White Paper

Increase Agility and Reduce Costs by Migrating from RISC/ UNIX Servers to the Cisco Unified Computing System

March 2013

With Intelligent Intel Xeon Processors

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The data center is a strategic asset to businesses—one that needs to be flexible, agile, and cost effective.

For years, servers based on Reduced Instruction Set Computing (RISC) processors running the UNIX operating system powered the engines of commerce. Although RISC/UNIX was the right choice for many IT departments at the time, the industry moved on, and the comparative value of RISC/UNIX systems has diminished. It is time to make a change. The Cisco Unified Computing System™ (Cisco UCS™) can help you improve your future with innovative architectural advantages that reduce costs, simplify operations, and accelerate deployment of enterprise-class applications running in bare-metal, virtualized, and cloud-computing environments.

Reaching the Limits of RISC/UNIX Architectures

IT departments are experiencing numerous challenges with their traditional RISC/UNIX architectures. In an era in which IT budgets are shrinking, ongoing support and rollout of applications based on RISC/UNIX systems leads to increasing acquisition, environmental, software licensing, personnel, and maintenance costs. At the same time, aging RISC/UNIX infrastructure fails to provide the performance and flexibility required to support today's strategic business initiatives. These challenges are compounded by rampant uncertainty over the future of RISC/UNIX vendors and systems. Missed deadlines, changes in planned roadmaps, and discontinuation of hardware and software support raise questions about the long-term viability of the platform. These issues are reducing the strategic viability of the data center.

Reduced Cost Effectiveness

RISC/UNIX acquisition and maintenance costs are now a significant component of IT costs. The platforms have, on average, a 65 percent higher total cost of acquisition than systems based on x86 architecture. Operating and maintenance costs also are high, and per-core software licensing often puts RISC/UNIX systems at a significant

disadvantage. With the price of energy and data center space continuing to rise, the cost to power, cool, and house these systems is a drain on revenue. In addition, fewer and fewer people are experienced in RISC/UNIX administration, raising training costs. With IT budgets flat or shrinking, continuing with RISC/UNIX architectures is no longer cost effective.

Inability to Meet Performance and Flexibility Needs

Successful businesses are faced with increasing amounts of data to process and more users wanting access to the information. The demands for additional performance capacity are frequent and unpredictable. Today's aging and proprietary RISC/UNIX infrastructure cannot provide the performance and the flexibility required to support rapidly changing business requirements, and the cost to scale for additional performance is high. At a time when data centers are moving to cloud computing, there is a greater need for standard, nonproprietary platforms and solutions.

An Uncertain Future

The installed base of RISC/UNIX systems in many organizations is ready to be replaced or refreshed, prompting either wholesale upgrades or migrations to better-performing platforms. Although the RISC/UNIX platform historically was the best option for mission-critical applications, today's RISC/UNIX servers may not be the right choice. The combination of x86-architecture servers and the Linux operating system now can provide performance and availability superior to that of RISC/UNIX systems at much lower costs. Over the past year, the market narrowed so that RISC/UNIX sales now comprise only 2 percent of all systems shipped. Processor roadmaps changed, delaying the release of new, faster capabilities. SPARC processor release dates were completely missed, and HP is no longer developing its PA-RISC processor. In addition, the acquisition of Sun Microsystems by Oracle is forcing SPARC customers to weigh the risk that Oracle's appliance focus may increase the risk of vendor lock-in.

The Market Is Changing

The landscape of the business-critical application market is changing, and there has never been a better set of alternatives to RISC/UNIX architectures. Many commercial, off-the-shelf enterprise applications have been restructured to take advantage of the improved economics of industry-standard x86-architecture hardware, with reliability and performance equal to or better than current RISC/UNIX implementations. IDC's World Wide Server Tracker 2Q2011 reports that by volume, x86-architecture servers make up 97 percent of the total processor market.

Intel Xeon Processor Market Share

Intel® Xeon® processors lead the market, with 80 percent of x86-architecture systems sold. This expansive growth creates huge economies of scale, or "Intel economics," and has drawn the interest of software developers and technology innovators. More applications are being developed for Intel Xeon processor–based servers than any other platform, and mission-critical applications typically are updated for Intel Xeon processor–based servers before other platforms.

