

TOMORROW starts here.



Cisco *live!*

UCS Architecture Overview

BRKCOM-1005

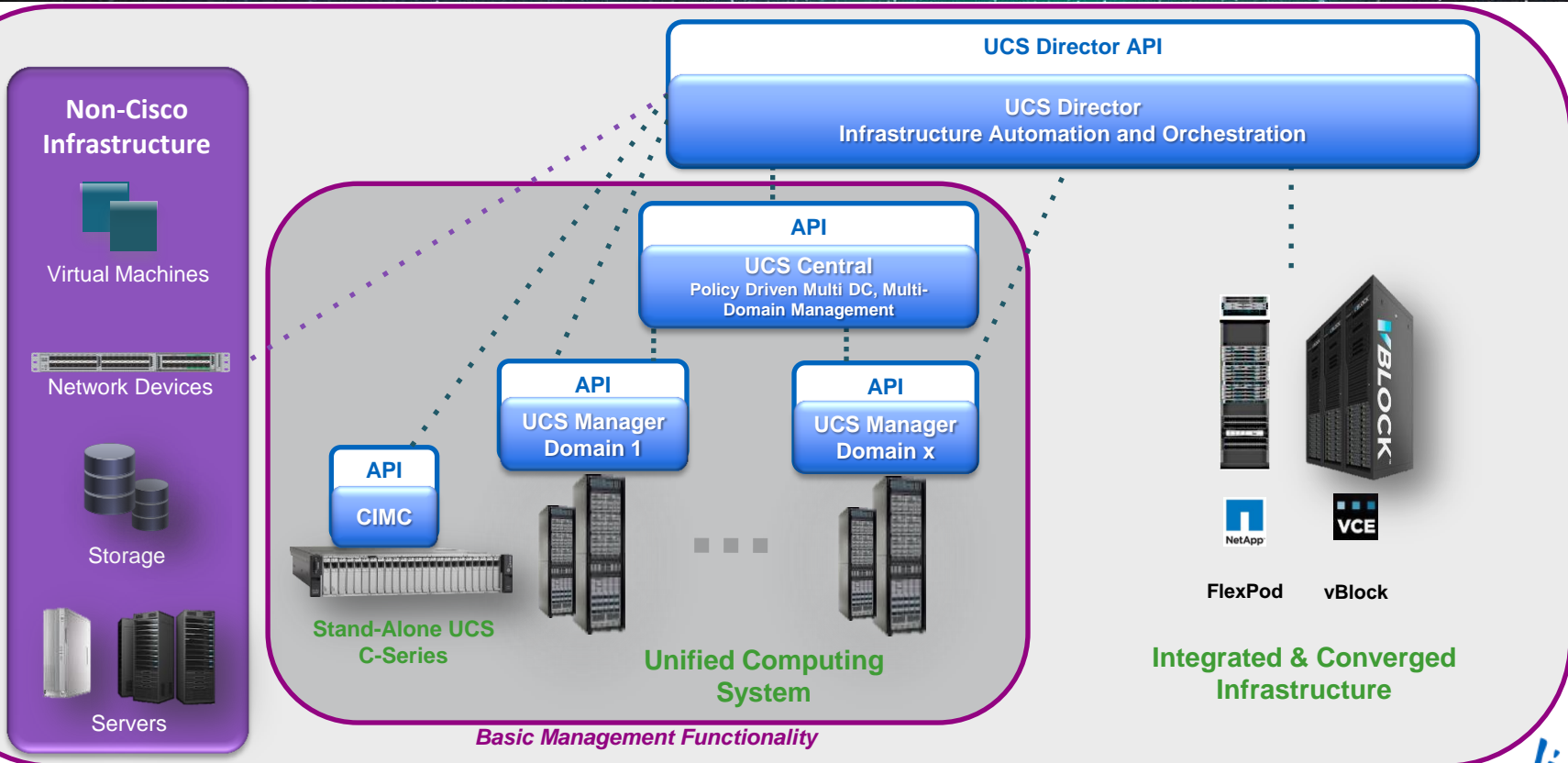
Eric Williams

UCS Technical Marketing Engineer

Agenda

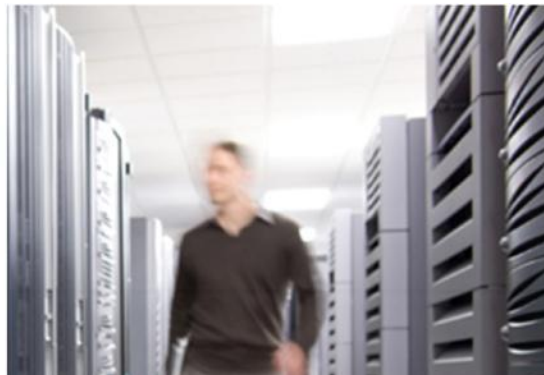
- UCS Building Blocks and Connectivity
 - UCS Chassis, Servers, Fabric Interconnects, I/O Modules, Fabric Extenders
- Service Profiles and Hardware State Abstraction
 - DEMO: Let's Create a Service Profile
- UCS Management Ecosystem
 - DEMO: Automate with UCS PowerTool

UCS Management Portfolio



Basic Management Functionality

Advanced Infrastructure Abstraction & Automation



UCS Building Blocks and Connectivity

Cisco Unified Computing System

Cisco UCS Central

Multi-UCS Manager

Global Inventory, Faults, Statistics, Admin Settings
Global Service Profiles, Pools, Policies

Cisco UCS Manager

(Read / Write Configuration Interfaces)

Embedded Element Manager, GUI and CLI

Cisco UCS Fabric Interconnects

(Read Only / Cut Through Interfaces)

SNMP, Syslog, SMTP, SMASH CLP, CIM XML, Smart Call Home

Cisco UCS I/O Modules and FEX's

Cisco UCS Blade Server Chassis

Cisco UCS Blade and Rack Servers

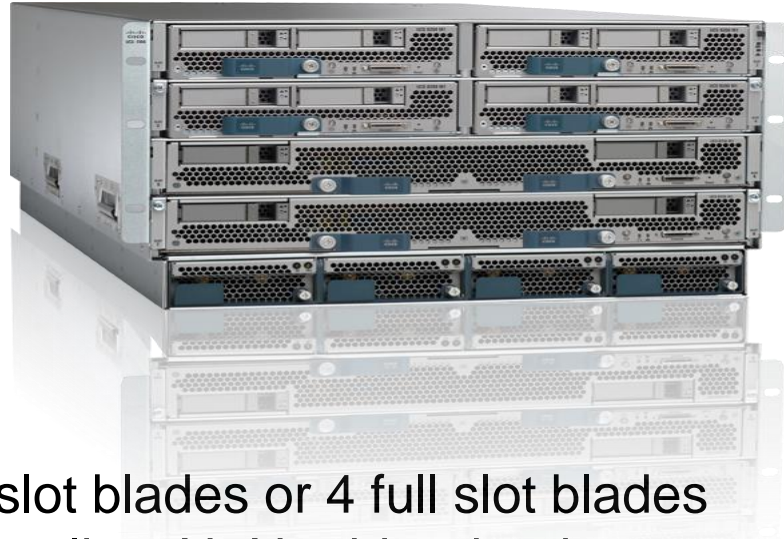
(Cut through Interfaces to CIMC)

