

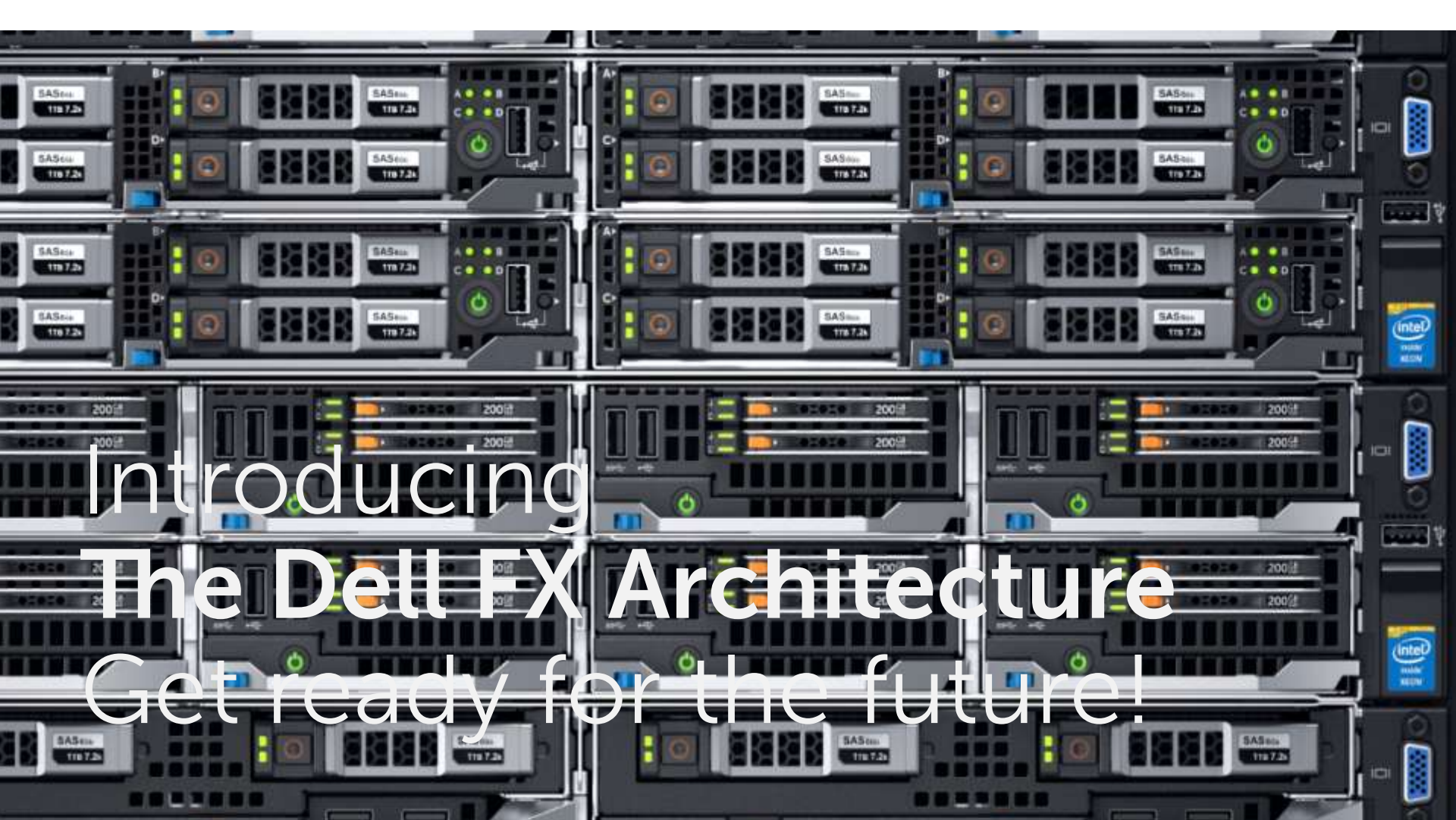
# Powering infrastructure transformation with PowerEdge FX converged solutions

