Cisco Unified Data Center

Business Transformation with Cisco UCS

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"A good hockey player plays where the puck is. A great hockey player plays where the puck is going to be."

Wayne Gretzky – One of Hockey's greatest

Focus on Top 5 Cisco Priorities

Core
routing, switching, services, including security & mobility

Collaboration

**Data Center/ Virtualization and Cloud**

Video

Architectures for Business Transformation

Today's Business Drivers.....

- Reduce CapEx / OpEx:

  Reduce Hardware Costs

  Lower Management cost

- Increase Profitability

- Improve Service Delivery

- Mitigate Risks:

  Eliminate Unplanned Downtimes

  Meet Compliance Standards

  Prevent Data Loses

Enabling The Cloud Computing Journey

Hybrid Cloud

Public Cloud

Community Cloud

Private Cloud

Automation

Consolidation
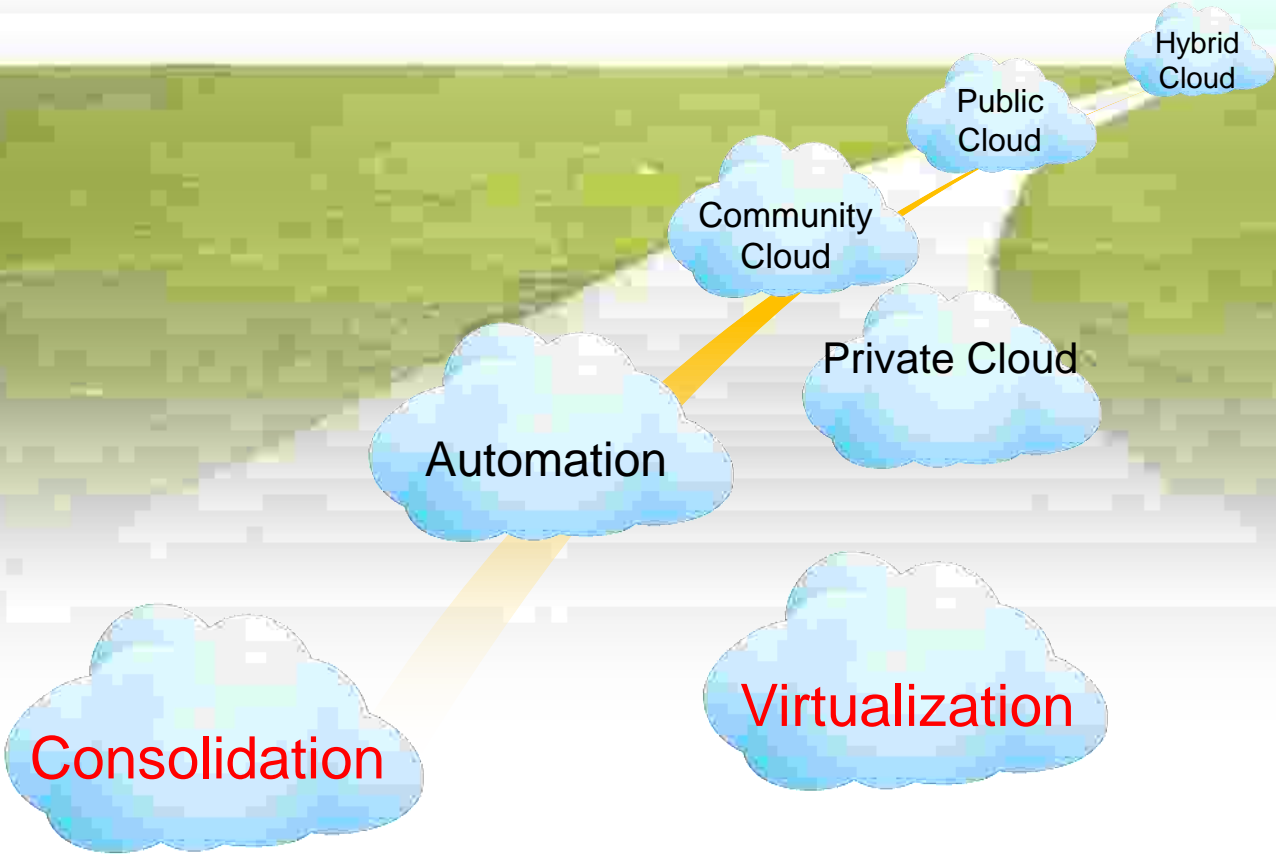
Virtualization

Virtualization Benefits

- Some key benefits:

  Maximizes utilisation of resources

  Elasticity and Faster provisioining

  High Availability and Failover capabilities

  Server portability

- Virtualization is **not** limitted to servers and OS

  Network virtualization (VLANs, VPNs, MPLS)

  Storage virtualization (VSAN, LUNs ..etc)

  Application virtualization (Streaming)

  Desktop virtualization

Virtualization Challenges
LAN/SAN Dependency

- **Server Virtualization is Highly Dependent on the Network "LAN and SAN"**

- **Workload mobility (i.e. Vmotion) requires All servers to have SAN connectivity**

- **Workload mobility requires High Performance LAN access layer**

- **Workload mobility required Scalable L2 Domains**

- **The Virtual Networking Challenge : `who owns the virtual Network**

Our Solution : Cisco's Unified Data Center
The Platform for Delivering IT as a Service

UNIFIED
COMPUTING

Modular, Stateless
Computing Elements

UNIFIED
FABRIC

Highly Scalable,
Secure Network Fabric

UNIFIED
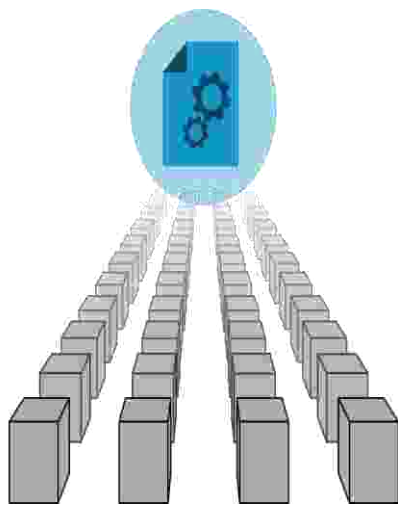### MANAGEMENT

Automated
Resource Management
(Physical and Virtual)

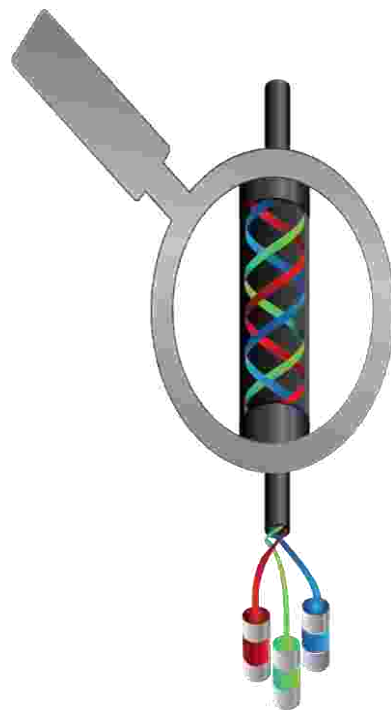**FLEXIBLE** | **RESILIENT** | **SECURE** | **SCALABLE**

Unique Design of Cisco UCS Automates and Reduces Complexity
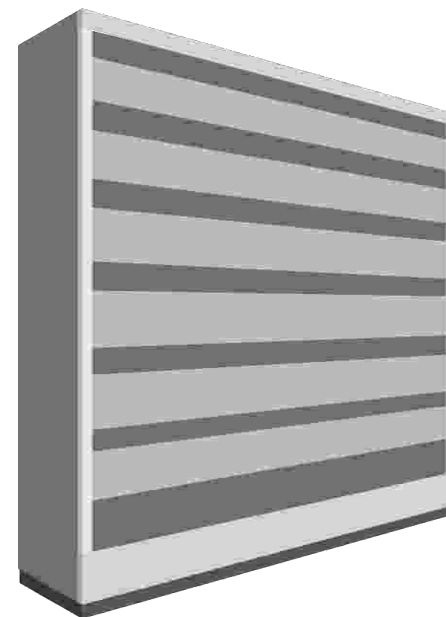
APPLICATION CENTRIC

UCS Manager Service Profiles define server identity for rapid deployment.

Treat hardware like software

CISCO SINGLECONNECT TECHNOLOGY

One connection for LAN, SAN, and management.
Physical and Virtual
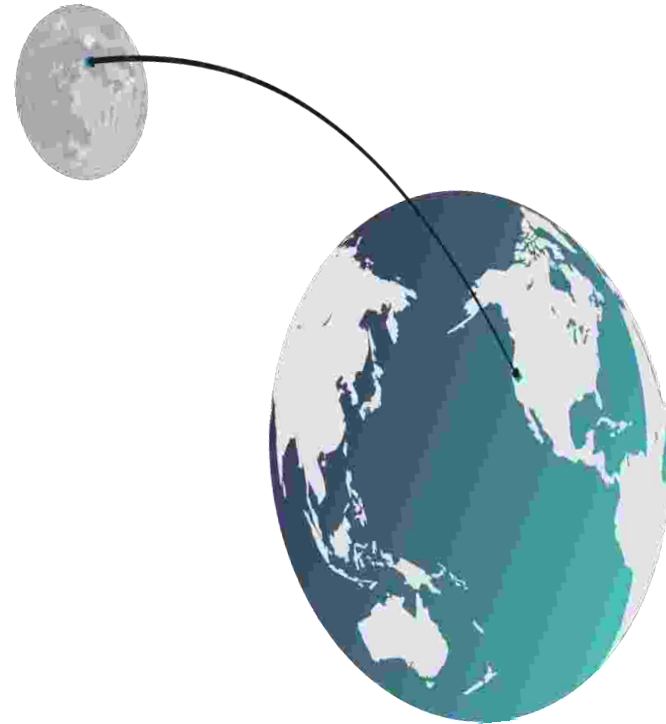Rack and Blade

SINGLE UNIFIED SYSTEM

Designed from the ground up to integrate computing, networking, storage access and virtualization for greater operational simplicity

If Cisco UCS Had Been Deployed in Every Data Center Over the Last 5 Years

221 Years of Admin Time

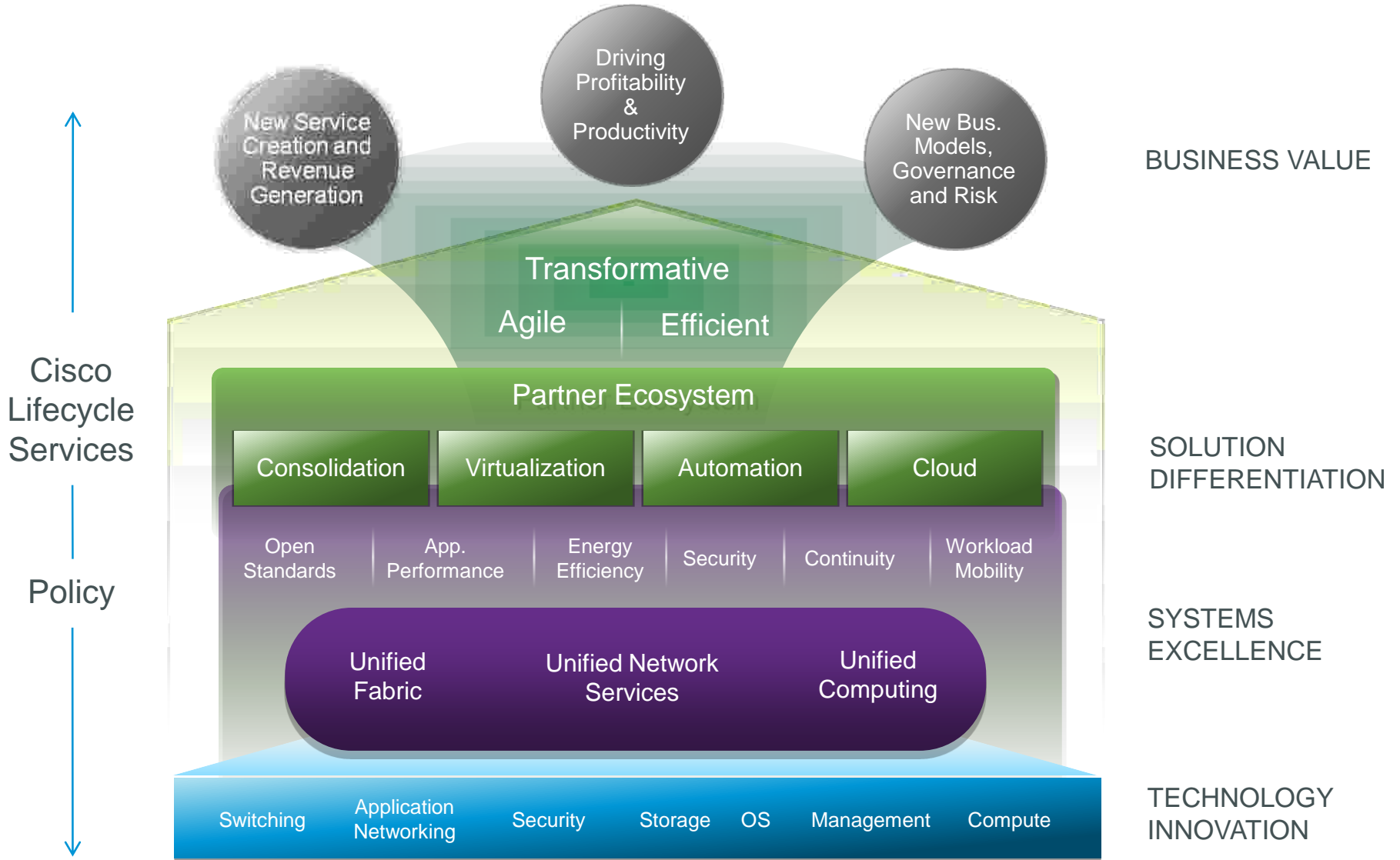could have been saved by deploying UCS blade servers

238,900 Miles

of cables could have been saved by deploying UCS rack servers with SingleConnect
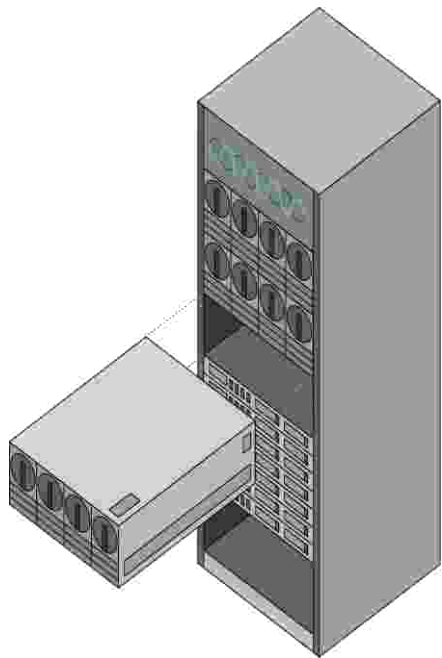
Data Center Business Advantage

