Cisco DCUCI Quick Reference

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About the Authors

James Casaletto is a technical marketing engineer in the Cisco SAVBU where the Unified Computing System was created. He has written and delivered training, white papers, and demonstrations on the UCS for customers, Cisco employees, and partners from around the globe. He has over 15 years experience in the high-tech industry as an instructor, practitioner, and author in software development and server administration.

Jeremy Moulton is a technical marketing manager for the Cisco SAVBU where the Unified Computing System was created. As part of the SAVBU he was project lead as well as a principle developer for the new product training developed for preparing Internal Cisco employees and Cisco partners for the launch of the Cisco Unified Computing system. Jeremy has over 18 years experience in designing, developing, and delivering technical training for a wide variety of server products. Jeremy was also a contributing author on the Prentice Hall "A+ Certification" guide and preparation video course.

About the Technical Reviewer

Roger Andersson was born in Stockholm, Sweden. He has spent 20 years in the computer industry in both Sweden and the United States. Roger's experience includes more than 12 years in the CLARiiON Engineering Division at EMC and five years at VERITAS/Symantec where Roger worked as a Technical Product Manager focusing on systems management, server, and application automated provisioning. Roger is currently working at Cisco as a Manager, Technical Marketing, where he is focused on the system management aspects of a Unified Computing System.

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Chapter 1

Cisco Unified Computing System and the Data Center

This chapter introduces the evolving compute infrastructure and examines key values of Cisco Unified Computing System (UCS).

Data Center Trends

In this section, we discuss server scalability, server statelessness, virtualization, unified fabric, and infrastructure management.

 Please see page 127 for more details.

Server Trends

Today the push for servers is to do more with less. Servers are designed into smaller form factors that use shared resources such as network and storage access. With the advent of server virtualization on x86 platforms, many servers are consolidated onto single physical computing resources.

These trends maximize space, make more efficient use of power, share network and storage infrastructure, and make it easier to cool the data center.

Figure 1-1 shows these trends.

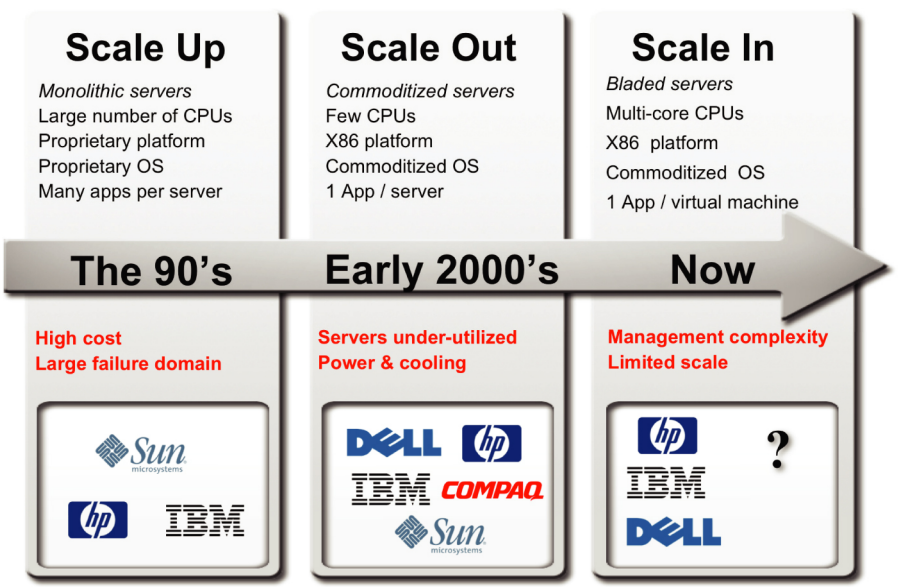


FIGURE 1-1
The Evolution of Server Scalability

 Please see page 127 for more details.

Unified Fabrics

With more servers, we need more cabling for power and LAN, SAN, and management console connectivity. Servers typically have dual connectivity for increased throughput and availability.

By converging LAN and SAN traffic onto the same adapter, the data center is less complex and more efficient.

Figure 1-2 summarizes unified fabrics.