Name  
Title



#DellST14





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

# Data Center Evolution

Service demands are driving infrastructure changes



- IT agility and efficiency is required for business competitiveness
- Maintaining application scalability and performance are critical
- Standardized HW and simplified management are needed to reduce IT budget growth

# Hyper-Converged Trends

Evolutionary

Revolutionary

Server-side storage

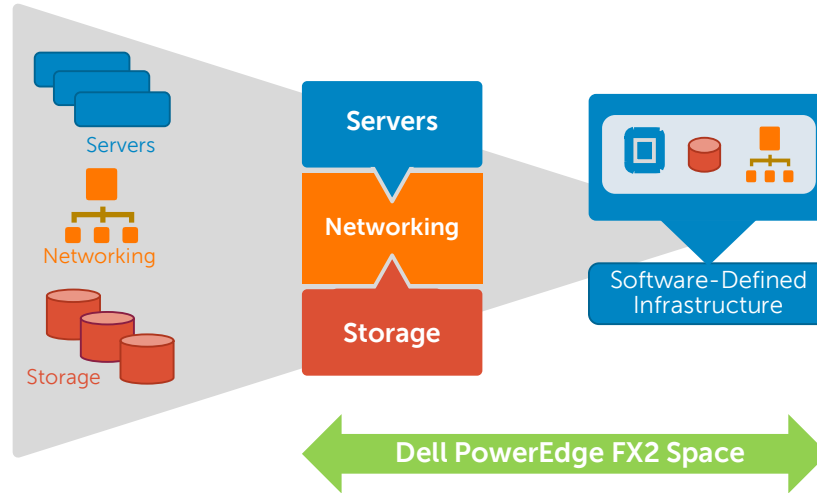
External SANs

Virtualised Storage

Physical Appliances

Virtual Appliances

Converged Solutions



Hyper Converged

Scalable solutions for private cloud and XaaS

Software-only solutions

There is no one-size-fits-all solution and Dell has you covered both ways!

# What is converged infrastructure?



**Gartner**

“**Combinations** of server, storage and network infrastructures, sold with management software that facilitates the provisioning and **management** of the combined unit.”



**TBR**  
TECHNOLOGY BUSINESS RESEARCH, INC.

“A **pre-configured and/or pre-validated** combination of compute, storage, networking and system **management** software”.

