PowerEdge 14G Servers

Martin Joniak
Intel® Xeon® Scalable Processors (Skylake-SP)
New Skylake-SP Scalable SKU Stack and Shelving
To Address Diverse Market Needs

Intel® Xeon® processor E5-2600
v4 Product Family
(codename Skylake-SP)

Platinum
Gold
Silver
Bronze

8+ Socket Capable
4 Socket Capable
2 Socket Capable

Advanced & Segment Optimized
Standard
Basic

Intel® Xeon® processor E7 v4 and
E5-4600 v4 Product Family
(codename Broadwell-EX)

Advanced & Segment Optimized
Standard
Basic

R830, R930

R630, R730, R730xd, C6320
R640, R740, R740xd, R940, C6420
Intel® Xeon® Processor Scalable Family – New Brand

- **Intel® Xeon® Platinum 8XXX Processor**
  - Highest performance, most scalable. Up to 28 cores. 2-8 socket. Advanced RAS.

- **Intel® Xeon® Gold 6XXX Processor**
  - Great performance, choices for every workload. Up to 22 cores, 2-4 socket. 3 UPI. DDR @ 2666. Advanced RAS. AVX-512 (2 FMA).

- **Intel® Xeon® Gold 5XXX Processor**
  - Up to 14 cores. 2-4 socket. 2 UPI. Advanced RAS. AVX-512 (1 FMA).

- **Intel® Xeon® Silver 4XXX Processor**
  - Up to 12 cores. 2 socket. Intel® Turbo Boost & Intel® Hyper-threading. DD4@2400.

- **Intel® Xeon® Bronze 3XXX Processor**
  - Up to 8 cores. 2 socket. DDR4 @ 2133.

### Skylake SKU Numbering

- **Shelf**
- **Generation**
- **Integration**
  - F = Fabric
  - P = FPGA
  - T = High Tcase/Extended Reliability
  - M = 1.5 TB/Socket Memory

**Example:** 8176F
<table>
<thead>
<tr>
<th></th>
<th>81xx (Platinum)</th>
<th>61xx (Gold)</th>
<th>51xx (Gold)</th>
<th>41xx (Silver)</th>
<th>31xx (Bronze)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2S-2UPI, 2S-3UPI(^1), 4S-2UPI, 4S-3UPI, and 8S-3UPI</td>
<td>2S-2UPI, 2S-3UPI(^1), 4S-2UPI, 4S-3UPI</td>
<td>2S-2UPI, 4S-2UPI</td>
<td>2S-2UPI</td>
<td>2S-2UPI</td>
<td></td>
</tr>
<tr>
<td>6-ch DDR4 @ 2666</td>
<td>6-ch DDR4 @ 2666</td>
<td>6-ch DDR4 @ 2400(^2)</td>
<td>6-Ch DDR4@2400</td>
<td>6-ch DDR4@2133</td>
<td></td>
</tr>
<tr>
<td>3 UPI links @ 10.4GT/s</td>
<td>3 UPI links @ 10.4GT/s</td>
<td>2 UPI links @ 10.4GT/s</td>
<td>2 UPI links @9.6GT/s</td>
<td>2 UPI links @9.6GT/s</td>
<td></td>
</tr>
<tr>
<td>Intel® AVX-512 (2 x 512-bit FMAs)</td>
<td>Intel® AVX-512 (2 x 512-bit FMAs)</td>
<td>Intel® AVX-512 (1 x 512-bit FMAs)</td>
<td>Intel® AVX-512 (1 x 512-bit FMAs)</td>
<td>Intel® AVX-512 (1 x 512-bit FMAs)</td>
<td></td>
</tr>
<tr>
<td>48 lanes PCIe Gen3</td>
<td>48 lanes PCIe Gen3</td>
<td>48 lanes PCIe Gen3</td>
<td>48 lanes PCIe Gen3</td>
<td>48 lanes PCIe Gen3</td>
<td></td>
</tr>
<tr>
<td>Intel® Turbo Boost</td>
<td>Intel® Turbo Boost</td>
<td>Intel® Turbo Boost</td>
<td>Intel® Turbo Boost</td>
<td>Intel® Turbo Boost</td>
<td></td>
</tr>
<tr>
<td>Intel® Hyper-Threading</td>
<td>Intel® Hyper-Threading</td>
<td>Intel® Hyper-Threading</td>
<td>Intel® Hyper-Threading</td>
<td>Intel® Hyper-Threading</td>
<td></td>
</tr>
<tr>
<td>Advanced RAS features</td>
<td>Advanced RAS features</td>
<td>Advanced RAS features</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Node Controller Support</td>
<td>Node Controller Support</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Paměť DDR4
14G Memory Channels / DIMMs per Channel

CPU architecture defines how many memory channels are available and how many DIMMs per channel are supported.