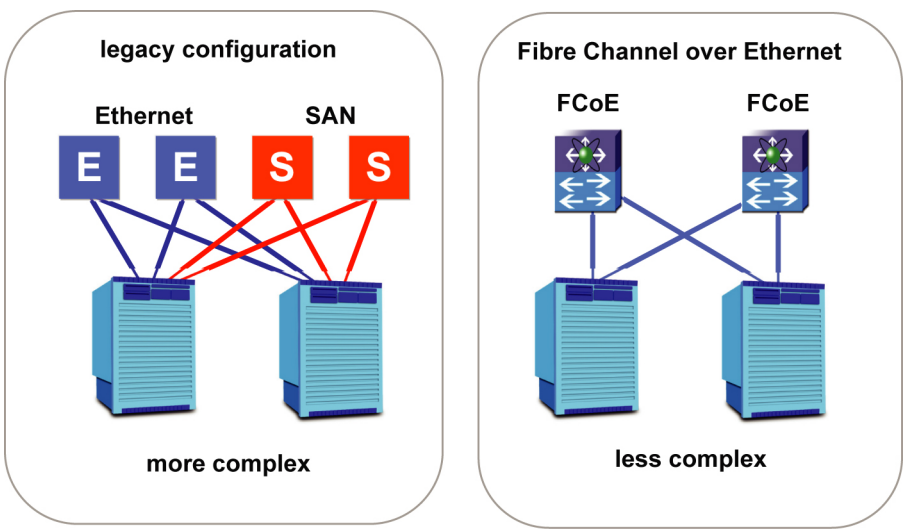


FIGURE 1-2
Unified Fabrics

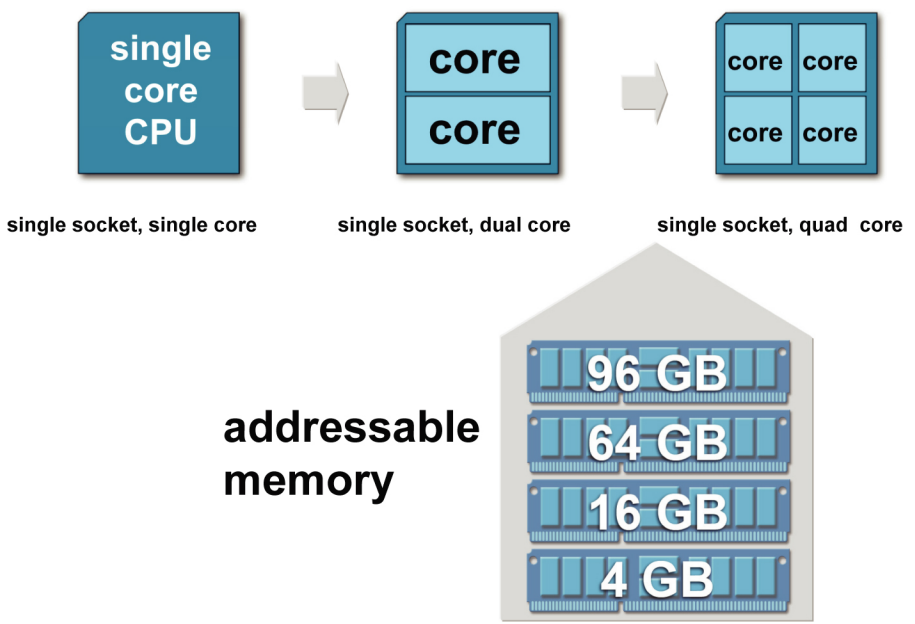
 Please see page 127 for more details.

CPU and Memory

Today server processors have multiple cores to make the space and power required to do computing more efficient. Although the blade sizes have remained the same, processing and memory densities have increased significantly, enabling blades to run more CPU and memory-intensive applications more efficiently.

Figure 1-3 summarizes memory and compute density reduction.

FIGURE 1-3
CPU and Memory Densities



 Please see page 127 for more details.

Statelessness

Statelessness in blade computing refers to the encapsulation of identity, personality, and connectivity in servers.

Some examples of server identities include

- **MAC addresses** for Ethernet connectivity
- **Worldwide names** for Fibre Channel connectivity
- **UUIDs** for applications and platforms such as ESX

Figure 1-4 summarizes hardware identities.

