Data Center Transformation through Automation: Achieve Breakthrough Gains in Efficiency

What You Will Learn

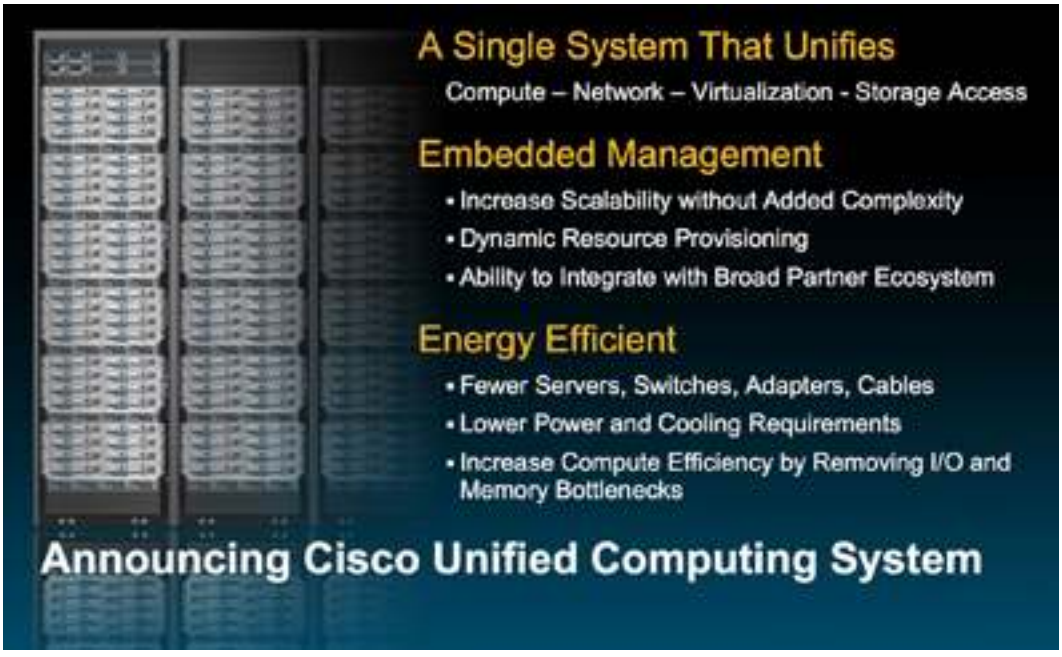
Many IT departments have begun to virtualize their infrastructure as a means of reducing capital expenditures (CapEx) and increase agility. In fact, some analysts predict that there will be a ten-fold increase in the adoption of virtualization over the next five years, and within the next two years, it is likely that more than 50 percent of the computing infrastructure in data centers will be virtualized.

This document presents some of the main challenges in virtualization today and the dramatic benefits received from the Cisco® Unified Computing System with BMC BladeLogic.

Meeting the Challenges of Virtualization with Cisco and BMC Solutions

Virtualization is creating a market transition in which servers have become objects that move throughout the network. The data center networking and compute infrastructure needs to evolve to support this change. The Cisco Unified Computing System integrates a low-latency unified network fabric with enterprise-class, x86 architecture servers along with virtualization resources and management software (Figure 1).

Figure 1. The Cisco Unified Computing System Integrates Network, Compute,Virtualization Resources, and Management Software in a Single Cohesive System



The Cisco Unified Computing System is an integrated, scalable, modular platform in which all resources participate in a unified management domain. A single system scales to up to 40 blade chassis, 320 compute nodes, and thousands of virtual machines. The system is integrated through the Cisco Unified Computing System (UCS) Manager. The Cisco UCS Manager is embedded in the Cisco Unified Computing System components and fabric interconnects, managing all aspects of system configuration and operation. This eliminates the need to use separate

element managers for each system component. The Cisco UCS Manager supports an intuitive GUI with both command-line interface (CLI) and XML API options. Through the XML API, Cisco UCS Manager can integrate with other management tools and upload its configuration database of Cisco Unified Computing System component information to enterprise-level configuration management databases (CMDBs), such as the BMC Atrium CMDB. BMC BladeLogic for Cisco UCS is integrated with Cisco UCS Manager out-of-the-box to automate provisioning and ongoing configuration of the full service stack (Cisco Unified Computing System resources, operating systems and applications).

BMC BladeLogic for Cisco UCS is offered directly from Cisco as a default option in the Cisco Unified Computing System. The BMC BladeLogic software extends the capabilities of the Cisco Unified Computing System to automate the provisioning and configuration of enterprise applications, middleware, and OS software in concert with the UCS resources.

Because Cisco UCS is integrated with BMC BladeLogic out-of-the-box, Cisco UCS can also be managed as part of a broader Business Service Management (BSM) approach (for more information, please visit http://www.bmc.com/bsm).

