



Introducing  
**The Dell FX Architecture**  
Get ready for the future!

# How to use this NDA deck..

This deck is intended as a deeper dive examination of the Dell FX Architecture and products, to be given by someone trained in the topic (Typically an ET.).

It is an NDA deck and should only be presented to customers who have signed a Non-Disclosure Agreement.

It introduces the FX Architecture, details for each of the FX products:

- FX2 enclosure
- FC430 server block
- FC630 server block
- FC830 server block
- FC120x4 server block
- FD332 storage block
- FN IO Aggregator modules

## NOTE:

These FX components will be releasing over time.

- the FX2 chassis, FM120, FC630 and IOAs in 12/14,
- followed by the FC430 and FD332 in early 2015,
- followed by the FC830 shortly after that.

It also describes the choice of systems management interfaces available on this architecture.



# What is the FX Architecture? How does it work?



# Converged experience and expertise

## PowerEdge servers



compute blocks



The FX converged architecture



FN-IOA

Dell networking



FD332

Dell storage



# The Dell FX architecture

The 2U high rack-based FX2 converged infrastructure enclosure can host different blocks of compute and storage resources – depending on workload needs.



Converged infrastructure provides data centers and private clouds with efficiencies of shared power, networking, I/O and management, as well as greater overall density

\* This is an animated slide



# PowerEdge FX: a full converged portfolio

## Flexible solutions for every workload

### PowerEdge FX2



A 2U converged enclosure sharing power, cooling, management and PCI connectivity capable of integrating a mix of server, storage and networking solutions

### PowerEdge FC630



- 2S half width ideal for solutions such as dense virtualization
- Up to 4 per FX2 enclosure

### PowerEdge FC430



- 2S quarter width ideal for solutions such as dense compute, HPC and light virtualization
- Up to 8 per FX2 enclosure

### PowerEdge FM120x4



- 1S Atom half width ideal for solutions such as static web pages
- Up to 16 servers (4 nodes) per FX2 enclosure

### PowerEdge FC830



- 4S full width ideal for solutions such as OLTP or database
- Up to 2 per FX2 enclosure

### PowerEdge FD332



- Half width direct attach storage with up to 16 drives per module
- Up to 3 nodes per FX2 enclosure

### PowerEdge FN IOA



- Designed for simple, integrated networking solutions
- Up to 2 nodes per FX2 enclosure



# Optimize Workloads

Unparalleled agility with almost limitless possibilities

## Traditional

FC630 (4X 2S)



FC830 (2 x 4S)



FC830 (1 x 4S) + 2x Storage



## Hosting

FM120x4 (4X 4X1S)  
(1S Micro-servers/16 in 2U)



FC430 (8x 2S)



FC430 (8 x 2S)



## SDDC

FC630 (2 x 2S) + Storage



FC430 (4 x 2S) + Storage



FC630 (1 X 2S) + Storage



# PowerEdge FX2 Enclosure

## Overview

The Dell FX2 is a new 2U rack-based hybrid computing platform that provides a greater dimension of functional flexibility along with a higher density of processing power. It combines the density of blades with the advantages of rack-based systems.

## Benefits

Its modular design lets it hold varying sized building blocks of resources that can be any combination of compute nodes and storage nodes configured in a number of variations, depending on the intended use of the platform and the amount of resource needed.



Configurability	Availability	Expandability, I/O, Storage
<ul style="list-style-type: none"><li>• 4 half width or 8 quarter width configurations</li><li>• Optional IO aggregator, 8:1 cabling simplification</li><li>• Choice of chassis or rack based management</li><li>• Choice of entry-level or switched configuration</li></ul>	<ul style="list-style-type: none"><li>• Redundant hot-plug PSUs (1100 or 1600W)</li><li>• Redundant hot-plug cooling fans</li><li>• Redundant out-of-band management fabric</li><li>• iDRAC on every node</li><li>• Entry "Express" and advanced "Enterprise" levels of chassis-level management</li><li>• Front KVM access; USB;</li></ul>	<ul style="list-style-type: none"><li>• Up to 2 pass-thru modules. 1Gb and 10Gb capable</li><li>• Up to 8 PCIe Gen 3 I/O expansion slots (low profile/half length)</li></ul>





# PowerEdge FM120x4 Microserver

## Overview

The PowerEdge FM120 microserver runs the low power Intel® Atom™ C2000 processors . Its System on a Chip (SoC) design allows it to pack 4 processors in each half width sled, providing a high density, low cost solution that is ideal for web serving and dedicated hosting.



## Targeted Workloads

- Web services
- Dedicated hosting,
- Light analytics

## Benefits

- Get quick response for web services even in spiky demand periods
- Save cost on real-time scheduling services with impressive performance per dollar and great performance per watt.
- Host more clients in less space with the FM120's higher density
- Provide higher availability (smaller failure domains) for XaaS infrastructure services
- Off load non-time-critical analysis to cost saving, low power solution

Performance	Availability	Expandability, I/O, Storage
<ul style="list-style-type: none"><li>• 4 microservers/FM120x4 1S Intel® Atom™ C2000 processor (SoC) 2/4/8 core options</li><li>• 2DIMMs of memory per microserver</li><li>• 2.5" HDD or 1.8" SSD</li></ul>	<ul style="list-style-type: none"><li>• Choice of chassis or server level management</li><li>• High availability via small domain</li></ul>	<ul style="list-style-type: none"><li>• Up to 4 half width FM120s/2U</li><li>• 16 processors/2U</li><li>• 128 cores/2U</li><li>• 32 DIMMs/2U</li><li>• 16x 2.5" HDDs/2U</li></ul>



# PowerEdge FC630

## Overview

- No compromise Compute & memory density, with new high performance storage subsystem
- Most Efficient platforms on the market (space, energy, fabric, chassis leverage)
- Enabling modular computing from ROBO to Datacenter

## Targeted Workloads

- Common shared infrastructure block: Spans customer environments from ROBO to Datacenter, DAS to SAN
- Best for XaaS, Private Cloud, HPC



## Benefits

- Leading storage performance & flexibility: 1U-like drive density SAN/DAS caching/in-box tiering & vSAN, scale out DAS w/ FS332x16
- Cutting Edge I/O capabilities: Flexible SNAs, Simple & cost effective aggregation w/ IOA, & IO virtualization
- iDRAC8 bringing System Management automation to mainstream IT

### Performance

- 2xCPU (to 18Cores), full server proc stack
- Up to 2xPCIe slots
- Half Height Dual Slot Blade
- Dual SD cards for redundant hypervisor

### Availability

- 24xDIMMs (1.5TB)
- Up to 8 x1.8" SSD or 2 x 2x2.5"
- PERC9/SAS HBA/Chipset SATA
- Management: iDRAC8 Enterprise w/LC
- Hot-plug, redundant power/cooling (chassis)

### Expandability, I/O, Storage

- 4x1GbE, 2x10GbE, 4x10GbE SNAs
- Managed Persistent Storage Options - 2x Express Flash PCIe Flash SSD



# PowerEdge FC430



## Overview

Innovative 1/4 width form factor with mainstream features enables lower cost/node, higher performance/watt, and lower connectivity cost/node. Its exceptionally small deployment domain makes it a great choice for distributed environments that require higher reliability

## Targeted Workloads

- Highly available web services (memory and processing power).
- Dedicated hosting (more clients per square foot)
- Virtualization of lightweight applications
- . Light analytics



## Benefits

- Industry leading compute density – more VMs, FLOPs per U than any other server on the market
- Cutting Edge I/O capabilities: Ideal companion to the simple & cost effective aggregation w/ IOA.
- iDRAC8 & CMC deliver automation and simplicity to mainstream IT

Performance	Availability	Expandability, I/O, Storage
<ul style="list-style-type: none"> <li>• 2S Intel Xeon E5-2600v3 (up to 14 cores)</li> <li>• 1/4 Width</li> <li>• Dual SD cards for redundant hypervisor</li> </ul>	<ul style="list-style-type: none"> <li>• Up to 8 DIMMs memory</li> <li>• 2 x 1.8" direct attach SATA / 1 x 1.8" SATA w/ front IB mezz</li> <li>• PERC9/SAS HBA/Chipset SATA</li> <li>• Management: iDRAC8 Enterprise w/LC</li> <li>• Hot-plug, redundant power/cooling (chassis)</li> </ul>	<ul style="list-style-type: none"> <li>• Access to 1 PCIe expansion slot</li> <li>• Dual-ported 10Gb or 1Gb LOM</li> <li>• Managed Persistent Storage Options</li> <li>• Up to 224 cores per 2U</li> <li>• Up to 64 DIMMs per 2U</li> <li>• Up to 16 1.8" SSDs per 2U</li> </ul>



# PowerEdge FD332



Displayed: FC630 and 3 x FS332 (Up to 48 drives)

## Overview

- An FX architecture storage block that can add up to 16 direct attach SFF storage devices to an FX2 chassis, the FD332 can be combined with the FC630 and FC430 servers to build highly flexible, scale out computing solutions.
- It can flexibly provide up to 48 SFF storage devices in an FX2 - resulting in a 2U 2S rack server with massive direct attach capacity, enabling a pay-as-you-grow model.
- Alternatively, two servers can access the non-shared storage devices with full I/O flexibility using RAID and/or HBA modes.

## Benefits

- A tremendous option for dense vSAN environments, with SSD caching drives in the server block(s) and low cost, high capacity HDDs in the FD332 storage block
- Great for consolidation of performance hungry high performing computing machines (Hadoop) that require high performance, low cost scale-out storage.
- Excellent for database-driven centralized software, scale-up, and scale-out solutions
- Spans customer environments with flexibility and scalability from Traditional IT to Service Providers

Performance	Availability	Expandability
<ul style="list-style-type: none"> <li>• 12Gb/s SAS 3.0 and 6Gb/s SATA 3.0</li> </ul>	<ul style="list-style-type: none"> <li>• Hot plug HDD</li> <li>• PERC9 RAID, Pass-thru I/O, Single or Dual SAS controllers, mix and match for dual controllers – RAID/non-RAID</li> </ul>	<ul style="list-style-type: none"> <li>• Up to 16 Small Form Factor SSDs/HDDs, both SATA and SAS</li> </ul>



# PowerEdge FC830



FC830 w/ 8x2.5"



FC830 w/ 16x1.8" and 2 FD332 storage blocks

## Overview

- A powerful, full-width 4-socket server with dense compute and memory scalability and a highly expandable storage subsystem, the FC830 excels at running a wide range of applications and virtualization environments for both mid-size and large enterprises.
- Combines highly dense compute and memory resources with extremely flexible storage and IO options.

## Targeted Workloads

- Flexible virtualization using SAN or virtual storage with a mix of SSDs and HDDs, great VM density and highly scalable resources for the consolidation of large or performance hungry virtual machines
- Very demanding, mission critical workloads, like database driven, centralized business applications - customer relationship management (CRM) and enterprise resource planning (ERP) - as well as the database tier of WebTech and HPC

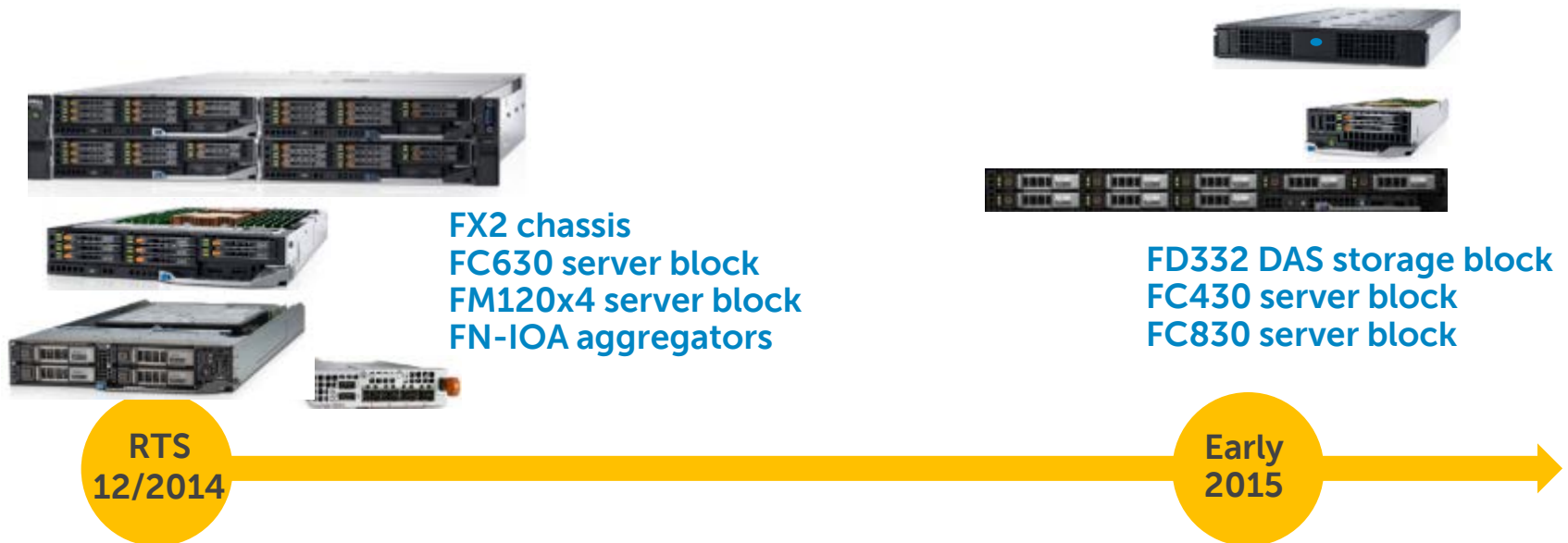
Performance	Availability, Manageability	Expandability, I/O, Storage
<ul style="list-style-type: none"> <li>• 4S Intel Xeon E5-4600 v3 ( up to 18 cores = 72 cores total)</li> <li>• 48xDIMMs (3TB)</li> <li>• From 4-8 PCIe expansion slots depending on chassis configuration</li> </ul>	<ul style="list-style-type: none"> <li>• PERC9/SAS HBA/Chipset SATA</li> <li>• Hot-plug, redundant power/cooling (chassis)</li> <li>• Dual SD cards for redundant hypervisor</li> <li>• iDRAC8 Enterprise w/ Lifecycle Controller</li> </ul>	<ul style="list-style-type: none"> <li>• Dual quad port 10Gb/1Gb SNA</li> <li>• Up to 8 x 2.5 HDD/SSD or 16 x 1.8" SSD</li> <li>• Supports up to 4 Express Flash PCIe Flash SSDs</li> <li>• Up to 144 cores per 2U</li> </ul>



# Complete portfolio

Investment protection into the future

Over time, the FX architecture will incorporate a full portfolio of products from microservers to powerful 4 socket servers, as well as storage and IO blocks



The FX architecture is designed to accommodate future generations of PowerEdge servers, so your investment today is protected going forward.



