Cisco Unified Computing System (UCS) Strategy & Overview

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presented by:
Dipl.-Inform. Andreas Wentland
Systems Engineer – Consultant, Datacenter Infrastructure Architecture & Design
Cisco Systems GmbH, Office Hamburg
awentlan@cisco.com

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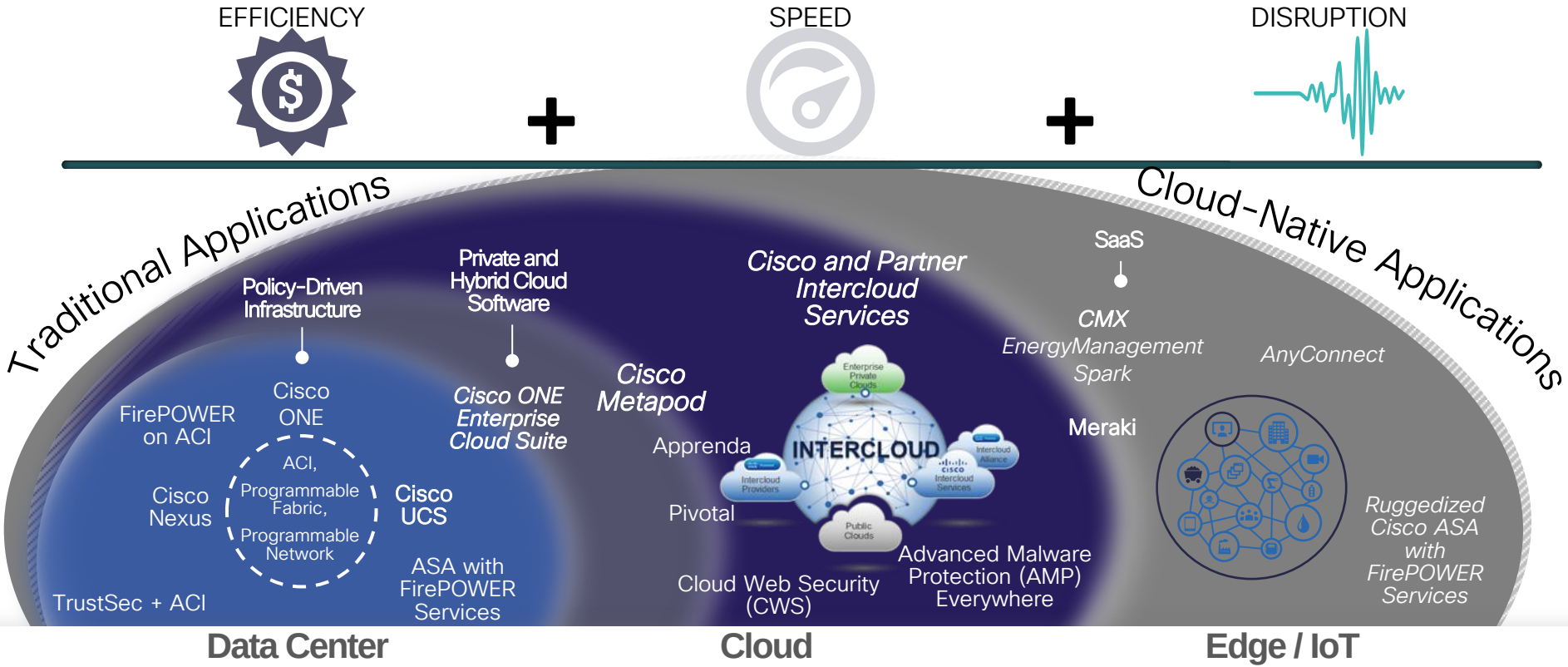
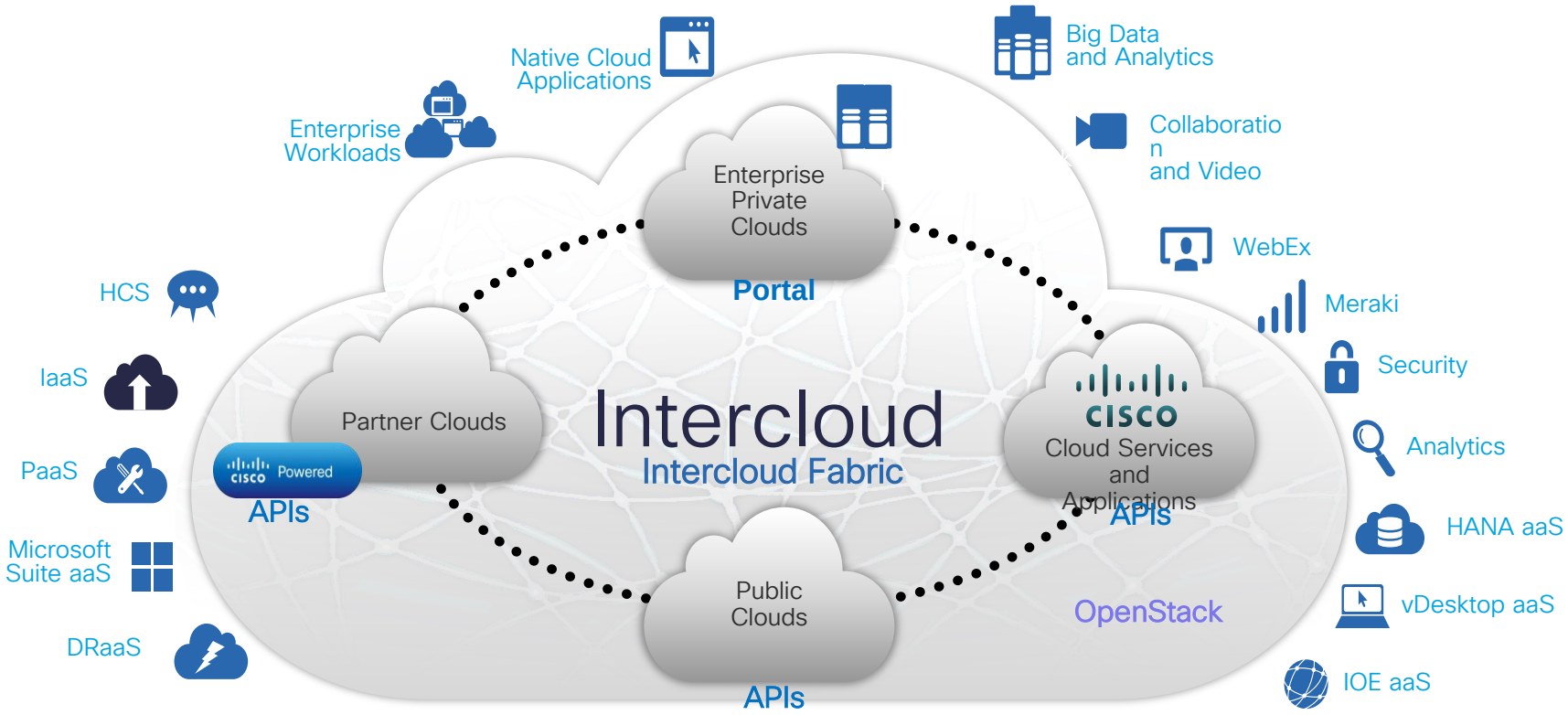
This roadmap is subject to change at the sole discretion of Cisco and Cisco will have no liability for delay in the delivery or failure to deliver any of the products or features set forth in this document

Best Data Center, Cloud, and Security Portfolio in the Industry



Network Centric Ecosystem of Clouds



Industry Evolution & Data Centers

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1011
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Digitization and IoT/IoE

Traditional Applications

Monolithic Model

Multi-tier Apps

Open-ness

Cloud-native applications

Business Agility with cloud model

Micro-services / Bi-Modal IT / DevOps

Manual Interaction

IT Silos based approach

Configuration driven

DevOps

Policy and Automation

Enterprise-wide policy, hyper-convergence and cross-domain automation

Consumption driven with analytics and programmability

Disjoint approaches to solve technical demands

Cohesiveness as “after thought”

Agility & Scale

Focus on business solutions

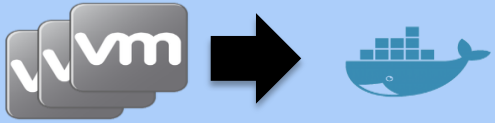
Data Center is the foundation for business agility

Delivered as a solution and / or as a service,

Datacenter in transition

Workload Mobility

VMs → Containers

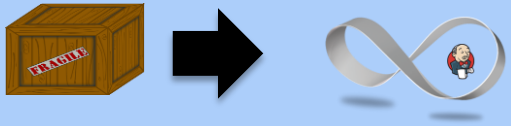


Application Architecture

J2EE Monolith → Polyglot Microservices

Delivery Process

Scheduled Release → Continuous Deployment



Application

Infrastructure

Configuration Management

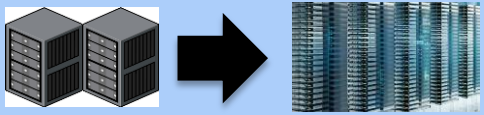
Physical/Virtual Machine management → Immutable Infrastructure

Integrated Networking

SDN Overlays → Application Centric

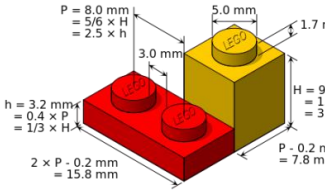
Converged Storage

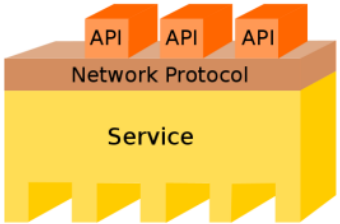
Storage Arrays → Software Defined



Puzzles Pieces Build Validated Designs
Legos Build Service Oriented Architectures (SOA)

Where We've Been...