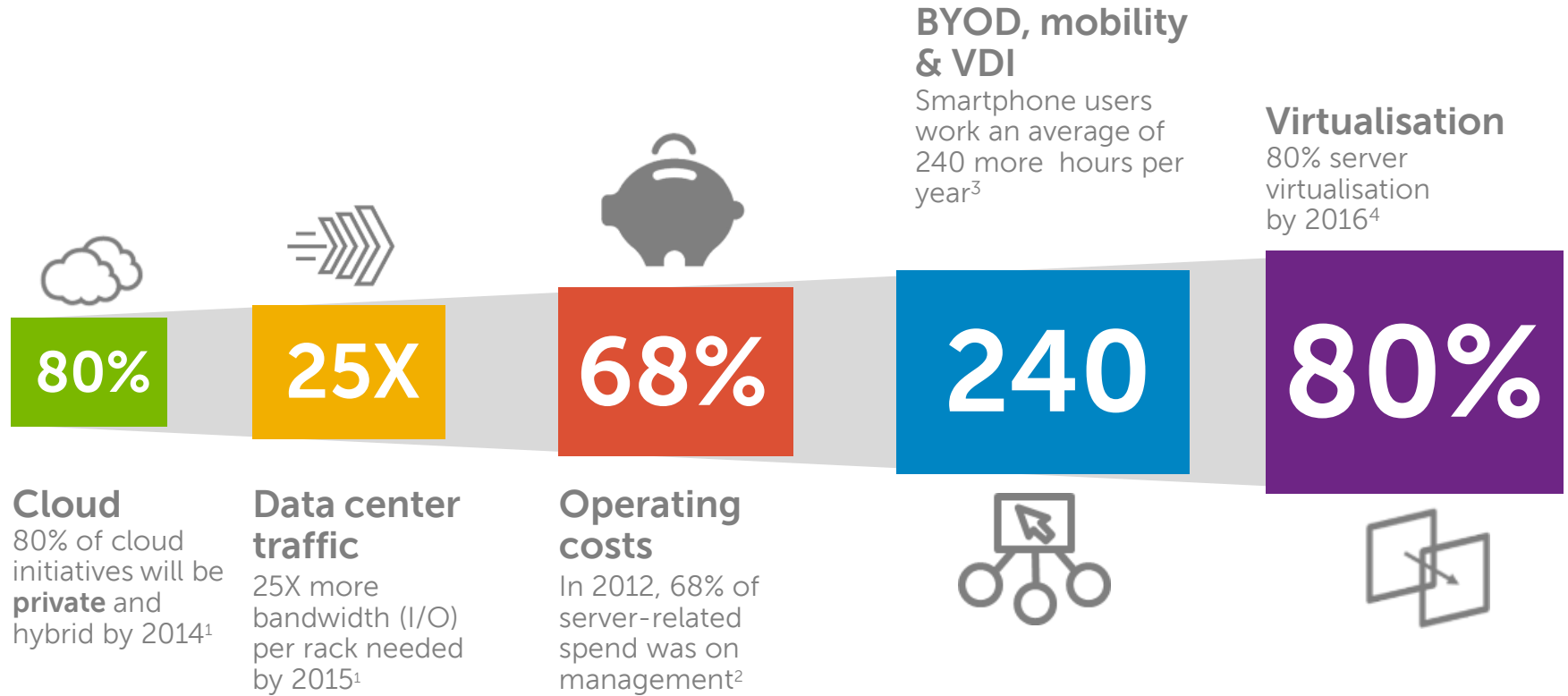


**IDC**

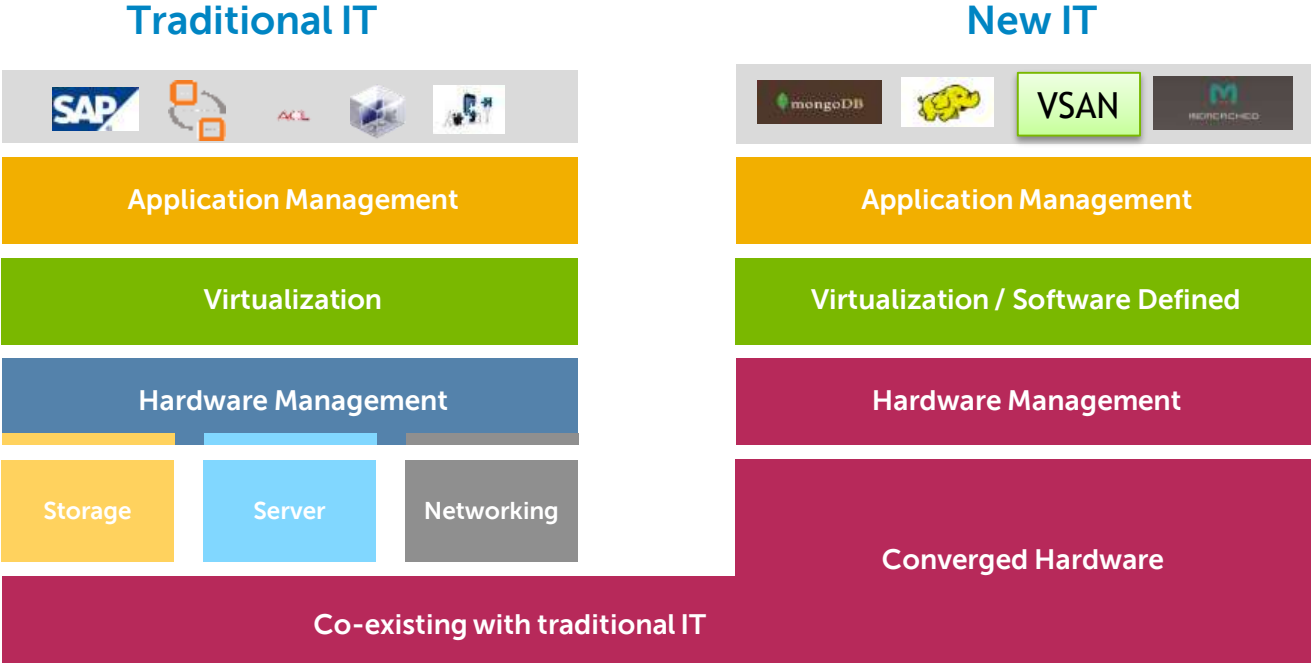
“**Pre-integrated, vendor-certified** systems containing server hardware, disk storage systems, networking equipment, and basic element/systems **management** software.