# The first PowerEdge FX products

The infrastructure for the future is here now

- The foundation of the FX architecture is a 2U rack enclosure – the Dell **PowerEdge FX2** – that can accommodate various sized resource blocks of servers and storage. Resource blocks slide into the chassis, like a blade, and connect to the shared infrastructure through a flexible IO fabric.

The initial release of FX products is the FX2 enclosure and 3 different servers. Over time, Dell will release a wide range of resource blocks for this enclosure.

- The **PowerEdge FX2 Enclosure** – 2U rack mount chassis that accommodates different sized “blocks” of IT resources
  - The **PowerEdge FM120x4** – the world’s first enterprise class microserver
  - The **PowerEdge FC630** – a shared infrastructure workhorse
- Also available as an option with the FX2 is the Dell **PowerEdge FN IO Aggregators** which use a switch to consolidate the IO connections from the chassis, reducing cabling by 8:1, improving “East/West” communication within the chassis and enabling simplified LAN/SAN convergence.



*FM120x4 block*



*FC630 block*



*FN IOA*



# The initial PowerEdge FX products

The initial release of the FX architecture is comprised of the FX2 chassis, the 2 server blocks that it houses, and the optional IO aggregators:



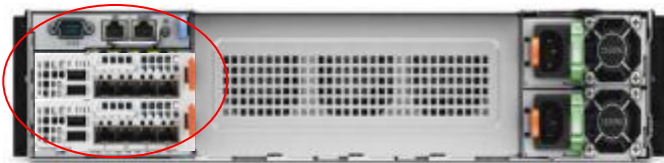
*FX2 Chassis w/ 4 FC630 servers  
each with eight 1.8" drives*



*FC630 server block  
with 1.8" drives*



*FM120x4 server block  
with 1.8" drives*



## **FX2 Chassis** – 2U, rack-mountable

- Quarter\*, half and full\* width bays
- Shared power, cooling, management
- Option for switched 8 PCIe expansion slots or low-cost non PCIe version

## **FC630** – 2S half-width

- Xeon E5-2600v3, 18 core (max)
- 24 DIMMS, 2 x 2.5" HDD/SSD  
or 2 x 1.8" SSD
- Dual-port 10GbE SNA (NDC)

## **FM120x4** – 1Sx4 half-width

- Four 1S servers per block
- Atom C2000 (SOC), 8 core (max)
- 2 DIMMS, 1 x 2.5" HDD/SSD  
or 2 x 1.8" SSD
- Chip-Integrated NIC (SOC)

## **FN IOA** – simplifies network integration

- 2 IOAs per FX2 / FX2s chassis
- Full DCB, FCoE, and iSCSI optimization
- 8 x 10GbE internal ports

*\* Post RTS*





*4 FC630 server blocks in a fully loaded FX2 enclosure  
each with 8 1.8" SSDs*

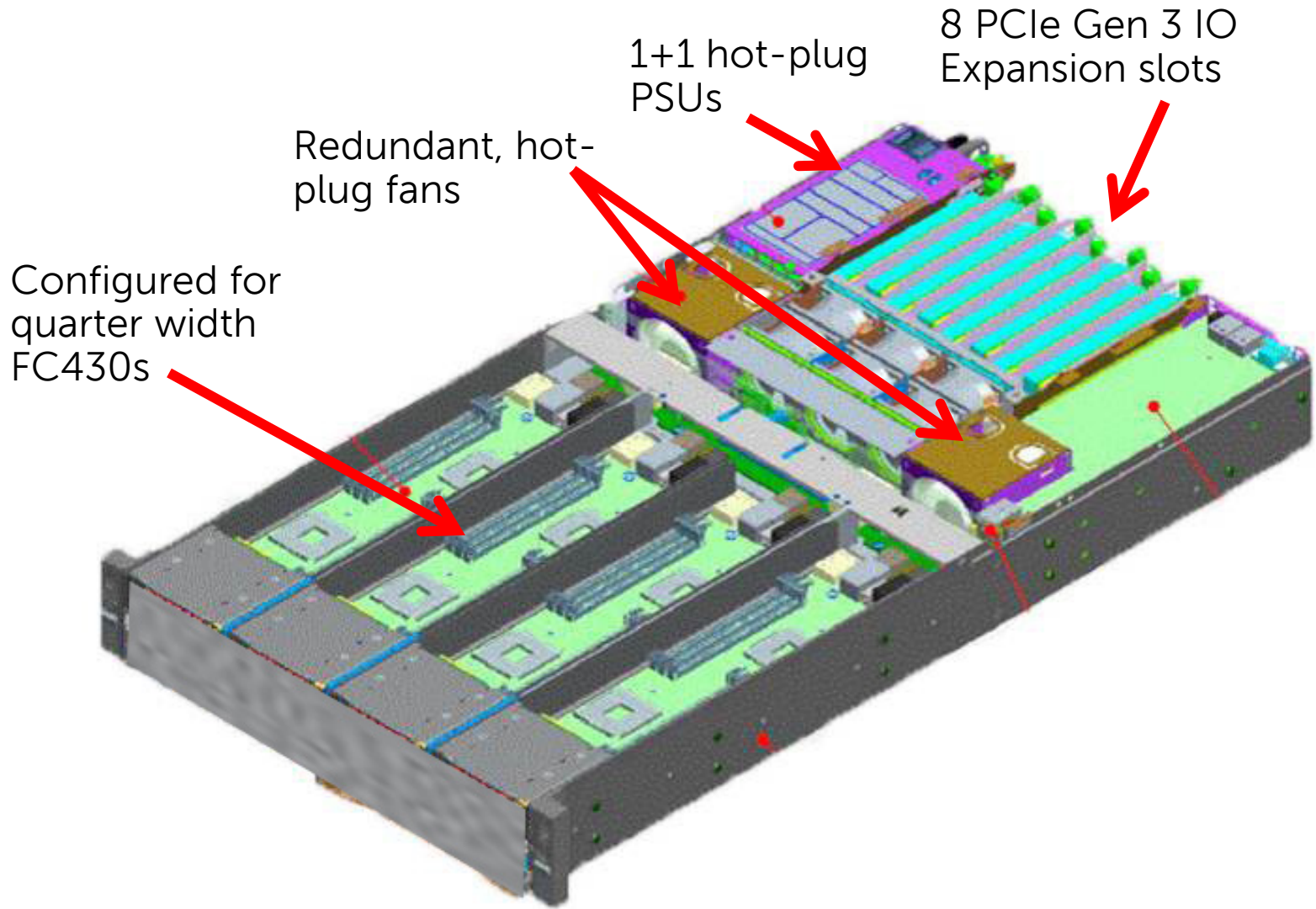


*Rear view of FX2s enclosure*

## The PowerEdge FX2 enclosure

# FX2s enclosure – top view

Shared infrastructure layout – for the switched option

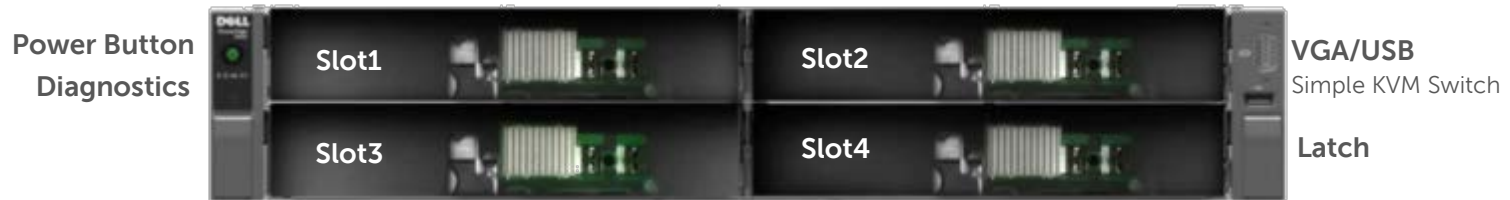


# FX2 Enclosure – front and back

Shared infrastructure designed for the future-ready data center

## Front View (half-width configuration)

Bays for Compute or Storage Blocks



## Rear View of FX2s

Power, I/O, Management and Fabrics

Consolidated Management  
Ports (1Gb Ethernet & Serial)

Redundant Ethernet Fabrics  
(Pass-through 1Gb, 10Gb, )  
10GE IO Aggregator



8 x Low Profile PCIe Slots  
Individually serviceable from rear  
Re-assignable

2x Hot Swap  
PSUs  
Same as PE portfolio



# FX2 - Innovative connectivity

Flexible fabric is the foundation of the FX2 shared infrastructure

The design of the FX IO fabric enables infrastructures to be highly adaptable and future-ready using industry standard PCIe cards, the flexible choice of Select Network Adapters and IO aggregation.

- Faster, low-cost DAS access
- Quad-port, 10GbE or 1GbE SNA
- Bandwidth allocation
- Industry standard PCIe cards
- Simplified cabling
- Out-of-band management

**SNA** – Server Select Network Adapters provide quad-port and dual-port 10 GbE speeds (and 1GbE options) and the ability to segment bandwidth allocation for greater flexibility

**PCIe** – The FX2 PCIe fabric supports any industry standard expansion card and innovative DAS storage connectivity\*

**IOA** – Optional IO aggregation simplifies cabling consolidation, reduces upstream switching infrastructure costs and can accelerate future 10GbE adoption

**iDRAC** – An independent fabric provides redundant access to iDRAC for out-of-band management of FX infrastructure

\* future implementation



# Mapping to Half-Width Sleds

The mapping PCIe slots and Ethernet pass-through ports to half width server sleds

## Location of Physical Ports (Back of FX2s Chassis)



## Mapping of PCIe Slots and Ethernet Ports to Server Sleds (Front of FX2s Chassis)



# Mapping to FM120x4 Sleds

Mapping of PCIe slots and Ethernet pass-through ports to FM120x4 server sleds

## Location of Physical Ports (Back of FX2 Chassis)



## Mapping of Ethernet Ports to Server Sleds (Front of FX2 Chassis)



# The PowerEdge FC630 server



*A single FC630 server block with two 2.5" drives*



*A single FC630 server block with eight 1.8" drives*



*4 FC630 server blocks in a fully loaded FX2 enclosure each with 8 1.8" SSDs*

# PowerEdge FC630

## A shared infrastructure workhorse

The PowerEdge FC630 is a converged infrastructure workhorse, with powerful processors and a huge memory footprint.



### Virtualization environment

- Run large virtualization environments with the FC630's huge memory footprint and powerful processing
- Run 4 times the VMs in the same 2U space as the competition

### Collaboration

- Run multiple virtual instances of Exchange

### Video/Audio streaming

- Scale your streaming to quickly answer increased customer demand
- Use SAN-based media sources more rapidly by leveraging Fluid Cache for SAN

### Features

- Processor:** 2S 18-core Intel Xeon E5-2600v3
- Memory:** Up to 24 DIMMs of memory
- Storage:** 2 X 2.5" HDD/SSD or 8 X 1.8"SSD  
Supports up to 2 Express Flash drives
- Networking:** Dual and quad-port 10Gb SNA, quad-port 1Gb SNA, dual-port CNA
- IO Expansion:** Access to 2 PCIe expansion slots

### 2U Capacities

- Up to 4 half width FC630s/2U
- 144 cores/2U
- 96 DIMMs/2U
- 8 x 2.5" HDDs/2U

- Choice of chassis or server level management
- High availability via small failure domain

### ERP

- Rapidly deploy and scale critical business analytics when you need them
- Grow even your largest critical business functions quickly and incrementally

### Financial analysis (but not low latency)

- Get fast distributed processing with small failure domains for non-time-critical financial analysis





# PowerEdge FC630: a usage example

## Private cloud virtualization with remote SAN

Take advantage of the architecture's flexibility to construct exactly the infrastructure you need for the task at hand.



*4 FC630s running virtualized applications*

Note that the FC630 supports up to two Express Flash NVMe PCIe SSDs – so it can be used with **Dell's Fluid Cache for SAN** caching technology (as either a cache provider or consumer) to accelerate application performance.