Based on industry standards, the Cisco Unified Computing System provides a major improvement in data center efficiency and agility with tightly integrated management software. Multiple technical innovations by Cisco and its extensive partner ecosystem enables much lower CapEx (up to 20 percent) and reduced operating expenses (OpEx; up to 35 percent) compared to competitive solutions for enterprise virtualized data centers. By packaging the Cisco Unified Computing System with BMC management solutions to automate and manage mission-critical and virtual IT infrastructure, you can deliver on the full promise of virtualization while dramatically reducing configuration and management effort. The combined solution helps enable customers to rapidly provision fully configured business services in minutes rather than days and weeks with real-time insight into the business relationship of the Cisco Unified Computing System components and applications.

Management Challenges

Virtualization has been largely successful in reducing the CapEx associated with data center assets, delivering higher utilization rates and shared compute workloads. However, most IT departments may not expect virtualization to also result in increased system administration staff and OpEx due to increased complexity. For example:

- A routine task by system administrators to determine the current state of a workload and its associated components (hardware and software details and settings) is far more complex in a virtualized environment. Every rack-mount or blade server and chassis is a separate point of management, each having its own unique identity and I/O configuration that is tied to the hardware, reducing the ability to respond quickly to workload changes. More complexity can mean the difference between preventing a significant service interruption for the business and having to instead respond to an outage by reassigning multiple administrators from several siloed areas to manually investigate and resolve the outage after it occurs.
- Administrative tasks, such as compliance and auditing, have become more labor intensive due to the increased volume and complexity of virtualized environments.
- The multiple activities associated with adding or changing server, network, and application components are largely manual today, performed by multiple platform tools that add to operational complexity and licensing costs. Routine changes for new or changed capacity can take days or weeks to implement, depending on the complexity of the environment, scale of provisioning, and silos of technology.
- Virtual server sprawl has resulted from the notion that virtual machines are “free,” yet the IT departments that support these virtual machines know that they introduce a new set of challenges. The increasing number of components in data center environments has increased the difficulty of securing both networks and storage to meet the same standards as discrete servers and operating systems.

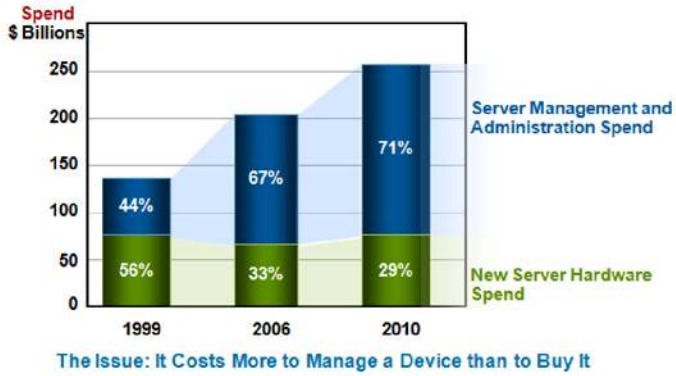
- Shared storage is a requirement to use some of virtualization's best features, including dynamic virtual machine movement and high availability. When access to a Fibre Channel SAN is added to every server in a rack, the required number of cables, adapters, and upstream switch ports increases dramatically.
- According to Forrester (December 2008), more than 70 percent of today's average IT budget is spent maintaining existing inflexible and siloed data center equipment. Data center owners are challenged with unifying and scaling separate virtualized environments. They are struggling to do the following:
  - Maintain consistent and coherent infrastructure policies in this new virtualized environment
  - Adapt current management tools and methods to the changing and increasingly interdependent roles of data center administrators
  - Simplify operations when their infrastructure is inflexible, underutilized, and lacking cohesive integration

As serious as these challenges are, a variety of economic forces are nonetheless causing companies to decrease IT resources and budgets. Fewer administrators are being tasked with managing a much larger population of servers and network components than ever before. As a result, IT departments must deal with significant increases in staff and operational requirements, while delivering even greater service levels with fewer people. Simply put, increasing demands and tighter budgets are forcing IT leaders to rethink the traditional data center architecture with its network, compute, storage, and applications silos. Breakthroughs are needed to unify and simplify the virtualization, network, and compute platforms to enable automation and increase business agility. The complexity of data center management makes supporting the business, controlling costs, and responding to business changes even more challenging. Often a business customer is so focused on its requirements that it is not aware of everything the IT team does to manage this environment. The customer sees only products, offerings, customer service, and employee productivity; the business does not have visibility into the great complexity of the hidden infrastructure.

The business does not see that IT is dealing with infrastructure sprawl, low asset utilization, and high operations overhead. Business customers may not be aware of how difficult this environment is to manage, scale, optimize, reconfigure, and maintain. This complexity makes it more difficult to deliver new business services because IT can become so focused on providing basic service and has little or no time to work on initiatives to support the company's growth.