**In essence,  
it is servers,  
storage and  
networking  
integrated  
and managed  
together**

# What is driving this trend?



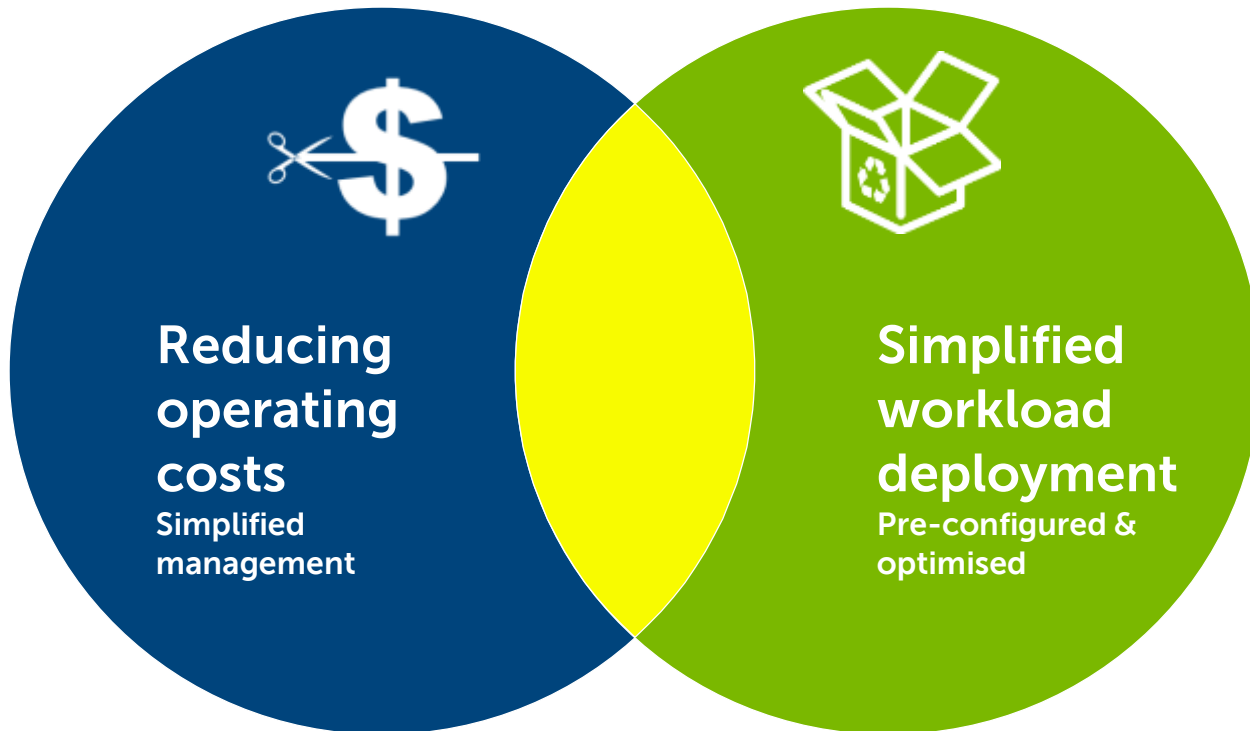
# Bridge to the Software Defined Data Center