Intel Economics

The additional processing capability available from Intel Xeon processors facilitated the rapid rise of virtualization, through which any workload can run on any server. This change has further accelerated the effects of "Intel economics," reducing the overall cost of server resources and increasing the number of migrations from bare-metal to virtualized servers. This change in turn has fostered a rich ecosystem of innovation that gives organizations choice in operating systems, applications, and hardware vendors to support business priorities for private and public cloud initiatives. Leading enterprise software solutions for enterprise resource planning (ERP), customer relationship management (CRM), business intelligence and online-transaction processing (OTP) databases have already been optimized for Intel Xeon processor–based servers.

Migration Is an Important Decision

Migration is a decision that most organizations consider carefully. Although migration to servers using Intel Xeon processors is a straightforward choice, there is a significant difference between x86-architecture servers and complete systems that give organizations a competitive edge. The Cisco Unified Computing System is designed to meet the challenges of mission-critical business computing now and into the future. Delivering the first truly unified system available anywhere, Cisco UCS supports rapid and accurate deployment of bare-metal, virtualized, and cloud-computing services and applications—giving organizations greater flexibility and performance at less cost than traditional systems.

Greater Value with Cisco

IT departments understand that greater agility and flexibility are critical to supporting the business. Those who have migrated find that mission-critical computing environments built on Cisco UCS deliver the scalability, performance, advanced reliability, and data protection that businesses require for their most data-intensive enterprise applications.

Figure 1. Cisco Manages Risk by Measuring, Assessing, Mitigating, and Executing

As a result, IT departments have the confidence to accept new requests and quickly adapt to changing business priorities. There has never been a better time to start planning a migration from RISC/UNIX platforms to the innovative, reliable, high-performance Cisco UCS powered by Intel Xeon processors running Red Hat Enterprise Linux.

Cisco: Your Trusted Data Center Partner

Cisco is in a unique position to help migrate mission-critical applications onto state-of-the-art platforms. Already a long-term partner in many data centers, Cisco understands the challenges associated with migrating mission-critical applications. Cisco® RISC/UNIX Migration Services provides a proven process to help customers move from RISC-based UNIX environments to Cisco UCS running Red Hat Enterprise Linux. Using best-in-class migration methodologies, in-depth analysis tools, a robust planning process, and design and implementation services, Cisco provides a comprehensive cost-effective approach to customer migration initiatives.

Not all RISC/UNIX application migrations are the same. Proper planning and a sound migration methodology are required to help ensure a successful migration. Cisco RISC/UNIX Migration Services provides a flexible approach that adapts to the complexity and importance of the applications to be migrated. These services build on strong relationships with enterprise software vendors, including Oracle and SAP, as well as trusted delivery partners with vast experience in migrating commercial off-the-shelf and custom applications.

Cisco RISC/UNIX Migration Services

Cisco RISC/UNIX Migration Services uses proven industry-leading methodologies and practices to migrate RISC processor–based applications to the award-winning Cisco Unified Computing System. A complete set of services are available to help you confirm return on investment (ROI) and reduce total cost of ownership (TCO), perform test migrations, and migrate applications based on your criteria and requirements (Figure 1). Using an abundance of experience garnered from assisting customers, Cisco Advanced Services consultants can help you exploit the significant architectural innovations of the Cisco UCS and help ensure that you get the best ROI from your migration effort.

Cisco offers two options that are designed to address customer questions and concerns at various stages of the RISC data center migration lifecycle:

- **RISC/UNIX Migration Discovery Session** is designed for customers who are beginning the process of migrating

their current RISC environment. This brief engagement confirms customer priorities, concerns, ROI requirements, and migration time frames. Following the workshop, Cisco provides a high-level TCO analysis and applicable case studies.

- **RISC/UNIX Migration Acceleration** is an in-depth, on-site engagement designed to build confidence that a migration of existing RISC-based applications to Cisco UCS is technically feasible and will deliver the expected benefits. Cisco performs a variety of tasks, including application inventory, identification of migration candidates and groupings, creation of a TCO and ROI analysis, and explanation of proof-of-concept (PoC) and migration-factory options.

Cisco offers a complete services package to migrate RISC-based data center applications to Cisco UCS. Cisco's flexible workshop formats and PoC services provide a no-risk environment to try RISC/UNIX-based applications running on Cisco UCS. After a decision is made to proceed with Cisco UCS, Cisco works with you to develop a migration strategy based on the best application candidates for the target environment. This strategy forms the high-level migration roadmap. After the strategy is approved, Cisco develops a detailed migration plan based on application dependencies, service-level agreements (SLAs), and operation requirements. The migration plan is then used as the basis for creating a target architecture and low-level design.