This situation is further complicated by a major shift in costs. In the past, labor was inexpensive and computers were very costly. Today, computers are cheap and labor is expensive. In fact, managing a server is nearly three times more expensive than buying one (Figure 2).

Figure 2. The Cost of Managing Devices



In addition to labor costs, IT departments are concerned about the power, cooling, and space costs for data centers. These expenses are so significant that some companies have moved entire data centers to less expensive locations

simply to save on utility and real estate costs. Many other IT departments have been able to contain these costs through server consolidation and virtualization, but they still need to deal with the complexity of managing this new environment.

As a result of the virtualization revolution of the past few years, new standards, technologies, and integration conventions are emerging. These innovations have enabled the design of a pre-integrated data center solution with industry-standard components, rather than requiring IT staff or consultants to integrate their own network, computing, and virtualization platforms to create a data center solution. The Cisco Unified Computing System is an innovative data center computing system with management software that is designed to address these challenges in the data center.

Evolution of the Data Center

It is easy to understand the challenges for IT departments by comparing the capabilities of IT today to an early production line process. Production provisioning of data center computing is labor intensive, with many IT specialists performing routine tasks, such as moving or installing servers in the data center. Simple changes require recabling of equipment and implementation of new and changed configuration settings for the server, network, storage devices, and interfaces. Complex changes are often backlogged due to the technical complexity of integration, precise planning, and implementation of the steps needed and the time required to perform the tasks.

To put this challenge in perspective, consider the changes in automobile manufacturing processes and customer requirements through the years. In the beginning, vehicles were built on assembly lines, the work was performed manually, and the number of features was limited. Earlier car models did not have cruise control or warning notifications for many critical functions. The cars did not have built-in navigation systems, power locks, or backup cameras and LCD screens that allow you to clearly see behind you when you back up a car: features that are now readily available.

As time went on, manufacturing processes evolved. Additional best practices were built into the manufacturing processes to simplify and standardize automation. Improved processes also enabled automobile dealers to build “smarter” cars that provided more value to consumers, while more sections of the assembly line became automated based on best-practice processes. This automation facilitated consistency in manufacturing and helped reduce costs.

As a result, automobile manufacturers designed and manufactured vehicles that became more responsive to market demands. Consumers benefited from quality changes in vehicle production and improved processes. The vehicles became easier to operate and maintain. Drivers received a warning when service was due or when a problem occurred in the engine, battery, or other car components. These kinds of innovations reduced the number of decisions required by drivers and support personnel.

Just as process improvements and standardization helped the automobile manufacturing industry, IT has made significant progress with the standardization of IT processes and infrastructure elements. Yet whereas automobile technology innovations and best practices evolved over many years, the Cisco Unified Computing System,

Cisco Data Center 3.0 vision, and IT management best practices are progressing much more rapidly, with capabilities to dramatically simplify, standardize, and automate virtual environments that were unheard of just a couple of years ago.

Many IT departments have been trying to standardize, simplify, and automate processes to respond to business requirements on their own. However, “home grown” data center architectures and integration efforts are typically very costly and often fragmented. Adoption of best practice processes and methods, including those found in the Information Technology Infrastructure Library (ITIL) Version 3, helps, but the effort is labor intensive due to the technical complexities and the burden placed on IT to integrate technology silos, complexity, and processes. Among

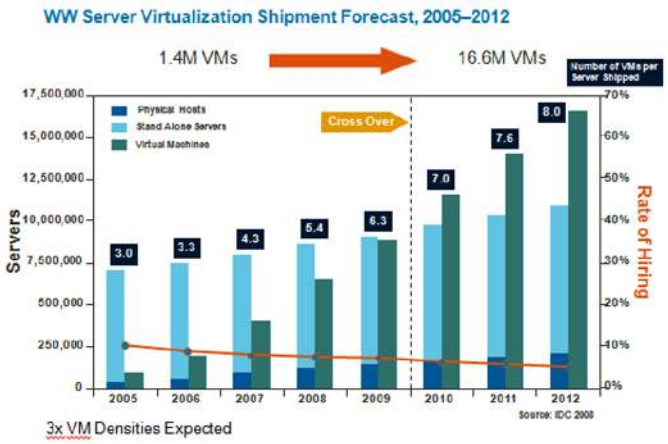
the biggest IT challenges today are the lack of flexibility and the cost of IT management, which constrain the capability to keep pace with rapidly changing business conditions.

Effect of Virtualization

Virtualization is dramatically changing the data center architecture. Many IT departments are achieving some of the benefits of virtualization, including reduced costs for facilities and power, better server utilization, higher service levels, and faster deployment of applications. In 2008, according to IDC, 38 percent of all IT workloads were virtualized. This trend is continuing as the majority of IT executives are planning to virtualize more than 50 percent of their computing infrastructure within the next 2 years. In2008, the average enterprise deploying virtualization could expect a return on investment (ROI) of more than 400percent and payback within 12 months. This payback is largely the result of server consolidation, increased utilization, and higher availability.

