

What You Make Possible

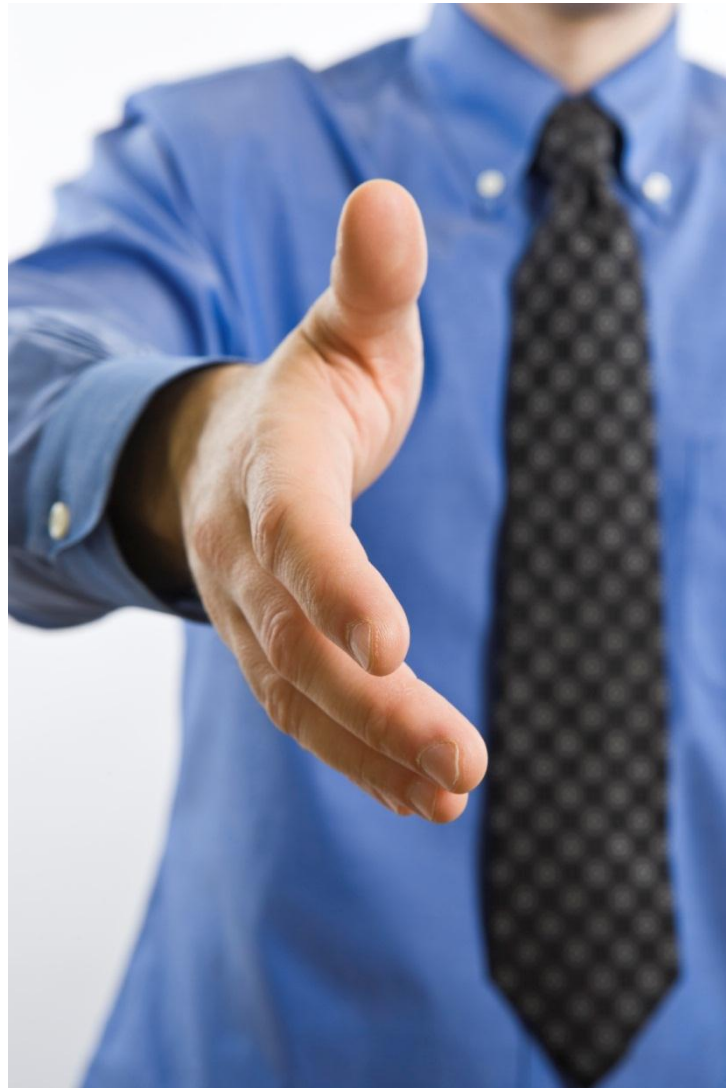


Deployment Best Practices for VMware on UCS

BRKVIR-2662

Introductions

Let us get to know each other



- VMware server virtualisation
- VMware desktop virtualisation
- Cisco UCS
- Area of expertise
 - Networking
 - Storage
 - Compute
- Job function
 - Architecture
 - Operations
 - Management

What We Will Cover

Deployment Best Practices for VMware on UCS

vCenter Plug-in



Networking



Compute



Rapid Deployment



Storage



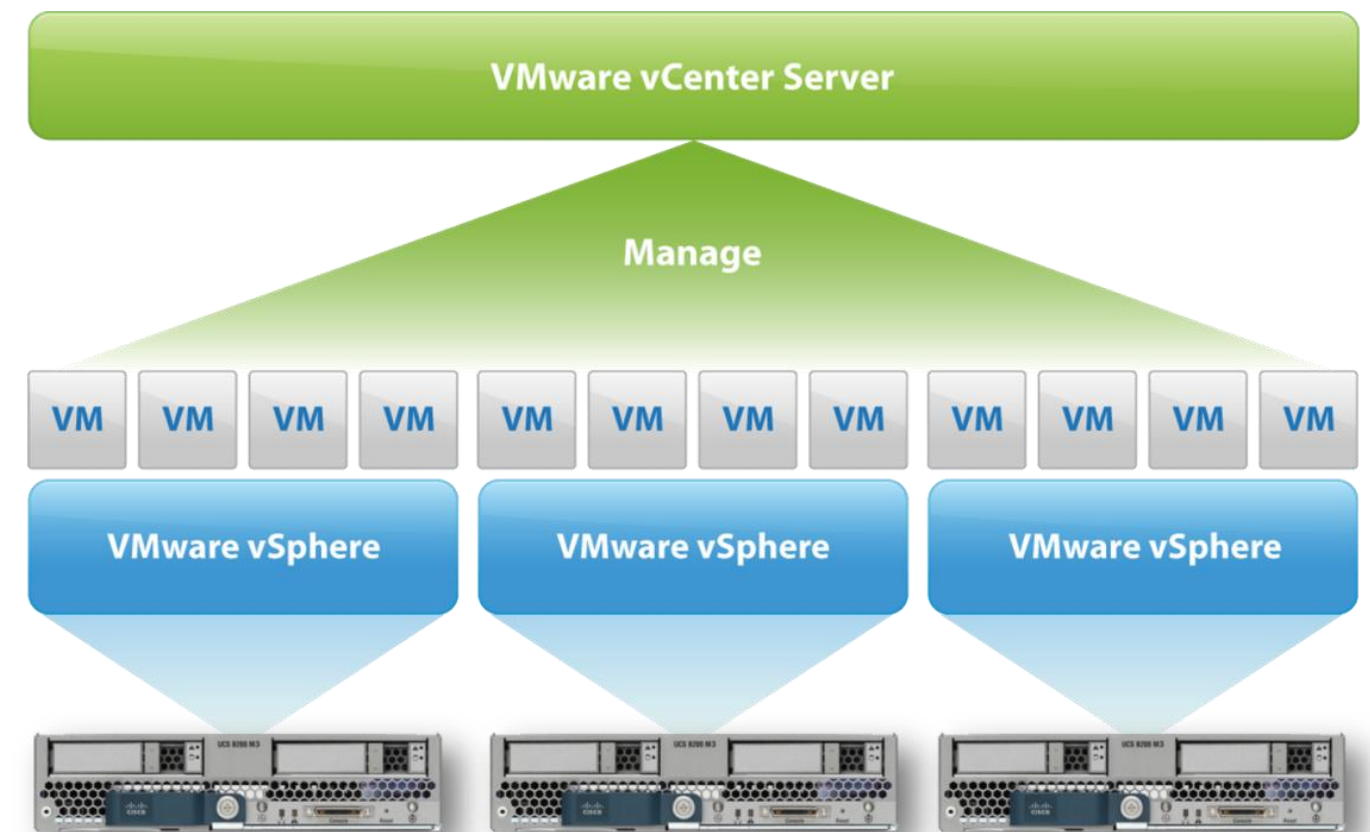
Cisco UCS vCenter Plug-in



Cisco UCS vCenter Plugin

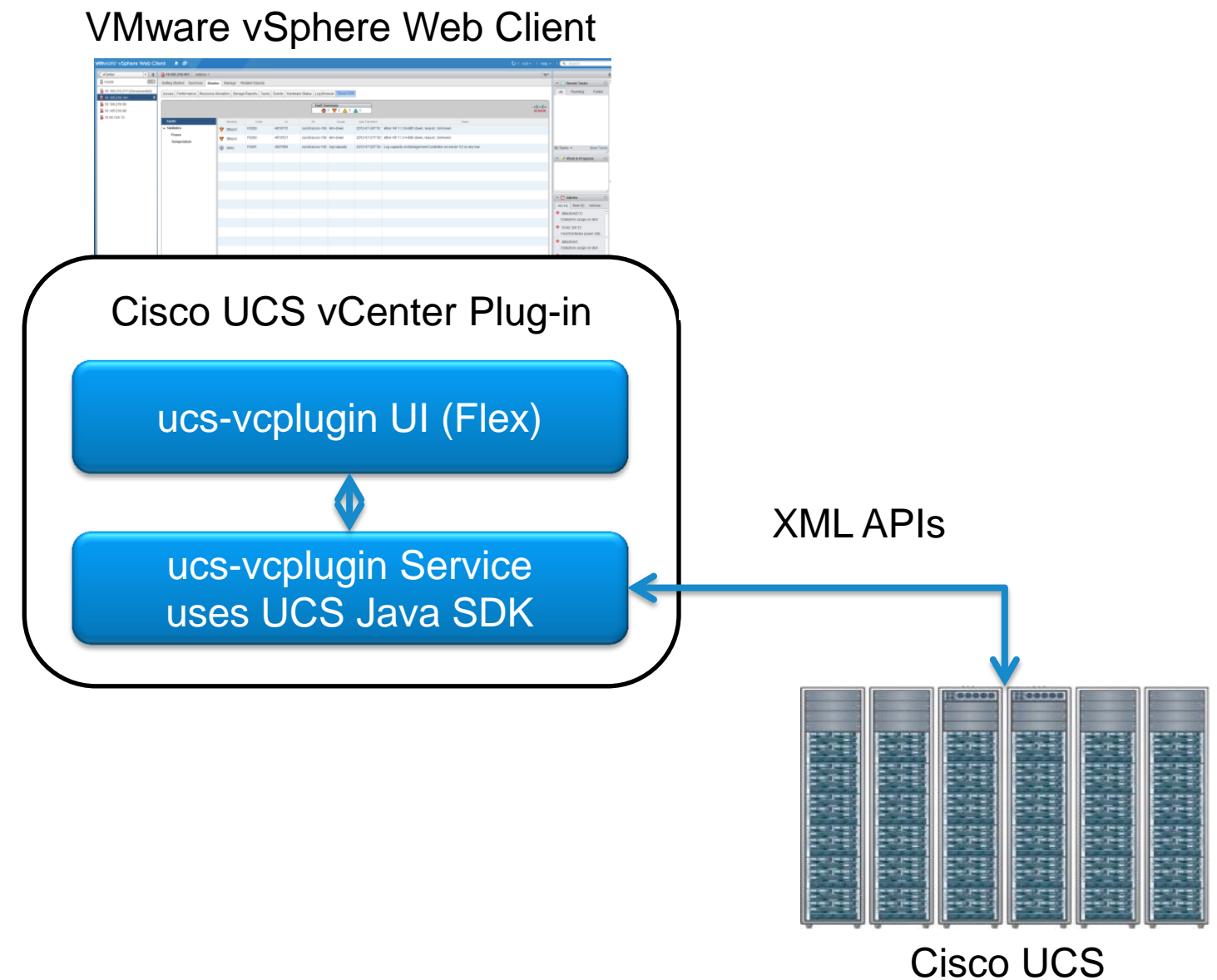
Version 0.9(1) beta

- Extension for vSphere Web Client 5.1
- Requires vCenter 5.0 or higher
- Enables admins to view, manage and monitor UCS physical infrastructure
- Free at <http://developer.cisco.com/web/unifiedcomputing/vmware>



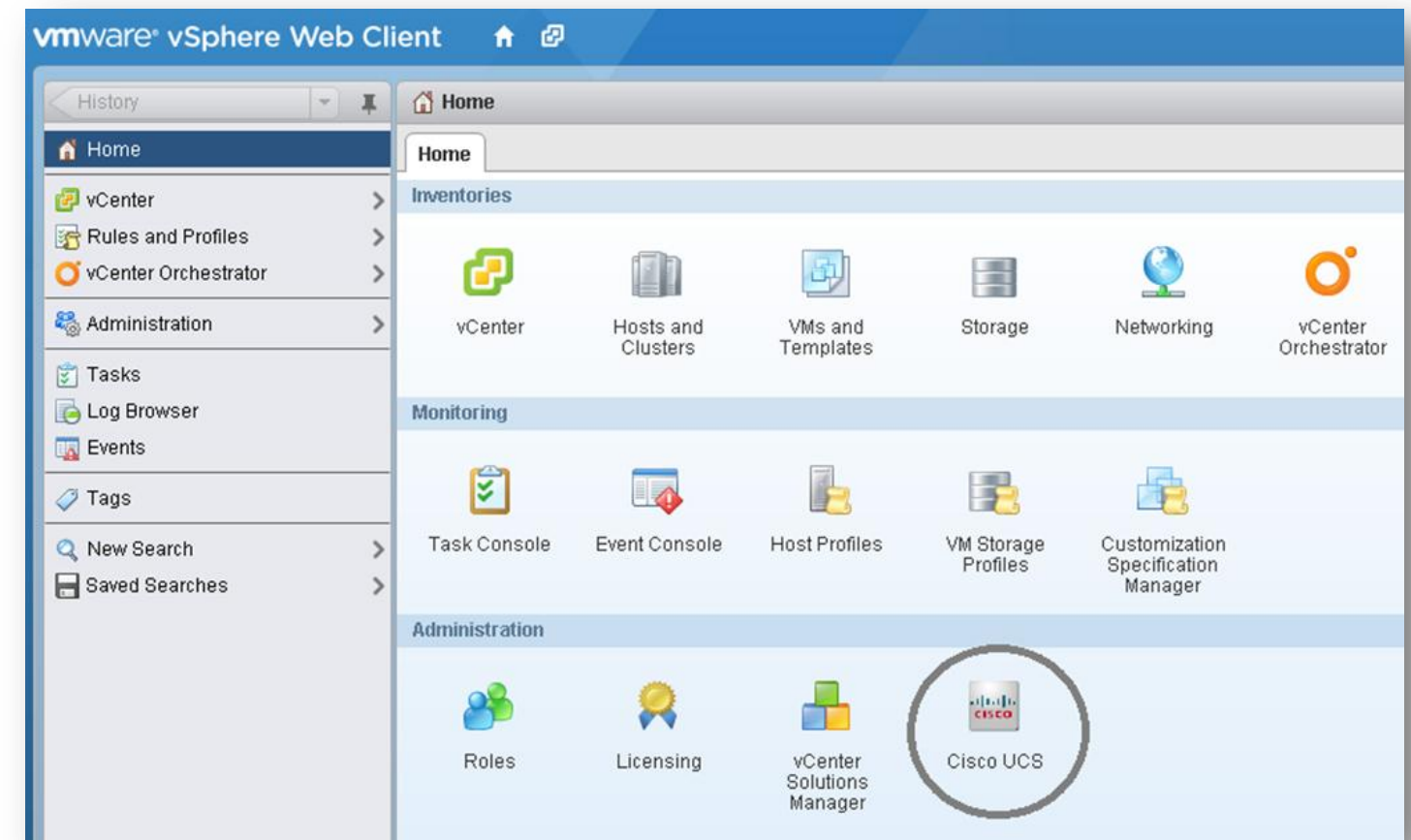
Cisco UCS vCenter Plug-in Architecture

- Two major components
 - UCS-vcplugin UI is Flex-based extension to VMware web client
 - UCS-plugin services uses XML API to get data from UCS
- v0.9(1) supports only one registration per UCS domain



Cisco UCS vCenter Plug-in Capabilities

- Physical hierarchy view
- Health of servers and infrastructure
- Maps physical servers to ESX hosts
- For each ESX host:
 - Inventory
 - Firmware
 - Faults
 - Power/temp statistics
- KVM launch
- Toggle blue locator LED



UCS Domains Shown in Inventory

The screenshot shows the VMware vSphere Web Client interface. On the left, the 'Inventory Lists' section is expanded to show 'Cisco UCS Domains' with a sub-item 'UCS Domains' (count: 3). An orange arrow points to this item. The main content area displays a 'Getting Started' guide with the following text:

What is vCenter?
The vCenter inventory is where you find all the objects associated with vCenter Server systems, such as datacenters, hosts, clusters, networking, storage, and virtual machines.

The Inventory Lists allow you to view an aggregated list of these objects across vCenter Server systems. These flat lists enable easier batch operations.

The inventory tree is still available under Inventory Trees. Here objects are listed hierarchically in four categories: Hosts and Clusters, VMs and Templates, Storage, and Networking.

There are three steps to get started with your virtual infrastructure:

1. Create a datacenter
2. Add hosts to the datacenter
3. Create virtual machines on the hosts

Below the text, there is a button labeled 'Select an Inventory item' and a section titled 'Explore Further' with links to 'What is vCenter Server?', 'Networking in vSphere', 'Storage in vSphere', and 'What are Inventory Views?'.

UCS Domain Inventory

Overview of domain components available



vmware vSphere Web Client

UCS Domains

- savbu-tpi01
 - Chassis 1
 - Rack Mounts 1
 - Fabric Interconnects 2**
 - switch-A
 - switch-B

switch-A

Summary

Dn sys/switch-A

Ucs savbu-tpi01

Fan				
Name	Operability	Performan...	Power	Temperature
fan-1	operable	not-suppor	on	ok
fan-2	operable	not-suppor	on	ok

PSU						
Name	Model	Operability	Performance	Power	Temperature	Voltage
psu-1		unknown	unknown	offduty	ok	unknown
psu-2	N10-PAC1-	operable	unknown	on	unknown	unknown

UCS Chassis View

ESX and non-ESX blades shown



Chassis details



vmware vSphere Web Client

savbu-tpi01 | **chassis-1** | Actions

chassis-1

- Non ESX Servers 4
- ESX Servers 2
- UCS Domain 1

Summary | Related Objects

Name chassis-1
Dn sys/chassis-1
UCS Domain savbu-tpi01

Fan

Module	Name	Operability	Performance	Power	Temperature
▼ Module-1					
Module-1	fan-1	operable	ok	on	ok
Module-1	fan-2	operable	ok	on	ok

PSU

Name	Model	Operability	Performance	Power	Temperature	Voltage
psu-1	N20-PAC5-2500W	operable	ok	on	ok	ok
psu-2	N20-PAC5-2500W	unknown	unknown	off	ok	unknown

IO Module

Id	Vendor	Model	If Role	If Type	Overall Status	Type	...
▼ IO Module-1							
▼							
IO Module	Cisco Systems I	N20-I6584			operable		
▼ Backplane Port							
Backplane port 1/2			server	physical	up	lan	dce



ESX Server Extension

Summary view

- Service profile name
- Server location
- Hardware inventory

The screenshot displays the VMware vSphere Web Client interface for an ESX server extension. The main content area shows the 'Summary' tab for the server '10.105.219.90'. The 'Cisco UCS' panel, highlighted with an orange border, provides the following details:

Property	Value
UCS	Savbu-tpi01
Server Location	1/5
UUID	E9e92891-a54d-11de-be99-000bab01c0fb
Service Profile	Org-root/ls-Blade5
Serial	QC1133701J7
Overall Status	Ok

Below the Cisco UCS panel, the 'Hardware' section shows:

Component	Details
Manufacturer	Cisco Systems Inc
Model	N20-B6620-1
CPU	8 CPUs x 2.26 GHz
Memory	24,304 MB / 28,605 MB

The right-hand pane shows the 'Configuration' section with the following details:

Property	Value
ESX Version	VMware ESXi, 5.0
Image Profile	ESXi-5.0.0-2012
vMotion Enabled	No
vSphere HA State	N/A
Host Configured for FT	No
EVC Mode	Disabled

The 'Tags' section is currently empty.

ESX Server Extension

Manage view

Type	Name	Model	Running Version	Startup Version	Backup Version	Update Status	Activate Sta
CIMC Controller	CIMC Controller	Cisco UCS B200 M1	2.0(1t)	2.0(1t)	2.0(0.130)	ready	ready
Adaptors	adaptor-1	Cisco UCS M71KR-Q	2.0(1t)	2.0(1t)	1.4(0.433p)	ready	ready
Storage Controllers	storage-SAS-1	SAS1064E PCI-Express Fu	01.28.03.00	01.28.03.00 06.2	N/A	N/A	ready
BIOS	BIOS	Cisco UCS B200 M1	S5500.1.3.1b.0.0511201016	S5500.1.3.1b.0.0	N/A	N/A	ready

Inventory and firmware summary information

ESX Server Extension

Monitor view

The screenshot displays the VMware vSphere Web Client interface for monitoring a Cisco UCS chassis. The left navigation pane shows various object types with counts: Top Level Objects (5), Virtual Machines (5), vApps (0), Datastores (1), Networks (1), Distributed Switches (0), Chassis (0), and Rack Mounts (0). The main content area is in the 'Monitor' view, showing a 'Fault Summary' widget with 0 critical, 0 major, 0 minor, and 2 warning faults. Below this is a table of faults:

Severity	Code	Id	Dn	Cause	Last Transition	Descr
(Warning)	F4525253	3499472	org-root/ls-Blade	named-policy-un	2012-03-16T14:00:00	Policy reference solPolicyName 'default' does not resolve to named policy
(Info)	F0461	3513290	sys/chassis-1/bl	log-capacity	2012-03-16T18:00:00	Log capacity on Management Controller on server 1/5 is very-low
(Warning)	F4528596	7300365	org-root/ls-Blade	named-policy-un	2012-09-26T14:00:00	Policy reference maintPolicyName 'TestQA' does not resolve to named policy

A context menu is open over the 'Faults' section, showing options for 'Statistics', 'Power', and 'Temperature'.

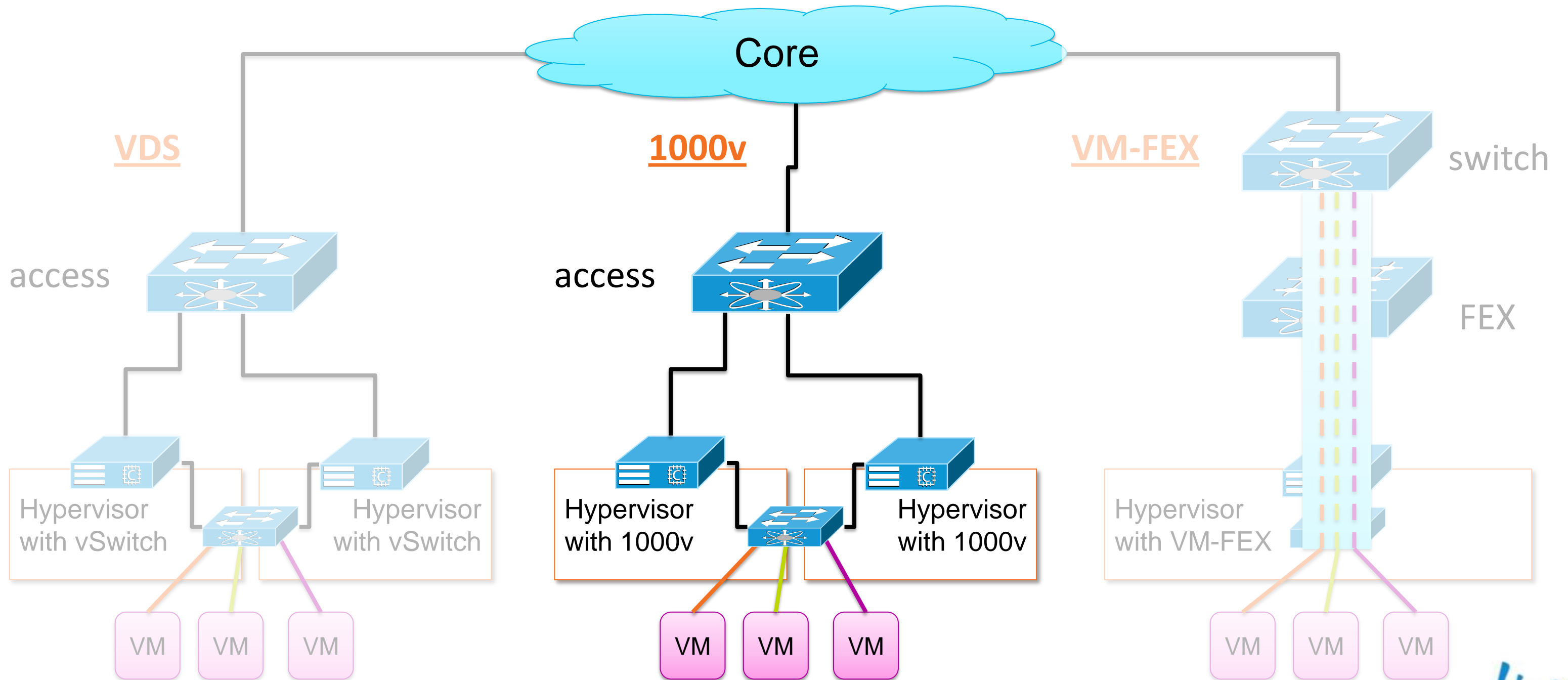
Faults, power statistics and temperature statistics

Networking



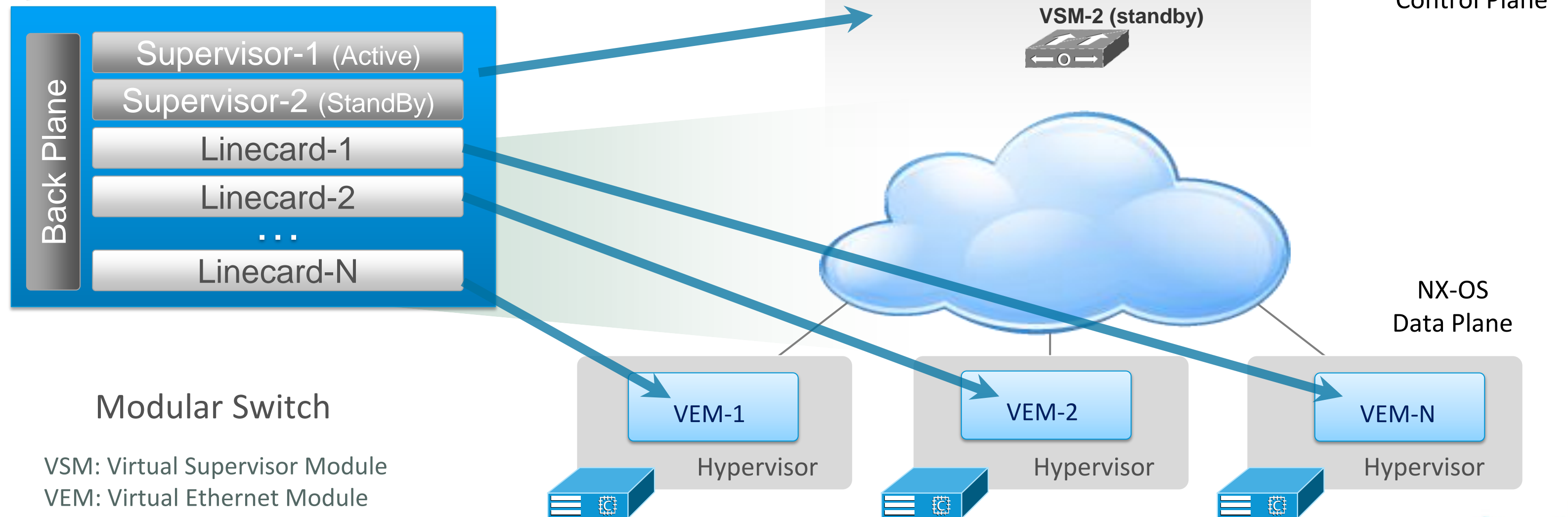
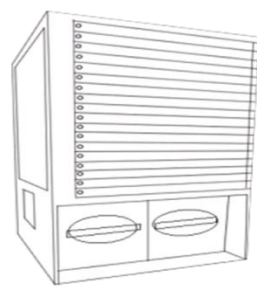
Three Ways to Provide IO to a VM