- **13G**
  - 4 Memory Channels x 3 Slots per Channel = 12 DIMMs per CPU

- **14G**
  - 6 Memory Channels x 2 Slots per Channel = 12 DIMMs per CPU

- PowerEdge R740/R740XD/R640 will have 24 total DIMMs (same as 13G)
- PowerEdge R940 will have 48 DIMMs (smaller than 13G due to CPU change)
# 14G Versus 13G DIMM Comparison

<table>
<thead>
<tr>
<th>Mainstream Servers</th>
<th>14G (DDR4)</th>
<th>13G MLK (DDR4)</th>
<th>13G (DDR4)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DIMM Type</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RDIMM</td>
<td></td>
<td>RDIMM</td>
<td>RDIMM</td>
</tr>
<tr>
<td>LRDIMM</td>
<td></td>
<td>LRDIMM</td>
<td>LRDIMM</td>
</tr>
<tr>
<td>NVDIMM-N</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Transfer Speed (MT/s)</strong></td>
<td>2667, 2400, 2133, 1866</td>
<td>2400, 2133, 1866, 1600</td>
<td>2133, 1866, 1600</td>
</tr>
</tbody>
</table>
NVDIMM – N Overview

- NVDIMMS are a form of persistent memory
- “Persistent memory” is memory that retains data in the event of a power lost or a system shut down

NVDIMMs allow the OS to see block storage running at the speed of memory

- NVDIMMs have both a Flash device and DRAM chips
- During a power failure all data gets copied from DRAM to the Flash
- NVDIMMs need an additional power source – Dell EMC solution is a battery
NVDIMM Implementation

Description/Features
- Access Method – Direct Byte or Block Oriented
- Capacity: 16GB at RTS
- Latency: DRAM (10's of nanoseconds)
- Designed to Co-exist with DDR4 DRAM in same system

OS/Systems Management Support
- Requires driver support in OS (for block)
- Windows at launch
- VMware – CY18
- Linux – Community support (TBD)

Problems it Solves & Key Value
- Workloads requiring Nano-second latency & persistence writes from storage subsystems

Use Model and Caveats if Any
- Limited to 12 DIMMs
- Must load a RDIMM in the channel first
- Requires OS drivers to appear as a Block Device

Key Points
- No comprise needed for power backup
- 1 battery per platform versus super cap (1 to1 with NVDIMM)
- BBU is spec’d for 5.83Whr for 140 seconds (more dense than super cap)
- Better uptime and resilience closer to CPU
- Integration w/ iDRAC 9
- Supported on R640, R740, R740xd, R940
Doporučené konfigurace
GPU, FPGA
GPU

- 14th Generation PowerEdge offers GPU option on **double** the number of servers
  - R740, R740XD (UI), T640, R540, and T440
  - New video card offering on R640
  - Increased support on R740 with **3x 300W DW GPUs**

- Three Key Workload Areas of Focus for 14G
  - **Machine Learning**
    - R740/T640 with P40/P100
  - **Data Analytics**
    - R740/T640 with P40/P100
    - Leverage partners *Kinetica* and *MapD*
  - **VDI**
    - R740/T640 with NVIDIA and AMD to get 100+ users per server
    - **T440/R540** great entry level options. Multiple hypervisors supported
CPU vs GPU vs FPGA

CPU - SISD
- Applicable to any programmable environment and language.
- Non-vectored integer applications
- Remains the core center of computation

GPU - SIMD
- Excels at vectored floating point
- Requires large data to be effective
- Hurt by branches or exceptions – “if” statements
- Remains focused on a subset of high-performance problems
- Not going away; limited breadth

FPGA - MIMD
- Many independent instructions can operate in parallel and with either small amounts or large amounts of data
- Excellent streaming with IO devices
- Greater breadth than GPUs
- Expect higher prevalence for enterprise applications than GPUs over time
## 14G Expanded GPU Offerings

<table>
<thead>
<tr>
<th>Workload</th>
<th>Card</th>
<th>R740/XD</th>
<th>R640</th>
<th>R540</th>
<th>T640</th>
<th>T440</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Data Analytics</strong></td>
<td>Nvidia Tesla P100 16GB</td>
<td>X</td>
<td></td>
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<tr>
<td></td>
<td>Nvidia Tesla P100 12GB</td>
<td>X</td>
<td></td>
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<tr>
<td></td>
<td>Nvidia Tesla K80</td>
<td>X</td>
<td></td>
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<tr>
<td><strong>Machine Learning</strong></td>
<td>Nvidia Tesla P40</td>
<td>X</td>
<td></td>
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<tr>
<td></td>
<td>Nvidia Tesla P4</td>
<td>X</td>
<td></td>
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<tr>
<td><strong>VDI</strong></td>
<td>Nvidia Tesla/Grid M60</td>
<td>X</td>
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<tr>
<td></td>
<td>Nvidia Tesla M10</td>
<td>X</td>
<td></td>
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<tr>
<td></td>
<td>Nvidia Quadro P4000</td>
<td>X</td>
<td></td>
<td></td>
<td>X*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AMD WX7100 (Post RTS)</td>
<td>X</td>
<td></td>
<td></td>
<td>X*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AMD S7150</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>AMD S7150X2</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Video Card</strong></td>
<td>Nvidia NVS310</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
FPGAs – why & how?

