# REALIZE YOUR DIGITAL FUTURE

**HADZRY RAJAB**
BUSINESS MANAGER, DELL EMC

TWITTER HANDLE OR EMAIL

DELL EMC /Forum


Technology is transforming
the way we live and work at
an ever-increasing pace.
DELL EMC

## Right Now

**8S**

average human attention span

## Work Anywhere

**80%**

of employees want to telecommute daily

## Data Deluge

**90%**

of data produced in the last 2 years

## More Threats

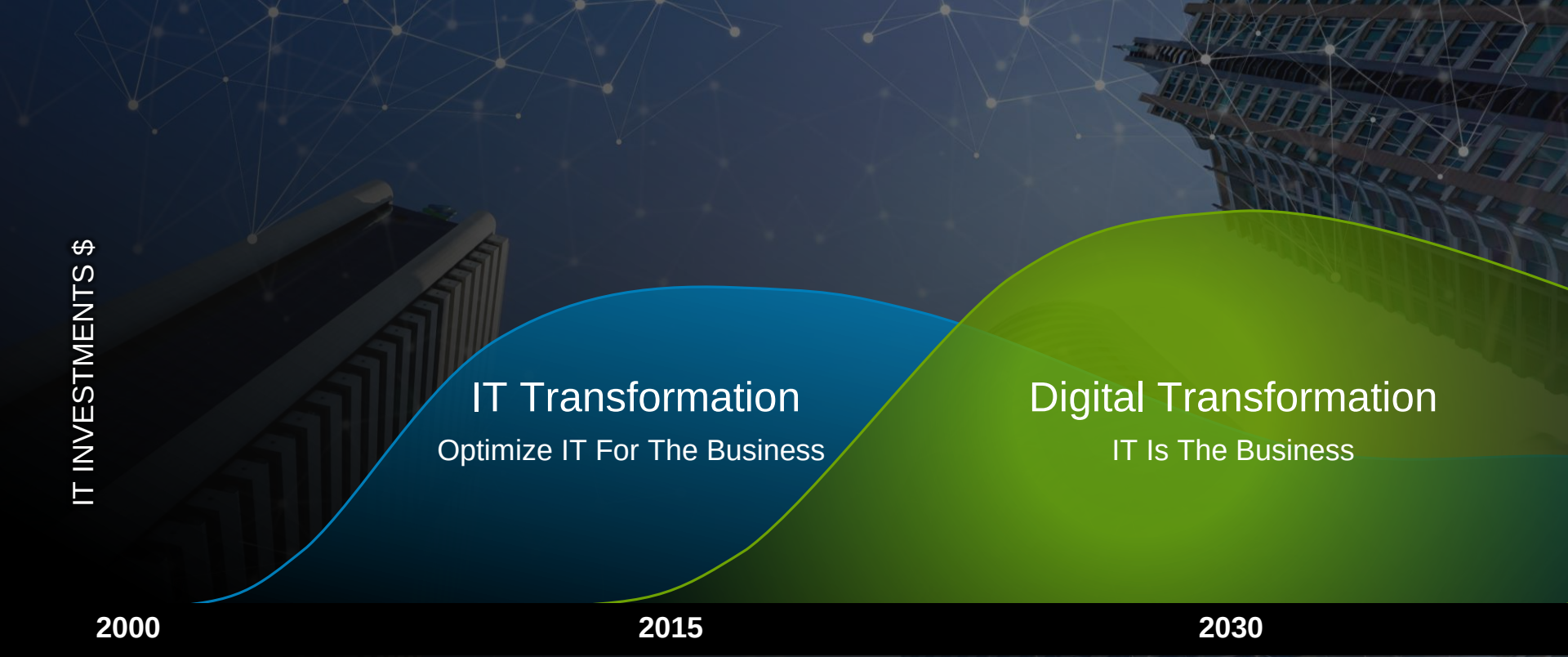
**1B**

identities exposed due to data breaches


Change can bring
rich opportunities.


Transform entire
industries.
DELL EMC


DIGITAL TRANSFORMATION
DELL EMC




Source: IDC

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# Uncertain Future

**78%**

feel threatened by digital startups

**52%**

have already experienced significant disruption to their industries

**48%**

don’t know what their industry will look like in 3 years

Source: Vanson Bourne & Dell Technologies

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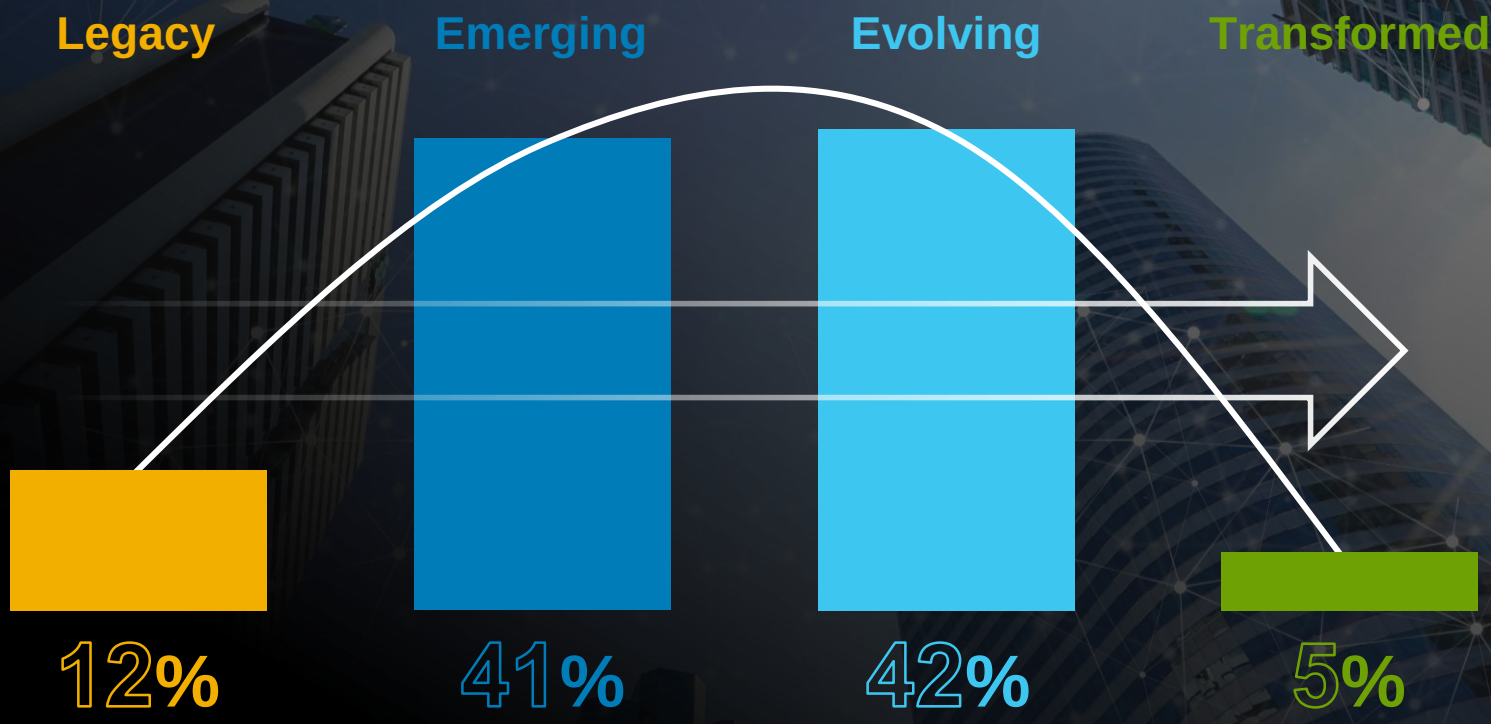
# IT Transformation **Maturity**




Source: ESG & Dell EMC

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# For Those Who Succeed

**3x**

More likely to be ahead of schedule on new projects

**33%**

More budget available for innovation

**2x**

More likely to exceed revenue goals

Source: ESG & Dell EMC

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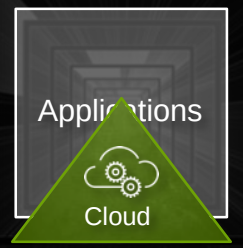
**Applications** drive business value

# Applications increasingly run on **clouds**

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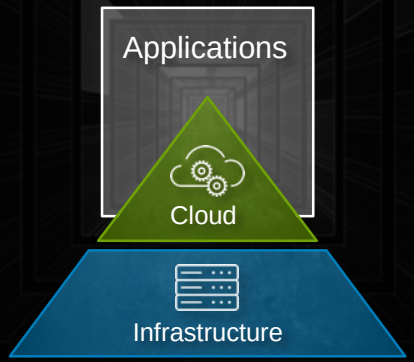
# Clouds run on IT **infrastructure**

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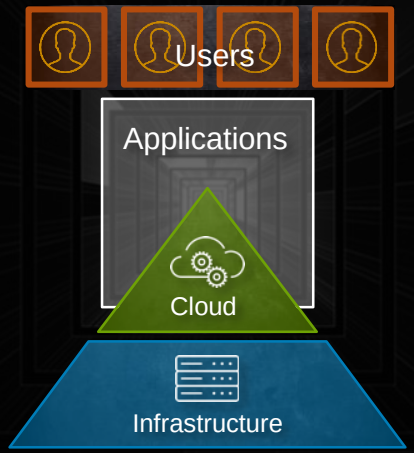
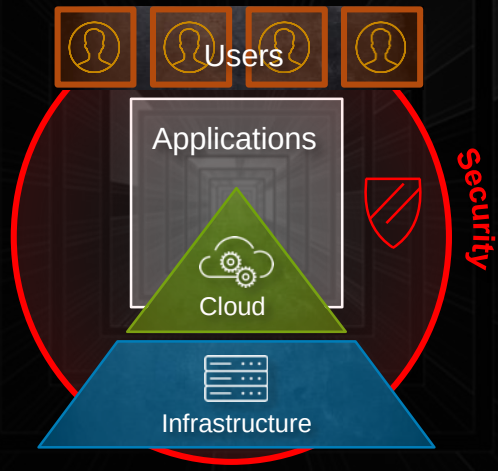
**Users** connect to applications



# Everything must be **secured**

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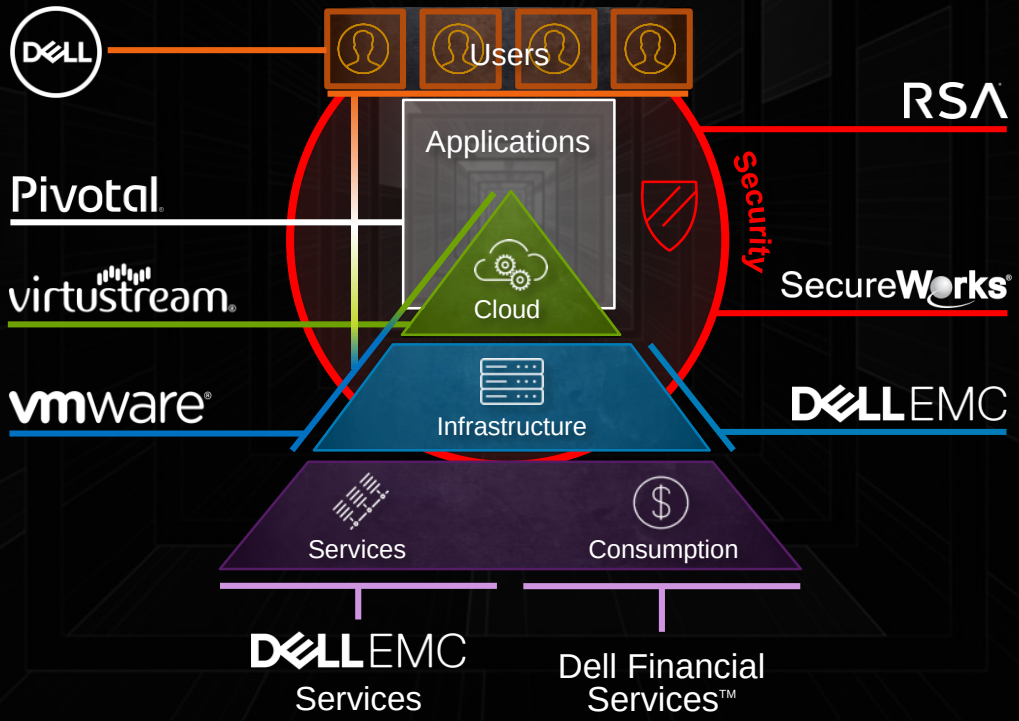
# Edge To Core To Cloud