Where We're Going...

Unified Computing: Inspired by Customer Needs

Industry in Transition

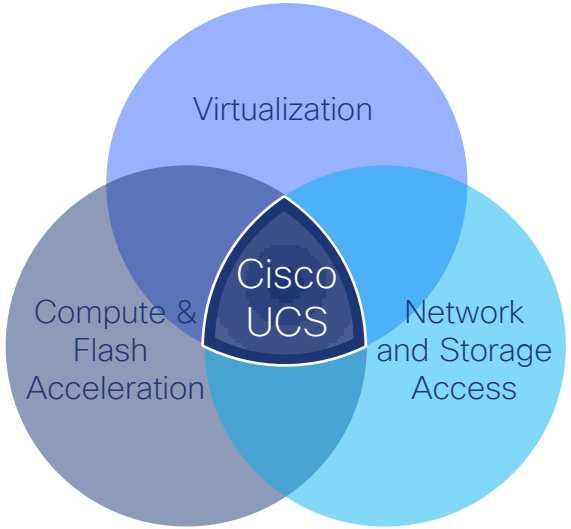
Help Me:

- Reduce complexity that drives OPEX
- Get the most out of virtualization
- Automate and move faster
- Get ready for cloud

Operational Simplicity

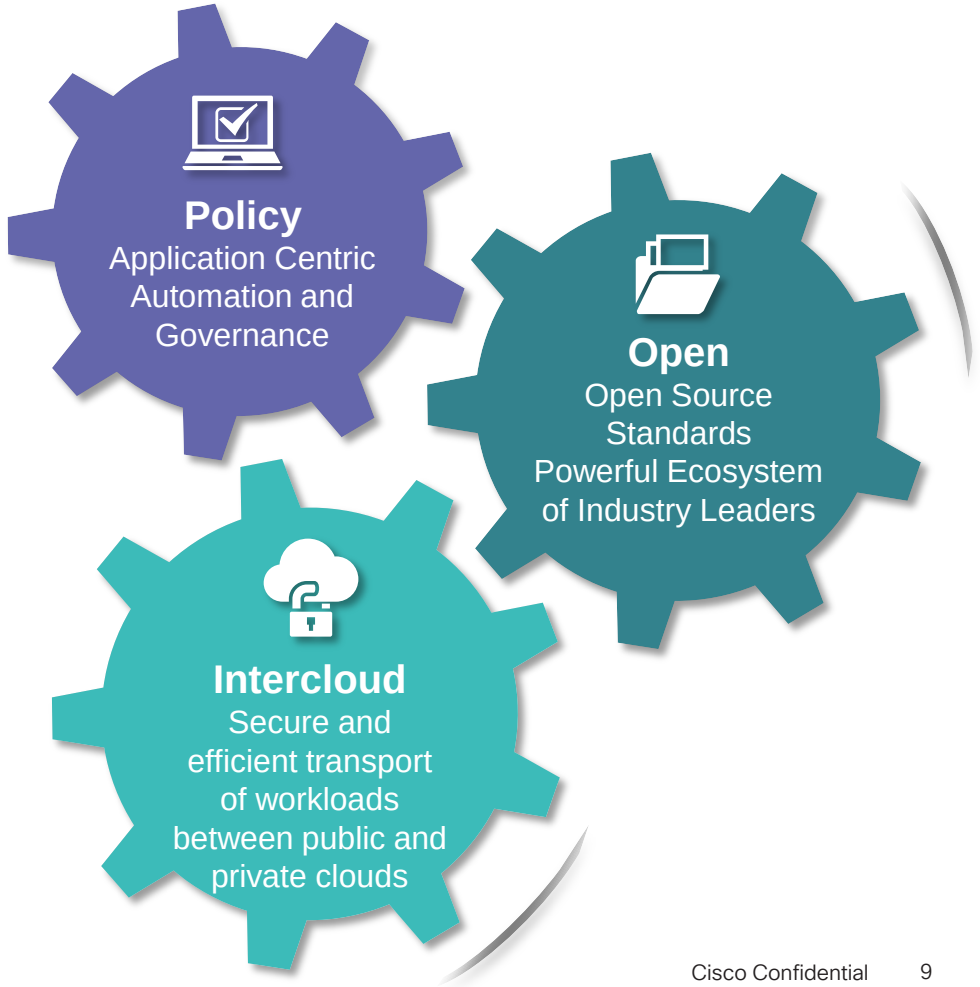
Application Centricity

Platform for IT Innovation



Cisco UCS Strategy

- Address new customer use cases with expanded portfolio
- Deliver solutions and validated designs that reduce complexity and time to deploy
- Expand the depth of Integrated Solutions and Management Ecosystem
- Deepen the Differentiation



Cisco Unified Computing System

Top 4
Server Vendor [1]

#1
Americas Revenue
Market Share in x86 Blades [1]

48,000+
Unique UCS Customers [2]

40%
Rack Growth

>85%
of all Enterprise
customers
have invested in UCS

$3.5B+
Data Center Annualized
Revenue Run Rate [2]

3,800+
UCS Channel Partners

Fortune 500

100+
World Record Performance
Benchmarks to Date

Source: 1 IDC Worldwide Quarterly Server Tracker, 2015 Q1, May 2015, Vendor Revenue Share
Source: 2 As of Cisco Q4FY14 earnings results Data Center Revenue is defined as Cisco UCS and Nexus 1000V

Cisco Unified Computing System

A differentiated/revolutionary approach

Simplified Architecture

- Networking with fewer components
- Lower cost and easier scaling
- Fewer management touch points
- Stateless: any resource, any time
- Better TCO/ROI

Unified Management

- Faster deploy/ provision
- Unification leads to reduced complexity
- Management via a single interface

Higher Performance

- Brings out the best of x86 architecture
- Optimized resource utilization for compute, networking, and management

Scale

- Ultimate Scalability
- Enhanced design capability
- Designed for the future, today

Unified Computing Product Innovation

Innovation to Improve Applications

UCS Management

- Reduced time to deploy new apps
- Reallocate resources quickly and efficiently

Unified Fabric

- Reduced infrastructure
- Cohesive resource pools

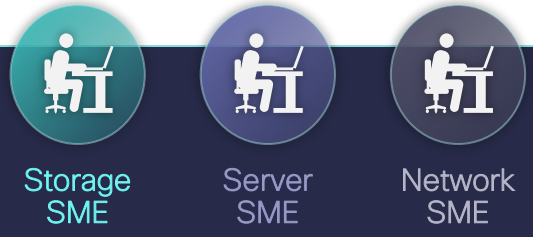
Virtualized I/O

- Improved scalability and flexibility
- Increased performance

Compute With NO Compromise

- Blade and rack servers in a single UCS managed domain
- Physical and virtual workloads

Traditional Element Configuration



- Subject matter experts consumed by manual configuration chores
- Serial processes and multiple touches inhibit provisioning speed
- Configuration drift and maintenance challenges

- QoS settings
- Border port assignment per vNIC
- NIC transmit/receive rate limiting

- VLAN assignments for NICs
- VLAN tagging config for NICs

- Number of vNICs
- PXE settings
- NIC firmware
- Advanced feature settings

- Remot
- Call ho
- Remote KVM firmware

- Server UUID
- Serial over LAN settings
- Boot order
- IPMI settings
- BIOS scrub actions
- BIOS firmware
- BIOS settings

- FC fabric assignments for HBAs

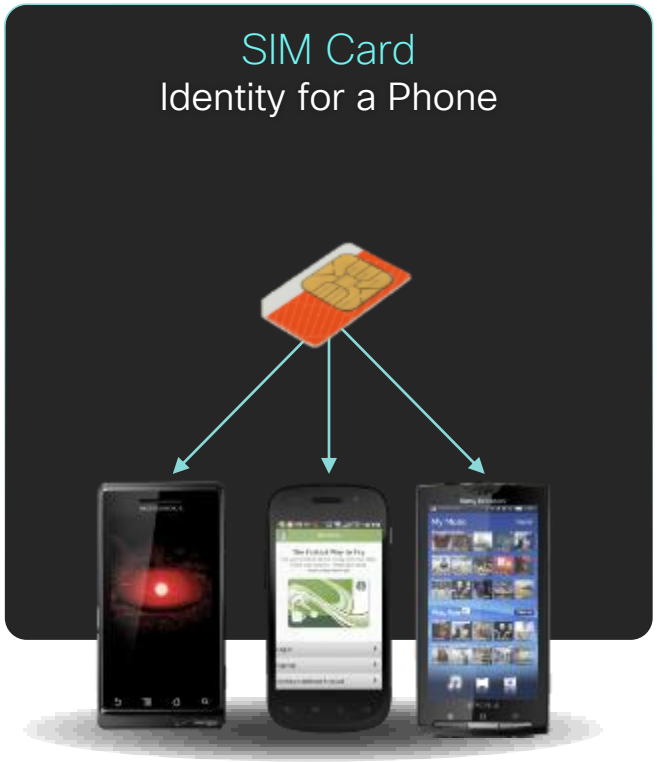
- Number of vHBAs
- HBA WWN assignments
- FC boot parameters
- HBA firmware

