maximize performance in a dense, scalable server architecture

Uses AMD EPYC processors to deliver up to 50% more core count per single socket platform

Optional GPUs to offer the highest throughput on the largest datasets

Latest Intel & AMD processors

DDR5 memory

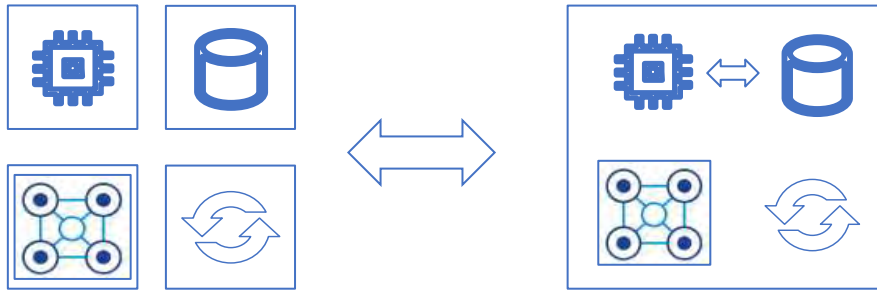
PCIe Gen5 capability

Zero Trust approach security

PowerClub – Agenda



LiveOptics: Erfassung und Analyse der Anforderungen

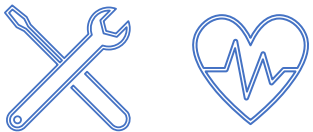


Produkte: Aktuelles von PowerEdge und Powerstore

Technologie: Intel, AMD, Nvidia,...

Virtualisierung: Server/Storage versus Hyper-Converged

Vergleich: VMWare, Hyper-V, Azure Local, Virtuozzo, Proxmox,...



Administration
Life Cycle Management
Support



Backup & Restore
DataDomain und PowerProtect



Cyber Security

AGENDA

09:00 – 09:45 Agenda / LiveOptics / Demo Setup

09:45 – 10:00 Pause

10:00 – 10:45 PowerEdge Server

10:45 – 11:00 Pause

11:00 – 11:30 Systemadministration am Beispiel Vsphere

11:30 – 12:00 Virtualisierung im Vergleich (Azure Local, Nutanix)

12:00 – 13:00 Mittagessen

13:00 – 13:45 Virtualisierung im Vergleich (Virtuozzo, Proxmox, Openshift)

13:45 – 14:00 Pause

14:00 – 14:45 Powerstore

14:45 – 15:00 Pause

15:00 – 15:45 Data Protection

15:45 – 16:00 kommerzieller Vergleich





Virtuozzo

OpenStack as Infrastructure as a Service



Flexibility

Huge range of services

Customize it
however you need

No Lock-In

Vendor-agnostic

Easier to migrate



Cost Efficiency

Avoid vendor tax

Use a wide range of
hardware



Community Support

Huge global
developer network

Continual innovation



But standard OpenStack is challenging for production

n d ...



Easy deployment



Rapid time
to market



Low management
overhead



Low TCO



OpenStack Reality



Complex



Time-consuming



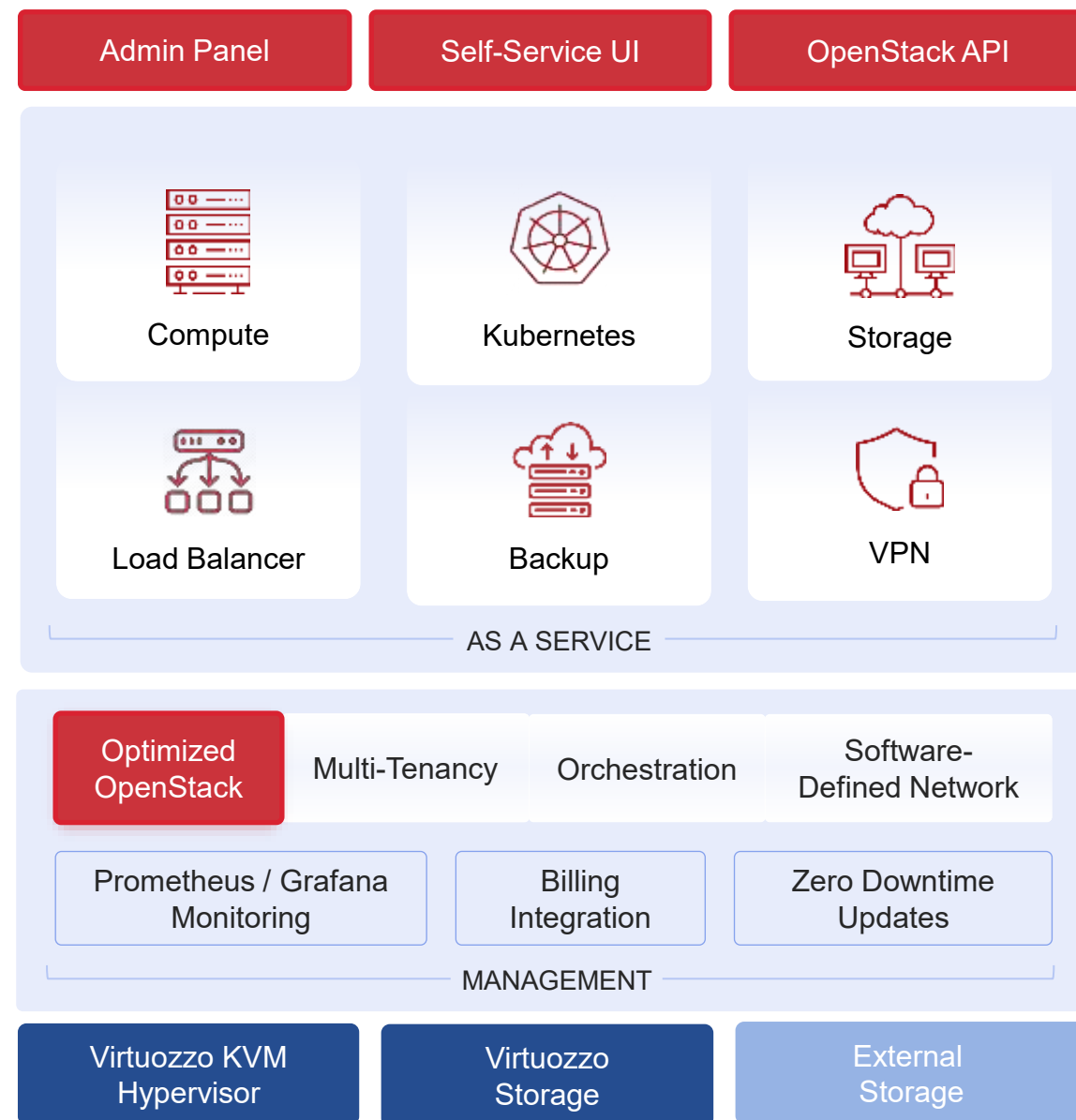
Requires skills or
headcount you
just don't have



Free to download,
expensive to run

Virtuozzo: production-ready OpenStack

- ✓ **Out-of-the-box cloud platform**
KVM virtualization, K8s, storage, orchestration, network
- ✓ **Automated install + zero downtime updates**
Significantly lower TCO and risk, true high availability
- ✓ **Tuned for performance + efficiency**
Optimized KVM, storage up to 3x faster than Ceph 16.x
- ✓ **Hugely experienced engineering team**
Your interface to the OpenStack community
- ✓ **Commercial 24/7 support for all components**
Enables predictable SLA for end customers
- ✓ **Self-service panels with white-labeling**
Comprehensive UI for platform admins and customers
- ✓ **Ready to use additional services**
Octavia, Magnum, Freezer, Watcher



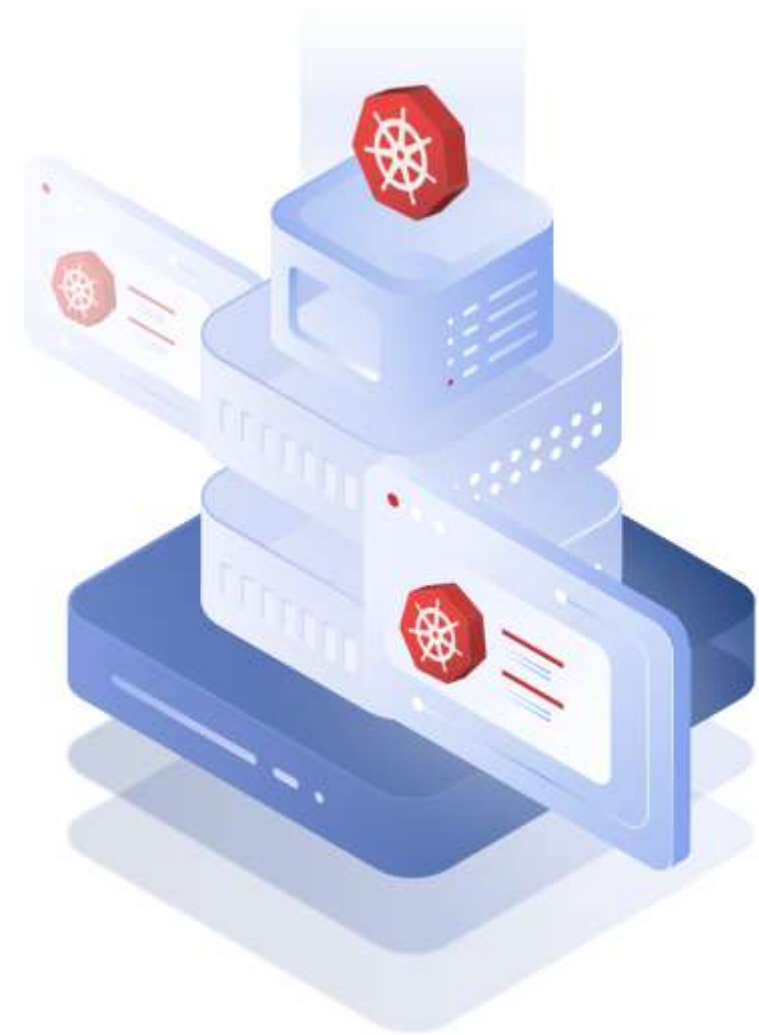
Private Cloud Infrastructure for Enterprises

- Built-in compute, network, storage & unified management in a dedicated private cloud installation
- Industry-standard Kubernetes-as-a-Service
- Integrated S3 object storage, iSCSI block and NFS file storage
- 3rd party storage support: iSCSI, FC, NFS
- Built-in load balancer, VPN and backup-as-a-service
- 3rd party backup and disaster recovery systems
- Tailored for cloud-native apps and emerging markets of AI/ML
- GPU and vGPU support
- Advanced monitoring based on Prometheus and Grafana
- Industry standard OpenStack API
- Pay as you Go and annual subscription pricing model
- Professional services: workload migration, deployment, managed services



Cloud Platform for Kubernetes Management

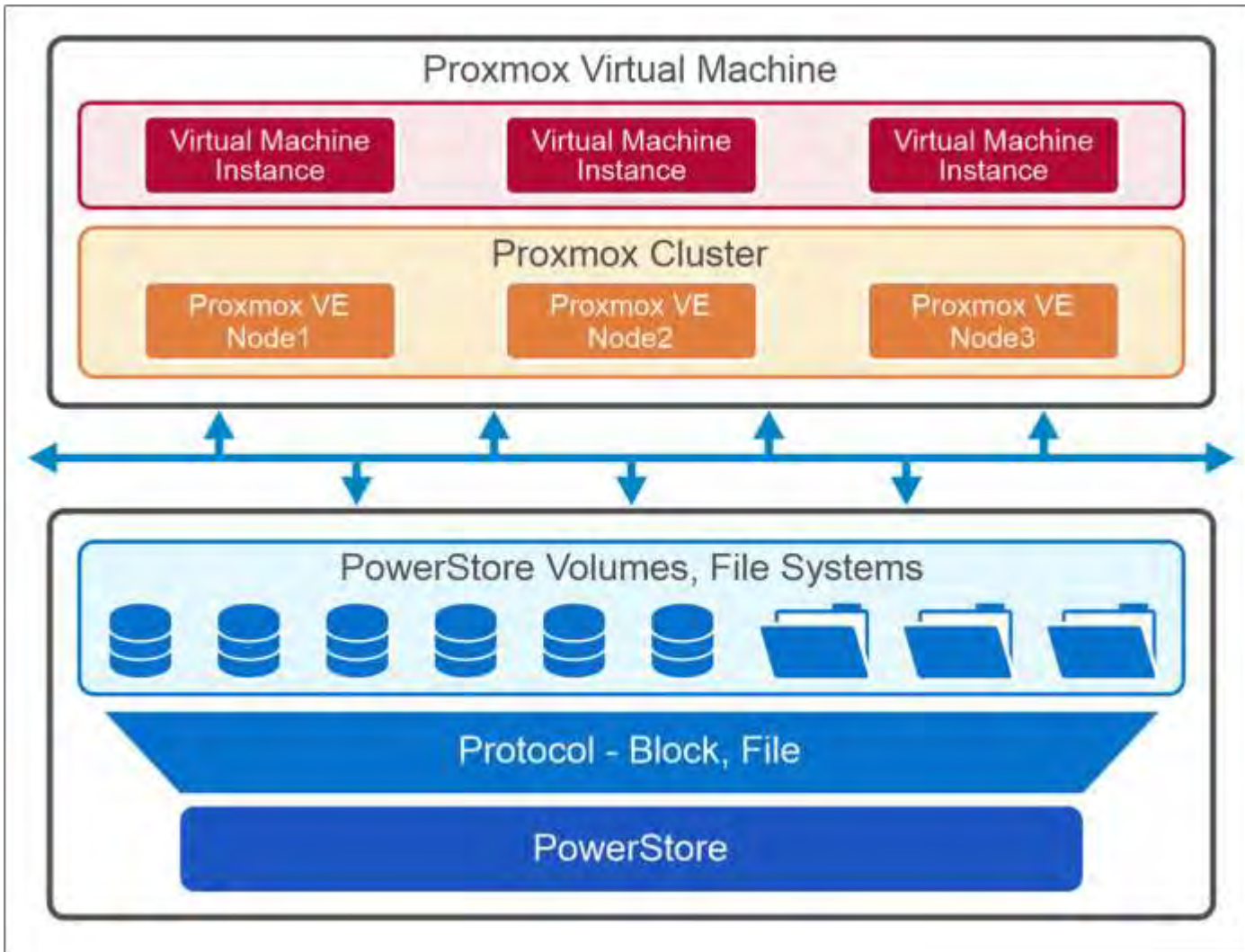
- Automated Kubernetes deployment and updates
- Industry standard, CNCF-certified Kubernetes implementation based on OpenStack Magnum
- Integrated Cluster Autoscaler for automated horizontal scaling according to the cluster load
- Pre-integrated persistent storage and load balancing
- Highly available Control Plane
- Integrated Monitoring with Prometheus and Grafana
- Multiple network options support
- Flexible cluster management with labels
- Rolling Kubernetes cluster update
- Cilium network plugin
- Compatible with third-party backup and disaster recovery solutions such as Trilio and Velero





Proxmox

Proxmox + Powerstore



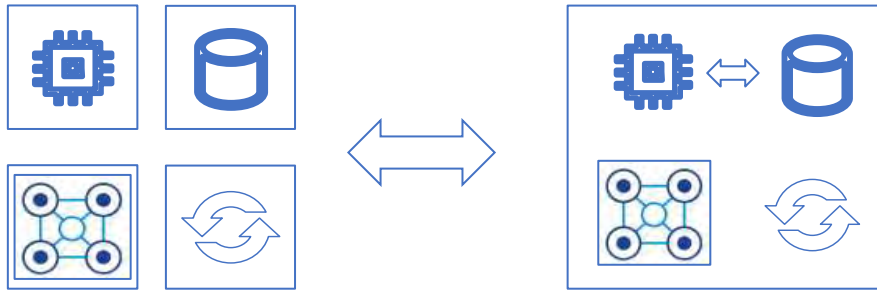
- Considerations

- Lifecycle Management
- No VSI Integration – no storage snapshots from PVE
- No VM Snapshots with shared VG
- NFS mounts
- Currently no 24/7 support
- E.g. SAP on Proxmox ?
- Good Linux knowhow

PowerClub – Agenda



LiveOptics: Erfassung und Analyse der Anforderungen

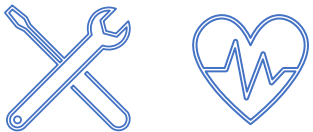


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Life Cycle Management
Support



Backup & Restore
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Cyber Security

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- 09:00 – 09:45 Agenda / LiveOptics / Demo Setup
- 09:45 – 10:00 Pause
- 10:00 – 10:45 PowerEdge Server
- 10:45 – 11:00 Pause
- 11:00 – 11:30 Systemadministration am Beispiel Vsphere
- 11:30 – 12:00 Virtualisierung im Vergleich (Azure Local, Nutanix)
- 12:00 – 13:00 Mittagessen
- 13:00 – 13:45 Virtualisierung im Vergleich (Virtuozzo, Proxmox, Openshift)
- 13:45 – 14:00 Pause
- 14:00 – 14:45 Powerstore
- 14:45 – 15:00 Pause
- 15:00 – 15:45 Data Protection
- 15:45 – 16:00 kommerzieller Vergleich



PowerStore

PowerStore momentum continues

Industry validation



Storage Product of the Year
3rd consecutive year!

“This is a major leap upgrade, not just window dressing” – Products of the Year judge, [TechTarget](#)



Independent 3rd party
Business Value Assessment
468% 3-year ROI

“Pays back investment in 11 months”

Customer adoption

Deployed in over **90%** of Fortune 500 sectors

Aerospace & Defense

Apparel

Business Services

Chemicals

Energy

Engineering
& Construction

Financials

Food, Beverage
& Tobacco

Healthcare

Hotels, Restaurants
& Leisure

Household Products

Industrials

Materials

Media

Motor Vehicles
& Parts

Retailing

Technology

Telecommunications

Transportation

Wholesalers

90+

countries
shipped

150M+

Run hours
clocked

4+ EBe

capacity
shipped

24%

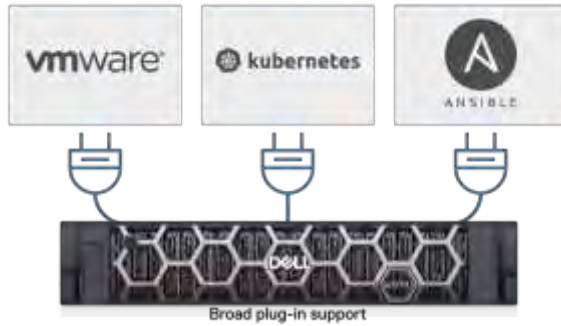
customers new
to Dell Storage

Simplified management for seamless operations

Streamlined storage with simplified integration

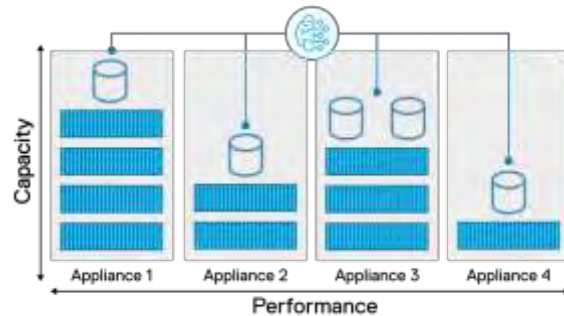
Programmable infrastructure

Automated, end-to-end workflows



Autonomous Appliance

Machine learning engine



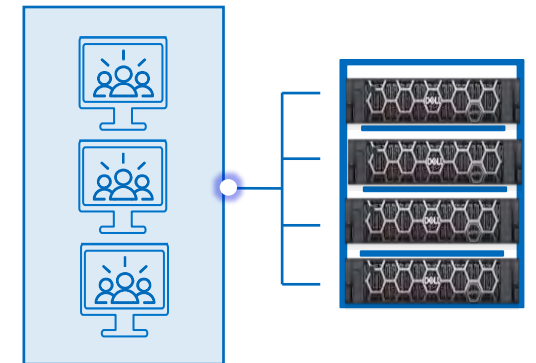
Simplified Management

Intuitive management and monitoring interface



No additional software or hardware required!

User Deployed & Maintained

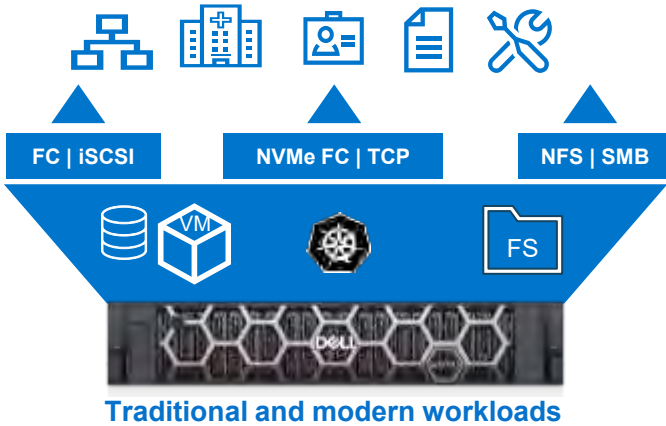


Simplify IT operations – So you can focus on business outcomes

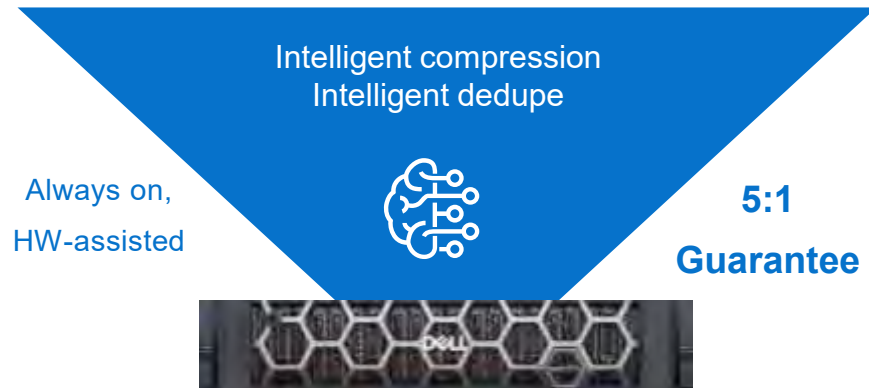
Continuously modern storage

Flexible architecture and program advantages help you adapt to any future

Any Workload



Self-optimizing Architecture



Non-disruptive upgrades



Future-Proof advantages



5:1 DRR Guarantee ¹



Dynamic Resiliency Engine

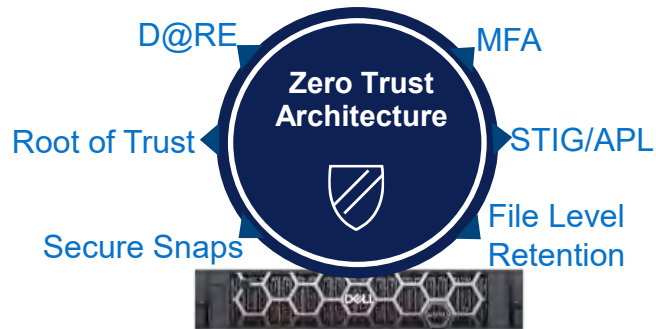


Lifecycle Extension with ProSupport

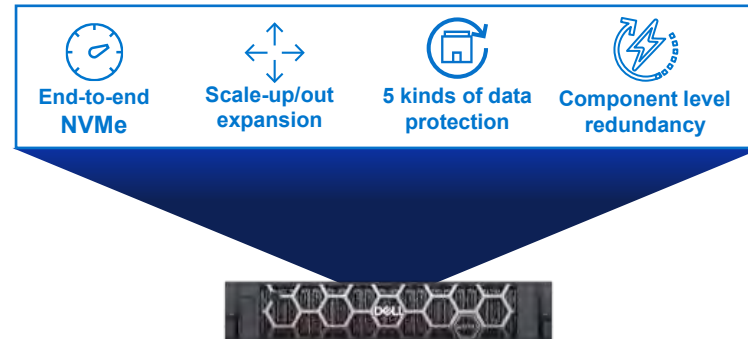
Resilient Architecture

Robust redundancy for uninterrupted performance and data protection

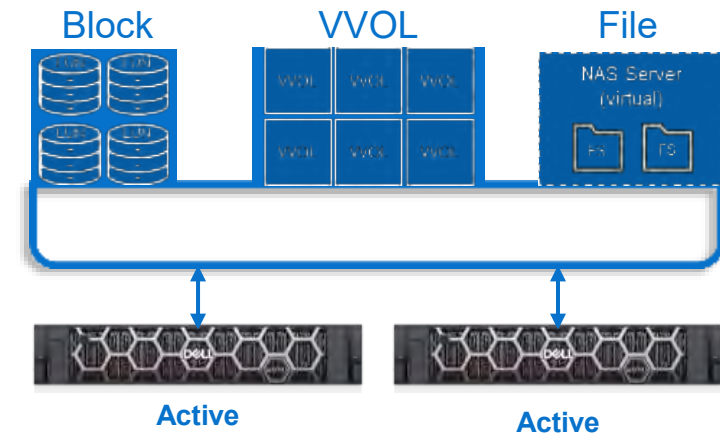
Enhanced Security and Protection



Efficiency without Compromise



High Availability



Designed for **99.9999% availability**

Protect storage systems

Secure critical data and reduce attack surface

Multi-layer Security

Trusted Admin Access Control

Multi-Factor Authentication (RSA SecurID)
Role-Based Access Control (RBAC)
LDAP support



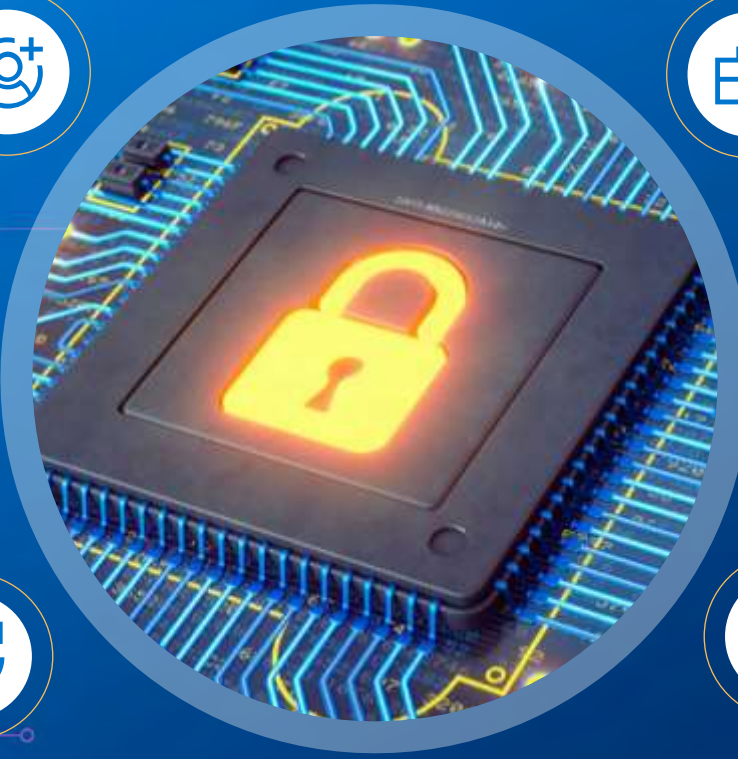
Data at Rest Encryption

Native solution
External key manager support
Self-encrypting media



Built in Hardware Security

Immutable HW Root of Trust
Secure Boot Chain of Trust
Digitally signed FW updates



Security Certifications

STIG/APL, USGv6-R1
FIPS 140-2/3 validated
Common Criteria
DoDIN APL



Cyber Security Resiliency

Secure & Immutable Snapshots
File Level Retention (FLR)
Operational air gap (PowerProtect CR)



Advanced Threat Detection

Security configuration deviation
Secure syslog events and exports
CEPA / CAVA



VAULT

DELL Technologies

PowerStore Family

PowerStore model	500	1200	3200 ³	5200	9200
CPU (appliance)	24 cores 2.2GHz	40 Cores 2.4GHz	64 Cores 2.1GHz	96 Cores 2.2GHz	112 Cores 2.2GHz
Memory (appliance)	192GB	384GB	768GB	1152GB	2560GB
Max capacity (appliance)	6.16 PB Effective <i>(1.49 PB Raw)</i>	5.90 PB Effective <i>(1.43 PB Raw)</i>			
Max capacity (cluster)	24.64 PB Effective ² <i>(5.96 PB Raw²)</i>	23.60 PB Effective <i>(5.71 PB Raw)</i>			
Max drives (appliance / cluster)	97 / 388 ²	93 / 372			
Drive types	NVMe SSD	NVMe SSD			
Embedded ports ¹	25/10/1 GbE	25/10/1 GbE or 10/1 GbE BaseT			
Expansion (per appliance)	Add up to 3 expansion enclosures per appliance				
Clustering	Up to four appliances (mix and match any model/config)				
IO Modules	32/16/8 Gb FC, 100/25/10 GbE, 10/1 GbE BaseT				
Front-end connectivity	FC: 32Gb NVMe/FC, 32/16/8Gb FC; Ethernet: 100/25/10 GbE NVMe/TCP, iSCSI, File				

1 - 500 customers may order without embedded ports

2 – Larger configurations available in mixed clusters with other PowerStore models

3 – Offered as T and Q model

PowerStore

MANAGEMENT
AND SERVICE PORTS
(1+1 PER NODE)

4-PORT MEZZ CARD
25GbE/10GbE IP OPTICAL OR 10/1GBaseT
(1 PER NODE)

NODE B

NODE A



2U

OPTIONAL
IO MODULES
(2 PER SP)

32/16/8Gb FC (4-PORT)
25/10GbE IP OPT (4-PORT)
10/1GbT IP (4-PORT)

DRIVE
EXPANSION
PORTS
(2 PER NODE)

PowerStore Ecosystem

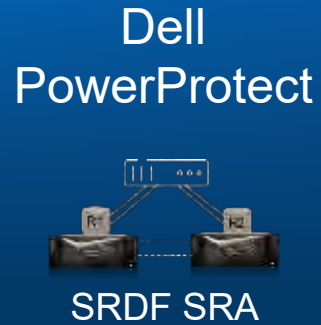
Enabling **modern** automation and DevOps



Automation Enablers



DR/Protection



Monitor



Management



Containers/Platform



Data Mobility

PowerStoreOS 4.x data mobility options

Block **vVols** File

Support more solutions, innovate without limits.