Need:
- CPUs performance increasing at a slower rate...

Capability:
- Moore’s law has grown FPGAs to the size where they can be applied to key algorithms
- FPGAs integrated more hard-wired capabilities (PCIe, SERDES, mathematical units)
- Support high-bandwidth memory interfaces—a gap with x86

Ecosystem:
- Improved development tools (OpenCL, C-to-HDL converters)
- Software capable of offloading
- IP delivery methods
- Proof-points and researched know-how in applying FPGAs to key problems
  - Microsoft for NW routing/security
  - Baidu for SQL processing
  - Fintech for High Frequency Trading
Disky a diskové řadiče
PERC10: “Top” Features

1. >1M IOPs Capability
2. Improved SSD Performance
3. 8GB NV Cache
4. eHBA Mode – RTS+
Typy disků:

- HDD: SATA, NLSAS, SAS
- SSD: SATA, SAS
- NVMe (PCIe slot, 2,5“)
- BOSS (Boot Optimized Storage Solution)
- SD card (16GB, 32GB, 64GB), hw RAID1
- vFlash
## HDD, SSD:

<table>
<thead>
<tr>
<th>Form Factor</th>
<th>Type</th>
<th>Speed</th>
<th>Rotational Speed</th>
<th>Capacities</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5”</td>
<td>SATA SSD</td>
<td>6Gb</td>
<td>N/A</td>
<td>240GB, 400GB, 480GB, 800GB, 960GB, 1600GB,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1920GB, 3200GB, 3840GB</td>
</tr>
<tr>
<td>2.5”</td>
<td>SATA</td>
<td>6Gb</td>
<td>7.2K</td>
<td>1TB, 2TB</td>
</tr>
<tr>
<td>2.5”</td>
<td>SAS</td>
<td>12Gb</td>
<td>7.2K</td>
<td>1TB, 2TB, 2TB(SED FIPS)</td>
</tr>
<tr>
<td>2.5”</td>
<td>SAS SSD</td>
<td>12Gb</td>
<td>N/A</td>
<td>400GB, 480GB, 800GB, 960GB, 1600GB, 1920GB,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3840GB, 800GB(SED FIPS), 1600GB(SED FIPS)</td>
</tr>
<tr>
<td>2.5”</td>
<td>SAS</td>
<td>12Gb</td>
<td>10K</td>
<td>300GB, 600GB, 1.2TB, 1.8TB, 2.4TB, 1.2TB(SED FIPS), 2.4TB(SED FIPS)</td>
</tr>
<tr>
<td>2.5”</td>
<td>SAS</td>
<td>12Gb</td>
<td>15K</td>
<td>300GB, 600GB, 900GB, 900GB(SED FIPS)</td>
</tr>
<tr>
<td>3.5”</td>
<td>SATA</td>
<td>6Gb</td>
<td>7.2K</td>
<td>1TB, 2TB, 4TB, 8TB, 10TB</td>
</tr>
<tr>
<td>3.5”</td>
<td>SAS</td>
<td>12Gb</td>
<td>7.2K</td>
<td>1TB, 2TB, 4TB, 8TB, 10TB, 4TB(SED FIPS), 8TB(SED FIPS)</td>
</tr>
</tbody>
</table>
NVMe portfolio proliferation

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

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

- Wider Variety 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
“BOSS” (Boot Optimized Storage Solution)

Overview

Our SDS solutions and partners have requested separate hardware boot controller for OS.

Feature Set

- 2x 120GB/240GB 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
Sít'ové porty
Bandwidth Needs for 14G

Performance Oriented Customers
- WebTech
- NFV
- Private Cloud
- HPC
- HFT

Enterprise I/O Customers

Customers With Low I/O Needs
14G Ethernet Adapter Form Factors

**PCle Adapter**
All Racks & Towers, FX2, VRTX

**rNDC**
R600-R900

**bNDC**
FX2, VRTX, M1000e

**M1000e Mezz**
M1000e

**LOMs**
R200-300 2Port 1GE BT Broadcom
T100-T400 2Port 1GE BT Broadcom

**LOM and LOM Mezz**
R400-R500
LOM: 2Port 1GE BT Broadcom
OCP LOM Riser:
- none
- LOM Riser 2Port 1GE BT Broadcom
- LOM Riser 2Port 10GE BT Broadcom
- LOM Riser 2Port 10GE SFP+ Broadcom