Serial over LAN, KVM, IPMI

Cisco UCS I/O Adapters



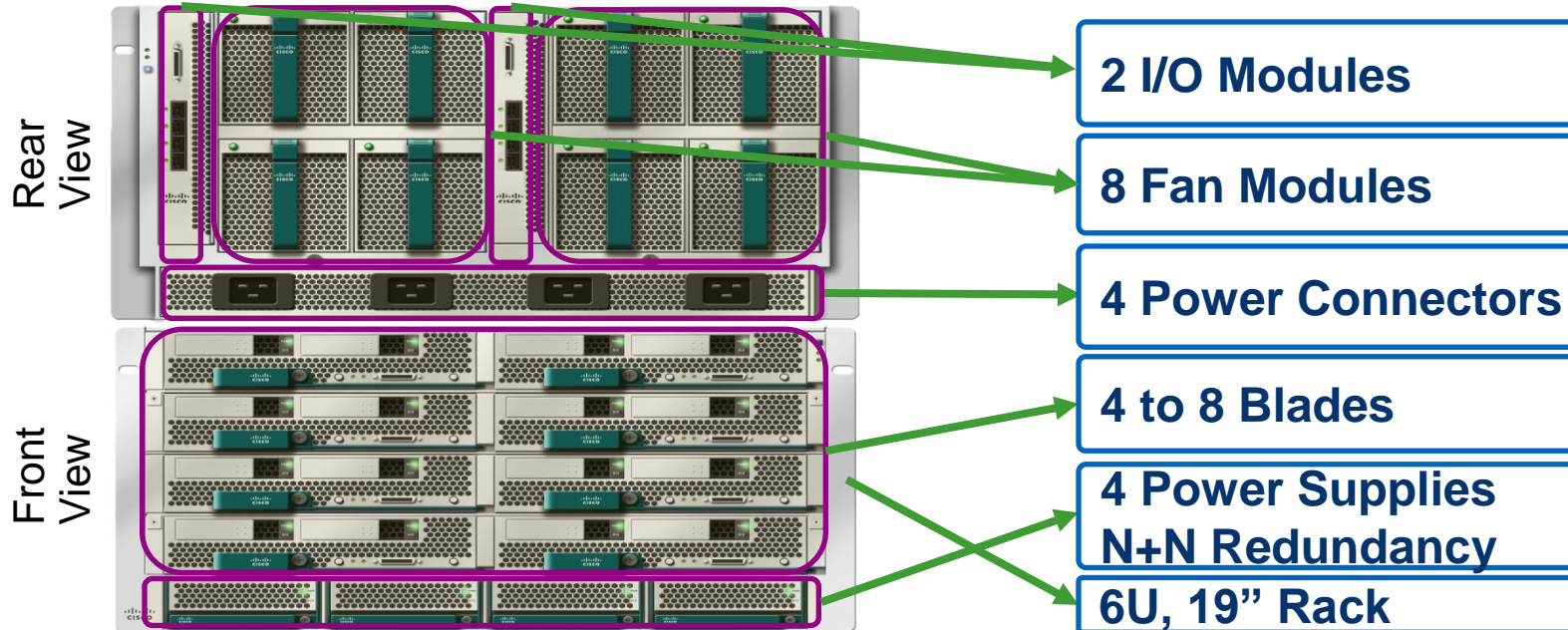
UCS 5108 Blade Chassis



Chassis

- Up to 8 half slot blades or 4 full slot blades
- 4 x power supplies, N+N grid redundant
- 8 x fans included
- 2 x UCS 2100 or 2200 Fabric Extender
- All items hot-pluggable

UCS 5108 Blade Chassis Parts



Current UCS Compute Portfolio

Performance Optimised for Bare Metal, Virtualised, and Cloud Applications

Scale Out

Enterprise Performance

Intensive/Mission Critical

Rack



UCS C24 M3

Entry, Expandable Rack Server for Storage Intensive Workloads



UCS C240 M3

Ideal Platform for Big Data, ERP, and Database Applications



UCS C420 M3

Enterprise Class, 4-Socket Server for Large, Memory-Intensive Bare Metal, and Virtualised Applications



UCS C460 M4

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



UCS C22 M3

Entry Rack Server for Distributed and Web Infrastructure Applications



UCS C220 M3

Versatile, General Purpose Enterprise Infrastructure, and Application Server



UCS B22 M3

Entry Blade Server for IT Infrastructure and Web Applications



UCS B200 M3

Optimal Choice for VDI, Private Cloud, or Dense Virtualisation/Consolidation Workloads



UCS B420 M3

Enterprise Class, 4-Socket Blade for Large, Memory-Intensive Bare Metal and Virtualised Applications



UCS B260 M4

Mission-Critical, 2-Socket Blade for Large, CPU-Intensive Bare Metal and Virtualised Applications