Cisco has selected best-in-class partners to deliver a cost-effective and high-quality migration-factory approach to accelerate application migration. Cisco's migration methodology proactively addresses migration risks and helps ensure that application SLAs are maintained during migration. At every stage of the process, you have access to the Cisco migration factory to resolve any questions or concerns about the migration. Cisco is confident that Cisco UCS can exceed the high-availability and scalability performance of your current RISC/UNIX environment.

The Ideal Migration Destination: Cisco Unified Computing System

When migrating from RISC/UNIX to x86/Linux, you will want to migrate to a platform that is right for today's needs, but also ready for the needs of future technologies, such as virtualization and cloud computing. The Cisco Unified Computing System is an ideal destination for RISC/UNIX migrations. Cisco UCS delivers outstanding reliability, flexibility, and performance while lowering TCO. A world-class computing platform, Cisco UCS delivers the flexibility and security demanded of mission-critical environments with lower capital and operating costs than proprietary RISC/UNIX solutions. This result is achieved through the architectural advantages of a simplified, intelligent architecture; unified, model-based management; unified fabric; and Cisco Fabric Extender Technology.

With Cisco UCS, companies get the benefits of a high-performance, innovative architecture that simplifies migration of enterprise-class applications running in bare-metal, virtualized, and cloud-computing environments. With its efficient design, Cisco UCS is able to get more performance from Intel Xeon processors. On the same day that Intel announced the new Intel Xeon processor E7 family, Cisco UCS broke nine world records for performance using this processor. Since the system was first introduced, it has established 44 new performance world records. Cisco UCS has moved into the number-three market position worldwide in the x86 blade server market and number-two position in the United States .

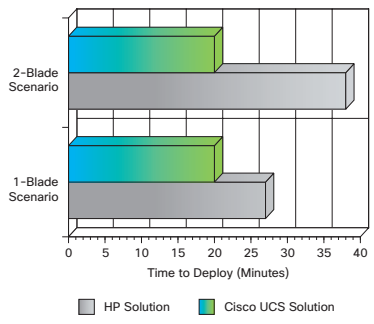
Single Unified System

The Cisco Unified Computing System is the first unified system that integrates computing, networking, and storage access resources (Figure 2). Because the system is self-aware, self-integrating, and self-documenting, it provides complete visibility into the results of a RISC/UNIX migration, making detailed configuration information available to administrators of higher-level management software. System

Deploy in Half the Time with Nearly 70 Percent Fewer Steps

Cisco UCS B250 M2 Extended Memory Blade Servers can be integrated in nearly half the time it takes to add HP c-Class blade servers with Virtual Connect, using 67 percent fewer steps due to a largely automated process (see http://www.youtube.com/watch?v=nijWlNzSgCQ).

Principled Technologies, March 2011 (http://principledtechnologies.com/clients/reports/Cisco/UCS_vs_HP_Deployment.pdf)