VMware VDS, Cisco 1000v, and Cisco VM-FEX



Nexus 1000V Architecture

A virtual modular switch with familiar NX-OS

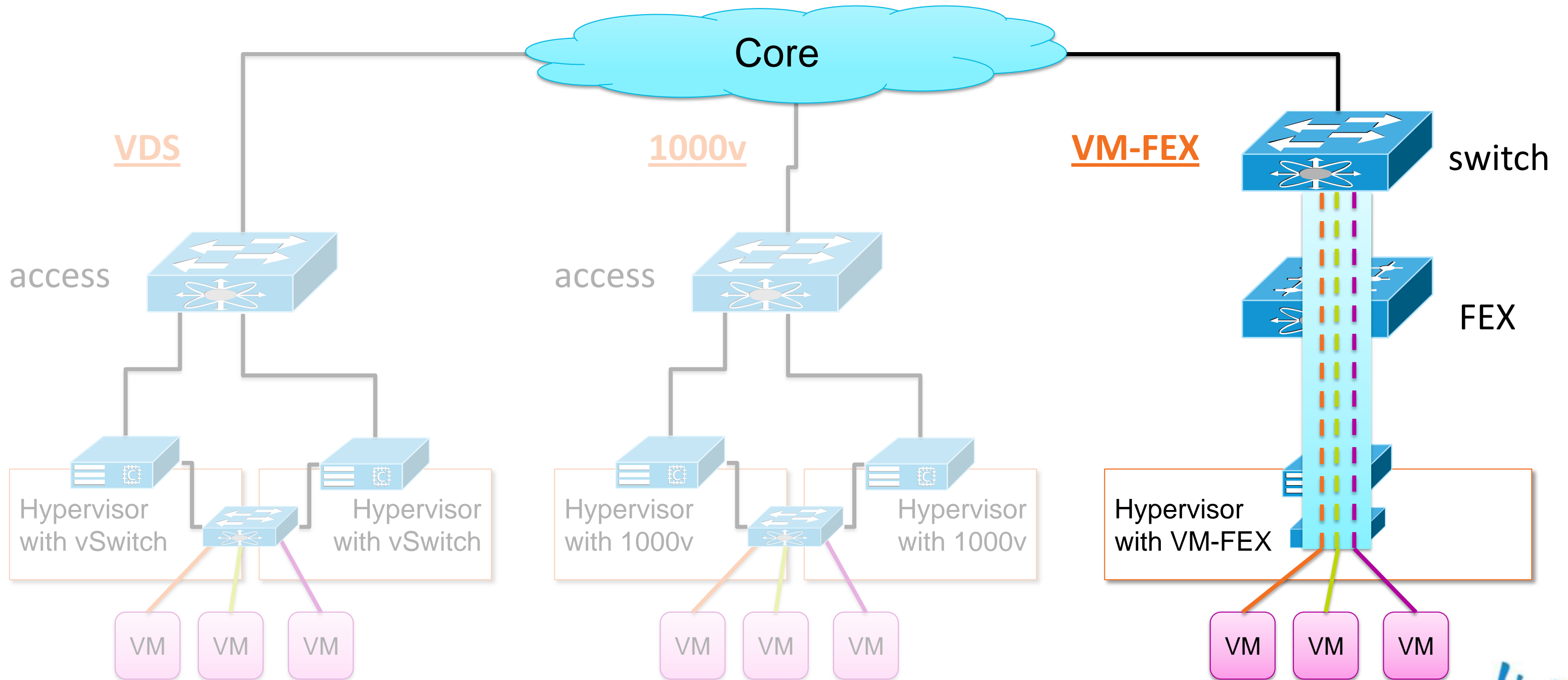


VSM: Virtual Supervisor Module
VEM: Virtual Ethernet Module



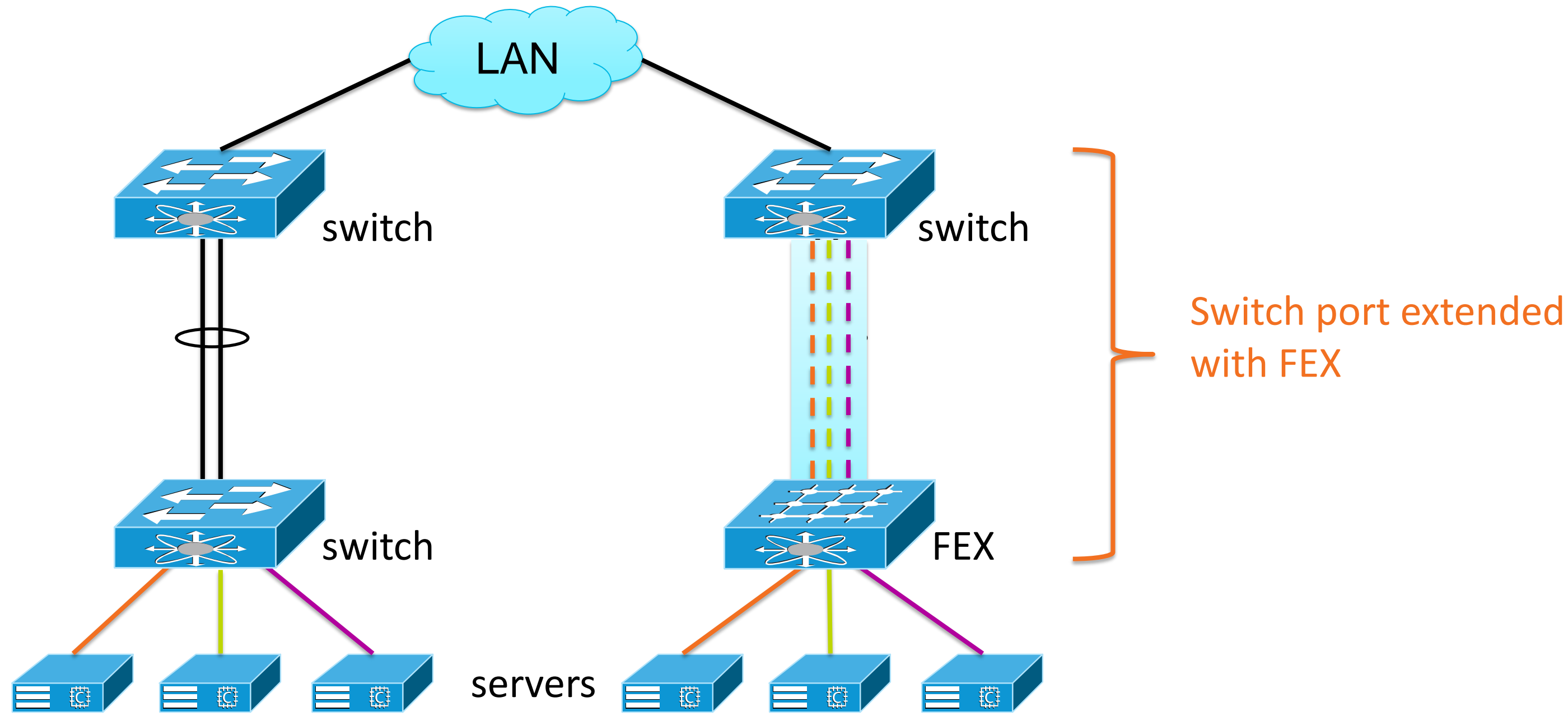
Three Ways to Provide IO to a VM

VMware VDS, Cisco 1000v, and Cisco VM-FEX



Fabric Extension (FEX)

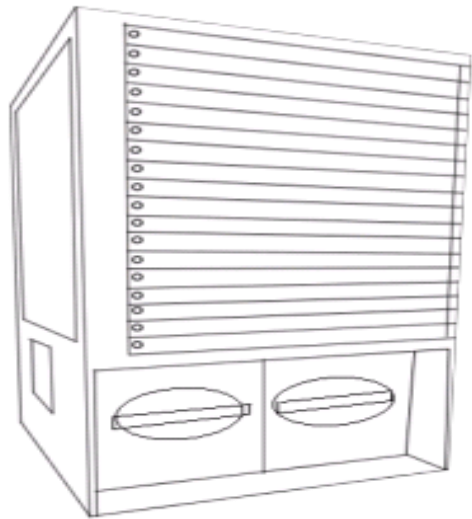
Virtualising the network port



Nexus 5K Family with FEX

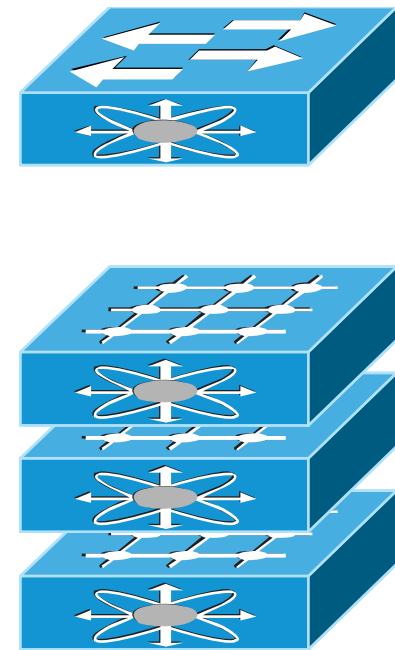
FEX puts switch ports closer to the load

Modular System



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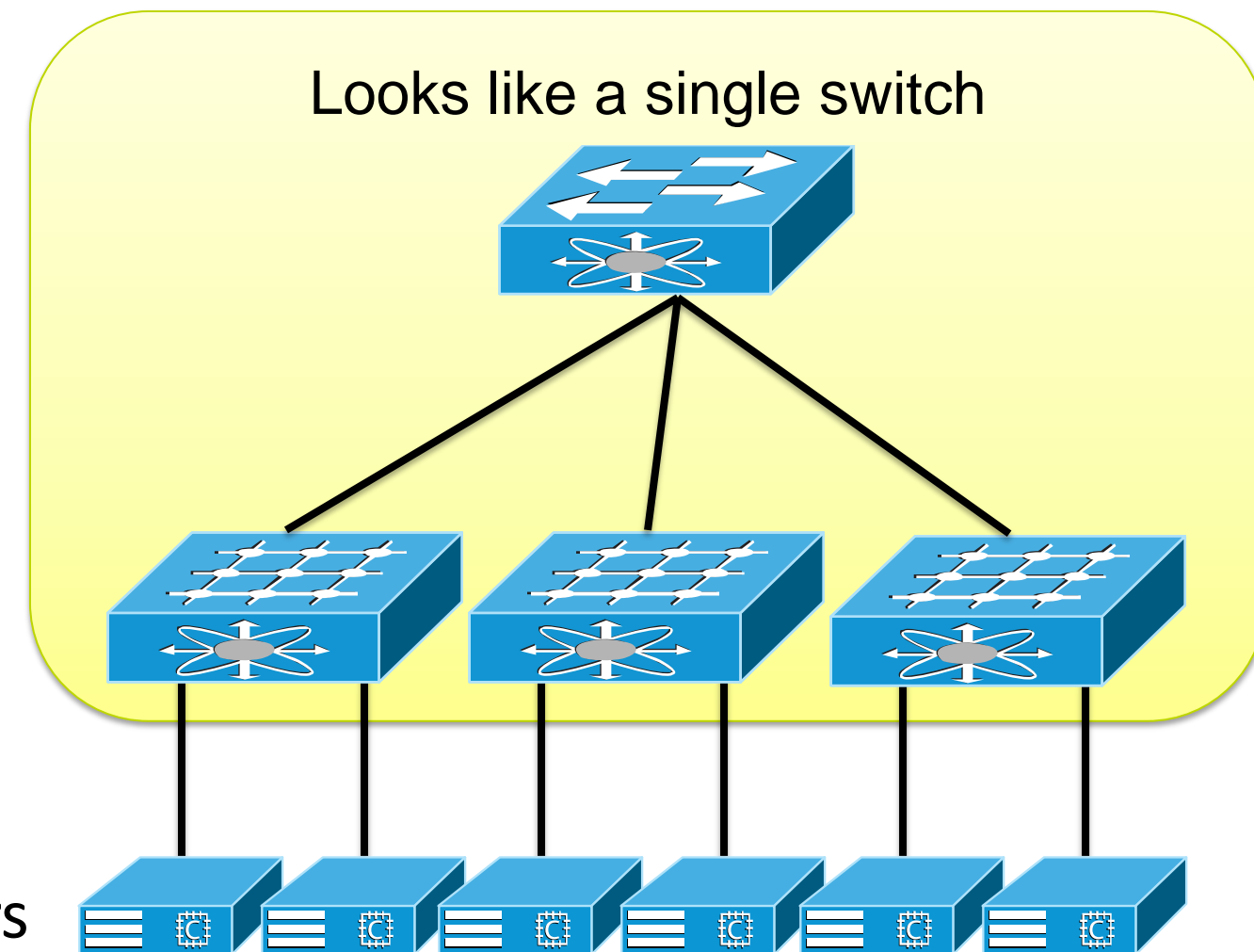
Distributed Modular System



Nexus 5K
(supervisor)

Nexus 2K
FEX
(line card)

Distributed Modular System



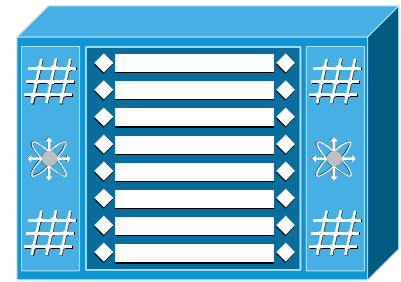
Distributed Modular System

- Nexus 2000 FEX is a Virtual Line Card to the Nexus 5000
- Nexus 5000 maintains all management & configuration
- No Spanning Tree between FEX & Nexus 5000

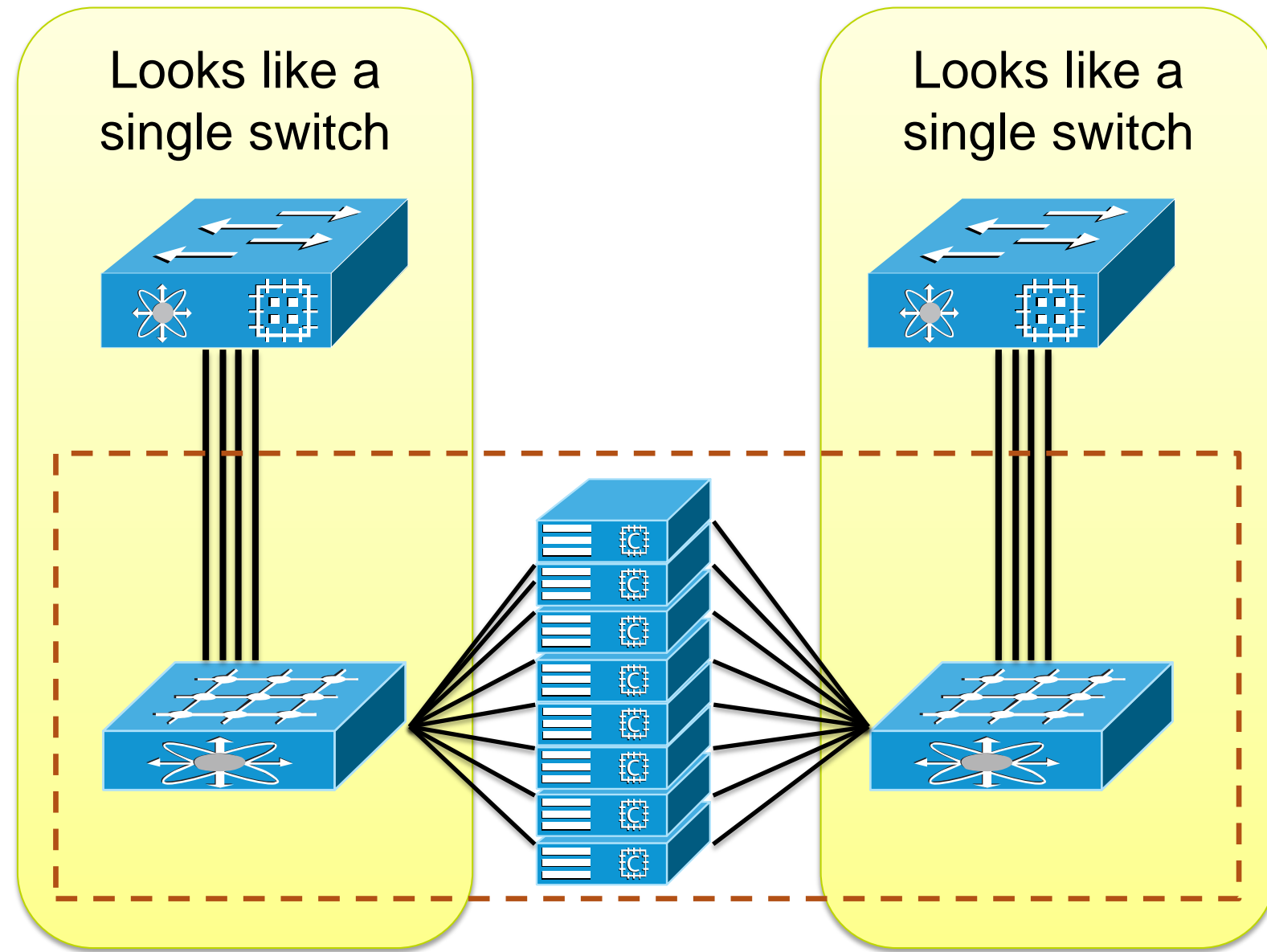
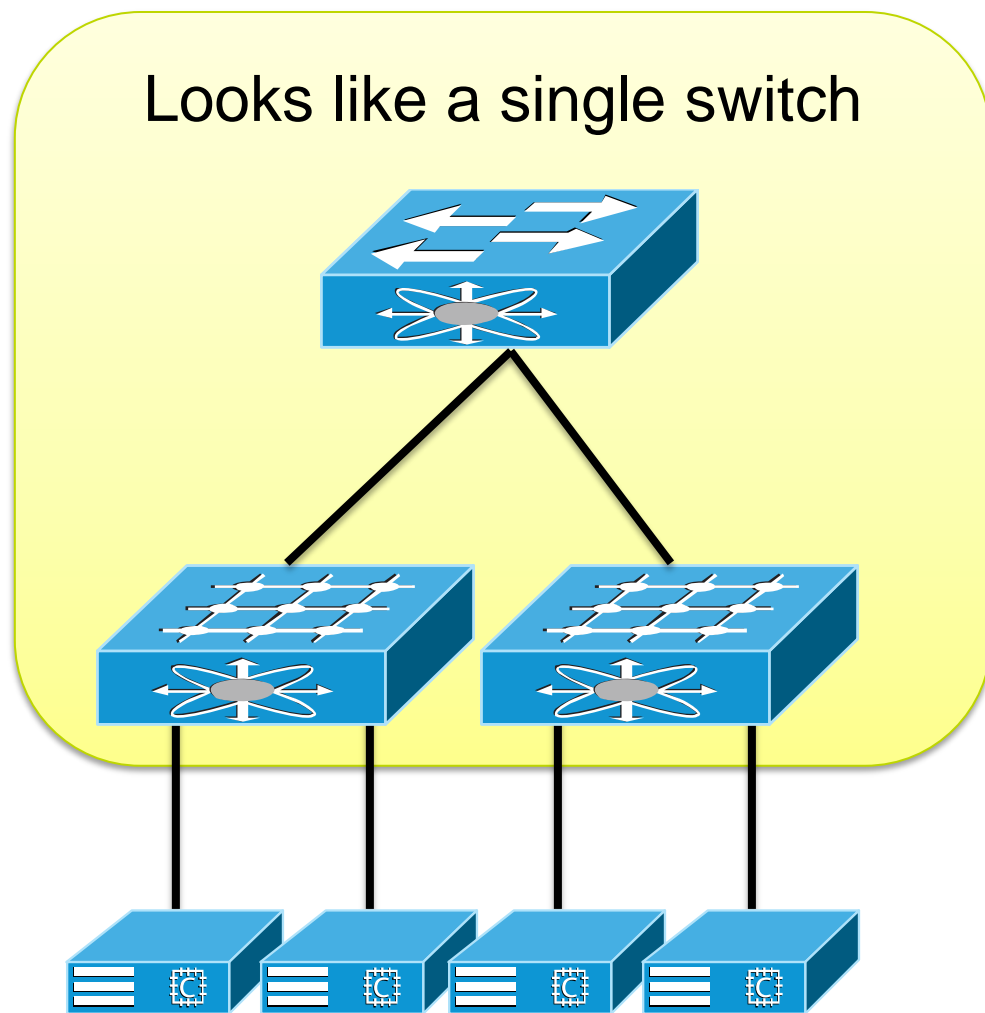
Over 6000 production customers
Over 5 million Nexus 2000 ports deployed