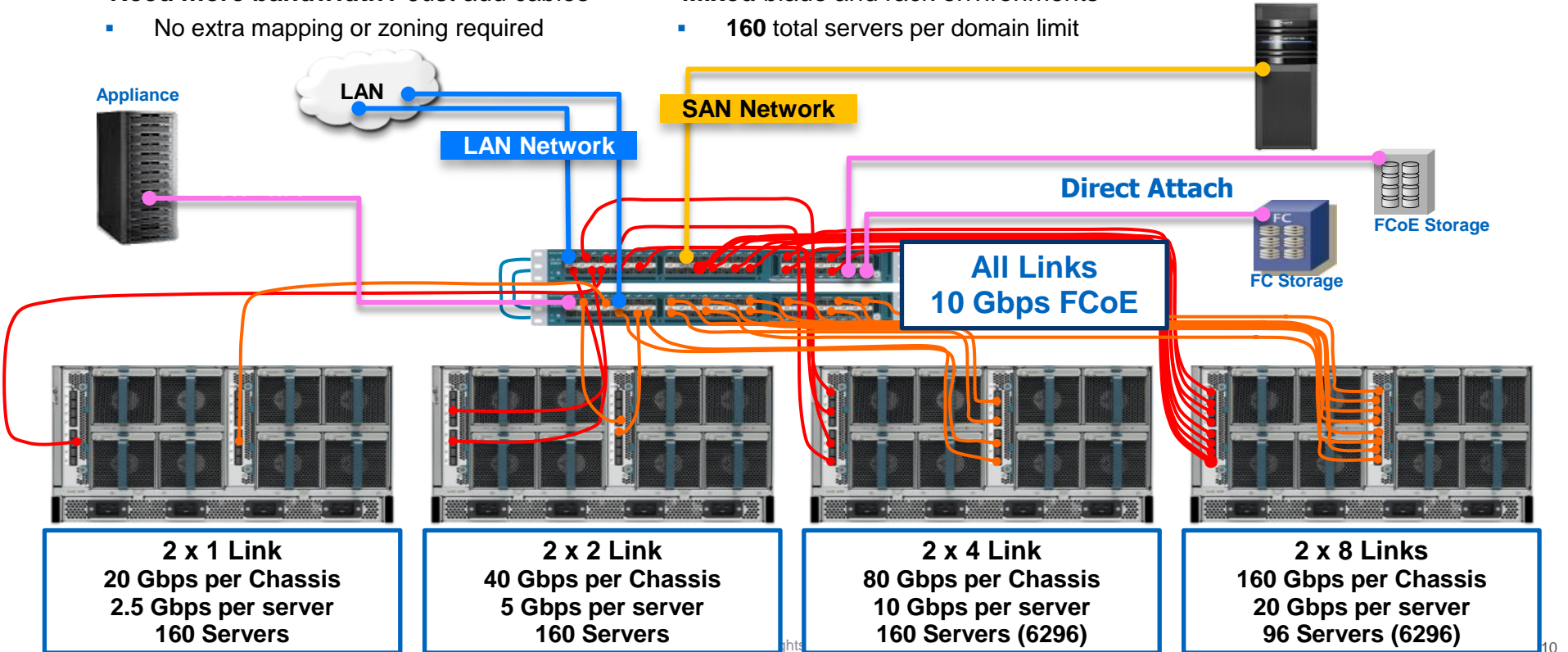
UCS B460 M4

Mission-Critical, 4-Socket Blade for Large, CPU-Intensive Bare Metal and Virtualised Applications

Blade

UCS: Flexible I/O Architecture

- Wire **once** for connectivity and bandwidth
- **Need more bandwidth?** Just add cables
 - No extra mapping or zoning required
- **Policy-driven** bandwidth allocation
- **Mixed** blade and rack environments
 - **160** total servers per domain limit



Cisco UCS Fabric Infrastructure Portfolio

Cisco UCS 6200 and 2200 with Unified Ports

UCS Fabric Interconnects

Typical Deployments

48 Port Fabric Interconnect



- Performance for typical deployments
- 1TB throughput
- 48 ports in 1RU
- Infrastructure agility with Unified Ports

High End Deployments

96 Port Fabric Interconnect



- High Application performance
- 2TB throughput
- High workload density 96 ports in 2RU
- Infrastructure agility with Unified Ports

UCS FEX I/O Modules

2204XP I/O Module



- 80G per chassis
- 20Gb to the Blade per I/O Module
- 40Gb total per blade
- Improved Utilisation with Port Channels

2208XP I/O Module



- 160G per chassis
- 40Gb to the Blade per I/O Module
- 80Gb total per blade, for burst traffic
- Improved Resiliency
- Improved Utilisation with Port Channels

UCS 6248 Fabric Interconnect

Double+ the Port Density of Previous Generation, 1/2 the Latency, Unified Ports



32 x Fixed ports: 1/10 GE or 1/2/4/8 FC

Expansion Module (GEM)

Fabric Interconnect
Cluster Connectivity

Out of Band Mgmt
10/100/1000



Console

Fan Module

Fan Module

Power Entry

Power Entry

N + N Redundant FANs

N + N Power Supplies

UCS 6200: Unified Ports

Dynamic Port Allocation: Lossless Ethernet or Fibre Channel



Lossless Ethernet

1GbE or 10GbE, FCoE, iSCSI, NAS

Native Fibre Channel

Supported Speeds: 1 / 2 / 4 / 8 Gb FC

Benefits

- Simplify switch purchase. Removes ports:ratio guess work
- Increases design flexibility
- Remove specific protocol bandwidth bottlenecks

Use-cases

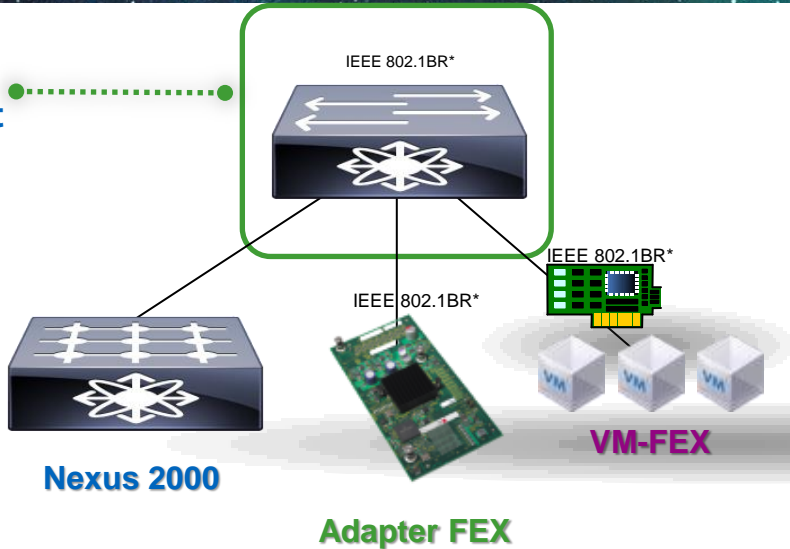
- Flexible LAN & storage convergence based on business needs
- Service can be adjusted based on the demand for specific traffic

Fabric Extender Technology

From Physical To Virtual

Single Point
of Management

Manage Network
all the Way to the
OS Interface:
Physical and
Virtual



Distributed Modular System For Top of
Rack, Server & Virtual Machine

Nexus 2000 FEX

- Consolidates network management
- FEX managed as remote line card
- Extends Cisco Unified Fabric into OEM partner blade chassis

Adapter FEX

- Consolidates multiple 1GbE interface into a single 10GbE interface
- Extends network into server

