

Cisco Unified Data Center: Provide Optimal Infrastructure for Microsoft Environments and Applications



What You Will Learn

IT departments are striving to establish data centers that support virtualization and cloud computing, reduce cost and complexity, and deliver valuable IT services. Together, Cisco and Microsoft offer flexible, open, and innovative solutions for your IT needs. The Cisco® Unified Data Center and its underlying networking, computing, and management components offer a holistic, single-fabric data center infrastructure architecture. A highly secure, scalable environment for companies that use Microsoft software and technologies, the Cisco Unified Data Center automates and simplifies deployment, orchestration, and management across server, network, and cloud services to help your organization:

- Respond rapidly to changing business needs
- Scale the data center while avoiding complexity
- Maximize your investments in Microsoft Windows Server 2012, System Center 2012, SQL Server 2012, and Exchange 2010
- Smooth the transition to deploy and provision new servers running Microsoft applications
- Accelerate its transition to virtual and cloud computing
- Better align IT costs with business needs

Challenges

Successful IT departments address the following needs in their quest to deliver IT as a service and align delivery capabilities and costs with the needs of the business.

- Responsiveness to business dynamics
 - Support rapid deployment of mission-critical applications.
 - Provide service-level support for mission-critical applications.
 - Support the transformation to service-based IT to become a trusted advisor.
 - Avoid disruptive hardware repositioning and network reconfiguration.
- Optimal management of physical and virtual systems
 - Provision and manage infrastructure and software across physical and virtual environments, rack and blade form factors, and public and private cloud infrastructures.
 - Integrate systems from multiple vendors in the data center.
 - Control virtualization sprawl.
 - Safeguard critical data.
- Cost containment
 - Design the data center for optimal efficiency and use across normal operations and peak workloads
 - Optimize application lifecycles.
 - Provide more predictable project lifecycles and costs and more consistent IT service delivery.
 - Reduce data center power, cooling, and space needs.

Business Benefits

With the Cisco Unified Data Center, Cisco delivers a complete infrastructure architecture that can help your organization build a high-performing, cost-effective infrastructure that supports business demands without burdensome complexity.

The Cisco Unified Data Center provides automation and simplified operations at the server, network, and cloud-services layers. When you run Microsoft applications with Cisco data center solutions, including the Cisco Unified Computing System™ (Cisco UCS®), in physical or virtual infrastructures, rack server or blade server, or public or private cloud environments, your company can gain numerous benefits.

- **Agility:** Provide ITaaS, respond to business dynamics, and scale more easily through a high-performance, highly available, and easily automated platform.
 - Transition to an ITaaS model and align delivery capabilities with the needs of the business by relying on a unified data center architecture built from the foundation to help organizations take advantage of the best of existing services and systems.
 - Accelerate deployment and time-to-value by taking advantage of a range of Microsoft-oriented reference architectures that Cisco has prebuilt and that Cisco Services supports.
 - Support growth with the capability to scale discrete servers and thousands of virtual machines.

- **Simplicity:** Simplify management of physical and virtual systems, which in turn reduces operating costs and makes it easier to roll out new services, support service-level agreements (SLAs), provide self-service provisioning, and manage clouds across multiple data centers, infrastructures, and service providers.
 - Increase business agility and the productivity of IT staff through just-in-time provisioning, self-service provisioning, and mobility support for both virtualized and physical environments.
 - Create the optimal environment for your needs and manage it easily—whether virtual or physical, or in a private or public cloud—across multiple data centers, infrastructures, and hosting service providers.
 - Ease support requirements now and in the future by using a solution that incorporates open industry standards that Cisco's vast partner ecosystem and Cisco Services supports.
- **Efficiency:** Reduce power, cooling, and cabling needs while protecting investments in current infrastructure, management platforms, and applications, achieving lower operating costs.
 - Reduce data center capital and operating costs while increasing IT agility by using a single, unified platform that eases IT management and requires less hardware and power than competitors' offerings.
 - Go beyond maintenance to focus on innovation that supports business growth by streamlining management and operations.
 - Reduce total-cost-of-ownership (TCO) at the platform, site, and organization levels.
 - Support memory-intensive applications with up to 1 terabyte (TB) of RAM—more than twice the memory that traditional servers support—through 16-GB dual in-line memory modules (DIMMs).

