
DELL Technologies /Forum
REAL
TRANSFORMATION
GLOBAL SPONSORS
intel
Microsoft

The Next Generation of PowerEdge Servers, Featuring AMD

Tim Loake

Vice President – UK&I
Dell Technologies | Infrastructure Solutions Group

DELL EMC

AMD

Multi-Cloud Agility
requires
Right Workloads
matched with
Right IT infrastructure

Multi-cloud deployments are the norm

2/3 of new server installations are being used for emerging workloads
(AI, ML, DL, Data Analytics, IOT, etc.)

Surveyed global IT Decision Makers **Base Sample:** 480
Source: Dell EMC Market Research, December 2018

Innovations required on multiple fronts across diverse workloads in the **multi-cloud** environment

Effortless Management

Dynamic W/L Optimized Scaling

Robust Security

Lower TCO

Larger Bandwidth Capacity

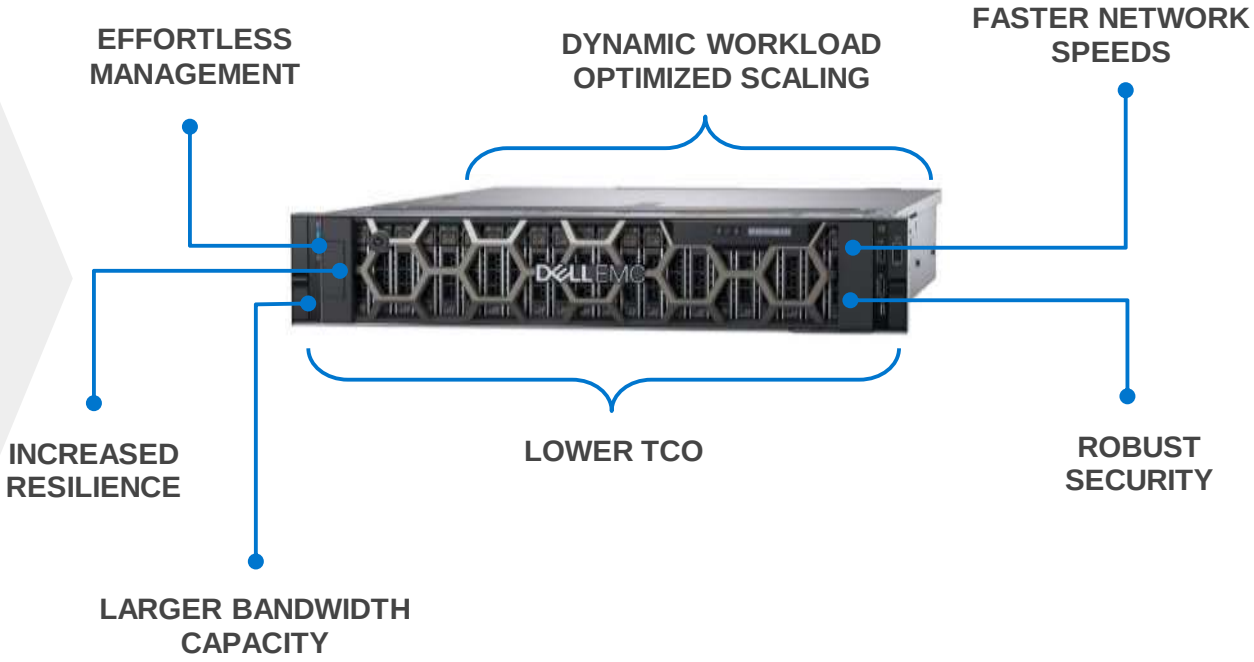
TOP FACTORS DRIVING WORKLOAD PLACEMENT

SECURITY | COMPLIANCE | COST | LATENCY | CONTROL

Introducing – The new PowerEdge Servers

Innovations designed to enable better business outcomes

SERVER PLATFORMS
REIMAGINED
&
REDESIGNED
FOR
MULTI-CLOUD
ENVIRONMENT



The new PowerEdge server innovations address key business priorities

Accelerate Performance

100%[1] more processing cores and faster data transfer speeds with PCIe Gen 4

20%[1] **faster** memory speed to reduce latency and deliver faster response

2X[1] PCIe performance with Gen4 at 16GT/s to overcome bottlenecks

Manage Effortlessly

Up to **96%**[2] reduction in deployment time through automation capabilities in OpenManage system management solutions

Easy BIOS tuning with workload-optimized server configuration profiles

56%[3] improvement in data center cooling power utilization efficiency (cooling **PUE**)

Integrated end-to-end security

Secure data at rest with OpenManage Secure Enterprise Key Manager and AMD Secure Memory Encryption (**SME**)

Maintain enterprise-wide security with automated firmware and compliance drift detection with iDRAC and OpenManage Enterprise

509 unique keys -Secure Encrypted Virtualization (**SEV**)

[1] Based on Dell EMC Internal Analysis: versus comparable Dell EMC PowerEdge Servers with AMD Naples configurations
[2] Based on Dell EMC Internal Analysis: PowerEdge OpenManage vs. manual deployment
[3] Based on Dell EMC Internal Analysis

Accelerating Performance

WORKLOAD – OPTIMIZED CONFIGURATIONS

Risers optimized for each specific workload including GPUs for ML/DL, maximizing slots for VDI or max PCIe B/W

HIGHER PERFORMANCE

2nd Gen AMD EPYC delivers higher performance with up to 64 Cores / 128 Threads , 2x L3 cache/ core

GREATER BANDWIDTH

PCIe Gen4 enables 2x PCIe performance at 16GT/s. Additionally, 20% higher memory speed increase to 3200MHz

BRAND NEW BOARD DESIGN

Improved signal integrity for PCIe Gen4 and enables balanced airflow for better thermal design

Manage Effortlessly

INTELLIGENT POWER MANAGEMENT

Streamline power management with the latest OpenManage Enterprise plug-in architecture

