

# Increase Efficiency with VMware Software and Cisco UCS

Solution Overview  
September 2015

## Cisco UCS and VMware Work Better Together



### Highlights

#### Consistent Management

- Manage your VMware environments with familiar VMware tools and establish policy-based best practices.

#### Increased Automation

- Reduce total cost of ownership (TCO) by simplifying routine operations and expediting problem isolation and resolution.
- Proactively improve performance through an integrated approach to health, capacity, log, and configuration management.

#### Long-Term Value

- Extend the value of your VMware environments with Cisco Unified Computing System™ (Cisco UCS®) and Cisco® network products.

Simplify operations. Reduce total cost of ownership. Identify and resolve problems more quickly. You get all of this with Cisco UCS combined with VMware vRealize Operations.

Cisco Unified Computing System™ (Cisco UCS®) with VMware vSphere and VMware vRealize Operations gives you a unified management experience for virtual and physical infrastructure that reduces total cost of ownership (TCO) while enhancing business agility. With this combination of technologies, you can manage a software-defined environment in a more effective and efficient manner than you can with other infrastructure solutions. You gain the speed and flexibility of delivering infrastructure as a service (IaaS).

### Cisco Unified Computing System

Cisco UCS is the first data center platform to integrate industry-standard, x86-architecture Cisco® servers with networking and storage access into a single integrated system. It is a purpose-built platform for virtualized environments that enables IaaS. You can program the platform's configuration through a single, model-based management interface. This capability accelerates the deployment and performance of physical, virtualized, and cloud-computing environments. Cisco SingleConnect technology provides a single mechanism for connecting your servers, hypervisors, virtual machines, and management networks over a single set of cables. Fewer cables and devices means a radically simplified architecture with lower infrastructure cost per server than for HP or Lenovo solutions (see sidebar).

Our approach better supports VMware products with rapid deployment and easy scalability, increasing IT productivity and business agility and reducing TCO.

## Better Together: Cisco UCS and VMware vRealize Operations

vRealize Operations was built to meet the challenges of managing and operating today's virtualized and cloud environments. Although you may be running this software on another platform today, you can go further faster when you pair it with Cisco UCS.

### Intelligent Operations: Work Smarter, Not Harder

With vRealize Operations, you can use self-learning tools, predictive analysis, and smart alerts to proactively monitor application health. Now you can identify and resolve potential problems before they affect your system. Predictive analysis helps you with capacity planning. Predictive analysis, along with smart alerts, helps you optimize application performance and availability. The software's self-learning tools help you be more application aware.

- **Performance management:** vRealize Operations helps you manage application performance. Cisco UCS gives you better underlying performance at the foundation. Cisco Data Center Virtual Machine Fabric Extender (VM-FEX) technology allows you to connect virtual machines directly to physical network interface cards (NICs). Bypassing the hypervisor and software switching [yields up to 37 percent better network performance](#). With the close integration of Cisco UCS management and vSphere,

these physical NICs are prepared on a new server as VMware VMotion moves a virtual machine between servers. After the virtual machine is relocated, it finds the exact same network connectivity in its new location (Figure 1).

Simplifying management, Cisco SingleConnect technology elevates virtual connections to the same level as physical connections. This feature allows you to use the same network management tools that you use with physical networks to detect and resolve any problems or issues with your virtual networks. No other vendor provides this level of visibility and control.

- **Capacity management:** Imagine physical infrastructure that's as easily to provision as virtual infrastructure. vRealize Operations helps you understand when you need to provision more resources or deploy a spare server. And Cisco UCS helps you manage physical resources without the time-consuming, error-prone, manual configuration process that can result in downtime.

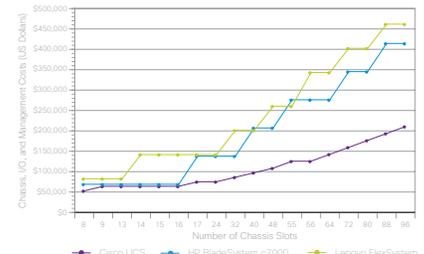
Rapid provisioning and deprovisioning through software-defined infrastructure management lets you scale easily. Cisco UCS management can establish a server's identity, configuration, and connectivity in minutes so that a hot spare can replace a failed server quickly and easily.