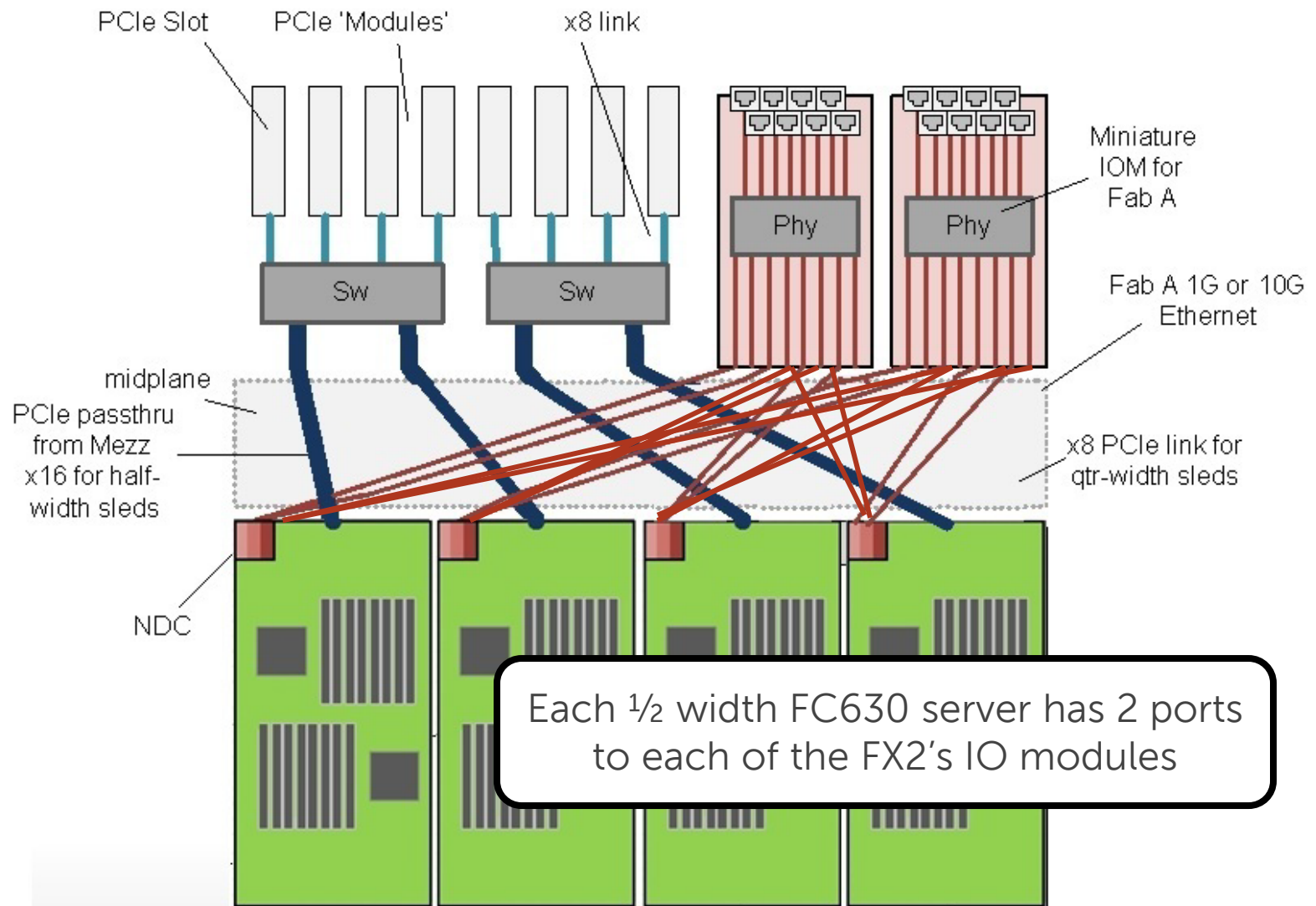
Create a powerful, dense virtualization environment using 4 FC630 servers in combination with Dell Compellent SAN storage



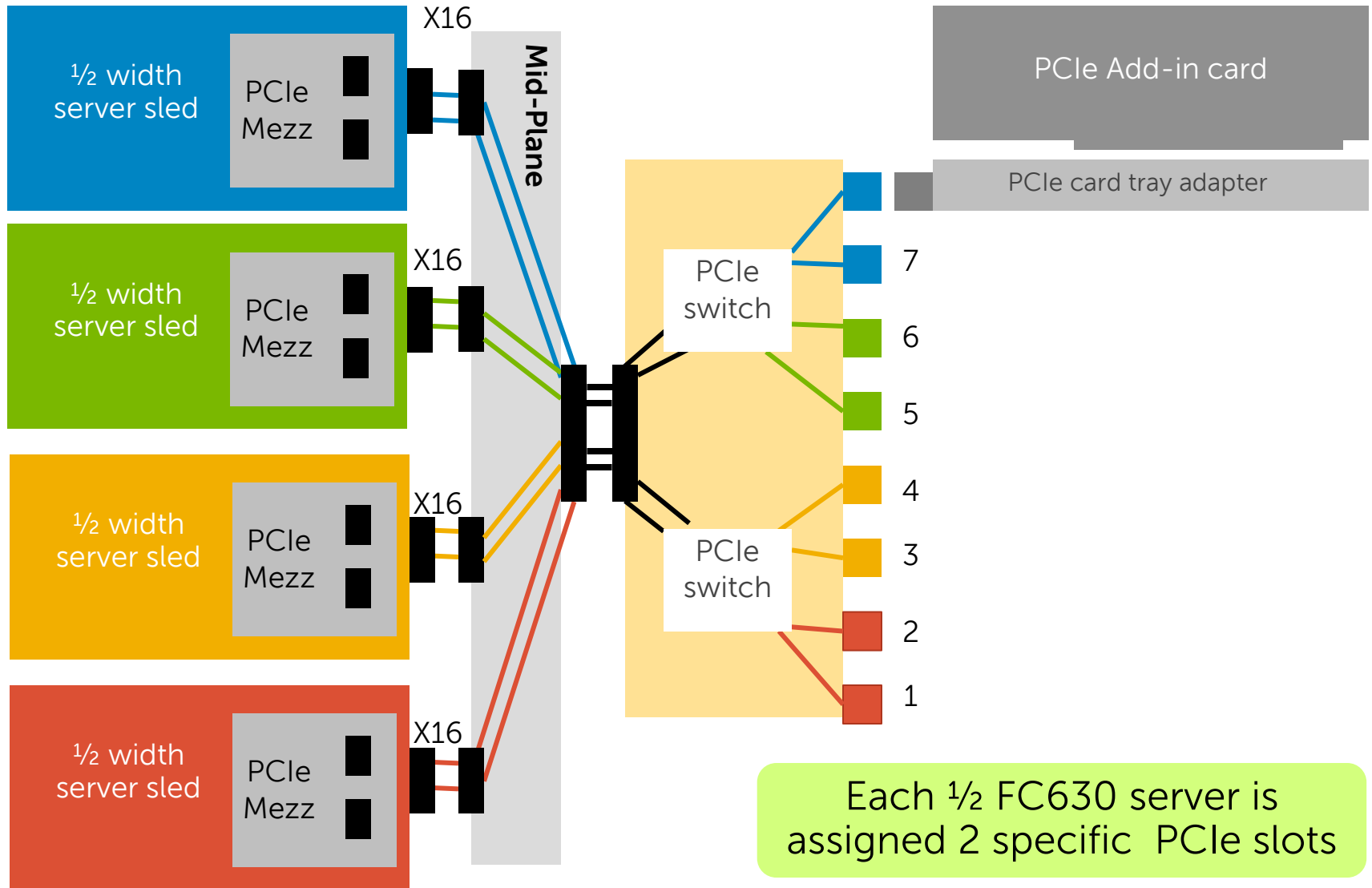
**Compellent  
SAN**

# I/O Mapping for the FC630

Two (2) ports for each server



# Detailed PCIe Mapping for the FC630



# PowerEdge FM120x4 microserver



*A single FM120 x4  
microserver block  
with four 2.5" drives*



*A single FM120 x4  
microserver block  
with eight 1.8" drives*



*4 FM120 micro-server blocks in a fully loaded FX2 enclosure  
each with eight 1.8" SSDs*

# PowerEdge FM120 microserver (4 per block)

## World's first enterprise class microserver

The PowerEdge FM120x4 block runs the low power Intel® Atom™ C2000 processors. Its System on a Chip (SoC) design lets it pack 4 processors in each half width sled, providing a high density, low cost solution, ideal for web serving and dedicated hosting.



4 FM120x4 sleds in an FX2 enclosure with 2.5" drives

### Web services

- Get quick response for web services even in spiky demand periods
- Save cost on real-time scheduling services with impressive performance per dollar
- Save energy costs on front-end web servicing with great performance per watt.

### Dedicated Hosting

- Host more clients in less space with the FM120's higher density
- Offer lower entry cost for hosted clients.
- Provide higher availability (smaller failure domains) for XaaS infrastructure services

### Light Analytics

- Get fast, highly available distributed processing for non-time-critical analysis
- Off load non-time-critical analysis to cost saving, low power solution

## Features

**Processor:** 1S Intel® Atom™ C2000 processor (SoC) 2/4/8 core options

**Memory:** Up to 2 DIMMs of memory/server

**Storage:** 2 X 1.8" SATA SSD/server or  
1 X 2.5" HDD/SSD/server

**Networking:** 1Gb NIC on the chip

**IO Expansion:** **No** PCIe support

### 2U Capacities

- Up to 4 half-width FM120s/2U
- 16 microservers/2U
- 128 cores/2U
- 32 DIMMs/2U
- 32 x 1.8" SSDs/2U

- Management: iDRAC8 Enterprise w/LC
- Choice of chassis or server level management
- Optional dual SD cards for redundant hypervisor



# PowerEdge FM120x4 server

## Energy Savings and Density for Light Workloads



- Density and energy efficiency in small bite size
- Ideal for web servers, light data analytics and hosting
- Low acquisition cost & easy scalability
- Independent management of each server

4 sleds each with 4 microservers  
Individually serviceable sleds

Each server:

- 2 UDIMMs
- 1x 2.5" or 2x 1.8"
- 2x 1GE (2:1 aggregation)
- iDRAC

Hot swap power supplies 2x 1100  
1GE pass through module



# PowerEdge FM120: a usage example

## Web hosting services

The FM120's unique System on a Chip (SOC) design enables the incredible 16/2U server density that creates a great environment for low-cost web hosting .



*4 FM120s (16 microservers) can run discrete client applications on separate physical servers*

Service more hosted clients in less space,  
and save on energy consumption at the same time.

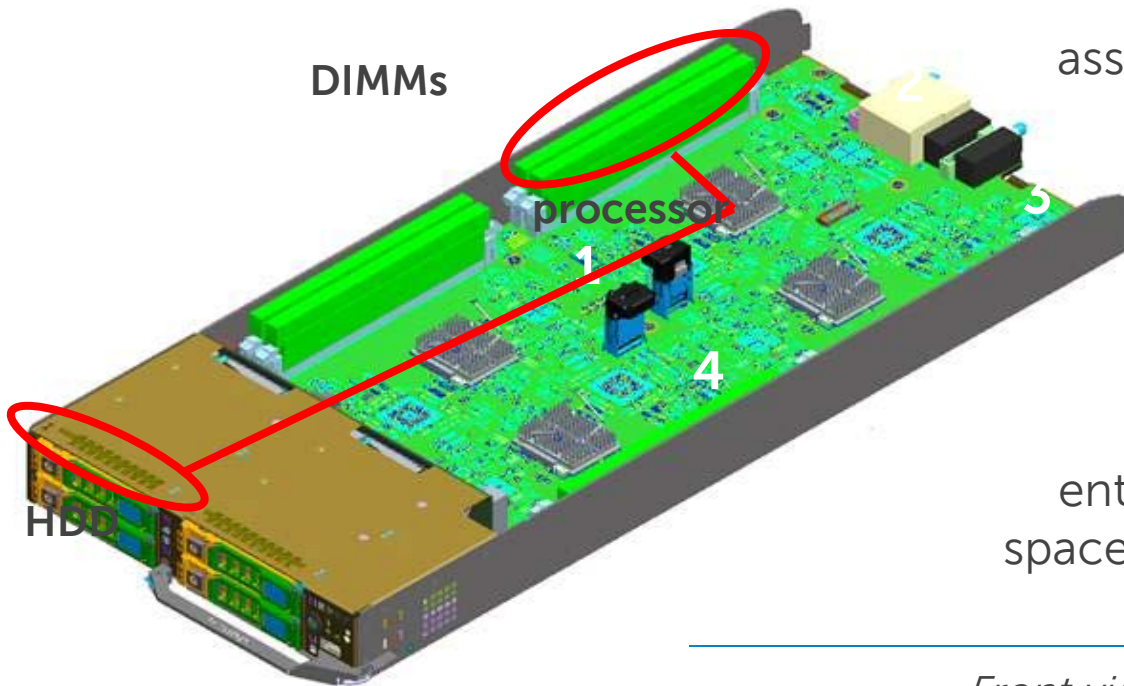


# PowerEdge FM120 - SOC

System on a Chip (SOC) design

The FM120 has processor and NIC integrated on a single server chip and each server associated with a one 2.5" or 2 1.8" drives and 2 U-DIMMs

Dell brings its leadership expertise in single socket servers, like the R210 and the R310, to this innovative product and introduces full enterprise manageability in this space with OpenManage Express and Enterprise options



*Front view of a single FM120x4 sled*





# Intel® Atom™ C2000 Processor Family (Avoton)

Low power, low cost



## Major Features:

- Increased core and thread counts vs. 'Centerton'
  - › Up to **8 cores / 16 threads** vs. 2 cores / 4 threads in the S1200
  - › Up to **6x performance** increase vs. S1200
  - › Up to **4x performance-per-watt** increase vs. S1200
- Support for VT-x, 64-bit addressing, and ECC memory
  - › Up to **8x greater memory capacity** vs. S1200
- Maintains **low power-per-node to reduce OpEx costs**
  - › **Same performance at 1/5 the power** vs. S1200
- Continues IA x86 **software compatibility** (vs. ARM products)





# The PowerEdge FN-series IO Aggregators



# PowerEdge FN IO Aggregator

## No-fuss installation and simple network integration

The FN IO Aggregator - purpose built for the FX2 - simplifies network deployment, offers cost-effective 10GbE performance, while enabling and simplifying LAN/SAN convergence in the datacenter

### Simplify Network Deployment

- Simplifying cabling complexity through server port aggregation
- The unique plug-and-play networking switch gives the server admin access layer ownership.
- Zero touch deployment with many pre-configured features included.

### Optimize FX2 Performance

- Takes full advantage of high performance 10GbE throughput with the FN IOA.
- Optimizes "East-West" traffic within the FX2 enclosure, ensuring superior performance and cost savings vs. competitive offerings.