Dell converged infrastructure allows you to innovate your data center for the future, while accommodating your existing infrastructure

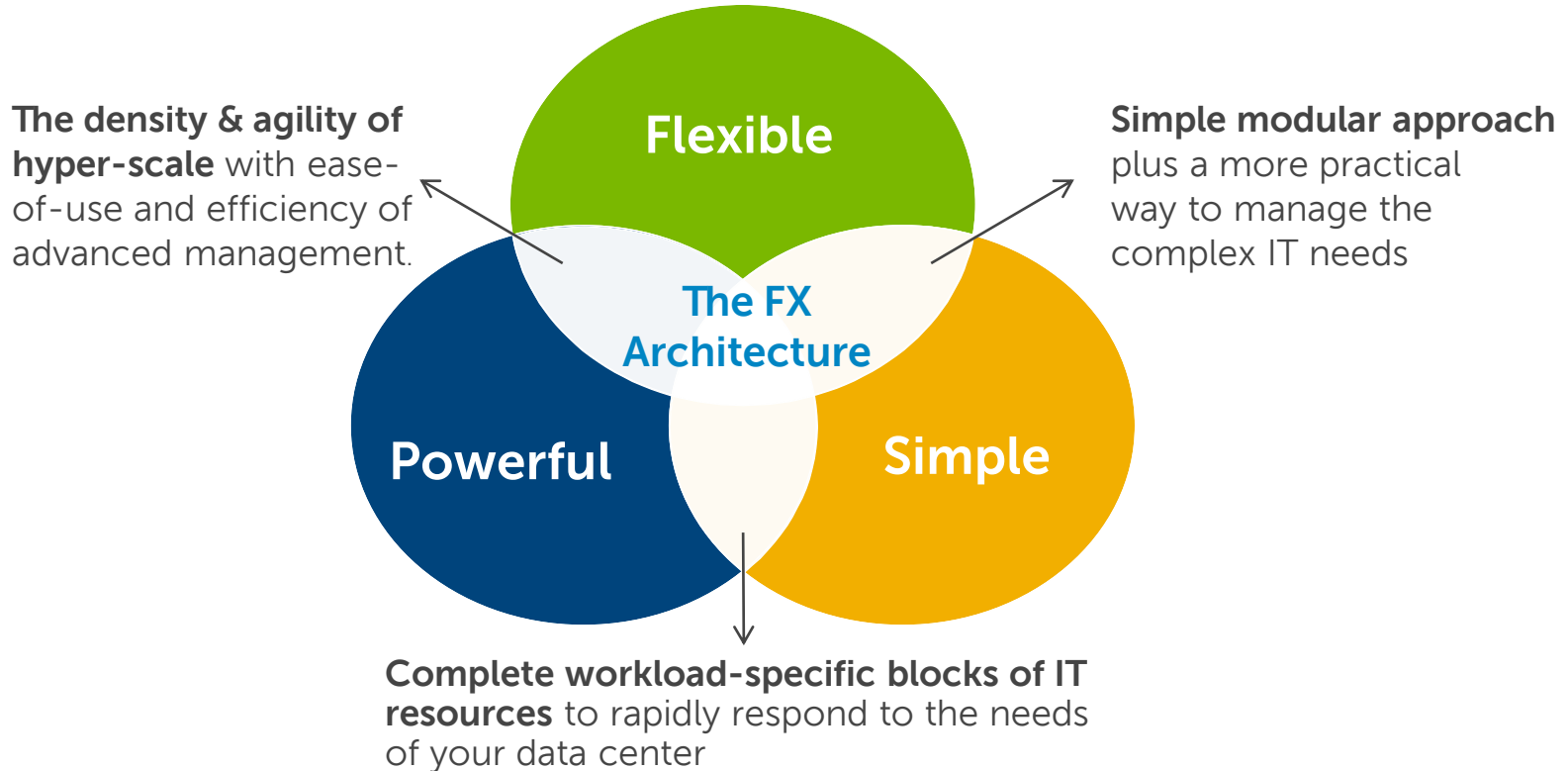


# The primary goals are about efficiency





# Dell's revolutionary approach to converged infrastructure



# Introducing the FX Architecture

Dell's revolutionary approach to converged infrastructure for enterprise computing

