

# What You Make Possible

















### TOMORROW starts here.



- Overview of UCS and Components
- Hardware Abstraction
- Network Abstraction
- Innovative Technologies
- Multi-Tenant & Security
- Monitoring & Fault Alerting



# Unified Computing System Overview



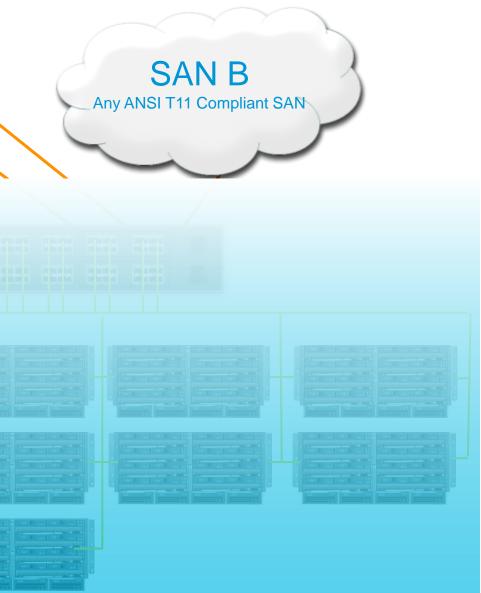






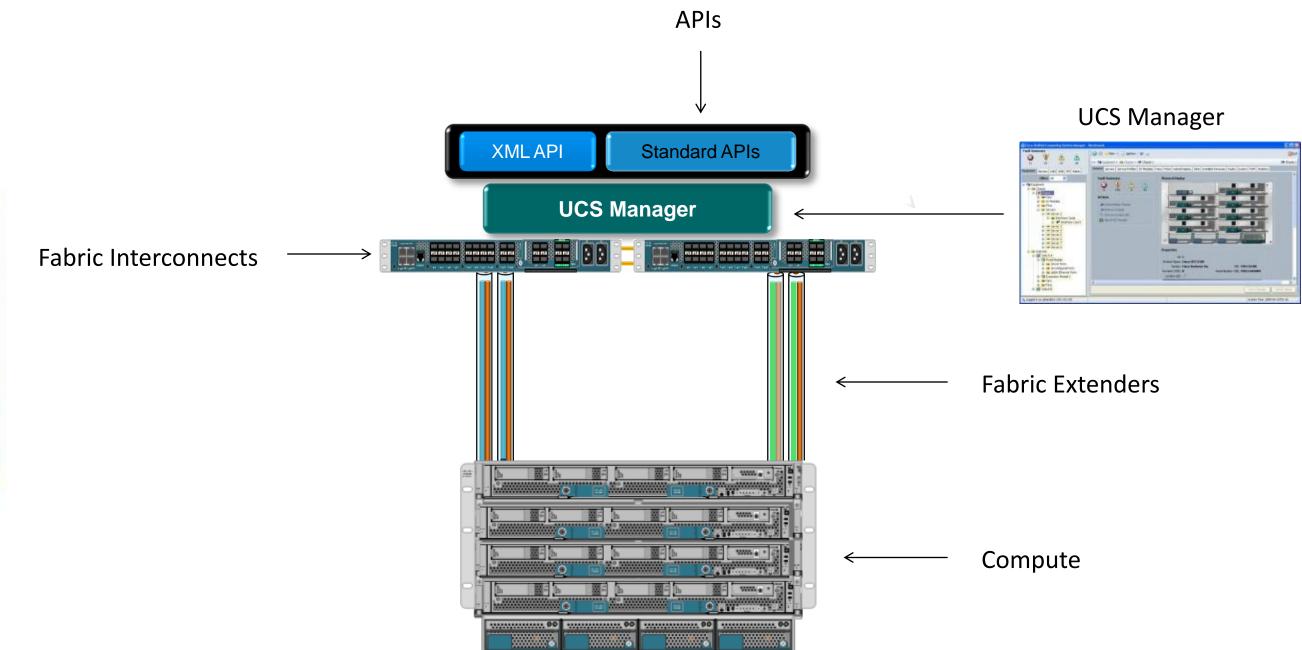
### **Cisco Unified Computing System** LAN Any IEEE Compliant LAN **SANA** Any ANSI T11 Compliant SAN Mgmt **One Logical Chassis** to Manage 160 Servers LAN Connectivity **SAN Connectivity Multiple Chassis** Blade & Rack Servers Server Identity Management Monitoring, Troubleshooting







## **Cisco UCS Architecture**

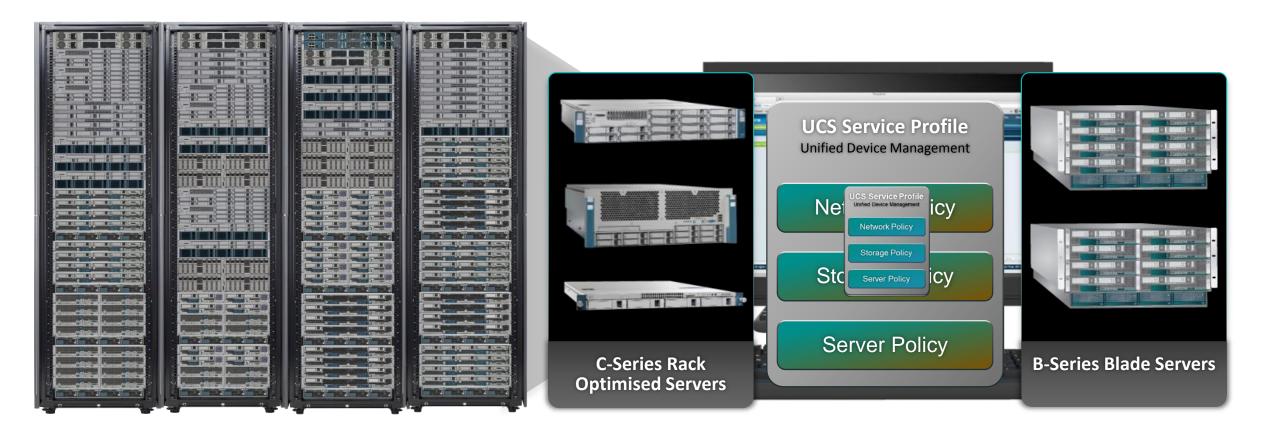




## **Unified Management**

**UCS Manager** 

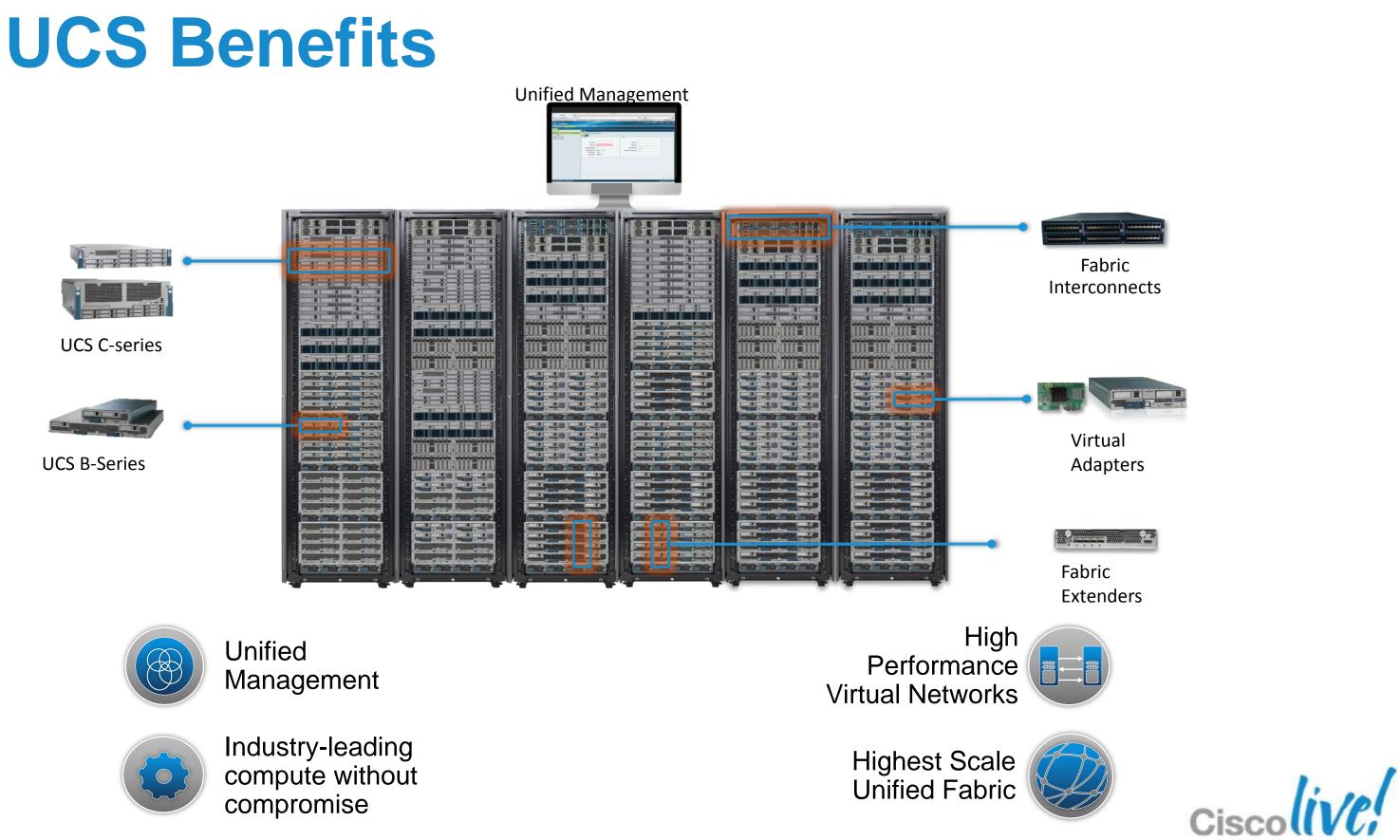
**Unified Management** A Single Unified System For Blade and Rack Servers



- Integral part of UCS system
- Manages all aspects of the UCS
- Single point of management for UCS •

- **Open API** •
- **Integrated Automation** •
- Add capacity without complexity •











```
BRKCOM-1005
```

### **Building Blocks of Cisco UCS** An Integrated System Optimises Data Centre Efficiency

### **UCS Manager**

• Embedded—manages entire UCS Domain

### **Fabric Interconnect**

• 10GE unified fabric switch

### **Chassis IO Module**

Remote line card

### **Blade Server Chassis**

• Flexible bay configurations

### **Blade and Rack Servers**

- x86 industry standard
- Patented extended memory

### I/O Adapters

• Choice of multiple adapters













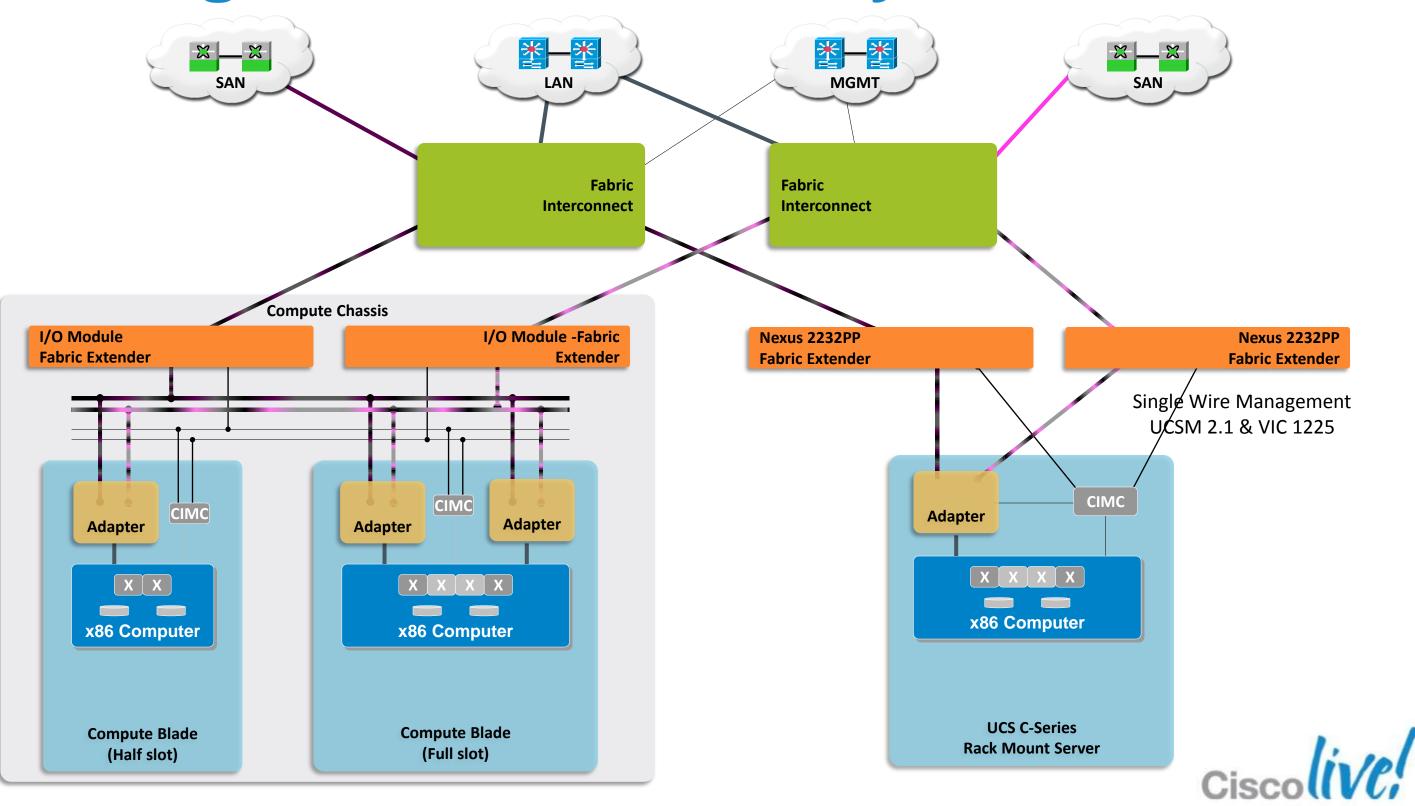








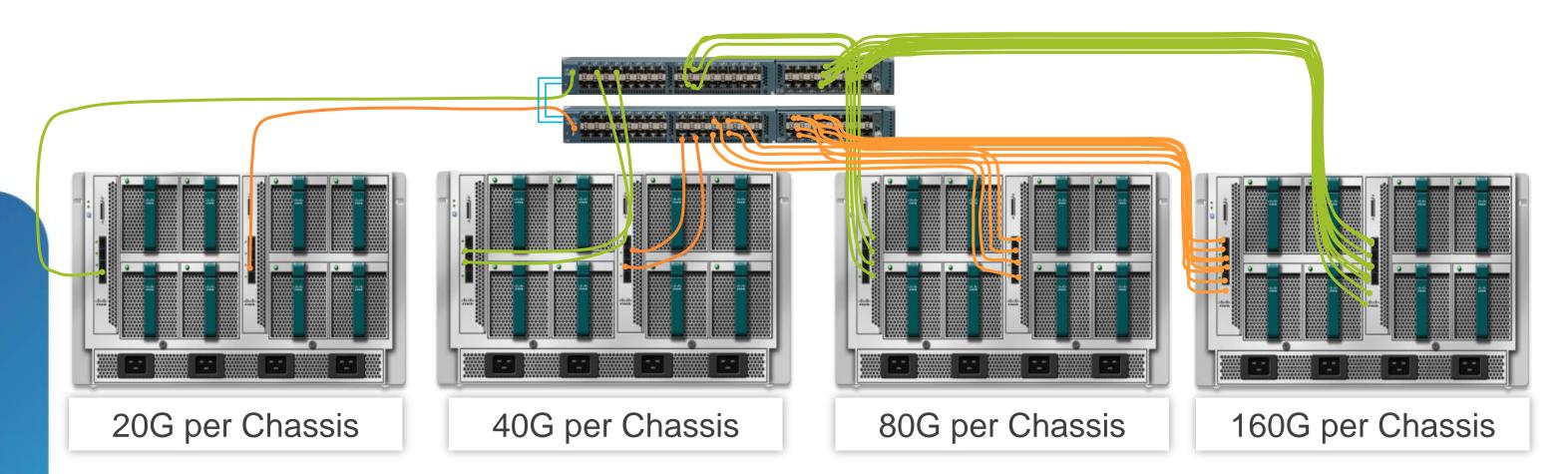
# **Building Block Connectivity**



BRKCOM-1005

© 2013 Cisco and/or its affiliates. All rights reserved.

# Wire for Bandwidth, Not Connectivity



- Wire Once Architecture
- All links can be active all the time
- Policy-driven bandwidth allocation
- Virtual interface granularity

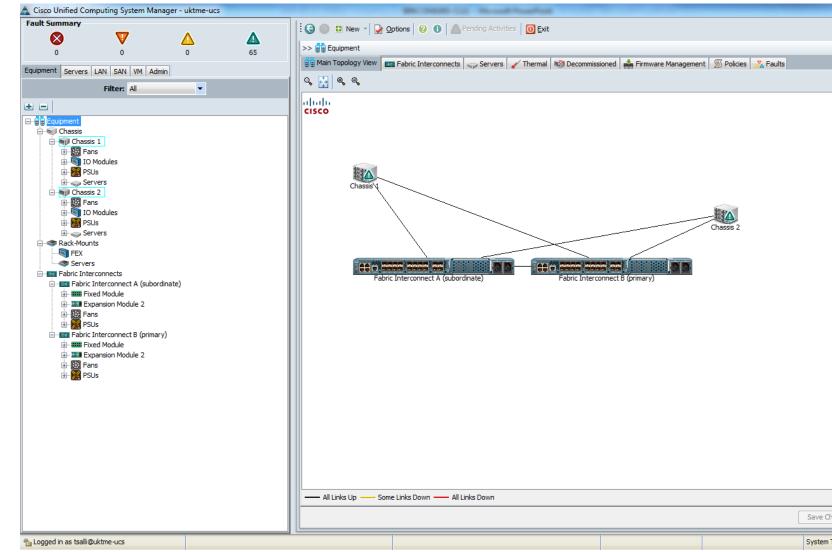
BRKCOM-1005

© 2013 Cisco and/or its affiliates. All rights reserved.