# **Only Dell EMC** Addresses All Four Pillars

Digital Transformation

IT Transformation

Workforce Transformation

Security Transformation

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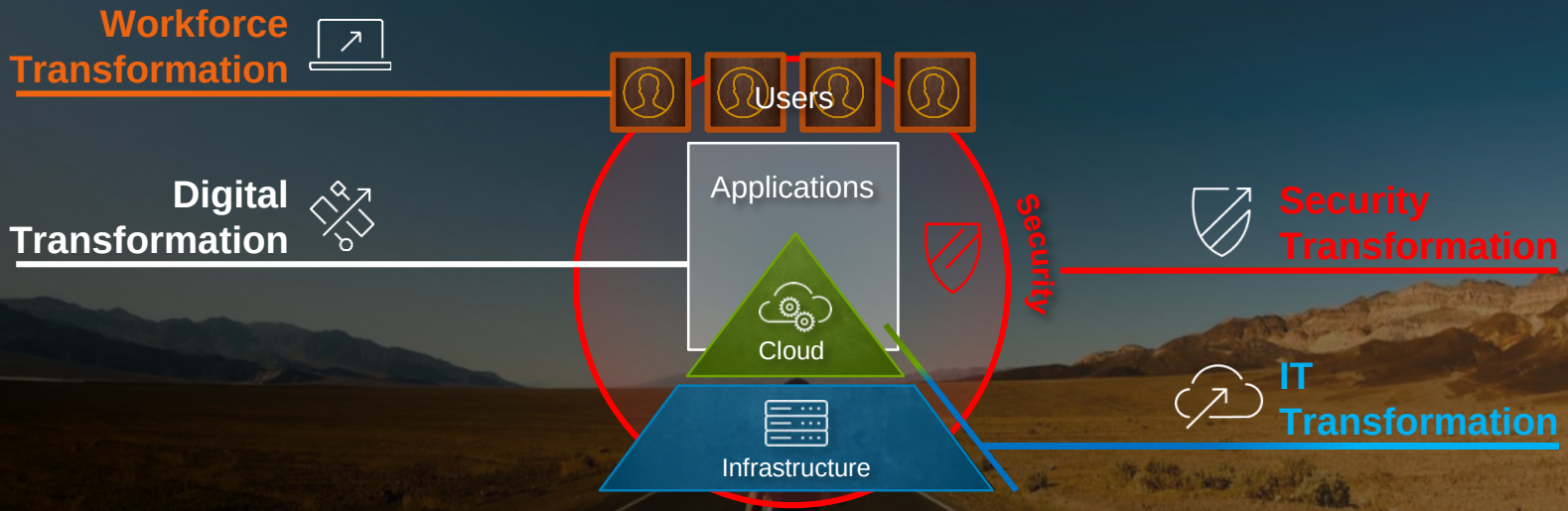
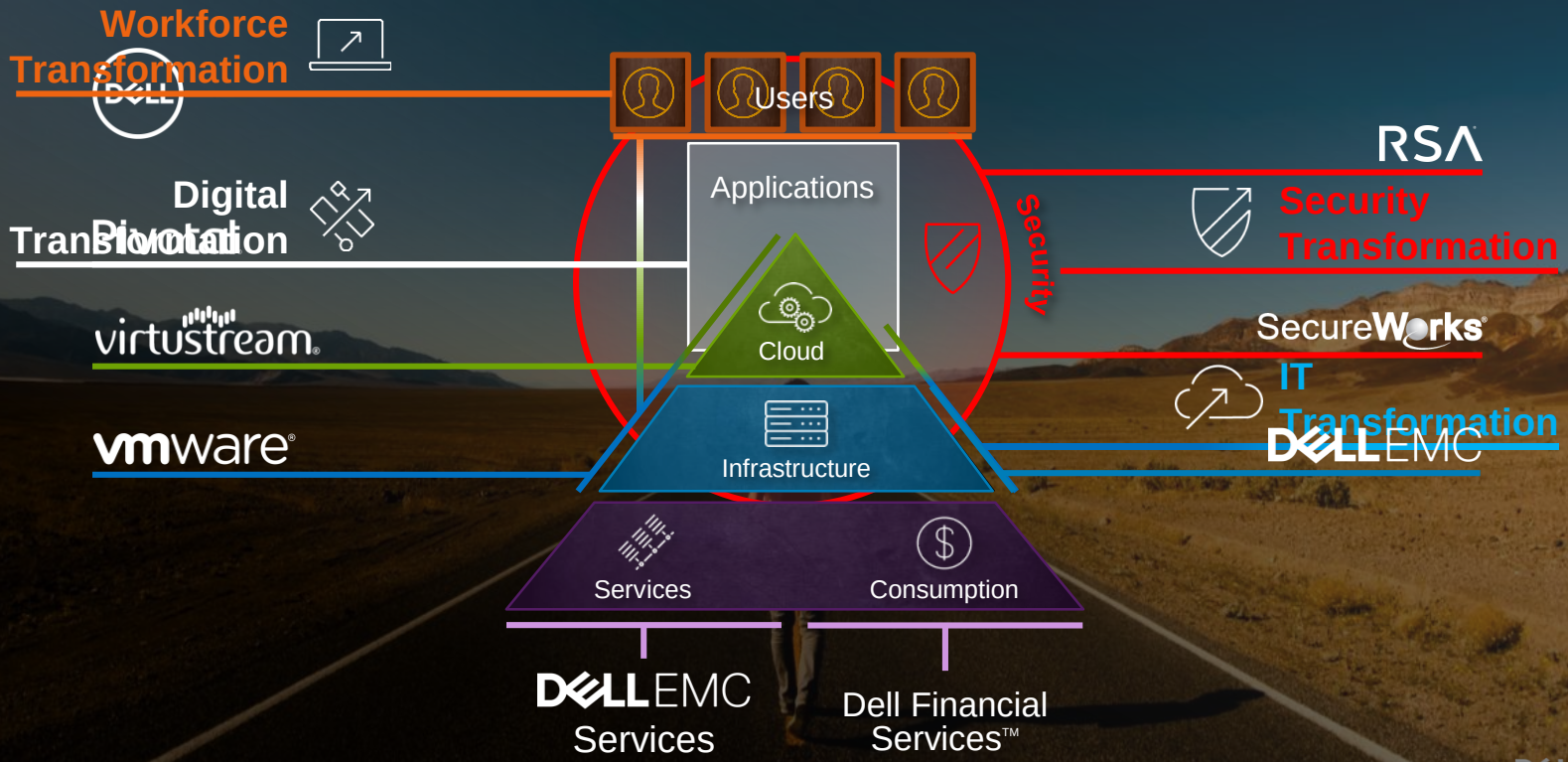
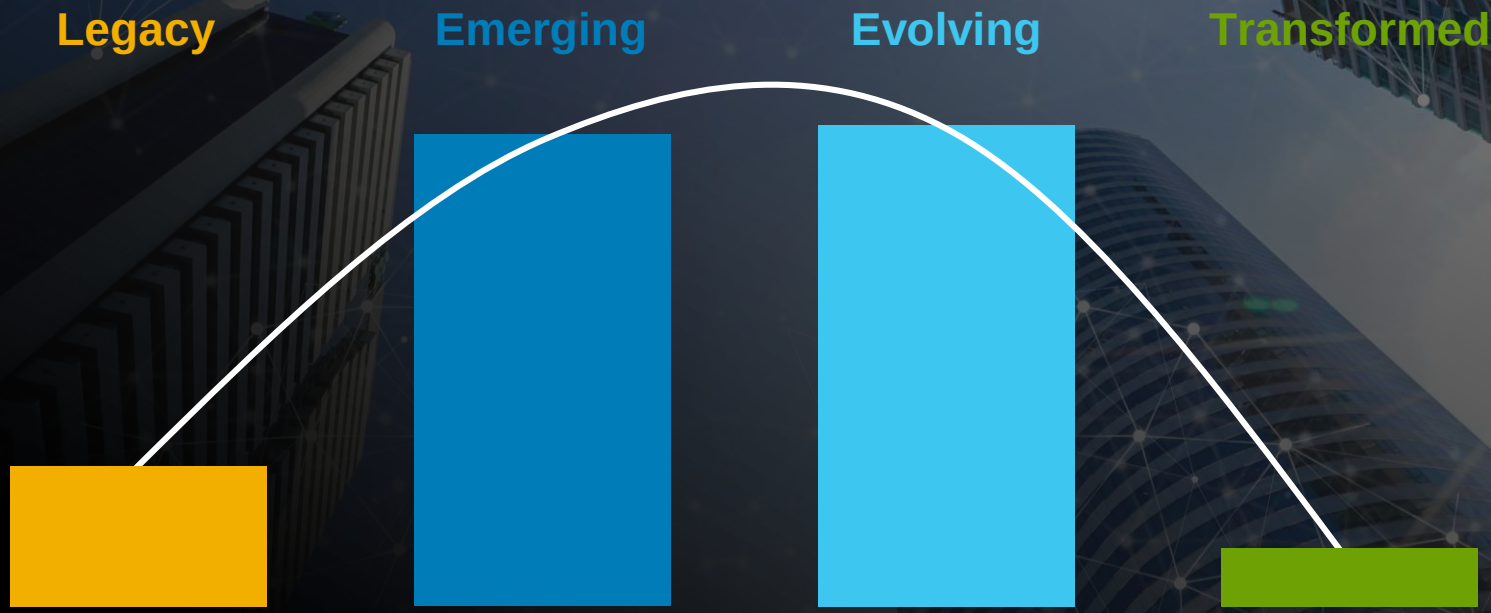
# Spanning The **Entire IT Ecosystem**



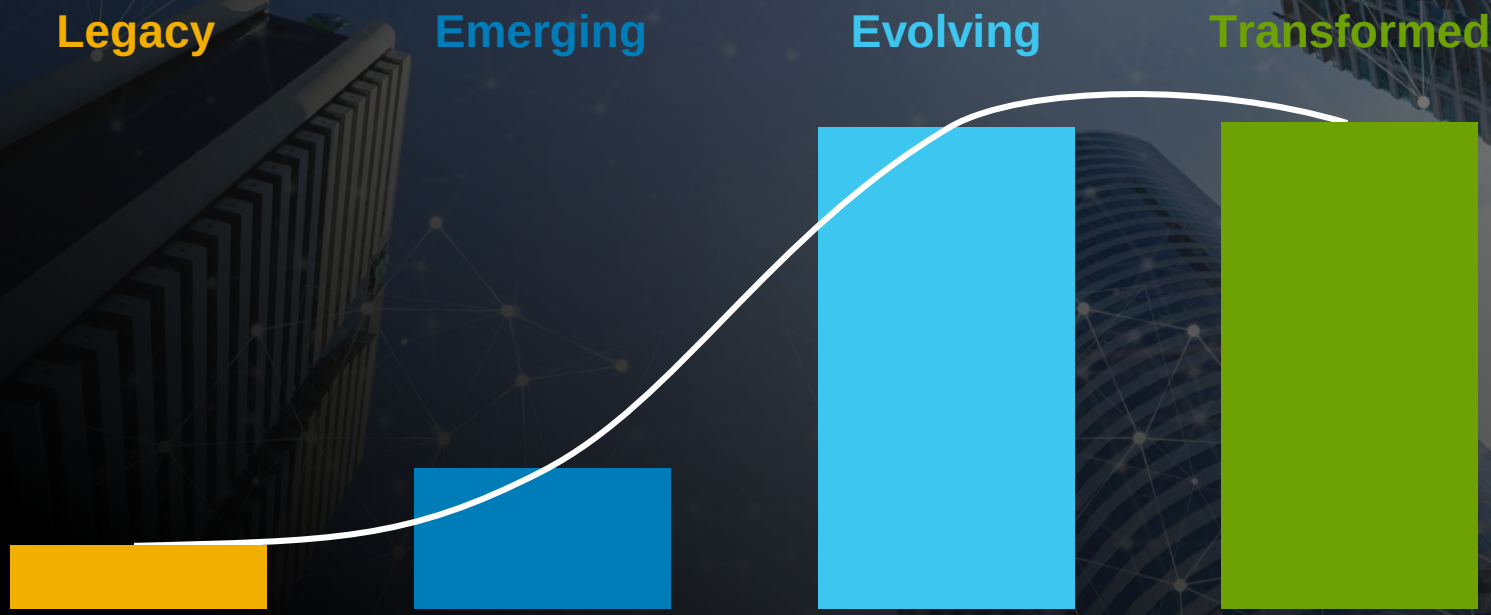
# From The **Edge** To The **Core** To The **Cloud**



# Driving Transformation **Maturity**



# Driving Transformation **Maturity**



# Dell EMC Server Master Class

Hadzry Rajab / GCN Business Manager

Mar 22th 2018

# Server Masters: PowerEdge Continuum to 14G

DELL EMC

# PowerEdge Introduction in the world

ABEND:_
Device deactivated due to drive failure

**SCSI ARRAY.**

Imagine, a fourth of your data just vanished with absolutely no hope of retrieving it. Nice thought, eh?

Well, that's pretty much unimaginable with our new PowerEdge™ servers' when equipped with an optional Dell® SCSI Array. You can set RAID levels for the performance, redundancy and protection you need. And configure hot spare drives that automatically rebuild your data if another drive fails. And hot plug drives allow you to replace a failed disk without turning off the system. It's like fixing a flat tire while you're driving.

What's more, as your company grows, so will your Dell server. Because our PowerEdge 486 servers can be upgraded to use a fully optimized Pentium processor board, including lightning-fast 60 and 66MHz systems. Plus our Dell PowerEdge 486 servers support up to 128MB of RAM – 192MB on Pentium models. You'll find seven expansion slots on our PowerEdge SP, and nine on the XE. And all Dell PowerEdge servers offer up to 114GB of disk space using optional external media systems.

**NOT A RAY OF HOPE.**

As you can see, these new Dell 486 servers can effortlessly keep up with any growing network.

Need proof?

We'll send you a few case histories to demonstrate how others have benefited from Dell's powerful servers.

We'll include our Advanced Solutions Capabilities Guide which fully describes Dell's network offerings.

Call now to talk with a sales representative or for a referral to one of our many authorized network resellers. In the meantime, keep your fingers crossed.

DELL
FOR ADVANCED SYSTEMS INFORMATION, CALL
800-433-2388

*Computerworld - March 7th, 1994*

# Dell pushes Pentium-based SMP server

## Company begins initial foray beyond the desktop

By Jaikumar Vijayan

**Dell Computer Corp. last week outlined a plan to launch itself into the enterprise in the next 18 months.**

In what it described as the first step toward that goal, the company today will announce its first scalable symmetrical multiprocessing (SMP) servers with dual 90- and 100-MHz Pentium processors.

The servers will top Dell's PowerEdge family of high-end systems, with Peripheral Component Interconnect (PCI) support, 256M bytes of error checking and correcting memory, Fast SCSI-2 on the PCI local bus, hot-pluggable drives, subsystems and redundant arrays of inexpensive disks support.

Integrated with the hardware will be Dell's SafeSite server management software, which gives users the ability to monitor, log and respond to systems alerts from remote nodes on the network.

The SMP announcement marks the first phase of Dell's attempt to break into the corporate data center, said Mark Garver, formerly vice president at superserver vendor Tricord Systems, Inc. and now Dell's vice president of advanced systems.

"We are really focused on getting into the groupware and entry-level database services market," Garver said. The firm expects to add quadprocessor support by mid-1995 and hopes to ride Intel Corp.'s next generation P6 technology into the enterprise when that becomes available in 1996, he added.

| Dell PowerEdge XE 590-2 | |
|---|---|
| Processor | 90-MHz Pentium |
| RAM | 32M bytes |
| Hard drive | 2G-byte SCSI |
| Cache | 512K bytes |
| Slots | Integrated PCI/SCSI and PCI |
| Price | $9,690 |

For the moment, however, a major part of Dell's server plans focus on building credibility in the high-stakes groupware and database services markets, analysts said.

"There is plenty of money to be made in the departmental server market," but the rules could be vastly different from what Dell is accustomed to, said James Greene, an analyst at BIS Strategic Decisions in Norwell, Mass.

"Dell has got a good solid product at a good price point," Greene noted. But with its direct-sales PC background, the vendor has its work cut out to break into the enterprise level, he added.

**Receptive to Idea**

Users were cautiously optimistic about the company's long-term server strategy.

"Dell has done a lot of things right in the past, so they do seem to have a shot at the enterprise," said Marshall Fernholz, network control manager at the American Medical Association in Chicago. "But their focus needs to be on absolute commitment to reliability and support. The customer has too much at stake to expect anything less than total commitment."

"I've got an open mind as far as using Dell is concerned," said Randal Shaw, a senior end-user services analyst at the Federal Reserve Bank of Baltimore. However, he added, the enterprise market is one in which people are generally conservative about choosing vendors, and Dell would have to demonstrate its reliability and support to succeed there.

**Vendors release slew of Pentium-based systems.** See page 46.



*Dell Computer Corp.*

**• Dell PowerEdge SP590**

The Dell PowerEdge SP590, from Dell Computer Corp., combines strong performance, a superior level of fault tolerance, and moderate expandability. Its price of $17,419 is competitive with other top-performing systems in this roundup as well.

The Dell PowerEdge provides six EISA slots and two PCI slots via a riser card that plugs into the system's 90-MHz Pentium motherboard. One of these slots is a shared EISA/PCI slot, allowing a maximum of seven expansion cards to be used at one time.

The motherboard's backplane design allows expansion cards to be loaded from the top of the system into the riser board. Although this design is convenient for port as many as 14 SCSI devices.

Two of the remaining drive bays in our test system were occupied by the triple-speed NEC CDR-510 CD-ROM drive and the combination 1.44MB/1.2MB floppy disk drive; the other two drive bays were empty. The floppy disk drive used the motherboard's integrated controller, which is able to support up to three devices at a time. Four of the unit's six EISA expansion slots were occupied by Eagle NE3200 EISA-based network interface cards.

The Dell PowerEdge was closely grouped with the best performers in this roundup. It easily outpaced the Acer-Altos 7000 and the GAIN Vector 90ER—the other two servers in this roundup that used 90-MHz Pentium processors. The Dell PowerEdge's network throughput climbed steadily as the client load increased, until the load reached 40 workstations, at which point the server's performance began to level off.

This unit's low CPU utilization was also impressive. Even with the maximum of 60 client workstations, CPU utilization

FACT FILE

**Dell PowerEdge SP590**

**List price (tested configuration):** $17,419

**Processor/memory:** Intel Pentium/90, 64MB RAM, 256K write-back cache. **Data storage:** Four 1GB DEC DSP3107L SCSI-2 hard disks, Dell SCSI Array controller with 1.5MB cache, NEC CDR-510 CD-ROM drive. **Network cards:** Four Eagle NE3200 EISA. **Power supply:** 300-watt. **In short:** The Dell PowerEdge, one of the leading performers on our benchmark tests, offers solid engineering at a competitive price.