Seamless import

Native block

- SC, PS, XIO, VNX, Unity
- VMax AF
- NetApp
- iSCSI or FC connect – **NEW**

Native file

- VNX
- Unity – **NEW**

File via Datadobi – **NEW** (Software now included)

- NetApp
- Unity

Replication

RP4VM

- Block (*sync, async*)
- **vVols** (*sync, async*)

Native

- Block *async*
- File *async*
- **vVols** *async*
- Block *sync* – **NEW**
- File *sync* – **NEW**

Metro area replication

Native Metro Volume

- Active/Active block sync metro
(VMware, *Linux, Windows* – **NEW**)

Metro node

- Block sync metro (*active/active*)
- Heterogeneous arrays

Now protect any workload

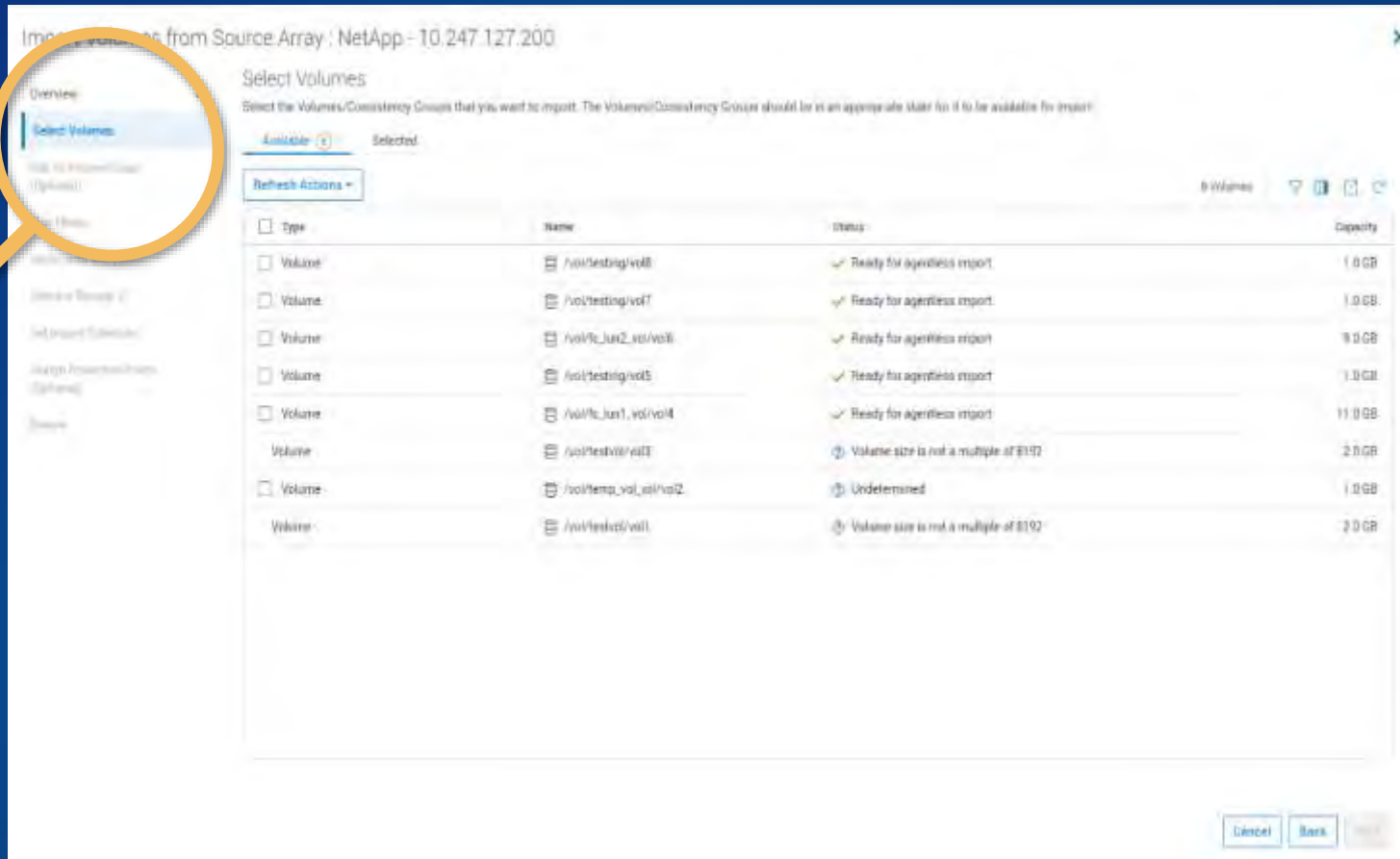
Import

Replicate

Distance

Universal Storage Import

Provides simple way to import block storage from ANY array!



- Driven from PowerStore Manager
- Completely agent-less
- Scalability identical to Destination PowerStore
- Intuitive, consistent workflow and alerting
- FC and iSCSI support



Native Metro Volume synchronous block replication

Create a high availability storage environment across sites.

Active/Active

Hosts write to PowerStore on either side. Data remains 100% in sync, *zero RPO/RTO*.

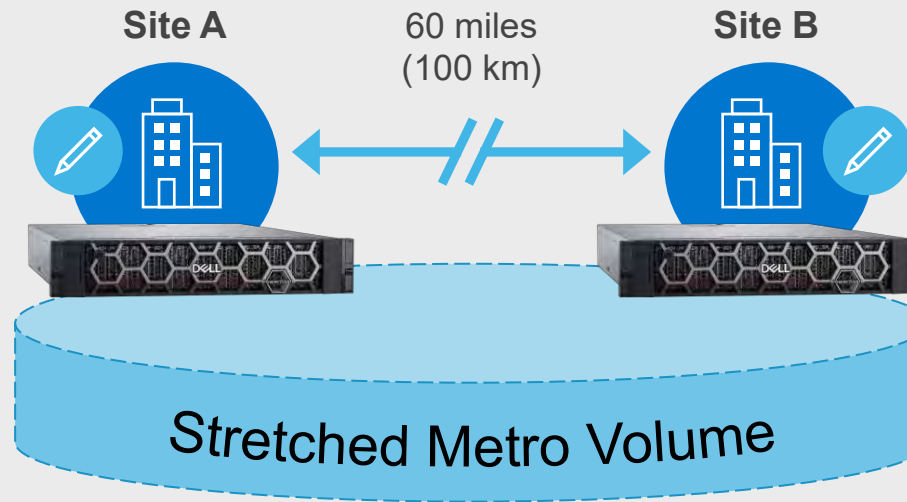
Built-in data service

Supports Gen 1 and Gen 2 hardware platforms with PowerStoreOS 3.0.

Easy to set up

No additional software or licenses needed to enable, configure in 6 clicks!

Data protection, load balancing, migration



Resilient

Integrated with VMware, Windows, and Linux HA to optimize and balance uniform and non-uniform clusters.

Flexible

Enables transparent load balancing and VM migrations between sites/arrays.

Supports heterogeneous PowerStore appliances – including PowerStore 500 and Gen 1 models!*

Now deploy **1PBe capacity + native metro sync** in a single, scalable 2U appliance.

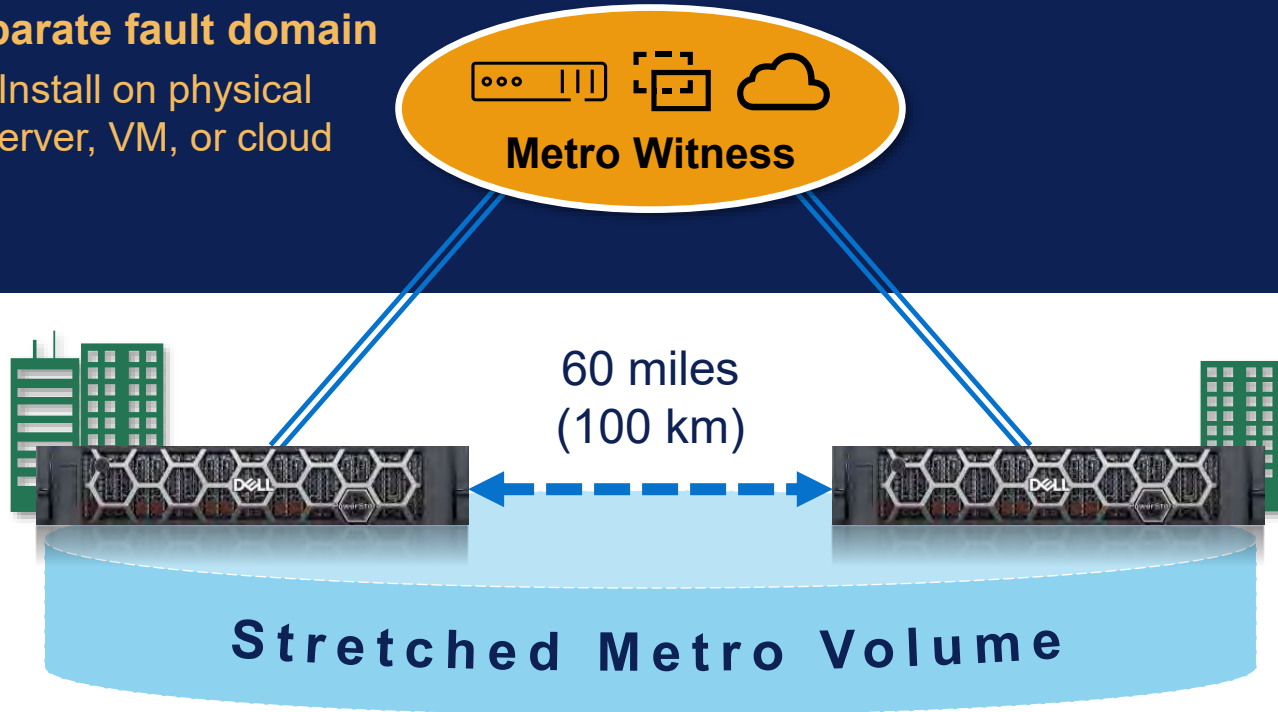
* Currently available on PowerStore T models only

Native metro volume: Third site witness

Fully-automated HA for mission-critical VMware workloads

Separate fault domain

Install on physical server, VM, or cloud



Native SW-only solution for Zero RTO/RPO needs

Active/Active: read/write to either side, 100% in sync

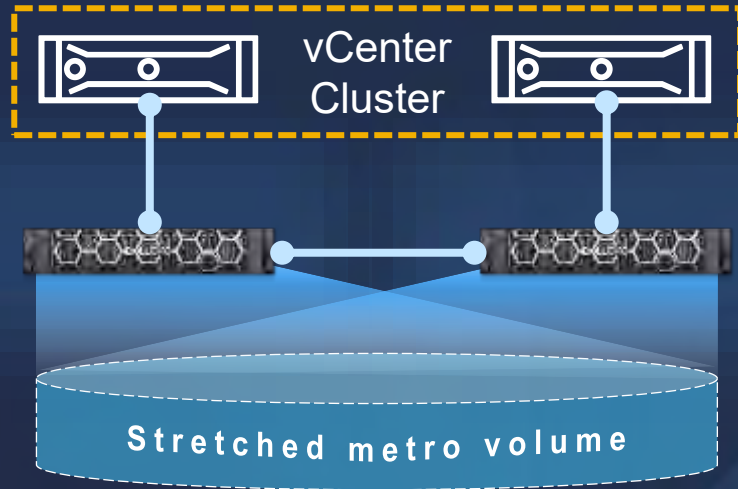
Third site witness option

- Automates recovery from either array *without manual intervention!*
- Prevents split-brain scenarios
- Easy to deploy in just minutes
- Single witness works with multiple PowerStore clusters and/or metro volumes
- No license or purchase required!

Uniform and non-uniform deployment options

Local/Non-uniform Host Connectivity

Hosts are each connected to a single array

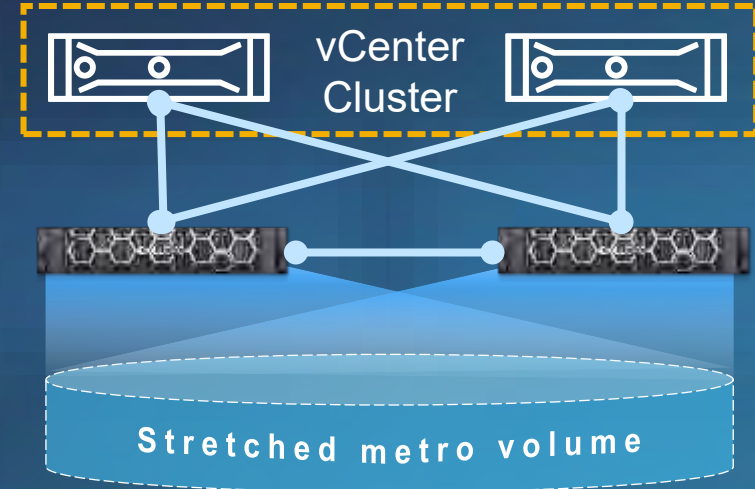


Enforces site affinity, hosts only have paths to their local array

- VMs runs on local array only and reduce network load of cross connecting hosts
- Enables traditional synchronous replication with the ability to restart/recover from either site

Metro/Uniform Host Connectivity

Hosts are cross connected to both arrays

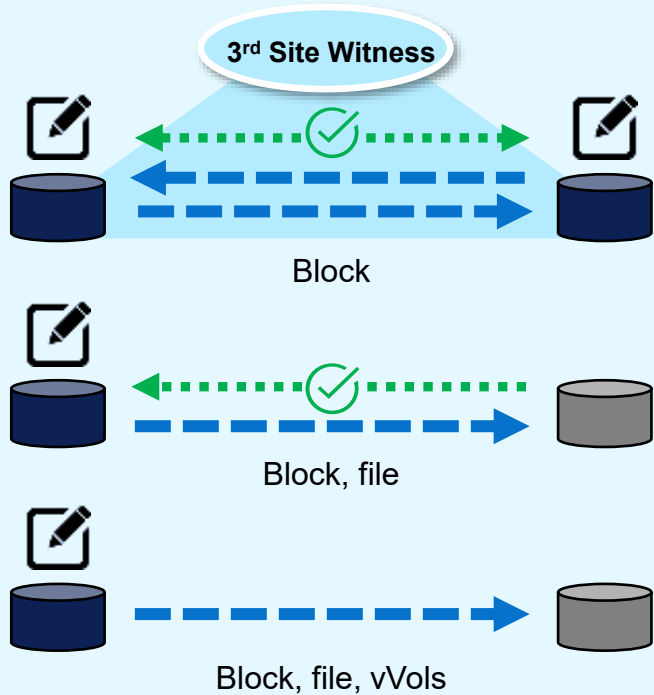


Most common active-active deployment, hosts can read/write to either site/array

- Pathing between hosts and arrays allows recovery/restart at the “non-preferred” site/array
- In event of a host/storage failure, host IO remains available on the “preferred” site

PowerStore native replication options

Select customized data protection and availability for each workload



Metro Volume Synchronous

- Now supports **Windows**, **Linux** and VMware environments **New!**
- Zero RTO/RPO, active/active writes to either location
- Automated failover and failback
- Witness prevents "split brain"

Synchronous **New!**

- Second site acknowledgement ensures 100% data integrity
- Easy failover, pause, resume, re-protect, and failback within PowerStore UI
- Protect Volumes, Volume Groups, NAS servers in same appliance

Asynchronous

- Replicate across ANY distance with as little as 5-minute RPOs
- Protect Volumes, Volume Groups, NAS servers in same appliance

Comprehensive protection
across data center,
campus or metro area



**PowerStore now supports up to 8X more
replication volumes per appliance¹**



ClusterLion for PowerStore

2024



Always-On Availability

IT services are the backbone of most companies. To ensure business continuity, systems and data are replicated in a second data center. Many companies need always-on availability to ensure productivity continues with zero system downtime.



Downtime impacts productivity, profits, and reputation!

*SOURCE: ServiceMax, from GE Digital, commissioned Vanson Bourne to conduct a global study into unplanned downtime, "After The Fall: Cost, Causes and Consequences of Unplanned Downtime."

*The Study surveyed 450 IT & field services decision makers in the UK, US, France and Germany across the manufacturing, medical, oil and gas, energy & utilities, telecoms, distribution, logistics and transportation sectors, among others.



There are only two options to switchover PowerStore NAS workloads...



Manual switchover
with downtime
for NAS servers and
applications

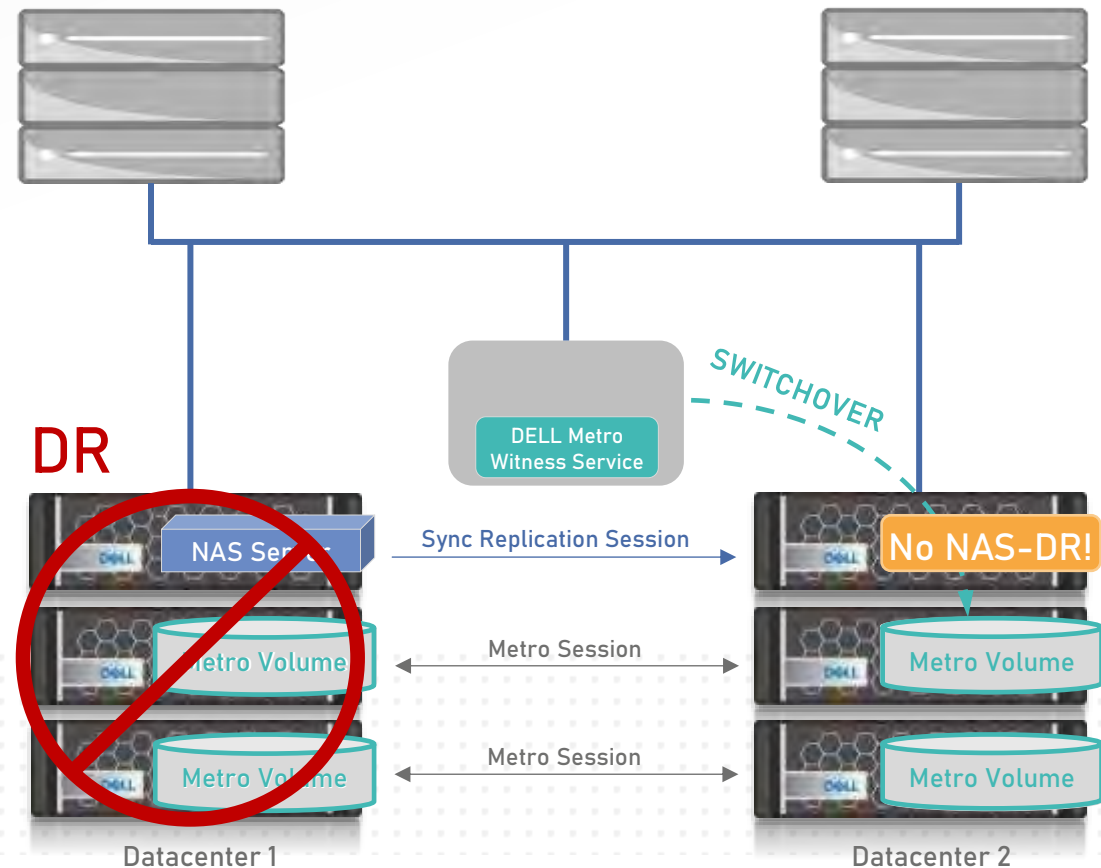


Fully automated
switchover for highest
availability

MetroVolumes and Switchover on PowerStore

NAS Servers don't switch over!

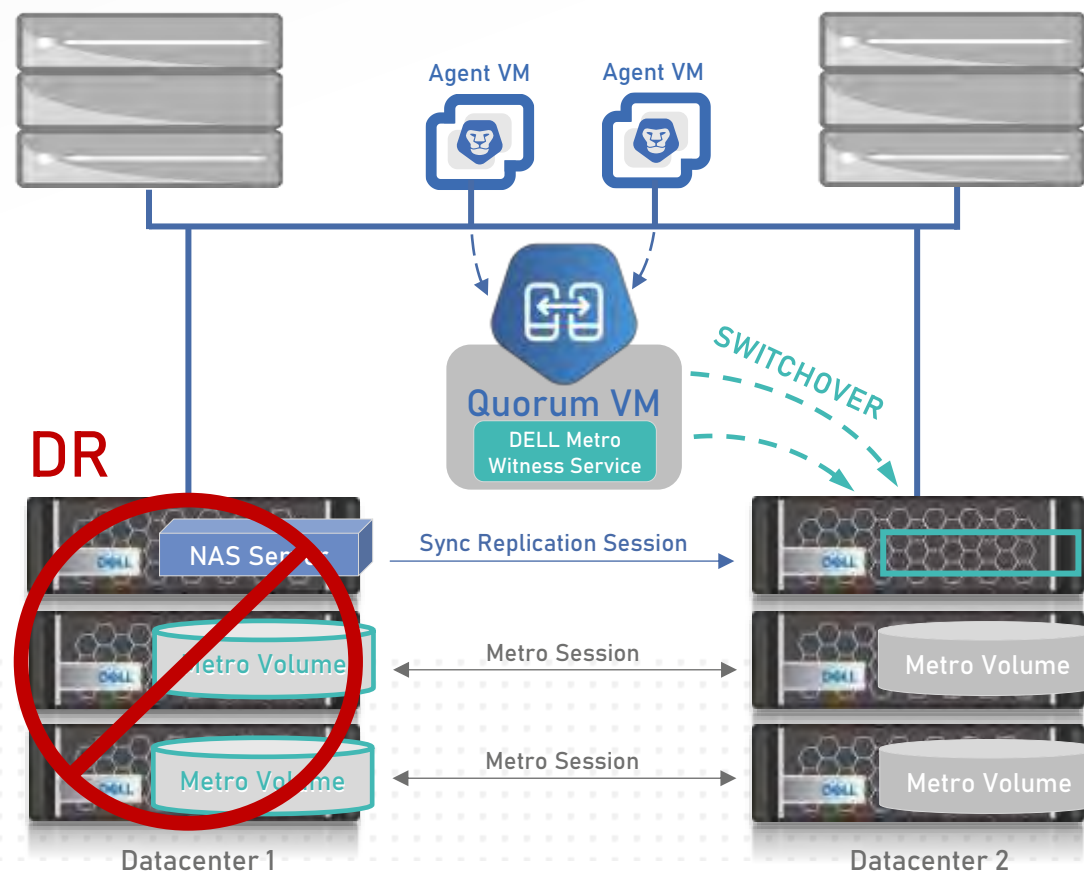
- For PowerStore DR you need a least 2 PowerStore appliances (4 Controllers)
 - Or more...
 - max. 4 appliances (8 controllers) per site
- NAS server for NFS and SMB workloads can only run on the first appliance
- All other appliances run SAN workloads
- Dell Metro-Witness will ensure automatic switchover of SAN workloads (Metro Volumes) in case of failure or disaster
- But NAS workloads (NAS Servers) don't switchover and go offline



Switchover with ClusterLion for PowerStore

- Simple deployment of ClusterLion VMs:
 - Agent VM – Metric collector
 - Quorum VM – Decision logic
- Health metrics are collected from the PowerStore nodes and the Metro Witness
- Automatic Switchover of all storage services (SAN & NAS) for highest availability

Always-ON for SAN & NAS



File Solutions

PowerStore file solutions

Consolidate file, vVols and block on a single platform.



Build your NAS breakthrough – *without the learning curve*

Traditional NAS

Home directories, file sharing/collaboration, file-based applications

VM Applications

Transactional workloads, SQL, Oracle, SAP HANA, etc.

Containers / DevOps

Workflow automation, on-demand infrastructure, cloud-native apps

Unified platform experience



- ✓ No extra hardware or software required
- ✓ Intuitive UI toolset for block, file, vVols
- ✓ Common replication, snapshot, DR, load balancing
- ✓ Common metrics, alerts, analytics/forecasting

PowerStore file solutions



Enterprise NAS capabilities

...on an intelligent, Unified platform

Scalable

- 4PBe per appliance
- 256TB per namespace
10M subdirectories, 32B files
- Multi-tenancy support
VLAN, 2000 file systems/appliance
- File system shrink/extend
- Up to 4x more scalable!