C6420
LOM: 1Port 1GE Intel I350
OCP LOM Riser:
- none
- LOM Riser 2Port 10GE SFP+ Intel X710
25GE Down to the Server

Reasons for 25GE

- The switch to switch interconnect is moving to 100GE
- 25GE Lowest cost per Gb
  - 30% premium for 2.5 the bandwidth
- 25GE backwards compatible with 10GE SFP+
- The data explosion in the data center is creating a demand for larger pipes
- 2 ports of 10GE not sufficient for SDS
  - 25GE is lower cost than 4 Ports of 10GE

New Network Deployments

- 100Gb Between Switches
- 25Gb to servers

- 25GE uses SFP28
  - SFP28 is backwards compatible with 10GE SFP+
  - same physical size
  - Customers need to manually configure the speed when connecting 25GE to 10GE
Dell EMC 25GE Portfolio
Dell EMC Networking & PowerEdge

DELL EMC Networking S5148F-ON
- Optimized for 25G connections in-rack with 100G to fabric
- RTS: October CY2017
- 48 x 25GbE ports
- 6 x 100GbE ports

<table>
<thead>
<tr>
<th>25GE Adapter Support</th>
<th>QLogic</th>
<th>Mellanox</th>
<th>Broadcom</th>
<th>Intel</th>
</tr>
</thead>
<tbody>
<tr>
<td>25GE rNDC</td>
<td>14G Post RTS</td>
<td>13G &amp; 14G</td>
<td>14G</td>
<td></td>
</tr>
<tr>
<td>Cable Support</td>
<td>13G &amp; 14G</td>
<td>13G &amp; 14G</td>
<td>13G &amp; 14G</td>
<td>14G Post RTS</td>
</tr>
<tr>
<td>Optic Support</td>
<td>14G</td>
<td>14G</td>
<td>13G &amp; 14G</td>
<td>14G Post RTS</td>
</tr>
</tbody>
</table>

- Customer use case/profile
  - SDS (2 ports of 10GE not enough)
  - Service Providers
  - WebTech
  - Cloud
  - Big Data

- SFP28 Passive cables
- Breakout cables 100GE QSFP+ to four 25GE SFP28
- SFP28 Optics
- Breakout fiber optic, 100GE QSFP+ to four 25GE SFP28
<table>
<thead>
<tr>
<th>Emulex (Broadcom)</th>
<th>Intel</th>
<th>Broadcom</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Fibre Channel</td>
<td>- Most popular 10GE vendor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- 1, 10, 40Gb Ethernet</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- 100Gb OmniPath</td>
<td></td>
</tr>
<tr>
<td>Note: No Emulex Ethernet in 14G</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>QLogic (Cavium)</th>
<th>Mellanox</th>
<th>SolarFlare</th>
</tr>
</thead>
<tbody>
<tr>
<td>- iWARP and RoCE</td>
<td>- RoCE (best of breed)</td>
<td></td>
</tr>
<tr>
<td>- Storage offloads (FCoE and iSCSI)</td>
<td>- 10, 40,100 Gb Fibre Channel</td>
<td></td>
</tr>
<tr>
<td>- Fibre Channel</td>
<td>- Low latency Ethernet</td>
<td></td>
</tr>
<tr>
<td>- 10, 25Gb Ethernet</td>
<td>- InfiniBand</td>
<td></td>
</tr>
</tbody>
</table>

|                                | SolarFlare           |
|                                | - ScaleOut Onload Kernel Bypass |
|                                | - Security: has application to filter an adapter by IP address |
|                                | - Low latency |
|                                | - Dominates HFT market |
|                                | - 10Gb Ethernet     |
Current RDMA Support

- RDMA support is expanding for OSes, applications and hardware
- Windows 2016 in the lead with RDMA support
  - Live Migration
  - Storage Spaces
  - SQL Clustering

### Adapter Support

<table>
<thead>
<tr>
<th>Vendor</th>
<th>QLogic</th>
<th>Broadcom</th>
<th>Mellanox</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicon</td>
<td></td>
<td></td>
<td>CX-3 Pro, CX-4, CX-4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>57412, 57414, 57416</td>
<td></td>
</tr>
<tr>
<td>Silicon Code</td>
<td>FastLin</td>
<td>Whitney+</td>
<td>CX-3 Pro, CX-4, CX-4</td>
</tr>
<tr>
<td>Name</td>
<td></td>
<td></td>
<td>LX, CX-4</td>
</tr>
<tr>
<td>RoCE v1/v2</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>iWARP</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