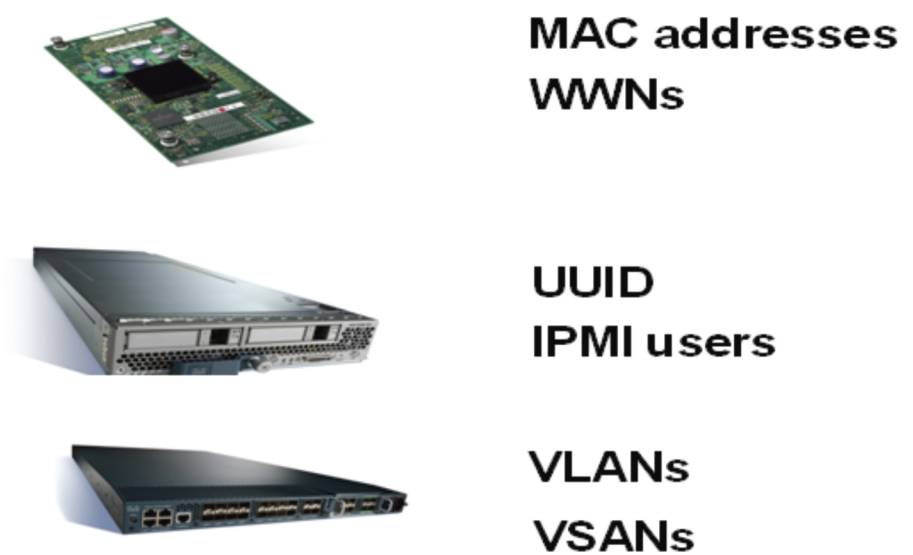


FIGURE 1-4
Hardware Identities

 Please see page 127 for more details.

Some examples of server personalities include

- **Firmware versions** for the BIOS and adapter
- **Boot order** for operating systems
- **Quality of service** (QoS) for network traffic

Figure 1-5 summarizes hardware personalities.

FIGURE 1-5
Hardware Personalities

 Please see page 127 for more details.

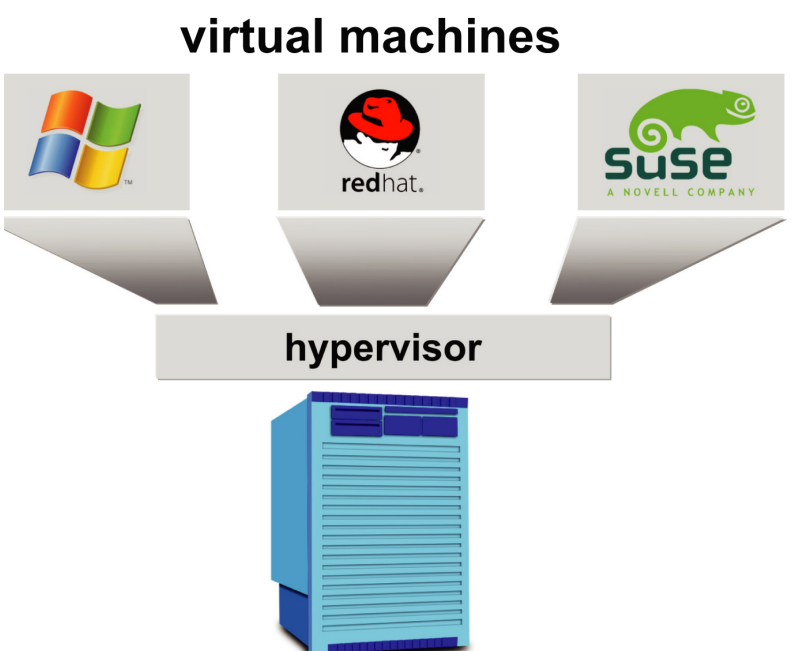
Virtualization

Server virtualization technology has enabled companies to easily consolidate servers in the data center. With the commoditized server model, one physical server was typically dedicated for each application. With virtualization, many servers (each running in independent virtual machines) can run on a single physical server, which provides a number of advantages including

- Better use of computing resources
- Higher server densities
- Seamless server migrations