Flexible

- Multi-protocol (NFS, CIFS)
- General file systems
- VMware file systems
- Kubernetes, CSI/CSM
- vRO, VSI, VAAI, VASA

Simple to use

- Unified interface
- Wizard-based deployment
- Provision your way
vSphere, REST, CLI, Ansible
- Cloud-based analytics, alerts
- Included migration tools

High performance

- NVMe, dual-socket CPUs
- 100GbE networking
- File on all Ethernet ports
- Link aggregation
- 64-bit file systems

Efficient

- Thin provisioning/clones
- Always-on data reduction
4K, global dedupe, compression
- Quotas (user, tree)

Highly available

- File async replication
- Easy DR testing
- Dynamic Resiliency Engine (DRE)
- NAS server auto-failover
- NDMP backups (3-way)
- Fail-Safe Networks

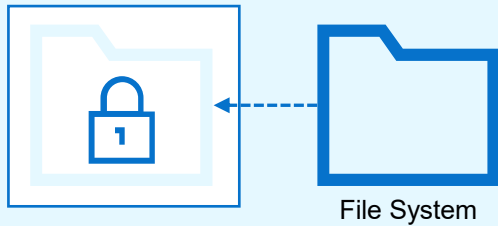
Secure

- Access/permissions control (Kerberos, LDAP, LDAPS)
- Anti-virus (multi-engine support)
- In-flight data encryption (SMB3)
- File locking (FLR)
FLR-E, FLR-C
- Manage SMB share permissions from PowerStore
- File monitoring, ransomware prevention
Supports 3rd-party monitoring apps: Varonis, Stealthbits, DefendX.

File management enhancements

Protect, prioritize, and optimize your file environment with new management options

Secure Snapshots



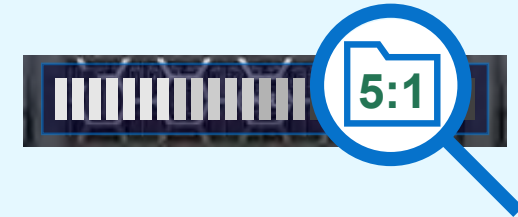
- Protect entire file systems from accidental or malicious deletion
- Ensure data integrity for compliance and regulatory purposes.
- Easy to manage via PowerStore Protection policies

Quality of Service



- Establish bandwidth limits for file systems & NAS servers
- Streamlined policy workflow using PowerStore Manager, CLI, or REST API
- Ideal for service providers

Capacity Accounting



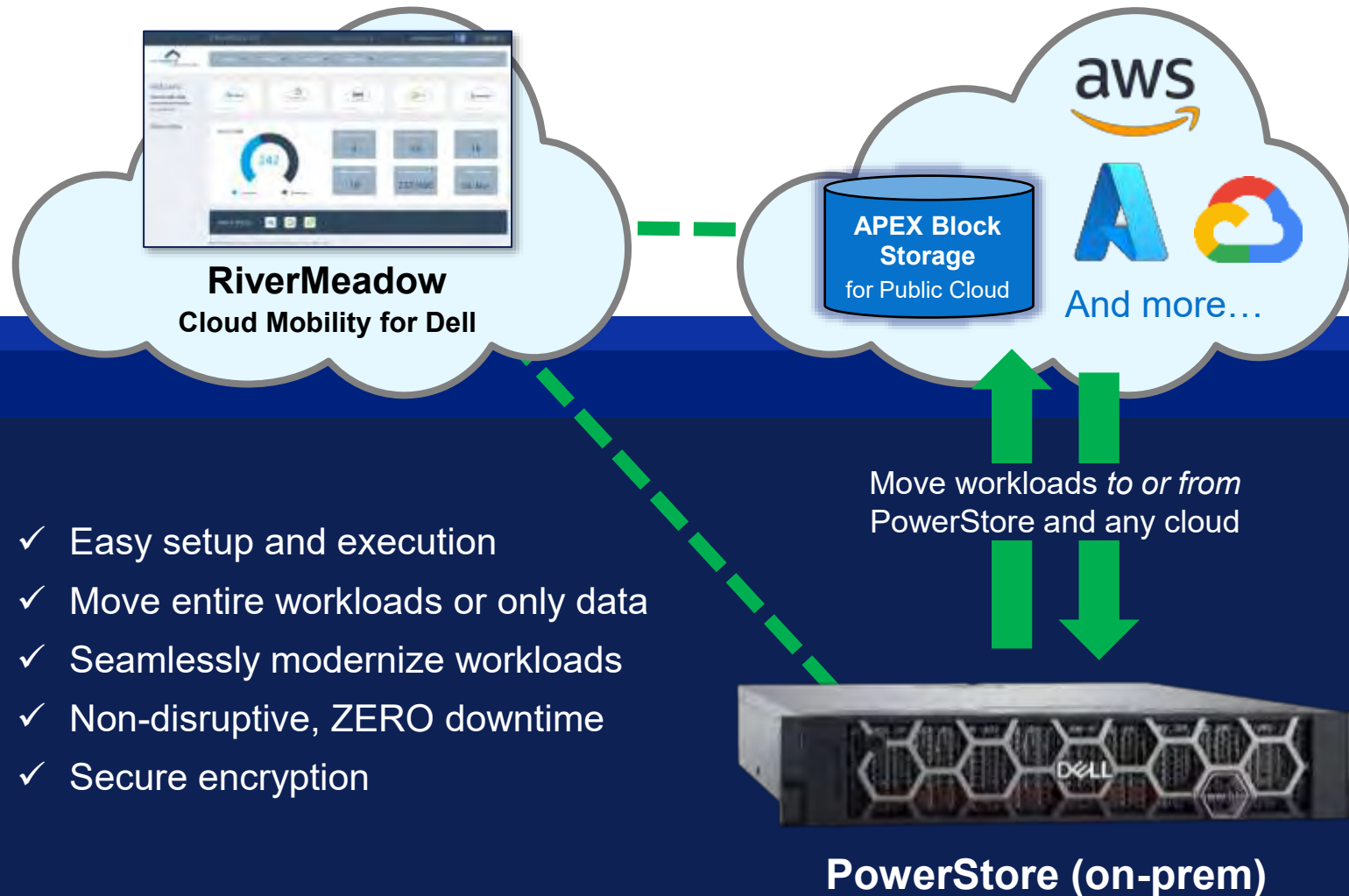
- Reducible and unreduceable data efficiency visibility for File Systems & NAS Servers
- Industry-leading capacity insights enable improved planning and optimization



Multicloud

RiverMeadow Cloud Mobility for Dell

Now connect PowerStore to the industry's most scalable block storage!



- ✓ Easy setup and execution
- ✓ Move entire workloads or only data
- ✓ Seamlessly modernize workloads
- ✓ Non-disruptive, ZERO downtime
- ✓ Secure encryption

Multicloud mobility solution for PowerStore

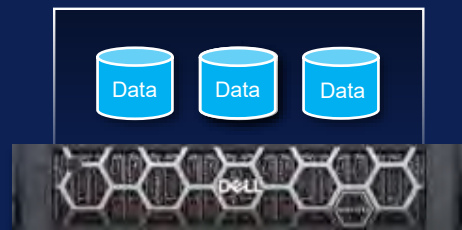
1. Move live PowerStore workloads to APEX Block Storage or ANY public cloud

Workload modernization & OS conversion managed by RiverMeadow!

2. Move any cloud (or on-prem) workload to PowerStore
3. SaaS-based licensing model!
No installs or contracts required

Available via Dell ETC
(Extended Technologies Complete)

PowerStore multi-cloud integrations



PowerStore

Data mobility

Data replication

Data backup

Operational consistency

Extend your on-prem vSphere

management to the cloud

vmware
CLOUD

**APEX Data
Storage Services**

PowerProtect DD
(native integration)



Modernize, protect and
scale with hybrid cloud

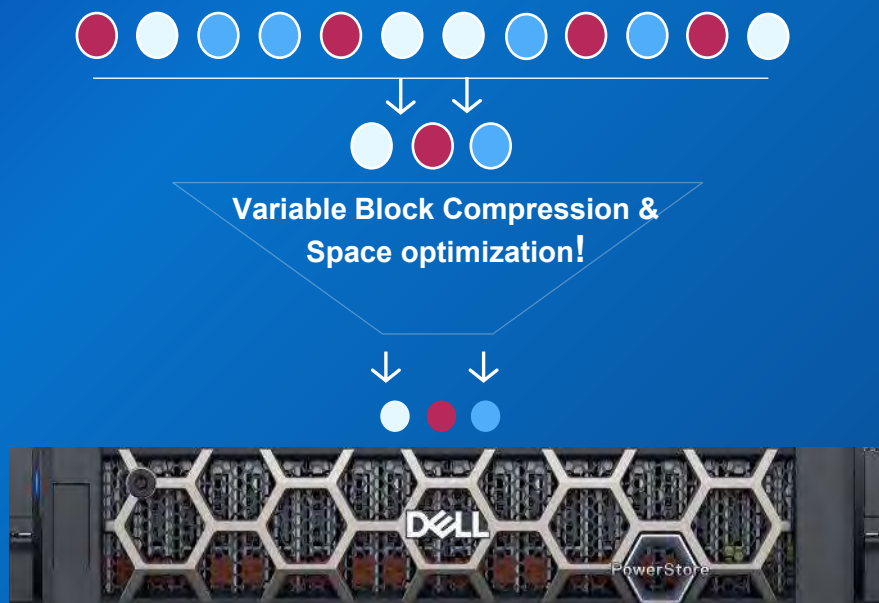
Leverage multiple clouds,
maintain full data control

Avoid vendor lock-in,
minimize access fees

Data Efficiency Reporting Enhancements

Storage Efficiency Gains

Enhanced services work proactively on your behalf



Always on

| HW-assisted

Storage efficiency **without compromise**

Enhanced Compression

- All new large block-size compression, supporting better compression ratios and capacity savings
- **Enhanced compression gains of up to ~20%**

NEW DRE spare space efficiency optimization increasing Usable Capacity

- Increase total usable capacity for new and existing systems by 2% optimizing DRE spare space

Guarantee increased to 5:1

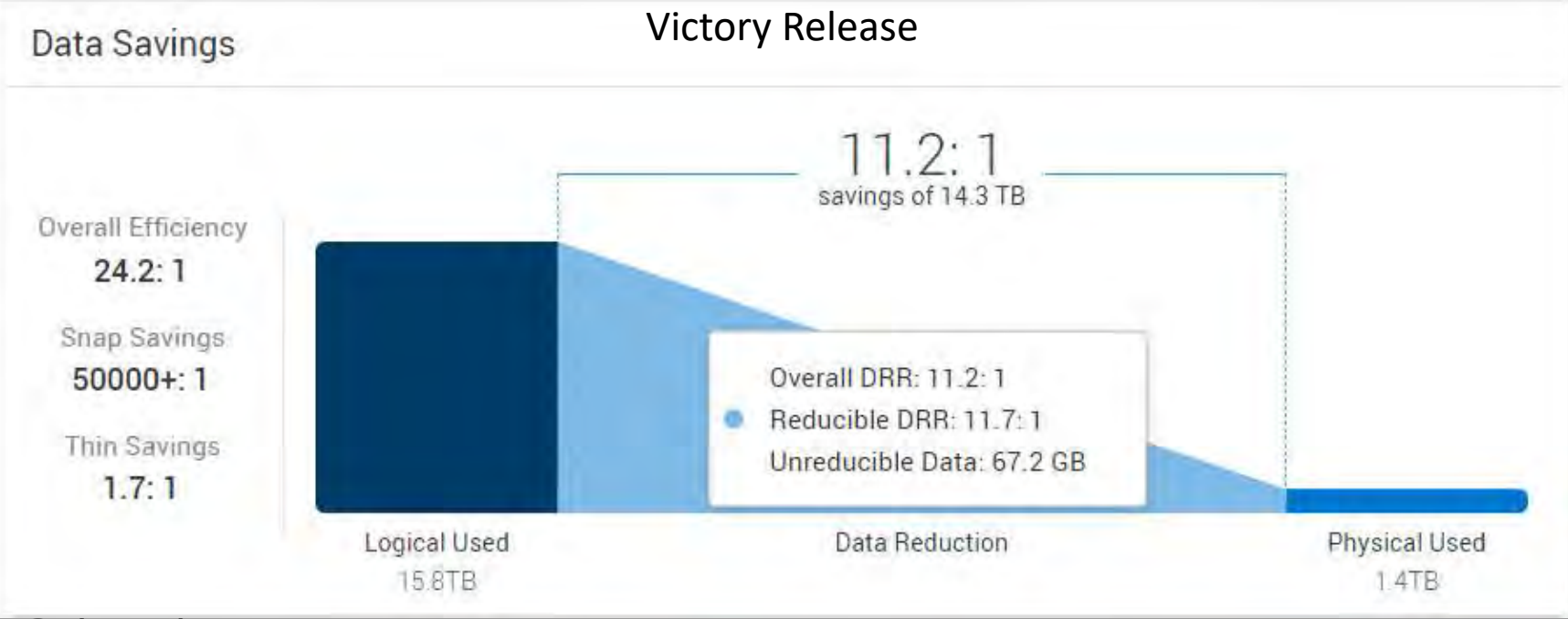
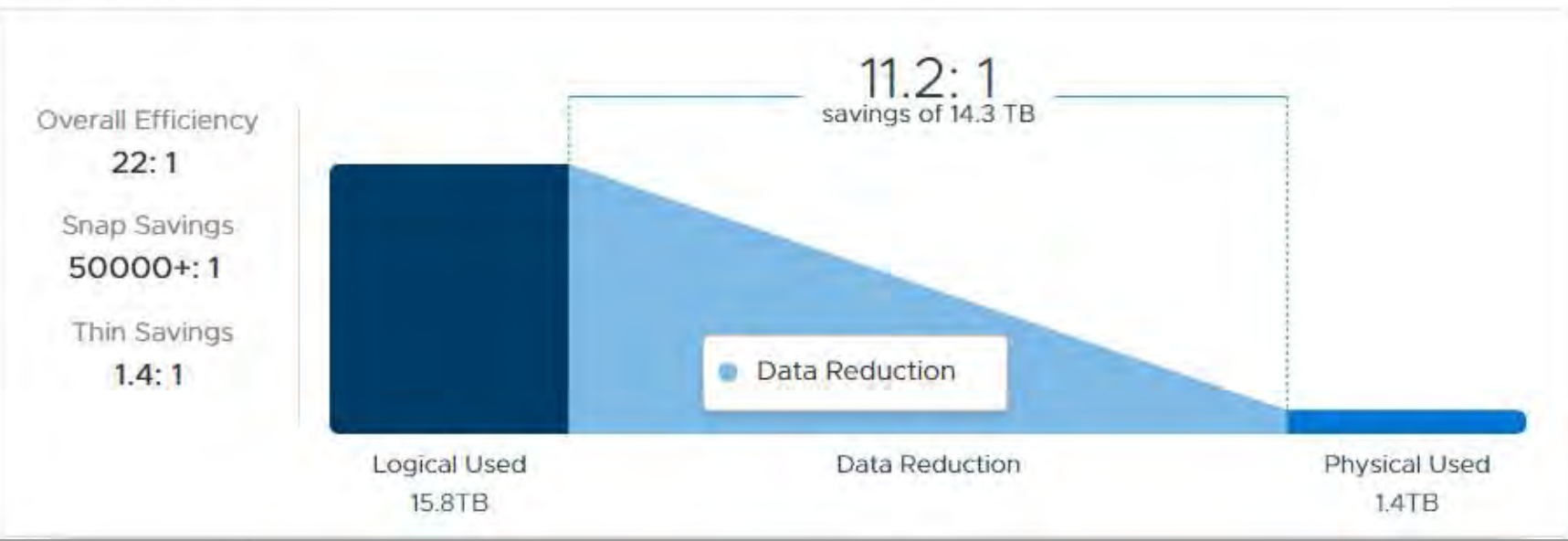
DRR Savings and Unreducible Data Reporting

Enterprise Strategy Group (ESG) – Dell PowerStore Data Efficiency

- In PowerStoreOS 3.5 and later, dial home telemetry data includes metrics for reducible and unreducible data
- This data confirms PowerStore is achieving **5.23:1** data reduction savings on average for reducible data
- In January 2024, ESG posted a technical review of PowerStore's Data Efficiency, and included the 5.23:1 finding:
 - <https://www.delltechnologies.com/asset/en-us/products/storage/briefs-summaries/esg-powerstore-data-efficiency-paper.pdf.external>
- *“Our analysis of the field data confirmed that PowerStore provided an average data reduction ratio of **5.23:1** for reducible data. The average customer reduced the footprint of this data by 81%...”*

Data Savings

3.6.0.0 (Build 2145637)



Settings

Bandwidth 4.1 MB/s

View: Last 24 hours

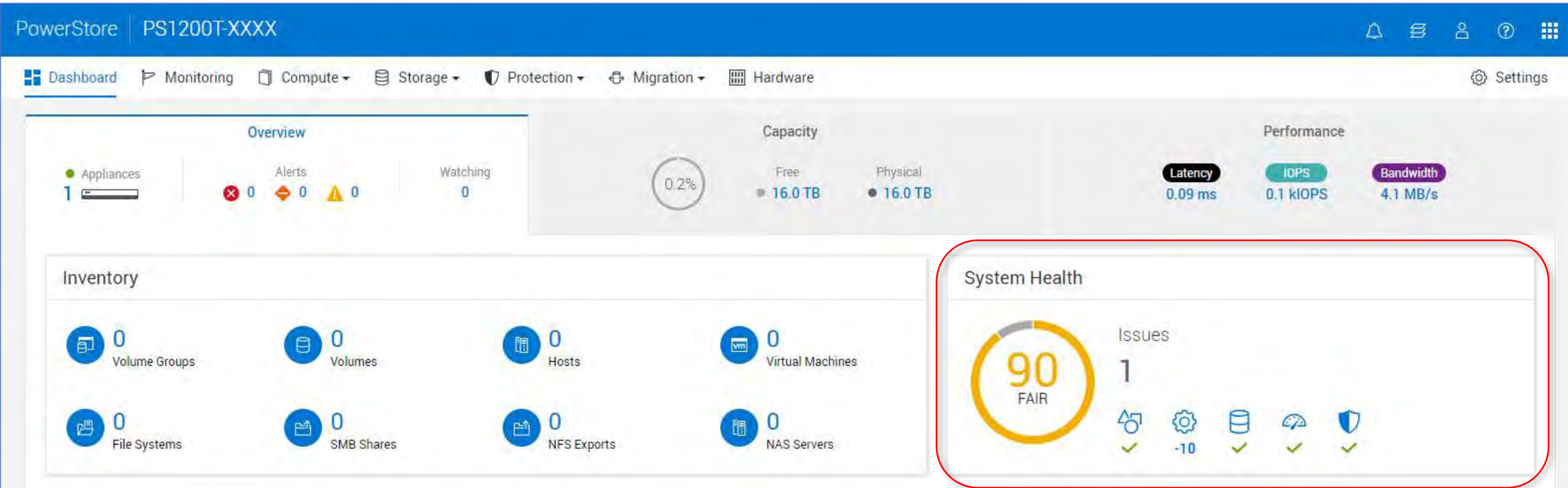
View: Volume

Provisioned

- 1.4 TB
- 1.4 TB
- 1.4 TB
- 1.5 TB

Integrated CloudIQ Health Score

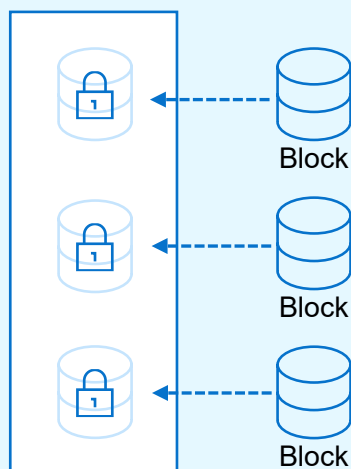
PowerStore Manager GUI



Data Protection

Secure and immutable snapshots

New security option for volume and volume group snapshots

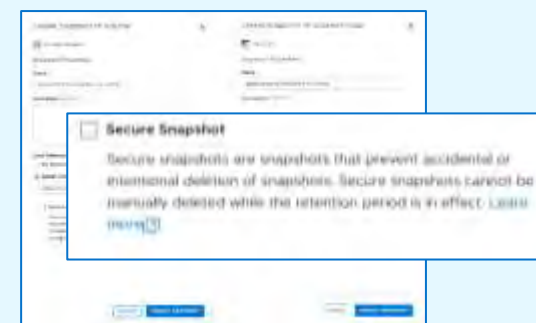


CANNOT be modified
or deleted prior to
expiration date – *even
by an administrator*



Virtual Vault Protection against...

- Ransomware attacks
- Accidental or malicious deletion by admin
- Point in time overwrites
- Prevents deletions even when out of capacity



Easy to manage

- Schedule / automate by policy
- PowerStore Manager, CLI, REST API
- Changes only affect future creation -- previously locked snaps **stay** locked

PowerStore Protection Policies

Five kinds of data protection – one easy workflow!

1

Choose any combination of protection layers



Secure & Immutable Local Snapshots



Remote

Sync Replication



Async Replication



Storage Direct backup
(to PowerProtect DD)

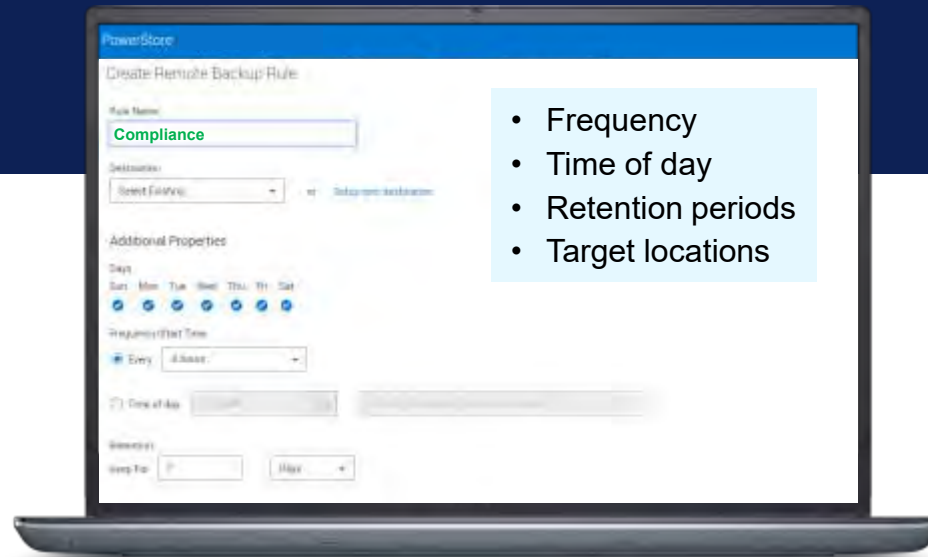


Cloud

Storage Direct backup
(to APEX Protection Storage)

2

Set rules for each layer, name policy



- Frequency
- Time of day
- Retention periods
- Target locations

3

Apply policy to any number of volumes or volume groups



Compliance

- ✓ Secure snapshots
- ✓ Sync rep
- ✓ Cloud backup
- ✓ 2-year retention



Mission Critical

- ✓ Secure snapshots
- ✓ Sync rep
- ✓ Remote backup
- ✓ 2-year retention



Archive

- ✓ Secure snapshots
- ✓ Sync rep
- ✓ 5-year retention

Create once and reuse. Customizable policies let you apply *multiple* kinds of protection at the same time!

Comprehensive data protection and mobility

PowerStore gives you ultimate flexibility to secure and backup your data

Local



Secure Immutable Snapshots

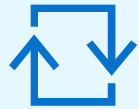


File Locking (FLR)



Dynamic Resiliency Engine

Remote



Sync Replication New!

(Block/File)

Async Replication

(Block/File/vVols)



Native Metro Replication with Witness

(VMware, **Windows**, **Linux**) New!



Integrated backup to PowerProtect DD

Cloud



Integrated Backup to Dell APEX Protection Storage for Public Cloud



Dell APEX Data Storage Services Block at Equinix



Workload mobility to/from APEX Block Storage New!

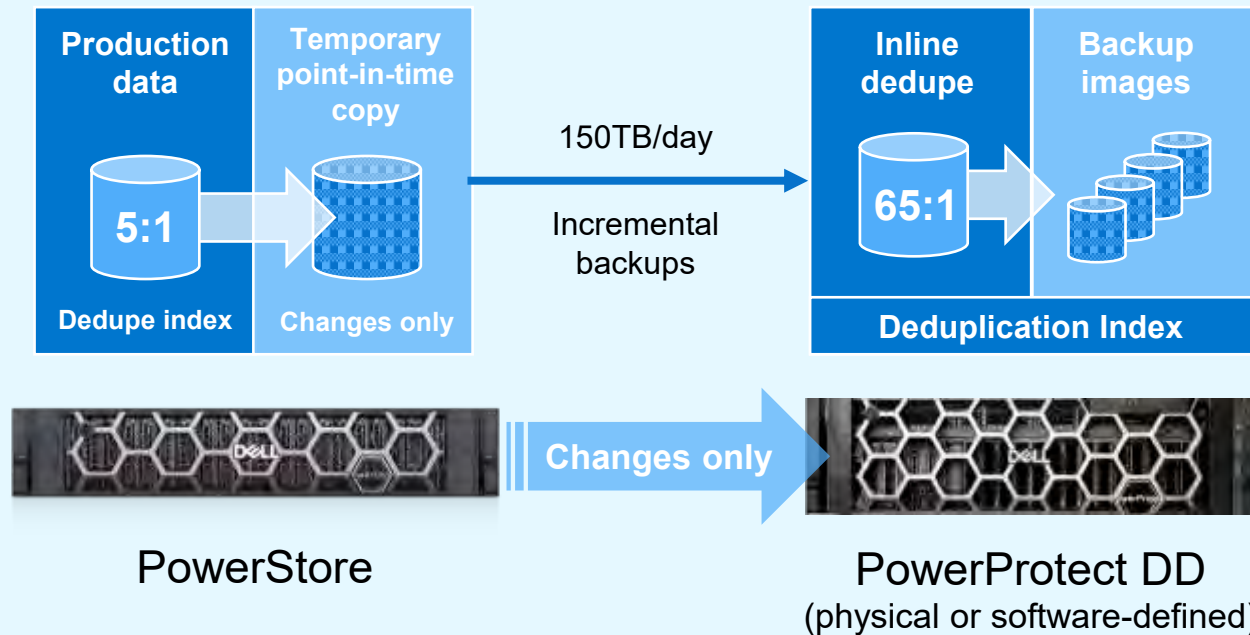


Designed for 99.9999% availability

Storage Direct backup to PowerProtect DD

Experience the resiliency and cost advantages of the industry's #1 data protection appliance

Create PowerStore remote snapshots **directly** on cloud or on-prem PPDD targets



No dedicated backup server required

Zero impact to application hosts

Reduced network traffic

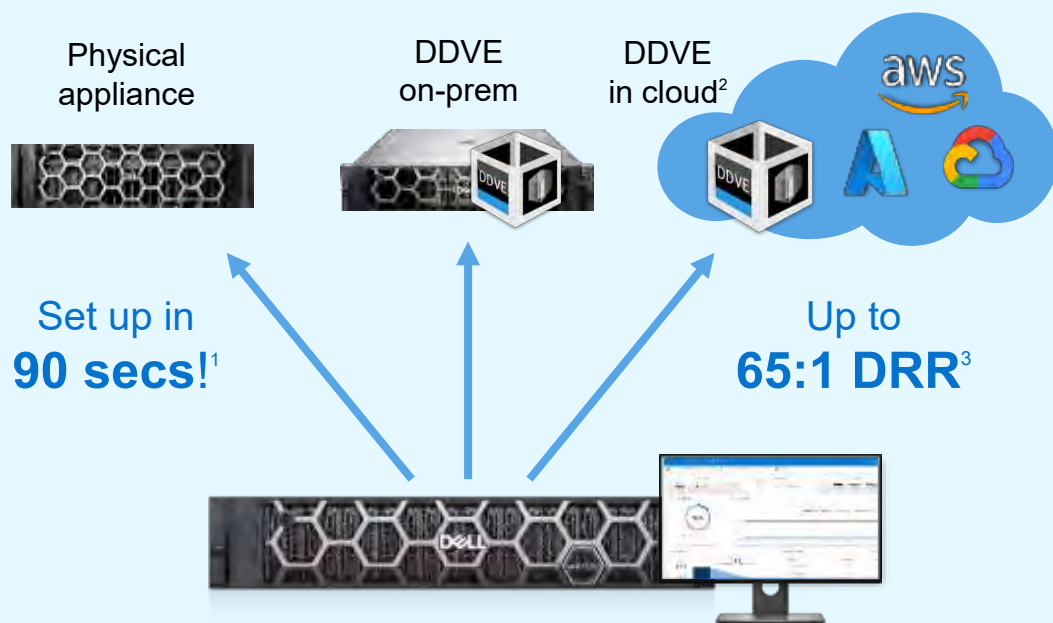
Up to 65:1 data reduction¹

¹ – Logical capacity based on up to 50x deduplication (DD3300) and typically deduplication (DD6400, DD6900, DD9400, DD9900) based on additional hardware-assisted data compression of typically 30% more logical capacity per TB.