Dell Computer Corp., 9505 Arboretum Blvd., Austin, TX 78759-7299; 800-813-3355, 512-338-4400; fax, 800-727-8320

| SUITABILITY TO TASK | |
|---|---|
| Expandability/ Scalability | GOOD |
| Security/Fault tolerance | GOOD |
| Server management | FAIR |
| Performance | GOOD |



*Computerworld - November 7th, 1994*
*PC Magazine - October 11th, 1994*

Dell
@Dell

Following

Happy birthday, PowerEdge! Here's to 20 years of innovation del.ly/6013fBB5 #PowerEdgeis20

RETWEETS 97 LIKES 65

6:00 PM - 16 Apr 2015

1 97 65

*20 years old Celebration – April 2015*



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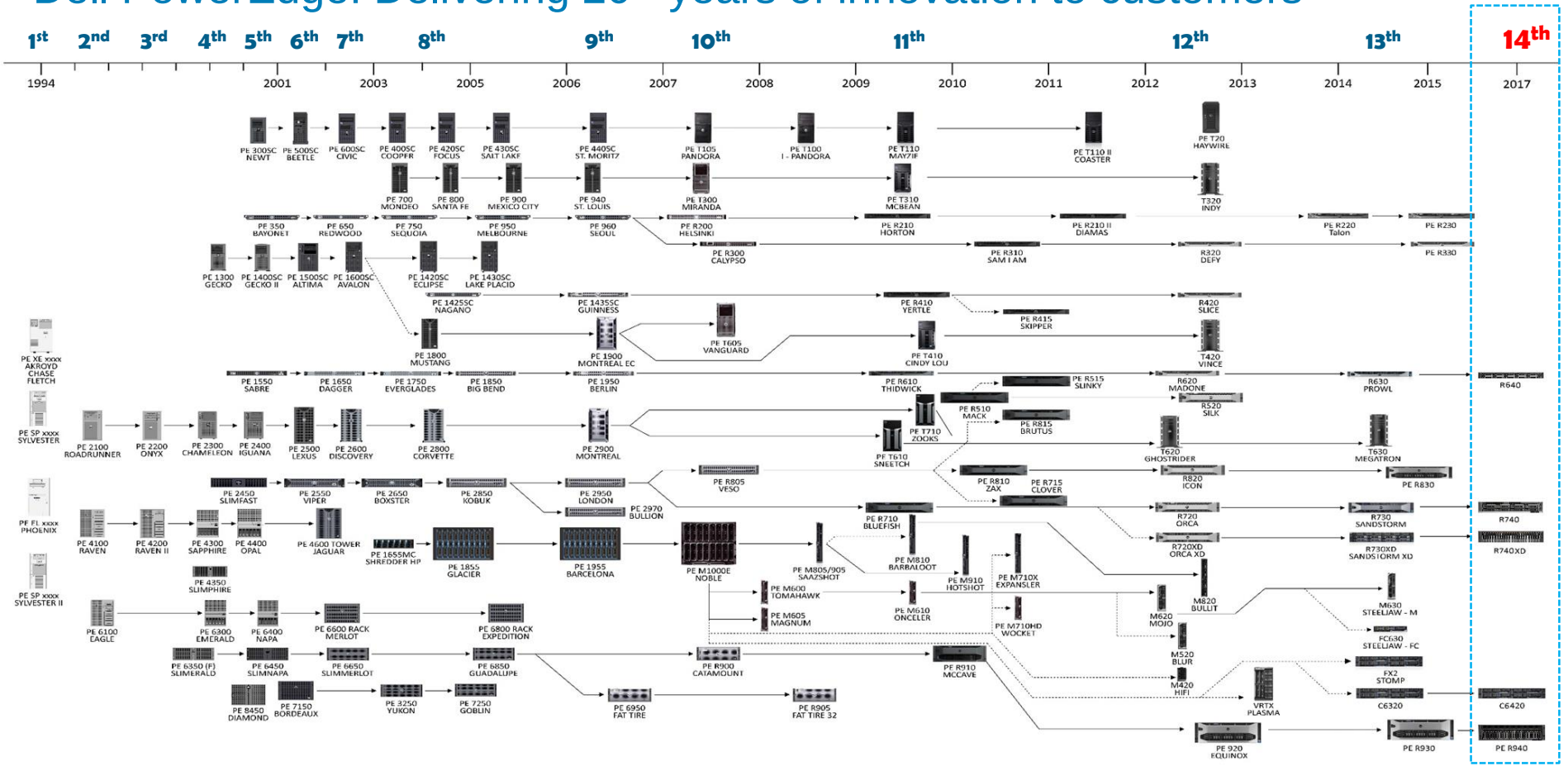
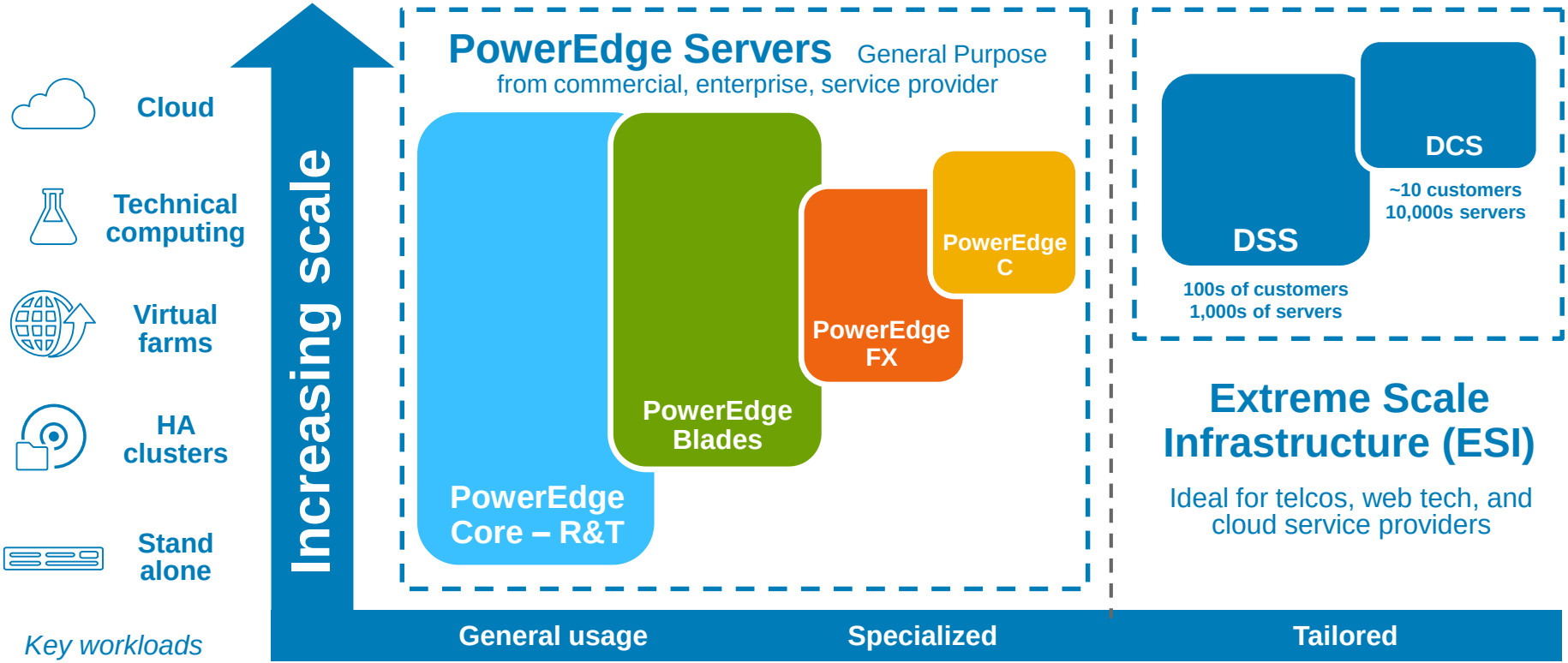
# Dell PowerEdge: Delivering 20+ years of innovation to customers



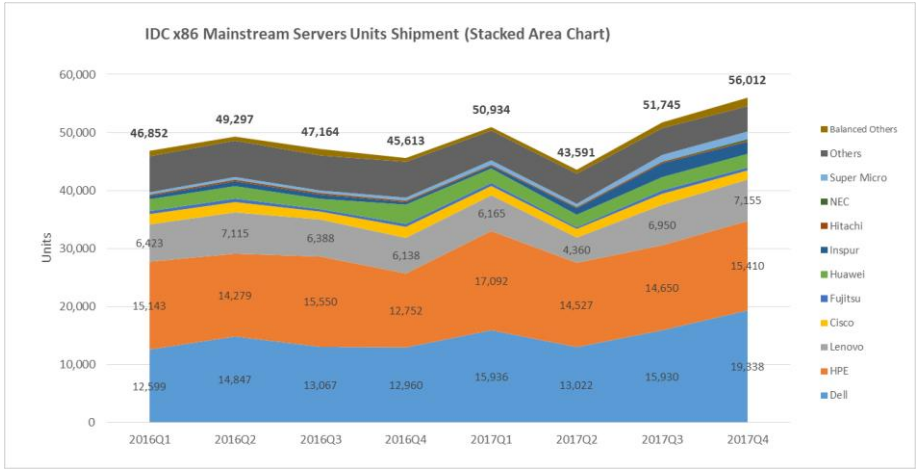



DELL EMC

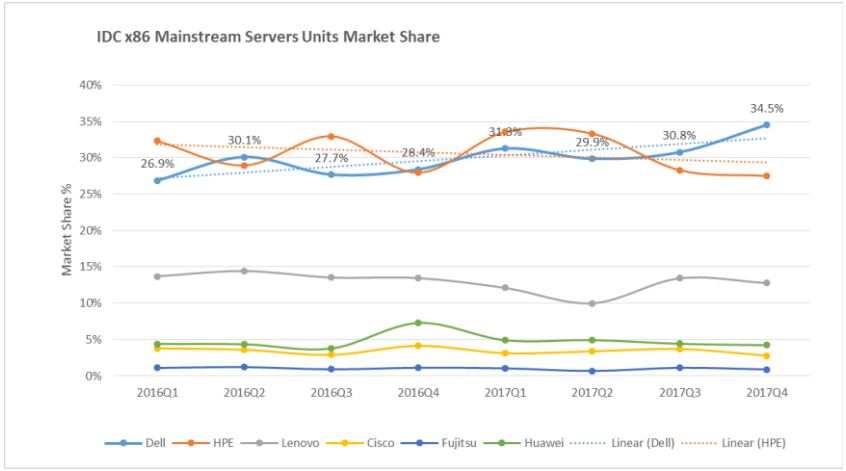
# Dell EMC server portfolio



# CY17Q4 Mainstream x86 Servers IDC Market Share – South Asia (SG, MY, ID, TH, VN, PH, RoAP)




TAM (Total Available Markets)




Market Share



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# Server Masters: 14G Features with 3 Key Strategies

DELL EMC

# 14G PowerEdge Servers 3 Key Strategic Messages

**ADAPT AND SCALE**
to dynamic business needs

1

**Scalable Business Architecture**

Dynamic server portfolio optimized for all your workloads

**AUTOMATE**
to sustain and grow

2

**Intelligent Automation**

Automate routine management & free up skilled resources

**PROTECT** your customers and your business

3

**Integrated Security**

Fortify business operations and profitability

# PowerEdge server solutions


## ADAPT AND SCALE
to dynamic business needs

1

**Scalable Business Architecture**

Dynamic server portfolio optimized for all your workloads

## OPTIMIZED PERFORMANCE FOR A MULTITUDE OF WORKLOADS

**Real Time Analytics:**
Improved throughput, Decreased latency with 6X more NVMe drives

**S/W Defined Storage:**
Optimize performance and capacity with mixing drive types

**Virtual Desktop Infra:**
Run up to **33%** more VDI instances* and up to **192** VDI users / Server+

Based on Dell Internal Analyses 03/01/2017. * R740 compared vs. R730. + Estimated. Final benchmark @RTS

# PowerEdge server solutions


**AUTOMATE**
to sustain and grow

2

**Intelligent Automation**

Automate routine management & free up skilled resources

## OpenManage™: AN INTUITIVE APPROACH TO SYSTEMS MANAGEMENT

Resolve issues up to **90% faster** with **ProSupport Plus** and **SupportAssist**+

**Next-generation APIs** for consistent and **extensible** management

Reduce **server configuration time*** up to **99%** with **Zero touch**

SOURCE: *Third-party lab testing with Principled Technologies (Resolving Server Problems with Dell ProSupport Plus and SupportAssist), September 2015. *Based on a Dell analysis dated Feb. 2016. Some ProSupport Plus features are not available on all products. See www.dell.com/prosupportplus

# PowerEdge server solutions


**PROTECT** your customers and your business

3

**Integrated Security**

Fortify business operations and profitability

## SECURITY IS BUILT-IN, NOT BOLT-ON

Every PowerEdge server is designed on a **Cyber Resilient Architecture**

Trusted partner with **end-to-end** server ecosystem and lifecycle **security**

Secure manageability protocols **save costs** in downtime and remediation

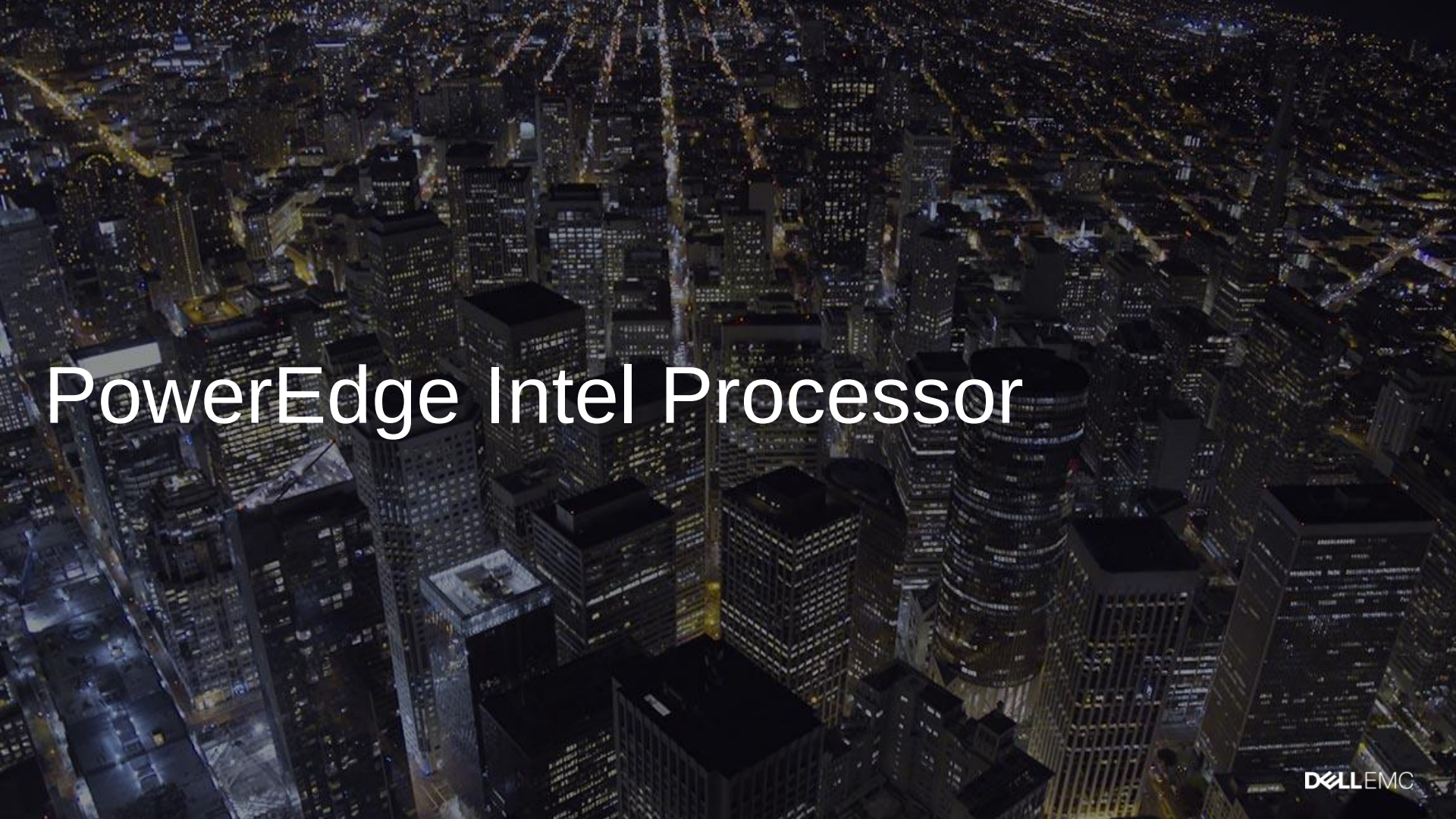
# Server Masters: 14G New Technology Offering