Solution

Cisco and Microsoft bring together the operating system, applications, networking, storage, virtualization, and management in manageable and scalable solutions. Addressing today's critical data center concerns, these solutions rely on the Cisco UCS computing infrastructure. Cisco UCS provides the optimum environment for Microsoft applications and virtualization and cloud-computing technologies, including:

- Windows Server 2008 R2 with Hyper-V
- Windows Server 2012 with Hyper-V
- Microsoft System Center 2012
- Microsoft Exchange Server
- Microsoft SharePoint Server
- Microsoft SQL Server 2012, including online transaction processing, data warehousing, and business intelligence solutions
- Microsoft private cloud solutions, including server and virtual desktop initiatives

Cisco UCS delivers an integrated system to provide superior data center design flexibility and remove management barriers between blade and rack servers across bare-metal, virtualized, and private and public cloud environments. Unifying data centers in this way helps companies deploy business applications more rapidly, enhance revenue streams, introduce new business models, and grow the businesses while reducing IT costs.

Built for Virtualization

The Cisco UCS platform is built for virtualization, featuring an agnostic, virtualization-aware unified network fabric. The following virtual networking products for hypervisor environments, including Microsoft Windows Server 2012 with Hyper-V and VMware environments, help companies control costs and improve efficiency:

- Cisco Nexus® 1000V Series Switches product portfolio
- Cisco Data Center Virtual Machine Fabric Extender (VM-FEX), which is included with Cisco UCS

With the Cisco Nexus 1000V Series, network administrators can rely on the same Cisco NX-OS Software command-line interface (CLI) and feature set, advanced switching and security features, and integrated network services for their virtual networks.

Cisco Data Center VM-FEX collapses virtual and physical networking into a single infrastructure. With Cisco Data Center VM-FEX, network administrators can provision, configure, manage, monitor, and diagnose virtual machine network traffic and bare-metal network traffic within one unified infrastructure.

Ready for Microsoft Private Cloud Solutions

Cisco and Microsoft help companies deliver the benefits of Microsoft private cloud solutions. The recent release of Windows Server 2012 with Hyper-V offers a complete virtualization platform, providing increased scalability and performance with an elastic and flexible solution from the data center to the cloud. Cisco support for Microsoft Windows Server 2008 R2 with Hyper-V and Windows Server 2012 with Hyper-V, as well as integration with Microsoft System Center 2012, supports simpler deployments of private cloud environments. Cisco UCS together with Microsoft private cloud solutions improve application availability and performance and offer deep application monitoring and diagnosis. IT administrators can run and monitor multiple operating systems, address application problems faster, improve SLA support, and manage multiple hypervisors.

Cisco Validated Designs for Microsoft Server Solutions

To help Cisco customers who run Microsoft software get the most from their data centers, Cisco pretests, validates, and provides validated designs and support for a growing list of Microsoft technologies such as Microsoft Exchange Server, SQL Server, and SharePoint Server. Review a complete list of Cisco Validated Designs at http://www.cisco.com/en/US/netsol/ns743/networking_solutions_program_home.html.

Cisco Validated Design for Microsoft Private Cloud Solutions

Cisco also offers Cisco Validated Designs to help customers move to the cloud more easily and quickly. These validated designs from Cisco and our partners EMC (EMC VSPX for Microsoft Hyper-V) and NetApp (FlexPod for Microsoft Private Cloud) provide shared infrastructure and Microsoft private cloud solutions in pretested architecture design guides. They combine networking, computing, and storage in a shared infrastructure and support multiple Microsoft applications and workloads. They are designed to reduce infrastructure and application deployment time from days to hours while helping achieve greater use of physical and virtual resource pools and are validated by Microsoft as part of the Microsoft Private Cloud Fast Track program.