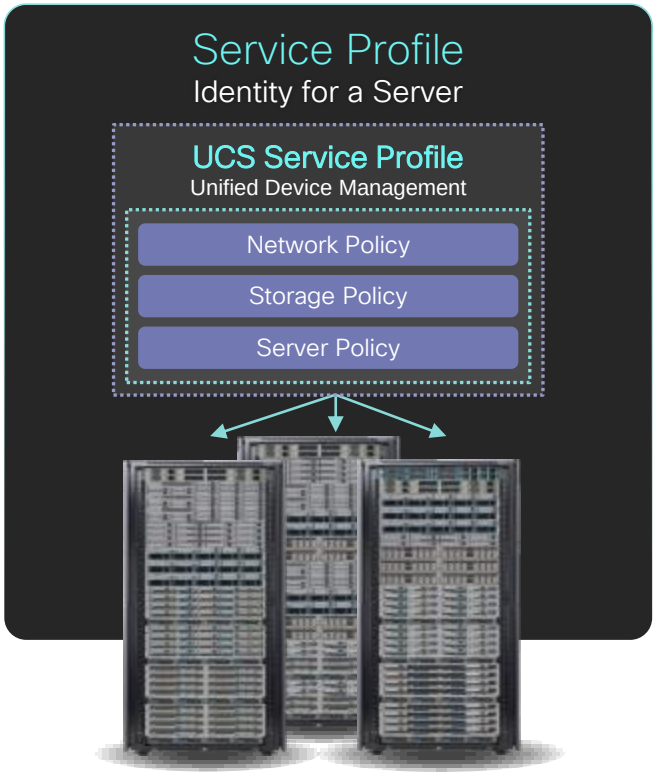
Compute, LAN, SAN Seamlessly Through Software

- RAID settings
- Disk scrub actions

UCS Service Profiles

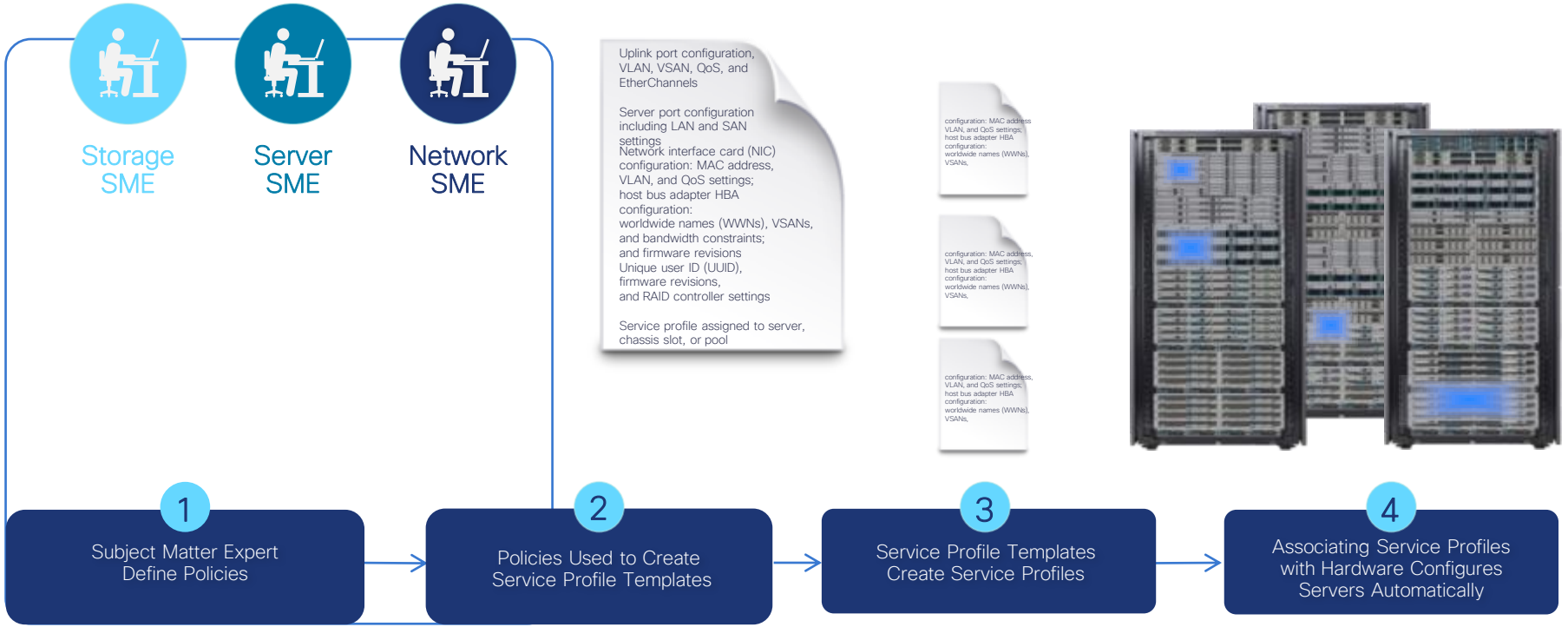
Configuration Portability





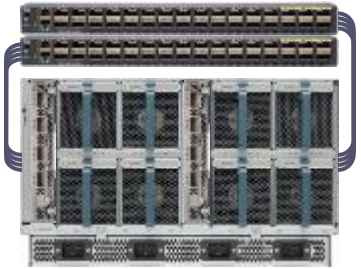
UCS: Embedded Automation

Integrated, Policy-Based Infrastructure Management



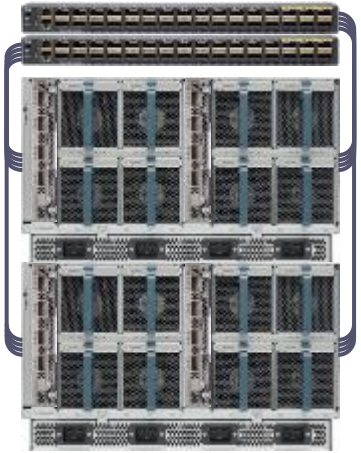
UCS Scalability

8 UCS Blades
1 UCSM, 3 Management IP



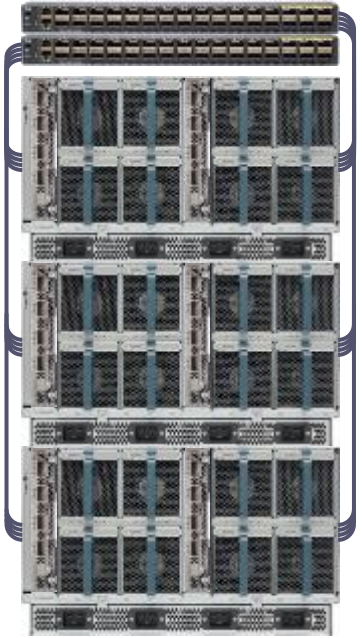
Add one Chassis

16 UCS Blades
1 UCSM, 3 Management IP



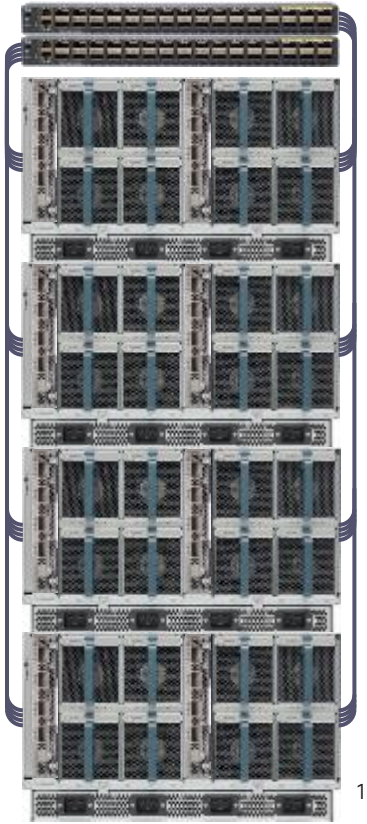
Add one Chassis

24 UCS Blades
1 UCSM, 3 Management IP



Add one Chassis

32 UCS Blades
1 UCSM, 3 Management IP



Up to 20 Chassis
(160 UCS blades)