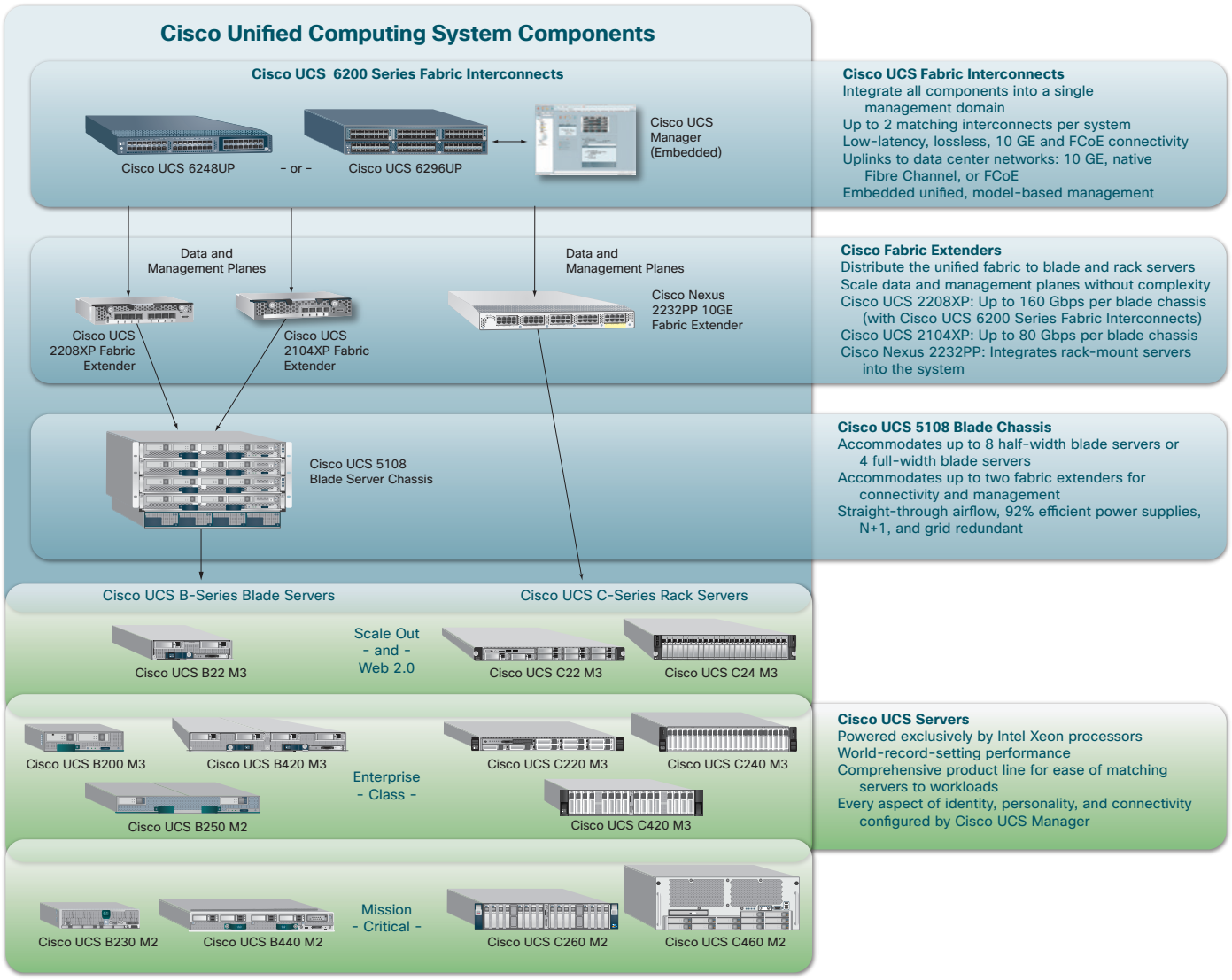


Figure 2. Cisco UCS Is the First Truly Unified System That Integrates Computing, Networking, and Storage Access Resources

configuration can be programmed through software, helping make migration and future server deployment fast and accurate.

Transcending the boundaries of traditional blade chassis and racks, Cisco UCS creates a physically distributed yet centrally managed system. Each system supports up to 320 blade servers and allows customers to choose from a broad portfolio of servers to deliver massive scalability. A unified fabric supported by a single, distributed virtual switch interconnects all server resources. Servers and virtual machines are interconnected equally and consistently, increasing security and eliminating multiple layers of switching. This radically simplified architecture uses fewer components than traditional x86 servers to lower capital and operating costs.

Intelligent Infrastructure

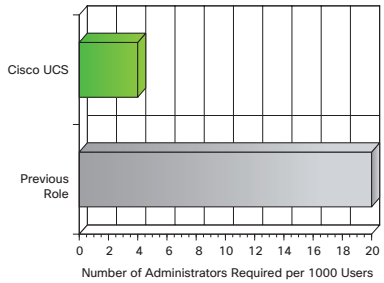
Cisco UCS is intelligent infrastructure in which every aspect of server personality is abstracted and can be applied programmatically. Servers and their I/O connectivity can be deployed on demand rather than through a time-consuming, error-prone manual process using individual element managers. With Cisco virtual interface cards, even the

Make Administrators Five Times More Efficient

"At my previous company, we needed 20 IT personnel for 1000 employees. With the Cisco Unified Computing System, ExamWorks can support the same number of people with a staff of four. Avoiding the need for 16 full-time positions saves more than US$1.1 million annually."