### Enable LAN/SAN Convergence

- Full DCB, FCoE, and iSCSI optimization, enabling converged data and storage traffic.
- Easily connects to the Dell S-Series platform, connecting to the S5000 for Fibre Channel breakout.

### Features

- 2 IOAs per FX2
- 3 SKU options:
  - 4 x 10GbE SFP+
  - 4 x 10GbE Base-T
  - 2 x 10GbE SFP+ and 2 x 2/4/8G Fibre Channel Combo
- All SKUs have 8 x 10GbE internal ports
- L2 only
- Uplink LAG
- Virtual Link Trunking (VLT)
- CMC management
- Automatic/Zero-touch mode
- Customizations using CLI mode
- DCB
- FCoE Snooping Bridge (FSB)
- NPIV Proxy Gateway (NPG)
- iSCSI TLV



# What is FN-Series I/O Aggregator



I/O  
Aggregation  
Device

FN-series offers I/O Aggregation for the Dell FX2 chassis  
Simply aggregates Ethernet (including converged storage traffic)  
from compute nodes to Top of Rack switches



**BEFORE**



**AFTER**

Each chassis can hold up to 2 x I/O Aggregators



**FRONT**



**BACK**



# IOAggregator

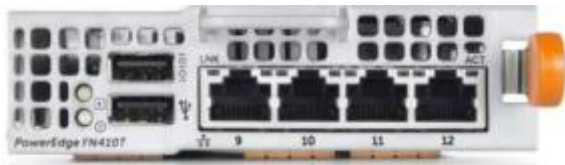
Three options

These three IOA versions address typical LAN, LAN + IP storage, LAN + iSCSI SAN and LAN + FCoE traffic



FN410S

Provides 4 ports SFP+ connectivity.  
Supports optical and DAC cable media.



FN410T

Provides 4 ports 10GBASE-T connectivity.  
Supports copper media up to 100m.



FN2210S

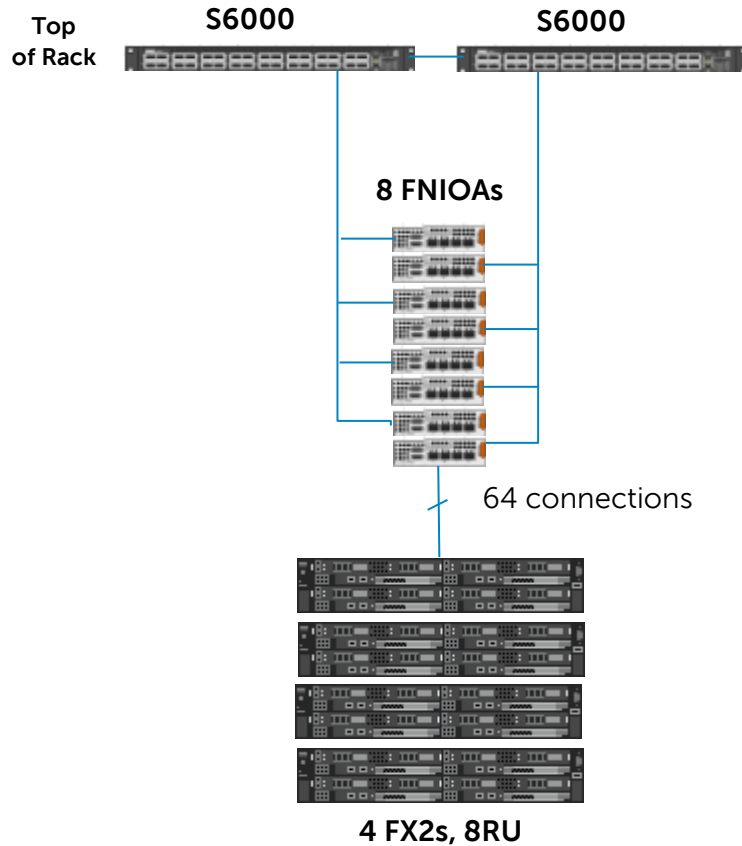
Provides two ports native Fibre Channel (NPG mode\*) and 2 ports SFP+ connectivity. Able to provide 4 ports SFP+ with reboot.

\*NPG (NPIV Proxy Gateway) mode provides capability to use converged FCoE inside the FX architecture chassis while maintaining Ethernet and native Fibre Channel outside of the FX chassis. NPIV Proxy Gateway *does not* provide full Fibre Channel fabric services.



# IOA connects to converged infrastructure data centers

Connect from the converged system (FX architecture system) to a fully converged infrastructure in the broader data center



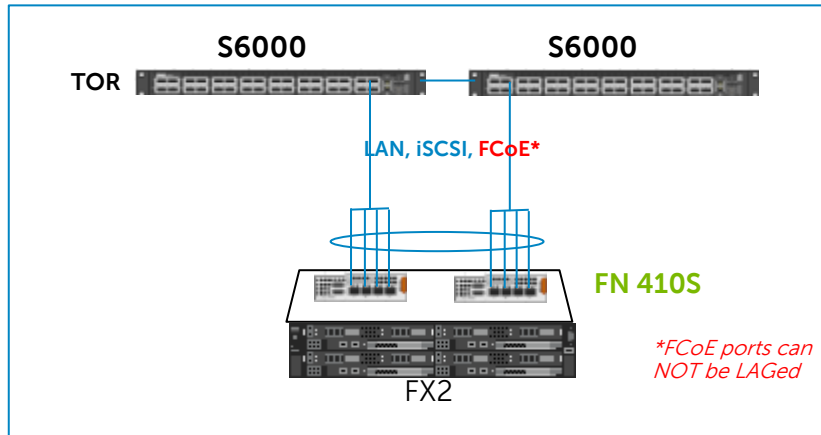
- Connect to the converged infrastructure via ToR (S6000 example illustration)

- Get 8:1 aggregation

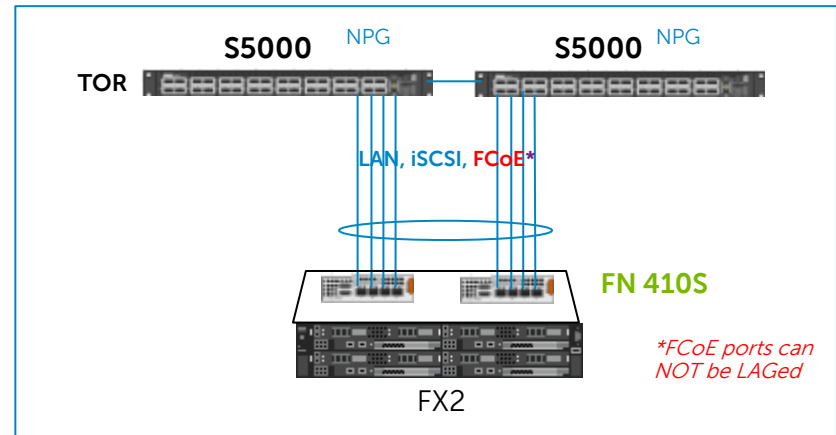
- Using 2 FN IO Aggregators from within each FX2 system.

# IOA enables FC/FCoE converged data centers

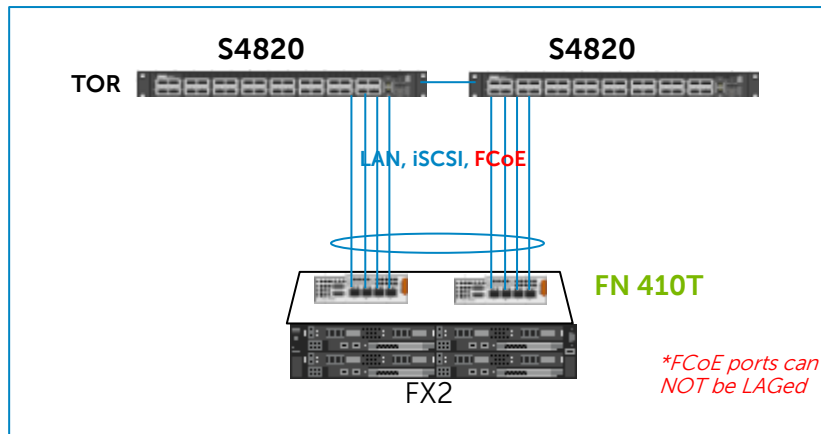
## Example Topologies



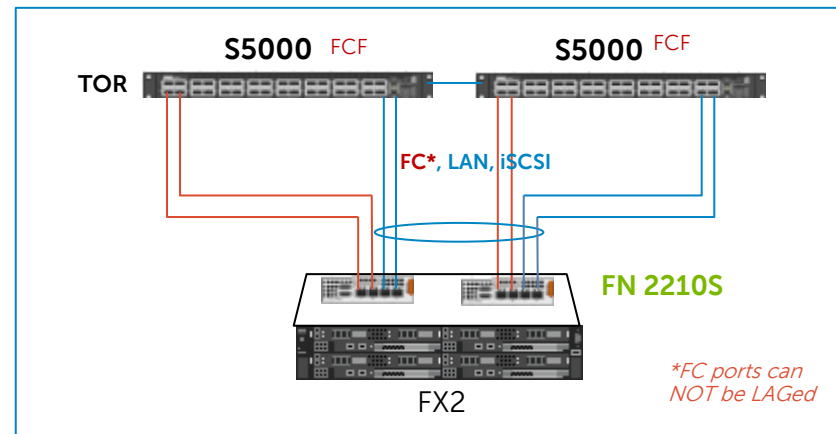
*\*For FCoE, a switch beyond S6000 offers gateway or full fabric services*



*For FCoE, S5000 offers gateway services*



*For FCoE, a switch beyond S4820 offers gateway or full fabric services*



*For FC, S5000 offers full fabric services*

# Post – 2014 FX product portfolio details





# The PowerEdge FC430 server



*8 FC430 server blocks in a fully loaded FX2 enclosure*



# PowerEdge FC430 server

## The ultimate in shared infrastructure density

The PowerEdge FC430 is a quarter width, half height server that combines powerful processors, great memory capacity and tremendous IO throughput. It is best suited for web serving and dedicated hosting, and can also be configured for low latency HPC workloads. Its small failure domain makes it a great choice for distributed environments that require higher reliability.



This product has not released and details, like chips and core count, are subject to change

### High performance hosting and web server

- Run highly available web services with lots of memory and processing power
- The FC420's 10 GbE capability provides faster overall performance for web services

### Dedicated hosting

- Host more clients per square foot with the FC420's high density footprint
- Offer hosted clients higher levels of service with the FC420's small failure domain.

### Features

**Processor:** 2S (up to 14 core) Intel Xeon E5-2600v3

**Memory:** Up to 8 DIMMs of memory

**Storage:** 2 X 1.8" SATA SSD ( w/1 PCIe access) or 1 X 1.8" SSD (w/ IB mezz port)

**Networking:** Dual-port 10Gb or 1Gb LOM

**IO Expansion:** Access to 1 PCIe expansion slots

### 2U Capacities

- Up to 8 qtr width FC430s/2U
- 224 cores/2U
- 64 DIMMs/2U
- 16 x 1.8" SSDs/2U

### "Light" virtualization farms

- Run lightweight applications virtually with the FC420's high processor core and memory density.

### HPC

- Drive HPC applications with the front access Infiniband connection configuration for low latency and greater processing density

- Management: iDRAC8 Enterprise w/LC
- Choice of chassis or server level management
- Optional dual SD cards for redundant hypervisor
- High availability via small failure domain



# FC430: Two distinct configurations

One especially designed for HPC/HFT usage

This product has not released and details, like core count, and final appearance are subject to change

The FC430 provides an extra degree of flexibility in its configuration options – one or two sockets, PCI or Infiniband access



- Two 1.8" SATA SSDs
- PCI switch & 1 slot access
- FX2 or FX2s can be used
- Typically used for virtualization or dedicated hosting.
- One or two socket option
- E5-2600 v3 Up to 14 cores

- One 1.8" SATA SSD
- Front access Infiniband mezz card port
- Used for HPC/HFT and other applications requiring lower latency
- Higher frequency processor



# FC430: a usage example

## Virtualized webservers

With 224 cores and 48 DIMMs in a 2U enclosure, the FX2/FC430 combination makes for a tremendous web serving solution. The FC430's small size also allows you to minimize service impact in case of a failure.