# **Unified Computing System Manager**



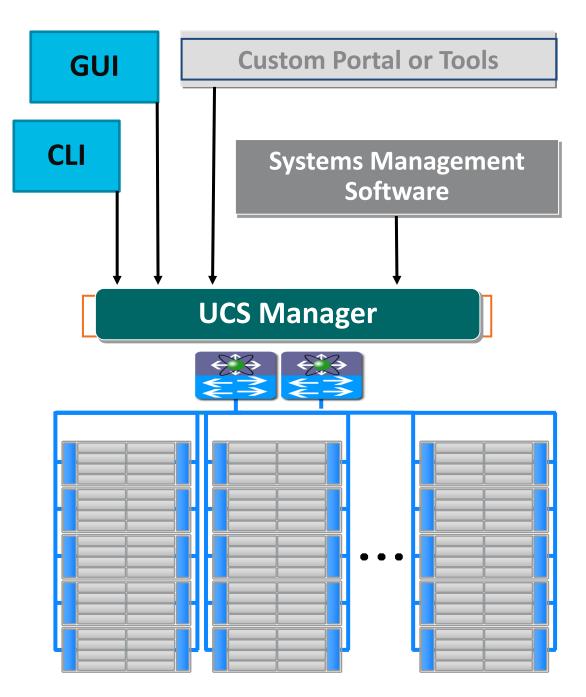
- Embedded device manager for family of UCS components
- Enables stateless computing via Service Profiles
- Efficient scale: Same effort for 1 to N blades
- APIs for integration with new and existing data centre infrastructure

	3
.1 C	isco
Equipme	ent
	-11
Changes Reset Values	
	_





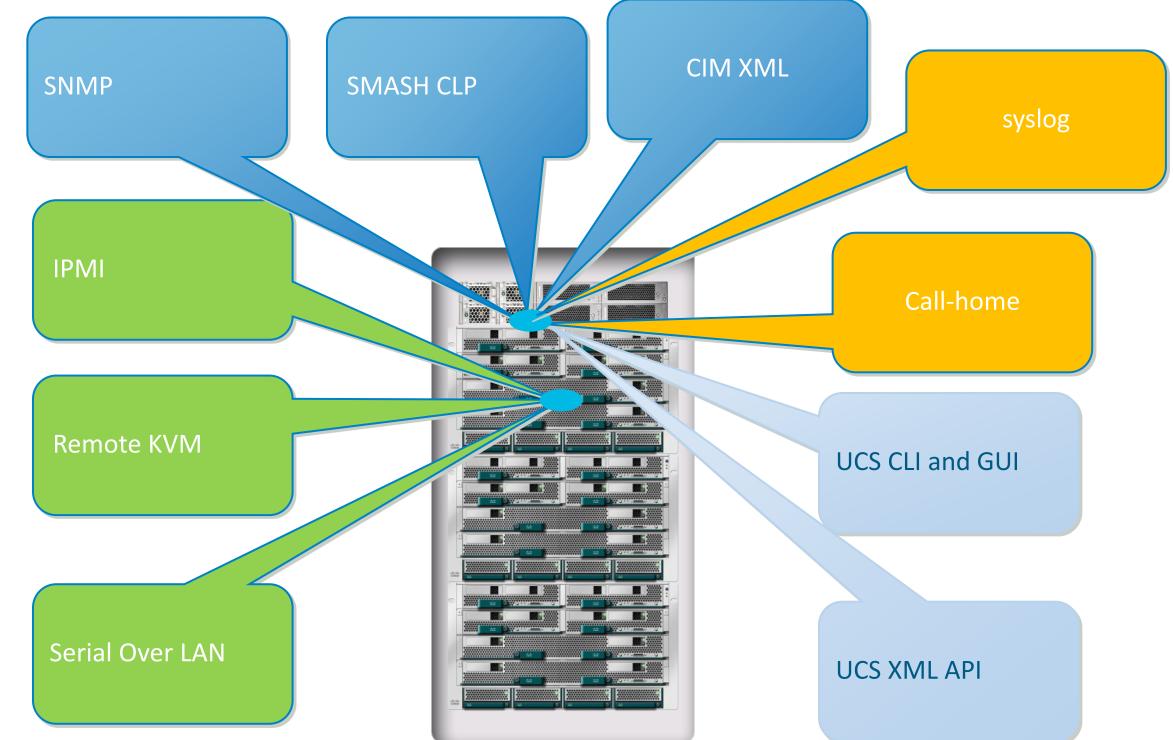
# **UCS Manager**



- Single point of management for UCS system of components
  - -Adapters, blades, chassis, fabric extenders, fabric interconnects
- Embedded device manager
  - -Discovery, Inventory, Configuration, Monitoring, **Diagnostics**, Statistics Collection
  - -Coordinated deployment to managed endpoints
- APIs for integration with new and existing data centre infrastructure
  - -SMASH-CLP, IPMI, SNMP
  - -XML-based SDK for commercial & custom implementations



## **Management Protocols**





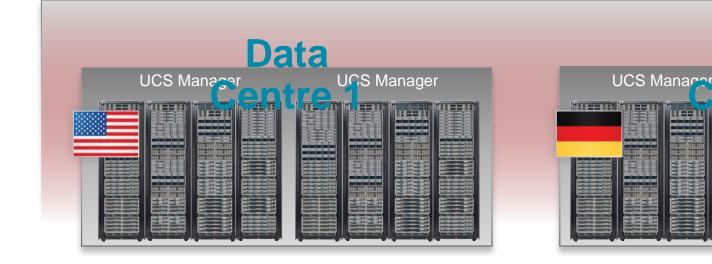
### **UCS Centrale**

### **Multi-UCS Manager**



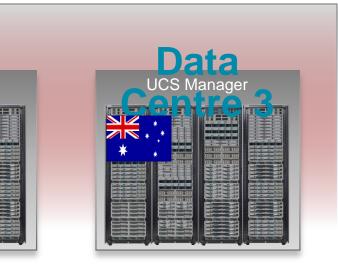
UCS Manager

Data



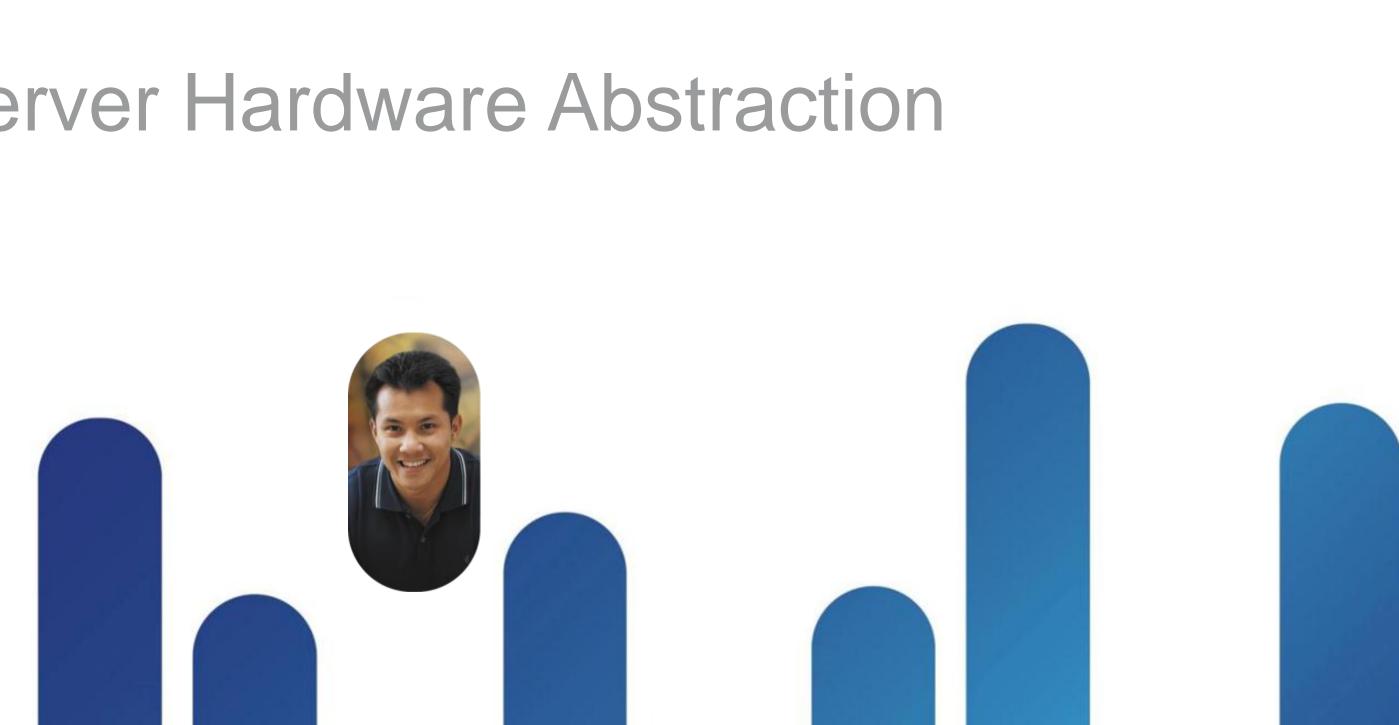
- Unifies management of multi UCS domains
- Leverages UCS Manager technology
- Simplify global operations with centralised inventory, faults, logs, and server consoles
- Delivers global policies, service profiles, ID pools, and templates
- Foundation for high availability, disaster recovery, and workload mobility
- Model based API for large scale automation







## **Server Hardware Abstraction**





# **UCS Technical System Architecture**

### Virtualising More than the Server

One way is to scale out a compute platform on cheap commodity servers and implement services on this platform.

The DC network provides L2/L3 connectivity between compute nodes and end-users. The value is in the APIs the end-user has access to within the compute layer (not network). Built for application developers and Internet companies using web services based applications.

The other is looking ahead and implementing a Next-Gen computing platform

Support Enterprise Class features.

Treating network and compute resources as equally important to scale, secure and provide differentiated services.

Built for Enterprises looking to adapt to Cloud infrastructure automation with option of sharing/bursting IT services to a Cloud Compute Platform.



## What is a "stateless" computing architecture?

- Stateless client computing is where every compute node has no inherent state pertaining to the services it may host.
- In this respect, a compute node is just an execution engine for any application (CPU, memory, and disk – flash or hard drive).
- The core concept of a stateless computing environment is to separate state of a server that is built to host an application, from the hardware it can reside on.
- The servers can easily then be deployed, cloned, grown, shrunk, de-activated, archived, re-activated, etc.





# What is our Unified Computing **Architecture?**

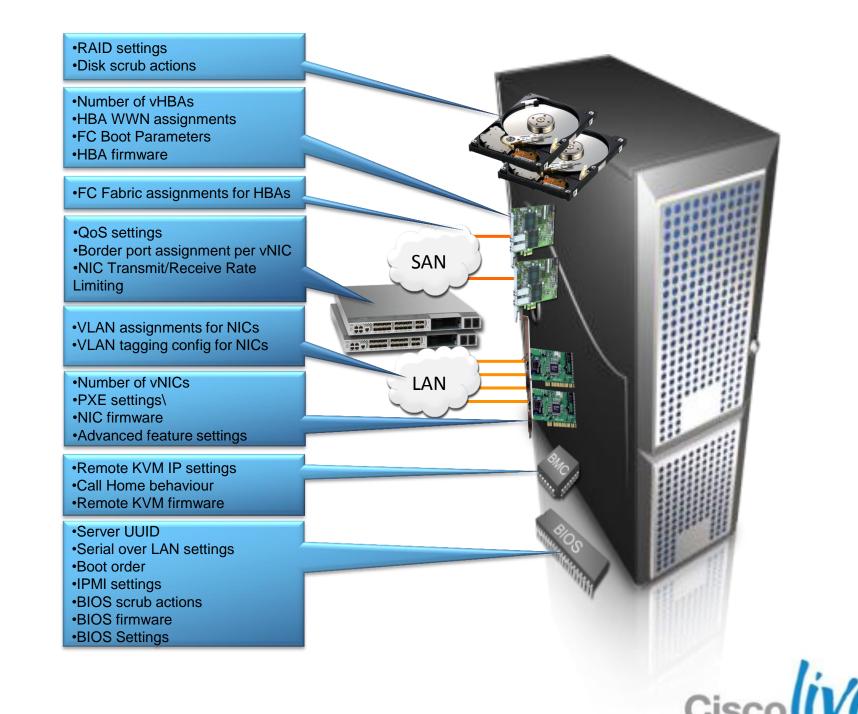
- We start with a data model of the existence, identity, and configuration of a Server and its various sub-components
- We grow this data model to include the upstream I/O needs to include the configuration of the upstream ports that face this server
- We include policies to define groupings of these servers, priorities, security segmentation, and many others
- We probe newly inserted hardware, to classify and get them ready for deployment\* and map these desired server models to the actual hardware when servers are required





### **Traditional Servers** Hardware Centric

- Servers are specifically purchased for applications
- Hardware dictates the identity of the servers
- Management of servers handled individually or through add-on software



### **UCS Technologies for Elasticity** A Traditional Server (Server has state on every host)

- Server Name = vmhost-cluster1-1
- UUID = 12345678-ABCD-9876-5432-ABCDEF123456 (Burned In)
- Description = ESX4-1 Host in Cluster 1
- Network Side LAN Config
  - Adapter PCI Order = PHYSICAL INSERTION TO RISER
  - Number of NIC's = PHYSICAL PRESENCE IN SERVER
  - vNIC0 Switch = PHYSICAL CONNECTION to Switch A
  - vNIC0 VLAN Trunking = Enabled (COORDINATION)
  - vNIC0 Native VLAN = VLAN 100 (COORDINATION)
  - vNIC0 Allowed VLANs = 101,102,103... (COORDINATION)
  - vNIC0 MAC Address = BURNED IN
  - vNIC0 QoS policy = MQC COMMANDS PER PORT
  - vNIC1 Switch = PHYSICAL CONNECTION to Switch B
  - vNIC1 VLAN Trunking = Enabled (COORDINATION)
  - vNIC1 Native VLAN = VLAN 100 (COORDINATION)
  - vNIC1 Allowed VLANs = 101,102,103... (COORDINATION)
  - vNIC1 MAC Address = BURNED IN
  - vNIC1 QoS policy = MQC COMMANDS PER PORT
- Server Side LAN Config
  - vNIC0 Network = PHYSICAL CONNECTION Switch A \*\*
  - vNIC1 Network = PHYSICAL CONNECTION Switch B \*\*
  - Bonding Driver = MANUALLY Setup Intel PROset
  - VLAN Interfaces = MANUALLY Setup Intel PROset for 100,101,102,103,...
  - ESX Networking = MANUALLY Setup multiple vSwitches, VLAN Tags, vCenter PortGroups
- Local Storage = 73GB, 10k RPM, Disk1 73GB, 10k RPM, Disk2
- **RAID = MANUALLY Setup through boot utility**

### SAN Config

- Node ID = BURNED IN
- Adapter PCI Order = PHYSICAL INSERTION TO RISER Adapter Parameters = MANUALLY Setup through boot utility vHBA0 Switch = PHYSICAL CONNECTION to Switch A vHBA0 VSAN = VSAN1-FabricA (COORDINATION) **vHBA0 WWPN = BURNED IN** vHBA1 Switch = PHYSICAL CONNECTION to Switch B vHBA1 VSAN = VSAN1-FabricB (COORDINATION) vHBA1 WWPN = BURNED IN iSCSI Boot Setup? = Option ROM to configure per server Virtual CD-ROM vHBA0, 50:00:16:aa:bb:cc:0a:01, LUN 00, primary (COORDINATION) 3. vHBA1, 50:00:16:aa:bb:cc:0b:01, LUN 00, secondary (COORDINATION)
- Boot order = MANUALLY Setup within the BIOS

4. vNIC0

Mainboard, etc.

Management Firmware Policy = BURNED IN on BMC

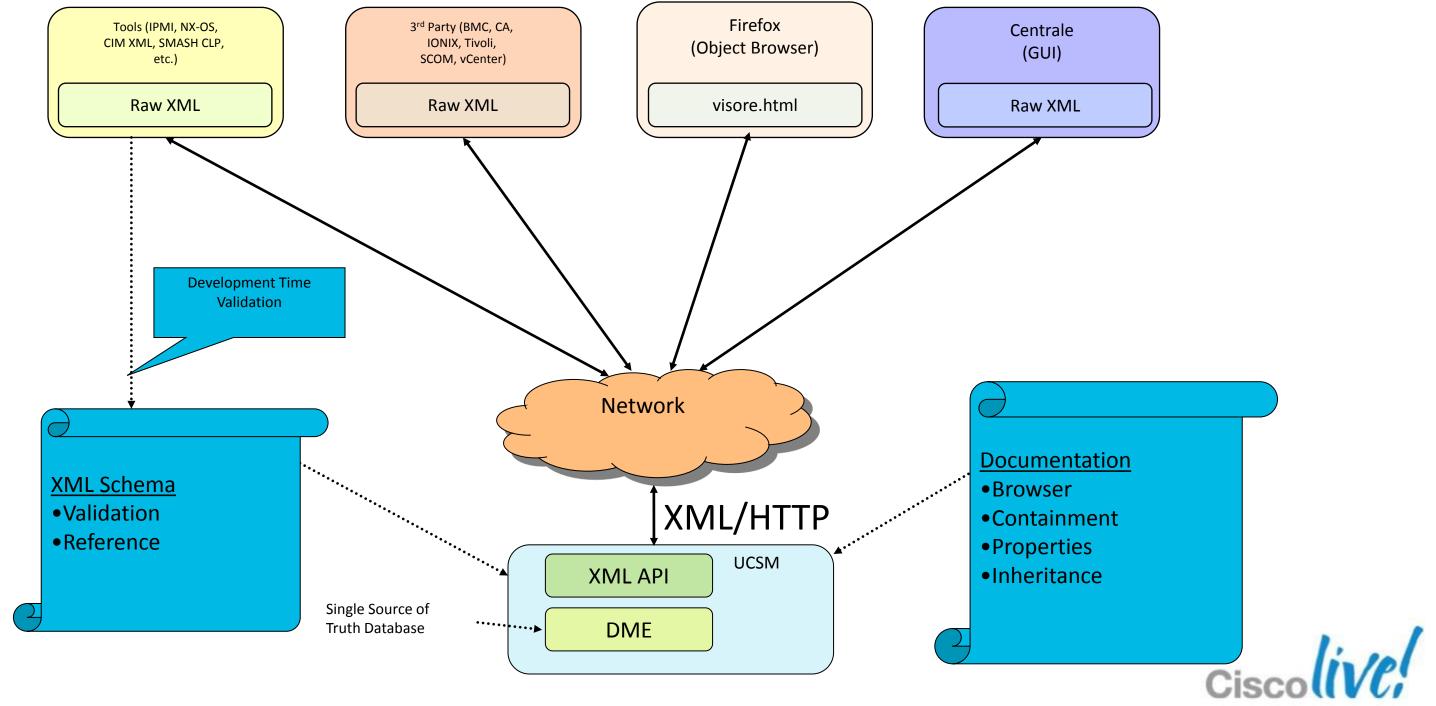
OS Configuration = Create Linux bond.0, or Windows Team

### SAN Connection for Server = HBA PHYSICAL PRESENCE IN SERVER

- Host Firmware = BURNED IN For: Disk Controller, BIOS Version, HBA Option ROM, NIC,
- **IPMI Access = ANYONE ON MANAGEMENT NETWORK**
- Serial-over-LAN access = PHYSICAL CONNECTION OF SERIAL PORT
- Monitoring Threshold Policy = MANUAL THRESHOLDS FOR ALL COMPONENTS
- BIOS Settings = MANUALLY SET FOR ALL CUSTOMISATIONS AND USAGE



## **UCS Technologies for Elasticity** XML Objects are Fundamental

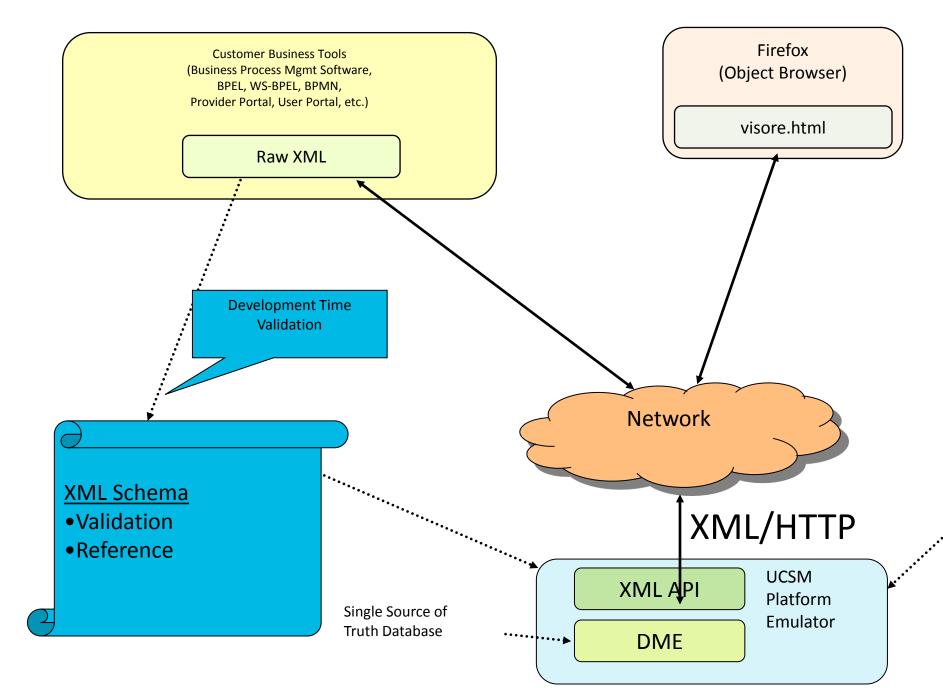


BRKCOM-1005

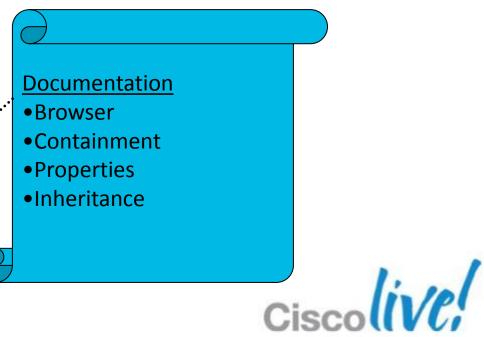
© 2013 Cisco and/or its affiliates. All rights reserved.



## UCS Technologies for Elasticity Open XML Development – No UCS Hardware Required



BRKCOM-1005



Workload Centric

- Servers are specifically purchased for additional capacity and provide service elasticity
- Server identities are defined by the service profile
- Management of servers provided through the very system that defines them (UCSM).

### **Cisco UCS** Service Profile

### 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 OoS **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**





### A UCS Server (not a blade, but an XML object in database)

Server Name = vmhost-cluster1-1

- UUID = 12345678-ABCD-9876-5432-ABCDEF123456 (Burned In)
- Description = ESX4-1 Host in Cluster 1
- Network Side LAN Config
  - Adapter PCI Order = PHYSICAL INSERTION TO RISER \_
  - Number of NIC's = PHYSICAL PRESENCE IN SERVER
  - vNIC0 Switch = PHYSICAL CONNECTION to Switch A \_
  - vNIC0 VLAN Trunking = Enabled (COORDINATION) \_
  - vNIC0 Native VLAN = VLAN 100 (COORDINATION) \_
  - vNIC0 Allowed VLANs = 101,102,103... (COORDINATION) \_
  - vNIC0 MAC Address = BURNED IN
  - vNIC0 QoS policy = MQC COMMANDS PER PORT \_
  - vNIC1 Switch = PHYSICAL CONNECTION to Switch B \_
  - vNIC1 VLAN Trunking = Enabled (COORDINATION) \_
  - vNIC1 Native VLAN = VLAN 100 (COORDINATION) \_
  - vNIC1 Allowed VLANs = 101,102,103... (COORDINATION) \_
  - vNIC1 MAC Address = BURNED IN
  - vNIC1 QoS policy = MQC COMMANDS PER PORT \_
- Server Side LAN Config
  - vNIC0 Network = PHYSICAL CONNECTION Switch A \*\*
  - vNIC1 Network = PHYSICAL CONNECTION Switch B \*\*
  - Bonding Driver = MANUALLY Setup Intel PROset
  - VLAN Interfaces = MANUALLY Setup Intel PROset for 100,101,102,103,...
  - ESX Networking = MANUALLY Setup multiple vSwitches, VLAN Tags, vCenter **PortGroups**
- Local Storage = 73GB, 10k RPM, Disk1 73GB, 10k RPM, Disk2
- **RAID = MANUALLY Setup through boot utility**

### SAN Config

- Node ID = BURNED IN
- Adapter PCI Order = PHYSICAL INSERTION TO RISER Adapter Parameters = MANUALLY Setup through boot utility vHBA0 Switch = PHYSICAL CONNECTION to Switch A vHBA0 VSAN = VSAN1-FabricA (COORDINATION)

- vHBA0 WWPN = BURNED IN
- vHBA1 Switch = PHYSICAL CONNECTION to Switch B
- vHBA1 VSAN = VSAN1-FabricB (COORDINATION)
- **vHBA1 WWPN = BURNED IN**
- iSCSI Boot Setup? = Option ROM to configure per server Virtual CD-ROM vHBA0, 50:00:16:aa:bb:cc:0a:01, LUN 00, primary (COORDINATION) 3. vHBA1, 50:00:16:aa:bb:cc:0b:01, LUN 00, secondary
- Boot order = MANUALLY Setup within the BIOS
- (COORDINATION) vNIC0 4.