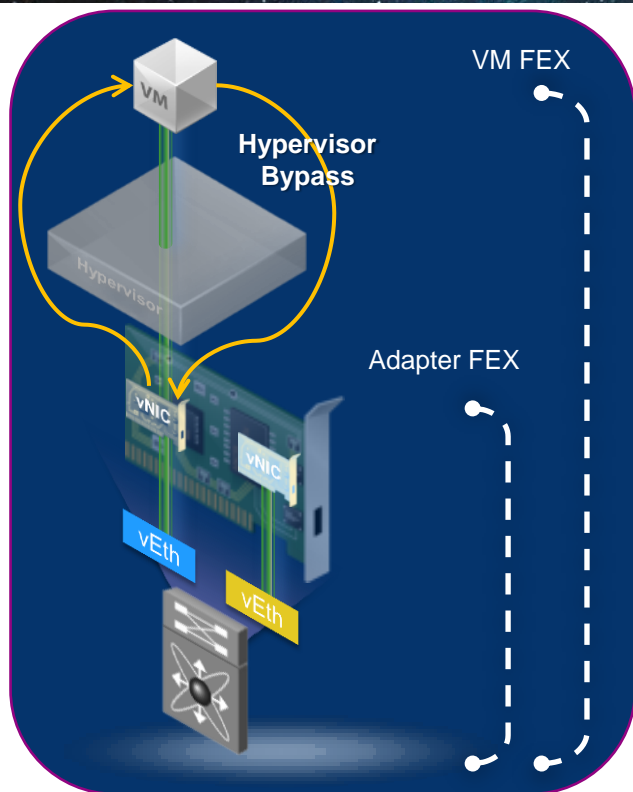
VM-FEX

- Consolidates virtual and physical network
- Each VM gets a dedicated port on switch

*IEEE 802.1BR emerging standard

Virtualised I/O

Improved Performance and Visibility with Cisco FEX Architecture



Features:

- Adapter FEX split a physical NIC into multiple logical NICs
- VM-FEX extends Adapter FEX technology to virtual machine
- Based on open Standards

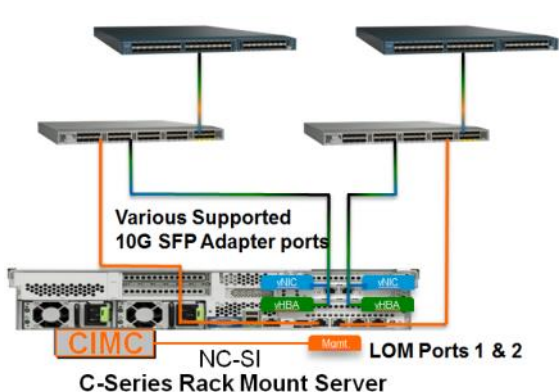
Benefits:

- Same functionality in Physical and Virtual environments
- Increased bandwidth utilisation by sharing physical interface to multiple Applications and/or VMs
- Improved Performance and dynamic network & security policy mobility during VM migration with VM-FEX

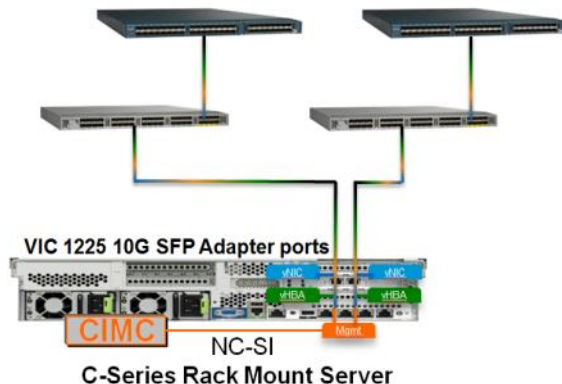
UCS Manager C-Series Rackmount Connectivity

Supported Topologies

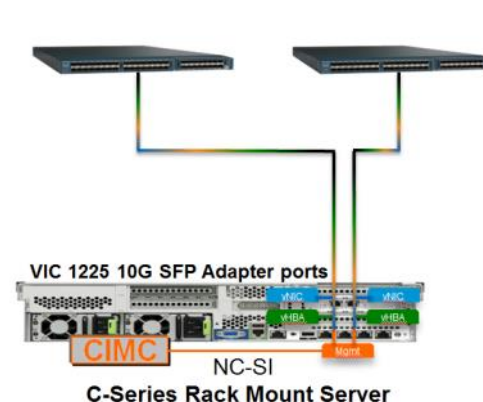
UCSM 2.0(2) – Dual Wire / FEX



UCSM 2.1 – Single Wire / FEX



UCSM 2.2 – Direct Attach to FI





Service Profiles and Hardware Abstraction

UCS Service Profiles

Policies, Templates

- NIC MACs
- HBA WWNs
- Server UUID
- VLAN Assignments
- VLAN Tagging
- FC Fabrics Assignments
- FC Boot Parameters
- Number of vNICs
- Boot order
- PXE settings
- IPMI Settings
- Number of vHBAs
- QoS
- Call Home
- Template Association
- Org & Sub Org Association
- Server Pool Association
- Statistic Thresholds
- BIOS scrub actions
- Disk scrub actions
- BIOS firmware
- Adapter firmware
- BMC firmware
- RAID settings
- Advanced NIC settings
- Serial over LAN settings
- BIOS Settings

Service Profile

SAN

LAN



UCS Service Profile Components

Server Policies:
Discovery, Boot, Bios settings, Firmware, Scrub, Templates, Pre Provisioning, etc.

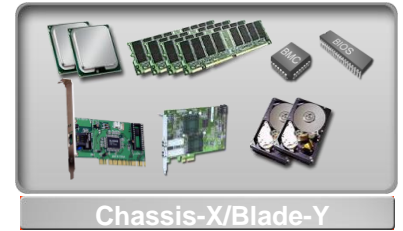
LAN Policies:
vLAN, QoS, Pin Groups, Port Channels, Northbound ports, etc.

Storage Policies:
vSAN, Adapter, Pin Groups, Thresholds, Northbound ports, etc

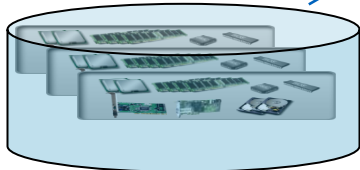


Service Profile
Server Name: Bob
UUID: 56 4d cd 3f 59 5b 61...
MAC : 08:00:69:02:01:FC
WWN: 5080020000075740
Boot Order: SAN, LAN