Who will manage those servers? IDC estimates the number of computer administrators and associated job functions will increase 2.7 percent each year from 2006 to 2016. As Figure 3 indicates, the number of virtual machines will increase dramatically, but the ratio of administrators to machines will drop dramatically.

Figure 3. Effect of Server Virtualization



This trend sets up a big operational problem as the environment grows far more quickly than the support staff's ability to control it. As a result, organizations need to address the following concerns:

- How to manage exponentially increasing numbers of disconnected physical and virtual computing, storage, and network resources
- How to most effectively adopt best-practice processes, such as those found in ITIL, that are not labor intensive as a result of technology complexities and integration requirements

Current approaches to data center design and common data center management practices have failed to meet the increasing needs of business and are increasing the cost of IT. That is why the challenges in the data center need to be addressed by rethinking the data center architecture and adopting a best practice-based management approach. Just as automobile manufacturers discovered that processes could be automated to reduce costs and increase efficiency and quality, IT departments can benefit from a unified and simplified computing system. The Cisco Unified Computing System is a next-generation data center platform that unites compute, network, storage access, virtualization, and management into a cohesive system designed to reduce total cost of ownership (TCO) and increase business agility.

Cisco Unified Computing System

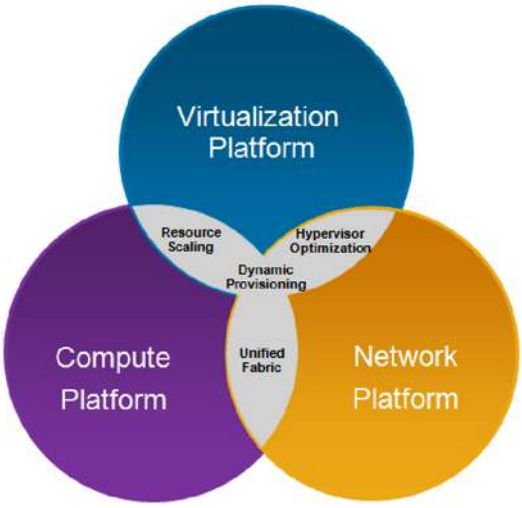
The Cisco Unified Computing System integrates a low-latency, lossless 10 Gigabit Ethernet unified network fabric with enterprise-class, x86-architecture servers along with virtualization resources and management software. The system is an integrated, scalable, multi-chassis platform in which all resources participate in a unified management domain. The main system components, illustrated in Figure 4, include:

- **Compute:** The system includes a new class of computing systems that incorporates blade servers based on the Intel Xeon processor 5500 series. The blade servers offer patented Cisco Extended Memory Technology to support applications with large data sets and allow more virtual machines per server.
- **Network:** The system offers integration onto a low-latency, lossless, 10-Gbps unified network fabric. This network foundation consolidates what today are three separate networks: LANs, SANs, and high-performance computing networks. The unified fabric lowers costs by reducing the number of network adapters, switches, and cables and by decreasing power and cooling requirements.
- **Virtualization:** The system helps achieve the full potential of virtualization by enhancing the scalability, performance, and operational control of virtual environments. Cisco security, policy enforcement, and diagnostic features are now extended into virtualized environments to better support changing business and IT requirements.
- **Storage Access:** The system offers consolidated access to both SAN storage and network attached storage (NAS) over the unified fabric. The Cisco Unified Computing System can access storage over Ethernet, Fibre Channel, Fibre Channel over Ethernet (FCoE), and Small Computer System Interface over IP (iSCSI), giving customers choice and investment protection. Administrators can pre-assign storage access policies for system connectivity to storage resources, simplifying storage connectivity and management.
- **Management:** The unique integration of all Cisco Unified Computing System components enables the entire solution to be managed as a single entity through Cisco UCS Manager software. Cisco UCS Manager provides an intuitive GUI, a command-line interface (CLI), and a robust API to manage all system configuration and operations. Cisco UCS Manager enables storage, network, and server administrators to collaborate on definition of service profiles, which are logical representations of desired physical configurations and infrastructure policies. Managed by BMC BladeLogic, these policies can be automatically provisioned in concert with the related software, Hypervisor, OS and application stack, to dramatically reduce cost and effort while increasing business agility. The result is that data center managers can now provision entire business services in minutes instead of days or weeks as in the past and do so much more consistently without the high error rates found in manual provisioning efforts.