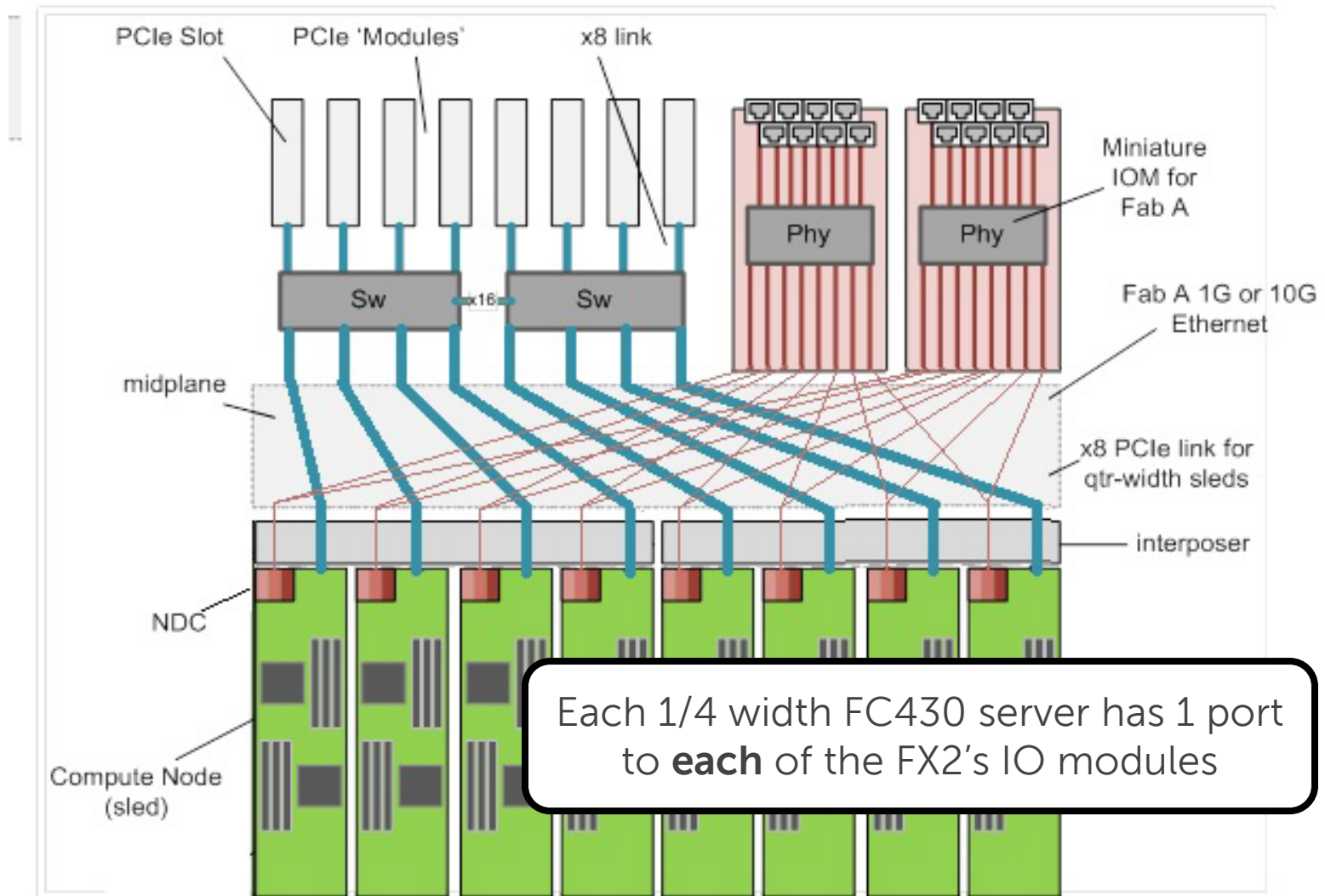


*8 FC430s can be used to run virtualized webservers*

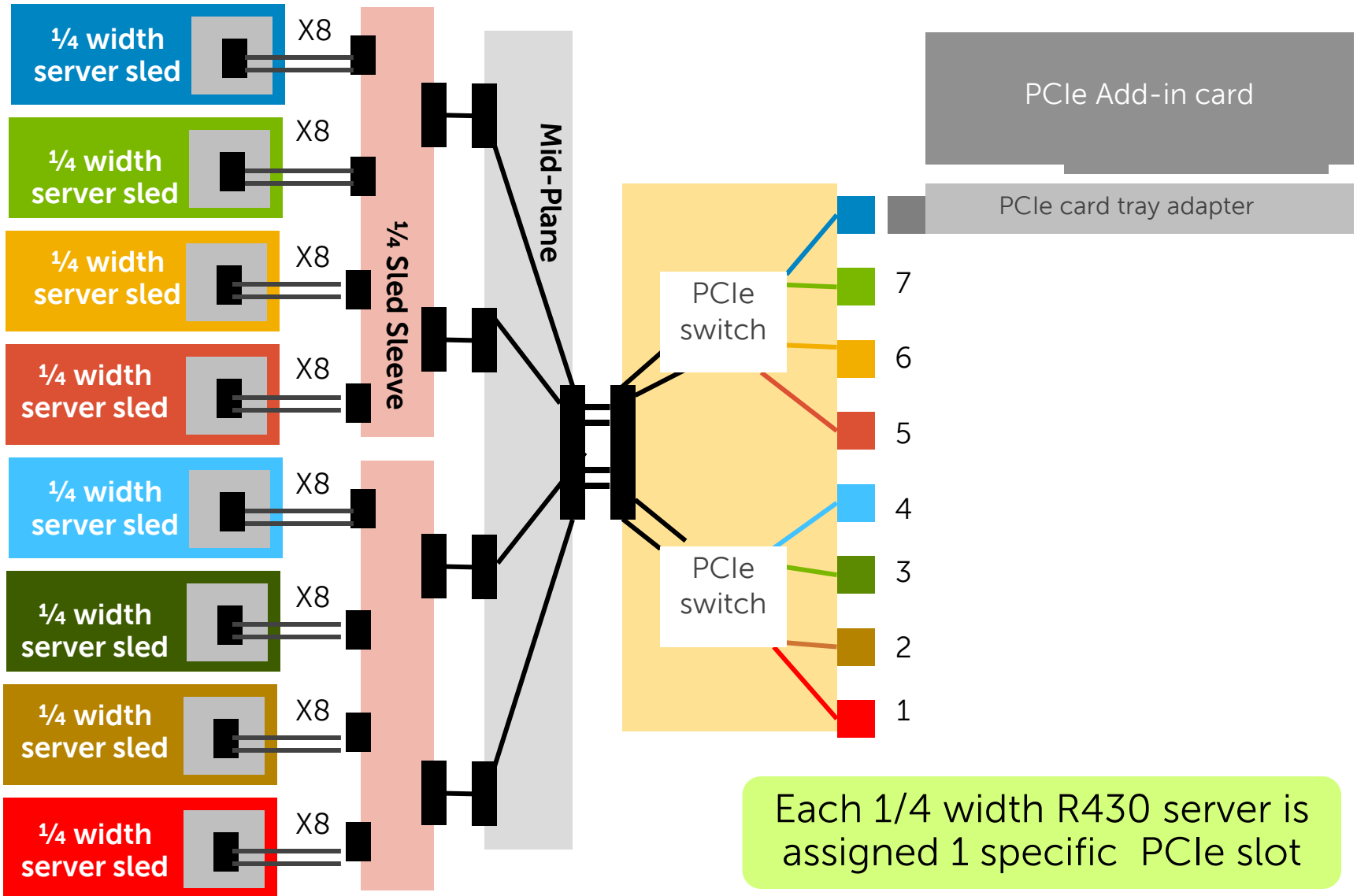


# I/O Mapping for the FC430

One (1) port for each server



# Detailed PCIe Mapping for the FC430



# The PowerEdge FC830 server



*1 FC830 server blocks with eight 2.5" drives*



*2 FC830 server blocks (each with 16 1.8" SSDs) in a fully loaded FX2 enclosure*

# PowerEdge FC830

## Overview

A powerful, full-width 4-socket server with dense compute and memory scalability and a highly expandable storage subsystem, the FC830 excels at running a wide range of applications and virtualization environments for both mid-size and large enterprises.

## Mission critical applications

Very demanding, mission critical workloads, like database driven, centralized business applications - customer relationship management (CRM) and enterprise resource planning (ERP) - as well as the database tier of WebTech and HPC

## Features

- Processor:** 4S 18-core Intel Xeon E5-4600v3
- Memory:** Up to 48 DIMMs of memory
- Storage:** 8 X 2.5" HDD/SSD or 16 X 1.8"SSD  
Supports up to 4 Express Flash drives
- Networking:** Dual-port 10Gb /1Gb SNA
- IO Expansion:** Up to 8 PCIe expansion slots  
(configuration dependent)



FC830 w/ 8x2.5"



FC830 w/ 16x1.8" and 2 FD332 storage blocks

## Highly flexible and scalable virtualization

Flexible virtualization using SAN or virtual storage with a mix of SSDs and HDDs, great VM density and highly scalable resources for the consolidation of large or performance hungry virtual machines

## 2U Capacities

- Up to 2 full width FC830s/2U
- 144 cores/2U
- 48 DIMMs/2U
- 16 x 2.5" HDDs/2U
- 32 x 1.8" SSDz/2U
- Choice of chassis or server level management
- iDRAC8 Enterprise w/ Lifecycle Controller
- Dual SD cards for redundant hypervisor





This product has not released and design detail and photo images are subject to change

# The PowerEdge FD332 storage block



*A half-width FD332 storage block*



# PowerEdge FD332

## Overview

A direct attached storage block that can be combined with the FC630, FC430 and FC830 servers to build highly flexible, scale out computing solutions.

- Up to 16 direct attach (DAS) SFF storage devices
- Up to 3 FD332s per FX2 chassis (with an FC630 server) = 48 additional storage devices in 2U space
- Optional dual PERC9 RAID controllers
- Mix and match pass-thru & RAID I/O option



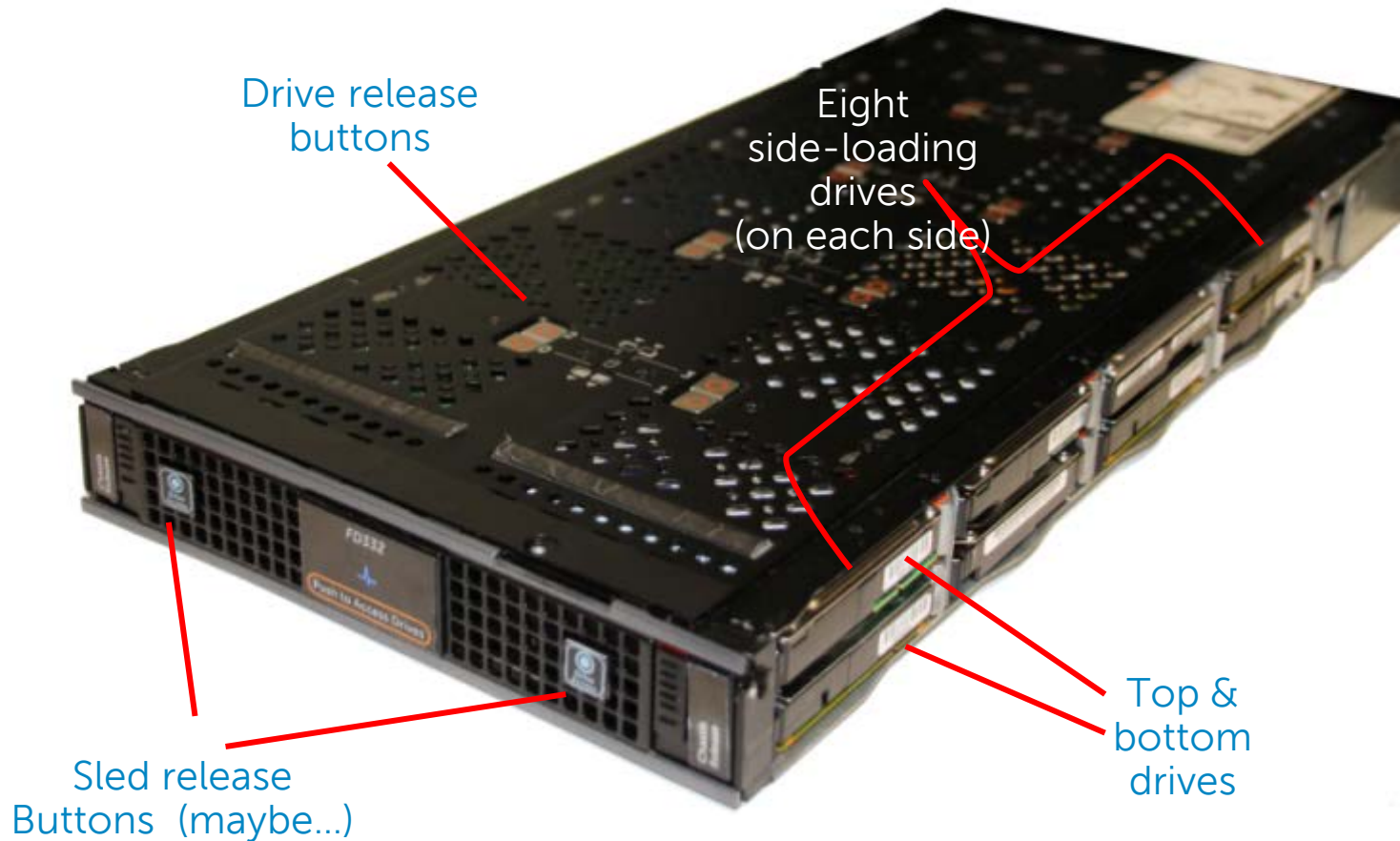
Displayed: FC630 and 3 x FS332 (Up to 48 drives)

- Block access can optionally be split by 2 servers – assigning 8 drives to each.
- Drives on the FD332 can be serviced while other components in an FX2 chassis continue to operate.

Performance	Availability	Expandability
<ul style="list-style-type: none"> <li>• 12Gb/s SAS 3.0 and 6Gb/s SATA 3.0</li> </ul>	<ul style="list-style-type: none"> <li>• Hot plug HDD</li> <li>• PERC9 RAID, Pass-thru I/O, Single or Dual SAS controllers, mix and match for dual controllers – RAID/non-RAID</li> </ul>	<ul style="list-style-type: none"> <li>• Up to 16 Small Form Factor SSDs/HDDs , both SATA and SAS</li> </ul>



# FD332 Full sled illustration



This product RTS in 1HCY15. Final design/image subject to change

# PowerEdge FD332

Drive layout – 16 drives, side loading

Front

Drive 1	Drive 5	Drive 9	Drive 13	
Drive 3	Drive 7	Drive 11	Drive 15	

*Side view of FD332*

Front

Drive 0 Drive 2	Drive 4 Drive 6	Drive 8 Drive 10	Drive 12 Drive 14	
Drive 1 Drive 3	Drive 5 Drive 7	Drive 9 Drive 11	Drive 13 Drive 15	

*Top view of FD332*



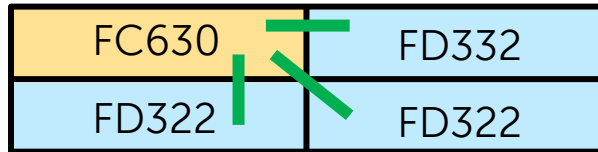
# PowerEdge FD332

## Configuration examples\* – half width

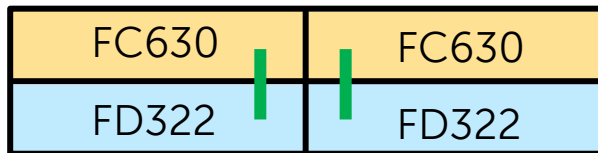
Slot 1	Slot 2
Slot 3	Slot 4

*FX2 chassis – front view*

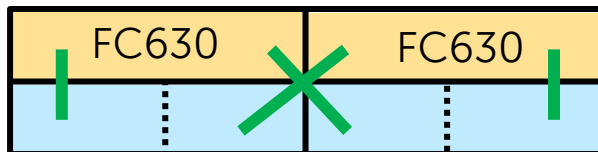
One way the FX2 chassis can be configured is as 4 half width bays. In this configuration, Slot 1 can **not** hold an FD332, it must hold a server for any FD332 to be assigned in the FX2 chassis. Servers can be attached to multiple FD332s, and in split-mode FD332s can be attached to 2 servers.