Cisco UCS Blade Chassis

FEX technology simplifies management



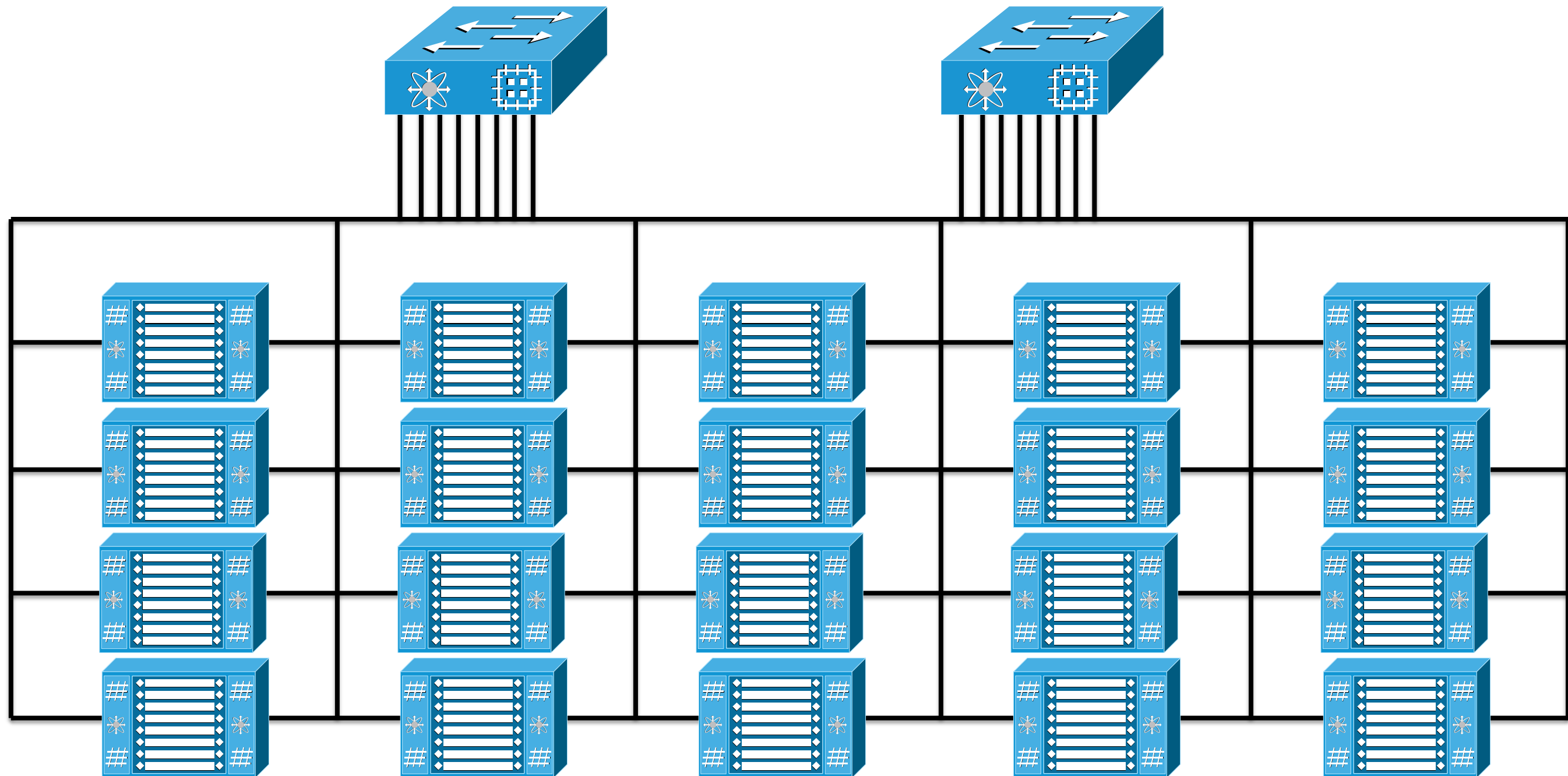
Distributed Modular System



UCS 5108 blade chassis = 8 blades + 2 FEX

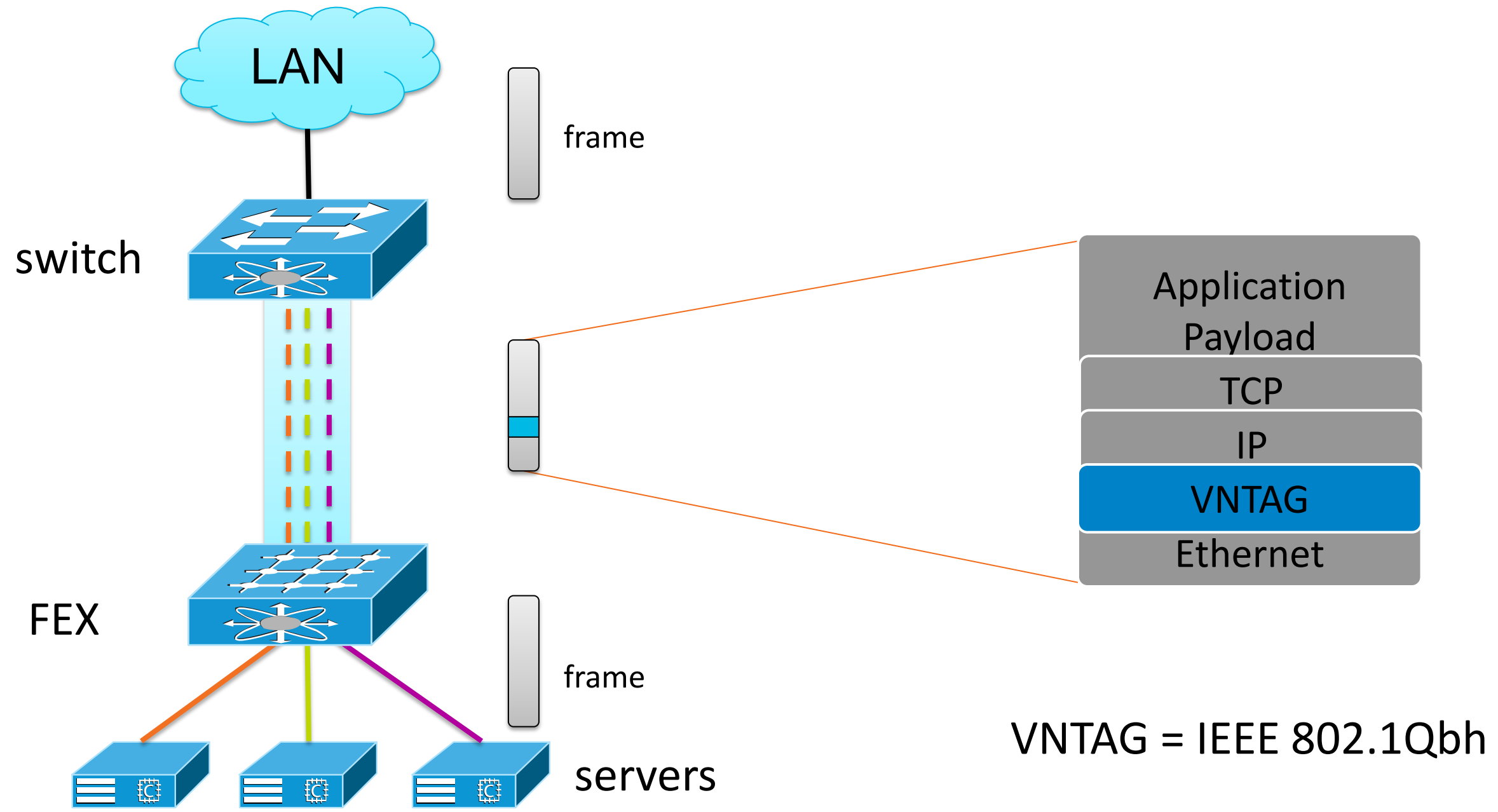
Cisco UCS Blade Chassis

Up to 160 blades can be part of one system



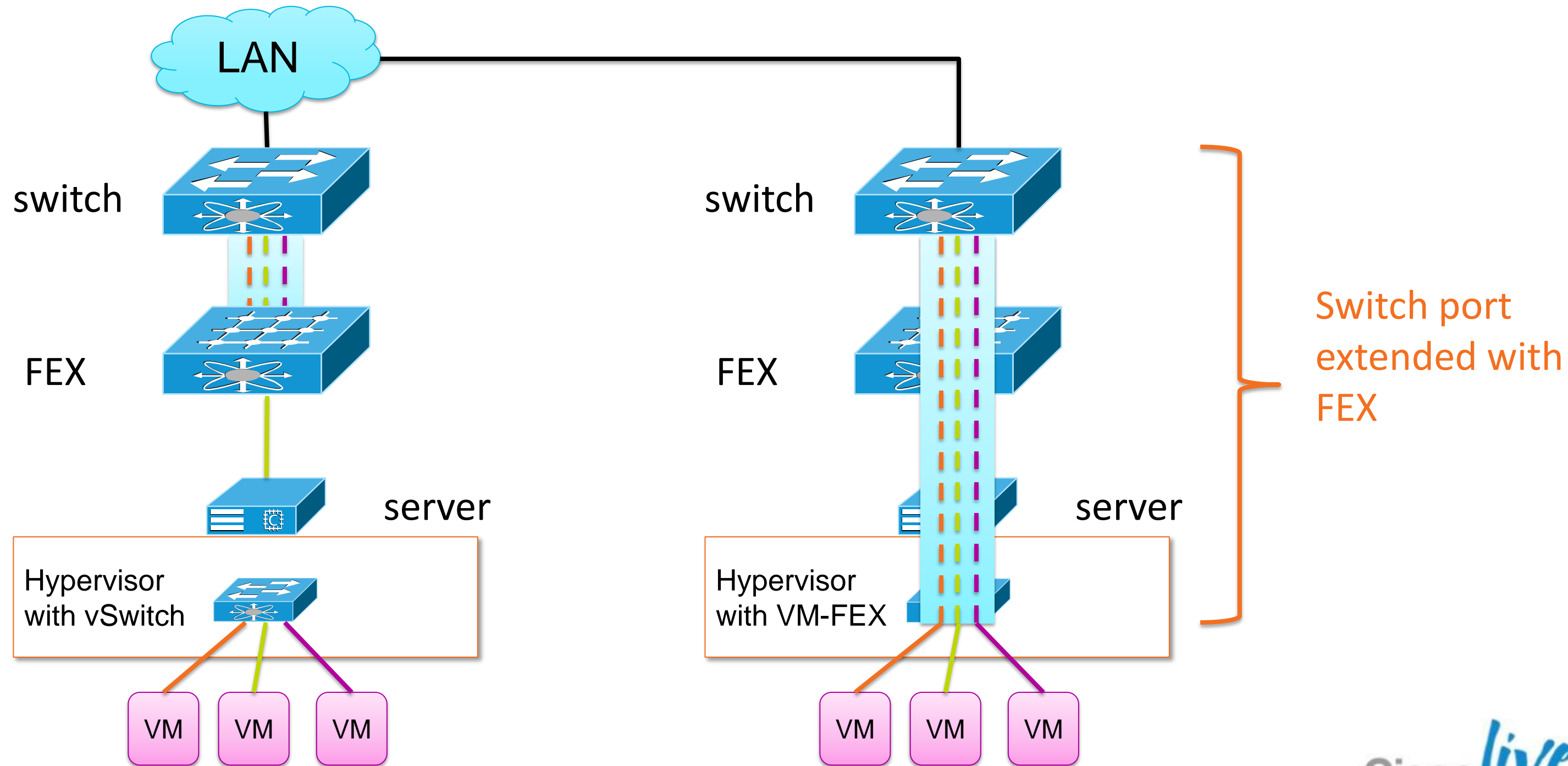
Key Architectural Component 1: VNTAG

Intra-chassis bus header



Extending FEX Architecture to VMs

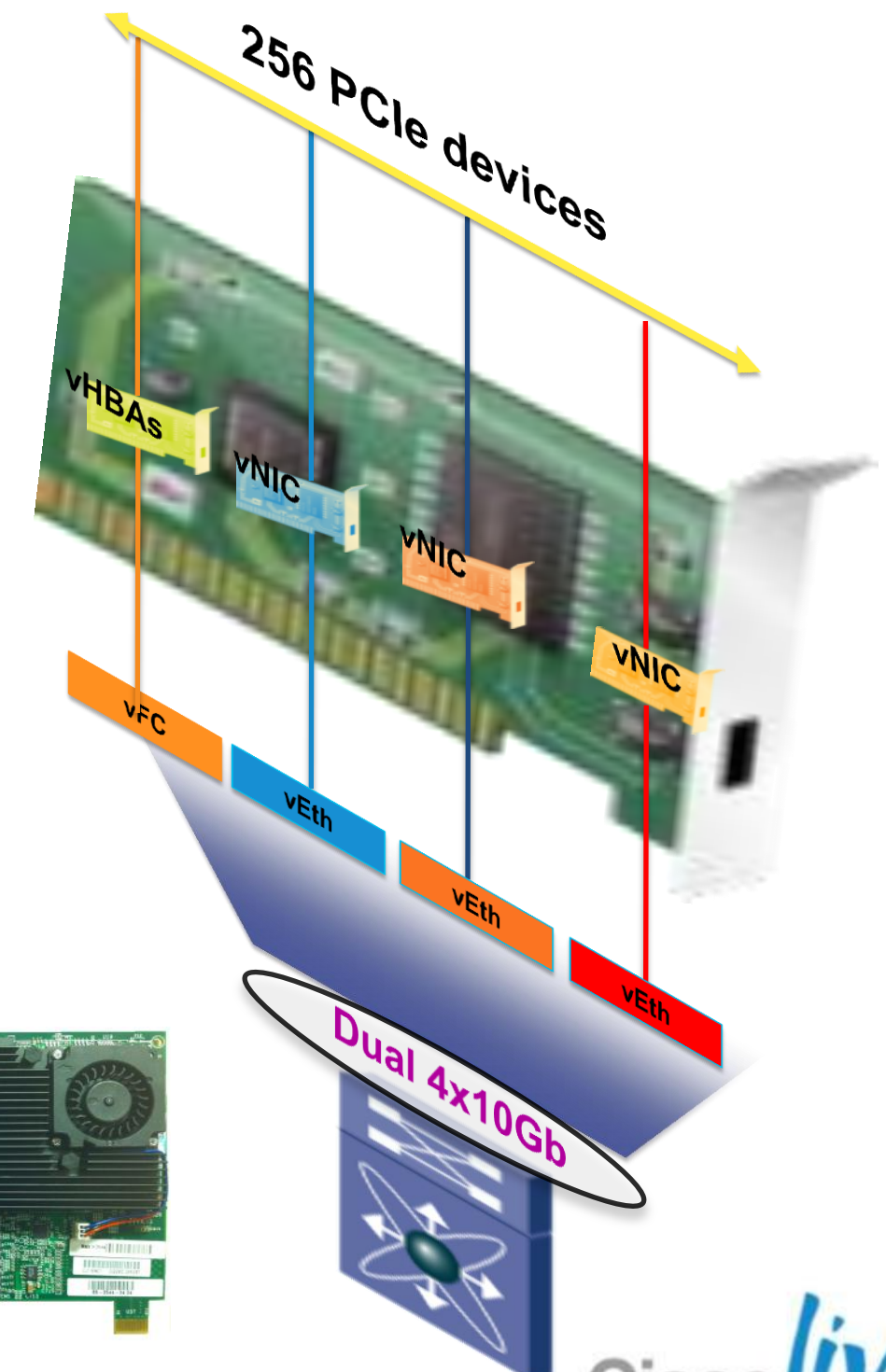
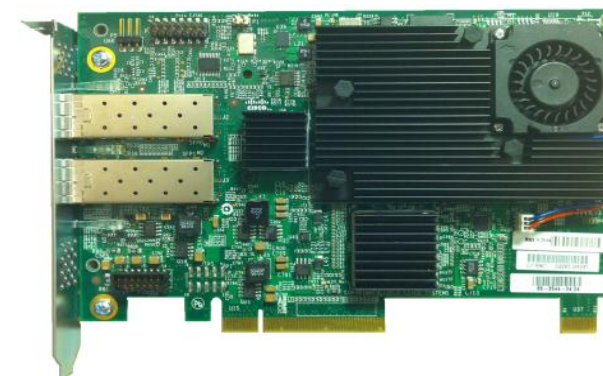
FEX inside the server



Key Architectural Component 2: UCS VIC

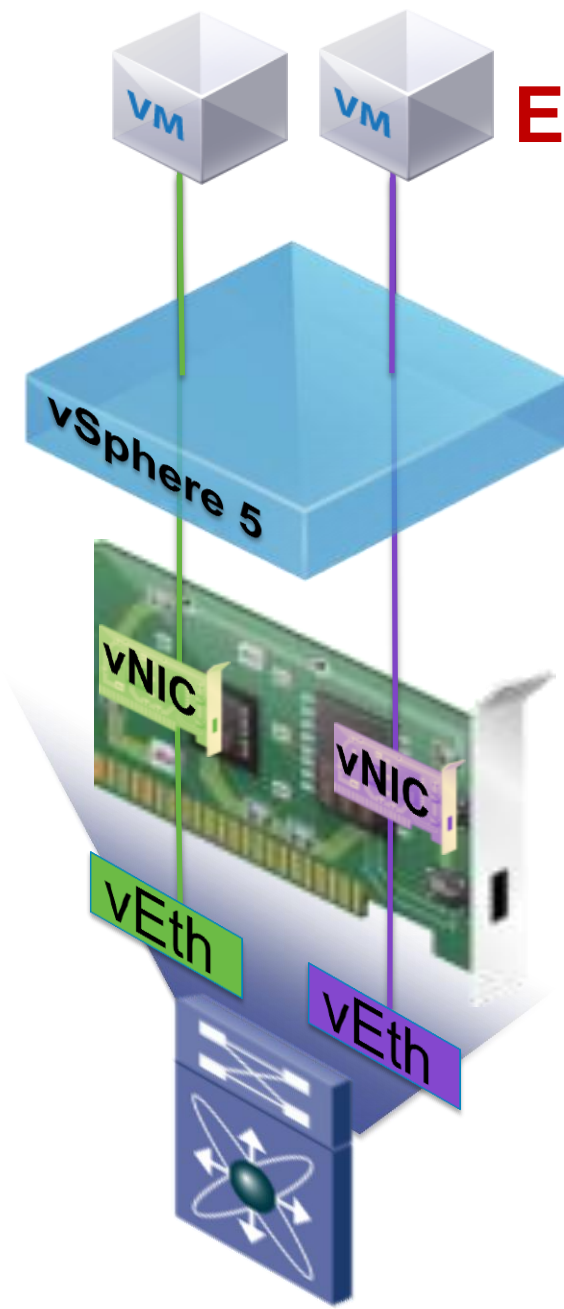
UCS Virtual Interface Card family

- 256 PCIe devices
 - Devices can be vNICs or vHBAs
 - Each device has a corresponding switch interface
- Bandwidth 2x4x10 Gb
 - Uses 4x10 Ether Channel, HW 40Gb Capable
 - vNICs/vHBAs NOT limited to 10Gb
- PCIe Gen-2 x 16
- Mezzanine and PCI



VM-FEX Modes of Operation

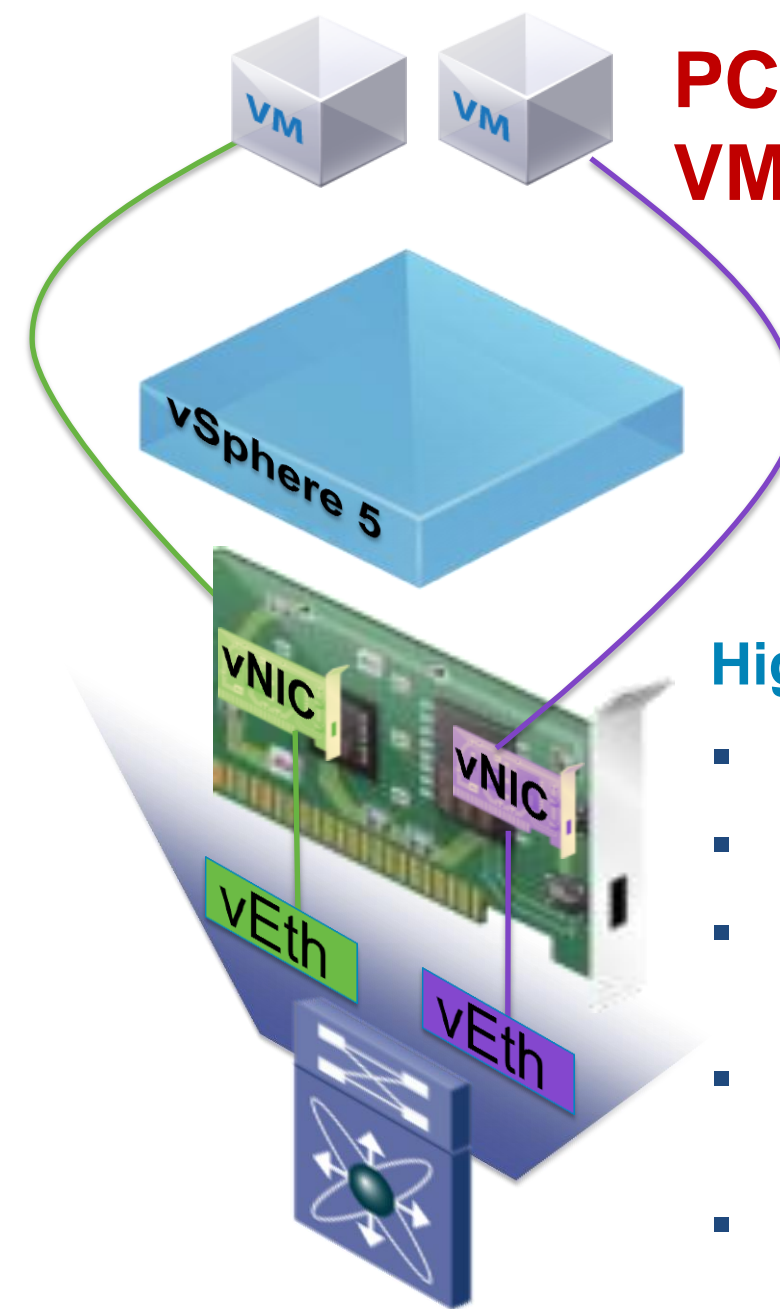
Enumeration vs. Hypervisor Bypass



Emulated Mode

Standard (Emulated) Mode

- Each VM gets a dedicated PCIe device
- ~12%-15% CPU performance improvement
- Appears as distributed virtual switch to hypervisor
- LiveMigration supported



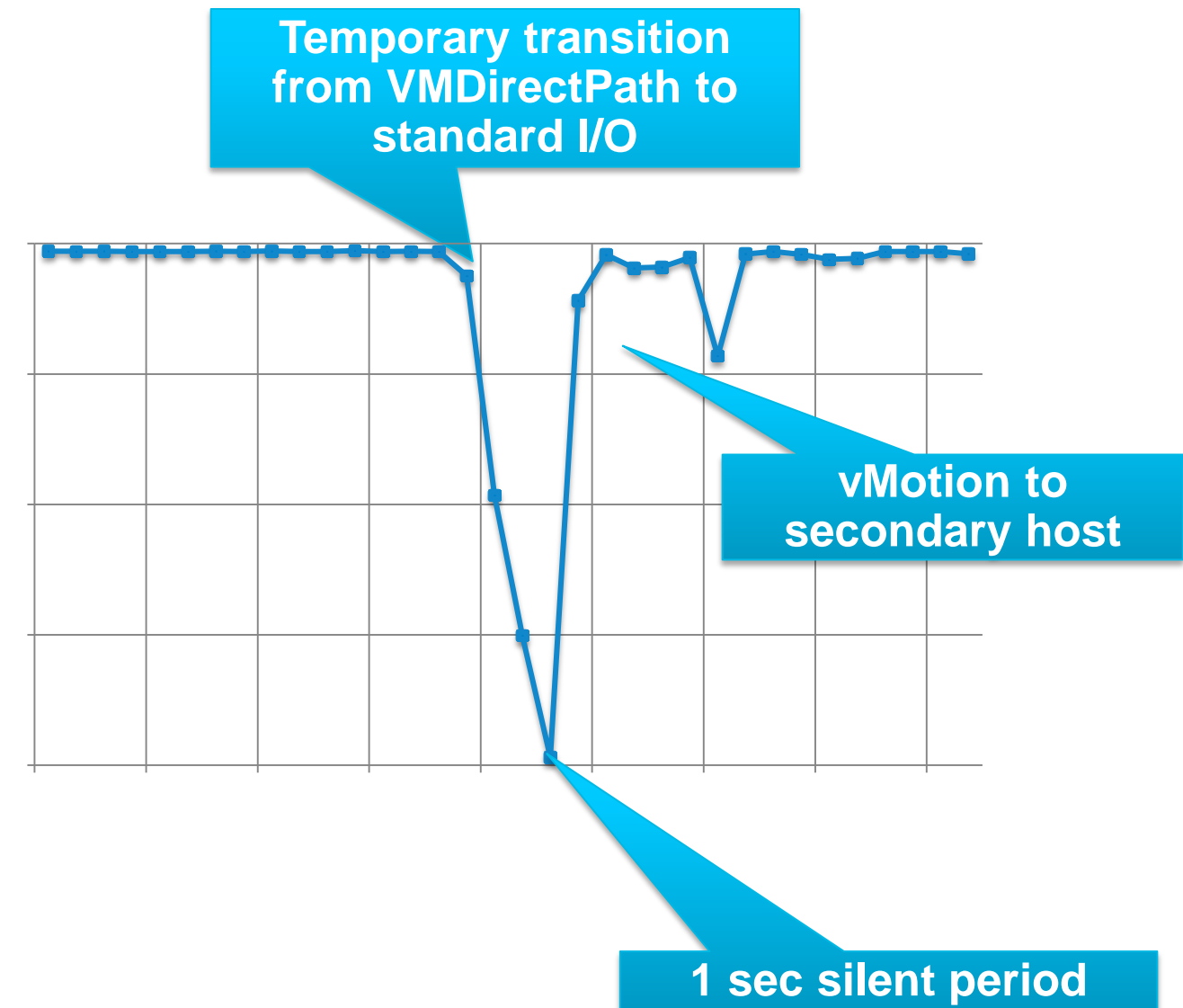
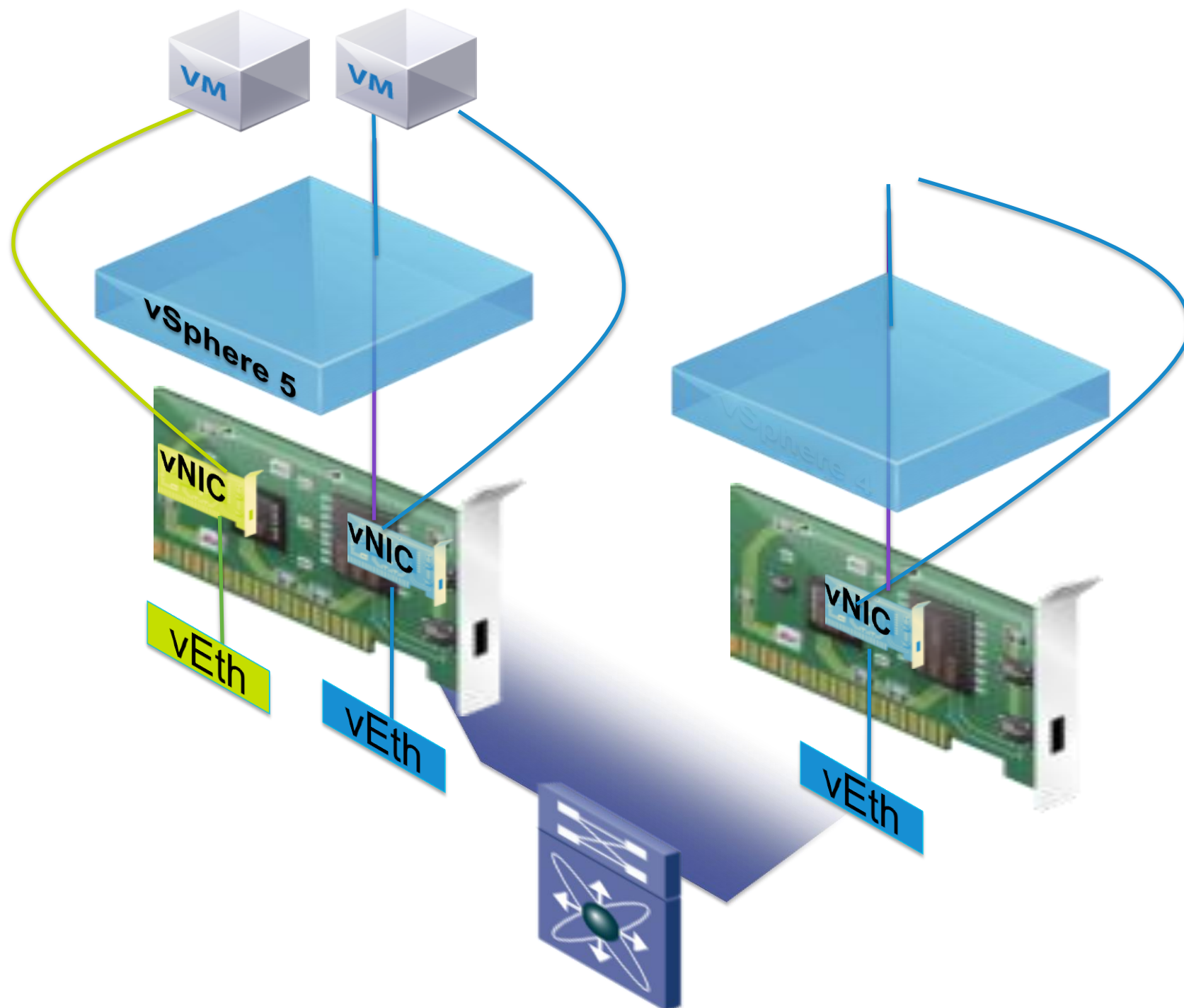
PCIe Pass-Through or VMDirectPath