Management Firmware Policy = BURNED IN on BMC **IPMI Access = ANYONE ON MANAGEMENT NETWORK** Serial-over-LAN access = PHYSICAL CONNECTION OF SERIAL PORT BIOS Settings = MANUALLY SET FOR ALL CUSTOMISATIONS AND USAGE OS Configuration = Create Linux bond.0, or Windows Team

### SAN Connection for Server = HBA PHYSICAL PRESENCE IN SERVER

Host Firmware = BURNED IN For: Disk Controller, BIOS Version, HBA Option ROM, NIC, Mainboard, etc. Monitoring Threshold Policy = MANUAL THRESHOLDS FOR ALL COMPONENTS



### **UCS Service Profiles** Most Things are Static – what about using templates and pools

- Profile Name = vmhost-cluster1-[#]
- UUID = 12345678-ABCD-9876-5432-[SuffixPool]
- Description = ESX4-1 Host in Cluster 1
- **Network Side LAN Config** 
  - Adapter PCI Order = vNIC0 first, then vNIC1, then vHBA.....
  - Number of NIC's = VMware-Static-NIC-Policy
  - vNIC0 Switch = Switch A
  - vNIC0 Pin Group = SwitchA-pingroupA
  - vNIC0 VLAN Trunking = Enabled
  - vNIC0 Native VLAN = VLAN 100
  - vNIC0 MAC Address = [MAC Pool ESX]
  - vNIC0 Hardware Failover Enabled = No
  - vNIC0 QoS policy = VMware-QoS-policy
  - vNIC1 Switch = Switch B
  - vNIC1 Pin Group = SwitchB-pingroupA
  - vNIC1 VLAN Trunking = Enabled
  - vNIC1 Native VLAN = VLAN 100
  - vNIC1 MAC Address = [MAC Pool ESX]
  - vNIC1 Hardware Failover Enabled = No
  - vNIC1 QoS policy = VMware-QoS-policy
  - Policy for VM vNIC's = 101\_Policy, 102\_Policy, 103\_Policy...
- Server Side LAN Config
  - ESX Networking= VM vNIC tied to Port-Group:
    - 101\_Policy, 102\_Policy, 103\_Policy, etc.
- Local Storage Profile = RAID1
- Scrub Policy = Scrub local disks only

### SAN Config

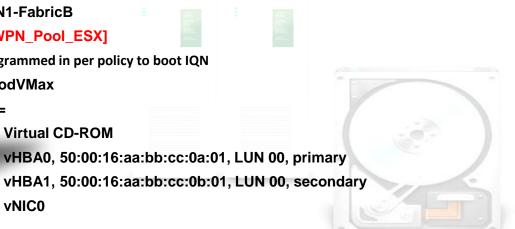
- Node ID = [WWNN\_Pool\_ESX]
- Adapter Parameters = VMware-4-1-BFS
- vHBA0 Switch = Switch A
- vHBA0 VSAN = VSAN1-FabricA
- vHBA0 WWPN = [WWPN\_Pool\_ESX]
- vHBA1 Switch = Switch B
- vHBA1 VSAN = VSAN1-FabricB
- vHBA1 WWPN = [WWPN\_Pool\_ESX]
- iSCSI Boot Setup? = Programmed in per policy to boot IQN
- Boot Policy = boot-from-ProdVMax

1. 2.

4.

### Boot order =

- Virtual CD-ROM
- vNIC0
- Host Firmware Policy = VIC-EMC-vSphere4 Management Firmware Policy = 1-3-mgmt-fw **IPMI** Profile = standard-IPMI Serial-over-LAN policy = VMware-SOL Monitoring Threshold Policy = VMware-Thresholds **BIOS Settings = VMware-IntelVT-Settings** OS Configuration = Create Linux bond.0, or Windows Team





Taking it further, adapters grouped with LAN/SAN config

- Profile Name = vmhost-cluster1-[#]
- UUID = 12345678-ABCD-9876-5432-[SuffixPool]
- **Description = ESX4-1 Host in Cluster 1**
- **Network Side LAN Config** 
  - Adapter PCI Order = vNIC0 first, then vNIC1, then vHBA.....
  - Number of NIC's = VMware-Static-NIC-Policy
  - vNIC0 Adapter Template = [ESX-A-LAN-Fabric]
  - vNIC1 Adapter Template = [ESX-B-LAN-Fabric]
  - Policy for VM vNIC's = 101 Policy, 102 Policy, 103\_Policy...
- Server Side LAN Config
  - ESX Networking= VM vNIC tied to Port-Group: 101\_Policy, 102\_Policy, 103\_Policy, etc.
- Local Storage Profile = RAID1
- Scrub Policy = Scrub local disks only

### **SAN Config**

- Node ID = [WWNN Pool ESX]
- Adapter Parameters = VMware-4-1-BFS
- vHBA0 Adapter Template = [ESX-A-SAN-Fabric]
- vHBA1 Adapter Template = [ESX-B-SAN-Fabric]
- iSCSI Boot Setup? = Programmed in per policy to boot IQN

Boot Poli	icy = boot	t-from-ProdVMax
	Boot	order =
	1.	Virtual CD-ROM
	2.	vHBA0, 50:00:16:
	3.	vHBA1, 50:00:16:
	4.	vNIC0

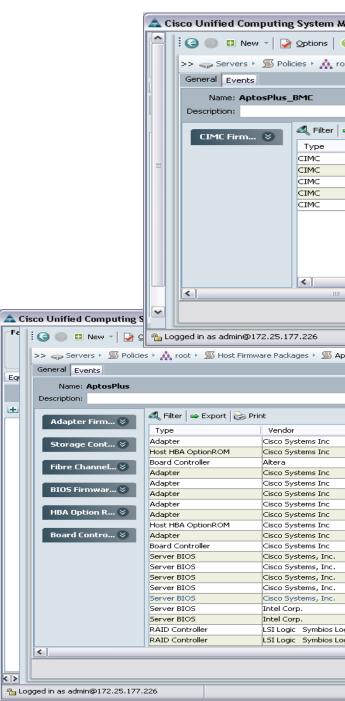
Host Firmware Policy = VIC-EMC-vSphere4 Management Firmware Policy = 1-3-mgmt-fw IPMI Profile = standard-IPMI Serial-over-LAN policy = VMware-SOL Monitoring Threshold Policy = VMware-Thresholds **BIOS Settings = VMware-IntelVT-Settings** OS Configuration = Create vSwitch active/active setups

:aa:bb:cc:0a:01, LUN 00, primary :aa:bb:cc:0b:01, LUN 00, secondary



Centralised Firmware Management

- Complete control of firmware that is qualified for use per application that will be running
- Various Components
  - Management Controller
  - BIOS
  - Option ROM
  - RAID Controller
  - NIC's
  - HBA's
  - Main Board
- Pulled into a profile or a profile template
- Allows for removing the firmware state on server
  - Easier automation possible



lanag	ger - UCS-TME-	LAB			-				
0	- [0] <u>E</u> xit					alialia cisco			
	_								
oot 🕨 .	写 Management F	irmware Pack	kages 🕨 🦻	🖇 AptosPlus_BM	10	s			
				_					
Exp	oort 😹 Print								
L V	endor	Model	1	Presence	Version				
- 1	co Systems Inc	N20-B6620	1-1	present	1.3(1c)				
_	co Systems Inc	N20-B6620		present	1.3(1c)				
_	co Systems Inc	N20-B6625		present	1.3(1c)				
_	co Systems Inc	N20-B6625		present	1.3(1c)				
Cis	co Systems Inc	N20-B6740	)-2	present	1.3(1c)				
						>			
			S	ave Changes	Reset Va	lues			
otosPlu:	s		Sy	/stem Time: 201	0-07-27T09:3	0 .:i		🗐 Apto	cise
tosPlu	s		Sy	vstem Time: 201	0-07-27T09:3	0,;;		🗐 Apto	CIS
tosPlu:						0,,;;			sPlu:
:osPlu:	Model		Presence	e Vers	ion	0			
tosPlus	Model N20-AQ0002		Presenc	:e Vers 1.3(1	ion c)	0			sPlu:
:osPlu:	Model N20-AQ0002 N20-AE0002		Presend present present	:e Vers 1.3(1 5.03,	ion c) 48				sPlu:
tosPlu:	Model N20-AQ0002		Presenc	:e Vers 1.3(1 5.03, 8440	ion c)				sPlu:
:osPlu:	Model N20-AQ0002 N20-AE0002 N20-B6740-2		Presenc present present present	:e Vers 1.3(1 5.03, 8440	ion .c) 100C-84402000 7.12.1				sPlu:
osPlu	Model N20-AQ0002 N20-AE0002 N20-B6740-2 N20-B6740-2 N20-AB0002		Presence present present present present	:e Vers 1.3(1) 5.03 8440 5.2.7	ion c) 48 100C-B4402000 102C-B4402000 .12.1 .c)				sPlu:
osPlu	Model N20-AQ0002 N20-AE0002 N20-B6740-2 N20-AB0002 N20-AE0002 N20-AE0002 N20-AE0102		Present present present present present present present	re Vers 1.3(1 5.03, 8440 5.2.7 1.3(1 1.3(1 2.70)	ion .c) 48 100C-B4402000 .12.1 .c) .c) .c) 2.200.1702				sPlu:
:osPlu:	Model N20-AQ0002 N20-AE0002 N20-B6740-2 N20-AB0002 N20-AC0002 N20-AE0002 N20-AE0102 N20-AE0102		Present present present present present present present present	te Vers 1.3(1 5.03) 8440 5.2.7 1.3(1 1.3(1 1.3(1) 2.70 2.1.6	ion .c) 48 100C-B440200 '.12.1 .c) .c)				sPlu:
:osPlu:	Model N20-AQ0002 N20-AE0002 N20-B6740-2 N20-B6740-2 N20-A60002 N20-AC0002 N20-AC0002 N20-AE0102 N20-AE0102 N20-AI0102 N20-AQ0002		Present present present present present present present present present	te Vers 1.3(1 5.03, 8440 5.2.7 1.3(1 1.3(1 1.3(1 2.70) 2.1.6 2.02	ion c) 48 100C-B4402000 .12.1 c) c) c) 2.200.1702 0.1.1				sPlu:
tosPlu	Model N20-AQ0002 N20-B6740-2 N20-AB0002 N20-AC0002 N20-AC0002 N20-AE0002 N20-AE0002 N20-AQ002 N20-AQ002 N20-AQ002		Present present present present present present present present present present	e Vers 1.3(1 5.03) 8440 5.2.7 1.3(1 1.3(1 2.70 2.1.6 2.02 01.0	ion .c) 48 100C-B4402000 7.12.1 .c) .c) 2.200.1702 50.1.1 1.81	6			sPlu:
cosPlu	Model           N20-AQ0002           N20-AE0002           N20-B6740-2           N20-AB0002           N20-AC0002           N20-AE0002           N20-AE0102           N20-AE0102           N20-AE0102           N20-AE0102           N20-AE0102           N20-AE0102           N20-AE0102           N20-AE0102           N20-AE0102           N20-AQ0102           N20-B6740-2		Present present present present present present present present present present	re Vers 1.3(1 5.03, 8440 5.2.7 1.3(1 1.3(1 2.70, 2.1.6 2.02 01.0 8440	ion .c) 48 100C-B440200 .12.1 .c) .c) 2.200.1702 0.1.1 1.81 100C-B440200	6			sPlu:
cosPlu	Model N20-AQ0002 N20-AE0002 N20-AE0002 N20-AE0002 N20-AE0002 N20-AE0102 N20-AE0102 N20-AE0102 N20-AQ0002 N20-AQ0002 N20-AQ0102 N20-B6740-2 N20-B6740-2		Present present present present present present present present present present present present	te Vers 1.3(1) 5.03 B440 5.2.7 1.3(1) 1.3(1) 2.70 2.1.6 2.02 010 B440 S550	ion .c) 48 100C-84402000 7.12.1 .c) 2.200.1702 50.1.1 1.81 100C-84402000 0.1.3.1c.0.052	6 6 6 020101544			sPlu:
cosPlus	Model           N20-AQ0002           N20-AE0002           N20-B6740-2           N20-B6740-2           N20-AE0002           N20-AE0002           N20-AE0002           N20-AE0102           N20-AE0102           N20-AE0102           N20-AE0102           N20-AE0102           N20-AE0102           N20-AE0102           N20-AQ0002           N20-B6740-2           N20-B6620-1           N20-B6620-2		Present present present present present present present present present present present present	te Vers 1.3(1 5.03, 8440 5.2.7 1.3(1 1.3(1 2.70 2.1.6 2.02 01.0 8440 5550 5550	ion c) 48 100C-B4402000 (12.1 c) c) c) 0.1.1 100C-B4402000 0.1.3.1c.0.052 0.1.3.1c.0.052	6 6 020101544 020102031			sPlu:
osPlus	Model N20-AQ0002 N20-AE0002 N20-AE0002 N20-AE0002 N20-AE0002 N20-AE0102 N20-AE0102 N20-AE0102 N20-AQ0002 N20-AQ0002 N20-AQ0102 N20-B6740-2 N20-B6740-2		Present present present present present present present present present present present present	e Vers 1.3(1 5.03) 8440 5.2.7 1.3(1 1.3(1 2.70 2.1.6 2.02 01.0 8440 5550 5550 5550	ion .c) 48 100C-84402000 7.12.1 .c) 2.200.1702 50.1.1 1.81 100C-84402000 0.1.3.1c.0.052	6 6 020101544 020102544		· · · · · · · · · · · · · · · · · · ·	sPlu:
osPlus	Model N20-AQ0002 N20-B6740-2 N20-B6740-2 N20-B6740-2 N20-AC0002 N20-AC0002 N20-AC0002 N20-AE0102 N20-AI0102 N20-AQ0102 N20-AQ0102 N20-AQ0102 N20-B6620-1 N20-B6620-1 N20-B6625-1		Present present present present present present present present present present present present present present present	e Vers 1.3(1 5.03 8440 5.2.7 1.3(1 1.3(1 2.700 2.1.6 2.02 01.0 8440 5550 5550 5550	ion .c) 48 100C-84402004 .i2.1 .c) .c) .2.200.1702 .i0.1.1 1.81 100C-84402000 0.1.3.1c.0.052 0.1.3.1c.0.052	6 6 0220101544 0220101544 0220101544		· · · · · · · · · · · · · · · · · · ·	sPlu:
osPlus	Model           N20-AQ0002           N20-AE0002           N20-B6740-2           N20-AE0002           N20-AE0002           N20-AE0002           N20-AE0002           N20-AE0002           N20-AE0002           N20-AE0002           N20-AE0002           N20-AE0102           N20-AE0102           N20-AE0102           N20-AE0102           N20-AQ0102           N20-B6620-1           N20-B6620-2           N20-B6625-1           N20-B6625-2		Present present present present present present present present present present present present present present present	te Vers 1.3(1) 5.03 B440 5.2.7 1.3(1) 2.70 2.1.6 2.02 01.0 B440 5550 5550 5550 5550 8440	ion .c) 48 100C-B440200 7.12.1 .c) .c) .c) 2.200.1702 60.1.1 1.81 100C-B440200 0.1.3.1c.0.052 0.1.3.1c.0.052 0.1.3.1c.0.052	6 6 020101544 020102031 020102031 020102031 50720101840		· · · · · · · · · · · · · · · · · · ·	sPlu:
cosPlus	Model           N20-AQ0002           N20-AE0002           N20-AE0002           N20-AB0002           N20-AB0002           N20-AE0002           N20-AQ0102           N20-B6740-2           N20-B6620-1           N20-B6625-1           N20-B6625-1           N20-B6625-1           N20-B66740-2		Present present present present present present present present present present present present present present present present present present	te Vers 1.3(1 5.03, B440 5.2.7 1.3(1 1.3(1 2.70 2.1.6 2.02 01.0 B440 S550 S550 S550 B440 S550	ion .c) 48 100C-84402000 7.12.1 .c) 2.200.1702 50.1.1 1.81 100C-84402000 0.1.3.1c.0.052 0.1.3.1c.0.052 0.1.3.1c.0.052 M1.1.3.1a.0.05	6 020101544 020102031 020102031 020102031 020102031 020102031 020101544			sPlu:
	Model N20-AQ0002 N20-AE0002 N20-B6740-2 N20-B6740-2 N20-AE0002 N20-AE0002 N20-AE0102 N20-AE0102 N20-AQ0002 N20-AQ0002 N20-AQ0002 N20-AQ0002 N20-B6740-2 N20-B6740-2 N20-B6625-1 N20-B6625-2 N20-B6740-2 N20-B6740-2 N20-B6740-2	60	Present present present present present present present present present present present present present present present present present present	e Vers 1.3(1 5.03) 8440 5.2.7 1.3(1 1.3(1 2.70 2.1.6 2.02 01.0 8440 S550 S550 S550 8440 S550 8440 S550	ion c) 48 100C-B4402000 12.1 c) c) c. 0.1.1 100C-B4402000 0.1.3.1c.0.052 0.1.3.1c.0	6 020101544 020102031 020101544 020102031 020101544 020102031			sPlu:
gic	Model N20-AQ0002 N20-B6740-2 N20-B6740-2 N20-A60002 N20-AC0002 N20-AC0002 N20-AC0002 N20-A00102 N20-A00102 N20-A00102 N20-AQ0102 N20-B6620-1 N20-B6620-1 N20-B6625-1 N20-B6625-1 N20-B6625-2 N20-B6620-1 N20-B6620-1 N20-B6620-1		Present present	e Vers 1.3(1 5.03 8440 5.2.7 1.3(1 1.3(1 2.70 2.11 2.02 01.0 8440 5550 5550 5550 8440 8450 8550	ion .c) 48 100C-84402004 .i2.1 .c) .c) .2.200.1702 .i0.1.1 100C-84402004 0.1.3.1c.0.052 0.1.3.1c.0.052 0.1.3.1c.0.052 0.1.3.1c.0.052 0.1.3.1c.0.052 0.1.3.1c.0.052 0.1.3.1c.0.052	6 6 020101544 020102031 020102031 50720101544 020102031 50720101544 020102031 020102031 020102031			sPlu:
	Model           N20-AQ0002           N20-AE0002           N20-B6740-2           N20-AE0002           N20-AE0002           N20-AE0002           N20-AE0002           N20-AE0002           N20-AE0002           N20-AE0102           N20-AE0102           N20-AE0102           N20-AE0102           N20-AE0102           N20-AQ0102           N20-B6620-1           N20-B6620-1           N20-B6625-2           N20-B6620-1           N20-B6620-1           N20-B6620-1           N20-B6620-2           LSI MegaSAS 92		Present present	e Vers 1.3(1 5.03 8440 5.2.7 1.3(1 1.3(1 2.70 2.11 2.02 01.0 8440 5550 5550 5550 8440 8450 8550	ion .c) 48 100C-B4402000 7.12.1 .c) .c) 2.200.1702 30.1.1 1.81 100C-B4402000 0.1.3.1c.0.052 0.1.3.	6 6 020101544 020102031 020102031 50720101544 020102031 50720101544 020102031 020102031 020102031			CISH osPlu:
	Model           N20-AQ0002           N20-AE0002           N20-B6740-2           N20-AE0002           N20-AE0002           N20-AE0002           N20-AE0002           N20-AE0002           N20-AE0002           N20-AE0002           N20-AE0102           N20-AE0102           N20-AE0102           N20-AE0102           N20-AQ0102           N20-B6620-1           N20-B6620-2           N20-B6625-1           N20-B6620-1           N20-B6620-1           N20-B6620-2           LSI MegaSAS 92           SAS1064E PCI-E		Present present	e Vers 1.3(1 5.03 8440 5.2.7 1.3(1 1.3(1 2.70 2.11 2.02 01.0 8440 5550 5550 5550 8440 8450 8550	ion .c) 48 100C-B4402000 7.12.1 .c) .c) 2.200.1702 30.1.1 1.81 100C-B4402000 0.1.3.1c.0.052 0.1.3.	6 6 020101544 020102031 020102031 50720101544 020102031 50720101544 020102031 020102031 020102031	.00.00		
	Model           N20-AQ0002           N20-AE0002           N20-B6740-2           N20-AE0002           N20-AE0002           N20-AE0002           N20-AE0002           N20-AE0002           N20-AE0002           N20-AE0002           N20-AE0102           N20-AE0102           N20-AE0102           N20-AE0102           N20-AQ0102           N20-B6620-1           N20-B6620-2           N20-B6625-1           N20-B6620-1           N20-B6620-1           N20-B6620-2           LSI MegaSAS 92           SAS1064E PCI-E		Present present	e Vers 1.3(1 5.03 8440 5.2.7 1.3(1 1.3(1 2.70 2.11 2.02 01.0 8440 5550 5550 5550 8440 8450 8550	ion .c) 48 100C-B4402000 7.12.1 .c) .c) 2.200.1702 30.1.1 1.81 100C-B4402000 0.1.3.1c.0.052 0.1.3.	6 6 020101544 020102031 020102031 0020102031 50720101810 0020102031 0020102031 0020102031 00,00003.12 Save Char	.00.00		