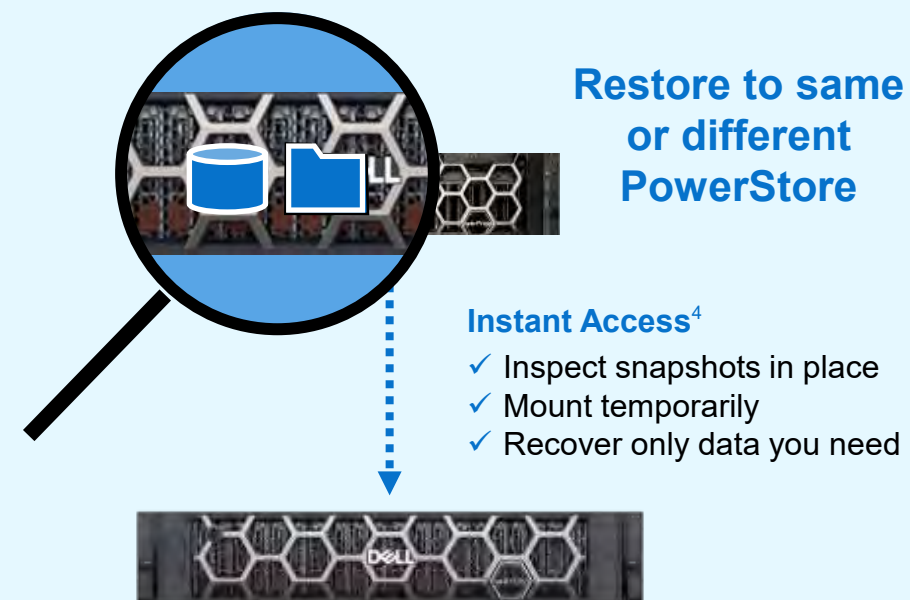
Control backups directly from PowerStore Manager

Native storage direct PowerProtect DD integration empowers data owners with self-service backup and recovery

Any PowerProtect DD target



Easy, granular data recovery



Initiate manually or via new Remote Protection rule. Schedule, Backup, Discover, Retrieve

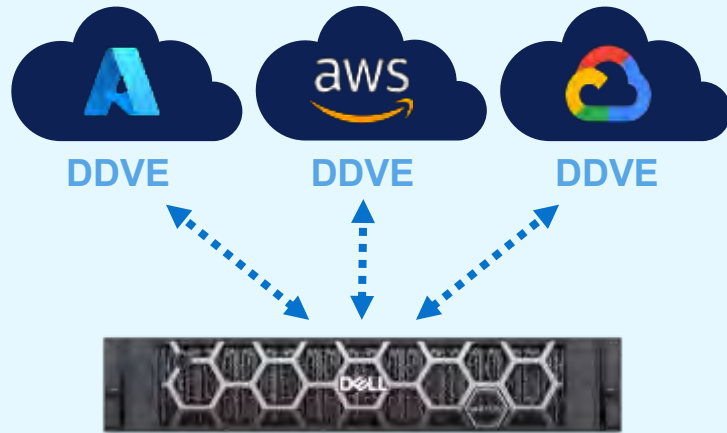
¹ – Based on Dell analysis, March 2023. ² – Qualified with AWS, Azure and Google Cloud qual pending. DDVE available now on AWS, Azure and Google.

³ – Logical capacity based on up to 50x deduplication (DD3300) and typically deduplication (DD6400, DD6900, DD9400, DD9900) based on additional hardware-assisted data compression of typically 30% more logical capacity per TB.

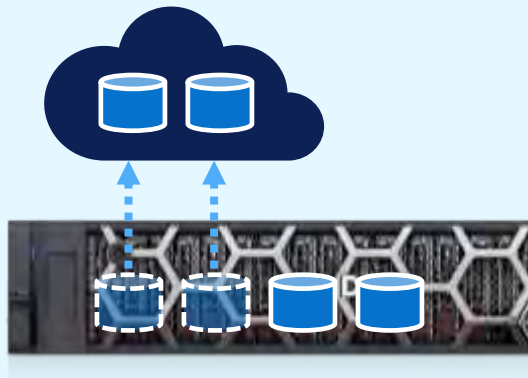
⁴ – Instant Access is not currently supported for VMFS datastores. VMFS support planned for 2H 2023. In current release VMFS datastores can still perform retrieves using PowerStore Manager.

Build your multicloud data protection strategy

PowerStore's PowerProtect DD integration helps you achieve business continuity goals, lower overall costs



Easy backup
and restore



Cost-effective
cloud archive

Avoid vendor lock-in

- Purchase DDVE on cloud marketplace
- AWS, Google, Azure¹

Reduce cloud costs

- Use inexpensive object storage
- Bandwidth-efficient replication
- PowerProtect DD data reduction

Reduce on-prem costs

- Offload cold data (optional)
- Reclaim space on PowerStore

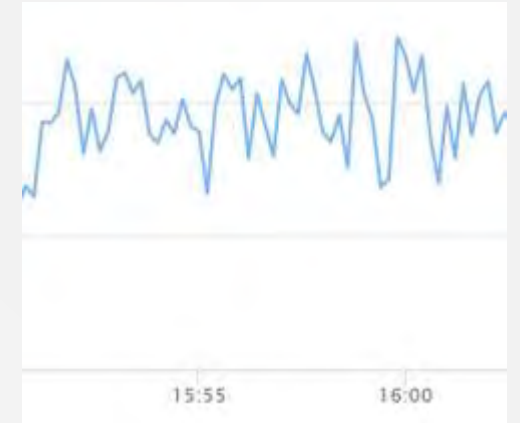
¹ – Qualified with AWS, Azure and Google Cloud qual pending. PowerProtect65X dt DDVE available now on AWS, Azure and Google.

Ransomware Protection

- >90# Personal
- >650 Kunden
- Dell Partner



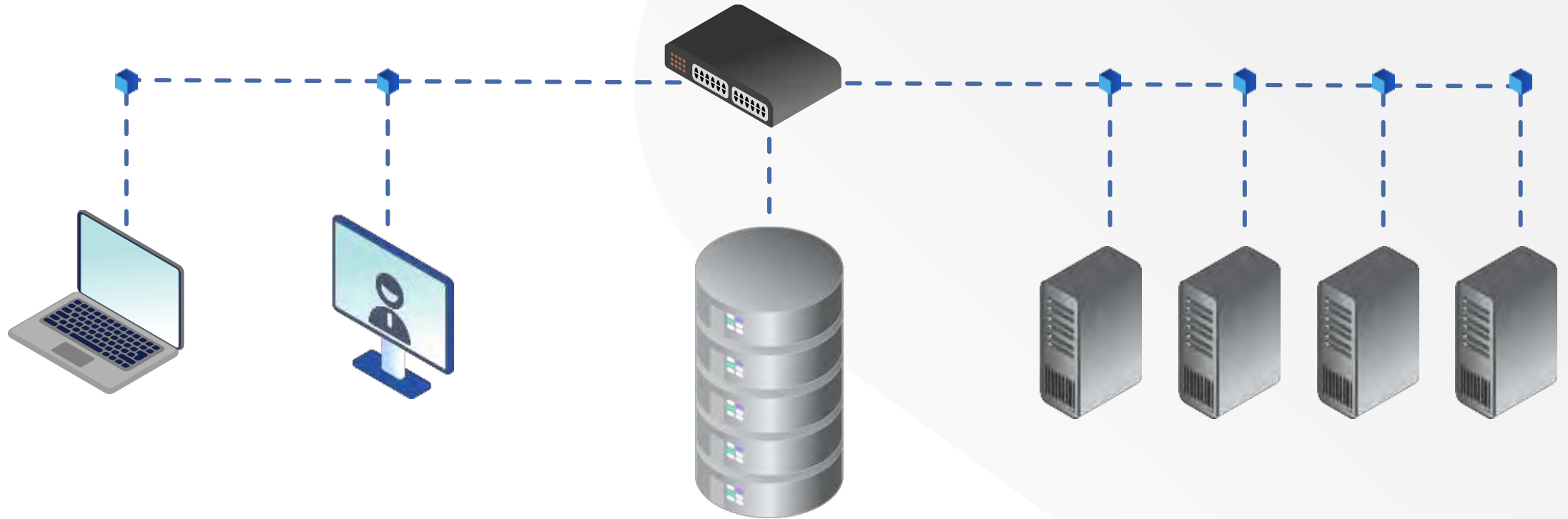
Normales Verhalten



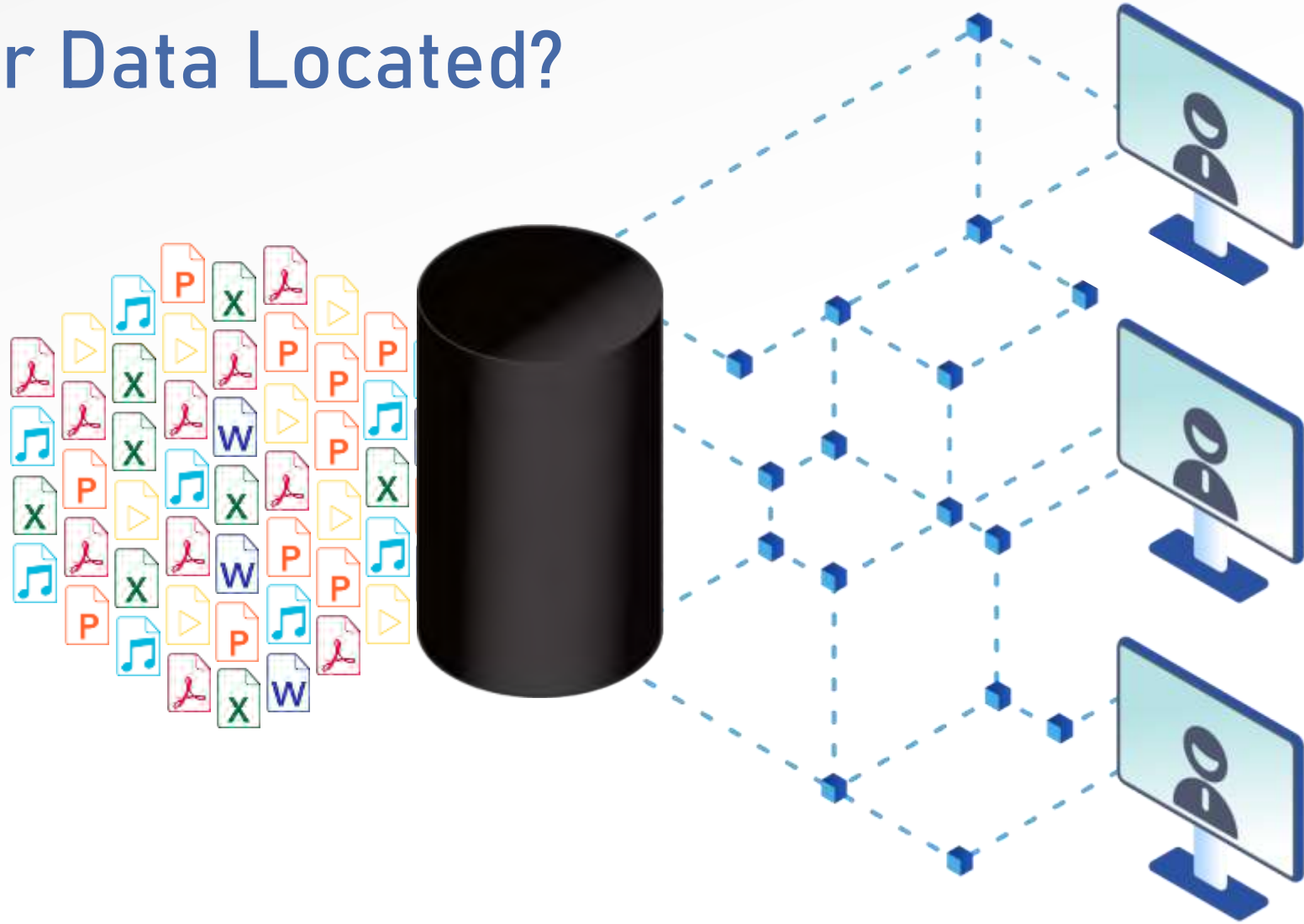
Ransomware-Verhalten



Where is Your Data Located?

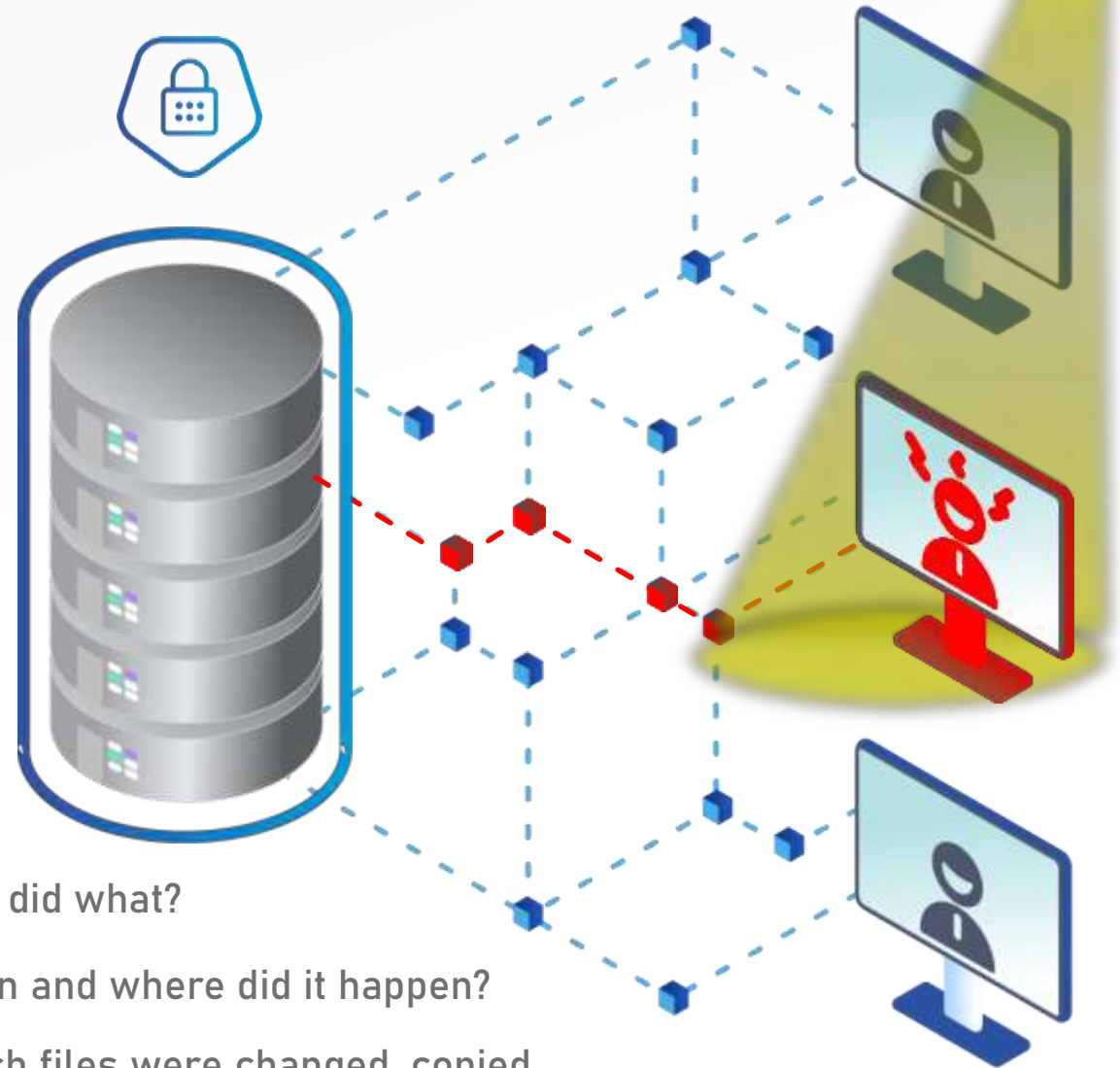


Where is Your Data Located?



Use Cases:

Gain Transparency and
Ransomware Protection



- ? Who did what?
- ? When and where did it happen?
- ? Which files were changed, copied or deleted?



Ransomware Attack

Which computer/server is infected?
Who will detect and stop the attack?
Snapshots and backups are getting infected as well!
Where is the ransomware located?

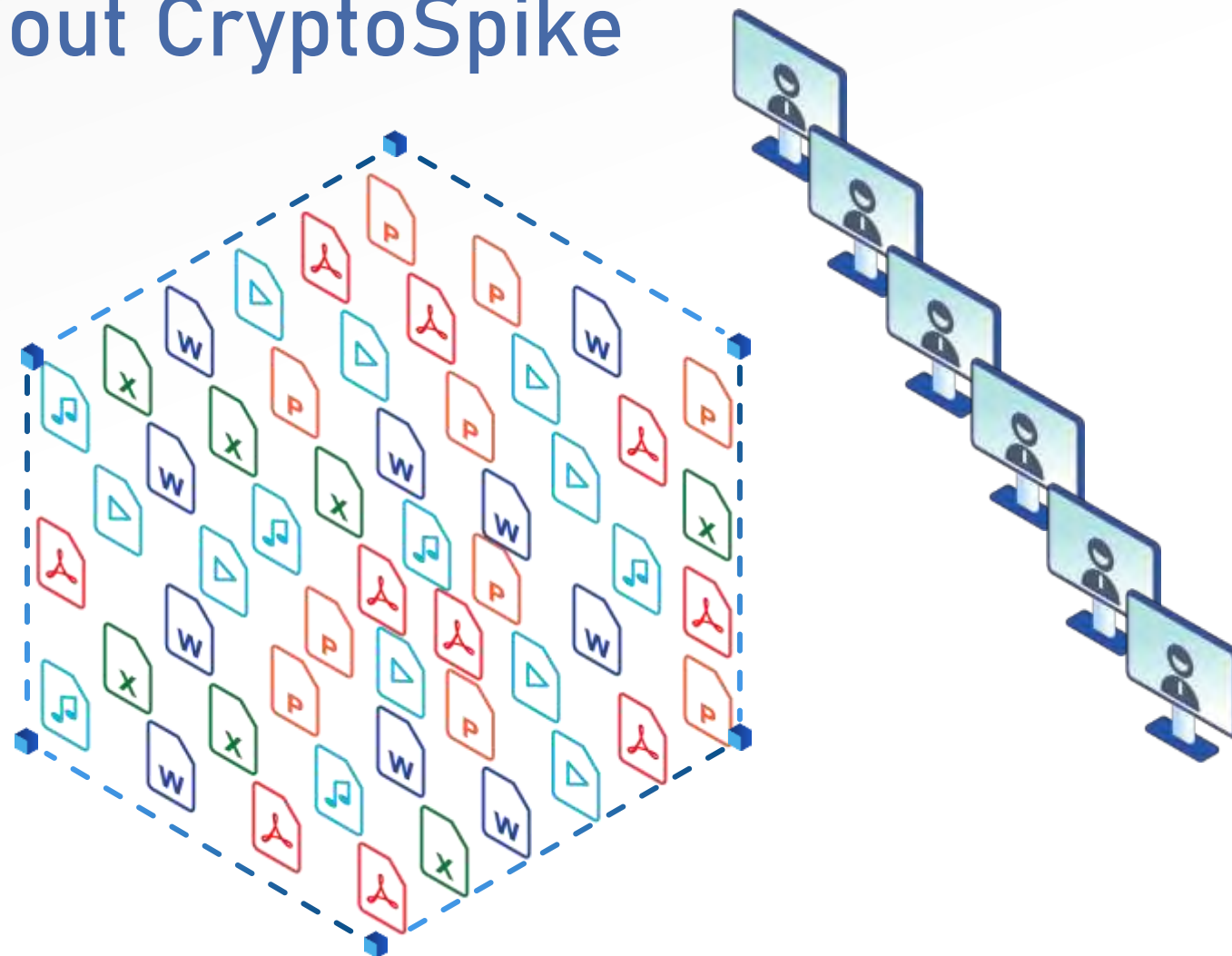
Data timeline

Ransomware attack



Without CryptoSpike

50M files
2,000 users





Ransomware Attack

Is the hacker/ransomware still in the network?

When did the attack start?

Which is my last clean backup?

What if I restore ransomware again?

Data timeline

Ransomware attack

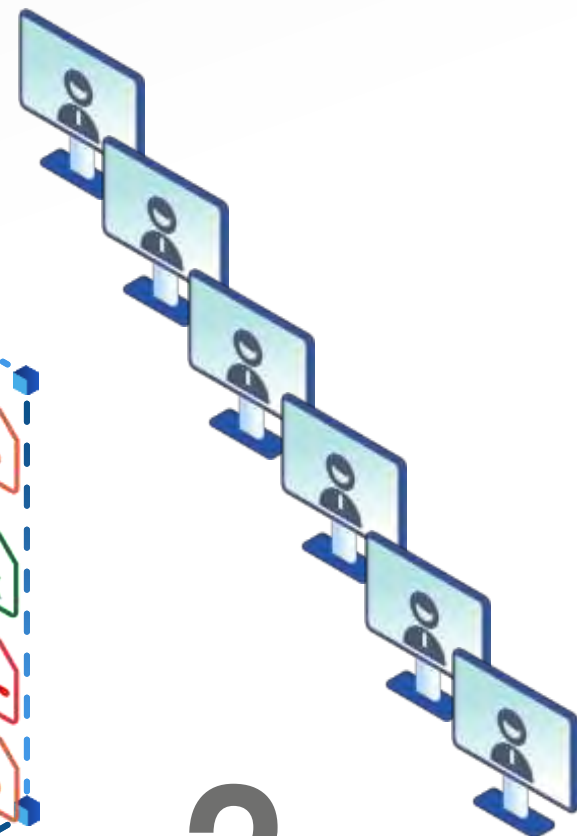
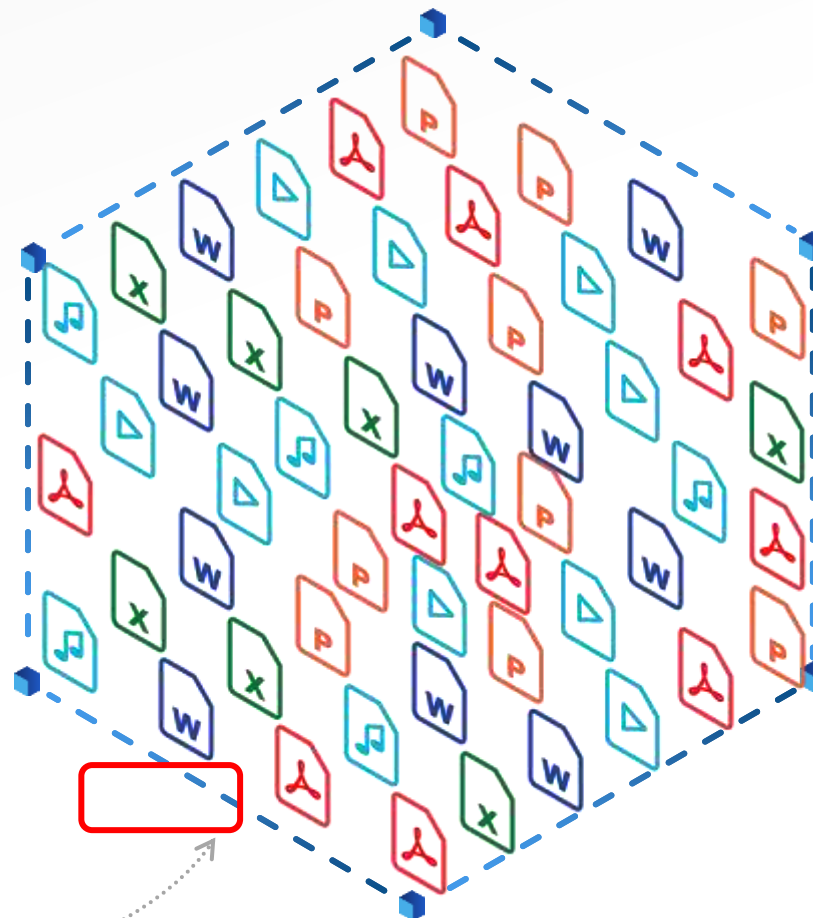


Downtime and data loss of multiple days!

Without CryptoSpike

50M files

2,000 user



?