### OS Support

<table>
<thead>
<tr>
<th>Kernel OS Support</th>
<th>Windows</th>
<th>Linux</th>
<th>VMWare</th>
</tr>
</thead>
<tbody>
<tr>
<td>As a hypervisor</td>
<td>Yes</td>
<td>Yes</td>
<td>RoCE only (future iWARP)</td>
</tr>
<tr>
<td>(le allows guest OS to run RDMA)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OS Kernel</td>
<td>Yes</td>
<td>Yes</td>
<td>RoCE only (future iWARP)</td>
</tr>
<tr>
<td></td>
<td>VM Migration</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Storage Spaces</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SMB Direct*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kernel Service Support</td>
<td></td>
<td>Ceph</td>
<td>(future Vmotion) (future VSAN)</td>
</tr>
</tbody>
</table>

*Note SMB Direct supports many things. For example Microsoft SQL databases can use RDMA when clustered because of SMB Direct.
## Intel Omni-Path Architecture

### Dell Networking H-Series portfolio

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HFI Adapter x16 Adapter (100 Gb/s)</td>
<td></td>
</tr>
<tr>
<td>H1024-OPF Edge Switch</td>
<td>24 x 100 Gbps ports with up to 4.8 Tbps aggregate bandwidth for small to medium medium systems.</td>
</tr>
<tr>
<td>H1048-OPF Edge Switch</td>
<td>48 x 100 Gbps with up to 9.6 Tbps aggregate bandwidth for medium to large large systems.</td>
</tr>
<tr>
<td>H9106-OPF Director-Class Class Switch</td>
<td>192 ports, 6 slots, 100 Gbps director-class switch supporting up to 38.4 Tbps switching capacity.</td>
</tr>
<tr>
<td>H9124-OPF Director-Class Class Switch</td>
<td>768 ports, 24 slots, 100 Gbps director-class switch supporting up to 153.6 Tbps Tbps switching capacity.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>HFI</th>
<th>Edge switches</th>
<th>Director-class switches</th>
</tr>
</thead>
</table>

iDRAC9
Dell OpenManage Portfolio

Simplifying hardware management through ease of use and automation

One-to-many with best of breed Dell solutions
One size doesn’t size fit all – Right/mean tool for the need
Protect customer’s investment – Single point for stack Mgmt.
Better together within Dell

Dell Consoles
- OpenManage Essentials
- OpenManage PowerCenter

Dell Tools
- Repository Manager
- Standards Based APIs
- OpenManage Mobile

3rd Party Integrations and Connections
- MS System Center
- VMware vCenter
- And Nagios, IBM, HPE, ...

Dell Services
- ProSupport Plus Services with SupportAssist
- OME deployment

Server Element Managers
Lifecycle Management: Discovery/Inventory, Configure/Deploy, Update, Monitor, Maintain by interacting with PE Servers via iDRAC with LC, CMC/MSM, iDRAC Service Module (ISM)

Modular Servers

Towers and Rack Servers

FX Ecosystem
iDRAC9 with Lifecycle Controller

- Automate common management tasks
- Agent-free architecture
- HTML5-based GUI
- Powerful scripting APIs and iDRAC REST API with Redfish 2016 additions
- Quick Sync 2 for Android or Apple mobile device
- “Hi-Rez” monitoring
- Embedded SupportAssist tools
New 14G Features – iSM and more

Remote Full Power Cycle

In-Band iDRAC Access via Host OS IP

LCD panel moves to an Optional Bezel
OpenManage Mobile 2.0: An iOS or Android app to monitor and manage Dell servers and devices

- Easily access and manage servers remotely, or at-the-box with Quick Sync 2 (BLE and Wi-Fi)
- Supports both iOS and Android mobile devices
- Monitor device health and receive notifications on smartwatch or mobile device
- Easily configure iDRAC and key BIOS attributes
- Get LCD functionality on your mobile device, including LCD error message
- Extract and share SupportAssist reports
- Run pre-defined or custom RACADM commands
- Available on all 14G rack servers and T640/T440

14G Quick Sync 2 option now is embedded in server not a bezel
Unique Password Deployment Options

- Default server configuration will use a unique password for iDRAC (no root/calvin)
- The root/calvin password option can still be enabled through a no-cost SKU option during order entry
- OMM can be used to scan/enter the unique password and change it.
- Alternately, OMM can collect unique passwords for emailing to OpenManage Essentials.
- The default network configuration will be DHCP
iDRAC Group Manager

- Scale

- iDRAC
- iDRAC
- iDRAC
- iDRAC
- iDRAC

- Upgrade to OME as you grow your datacenter!

- OME
  - Comprehensive 1XM Server Mgmt
  - Comprehensive Dell Server, Switch, Storage Inventory & Monitoring

- New iDRAC Group Page
  - Group Server Inventory and Health
  - Group Credentials Management
  - Email alerting

- iDRAC 1X1 Mgmt
  - Web GUI
  - RACADM
  - WS-MAN
  - IPMI, SSH, RedFish

- “My First Console”: Basic 1XM Server and iDRAC Management
- Nothing to install or host externally
- Gives customers a simple console approach w/o the pain

- iDRAC 1X1 Management

- < 100 nodes
PowerEdge System Lockdown

System Lockdown is a new 14G feature that helps prevent change in System firmware image(s) & critical configuration data via Dell tools.