(Processor, Memory, I/O, Management)

DELL EMC

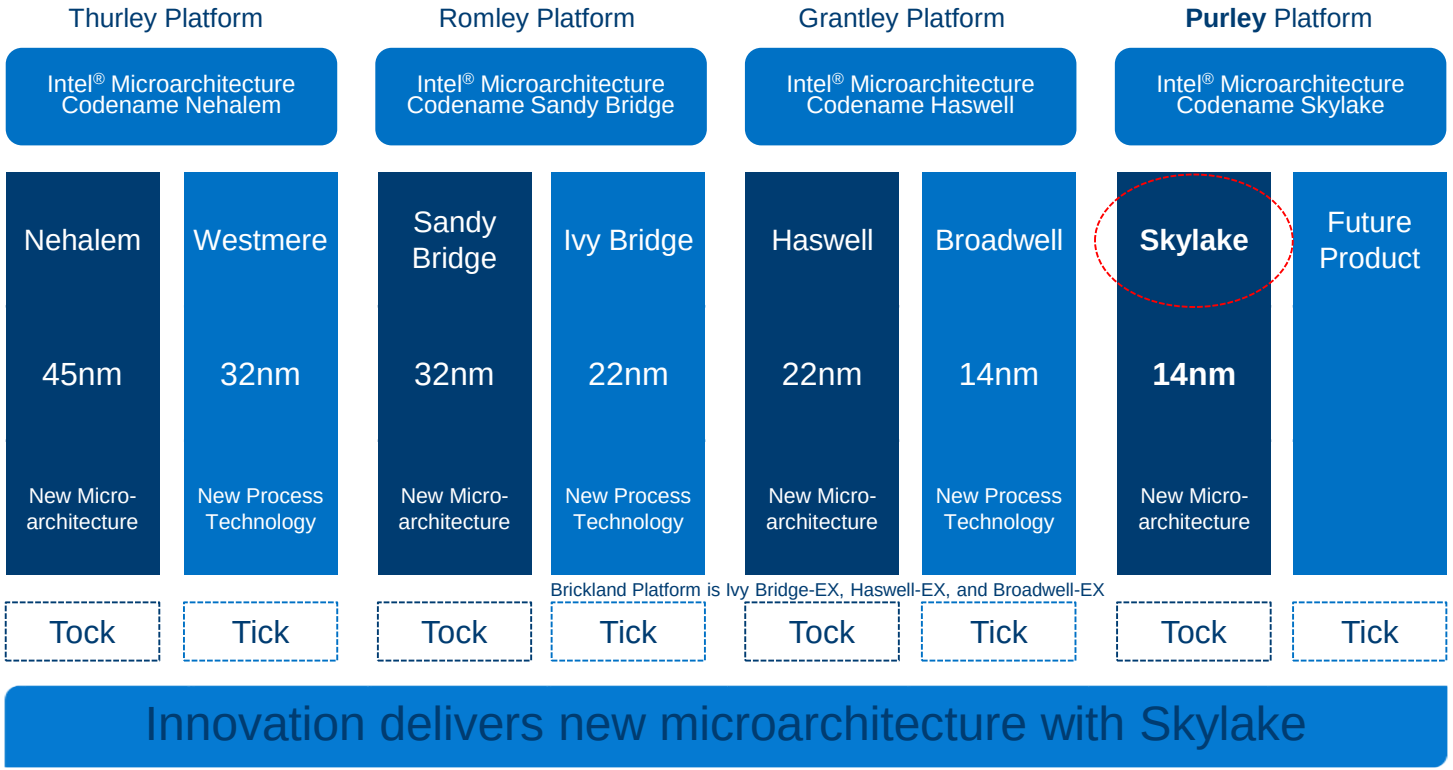
# 14th Generation PowerEdge Summary

| PowerEdge | 12G | 13G | 14G |
|---|---|---|---|
|  *CPU* | • Intel Sandy / Ivy Bridge | • Intel Haswell / Broadwell | • **Intel Skylake** |
|  *Memory* | • DDR3 | • DDR4 | • > **DDR4**<br>• Persistent memory (**NVDIMM-N)**<br>• **Intel 3D Xpoint** (Apache Pass) |
|  *Storage* | • Variety of chassis options<br>• Internal Dual SD Module<br>• PCIe SSDs | • 12Gb/s SAS<br>• 6Gb/s SATA<br>• Options for more storage devices<br>• NVMe PCIe SSDs | • More density<br>• **Storage tiering options**<br>• **NVMe** PCIe SSDs mainstream<br>• Intel 3D XPoint NVMe |
|   *I/O* | • New Options for vendor & technology flexibility | • PCIe Gen 3<br>• 4 x 10GE NDC<br>• Better troubleshooting<br>• 100GE, FC32<br>• 25GE NDC | • enable new **GPU** & **FPGA**<br>• More low latency options<br>• **RDMA**, **25GE** mainstream |
|  *Management* | • LCD | • iDRAC Direct USB port<br>• Quick Sync mobile management (NFC) | • **iDRAC9** Direct dedicated Micro-B USB port<br>• Quick Sync 2 (BLE/WiFi)<br>• Optional LCD, bezel-based |

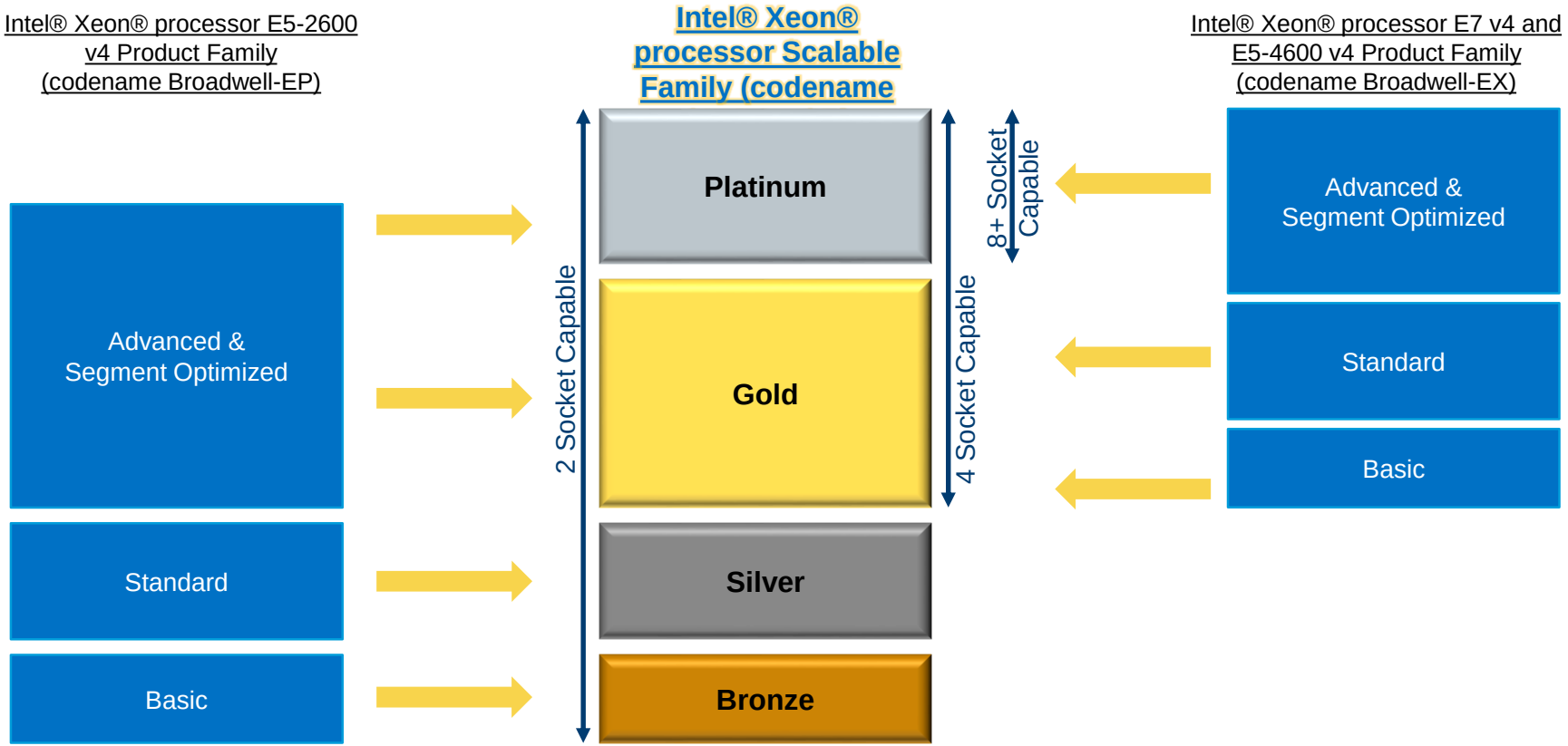

PowerEdge Intel Processor

# Intel Tick-Tock Development Model:

## Sustained Microprocessor Innovation Leadership



# Intel® Xeon® Processor Scalable Family SKU Shelfing



# Intel® Xeon® Processor Scalable Family – new brand


**Intel® Xeon® Processor E7 Family**
(4/8S+)

**Intel® Xeon® Processor E5 Family**
(2S, 4S)

- Intel® Xeon® Platinum 8XXX Processor
- Intel® Xeon® Gold 6XXX Processor
- Intel® Xeon® Gold 5XXX Processor
- Intel® Xeon® Silver 4XXX Processor
- Intel® Xeon® Bronze 3XXX Processor

**Highest Performance / Capabilities**

- ✓ More Cores
- ✓ Higher Frequencies
- ✓ Faster UPI
- ✓ More UPI
- ✓ Faster DDR
- ✓ Faster AVX-512
- ✓ Advanced RAS

**Entry Processor**

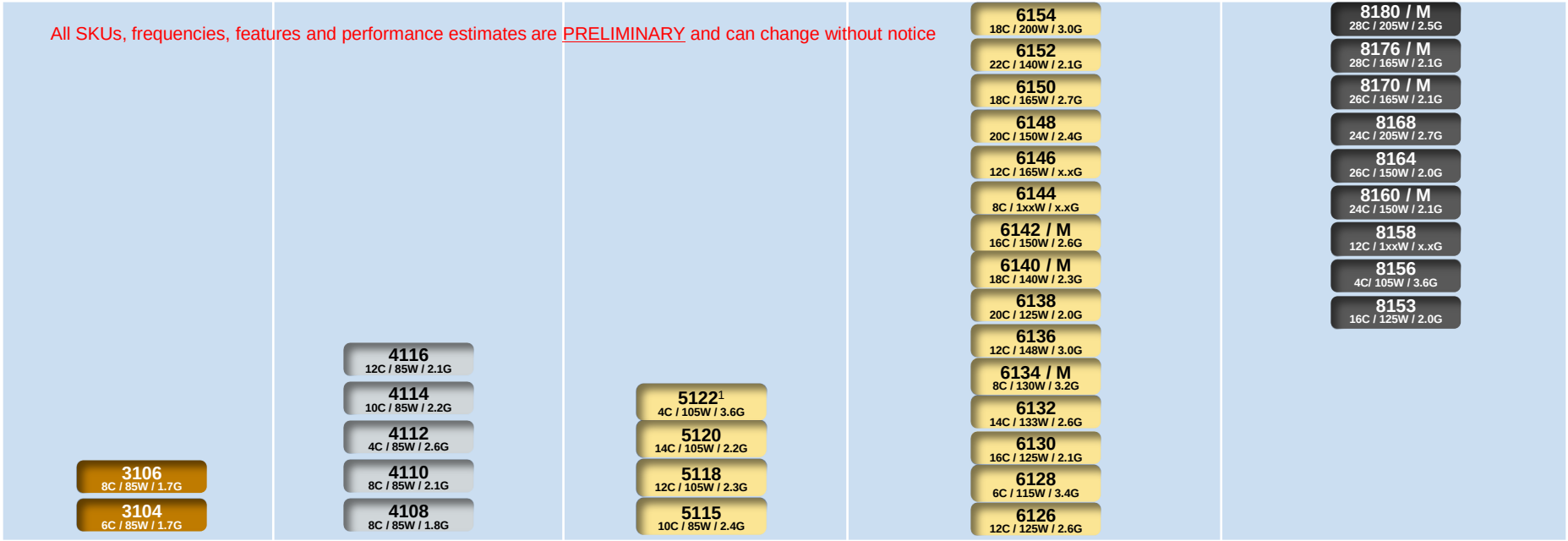
## Skylake SKU Numbering

| Shelf | Generation | | | Integration |
|---|---|---|---|---|
| 8 | 1 | 7 | 6 | F |

**Integration**
F = Fabric
P = FPGA
T = High Tcase/Extended Reliability
M = 1.5 TB/socket Memory

# Intel® Xeon® Processor Scalable Family SKU Stack

All SKUs, frequencies, features and performance estimates are PRELIMINARY and can change without notice




| 31xx (Bronze) | 41xx (Silver) | 51xx (Gold) | 61xx (Gold) | 81xx (Platinum) |
|---|---|---|---|---|
| • 2S-2UPI | • 2S-2UPI | • 2S-2UPI, 4S-2UPI capability | • 2S-2UPI, 2S-3UPI, 4S-2UPI, 4S-3UPI capability | • 2S-2UPI, 2S-3UPI, 4S-2UPI, 4S-3UPI, 8S-3UPI capability |
| • 6-ch DDR4 @ 2133 | • 6-ch DDR4 @ 2400 | • 6-ch DDR4 @ 2400 | • 6-ch DDR4 @ 2666 | • 6-ch DDR4 @ 2666 |
| • 2 UPI links @ 9.6GT/s | • 2 UPI links @ 9.6GT/s | • 2 UPI links @ 10.4GT/s | • 3 UPI links @ 10.4GT/s | • 3 UPI links @ 10.4GT/s |
| | • Intel® Turbo Boost Technology | • Intel® Turbo Boost Technology | • Intel® Turbo Boost Technology | • Intel® Turbo Boost Technology |
| | • Intel® HT Technology | • Intel® HT Technology | • Intel® HT Technology | • Intel® HT Technology |
| • Intel® AVX-512 (1 512-bit FMA) | • Intel® AVX-512 (1 512-bit FMA) | • Intel® AVX-512 (1 512-bit FMA) | • Intel® AVX-512 (2 512-bit FMA) | • Intel® AVX-512 (2 512-bit FMA) |
| • 48 lanes PCIe* Gen3 | • 48 lanes PCIe* Gen3 | • 48 lanes PCIe* Gen3 | • 48 lanes PCIe* Gen3 | • 48 lanes PCIe* Gen3 |
| | | | • Node Controller Support | • Node Controller Support |
| • Standard RAS | • Standard RAS | • Advanced RAS | • Advanced RAS | • Advanced RAS |