- **Application aware:** Together, Cisco UCS and vRealize Operations

comprehend application requirements and mold the environment to best support them. Today, Cisco UCS and vSphere coordinate virtual machine movement so that the physical infrastructure and the virtual infrastructure are synchronized. As you begin to deploy Cisco Application Centric Infrastructure (Cisco ACI™) in virtualized environments, you will notice a close relationship between

### Lower Infrastructure Cost per Server

Server costs are significant, but so is the cost of the infrastructure to support each server. SingleConnect technology dramatically reduces the number of interfaces, cables, and switches needed to support Cisco UCS blade servers. The result is an average per-server infrastructure cost for 96 servers of US\$2194 for Cisco UCS compared to US\$4316 for an HP system with HP OneView\* and US\$4809 for a Lenovo system with Lenovo Flex System Manager, more than double the cost of Cisco UCS.



\*Based on the Cisco UCS manufacturer's suggested retail price (MSRP) and HP and Lenovo retail price on May 21, 2015.

the physical and virtual infrastructure that was impossible to achieve until the development of the Cisco Nexus® 9000 Series Switches. With Cisco ACI, your applications are secure within policy-based network containers that isolate applications and tenants from one another. Other software-defined networks hide the network under a layer of software, obscuring the hardware that may be responsible for performance or connectivity problems. With Cisco ACI, we unify the software overlay so that virtual

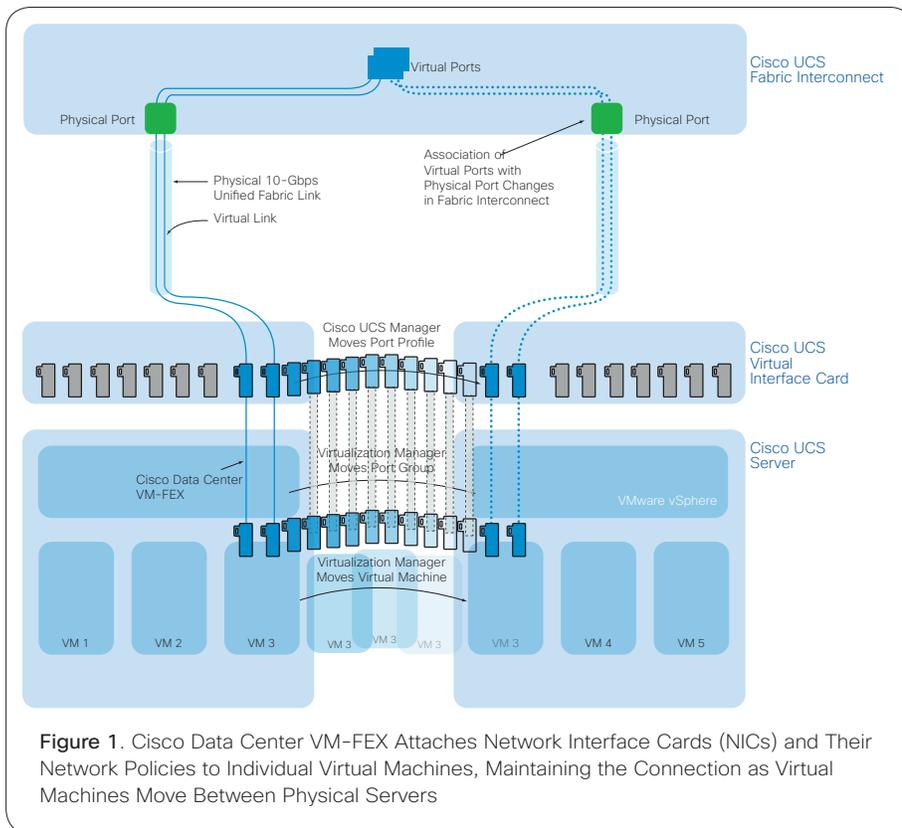
networks can be viewed in the same way as physical networks, with the capability to view application health in real time correlated with the underlying hardware that supports every network connection. This application-centric support goes far beyond what generic server and switching infrastructure can provide.

**Policy-Based Automation: Get More Done Faster with Increased Visibility and Control**

Cisco UCS was designed with role- and policy-based automation, and

Cisco ACI extends this approach to unify network and computing resources. Our approach encourages a process by which administrators create policies that dictate server and network configuration. You can deploy secure and compliant servers directly through Cisco UCS or through vRealize Operations. This approach helps you achieve compliant configurations and hardens your security beyond what any other vendor can provide.