High Performance Mode

- Co-exists with Standard mode
- Bypasses Hypervisor layer
- ~30% improvement in I/O performance
- Appears as distributed virtual switch to hypervisor
- Currently supported with ESX 5.0 only
- vMotion supported

VM-FEX Operational Model

vMotion with Hypervisor Bypass (VMDirectPath with VM-FEX)



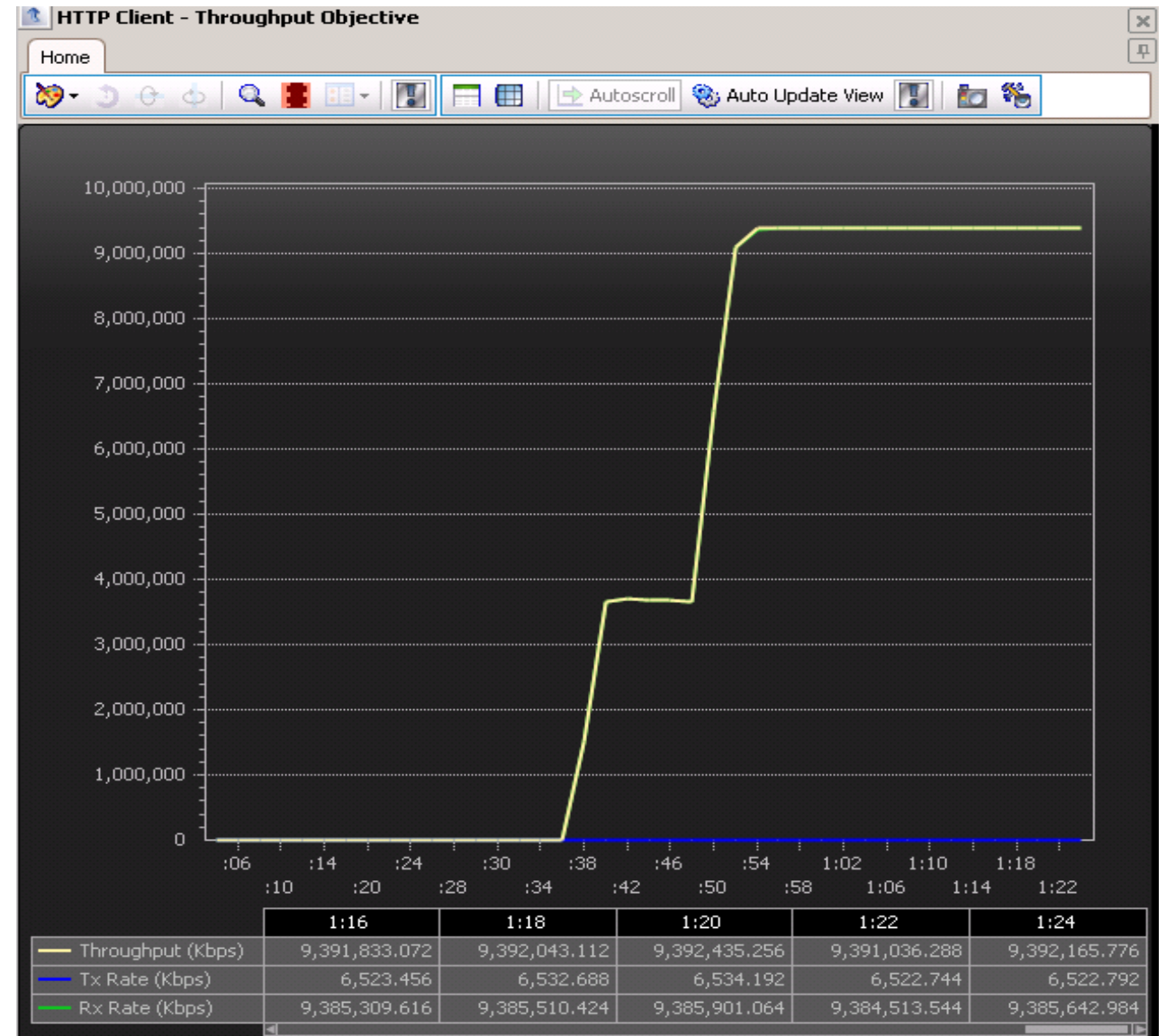
- VM Sending TCP stream (1500MTU)
- UCS B200 M2 blades with UCS VIC card

VM-FEX Performance Review

Test of 10 VM's running HTTP and FTP Gets with IxLoad



Virtual Switch, CPU at ~65%



VM-FEX, CPU at ~ 37%

Compute



Intel E5-2600 Processor Improvements

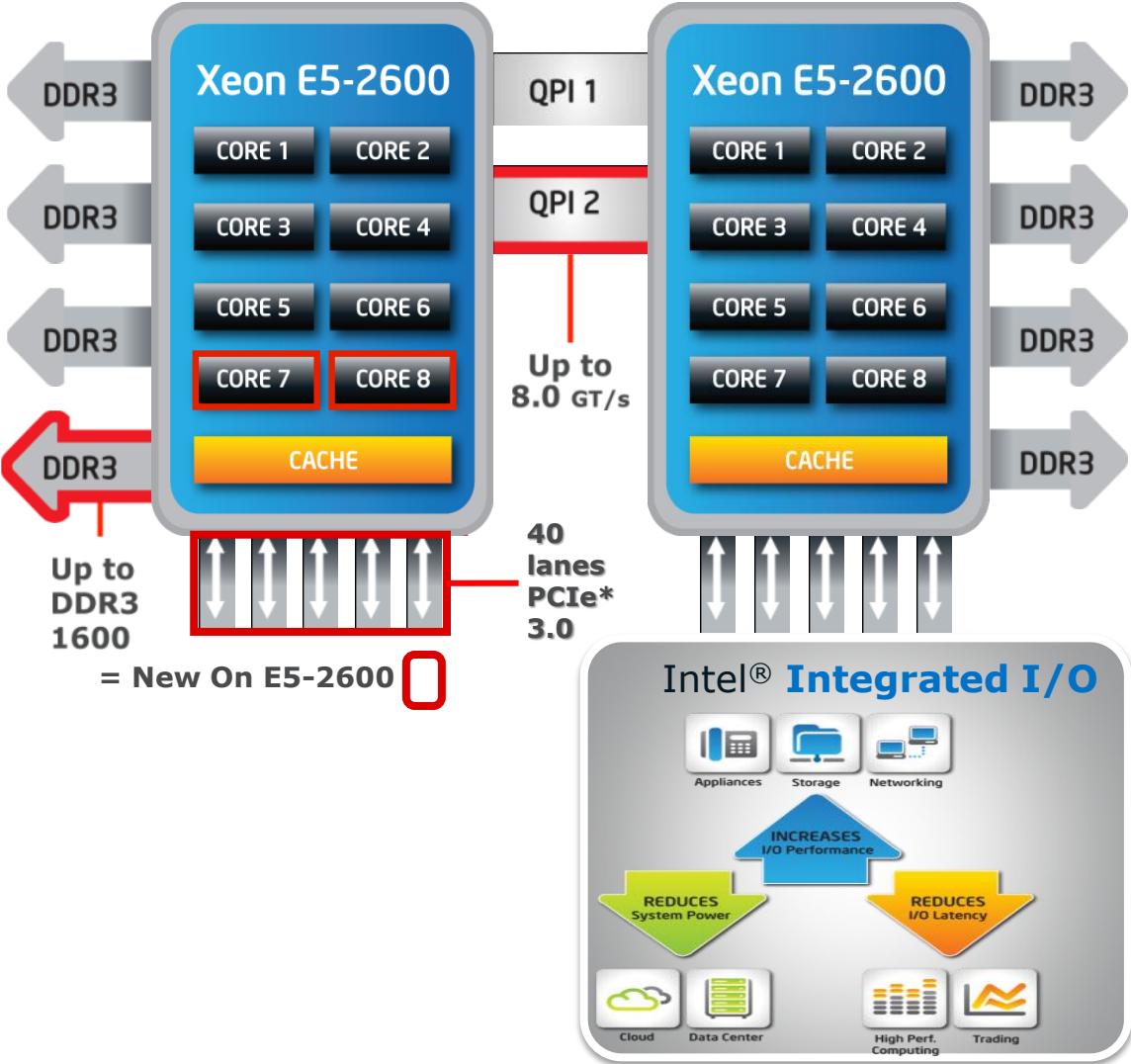
More Cores

More Memory

More Integration









Reduces I/O latency by as much as 30%
PCIe 3.0 improves I/O by as much as 2X

More Bandwidth



For more information: <http://www.intel.com/go/performance>

Top Bin E7 Versus Top Bin E5

	E7-2870	E5-2690
Power (W)	130 	135
Cores	10 	8
Cache	30M 	20M
Speed (GHz)	2.40	2.90 
QPI	6.4GT/s	8.0GT/s 
SPECint	267.5	348.5 
SPECfp	184.5	254.5 
Recommended Cost	\$4,227	\$2,057 

Higher performance at half the price. Which one do you prefer?

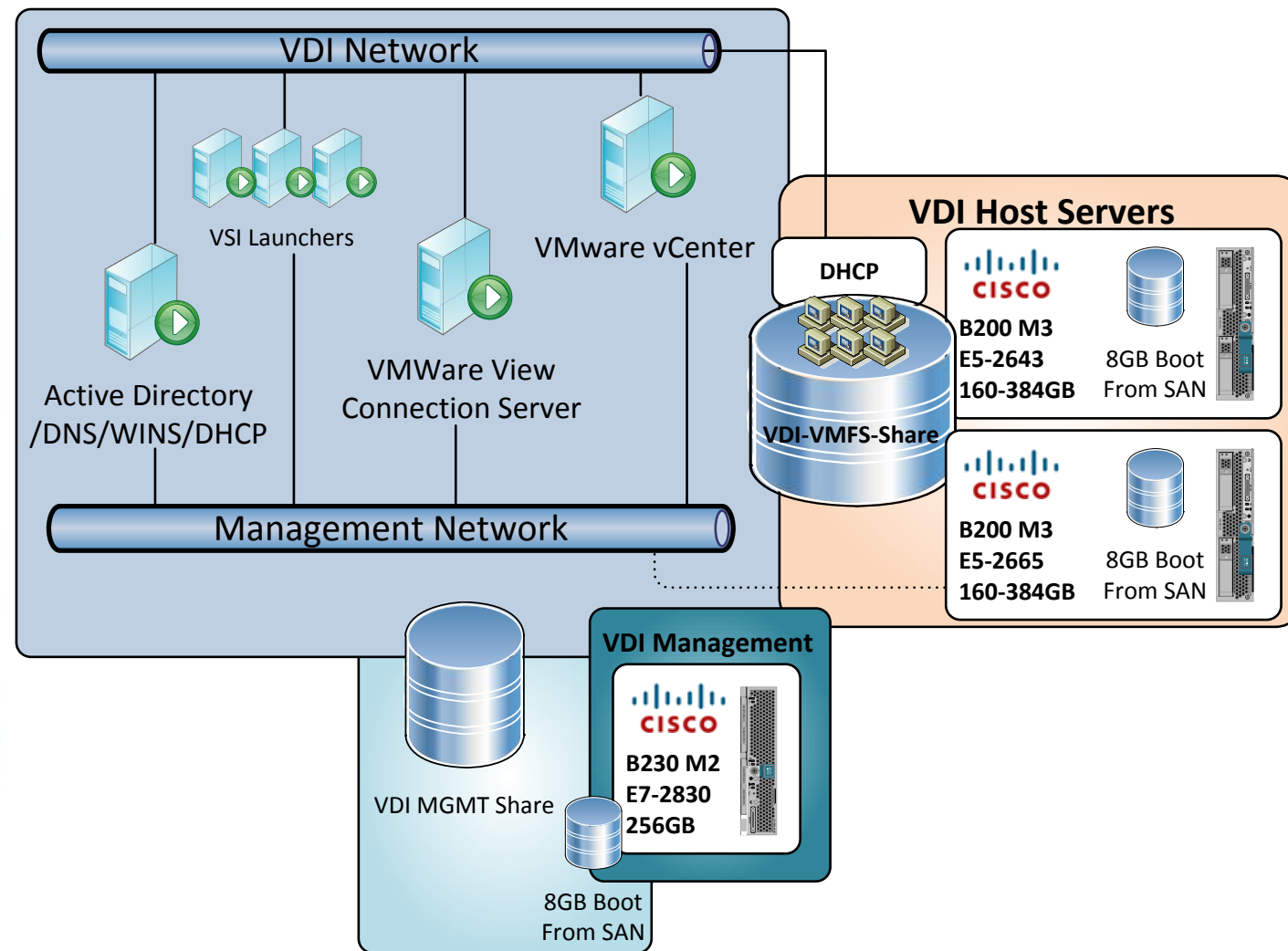
E7 Versus E5 Proc Comparison

To be fair...

- Most comparisons are not as extreme
- Most sizing exercises show E7 systems to be superior
- E5-2600 systems substantially less expensive

Lessons Learned From VDI Testing

Compute trends relevant to general server virtualisation



Logical test environment






- Various UCS B200 M3 configurations
- Login Consultants' Virtual Session Indexer (Login VSI) 3.6.1 benchmark
- Login VSI's Medium with Flash workload
- VMware View 5.1.1
- Microsoft Windows 7 SP1 32-bit virtual desktops
- Pure Storage FlashArray with Purity version 2.0.2.

Configuration Settings for Tests

Configuration	Setting(s)
Login VSI Configuration Settings	<ul style="list-style-type: none">• Medium with Flash workload generator• 4,000ms response cut off
Windows 7 Configuration	<ul style="list-style-type: none">• 1.5GB memory for all tests• 32-bit Windows 7 SP1 and Windows updates through September 1, 2012
ESX Host Configuration	<ul style="list-style-type: none">• Power management set to High Performance in vSphere• BIOS settings have C1E disabled in UCSM policy• ESXi-5.0.0-623860-custom (Cisco specific build of ESXi with drivers)
VM Configuration	<ul style="list-style-type: none">• 1vCPU and 2vCPU configurations
View Configuration	<ul style="list-style-type: none">• Linked clones• View Optimisation* registry changes on all Virtual desktops• Did not use profile management• Did not use host Cache for View

* <http://www.vmware.com/files/pdf/vmware-view-optimizationguidewindows7-en.pdf>

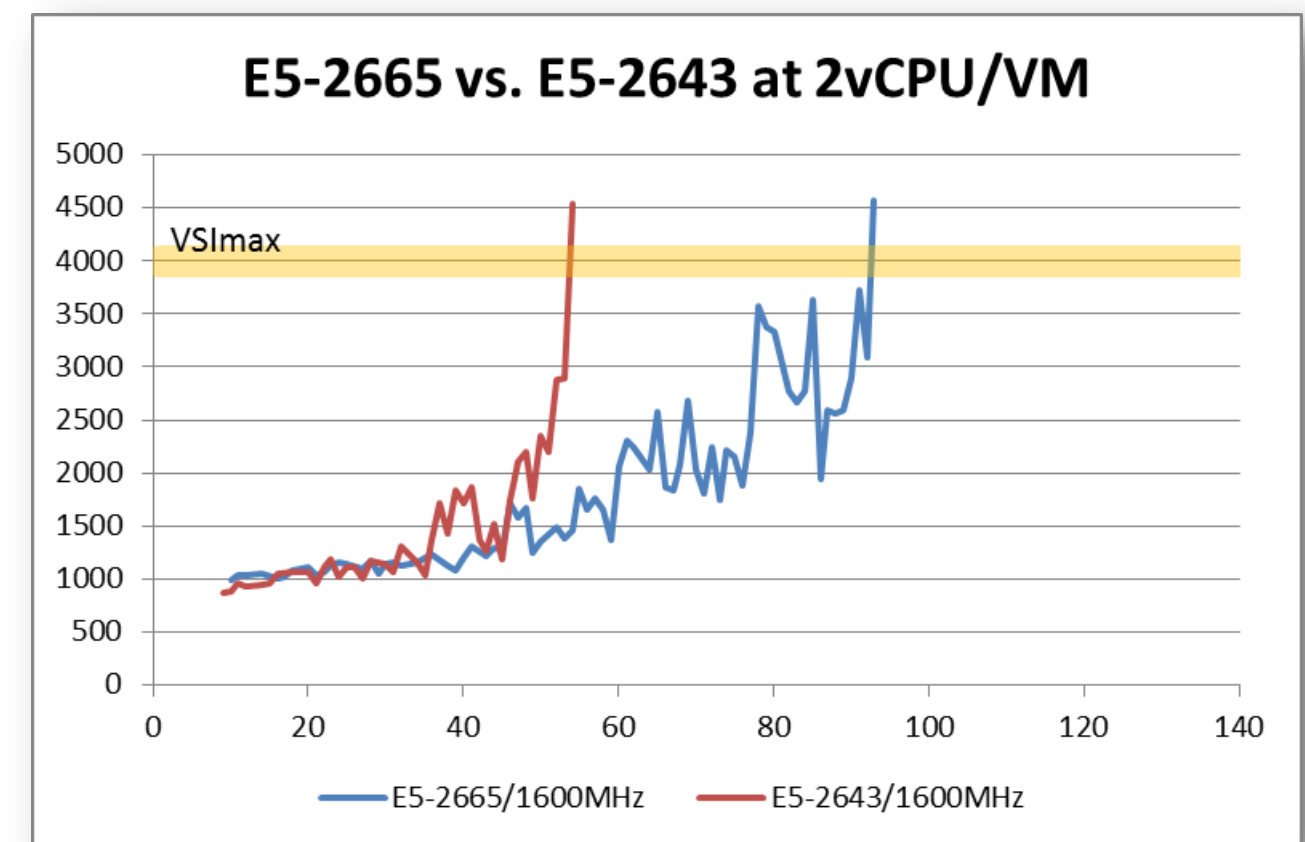
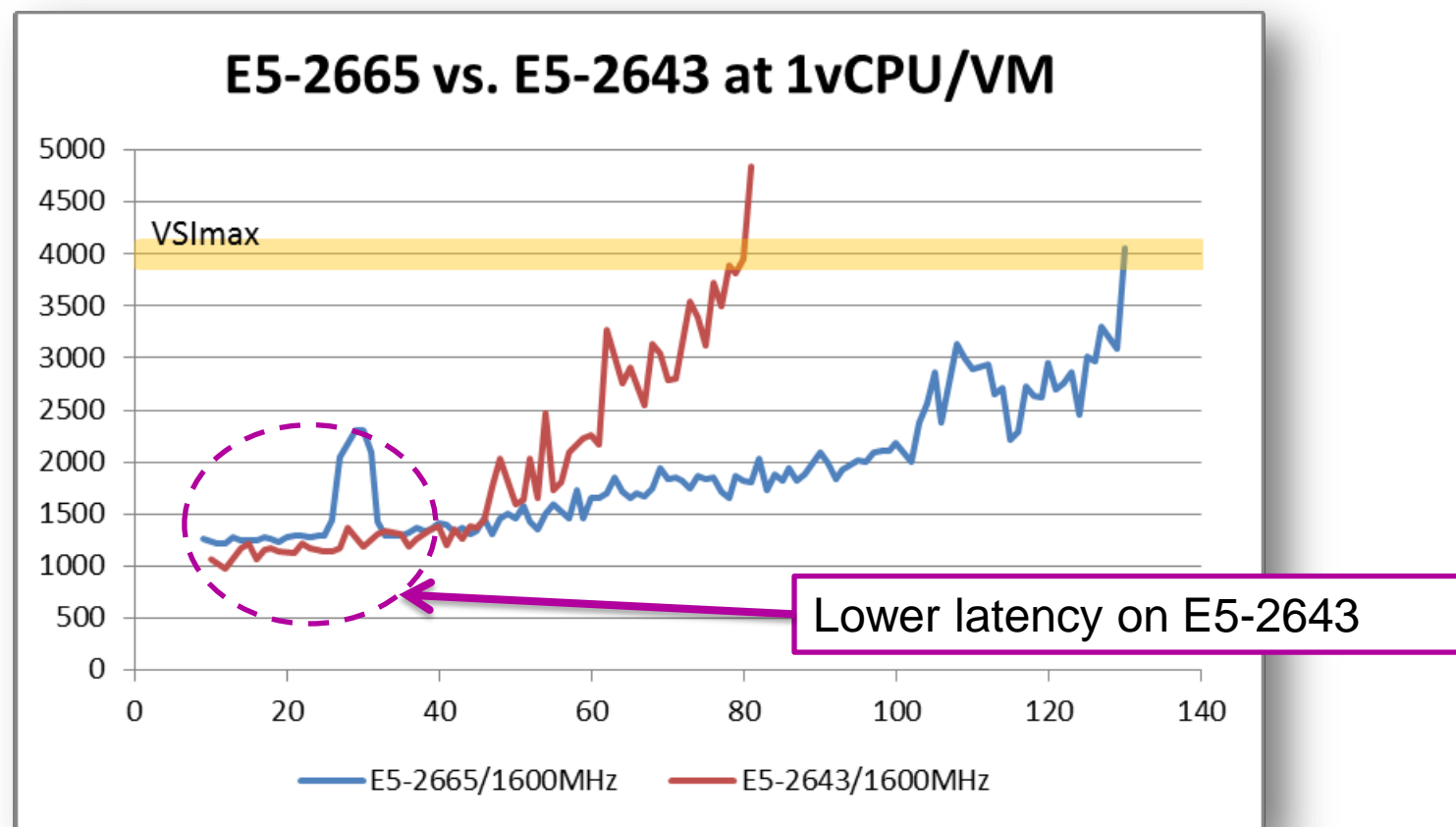
Processor Comparison

	Intel E5-2643	Intel E5-2665
Number of Cores	4	8 
Clock Speed	3.3 GHz 	2.4 GHz
Max Turbo Frequency	3.5 GHz	3.1 GHz
Max TDP	130W	115W
Cache	20M	20M
Recommended Customer Price (Tray)	\$885 	\$1440
SPEC CINT2006 Rate	187.5	305 
SPEC CFP2006 Rate	167.5	233.5
SPEC Blend/Core	44.38 	33.6