End-to-End Management Tools

Management tools in Cisco UCS extend the capabilities of Microsoft System Center 2012. Microsoft System Center 2012 is a comprehensive management platform that enables you to more easily and efficiently manage your IT environments, including your server infrastructure and client devices. To give IT managers and administrators a common tool set to achieve simple, responsive, end-to-end management of all layers, Cisco created:

- The Cisco UCS PowerTool command-line toolkit based on Microsoft Windows PowerShell for automation and integration of Cisco UCS management with Microsoft applications
- Integration between Cisco UCS Manager and Microsoft System Center and a framework for extensibility with third-party management tools

Cisco Services Support

Engaging with Cisco Services, customers can help ensure a smooth production rollout of Microsoft applications on Cisco UCS that is on time and on budget. Cisco Services can help customers design and implement virtualized data centers and private or public cloud solutions. Cisco Advanced Services or one of the many Cisco channel partners can directly deliver these services. The award-winning global technical support services from Cisco can help you increase uptime, quickly resolve problems, and optimize solution performance.

Cisco Unified Data Center

At the core of our mutual offerings is the Cisco Unified Data Center. The Cisco Unified Data Center is a holistic data center infrastructure architecture. It combines computing, storage, networking, security, and management resources into a single fabric architecture to create an optimal environment for Microsoft enterprise applications. The Cisco Unified Data Center consists of:

- **Cisco Unified Fabric:** Network infrastructure, including Cisco network switches and integrated network services that provide high-speed connectivity, high availability, security, and quality of experience
- **Cisco Unified Computing:** System-level computing infrastructure that integrates rack and blade servers, access networking, storage networking, and management into a scalable framework for physical or virtualized x86-based applications
- **Cisco Unified Management:** Automation and lifecycle management frameworks to manage and simplify deployment and operations at the network, computing layer, and application and cloud-services layers; the open design of the Cisco unified management framework integrates well with Microsoft applications and extends the capabilities of Microsoft management tools, helping organizations manage the data center cohesively—from the bare-metal environment and operating system to the applications and the cloud

Customer Snapshot: Microsoft Partner Solutions Center

Solutions

- Cisco Nexus 5000 and 7000 Series Switches
- Cisco Services
- Cisco Unified Computing System

"The Microsoft Partner Solutions Center lab environment runs end to end with System Center, Virtual Machine Manager, and other Microsoft products and our entire data center operations are managed by just four staff members, so the ability to manage the entire system through a single Systems Center-compatible console was a key factor in our decision process."

—David Hayes, Senior Director, Microsoft Partner Solutions Center

"The entire migration took just one day. People don't believe us, especially when considering such a migration very well could have taken at least two weeks with significant downtime."

—Gary Leonard, Dynamic Data Center Consultant, Microsoft Partner Solutions Center

"With a full management platform, we've been able to reduce the time it takes to deploy host servers from a day down to less than an hour."

—Gary Leonard, Dynamic Data Center Consultant, Microsoft Partner Solutions Center

"Our previous servers were 2 RU with 128 gigs of RAM, holding around 35 virtual machines but using 2.5 watts of power per virtual machine. In comparison, the UCS blades are half an RU with 196 gigs of RAM, can hold around 50 virtual machines, and only use 0.85 watts of power per virtual machine."

—Gary Leonard, Dynamic Data Center Consultant, Microsoft Partner Solutions Center

Helping You Achieve an Agile, Simple, and Cost-Effective Data Center

Together, Cisco and Microsoft help companies achieve a unified system that can increase organization agility, reduce complexity, and lower costs, along with providing additional benefits, as discussed here.

Customer Snapshot: Erste Bank Serbia

Solutions

- Cisco Nexus 5000 Series Switches
- Cisco Unified Computing System
- Cisco UCS C-Series Rack Servers

Microsoft Software

- Microsoft Exchange Server
- Microsoft SQL Server

"Our Cisco UCS cloud computing platform is providing significant savings on power, cooling, space, and maintenance. In fact, it has been so successful that we expect the solution to completely pay for itself within 10 months."

—Zoran Savić, Head of IT Operations

Respond and Scale to Dynamic Business Needs

In support of Microsoft workloads, the Cisco Unified Data Center stands apart from alternative platforms because it can deliver scalability and manageability without complexity. The industry's first unified data center platform, Cisco UCS provides smart, programmable infrastructure that simplifies and accelerates deployment of enterprise-class applications and services in physical, virtualized, and cloud-computing environments.