1 half-width server can attach to 3 storage blocks



2 half-width servers can attach to 1 storage block each

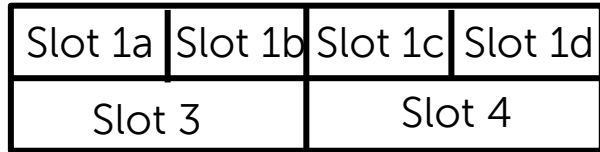


FD332s with dual RAID controllers can be operated in split mode – and each controller can be assigned to a different server.

\* There are other variations

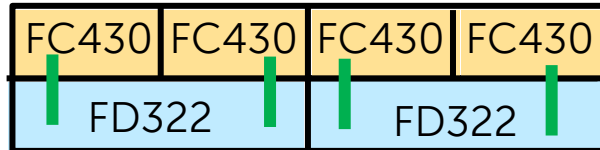
# PowerEdge FD332

## Configuration examples\* – quarter and full width

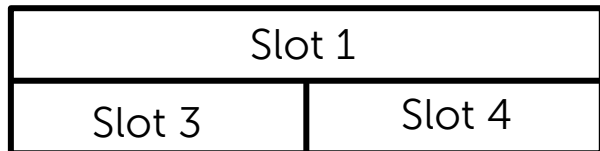


*FX2 chassis – front view*

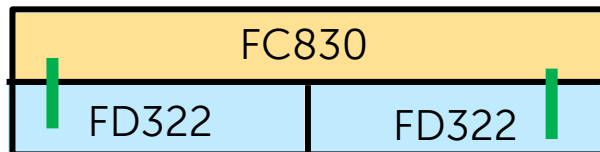
In post 2014 releases, the FX2 chassis will also be able to be configured with 4 quarter width slots across the top – for the FC430 server, or one full width FC830 across the top – and 2 FD332 storage blocks on the bottom.



4 quarter-width FC430 servers can each attach to half of a split-mode storage block.



*FX2 chassis – front view*



1 full-width FC830 server can attach to two FD332 storage blocks

\* There are other variations



# FX2 chassis configuration options

## Supported chassis configurations

### FX2/FX2s Sled Form Factor Support

### FX2/FX2s Sled Bay Slot Numbering

**2014  
Release** 4-bay  
Chassis

Half-width	Half-width
Half-width	Half-width

1	2
3	4

**Early  
2015  
Release** 8-bay  
Chassis

Quarter	Quarter	Quarter	Quarter
Quarter	Quarter	Quarter	Quarter

1a	1b	1c	1d
3a	3b	3c	3d

6-bay  
Chassis

Quarter	Quarter	Quarter	Quarter
Half-width		Half-width	

1a	1b	1c	1d
3		4	

2-bay  
Chassis

Full-width	
Full-width	

1
3

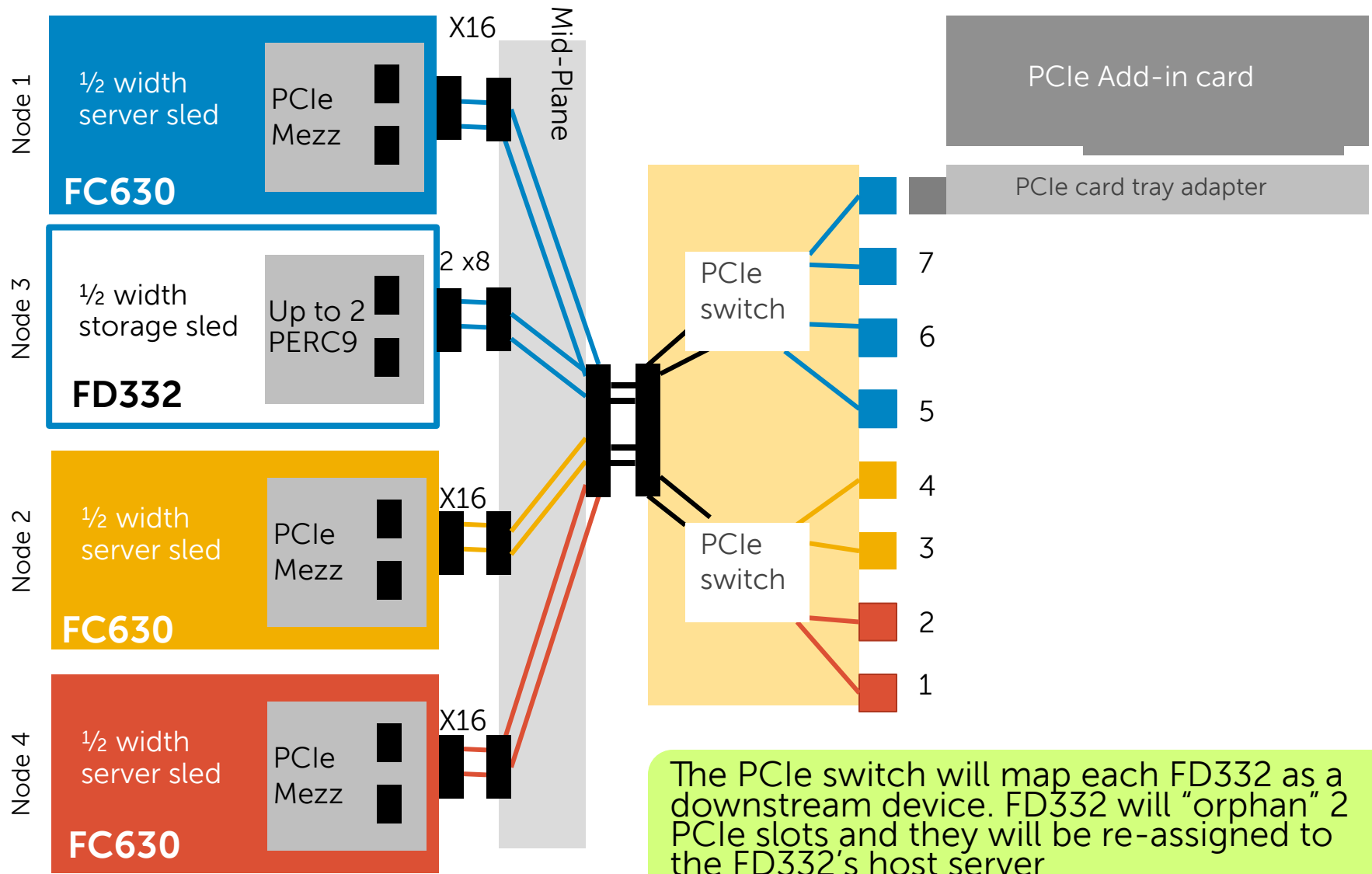
3-bay  
Chassis

Full-width	
Half-width	Half-width

1	
3	4



# PCIe Mapping for FC630s + FD332 (w/Dual PERC)





# FX Systems Management



# FX2 Management Flexibility

Customer choice to manage at the server, shared infrastructure or fully automated converged infrastructure

**ASM**

- Fully automated CI Mgmt
- Massive Provisioning
- GUI IOA Config & Stateless
- Scalability

**Compute  
Network  
Storage**

**OME**

- Monitoring CI
- Massive Provisioning
- Update Compute nodes
- Scale up to 4000 devices

<b>Compute</b>	<b>Storage</b>	<b>Network</b>
----------------	----------------	----------------

**CMC**

- Semi-automated CI Mgmt
- Chassis Provision/Update
- Manual IO/A Config
- Monitor 20 FX2 systems

<b>Compute</b>	<b>Storage</b>	<b>Network</b>
----------------	----------------	----------------

**iDRAC8 with  
Lifecycle  
Controller**

- Embedded Server lifecycle management

<b>Compute</b>	<b>Storage</b>
----------------	----------------



**Extensive Deployment of FX2**



**Multiple FX2**



**Compute and Storage Sled**



# Saving significant management costs

FX has all the management goodness of PowerEdge

## Automation

### **“ZeroTouch” automated deployment**

Rack, cable and walk away! No special technician training required

### **Automated server updates**

Latest updates are always staged in the server, ready to be applied, reducing maintenance windows

### **Automated technical support**

Greatly reduces time to identify and resolve server issues

## Simplification

### **Enhanced agent-free solution**

Real-time server performance monitoring and SAS storage health monitoring

### **Simplified management “at-the-box”**

Deploy, configure and troubleshoot servers with all the information you need at your fingertips

### **OpenManage Essentials 2.0**

Automated lifecycle management with a 1-to-many console, and profile based configuration capabilities