Question 1

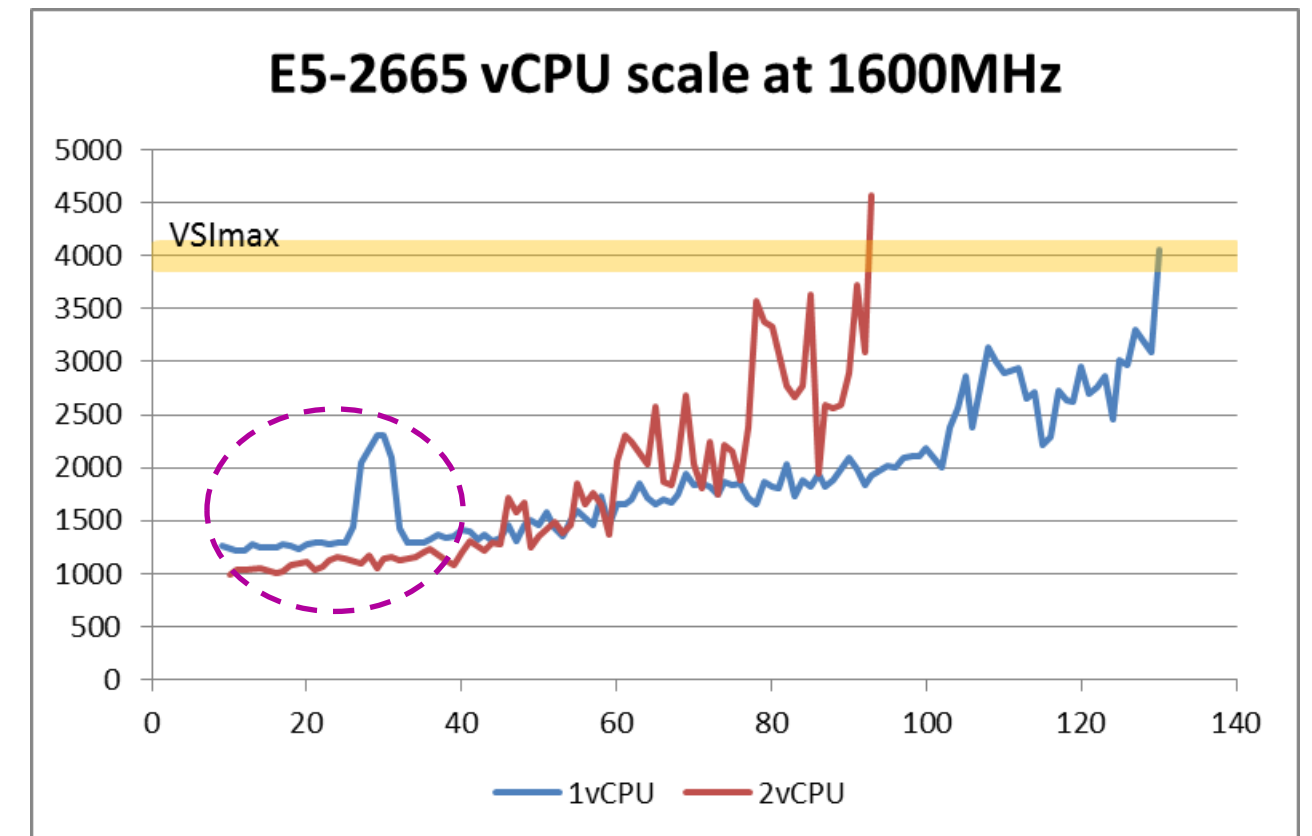
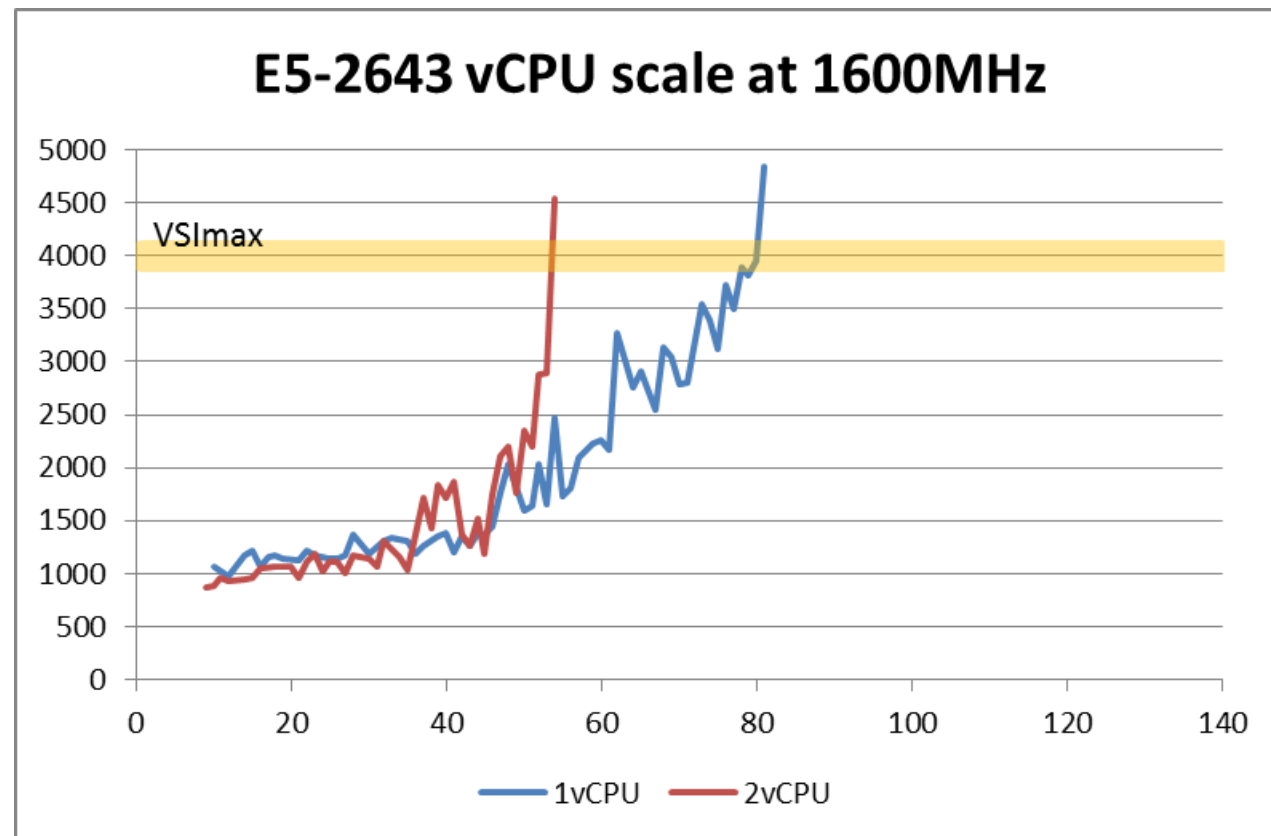
Which is more important, core count or core speed?

- E5-2665 achieves 60-72% better density
- E5-2643 has lower latency at small desktop counts
- When density is the goal, core count is more important



Question 2

How well does a system scale with multi-vCPU VMs?

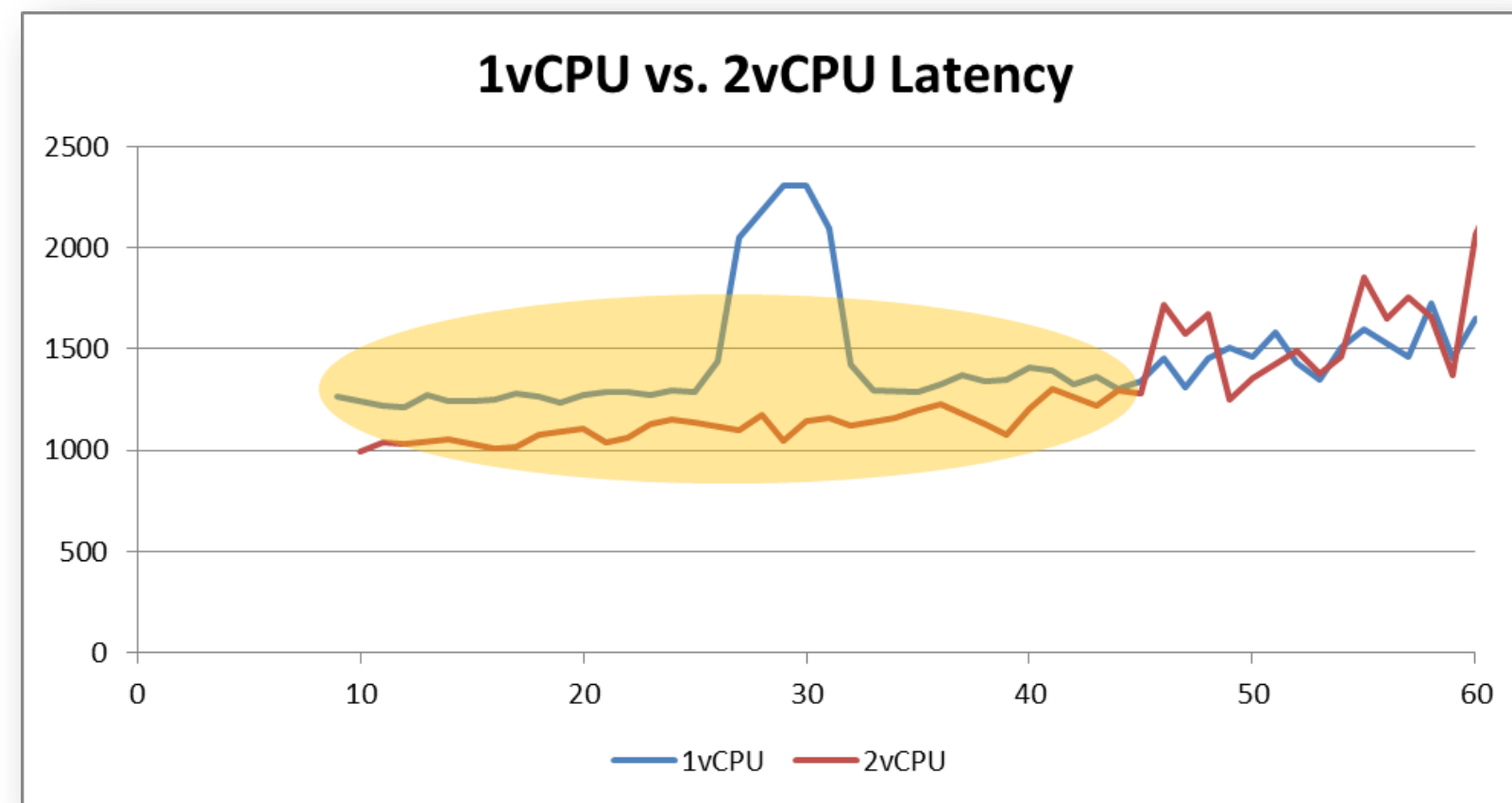


- Going from 1vCPU to 2vCPU yielded 66-72% as many desktops
- Increasing vCPU count impacts scale, even with **the same workload**
- Advice: don't give a VM more vCPUs unless it needs it

Question 2 Continued

How well does a system scale with multi-vCPU VMs?

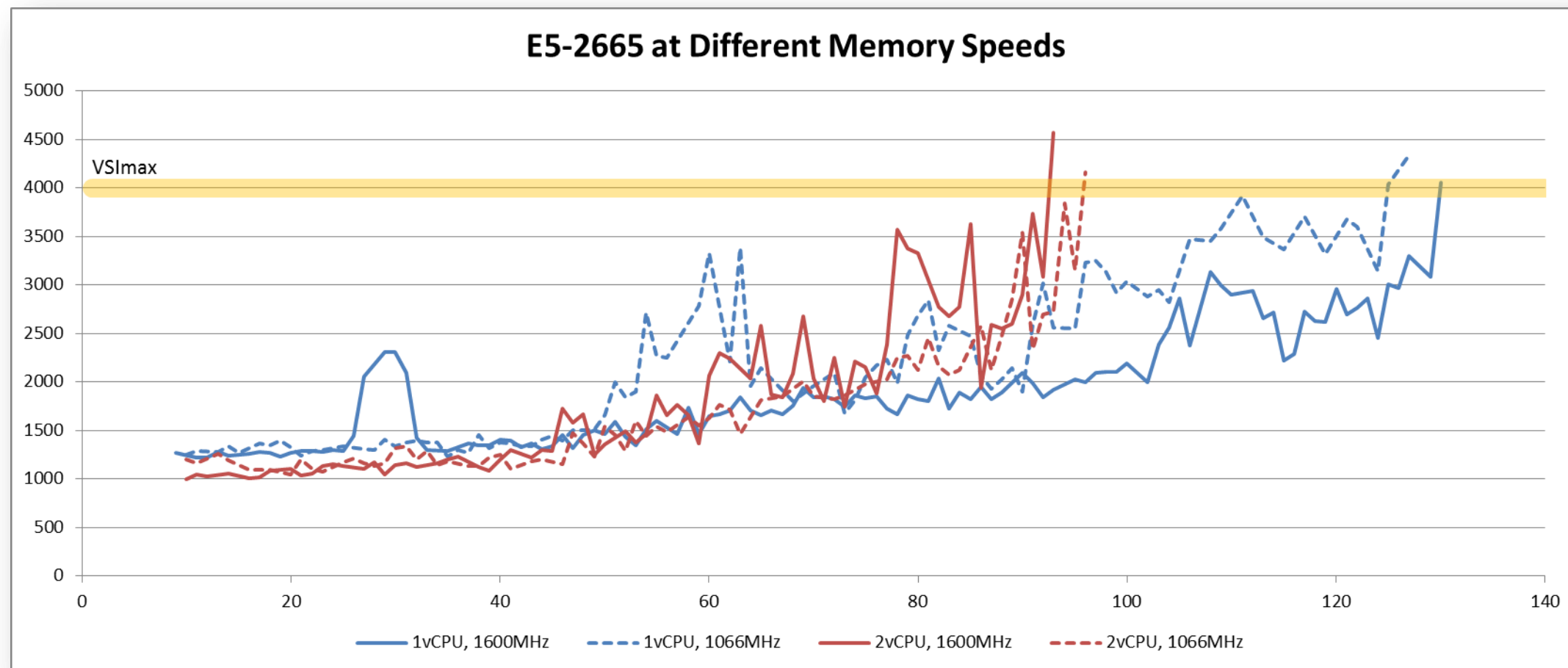
- Purpose of multi vCPU machine is better performance
- Graph shows better performance (lower latency)
- Performance benefits taper off after 45 desktops



Question 3

How does memory speed affect scalability?

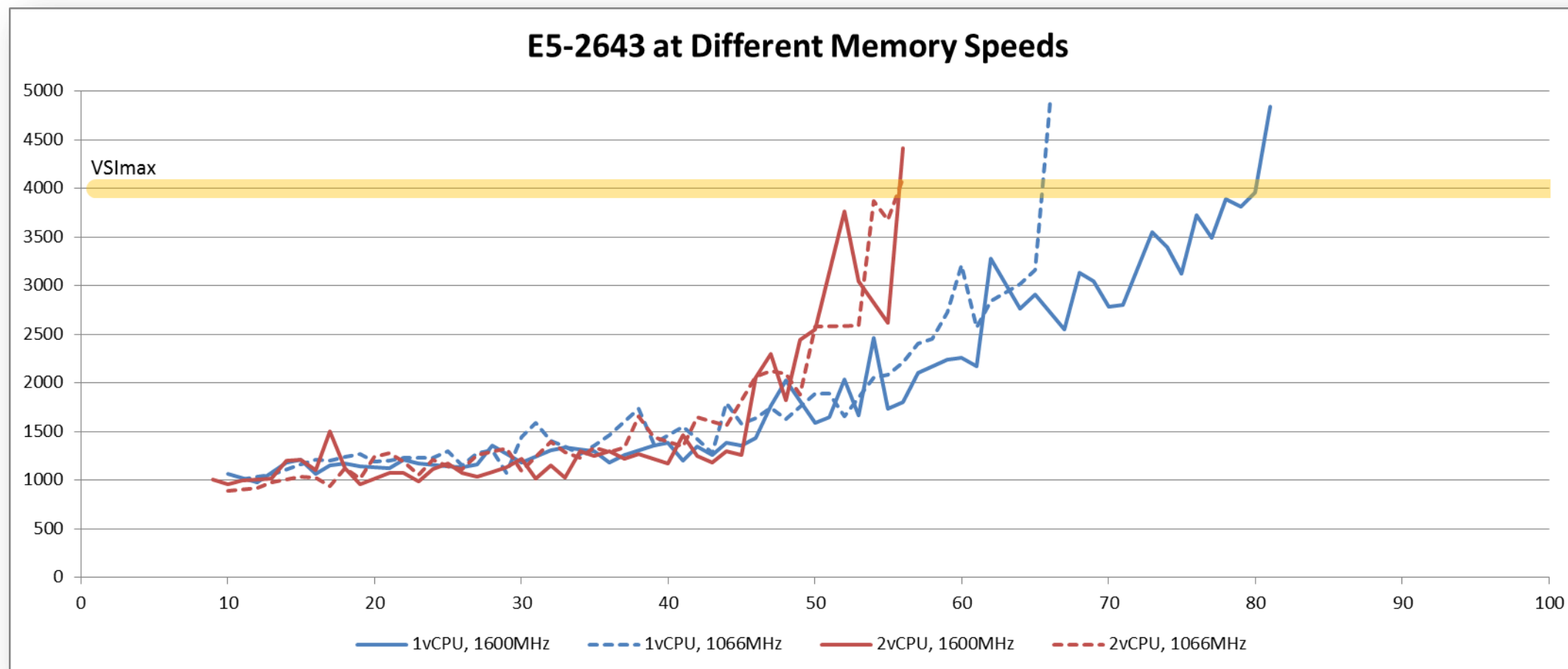
- At 1vCPU (blue lines), only 4% difference between 1600MHz and 1066MHz
- At 2vCPU (red lines), only 3% difference between 1600MHz and 1066MHz
- In both cases, the difference is negligible



Question 3 Continued

How does memory speed affect scalability?

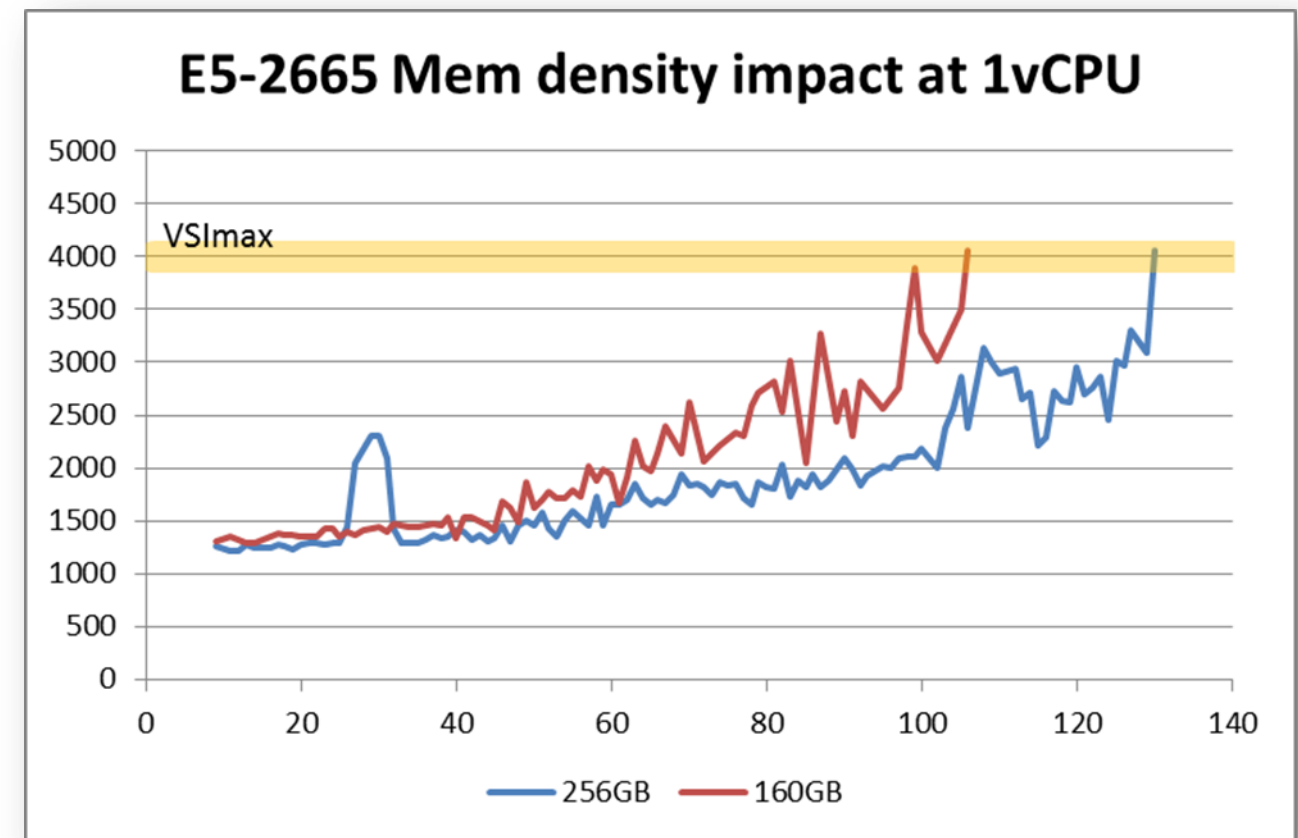
- At 2vCPU, performance difference is negligible
- At 1vCPU, E5-2643 saw huge 23% performance difference
- What is the cause? A higher VM/core ratio?



Question 4

How does memory capacity affect VDI scalability

- At 160GB system memory
 - Theoretical limit 98 desktops
 - Actual test reached 106 desktops
 - VMware memory overcommit gave ~12%
- At 256GB system memory
 - Theoretical limit 157 desktops
 - Actual test reached 130 desktops
 - System ran out of CPU
- Lesson: understand system constraints

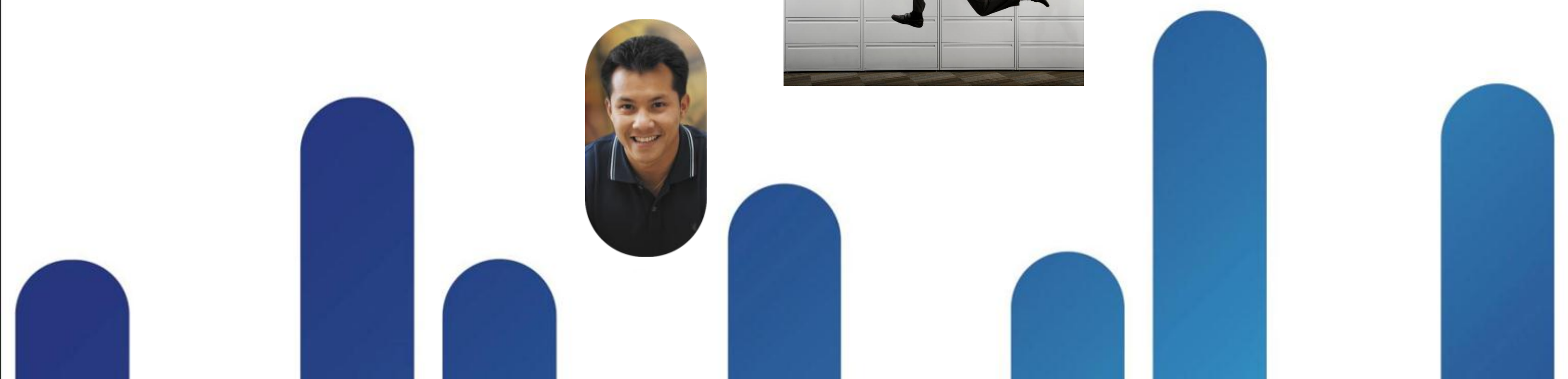


Theoretical

98 desktops X (1.5GB + 130MB overhead) = **160GB**

157 desktops X (1.5GB + 130MB overhead) = **256GB**

Rapid Deployment and Automation



Stateless Computing

What does it mean to you?



Stateless: UCS Service Profiles

- RAID settings
- Disk scrub actions

- Number of vHBAs
- HBA WWN assignments
- FC Boot Parameters
- HBA firmware

- FC Fabric assignments for HBAs

- 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

- Remote KVM IP settings
- Call Home behaviour
- Remote KVM firmware
- Server UUID

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



Stateless: UCS Service Profiles

- 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 Assoc.
- 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



Creating and Moving Service Profiles

- **State** is decoupled from **hardware**
- Easy to redeploy HW for other applications
- Dynamic provisioning
 - Speed/agility
 - Consistency
- Simplified management



Service Profile: **ESX_5**
Network1: www_prod
Network1 QoS: Gold
MAC : 08:00:69:10:78:ED
Boot Order: LOCAL
FW: WebServerBundle



Quickly Recover From ESX Host Failure

Local boot media breaks stateless computing

- No local disk
- No USB flash drive
- No SD card



Local boot media is something an admin has to touch or move

Quickly Recover From ESX Host Failure

Boot from SAN

ESX Host

(WWN set by UCSM)

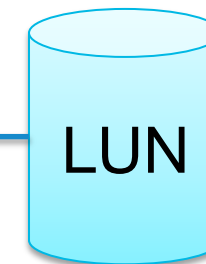


UCSM moves the WWN



ESX Host

(WWN set by UCSM)

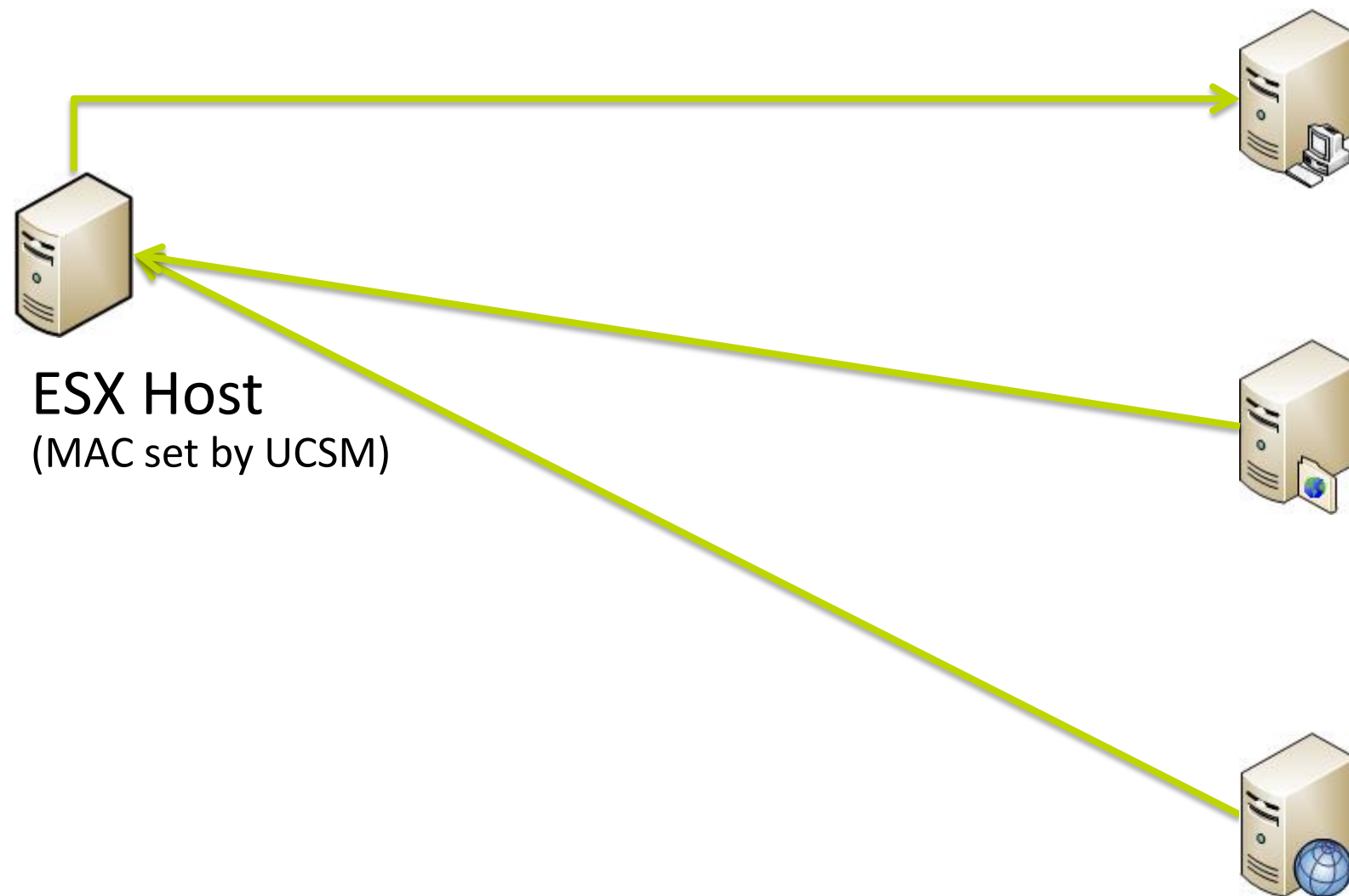


RESULT

WWN does not change,
zoning does not change,
LUN masking does not change

Quickly Recover From ESX Host Failure

VMware Auto Deploy (boot from Ethernet)



DHCP Server

set option 66 NextServer = IP of TFTP server
set option 67 FileName = name of PXE boot file
provides host with IP & FileName for boot

TFTP Server

gPXE boot image downloaded from vCenter
provides host gPXE boot image to perform HTTP boot from Auto Deploy server

Auto Deploy Server

rules engine and profiles configured with PowerCLI
uses host MAC, IP, etc. in rules engine to assign a host profile



What happens when this host fails?