Lockdown mode provides a level of protection yielding higher assurance against malicious modification of code and configuration in any of the system components.

Lockdown mode is a licensed feature and it is available as part of iDRAC enterprise license.

Dell tools or interface that support/enforce lockdown mode: iDRAC GUI, racadm, WSMAN, Redfish, DUPs, OMSA/OMSS, BIOS F2, SysConfig, IPMI.

Certain operations such as power capping, power operations, etc. are allowed when the system is in lock down mode.
Automate Support via SupportAssist Enterprise (May 2017)

Customer site

Dell SupportAssist Enterprise
Diagnostics and logs

ProSupport Remote Services at Dell

Auto-case creation
Data analysis
Dell Support
Remote remediation
Part dispatch

Hardware discovery
Hardware inventory
Hardware health status
Hardware monitoring

iDRAC with Lifecycle Controller and iDRAC Service Module

IT Admin
<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOS Recovery</td>
<td>Detect an invalid, untrusted BIOS image when a boot is attempted and recover to an authenticated, trusted BIOS image.</td>
</tr>
<tr>
<td>Connection View</td>
<td>Quickly check if server LOMs/NDCs and iDRAC are connected to the correct switches and ports via the GUI or by command line interface. This helps prevent costly remote dispatch of technicians to remediate cabling errors.</td>
</tr>
<tr>
<td>Full Power Cycle</td>
<td>By utilizing the iDRAC Service Module (iSM), DC power, including AUX power, can be temporarily removed via local or remote control to reset all power nodes in a server, saving time when troubleshooting.</td>
</tr>
<tr>
<td>iDRAC Direct</td>
<td>Secure front-panel USB connection to iDRAC web interface which eliminates the need for crash carts or a trip to the hot aisle of your data center. You can use the same port to insert a USB key to upload new system profile for secure, rapid system configuration.</td>
</tr>
<tr>
<td>iDRAC Group Manager</td>
<td>Provides built-in, one-to-many monitoring and inventory of local iDRAC9s with no software to install. Ideal for customers who don’t want to install and maintain a separate monitoring console. This feature does require iDRAC Enterprise licenses.</td>
</tr>
<tr>
<td>iDRAC RESTful API</td>
<td>With this API, IDRAC enables support for the Redfish standard and enhances it with Dell extensions.</td>
</tr>
<tr>
<td>Multi Vector Cooling</td>
<td>Airflow for each PCIe slot can be fine-tuned to ensure proper cooling. This allows for greater power efficiency and more precise cooling within each server for accessory cards.</td>
</tr>
<tr>
<td>OpenManage Mobile and Quick Sync 2</td>
<td>Use the OpenManage Mobile 2.0 (or higher) app on your handheld device to securely retrieve critical health data and easily perform bare-metal server configuration tasks via BLE/Wi-Fi connectivity. Compatible with various iOS and Android devices.</td>
</tr>
<tr>
<td>System Erase</td>
<td>With proper authentication, administrators can securely erase data from local storage (HDDs, SSDs, NVMs) and embedded flash devices.</td>
</tr>
<tr>
<td>System Lockdown</td>
<td>Helps to prevent configuration or firmware changes to a server when using Dell tools. Requires iDRAC Enterprise License.</td>
</tr>
<tr>
<td>Zero touch deployment and provision</td>
<td>When ordered with DHCP enabled from the factory, PowerEdge servers can be automatically configured when they are initially powered up and connected to your network. This process uses profile-based configurations that ensure each server is configured per your specifications. This feature requires an iDRAC Enterprise license.</td>
</tr>
</tbody>
</table>
Typy 14G serverů
Funkčně shodné komponenty:

- procesory
- paměť
- disky (včetně rámečků)
- diskové řadiče
- napájecí zdroje
- síťové karty, HBA
- iDRAC + LC
R-Series
PowerEdge R940

Designed to handle extremely demanding, mission critical workloads and very large databases

Targeted Workloads
- In-memory database: massive resource footprint
- Analytics: NVMe and NVDIMM-N to maximize I/O
- Dense virtualization: dual-redundant hypervisors, Fault Resilient Memory

Key Capabilities
- Up to 12 NVMe and up to 24x2.5” universal backplane
- Performance optimized 2 socket configuration delivering 50% more QPI bandwidth than typical 2 socket server
- Internal M.2 boot optimized storage subsystem
- Advanced management and scripting support with integrated iDRAC9 and RESTful API