Recovery



Ransomware Attack

- Anomaly detection
- Active blocking
- Full data access transparency!
(Who did what?)
- Emergency snapshot
- File system repair from snapshot

50M files
2,000 users

Data timeline

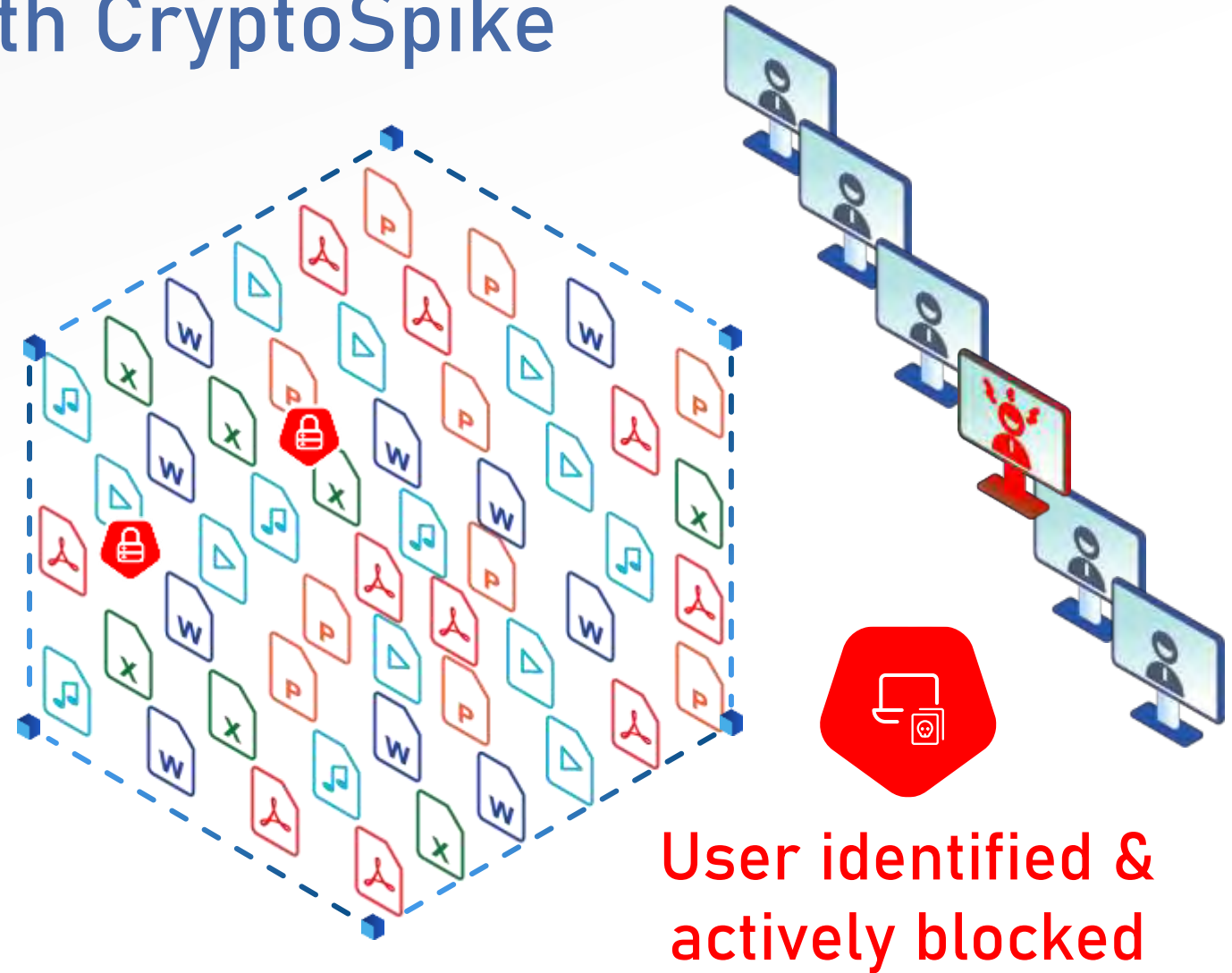
Ransomware attack



Snapshots

Emergency
Snapshot

With CryptoSpike





Ransomware Attack

User/device got identified
Full file history
Emergency snapshot
Single file restore / file system repair
100% uptime

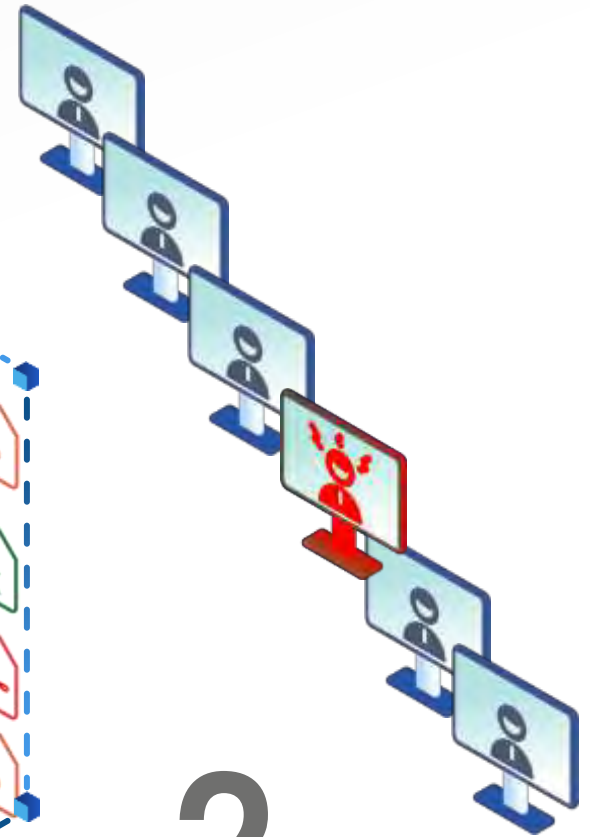
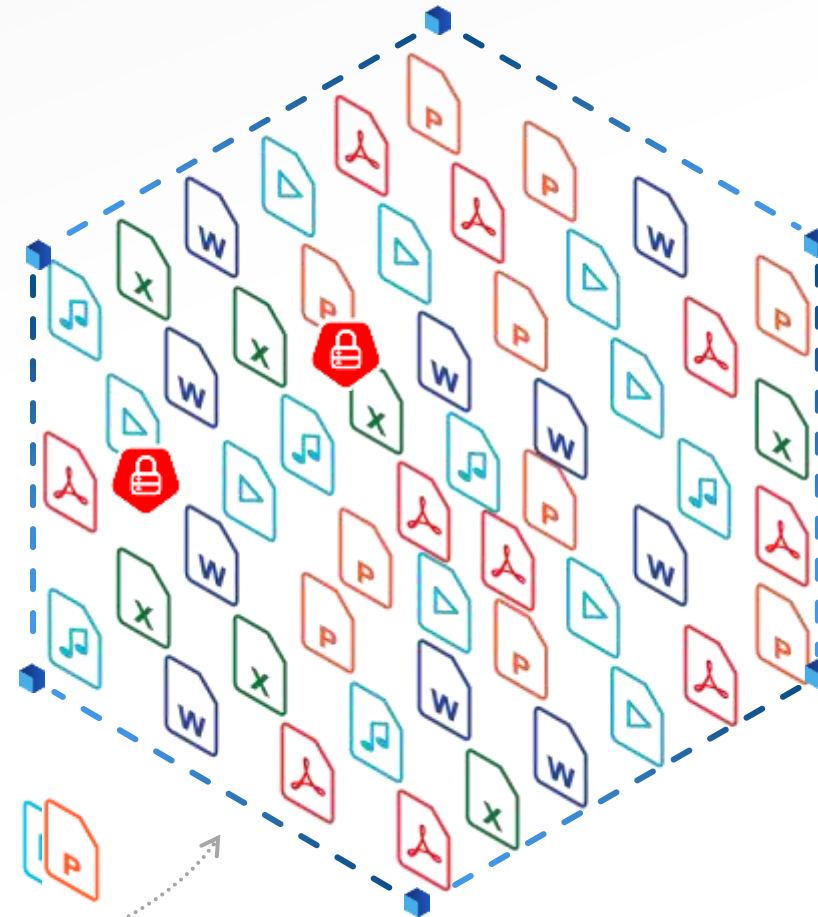
50M files
2,000 users

Data Timeline



File system repair without any data loss!

With CryptoSpike

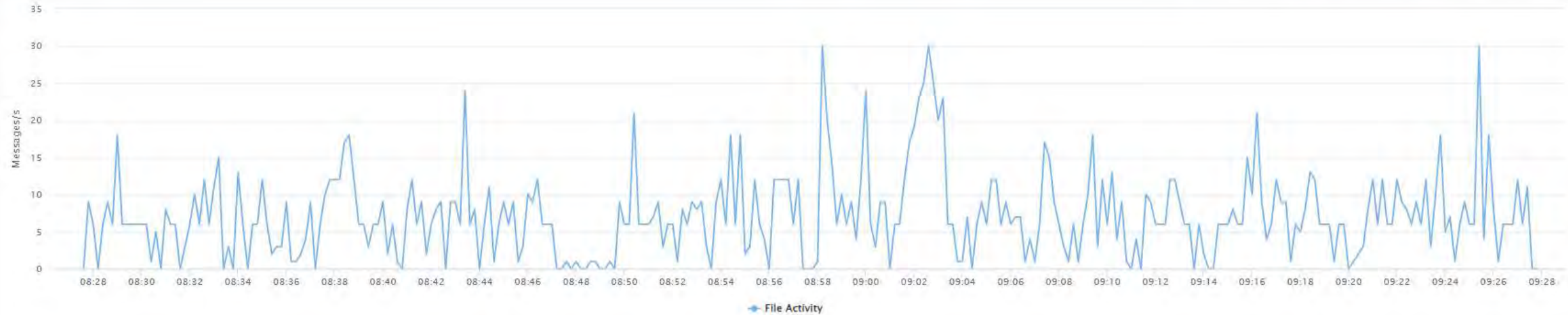


?
Recovery

Path



Last 1 Hour

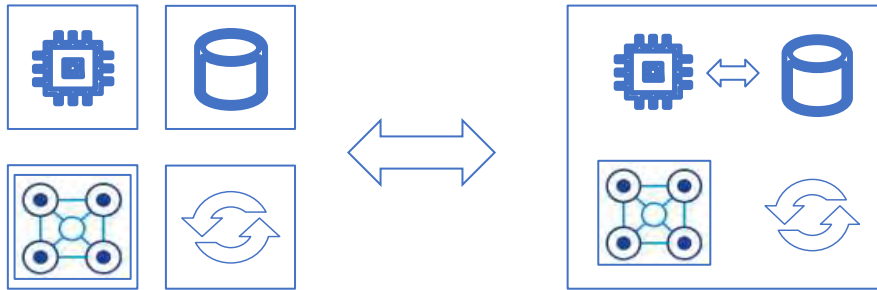


☐	Date	Name	Type	Path	
☐	2024-02-15 09:27:35.216	Fabian Raynolds	WRITE	\ifs\ProLion\demo04\FOPS\7083\.snapshot\ScheduleName_duration_2024-02-15_03:00\0665\myFile-1357935136444211.txt	
☐	2024-02-15 09:27:35.216	Fabian Raynolds	CREATE	\ifs\ProLion\demo04\FOPS\7083\.snapshot\ScheduleName_duration_2024-02-15_03:00\0665\myFile-1357935136444211.txt	
☐	2024-02-15 09:27:35.214	Fabian Raynolds	WRITE	\ifs\ProLion\demo04\FOPS\7083\.snapshot\ScheduleName_duration_2024-02-15_03:00\0665\myFile-1357935133838469.txt	
☐	2024-02-15 09:27:35.214	Fabian Raynolds	CREATE	\ifs\ProLion\demo04\FOPS\7083\.snapshot\ScheduleName_duration_2024-02-15_03:00\0665\myFile-1357935133838469.txt	
☐	2024-02-15 09:27:35.211	Fabian Raynolds	WRITE	\ifs\ProLion\demo04\FOPS\7083\.snapshot\ScheduleName_duration_2024-02-15_03:00\0665\myFile-1357935131638042.txt	
☐	2024-02-15 09:27:35.211	Fabian Raynolds	CREATE	\ifs\ProLion\demo04\FOPS\7083\.snapshot\ScheduleName_duration_2024-02-15_03:00\0665\myFile-1357935131638042.txt	
☐	2024-02-15 09:27:27.421	John Smith	CREATE	\ifs\ProLion\demo04\FOPS\7778\4813\5483\2985\7632\3392\7297\1679\7240\7613\9848	
☐	2024-02-15 09:27:27.417	John Smith	CREATE	\ifs\ProLion\demo04\FOPS\7778\4813\5483\2985\7632\3392\7297\1679\7240\7613	

PowerClub – Agenda



LiveOptics: Erfassung und Analyse der Anforderungen

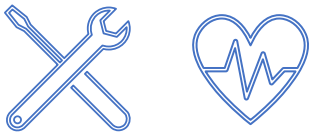


Produkte: Aktuelles von PowerEdge und Powerstore

Technologie: Intel, AMD, Nvidia,...

Virtualisierung: Server/Storage versus Hyper-Converged

Vergleich: VMWare, Hyper-V, Azure Local, Virtuozzo, Proxmox,...



Administration
Life Cycle Management
Support



Backup & Restore
DataDomain und PowerProtect



Cyber Security

AGENDA



- 09:00 – 09:45 Agenda / LiveOptics / Demo Setup
- 09:45 – 10:00 Pause
- 10:00 – 10:45 PowerEdge Server
- 10:45 – 11:00 Pause
- 11:00 – 11:30 Systemadministration am Beispiel Vsphere
- 11:30 – 12:00 Virtualisierung im Vergleich (Azure Local, Nutanix)
- 12:00 – 13:00 Mittagessen
- 13:00 – 13:45 Virtualisierung im Vergleich (Virtuozzo, Proxmox, Openshift)
- 13:45 – 14:00 Pause
- 14:00 – 14:45 Powerstore
- 14:45 – 15:00 Pause
- 15:00 – 15:45 Data Protection
- 15:45 – 16:00 kommerzieller Vergleich

Dell Data Protection Portfolio

DP series



DD series



Data Protection Suite



PowerProtect Data Manager



PowerProtect DataDomain

PowerProtect Data Domain Platform

Recover faster from the unexpected. Guaranteed.*



* Cyber Recovery Guarantee and Data Protection Deduplication Guarantee. [Terms and conditions apply.](#)

PowerProtect Data Domain built-in security features



Device Security

Hardware Root of Trust | Secure Boot



Data Immutability

Retention Lock Compliance & Governance Mode | SEC 17a-4(f) Compliance



End-to-End Encryption

Encryption In Transit & At Rest, KMS Support, FIPS 140-2 Crypto Libraries



User and Identity

RBAC | Quorum Auth | MFA - Security Officer, and iDRAC



Secure System Clock | NTP Clock | Tamper Controls

Clock Change | Drift | Synchronization



File System with Data Invulnerability Architecture

Hashed Containers – not recognized by malware | No Single User Mode



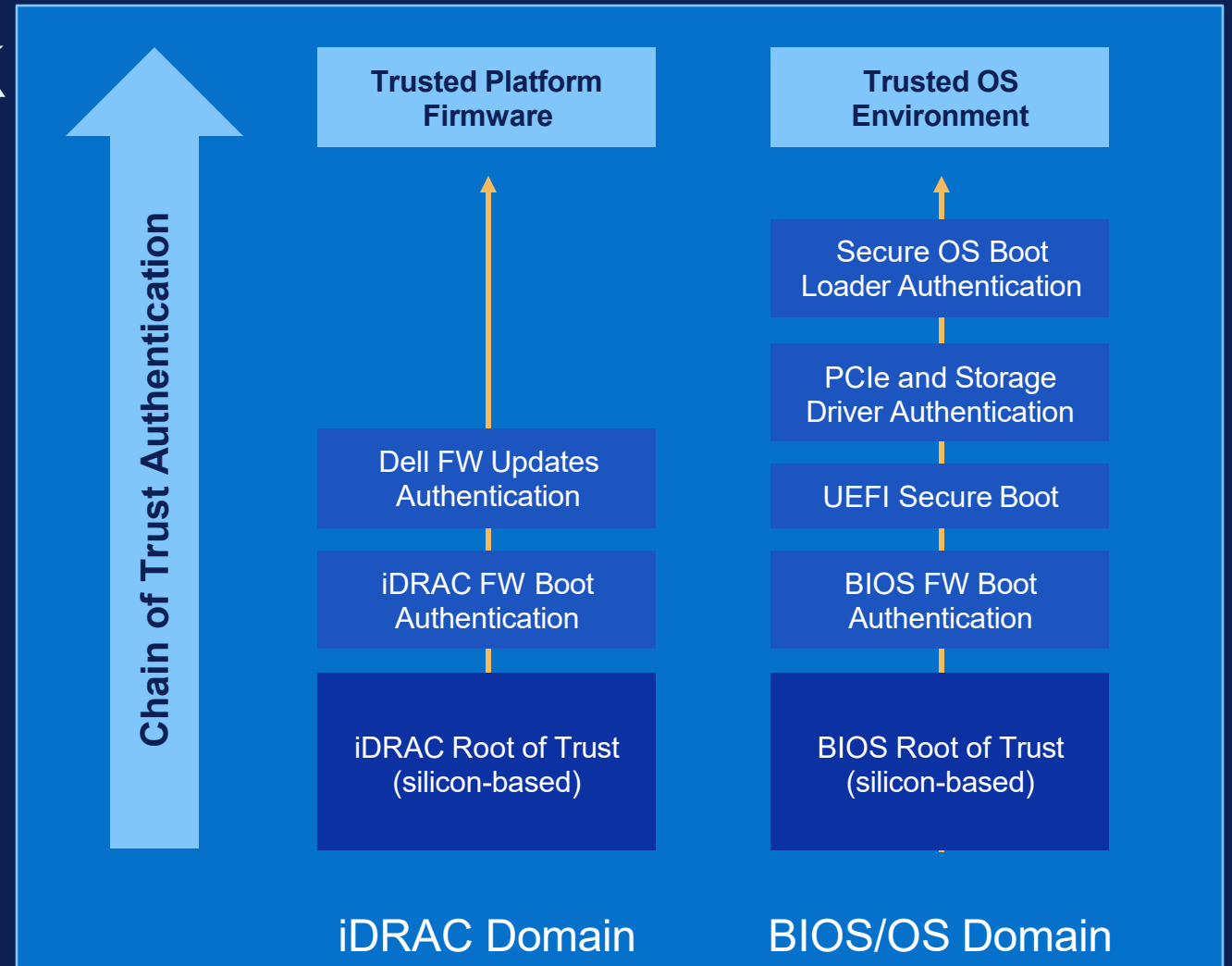
Transport Protocol – DD Boost

Encrypted, Secure, Authorized, Not Open

Zero Trust at work

Protect the boot process and establish trustworthiness

- ✓ Secure boot
- ✓ Hardware Root of Trust



PowerProtect Data Domain Platform

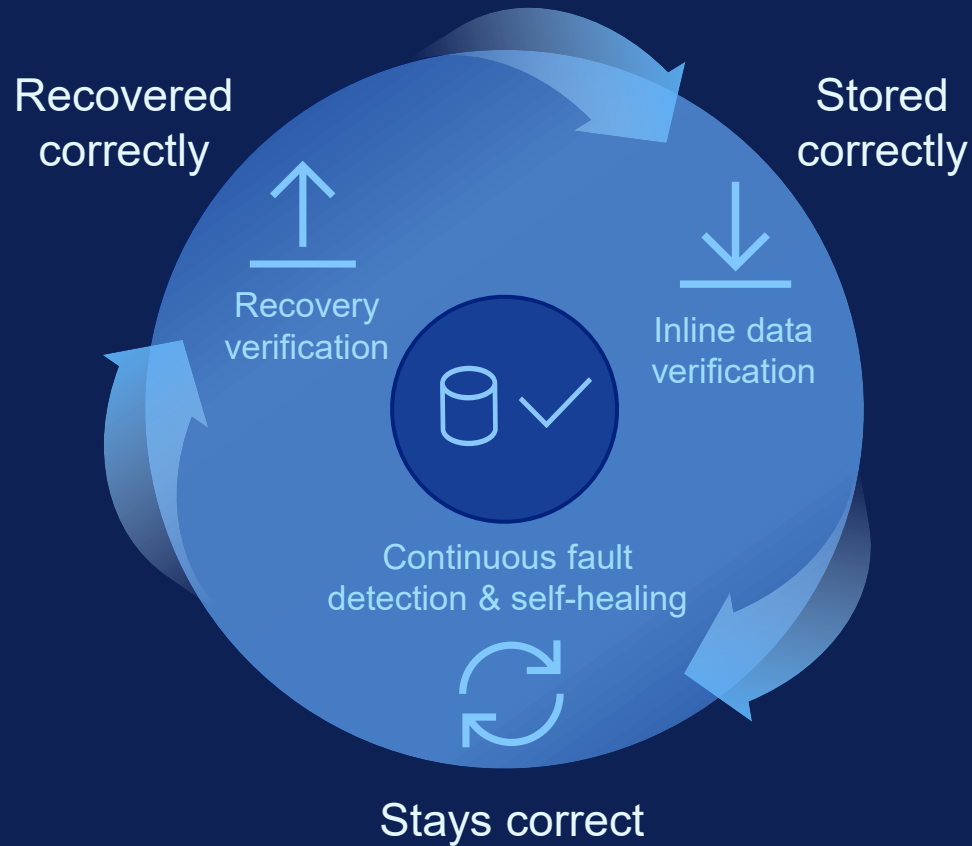
Recover faster from the unexpected. Guaranteed.*



* Cyber Recovery Guarantee and Data Protection Deduplication Guarantee. [Terms and conditions apply.](#)

Durability to ensure your data is always there

Data Invulnerability Architecture (DIA) ensures that you can recover what you back up—every time



100% data validation from end-to-end – Industry Exclusive

Data errors are corrected immediately from persistent memory, including in-flight data

New data and metadata never overwrite existing data

Continuous fault detection and self-healing of data stored on disk

The filesystem is always consistent due to an append-only architecture

Data is validated and verified to be correct even at the point-of-origin when using the DD Boost protocol

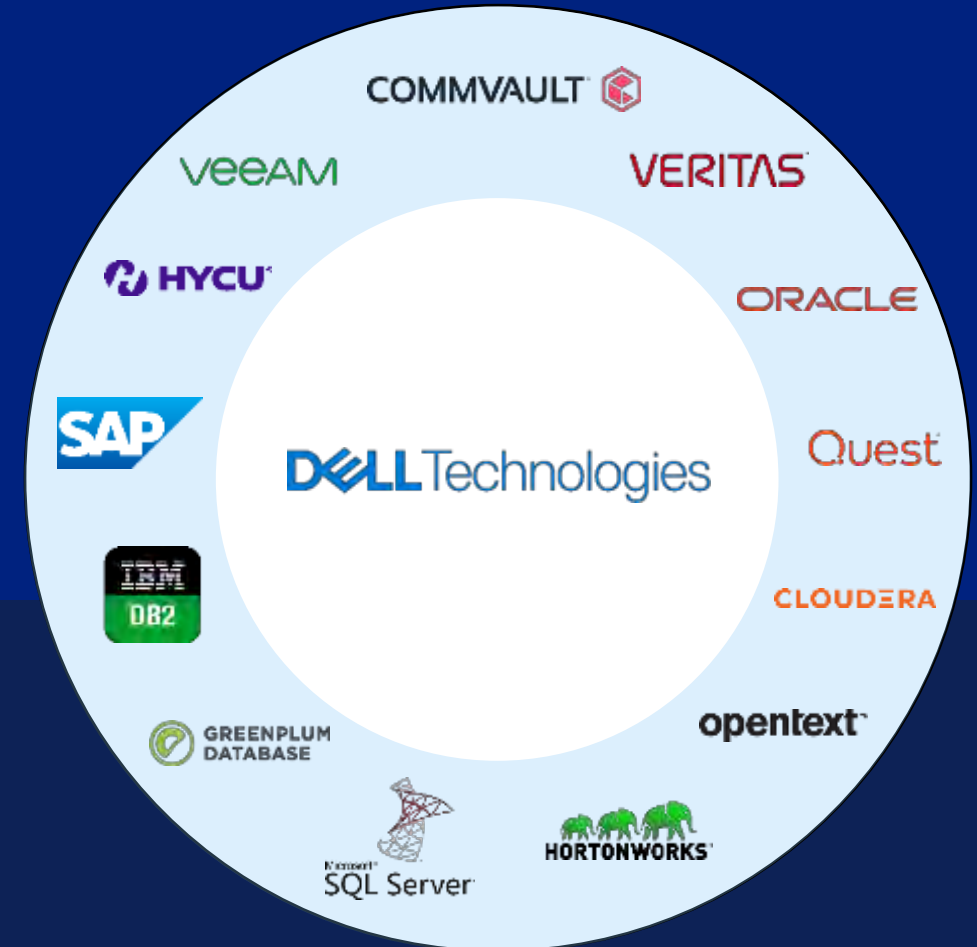
Flexibility to secure all your data, anywhere

Core to edge to multicloud

Cloud Tier for long-term retention

Dell PowerStore & PowerMax integration

Extensive backup software partner ecosystem



Efficiency for lower TCO

DD Boost: A Dell proprietary deduplication technology

- ✓ Far less network traffic
- ✓ Less impact to backup clients
- ✓ Accelerates overall system performance
- ✓ Massively reduced storage requirements



Up to 65:1 data reduction¹
**Less than 1¢ per GB/month
cost to protect²**

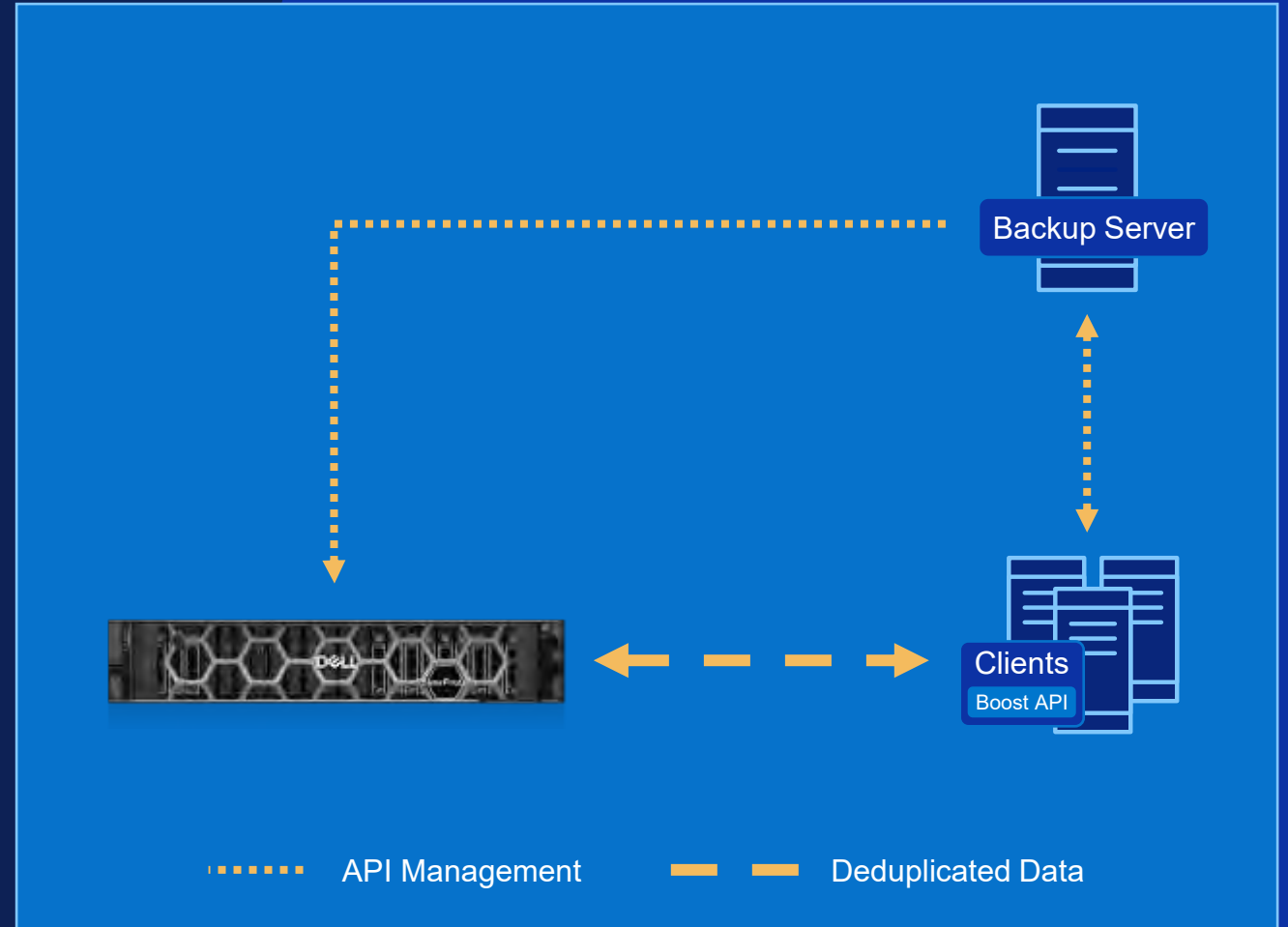
¹Based on Dell internal testing and field telemetry data, February 2024. Actual results may vary.