Use UCS Manager to move the MAC to spare server.

Auto Deploy Methods in vSphere 5.1

All three modes work well with UCS stateless computing

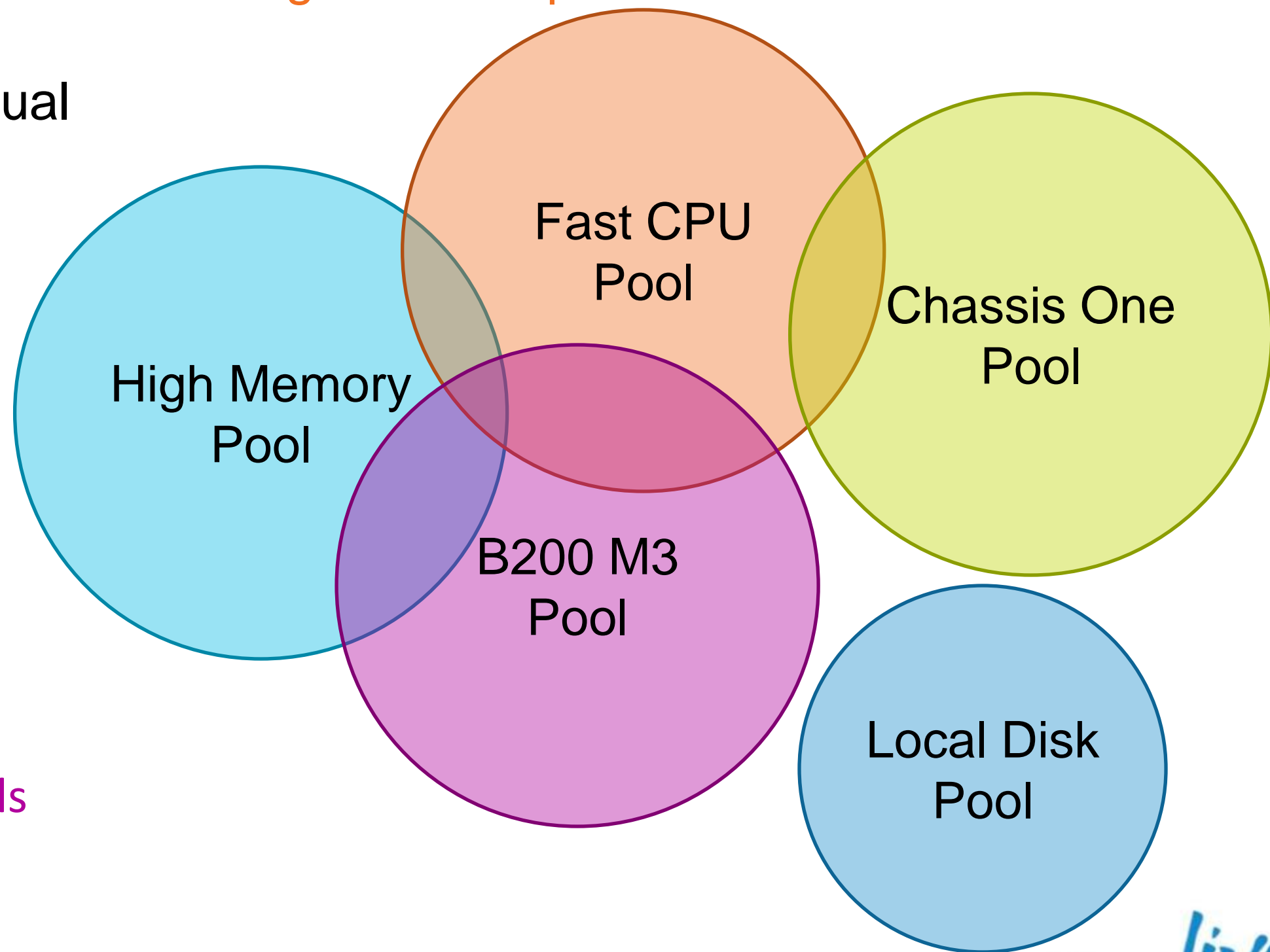
- **Stateless**
 - Host boot order: PXE only
 - Loads image and configuration from AD server on every reboot
- **Stateless caching**
 - Host boot order: PXE then local disk
 - Caches ESXi image to local disk; used only if PXE fails
- **Stateful Install**
 - Host boot order: local disk then PXE
 - Uses AD to install to disk

Using Server Pools

Don't assign profiles to servers – assign them to pools

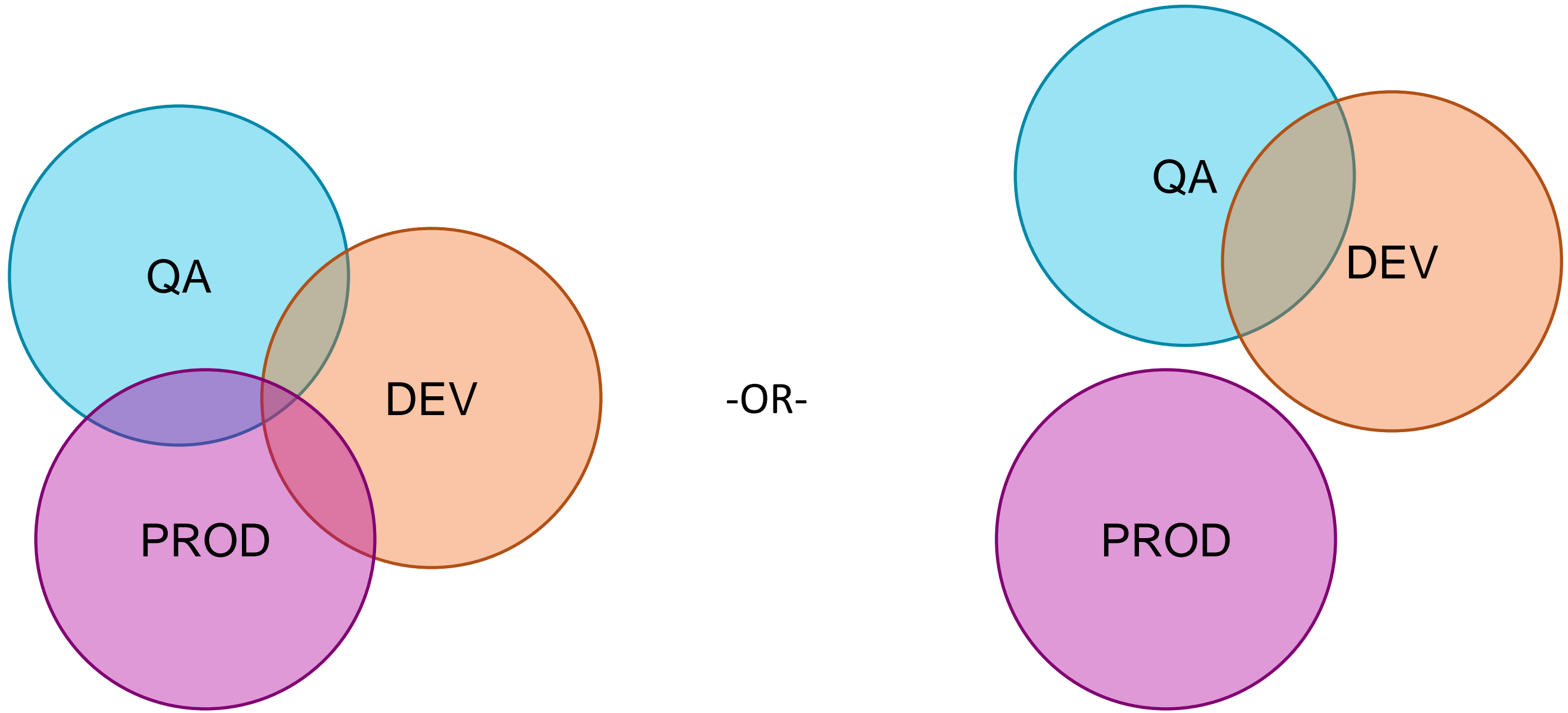
- Pools can be static/manual
- Pools can be dynamic
- Pools can overlap

The true power of pools



Beware That Pools Can Overlap

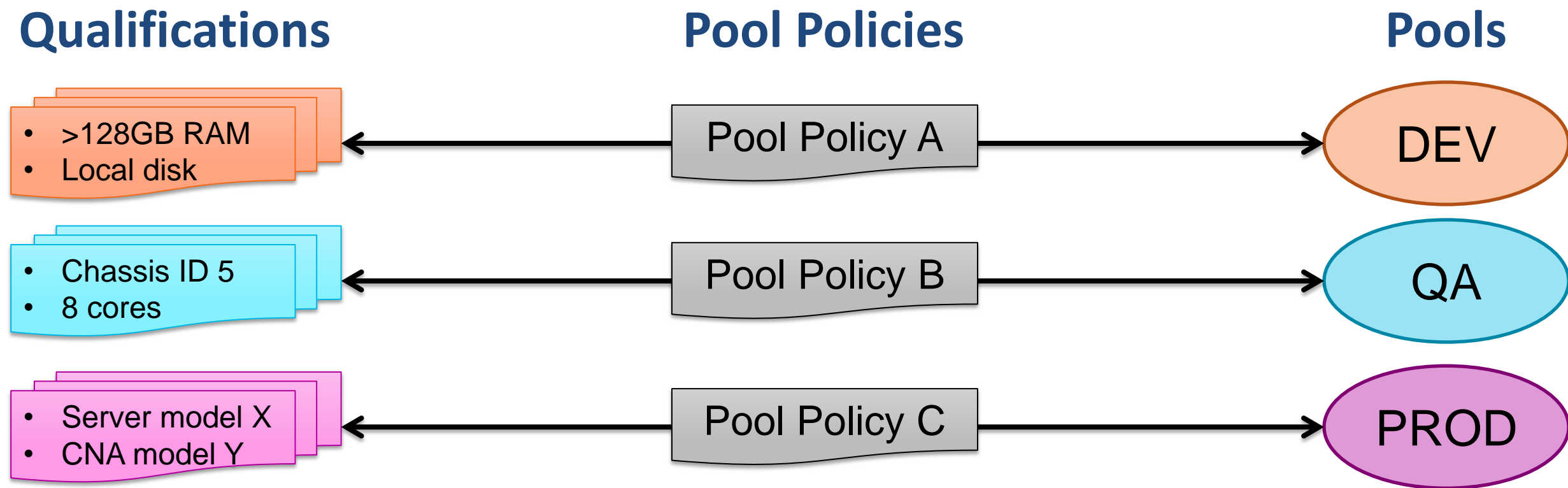
Don't accidentally take resources away from one pool



Creating Dynamic Pools

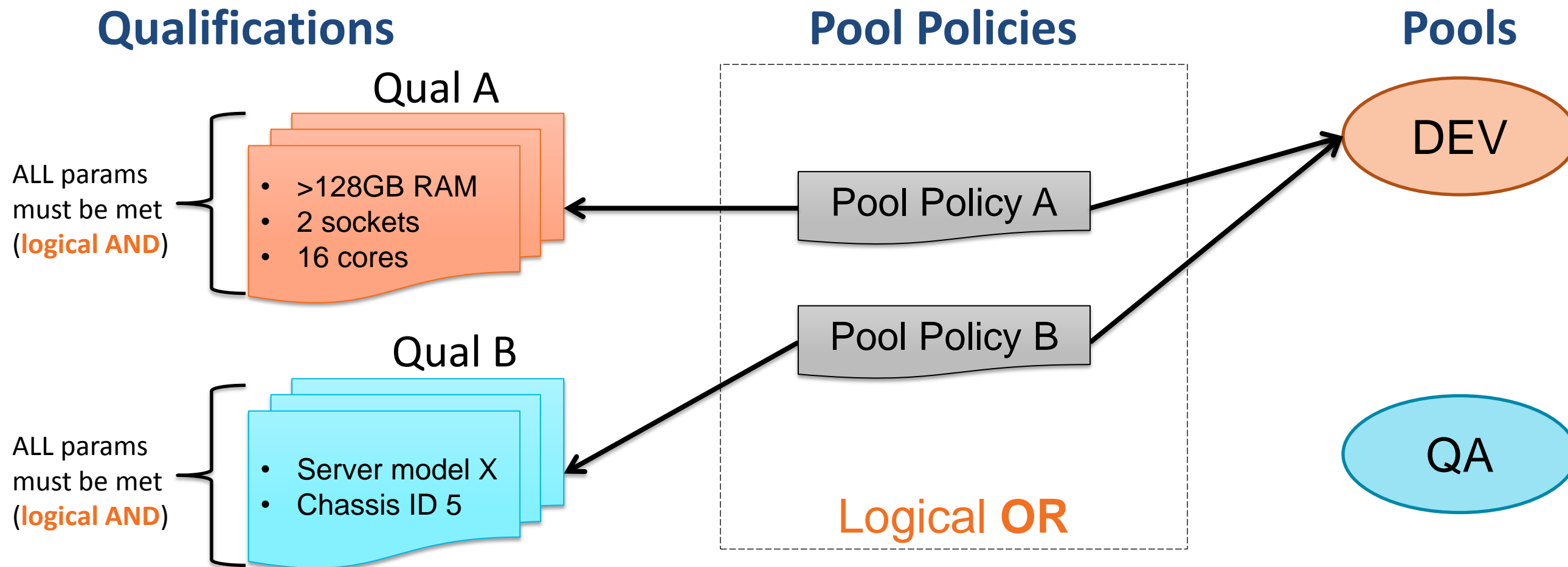
Relationship between pools and policies

1. Create **Server Pool Policy Qualifications**
2. Create empty **Server Pools**
3. Link each **Server Pool to Qualification(s)** with a **Pool Policy**



Dynamic Pool Advanced Scenario 1

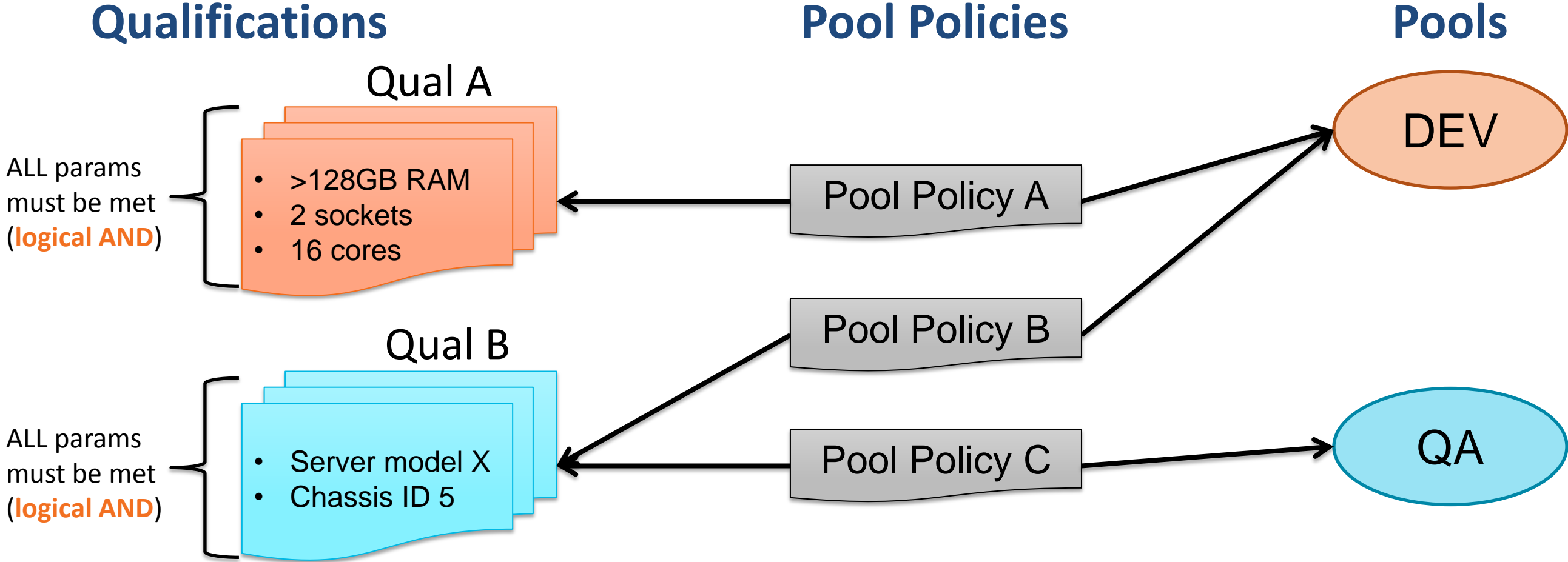
Pools can be fed by more than one qualification policy



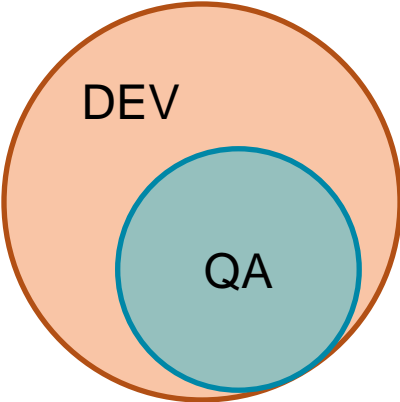
IF (Qual A is TRUE) OR (Qual B is TRUE) THEN add server to DEV pool

Dynamic Pool Advanced Scenario 2

One pool can be a subset of another



QA pool is a SUBSET of the DEV pool



Templates Promote Agility, Consistency

BIOS Policies



Firmware Policies



Boot Order Policies



QoS Policies



MAC Pools



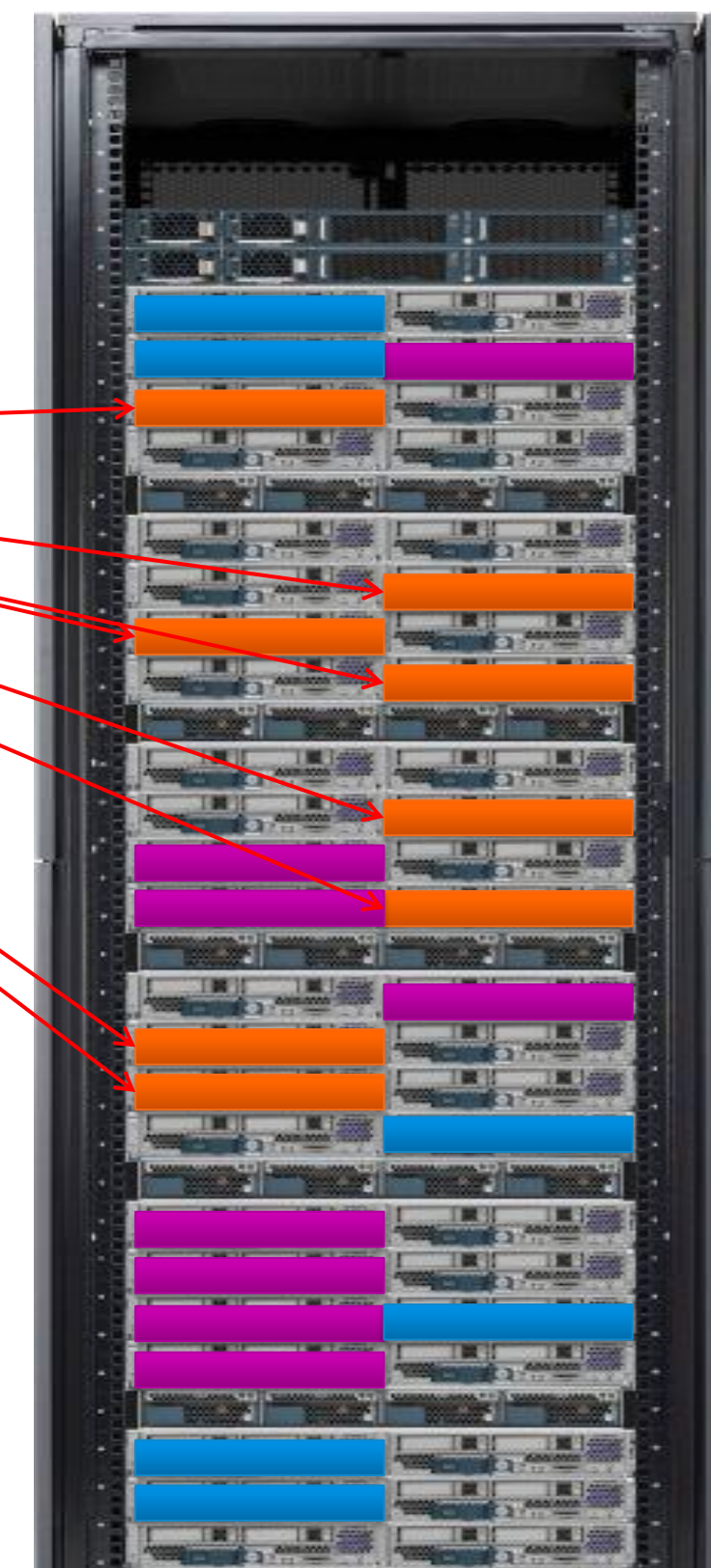
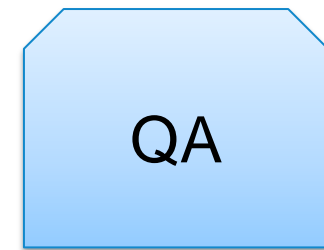
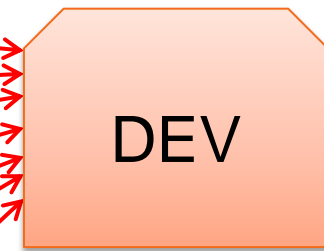
WWNN Pools



Server Pools



Service Profile Templates



Cisco Unified Computing System

Optimised and Designed as an Integrated System

Cisco UCS™ Manager

(Read / Write Configuration Interfaces)

UCS 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



Cisco UCS Blade Server Chassis



Cisco UCS Blade and Rack Servers

(Cut through Interfaces to CIMC)

Serial over LAN, KVM, IPMI

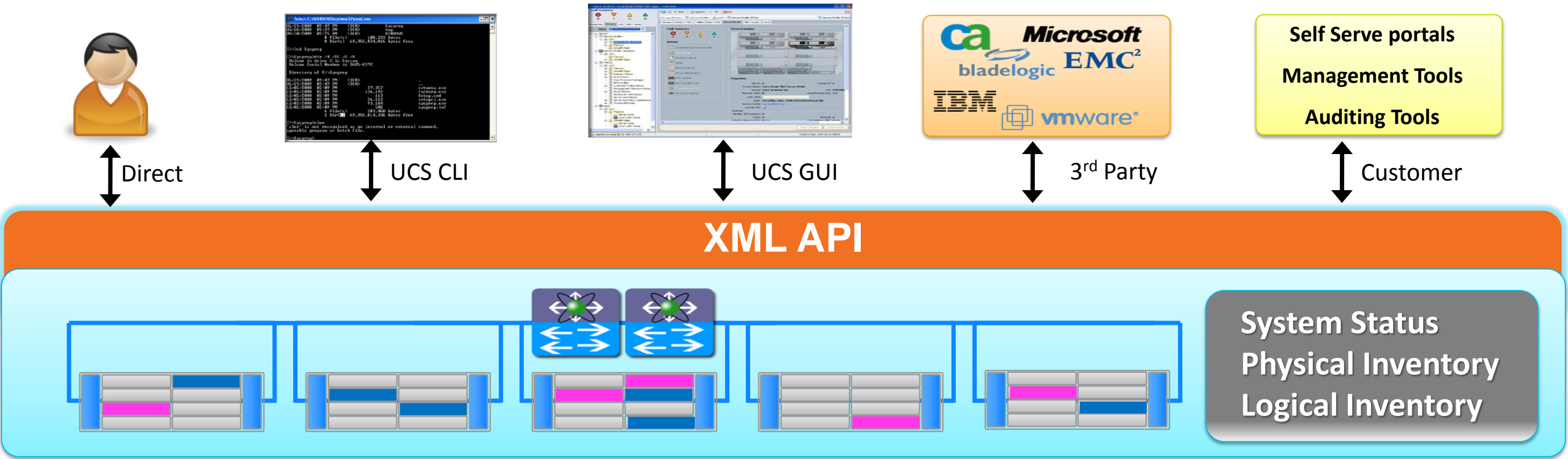


Cisco UCS I/O Adapters



Programmatic Infrastructure

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



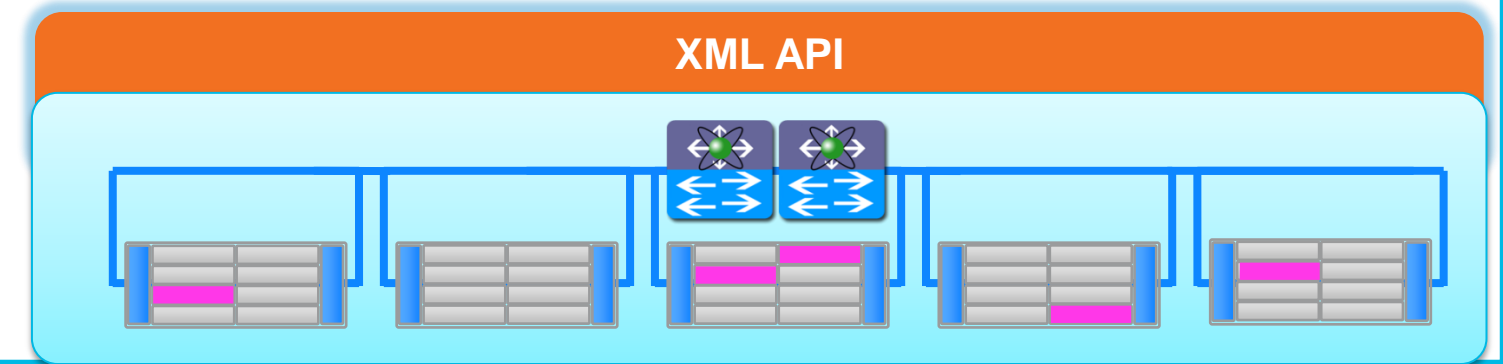
- Broad 3rd party integration support
- Faster custom integration for customer use cases
- Consistent data and views across ALL interfaces