–Brian Denton
Chief Technology Officer
ExamWorks, Inc.

Cisco UCS staffing needs compared to the needs required in Denton's previous role.



http://www.cisco.com/en/US/prod/collateral/switches/ps9441/ps9670/case_study_c36-580410.pdf

number, type, and speed of the interfaces (network interface card [NIC] or host bus adapter [HBA]) are programmable. This approach does for physical serves what hypervisors do for virtual machines: it provides a pool of abstracted resources that can be quickly and easily configured to be whatever the software stack (hypervisor, operating system, or application) requires in terms of identity, personality, and I/O settings.

Reproducible and easy server deployment makes the migration process efficient, smooth, and error-free. Without human intervention, this self-aware, self-integrating system automatically discovers and maintains an inventory of its components for easy access. An XML API allows the system to be easily integrated into higher-level data center–wide management systems as a single logical entity. Applications gain flexibility and scalability, improving business agility while reducing configuration errors that can cause downtime.

Unified, Model-Based Management

Unified, model-based management was designed into the Cisco UCS platform. Cisco UCS Manager, embedded in the system, allows administrators to create a model of the desired server configuration using service profiles and templates. The model is created as a Cisco service profile and instantiated on a Cisco UCS server and its associated I/O connections by associating the model with physical resources. This process reliably automates configuration management because it is essentially impossible to create noncompliant configurations. After configuration, the system is monitored efficiently through a single interface.

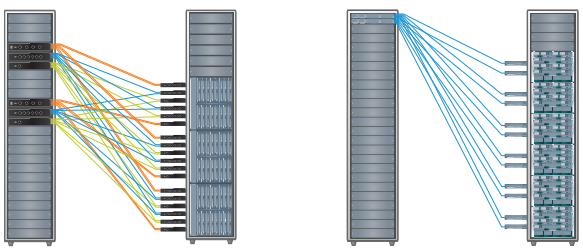
The model is accessible and programmable through an intuitive GUI or open-standards XML API, enabling the system to be integrated easily into ITIL processes and higher-level management tools. Today, more than 20 higher-level management tools, such as tools from BMC, CA, HP, IBM, and Symantec, integrate with Cisco UCS, facilitating compliance with existing data center best practices. Cisco UCS Manager's role- and policy-based management preserves current server, network, and storage administrator roles and adapts to organization-specific role assignments. Subject-matter experts gain the ability to define policies that lower-level administration staff can implement, further increasing staff effectiveness. In Cisco UCS, deploying 100 servers is no more time consuming than managing one, making IT staff more efficient.

Unified Fabric

A unified fabric integrates Cisco UCS servers with a single high-bandwidth, low-latency network that supports all system I/O. The fabric carries IP, storage, and interprocess communication on two 10 Gigabit Ethernet and Fibre Channel over Ethernet (FCoE) networks. Simplifying the architecture and eliminating up to two-thirds of the rack-level network infrastructure that is required for traditional platforms, the system's wire-once network infrastructure increases agility and accelerates deployment with zero-touch network configuration. LAN-safe implementation makes it straightforward to integrate Cisco UCS into existing data

Simplify Infrastructure and Reduce Cost

The number of components and management points correlates directly with operating costs. Cisco UCS reduces the number of components, cables, and management points to reduce costs.

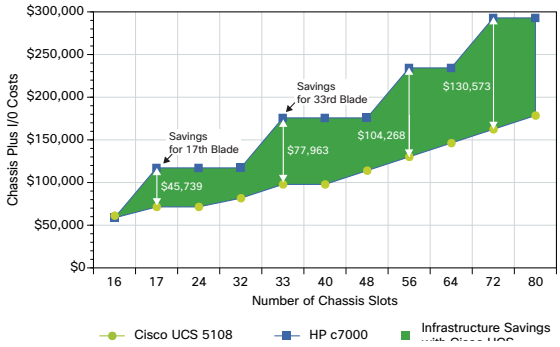


More Components and Cables for Traditional Blade Servers

Fewer Components and Cables with Cisco Unified Computing System

Scaling at Half the Cost and Complexity

Server costs are significant, but so is the cost of the infrastructure to support each server. The Cisco Fabric Extender Architecture condenses three layers of switching into one and reduces the number of interfaces, cables, and switches needed to support Cisco UCS blade servers. The cost to simply support the seventeenth HP server is US$45,522 more than the cost for the seventeenth Cisco UCS server. The same incremental cost is incurred every time an additional HP chassis is required, with costs greatly increasing as the configuration scales, with an average infrastructure cost per blade of US$3621. Conversely, Cisco UCS infrastructure costs scale nearly linearly, with an average infrastructure cost per blade of US$1833.