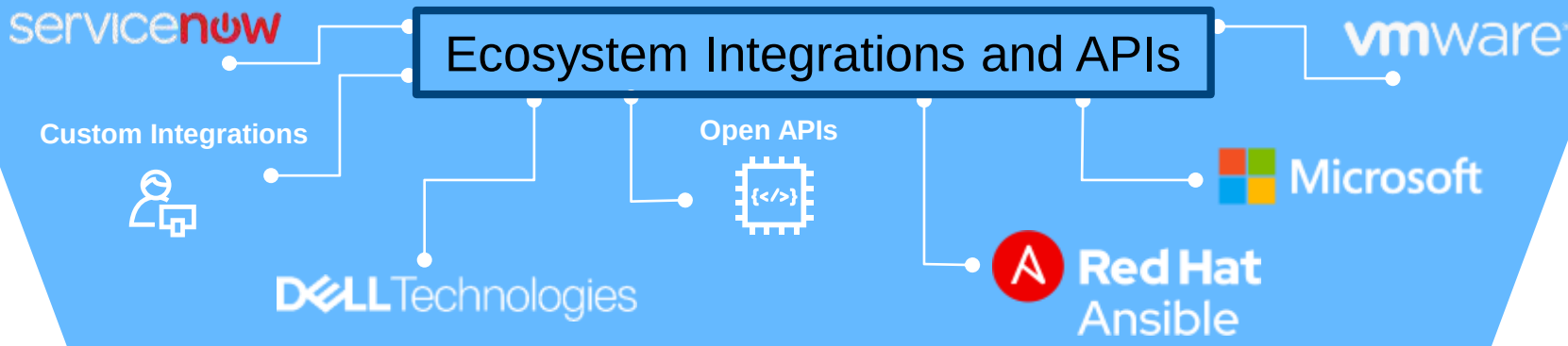
iDRAC9

4x faster user experience vs. previous generation including support for PCIe Gen4

AUTOMATED COOLING

Multi-vector cooling that is automatically guided on to the hottest parts of the server

Enhanced management agility **on-premises** and in the **cloud**



iDRAC + OpenManage Enterprise Innovations

- Cluster/vSAN aware updates
- Server Configuration Profiles
- Authenticated updates
- Configuration and firmware drift detection
- Health/security monitoring

PowerEdge Servers

Robust end-to-end integrated security

DATA PROTECTION

Reduce the risks of securing data across their data center with OpenManage Secure Enterprise Key Manager[1]

VIRTUAL MACHINE PROTECTION

Protect each VM by isolating the guests and the hypervisor with AMD Secure Encrypted Virtualization (**SEV**)

MEMORY PROTECTION

Protect data by using a single key to encrypt the system memory with AMD Secure Memory Encryption (**SME**)

DRIFT DETECTION & SYSTEM LOCKDOWN

Detect and remediate unauthorized or malicious change with drift detection and system lockdown with OpenManage Enterprise and iDRAC9

1. OpenManage Secure Enterprise Key Manager will be available on R6515 and R7515 in December 2019

Expanding the New Dell EMC PowerEdge Servers

with the 2nd Generation AMD EPYC™

BRAND NEW





R6515	R7515	R6525	R7525	C6525
Single-socket 1U rack server brings peak performance and excellent TCO	Highly scalable 2U rack server delivers performance and outstanding TCO	Highly configurable 1U rack server delivers outstanding balanced performance for dense compute	Highly adaptable 2U rack server brings powerful performance and flexible configuration	Compute-dense server sled accelerates data center performance to tackle diverse HPC applications
1S RACKS		2S RACKS		C-SERIES

HPC & DATA ANALYTICS

VIRTUALIZATION & VDI

SDS

SDS

DELL EMC PowerEdge

Target Workloads and Solutions

	Data Analytics	SDS	HPC	Virtualization & VDI	NFV
workloads	• High core count for complex analysis • Massive I/O bandwidth for faster data loading • Fast memory and high bandwidth for better performance with in-memory databases • Security for business critical data	• NVMe Direct for lowest latency storage • More memory for larger cache • Memory encryption for data security • Single-Socket licensing enables large TCO advantages	• High core count CPUs optimize compute performance • Faster Gen4 I/O for cluster connectivity • Memory capacity for large datasets • Massive I/O bandwidth for NVMe with GPUs	• Higher CPU core count to enable richer user sessions for VDI • Large memory bandwidth, high core count with Gen 4 I/O provides increased VM Density • Cryptographic isolation between hypervisor and VM	• Gen4 I/O provides best networking performance and bandwidth • Memory and VM encryption for business critical data • Large I/O bandwidth enables high performing network VMs
solutions	• **Hadoop Ready Sol.** • **Apache Spark** • **TensorFlow**	• **Azure Stack HCI Ready Node** • **vSAN Ready Node** • **VxRail**	• **Digital Mfg.** • **Life Sciences** • **Research**	• **VDI Ref. Architecture** **Horizon** **Dassault Sys.** **Autodesk**	• **OpenStack**
	R7515, R7525	R6515, R7515 R7525	R6525, C6525	R6515, R7515 R6525, R7525	R6515, R7525