Automate Provisioning and Configuration

A programmable infrastructure in Cisco UCS abstracts the personality, configuration, and connectivity of server and I/O resources so that these attributes can be programmed automatically rather than set manually through individual element managers. This approach transforms the physical infrastructure into a pool of resources that can

be provisioned to support any workload in minutes. Cisco UCS automatically provisions servers by associating models with system resources. This unified, model-based management in Cisco UCS helps administrators automatically deploy servers with click-of-the-mouse simplicity. In addition, Cisco service profiles from Cisco UCS Manager accelerate system deployment and scaling while eliminating configuration errors that can cause downtime.

Scale Without Compromising Manageability

Unique to Cisco UCS, Cisco Unified Fabric delivers a consistent network fabric with a comprehensive feature set that supports both network and storage I/O at lower costs than alternative systems. Cisco fabric extender technology extends the fabric directly to servers and virtual machines for increased performance, security, and manageability. Cisco UCS can scale beyond what a blade chassis or preconfigured rack can provide. With Cisco blade and rack servers, IT departments can scale up to 160 discrete servers and thousands of virtual machines, without complicating manageability.

Eliminate Complexity of Managing Physical and Virtual Systems

Cisco data center and networking products support the native Microsoft Hyper-V hypervisor, as well as other leading hypervisors. They help optimize Microsoft Windows Server and other Microsoft applications, which scale better in the data center with Cisco UCS.

- Manage capital costs—in fact, Cisco UCS can help organizations reduce infrastructure capital costs by 60 to 90 percent. [Berlin Technical University](#) uses Cisco UCS to lay foundations for cloud infrastructure.
- Simplify control of server and network architectures
- Unify server, storage, networking, and management resources
- Use existing tools and skill sets

Consolidate and Virtualize

Common Microsoft applications, such as Microsoft Exchange Server, SharePoint Server, and SQL Server, are among the prime candidates for consolidation and virtualization. Administrators can expedite and simplify virtualization deployment, management, and operation by using Cisco UCS together with Microsoft Windows Server 2008 R2 with Hyper-V or Microsoft Windows Server 2012 with Hyper-V and Cisco high-bandwidth, low-latency, virtualization-aware unified network fabric.

Customers can make use of the full portfolio of Cisco virtual networking technologies for their Microsoft Hyper-V deployments. These technologies provide the following benefits:

- Simplified operations through tight integration with Microsoft Hyper-V management tools
- Consistent operating model for both physical and virtual networks.

Simplify Management and Administration

Cisco UCS and Cisco UCS Manager help server administrators simplify management tasks. For example, by deploying Cisco UCS, the Microsoft Partner Solutions Center streamlined its data center operations with fully automated provisioning. The Microsoft Partner Solutions Center also reduced deployment time for host servers from one day to less than one hour.

Through enhanced integration with Cisco Unified Fabric technology, Cisco UCS Manager unifies management for both blade and rack servers within a single domain. This industry-first capability reduces the cost of server connectivity, provides resource flexibility, and lets IT administrators add data center capacity without also adding complexity.

Coupling Cisco UCS with Microsoft System Center automates provisioning and extends management beyond the software to the infrastructure. This approach helps streamline and centralize management for physical, virtual, and cloud environments, including deployment, network optimization, and application services. It also can reduce service interruption, save time, extend existing tool sets and skills, simplify and standardize processes, and decrease security and service exposure.

Build a High-Performing Infrastructure While Reducing Resource Consumption and Costs

With the Cisco Unified Data Center, organizations that rely on Microsoft enterprise applications can gain high-performing solutions while dramatically reducing the supporting infrastructure along with its related costs. The result is fewer network adapters and blade server switches and less cabling. This reduction can occur because Cisco Unified Fabric passes all network and storage traffic over one cable to the parent fabric interconnects. There, the traffic can be processed and managed centrally, improving performance and reducing the number of devices that need to be powered, cooled, secured, and managed. Young America, a rebate processor and marketing promotions provider, turned to Cisco UCS to integrate resources into a single, unified system. The company reduced 41 racks down to 5 and is turning off cooling units and downsizing uninterruptible power supply systems.