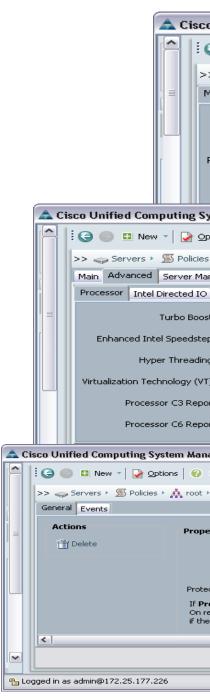


**BIOS and RAID Controller Management** 

- Complete control of BIOS settings
  - All pertinent fields are configurable in a BIOS policy
  - When profile is associated, the BIOS settings are also matched to the preference of the application

### Complete control of RAID settings

- RAID configuration can be setup on a profile basis
- RAID can be protected if a profile application to an existing RAID server, can raise exception rather than applying
- Allows for removing the low-level configuration state on server
  - Easier automation possible



o Unified Computing System Manager - UCS-TME-LAB 📃 🗖 🔀
G 💿 🗳 New 👻 🛃 Options   🚱 🕕 🚺 🚺 Exit
>> 🥪 Servers 🕨 🗐 Policies 🕨 💑 root 🕨 🚿 BIOS Policies 🕨 🗐 VMW-ESX-NoQuiet
Main Advanced Server Management Events
Name: VMW-ESX-NoQuiet
Quiet Boot: 💿 disabled 🔵 enabled 🔵 platform-default
Resume Ac On Power Loss: 🔵 stay-off 💿 last-state 🔵 reset 🔵 platform-default
Front Panel Lockout: Odisabled O enabled O platform-default
system Manager - UCS-TME-LAB
ptions ? 1 0 Exit
s 👌 📩 root 🕨 🗐 BIOS Policies 🕨 🗐 VMW-ESX-NoQuiet 🛛 🔹 System Time
anagement Events
RAS Memory
st: 🔿 disabled 💿 enabled 🔿 platform-default
ep: 🔿 disabled 💿 enabled 🔿 platform-default
ng: 🔿 disabled 💿 enabled 🔿 platform-default
T): Odisabled O platform-default
ort 🕜 disabled 🔿 acpi-c2 🔿 acpi-c3 💿 platform-default
ort Odisabled Oenabled Oplatform-default
nager - UCS-TME-LAB
Exit
S Local Disk Config Policies     S Lo
erties
Name: default
Description: Mode: Any Configuration
ect Configuration
rotect Configuration parts
reassociation of the RAID 1 Mirrored will be raised
RAID 0 Striped
RAID 6 Scriped Dual Parity
Reset Values
System Time: 2010-07-27T09:38



Boot and Server Disassociate Management

- Complete control of system boot policy separate from the BIOS settings
  - PXE, FC SAN boot today
  - iSCSI boot soon
  - Virtual media (CDROM, .iso, USB, floppy)
- Complete control of how to return a server to the infrastructure when no longer required
  - Called "Scrub Policy"
  - Optionally clear BIOS settings
  - Optionally wipe local disk boot sector and table
- Allows for removing the low-level configuration state on server
  - Easier automation possible



n Manager - UCS-TME-LAB	Z
😯 🕕   💽 Exit	alialia cisco
a root ト 写 Boot Policies ト 🗐 Boot Policy SANboot	🔊 Boot Policy SANboot
Nboot	
]	
ces will always cause a reboot on non-virtualized adapters.	
]	
s not indicate a boot order presence.	
s within the same device class (LAN/Storage) is determined by PCIe bus scan order. selected and the vNIC/vHBA does not exist, a config error will be reported.	
As are selected if they exist, otherwise the vNIC/vHBA with the lowest PCIe bus scar	n order is used.
Boot Order	
Name Order vNI Type Lun ID	WWN E
Storage 2	
Image: SAN primary     fc0     primary       Image: SAN Target primary     primary     0	50:0A:09:81:87:99:99:C9
printing of printigenet of prinining of printing of printing of printig	30.04.09.01.07.99.99.09
3	
🔺 Moye Up 🔍 Moye Down 👕 Dele	
	Save Changes Reset Values
Computing System Manager - U 😑 🗖 🔀 🔛	System Time: 2010-07-27T09:48
New 👻 🌛 Options 🛛 😧 🕕 🚺 🔯 Exit 💦 diada	
s 🕨 🗐 Policies 🕨 🎄 root 🕨 写 Scrub Policies 🕨	
nts	
es	
Name: default	
Description:	
Disk Scrub: 💿 no 🔵 yes	
tings Scrub: 💽 no 🔵 yes	
Save Changes Reset Values	
@172.25.177.226	
	line
	11 00

Ciscol

Initial Service Profile Templates

- Default mode if customer using templating
- Create 1 or more profiles from template
  - Can later create more when needed
- Draw 1 or more entries from pools of server unique template data
  - UUID, MAC, WWN, etc.
  - When profile is created
- Administrator or XML API can then modify configuration of profile
  - Used functionally as a starting-point
  - Shows as bound to initial template (record of origin)
- Ability to extrapolate a given profile into an initial template for future use
- Local disk implies state, Boot from SAN or iSCSI is stateless
  - Boot and Data images can stay on SAN storage for when needed





BRKCOM-1005

### Template

**ESX-DRS-Node** UUID, MAC, WWN Boot info firmware LAN, SAN Config Firmware...

> **One-Time** Instantiation

ESX-DRS-Node2 UUID, MAC, WWN **Boot** info firmware LAN, SAN Config Firmware... Profile

Updating Service Profile Templates

- Method to coordinate changes over groups of servers
- Create 1 or more profiles from template
  - Can later create more when needed
- Draw 1 or more entries from pools of server unique template data
  - UUID, MAC, WWN, etc.
  - When profile is created
- Administrator or XML API can then modify configuration of profile
  - Shows as bound to updating template (proof of tie)
  - No ability to modify the profiles directly
- Ability to extrapolate a given profile into an updating template for future use
- Later changes to template are propagated to profiles
  - Understanding of service impacting changes key





### Template

**ESX-DRS-Node** UUID, MAC, WWN Boot info firmware LAN, SAN Config Firmware...

> **Real-Time** Synchronisation

ESX-DRS-Node2 **UUID, MAC, WWN Boot** info firmware LAN, SAN Config Firmware... Profile

### **UCS Hardware Resources Server Pools**

eate Server Pool	Add Servers
<ol> <li><u>Set Name and Description</u></li> <li><u>Add Servers</u></li> </ol>	Servers         Pioled Servers           Chassis ID         Slot ID         PID         Adapter         Serial         Cores En         Chassis         Slot ID         PID         Adapter         Serial         Cores E           1         2         N20-B662         N20-AC0002         QCI1308         8         Image: Cores E         Chassis         Slot ID         PID         Adapte         Serial         Cores E           1         4         N20-B662         N20-Ad0002         QCI1308         8         Image: Cores E         1         1         N20-B66         QCI1407         8           2         2         N20-B662         N20-Ad0002         QCI1410         8         Image: Cores E         1         N20-B66         QCI1407         8           2         3         N20-B662         N20-Ad0002         QCI1410         8         Image: Cores E         Im
	Model:

- Method of pulling physical blades into server pool shown
- Can be any blade on any chassis, or rack-mount pooled together



# **UCS Hardware Resources**

### Server Pool Qualification Policies

Create Server Pool Policy Qualific	ation 🛛	
reate Server Pool Poli	cy Qualification 0	
Naming Name:		Create CPU/Co
Description:		Create CPL
Actions	ly to new or re-discovered servers. Existing servers are not qualified until they are re-discovered Qualifications	Processor Architect Min Number of Co
Create Adapter Qualifications	🛨 🖃 🔍 Filter   ⇔ Export   📚 Print	Min Number of Threa
Create Chassis/Server Qualifications	Name Max Model From To Architect Speed Stepping	CPU Speed (MI
Create CPU/Cores Qualifications		
E Create Server Model Qualifications		
	OK Cancel	

- As hardware added into UCS, it can be automatically added to pools to offer SLA's
  - By chassis/slot/organisation for ownership of hardware
  - Qualified by this policy, and made available to users as unconfigured device in the appropriate pool
- Method to select minimums for hardware pool candidates
- Server pool policy to map pools to minimal qualifiers

Jalifi res

	🛕 Create Mei	nory Qualifications						
	Create N	lemory Quali	fications		0			
	Clock (MHz):	unspecified	Latency (ns):	unspecified				
	Min Cap (MB):	unspecified	Max Cap (MB):	unspecified				
	Width:	unspecified	Units:	unspecified				
cations					Cancel			
Qua	alifications	;		0				
	-	Model (RegEx):		_				
ied		Max Number of Cores:	unspecified					
ied		Max Number of Threads:	unspecified					
ied		CPU Stepping:	unspecified					
			ОК	Cancel				
	Create Ada	pter Qualificatio	ns					
6	Create A	dapter Qua	alificatio	ons 🥝				
	т	notected-et	h_if	-				
	Type: protected-eth-if							
		ity: unspecified						
					_			
			ОК	Cancel	J			



### UCS Operations Invoking a UCS Server

### If Single Profile and Single Compute Instance

- Administrator or XML API invokes association
- Administrator or XML API assigns server power state
- Administrator or XML API stops server
- Administrator of XML API dissolves association

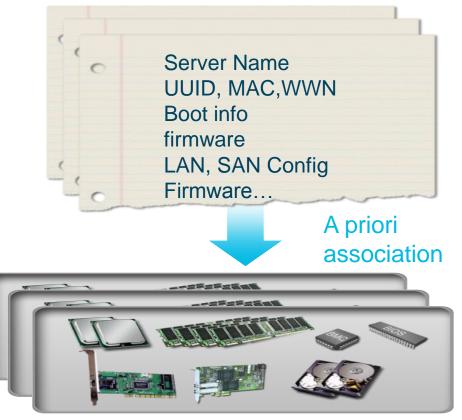
### If Servers are Pooled

- Administrator or XML API invokes association to pool
- Administrator or XML API then functions as above

### If Service Profile Templates and Pools

- Administrator or XML API defines number of servers required and the desired power states
- UCS system, assigns profiles to available compute in the pool (which has been classified before the fact)
- Administrator or XML API then administers individual servers as above, but configuration is bound to template

### Service Profile XML Objects



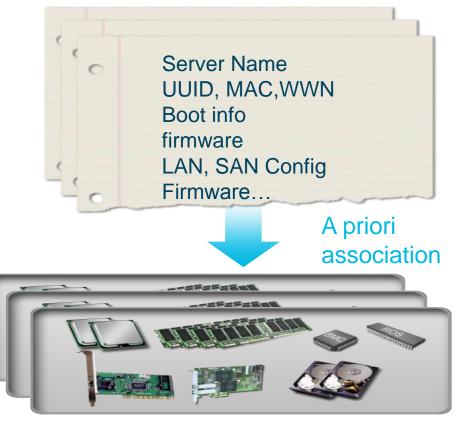
**Pools of Physical Server Resources** 



### **UCS** Operations Invoking a UCS Server (Continued)

- At profile assignment time
  - Blades take on configuration via processing node utility OS configuration run, LAN and SAN edge configured
- We are "informing" the stateless compute node of who it is, along with the network and SAN edge that the server connects to
- We have the XML object in the UCS database
  - Examinations of server configurations grouped
  - No CMDB interaction with bare-metal server
- With updating templates, we have a "bound" relationship where profiles are guaranteed to be matching the template
  - Audit the template, and show bound profiles
  - Reduced audit scope from a server hardware perspective

### Service Profile XML Objects



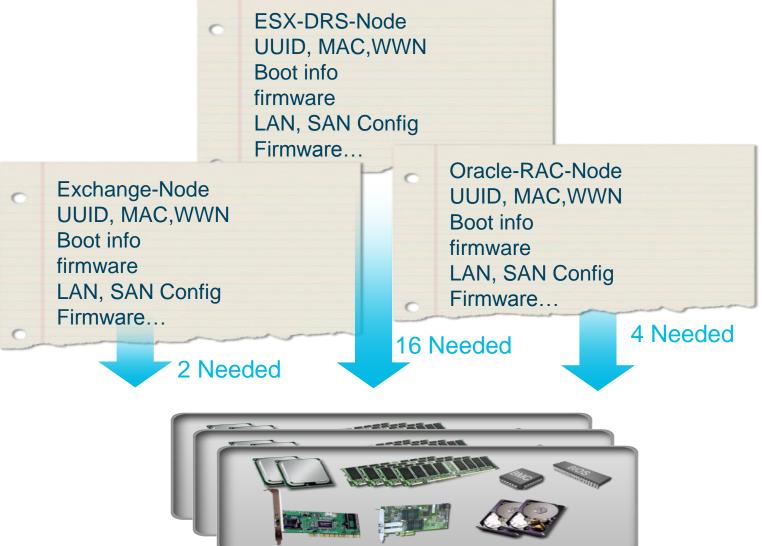
### **Pools of Physical Server Resources**



## **UCS Operations**

Infrastructure Automation from Profiles or Templates

- Supports fast turnaround business requirements
- No need to maintain cache of servers for each service type
- Can assign business priority to each server
  - Temporarily disassociate lower priority services when compute needed
- Can assign project length to each server or group of servers
  - Can disassociate after sign-up period (and appropriate governance)
  - Make reclaimed compute available for other projects
  - Preservation of boot/data images (disk/LUN) needed if project restoral needed later
- Boundary for services is not a chassis or rack
  - Server Pools and Qualifications allow more intelligent infrastructure



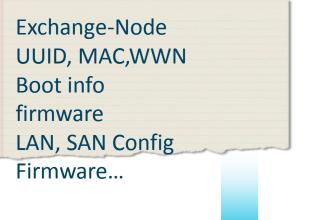




## **UCS** Operations

Stateless Implies Server Mobility at Bare Metal

- Supports fast turnaround business service SLA
- No need to re-build servers
- Profile or Profiles can move from hardware to hardware within UCS without re-building
- Bring off-hours troubleshooting of hardware now in-hours when decommission faulty hardware
- Easy to clone servers to scale







## **Network Abstraction**



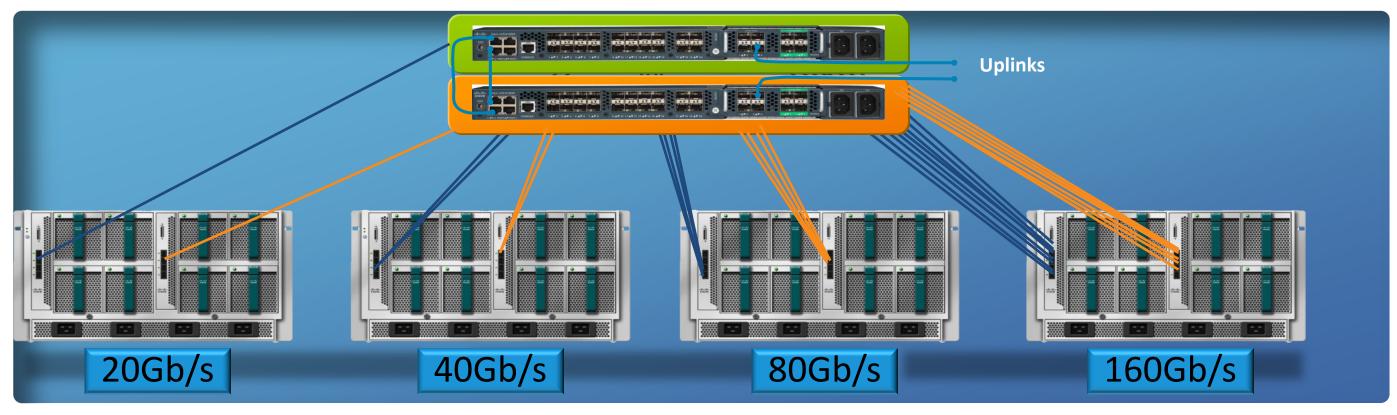






## **UCS Infrastructure**

Intra-UCS Cabling and Licensing

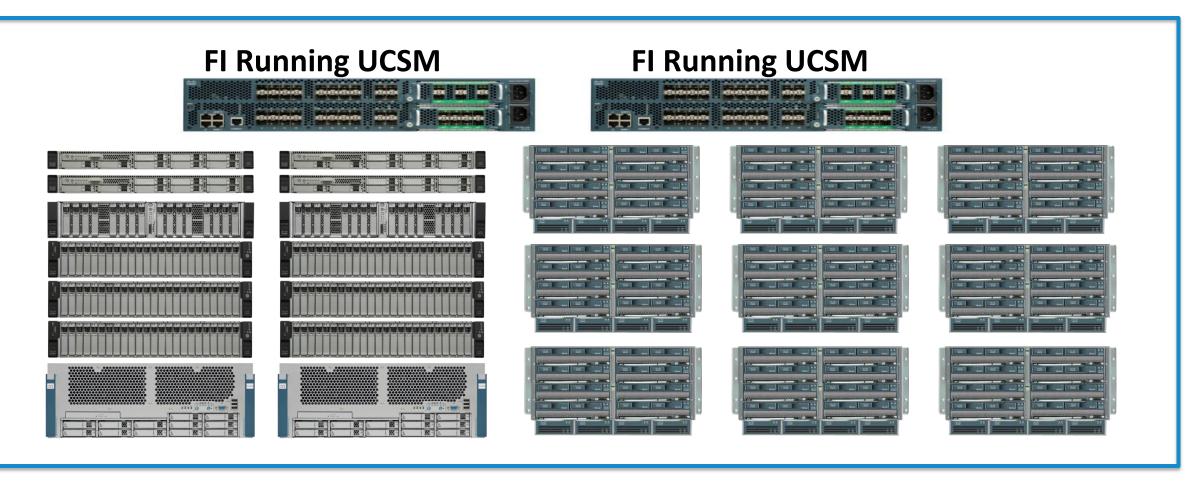


- Wire Once Architecture 20 chassis per UCS today, more coming
- All links can be active all the time
- Numbers and types of I/O adapters are not fixed on a given server (no rules on placements relative to backplane, types of cards, etc.)
- All servers can have storage access at no added costs (Stateless)
- Licensing on ports within FI (not tied to chassis directly)
- Infrastructure will not need to take licensed features into account (Stateless)





## **UCS Infrastructure**

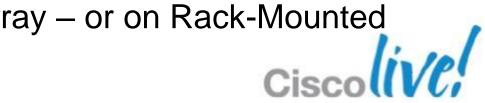


### Typical Infrastructure: Assign a business use to a chassis

- Some chassis filled and requires new purchases of chassis, LAN I/O modules, SAN I/O modules, Management modules, Intra-DC cabling all required
- Open capacity in other chassis are stranded
- Leads to slower business turn-around
- With UCS, grouping of business functions can be virtual within array or on Rack-Mounted arrays near-term – Single Management Entity for a UCS array

BRKCOM-1005

© 2013 Cisco and/or its affiliates. All rights reserved.