DELL EMC PowerEdge

SINGLE SOCKET LEADERSHIP

1S AMD EPYC™ MATCHES PERFORMANCE OF 2S INTEL STACK UP TO XEON® PLATINUM 8280M

SPECRATE®2017_INT_PEAK

INTEL STACKS DO NOT INCLUDE XEON PLATINUM 9200 SERIES

1S Intel® Xeon® PRODUCT STACK

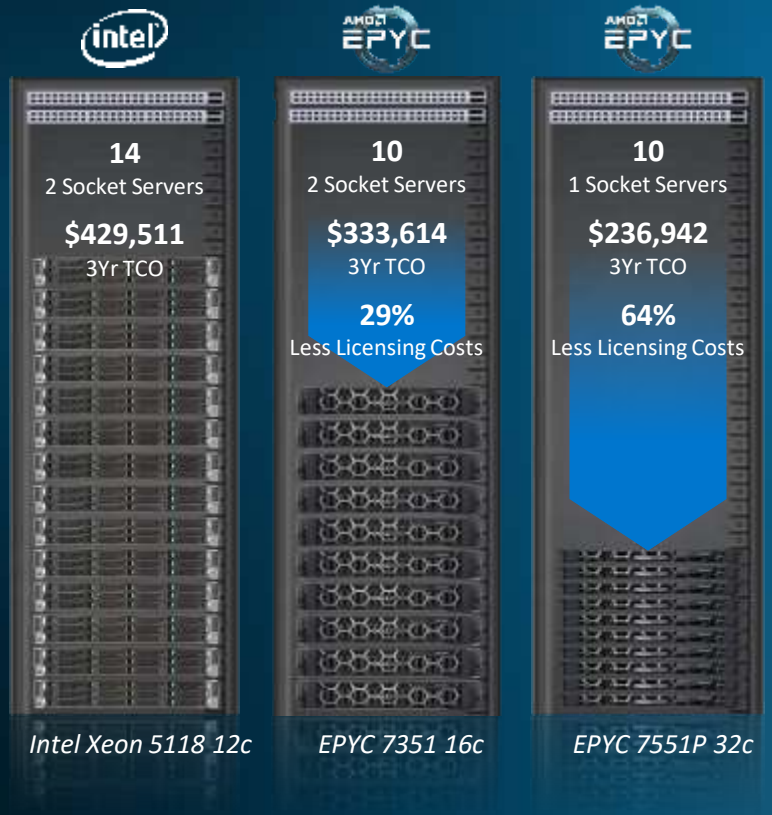
2S Intel® Xeon® PRODUCT STACK

1S AMD EPYC™ PRODUCT STACK

DELL EMC PowerEdge

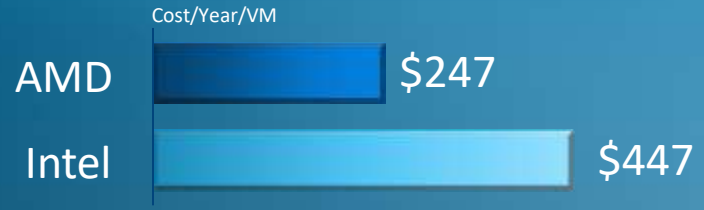
SEE ENDNOTE ROM-260

AMD EPYC™ FOR VIRTUALIZATION AND CLOUD



SLASH TCO by up to…

45%[14]



320 Virtual Machines

1VM w8GB DRAM per Core

(AMD EPYC™ similar or better performance)

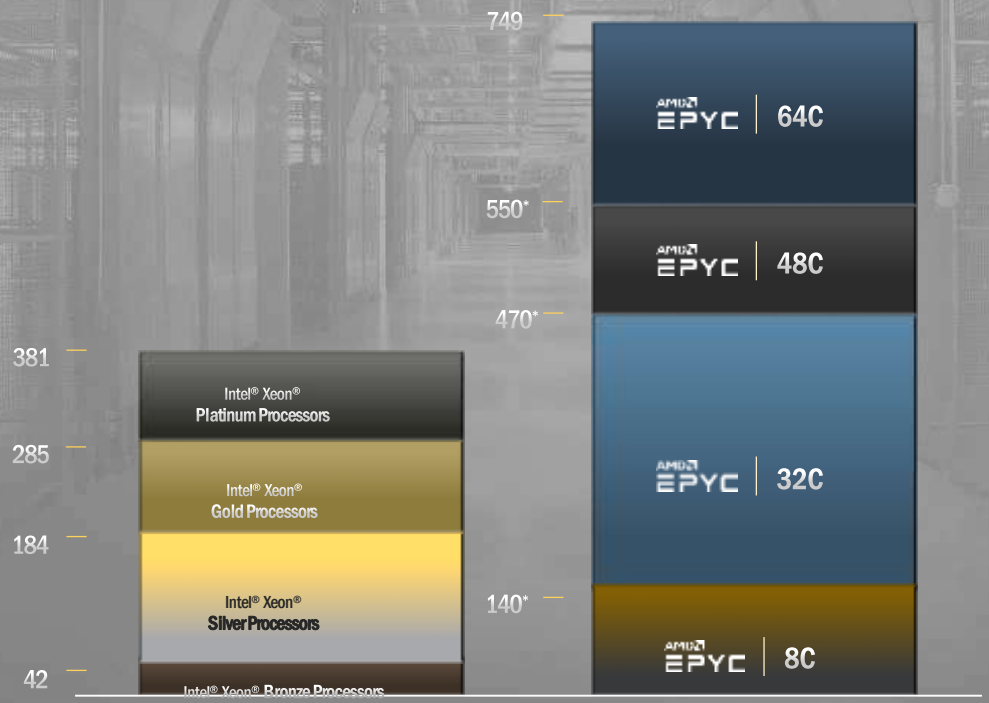
DELL Technologies

TWO SOCKET LEADERSHIP

2S INTEL® XEON® vs. 2S AMD EPYC™ SPEC CPU® 2017 PERFORMANCE

SPECRATE®2017_INT_PEAK

2S Intel® Xeon®
PRODUCT STACK



2S AMD EPYC™
PRODUCT STACK

INTEL STACK DOES NOT INCLUDE XEON PLATINUM 9200 SERIES

*ESTIMATED; SEE ENDNOTE ROM-258

DELL EMC PowerEdge

Intel Cascade Lake / AMD Rome

	INTEL Cascade Lake	AMD ROME
1S Rich	No	Yes
Transistor size	14nm	7nm (lower power usage)
CPU I/O (2S) PCIe	96 lanes / gen 3	128 lanes / gen 4 x 2 speed
Max Core Count per socket	28	64
Memory Channels per socket	6	8
New AI CPU Instructions	AVX512 new AI//ML “VNNI”	No additional instructions
NUMA domains in Socket	1	1
Storage Class Memory	Optane DC persistent memory (code name “AEP” Apache Pass)	None

To Rome, or not to Rome?

Requirement	INTEL Cascade Lake	AMD ROME
Expand Existing Virtual Environment	Yes	No
New Virtual Environment	Yes	Yes (lower $/VM than Intel)
Artificial Intelligence / GPU workloads – PCIe Gen 4	No	Yes
Artificial Intelligence codes taking advantage of VNNI	Yes	No
High Performance Compute – Max core count and throughput	No	Yes
HPC code optimised by AVX512	Yes	No
Extremely large memory spaces – e.g SAP HANA	Yes	Not optimal

ROME AT A GLANCE

BUILT UPON THE SOLID FOUNDATION OF EPYC 7000 WITH ADDITIONAL FEATURE AND SOCKET COMPATIBILITY

Compute Core Die (CCD)

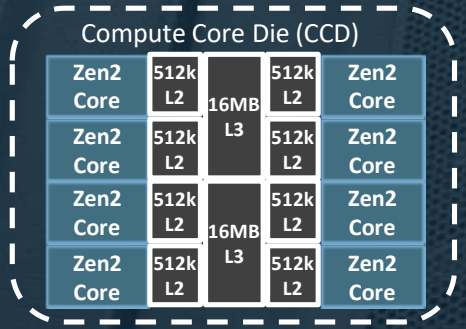
COMPUTE

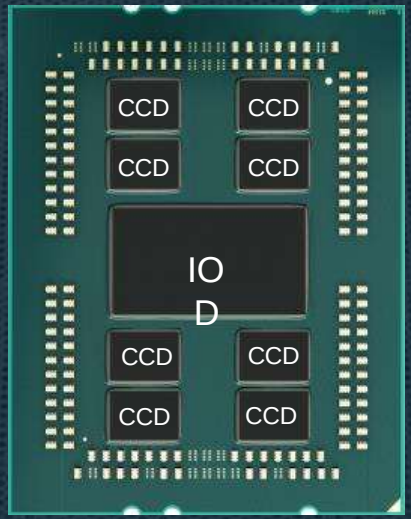
Up to 2x AMD “Zen2” x86 cores
(64 core / 128 threads)
2x FLOPs per cycle per core

Up to 4x shared L3 cache (256MB)
Up to 2x L3 cache per core (16MB per 4 cores)

Reduced System Diameter (NUMA domain)

TDP range: 120W-225W*





*Motherboard update required to support higher data rate

IO Die (IOD)

MEMORY

First x86 Server Processor with DDR4-3200*

RDIMM, LRDIMM, 3DS, NVDIMM

2 DIMMs/channel capacity of 4TB/socket (256GB DIMMs)

INTEGRATED I/O – NO CHIPSET

128 lanes PCIe Gen3/4*
- Used for PCIe, SATA, and Coherent Interconnect
- Up to 32 SATA or NVMe devices

Server Controller Hub
(USB, UART, SPI, LPC, I2C, etc.)