New Service Creation and Revenue Generation

Driving Profitability & Productivity

New Bus. Models, Governance and Risk

BUSINESS VALUE

Transformative

Agile | Efficient

Cisco Lifecycle Services

Partner Ecosystem

| Consolidation | Virtualization | Automation | Cloud |

SOLUTION DIFFERENTIATION

| Open Standards | App. Performance | Energy Efficiency | Security | Continuity | Workload Mobility |

Policy

Unified Fabric | Unified Network Services | Unified Computing

SYSTEMS EXCELLENCE

| Switching | Application Networking | Security | Storage | OS | Management | Compute |

TECHNOLOGY INNOVATION

Operational Simplicity

GROWS WITH YOUR APPLICATIONS

Single point of management eliminates complexity as you add capacity
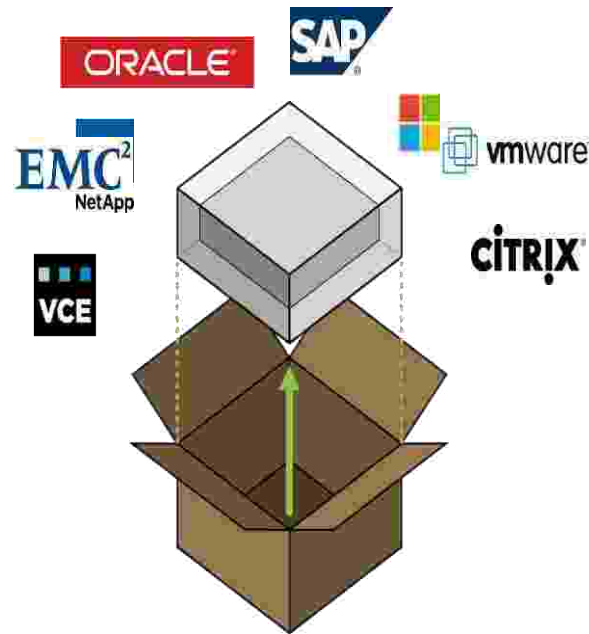
VALIDATED INTEGRATED SOLUTIONS

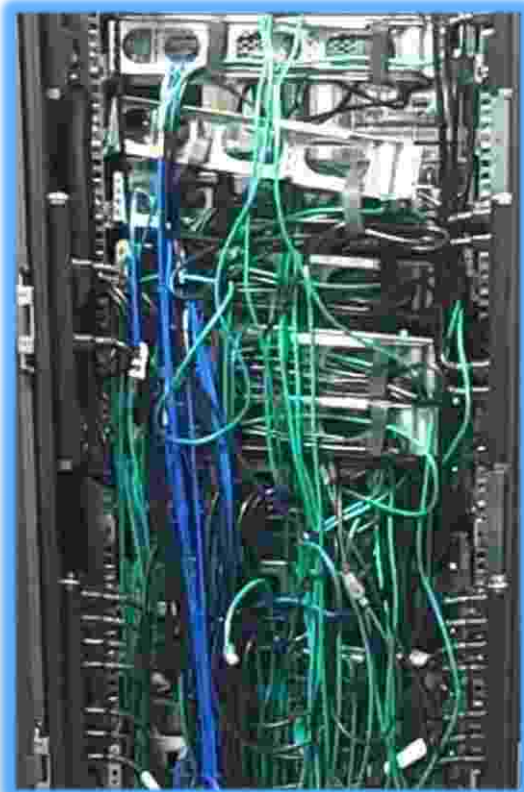Speeds your deployment and reduces risk

OPEN API

Automation ready for Virtualization and Cloud, deep integration with industry-standard tools

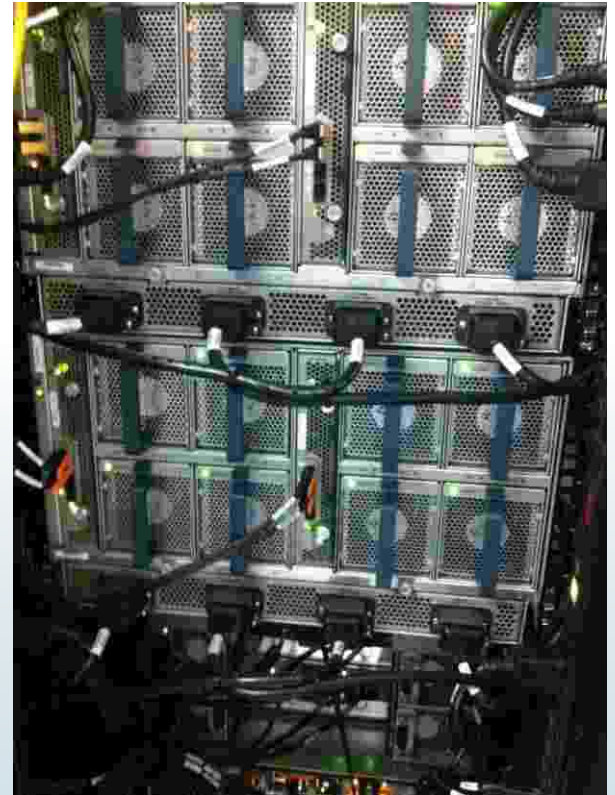# From Cabling to Your Data Center Organization – UCS Simplifies

From ad hoc and inconsistent…

…to structured, but siloed, complicated and costly…

…to simple, optimized and automated
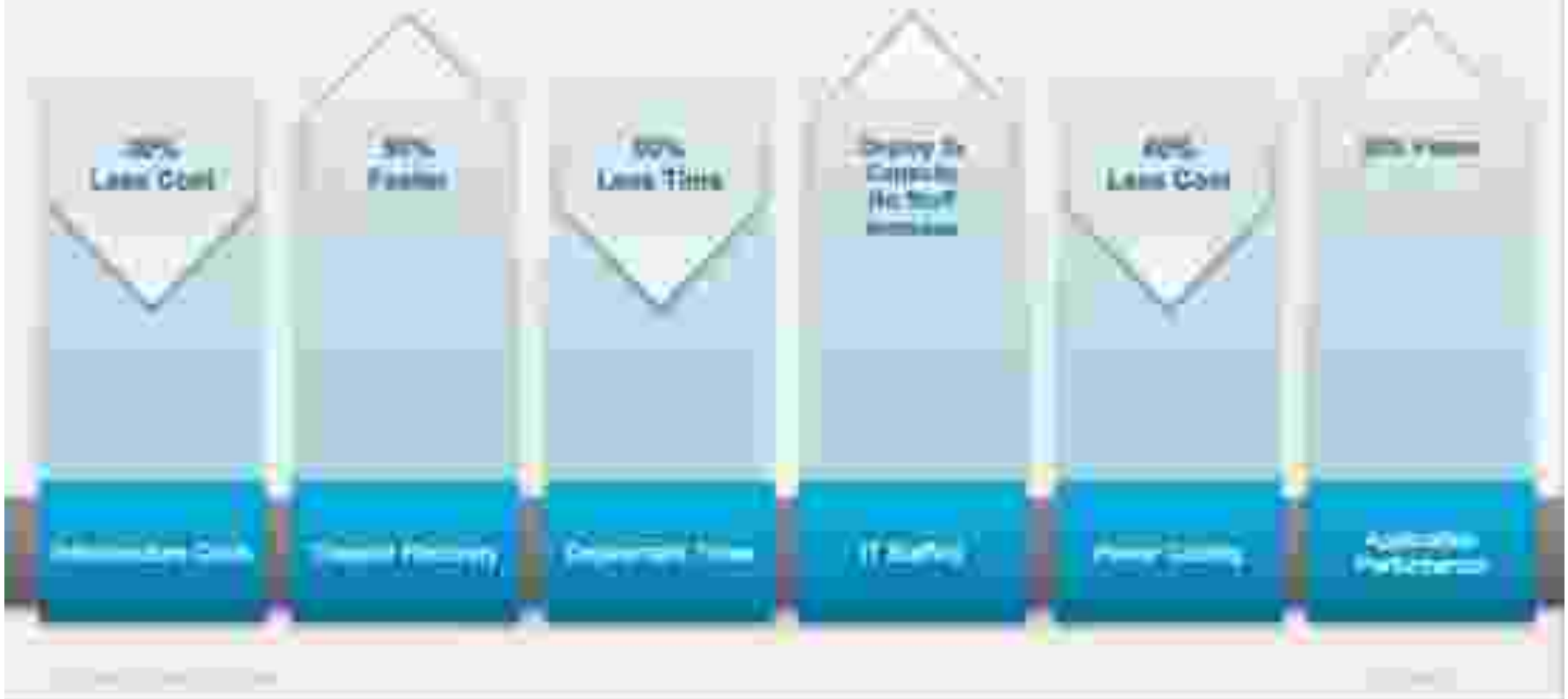
UCS Success Story…..

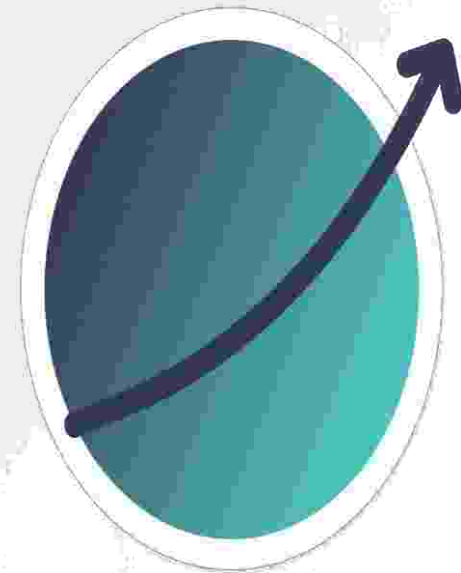# Cisco UCS - A Market Leader in Just 5 Years

45,000 Cisco UCS Customers, 85% of Fortune 500 Customers
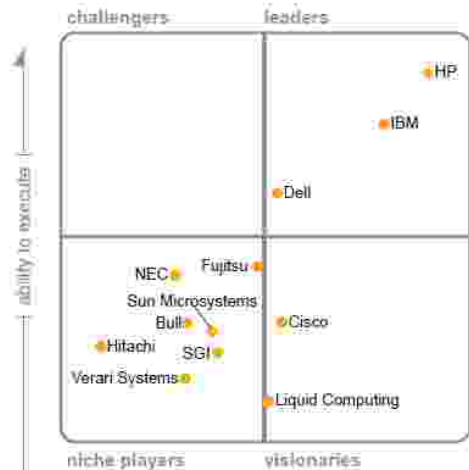
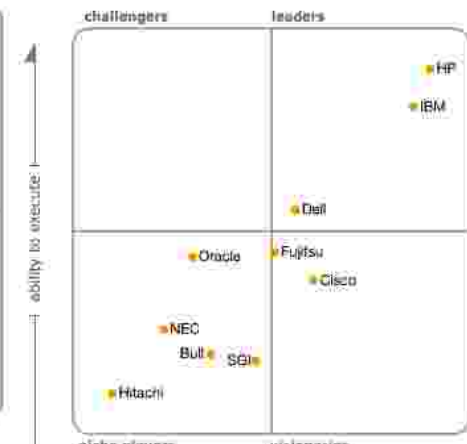120 Industry Performance Records Achieved[1]

From Unknown to Universal

#2 Worldwide in the Blade Server Market, Leader in Gartner Magic Quadrant[1]

Sources[1] : Cisco UCS Performance Benchmarks, Gartner 2013 Magic Quad for Blade Servers

Gartner Magic Quadrant – Blade Servers Market Cisco UCS Evolution
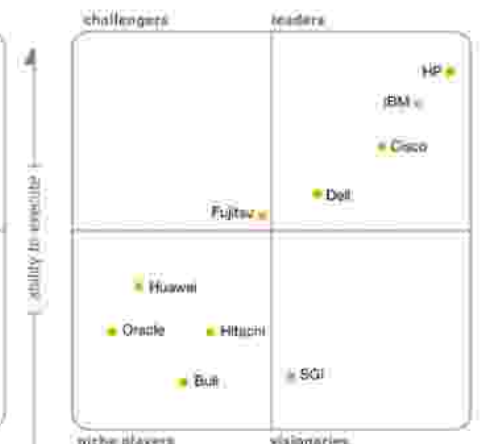
2009   **2011**   **2012**   **2013**

Overview GARTNER 2013

Gartner has published the 2013 Blade Server Magic Quadrant. **Cisco UCS is in the Leader quadrant for the second consecutive year and has dramatically risen in that category. In 2012 UCS was just over the Leader line and in 2013 the Cisco dot has been placed nearly half way up the Leader Quadrant significantly closing the gap between established leaders HP and IBM**. HP dropped down in the Quadrant and IBM did slightly move up on HP…more likely because HP dropped rather than any market disruptive moves by IBM.