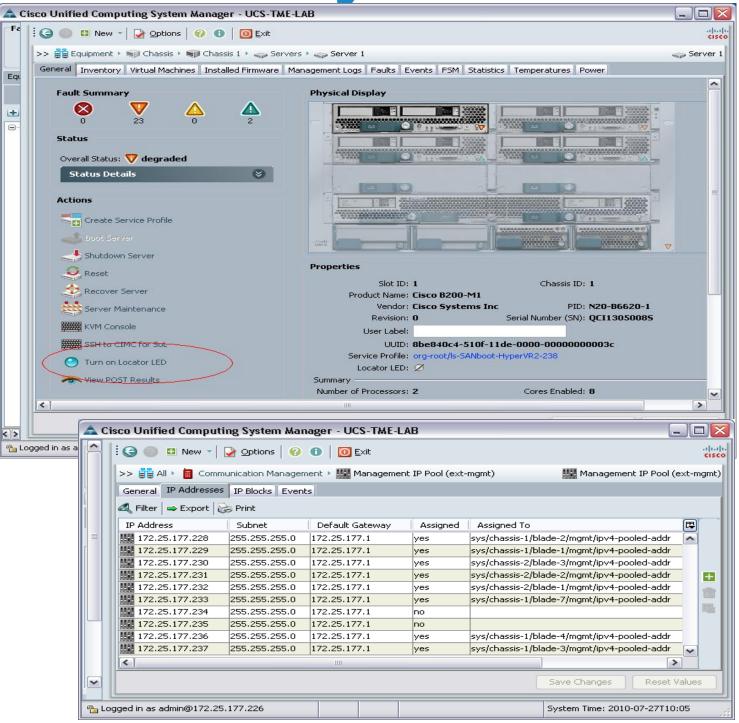
## **UCS Management Connectivity**

### Lights out Management

- There is no advantage in UCS to be in front of or near system
- All Field Replaceable Units (FRU) hot swappable
  - All have a LED "beacon" to indicate to facilities personnel item needing replacement
  - Greatly decrease IT engineering rolls onsite to DC

### KVM over IP supported

- Integrated not a licensable feature
- Remote Media (.iso, CDROM, USB, virtual floppy)
- Serial over LAN (also policy-based) for Linux terminal/console serial access – along with KVM for X session
- KVM IP and MAC will be in service profile







### **UCS Networking Basics** Different School of thought for I/O

LAN and SAN access ports typically configured "alongside" peer server port configuration

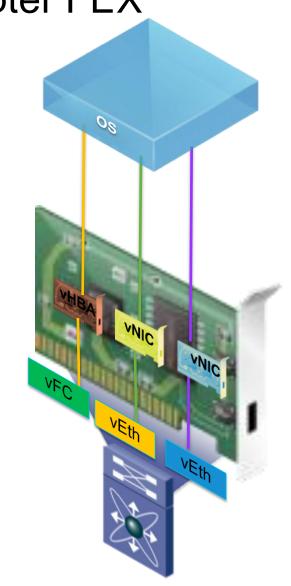
- With UCS the LAN and SAN access configuration is now part of the server configuration within the data model yet managed by current LAN/SAN teams
- Virtual Machine adapters are typically one or two switching entities away from the network edge
  - With UCS the Networking Edge can reach directly to the Virtual Machine's virtual adapter

### Legacy servers have "State" as NICs and HBAs are added to PCI slots

With UCS the existence, counts, types, identifiers, etc. of I/O cards can be imposed on a server – not just queried



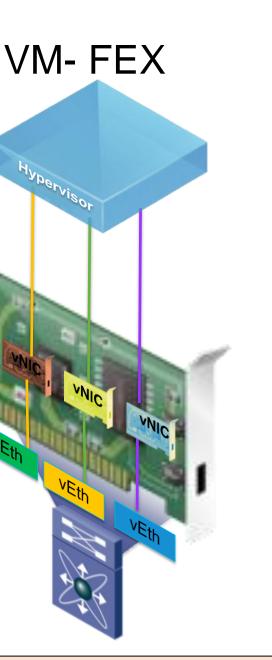
### **UCS Networking Basics** Adapter FEX



OS See's Administratively definable (MAC, QoS, VLAN, VSAN, WWPN, etc.) Ethernet and Fibre Channel interfaces which connects to a Cisco virtual interface (VIF)

Hypervisor see's unconfigured (no MAC, VLAN, etc.) Ethernet interfaces which are configured by the external VMM and connects to a Cisco virtual interface (VIF)

Cisc





Virtualising the Switchports with Unified I/O

- Mapping of Ethernet and FC Wires over Ethernet
- Service Level enforcement
- Multiple data types (jumbo, lossless, FC)
- **Individual link-states** 
  - DCB Ethernet Blade Management Channels (KVM, USB, CDROM, Adapters)
  - Individual **Ethernets**

Individual Storage (iSCSI, NFS, FC)

- Fewer Cables
  - same cable

- Models

Multiple Ethernet traffic co-exist on

### Fewer adapters needed

### **Overall less power**

Interoperates with existing

Management remains constant for system admins and LAN/SAN admins

Possible to take these links further upstream for aggregation



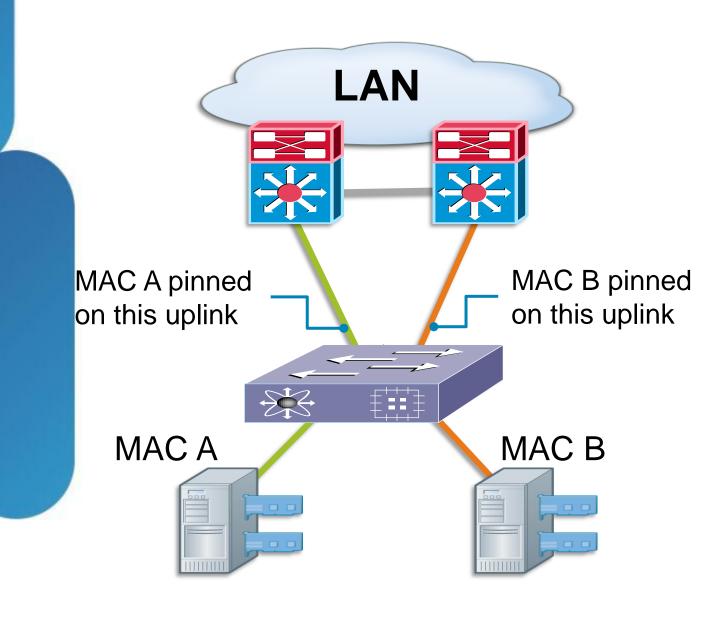
Network Team Defines Adapters and Connectivity Needs

- Centralised per Organisation/Root
  - Determine if Native VLAN only
  - If Trunk, if untagged allowed
  - VLANs on trunk
  - MTU for adapter
  - MAC Pool
  - QoS Policy (Minimums and max-bursts)
  - Presentation to outside world physical port
  - Statistics Treshold
- Adapter Templates Can be used as Initial or Updating Templates
- Tightly Controlled Policy
- Policy Managed by Network Administrator
  - Tied into Service Profile Templates
  - Tied into vNIC Templates
- Highly Automated Process to Add Connectivity to Server with Policy

Create vNIC Template
0
0
Ψ.
Description:
Fabric ID: 💿 Fabric A 🔵 Fabric B 🔄 Enable Failover
Target
Adapter
VM
Warning
If <b>VM</b> is selected, a port profile by the same name will be created. If a port profile of the same name exists, it will be overwritten
Template Type: O Initial Template 💿 Updating Template
YLANs
Select Name Native VLAN
VM_Data_6
✓         VM_Kernel_3         ○           ✓         VM_VLAN_7         ○
VM_VLAN_7         O           iSCSI_NetApp         V
+ Create VLAN
MTU: 1500
MAC Pool: <not set=""></not>
QoS Policy: <not set=""></not>
Network Control Policy: <pre><pre><pre><pre><pre><pre><pre><pre></pre></pre></pre></pre></pre></pre></pre></pre>
Pin Group: <not set=""></not>
Stats Threshold Policy: default
OK Cancel



Ethernet End Host Mode



- Eliminates Need for Spanning Tree Protocol on Uplink Bridge Ports
- Maintains MAC table for downstream servers only
- Fabric Interconnect to Network
  - Doubles effective bandwidth vs STP
- to Only One Port or Port-Channel
- all bandwidth usage

# Reduces CPU load on upstream switches

Eases L2 MAC Table sizing in the Access Layer Allows Multiple Active Uplinks from UCS

Prevents Loops by pinning a MAC Address

Upstream VSS/vPC for MCEC optional for

Completely Transparent to Next Hop Switch

Traffic on same L2 subnet switched locally

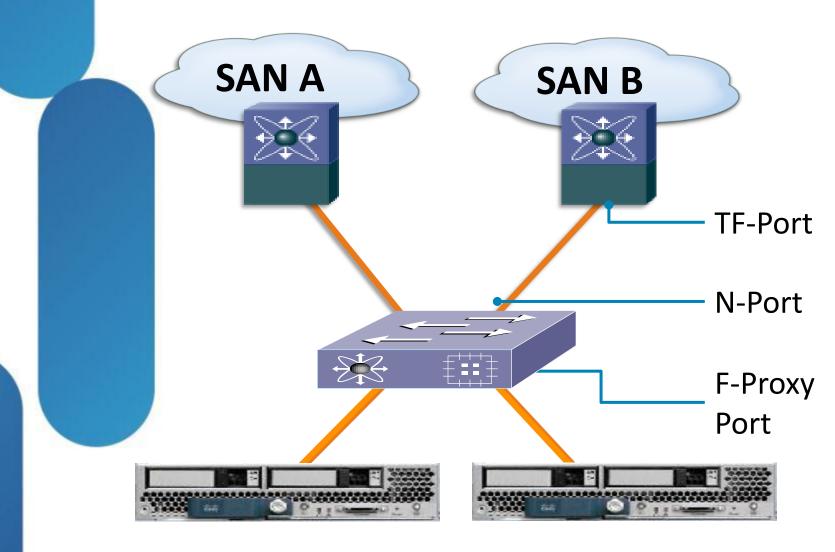
Storage Team Defines Adapters and Connectivity Needs

- Centralised per Organisation/Root
  - Determine vSAN
  - MTU for adapter
  - WWPN pool
  - QoS Policy (Minimums and max-bursts)
  - Presentation to outside world physical port
  - Statistics Treshold
- Adapter Templates Can be used as Initial or Updating Templates
- Tightly Controlled Policy
- Policy Managed by SAN Administrator
  - Tied into Service Profile Templates
  - Tied into vHBA Templates
- Highly Automated Process to Add SAN Connectivity to Server with Policy

📥 Create vHBA Temp	late			$\overline{\mathbf{X}}$
Create vHBA	Template			0
	ESX-Fabric-A			
Description:	0			
Fabric ID:	💿 А 💿 В			
Select VSAN:	default	-		🛨 Create VSAN
Template Type:	Ť –	O Updating Tem	plate	
Max Data Field Size:	2048			
WWN Pool:	<not set=""></not>	-		
QoS Policy:	<not set=""></not>	-		
Pin Group:	<not set=""></not>	-		
Stats Threshold Policy:	default	-		
				OK Cancel



## **UCS Storage Basics** N-Port Virtualisation or for Storage



- function as N-ports or NPIV ports
- Server facing ports function as F-proxy ports
- Provides physical port level virtualisation of multiple FC end nodes to one F Port off an FC Switch
  - Fabric Interconnect operates in N\_Port Proxy Mode (not in FC Switch mode)
  - Simplifies multi-vendor interoperation
- Eliminates the FC domain on UCS Fabric Interconnect
- Simplifies management
- F-Port trunking and channelling supported
- FC Switched mode coming as option for locating disk out closer to servers

### Storage switch sees Fabric Interconnect as an FC endhost with many ports and many FC IDs assigned

UCS Fabric Interconnects network facing ports



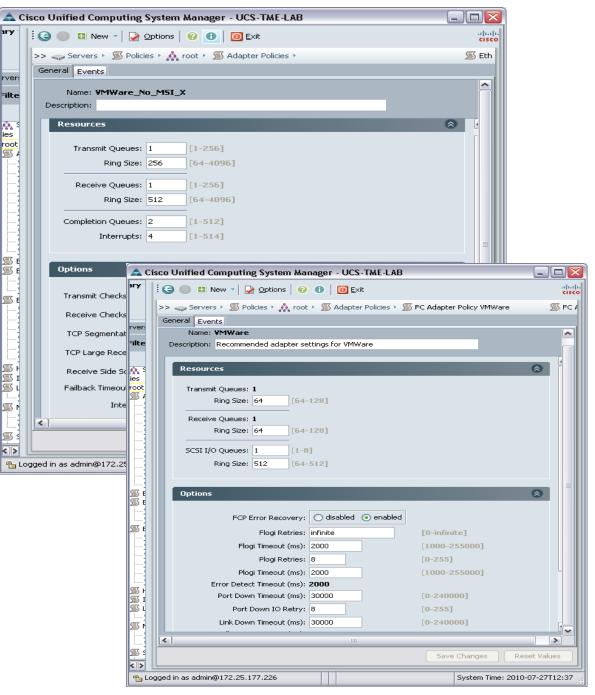
## **UCS Storage Basics**

Example of Detail in Low Level Adapter Settings

- Centralised per Organisation/Root
- vNIC Settings
  - No need to interrupt server boot in Option ROM to customise settings
  - Interrupt coalescing and ring buffer sizing (among outhers) will not imply a need for customer to physically make modifications to servers as part of deployment

### vHBA Settings

- No need to interrupt server boot in Option ROM to customise settings
- HBA timers and retry counts (and others) will not imply a need for customer to physically make modifications to servers as part of deployment
- PCI Order (on Cisco VIC only) can be controlled in the presentation to the OS
  - Allows consistent connectivity as Ethernets are configured first





### **UCS Networking Components Ethernet Adapter Virtualisation**

Run a quad-port GE or 10GE adapter into the PCI slots of a server

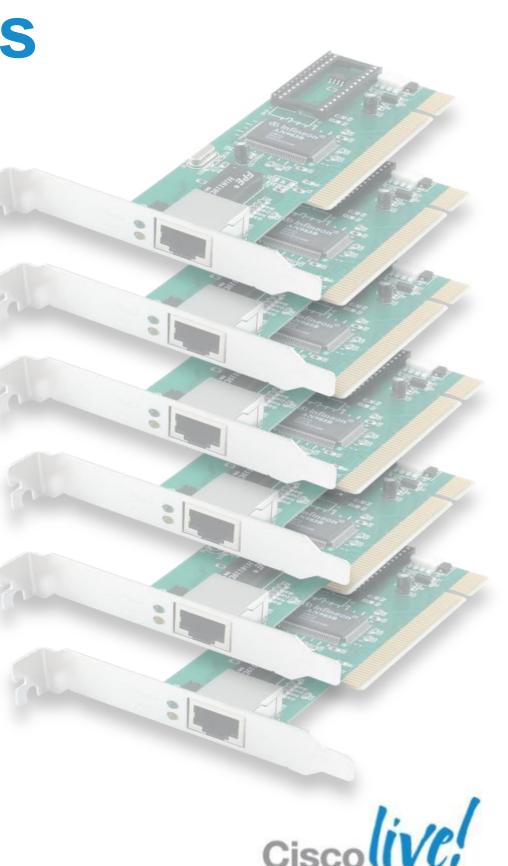
Easily filling the PCI capacity many times

- We are imposing "State" on the server by inserting cards at staging time
- Consumes an equal amount of ports on the DC switching infrastructure (and cables)
- Single-Root I/O Virtualisation is early attempt at adapter virtualisation
  - Maps memory buffer to present a new adapter

Locally switches traffic on the adapter directly

- No per-virtual interface link-state
- No Operating System support currently

No Rate-Shaping, QoS Marking, etc.



### **UCS Storage Components Storage Adapter Virtualisation**

Run a single-port or dual-port 1/2/4/8G FC HBA into the PCI slots of a server

> Easily filling the PCI capacity many times when mixed with Ethernet

- We are imposing "State" on the server by inserting cards at staging time
- Consumes an equal amount of ports on the SAN switching infrastructure (and cables)
- Single-Root I/O Virtualisation is early attempt at adapter virtualisation

Not yet in mainstream discussion on the FC side





### **UCS Adapter Virtulisation** Unified I/O within UCS

- Run a Virtual Interface Card PCI slots of a server
- We are not imposing "State" on the server
- Consumes far fewer ports on the DC switching infrastructure (and cables)
- NOT Single-Root I/O Virtualisation
- **PCI Bus Structure Virtualisation**

Virtualise Adapters and PCI-PCI Bridges

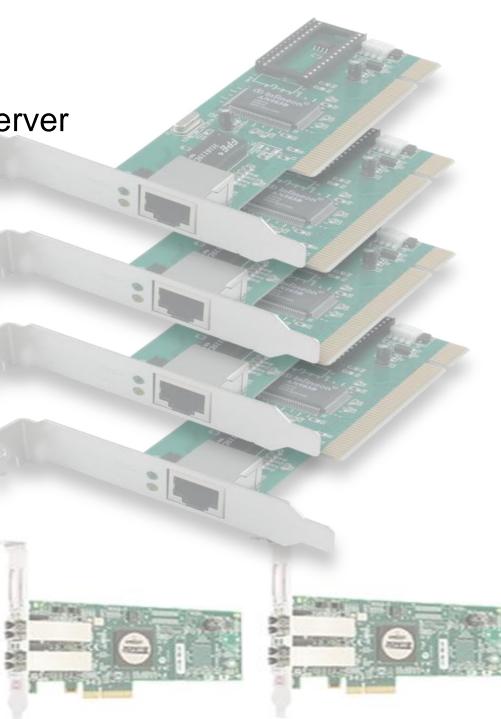
No Locally Traffic Switching to Manage

Per-virtual interface link-state

Operating System support if they support PCI

Rate-Shaping, QoS Marking, etc. per Virtual Interface

UCS sends only VLANs and VSANs to Virtual Interface as Needed – to ease L2 scale in designs





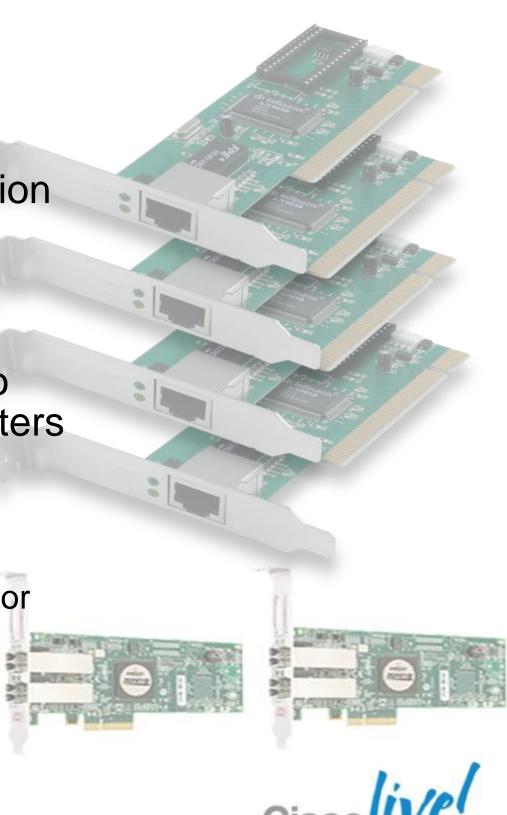
### **UCS Adapter Virtualisation** Unified I/O within UCS (Continued)

- Central Administration can group definitions and updates to configuration
- 128 Maximum interfaces on adapter today (58 today possible with OS')
- Possible for system administrators to now directly define many more adapters

No 802.1q tagging to servers

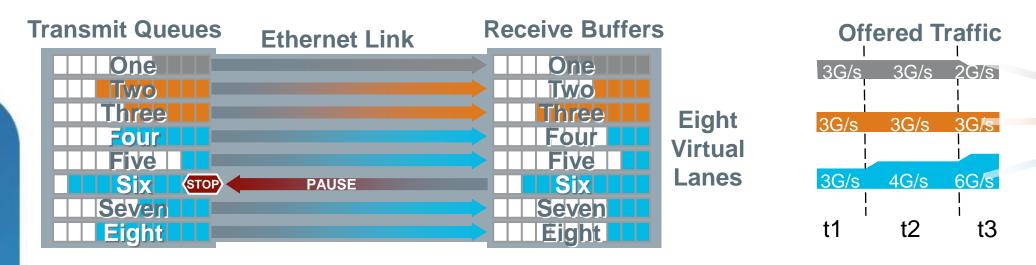
No qualifications, install, and configuration of Broadcom ACS or Intel PROset tools

Enabler of stateless and highly automated configuration of I/O



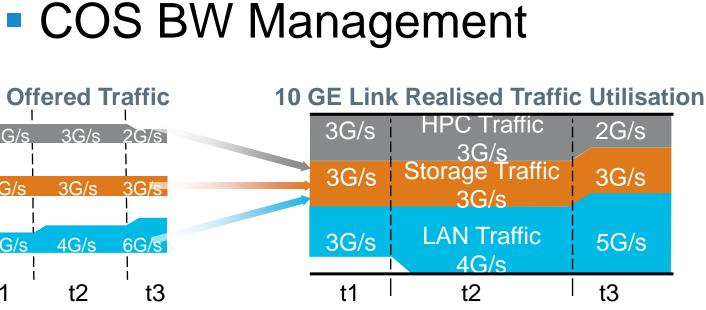
### **UCS Traffic Managment** Unified I/O and QoS within UCS

### Priority Flow Control



- Enables lossless Fabrics for each class of service
- PAUSE sent per virtual lane when buffers limit exceeded

- Among the tools used are aggregate shapers at the vNICs (VIC), ETS, Policers at the switch for each vNIC.