UCS XML API Overview

UCS XML API Features

- Communicates over HTTP / HTTPS
- XML Based, Transactional
- XML Transactions are Order Agnostic
- Standard Request / Response cycle
- Role Based Authentication
- Object Model Hierarchy
- Built-in Object Browser
- Published XML Schema
- Java Doc Style documentation
- High Availability
- Event Stream



A Very Simple XML Query

Home > Report Project1 > UCSFaultCheck Home | My Subs

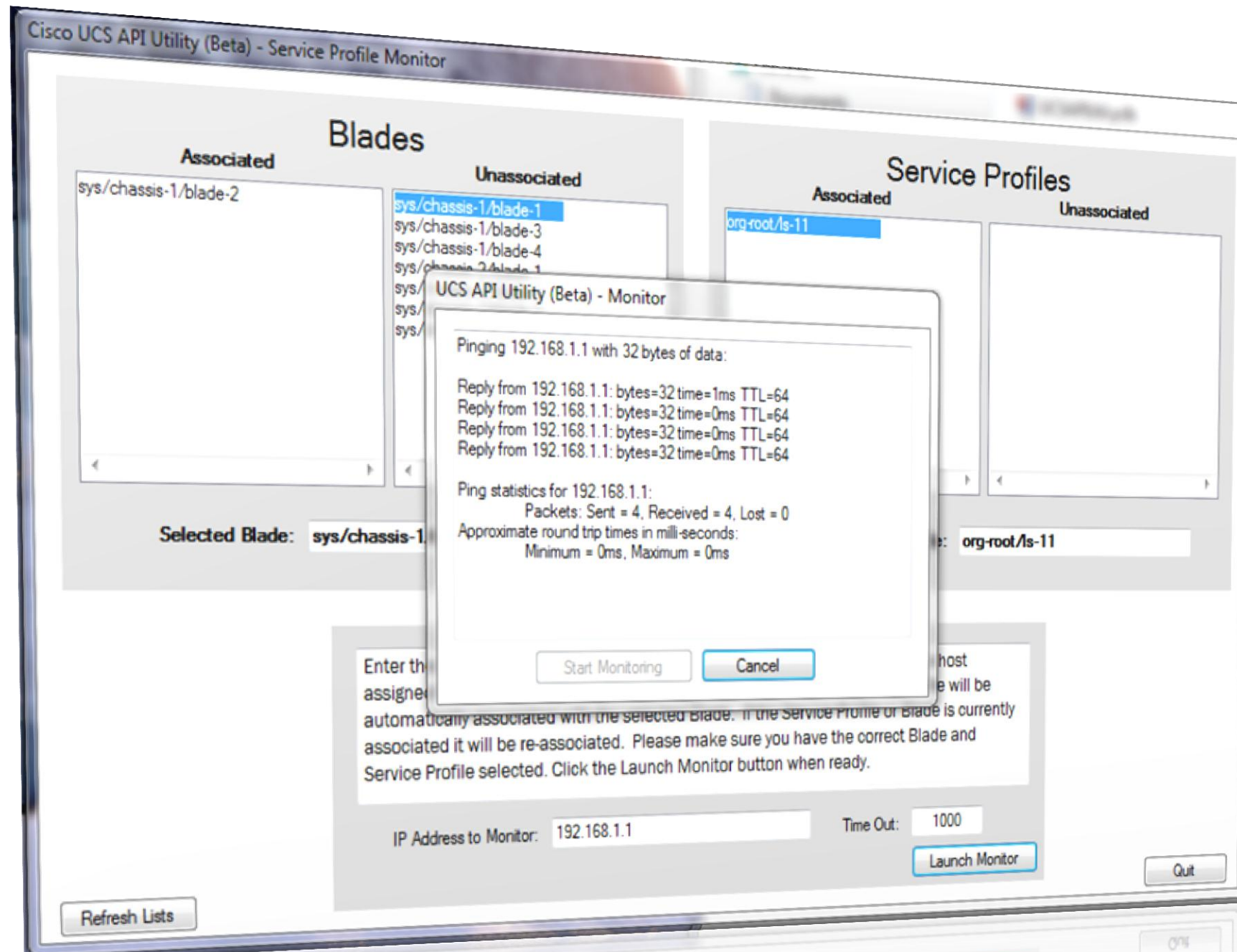
1 of 1 100% Find | Next

UCS Fault Check Report

pod	cookie	response	class Id	ack	cause	code	created	descr	dn	highest Severity	id	last Transition	lc	occur	orig Severity	prev Severity	rule	severity	tags	type	fault Inst
PFUCSPOD 1																					
	1280766240/11d21e71-ba16-4485-86d2-b3c235dc5e2b	yes	faultInst																		
PNUCSPOD 1																					
	1280765498/77f49a5d-d94c-4a75-bb05-08a73da591f0	yes	faultInst	no	equipment-inoperable	F0185	2010-07-30T16:14:24.647	DIMM 1/7 on server 10/7 operability: inoperable	sys/chassis-10/blade-7/board/memarray-1/mem-7/fault-F0185	major	715935	2010-07-30T16:14:24.647		1	major	major	memory-unit-inoperable	major	server	equipment	
PNUCSPOD 2																					
	1280766236/f84c6b28-f14d-4622-af13-17fc54fdea15	yes	faultInst	no	thermal-problem	F0411	2010-07-29T10:38:30.198	Temperature on chassis 6 is upper-non-recoverable	sys/chassis-6/fault-F0411	critical	601433	2010-07-29T10:38:39.949		1	critical	critical	equipment-chassis-thermal-threshold-non-recoverable	critical	server	environmental	
	1280766236/f84c6b28-f14d-4622-af13-17fc54fdea15	yes	faultInst	no	configuration-failure	F0327	2010-07-29T11:04:21.278	Service profile SHLPNGFAS0606-1 configuration failed due to compute-unaavailable,insufficient-resources	org-root/org-XPM/ls-SHLPNGFAS0606-1/fault-F0327	major	601488	2010-07-29T11:04:21.278		1	major	major	ls-server-config-failure	major	server	server	
	1280766236/f84c6b28-f14d-4622-af13-17fc54fdea15	yes	faultInst	no	execute-peer-failed	F77959	2010-07-29T11:05:03.762	[FSM:STAGE:REMOTE-ERROR]: Result: unidentified-fail Code: ERR-0505-IBMC-fru-retrieval-error Message: Could not get Fru from 7f050607, dn=fabric/server/chassis-6/slot-7 (sam:dme:FabricComputeSlotEpiIdentify:ExecutePeer)	fabric/server/chassis-6/slot-7/fault-F77959	condition	601565	2010-08-02T12:20:16.261		512	condition	cleared	fsm-identify-remote-inv	condition		fsm	
	1280766236/f84c6b28-f14d-4622-af13-17fc54fdea15	yes	faultInst	no	fsm-failed	F999559	2010-07-29T11:21:26.108	[FSM:FAILED]: identifying a blade in 6/7 (FSM:sam:dme:FabricComputeSlotEpiIdentify)	fabric/server/chassis-6/slot-7/fault-F999559	critical	616634	2010-07-29T11:21:26.108		1	critical	critical	fsm-identify-fsm-fail	critical		fsm	
PNUCSPOD 3																					
	1280766236/6c5dd41a-d243-4ec1-93d0-0d288dbf8ad6	yes	faultInst																		
PNUCSPOD 4																					
	1280766237/98a6b135-ce1a-4b90-b97a-587a904e3299	yes	faultInst	no	equipment-inoperable	F0185	2010-07-19T03:26:31.495	DIMM 1/6 on server 6/2 operability: inoperable	sys/chassis-6/blade-2/board/memarray-1/mem-6/fault-F0185	major	1306742	2010-07-19T03:26:31.495		1	major	major	memory-unit-inoperable	major	server	equipment	
PNUCSPOD 5																					
	1280766237/054ccc7a-0287	yes	faultInst																		

Write Your Own App

Expose only features you want exposed OR create new functionality



Purpose-built console for Service Profile monitoring

Cisco Developer Network

The screenshot shows the Cisco Developer Network website. The main navigation bar includes Home, Membership, Technologies, Community, Technology Partners, News & Events, and My C. The main content area is titled "UCS Manager" and has sub-navigation for UCS Manager, Forums, Blogs, and Documentation. The main text describes the Cisco Unified Computing System (UCS) and its XML API. Below this are three columns: "What Is It?" (Overview), "How Do I Get Started?" (Getting Started), and "What Resources Are Available?" (Resources). At the bottom, there are three more sections: "Developer Forums", "Recent Bloggers" (with a table of users, posts, and dates), and "Recent Downloads".

User	Posts	Date
Sheryl Sage	3	8/27/10
John McDonough	3	7/14/10
Pramod Borkar	1	6/23/10

Web based developer community

<http://developer.cisco.com/web/unifiedcomputing/home>

Downloads:

- UCS Platform Emulator (UCSPE)
- goUCS Automation Tool
- XML API, Perl, PowerShell code samples (44 and counting)
- Microsoft – PowerShell library, SCOM MP
- HP Software – HPOM, HPOO integration modules

Documentation:

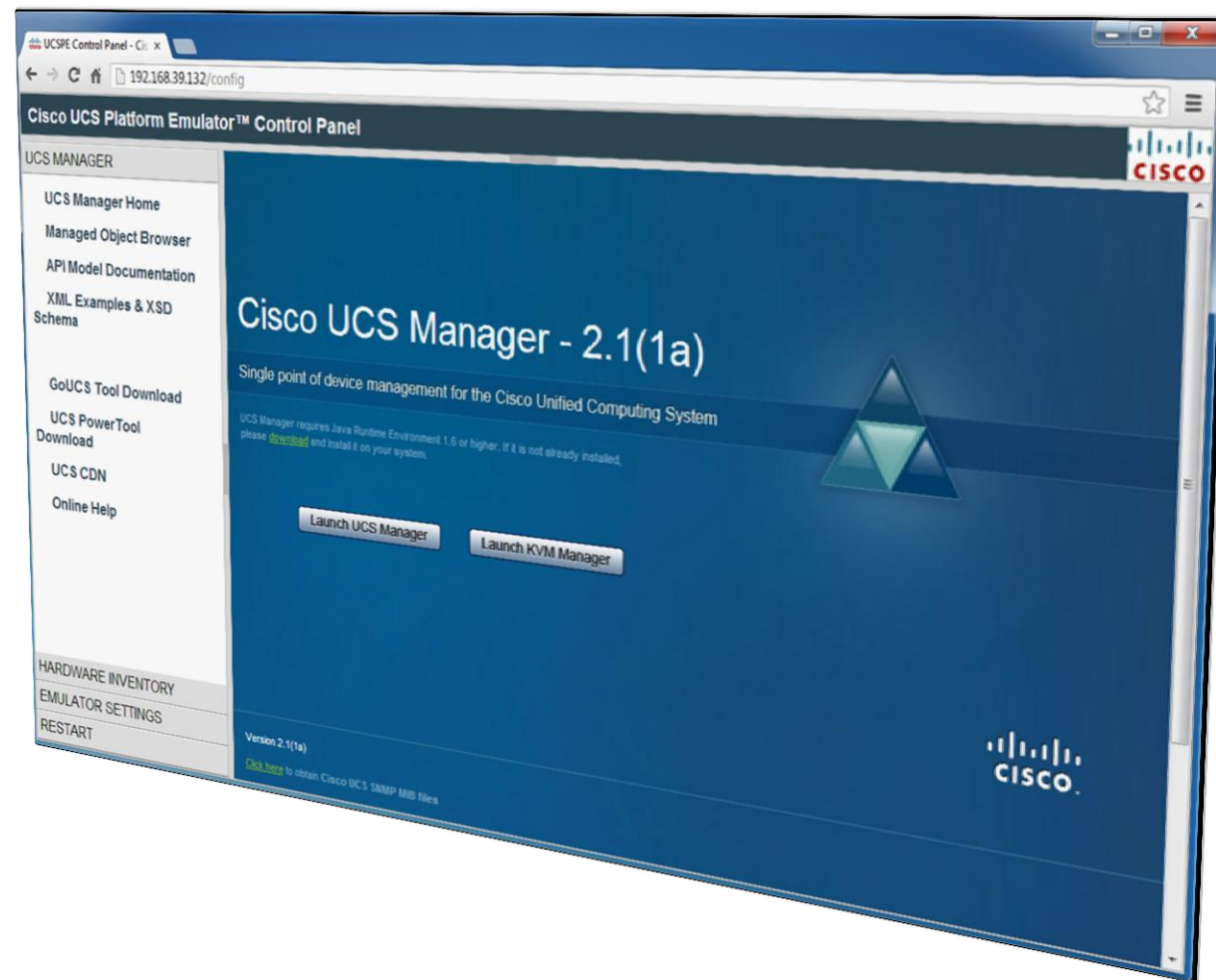
- Programming & developer guides
- White papers
- Reference guides (XML model, Faults)

Collaboration:

- Blogs
- Peer to peer forums
- Videos
- Access to Cisco subject matter experts

UCS Platform Emulator (UCSPE)

No UCS hardware needed for code development



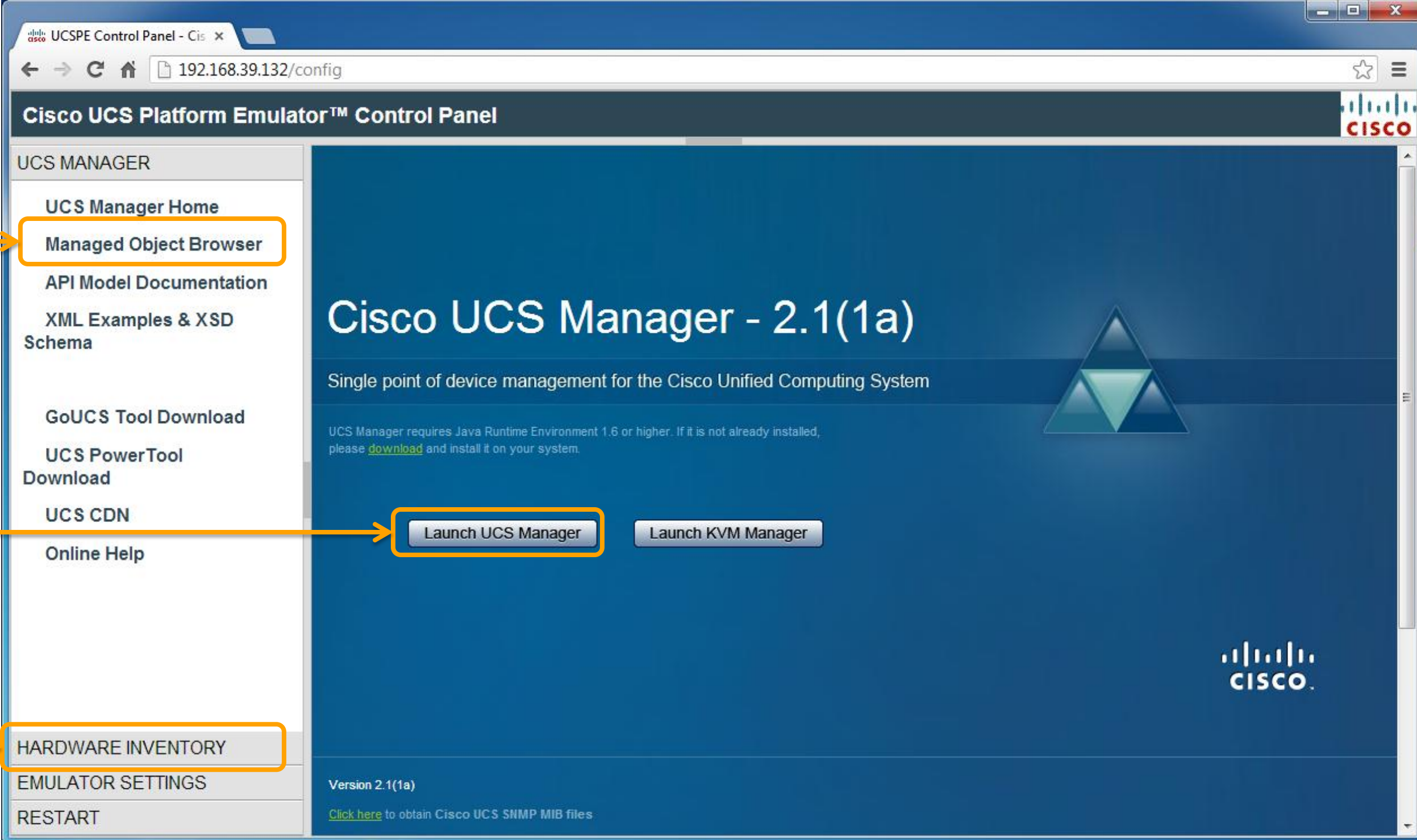
- Full featured emulator
- Installs as a Virtual Machine
- Support for all XML API calls
- Object Browser to view the UCSM model
- Import & replicate existing live UCS Manager physical inventory
- Share saved inventories among UCS Platform Emulators
- Drag-n-drop hardware builder to create custom physical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

UCS Platform Emulator: Great DEV Tool

Browse XML objects

UCS Manager GUI

Change emulated HW



UCS Platform Emulator: Great DEV Tool

Import inventory from live UCS system

Build and replicate custom blades

The screenshot shows the Cisco UCS Platform Emulator Control Panel interface. The browser address bar displays '192.168.39.132/config'. The main title is 'Cisco UCS Platform Emulator™ Control Panel'. On the left, a navigation menu includes 'UCS MANAGER', 'HARDWARE INVENTORY', 'Start-up Inventory', and 'Hardware Catalog'. The 'Start-up Inventory' section is active, showing a toolbar with icons for import, export, refresh, and save. Below this are three main panels: 'Stash (unused servers: 0)', 'Rack Servers', and two chassis views ('Chassis 1: chassis 1' and 'Chassis 3: chassis 3'). The 'Stash' panel has a 'New Server' button and a text box 'drop new server here'. The 'Rack Servers' panel has 'Fabric-A' and 'Fabric-B' dropdowns, and a 'New Server' button with 'drop new server rack here'. The chassis panels show details like Model (N20-C6508), UCSM Chassis ID, Serial, Fabric Extender, and counts for Servers (7), Fans (8), and PSU (2). At the bottom, a 'Blades' tab is selected in a navigation bar, which is highlighted with an orange box. Below the tabs is a table of hardware items.

Item	Description	Vendor	Part No	PID
Cisco UCS B200 M1 2 Socket Blade Server	2 Socket, Single slot Blade Server, 12 DIMMs, 2 SFF HDDs, Intel Xeon 5500 series, 1 Mezz. Slot	Cisco Systems, Inc.	74-5390-01	N20-B6620-1
Cisco UCS B440 M1 4 Socket, Extended Memory Blade Server	4 Socket, Dual slot Blade Server, 32 DIMMs, 4 SFF HDDs, Intel Xeon 7500 series, 2 Mezz. Slots	Cisco Systems, Inc.	68-3516-06	N20-B6740-2

PowerShell is Common Scripting Method



- Plain English cmdlets
- Pipeline commands
- Strong library/module/snapin support
- Strong support in Microsoft environments
- Free development tools



PowerTool



PowerCLI

Scripting with PowerShell

```
PS C:\> Get-Command -Module CiscoUcsPS | Measure-Object
```

```
Count      : 1506
```

Over 1500 cmdlets for UCS

```
PowerCLI C:\> Get-Command -PSSnapin (Get-PSSnapin | ? {$_.Name -match "VMware"}) | Measure-Object
```

```
Count      : 301
```

Over 300 cmdlets for VMware

Real World Scripting Example

How many and what kind of DIMM is in every server I own?

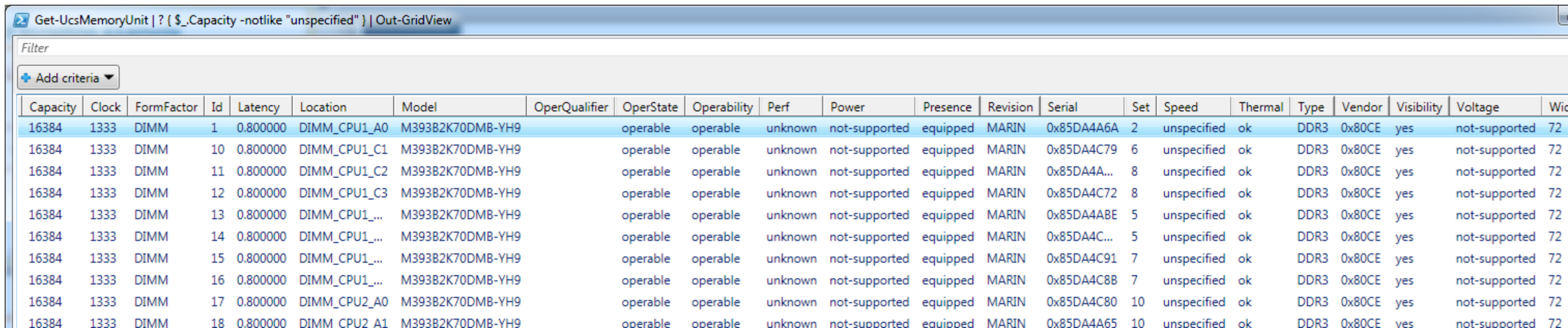
```
Get-UcsMemoryUnit | ? {$_.Capacity -notlike "unspecified"} | ft Bank, Capacity, Dn, Id, Location, Model, Serial, Type, Vendor -AutoSize
```

Or dump it to Excel...

```
Get-UcsMemoryUnit | ? {$_.Capacity -notlike "unspecified"} | Export-Csv -Path "mem.csv"
```

Or dump it to the screen...

```
Get-UcsMemoryUnit | ? {$_.Capacity -notlike "unspecified"} | Out-GridView
```



The screenshot shows a PowerShell window titled "Get-UcsMemoryUnit | ? { \$_.Capacity -notlike 'unspecified' } | Out-GridView". The window displays a table with 22 columns and 18 rows of data. The columns are: Capacity, Clock, FormFactor, Id, Latency, Location, Model, OperQualifier, OperState, Operability, Perf, Power, Presence, Revision, Serial, Set, Speed, Thermal, Type, Vendor, Visibility, Voltage, and Width. The data rows show various DIMM configurations, including capacity (16384), clock speed (1333), form factor (DIMM), ID (1-18), latency (0.800000), location (DIMM_CPU1_A0 to DIMM_CPU2_A1), model (M393B2K70DMB-YH9), operability (operable), performance (unknown), power (not-supported), presence (equipped), revision (MARIN), serial numbers (e.g., 0x85DA4A6A), set numbers (2, 6, 8, 5, 7, 10), speed (unspecified), thermal status (ok), type (DDR3), vendor (0x80CE), visibility (yes), voltage (not-supported), and width (72).