- **Configuration and compliance:** vRealize Operations helps you establish server configurations that comply with your standards. With Cisco UCS management, compliant server configurations are prepared in minutes, without human intervention. Creating a noncompliant server is impossible. Configuration creep doesn't occur because the mechanism that establishes compliance to begin with—Cisco UCS management—prevents unauthorized changes. You can be confident with Cisco UCS that every aspect of the system's configuration adheres to defined policy.
- **Security hardening:** Cisco UCS eliminates the need to make trade-offs between flexibility and security, because there is no difference between physical and virtual networks. Both networks are implemented in hardware and have the same visibility, control, and security. Whether you connect your virtual machines using Data Center VM-FEX or you use Cisco software



**Figure 1.** Cisco Data Center VM-FEX Attaches Network Interface Cards (NICs) and Their Network Policies to Individual Virtual Machines, Maintaining the Connection as Virtual Machines Move Between Physical Servers

products such as the Cisco Nexus 1000V Switch, Cisco quality and security are built in.

In the unlikely event that a hypervisor is compromised, only Cisco UCS can reimage a system completely and automatically from the firmware up. This capability helps ensure that a compromised system can be recovered to a known, secure state.

- **Policy-based VSAN:** VMware Virtual SAN capabilities provide a virtual storage tier for virtual machines. This unites the management capabilities for the physical infrastructure (Cisco UCS Manager) with those of the virtual infrastructure (vSphere). The mechanism provides a software-defined storage tier that recruits physical storage devices from all of the servers in the virtualization pool. These tools enable you to easily scale out the storage pool by adding storage devices to servers

and incorporating the storage from new servers into the virtual pool. The result is reduced TCO, faster deployment of virtual machines, and highly resilient shared storage.

### Better Together with Unified Management

vRealize Operations provides a single point, a common console, from which to manage your virtualized environment, and Cisco UCS continues to act as unified management for the underlying infrastructure. This combination simplifies operations and makes your environment even easier to troubleshoot if adverse operating conditions (such as any computing or networking overutilization) occur.

- **Visibility and control:** The fundamental networking in Cisco UCS is designed to give you visibility and control as if your virtualized environment were a physical one.

Because network links that connect virtual machines look the same as links to physical ones, vRealize Operations or any other enterprise network management tool can manage connections to virtual machines. This capability takes the guesswork out of troubleshooting and allows you to use the tools with which you are familiar and productive (Figure 2).

- **Open and extensible:** Through a standard, published XML API in Cisco UCS management, tools such as vRealize Operations can have complete visibility into the server configuration with a single source of truth about server state. A broad ecosystem of third-party management tools, as well as Cisco UCS Director, can be used with Cisco UCS at your discretion. Cisco UCS Director can perform comprehensive infrastructure orchestration and automation for the entire lifecycle of both physical servers and virtual machines.
- **Disaster recovery:** Only Cisco UCS management, with complete automation of configuration, can exactly duplicate your physical infrastructure in a remote location in the event of a disaster. With Cisco UCS Central Software, you simply associate Cisco UCS service profiles with servers in the remote location. Then you are ready for bare-metal installation of VMware software. You don't have to worry about whether you have different server and processor types at the

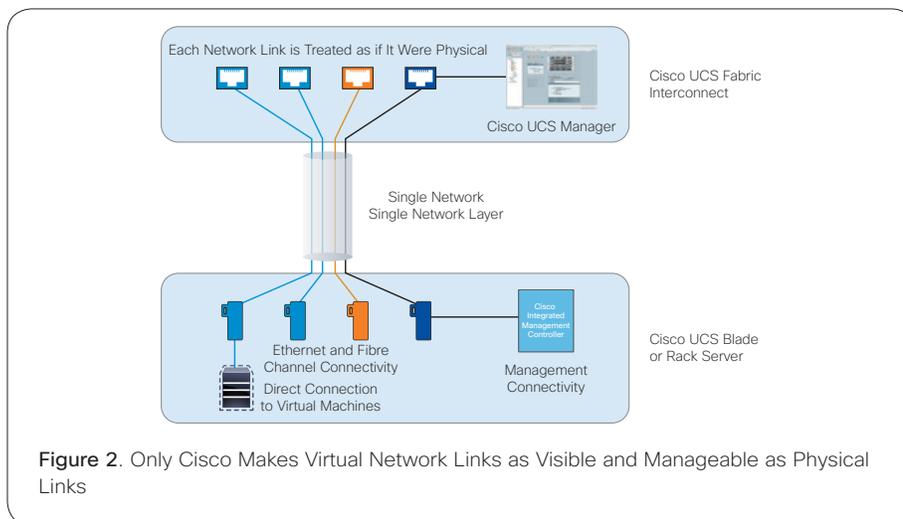


Figure 2. Only Cisco Makes Virtual Network Links as Visible and Manageable as Physical Links



remote location. Because Cisco UCS management is object based, not script oriented, you don't have to worry about scripts that require exactly the same servers in each location. And you don't have to budget and plan for an exact duplicate of your primary environment at all your disaster-recovery sites.