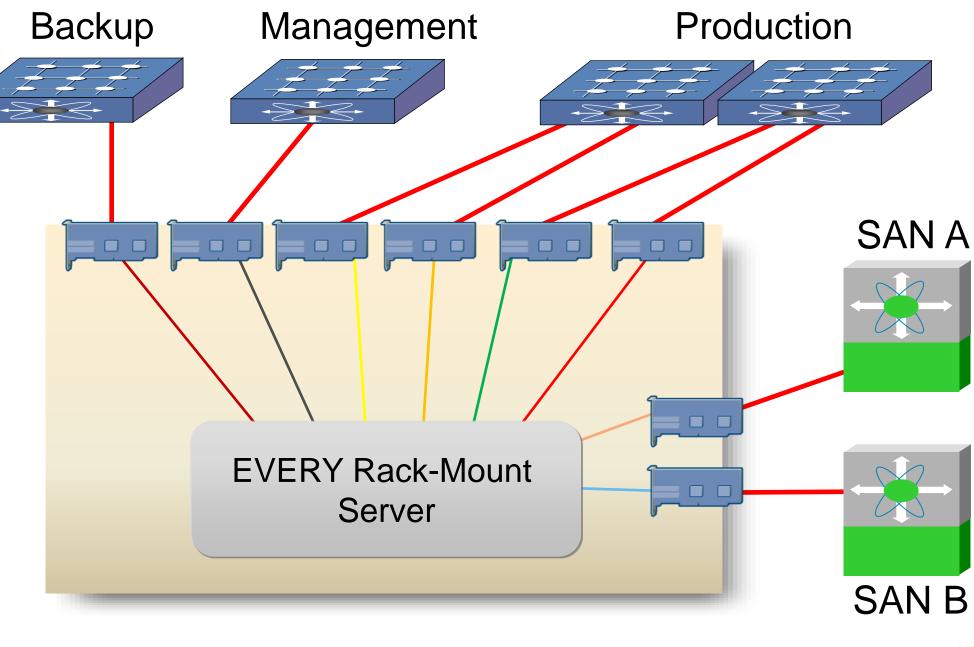


• Enables Intelligent sharing of bandwidth between traffic classes control of bandwidth 802.1Qaz Enhanced Transmission



### **UCS Unified I/O Advantages** Unified I/O within the DC

 Proliferation of NIC and HBA devices, cables, ports as servers are added

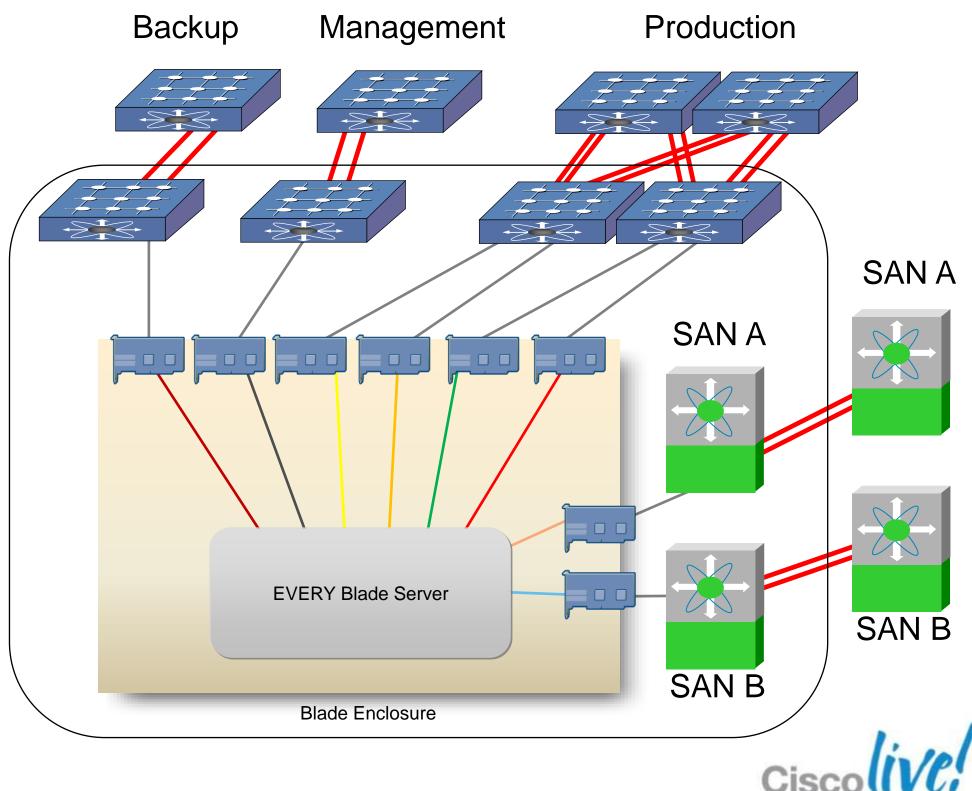


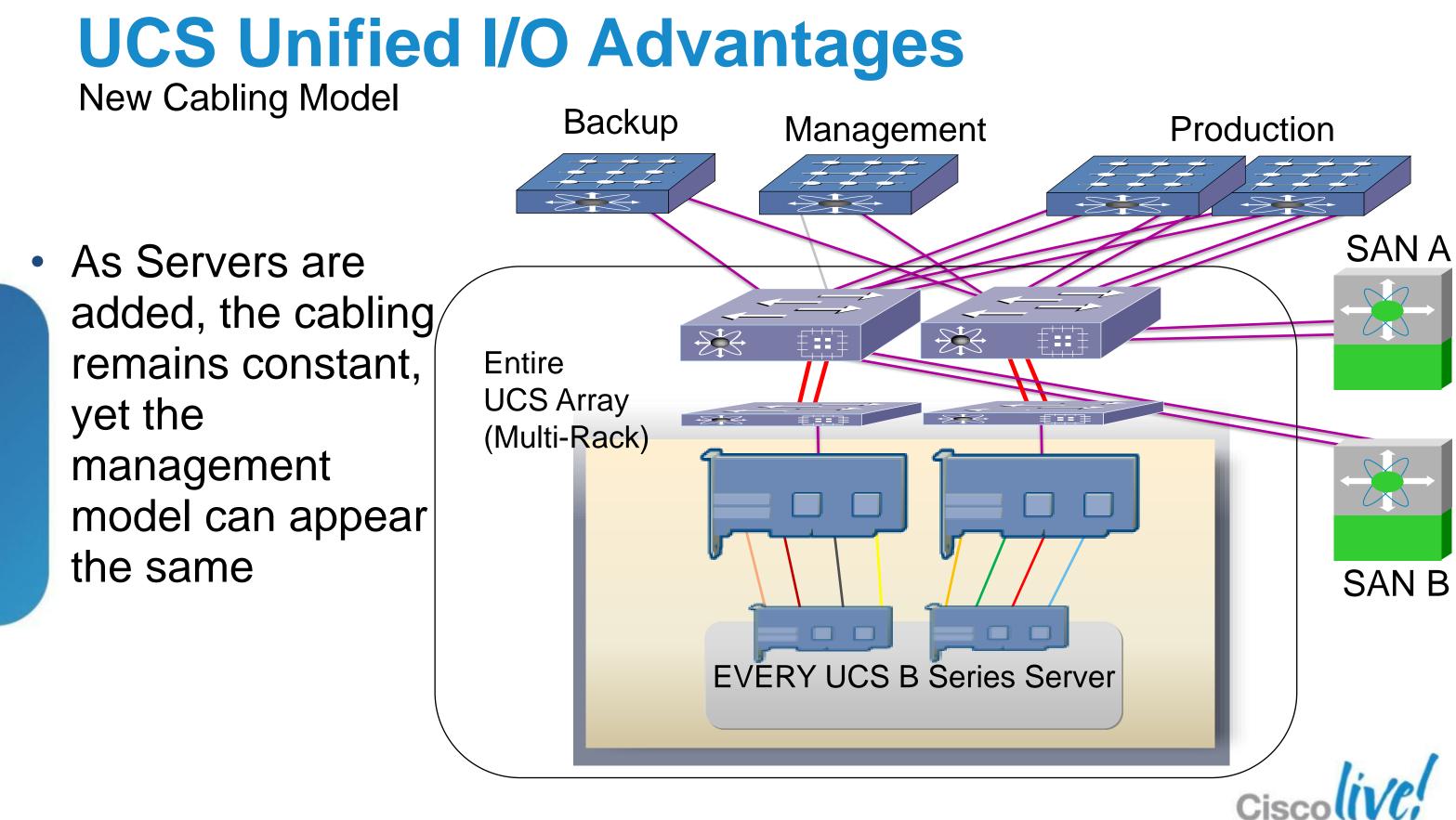


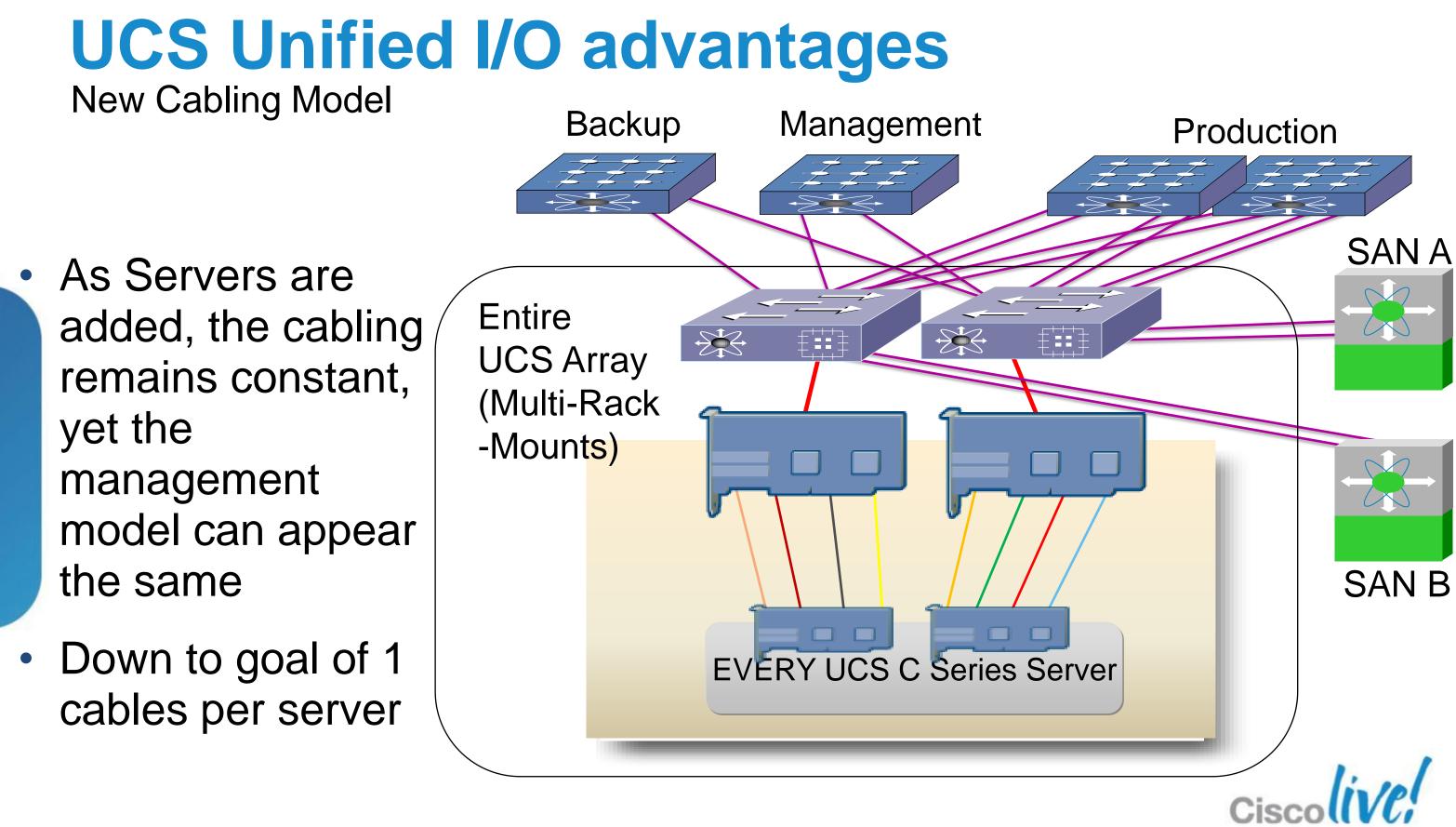
## **UCS Unified I/O advantages**



Proliferation of upstream cables, ports as servers are added







## **Data Network Connectivity and UCS**

Where is the Server/Network Boundary?

- Traditional DC designs have Access Layer
  - Middle of Row modular switching
  - End of Row modular switching
  - Top of Rack fixed switching
  - Many touches at this layer as traditional server infrastructure is administered

### Traditional DC designs have Aggregation Layer

- Centralised modular switching
- Services layer for common network services

### With UCS, Access Layer is now ToR

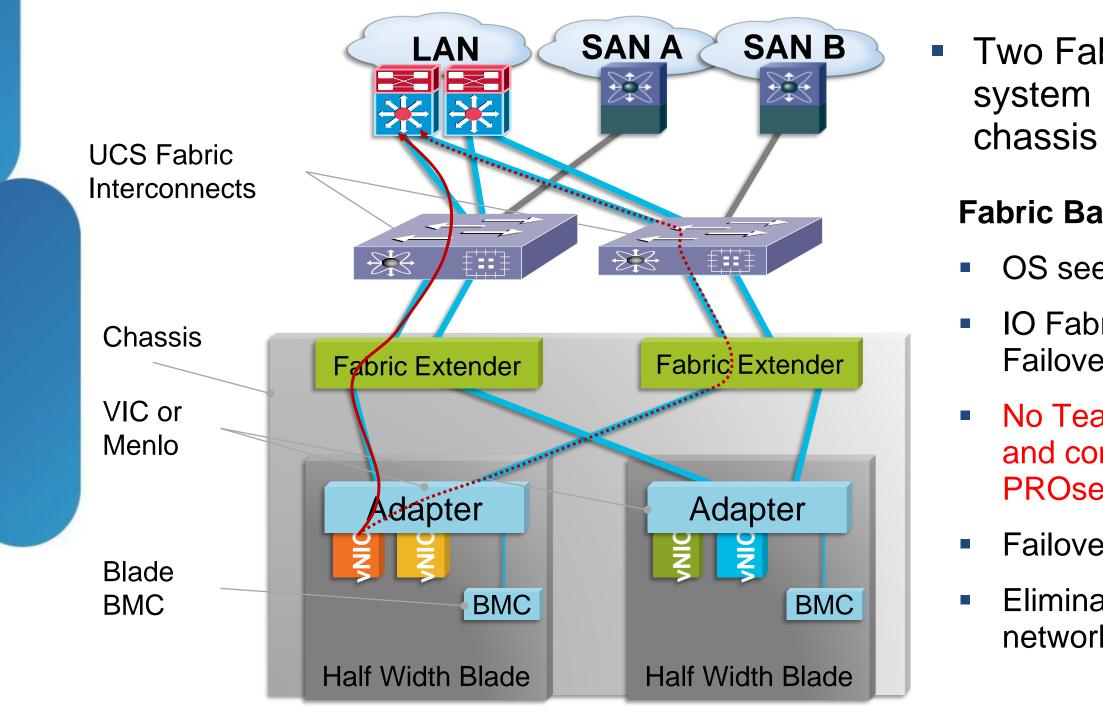
- Networking setup on UCS for blades and VM's (100's of Servers)
- NX-OS manageability for visibility
- UCSM configurability of network attributes
- Far fewer touches of the access layer switching this is rolled into the server adapters
- Aggregation Layer unchanged





## **Data Network Connectivity and UCS**

Fabric Failover with Blade Servers



BRKCOM-1005

Two Fabric Interconnects in the system going to two FEX in each

### Fabric Based LAN vNIC Failover:

- OS sees single or multiple vNICs
- IO Fabric provides Active-Passive Failover per server adapter
- No Teaming Driver to qualify, install, and configure (Broadcom ACS, Intel PROset, RHEL Bonding, etc.)
- Failover happens under OS layer
- Eliminate half of server adapters and network ports



### **Storage Network Connectivity and UCS** Where is the SAN Boundary?

### Traditional DC designs have dual SAN Access

- Edge modular switching
- Edge fixed switching
- Collapsed Core modular switching
- Many touches at this layer as traditional server infrastructure is administered

### Traditional DC designs have dual SAN Core Layer

- Core modular switching
- Services layer for common SAN services

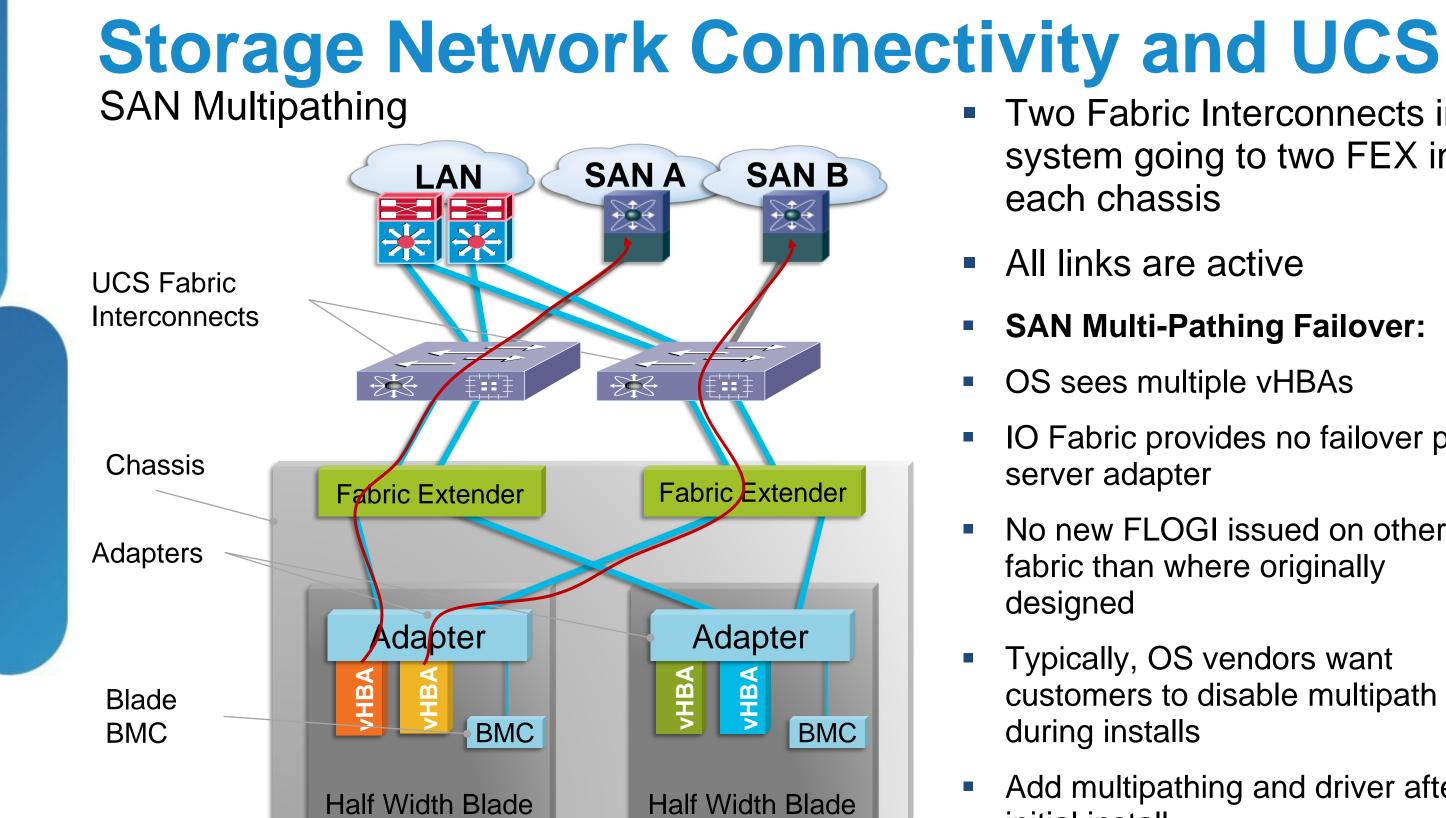
### With UCS, SAN Edge Layer is now ToR

- SAN Edge configuration setup on UCS for blades and VM's (100's of Servers)
- NX-OS manageability for visibility
- UCSM configurability of SAN attributes
- Far fewer touches of the SAN switching this is rolled into the server adapters
- Core Layer unchanged (with exception of NPIV enablement) and multi-vendor



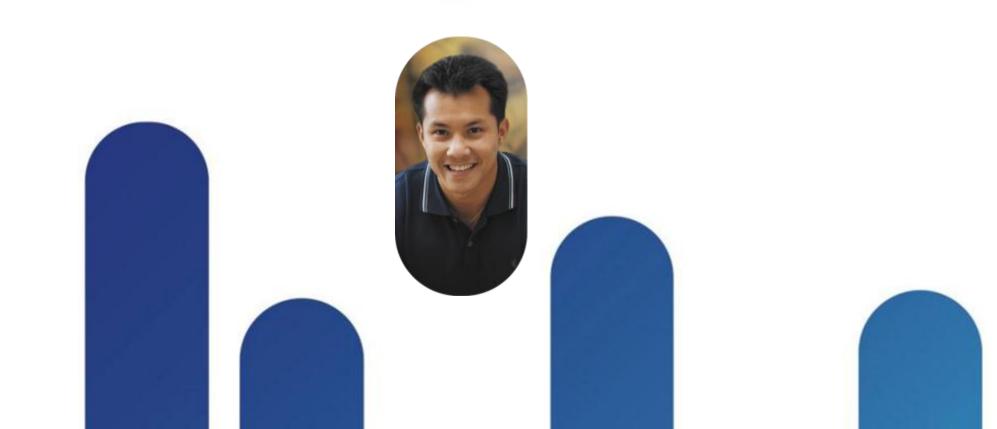






- Two Fabric Interconnects in the system going to two FEX in each chassis
- All links are active
- **SAN Multi-Pathing Failover:**
- OS sees multiple vHBAs
- IO Fabric provides no failover per server adapter
- No new FLOGI issued on other fabric than where originally
- Typically, OS vendors want customers to disable multipath during installs
- Add multipathing and driver after initial install