Working as a single cohesive system, these components unify technology in the data center. The system offers a radical simplification in comparison to traditional systems, helping simplify data center operations while reducing power and cooling requirements. This approach can dramatically simplify and enable automation of many of the manual tasks performed today, including the capability to do the following:

- Track and account for virtualization and physical resources and their workloads
- Use a single management console for virtualized and physical network and server environments
- Significantly reduce manual steps and cycle time for server and network infrastructure provisioning and change requests
- Automate key operations processes, including change management, configuration and asset management, security management, incident management, capacity management, and business continuance for disaster recovery

Figure 4. Cisco Unified Computing System



Dramatically Simplified Architecture

The Cisco Unified Computing System architecture integrates network, computing, storage access, and virtualization platforms into a single, highly available and cohesive system. With hundreds of servers and thousands of virtual machines managed as a single system, this approach decouples scale from complexity. The market transition to virtualization, which Cisco is implementing as unified computing, signifies the natural evolution of the data center to link data center resources within a cohesive management framework. It brings infrastructure policy consistency and transparency—traditionally delivered by the network—to the virtual machine level. Increasingly, the network is becoming the foundational infrastructure of the data center.

This architectural shift will have a profound, positive effect on traditional data center administrator roles. Unifying and embedding management at the system level creates the opportunity to increase flexibility and join multiple administrator roles within the same system. With embedded role-based management, IT departments can make more efficient use of their administrator resources. Server, network, and storage administrators can preserve accountability for their domain policies while interoperating within a single integrated management environment.

Computing infrastructure can then be provisioned and changed without the cumbersome, time-consuming coordination required by older infrastructure. As data center roles and policies evolve, individual responsibilities and system privileges can be easily modified and new roles quickly created.

Unified computing will accelerate adoption of virtualization and increase the returns. Unification of virtualization, network, and compute resources creates the opportunity to provide the same level of network visibility for virtualized environments that is expected and required for physical servers. It automates the migration of virtual machines while maintaining network policies. Administrators can now have visibility into the network all the way to the virtual machine, helping them diagnose and ensure policy consistency with ease and confidence. Unified computing integrates policy-based virtual machine connectivity, mobility of network properties with the virtual machine, and a consistent operational model for both physical and virtual environments. This approach simplifies network and security policy enforcement when virtual machines are migrated from one host to another.

The Cisco Unified Computing System centralizes switching resources, reducing network access-layer fragmentation by eliminating switching inside the blade chassis. The architecture uses a unified fabric, which provides transport for LAN, storage, management, and high-performance computing traffic over a single cohesive infrastructure. This approach can consolidate or entirely eliminate multiple server adapters, chassis switches, cables, and other

supporting infrastructure. This simplification can reduce the supporting infrastructure—with its power, cooling, management, and security requirements by half compared to traditional computing environments.

With management simplified and embedded, data center administrators can now use centralized management capabilities within a unified management domain that serves as the central nervous system of the Cisco Unified Computing System. Embedded device-management software can manage a system with hundreds of servers and thousands of virtual machines as a single, highly available, coherent system. This embedded approach allows multiple administrator roles to interact dynamically in managing infrastructure and its policies. It lets administrators encapsulate the infrastructure policies needed to deploy applications into mobile, repeatable constructs called service profiles.

The unified computing architecture is optimized for virtualized environments, from the processor to the network access layer. The latest industry-standard processor technology enables better virtualization performance, superb scalability, and enhanced flexibility. By balancing CPU and I/O capabilities while increasing the memory capacity of the servers, more virtual machines can be hosted per server than ever before. By providing visibility and portability for network policies and security all the way to the virtual machine, a consistent operational model can be implemented between the physical and virtual environments. The Cisco Unified Computing System is designed in anticipation of future advances of technology to increase ROI today while protecting that investment over time. The blade server chassis, power supplies, and midplane are capable of handling future servers with even greater processing capacity. For example, the chassis is ready to support future 40 Gigabit Ethernet standards when they are available.

The Cisco and BMC Partnership: Automating Best-Practice Processes for the Data Center

Cisco has partnered with BMC to deliver a single platform for provisioning, configuring, and managing the Cisco Unified Computing System infrastructure in conjunction with the hypervisor, OS, and application stacks. Utilizing the industry-standard XML API (Figure 5) inherent in the Cisco Unified Computing System, BMC BladeLogic provides customers additional value at lower cost by combining BMC's industry-leading IT management capabilities with the Cisco Unified Computing System. This combined solution gives system administrators a clear line of sight across their infrastructure and applications with a holistic view that will completely transform data centers, eliminating the need for vast amounts of labor in the deployment, configuration, provisioning, management, and monitoring of virtual environments.