Customer Snapshot: Young America

Solutions

- Cisco MDS 9148 Multilayer Fabric Switch
- Cisco Nexus 7000 Series Switches
- Cisco UCS B200 and B230 M2
- Cisco UCS 5108 Blade Server Chassis
- Cisco UCS 6120 Fabric Interconnects

Microsoft Software and Technologies

- Microsoft SharePoint Server
- Microsoft SQL Server 2008 R2
- Microsoft System Center Configuration Manager
- Microsoft System Center Operations Manager
- Microsoft System Center Service Center Manager
- Microsoft Windows Server 2008 R2

"With this infrastructure upgrade, we basically opened up the floodgates to any and all new business submissions. And our customers are noticing, too. They're noticing the fact that they're getting their webpages quicker and they can throw more jobs at us. They're especially noticing better performance and service across the board."

—Ted Bienapf, Director of Infrastructure, Network Services, and Development, Young America

"When I joined Young America, we were operating 41 racks and related gear nonstop. The room was hot, and we were running out of power. We'll soon be running our entire operations on just five racks. We're already starting to turn off cooling units and downsize UPS systems."

—Ted Bienapf, Director of Infrastructure,

When it comes to supporting high-performing infrastructure, Cisco is constantly innovating. In June 2012, the Cisco server product line added new servers built around the new Intel Xeon processor E5-2400 series. Also, Cisco recently broadened its Cisco UCS portfolio with one blade and two rack servers based on the latest Intel Xeon processor E5-2600 product family and a full-width blade based on the new Intel Xeon processor E5-4600 product family. This server lineup improves workload delivery with enhanced performance, flexibility, and efficiency to support increasing data center demands. With more cores, cache, memory capacity, and internal storage and faster communication pathways to move data more quickly, Cisco UCS with the Intel Xeon processor E5-4600, E5-2600 and E5-2400 series offers the industry's best performance, power efficiency, features, and cost:

- **Cisco UCS B200 M3 Blade Server:** The enterprise-class [Cisco UCS B200 M3](#) provides performance, versatility, and density in a half-blade form factor, delivering balanced, industry-leading density through its 24 DIMM slots and up to 80 gigabits of I/O bandwidth. Greater density, performance, and bandwidth mean that business applications can run faster, more cost-effectively, and more efficiently.
- **Cisco UCS C220 M3 Rack Server:** The [Cisco UCS C220 M3](#) is a one-rack-unit (1RU) server designed for performance and density for a wide range of business workloads—from web services to distributed databases.
- **Cisco UCS C240 M3 Rack Server:** The [Cisco UCS C240 M3](#) is a two-rack-unit (2RU) server designed for both performance and expandability over a wide range of storage-intensive infrastructure workloads, from big data to collaboration.
- **Cisco UCS B22 M3 Blade Server.** The [Cisco UCS B22 M3](#) feature set offers price and performance to address a range of requirements, from IT infrastructure to Web 2.0 applications.
- **Cisco UCS B420 Blade Server:** The [Cisco UCS B420 M3](#) is designed to deliver performance, scalability, and expandability to address a broad range of workloads, from large virtual desktop infrastructure (VDI) enterprise resource planning (ERP) and customer relationship management (CRM) tasks to database workloads
- **Cisco UCS C24 M3 Rack Server:** The [Cisco UCS C24 M3](#) is a 2RU, 2-socket rack server designed for both outstanding economics and internal expandability over a range of storage-intensive infrastructure workloads, from IT and web infrastructure to big data.
- **Cisco UCS C22 M3 Rack Server:** The [Cisco UCS C22 M3](#) is a 1RU, 2-socket rack server design that combines outstanding economics and a density-optimized feature set over a range of scale-out workloads, from IT and web infrastructure to distributed applications.

Customer Snapshot: Elon University

Solutions

- Cisco Nexus 1000V Series Switches
- Cisco Services
- Cisco Unified Computing System

Microsoft Software and Technologies

- Microsoft Active Directory
- Microsoft Exchange Server
- Microsoft SQL Server
- Microsoft Windows operating system
- Microsoft Windows clustering, file storage, and application servers

"We were getting very close to our maximum allowed amperage and cooling power in our data center. Now, we only use about a quarter of the footprint we had before with almost triple the servers. At the same time, our energy use has gone down tremendously compared to the previous servers and we've increased our ability to grow while achieving these green benefits. We can easily double our capacity and still be well within our data center threshold."

—Jerry Williams, Systems Administrator,

Rely on a Platform Optimized for Application Performance

Since Cisco UCS was introduced in 2009¹, it has achieved 70 industry benchmark world records. With industry-leading application performance and a rapid, automated configuration model that accelerates the deployment of applications, Cisco UCS makes performance predictable and increases business productivity.