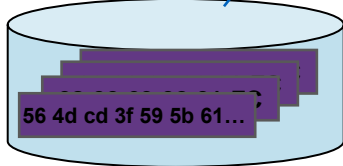
Association



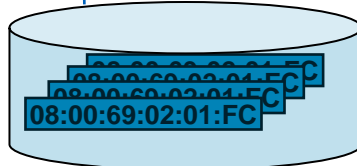
Cisco UCS Manager



Server Pools



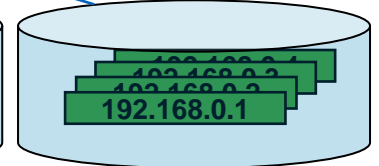
UUID Pools



MAC Address Pools



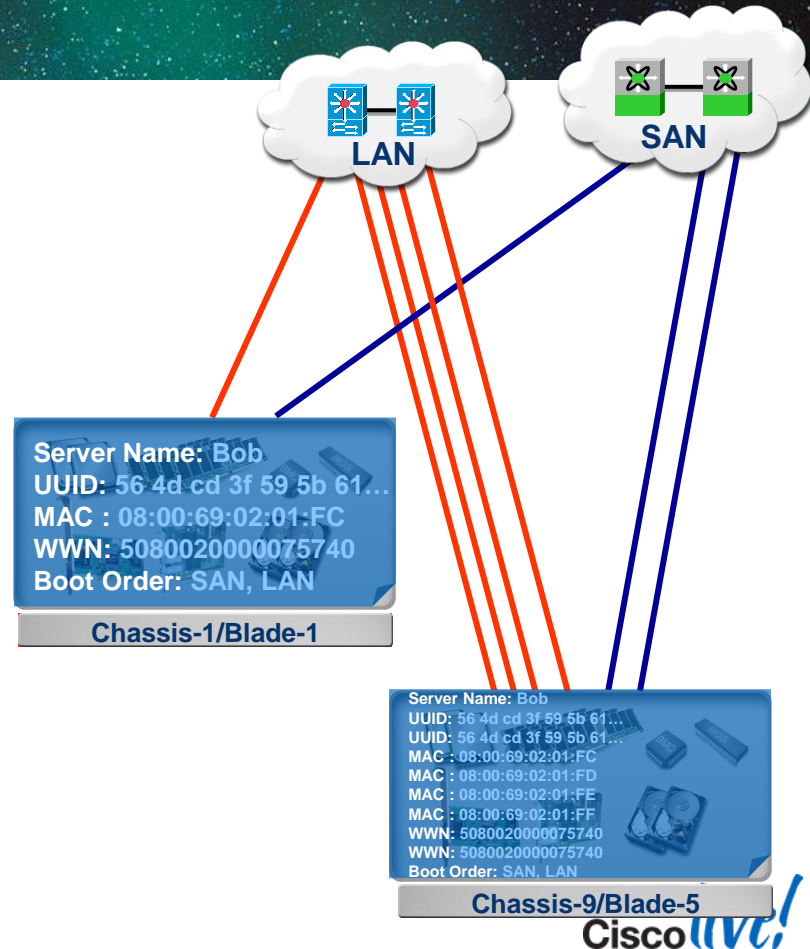
WWxN Address Pools



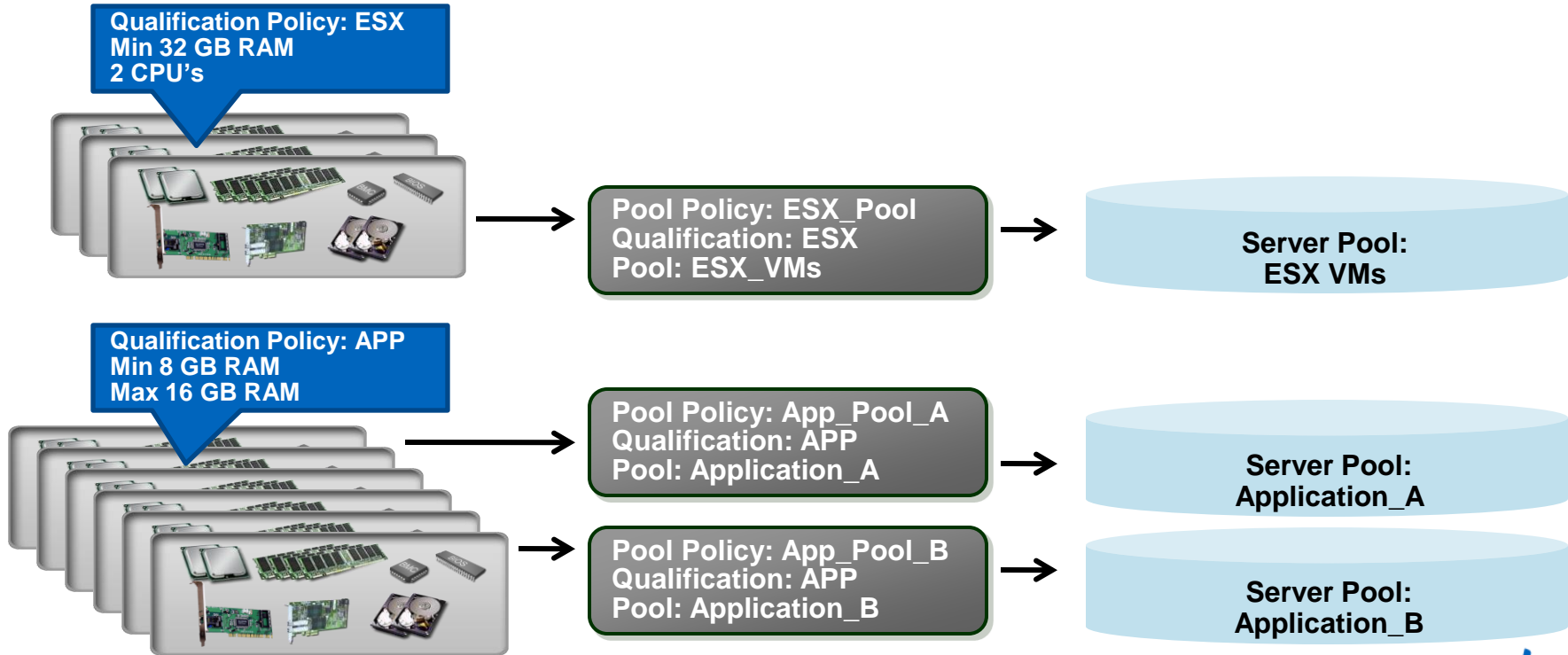
IP Address Pools

Stateless Computing Benefits

- Server identity no longer has to be tied to physical server hardware
 - Profiles provide identity
 - Seamless server mobility
 - Stateless components
- Boot over network (LAN or SAN)
 - Boot order and boot devices are part of the pre-defined logical server profile
 - On-board disks can be used for temp, swap, etc.
- LAN and SAN Connectivity
 - # of NIC's
 - # of HBA's
- No infrastructure changes needed when moving a Service Profile