Cisco Unified Computing System

Fastest Growing Product in the Market

43,800+ UNIQUE UCS CUSTOMERS [2]

#1 Americas revenue market share in x86 blades [1]

Data Center Annualized Revenue Run Rate [2]

$3B+

Top 5 Server Vendor [1]

More than **85%** of all **Fortune 500** customers have invested in UCS

3,770+ UCS CHANNEL PARTNERS

120 world record performance benchmarks to date
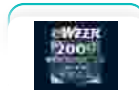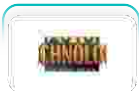
Source: 1 IDC Worldwide Quarterly Server Tracker, 2014Q4, March 2015, Vendor Revenue Share
Source: 2 As of Cisco Q4FY14 earnings results Data Center Revenue is defined as Cisco UCS and Nexus 1000V

Cisco UCS Leading Overall Server Growth (Y/Y)
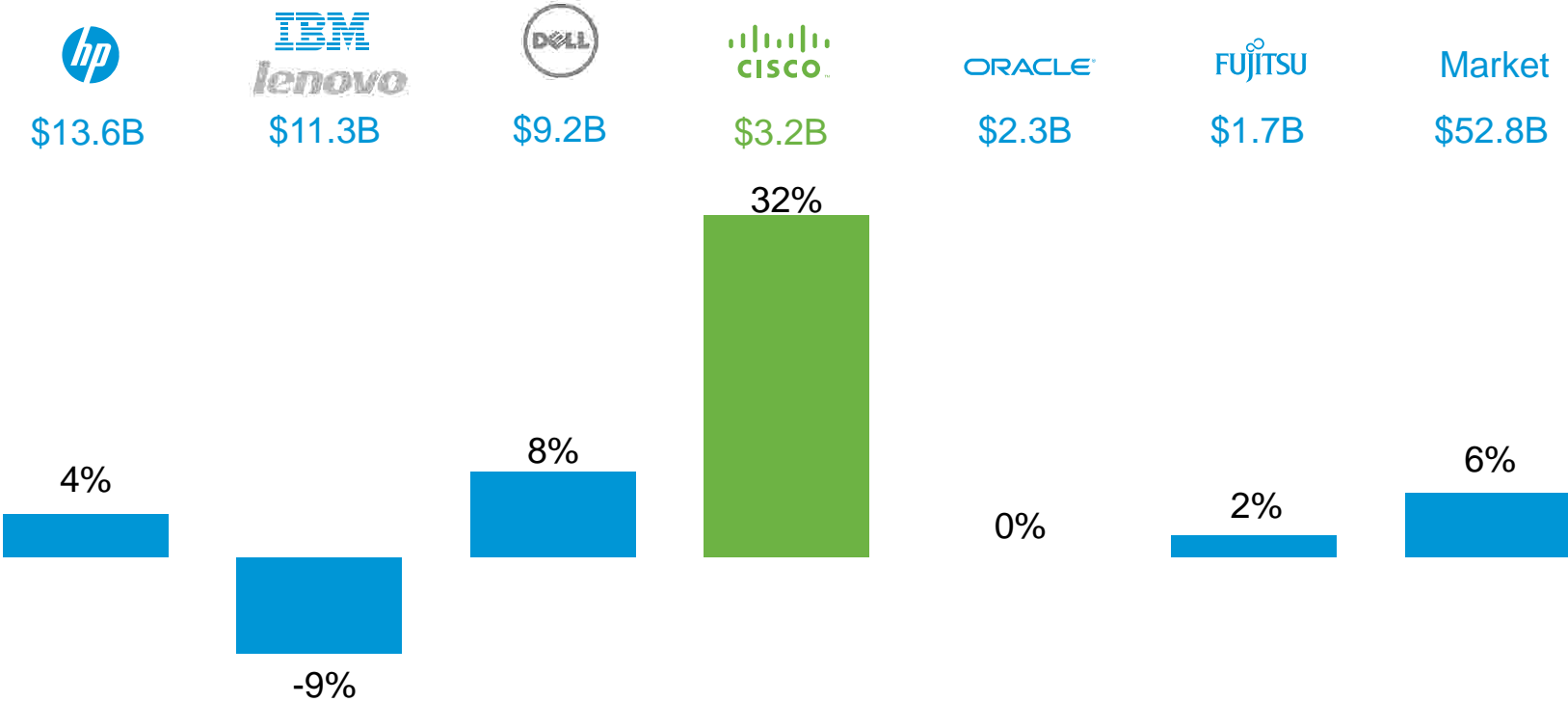
hp	IBM lenovo	Dell	CISCO	ORACLE	FUJITSU	Market
$13.6B	$11.3B	$9.2B	$3.2B	$2.3B	$1.7B	$52.8B
4%	-9%	8%	32%	0%	2%	6%

Source: IDC Worldwide Quarterly Server Tracker, 2015 Q1, May 2015, Vendor Revenue Share for top vendors. Y/Y growth based on cumulative 4 quarters revenue (Q2CY14 – Q1CY14).

Cisco UCS Leading X86 Blade Server Growth (Y/Y)
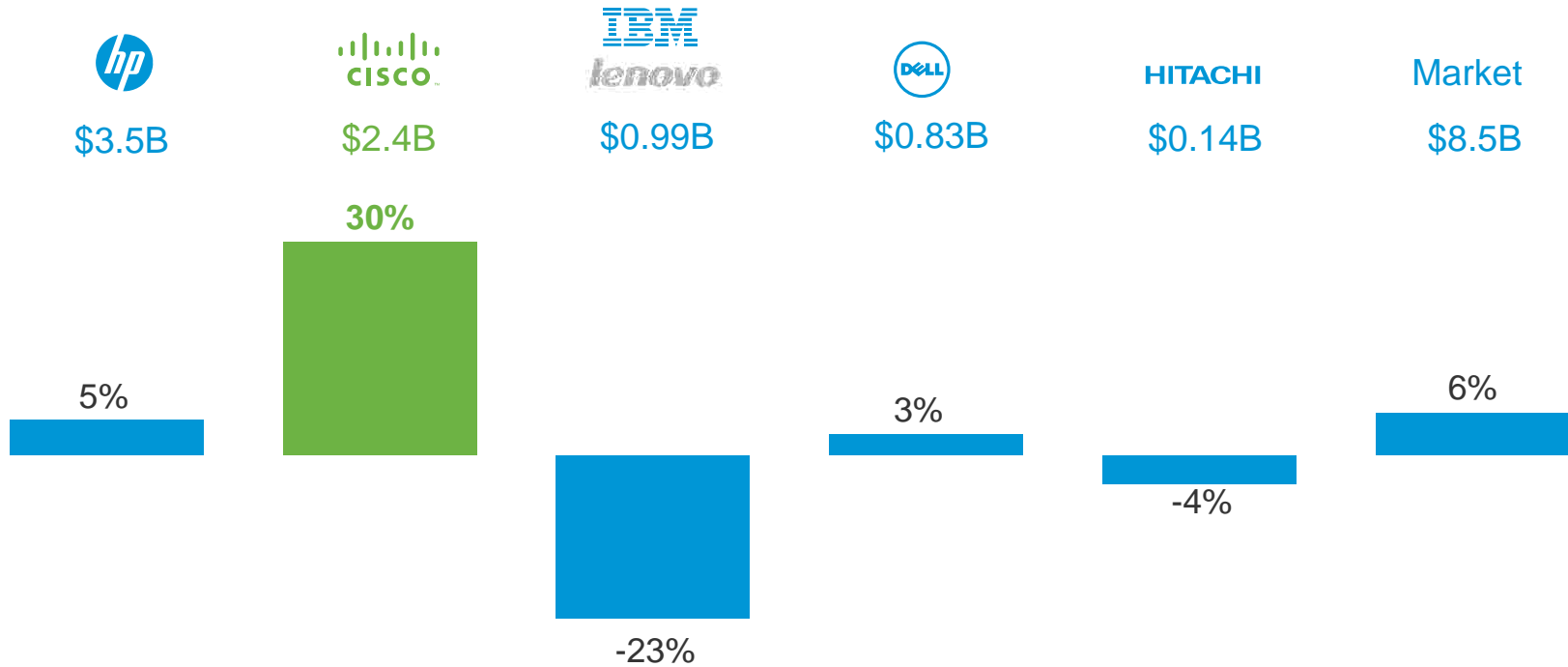
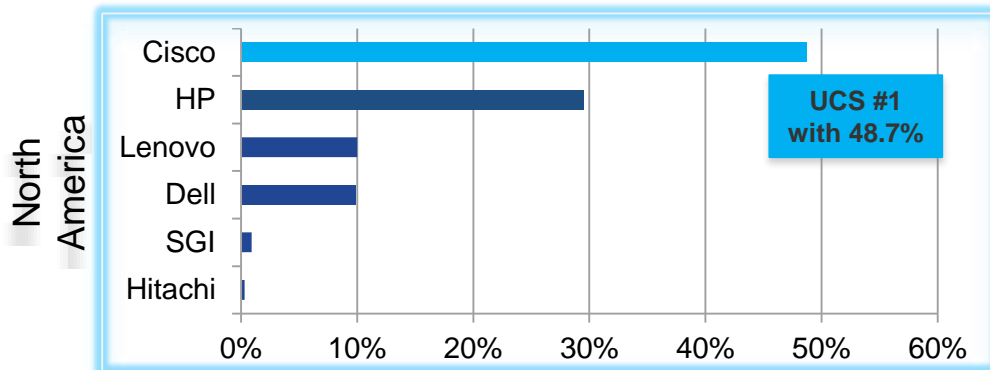| hp	CISCO	IBM / lenovo	DELL	HITACHI	Market
$3.5B	$2.4B	$0.99B	$0.83B	$0.14B	$8.5B

5% | **30%** | -23% | 3% | -4% | 6%

Source: IDC Worldwide Quarterly Server Tracker, 2015 Q1, May 2015, Vendor Revenue Share for top vendors. Y/Y growth based on cumulative 4 quarters revenue (Q2CY14 – Q1CY15).

X86 Server Blade Market Share CY 2015 Q1

North America

Cisco
HP
Lenovo
Dell
SGI
Hitachi

UCS #1
with 48.7%

0% 10% 20% 30% 40% 50% 60%

Worldwide

HP
Cisco
Dell
Lenovo
Hitachi
Huawei
Fujitsu

UCS # 2
with 33.6%

0% 10% 20% 30% 40%

#1 in North America for CY15Q1 (48.7%), growing revenue 47% YoY1

#2 Worldwide for CY15Q1 (33.6%)1 growing revenue 41% YoY1
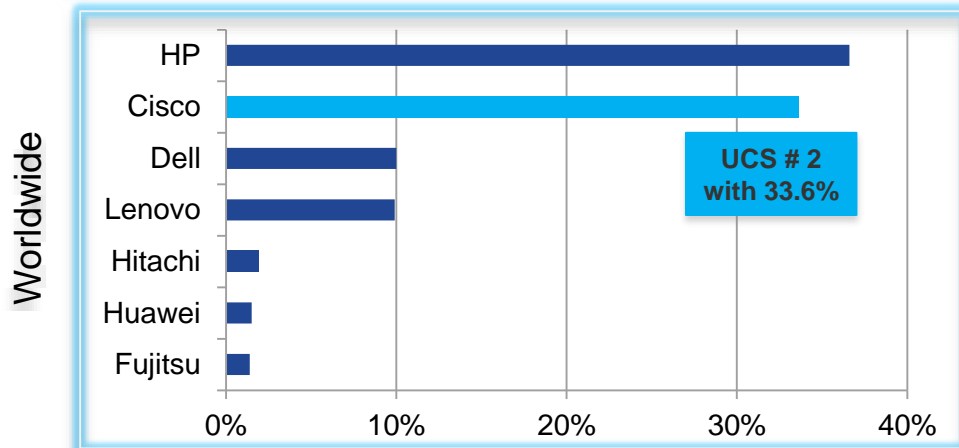
UCS momentum
    43,800+ Unique Customers
    20,800+ Repeat Customers

Source: 1 IDC Worldwide Quarterly Server Tracker, 2015 Q1, May 2015, Vendor Revenue Share

X86 Server Blade Market Share CY 2015 Q1

US

Cisco | HP | Dell | Lenovo | SGI | Fujitsu

UCS #1
with 48.8%

0% 10% 20% 30% 40% 50% 60%

Worldwide

HP | Cisco | Dell | Lenovo | Hitachi | Huawei | SGI

UCS # 2
with 33.6%

0% 10% 20% 30% 40%

#1 in US for CY15Q1 (48.8%), growing revenue 49% YoY1

#2 Worldwide for CY14Q1 (33.6%)1 growing revenue 41% YoY1
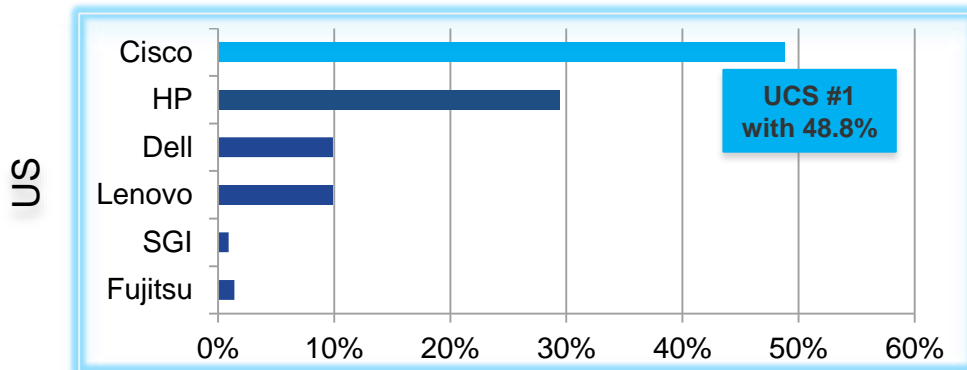
UCS momentum
   43,800+ Unique Customers
   20,800+ Repeat Customers

Source: 1 IDC Worldwide Quarterly Server Tracker, 2015 Q1, May 2015, Vendor Revenue Share

X86 Server Blade Market Share CY 2015 Q1

Americas

UCS #1 with 47.1%

(Chart: Cisco, HP, Dell, Lenovo, SGI, Hitachi — axis 0% to 50%)

Worldwide

UCS # 2 with 33.6%

(Chart: HP, Cisco, Dell, Lenovo, Hitachi, Huawei, Fujitsu — axis 0% to 40%)

#1 in Americas for CY15 Q1 (47.1%), growing revenue 48% YoY1

#2 Worldwide for CY15 Q1 (33.6%)1 growing revenue 41% YoY1

UCS momentum
- 43,800+ Unique Customers
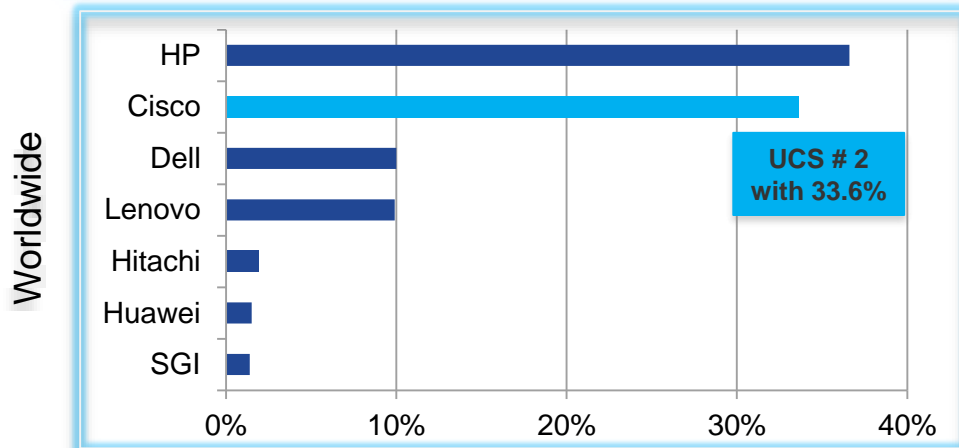- 20,800+ Repeat Customers

X86 Server Blade Market Share CY2015 Q1

EMEA

HP
Cisco — UCS #2 with 23.8%
Dell
Lenovo
Groupe Bull
Fujitsu

0% 10% 20% 30% 40% 50% 60%

Worldwide

HP
Cisco
Dell — UCS # 2 with 33.6%
Lenovo
Hitachi
Huawei
Fujitsu

0% 10% 20% 30% 40%

#2 in EMEA for CY15 Q1 (23.8%), growing revenue 38% YoY1

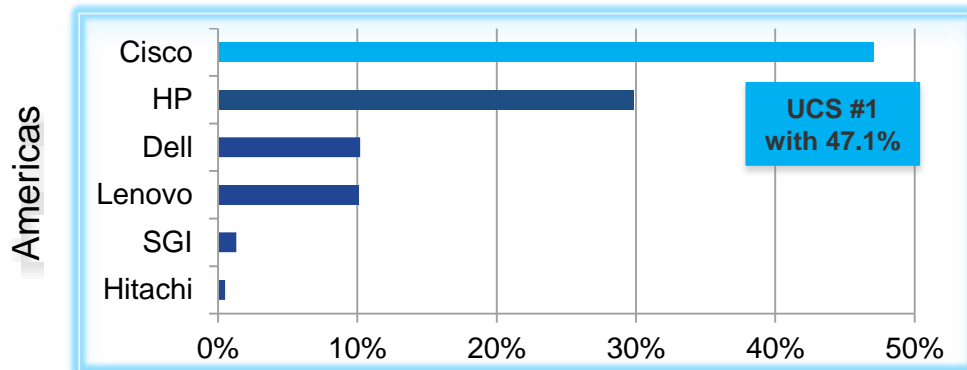#2 Worldwide for CY15 Q1 (33.6%)1 growing revenue 41% YoY1