[1] Note: Intel® Xeon® Gold 5122 processor will support 2666 DDR4 and 2 512-bit FMA units

Note: Slide does not show high Tcase, fabric SKUs

# SKU Transition Guide from Broadewell to Skylake (Draft)
## (Pricing Perspective)

| Broadwell | Skylake |
|---|---|
| E5-2603 v4 | 3104 |
| E5-2609 v4 | 3106 |
| E5-2620 v4 | 4108/4110 |
| E5-2623 v4 | 4112 |
| E5-2630 v4 | 4114 |
| E5-2640 v4 | 4116 |
| E5-2650 v4 | 5115/5118 |
| E5-2660 v4 | 5120 |
| E5-2637 v4 | 5122 |
| E5-2643 v4 | 6128 |
| E5-2680 v4 | 6130 |
| E5-2667 v4 | 6132/6134 |
| E5-2687W v4 | 6136 |
| E5-2695 v4 | 6138 |
| E5-2690 v4 | 6140 |
| E5-2697 v4 | 6142/6148 |
| E5-2697A v4 | 6154 |
| E5-2698 v4 | 6150/6152 |
| E5-2699 v4 | 8160 |
| E5-2699A v4 | 8164 |

# Purley SKU Transition Guide Example

*From E5-2680 v4*

**Xeon E5v4 (Broadwell)**

| GHz | CC | TDP | Shelf | Broadwell-EP2S |
|---|---|---|---|---|
| 2.4 | 14 | 120 | Advanced | **E5-2680 v4** |

Primary Transition Guidance →
Optional Transition Options ↗↘

**Skylake-SP**

| | Skylake-SP | Shelf | TDP | CC | GHz |
|---|---|---|---|---|---|
| ↗ | 2 **6132** | Gold | 133 | 14 | 2.6 |
| → | 1 **6130** | Gold | 125 | 16 | 2.1 |
| ↘ | 3 **6126** | Gold | 125 | 12 | 2.6 |

**Gen/Gen Performance Gain Estimate**

| | Per Core Efficiency | Socket Power Efficiency | Socket Performance Efficiency | | |
|---|---|---|---|---|---|
| | SIR/Core | SIR/TDP | SIR* | SFR* | LINPACK* |
| 2 **6132** | 25% | 13% | 25% | 28% | 79% |
| 1 **6130** | 8% | 18% | 23% | 30% | 56% |
| 3 **6126** | 26% | 4% | 8% | 16% | 53% |

*SIR (SPECint_rate2006), SFR (SPECfp_rate2006)

## 1 Gold 6130

- ✓ Excellent socket level gains
- ✓ Excellent power efficiency
- Good per core gains

## 2 Gold 6132

- ✓ Excellent socket level gains
- ✓ Excellent per core gains
- ✓ Excellent power efficiency

## 3 Gold 6126

- ✓ Excellent per core gains
- Good socket level gains
- Good power efficiency

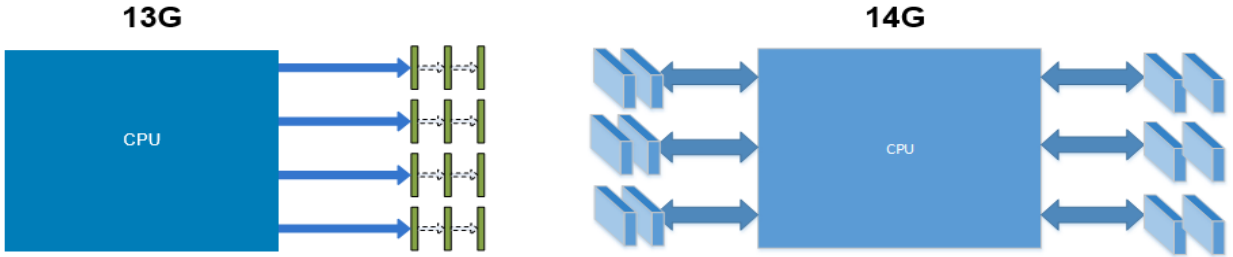
*Multiple transition options depending on Workload and Market needs*


PowerEdge Memory

# 14G memory changes

- Increased Speed & Bandwidth
  - DDR4 Speed increase from 2,400MT/s to **2,667MT/s**
  - Moving from **4** channels to **6** channels
  - Voltage is stable at 1.2V per DIMM


- Memory slots
  - PowerEdge R640/R740/R740XD will have 24 total DIMMs (same as 13G)
  - PowerEdge R940 will have 48 DIMMs (smaller than 13G due to CPU change)
  - Some platforms will increase from 12 to 16 slots (eg. R440/T440)
  - 6 DIMMs per CPU for performance configurations




4 Memory Channels x 3 Slots per Channel = 12 DIMMs per CPU6 Memory Channels x 2 Slots per Channel = 12 DIMMs per CPU

# NVDIMM-N

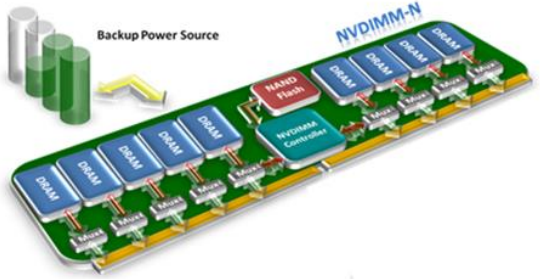
## NVDIMM Persistent Memory

***'Persistent memory'*** *is a* ***storage class memory****, which can offer* delivering the performance of **DDR4 Memory** with the Persistent feature as **NAND Flash**. It retains data in the event of a power lost or a system shut down due to Battery functions.

| Performance | Resiliency | Workload-Optimized |
|---|---|---|
| Breakthrough performance enabling faster business decisions | Resilient technology for maximum uptime w/ Battery solutions | Complete solutions designed around databases and analytics workloads |

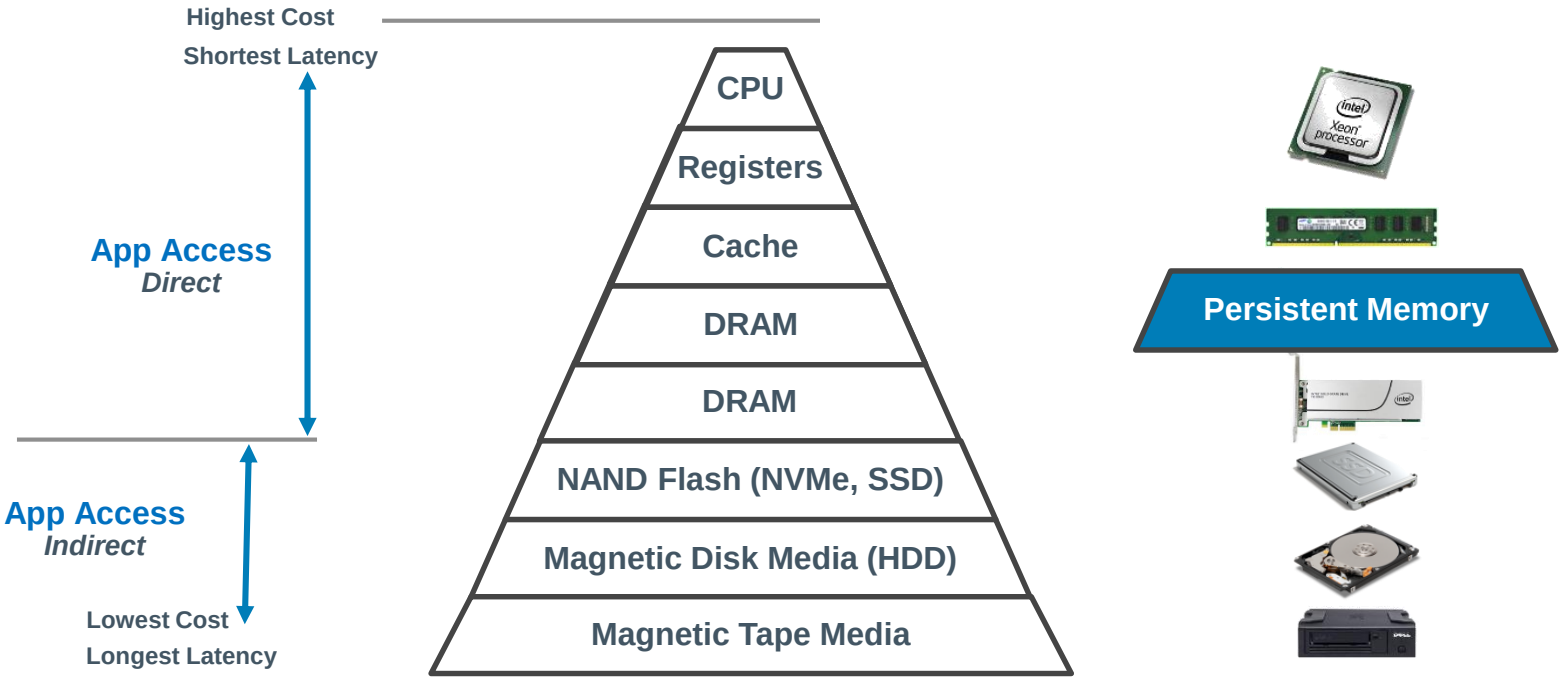
**2 different types access**

- Indirect Access Block Storage thru file system
- Direct Access Storage (SDK)



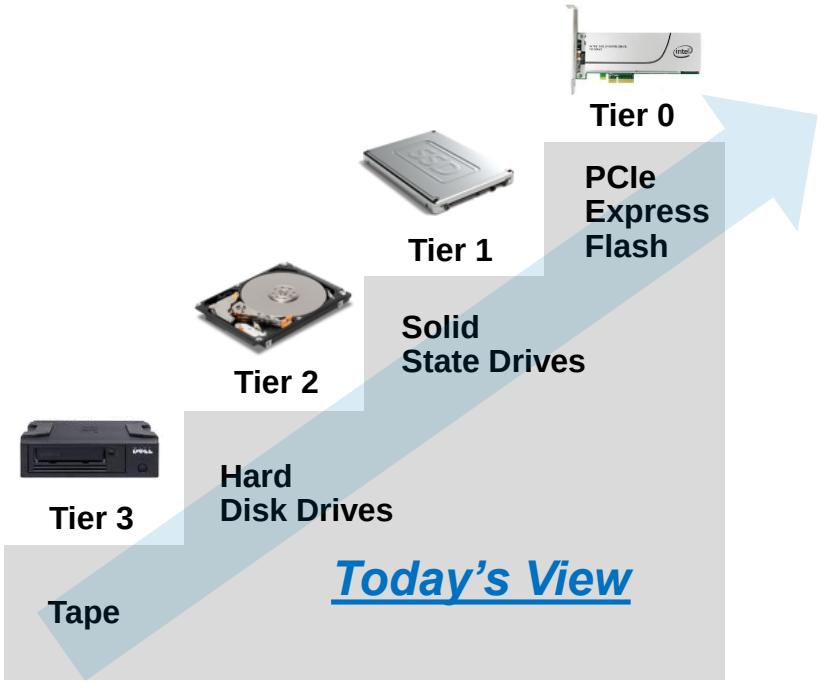

- JEDEC (Joint Electron Device Engineering Council) Standard Prerequisite
  - Can support mixing vendors as common technology
- Software Eco-system in Place (SDK)
  - Microsoft backing solution with full support - SQL 2016
  - Linux community support
  - VMWare support in CY18
- Dell EMC designed battery solution
  - No comprise needed for power backup
  - Better uptime and resilience closest to CPU
- Integration w/ iDRAC 9

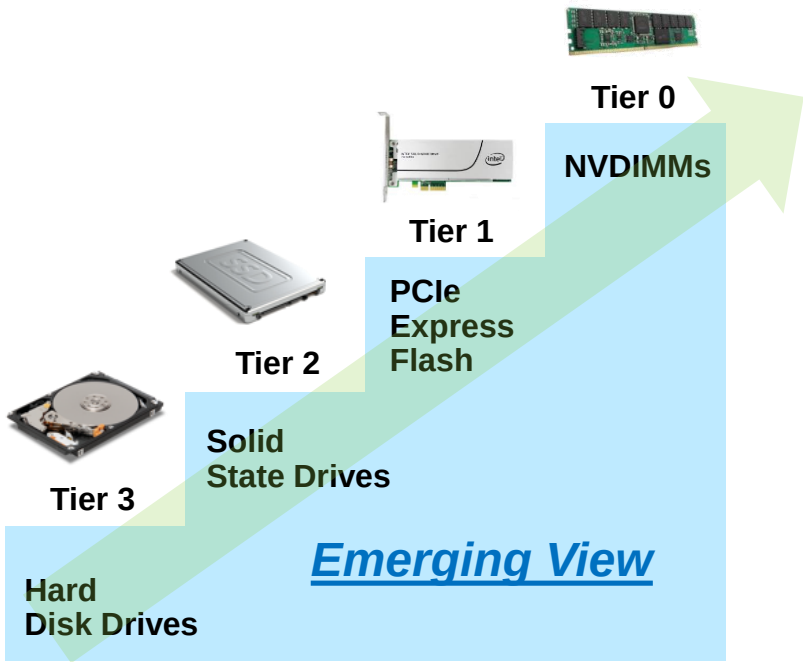
# Memory – Storage Technology



# Storage Tiering Options View

Millisecond (**ms**): 1/1K, **0.001**
Microsecond (**µs**): 1/1M, **0.000001**
Nanosecond (**ns**): 1/1B, **0.000000001**




- NVDIMMs – nanoseconds (ns) of latency.
- PCIe Express NVMe and PCIe SSD IO Accelerators (NAND flash on the SAS/SATA or PCIe bus) – 100s of microseconds (µs) of latency.
- SAS HDDs (Highest performing rotational media with lower capacities and higher $/GB relative to SATA) – 10s of milliseconds (ms) of latency.
- SATA HDDs (Higher capacity relative to SAS and lower $/GB but lower performance relative to SAS) – 100s of milliseconds (ms) of latency.