# FX Shared Infrastructure Monitoring

## A choice of system management methods

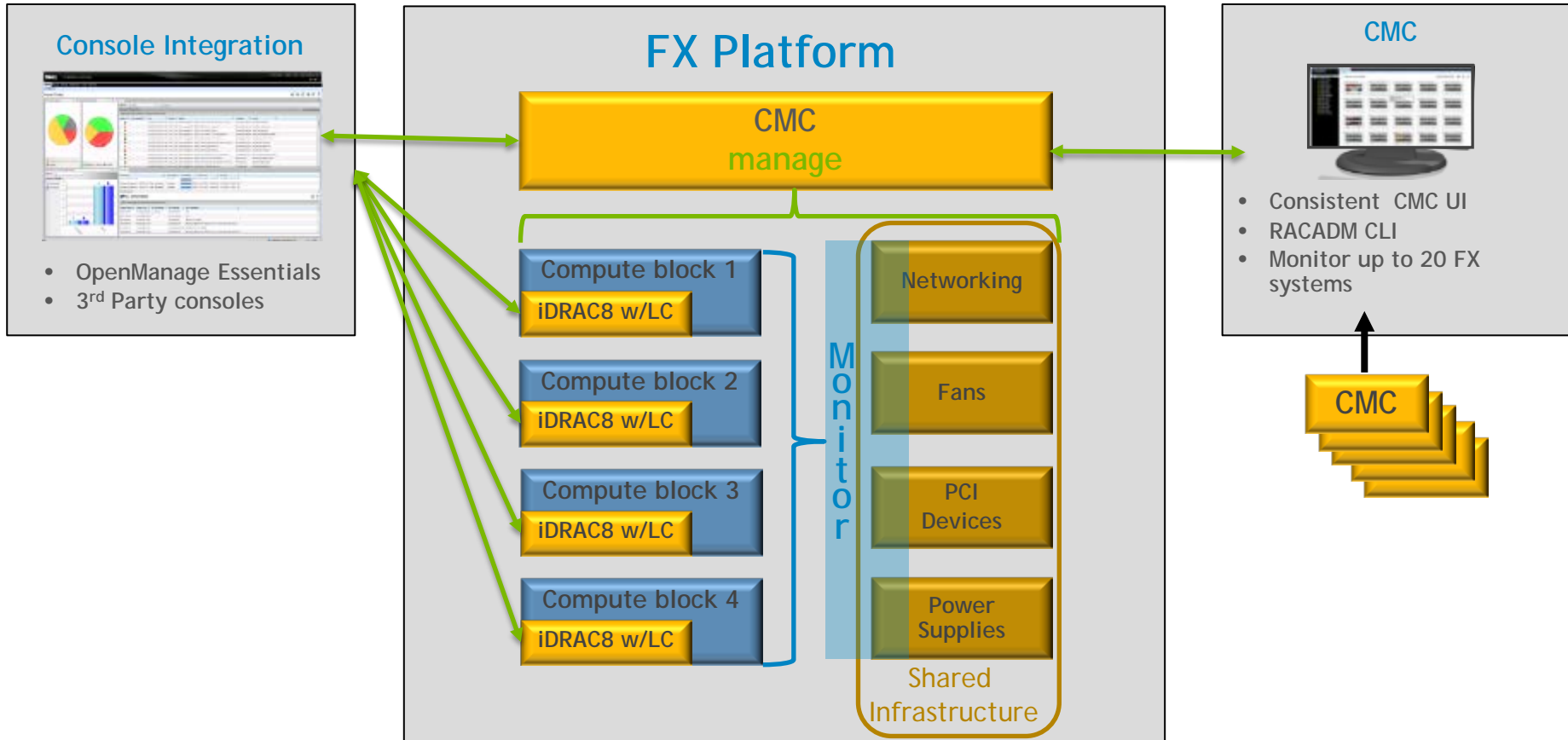
### Monitor like a rack server

- Integrate and scale with existing server management

OR

### Monitor like a blade server

- Use CMC to manage servers and shared infrastructure



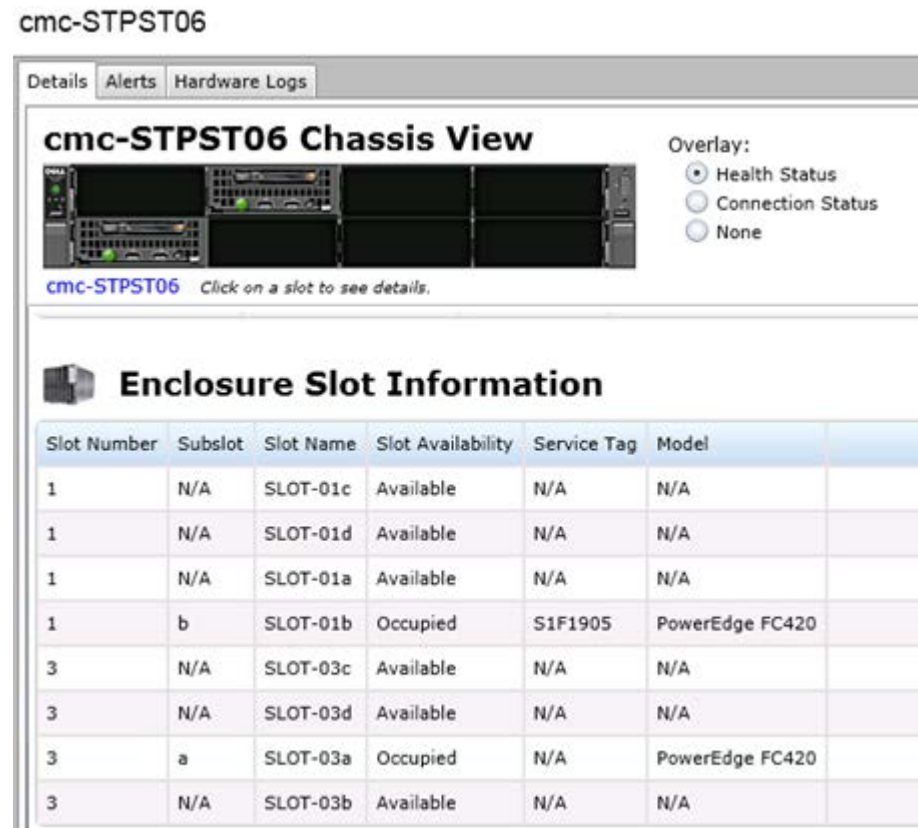
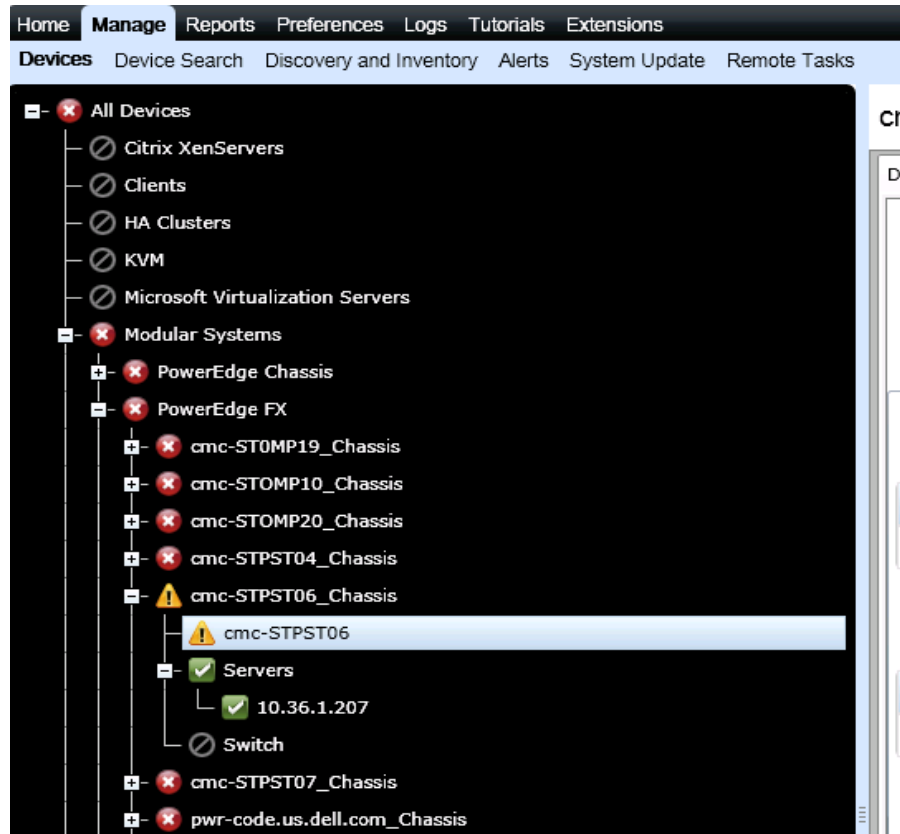
# OME v2.0 – 1:M FX management made simple

## Discovery/Health View

- FX Systems are discovered and sleds correlated in the Device Tree
- Health status for chassis and sleds and launch CMC and iDRAC from the device tree

## FX Layout and Slot Info

- Graphical chassis layout is displayed as part of the FX CMC inventory
- Enclosure table is used to show slots availability within FX chassis



# Chassis Management Controller (CMC)

## Simple and Scalable Management



- **Simplified & integrated management**

- It's embedded, nothing additional to install
- No agents, all out of band
- Discovery is built-in
- Easy to use, intuitive interfaces
- In VRTX create virtual disks from 48TB of shared storage and make them available to one or more servers

- **Scalable management**

- Automated 1:many operations for greater productivity
  - Server BIOS/FW update
  - Server configuration profile capture & replication
  - Slot assigned configuration profiles, MAC/WWN
- Ability to span 9 chassis (20 FX2)

**For monitoring, inventory, update, configuration and remediation**



# Chassis Management Controller Features

Feature	Function	Benefit
Management within a chassis is hard-wired	Dedicated network within the chassis	Private access to iDRAC & blade power from the CMC GUI even when iDRAC7/server access is delegated
Converged management GUI	Single GUI for management of servers, shared storage and networking	Only one interface to learn and use
Multi-chassis management	Lead chassis can display 9 to 20 chassis	At a glance status with context sensitive details and actions
Server configuration and update libraries sharable across chassis (CMC 5.0)	Capture a server's configuration and apply to other servers in the same or different chassis	Automated server setup saves time and improves accuracy
Profile QuickDeploy	QuickDeploy profile apply when a server is inserted	Sysadmin time to configure a server's hardware is a single click to accept
Group server BIOS/FW update	Automated deployment of one update or all the components to one or all the servers in a chassis	Time savings on initial deployment and later updates
FlexAddress	Slot assigned MAC/WWN (identity)	Replacement servers inserted into a slot will have the same addresses as the previous server
VRTX shared storage	Create virtual disks and make them available to one or more servers	Share up to 48TB of storage across multiple servers for growth and increased application availability



# Converged graphical chassis management

Overall status at a glance with display & actions in context without leaving the Overview page

Four FC630 server blocks

IO Modules

PCIe expansion slots

Direct power & iDRAC control from CMC

Details of the selected component

The screenshot displays the Dell Chassis Management Controller (CMC) interface. The top navigation bar includes the Dell logo, 'Chassis Management Controller', and 'Enterprise'. The main content area is divided into a left sidebar and a main right pane.

**Left Sidebar (Overview):**

- CMC-STOMP18  
PowerEdge FX2s  
root, Administrator
- Chassis Overview
- Chassis Controller
- Server Overview
  - 1 Win-DUP-tests
  - 2 Linux-DUP-tests
  - 3 DO NOT CHANGE
  - SETTINGS ON CMC
- I/O Module Overview
  - A1 Gigabit Ethernet
  - A2 Not Installed
- PCIe Overview
  - 1 PCIe Slot 1
  - 2 PCIe Slot 2
  - 3 PCIe Slot 3
  - 4 PCIe Slot 4
  - 5 PCIe Slot 5
  - 6 PCIe Slot 6
  - 7 PCIe Slot 7
  - 8 PCIe Slot 8
- Front Panel
- Fans
- Power Supplies
- Temperature Sensors

**Main Right Pane (Properties):**

- Health Summary
- Chassis Health
- Chassis Component Summary
- Front view of server rack
- Back view of server rack
- Click the components to view their details
- Server Slot 1 details:
  - Health and Performance:
    - Power State: On
    - Health: OK
    - Temperature: N/A
    - Power Consumption: 40 W
    - Power Allocated: 233 W
  - Server Properties:
    - Name: Win-DUP-tests
    - Model: PowerEdge FC630
    - Service Tag
    - Host Name: WIN-73G6VUDEP8S
    - IDRAC: 2.05.05.05 (17)
    - CPLD: 0.3.5
    - BIOS: 0.3.29
    - OS
    - CPU Information: 1 x Intel(R) Xeon(R) CPU E5-2650 v3 @ 2.30GHz
  - Quick Links:
    - Server Status
    - Launch iDRAC GUI
    - Launch OMSA GUI
    - Power Off Server
    - Graceful Shutdown
    - Remote File Share
    - Deploy iDRAC Network
    - Server Component Update





# Chassis management

## FM120 Microserver example

### Display 4 low power Atom micro-servers in a block

- Each has an individual iDRAC but only a single license as all servers have the same service tag
- All 4 power up/down together
- iDRAC does not show or track power per server

The screenshot displays the Dell Chassis Management Controller (CMC) interface for a PowerEdge FX2 chassis (CMC-STOMP03). The interface is divided into a left-hand navigation pane and a main content area.

**Left-hand navigation pane:**

- Chassis Overview
- Chassis Controller
- Server Overview
  - 1 SLOT-01
    - 1a SLOT-01a
    - 1b SLOT-01b
    - 1c SLOT-01c
    - 1d SLOT-01d
  - 2 SLOT-02
    - 2a SLOT-02a
    - 2b SLOT-02b
    - 2c SLOT-02c
    - 2d SLOT-02d
  - 3 SLOT-03
  - 4 SLOT-04
    - 4a SLOT-04a
    - 4b SLOT-04b
    - 4c SLOT-04c
    - 4d SLOT-04d
  - IO Module Overview
    - A1 Gigabit Ethernet
    - A2 Gigabit Ethernet
  - Front Panel
  - Fans
  - Power Supplies
  - Temperature Sensors

**Main content area:**

- Properties: Setup, Power, Logs, Network, User Authentication, Alerts, Troubleshooting
- Health: Summary
- Chassis Health
  - Chassis Component Summary
  - Front: Image of the server chassis front view.
  - Back: Image of the server chassis back view.
  - Click the components to view their details.
- Server Slot 1
  - Health and Performance: Summary with a green checkmark icon and a "Return to Chassis Health" link.
  - Power State: On Off Off Off
  - Health: OK OK OK OK
  - Temperature: Unavailable
  - Power Consumption: N/A
  - Power Allocated: N/A
  - Server Properties:
    - Name: SLOT-01
    - Model: PowerEdge FM120
    - Service Tag
    - CPLD: 0.2.1
  - Quick Links:
    - Server Status



# Agent-free, out-of-band server updates

## Option with CMC Enterprise License

- CMC reads current versions
- Admin can select one or all components to deploy to one or all servers
- Option to update all components from a catalog / directory

Chassis Management Controller Enterprise

Support | About | Log Out

CMC-STOMP18  
PowerEdge FX2s  
root, Administrator

Chassis Overview  
Chassis Controller

Server Overview

- 1 Win-DUP-tests
- 2 Linux-DUP-tests
- 3 DO NOT CHANGE
- 4 SETTINGS ON CMC

I/O Module Overview

- A1 Gigabit Ethernet
- A2 Not Installed

PCIe Overview

- 1 PCIe Slot 1
- 2 PCIe Slot 2
- 3 PCIe Slot 3
- 4 PCIe Slot 4
- 5 PCIe Slot 5
- 6 PCIe Slot 6
- 7 PCIe Slot 7
- 8 PCIe Slot 8

Front Panel

- Fans
- Power Supplies
- Temperature Sensors

Properties Setup Power Troubleshooting Update

### Server Component Update

Choose Update Type

Which type of update would you like to use?

- Update from file
- Update from Network Share

Component/Device Update Filter

- BIOS
- iDRAC
- Lifecycle Controller
- 32-Bit Diagnostics
- OS Driver Pack
- Network I/F Controller
- RAID Controller

Component/Device Firmware Inventory

Save Inventory Report

Slot	Name	Model	Component/Device	Current Version	Rollback Version	Job Status	Update
1	Win-DUP-tests	PowerEdge FC630	BIOS	0.3.29	<input type="checkbox"/>		<input type="checkbox"/>
			Lifecycle Controller	2.05.05.00			
2	Linux-DUP-tests	PowerEdge FC630	BIOS	0.3.24	<input type="checkbox"/>		<input type="checkbox"/>
			Integrated Dell Remote Access Controller	2.10.10.40			<input type="checkbox"/>
4	SETTINGS ON CMC	PowerEdge FC630	BIOS	0.3.14	<input type="checkbox"/>		<input type="checkbox"/>
			Integrated Dell Remote Access Controller	2.00.00.00			<input type="checkbox"/>
			Lifecycle Controller	2.00.00.00			

Reboot Mode: On Next Reboot



# Server configuration profile on insertion or one-to-many after install

- Select profile from external library shared across chassis
- Select empty slot for profile to be applied on insertion
- Library can also include templates for common tasks like configuring a 100GB RAID VD or partitioning a NIC

The screenshot displays the Dell Chassis Management Controller (CMC) interface for a PowerEdge FX2 chassis. The 'Server Profiles' page is active, showing a table of slots and their current profile assignments. A dropdown menu is open over the 'Slot 01' column, showing a list of profiles including 'SLOT-01', 'SLOT-02a', 'SLOT-02b', 'SLOT-02c', and 'SLOT-04'. The table below shows the current profile assignments for each slot.