UCS momentum
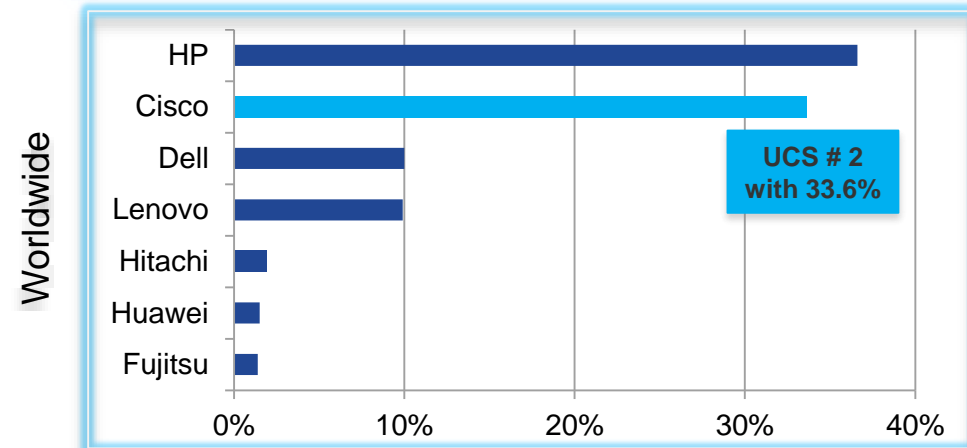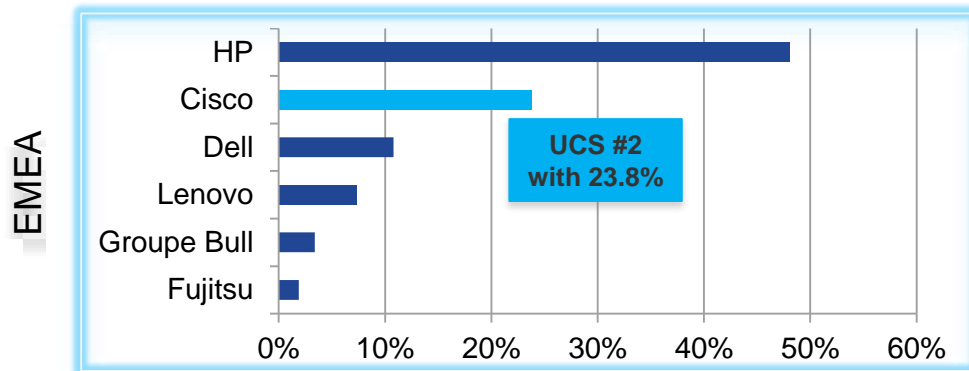   43,800+ Unique Customers
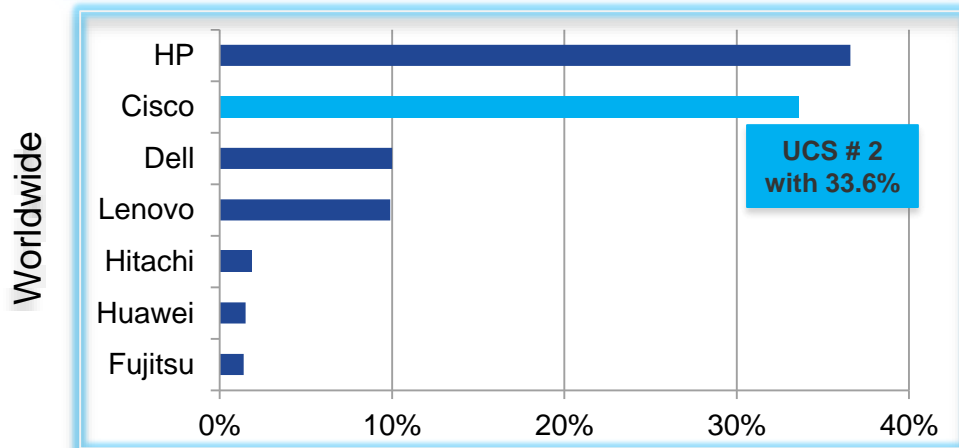   20,800+ Repeat Customers

Source: 1 IDC Worldwide Quarterly Server Tracker, 2015 Q1, May 2015, Vendor Revenue Share

Cisco UCS: Foundation for Integrated Infrastructure
Cisco is #1 and a Partner in ~50% of All Integrated Infrastructure Solutions

Integrated Infrastructure Market Share
(Q4 2014 vendor revenue)

Dell
6.6%

Others
2.2%

Lenovo
5.5%

HP
16.0%

Hitachi
2.4%

EMC
16.9%
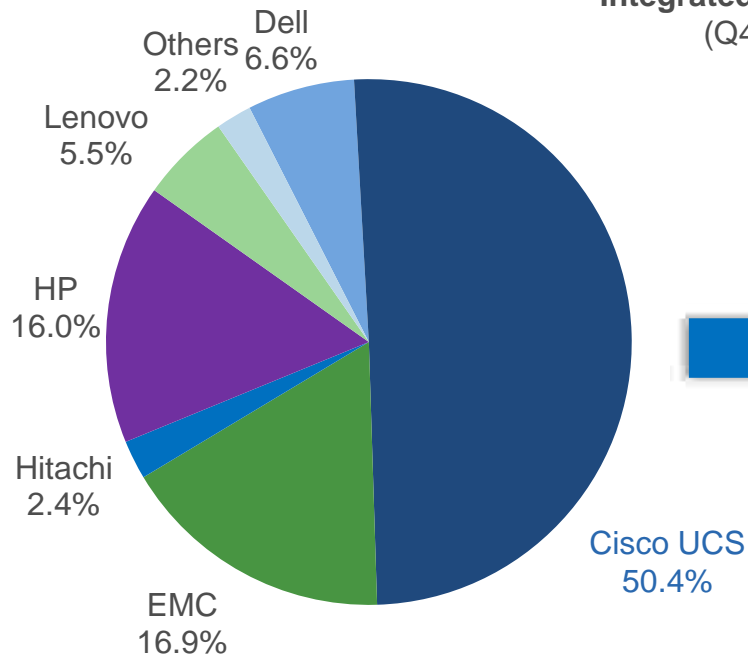
Cisco UCS
50.4%

With Cisco UCS

Cisco/NetApp
21.8%

VCE
28.6%
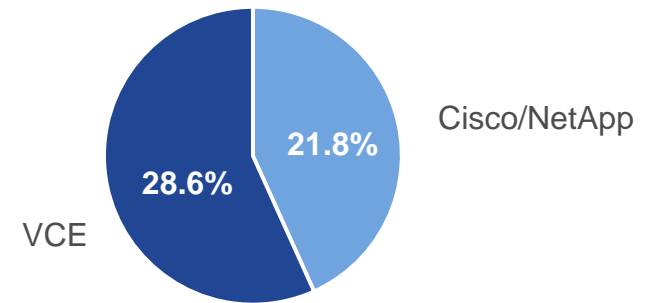
Cisco is exclusive in the top 2
solutions – Vblock and FlexPod

Source: IDC Worldwide Integrated Infrastructure & Platforms Tracker Q4 2014 Vendor Revenue

UCS Customers in Africa
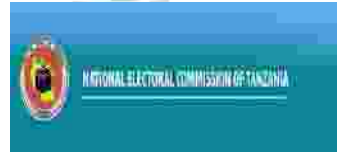
UCS Portfolio…..

Many Form Factors, One system

Single Unified System

Cisco UCS
Fabric Interconnect

Cisco UCS
Fabric Extender

- Rack and Blade form factors in a common resource pool

- Self Integrating System

- Add capacity without complexity

B-Series Blade Servers

C-Series Rack Mount Servers
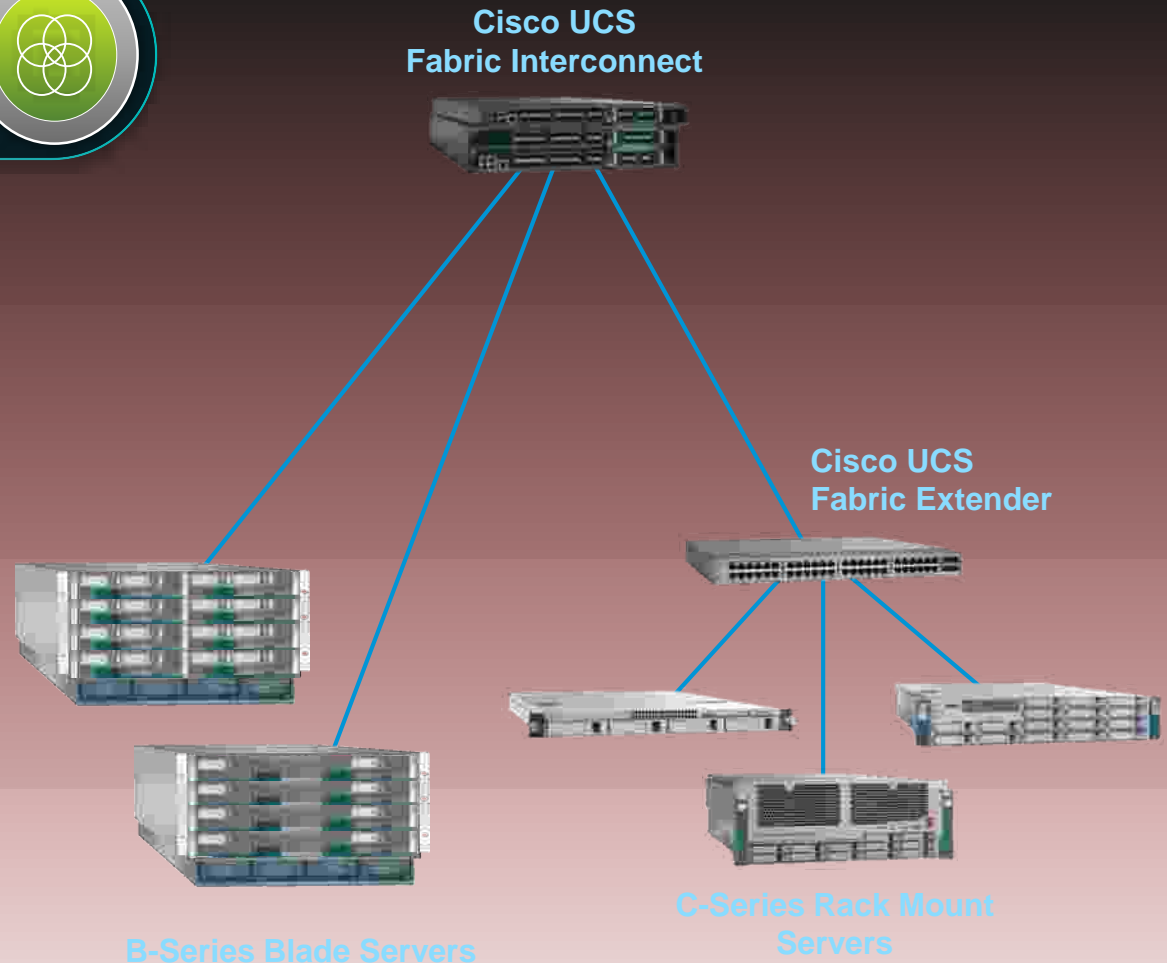
UCS Building Blocks

UCS Manager
Embedded in FI (B-Series Servers) or
Within C-Series Server

CIMC

UCS Fabric Interconnect
UCS 6200 48/96 Unified Ports

UCS 6248/6296

UCS Fabric Extender
4-Port and 8-Port 10Gb FCoE

UCS 2204

UCS 2208

Nexus 2xxx

UCS Blade Server Chassis
Flexible bay configurations

UCS 5108

UCS Blade or Rack Server
Industry-standard architecture

UCS B-Series Blade Servers

UCS C-Series Rack Servers

UCS Virtual Interface Card
Choice of multiple adapters

UCS M72KR-Q
UCS M72KR-E
UCS M81KR VIC

UCS 1240 VIC
UCS 1280 VIC
UCS P81E VIC

UCS Components

Cisco UCS 6248UP Fabric Interconnect

Cisco UCS 2208XP Fabric
(Up to 2 in Each Chassis)