Unified Management

Blade, Rack & Modular Servers Managed a Cohesive Resource Pool

UNIFIED MANAGEMENT
A SINGLE UNIFIED SYSTEM FOR
BLADE AND RACK SERVERS

UCS Manager

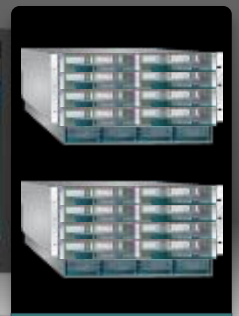
C-Series Rack
Optimized Servers

UCS Service Profile
Unified Device Management

Netw olicy

Stor olicy

Server Policy



B-Series
Blade Servers

A Major Market Transformation in Unified Server Management

Benefits of UCS Manager and Service Profiles for Both Blade and Rack-Optimized Servers

Add Capacity Without Complexity

Cisco Data Center Vision

Defined by Applications. Driven by Policy. Delivered as a Service

Cisco Advantage: Unified Management Framework

UCS Management

Policy-Driven, Application Centric Infrastructure Management and Orchestration

Centralized Simple Management Interface

Cisco Integrated Infrastructure

Automated Infrastructure Deployment

Software Defined Storage (SdS)

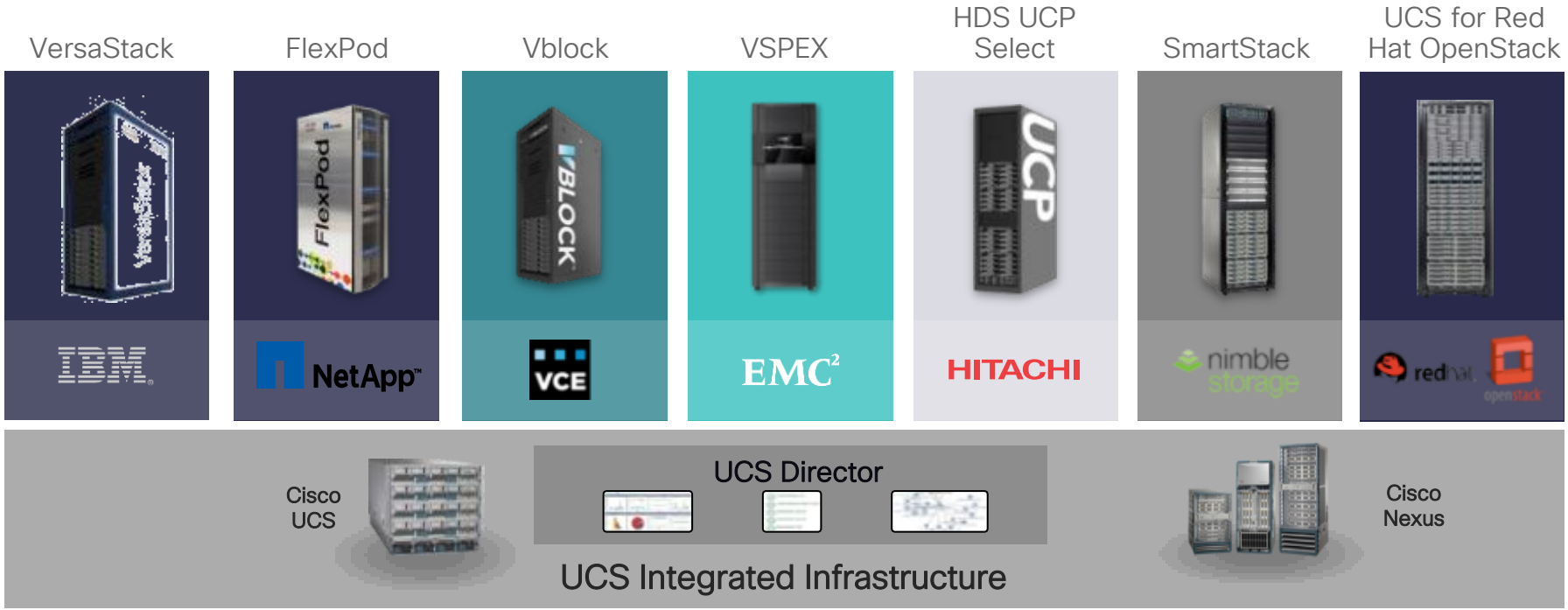
Simple to Scale

Application Specific Infrastructure

Big Data
Analytics
Ceph/Gluster
OpenStack

Bringing the Same Simplicity Model to **ANY** Storage Type

UCS Integrated Infrastructure



Cisco is #1 and a partner in ~69% of all Integrated Infrastructure*

Exclusive in the top 2 solutions (FlexPod and Vblock) and ~50% in the #3 solution (VSPEX)*

*IDC Worldwide Integrated Infrastructure and Platforms Tracker, April 29, 2014

UCS Portfolio & Innovations Agenda

COMPREHENSIVE MANAGEMENT AND AUTOMATION

1 UCS Core Blade and Rack

2 UCS Fabric

3 UCS Mini

4 C3000 Storage Server

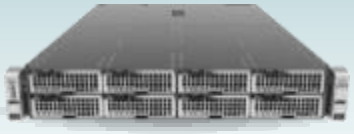
5 UCS M-Series Modular Servers

UCS Compute Portfolio

Performance Optimized for Bare Metal, Virtualized, and Cloud Applications

Cloud Scale

UCS C3000 Series
Ideal Capacity-Optimized Platform for Large Object Storage at Scale



UCS M-Series Modular Servers
Modular servers optimized for Cloud-scale deployments

Enterprise Performance

UCS C240 M4
Ideal Platform for Big Data, ERP, and Database Applications

UCS C220 M4
Versatile, General Purpose Enterprise Infrastructure, and Application Server

UCS B200 M4
Optimal Choice for VDI, Private Cloud, or Dense Virtualization/ Consolidation Workloads

Intensive/Mission Critical

UCS C460 M4
Mission-Critical, 4-Socket Server for Large, CPU-Intensive Applications

UCS B420 M4
Enterprise Class, 4-Socket Blade for Large, Memory-Intensive Bare Metal and Virtualized Applications

UCS B260 M4
Mission-Critical, 2-Socket Blade for Large, CPU-Intensive Bare Metal and Virtualized Applications

UCS B460 M4
Mission-Critical, 4-Socket Blade for Large, CPU-Intensive Bare Metal and Virtualized Applications

UCS Fabric Interconnect Portfolio

UCS 6324 (Mini)

UCS 6296 & 6248

UCS 6300*

UCS 6120 & 6140

Sustaining

10GbE

40GbE

* FUTURE SHIPPING EOL

UCS 3rd Gen FI & IOM Overview

FI 6300 Series and IOM 2304

Enabling a high-performance, low-latency & lossless fabric

High-density 40GbE ports

- FI 6300 series & IOM 2304 coupled with B-Series & C-Series enables an end-to-end 40GbE solution
- FI 6300 series coupled with Cisco MDS 40G FCoE enables an end-to-end 40GbE FCoE solution

High speed Fibre Channel 16G FC ports

- Provides high performance SAN (4/8/16G FC) connectivity for blades & rack servers