Figure 5. Cisco UCS Manager Integration with Systems Management Software, including BMC BladeLogic, through the XML API

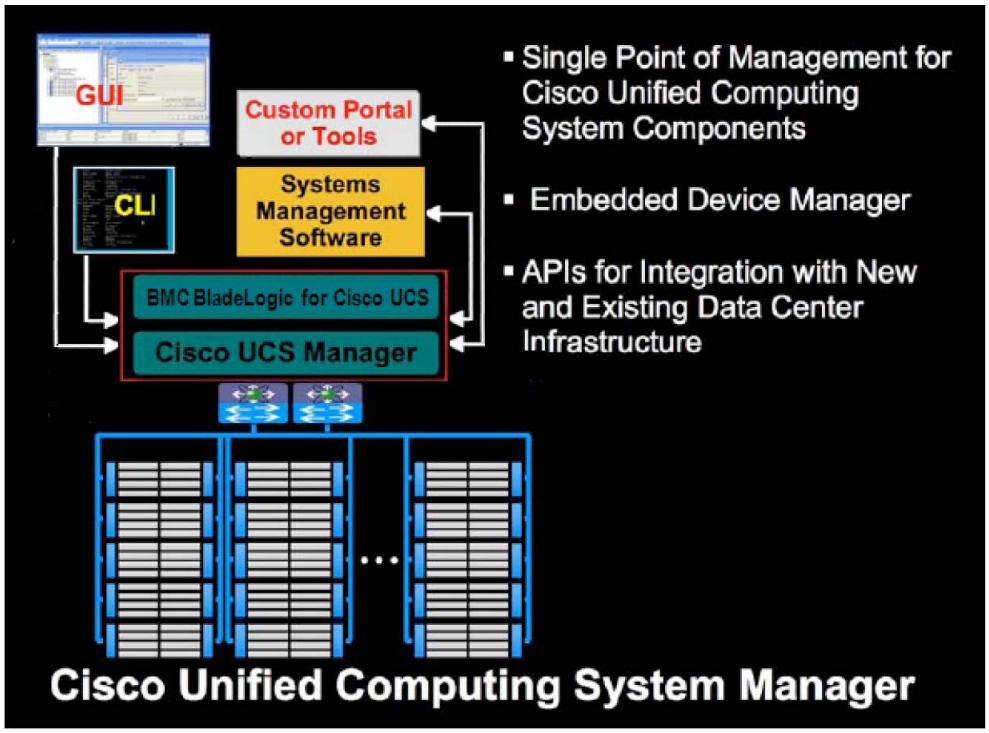
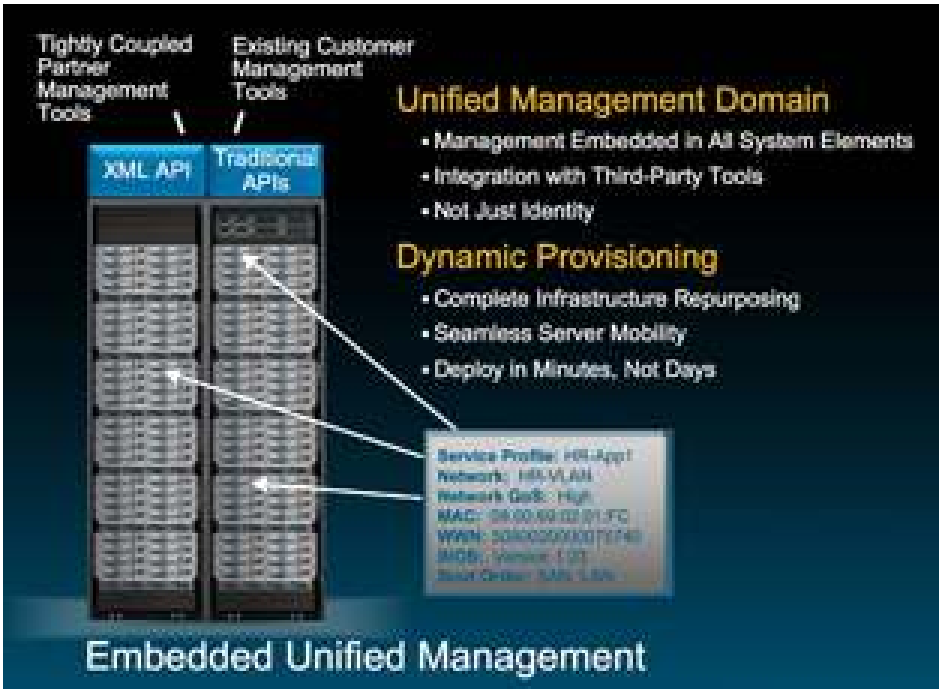


Figure 6. Cisco UCS Manager Industry-Standard XML API for Interface with BMC BladeLogic and 3rd-Party Management Tools



Process Improvements

The Cisco and BMC solution fully automates provisioning and configuration of mission-critical business services, supporting both applications and the underlying virtual and physical resources. It provides the capability to effectively manage private (i.e. internal) clouds along with network and storage elements. IT staff can now work from a single console to improve processes that enable IT departments to do the following:

- Standardize and automate system administration to simplify operational tasks and deliver network connectivity directly to virtual machines.
- Reduce the risks associated with changes to the IT infrastructure by automating provisioning and management of configuration information, greatly reducing the time, effort, and risk associated with provisioning new servers and updating and patching existing servers.
- Reconfigure environments much more rapidly than previously possible and with higher quality.
- Unify and simplify virtualization, network, and computing platforms to dramatically simplify system administration. Your IT staff will be able to wire once, with low-latency fiber connections and Ethernet. The virtualization-aware capability enables network visibility into individual virtual machines.
- Virtualize applications that are memory and I/O intensive, increasing the CPU processing power and memory available to applications, which will help eliminate I/O bottlenecks.
- Access virtualized hardware resources to configure and reconfigure processors, memory, and storage in real time, rather than having to purchase new hardware equipment. This capability provides fine-grained control of and visibility into network, compute, and storage attributes.
- Rapidly provision virtualized and physical server configurations, streamlining the process for provisioning higher-level operating system and applications. This capability enables automated, dynamic provisioning and configuration of the full technology stack: network components, hardware resources, physical and virtual server instances, and business applications.
- Reduce cycle time by eliminating handoffs and errors from labor-intensive tasks through the automation of operating system and application-stack provisioning.

The Cisco and BMC integrated solution also enables data center managers to align with best-practice frameworks. Several frameworks and standards have emerged for IT service management, security, and governance controls. These frameworks, such as ITIL and Control Objectives for Information and Related Technology (COBIT) are supported by BMC solutions and Cisco UCS and can be blended with your company-specific needs to standardize daily operations tasks and to outline processes for provisioning new applications and infrastructure.

Table 1 provides an example of the way that the infrastructure can quickly address business changes. Assume that your IT department needs to accelerate business changes. Applications are being developed rapidly to respond to enterprise needs and innovation. However, there are significant wait times to provide the base infrastructure for these applications. With Cisco UCS, the setup times can be reduced, enabling administrators to meet business demands. They can accelerate the provisioning process for application infrastructure and remove bottlenecks to create better business outcomes.

Table 1. Example of Tasks With and Without Cisco Unified Computing System and BMC

Task	Without Cisco Unified Computing System	Process Improvements with Cisco Unified Computing System and BMC
Establish production infrastructure and applications	7 to 14 days	Minutes
Establish test environment infrastructure and applications	14 to 28 days	Minutes
Establish development infrastructure and applications	14 to 21 days	Minutes

The Cisco Unified Computing System, combined with BMC BladeLogic, enables a new era of process simplification, automation, and management agility to respond to business needs. It addresses people-related needs by providing policy-based roles and responsibilities, rules and monitoring to help ensure compliance, and, when used in conjunction with other BMC solutions such as BMC Remedy Service Desk and BMC Remedy Change Management, provides predefined escalations and approvals, and process models for standardization of activities.

One of the most onerous tasks in data center operations today is tracking and accounting for the state of all computing assets, including their attributes and relationships. Numerous changes make the configuration management task especially difficult, with manual dependencies and high error rates. With hundreds of changes occurring monthly across multiple separate systems, including virtualized environments, the labor-intensive task of updating CMDBs is subject to errors and incomplete information. The Cisco Unified Computing System enables the single auto discovery of resource information with a standard XML interface for respective CMDBs, eliminating manual entry of state information and improving the timeliness and accuracy of CMDB information. Pre-integration of BMC's CMDB capability (Atrium) and the Cisco Unified Computing System is an example of the integration between Cisco and BMC.

Collaboration Improves the Management of Controls

In a highly virtualized environment, six areas of management controls and processes are crucial: access, change, configuration, release, service levels, and resolution. To successfully manage virtual computing systems, various teams need to work together effectively on these controls and process activities. Currently, this work is typically performed manually. For example, the service-level management team typically monitors processes from an event perspective, but the service level is not correlated with the business effects. Incident resolution is often delayed because of manual correlation of event data and, many times, the use of multiple element managers.

With the Cisco Unified Computing System, you can automate and effectively manage these controls for your various IT teams:

- **Access Management:** The primary access management control is the way that you determine access privileges. Access rights to manage the Cisco Unified Computing System is role-based (both in Cisco UCS Manager and BMC BladeLogic), with access tied to roles rather than to people and departments.
- **Capacity Management:** The Cisco Unified Computing System offers the capability to scale up, scale down, add, and remove IT services. Capacity management helps ensure that IT services can be modified so that the system can effectively handle these changes. Additionally, capacity management helps IT departments plan for future infrastructure needs.
- **Change Management:** The greatest change management issue is the way that multiple groups work together and orchestrate changes to meet business requirements while not affecting service availability. The Cisco UCS Manager and BMC BladeLogic orchestrates and automates the execution of change requests to help ensure error-free and rapid change execution.
- **Configuration Management:** Getting disparate teams to agree on service policies can be a challenge let alone defining and maintaining them in a consistent manner. Cisco UCS Manager and BMC BladeLogic both use a policy-based approach for configuration change, provisioning, and compliance, eliminating areas of contention.
- **Release Management:** Integration of build and release functions among different teams can be difficult to accomplish with multiple manual handoffs that can result in configuration errors. The Cisco Unified Computing System enables the use of a virtualized definitive software library (DSL) to facilitate this integration and with BMC BladeLogic offers seamless full stack provisioning.