Automatic Pool Assignment

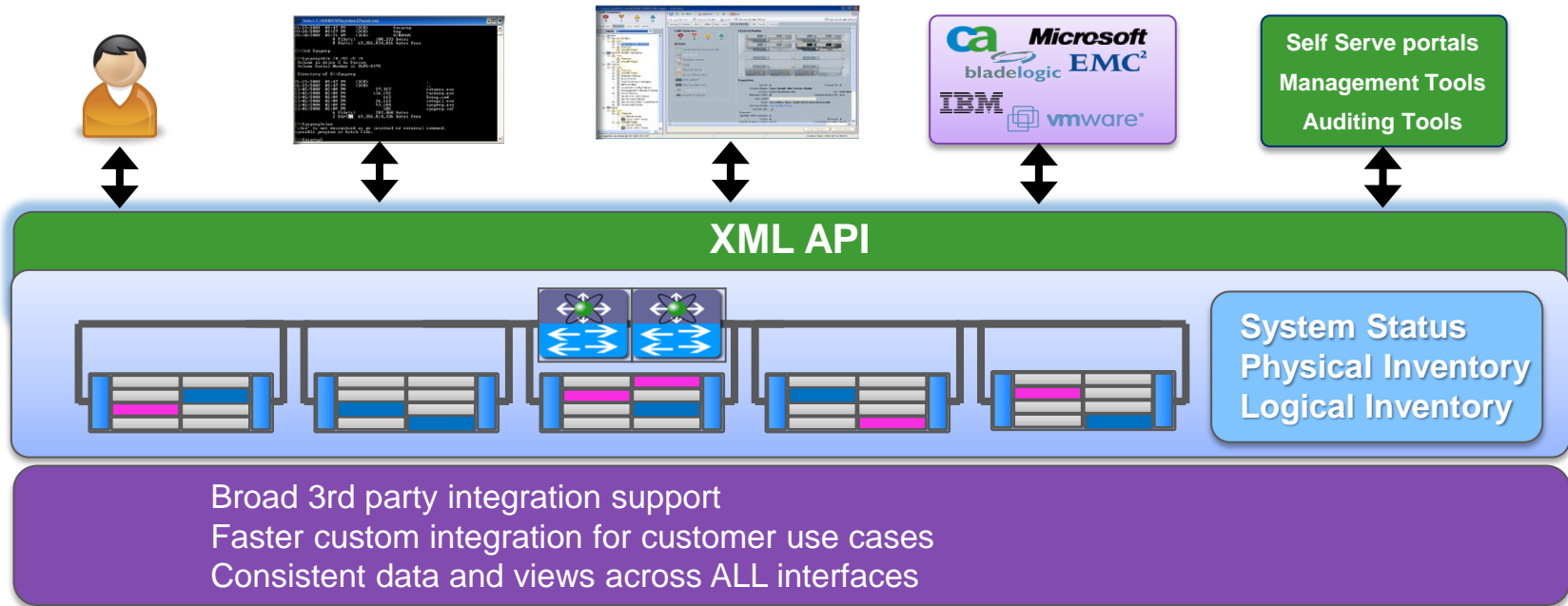




DEMO: Let's Create a Service Profile

Programmatic Infrastructure

- Comprehensive XML API, standards-based interfaces
- Bi-Directional access to physical & logical internals



UCS Manager 2.2(1) “El Capitan”

Features Overview

Fabric Enhancements

- Fabric scaling: VLANs, VIFs, IGMP Groups, Endpoints
 - IPv6 Management Support
 - Uni-Directional Link Detection (UDLD) Support
 - User Space NIC (usNIC) for Low Latency
 - Support for Virtual Machine Queue (VMQ)
-

Operational Enhancements

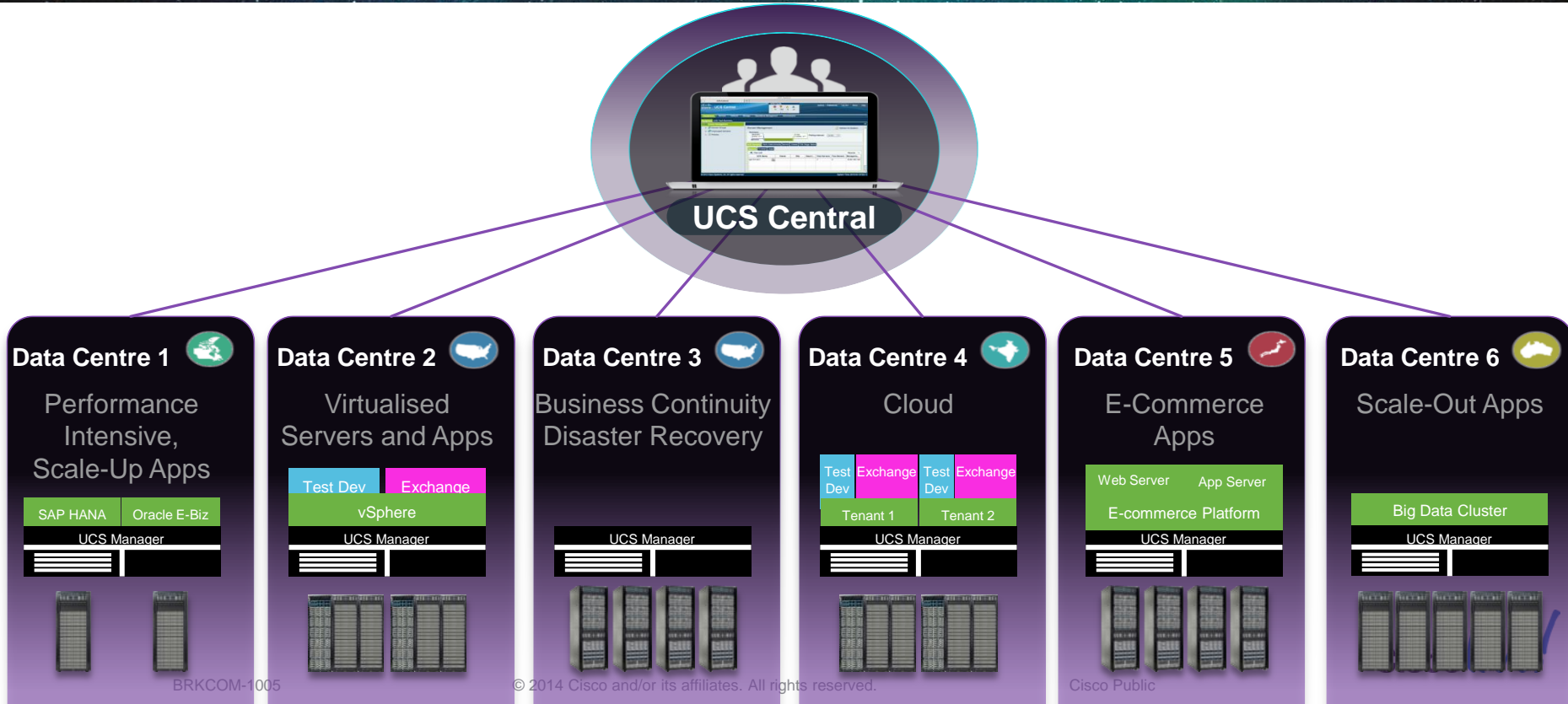
- Direct Connect C-series to FI without FEX
 - Two-factor Authentication for UCS Manager Logins
 - VM-FEX for Hyper-V Management with Microsoft SCVMM
 - Cisco IMC In-band Management
 - Direct KVM Access
 - Server Firmware Auto Sync
-