Cisco UCS 5
Blade Serve
(Up to 40 pe
to 320 Half-

Cisco UCS B-Series
Blade Servers

Cisco UCS B260 M2 Extended
Memory Blade Server

Cisco UCS B440 M2
Blade Server

Cisco UCS B200 M2
Blade Server
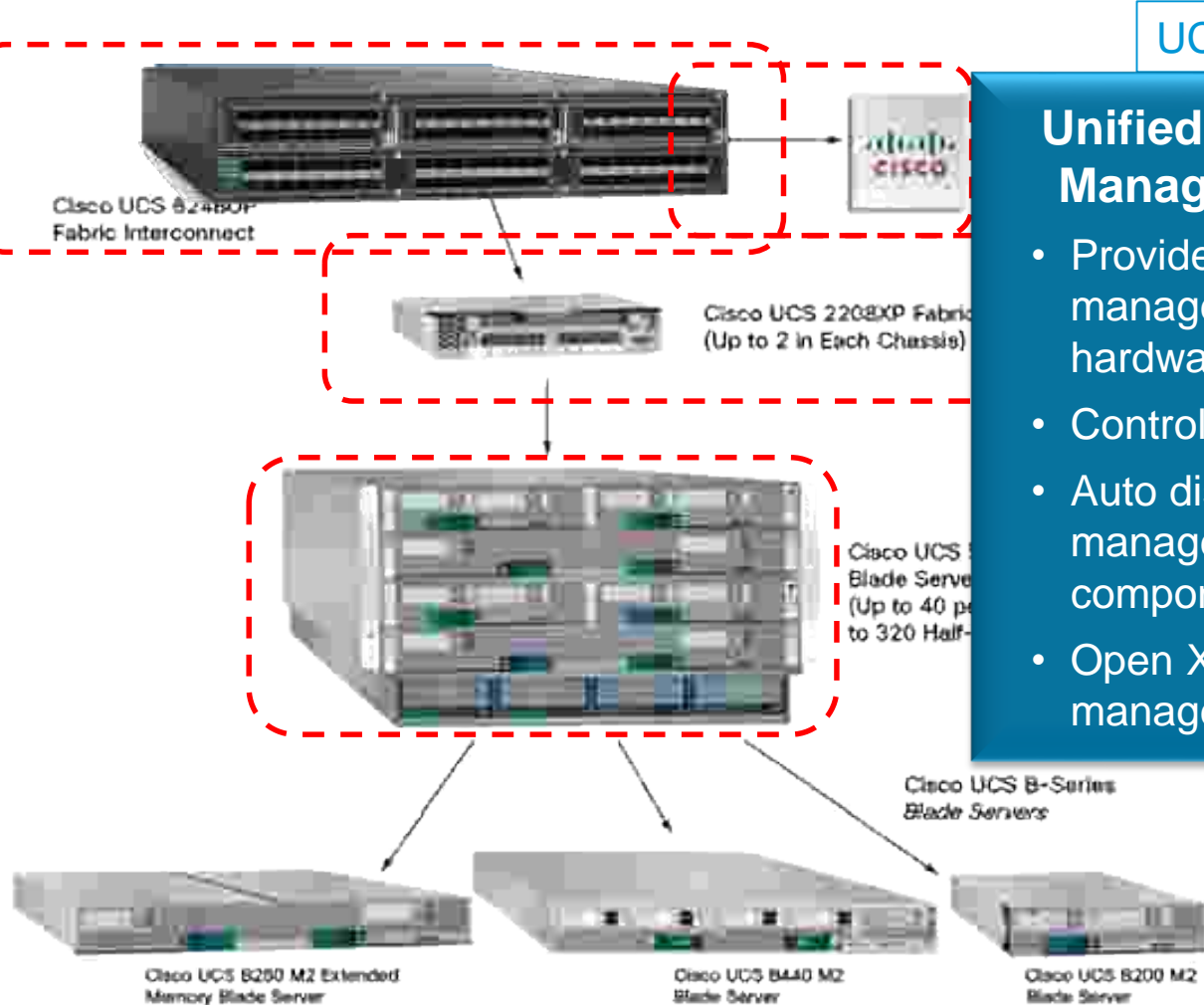
UCS 2208

Unified Computing System (UCS) Manager – Single Pane of Glass

- Provides unified, embedded management of all software and hardware components in the UCS
- Controls multiple chassis
- Auto discovery to detect, inventory, manage, and provision system components that are added or changed
- Open XML API integrates with third-party management tools

Putting UCS Technologies Together
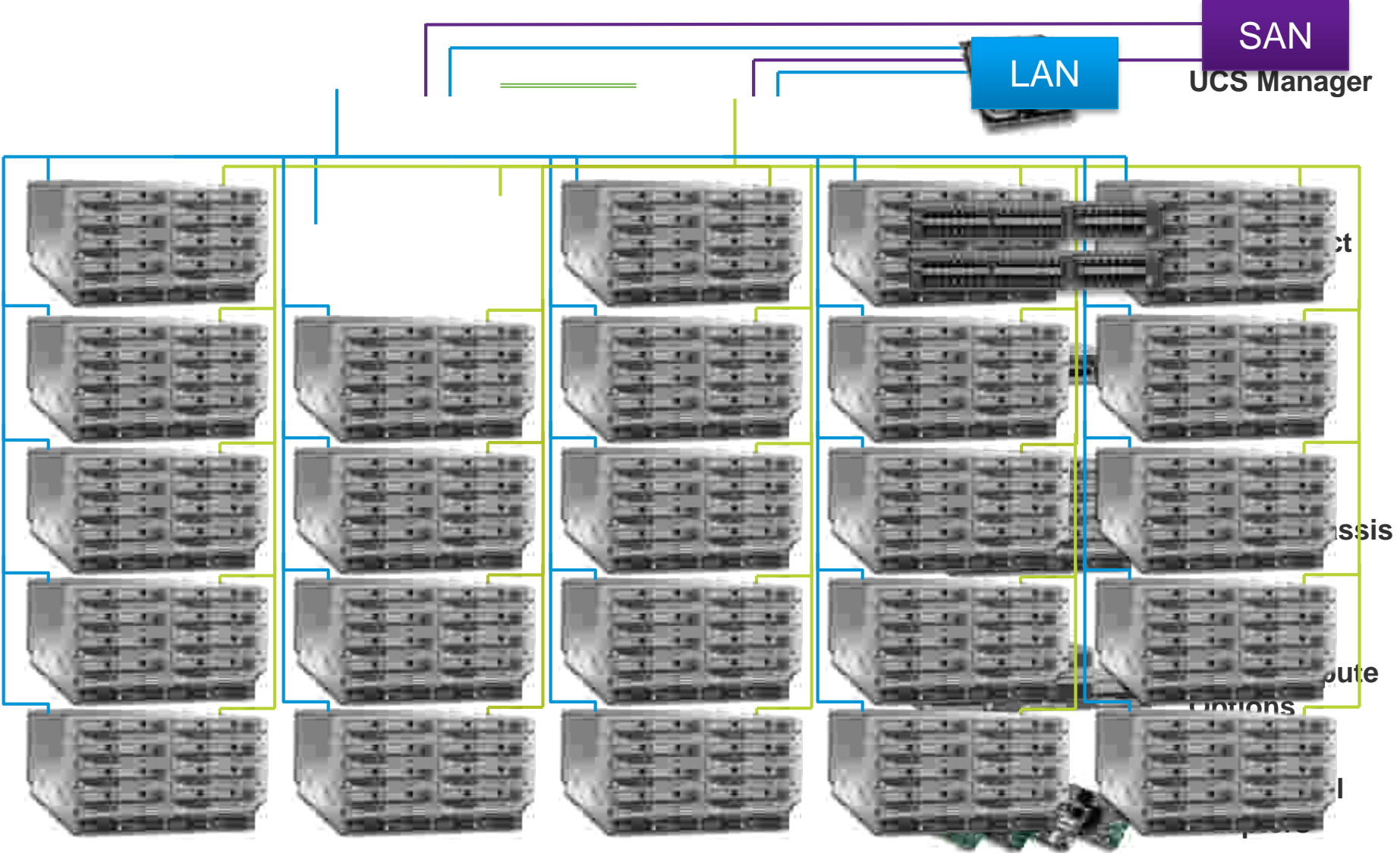
Legacy Blade Architecture
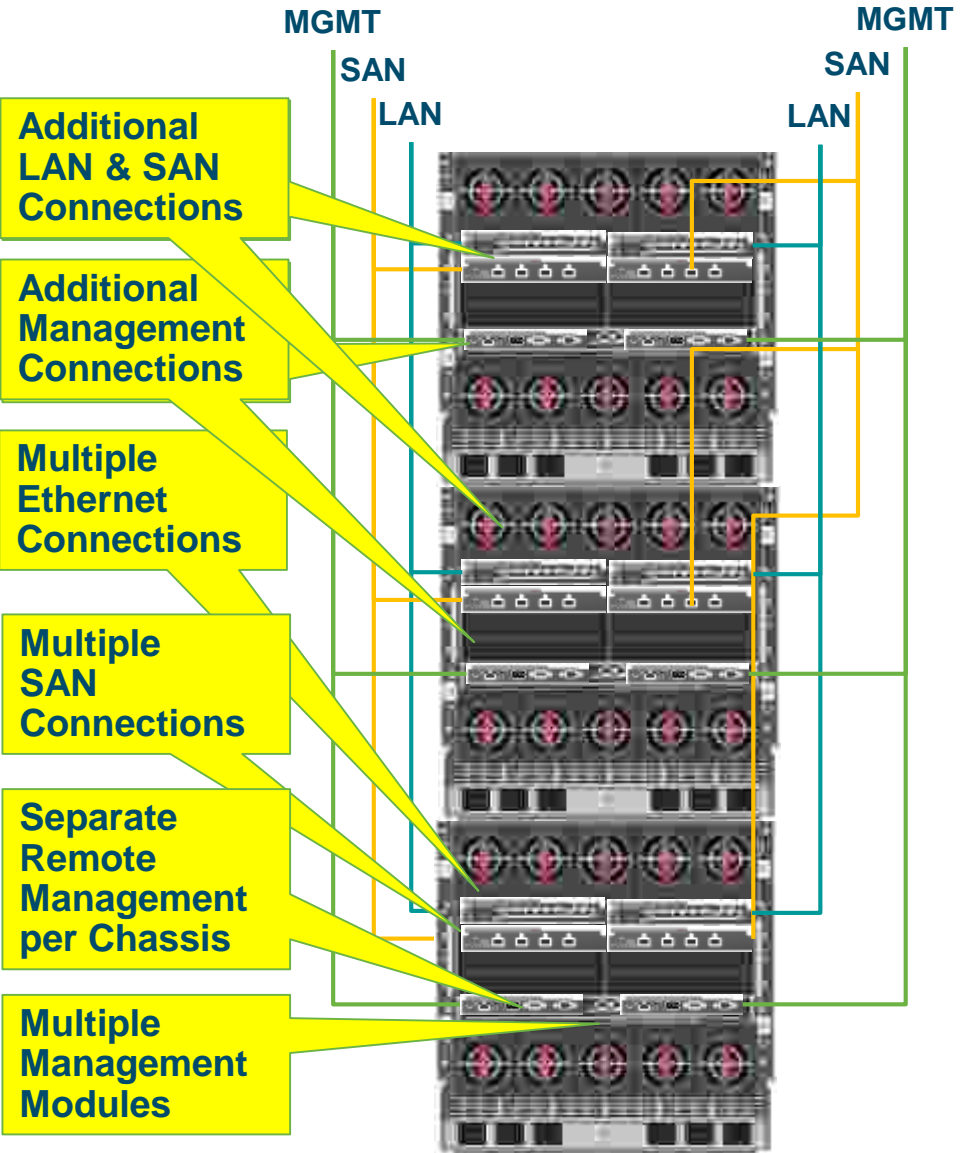
MGMT

SAN

LAN

MGMT

SAN

LAN

Additional LAN & SAN Connections

Additional Management Connections

Multiple Ethernet Connections

Multiple SAN Connections

Separate Remote Management per Chassis

Multiple Management Modules

- **Over the past 10 years**
  - A... ...e, not th...
  - M... ...itches th...
  - M... ...server
  - Ma... ...ed, not in...

- **An acci... ...ture**

- **Result:**
  - M... m...
  - M... ...aintain po...
  - M... ...cure
  - **More difficult to scale**
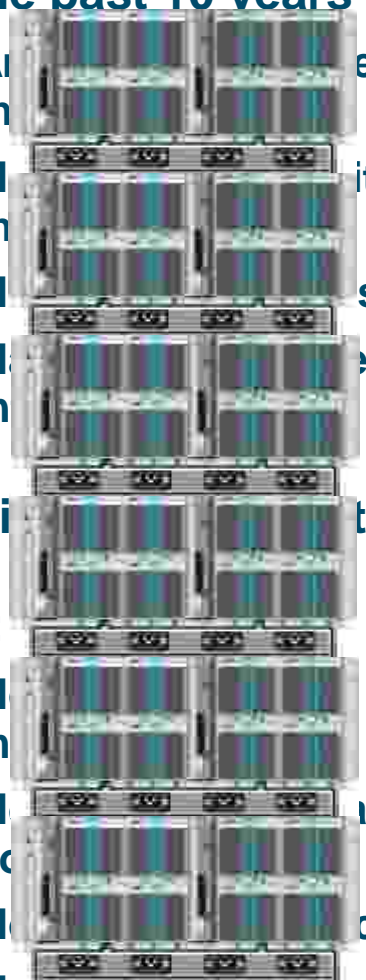
Cisco UCS – Reducing Complexity
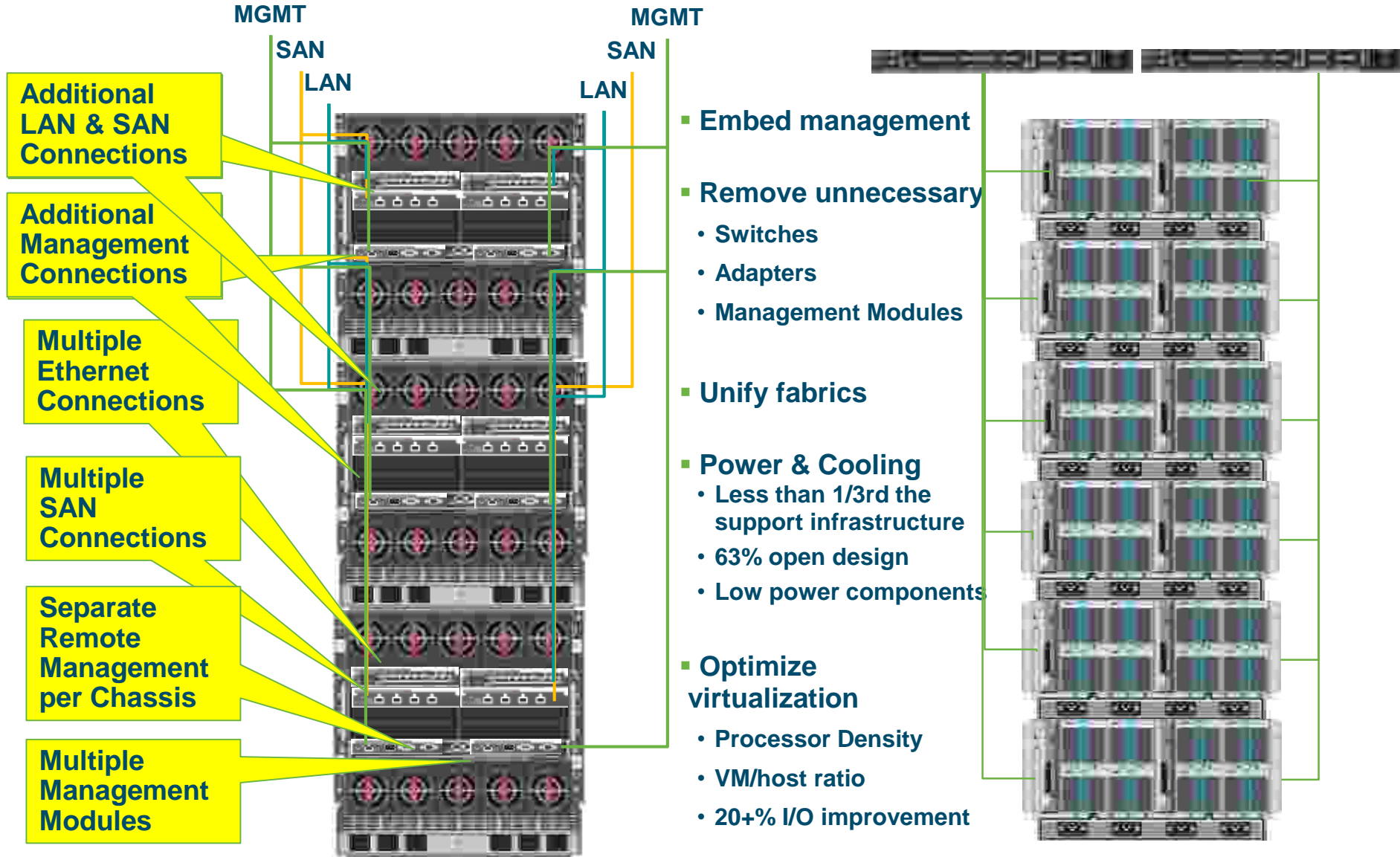
MGMT