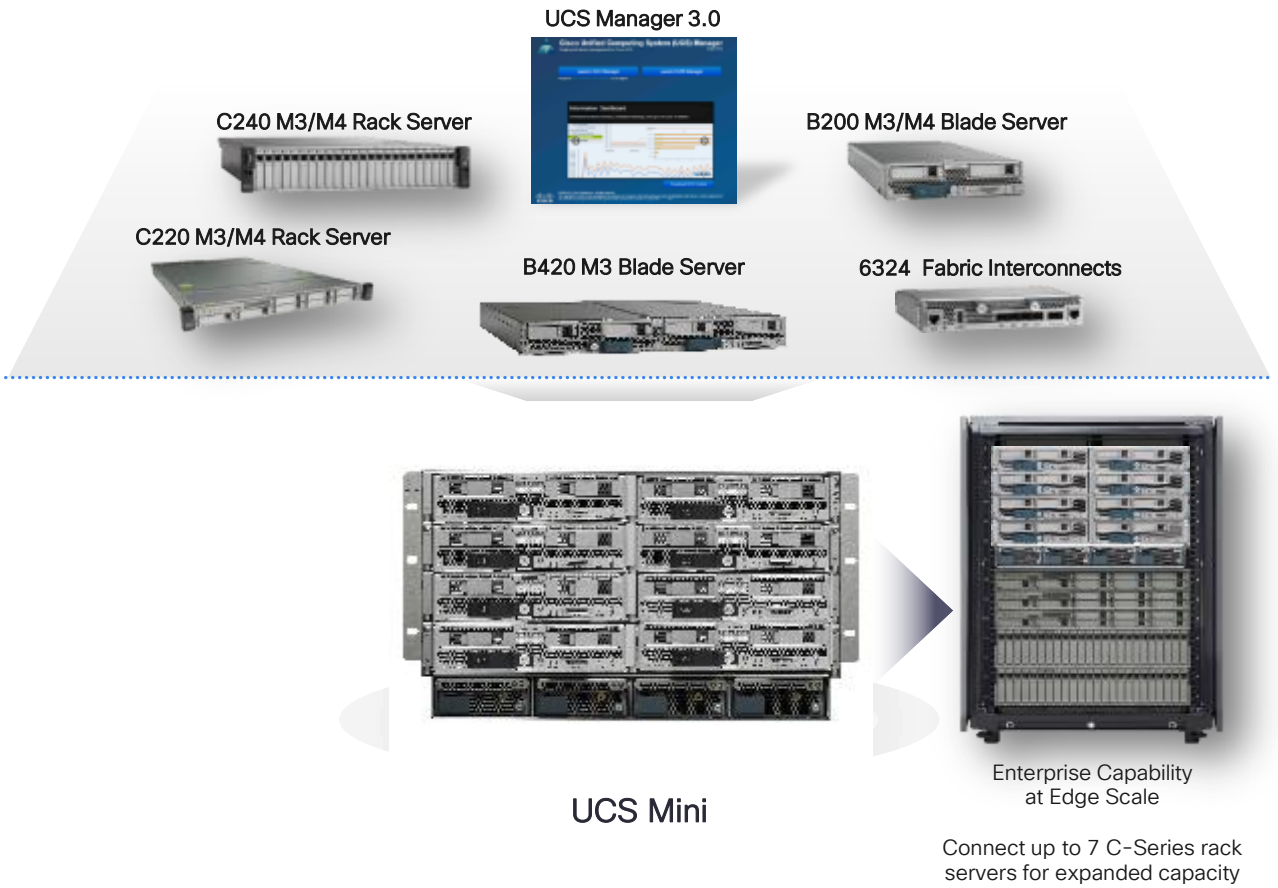
Production Q1'CY16

UCS Mini

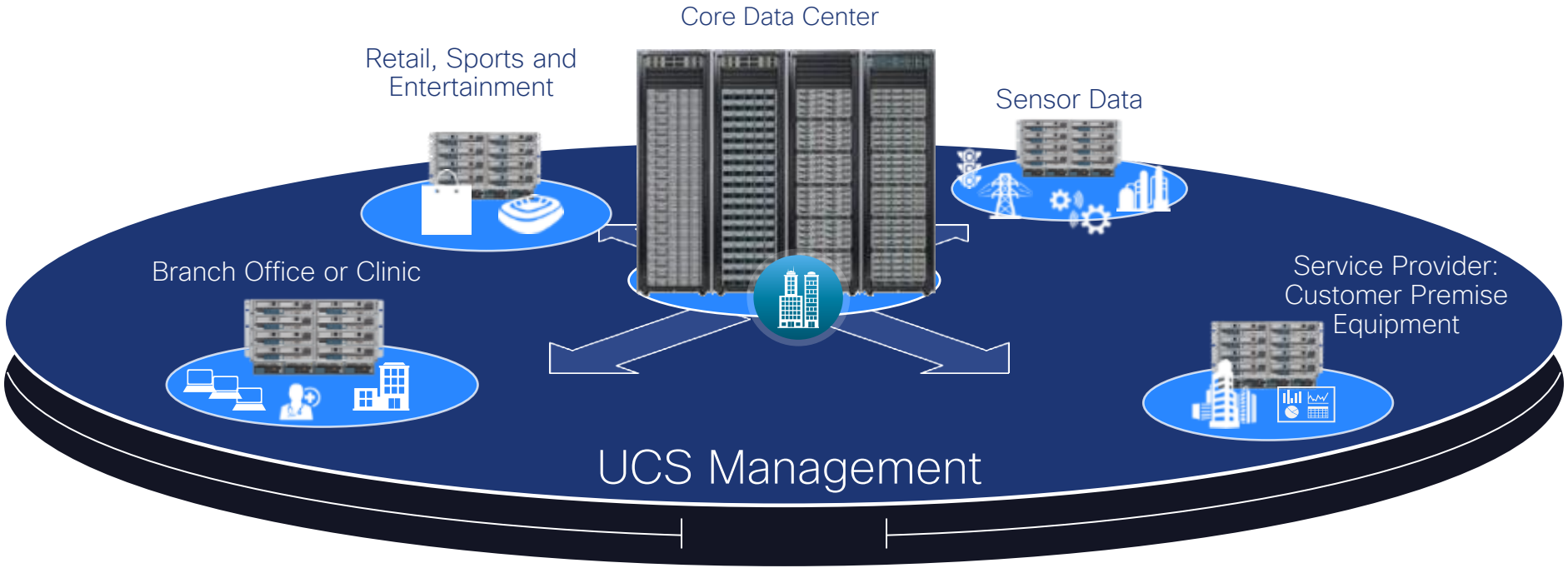
New architectural entry point for Unified Computing

UCS in an All-in-One package:

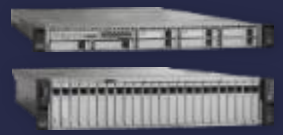
- Compute
- Networking
- UCS Management
- Unified Computing in 6U
- Chassis-Integrated Fabric Interconnects
- Standard UCS Blades / Fans / Power Supplies



Placing Computing at the Source of Demand



Cisco UCS Mini Solutions

Deployment Models	Remote Office/Branch Office	On-Prem–Smaller Footprint	Small and Medium Business
Use Cases	Virtual Infrastructure, VDI Use Cases, Branch-in-a-box (WIP)		
Hypervisor	VMware ESX, Microsoft Hyper-V		
Management	UCS Manager, UCS Central, UCS Director		
Storage	 NetApp FAS 2552-2RU	 EMC VNXe 3200-2RU	 Nimble CS220-2RU	 IBM Storwize v3700-2RU	 Hyper-convergence Options
Network	Two Nexus 93xx or 3524 switches 		
Compute	UCS Mini Config: Chassis–Up to 8 x B200 M4 Servers and up to 2 x C-Series M4 Servers Capacity: Up 150 VMs or 600 Desktops   		

Applications in the Connected World

Data Center | Cloud | Edge/IoT

Security Everywhere

Monolithic Servers Are Not the Best Answer for all types of Workloads

What the Industry Offers Today	What Customers Should be Able to Do
Match the Application to Fixed Infrastructure With Virtualization	Create Ratio-optimized Combinations of Subsystems Tuned for the Application
Replace Entire Server to Upgrade One Subsystem	Upgrade Subsystem Components Independently as Required
Orchestrate Fixed-ratio, Monolithic Servers	Applications Invoke Composable Infrastructure

Monolithic Servers

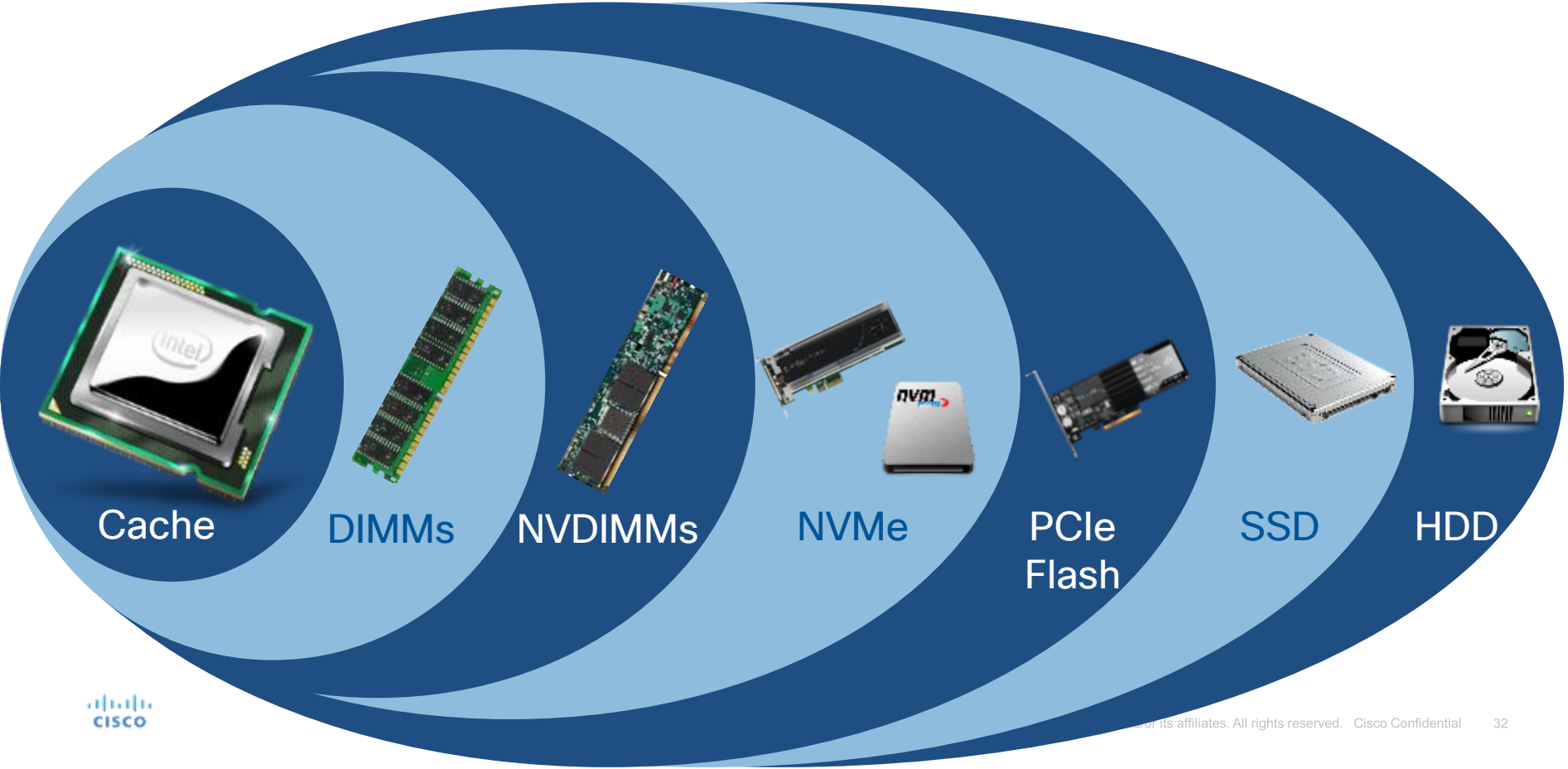
Resource Pools

What's Required?