SECURITY

Dedicated Security Subsystem

Hardware Root-of-Trust

Additional Security enhancement

Rome Product Stack

Model No.	1P model No.	TDP (W)	Cores	Threads	Base Freq (Ghz)	Max. Boost Freq** (Ghz)	L3 Cache (MB)	DDR Channels	Max DDR Freq (1DPC)	PCIe	Wave
7742	-	225	64	128	2.25	3.40	256	8	3200	x128	1
7702	7702P	200	64	128	2.00	3.35	256	8	3200	x128	1
7642	-	225	48	96	2.30	3.30	256	8	3200	x128	2
7552	-	200	48	96	2.20	3.30	192	8	3200	x128	2
7542	-	225	32	64	2.90	3.40	128	8	3200	x128	2
7502	7502P	180	32	64	2.50	3.35	128	8	3200	x128	1
7452	-	155	32	64	2.35	3.35	128	8	3200	x128	1
7402	7402P	180	24	48	2.80	3.35	128	8	3200	x128	1
7352	-	155	24	48	2.30	3.20	128	8	3200	x128	2
7302	7302P	155	16	32	3.00	3.30	128	8	3200	x128	1
7282	-	120	16	32	2.80	3.20	64	8*	2666*	x128	2
7272	-	120	12	24	2.90	3.20	64	8*	2666*	X128	2
7262	-	155	8	16	3.20	3.40	128	8	3200	x128	1
7252	7252P	120	8	16	3.10	3.20	64	8*	2666*	x128	2

*8 channel and 3200 capable, Performance Optimized for 4 channels @ 2666

**The maximum single-core frequency at which the processor is capable of operating.

Bedrock of the Modern Data Center

#1

World's

Server Portfolio

PowerEdge

Accelerate Performance

Manage Effortlessly

Integrated End–to–End Security

Source: IDC Quarterly Server Tracker, Q1 2019

Backup

CHIPLETS EVOLVED – HYBRID MULTI-DIE ARCHITECTURE

Use the Most Advanced Technology Where it is Needed Most

Each IP in its Optimal Technology, 2nd Gen Infinity Fabric™ Connected

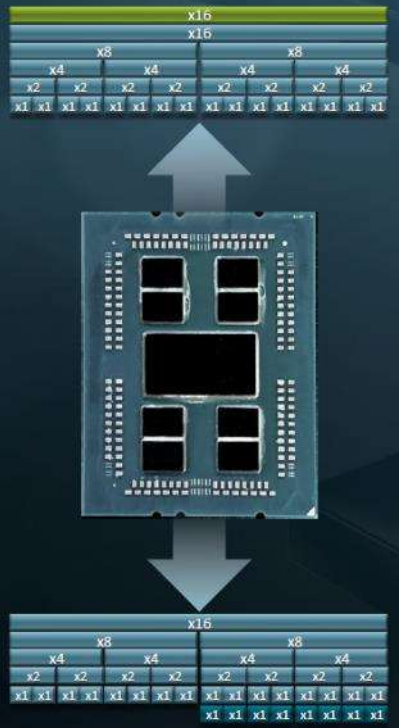
Centralized I/O Die Improves NUMA

Superior Technology for CPU Performance and Power

EPYC™ 7002 SERIES I/O SUBSYSTEM

- All 8 x16 links PCIe® Gen4 ready
  - 64GB/s bi-dir bandwidth per link, 512GB/s per socket
- 8 x16 links available per CPU, IOMMU support
- Link bifurcation support; max of 8 PCIe devices per x16
- Full PCIe Peer-to-Peer (P2P) support, within-socket, across-socket
  - Up-to 256B P2P payload size
  - Up-to 512B Direct-Memory-Access (DMA) payload size
- I/O Die AMD Infinity Fabric™ optimized for DMA and P2P traffic
- All links available for I/O in 1 socket platforms
- New 2 socket platform options with up to 162L of PCIe Connectivity

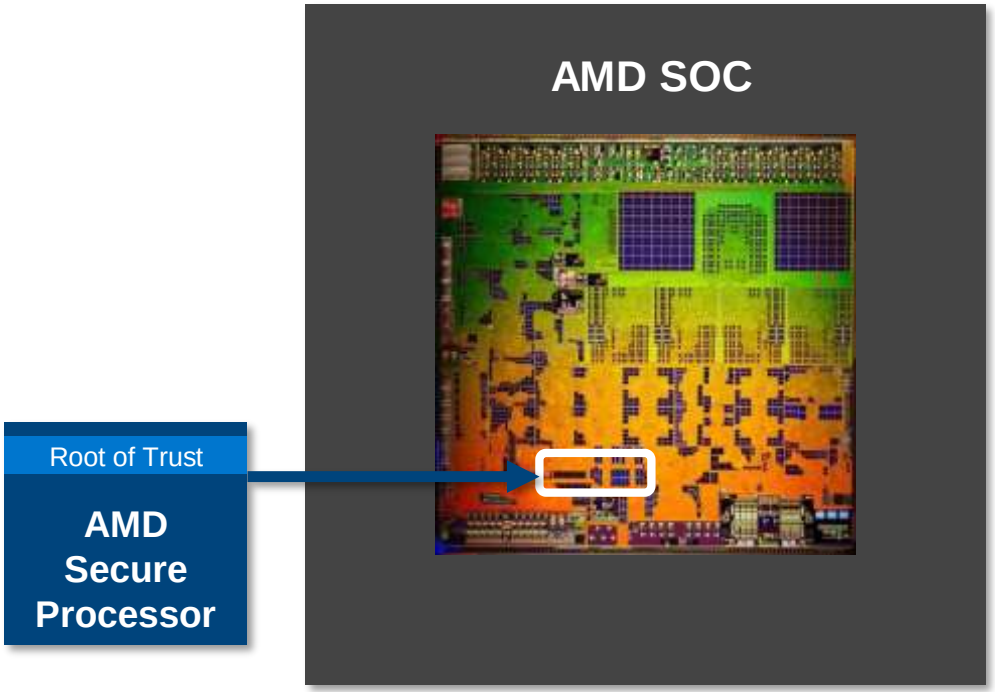
LEADERSHIP PCIE GEN4 I/O CAPABILITIES AND CONNECTIVITY WITH EPYC PROVISIONED BANDWIDTH FOR PERFORMANCE SCALING