HIGHLIGHTS
- 50% more NVMe than R930
- Up to 48 DIMMs totaling 6TBs of memory with up to 12 NVDIMM-Ns
- Highly optimized design reducing footprint from 4U to 3U

Based on Dell EMC Internal Analyses 03/01/2017.
PowerEdge R740

Workhorse providing storage, I/O, and application acceleration balance with configuration flexibility

Targeted Workloads
- VDI: GPU and storage flexibility
- AI/Machine learning: Maximum accelerator card support
- Private cloud: Optimized performance

Key Capabilities
- Up to three 300W or six 150W accelerator cards maximizing workload acceleration
- Up to 16 x 2.5” or 8 x 3.5” drives
- Multi-vector cooling delivers correct air flow to each PCIe slot
- Up to 8 PCIe slots (one slot for PERC adapter)

Highlights
- Multi Vector Cooling design enables tremendous configuration flexibility and industry leading energy efficiency
- 50% more accelerator card support than R730
- 24 DIMMS with up to 12 NVDIMM-Ns
- Internal M.2 boot optimized storage subsystem

Based on Dell EMC Internal Analyses 03/01/2017.
PowerEdge R740xd

Ideal for applications requiring best-in-class storage performance, high scalability, and density

**Targeted Workloads**
- Software Defined Storage: ScaleIO, vSAN, XC (Nutanix)
- Big Data, Unstructured data, Analytics
- Service providers: data tier

**Key Capabilities**
- Up to 24 NVMe
- Up to 32 x 2.5” or 18 x 3.5” drives
- Supports up to three 300W or six 150W accelerator cards in non-NVMe configuration only
- Multi-vector cooling delivers correct air flow to each PCIe slot

**HIGHLIGHTS**
- Multi Vector Cooling design enables tremendous configuration flexibility and industry leading energy efficiency
- 6X more NVMe support than R730xd
- 24 DIMMs with up to 12 NVDIMM-Ns
- Internal M.2 boot optimized storage subsystem

Based on Dell EMC Internal Analyses 03/01/2017.
PowerEdge R640

Ideal combination for dense scale out data center computing and storage in a 1U/2S platform

Targeted Workloads
- HPC: Dell EMC Validated Solutions for HPC
- Virtualization: dense, powerful compute node
- Software Defined Storage: ScaleIO, vSAN, XC (Nutanix)
- Service Providers: application tier

Key Capabilities
- Mix drive types in front and rear with up to 12 x 2.5” drives, 4 x 3.5” drives, or 8 NVMe to optimize performance
- Internal M.2 boot optimized storage
- Advanced management and scripting support with integrated iDRAC9 and RESTful API

HIGHLIGHTS
- 200% more NVMe than R630
- Dell EMC Ready Nodes for ScaleIO, vSAN and XC (Nutanix)
- 27% increase in core count and 50% increase in memory bandwidth versus R630

Based on Dell EMC Internal Analyses 03/01/2017.
PowerEdge R540

Versatile 2U/2S server providing balanced compute and storage to adapt to a variety of applications

**Targeted Workloads**
- Software Defined Storage
- Messaging server
- Video streaming

**Key Capabilities**
- Up to 14 3.5" drives, max 140TB’s
- Internal M.2 boot optimized storage subsystem
- Flexible network daughter card options
- One button workload tuning

**HIGHLIGHTS**
- 16 DDR4 DIMMS, up to 512GB
- Internal M.2 boot optimized drives
- iDRAC9 with Lifecycle controller
PowerEdge R440

Optimized for dense scale out computing and storage in a 1U/2S platform

**Targeted Workloads**
- High performance computing
- Virtualization: dense, powerful compute node
- Web-tech deployments
- Service Providers: application tier

**Key Capabilities**
- Up to 10 x 2.5" drives with up to 4 NVMe or up to 4 x 3.5"
- Internal M.2 boot optimized storage
- Advanced management and scripting support with integrated iDRAC9 with Lifecycle Controller and Redfish API

**HIGHLIGHTS**
- Up to 4 NVMe drives
- 27% increase in core count and 50% increase in memory bandwidth vs. R630
- Only 23.9" deep
C-Series
PowerEdge C6420

Maximizes density, scalability, and energy efficiency per U for high-performance hyperscale workloads

**Targeted Workloads**
- HPC: Dell EMC Validated Solutions for HPC
- Web tech / SaaS: 224 processor cores/2U chassis for high density
- HCI: Dell EMC XC6420 powered by Nutanix
- Financial modeling / HFT

**Key Capabilities**
- Up to 4 dual socket compute nodes in a 2U form factor.
- Direct Liquid Cooling Technology support high TDP processors.
- Multiple chassis offerings for up to 24 x 2.5” drives/ 12 x 3.5” drives or diskless chassis along with a 2 or 4 node expander chassis.
- Advanced management and scripting support with integrated iDRAC and RESTful API