Slot	Slot Name	Profile Location	Slot	Slot Name	Assign Profile	Profile Location
1	SLOT-01		2a	SLOT-02a	-- No Profile Selected --	
			2b	WIN-SPPOCEDRND	-- No Profile Selected --	
			2c	SLOT-02c	-- No Profile Selected --	
			2d	SLOT-02d	-- No Profile Selected --	
			4	SLOT-04	-- No Profile Selected --	

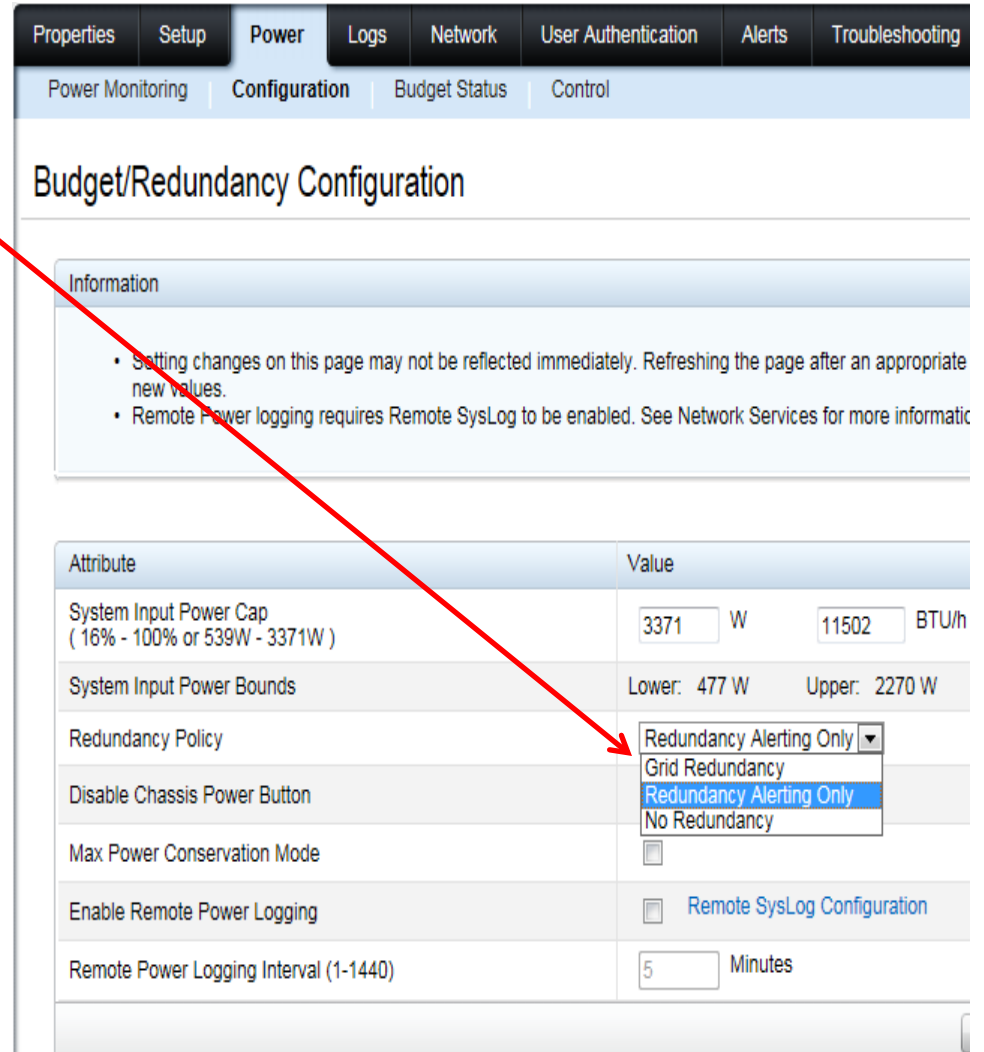
  

Select	Profile Name	Description	Profile Version	Profile Location	View Profile
<input type="radio"/>	ESX3v1		ALL	Network Share	> View
<input type="radio"/>	VD-100GB		ALL	Network Share	> View
<input type="radio"/>	WebServer		ALL	Network Share	> View
<input type="radio"/>	Win12R2v3		ALL	Network Share	> View
<input type="radio"/>	Win12SQL		ALL	Network Share	> View



# New default power configuration

- Grid Redundancy restricts the power consumption to what can be supplied by one PSU (one power grid)
- No Redundancy allows for allocation of all the power from both PSUs
- Redundancy Alerting Only(RAO) is a new option with FX2 that allows allocation of all the power like No Redundancy but when power exceeds what a single PSU can provide it will generate an alert
- Redundancy Alerting Only is the default requiring the user to change the policy in the CMC for grid redundancy



The screenshot displays the 'Budget/Redundancy Configuration' page in the Dell iDRAC Configuration Utility. The page is divided into several sections: 'Properties', 'Setup', 'Power', 'Logs', 'Network', 'User Authentication', 'Alerts', and 'Troubleshooting'. Under the 'Power' tab, there are sub-sections for 'Power Monitoring', 'Configuration', 'Budget Status', and 'Control'. The 'Configuration' sub-section is active, showing the 'Budget/Redundancy Configuration' page. The page includes an 'Information' section with two bullet points: 'Setting changes on this page may not be reflected immediately. Refreshing the page after an appropriate new values.' and 'Remote Power logging requires Remote SysLog to be enabled. See Network Services for more information.' Below this is a table with two columns: 'Attribute' and 'Value'. The table contains the following rows: 'System Input Power Cap ( 16% - 100% or 539W - 3371W )' with values '3371 W' and '11502 BTU/h'; 'System Input Power Bounds' with values 'Lower: 477 W' and 'Upper: 2270 W'; 'Redundancy Policy' with a dropdown menu showing 'Redundancy Alerting Only', 'Grid Redundancy', 'Redundancy Alerting Only', and 'No Redundancy'; 'Disable Chassis Power Button'; 'Max Power Conservation Mode' with a checkbox; 'Enable Remote Power Logging' with a checkbox and a link to 'Remote SysLog Configuration'; and 'Remote Power Logging Interval (1-1440)' with a value of '5 Minutes'. A red arrow points to the 'Redundancy Policy' dropdown menu.

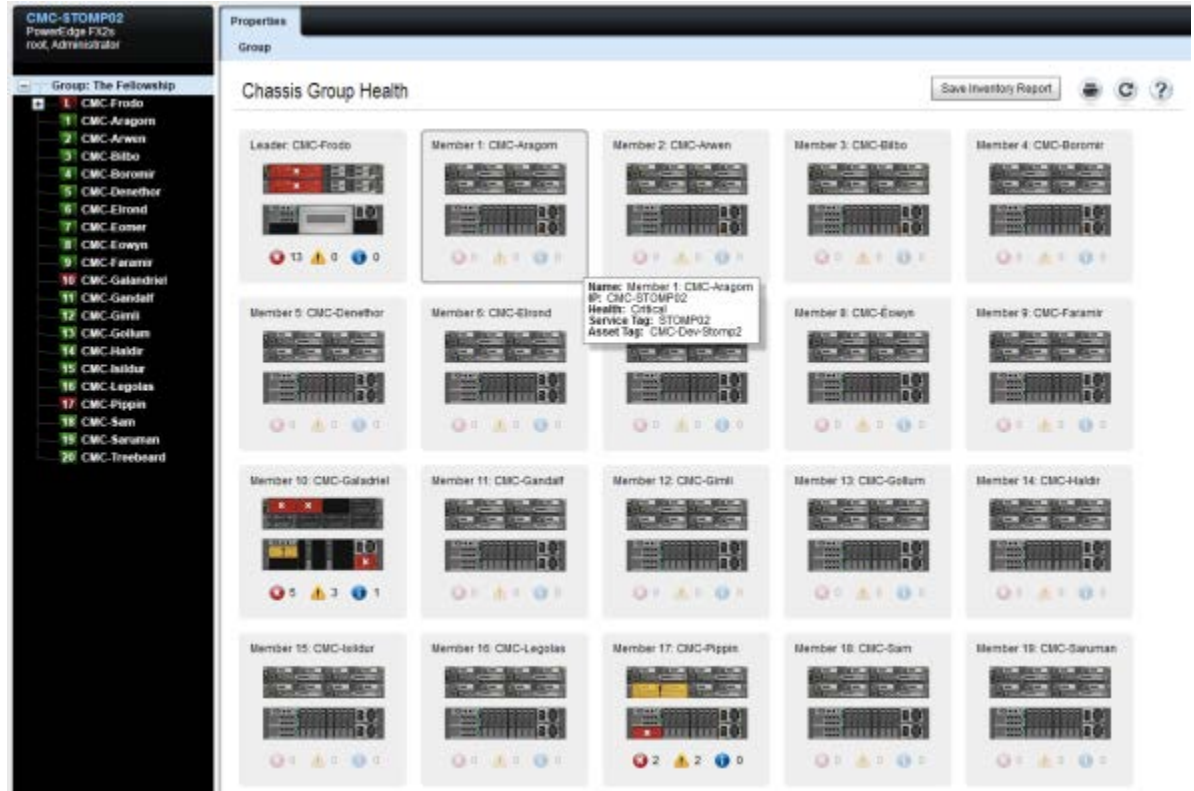
Attribute	Value
System Input Power Cap ( 16% - 100% or 539W - 3371W )	3371 W 11502 BTU/h
System Input Power Bounds	Lower: 477 W Upper: 2270 W
Redundancy Policy	Redundancy Alerting Only Grid Redundancy Redundancy Alerting Only No Redundancy
Disable Chassis Power Button	
Max Power Conservation Mode	<input type="checkbox"/>
Enable Remote Power Logging	<input type="checkbox"/> Remote SysLog Configuration
Remote Power Logging Interval (1-1440)	5 Minutes



# CMC multi-chassis monitoring capability

Monitor up to 20 platforms at-a-glance

- CMC for FX2 is embedded and requires no additional installation of management software
- CMC displays at-a-glance status for up to 20 FX2 platforms
- FX2 only, no mix of FX2 / M1000e / VRTX platforms
- Operations limited to a single chassis
  - 1:Many BIOS/FW update
  - Server profile capture & replicate



# CMC options for FD332 storage sled

- Mapping of a FD332 to server(s) is fixed based on it's slot location with a single CMC option
  - Joined: all 16 drives to a single host
  - Split single host: drives 0-7 to first controller, 8-15 to second controller
  - Split dual host: first controller & drive 0-7 to first host, second controller & drives to second host
- Optional licensed feature to enable RAID vs. default HBA or non-RAID

The screenshot displays the Dell Chassis Management Controller (CMC) interface for a PowerEdge server. The left-hand navigation pane shows a tree structure under 'Chassis Overview' with categories: Chassis Controller, Server Overview (SLOT-01 to SLOT-04), I/O Module Overview (Gigabit Ethernet, Not Installed), PCIe Overview (PCIe Slot 1 to 8), Front Panel, Fans, Power Supplies, and Temperature Sensors. The main content area is titled 'Chassis Health' and shows details for 'Storage Slot 3', including its name, model (PowerEdge FD332), status (OK), and connection to other slots. Below this, the 'Storage Array Slot 3' section provides 'Health and Performance' status (green checkmark) and 'Array Properties' such as Name (SLOT-03), Model (PowerEdge FD332), Service Tag (666666), Asset Tag (123456789012345678901234567890), Number of Controllers (2), and Intrusion State (Closed). The 'Controller: 1' section lists Physical Disk Slots (Physical Disk 0-7), Connected to Server (SLOT-01), and Controller Mode Capability (HBA). The 'Controller: 2' section lists Physical Disk Slots (Physical Disk 8-15), Connected to Server (SLOT-02), and Controller Mode Capability (HBA). A 'Quick Links' section offers options for Storage Array Status, Storage Array Setup, Launch SLOT-01 iDRAC GUI, and Launch SLOT-02 iDRAC GUI. Red arrows from the text on the left point to the 'Server Overview' tree and the 'Storage Array Slot 3' details.



# Enterprise vs. Express CMC Licensing

Feature	Description
<b>Blade update</b>	Enables 1:many component, i.e. BIOS/FW of blades from the CMC
<b>Remote syslog</b>	Ability for the CMC to log messages to a remote syslog service.
<b>Active Directory and LDAP</b>	Active Directory and LDAP for login authentication
<b>PK Authentication</b>	PK Authentication for SSH
<b>Single Sign-on</b>	Single Sign-On for LDAP. Requires Active Directory/LDAP feature to be enabled. This is the Integrated Windows Authentication feature using OS logon credentials and not the simple token based local single sign on.
<b>Two-Factor Authentication</b>	Two-Factor Authentication with smartcards. Requires Active Directory/LDAP
<b>Remote File share</b>	Remote File Share (RFS) option maps a file from a NFS/CIFS share on the network to one or more blades through the iDRAC to deploy or update an operating system. When connected, the remote file is accessible as if it is on the local system. When using the CMC interface, the CMC passes the NFS/CIFS credentials to iDRAC to initiate RFS.
<b>Advanced Configuration</b>	Enables server node configuration profile capture & 1-to-many config. replication
<b>Advanced Power Management</b>	Enclosure level power capping.
<b>Chassis grouping</b>	Enables/disables the ability to manage multiple chassis from a single CMC. This needs to be licensed on both the master and the member devices.
<b>Enclosure level backup</b>	Enables/disables the ability to perform backup of CMC settings. Restore is available by default
<b>Flex Address</b>	Flex Addresses can be used.

- **Licensing for M1000e is via presence of FlexAddress Plus SD**
- **SD card is included with VRTX and FX2 but features are enabled via a SW license like iDRAC**



# Understanding converged infrastructure solutions

Unique solutions for each unique need

## PowerEdge M Series



10U blade platform for data centers

- ✓ Ideal for an integrated server, networking switching and iSCSI storage solution
- ✓ Highest level of hardware redundancy
- ✓ Full networking switch integration

## PowerEdge VRTX



5U tower/rack for remote, branch, and SMB office environments

- ✓ Designed for easy shared storage inside the chassis and simplified networking

## PowerEdge FX Series



2U high functionality rack server

- ✓ Designed for highly flexible compute, IO, storage and systems management all in a small rack footprint
- ✓ Great as a full featured, small fault domain, solution

## PowerEdge C Series



Multiple options for distributed workload environments

- ✓ Ideal for environments based on open stack systems management
- ✓ Great for purely external switching infrastructures
- ✓ Provides lowest cost/Gb DAS storage