SAN

LAN

MGMT

SAN

LAN

Additional LAN & SAN Connections

Additional Management Connections

Multiple Ethernet Connections

Multiple SAN Connections

Separate Remote Management per Chassis

Multiple Management Modules

- **Embed management**

- **Remove unnecessary**
  - **Switches**
  - **Adapters**
  - **Management Modules**

- **Unify fabrics**

- **Power & Cooling**
  - **Less than 1/3rd the support infrastructure**
  - **63% open design**
  - **Low power components**

- **Optimize virtualization**
  - **Processor Density**
  - **VM/host ratio**
  - **20+% I/O improvement**

Overall System (Front)

Fabric Interconnects

Chassis
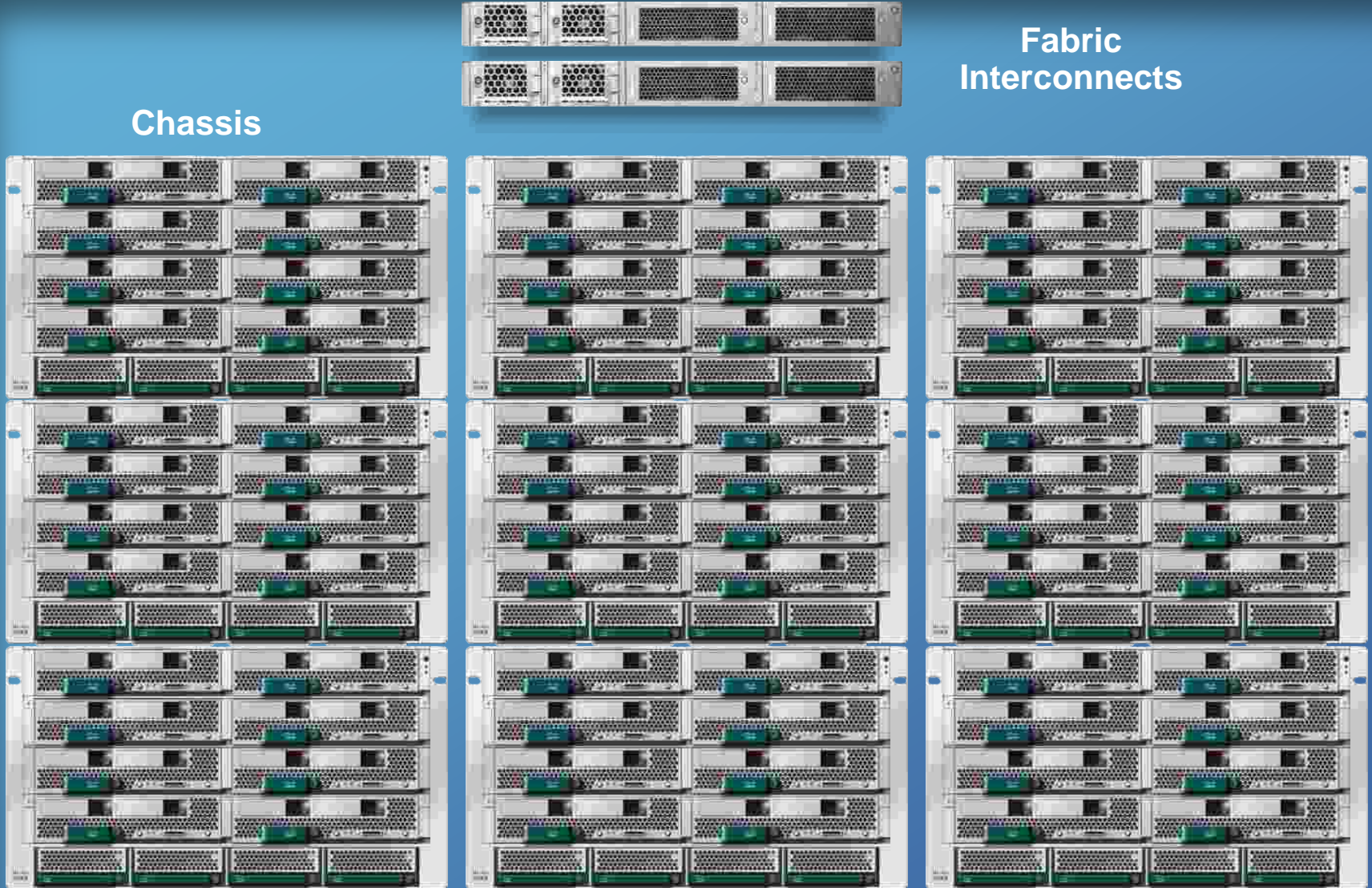
Fabric Interconnect Cabling Options

A

B

Scalability
20GB bandwidth
per chassis

Balance
40GB bandwidth
per chassis

Bandwidth
80GB bandwidth
per chassis

Mix scalability, balance, and bandwidth options in a single
environment based on bandwidth needs
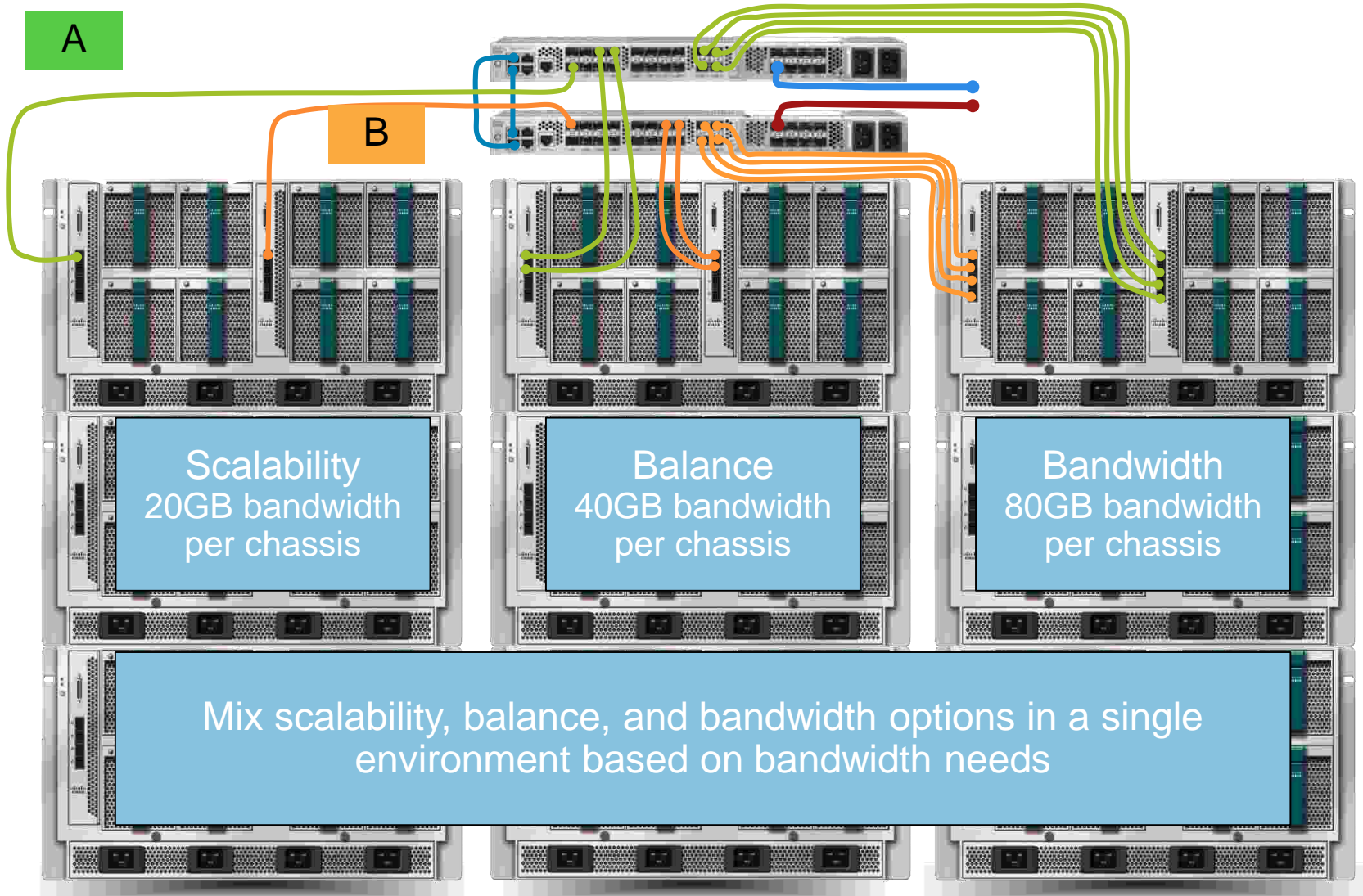
Virtualization Driving the need to for Unified Fabrics

FC HBA — SAN (FC)

FC HBA — SAN (FC)

NIC — LAN (Ethernet)

NIC — LAN (Ethernet)

CNA ← LAN (Ethernet)
← SAN (FCoE)

CNA ← SAN (FCoE)
← LAN (Ethernet)
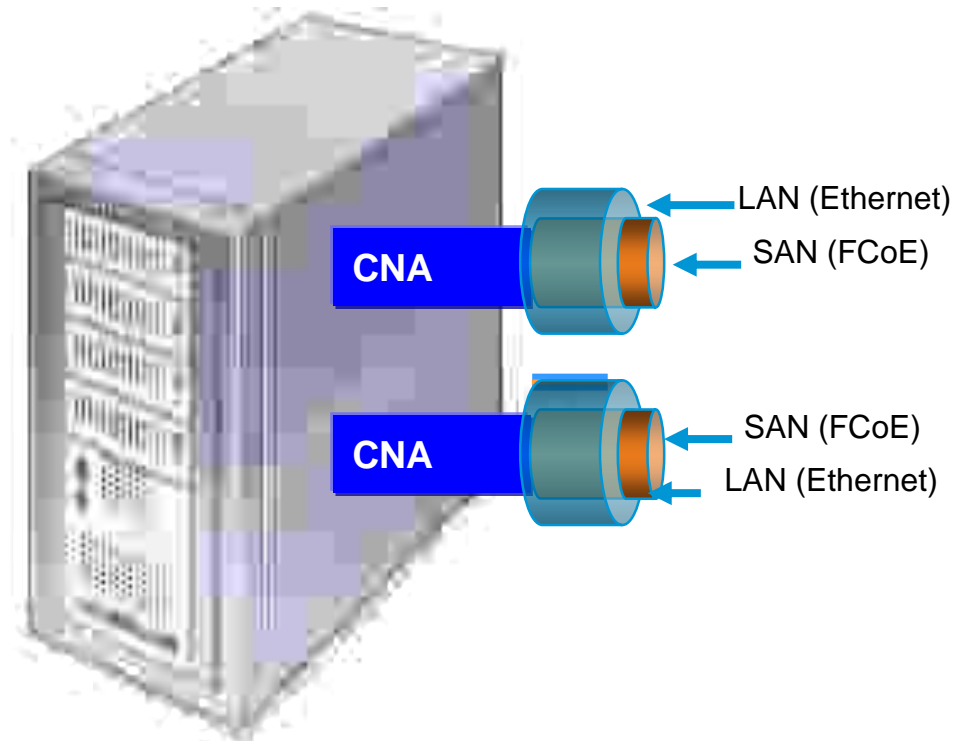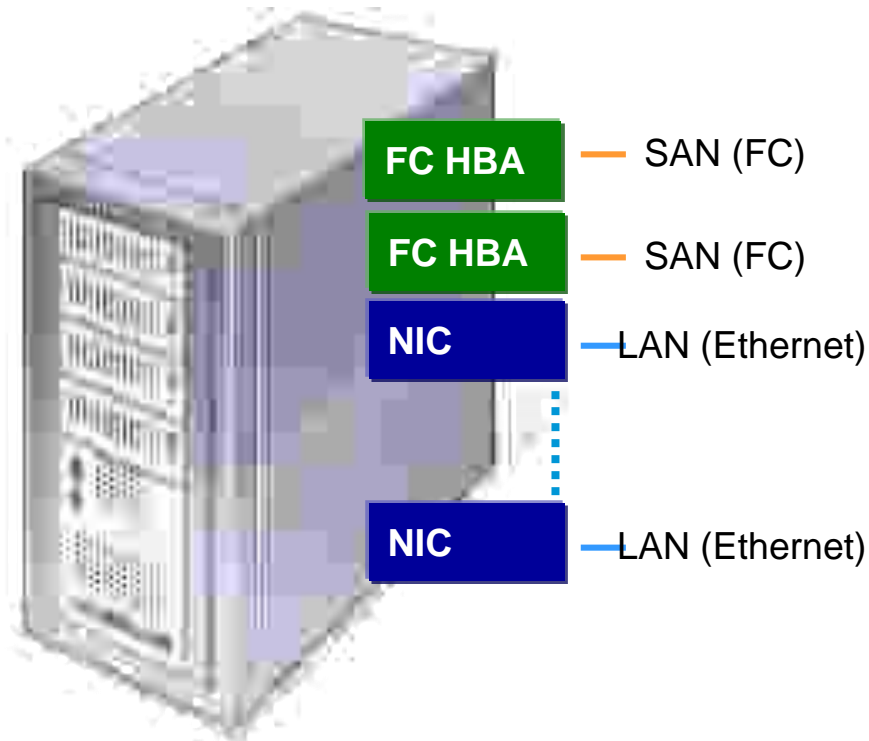
CNA = Converged Network Adapter

UCS Components
UCS Blade Servers
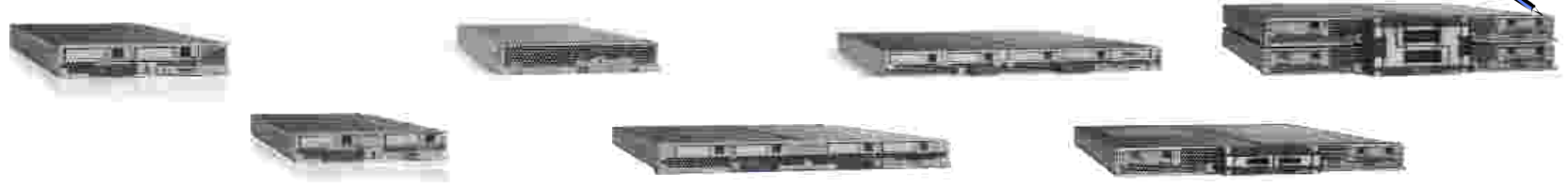
	B22 M3	B200 M3	B200 M4	B230 M2	B420 M3	B440 M2	B260 M4	B460 M4
Blade Size	Half-Width	Half-Width	Half-Width	Half-Width	Full-Width	Full-Width	Full-Width	Double-High, Full-Width
CPU	E5-2400 v2 and E5-2400	E5-2600 v2 and E5-2600	E5-2600v3	E7-2800/8800	E5-4600 v2 and E5-4600	E7-4800/8800	E7-2800/4800/8800 v2	E7-4800/8800 v2
Max Cores	20	24	36	20	48	40	30	60
DIMM slots	12 DDR3	24 DDR3	24 DDR4	32 DDR3	48 DDR3	32 DDR3	48	96
Max memory	384 GB*	768 GB	768GB	512 GB	1.5 TB	1 TB	1.5 TB (32 GB) 3 TB (64 GB)*	3 TB (32 GB) 6 TB (64 GB)*
Local disk	2 x 2.5"	2 x 2.5"	2 x 2.5"	2 x SSD	4 x 2.5"	4 x 2.5"	2 x 2.5"	4 x 2.5"
IO throughput	Dual 40Gb/s	Dual 40Gb/s	Dual 40Gb/s	Dual 40Gb/s	Dual 80Gb/s	Dual 80Gb/s	Dual 80Gb/s	Dual 160Gb/s
Mezz slots	2	2	2	1	3	2	3	6