## Optimize Workloads

Tailor infrastructure precisely, with the right compute, storage, caching, and connectivity to meet specific workload needs

## Maximize Efficiency

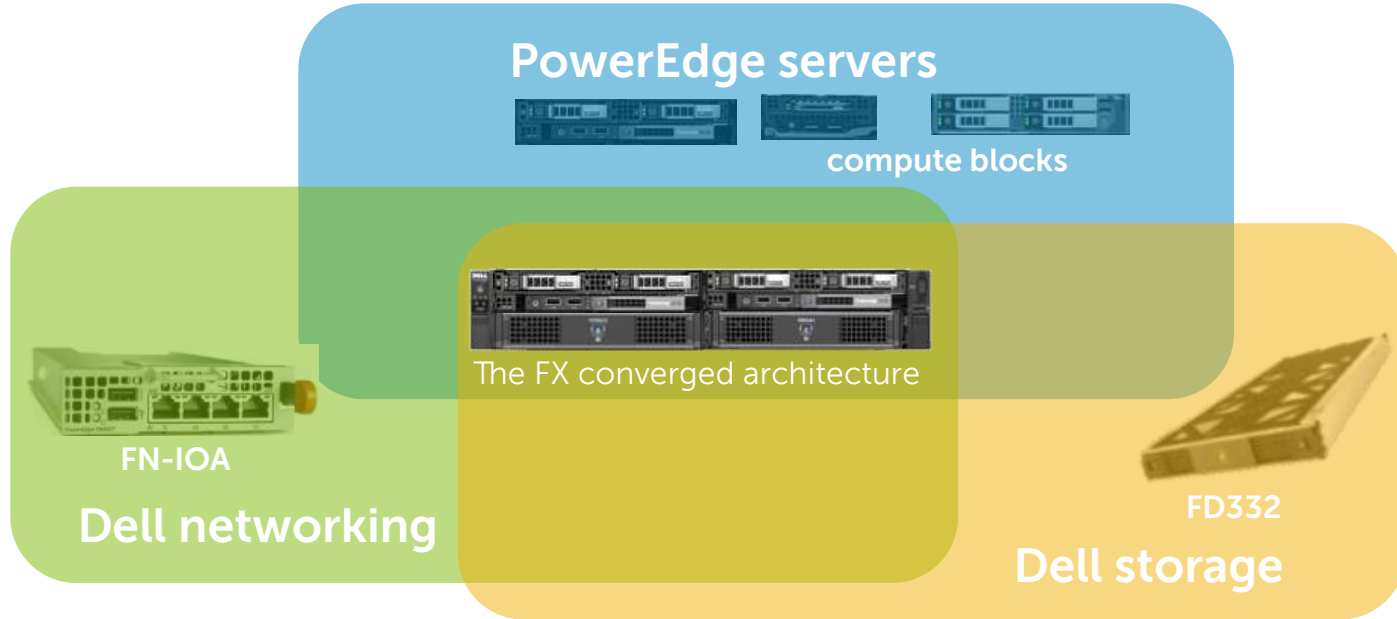
Easily and rapidly scale your workloads with an unprecedented level of density, allowing more services using fewer resources resulting in overall lower costs