²Based on ESG review commissioned by Dell, "Analyzing the Economic and Operational Benefits of the Dell Data Protection Portfolio", November 2022. Actual results will vary.

DD Boost

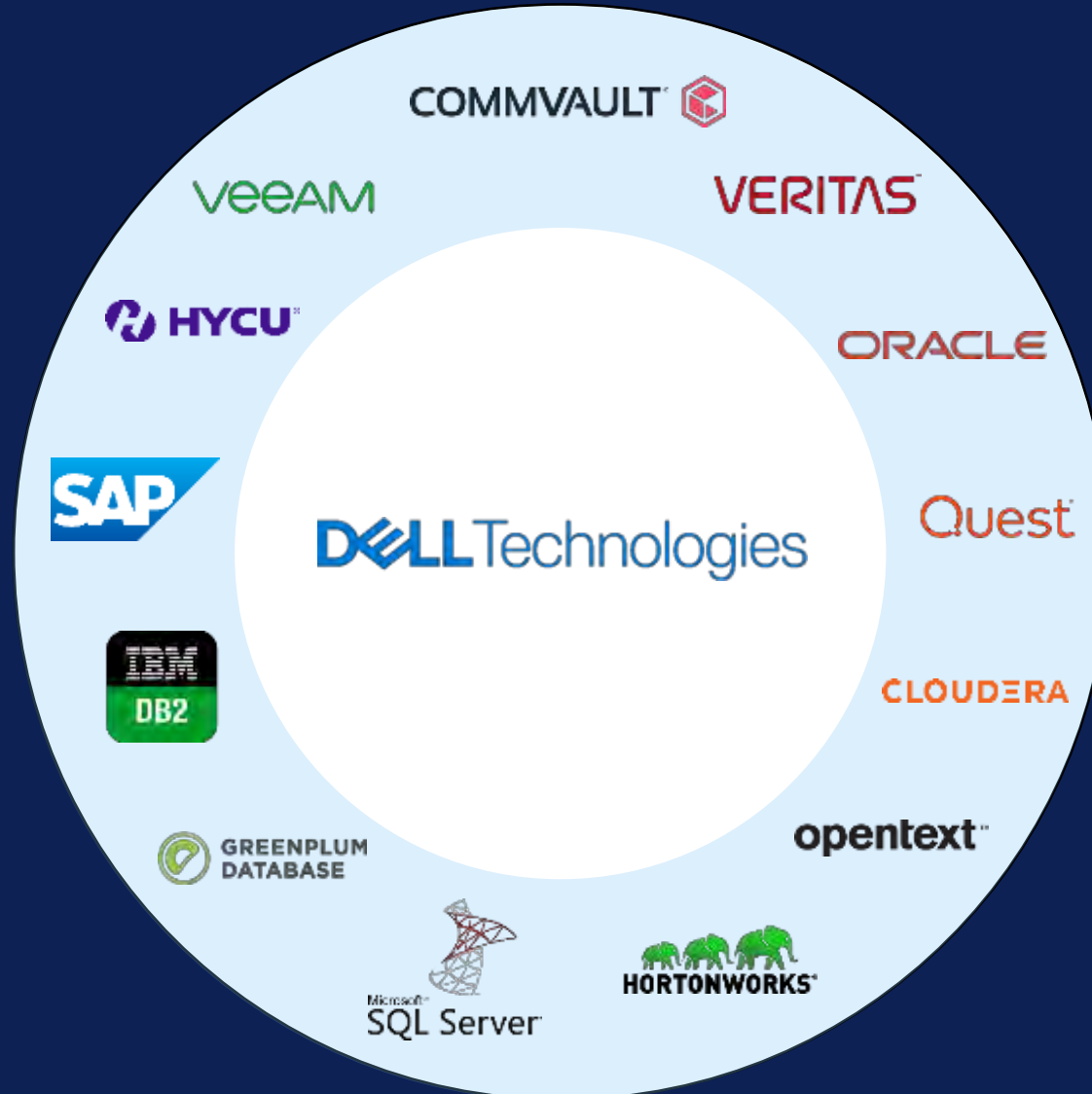
A Dell proprietary deduplication algorithm with broad ecosystem

- ✓ Reduce network impact
- ✓ Less burden on client / server
- ✓ Less impact to Data Domain
- ✓ Reduce storage needed



DD Boost ecosystem support

Data Domain delivers advanced integration with backup software and applications



Deduplication

Taking the micro view matters

- Small segment size (8KB average)
- Variable length / sliding window
- Inline at high speed

Deduplication

Minimizing storage consumption matters

- Protection copies can represent up to 95% of an organization's data
- A 15% difference in deduplication rate can lead to consumption of 4x more protection storage
- It doesn't matter what you save, but what you consume



Deduplication with Data Domain improves operations



Right-sized Solution

No more chasing capacity with under-sized solution



Shorter Backup Windows

Faster backups with less impact to both LAN and clients



Faster Replication

Replication takes less time & less WAN bandwidth for a better RPO



Retention Aligned to Business Policy

All your data where you need it and no hidden cloud costs



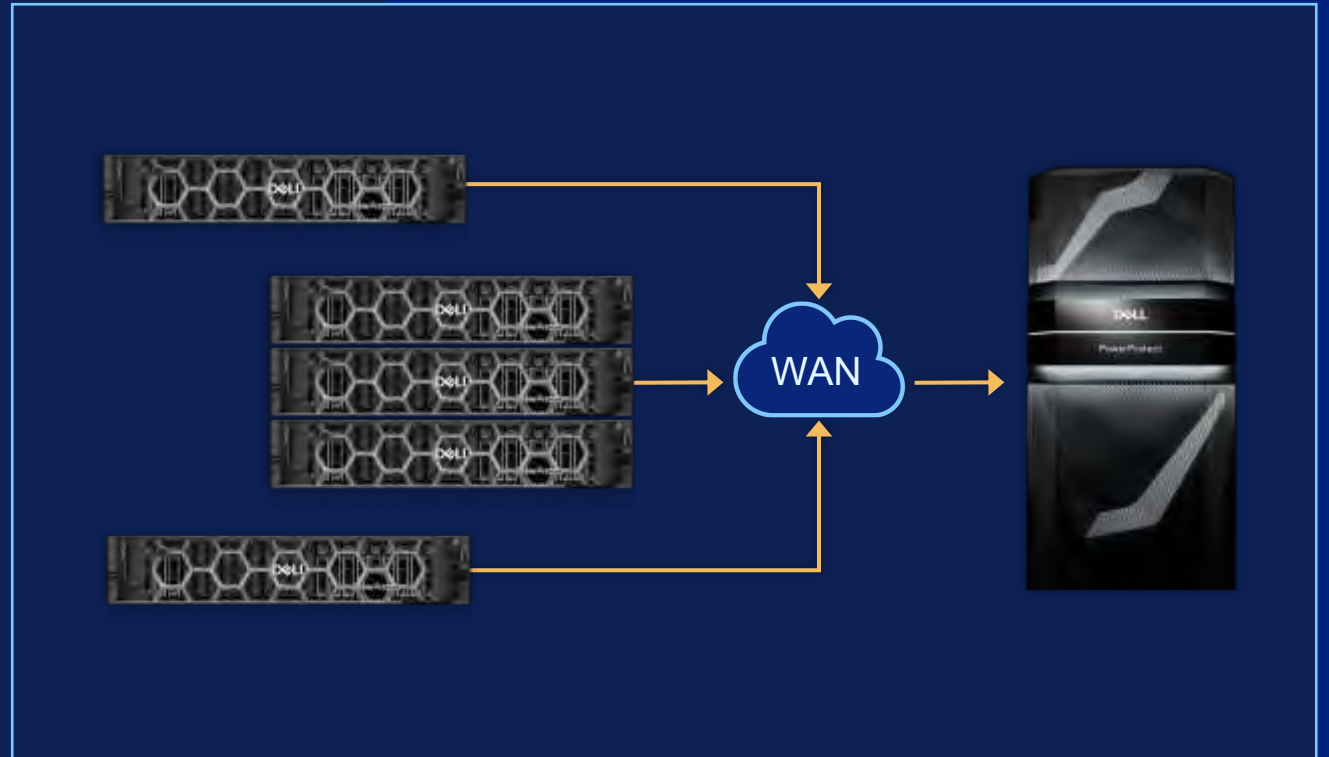
Low Total Cost of Ownership

Less bandwidth, storage, & management results in lower TCO

Data Domain Replicator

Create a secure and reliable offsite copy

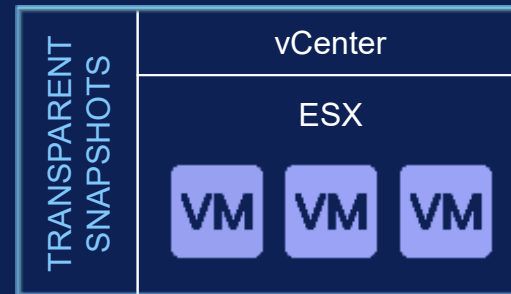
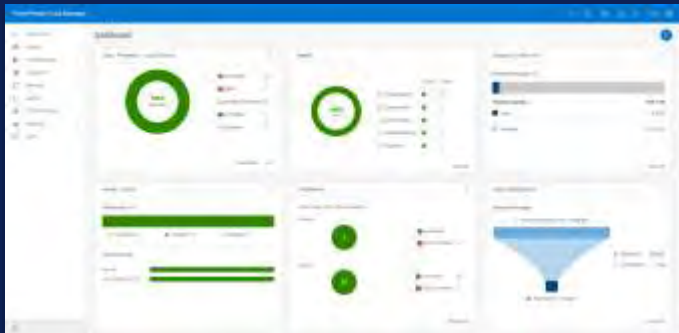
- ✓ Reduce bandwidth requirements
- ✓ Protect sensitive data when replicating over untrusted networks
- ✓ Consolidate backup and archive data from hundreds of remote sites



Transparent Snapshots

Transparent Snapshots simplifies VM image backups delivering **near-zero impact** on VMs

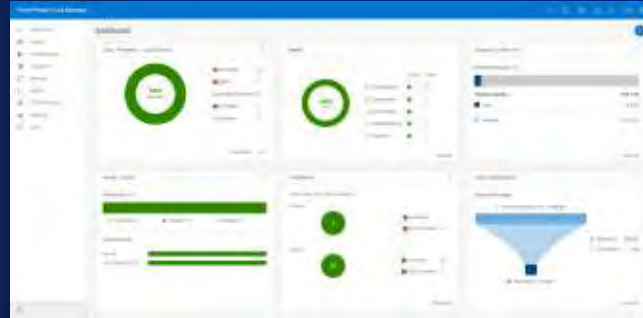
Up to 5x faster backups¹ | Up to 6x faster restores² | Up to 5x reduction in VM latency³



Available only in Dell
PowerProtect Data Manager

¹When comparing PowerProtect Data Manager 19.13 with Transparent Snapshots backup performance to PowerProtect Data Manager with VADP backup performance. Based on Dell internal testing, June 2023.
²When comparing PowerProtect Data Manager 19.13 with Transparent Snapshots restore performance to PowerProtect Data Manager with VADP VM latency performance. Based on Dell internal testing, June 2023.
³When comparing PowerProtect Data Manager 19.13 with Transparent Snapshots VM latency performance to PowerProtect Data Manager with VADP VM latency performance. Based on Dell internal testing, June 2023.

Storage Direct Protection



Native integration delivers fast, efficient, and secure backup and recovery

Dell PowerMax*

Dell PowerStore

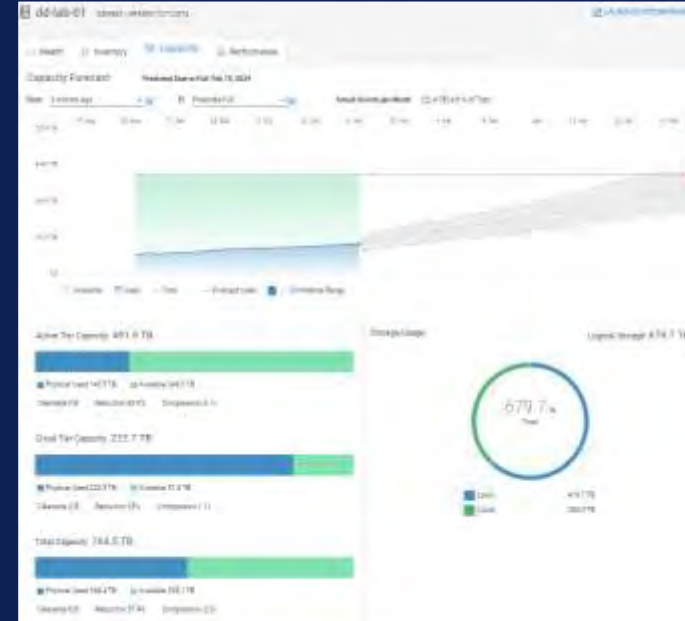
*Requires Dell PowerProtect Data Manager

APEX AIOps forecasting & cyber security

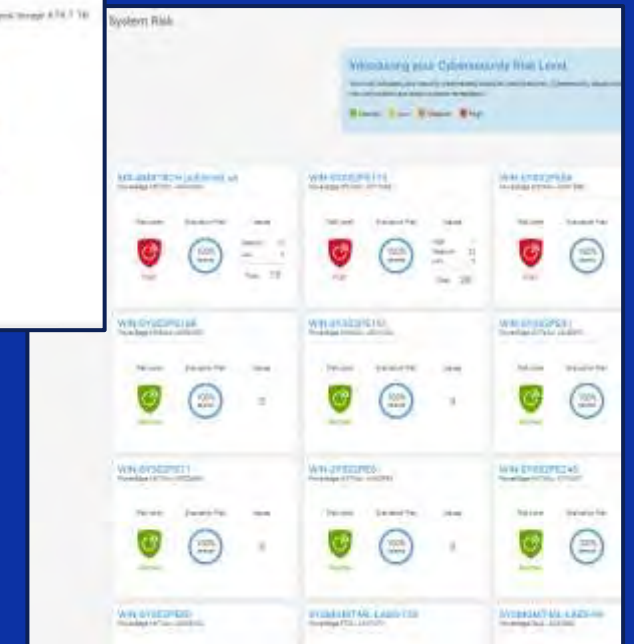
What's happening, why and what to do about it

- Capacity forecasting
- Security risk assessment, notifications and recommendations
- Intelligent security advisories

Capacity Analytics & Forecasting



Security Misconfiguration Risk Levels & Recommendations



Security Advisories & Recommendations



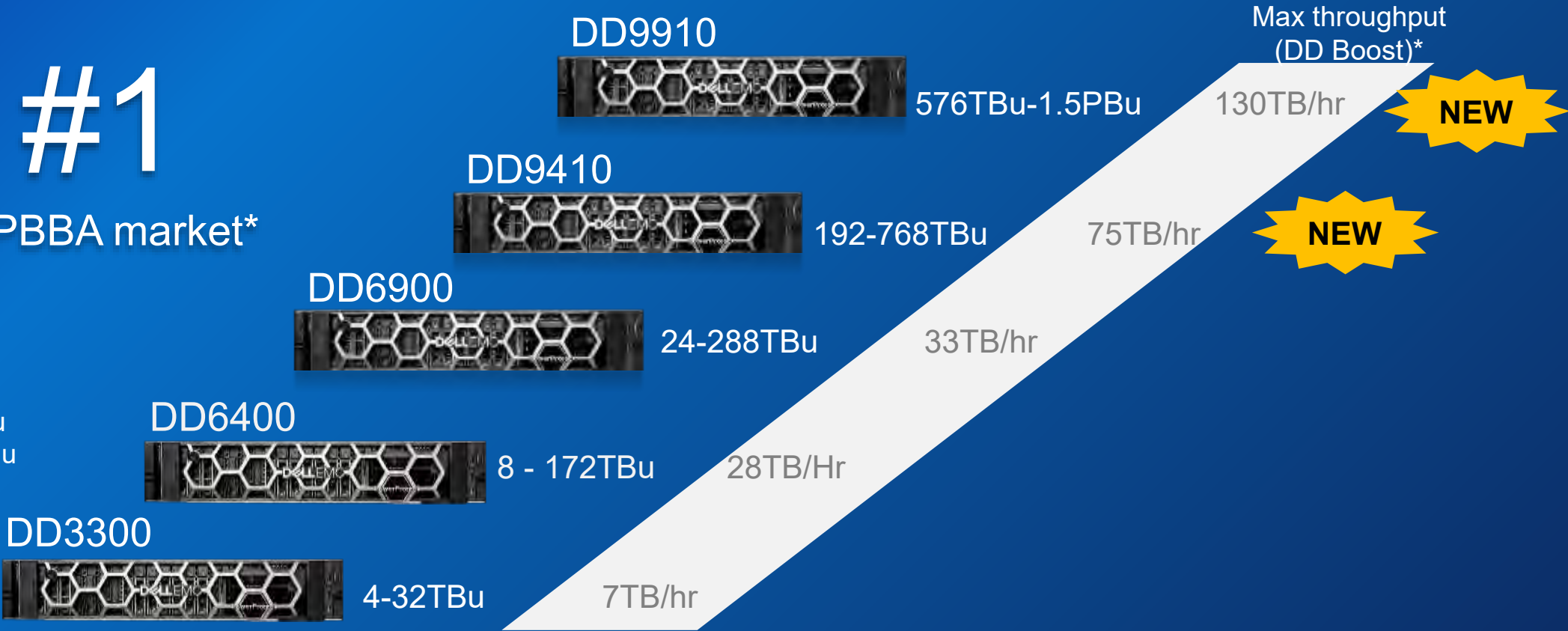
PowerProtect DD Portfolio

#1

In PBBA market*



On-prem: 1TBu – 96TBu
In-Cloud: 1TBu – 256TBu



PowerProtect Data Domain Portfolio

	MIDSIZE	MIDSIZE ENTERPRISE	LARGE ENTERPRISE		
	DD3300	DD6400	DD6900	NEW! DD9410	NEW! DD9910
Backup Ingest	Up to 7.0 TB/hr ¹	Up to 27.7 TB/hr ¹	Up to 33 TB/hr ¹	Up to 75 TB/hr ¹	Up to 130 TB/hr ¹
Logical Capacity ²	Up to 1.6 PB Up to 4.8 PB ³	Up to 11.2 PB Up to 33.5 PB ³	Up to 18.7 PB Up to 56.1 PB ³	Up to 49.9 PB Up to 149.8 PB ³	Up to 97.5 PB Up to 293 PB ³
Usable Capacity	4 TB – 32 TB 3.5 TiB – 28.4 TiB ⁴	8 TB - 172 TB 7.1 TiB – 152.5 TiB ⁴	24 TB – 288 TB 21.3 TiB – 255 TiB ⁴	192 TB – 768 TB 170 TiB – 681 TiB ⁴	576 TB – 1.5 PB 511 TiB – 1.33 PiB ⁴
Usable Capacity with Cloud Tier	Up to 96 TB Up to 85 TiB ⁴	Up to 516 TB Up to 458 TiB ⁴	Up to 864 TB Up to 766 TiB ⁴	Up to 2.3 PB Up to 2.0 PiB ⁴	Up to 4.5 PB Up to 4PiB ⁴

Software-defined protection storage on-premises: PowerProtect Data Domain Virtual Edition (DDVE) scales up to 96 TB
In-cloud protection storage: Dell APEX Protection Storage scales up to 256 TB

¹ Maximum data ingest with DD Boost.

² Logical capacity based on up to 50x deduplication (DD3300) and up to 65x deduplication (DD6400, DD6900, DD9410, DD9910). Actual capacity & throughput depends on application workload, deduplication, and other settings.

³ Total capacity with cloud tier for long-term retention.

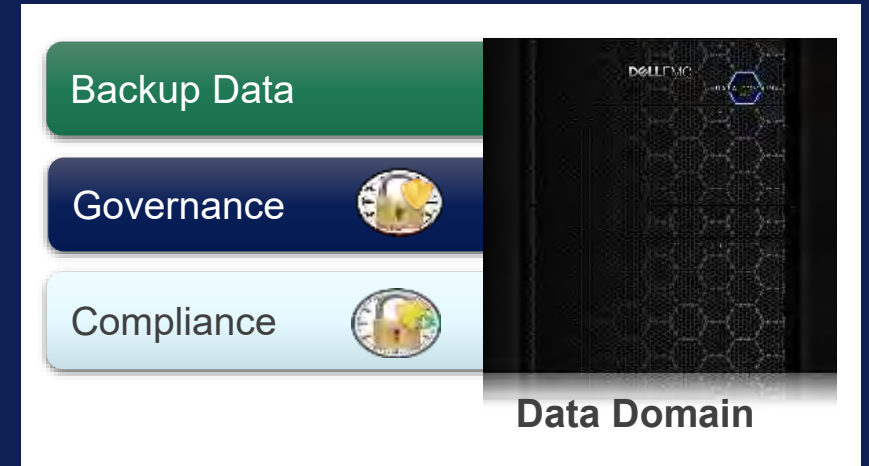
⁴ TiB/PiB values adjusted for estimated DDOS overhead. DDOS overhead can vary depending on metadata required for customer workloads.

Data Domain Governance / Compliance / NFS - Retention Lock

Compliance or Governance mode options available

Secure retention of data stored on Data Domain systems

- Co-locate governance and compliance archive data on the same system
- Retention Lock - Governance or Compliance feature
- Meet compliance requirements from both US and International Regulatory Agencies
 - US: SEC 17a-4f, CFTC, SOX, FDA, IRS
 - International: ISO Standard 15489-1, MoREQ



System administrator is trusted with all operations and actions



Ensures administrative actions are under the control of higher authority above the system administrator



PowerProtect Data Manager

PowerProtect Data Manager - At a Glance

Highlights:

- Protecting multi- open hypervisors using vProtect
- Provision to protect backup data from cyber attacks with Cyber Recovery
- Restore to alternate Kubernetes cluster and storage class mapping
- Compound rule-based protection policy assignment

DEPLOYMENT

- On-prem
- Cloud – AWS, Azure, GPC
- Image availability in public cloud – AWS, Azure, GCP
- Embedded agents for supported applications (SQL, Oracle, etc.)

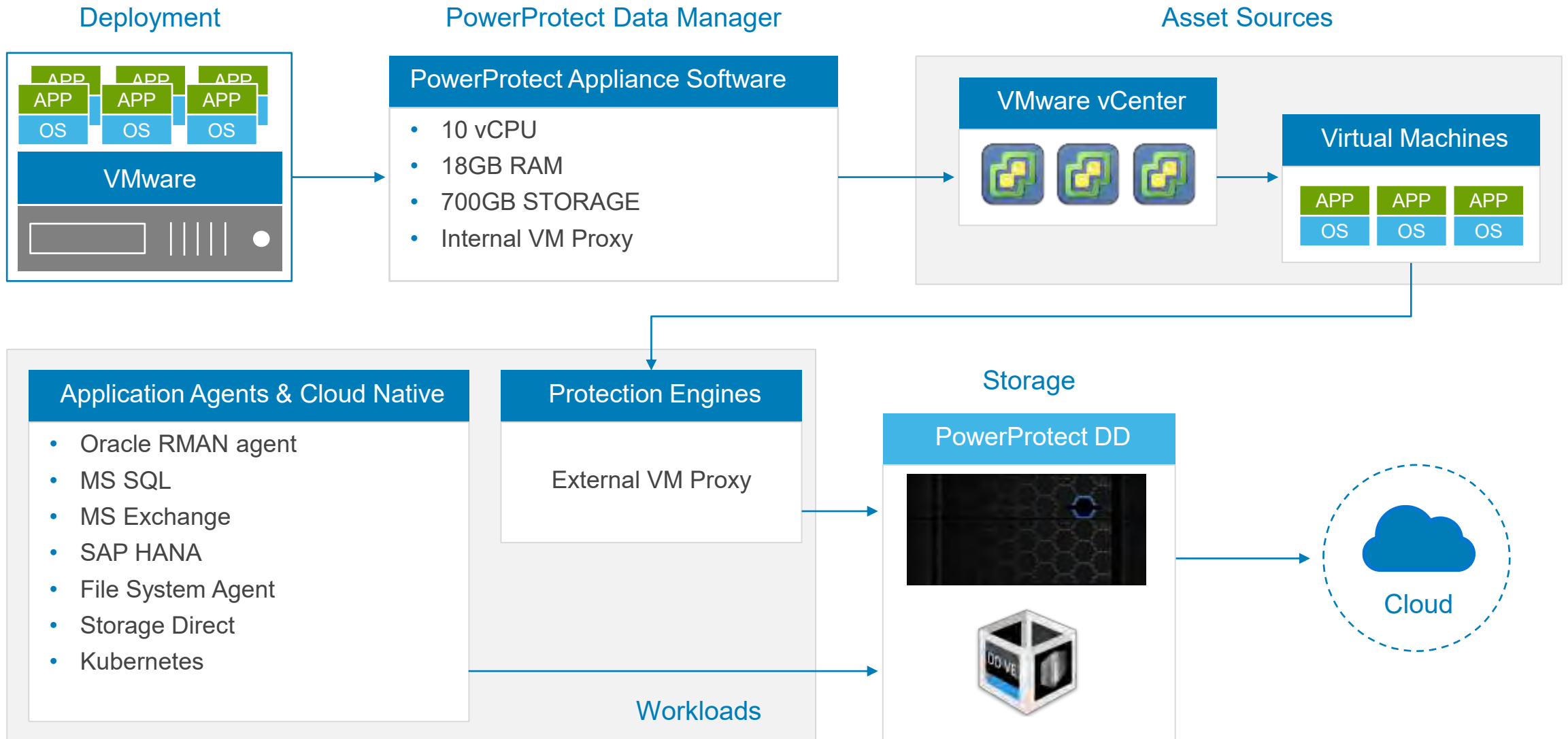
WORKLOADS

- VMware
- Kubernetes
- Oracle
- SQL
- SAP HANA
- Filesystems
- Exchange
- Storage Direct