PowerEdge Storage

# NVMe portfolio proliferation

- 14G to **more than double (2-3X) NVMe** 2.5” PCIe SSD devices
- Up to 6.4TB in 2.5” form factor

- **Wider Choices** of PowerEdge Servers with NVMe PCIe SSDs
    1. Racks: R640, R740, R740xd, R940
    2. Towers: T640
    3. Converged: FX2 with FC640
- Enhanced Drive Offering
    1. New Read Intensive swim lane
    2. Dual Supplier strategy (Samsung & Intel) for high volume
    3. Full Integration with Systems Management
    4. Factory installation of card based solutions

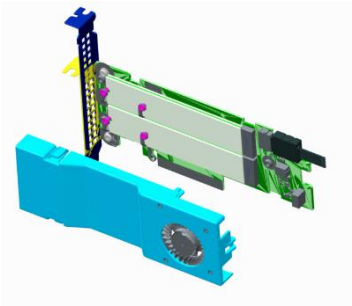
***Over 50%** of servers expected to ship with NVMe and have an average of **5.5** NVMe devices/server in 2020.*

# Boot Optimized Server Storage (BOSS)

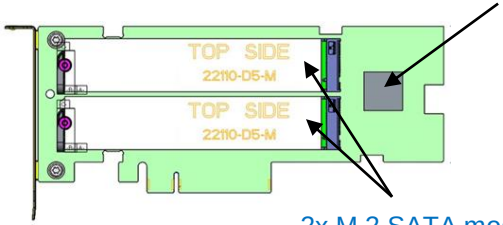
# BOSS Overview

**Objective**

- SDS solutions and ISV partners wanted **separate** O/S Boot disks & controller from Data area
- **Maximize** capacity of Front/Rear bay for data disk, and not using for server O/S or Hypervisor Boot drives, because SATA is enough for O/S Boot Disk
- Not replacing the standard Hypervisor SD-card functionality



RAID Controller




2x M.2 SATA modules

**Feature Set**

- **2x** 120GB (240GB in plan) 110mm M.2 **SATA** devices (Fixed function Hardware **RAID 1 mirroring**)
- Single x8 PCIe Gen 3 host interface
- Dual x1 SATA ports for device interfaces
- Presents single virtualized SATA device to the host
- Half height / half length **PCIe adapter module**


PowerEdge I/O

# GPU Acceleration of 3 Key Workloads

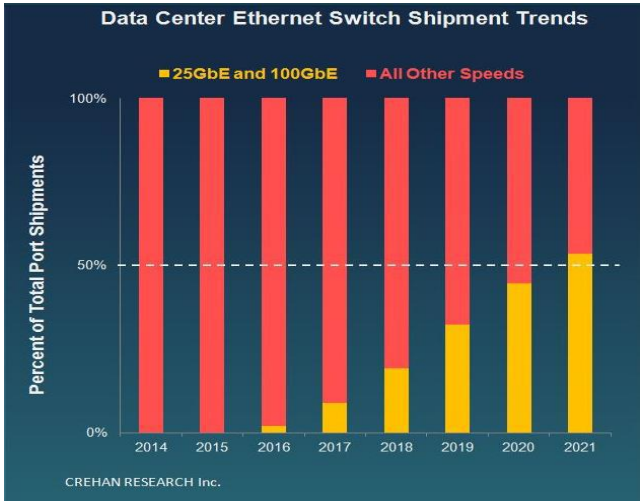
- **Workload growth** for VDI, machine learning, and data analytics will continue to drive increase in need for GPU solutions
- 14th Generation PowerEdge offers GPU option on **double** the number of servers
- 3 Key Workload Areas of Focus for 14G
  - **VDI**
    - R740/T640 with NVIDIA and AMD to get 100+ users per server
    - T440/R540 great entry level options.  Multiple hypervisors supported. GRID Software licenses supported for vGPU.
  - **Data Analytics**
    - R740/T640 with P40/P100
    - Leverage partners Kinetica and MapD
  - **Machine Learning**
    - R740/T640 with P40/P100


# Ethernet market trends

## 25 & 100GbE Technologies will be main stream Ethernet by 2021

- Over half of all datacenter Ethernet switch shipments will be 25 & 100GbE
  *Crehan Research, January 17, 2017*

- Factors driving expected volumes include:
  - Very small to little price premium over comparable 10GbE and 40GbE
  - 25GbE currently uses the same number of lanes as 10Gb
  - 100GbE currently uses the same number of lanes as 40GbE
  - Compatibility with existing data center fiber cabling
  - Hyper-scale cloud provider demand can reduce costs




PowerEdge Management

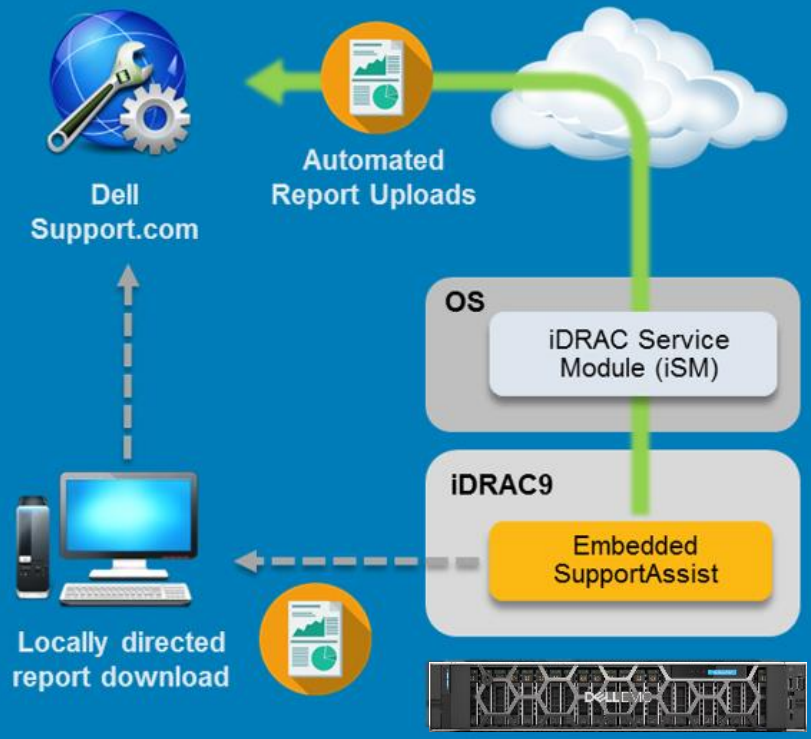
# Introducing the world industry leading embedded management solution

## Dell EMC iDRAC9

- A new and more powerful processor
  - **Dual-core ARM** architecture
  - 4x performance improvement over iDRAC8
- Faster page loading, responsiveness, and quicker data alert collections
- Optimized for PCIe Vendor Defined Message (VDM), RedFish, and new cryptography suites server management performance needs
- Designed for multi-generational firmware and feature compatibility

# iDRAC9: SupportAssist

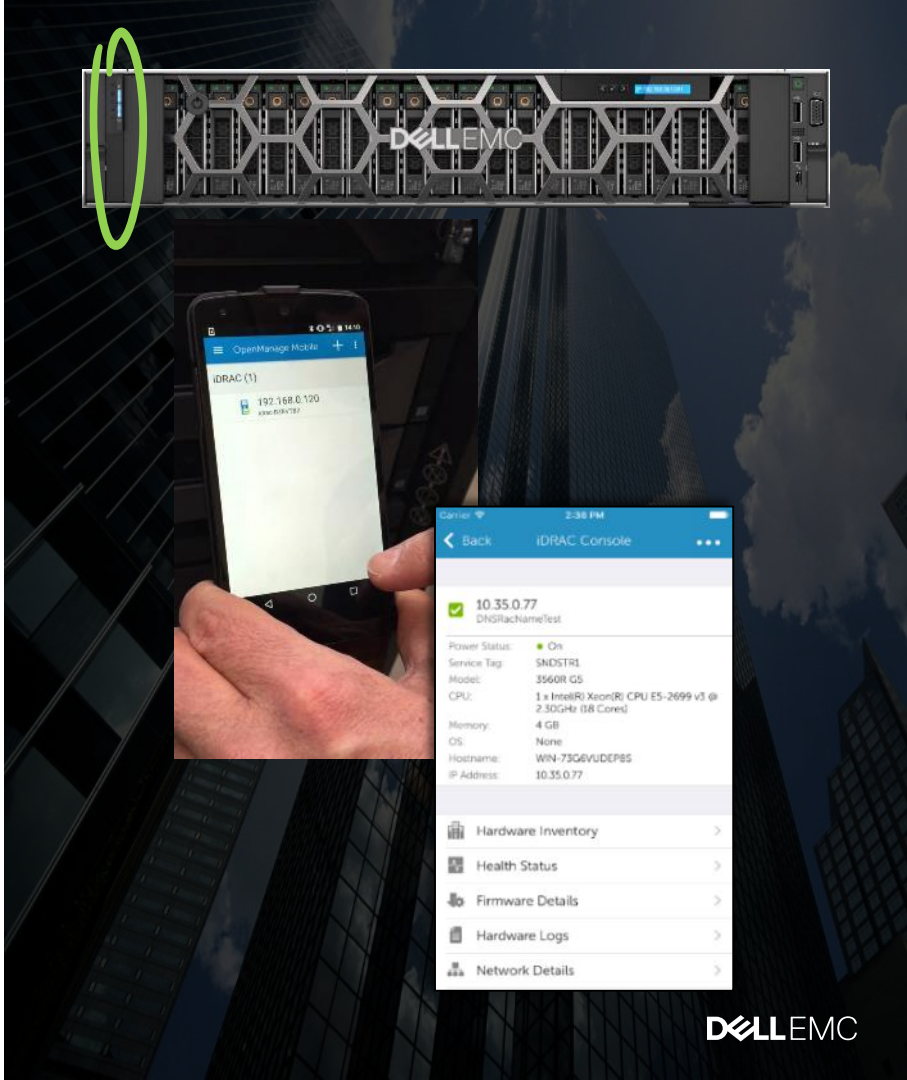
- Embedded SupportAssist feature to minimize system downtime
- Customer option to switch on/off
- Direct ‘phone home’ functionality to Dell EMC Services
- No need for Proxy servers or console software plug-ins
- Predictive alerting & auto-case creation (requires ProSupport+)
- Inspect SupportAssist Collection (SAC) reports from standard web browsers
- Reduces phone support time and improves IT service delivery (SLA’s)



# OpenManage Mobile 2.0

## New Quick Sync 2

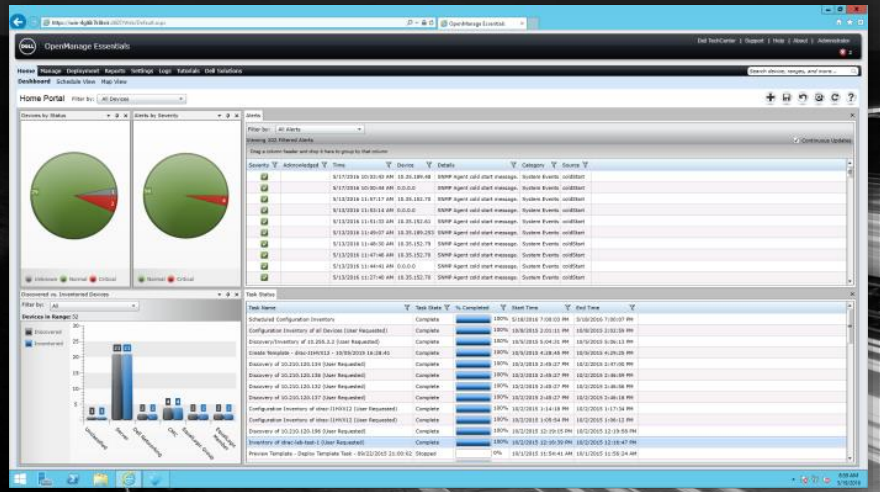
- Optimized mobile device based server management for Dell EMC's 14th generation PowerEdge
- Optional feature for all rack mount servers
  - Wireless circuits part of the module for security environments
- Module as integrated part of the server
- Ease of use
- Improved performance with Bluetooth Low Energy (BLE) and Wi-Fi, replacing current NFC bezel options
- Supports both Apple iOS and Android devices
- "Touch and Roam" operation, no need to hold mobile device at the server front, up to approx. 5m reach
- Simplified at-the-server setup and basic configuration with the new Dell EMC OpenManage Mobile 2.0 app



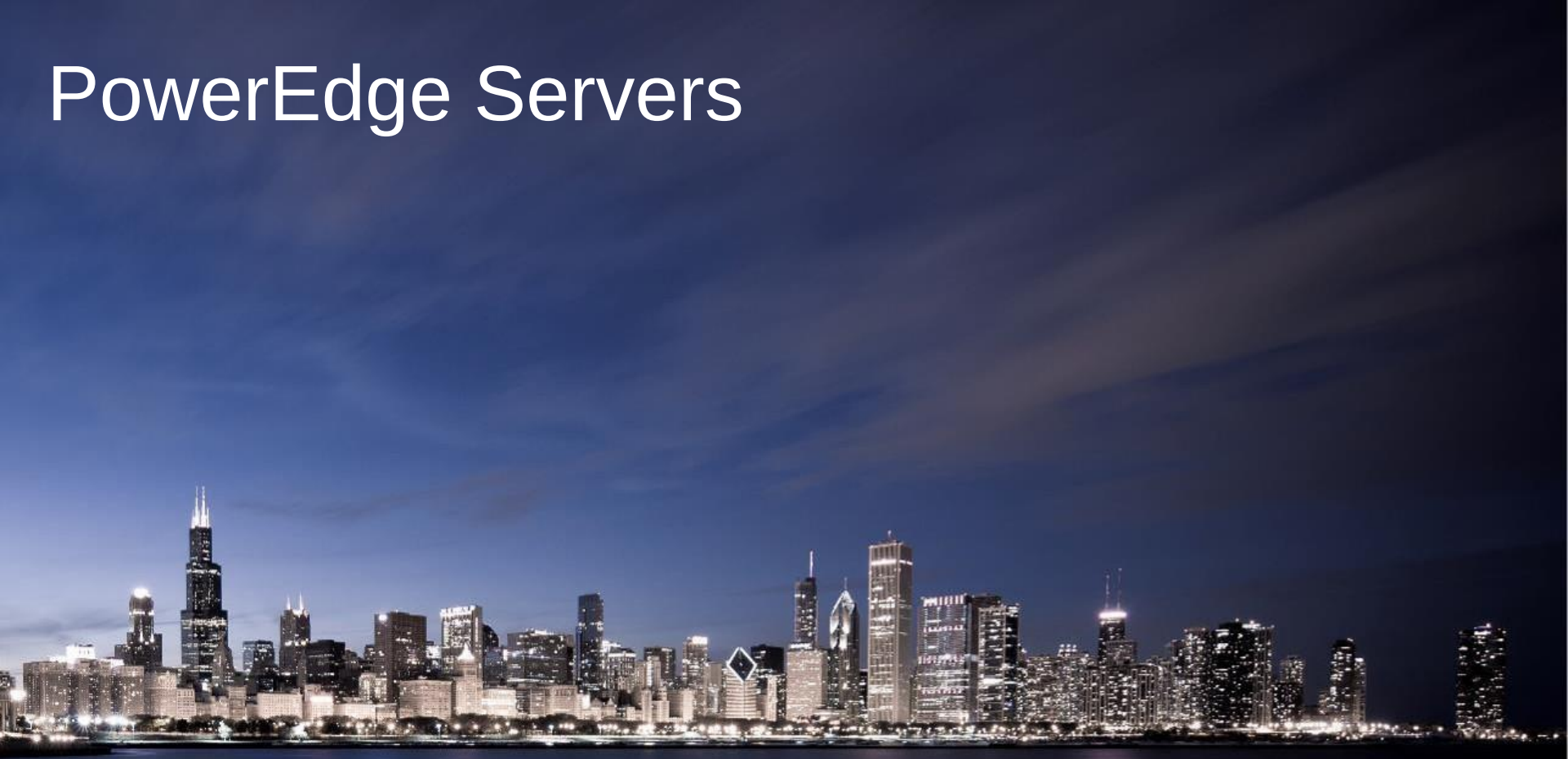
# Dell EMC OpenManage Essentials (OME)