**HIGHLIGHTS**
- Designed for large scale cloud environments
- The foundation for validated solutions for HPC and Hyper Converged Infrastructure
- Factory-integrated liquid cooled CPU options delivers increased performance while improving power efficiency

Based on Dell EMC Internal Analyses 03/01/2017.
FX-Series
PowerEdge FX2 Architecture

Hybrid computing platform with the density and efficiencies of blades and the simplicity and cost benefits of racks

**Compute Node**
- Full, half, or quarter width blocks supporting 2 or 4 sockets

**Chassis**
- Shared cooling, power, networking, management, and PCIe expansion slots in a 2U enclosure

**IO Module (rear)**
- Simplifies network connectivity and reduces cabling by as much as 8-to-1

**Storage Sled**
- Half-width 1U, 12Gb SAS storage block with up to 16 direct-attached SFF storage devices
PowerEdge FX2 Enclosure

Uniquely small, modular foundation designed to meet nearly any workload objective

Hosts flexible blocks of server and storage resources while providing outstanding efficiencies through shared power, cooling, networking, I/O and management within the chassis itself.

**Key Capabilities**
- 2 full-width, 4 half-width, or 8 quarter-width server configuration
- Lower-cost non-expandable or “switched” with up to 8 PCIe 3.0 expansion slots versions
- Redundant PSUs, fans, and out-of-band management fabric

**HIGHLIGHTS**
- Incrementally add or swap compact, modular IT building blocks to fit any computing environment
- Full management integration, choice of chassis or rack-based management
PowerEdge FC640

Designed for flexibility and performance with best-in-class density

**Targeted Workloads**
- Virtualization: denser footprint with greater infrastructure flexibility
- Software defined storage solutions like vSAN
- In-memory OLTP: performance and memory density well suited for clustered database environments

**Key Capabilities**
- Up to two 28-core Intel® Xeon® Scalable processors
- 16 DDR4 DIMM slots, supports RDIMM / LRDIMM / AEP, up to 2666MT/s speeds, 2TB* maximum memory
- High performing storage options include up to two 2.5” drives with optional NVMe PCIe SSDs; 12.8TB maximum capacity

**HIGHLIGHTS**
- Offering exceptional performance and a rich set of storage options
- Supports several different server node configurations to meet unique requirements

* post General Availability
M-Series
PowerEdge M640

Designed for high performance with best-in-class density for exceptional scalability

**Targeted Workloads**
- Virtualization: denser footprint with greater infrastructure flexibility
- Software defined storage: compatible with SDS solutions
- HPC Applications: high performance and scalability well suited for large clustered database or multi-server environments

**Key Capabilities**
- Up to two Intel Xeon SP processors
- 16 DDR4 DIMM slots, supports up to 2TB* maximum memory
- Universal backplane with choice of 2 x M.2 (BOSS) or IDSDM
- Advanced management and scripting support with integrated iDRAC and RESTful API

**HIGHLIGHTS**
- Offering exceptional performance and versatility with same physical footprint
- Supports several different server node configurations to meet unique requirements
PowerEdge T640

Versatile and scalable powerhouse with massive internal storage capacity in a rack or tower form

**Targeted Workloads**
- Desktop and server virtualization, ERP, consolidation
- Databases, business intelligence, and analytics
- Applications and imaging for medical, education and science

**Key Capabilities**
- Address data growth with up to 32 x 2.5” or 18 x 3.5” drives
- Deliver faster insights with up to 8 NVMe drives
- Drive demanding workloads with up to 4 doublewide 300W GPU accelerator cards*
- Easy lifecycle manageability with integrated iDRAC

**HIGHLIGHTS**
- 10-fold increase in Ethernet speed to boost productivity (1GbE to 10GbE)**
- 100% more PCIe Gen3 I/O slots to provide built-in room for growth**

*GPU capability available in a rack form factor. Two 300W GPU are supported within NVMe drive configurations.
** Dell internal analysis in July 2017 comparing the previous generation T630 specifications vs T640 specifications.
PowerEdge T440

Powerful, expandable and quiet workhorse for your office workloads

Targeted Workloads
• Mail, messaging, file, and print
• Workgroup collaboration, virtualization and web serving
• Mid-size business analytics and intelligence

Key Capabilities
• Balance of performance and storage for a wide variety of workloads
• Up to 16 x 2.5” or 8 x 3.5” drives
• Short 22” depth - flex placement under desk or mounted in a rack
• Easy lifecycle manageability with integrated iDRAC

HIGHLIGHTS
• Quiet Office compliant for small office/home office (SOHO) and remote office/branch office (ROBO), but can accommodate data center needs
• 33% more DIMM slots to future-proof your server with built-in room for growth*

*Dell internal analysis in July 2017 comparing the previous generation T430 specifications vs T440 specifications.