UCS Components

UCS Rack Servers
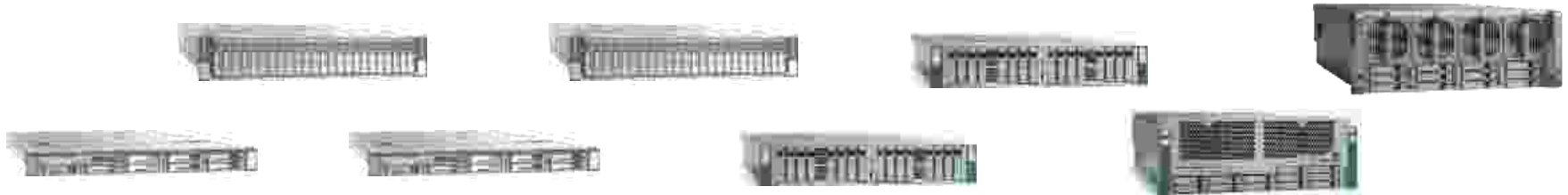
|	C22 M3	C24 M3	C220 M3	C220 M4	C240 M3	C240 M4	C260 M2	C420 M3	C460 M2	C460 M4
RU	1	2	1	1	2	2	2	2	4	4
CPU	E5-2400 v2 and E5-2400	E5-2400 v2 and E5-2400	E5-2600 v2 and E5-2600	E5-2600v3	E5-2600 v2 and E5-2600	E5-2600v3	E7-2800/8800	E5-4600	E7-4800/8800	E7-4800/8800 v2
Max Cores	20	20	24	36	24	36	20	32	40	60
DIMMs	12	12	16	24 DDR4	24	24 DDR4	32	48	64	96
Max GB	384 GB*	384 GB*	512 GB	512GB	768 GB	768GB	1 TB	1.5 TB	2 TB	3 TB (32 GB) 6 TB (64 GB)*
Disk	8 x 2.5" or 4 x 3.5"	24 x 2.5" or 12 x 3.5"	8 x 2.5" or 4 x 3.5"	8 SFF or 4 LFF	24 x 2.5" or 12 x 3.5"	26 SFF or 14 LFF	16 x 2.5" or 32 x SSD	16 x 2.5"	12 x 2.5"	12 x 2.5"
LoM	2 x 1Gb	2 x 1Gb	2 x 1Gb	2 x 1Gb	4 x 1Gb	2 x1Gb	2 x 1Gb + 2 x 10Gb	2 x 10Gb	2 x 1Gb + 2 x 10Gb	2 x 1Gb + 2 x 10Gb
PCIe Slots	2 x PCIe 3.0	5 x PCIe 3.0	2 x PCIe 3.0	2 x PCIe 3.0	5 x PCIe 3.0	6 x PCIe 3.0	5 x PCIe 2.0	7 x PCIe 3.0	10 x PCIe 2.0	10 x PCIe 3.0

Cisco UCS Mini: At the Edge of Large IT Configurations

Central IT

Cisco UCS Mini

Cisco UCS Mini

Cisco UCS® Mini

Cisco UCS Mini

UCS Management
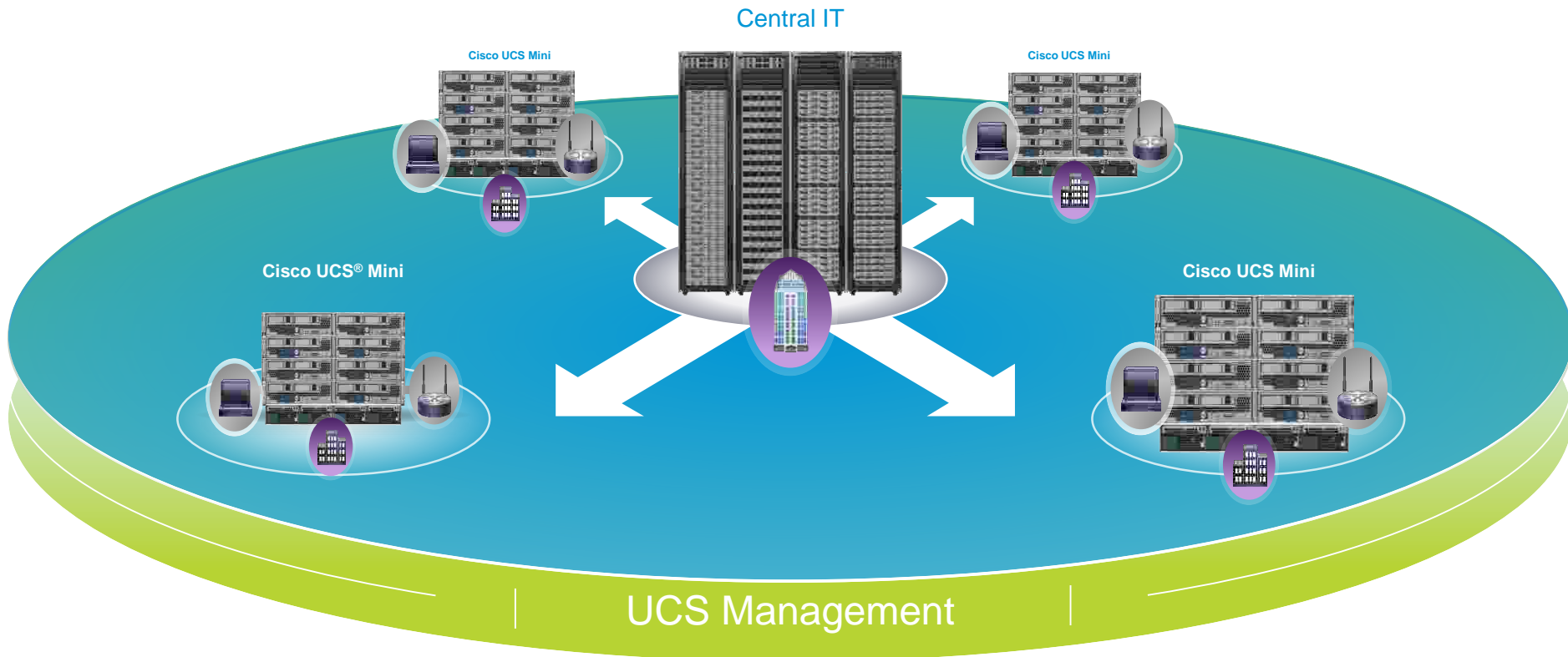
Cisco UCS Mini: Delivering the Power of Unified Computing at the Edge

› **Simple**
- Allows for consolidation of multiple servers in a single managed solution
- All hardware is managed from a single interface
- Cisco UCS® Central Software manages data centers and remote sites as one

› **Efficient**
- Unified systems management
- Highly-availability system for the most uptime
- Reduced capital and operational expenses with consolidation and virtualization

› **Expandable**
- Extensive scalability within a stable platform
- Support for future Cisco UCS blades

Cisco UCS Mini: Enterprise Capabilities at the Edge

› **Computing and storage integration**
  - 6RU rack-mount chassis
  - Up to 16 blade servers
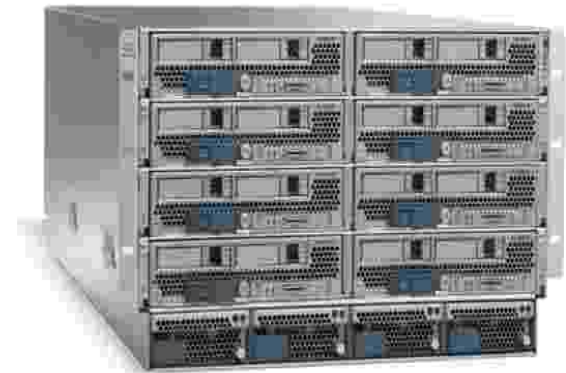 - Up to 4 rack servers

› **Integrated networking**
  - SFP+ for 1- or 10-Gbps connectivity

› **High availability**
  - Hot-pluggable redundant power (N+N, N+1, and N support)
  - 100 to 120V, 200 to 240V, -48V support
  - Redundant network connectivity
  - Redundant fans

› **Full systems management capabilities**
  - Full-featured Cisco UCS® Manager
  - Cisco UCS Central Software for remote management

Cisco UCS Mini: Simplified Networking Support

› **Easily connect to upstream networks with
end-host mode**

› **SFP+ supports 1 and 10 Gigabit Ethernet for
future proofing**

› **Redundant networking capability built in**

› **Simple expansion for additional computing power**
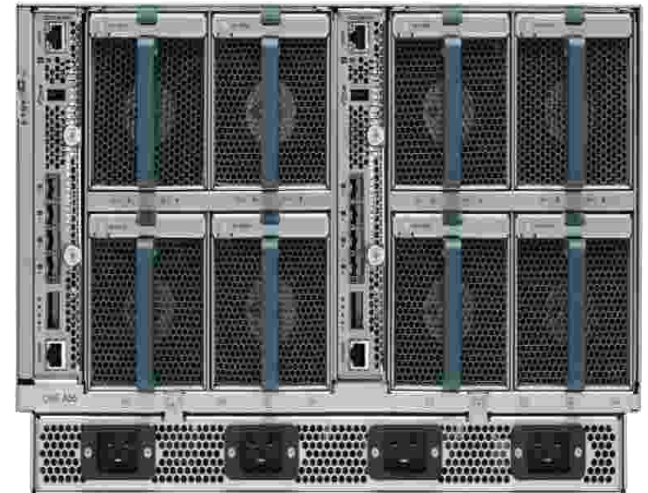
Max Scale Supported

Connect up to 20 servers
16 blades + 4 rack mount servers

UCS and vBlock

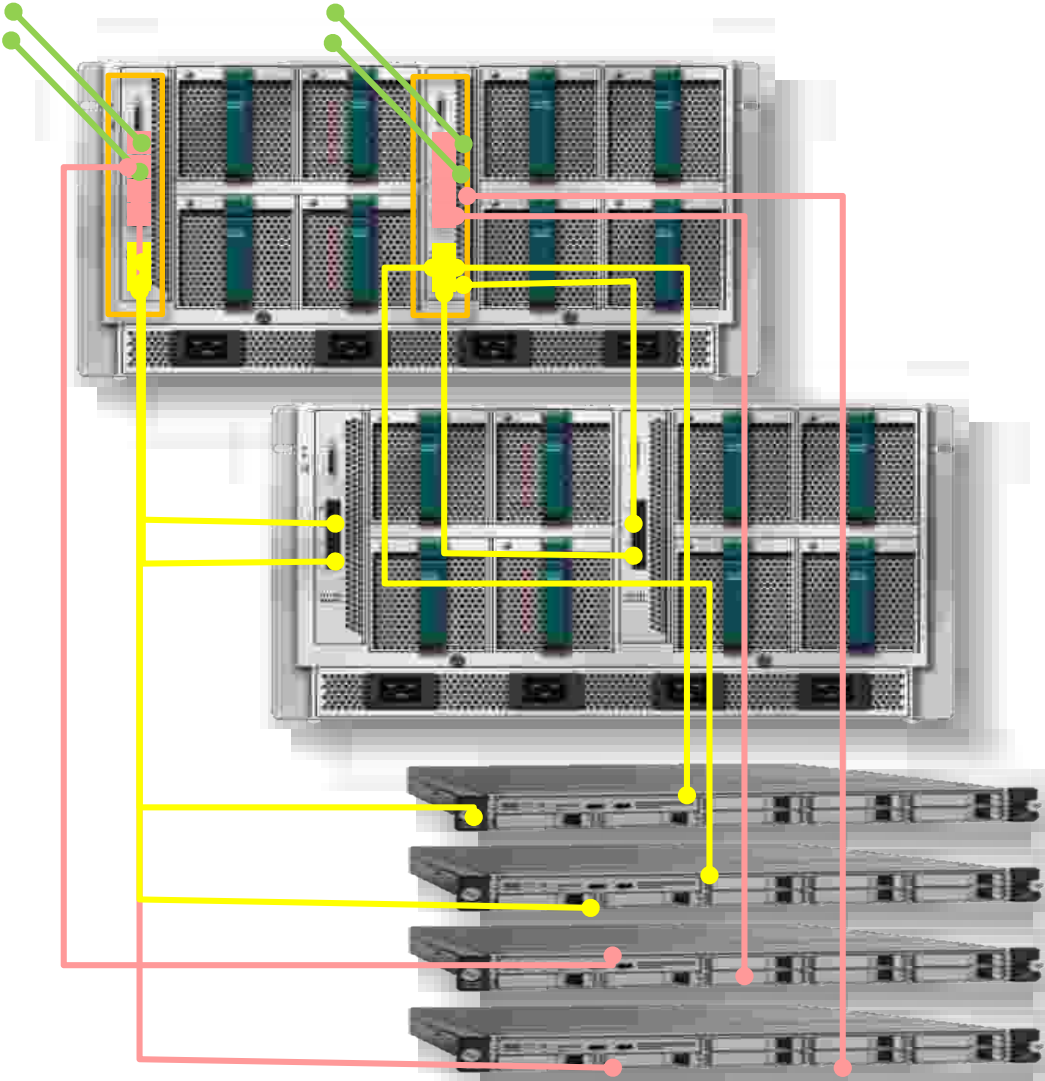**Vblock** is defined as a reference architecture, from VMware, Cisco and EMC and acts as a foundation for Cloud that all companies would market and sell together

- Rapid deployment model for virtualized infrastructure

- Pre-integrated and validated solutions reduce total cost of ownership

- Service-level driven through predictable performance & operational characteristics