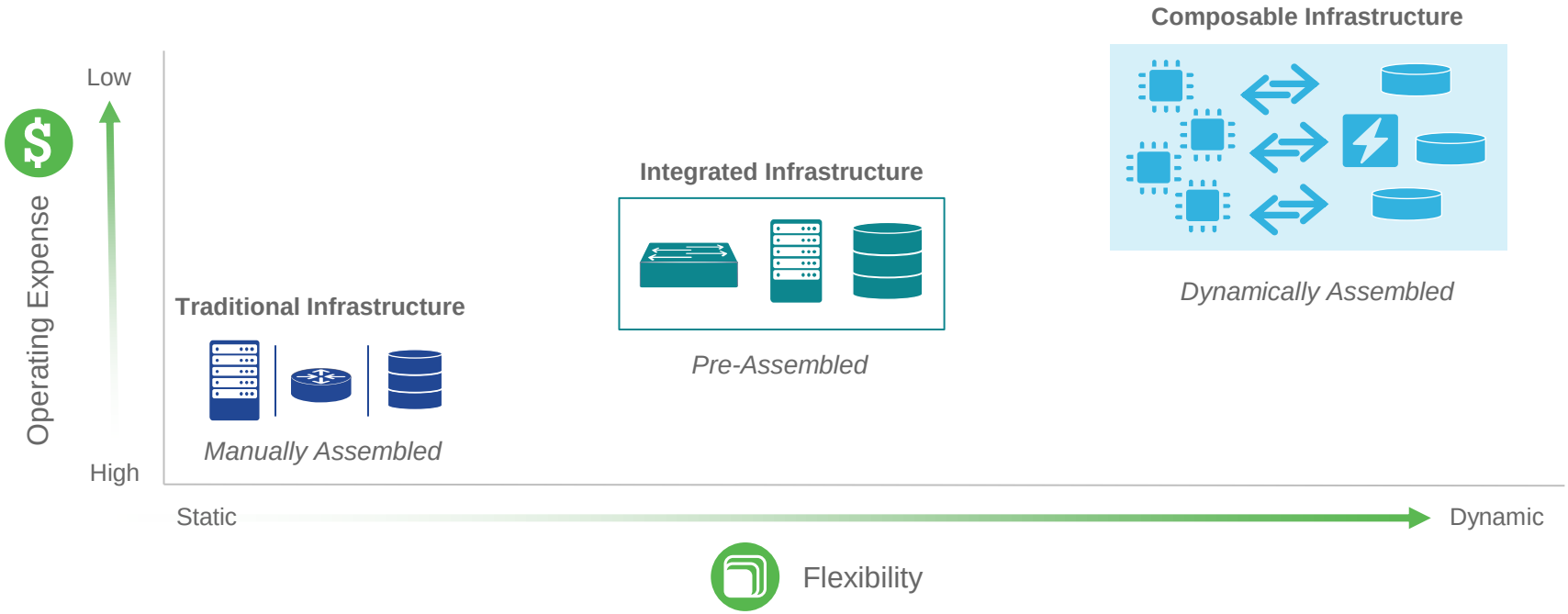
- Total server subsystem disaggregation: CPU, Memory, I/O and Accelerators, Local Disk
- Control plane to create composite machines out of atomic components
- Exposed programmability for composable IT services

CPU Memory Storage Network

Storage is Moving Ever Closer to the CPU

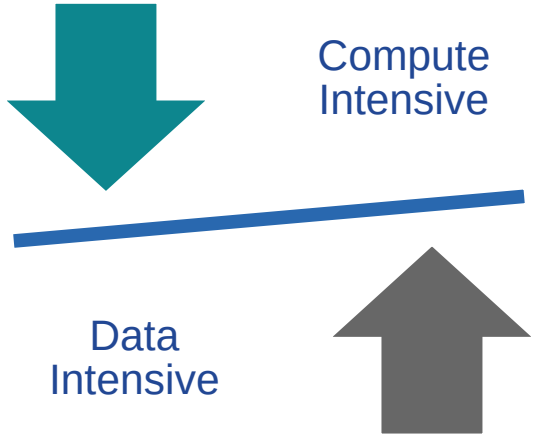


Composable Infrastructure

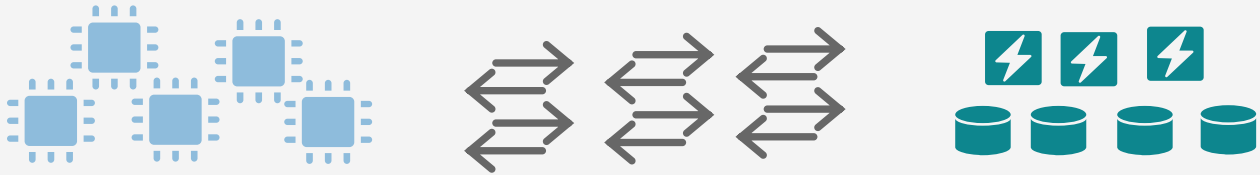


Dynamically Configures To:

- Optimize application performance
- Achieve best ratio of compute to I/O to storage
- Reduce under-utilization and/or over provisioning of local resources

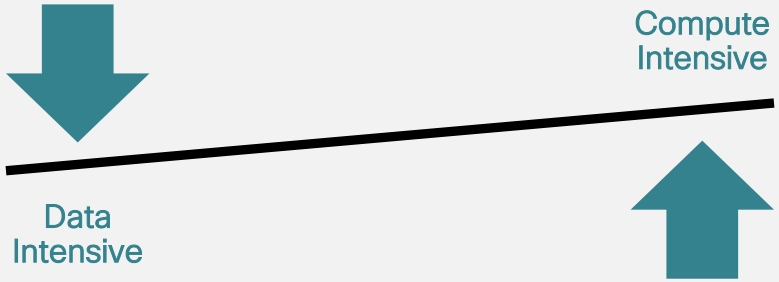


Composable Infrastructure Pool



Cisco Composable Infrastructure

- M-Series for compute intensive applications
- C3260 for data intensive applications



C3260
Data Intensive

M-Series
Compute Intensive

Storage Capacity Tier Converging Into Compute

- High Performance, High Availability
- Lower TCO for $PB Storage

80% of Data is Unstructured

DECREASE in $/GB

INCREASE in SDS

UCS C3260 Rack Server

UCS C3260
Dense Rack Server

COMPUTE RESOURCES

SHARED LOCAL RESOURCES

Increased flexibility in CPU storage ratio and associated use cases

HA in a box

DUAL SERVER NODES

Dedicated RAID controller and IO path for each node

Coming 1H2016: UCSM and UCS Director, Intel “Broadwell”

STORAGE RESOURCES

MASSIVE LOCAL STORAGE

Up to 360TB (Coming soon 480TB) of dense storage in a compact 4U Form Factor that fits in a standard rack

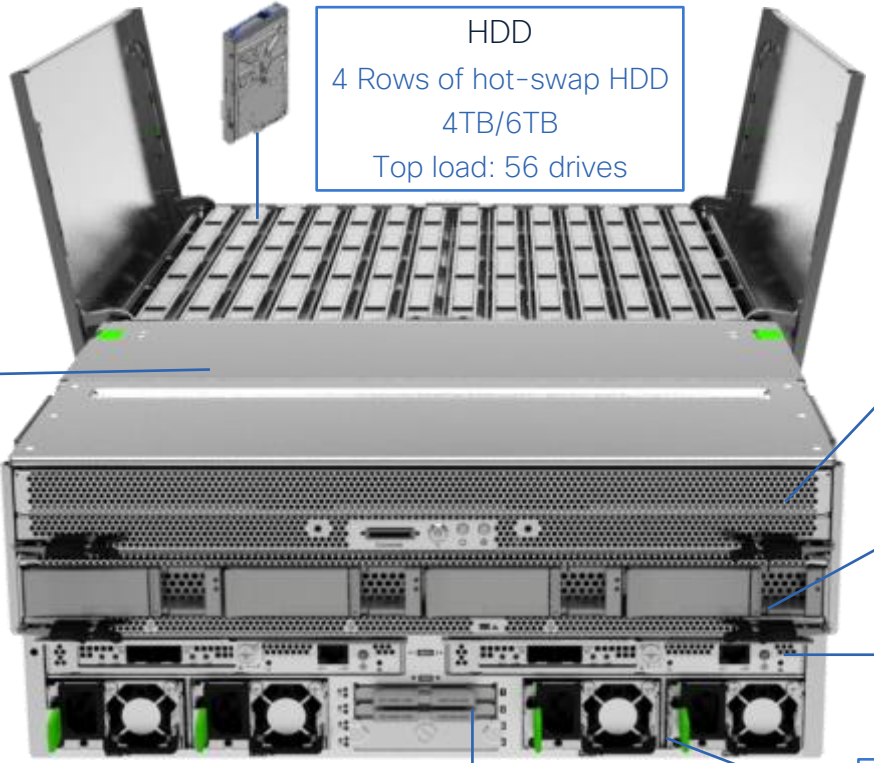
Disks can be distributed across node in any scale