USE CASES

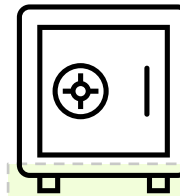
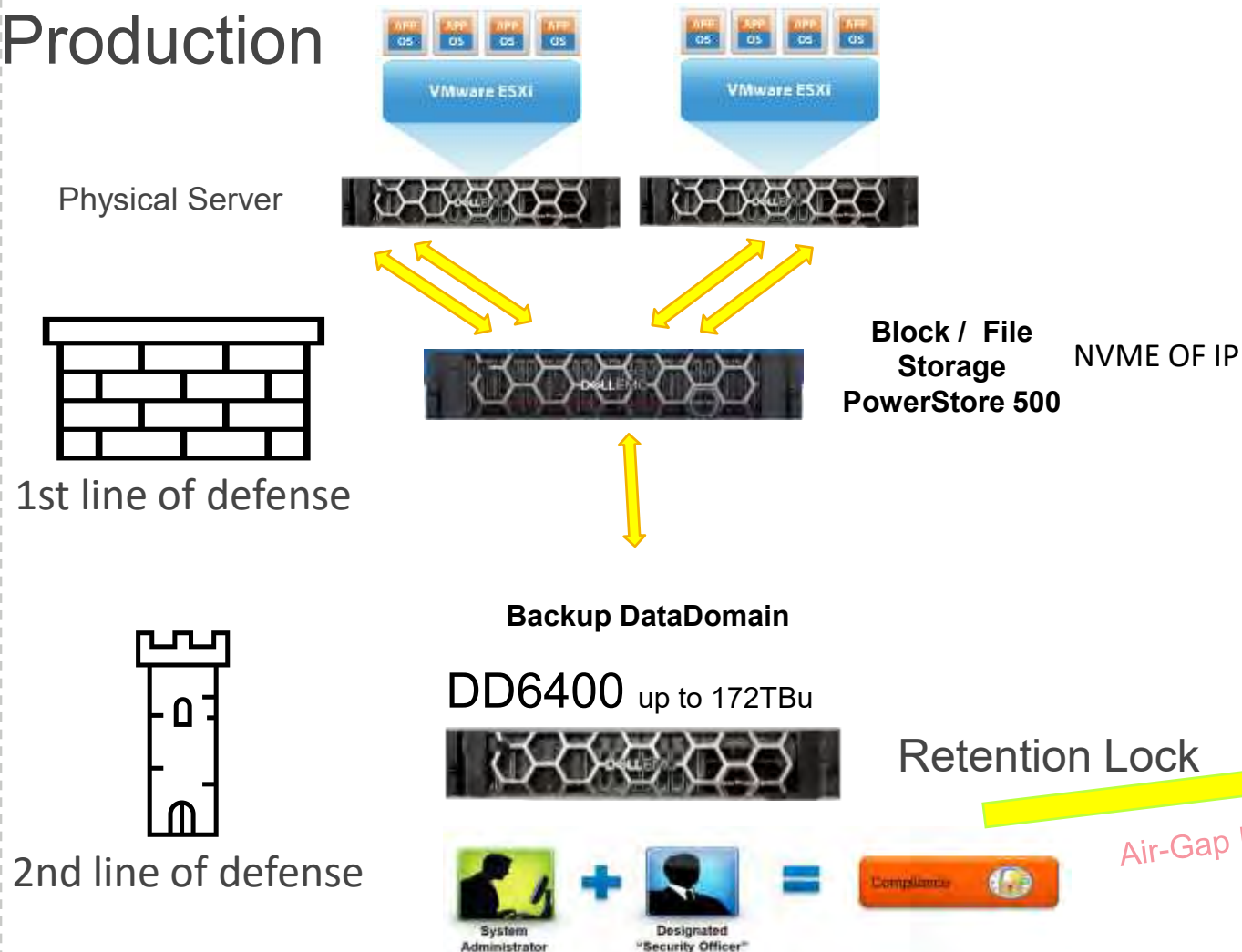
- VMware storage-based policy integration (SPBM)
- Quick Recovery for VM and File Systems using replica copies
- Protecting VMAX3 and PowerMax storage groups
- Kubernetes protection and restore using VMware and storage CSI drivers
- Protection and snapshot management with Cloud Snapshot Manager
- VM backup and recovery
- Self-service back and restore and centralized oversight and governance
- VMC on AWS integration
- SQL backup and recovery
- Cloud tiering for long term retention

Components



PowerClub – Solution

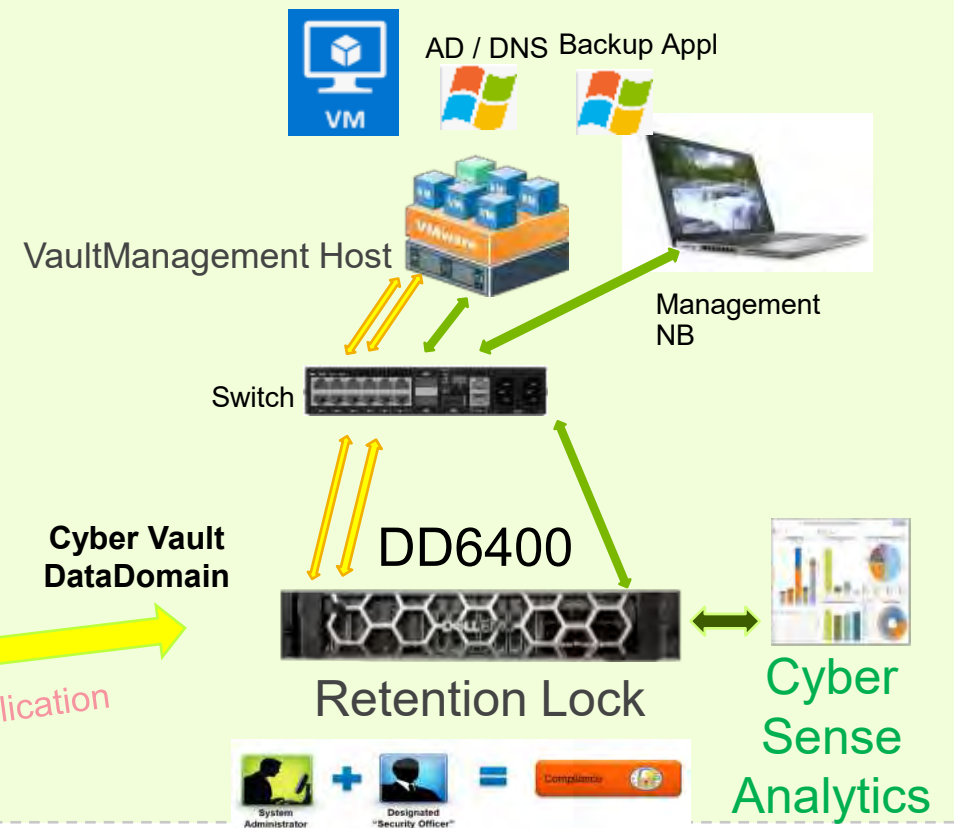
Production



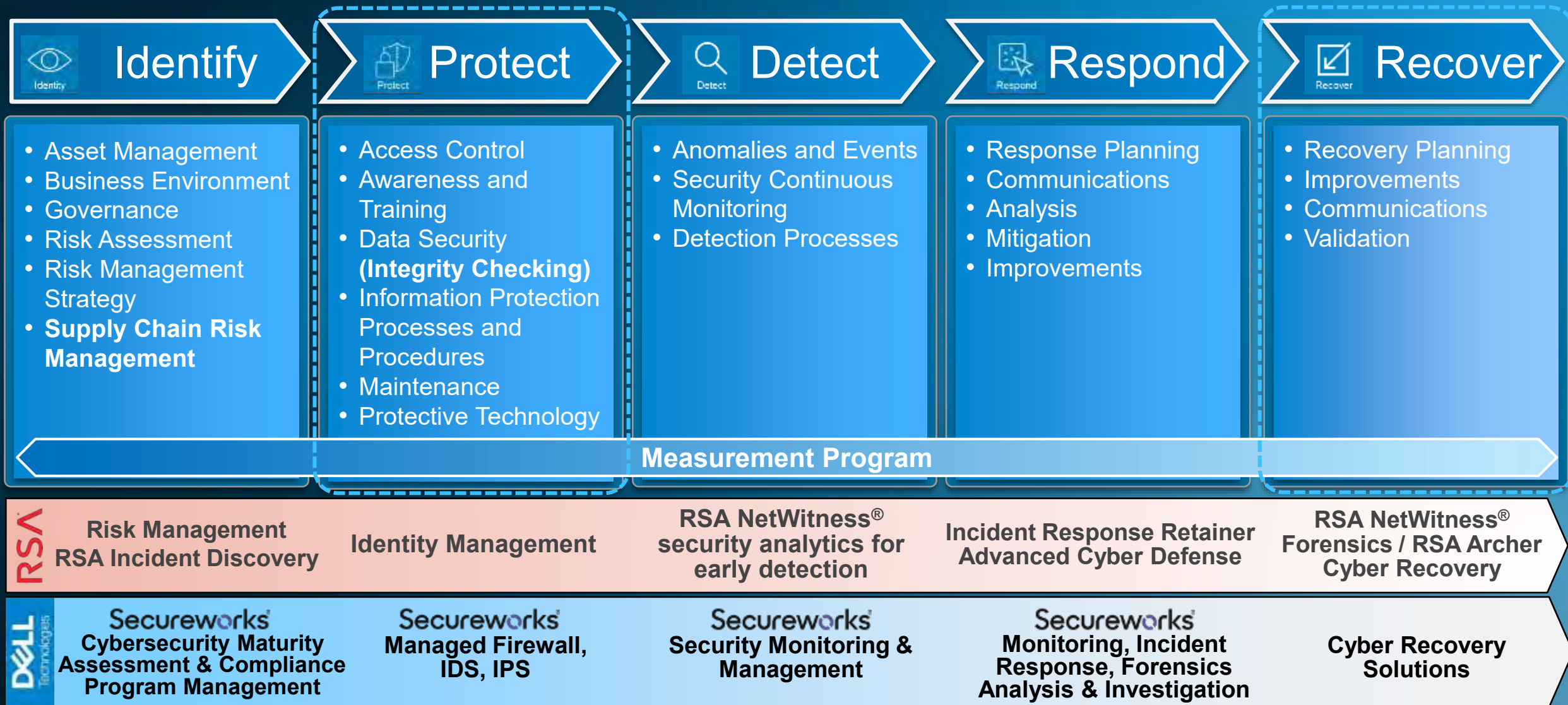
3rd – last line of defense

DR-Site Cyber Vault

Cyber Recovery Software VM



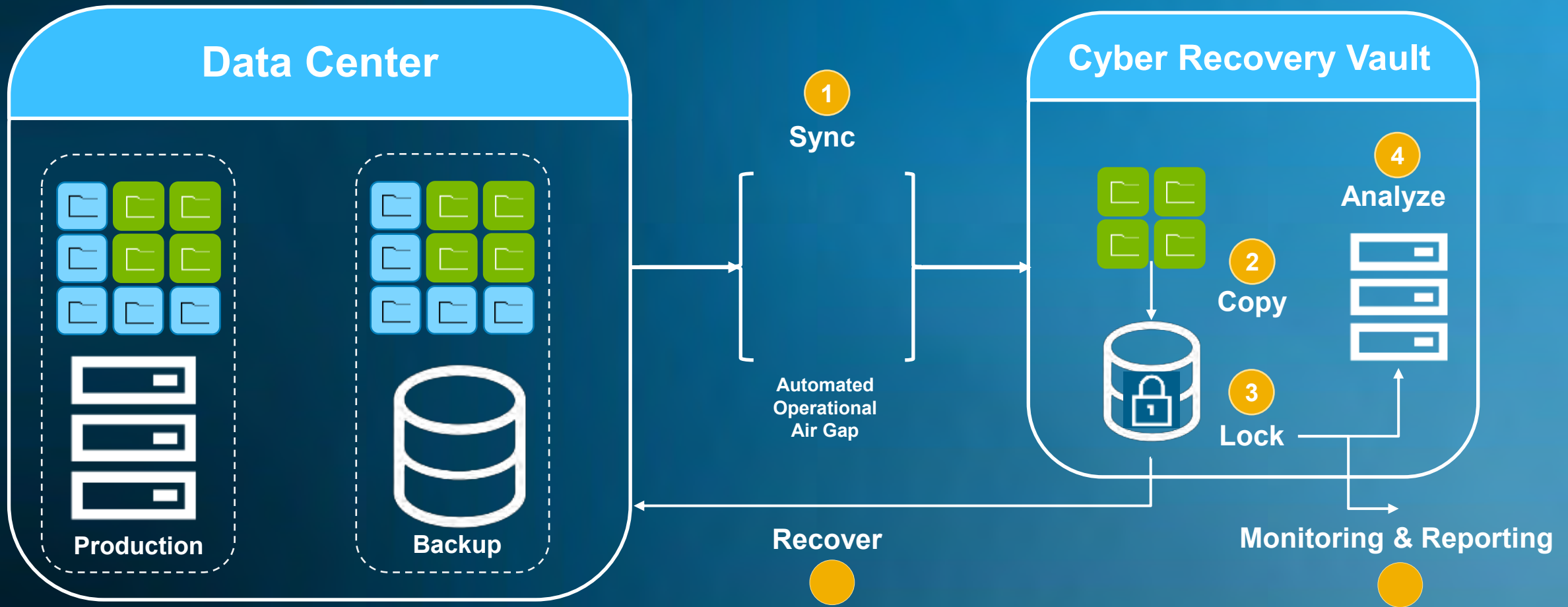
Cybersecurity Framework (NIST)



Dell Technologies Aligned Services

PowerProtect Cyber Recovery

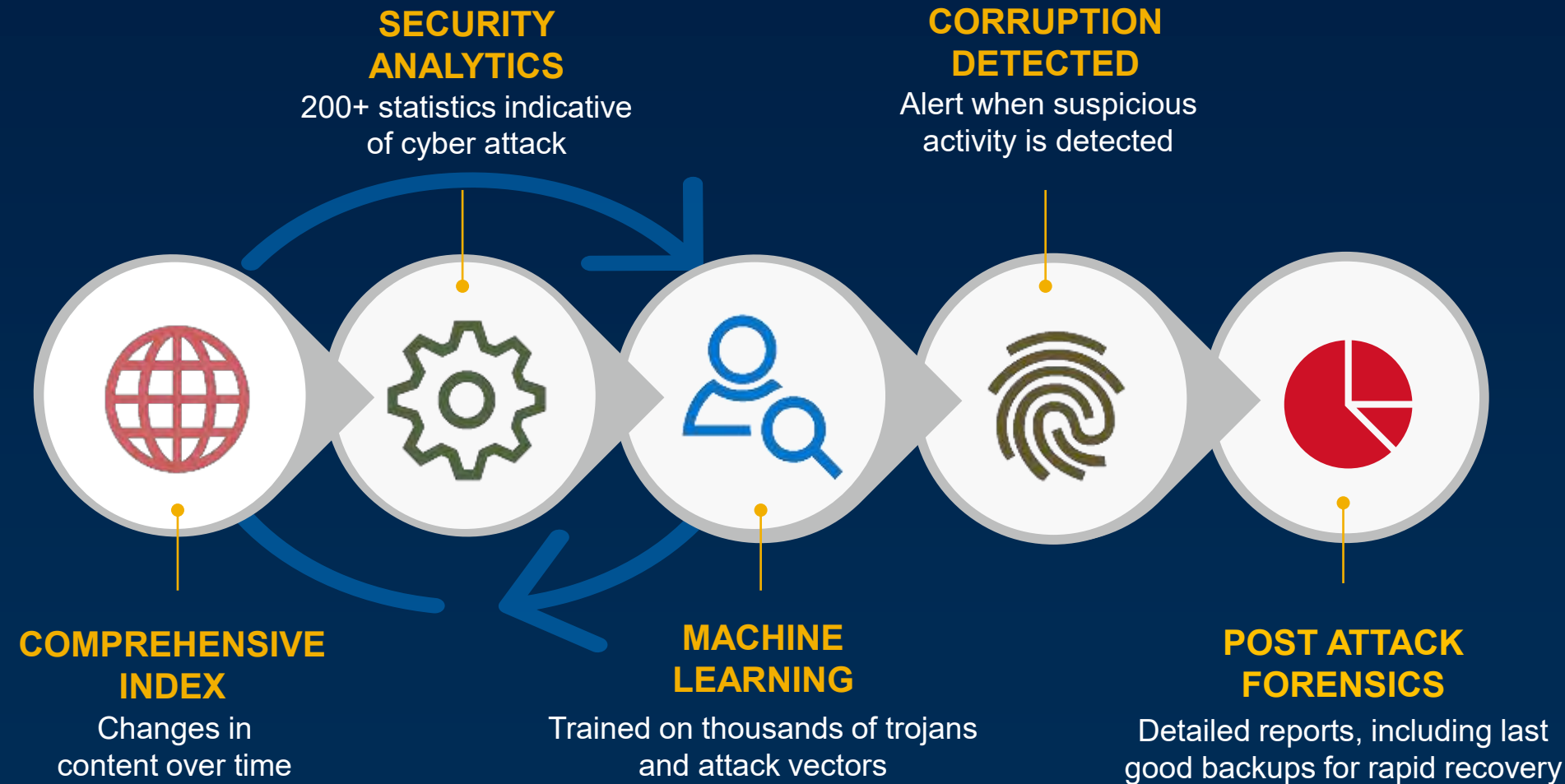
Data Vaulting and Recovery Processes





How CyberSense Works

Analytics, Machine Learning and Forensic Tools to Detect & Recover from Cyber Attacks



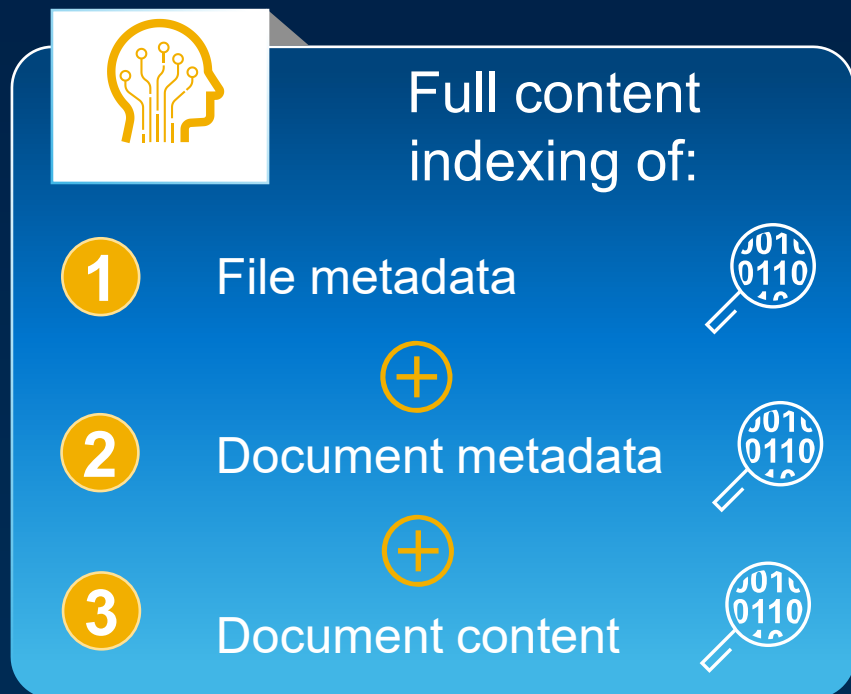
CyberSense Provides

- Attack vector notification
- Ransomware detection
- Corrupted file details
- Data changes / deletions
- Breached user accounts
- Breached executables
- Last good backup copy

Compare: CyberSense vs. “Basic” Analytics

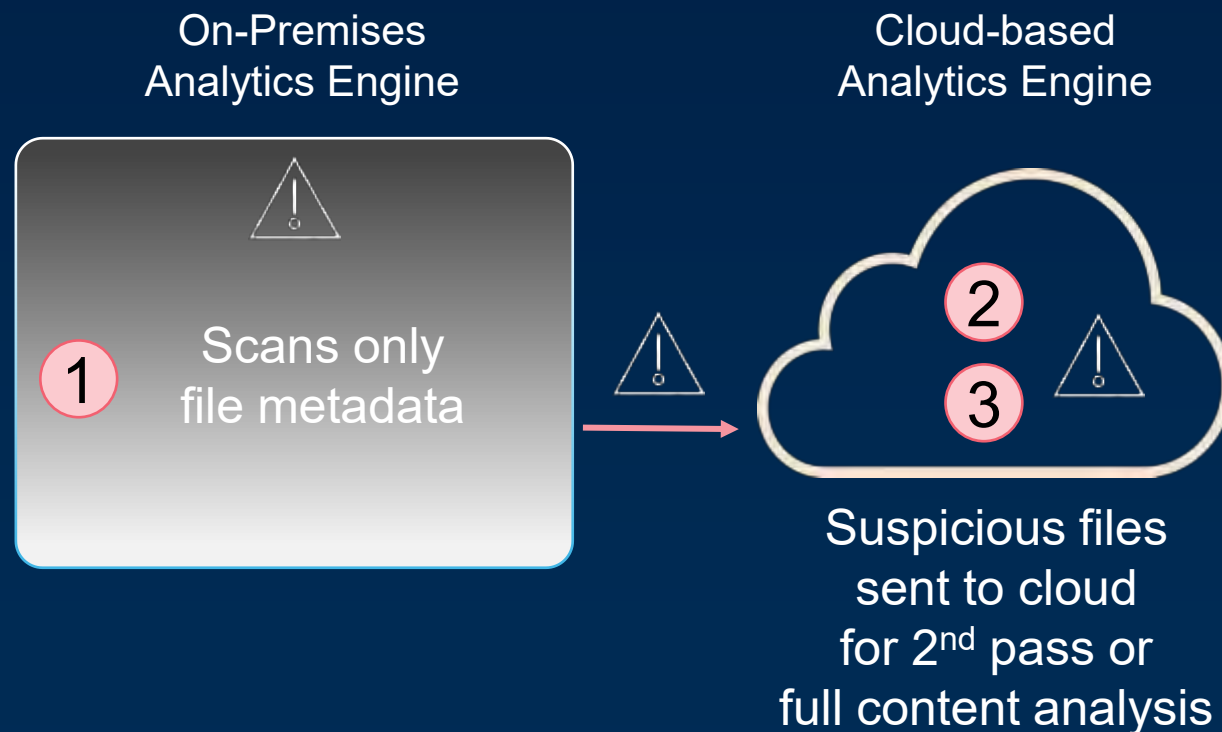
Machine learning enables early detection & rapid recovery within the Cyber Recovery vault

CyberSense:

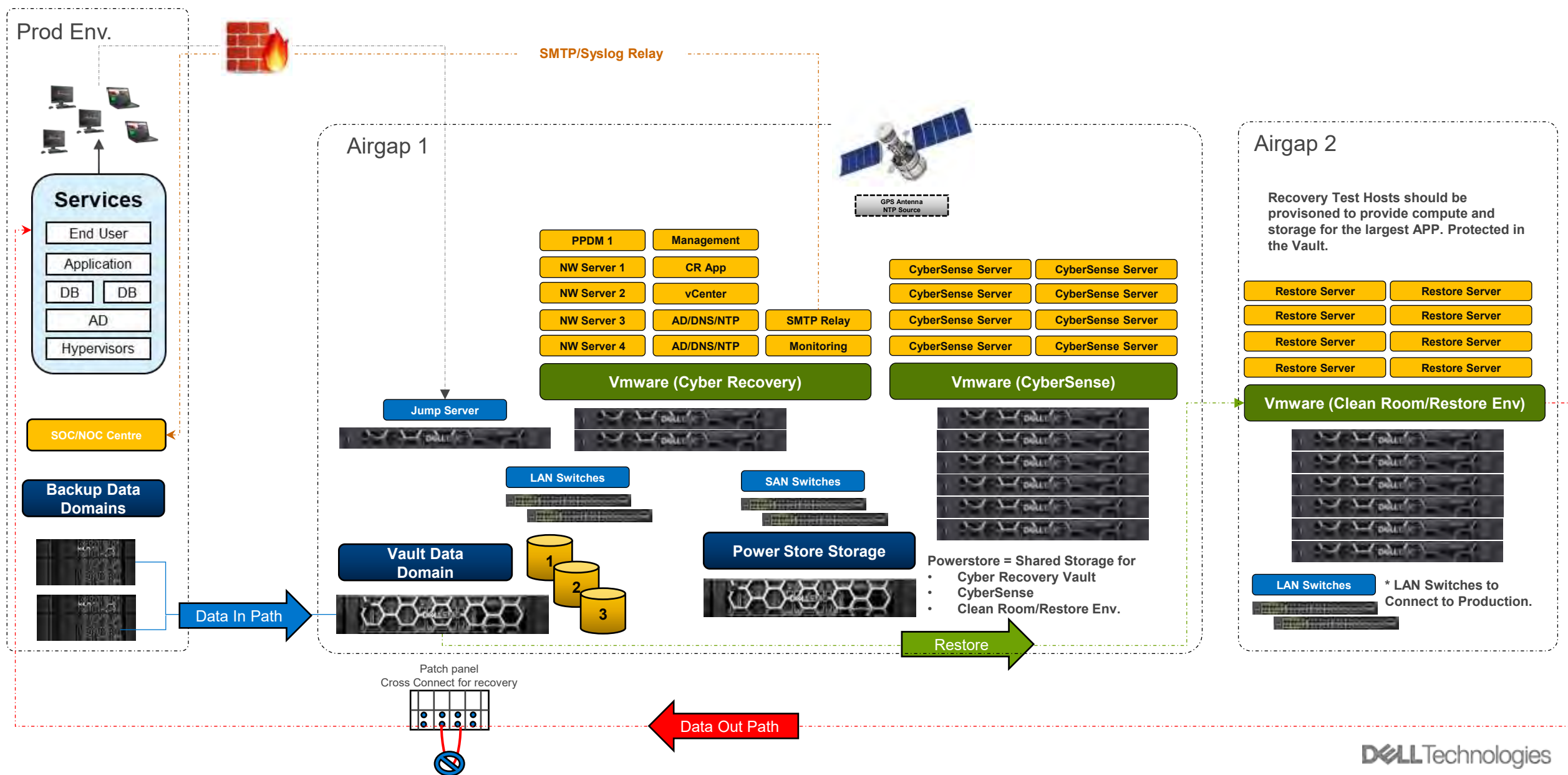


VS.

Basic Analytics:



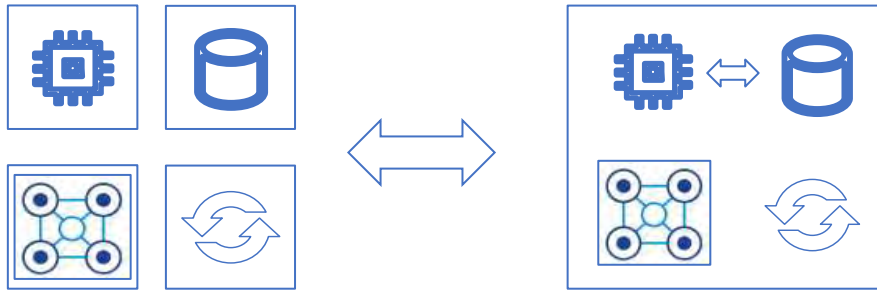
Example: Dell PowerProtect Cyber Recovery Solution Stack



PowerClub – Agenda



LiveOptics: Erfassung und Analyse der Anforderungen

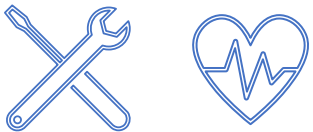


Produkte: Aktuelles von PowerEdge und Powerstore

Technologie: Intel, AMD, Nvidia,...

Virtualisierung: Server/Storage versus Hyper-Converged

Vergleich: VMWare, Hyper-V, Azure Local, Virtuozzo, Proxmox,...