Based on Cisco UCS manufacturer's suggested retail price (MSRP) June 28, 2011; HP retail July 2, 2011

center networks as a single server rather than as a silo of servers and switches.

Cisco Fabric Extender Architecture

The Cisco Fabric Extender Architecture integrates the blade and rack-mount servers into a single, distributed virtual system, providing scalability without complexity. All I/O traffic meets at a single point, where it is efficiently and consistently managed, increasing network security, simplifying management, and reducing errors.

Through Cisco fabric extenders and virtual interface cards, the Cisco Fabric Extender Architecture extends fabric interconnect ports to servers and virtual machines, allowing a greater number of end devices or virtual machines to connect to the unified fabric. This approach eliminates blade server and hypervisor-resident switching and condenses three network layers into one to reduce capital and operating costs. With the capability to interconnect physical servers and virtual machines equivalently, the architecture delivers outstanding visibility and control that lets virtual networks be managed in the same way as physical networks.

Architectural Advantages Enable Efficient Migration

The architectural advantages of the Cisco Unified Computing System enable the efficient delivery of migration services and offer greater scalability than traditional RISC/UNIX and x86-architecture blade servers. With vast resource flexibility managed through a single interface, Cisco UCS can help improve business agility at significantly lower TCO.

Red Hat Enterprise Linux

Partnering with Red Hat brings a trusted, open source operating system that uses some of the greatest innovators in the industry to produce high-quality software faster. Thousands of enterprises run Red Hat Enterprise Linux, including systems that host mission-critical workloads. Red Hat Enterprise Linux is highly optimized for Intel Xeon processors and delivers exceptional reliability and performance. Tight integration with Cisco UCS enables greater application processing and increases visibility and manageability of physical and virtual environments. Cisco also has close partnerships and support for other operating systems. For a list of operating systems supported on Cisco UCS, see the Cisco® website.

Reliability, Availability, and Serviceability (RAS)

The deep integration of Cisco UCS powered by the new Intel Xeon processor E7 family running Red Hat Enterprise Linux provides extensive and robust RAS features. These capabilities start in the silicon to provide error detection, correction, containment, and recovery in all processors, memory, and I/O data paths. Both Cisco UCS and Red Hat Enterprise Linux build on this foundation to provide excellent reliability for mission-critical applications. Designed to support systems with no single point of failure, Cisco UCS chassis have redundant, hot-pluggable power and cooling as well as hot-swap blades and fabric extenders. The system's stateless computing characteristics greatly enhance application availability. If a hardware failure occurs, another Cisco UCS blade can be provisioned from the pool of resources in minutes. Running Red Hat Enterprise Linux brings advanced RAS features such as machine check architecture recovery, predictive failure analysis, PCI hot-plug support, and high availability of Cisco UCS blades. These RAS capabilities help ensure the reliability, availability, and serviceability of the systems running your mission-critical applications.

The Data Center as a Strategic Asset

There are traditional x86 solutions–and then there is the Cisco Unified Computing System. With Cisco UCS, you can transform your IT infrastructure into a flexible, agile, cost-effective data center that is a strategic asset to the business.

Imagine the possibilities–an environment in which computing, networking, and storage access resources are part of an elastic, scalable, flexible infrastructure that can be put into action at any moment.

Cisco, Intel, and Red Hat provide market-leading, innovative, standards-based solutions that combine to deliver the data center of the future. Working in lock-step with the business, this new, open infrastructure offers enhanced performance, scalability, reliability, and manageability at less cost. Because it is an open platform, enterprises gain the freedom to adopt the latest hardware and software advancements faster to meet changing business and IT infrastructure priorities.

For More Information

For more information about migration to the Cisco Unified Computing System, contact your local account representative or use the following resources:

- Learn more about migrating to Cisco UCS.
- Learn more about Intel Xeon processors.
- Learn more about Red Hat Enterprise Linux.

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Cisco Systems, Inc.
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Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco Website at **www.cisco.com/go/offices**.

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