AMD Secure Processor

A Dedicated Security Subsystem

- AMD Secure Processor integrated within SoC
  - 32-bit microcontroller (ARM Cortex-A5)
- Runs a secure OS/kernel
- Secure off-chip NV storage for firmware and data (i.e. SPI ROM)
- Provides cryptographic functionality for secure key generation and key management
- Enables hardware validated boot



EPYC Memory Encryption - Overview

AES-128 engine in the memory controller

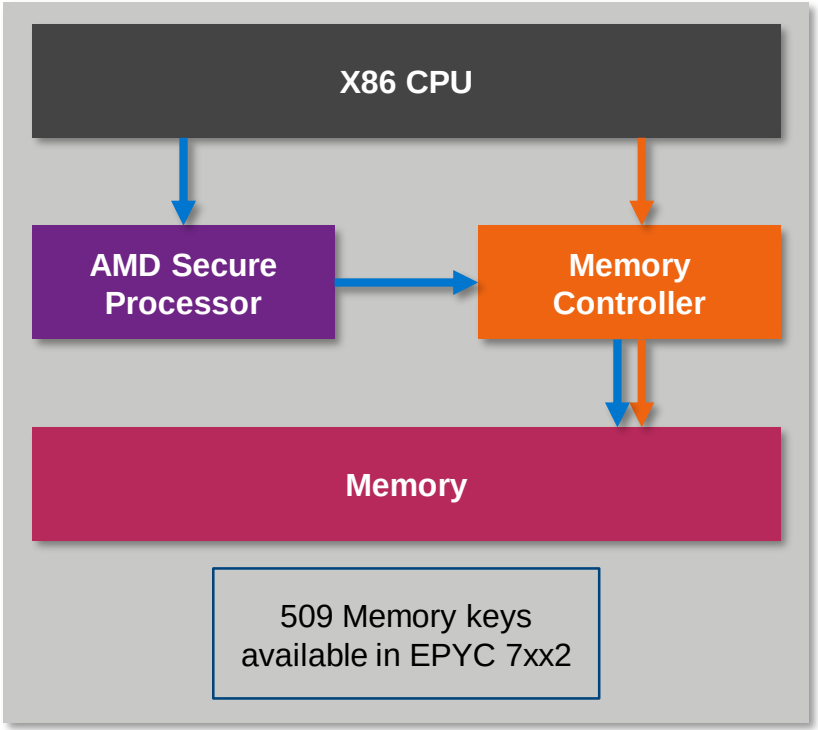
- Encryption keys managed by the AMD Secure Processor / not visible to the x86
- Guest OS chooses pages to encrypt via page tables
- No changes to end user applications

AMD Secure Memory Encryption (SME)

- All memory encrypted by single key
- Can be implemented in BIOS (Transparent SME / TSME)

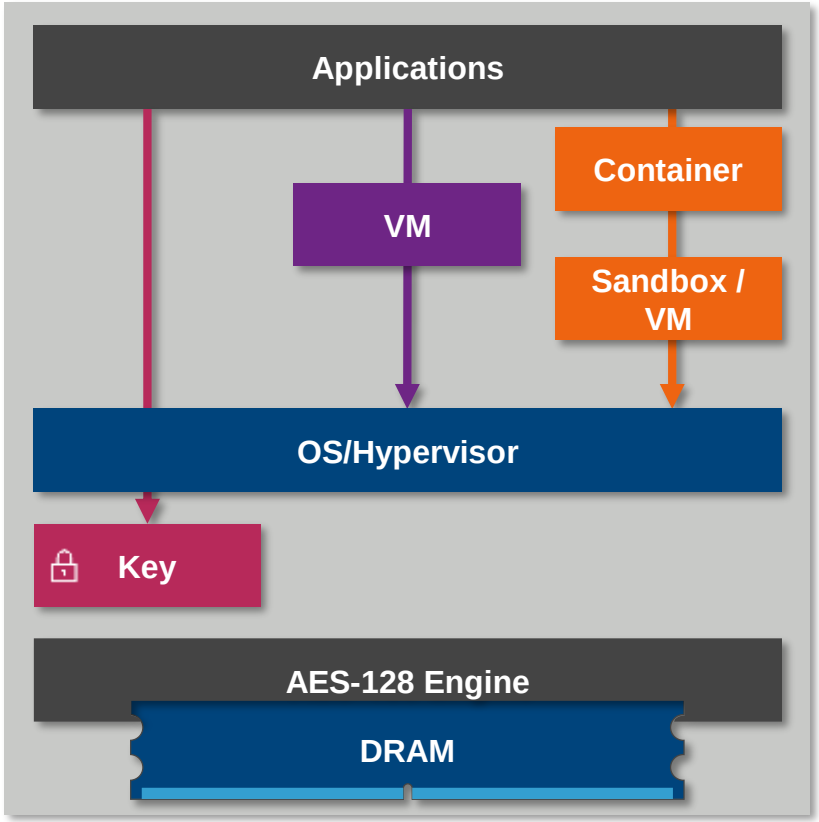
AMD Secure Encrypted Virtualization (SEV)

- Active encryption key selected by Virtual Machine ID
- Hypervisor and Guest VMs cryptographically isolated from one another