## Innovative Technologies

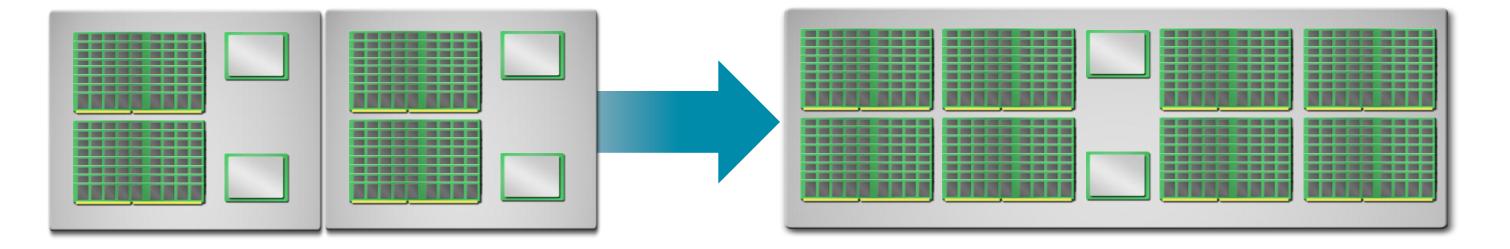








### **Savings with Cisco Memory Extension** Enterprise Software Licesning



	Capacity/ Cores		
\$40,000	384GB/32	\$640k	N/A
\$40,000	192GB/8	\$160k	\$960k
\$40,000	384GB/8	\$160k	\$960k



## **UCS Memory Expansion**

- Get 48 DIMMs on a 2 Socket Server for higher memory applications
- All memory running at 1333MHz
- Combinations of 2,4,8 GB for wide array up to 384G in 2 socket footprint
- More VM's into existing server footprint inside customer Data Centres
  - Extend the life of legacy DC builds
  - Push out needs for new DC builds



## **VN-TAG: Industry Pre-standard Implementation**

IEEE 802.1BR and VN-TAG

Same architecture and logic Minor frame format difference

• Future platforms will support both formats Backward compatibility guaranteed Interoperability even easier

VN-TAG frame format (6 bytes)

direction indicates to/from adapter

source virtual interface indicates frame source

looped indicates frame came back to source adapter

destination virtual interface dictates forwarding

pointer helps pick specific destination vNIC or vNIC list

### Link local scope

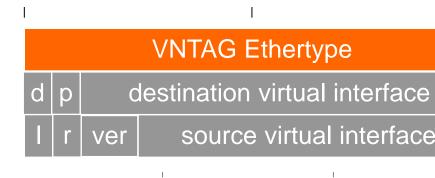
- Rooted at Virtual Interface Switch
- 4096 virtual interfaces
- 16,384 Virtual interface lists

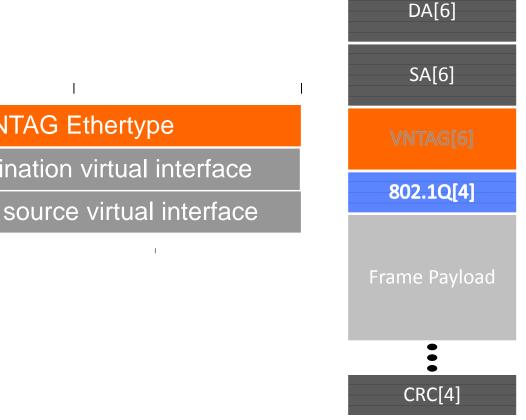
### Coexists with VLAN (802.1Q) tag

- 802.1Q tag is mandatory to signal data path priority

BRKCOM-1005

© 2013 Cisco and/or its affiliates. All rights reserved.







## **IEEE 802.1BR: Bridge Port Extension**

### Fully specifies a Port Extender (FEX Equivalent)

> Extends ports of a switch to lower entities in a network

### Port Extenders are not individually managed

> Their ports become ports of the controlling switch

### **Cascading Port Extenders**

- Allows one to choose the appropriate controlling switch
- Frame replication supported for efficient multicast / flooding

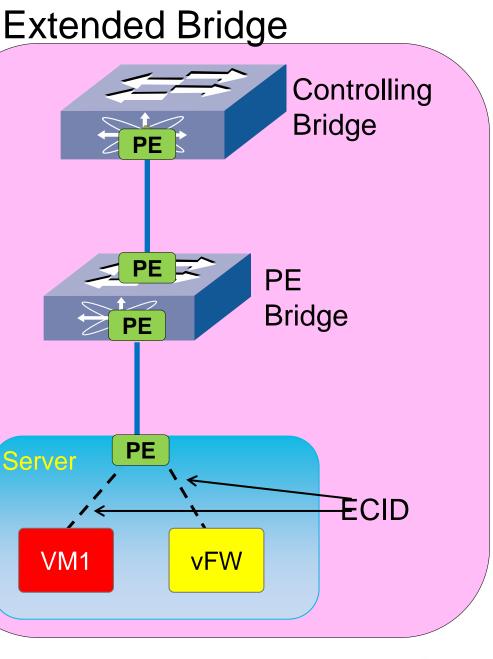
Traffic from each "Extended Port" is reliably segregated to an E-channel and identified by a tag containing an E-channel identifier (ECID)

- Does not require prior knowledge of MAC addresses; switch performs standard learning functions
- Works with all devices including VEBs, VEPAs, individual VMs, physical services, and devices providing transparent services
- $\succ$  E-Tag size = 8 Bytes

### Controlling Bridge + PE = Extended Bridge

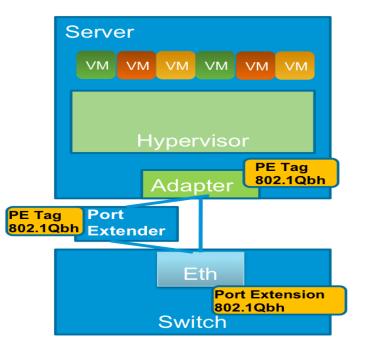
Single Point of Management

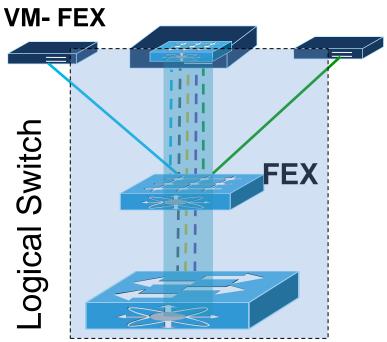






## **Cisco FEX Architecture Advantage**





### FEX based on IEEE

### ′\_1BR

- Ease of management: one switch manages all Port Extenders (adapters/switches/virtual interfaces)
- Supports cascading of Port Extenders (multi-tier, single point of management)

✓ Virtual Machine aware FEX

- Secure: ACLs based on VN-TAG
- Scalable: Mcast and Bcast replication performed in HW at line rate
- Efficient: no impact to server CPU

### Switch

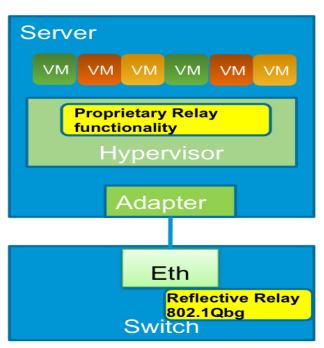
### VEPA based on IEEE

- Doesn't support cascading

Reflective Relay (used in basic VEPA)

Multichannel (used in advanced VEPA)

- Even more components to manage X
- wire



Management complexity: 2000 EPA is an independent point of management

× Vulnerable: ACLs based on source MAC (can be spoofed)

Resource intensive: Hypervisor component consumes CPU cycles

Inefficient bandwidth : separate copy of each Mcast and Bcast packets on the



### **UCS VM-FEX** VM-FEX Technology

- Virtualise the network end-point to match with the virtualised adapter on the VM
  - More than Just a Single Fabric Layer
- Define policy groupings (called port-profiles) including things like:
  - VLAN(s) Membership
  - Policing Rate
  - CoS Marking for minimum service guarantee's
  - What Physical Ports to use for Upstream Communications
  - MAC Security
- Method to publish port-profiles to VMware (and Linux KVM) administrators for their autonomous use within their VM's



### **UCS VM-FEX** What does VM-FEX change?

- Each Virtual Machine vNIC now "connected" to the data network edge
- 1:1 mapping between a virtual adapter and the upstream network port
- Helps with Payment Card Industry (example) requirements for VMs to have separate adapter (no soft switches)
- As Virtual Machines move around infrastructure, the network edge port moves along with the virtual adapter



## **UCS VM-FEX**

Who Manages the Virtual Access Layer?

- If we are using VN-Link, we have multiple options
- Network team can utilise Nexus 1000V to manage up to 64 ESX hosts
  - Any UCS adapter type including the VIC
  - VSM and Nexus 1010 to setup VM networking policy
- Network team can utilise VN-Link in Hardware on the VIC
  - VM tab in UCSM to setup VM networking policy

### Key Results Here

- No requirement to manage vSwitches or VLAN tags on Servers
- No requirement to manage Blade Chassis enclosure switches
- Server administrators can invoke services without coordination each time with Network and Storage Teams
- Management operations of Virtualised infrastructure maps to current physical infrastructure
- Infrastructure automation becomes simpler as policy is centrally defined

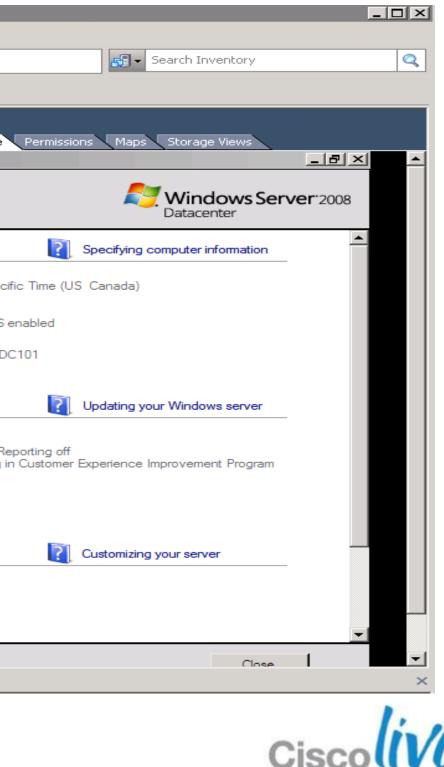


## **VMware VM-FEX View**

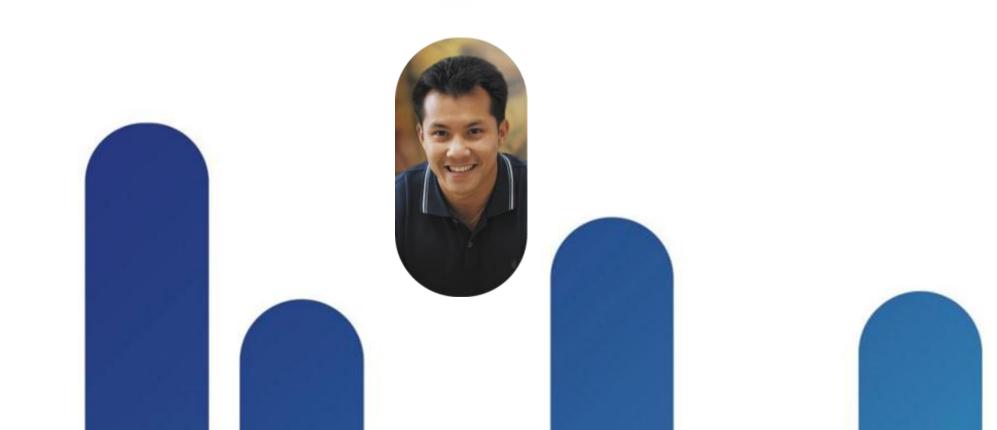
UpLink23 (0 NIC Adapters)	UCS_TME_LAB UCS_DVS UCS_DVS UCS_DVS UCS_DVS UCS_DVS Data_177 Kernel ServiceConsole VMdata_6 VM Network VM Network	Getting Started       Summary       Networks         UCS_DVS       Image: Construct of the system of	Ports Conf	portprofile-7 UpLink0 (2 NIC Adapters) ic0 172.25.177.247 ic0 172.25.177.247 ic0 172.25.177.245 UpLink1 (2 NIC Adapters) ic1 172.25.177.245 UpLink10 (0 NIC Adapters) UpLink10 (0 NIC Adapters) UpLink11 (0 NIC Adapters) UpLink12 (0 NIC Adapters) UpLink13 (0 NIC Adapters) UpLink14 (0 NIC Adapters) UpLink15 (0 NIC Adapters) UpLink16 (0 NIC Adapters) UpLink16 (0 NIC Adapters) UpLink17 (0 NIC Adapters) UpLink18 (0 NIC Adapters) UpLink19 (0 NIC Adapters) UpLink2 (0 NIC Adapters) UpLink2 (0 NIC Adapters) UpLink2 (0 NIC Adapters)		ts Alarms Permission Id Host New Port Grou an and Zoom	p Edit Settings
ent Tasks X	nt Tasks	]		UpLink23 (0 NIC Adapters	;)		×

# **View from the VM Settings**

VCENTER4U1 - vSphere Client				
File Edit View Inventory Administ	ration Plug-ins Help			
💽 💽 🏤 Home 🕨 🚓 In	iventory 🔹 🛐 Hosts and Clu	sters		
	19 🖻 ⊳ 🧇			
	6.101 Windows 2008	Data Center Server		
	Getting Started Sum	nmary Resource Allocation Pe	erformance Tasks & Events	s Alarms Console
🔂 172.25.177.245	Tinitial Config	uration Tasks		
172.25.177.247				
6.101 Windows 200		orm the following tasks to	initially configure this	server
		Provide Computer Inf	ormation	
		Set time zone	Time Zone:	(GMT-08:00) Pac
		2		
		Sonfigure networking	Local Area Connecti	ion: 10.1.6.101, IPv6
🗿 6.101 Windows 2008 Data Cente	er Server - Virtual Machine F	Properties		
Hardware Options Resources			Virtual Machine Versio	
	Add Remove	Device Status		
Show All Devices	Add Remove	Connected		
Hardware	Summary	Connect at power on		pt configured
Memory	4096 MB	Adapter Type		indows Error R
CPUs	1		(NET 3	ot participating
📃 Video card 📼 VMCI device	Video card Restricted			
VMCI device Floppy drive 1	Client Device	MAC Address		ever
CD/DVD Drive 1	Client Device	00:50:56:b5:2d:ee		0,001
Network adapter 1	VMdata_6 (UCS_DVS),	C Automatic C Mar	mal	
SCSI controller 0	LSI Logic SAS			
🚍 Hard disk 1	Virtual Disk	Network Connection		
		• Network label:		bne
		VMdata_6 (UCS_DVS)		
		Port: 128		bne
		💿 💭 Specify standalone port (A	Advanced):	
			· · · · · · · · · · · · · · · · · · ·	



# Multi-Tenancy & Security

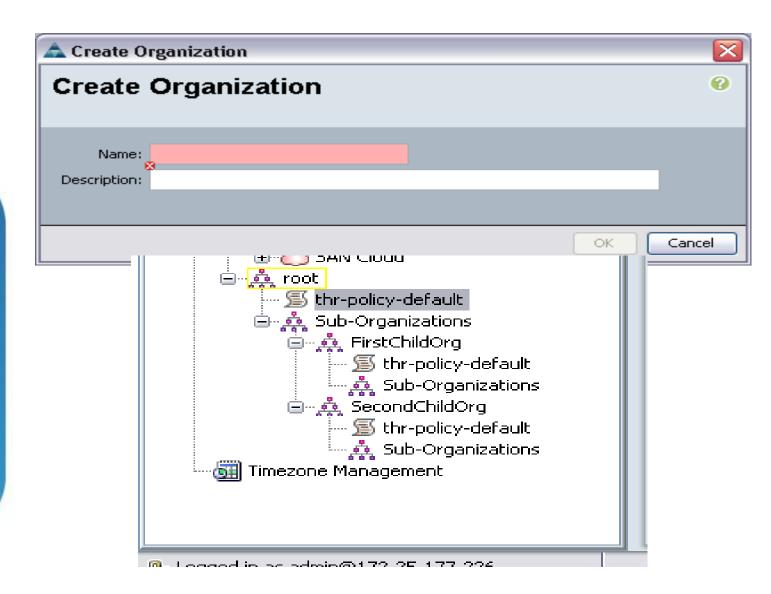








### **Security Considerations in UCS Defining Organisations and Sub-Organisations**



organisation

- resources
- policy
- organisations



# First fundamental multitenancy unit is an

Maximum is only based on

### Organisations are logical divisions of resources and

# Can be tiered with sub-

5 levels deep maximum



# **Security Considerations in UCS**

What do Organisations Define?

- Many things shown to this point can be sub-divided into organisational boundaries including:
  - Server Pools
  - Server Pool Qualifications
  - Service Profile Templates
  - vHBA Templates
  - vNIC Templates
  - WWNN Pools
  - WWPN Pools
  - MAC Pools
  - QoS Policy
  - Network Control Policy
  - Flow Control Policy

- Dynamic vNIC Connection Policy
- UUID Pools
- Ethernet Adapter Policy
- FC vHBA Policy
- Boot Policy
- Host Firmware Policy Management Firmware Policy
- Local Disk RAID Policy
- Scrub Policy
- BIOS Settings Policy
- BIOS Defaults Policy





## **Security Considerations in UCS** What do Locale's Define

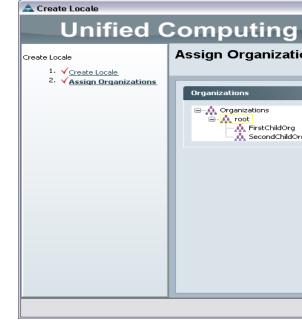
- Management of Organisation or **Groups of Organisations** 
  - Assign the behaviour of all the components listed prior

### Granular management of servers:

- Business unit
- Functional grouping (virtualisation, etc.)
- Location

### Applies to entire UCS fabric

- Allows a segmentation of management responsibilities for the respective components
- Potentially reduce audit scope

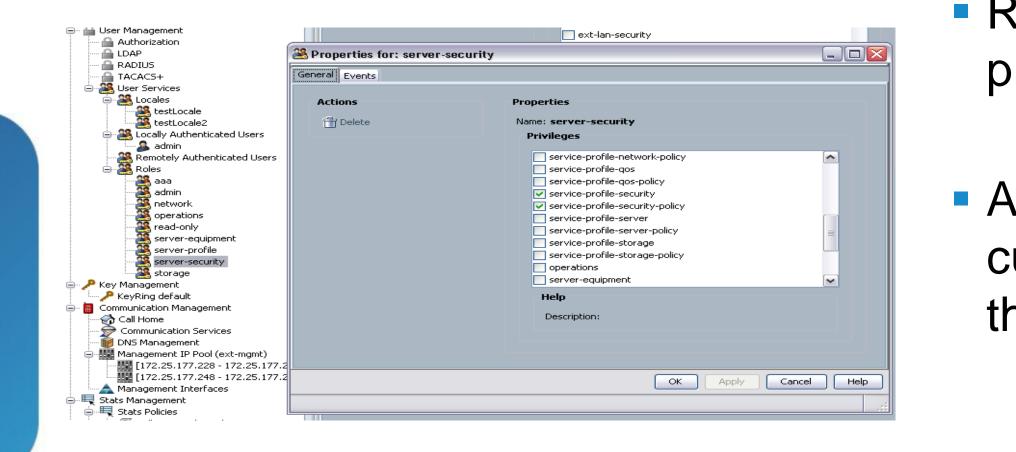




Svste	em Manager
ons	0
8	
	i 🚓 🚓 🔂
	💝 HRIocale
3	
	search >> 🔀
	<pre></pre>



## **Security Considerations in UCS Defining Users and Roles**





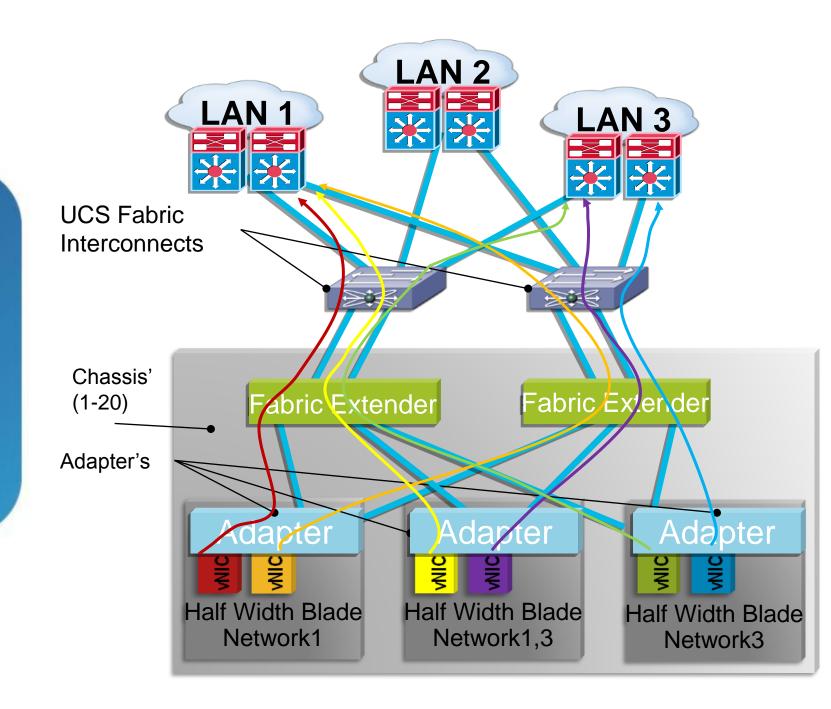
### Roles exist to define priveledges

### System has defaults

### Administrator can define custom roles to match their business



## **Security Considerations in UCS** UCS Security sone Segmentation



- switches
- (Pruning)
- Machines:

- groups



### Fabric Interconnects are NOT simple data

VLANs that have a configured listening port to only pass upstream on that port also

### **Dis-Joint Upstream Networks to Rack** Mount, Bladed, and direct to Virtual

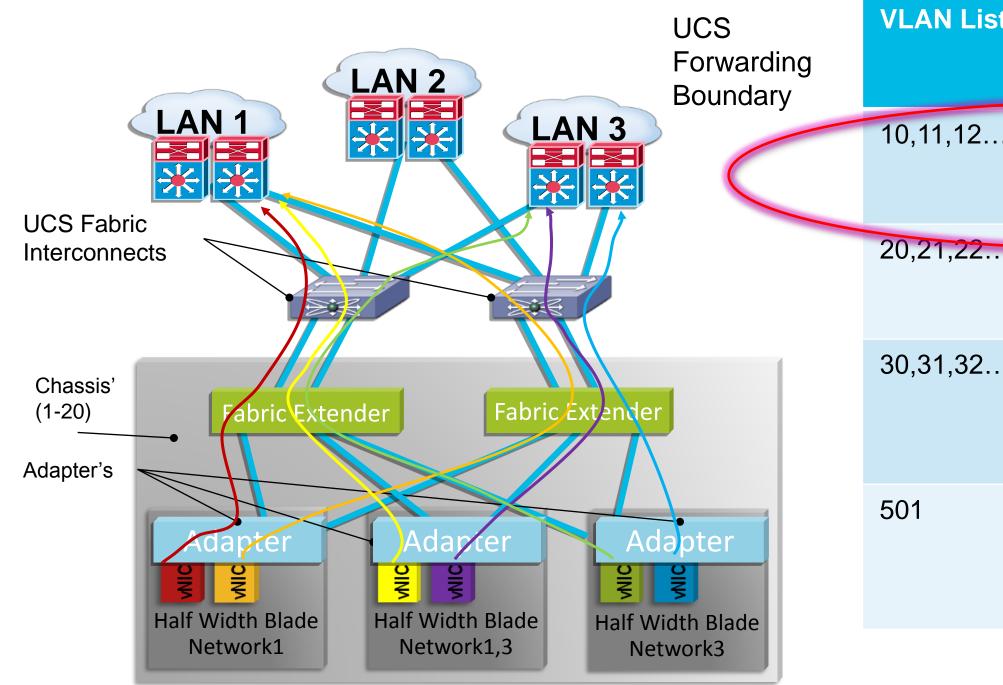
 VLAN uplink pinning selections are tied into appropriate upstream network

Each adapter will receive only needed traffic on the VLANs part of the L2 domain

SIMPLE procedure to directly attach Fabric Interconnects to multiple LAN segments now, and tie vNICs to new pin-



### **Security Considerations in UCS UCS Security Zone Segmentation**





st	Uplink Group	Server Interface List	
	E1/1,E1/2	Blade1 NIC0 & NIC1, Blade 2 NIC0	
	E1/10,E1/11	None	
	E1/20,E1/21	Blade 2 NIC1, Blade 3 NIC0 & NIC1	
	FC0,FC1	Blade 1 vHBA0, Blade 2 vHBA0	



# Monitoring & Fault Alerting







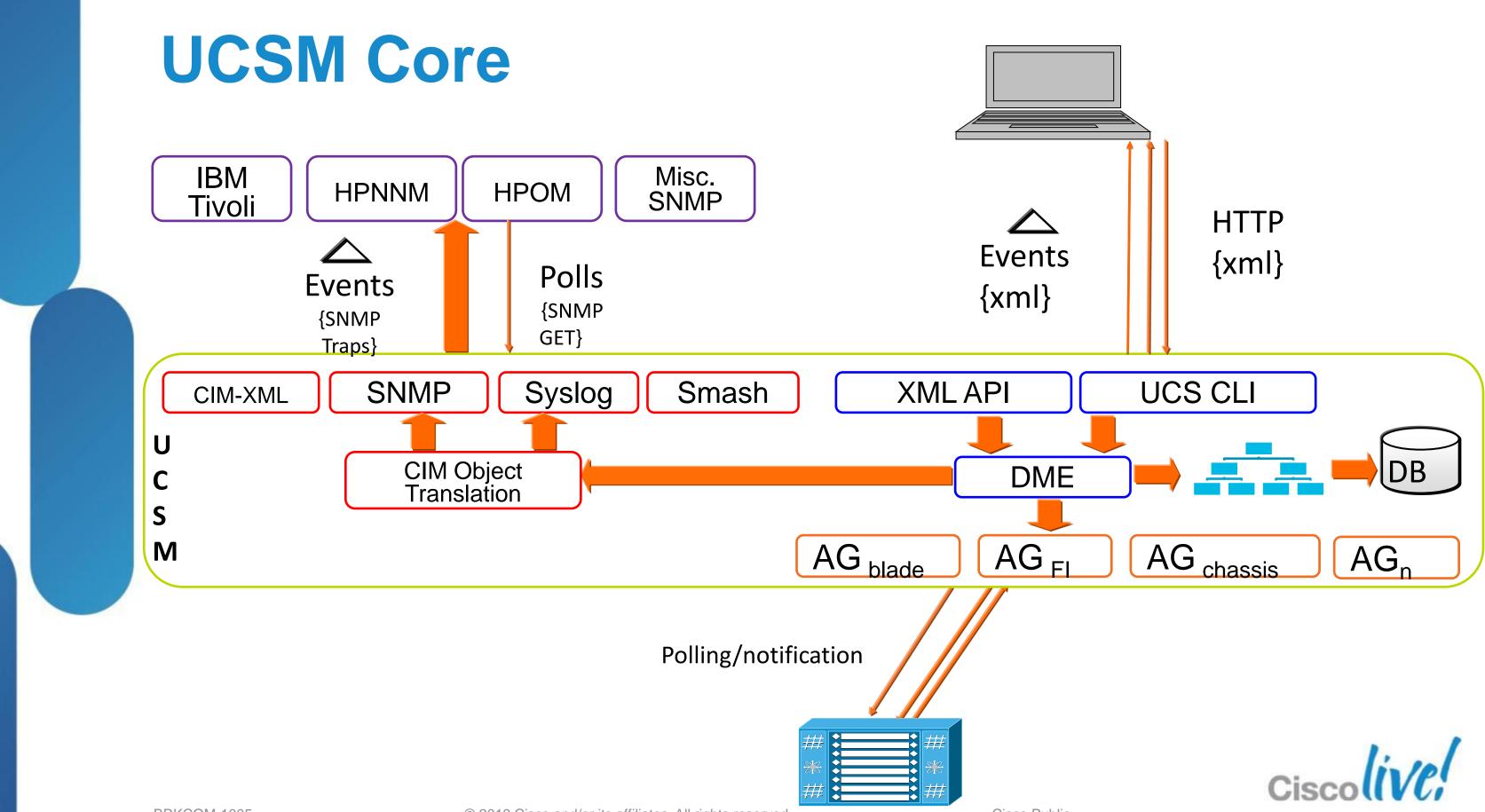


## **UCS Monitoring and Alerting** System Faults

- UCSM Aggregates Faults and events for all integrated components.
- System database is the source of all fault information.
- When faults are triggered the fault information can be sent out via Syslog and **SNMP**

🚵 Cisco Unified Computing System Manager - TME-	F5-RACK-FI-A					
Fault Summary	🕒 🍥 🖽 New	🗸 🕞 Options 🗌 🙆	1 Pending /	Activities 0 Exit		սիսիս
I 😣 V 🛆 🛆						cisco
0 2 4 13	>> 🔀 Faults, Even	-				🔀 Faults, Events and Audit Log
Equipment Servers LAN SAN VM Admin	Faults Events Au	idit Logs 🛛 Syslog 🗍 Core	Files TechSupport Fil	es Settings		
Filter: Faults, Events and Audit Log 🔻	🔍 Filter 👄 Export	📚 Print 🛛 Hide Fault D	etails Show: 🔽 All	🛆 🗵 💙 🖳 🔇 🖻	। 🖓 🔼 🗹 🔍	Z 🛈 🗹 I 🗆 🕒 🗆 🕼 🖊 🚺
	Category: 📢 🔽 All	🔽 Generic 🔽 Networ	rk 🔽 Sysdebug 🔽 S	ierver 🔽 FSM 🔽 Ope	rations 🔽 Equipme	nt 🔽 Connectivity 🔽 Configuration 🔽 Enviror 🕨
•	Severity	Code	ID	Affected object	Cause	Last Transition V Description
	Δ	F0334	118285	org-root/ls-SM-RHE	unassociated	2013-01-21T00:24:15 Service profile SM-R
- 🔀 Faults	$\mathbf{\nabla}$	F0200	102477	sys/rack-unit-6/ada	unidentifiable-fru	2013-01-08T23:11:43 Adapter 2 in server
	7	F0200	102478	sys/rack-unit-6/ada	unidentifiable-fru	2013-01-08T23:11:43 Adapter 3 in server
Audit Logs	<b></b>	F0461	101496	sys/rack-unit-6/mg		2013-01-08T23:07:40 Log capacity on Ma
	▲	F0528	93470	sys/rack-unit-1/psu-2	equipment-offline	2013-01-08T22:46:39 Power supply 2 in s
		🔇 critical 💎 majo	or 🛆 minor 🛆 warning	① info① condition	cleared 🗞 flapping	soaking
						1
						Save Changes Reset Values
	egistered with UCS Ce	entral				System Time: 2013-01-23T02:41





# **UCS Faults**

### A Fault is an abnormal condition or defect at the component, equipment, or sub-system level which may lead to a failure

	-						
Fault Summary	i G 🌑	🕒 New 🖞	-   🛃 Of	otions   🕜 🕕	<mark>⊙ E</mark> ×it		
	>> 🖥 E	quipment					
			Main Top	ology View			💷 Fabric Interc
Equipment Servers LAN SAN	1	Thermal		Becommission	ned		Firmware Manager
Filter: All	🔍 Filter	👄 Export	: 📚 Prin	t   Hide Fault Detai	ils	S	everity: 💌 All 💽
	Seve	Code	ID	Affected object	Cause	Last Tra 🔻	Description
		F16550	19434	fabric/lan/profiles	local-fa	2010-02-17T2	[FSM:STAGE:RET
	V	F0374	19421	sys/switch-B/p	equipm	2010-02-17T2	Power supply 2 in
		F0466	19419	org-root/mac-p	empty	2010-02-17T2	MAC pool default
		F0522	19422	sys/switch-B/p	equipm	2010-02-17T2	Power supply 2 in
	$\Delta$	F0463	19418	org-root/comp	empty	2010-02-17T2	server pool defau
	$\Delta$	F0476	19417	org-root/wwn	empty	2010-02-17T2	FC pool node-ww
		F0465	19415	org-root/ip-poo	empty	2010-02-17T2	IP pool ext-mgmt
	$\Delta$	F0476	19416	org-root/wwn	empty	2010-02-17T2	FC pool port-wwr
	$\nabla$	F0374	19423	sys/switch-A/p	equipm	2010-02-17T2	Power supply 2 in
		F0522	19424	sys/switch-A/p	equipm	2010-02-17T2	Power supply 2 in
	<				1111		
			😒 crit	ical 💎 major 🛆	minor 🛆	warning  info	🔍 🗘 condition 🔽

					() CISC
			E E	quipm	ienl
onnects		<b>S</b> 2	Servers		
ment j	🗊 Policies		💑 Fa	ults	
0 😒 🗹 🔽 🛆	Δ 🖂	<b>v</b>	<b>v</b>		<b>~</b>
					₽
RY:]: VNIC profile con	figuration o	n local f	abric(FSN	1-STA	^
fabric interconnect B	operability:	inopera	able		
is empty					
fabric interconnect B	power: offo	duty			
ılt is empty					
n-assignment node-de	fault is emp	oty			
is empty					
n-assignment default is	; empty				=
fabric interconnect A	operability:	inopera	able		
fabric interconnect A	power: off	duty			~
				>	
🛾 cleared \infty flapping	🕒 soakin	g			



# How UCSM Severity Mapped to Syslog Level

UCSM Severity	Syslog level (v1.3 and prior)	Sys bey
info	Info	Info
warning	warning	notif
minor	error	warr
major	error	erro
critical	critical	critic



### log level (v1.4 and ond)

ifications

nings

)r

cal



# **UCSM Fault MIB Sub Tree**

- Unified Computing Private MIB
  - MIB registered under enterprises.cisco.ciscoMgmt.719
- One fault table and two traps
- Trap contains all the fault details to identify the nature and cause of the fault
- Switch Networking MIBs continue to be supported
- SNMP configuration
  - SNMP enabled/disabled
  - SNMPv3 users
  - **Trap Recipients**



# **UCS Monitoring and Alerting**

Failure Analysis and Pro-active Support Cases

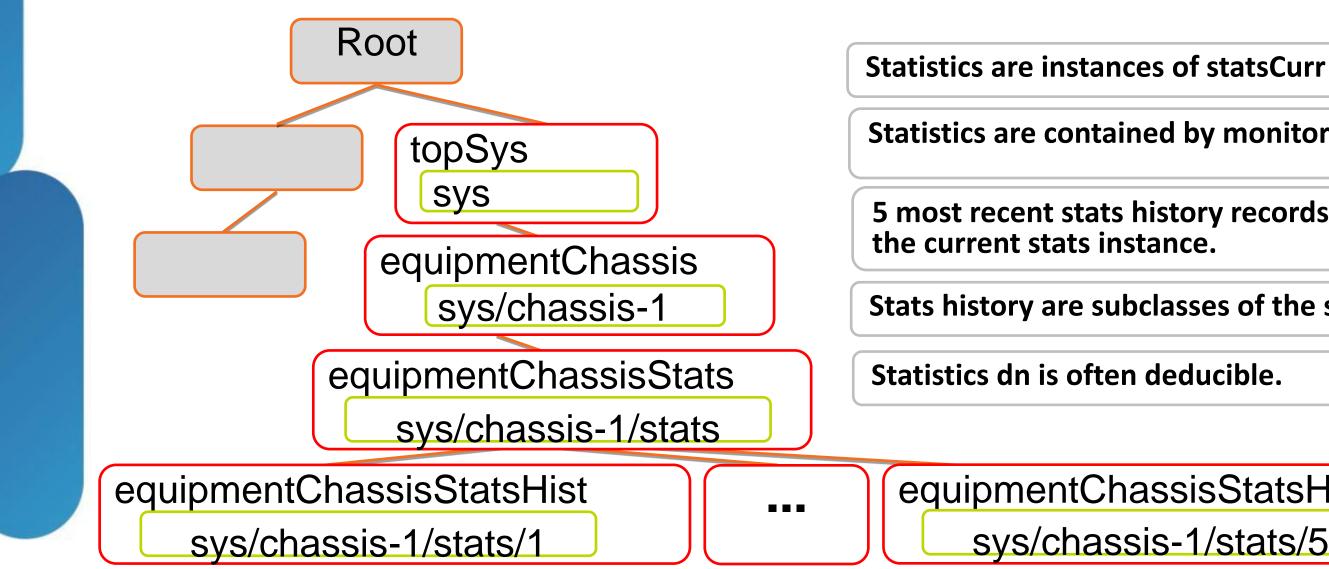
- Smart Call-Home functionality
  - Similar to MDS and Nexus mechanisms
- Alert when thresholds are crossed
  - Thresholds set per organisation for servers
  - Thresholds on UCS infrastructure central
  - Error rates indication of impending component failure
  - SNMP traps
  - Syslog facility

### Call-Home event raised to Cisco support

- Pro-actively open support cases automatically
- RMA defective hardware
- Notification of customer via email and facilities above
- Customer can disable problem server, if profile in a pool, it will reassociate to other server and boot

📥 Ci	sco Unifie	d Computing System Manager	- UCS-TME-LAB	_	
Fa	i 🈋 🍥	🗈 New - 🛛 🏹 Options 🛛 🕢 🕕	0 <u>E</u> xit		altalta cisco
	>> 👬 All	Communication Management	😚 Call Home	4	Call Home
$ \ge $	General	Profiles Call Home Policies System	Inventory Events F	SM	
Eq	🕰 Filter 🛛	👄 Export   📚 Print			
	Cause		Administrative State		<b>F</b>
Ð	association	failed	enabled		
<u>.</u>	configurati		enabled		
	connectivit		enabled		
	election-fai	ilure	enabled		
		-inaccessible	enabled		
	equipment-	-	enabled		
	equipment-	-	enabled		
	fru-problen		enabled		
		establishable	enabled		1
	limit-reache	ed	enabled		
	link-down		enabled		
		nt-services-failure			
		Properties for: Profile CiscoTAC-1			
	power-prol				
	thermal-pr	Level: pormal			
	voltage-pri	Alert Groups: ciscoTac	-		
	version-ind	Email Configuration			1
			Txt		$\sim$
	L	Max Message Size: 5000000			
				Save Changes Reset V	alues
< >		Recipients			
🐴 Log	gged in as a(		ar	System Time: 2010-0	07-27T10:14
		Email			
			•		
			<b>a</b>		
			<b>1</b>		
		~			
		ОК Аррі	y Cancel Help		
			.:	Ciscoli	
	L	hanna an			10
				Ciscol	

# **UCSM Statistics**



### Statistics are contained by monitored object

## 5 most recent stats history records are contained by

### Stats history are subclasses of the stats.

### equipmentChassisStatsHist sys/chassis-1/stats/5



# **Stats Collection Policy**

A Systemwide Set of Stats Collection Policies (One per Application Domain) Allow Configuration of Collection and Reporting Intervals.

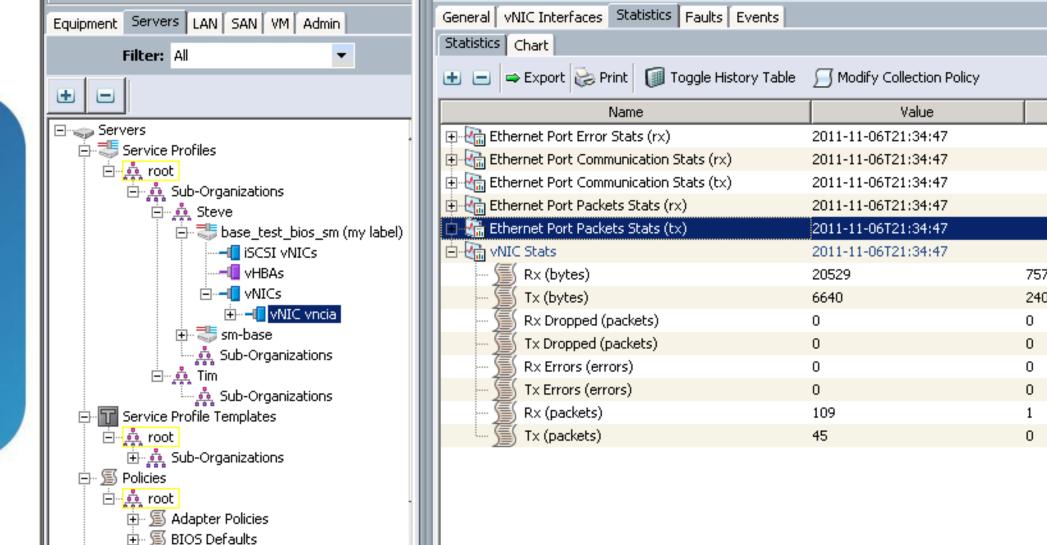
Domains: adapter, chassis, host, port, server

When a Collection Interval Is Changed, the reporting Interval Is Restarted

- collectionInterval: frequency that endpoints will send stats updates to DME
- reportingInterval: frequency that DME will report stats updates to external collectors and update stats history



## **Network Statistics in UCSM** Server to IOM vNIC Port Statistics



Avg	Max	Min	Delta	R
57	7458	0	482	
10	5858	0	0	
	0	0	0	
	0	0	0	
	0	0	0	
	0	0	0	
	44	0	3	
	34	0	0	



# Summary

What we have covered

- UCS Architecture abstracts the server from the hardware which provides elasticity for infrastructure
- Unified I/O and network abstraction reduces the number of cables required to connect to the infrastructure and allows flexibility for connectivity
- Cisco innovation is fundamental in building UCS and emerging virtualisation technologies.
- UCS provides secure multi-tenancy support
- Because UCSM is central to all infrastructure it provides a centralised fault monitoring, alerting, and statistics gather interface with call-home capabilities



# Q & A









# **Complete Your Online Session Evaluation**

### Give us your feedback and receive a Cisco Live 2013 Polo Shirt!

Complete your Overall Event Survey and 5 Session Evaluations.

- Directly from your mobile device on the **Cisco Live Mobile App**
- By visiting the Cisco Live Mobile Site www.ciscoliveaustralia.com/mobile
- Visit any Cisco Live Internet Station located throughout the venue

Polo Shirts can be collected in the World of Solutions on Friday 8 March 12:00pm-2:00pm





communities, and on-demand and live activities throughout the year. Log into your Cisco Live portal and click the "Enter Cisco Live 365" button. www.ciscoliveaustralia.com/portal/login.ww



Don't forget to activate your Cisco Live 365 account for access to all session material,



# CISCO

© 2013 Cisco and/or its affiliates. All rights reserved.