Administration
Life Cycle Management
Support



Backup & Restore
DataDomain und PowerProtect



Cyber Security

AGENDA

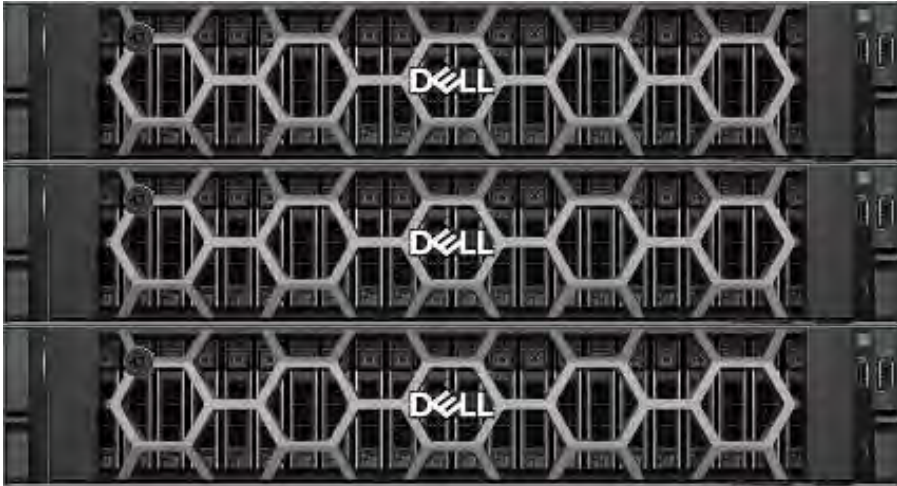


- 09:00 – 09:45 Agenda / LiveOptics / Demo Setup
- 09:45 – 10:00 Pause
- 10:00 – 10:45 PowerEdge Server
- 10:45 – 11:00 Pause
- 11:00 – 11:30 Systemadministration am Beispiel Vsphere
- 11:30 – 12:00 Virtualisierung im Vergleich (Azure Local, Nutanix)
- 12:00 – 13:00 Mittagessen
- 13:00 – 13:45 Virtualisierung im Vergleich (Virtuozzo, Proxmox, Openshift)
- 13:45 – 14:00 Pause
- 14:00 – 14:45 Powerstore
- 14:45 – 15:00 Pause
- 15:00 – 15:45 Data Protection
- 15:45 – 16:00 kommerzieller Vergleich



Und was kostet....?

Kommerzieller Vergleich



Server (288GHz – 4.5TB)

Bestehend aus 3x PowerEdge R7625 mit je

2x AMD EPYC 9124 3.0GHz 16 Cores
24x 64GB RDIMM = 1.5TB
2x 480GB SSD für ESX Boot + 1x1.92TB NVME
2x 2-port 10/25Gb SFP28
iDRAC 9 Enterprise + OME Advanced+
5 Jahre ProSupport NBD



2x Dell EMC Networking S5212
12x 25Gb SFP28 + 2x 100Gb QSFP28
5 Jahre ProSupport Next Business Day



Dell EMC Powerstore 1200T
Dual Controller – 192GB RAM
• 2x 4-port 25Gb SFP28

14x 1.92TB NVME (7 freie Slots)

- Brutto Kapazität: 24 TiB
- Netto Kapazität: 18TiB (Single Parity)
- Effektive Kapazität: ca 54 TiB (DR 3:1)
- Leistung: 93.000 IOPS bei 70/30 Read/Write - random

5 Jahre ProSupport 4h

Kommerzieller Vergleich

HCI Allgemein



Server (288GHz – 4.5TB)

Bestehend aus 3x PowerEdge R7625 mit je

2x AMD EPYC 9124 3.0GHz 16 Cores
24x 64GB RDIMM = 1.5TB
2x 480GB SSD für ESX Boot
10x3.84TB NVME
2x 2-port 10/25Gb SFP28
iDRAC 9 Enterprise + OME Advanced+
5 Jahre ProSupport NBD

2x DellEMC Networking S5212
12x 25Gb SFP28 + 2x 100Gb QSFP28
5 Jahre ProSupport Next Business Day

Azure Local / RHEL Openshift



Server (345GHz – 4.5TB)

Bestehend aus 3x AX-760 mit je

2x Intel Xeon 6544Y 3.6GHz 16 Cores
24x 64GB RDIMM = 1.5TB
2x 480GB SSD für ESX Boot
10x3.84TB NVME
2x 2-port 10/25Gb SFP28
iDRAC 9 Enterprise + OME Advanced+
5 Jahre ProSupport 4h

2x DellEMC Networking S5212
12x 25Gb SFP28 + 2x 100Gb QSFP28
5 Jahre ProSupport Next Business Day

Nutanix



Server (288GHz – 4.5TB)

Bestehend aus 3x PowerEdge R7625 mit je

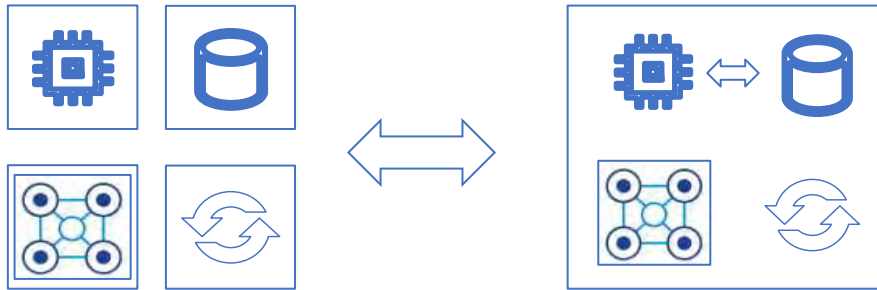
2x AMD EPYC 9124 3.0GHz 16 Cores
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2x DellEMC Networking S5212
12x 25Gb SFP28 + 2x 100Gb QSFP28
5 Jahre ProSupport Next Business Day

PowerClub – Agenda



LiveOptics: Erfassung und Analyse der Anforderungen

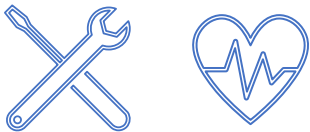


Produkte: Aktuelles von PowerEdge und Powerstore

Technologie: Intel, AMD, Nvidia,...

Virtualisierung: Server/Storage versus Hyper-Converged

Vergleich: VMWare, Hyper-V, Azure Local, Virtuozzo, Proxmox,...



Administration
Life Cycle Management
Support



Backup & Restore
DataDomain und PowerProtect



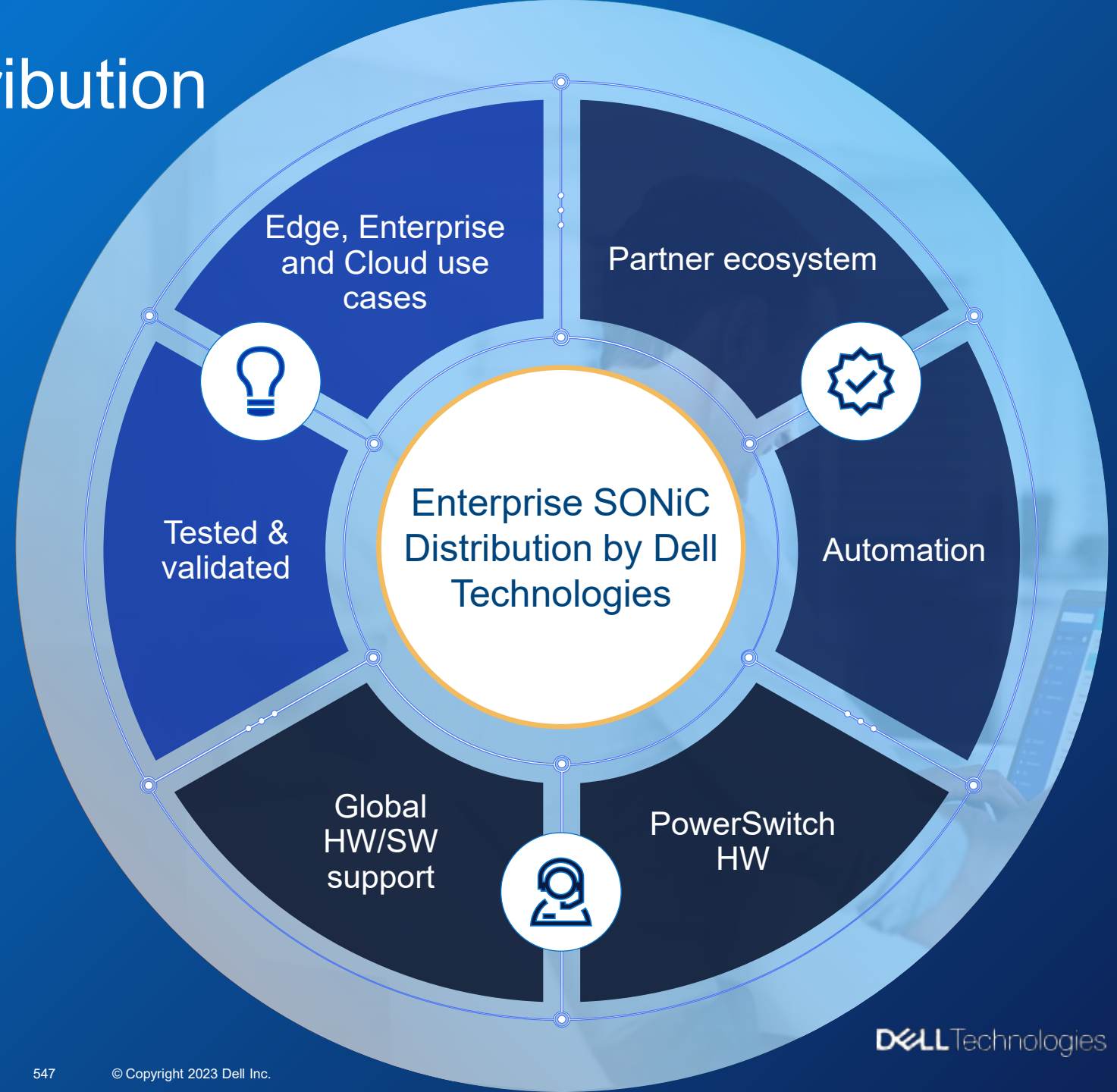
Cyber Security



Dell Networking

Enterprise SONiC Distribution by Dell Technologies

- Hardened Enterprise Features
- Global 24x7 ProSupport and ProDeploy
- 1M lines of code & 5K bug fixes contributed
- Enterprise, Cloud and Edge use cases
- Support for 3rd party & open-source solutions
- Container-based Automation and Visibility
- 3rd Party Container Management
- Education, demos and documentation



Dell Networking Data Center Switches

Management



S3248T-ON

48 x 1GBase-T; 4 x 10GbE;
2 x 100GbE



N3248TE-ON

48 x 1GBase-T; 4 x 10GbE;
2 x 100GbE

ToR



S4348F-ON

48 x 10GbE; 6 x 40GbE; 6 x 100GbE



S4348T-ON

48 x 10GBase-T; 6 x 40GbE; 6 x 100GbE



S4148F-ON

48 x 10GbE; 2 x 40GbE; 4 x 100GbE



S4148T-ON

48 x 10GBase-T; 2 x 40GbE; 4 x 100GbE



S4128F-ON

28 x 10GbE; 2 x 100GbE



S4128T-ON

28 x 10GBase-T; 2 x 100GbE



S4112F-ON

12 x 10GbE; 3 x 100GbE



S4112T-ON

12 x 10GBase-T; 3 x 100GbE

ToR/Leaf



S5448F-ON

48 x 100GbE; 8 x 400GbE



S5232F-ON

32 x 100GbE; 2 x 10GbE



S5296F-ON

96 x 25GbE; 8 x 100GbE



S5248F-ON

48 x 25GbE; 2 x 100GbE



S5224F-ON

24 x 25GbE; 4 x 100GbE



S5212-ON

12 x 25GbE; 3 x 100GbE

Spine



Z9864F-ON

64 x 800GbE; Tomahawk[®] 5



Z9664F-ON

64 x 400GbE; Tomahawk[®] 4



Z9432F-ON

32 x 400GbE; Trident[™] 4



= SONiC or OS10



= OS10 only



=SONiC only

PowerSwitch Z9864F-ON 800GbE AI fabric and super spine switch

Powering up the next-generation IP fabric with 800GbE open networking

- State-of-the-art, high density 100/400/800GbE switch for demanding environments with 2X the throughput, 2X the price/performance and double the power efficiency of 100GbE platforms¹:
 - 64 ports x 800GbE
 - 128 ports x 400GbE (via breakout)
 - 256 ports x 10/50/100GbE ports (via breakout), + 32 ports x 800GbE or 64 ports x 400G (via breakout)
- 51.2Tbps switching capacity in 2U (half duplex, unidirectional)
- Based on Broadcom® Tomahawk® 5 chipset

Purpose

- Built for AI/ML fabrics, Web 2.0, enterprise, and Tier1/Tier2 cloud service provider data center networks with intensive compute and storage traffic, cloud IoT, AI and streaming video requirements

Dell Technologies innovation

- Flexible & multi-rate (50/100/200/400/800GbE) for cost-effective 400GbE and 800GbE connectivity and to help simplify migration to 50/100/200/400/800GbE
- OSFP112 - 800G form factor with low power, cost & space
- Runs Dell Enterprise SONiC Distribution by Dell Technologies
- Supports Open Networking (ONIE)

Enterprise SONiC
Distribution by Dell
Technologies

Dell PowerSwitch Z9864F-ON



2X

Switching
throughput in
2U form factor*

2X

Density of
400GbE
switching ports**

* As compared to latest 400GbE Z-series switches

** As compared to current 64-port 400GbE Z-series switches

DELL Technologies

Z9664F-ON 400GbE super spine switch

Powering up the next-generation IP fabric with 400GbE open networking

- State-of-the-art, high-density 100/400GbE switch for demanding environments with 4X the throughput, 2X the price/performance and double the power efficiency of 100GbE platforms
 - 64 ports of 400 GbE
 - Can be used as a multi-rate switch via breakout cables for up to 256 ports (10/25/40/50/100/200/400GbE)
- 51.2bps switching capacity in 2RU
- Based on Broadcom Tomahawk 4 chipset

Purpose

- Optimum flexibility and cost-effectiveness for the web 2.0, edge, large enterprises, mid-market and cloud service providers with demanding compute and storage traffic environments
- Enables denser footprints and simplifies migration to 400Gpbs

Dell Technologies innovation

- Flexible & multi-rate (10/25/40/50/100/200/400GbE) for cost-effective 400GbE connectivity and to help simplify migration to 100/200/400GbE
- Running Dell SmartFabric OS10 or Enterprise SONiC Distribution by Dell
- QSFP56-DD 400G form factor with low power, cost & space

Enterprise SONiC Distribution by Dell Technologies OS10

Dell PowerSwitch Z9664F-ON



2X

Switching
throughput in
2RU form factor*

2X

Density of
400GbE
switching ports**

*As compared to existing 400GbE Z-series switches

**As compared to existing 32-port 400GbE Z-series switches

DELLTechnologies

Z9664F-ON 400GbE super spine switch

Powering up the next-generation IP fabric with 400GbE open networking

- State-of-the-art, high-density 100/400GbE switch for demanding environments with 4X the throughput, 2X the price/performance and double the power efficiency of 100GbE platforms
 - 64 ports of 400 GbE
 - Can be used as a multi-rate switch via breakout cables for up to 256 ports (10/25/40/50/100/200/400GbE)
- 51.2bps switching capacity in 2RU
- Based on Broadcom Tomahawk 4 chipset

Purpose

- Optimum flexibility and cost-effectiveness for the web 2.0, edge, large enterprises, mid-market and cloud service providers with demanding compute and storage traffic environments
- Enables denser footprints and simplifies migration to 400Gpbs

Dell Technologies innovation

- Flexible & multi-rate (10/25/40/50/100/200/400GbE) for cost-effective 400GbE connectivity and to help simplify migration to 100/200/400GbE
- Running Dell SmartFabric OS10 or Enterprise SONiC Distribution by Dell
- QSFP56-DD 400G form factor with low power, cost & space

Enterprise SONiC Distribution by Dell Technologies OS10

Dell PowerSwitch Z9664F-ON



2X

Switching
throughput in
2RU form factor*

2X

Density of
400GbE
switching ports**

*As compared to existing 400GbE Z-series switches

**As compared to existing 32-port 400GbE Z-series switches

DELLTechnologies

Z9432F-ON 400GbE super spine switch

Powering up the next-generation IP fabric with 400GbE open networking

- State-of-the-art, high-density 100/400GbE switch for demanding environments with 4X the throughput, 2X the price/performance and double the power efficiency of 100GbE platforms:
 - 32 ports x 400GbE
 - 64 ports x 200GbE (via breakout)
 - 128 ports x 10/50/100GbE ports (via breakout)
- 25.6Tbps switching capacity in 1RU (full duplex)
- Based on Broadcom Trident 4 chipset

Purpose

- Built for Web 2.0, enterprise, and Tier1/Tier2 cloud service provider data center networks with intensive compute and storage traffic, cloud IoT, AI and streaming video requirements

Dell Technologies innovation

- Supports Open Networking (ONIE)
- Flexible & multi-rate (10/25/40/50/100/200/400GbE) for cost-effective 100GbE connectivity and to help simplify migration to 100/200/400GbE
- Runs Dell SmartFabric OS10 or Enterprise SONiC Distribution by Dell Technologies
- QSFP56-DD 400G form factor with low power, cost & space

Enterprise SONiC Distribution by Dell Technologies OS10

Dell PowerSwitch Z9432F-ON



4X

Switching
throughput in
1RU form factor*

2X

Density of
100GbE
switching ports**

*As compared to existing 100GbE switching platforms

**As compared to existing 64 port 100GbE switch

DELLTechnologies

S5448F-ON 100/400GbE ToR switch

Multi-rate 1RU ToR switch for 15G Servers

- Fixed switch with 48x25/50/100GbE + 8x400GbE in 1RU
- Max 50/100GbE density: 72x50/100GbE (with breakout)
- SFP56-DD is backwards compatible to SFP+/SFP28 and supports 10/25/50/100G without breakouts
- 16Tbps of switching capacity (full-duplex)
- Based on Broadcom Trident 4 chipset
- Full multi-rate capabilities from 10-400GbE
- Optical breakouts with single-mode and multi-mode fiber
- TAA models support TPM-based Secure boot
- Supports PTPv2 (1588) and SyncE
- ON platform with OS10

Purpose-built for 400G fabrics

- Multiple ToR use cases:
 - 10/25G (NRZ) ToR to 100G/400G fabrics
 - 50/100G (PAM4) ToR to 400G fabrics
- 1.5:1 oversubscribed ToR with 8x400GbE uplinks

Dell Technologies innovation

- Runs Dell SmartFabric OS10 or Enterprise SONiC Distribution by Dell Technologies
- Supports Open Networking (ONIE)
- Multi-Rate platform (10, 25, 40, 50, 100, 200, 400GbE)

Enterprise SONiC Distribution
by Dell Technologies
OS10

Dell PowerSwitch S5448F-ON



Multi-Rate
Without
Breakout

2X
Packet Buffers
& Routes

S5200-ON 25GbE & 100GbE in-rack switches

25GbE & 100GbE open networking switches

- Low-cost fixed form factor top-of-rack switches offering multiple options of 25GbE SFP28 ports for in-rack server and storage connections and 100GbE QSFP28 & QFSPDD-28 ports for uplink and clustering
- Based on Broadcom Trident3 chipset
- Enhanced buffering, higher forwarding tables and data plane support for VXLAN routing
 - S5212F-ON – 1RU, half-width, 12 x 25GbE ports and 3 x 100GbE ports. 2.5X the throughput at ½ the size
 - S5224F-ON - 1RU, 24 x 25GbE ports and 4 x 100GbE ports
 - S5248F-ON – 1RU, 48 x 25GbE ports and 8 x 100GbE ports (4xQSFP28 100GbE and 2xQSFPDD-28 2x100GbE ports)
 - S5296F-ON – 2RU, 96 x 25GbE ports and 8 x 100GbE ports
 - S5232F-ON – 1RU, 32 x 100GbE ports

Purpose

- Built and optimized for combinations of 25GbE connections in-rack with 100G to fabric and highly scalable and cost-effective 100GbE leaf/spine fabric between data center racks
- Ideal for Web 2.0, Enterprise, mid-market and Cloud Service Provider data center networks

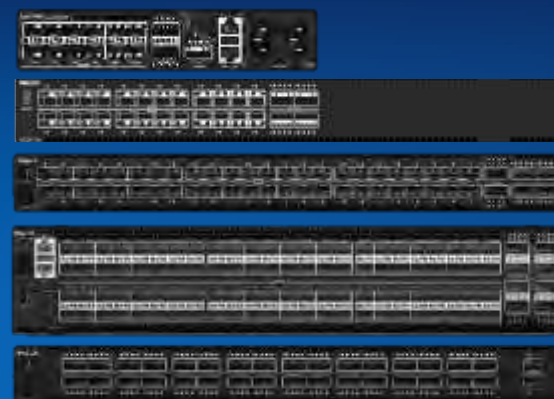
Dell Technologies innovation

- High-density (96-port) for ToR/MoR/EoR
- QSFPDD-28 ports for higher density 100GbE uplink (S5248F)
- Open Networking running OS10 & ONIE or Enterprise SONiC Distribution (S5232F-ON, S5248F-ON, S5296F-ON)

Enterprise SONiC Distribution
by Dell Technologies

OS10

Dell PowerSwitch S5200-ON



2.5X

Throughput of traffic

32

100GbE ports in 1RU

DELL Technologies

S4348F/T-ON 10/100GbE

In-rack switches

Latest multi-functional, multi-protocol 10/100GbE in-rack switches

- S4348F-ON - 48 x 10G SFP+, 6 x 100G QSFP28 ports
- S4348T-ON - 48 x 10GBaseT ports, 6 x 100G QSFP28 ports

Applications

- 10/100GbE in-rack connectivity for servers and SDS environments
- Both fiber version and copper port version
- Based on Broadcom Trident3 silicon

Dell Technologies innovation

- Open Networking with full ONIE bootloader support
- Runs Dell Enterprise SONiC Distribution by Dell Technologies
- SFP+, 10GBaseT-CU RJ45 port and QSFP28 uplink connectors with low power, cost and space

ONIE

Enterprise SONiC
Distribution by
Dell Technologies



Dell PowerSwitch S4348T/F-ON

10/100 GbE
in-rack
connectivity

Dell Enterprise
SONiC
Programmable
Container OS

DELL Technologies

S4100-ON 10/100GbE in-rack switches

Multi-functional, multi-protocol 10/100GbE in-rack switches

- S4112F-ON – ½ RU, 12 x 10GbE + 3 x 100GbE ports
- S4112T-ON – 1/2RU, 12 x 10GBase-T + 3 x 100GbE ports
- S4128F-ON - 28 x 10G SFP+ and 2 x 100G QFSP28 ports
- S4128T-ON - 28 x 10GBaseT ports and 2 x 100G QFSP28 ports
- S4148F-ON - 48 x 10G SFP+, 2 x 40G QSFP+ ports and 4 x 100G QSFP28 ports
- S4148T-ON - 48 x 10GBaseT ports, 2 x 40G QSFP+ ports and 4 x 100G QSFP28 ports

Applications

- 10/100GbE in-rack connectivity for servers and SDS environments

Dell Technologies innovation

- Open Networking with support for SmartFabric OS10 & ONIE

OS10

Dell PowerSwitch S4100-ON



10/100 GbE
in-rack
connectivity

**OS10 software
environment**
Programmable
Linux OS

DELLTechnologies

S3248T-ON 1/10GbE in-rack switch

Latest 1/10GbE 1U in-rack OOB management switch

- 48x RJ45 10/100/1000Mb auto-sensing ports, 4x 10G SFP+ ports, 2X 100G QSFP28 ports
- x86 platform based on Broadcom Trident3 chipset

Purpose-built for

- Ideal for large enterprise networks, as a management switch in data center

Dell Technologies innovation

- Open Networking
- Runs Dell Enterprise SONiC

Enterprise SONiC Distribution by Dell Technologies OS10

Dell PowerSwitch S3248T-ON



1/2

Latency vs.
current
generation 1G
ToR*

1/2

Power
consumption
vs. current
generation*

* Source: Competitive Data Sheets

Dell Edge Switches & uCPE

Edge Access

E3200-ON



E3224F-ON – 24x1G SFP ports (Americas only)

E3248P-ON – 48x1G 802.3at 30W PoE ports
E3248PXE-ON – 48x1/2.5/5/10G 802.3bt 90W PoE ports

N3248TE-ON



N3248TE-ON – 48x1G RJ45, 4x10G, 2x100G



= SONiC or OS10



= OS10 only

uCPE

VEP4600



VEP V910 – Versa OS, 8 Core, 64GB RAM, 240G SSD

VEP V930 – Versa OS, 16 Core, 64GB RAM, 960G SSD

VEP ESX – ESXi OS:

- 4 Core, 16GB RAM, 128GB SSD
- 8 Core, 16GB RAM, 240GB SSD
- 8 Core, 32GB RAM, 960GB SSD
- 16 Core, 32GB RAM, 240GB SSD
- 16 Core, 64GB RAM, 960GB SSD

Ports: 4x1G, 2x10G



VEP1400

VEP1420/1420N/1420LTE – Versa OS, 4 Core, 8GB RAM, 32GB eMMC

VEP1425 – Versa OS, 4 Core, 8GB RAM, 120GB SSD

VEP1425N – Versa OS, Non-WiFi, 4 Core, 8GB RAM, 120GB SSD

VEP1445 – Versa OS or Adva, 8 Core, 16GB RAM, 240GB SSD

VEP1445N – Versa OS, Non-WiFi, 16GB RAM, 240GB SSD

VEP1485 – Versa OS or Adva, 16 Core, 32GB RAM, 240GB SSD

VEP1485N – Versa OS, Non-WiFi, 16 Core, 32GB RAM, 240GB SSD

Ports: 802.11ac, 6x1G, 2x10G, 4x1G on VEP1420N 

E3200-ON Enhanced 1/10GbE MultiGig Edge switches

Latest generation 1G and 10G MultiGig Edge Switches

- E3248PXE-ON
 - 1RU, 48x1/2.5/5/10GbE 802.3bt (90W) PoE ports, 4x25GbE SFP28, 2x100GbE QSFP28
 - SONiC 4.0.3 support
- E3248P-ON
 - 1RU, 48x1GbE 802.3at (30W) PoE ports, 4x10GbE SFP+, 2x100GbE QSFP28
 - SONiC 4.0.3 support
- E3224F-ON
 - 1RU, 24x1GbE SFP ports, 4x10GbE SFP+, 2x100GbE QSFP28
 - OS10 support at RTS limited to DC Feature Parity
 - Americas only

Purpose-built for

- Large enterprise and retail edge networks
- Enhanced CPU/memory for containerized applications at the edge

Dell Technologies innovation

- Extend data center fabric to remote locations using the same NOS, SONiC, and familiar networking tools to monitor, manage and deploy at the edge
- Open networking, high density
- 10/25G and 100G uplinks to aggregation
- External power shelves to maximize PoE budgets

Enterprise SONiC Distribution by
Dell Technologies

Dell PowerSwitch E3200-ON



48x
10G MultiGig

48x
90W PoE

N3248TE-ON L3 Advanced 1G Access

1G management switch

- 48x RJ45 10/100/1000Mb auto-sensing ports, 4x 10G SFP+ ports, 2X 100G QSFP28 ports
- x86 platform based on Broadcom Trident3 chipset

Purpose-built for

- Ideal for large enterprise networks, as a management switch in data center, and large retail deployments

Dell Technologies innovation

- Open Networking
- Runs Enterprise SONiC for Edge, OS10
- 400G stacking with up to 12 members
- 25G uplinks to aggregation

Enterprise SONiC Distribution by
Dell Technologies

OS10

Dell PowerSwitch N3248TE-ON



48x1G