- Improved compliance/security and reduced risk

Vblock Infrastructure Packages

Information

Applications

Operating Systems

Virtualization

Compute

Network
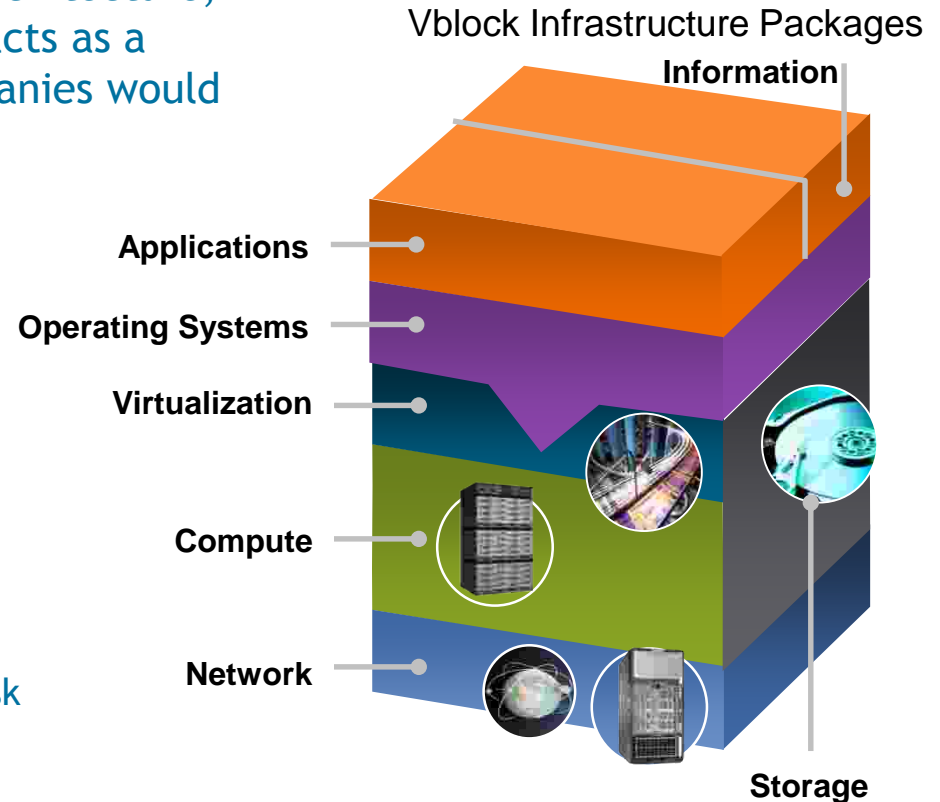
Storage

Accelerate Time to Results – Reduce TCO

UCS and vSpex

Range of Cisco Validated Architectures, based around C-Series or B-Series servers and EMC VNX or VNXe storage controllers

Small architecture (50 VMs) utilises:

> 3x UCS C200 C-servers
>
> 2x Nexus 3048 switches
>
> EMC VNXe 3150 storage controller

Large architecture (800 VMs) utilises:

> 5x UCS C200 B-Servers
>
> 2x Nexus 2232PP Fabric Extenders
>
> 2x Nexus 6248UP Fabric Interconnects
>
> 2x Nexus 5548UP switches
>
> EMC VNX 5300 storage controller
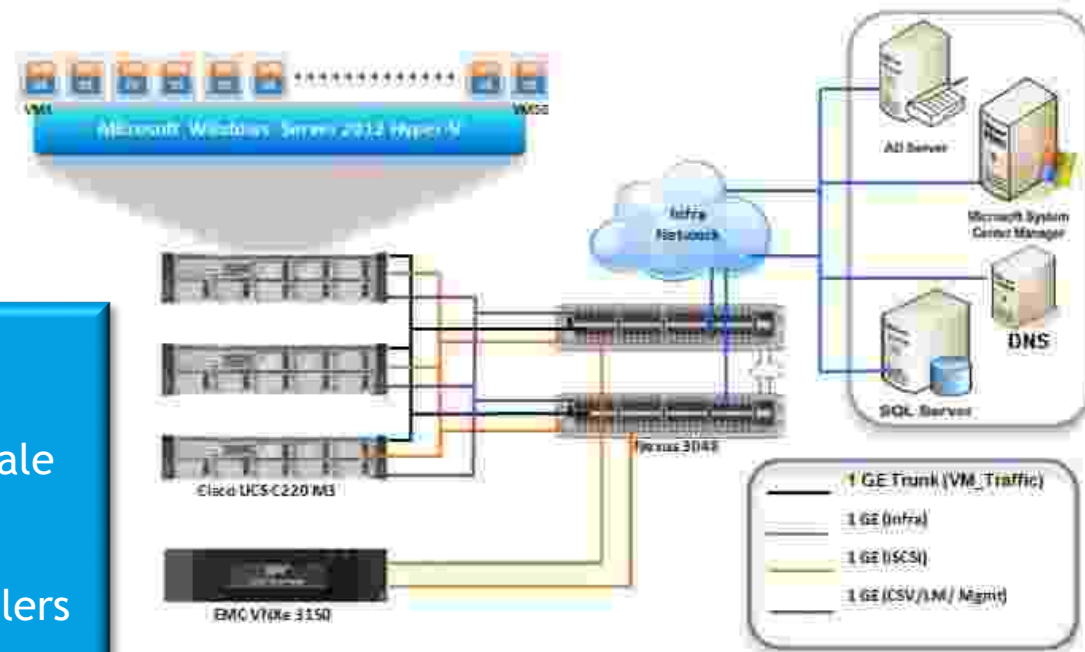
- Validated design ensures low risk
- Multiple architectures that can scale
- Targeted at specific applications
- Based around EMC storage controllers

UCS and FlexPod

- ## CVD Reference architecture:
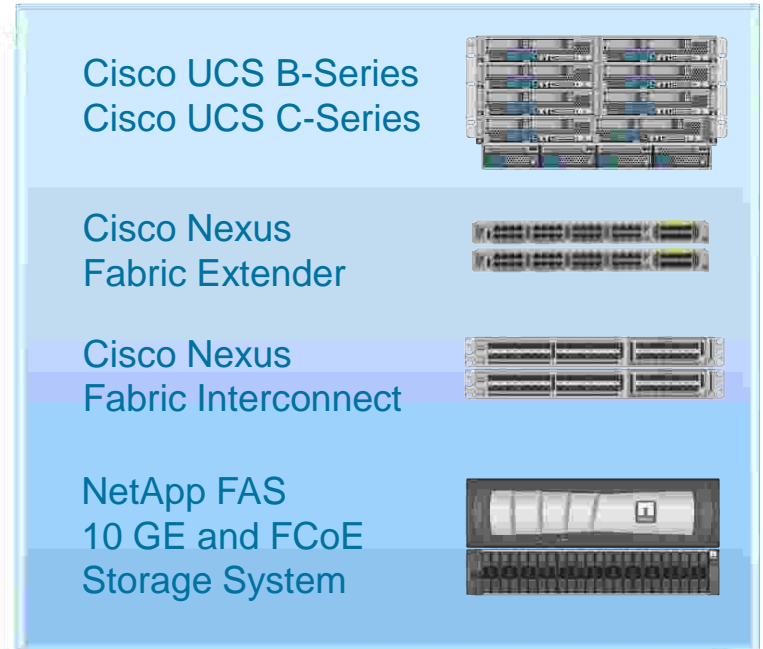
  Flexibility and scalability within a single rack and multiple racks

  Low-risk deployment of a standardized shared infrastructure

  Step-by-step deployment guides

  Solution guides for multiple workloads

  Centralized management of pooled compute, network and storage resources

Cisco UCS B-Series
Cisco UCS C-Series

Cisco Nexus
Fabric Extender

Cisco Nexus
Fabric Interconnect

NetApp FAS
10 GE and FCoE
Storage System

- Validated design ensures low risk
- Highly scalable architectures
- Based around NetApp storage controllers

Shared infrastructure for wide range of environments and applications:

- IaaS, Paas and SaaS cloud platforms
- Secure Multi Tenancy
- VMware vSphere deployments
- VMware View
- Microsoft Private Cloud
- Microsoft Exchange
- Citrix Xen Desktop
- SAP / Oracle RAC

UCS and ExpressPod

- Two preconfigured architectures designed for SMB (less than 500 employees)

- Built around C-Series servers and NetApp FAS storage controllers

- Managed by Cisco Cloupia Unified Infrastructure Controller

- Can scale to 20x C-series servers

- Delivered as configured system
- Scalable architectures
- Based around NetApp storage controllers

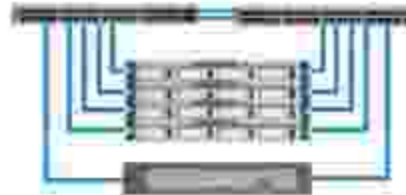**ExpressPod Small (2x C-series Servers, 7.2 TB storage)**
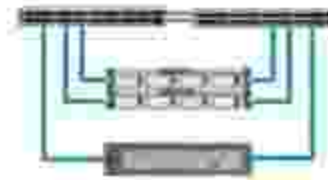
Cisco Nexus 3048 Switch

Cisco UCS C220 M3 Server

NetApp FAS2220 Storage

ExpressPod Medium (4x C-series Servers, 14.4 TB storage)

Cisco Nexus 3048 Switch

Cisco UCS C220 M3 Server

NetApp FAS2240 Storage

Cisco UCS Director
Validated Management Solution for FlexPod

Self-service Delivery

Model-based Management

Secure Cloud Container

vFiler® vNetwork vCompute VMs Storage

Policy Driven Provisioning

CISCO / cloupia

Single Panel- of-Glass for End-to-End Management and Automation

VM Manager — **Plug-ins**

Compute Manager

Network Manager

Storage Manager

Virtualization — A B C

Compute

Network — A B C

Storage — Tenant A / Tenant B / Tenant C
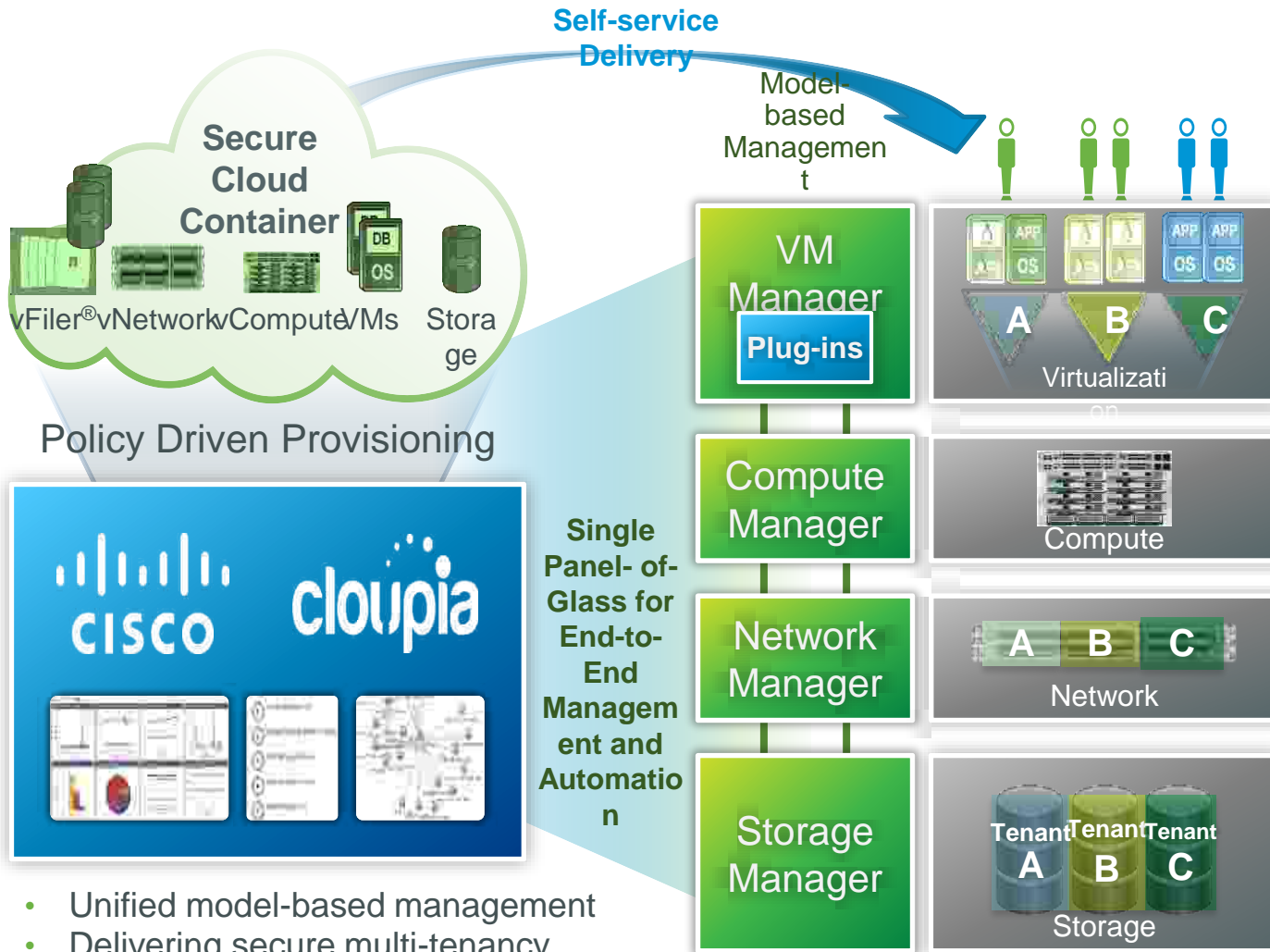
- Unified model-based management
- Delivering secure multi-tenancy

Cisco UCS Director Differentiators

Simple and Easy to Deploy

- A single, integrated, out-of-the-box solution
- Install in the morning, provision in the afternoon

Flexibility

- Model-based orchestration eliminates need for scripting

Integrated Compute Stacks

- FlexPod^{TM}
- Vblock
- VSPEX

End-to-End Functionality

- Support for both virtual and physical infrastructures
- Multi-vendor public cloud support
- Hypervisor agnostic
- Single pane of glass management, automation and orchestration
- Self-service, integrated monitoring and chargeback
- Includes task library with over 400+ tasks for easy drag and drop workflow creation

Recapturing…..

Why Cisco Unified Computing System?

Business Value

Improve Business Agility

Extend Business Asset Life

Reduce the Time to Deploy New Applications

Ensure Compliance

Operational Efficiency

Technical Differentiation

Unified Fabric

Unified Management

Service Profile with Hardware Abstraction

Virtual Interfaces

Patented Memory Extension Technology

http://www.cisco.com/go/ucs

Cisco Unified Computing System

Simplified Architecture	Unified Management	Higher Performance	Scale
• Networking with fewer components • Lower cost and easier scaling • Fewer management touch points • Stateless: any resource, any time • Better TCO/ROI	• Faster deploy/provision • Unification leads to reduced complexity • Management via a single interface	• Brings out the best of x86 architecture • Optimized resource utilization for compute, networking, and management	• Ultimate Scalability • Enhanced design capability • Designed for the future, today

"If you don't like change, you're going to like irrelevance even less."

General Eric Shinseki - United States Army

Thank you.

CISCO