Compute Enhancements

- Secure Boot
- Enhanced Local Storage Management
- Flash Adapters & HDD Firmware Management
- Precision Boot Order Control
- FlexFlash (Local SD card) Support
- Trusted Platform Module (TPM) Inventory
- DIMM Blacklisting and Correctable Error Reporting

UCS Central

All Workloads, Common Platform Unified Management



Intro: UCS Central Feature Details

Provides 5 Key “Global” UCS Functions:

1. Information Dashboard

- Inventory
- Faults / Logs
- Statistics

2. Identifier / ID Pool Management

3. Domain-wide Infrastructure Policies

- Admin Settings & Enforcement

4. Server Policies

- Component Settings
- Policy Subscription

5. Workload Mobility

- Global Service Profiles
- Site Specific Settings





UCS Management Ecosystem

UCS Solution Ecosystem

Vertical Solution Focus



Healthcare



Financial Services



Manufacturing



Retail

Applications

Enterprise Apps	Databases	Business Analytics	Virtual Desktop

Management

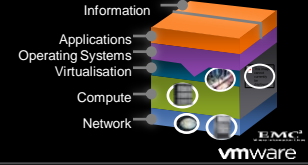


Operating System and Hypervisor



Integrated Solutions

VBLOCK



VSPEX

FLEXPOD

VXI

RISC Migration

Cisco UCS User Community

Web Based End User Community

<http://communities.cisco.com/ucs>

<http://communities.cisco.com/ucsintegrations>

■ Tools, Downloads, Examples

- UCS Platform Emulator (UCSPE)
- goUCS Automation Tool
- XML API, PowerShell code Examples
- Cisco UCS PowerTool (PowerShell Module)
- Microsoft SCOM Management Pack for Cisco UCS
- Microsoft SCVMM UI Extension for Cisco UCS
- Microsoft SCO Integration Pack for Cisco UCS

■ Documentation

- Programming & Developer Guides
- Whitepapers
- Reference Guides (XML Model, Faults)

■ Collaboration

- Blogs
- Peer to peer forums
- Videos
- Access to Cisco Subject Matter Experts

The screenshot shows the Cisco UCS User Community website. At the top, there's a navigation bar with tabs for Overview, All Content (36), Discussions (5), Documents (21), Blog, Polls, and Videos. Below this is an announcement banner for a survey. The main content area is divided into several sections: Spaces (Cisco Developed Integrations), Follow Us (Facebook and Twitter), Actions (Post and Share, Notifications, View feeds), Email/RSS Notifications (Subscribe, View feeds), and Popular Tags (boot_from_iscsi, boot_from_san, c-series, etc.). On the right, there's a large green banner for 'Welcome to Cisco Unified Computing' with a video player and product announcements. Below that is a 'Featured Content' section with a list of articles and their authors. At the bottom right, there's a 'Categories' table.

Category	3	1	4	0	0
UCS Central	3	1	4	0	0
UCS C-Series Standalone	0	0	9	0	4
UCS Director	0	0	2	0	0
UCS Manager	4	4	8	0	0

UCS Platform Emulator (UCSPE)

No UCS Hardware Needed for API Integration Development

<http://communities.cisco.com/ucspe>

- Full featured emulator for the UCS Manager
- Installs as a Virtual Machine
- Provides complete support for all XML API calls
- Object Browser to peruse the UCSM model
- Import & replicate existing live UCS Manager physical inventory
- Share saved physical inventories among UCS Platform Emulators
- Drag-n-drop hardware builder to create custom physical inventory

Cisco UCS Manager - 2.2(1b)