## Simplify Complexity

Simplify management of increasingly complex data centers using the flexibility of FX platforms to standardize operations for higher productivity



# Converged experience and expertise



# Changing Data Center Dynamics

Data Center Customers have had to choose between rack and blade deployments - each optimized for a specific deployment

## Rack Servers



### Strong for

- Small initial investment size
- Standard form factor
- Simple to cool or power
- Industry standard PCI slots
- Small fault domain

### Limited for

- Not the most dense
- Lack of cable aggregation
- No sharing of power and cooling for efficiency

## Blade Servers



### Strong for

- Up to 60% better density
- Full server & switching modularity
- Faster physical deployment
- Easy group management
- Integrated switching up to 94% cable agg
- Best per node cooling and power

### Limited for

- Suboptimal for DAS support
- Poor economics for initial purchase of small increments
- No PCI flexibility

# The best of both worlds!

What do you get when you combine the best of blades and rack servers?



A 2U rack-based  
converged computing platform

# FX Architecture benefits

Flexible

Tailor your infrastructure precisely to your workloads with a wide variety of resource “blocks”

Scalable

Adapt quickly and dynamically to your changing IT needs at the pace of your business

Modular

Grow and deploy as needed while avoiding the excessive investment of overprovisioning

Manageable

Select management that best fits your operations



*FC630 server block  
with eight 1.8" SSDs*

The FX architecture is designed to make building workload specific solutions as easy as putting blocks together



Deploy only the resources you need...  
Only when you need them.

# 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



# Enterprise systems management

FX has all the innovative value of OpenManage, and more

## Automation

### Reduce TCO with streamlined lifecycle management processes

- “Zero Touch” automatic configuration deploys servers faster -99% reduction in configuration time
- Automated server updates require 60% less time than manual methods.
- Automated technical support - 73% reduction in troubleshooting time via real time trouble report

## Simplification

### Reduced complexity leads to lower TCO

- Enhanced agent free solution – Real-time performance monitoring and SAS storage health monitoring
- Management “at-the-box” – iDRAC Direct USB port configuration reduces configuration time by 95%
- OpenManage Essentials 2.0 – Simple one-to-many console, with profile capabilities eliminates 100s of steps

## One-to-many made simple

### FX offers management choice and makes managing one-to-many even easier

- Choice of management styles – manage servers either rack-style or chassis/blade style (with CMC)
- OpenManage Essentials 2.0 provides a graphical FX system discovery and health view
- CMC provides realistic graphical chassis layout to greatly simplify inventory and slot assignment



# PowerEdge FX: a full converged portfolio

## PowerEdge FX2



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

## Flexible solutions for every workload

### 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



# FX architecture benefits

Flexible, scalable, modular, reliable and easily manageable

- **Flexible and agile** – the wide variety of resource “blocks” lets you construct specific variations for specific workloads
- **Scales rapidly to meet needs** – modular structure lets you quickly adapt to dynamic IT needs
- **Small scale modular approach** – implementing your infrastructure resources in small increments lets you grow as you need to and avoids over provisioning
- **More highly available** – small modules means smaller failure domains, means higher overall availability
- **Choice of familiar management styles** – Use either rack-based management or blade-like CMC chassis management, whichever fits your operation

*FC630 server block  
with eight 1.8" SSDs*



# PowerEdge FX: one platform, unparalleled workload agility

## Workload examples

- VSAN
- Small Hadoop cluster

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- Storage heavy VSAN
- Performance database

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- Performance Database
- Dense virtualisation & VDI

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- Virtualisation farm
- VDI

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- Database consolidation

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- Low latency HPC

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- Physical hosting
- Light analytics

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- Virtualisation with network storage