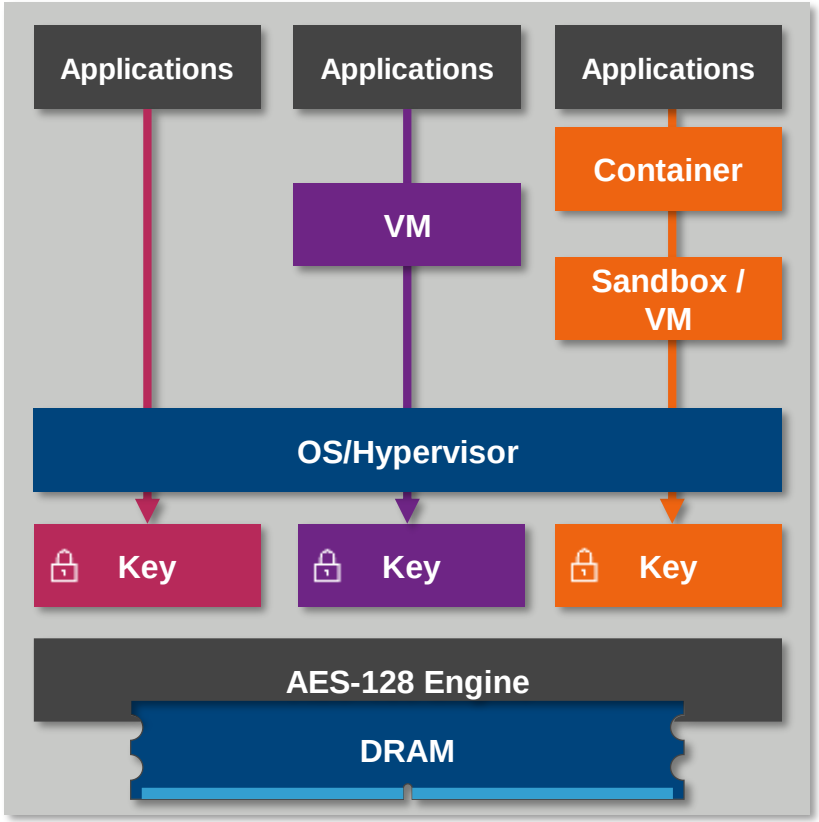
Secure Memory Encryption (SME)

- Helps protect against physical memory attacks
- Single key is used for encryption of system memory
  - Can be used on systems with VMs or Containers
- OS/Hypervisor chooses pages to encrypt via page tables
- Support for hardware devices (network, storage, graphics cards) to access encrypted pages seamlessly through DMA

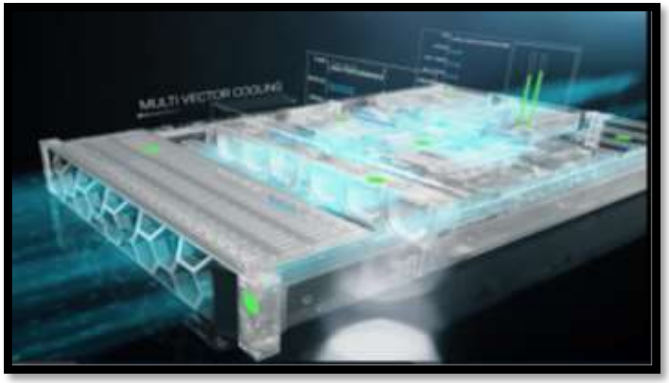


Secure Encrypted Virtualization (SEV)

- Helps protect VMS from each other, administrator tampering, and untrusted Hypervisor
- One key for Hypervisor and one key per VM, groups of VMs, or VM/Sandbox with multiple Containers
- Cryptographically isolates the hypervisor from the guest VMS
- Integrates with existing AMD-V technology
- System can also run unsecure VMs
- EPYC 7002 Series: Adds Virtual-transparent-encryption capability to facilitate unmodified guest VM support

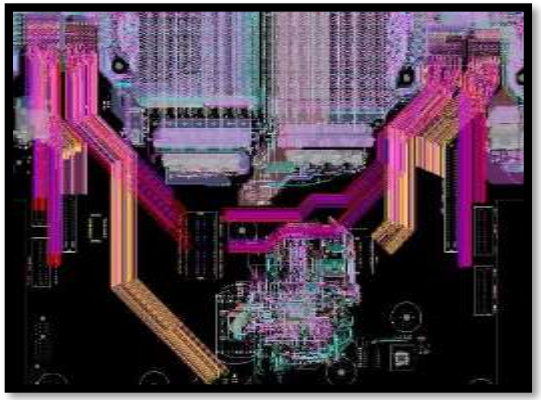


Balanced System Board Design



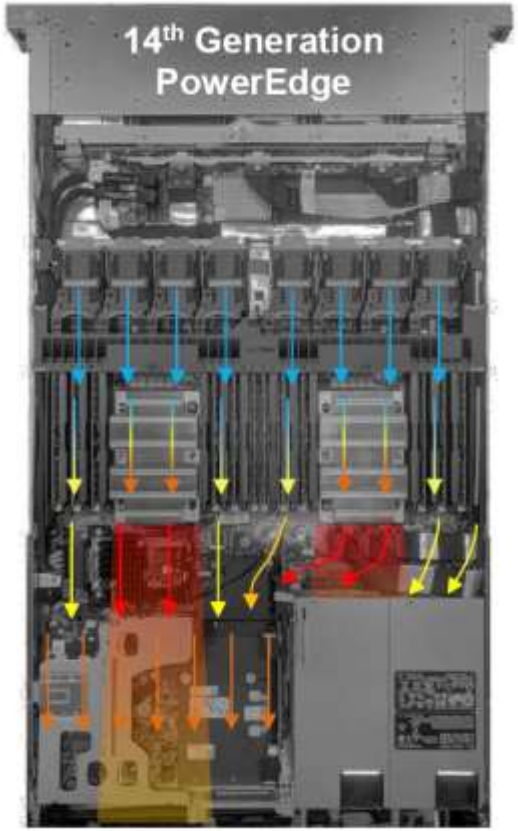
Balanced airflow provides better thermals for workloads requiring rich configurations

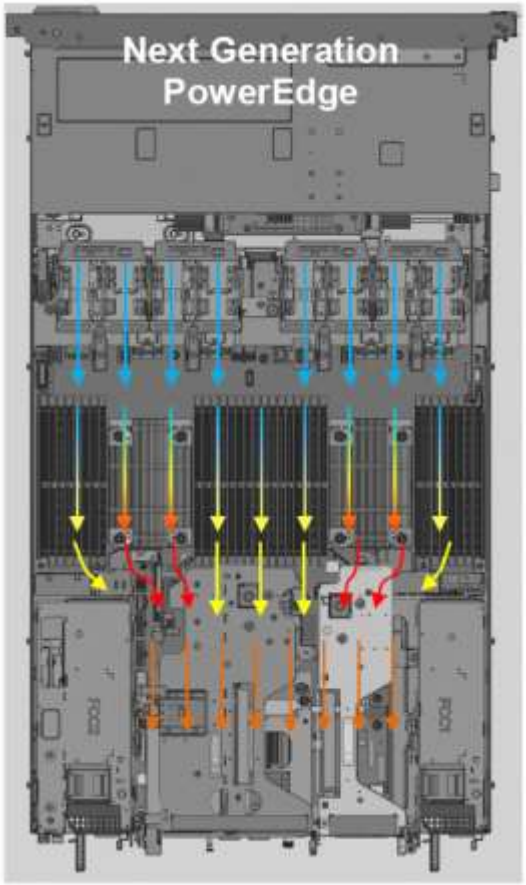
- CPU TDPs up to **240W**
- Multiple GPUs up to **300W**
- High mem capacities – up to **32** LRDIMMs