## New v2.3 with 14th generation

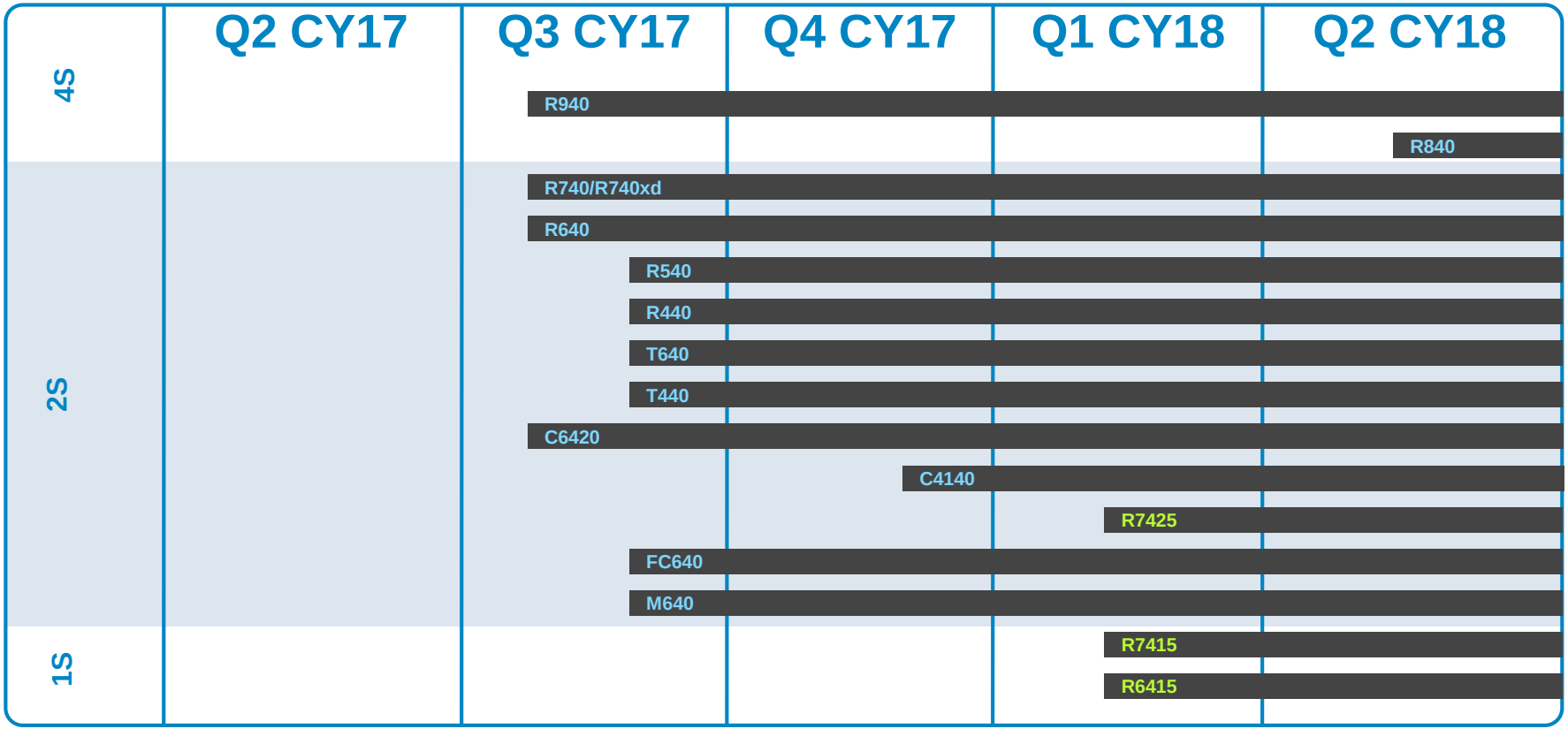
- **SNMP v3 support for secure alerting**
- Windows 2016 Support
- Simplified and Enhanced Server Configuration Management
- Configuration profile capture for backup
- **Auto-discover new iDRAC's after IP provisioning**
- **Manage the entire chassis infrastructure configuration as a whole including the IOA/IOM fabric inside**
- Wizard-based guides to quickly build server templates to simplify boot options and NIC configuration
- **Discover Dell EMC hyper-converged solutions**



# PowerEdge Servers



# PowerEdge Roadmap



**Buy**

*Turnkey, Maximum Agility*

**Build**

*Maximum Flexibility*

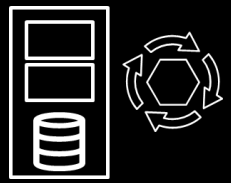
## Converged continuum | solutions for every customer & workload

### Hybrid Cloud Platforms

The ultimate turn-key, pre-integrated hybrid cloud system with life-cycle management & single SKU support experience

### Engineered Systems

Turn-key, pre-integrated & optimized system with life-cycle management & single SKU support experience

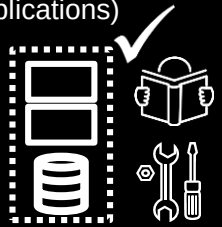


### Ready Systems

Tested and validated Engineered Systems for a given use case or workload (SAP, SQL, Splunk, Oracle etc)

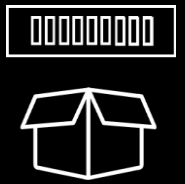
### Ready Bundles

Tested and validated multi-component bundles, optimized for a given use case (HPC, SDDC, VDI, OpenStack) or workload (Data Analytics, Business Applications)



### Ready Nodes

Tested and validated single node optimized for a given use case or workload (HCI, SAP, etc)



- Deliver better outcomes
- Deploy faster & easier
- Mitigate risk

DELL EMC

# PowerEdge: The Compute Engine for Dell EMC Solutions

## Traditional Arrays

13G

E-Labs certs on 13G R630-930, M & FX, & Dell Networking.

14G

Refresh certs w/**14G R640-940**, **M-Series & FX**

## Object Storage


13G

ECS software cert. on R730xd & DSS7000

14G

**14G** cert refresh

*NEW: all flash options*

***R640** Compute (analytics) + ECS appliance solution*

*Investigating ECS Ready Nodes*

## SDS: Block & File


13G

SDS software certified on multiple PE 13G platforms

14G

Refresh to **14G** enhanced capabilities with all NVMe, BOSS, new storage options, >GPUs & NVDIMM)

## Data Protection & Security

13G

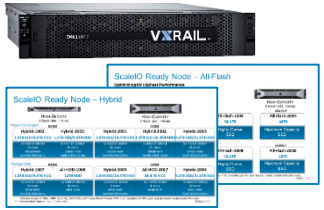
DDVE RA(R530/730xd), Int. DP Appl. (R630) CloudArray (R730xd) cert RSA Appl. (R330/R630/730xd)

14G

*Data Protection S/W on **14G** RSA Appl. (**R640/740xd**)*

*NEW: DD Appliance & DLm on **R740xd**; eCDM w/ **R640***

## HCI Nodes & Appliances




13G

VxRail & SIO Ready Nodes on R630/R730/R730xd (CTO/BTO)

14G

Refresh VxRail & ScaleIO RN to **R640/740xd**

*NEW: VxR **C6420 & R440**, GPU in SIO Ready*

*Investigating Isilon Ready Node*

## Converged Solutions


13G

VxRack Flex & SDDC on R630/R730xd

14G

Refresh to **R640** & **R740xd**

Appliances & Ready Nodes (starting in 13G) deeply integrated w/ iDRAC & Dell Management tools



DELL EMC

# Server Masters:
# 14G PowerEdge Intel Xeon Servers Line-up


DELL EMC


OpenManage Enterprise – Intelligent Automation Systems Management

**Towers** | **Racks** | **Modular** | **Extreme Scale Infrastructure**

*Based on units sold (tie). IDC Worldwide Quarterly Server Tracker, Q1-Q3, 2016.

# Server solutions for every workload


PowerEdge

- R640
- R740 – 740XD
- R940
- M640 – FC640
- C6420

- Cloud Providers, HCI
- SQL, Deep Storage
- SAP Hana, Genomics
- Virtualization, OLTP
- Database, BI Analytics, SDS
- HPC, Web Tech, SDS

IT Transformation  Digital Transformation

# Server Masters:
# 14G PowerEdge AMD EPYC Servers Line-up


DELL EMC

# PowerEdge AMD Products

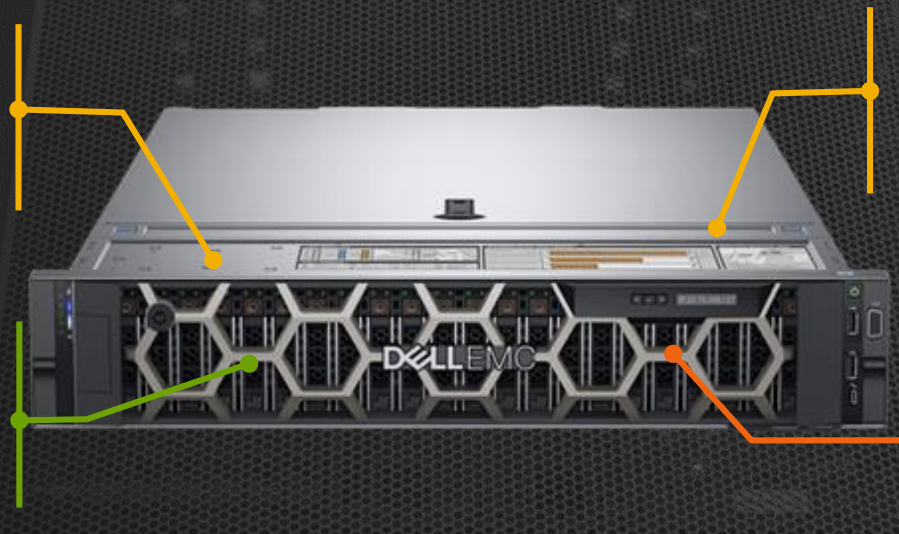
*Single- and two-socket AMD EPYC-based servers*

**More cores and memory capacity**

Improved east/west bandwidth needs for cloud computing and virtualization

**Integrated security**

Cyber-resilient architecture, security is integrated into full server lifecycle – from design to retirement




**High number of PCIe lanes**

In a 1-socket system, 3x more PCIe lanes offering outstanding low-latency performance for scale out solutions

**Intelligent automation**

New OpenManage™ Enterprise console delivers crystal clear reporting and full lifecycle automation

| Architecture Features | AMD EPYC | Intel Xeon Skylake |
|---|---|---|
| Max Cores per Processor | 32 | 28 |
| Max Memory Channels per Processor | 8 | 6 |
| Max PCIe Lanes Per Processor | 64 | 48 |

# Server Masters: Enterprise Workload Solutions

DELL EMC

# Workloads introduction

## Most common workloads

- Server virtualization
- Business processing and OLTP
- Virtual desktop infrastructure
- High performance computing
- Unified communications and collaboration
- Big data and analytics

## Hardware requirements

- Memory
- CPU
- Storage
- Network
- Rack density

Dell EMC Blueprint solutions on SalesEdge or Partner Central



DELL EMC

# Hardware requirement comparison

## Memory

- Business processing (BPI)
- VDI
- Virtualization
- Big data
- OLTP
- HPC
- UC&C

## CPU

- HPC
- VDI
- OLTP
- Virtualization
- Business processing
- Big data
- UC&C

## Storage

- Business processing
- UC&C
- VDI
- Big data
- OLTP
- Virtualization
- HPC

## Network

- VDI
- HPC
- OLTP
- Big data
- UC&C
- Business processing
- Virtualization

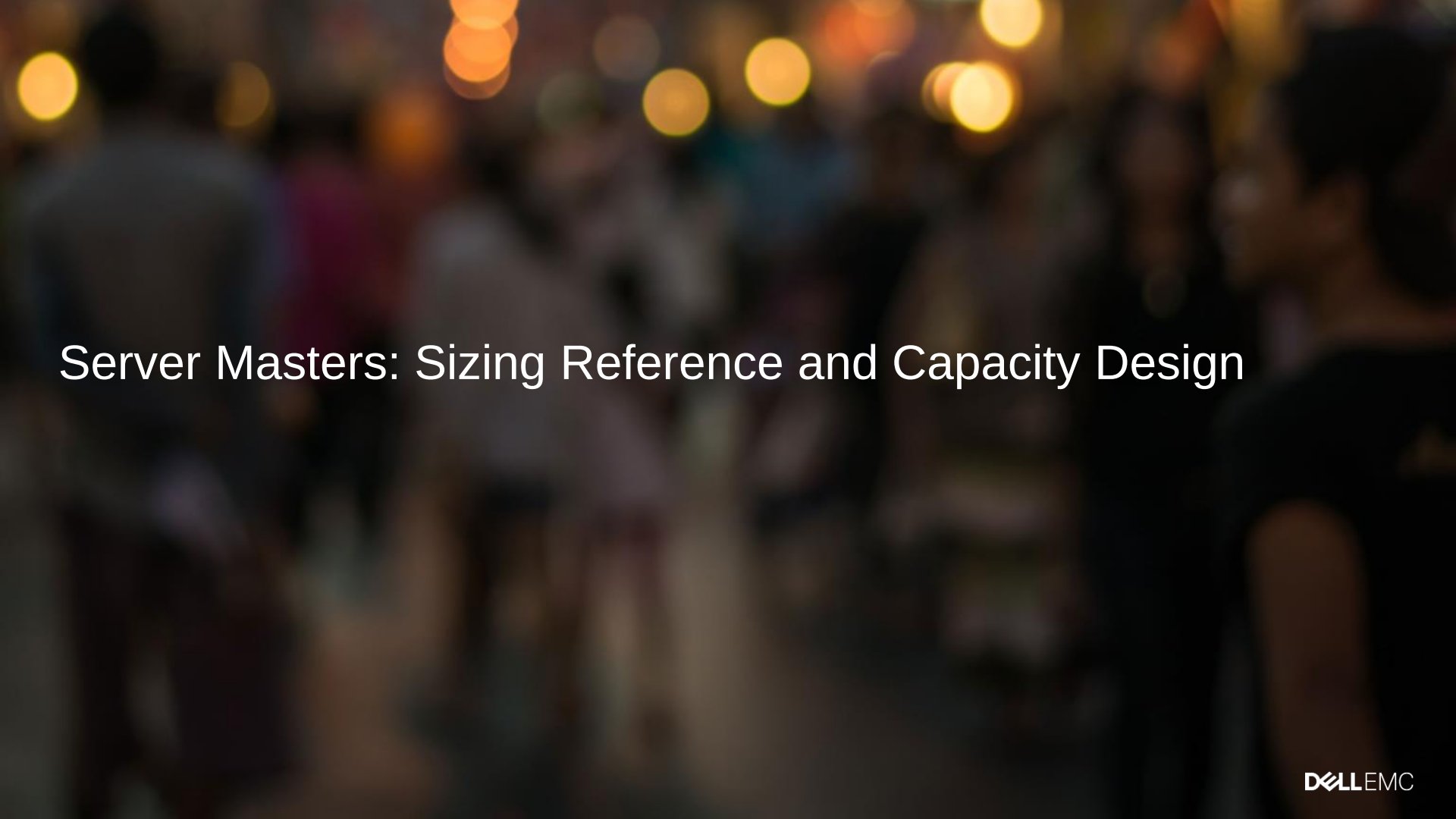
## Rack density

- Virtualization
- HPC
- Big data
- VDI
- UC&C
- BPI
- OLTP



DELL EMC

# Server Masters: Sizing Reference and Capacity Design



# Workload Positioning Configuration References 1/3

| Workload | 1st tier - WEB & Access Gateway | 2nd tier - WAS & Application | 3rd tier – Database (Structured) | Big Data (Unstructured) |
|---|---|---|---|---|
| Compute Performance Requirements | • Keyword: Multiple Connections<br>• CPU: Medium Clock & Multiple Cores<br>• Memory: Medium to High<br>• Disk: Medium IOPS Disk<br>• I/O: High Speed **Multiple NIC ports** | • Keyword: Safe Connections & Transaction<br>• CPU: High Clock & Multiple Cores<br>• Memory: Medium to High<br>• Disk: Medium IOPS Disk<br>• I/O: High Speed **Multiple NIC ports** | • Keyword: High Performance Transaction<br>• CPU: **High Clock & Multiple Cores**<br>• Memory: High<br>• Disk: **High IOPS** Disk<br>• I/O: High Speed Multiple NIC ports | • Keyword: High Performance Transaction<br>• CPU: **High** Clock & Multiple Cores<br>• Memory: **Very** High (In-memory)<br>• Disk: **High** IOPS Disk<br>• I/O: **High** Speed Multiple NIC ports |

| Component | CPU | Memory | Storage | I/O | CPU | Memory | Storage | I/O | CPU | Memory | Storage | I/O | CPU | Memory | Storage | I/O |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Workload Accelerator | | v | | vv | v | v | | vv | vv | vv | vv | v | vv | vv | vv | vv |
| High Config | Skylake 5000/6000 | 64GB-96GB | | Multiple 10Gb + 4x1Gb | Skylake 6000 | 96GB-128GB and NVDIMM | | Multiple 10Gb + 4x1Gb | Skylake 6000/8000 | 256GB+ and NVDIMM | NVMe and SAS SSD and BOSS | Multiple 10Gb + 4x1Gb | Skylake 6000/8000 | 256GB+ and NVDIMM | NVMe and SAS SSD and BOSS | Multiple 10Gb + 4x1Gb |
| Medium Config | Skylake 4000/5000 | 64GB-96GB | | 2x10Gb + 2x1Gb | Skylake 5000 | 96GB-128GB | | Multiple 10Gb + 4x1Gb | Skylake 6000 | 128GB+ and NVDIMM | SAS SSD and SATA SSD and BOSS | Multiple 10Gb + 4x1Gb | Skylake 6000 | 128GB+ and NVDIMM | SAS SSD and SATA SSD and BOSS | Multiple 10Gb + 4x1Gb |
| Light Config | Skylake 3000/4000 | 16GB-64GB | SATA HDD | 4x1Gb | Skylake 4000 | 32GB-64GB | SATA HDD | 2x10Gb + 2x1Gb | Skylake 5000 | 64GB-128GB | SATA SSD and HDD | 2x10Gb + 2x1Gb | Skylake 5000 | 64GB-128GB | SATA SSD and HDD | 2x10Gb + 2x1Gb |