## Plug In and Run: Accelerate Deployment and Heighten Performance

Achieving the benefits of VMware software running on Cisco UCS is as easy as using preintegrated software and plug-ins to enable advanced features. Because Cisco UCS management is integrated into every system, you are already most of the way toward running the VMware software with which you are familiar.

- **VMware vSphere Auto Deploy with Cisco UCS Service Profiles:**

This preintegrated feature enables you to establish Cisco UCS service profiles in VMware, deploy bare-metal servers, and then deploy the hypervisor with a single click. This results in a rapid, simplified, and cost-effective means of deploying new hypervisors. This feature is beneficial in deploying a large number of physical hosts quickly or in facilitating on-demand hypervisor deployment to keep up with changing workload conditions.

- **Cisco UCS Manager Plug-In for VMware vCenter:** This software integrates Cisco UCS with vCenter and enables critical vSphere capabilities such as VMware vSphere VMotion, Distributed Resource Scheduler (DRS), High Availability (HA), and Fault Tolerance (FT). The plug-in adds the capability to provision servers from the firmware up with the policy-based provisioning and configuration-drift protection that Cisco UCS management provides.

- **Cisco UCS Manager Plug-in for VMware vRealize Orchestrator:** This software brings Cisco UCS infrastructure automation and composable infrastructure into the realm of vRealize Orchestrator. As a result, the library of VMware-provided workflows can work in harmony with Cisco UCS workflows. You can create a custom workflow that adds servers dynamically to a vSphere cluster for truly elastic capacity. This capability eliminates the need for administrators to configure server hardware manually. With Cisco UCS management, every aspect of server configuration—including the number and type of I/O devices—is configured through software, eliminating the need for human intervention.
- **Cisco UCS Content Pack for VMware vRealize Log Insight:** This software brings insight into one or more VMware clusters at the infrastructure level. It provides

analytics for unstructured data and log management to provide enterprisewide operational intelligence. Because Cisco UCS uses integrated, model-based management, the system itself maintains a single source of truth regarding the components connected to it. It enables administrators to connect to everything in their environment—operating systems, applications, storage arrays, firewalls, and network devices—providing a single location for you to collect, store, and analyze logs at scale.

## Cisco ONE Foundation for Compute

Cisco ONE™ Foundation for Compute is a suite of software, built on top of Cisco UCS management. It provides complete automation and orchestration to deliver IaaS across Cisco UCS and third-party servers, storage, networking, integrated infrastructure, composable infrastructure, and hyperconverged systems. Instead of a fragmented approach to IT operations and administration, Cisco ONE Foundation for Compute offers a unified set of capabilities in the management stack. These capabilities provide the foundation for the efficient delivery of IaaS, helping ensure that your IT organization meets its service-level

agreements (SLAs) with optimized operations management.

This integrated management suite includes:

- Self-service portal and service lifecycle management that enable customers to easily order IaaS
- Automation and orchestration of bare-metal and virtual resource provisioning
- Extensibility of your private IaaS to the public cloud with a 1-year subscription to four hybrid cloud ports
- Increased security with consistent security policies applied automatically across your environment
- Management of multiple domains to support up to 6000 servers and associated storage resources and networks across geographic locations
- Health and performance monitoring for Cisco UCS servers, hypervisors, and local storage, plus capacity planning to optimize resource utilization
- Management of energy consumption for physical and virtual resources to improve utilization and reduce operating expenses

vRealize Operations plugs into the Cisco ONE Foundation for Compute through Cisco UCS management to provide integrated operations management of your entire bare-metal and virtualized infrastructure. Cisco's innovative approach to unified infrastructure and operations management with Cisco ONE Foundation for Compute provides your organization with significant business benefits and cost savings while reducing risk. These benefits can help your organization efficiently transition to new business and operational models, helping IT make your enterprise and organization more competitive.

## Conclusion

By combining VMware software and Cisco UCS, you can manage your VMware environments with the same VMware tools that you are used to using, and help reduce TCO, improve performance, and increase availability through proactive management. Using Cisco UCS, Cisco networking products, and VMware software together, you gain the reliability and security of Cisco products in combination with the leading virtualization platform.

## For More Information

- [Cisco and VMware](#)
- [Cisco ONE Platform for Compute](#)



**Americas Headquarters**  
Cisco Systems, Inc.  
San Jose, CA

**Asia Pacific Headquarters**  
Cisco Systems (USA) Pte. Ltd.  
Singapore

**Europe Headquarters**  
Cisco Systems International BV Amsterdam,  
The Netherlands

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](http://www.cisco.com/go/offices).