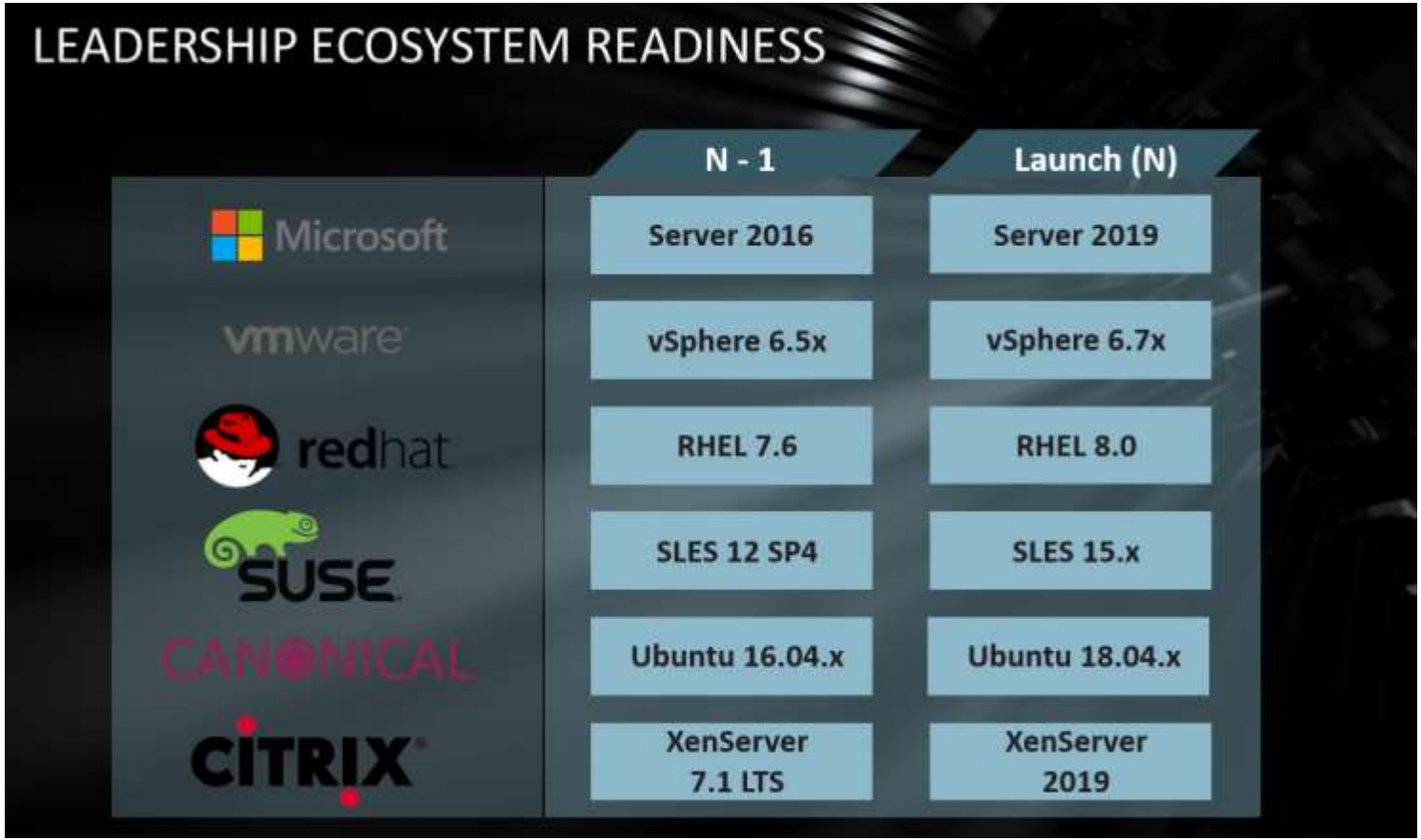
Improved signal integrity for PCIe Gen4 at 2X the speed of Gen3 – 16GT/s

T-Bar Power Supply Design





Optimised Ecosystem



Dell EMC PowerEdge R6515

1-socket server that performs like a 2-socket

SINGLE-SOCKET RACK SERVER BRINGS PEAK PERFORMANCE AND EXCELLENT TCO

VIRTUALIZATION

Improved TCO with VM density and SQL performance improvements

HCI

High parallelism for low latency on ROBO VxRail and Dense Azure Stack HCI

NFV

OpenStack Ready Architecture applicable for Telco

Dell EMC PowerEdge R6515 – Tech Specs

Features	PowerEdge R6515
CPU	1x AMD Rome/Milan (Socket SP3), up to 240W (cTDP)
Memory	**DDR4**: Up to 16 x DDR4 RDIMM, LRDIMM (2TB), bandwidth up to 3200 MT/S
Disk Drives/Storage	**Front:** 1. Up to 4x 3.5” Hot Plug SAS/SATA HDD 2. Up to 10x 2.5” Hot Plug SAS/SATA/NVMe 3. Up to 8x 2.5” Hot plug SAS/SATA **Internal**: Option 2x M.2 (BOSS)
PCIe Storage	Up to 10 NVMe Direct
USB	**Front: 1** ports (USB 2.0), 1 (micro-USB, iDRAC Direct) **Rear**: 2 ports (USB 3.0) I**nternal**: 1 port (USB 3.0)
Storage Controller	**HW RAID**: PERC 9/10 - HBA330, H330, H730P, H740P, H840, 12G SAS HBA **Chipset** SATA/SW RAID (S150): Yes
Network Daughter Cards (NDC)	2 x 1GbE; 2 x 10GbE BT; 2 x 10GbE SFP+; 2 x 25GbE SFP28
PCIe slots	Up to 2 PCIe: 1 PCIe Gen3; 1 PCIe Gen4
Power Supply Unit (PSU)	PSU – 550W
System Mgmt	LC 3.x, OpenManage, QuickSync 2.0, Digital License Key, iDRAC9, iDRAC Direct (dedicated micro-USB port), Easy Restore
High Availability (HA)	Hot plug Hard drives, PSUs, IDSDM, Boot Optimized Storage Subsystem (BOSS)
Security	Dell EMC Integrated Security
Graphics Processing Unit (GPU)	Up 2 Single-Wide GPU (T4)

Dell EMC PowerEdge R7515

Powerful performance and scalability

HIGHLY SCALABLE SINGLE-SOCKET 2U RACK SERVER DELIVERS PERFORMANCE AND OUTSTANDING TCO

SDS

Direct connect SAS/SATA/NVMe for vSAN Ready Nodes

VIRTUALIZATION

High core count performance for highest VM density in 1S

DATA ANALYTICS

Multi-die architecture offers low latency and floating point capacity for Big Data and Containers