Figure 1-6 depicts a virtualized compute environment

FIGURE 1-6
Virtualization



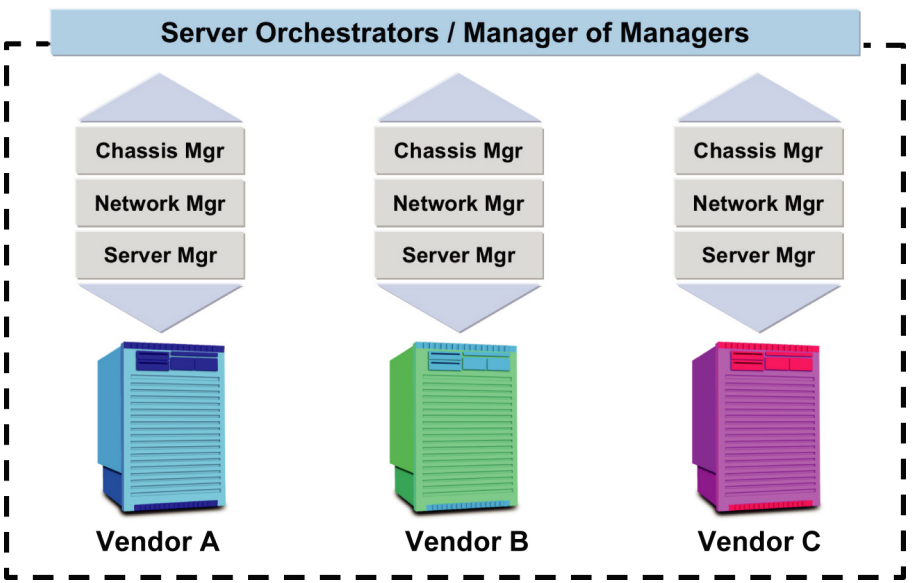
 Please see page 127 for more details.

Complex Server Management

Although data center trends have reduced much of the infrastructure required in the data center, servers (and the virtual machines running on them) continue to sprawl. Server sprawl has increased the challenges of managing a diverse environment. To address this challenge, both server vendors and third-party companies have developed software to centralize systems management.

Figure 1-7 depicts a centralized management hierarchy.

FIGURE 1-7
Server Management Hierarchy



 Please see page 127 for more details.

Key UCS Values

In this section, we discuss key values of using the Cisco UCS.

Simplified Management

UCS Manager (UCSM) software is a singularly installed piece of software that manages all endpoints in the UCS system. UCSM is embedded within the UCS and runs on the fabric interconnects in a high availability configuration. These endpoints include the servers (and their BIOS and adapters), chassis (and their fan modules, power supplies, and IO modules), and fabric interconnects (and their fan modules, power supplies, and expansion cards).

With UCS, IT can manage from 1 to 40 chassis and up to 320 blades. UCSM provides the following features:

- GUI and CLI interfaces
- Open XML interface
- Support for many industry-standard management protocols such as SNMP, SMASH-CLP, and CIM-XML
- Partner relationships with key systems management vendors

Unified Fabric

The UCS uses 10 gigabit Ethernet and Fibre Channel over Ethernet (FCoE) on a single infrastructure to optimize power and cooling and significantly reduce cabling requirements.

Improved Scalability

UCSM can rapidly deploy servers using service profiles and templates. Hardware can automatically be placed into pools and immediately made available for use. There are no “bolt on” additions to UCSM as the system grows–the same software manages from 1 to 320 servers. UCS also scales vertically with support for blades containing up to 384 GB of memory.

 Please see page 127 for more details.

Extended Statelessness

UCSM, through the use of service profiles, can ensure that all critical server identities and behaviors are faithfully reproduced as the service profile is moved to different blades. This includes managing

- **Identity**: For example, MAC, UUID, WWN
- **Behavior:** For example, firmware
- **Connectivity:** For example, number of vNICs

Enhanced Virtualization

The UCS was designed to enhance server virtualization. Virtualization has the following features on the UCS:

- UCS has virtualized interface cards that are VM-aware.
- UCS supports blades with up to 320 GB memory, thereby mitigating the memory bottleneck often associated in virtualized environments.
- UCS CPUs are designed to enhance VM performance.

Summary

In Chapter 1, we discussed the evolution of servers in the data center and presented an overview of key UCS values.

 Please see page 127 for more details.