Single point of device management for the Cisco Unified Computing System

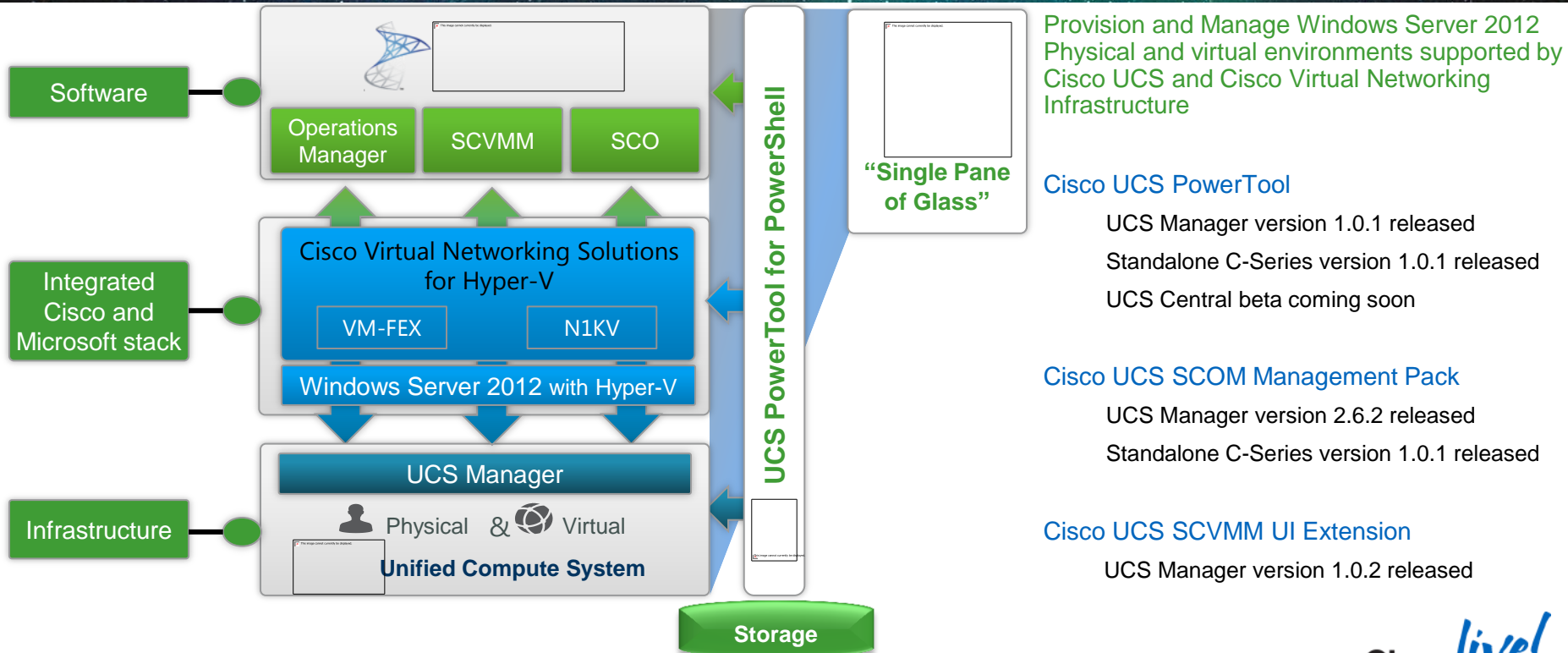
Launch UCS Manager Launch KVM Manager

Name	IP Address	Overall Status	Active State
Service Profile ESX1-...	ESX-1-172.25.180.113	OK	Associated
Service Profile ESX4-...	ESX - VMs	OK	Associated
Service Profile ESX1L-...	Windows 2008 - 172.25...	OK	Associated
Service Profile Win2k...	JumpBox	OK	Associated
Service Profile esm...	Linux - 172.25.180.116	OK	Associated
Service Profile esm...	Linux - 172.25.180.116	OK	Associated
Service Profile esx-11		OK	Associated
Service Profile esm...		OK	Associated
Service Profile esm...		OK	Associated
Service Profile ESX2-...	HR ESX 2	Unassociated	Unassociated
Service Profile ESX2L-...	Sales Engineer V	Unassociated	Unassociated
Service Profile Linux...		Unassociated	Unassociated
Service Profile ESX-...		Unassociated	Unassociated
Service Profile Text0P		Unassociated	Unassociated

Associated State: 50% associated, 50% unassociated

Deliver Integrated Private Cloud Solutions

Cisco Compute and Network Infrastructure with WS2012, SC 2012/SP1 and Hyper-V



Provision and Manage Windows Server 2012 Physical and virtual environments supported by Cisco UCS and Cisco Virtual Networking Infrastructure

Cisco UCS PowerTool

UCS Manager version 1.0.1 released
Standalone C-Series version 1.0.1 released
UCS Central beta coming soon

Cisco UCS SCOM Management Pack

UCS Manager version 2.6.2 released
Standalone C-Series version 1.0.1 released

Cisco UCS SCVMM UI Extension

UCS Manager version 1.0.2 released

Cisco UCS PowerTool

Programmatic Control over UCS Hardware

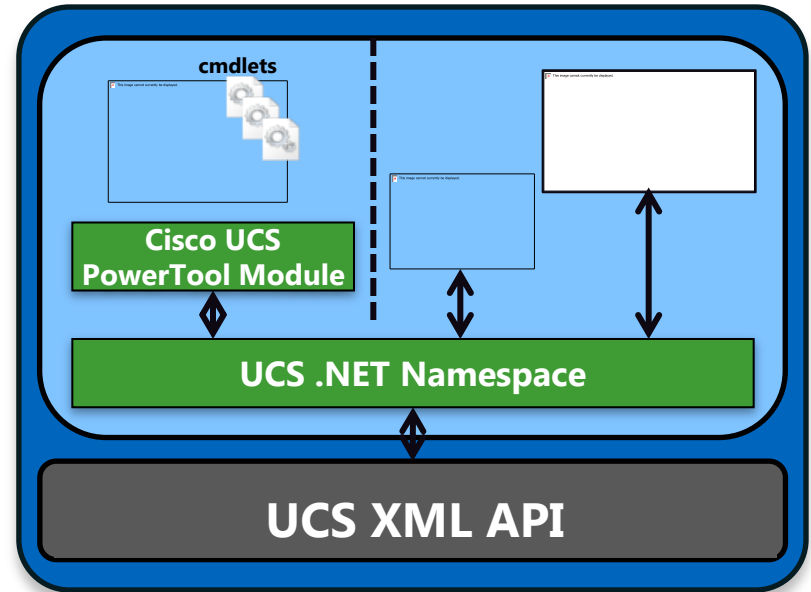
Architected for Flexibility and coverage

- PowerShell Wrapper
 - Cmdlet definition and structure
 - Get-help support
- .NET UCS Namespace Library
 - XML API call construction
 - Class Definition
 - Validation

PowerShell Design

- In-line get-help support
- Full Pipelining support
- Fully classed object definition
- All 'legal' verbs

- .NET Namespace provides common base for all Microsoft focused integration
- Targeted to support full manageability of UCS across multiple releases



Cisco UCS PowerTool

Most Commonly Used Objects and Assets

■ Service Profiles

- Policies (Firmware, Boot Order, vNIC / vHBA config, Storage, IPMI, SoL, BIOS)
- Pools (WWN, UUID, MAC)
- Configuration Faults
- Launch UCS KVM for SP

■ Servers

- Hardware - CPU, Memory, Adaptors, CIMC)
- Power Operations
- Power / cooling / network / environmental statistical data
- Hardware Faults

■ Chassis

- Hardware – Power Supply / Fan Modules / IO Modules
- Power / cooling / network / environmental statistical data
- Config and Hardware Faults

■ Fabric Interconnect

- Hardware – Power Supply / Fan Modules / Network Expansion Modules
- Power / cooling / network / environmental statistical data
- Network Elements (VLAN, VSAN, QoS, Port Profiles)
- Config and Hardware Faults

■ Config. Operations

- Pools (WWN, UUID, MAC, IP)
- Policy creation, manipulation, deletion, and consumption
- vNIC / vHBA Templates
- Service profile template creation, cloning, deletion, and consumption
 - Simplistic service profile creation (with a limited scope of what is available to configure)
 - Expert SP creation (use variablised XML w/ config file)
- Compare Managed Objects across orgs and/or domains
- Sync Managed Objects across orgs and/or domains

Getting Started: ConvertTo-UcsCmdlet

The best way to discover usage of PowerTool cmdlets and usage

▪ Usage: Option #1

- Launch UCS GUI & Login
- Run `convertTo-UcsCmdlet`

▪ Usage: Option #2

- Run `connect-Ucs 1.2.3.4`
- Run `start-UcsGuiSession -LogAllXml`
- Run `convertTo-UcsCmdlet`

▪ Usage: Option #3

- Create a '**config-all**' XML backup from UCS Manager
- Run `convertTo-UcsCmdlet -UcsBackup -LiteralPath backup.xml -OutputPath output.ps1`



DEMO: Automate with UCS PowerTool



Q & A

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