## Example FX2 Configuration by workload

- 4 x 2-socket FC430
- 2 x FD332

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- 2 x 2-socket FC430
- 3 x FD332

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- 1 x 4-socket FC830
- 2 x FD332

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- 4 x 2-socket FC630

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- 2 x 4-socket FC830

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- 8 x 2-socket FC430

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- 4 x FM120x4

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- 8 x 2-socket FC430

## How it looks



# FX2 Solution Benefits



## Increase IT efficiency

- CapEx Reduction: Datacenter virtualisation and standardization
- OpEx Reduction: Streamlined and automated datacenter operations



## Improve agility

- Quicker deployment: Converged infrastructure with single management pane
- Easy transition path: Versatile platform for traditional and new IT
- Improve uptime: High available and resilient infrastructure



## Enable more flexibility

- Scale up/down and out/in to meet service levels with right levels of infrastructure

## FX2 Benefits

Delivering the  
**most**  
processing  
**power**  
per rack of any other platform<sup>1</sup>



Save \$  
with less than  
**17 watts**  
per server<sup>3</sup>



up to  
**50% more**  
available server-side  
storage than HP<sup>2</sup>



Up to  
**8x**  
reduction  
in networking  
cables vs Cisco<sup>4</sup>





Let's get  
started



#DellST14

Meet with Dell subject matter experts at the  
Solutions Showcase

Complete your Solutions Showcase evaluations

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address your specific requirements. Contact your  
account team for details.

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# Annexure



# 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	Availability	Expandability, I/O, Storage
<ul style="list-style-type: none"><li>• 2xCPU (to 18Cores), full server proc stack</li><li>• Up to 2xPCIe slots</li><li>• Half Height Dual Slot Blade</li><li>• Dual SD cards for redundant hypervisor</li></ul>	<ul style="list-style-type: none"><li>• 24xDIMMs (1.5TB)</li><li>• Up to 8 x1.8" SSD or 2 x 2x2.5"</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>• 4x1GbE, 2x10GbE, 4x10GbE SNAs</li><li>• Managed Persistent Storage Options - 2x Express Flash PCIe Flash SSD</li></ul>



# 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>





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



*Rear view of FX2s enclosure  
1Gb passthru IO shown, 10Gb SFP+ & FN IO Aggregator options available*

## The PowerEdge FX2 enclosure





# FX2 enclosure configuration options

## Flexible configurations based on workload needs

In the initial release, there will be two orderable configurations for the FX enclosure – half-width configurations, each available with or without PCIe switching and slots.

- **Half width configuration** – designed to house 4 half-width sleds. For the initial release that can mean either 4 (or fewer) FC620 servers, or 4 or fewer FM120x4 micro-server blocks. (There are 4 micro-servers in each FM120x4 block.)
- **Base/Entry configuration option (FX2)** – an FX enclosure configured with no PCIe switching or slots – for applications where there is no need for external access through the PCI interface. (mandatory for FM120x4)
- **Base/Entry configuration option (FX2s)** – an FX enclosure configured with PCIe switching and slots to enable PCIe expansion options.
- **Quarter and full width configurations** – Future releases of the FX2 will support quarter and full width configurations for the FC430 and FC830 respectively.

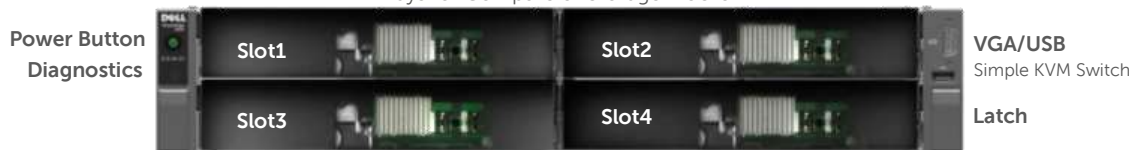


# FX2 Enclosure – front and back

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