**R640/R740/R7425/C6420**

**R640/R740/R7425/C6420**

**R740XD/R7425/R840/R940**

**R740XD/R7425/R840/R940**

**R440/R7415/C6420**

**R440/R7415/C6420**

**R640/R740**

**R640/R740**

**R440/R6415**

**R440/R6415**

**R440/R540/R7415**

**R440/R540/R7415**

# Workload Positioning Configuration References 2/3

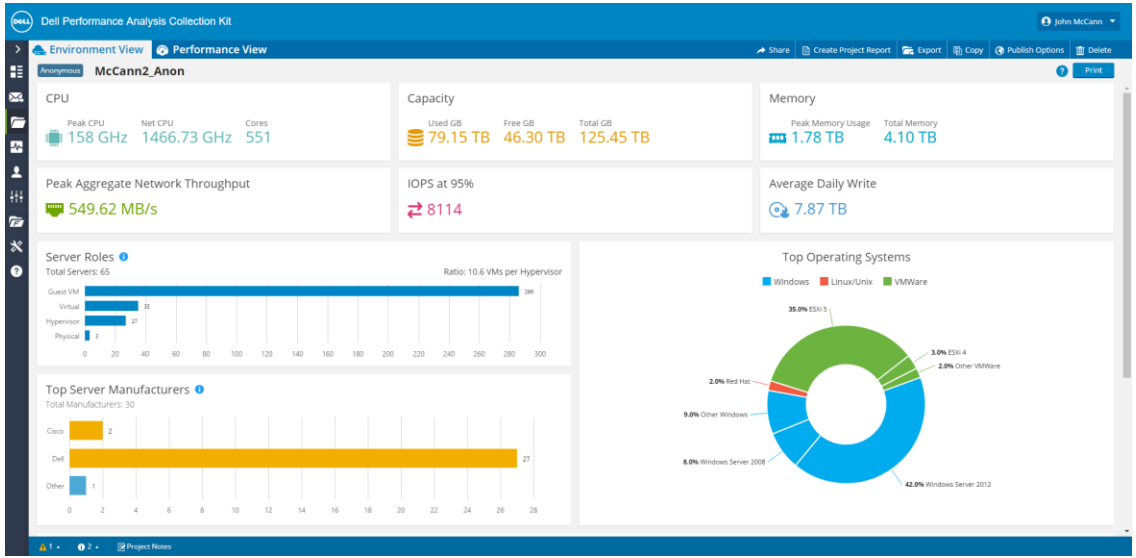
| Workload | Virtualization & Private Cloud | | | | VDI (Virtual Desktop Infrastructure) | | | | SDx (Software Defined Solutions) | | | | HPC | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Compute Performance Requirements | • Keyword: Multi purposed V-environment<br>• CPU: High Clock & Multiple Cores<br>• Memory: Very High<br>• Disk: Mixed Medium & High IOPS Disk<br>• I/O: **High Speed Interconnection** | | | | • Keyword: Multi purposed V-environment<br>• CPU: Multiple Cores<br>• Memory: Very High<br>• Disk: Mixed Medium & High IOPS Disk<br>• I/O: **GPU** & High Speed Interconnection | | | | • Keyword: Disk Intensive<br>• CPU: High Clock & Multiple Cores<br>• Memory: Very High<br>• Disk: High IOPS Disk<br>• I/O: **High Bandwidth** & Multiple NIC ports | | | | • Keyword: CPU/Memory/IO Intensive<br>• CPU: **High Clock** & Multiple Cores<br>• Memory: Very High<br>• Disk: High IOPS Disk<br>• I/O: **High Speed Fabric (IB)** | | | |
| Component | CPU | Memory | Storage | I/O | CPU | Memory | Storage | I/O | CPU | Memory | Storage | I/O | CPU | Memory | Storage | I/O |
| Workload Accelerator | v | vv | v | v | v | vv | v | vv | v | vv | vv | vv | vv | vv | v | vv |
| High Config | Skylake 6000 | NVMe + SAS SSD and BOSS | Multiple 10Gb + 4x1Gb | **R740XD/R7425/C6420/FX2** | Skylake 5000/6000 | NVMe + SAS SSD and BOSS | Multiple 25Gb + 4x1Gb and GPU | | Skylake 6000/8000 | 256GB-2.5TB and NVDIMM | NVMe and SAS SSD and BOSS | Multiple 25Gb + 4x1Gb | **R740/R740XD/R7425** | | | |
| Medium Config | Skylake 5000 | 128GB-2TB and NVDIMM | SAS SSD and SATA SSD and BOSS | Multiple 10Gb + 4x1Gb | **R540/R7415/C6420/FX2** | | | | Skylake 4000/5000 | | | Multiple 10Gb + 4x1Gb and GPU | Skylake 6000 | 128GB-2TB and NVDIMM | SAS SSD and SATA SSD and BOSS | Multiple 10Gb + 4x1Gb |
| Light Config | Skylake 4000 | 128GB-1TB and NVDIMM | SATA SSD and SATA HDD | 2x10Gb + 2x1Gb | Skylake 3000/4000 | 128GB-1TB and NVDIMM | SATA SSD and SATA HDD | 2x10Gb + 2x1Gb and GPU | Skylake 5000 | 64GB-1TB and NVDIMM | SATA SSD and SATA HDD | 2x10Gb + 2x1Gb | **R640/R6420** | | | |
| | | | | | | | | | | | | | Skylake 6000 | 256GB+ NVDIMM | SAS SSD and SATA SSD | Multiple 10Gb + 4x1Gb |
| | | | | | | | | | | | | | **R640/C6420** | | | |
| | | | | | | | | | | | | | Skylake 5000 | 128GB-1TB and NVDIMM | SATA SSD and SATA HDD | 2x10Gb + 2x1Gb |
| | | | | | | | | | | | | | **R440/R6415** | | | |

# Workload Positioning Configuration References 3/3

| Workload | UC & e-Mail | | | | Security & Management | | | | Cloud & Service Provider | | | | ERP | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Compute Performance Requirements** | • Keyword: Multi Space & Session<br>• CPU: Multiple Cores<br>• Memory: High<br>• Disk: **Big Volume with Medium & High IOPS Disk**<br>• I/O: High Speed Interconnection | | | | • Keyword: High Speed & Multi Session<br>• CPU: High Clock & Multiple Cores<br>• Memory: High<br>• Disk: Medium IOPS Disk<br>• I/O: **High Speed & Multiple NIC ports** | | | | • Keyword: Multi purposed V-environment<br>• CPU: High Clock & Multiple Cores<br>• Memory: **Very High**<br>• Disk: **High IOPS Disk**<br>• I/O: **High Speed Interconnection** & Multiple NIC ports | | | | • Keyword: High Performance Transaction<br>• CPU: **High Clock & Multiple Cores**<br>• Memory: **Very High (In-memory)**<br>• Disk: **High** IOPS Disk<br>• I/O: **High** Speed Multiple NIC ports | | | |
| **Component** | **CPU** | **Memory** | **Storage** | **I/O** | **CPU** | **Memory** | **Storage** | **I/O** | **CPU** | **Memory** | **Storage** | **I/O** | **CPU** | **Memory** | **Storage** | **I/O** |
| **Workload Accelerator** | | v | vv | v | v | v | v | vv | vv | vv | v | vv | vv | vv | v | v |
| **High Config** | Skylake 6000 | **R740XD/R7425/C6420/FX2** | SAS SSD + SATA and BOSS | Multiple 10Gb + 4x1Gb | 5000/6000 | **R640/R740** | SAS SSD + SATA SSD | Multiple 25Gb + 4x1Gb and GPU | Skylake 6000 | **R640/R740/R7425/C6420** | NVMe + SATA SSD and BOSS | Multiple 10Gb + 4x1Gb | 6000/8000 | **R740XD/R7425/R840/R940** | 512GB+ NVDIMM | NVMe + SATA SSD | Multiple 10Gb + 4x1Gb |
| **Medium Config** | Skylake 5000 | **R540/R7415/C6420/FX2** | SATA SSD and HDD | Multiple 10Gb + 4x1Gb | 4000/5000 | **R540/R7415** | SAS SSD + SATA SSD | Multiple 10Gb + 4x1Gb and GPU | 5000/6000 | **R540/R7415/C6420** | SAS SSD + SATA SSD and BOSS | Multiple 10Gb + 4x1Gb | 6000 | **R640/R740** | 256GB+ NVDIMM | SAS SSD + SATA SSD | Multiple 10Gb + 4x1Gb |
| **Light Config** | Skylake 4000 | **R440/R6415** | SATA SSD and SATA HDD | 2x10Gb + 2x1Gb | Skylake 4000 | **R440/R6415** | SATA SSD and SATA HDD | 2x10Gb + 2x1Gb and GPU | Skylake 5000 | **R440/R6415** | SATA SSD and SATA HDD | 2x10Gb + 2x1Gb | Skylake 5000 | **R440/R540/R7415** | 128GB-256GB | SATA SSD and SATA HDD | 2x10Gb + 2x1Gb |

# Dell Performance Analysis Collection Kit (DPACK) → Live Optics!

- **What is DPACK (Live Optics)?**
  In an effort to help guide you through mission-critical IT decisions, Dell's solution team has developed an innovative **new tool to analyze resource utilization and support the capacity planning**. This complimentary tool will help you make the most impactful decisions for your business, whether it's reducing wasteful spending or analyzing opportunities for virtualization or data center expansion.

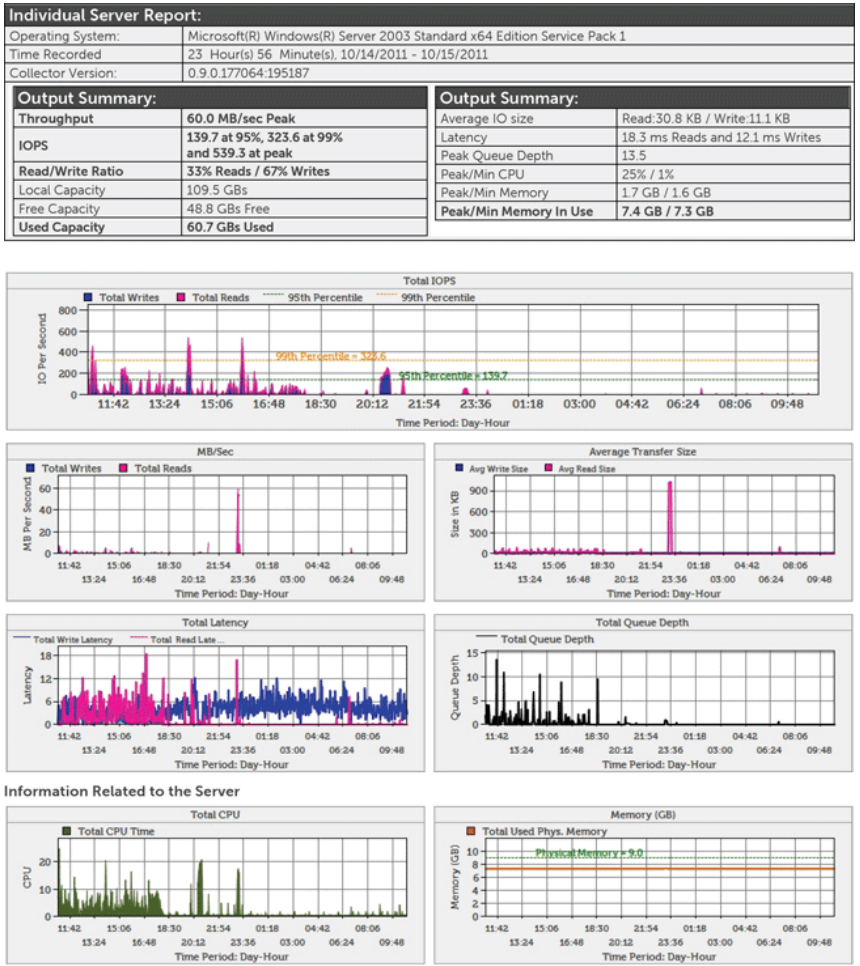



https://www.liveoptics.com/

# Dell Performance Analysis Collection Kit (DPACK)

- **Analyze the workload style**
  DPACK runs remotely and agentless to gather core requirements, including:
  - CPU Capacity and Memory utilization
  - Disk Read/Write Throughput IOPS
  - Network Throughput, Latency, Queue Depth
  - Server workload and capacity requirements at Peak Utilization

- **DPACK generates two kinds of reports:**
  1. An in-depth individual server report to be used by IT administrators to search for potential bottlenecks or hotspots that need to be engineered out of a new design
  2. Centralized aggregation of resource reports across disparate servers, with a simulation of those workloads if consolidated to shared resources



**Individual Server Report:**

| | |
|---|---|
| Operating System: | Microsoft(R) Windows(R) Server 2003 Standard x64 Edition Service Pack 1 |
| Time Recorded | 23 Hour(s) 56 Minute(s), 10/14/2011 - 10/15/2011 |
| Collector Version: | 0.9.0.177064:195187 |

| Output Summary: | |
|---|---|
| **Throughput** | **60.0 MB/sec Peak** |
| **IOPS** | **139.7 at 95%, 323.6 at 99% and 539.3 at peak** |
| **Read/Write Ratio** | **33% Reads / 67% Writes** |
| Local Capacity | 109.5 GBs |
| Free Capacity | 48.8 GBs Free |
| **Used Capacity** | **60.7 GBs Used** |

| Output Summary: | |
|---|---|
| Average IO size | Read:30.8 KB / Write:11.1 KB |
| Latency | 18.3 ms Reads and 12.1 ms Writes |
| Peak Queue Depth | 13.5 |
| Peak/Min CPU | 25% / 1% |
| Peak/Min Memory | 1.7 GB / 1.6 GB |
| **Peak/Min Memory In Use** | **7.4 GB / 7.3 GB** |





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