NETWORK RESOURCES

HIGH I/O BANDWIDTH

Powered by Cisco Gen 3 VIC 1300

Modular Architecture of the UCS C3000



HDD
4 Rows of hot-swap HDD
4TB/6TB
Top load: 56 drives

FANS
8 hot-pluggable fans

Server Node
2x E5-2600 V2 CPUs
128/256GB RAM
1GB/4GB RAID Cache

Optional Disk Expansion
4x hot-swappable
rear-load LFF 4TB/6TB HDD

System I/O Controller (SIOC)
Cisco mLOM Slot

Two 120GB SSDs
OS/Boot

Power Supply
4 hot-pluggable PSUs

Use Cases for the UCS C3000 Server Family

Service Providers, Enterprise, Cloud

Software Defined Storage
Object Store

SP COS

Storage Spaces

Service Providers Public Sector

Media Streaming and Content Distribution
Video Surveillance

SP COS VSOM

Service Providers, Enterprise

Exchange
Backup and Archive (as Service)

Service Providers, Enterprise

Big Data and Analytics
Warm Storage Tier

Hadoop 2.0 Tiered storage

UCS M-Series Composable Server

UCS M Series

Shared Local Resources
Improved utilization of resources
Resource amortization over smaller nodes

Shared Local Resources

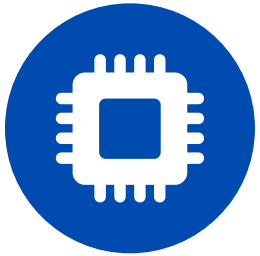
Based on Cisco System Link Technology
Third Gen VIC extends UCS fabric to within the server

Compute Cartridges

Modular Design
Improved subsystem lifecycle management
Ability to scale individual subsystems independently

Lean Componentry
Improved compute density
Cost and power optimization

Most Common Use Cases

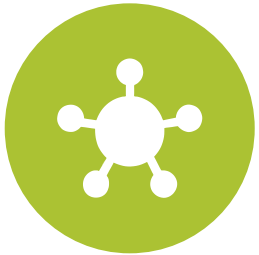


Dense Compute (Micro servers)

- Web serving
- Bare metal as a service/hosted desktops
- Test and dev

Next-Gen Applications

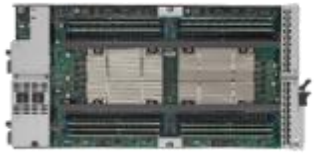
- Bimodal IT - Mode 2 applications
- DevOps
- Application containers and micro services



Grid Computing

- Risk modeling and derivatives pricing
- Electronic design automation
- Cancer research

UCS M-Series
Current Portfolio of Cartridges



	UCS M142	UCS M1414	UCS M2814
Density	16 Single Socket Servers in 2 RU	8 Single Socket Servers in 2 RU	4 Dual Socket Servers in 2 RU
Processor	Intel Xeon E3 L (Lower wattage CPU)	Intel Xeon E3 (Highest Clockspeed)	Intel Xeon E5 (TDP < 105W per CPU)
Targeted Workloads	**Static web page serving, dedicated hosting, online game delivery, genomics research**	**Electronic design automation, seismic research**	**Dynamic content delivery, Application Containers, Cloud Computing**

M-Series Adopters

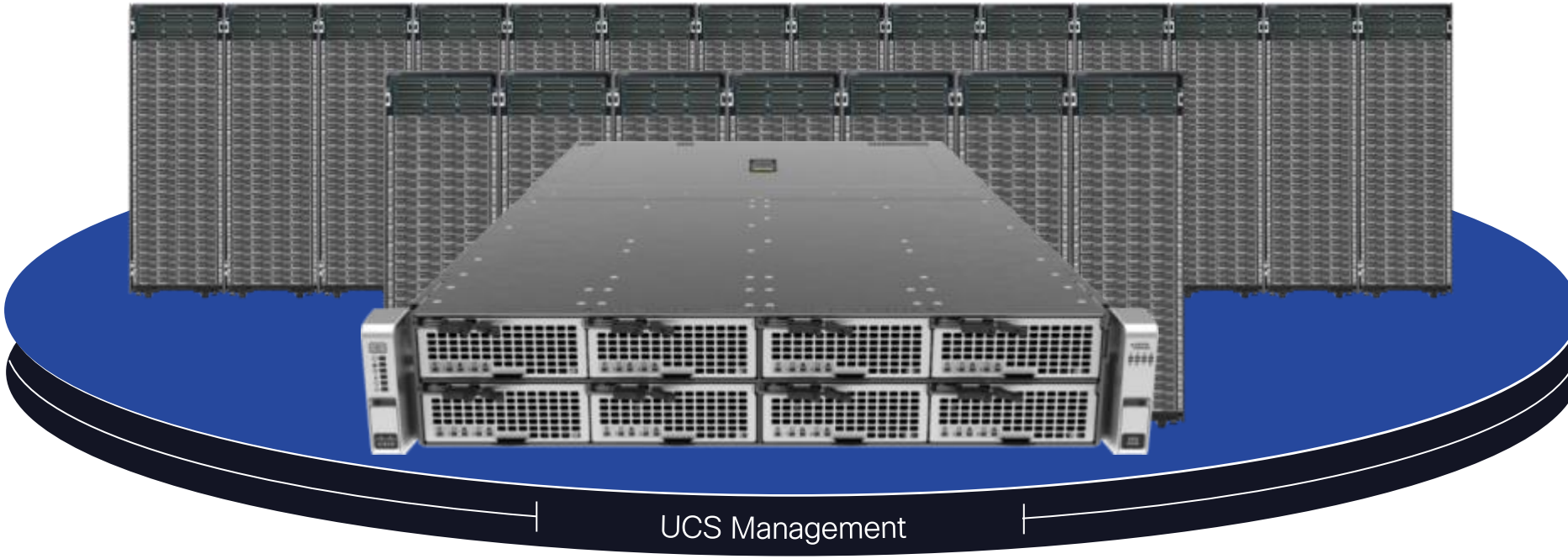
- Finance
- Cloud Services
- Medical Research
- EDA

Dense Compute (Microservers)

Cloud Native Apps (Microservices)

Grid Computing

UCS M-Series Composable Servers



UP TO **77%** Faster Provisioning

UP TO **8x** Server Density

UP TO **95%** Fewer Peripherals

UP TO **38%** TCO Improvement

UP TO **22%** Power Efficiency

Cisco Modular Server Options

Unmatched Breath of Scale, Common Operating Environment

UCS E-Series

ISR Embedded Compute

Distributed Branch, Small Retail, Healthcare, Education

UCS Mini

Enterprise Compute for Edge Scale

Mid-Market, Branch Office and Remote Site

UCS B & C Series

Core Data Center Applications

Mid-Market, Enterprise, Global, Public Sector, Service Provider

UCS M Series

High Density Scale-Out Computing

Service Providers, Cloud Services Large Enterprise, Public Sector & National Labs