Improve Efficiency

The design of the Cisco Unified Data Center saves space and reduces power and cooling costs. In fact, the Cisco UCS infrastructure requires 37 percent less space and supports 60 percent more servers per rack unit, resulting in a 33 percent cost savings compared to alternative data center platforms. Cisco UCS has also been shown to reduce operating costs by as much as 35 percent.²

The following are examples of the power efficiency and administrative overhead improvements Cisco customers have achieved by deploying Cisco data center offerings:

- The National FFA Organization reduced power consumption by 40 percent by using Cisco UCS and Cisco Nexus switches.
- Slumberland manages 120 Cisco UCS servers with only two system administrators. Previously, system administrators each spent 16 hours weekly provisioning and managing physical servers. Through efficiencies gained from Cisco UCS and Windows Server 2008 R2 with Hyper-V, the administrators now spend 10 fewer hours per week on management tasks, which they can spend on tasks that add business value.
- By choosing Cisco UCS B200 M2 and B230 M2 and Cisco UCS, the National FFA Organization decommissioned an entire rack of servers. Administrators now spend 80 percent less time managing physical servers.

Meet Memory Requirements Efficiently

Virtualization has increased server memory requirements, and to help companies meet this demand efficiently and cost effectively and to enhance the performance of Microsoft workloads, Cisco offers patented Cisco Extended Memory Technology. It is available for Cisco UCS B-Series Blade Servers and C-Series Rack Servers and supports 1 to 2 TB of RAM per server, which is two times more RAM than conventional 2-socket servers support. Inexpensive 16-GB DIMMs can be used instead of 32-GB DIMMs, providing the ability to support 1 TB of RAM with 32-GB DIMMs. This option provides Cisco customers with a high degree of flexibility when configuring Cisco UCS servers to meet business and budgetary requirements and having more DIMM slots allows customers to reach higher memories without having to pay a premium for that largest memory DIMMs.

Support Responsive Business Applications

Cisco customers also achieve fast memory access speeds for responsive business applications. Cisco technology delivers up to 27 percent faster memory access speeds at high memory densities.³ This higher access speed is critical for high-performance databases and virtualization workloads that require both large memory footprints and low latency.

¹ <http://newsroom.cisco.com/press-release-content?type=webcontent&articleId=680777>

² Business Advantage Delivered: The Cisco Unified Computing System
http://www.cisco.com/en/US/solutions/collateral/ns340/ns517/ns224/ns944/business_delivered_cisco_ucs.pdf

³ Cisco UCS: A Real-World TCO Analysis
http://www.cisco.com/en/US/solutions/collateral/ns340/ns517/ns224/ns944/cisco_ucs_areal_world_tco_analysis.pdf

Achieve ROI Rapidly

Many Cisco customers have reported significant return-on-investment (ROI) from Cisco UCS architectures. For example, the infrastructure team at Slumberland provisioned 28 logical servers, spending nearly US\$47,000 less than the company would have with the previous server architecture. When the company eventually uses all eight server blades, the savings will increase to nearly US\$188,000. The company expects to save more than US\$1600 on each logical server it deploys.

Why Cisco for Microsoft?

We recognize that the intersection of computing, networking, virtualization, and software is at the center of a new era of innovation. The Microsoft and Cisco alliance extends the value of the Cisco Unified Data Center, including unified fabric, Cisco UCS, and unified management, by integrating the operating system, native hypervisor, application, and management stacks into manageable and scalable solutions. Together, Microsoft and Cisco offer service and support to accelerate time-to-value and ROI. Our partner ecosystem, including value-added resellers and global systems integrators, benefits Microsoft partners and Cisco partners and customers alike.

For More Information

For more information, contact your Cisco or Microsoft representative, or visit www.cisco.com/go/microsoft

Best of Tech Ed

The Cisco UCS B250 M2 Extended Memory Blade Server won the Best of Tech•Ed Award in 2011 in the Hardware and Storage category.



Cisco UCS Manager was honored at Microsoft Tech Ed 2012 as the recipient of the [Breakthrough Technology Award during the Best of Tech Ed 2012 awards program in Orlando, Florida held on June 14, 2012.](#)



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