- **Service-Level Management:** In an ever-changing environment, meeting service levels is critical. The system focuses on dynamic thresholding, instead of static thresholding, which requires manual maintenance and often lags actual system usage patterns.
- **Incident Management:** One of the biggest challenges in IT is anticipating issues before they affect business services and generate incidents. Cisco UCS helps you move from reactive root-cause analyses to prediction, which lets you identify a pending issue and automatically repair it to alleviate service outages.

By using Cisco UCS and BMC BladeLogic, data centers can achieve many benefits that affect critical initiatives such as those listed in Table 2.

Table 2. Critical initiatives Achieved with Cisco Unified Computing System

Critical Initiatives	Key Metrics
Data Center Consolidation	Higher utilization ratio; improved administrator-to-server ratio; and reduced space, power, cooling, and points of management
Security and Quality-of-Service (QoS) Management	Reduced security incidents
Dynamic Application Release and Change Availability	Meet or exceed release cycle objectives and provide increased service availability
Service Continuity and Disaster Recovery	Meet or exceed recovery point and recovery time objectives

Business Benefits

Cisco UCS Manager combined with BMC BladeLogic speeds implementation for customers seeking the business benefits of a unified and simplified compute, network, and virtualization platform along with powerful enterprise software management for IT workflow management, and deployment of ITIL-based practices. The dramatic simplification of today's complex systems and unification of silos of technology through Cisco UCS delivers significant CapEx and OpEx savings. Exceptional levels of automation are enabled, reducing provisioning and change management costs and the cycle time for infrastructure and applications from days and weeks to minutes. The full benefits of virtualization can now be achieved, yielding business advantage and agility, reduced costs, and simplified management at the same time.

Taking the Unified Computing System to the Next Level

Extending the capabilities of the Cisco Unified Computing System, BMC offers solutions that address additional requirements for your critical IT initiatives, such as those related to:

- IT service management
- Data center consolidation
- Dynamic application release and change management
- Service continuity and disaster recovery
- Compliance

With BMC BladeLogic, Cisco Unified Computing System customers can take advantage of out-of-the-box integration to BMC's Business Service Management solutions, such as the BMC Remedy IT Service Management suite. The suite reduces complexity and makes customer support, change management, and asset management more integrated and efficient. It provides greater business transparency, visibility, and control across all service support activities with one solution.

BMC solutions provide exceptional compliance and audit functions across physical and virtual environments. Using the same core components that are included with every instance of BMC BladeLogic for the Cisco Unified Computing System, administrators can activate additional content to manage compliance for Sarbanes-Oxley,

Payment Card Industry (PCI), Center for Internet Security (CIS), and other regulations. Additionally, administrators can perform real-time audits of physical, virtual, and Cisco Unified Computing System computing environments, allowing organizations to enforce configuration polices and detect and resolve unplanned change in an environment. For example, an organization could make sure that all guest virtual machines have at least 2 GB of RAM or that certain TCP/IP ports are disabled.

The compliance modules also integrate with leading IT service management solutions, such as the BMC Remedy Service Desk or BMC Remedy Change Management. This capability enables administrators to automate the paperwork related to change management, including automated creation of change records and requests, automated creation of incidents and remediation actions when a compliance violation is found, and automated enrichment of incidents.

BMC can also help you deploy a service catalog for all services running in your environment, enabling end users to request a complete service and have that request be fulfilled automatically through Cisco UCS Manager and BMC BladeLogic.

Conclusion

Working together, BMC and Cisco have eliminated the limitations found in the complex, labor-intensive computing system architectures of the past. With the Cisco Unified Computing System, data center staff can manage more resources with less effort, and provide higher levels of service while reducing risk. The Cisco Unified Computing System provides standardized, automated delivery of mission-critical business services, with integrated management out-of-the-box through Cisco UCS Manager and BMC BladeLogic. This powerful integration of management software helps IT departments reduce the cost and complexity of managing large-scale virtualized resources while also increasing their responsiveness to business demands.

For More Information

- For more information about BMC solutions, visit http://www.bmc.com.
- For more information about Cisco and the Cisco Unified Computing System, visit http://www.cisco.com/go/ucs and http://www.cisco.com/go/unifiedcomputing.

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