Cisco Infrastructure for Future Proofed IT

Scale up & Scale Out
Virtualized & Bare Metal

Cisco Unified Computing System

+

Converged Infrastructure

EMC² IBM NetApp
VCE nimble storage HITACHI

+

Hyper Converged

springpath vmware EMC SCALEIO
maxta StorMagic

+

Composable Infrastructure

Cisco System Link Technology
UCS M-Series

Extensible Control Plane
&
Comprehensive API

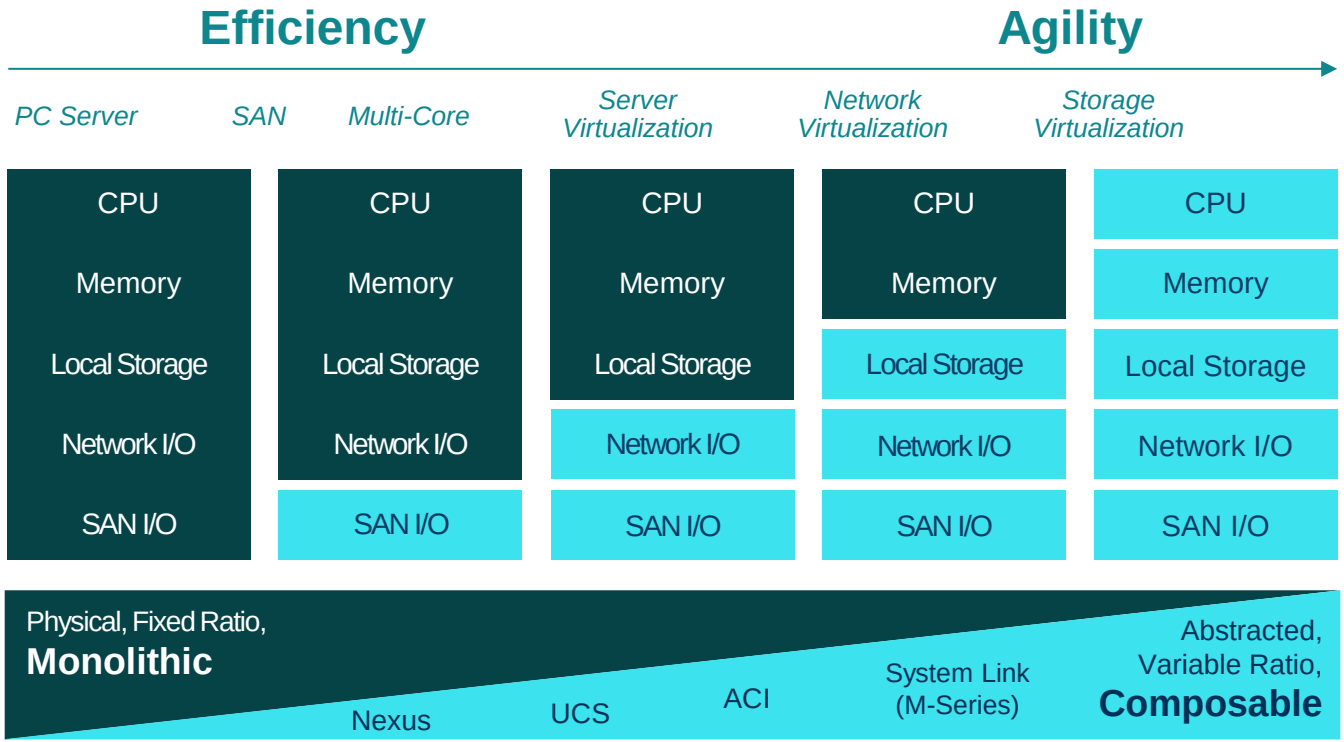
Consistent Infrastructure Management
&
Broad Interoperability

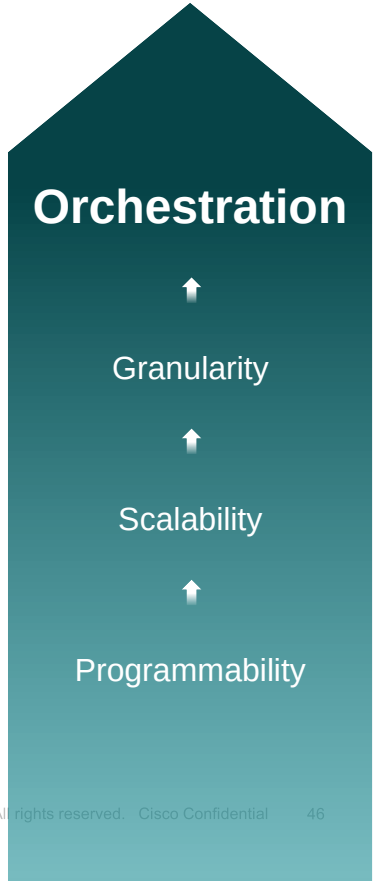
Architectural Flexibility
&
Future Proofed IT

DevOps Style IT

Traditional IT Models

Composable Server Journey





Extending the Cisco UCS Advantage

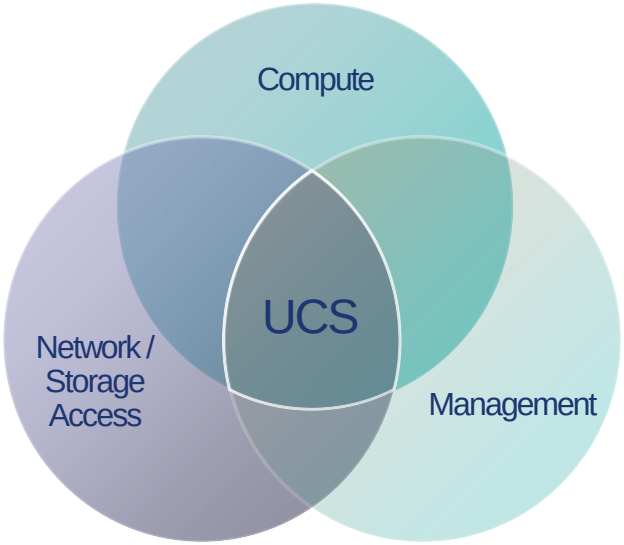
Optimized App Delivery with Simplified Operational Experience

UCS Founding Principles

- Application Centricity
- Operational Simplicity
- Platform for IT Innovation

UCS SystemLink Technology

- Scale server subsystems independently
- Extend policy-architected management to Cloud Scale Applications

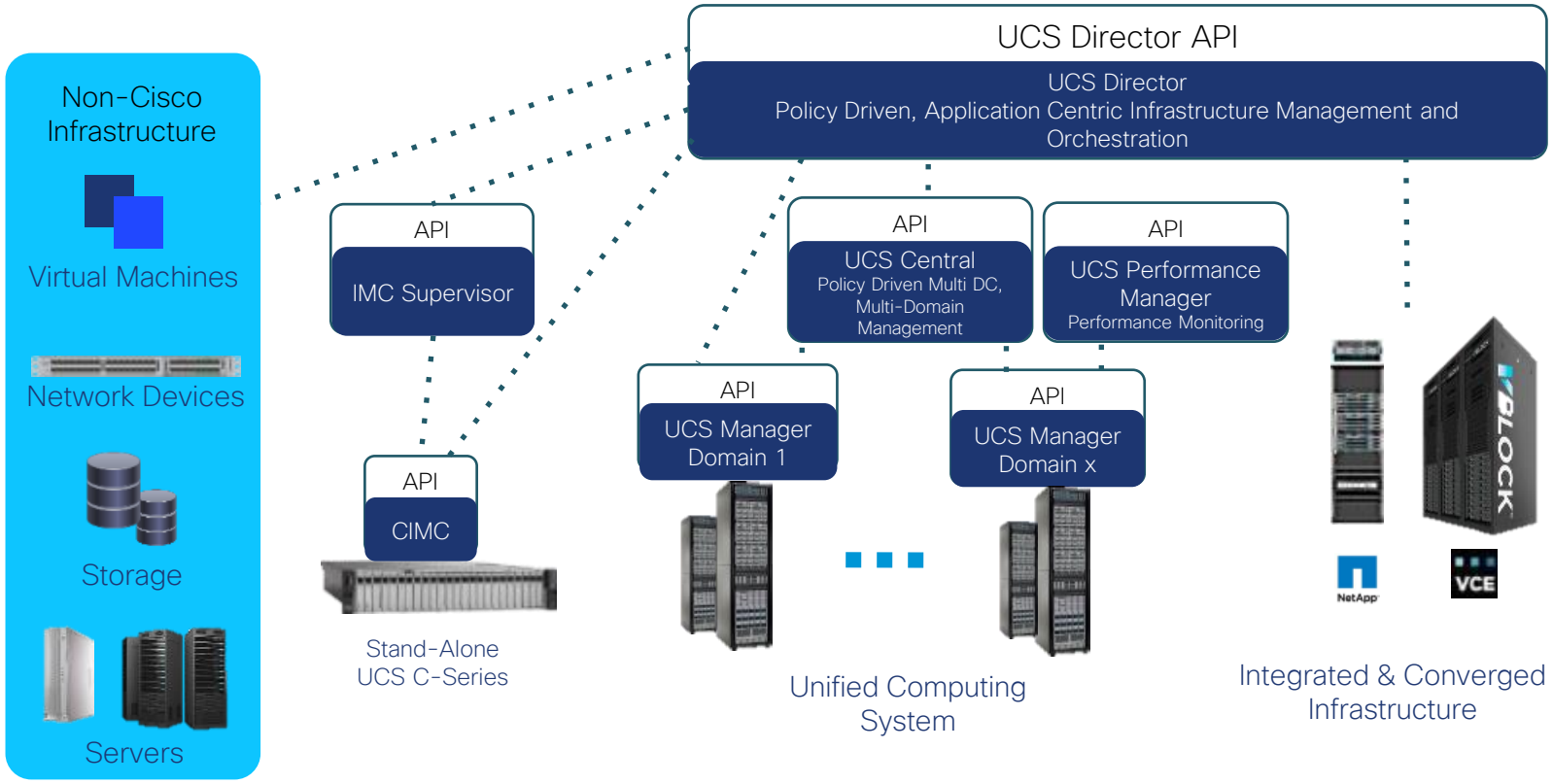


Next Gen Unified Computing

Server Level Disaggregation Disrupts Mainstream Computing

Thank you.

UCS Management Evolution



Powering Applications at Every Scale