Capacity	Clock	FormFactor	Id	Latency	Location	Model	OperQualifier	OperState	Operability	Perf	Power	Presence	Revision	Serial	Set	Speed	Thermal	Type	Vendor	Visibility	Voltage	Width
16384	1333	DIMM	1	0.800000	DIMM_CPU1_A0	M393B2K70DMB-YH9		operable	operable	unknown	not-supported	equipped	MARIN	0x85DA4A6A	2	unspecified	ok	DDR3	0x80CE	yes	not-supported	72
16384	1333	DIMM	10	0.800000	DIMM_CPU1_C1	M393B2K70DMB-YH9		operable	operable	unknown	not-supported	equipped	MARIN	0x85DA4C79	6	unspecified	ok	DDR3	0x80CE	yes	not-supported	72
16384	1333	DIMM	11	0.800000	DIMM_CPU1_C2	M393B2K70DMB-YH9		operable	operable	unknown	not-supported	equipped	MARIN	0x85DA4A...	8	unspecified	ok	DDR3	0x80CE	yes	not-supported	72
16384	1333	DIMM	12	0.800000	DIMM_CPU1_C3	M393B2K70DMB-YH9		operable	operable	unknown	not-supported	equipped	MARIN	0x85DA4C72	8	unspecified	ok	DDR3	0x80CE	yes	not-supported	72
16384	1333	DIMM	13	0.800000	DIMM_CPU1_...	M393B2K70DMB-YH9		operable	operable	unknown	not-supported	equipped	MARIN	0x85DA4ABE	5	unspecified	ok	DDR3	0x80CE	yes	not-supported	72
16384	1333	DIMM	14	0.800000	DIMM_CPU1_...	M393B2K70DMB-YH9		operable	operable	unknown	not-supported	equipped	MARIN	0x85DA4C...	5	unspecified	ok	DDR3	0x80CE	yes	not-supported	72
16384	1333	DIMM	15	0.800000	DIMM_CPU1_...	M393B2K70DMB-YH9		operable	operable	unknown	not-supported	equipped	MARIN	0x85DA4C91	7	unspecified	ok	DDR3	0x80CE	yes	not-supported	72
16384	1333	DIMM	16	0.800000	DIMM_CPU1_...	M393B2K70DMB-YH9		operable	operable	unknown	not-supported	equipped	MARIN	0x85DA4C8B	7	unspecified	ok	DDR3	0x80CE	yes	not-supported	72
16384	1333	DIMM	17	0.800000	DIMM_CPU2_A0	M393B2K70DMB-YH9		operable	operable	unknown	not-supported	equipped	MARIN	0x85DA4C80	10	unspecified	ok	DDR3	0x80CE	yes	not-supported	72
16384	1333	DIMM	18	0.800000	DIMM_CPU2_A1	M393B2K70DMB-YH9		operable	operable	unknown	not-supported	equipped	MARIN	0x85DA4A65	10	unspecified	ok	DDR3	0x80CE	yes	not-supported	72

Real World Scripting Example

Which profile is associated with a specific MAC address?

```
$mac = "4f"
```

```
Get-UcsVnic | ? {$_.Addr -match $mac} | Format-Table Ucs, Dn, Addr -AutoSize
```

Ucs	Dn	Addr
---	--	----
OPK-SELAB-Area51	org-root/org-jamarche/ls-jmESXTest01/ether-jmESXvmnic1	00:25:B5:AA:E0:4F
OPK-SELAB-Area51	org-root/org-VDI_TEST/ls-M3_ESXi_2/ether-vnic0	00:25:B5:10:00:4F
OPK-SELAB-Area51	org-root/org-VDI_TEST/ls-VI_MGMT/ether-vNIC0	00:25:B5:20:10:4F

Objects

“An object is a collection of parts and how to use them”

Parts

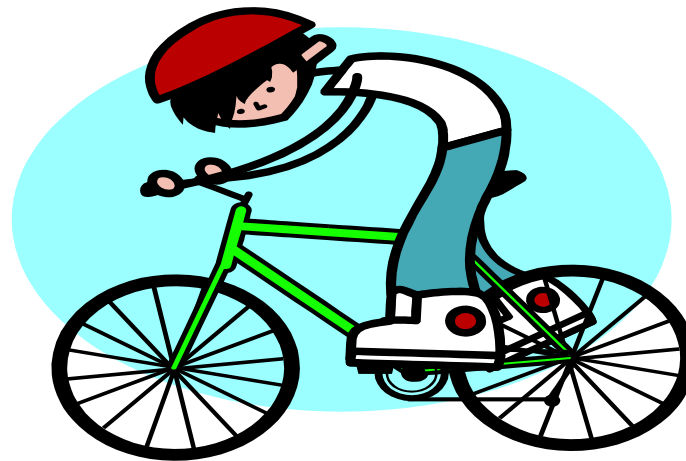
Front Wheel

Back Wheel

Pedals

Saddle

Frame



How to use

Pedal

Steer Left

Steer Right

Apply Front Brake

Apply Rear Brake

Objects

~~Parts~~
Properties

DisplayName

Status

RequiredServices



Windows
Service

~~How to use~~
Methods

Stop()

Start()

Pause()

Demo Time!



I hope this demo doesn't crash!

I have no idea what is going on

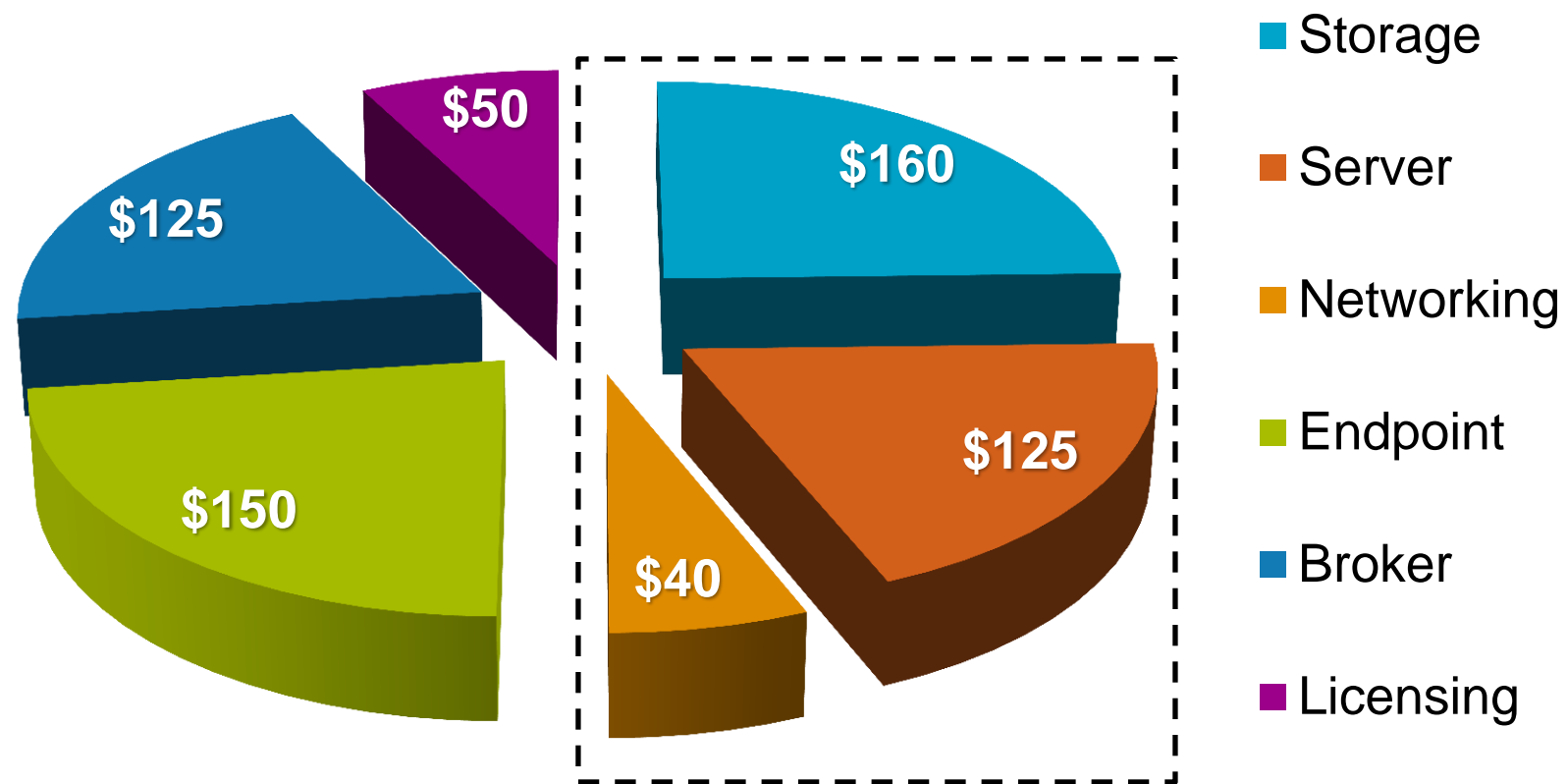
Storage Considerations



Cost

Where does your VDI money go?

Average Cost per Virtual Desktop (\$650)

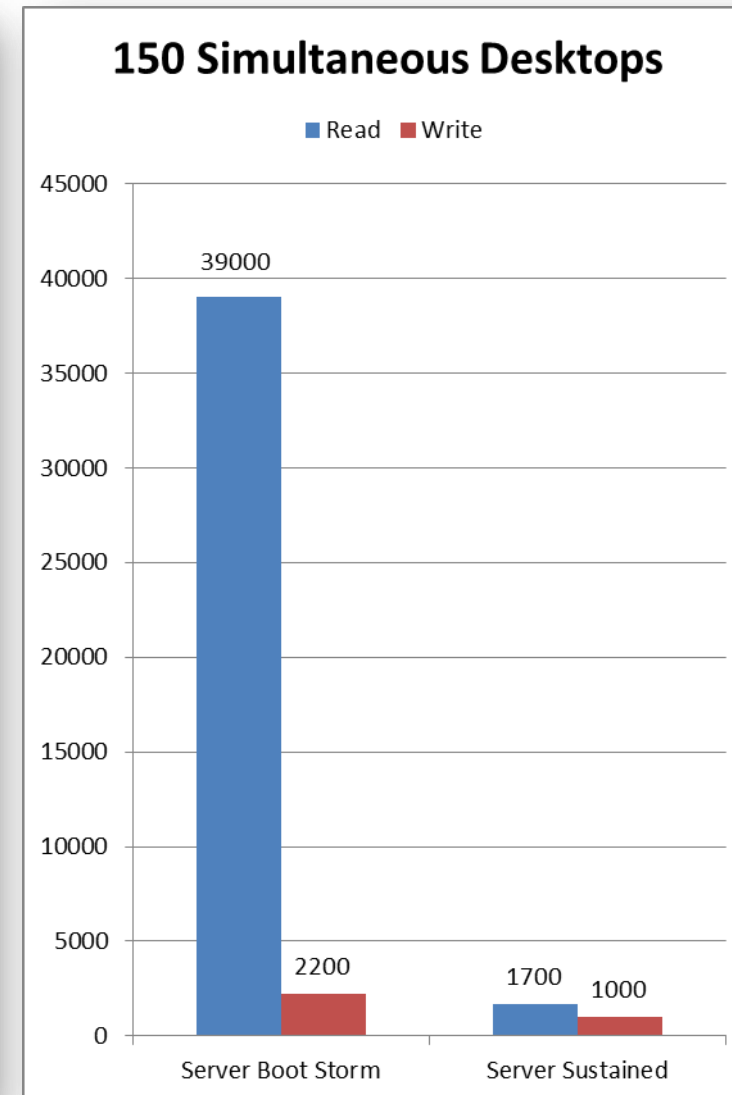
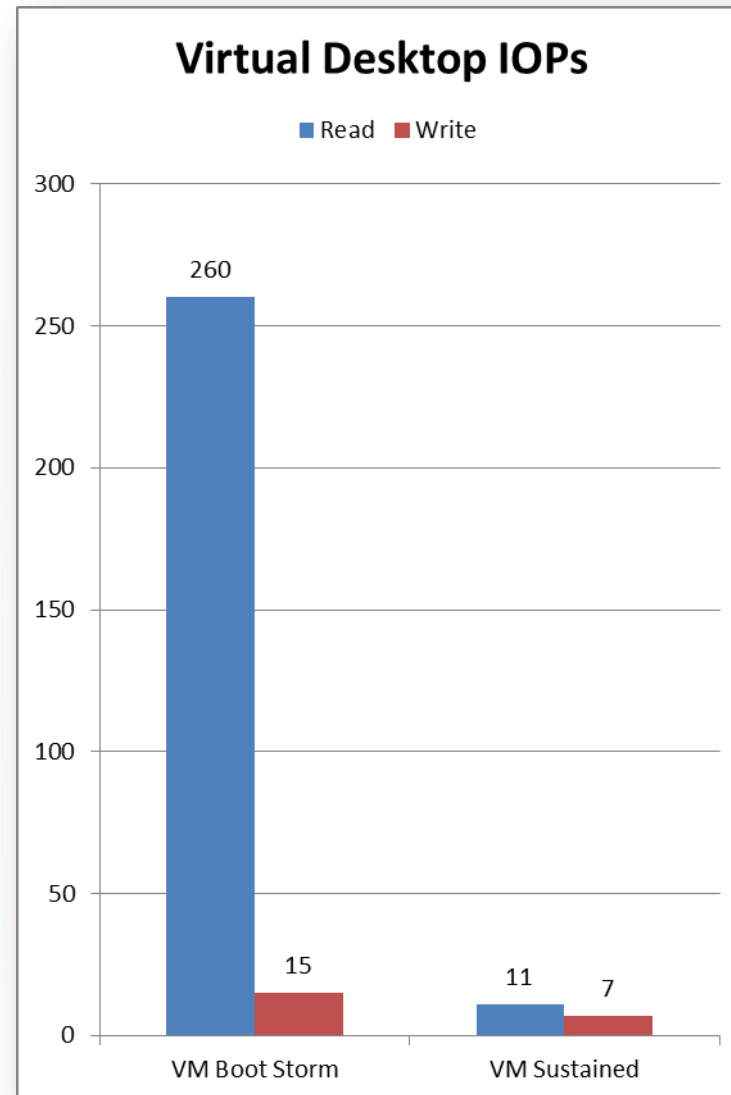


Source: 2011 Morgan Stanley Desktop Survey

Server, Storage and Networking on average comprise 50% of solution TCO per desktop

VDI Boot and Login Storms

More lessons learned from earlier VDI testing

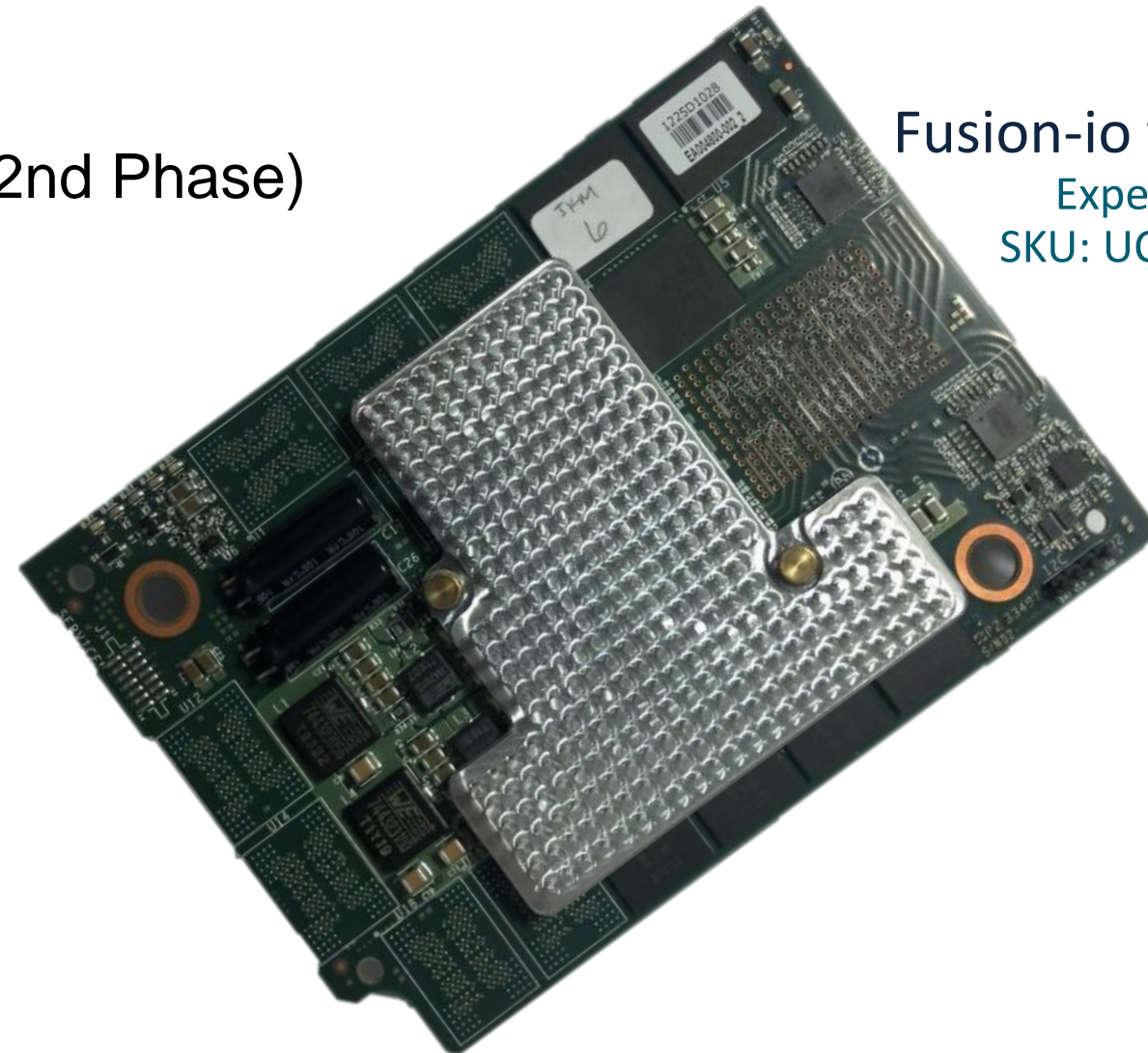


- Single Win7 VM can demand 260 read IOPS during boot
- Single ESX host can demand 39K read IOPS during VM boot storm

Fusion-io Mezzanine Card for UCS Blades

Expanding the Unified Computing blade option portfolio

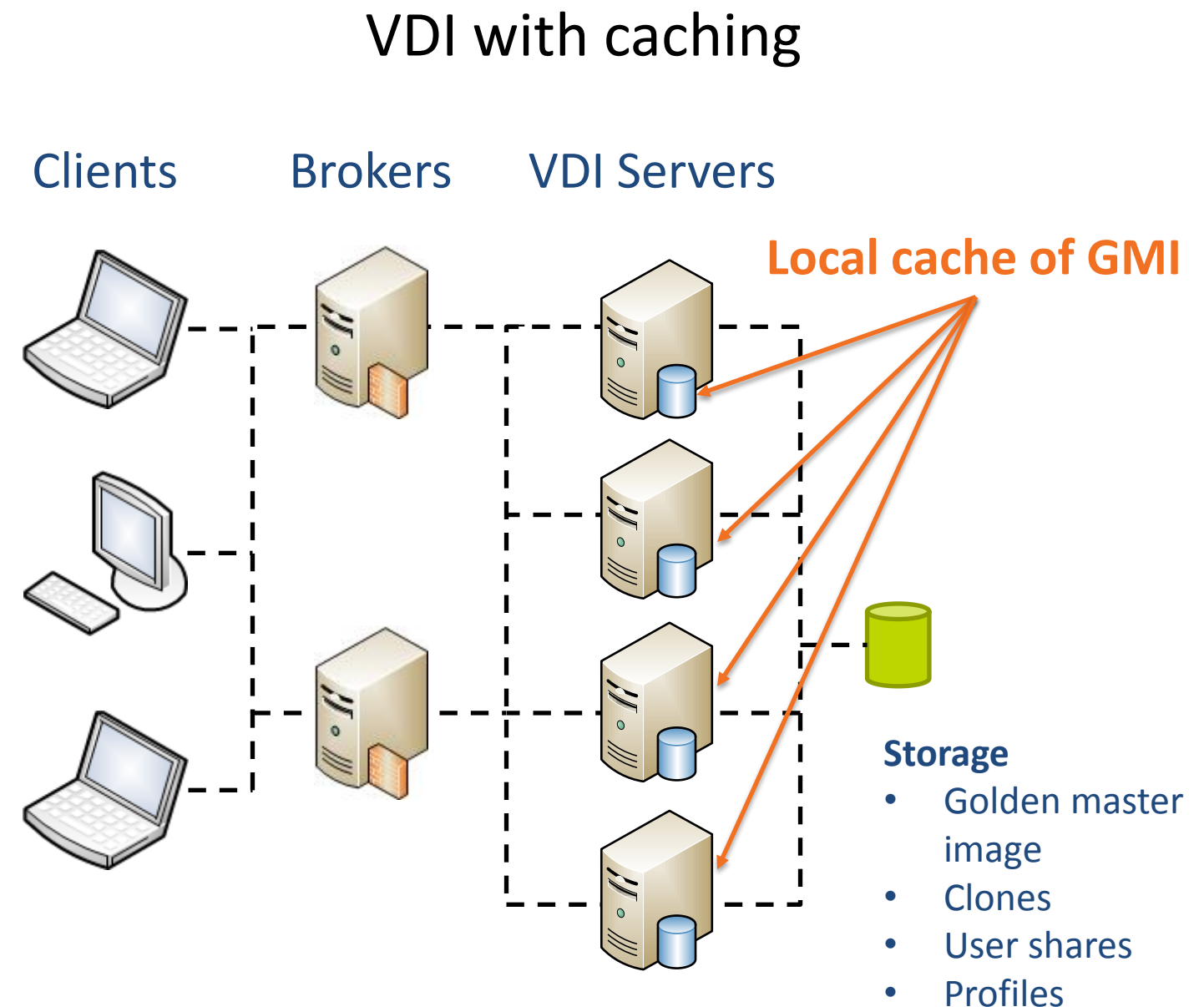
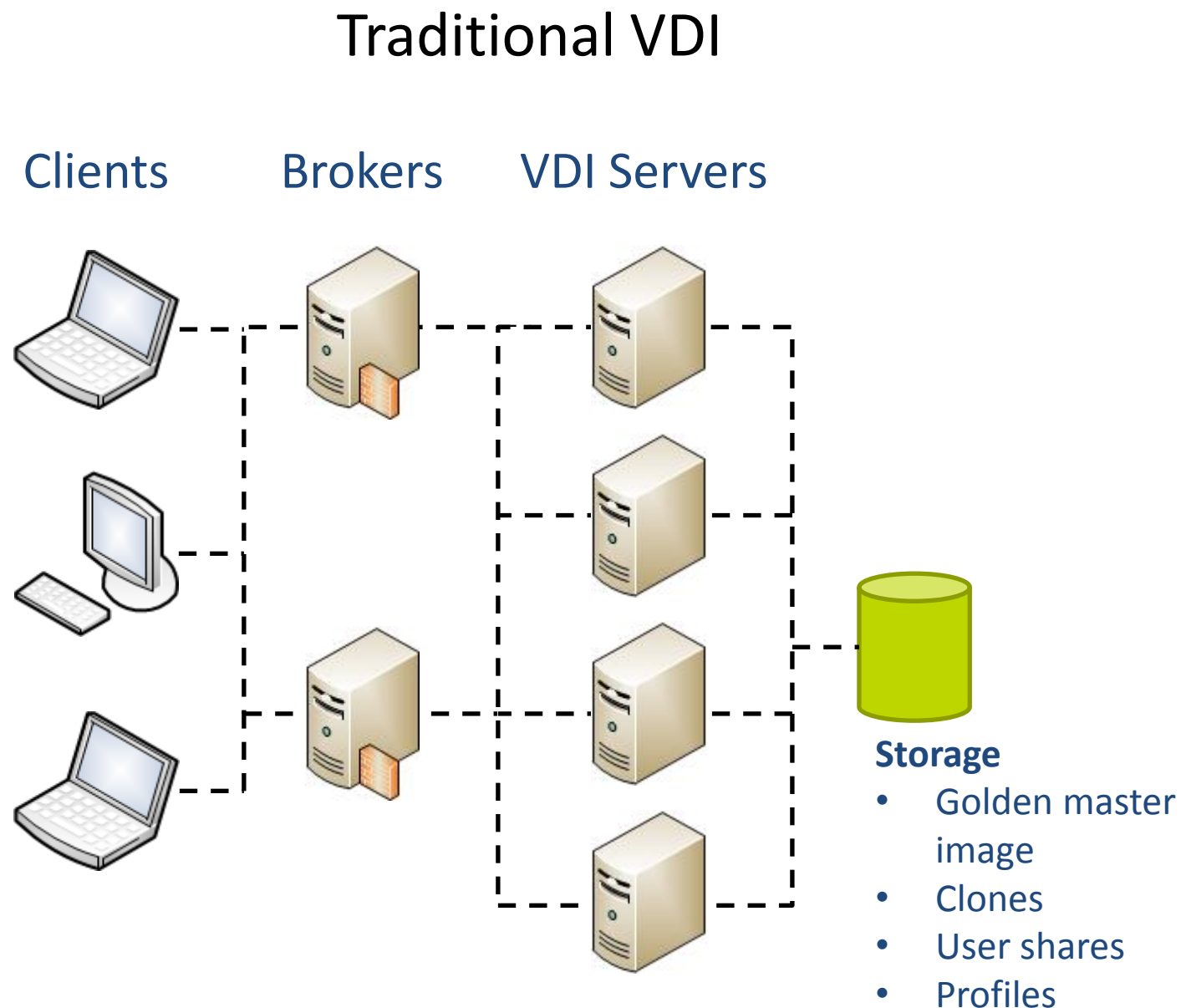
- Create new ultra-low latency storage tiers
- Boost in-server application performance with database and virtualisation workloads
- Specs:
 - 785 GB MLC Flash capacities (365 GB MLC 2nd Phase)
 - 1.5GB/s Bandwidth (1MB Read)
 - 1.1GB/s Bandwidth (1MB Write)
 - 141,000 IOPS (512B Random Read)
 - 535,000 IOPS (512B Random Write)
 - 15µs Write Latency, 68µs Read Latency
- HW supported: all M3 blades
- SW supported: UCS Manager 2.1+



Fusion-io for UCS B-Series
Expected Q1CY13
SKU: UCSB-F-FIO-785M

VDI With and Without Local Cache

Caching Golden Master Image (GMI) saves IOPS



Fusion-io doesn't change your storage needs. It changes your storage performance needs.

Q & A



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Complete your Overall Event Survey and 5 Session Evaluations.

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- By visiting the Cisco Live Mobile Site www.ciscoliveaustralia.com/mobile
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Don't forget to activate your Cisco Live 365 account for access to all session material,

communities, and on-demand and live activities throughout the year. Log into your Cisco Live portal and click the "Enter Cisco Live 365" button.

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Cisco *live!*