Dell EMC PowerEdge R7515 – Tech Specs

Features	PowerEdge R7515
CPU	1x AMD Rome/Milan (Socket SP3), up to 240W (cTDP)
Memory	**DDR4:** Up to 16 x DDR4 RDIMM, LRDIMM (2TB), bandwidth up to 3200 MT/S
Disk Drives/Storage	**Front:** 1. Up to 8 x3.5" Hot Plug SATA/SAS HDDs 2. Up to 12x 3.5" hot-plug SAS/SATA HDDs 3. Up to 24x 2.5" Hot Plug SATA/SAS/NVMe **Rear**: Up to 2x 3.5" hot-plug SAS/SATA HDDs **Internal**: 2x M.2 (BOSS)
PCIe Storage	Up to 24 NVMe (Up to 12 NVMe Direct)
USB	**Front:** 2 ports (USB 2.0), 1 (micro-USB, iDRAC Direct) **Rear**: 2 ports (USB 3.0) **Internal**: 1 port (USB 3.0)
Storage Controller	**HW RAID:** PERC 9/10 - HBA330, H330, H730P, H740P, H840, 12G SAS HBA **Chipset** SATA/SW RAID(S150): Yes
Network Daughter Cards (NDC)	2 x 1GbE; 2 x 10GbE BT; 2 x 10GbE SFP+; 2 x 25GbE SFP28
PCIe slots	Up to 4 PCIe: 2 PCIe Gen3; 2 PCIe Gen4
Power Supply Unit (PSU)	PSU – 495W, 750W, 1100W, 1600W
System Mgmt	LC 3.x, OpenManage, QuickSync 2.0, Digital License Key, iDRAC9, iDRAC Direct (dedicated micro-USB port), Easy Restore
High Availability (HA)	Hot plug Hard drives, PSUs, IDSDM, Boot Optimized Storage Subsystem (BOSS)
Graphics Processing Unit (GPU)	Up to 4 Single-Wide GPU(T4); Up to 1 Full-Height FPGA

Dell EMC PowerEdge R6525

Dense virtualization

HIGHLY CONFIGURABLE, DUAL-SOCKET RACK SERVER DELIVERS OUTSTANDING BALANCED PERFORMANCE FOR DENSE COMPUTE

HPC

20% more memory performance for scale out environments

DENSE VDI

Multi GPU support to accelerate end user VDI performance

VIRTUALIZATION

Highest core count PE 1U server with cryptographic isolation between hypervisor and VMs

Dell EMC PowerEdge R6525 – Tech Specs

Features	PowerEdge R6525
CPU	2x AMD Rome/Milan (Socket SP3), up to 240W (cTDP)
Memory	**DDR4:** Up to 32 x DDR4 RDIMM, LRDIMM (8TB), bandwidth up to 3200 MT/S
Disk Drives	**Front:** 1. Up to 4x 3.5” Hot Plug SAS/SATA HDD 2. Up to 12x 2.5” (10 Front + 2 Rear) Hot Plug SAS/SATA/NVMe 3. Up to 8x 2.5” Hot plug SAS/SATA Optional: BOSS (2x M.2)
PCIe Storage	Up to 12 (10+2) NVMe Direct
USB	**Front:** 1 port (USB 2.0), 1 (micro-USB, iDRAC Direct) **Rear:** 1 port (USB 3.0) + 1 port (USB 2.0) **Internal:** 1 port (USB 2.0)
Storage Controller	**HW RAID**: PERC 10.5– HBA345, H345, H745, H840, 12G SAS HBA **Chipset** SATA/SW RAID: Yes
Network	OCP x16 Mezz 3.0 + 2 x 1GE LOM
PCIe slots	Up to 3 x PCIe x16 Gen4 slots @ 16GT/s; 2 EMS slots @ 25GT/s
Power Supply Unite (PSU)	PSU – 800W, 1400W
System Mgmt	iDRAC9 with Lifecycle Controller
High Availability (HA)	Hot plug redundant Hard drives, Fans, PSUs BOSS (2 x internal M.2) pRTS
Graphics Processing Unit (GPU)	2 x FH ¾ L at 150W each

Dell EMC PowerEdge C6525

High Performance Dense-computing

COMPUTE-DENSE SERVER BOOSTS DATA CENTER PERFORMANCE TO TACKLE A VARIETY OF HPC APPLICATIONS

DIGITAL MANUFACTURING

Optimized core count and memory for large datasets

RESEARCH

Low latency and flexible high speed fabric for highly performant clusters

WEB TECH

Cost optimized design with rich 1S configurations

Dell EMC PowerEdge C6525 – Tech Specs

Features	PowerEdge C6525
CPU	Single or dual AMD Rome (and Milan) per node Air and Direct Contact Liquid Cooling (DCLC target post RTS)
Memory	**DDR4:** 8 channels/CPU; Up to 16 x RDIMMs and LRDIMMs Speed: up to 3200 MT/s
Storage	**Backplanes:** • 24 x 2.5” (direct, and NVMe with 2 universal slots) • 12 x 3.5” direct • No-Backplane **Internal:** uSD card | M.2 SATA BOSS 1.0
PCIe slots	2 PCIe Gen4 HH/HL slot, x16 (network, storage, AIC) 1 x16 Gen4 OCP 3 Slot
USB	MiniDP, 1x USB 3.0, dedicated iDRAC direct port
Storage Controller	**HW RAID:** PERC 10.x: H345, HBA 345 & H745 adaptor PERC **SW RAID:** Yes, S150
LOM	Single port 1Gbe LOM (Broadcom)
Power Supply Unite (PSU)	PSUs (support for 2x1600W, and 2400W), and 2000W 240VDC
System Mgmt	iDRAC9 with Lifecycle Controller
High Availability (HA)	Hot plug Hard drives and PSUs, Dual rotor redundant fans
Graphics Processing Unite (GPU)	At least 1 x T4

Dell EMC PowerEdge R7525

Unprecedented performance

Available February 2020

HIGHLY ADAPTABLE RACK SERVER BRINGS POWERFUL PERFORMANCE AND FLEXIBLE CONFIGURATION

DATA ANALYTICS

Maximized storage and memory configuration option enables HPC, ML/DL/AI and rendering

ALL FLASH SDS

24 direct connect Gen4 NVMe supports all flash vSAN Ready Node

VDI

Balanced core count and GPU to support for maximum numbers of end users


DELL Technologies
DELL
DELL EMC
Pivotal
RSA
Secureworks
virtustream
vmware