



# SIMPLIFY OPENSTACK CLOUD DEPLOYMENT

Cisco, Intel, and Red Hat deliver a proven solution that reduces risk



According to a global survey of 3,643 enterprise executives responsible for IT decisions,

**69%**

of enterprise organizations have a cloud adoption strategy in place.<sup>1</sup>

Of these organizations,

**65%**

say OpenStack is an important part of their cloud strategy and had higher expectations for business improvements associated with cloud adoption.<sup>1</sup>

Cisco, Intel, and Red Hat provide an integrated, proven solution to help you quickly and easily deploy a reliable, secure, and supported OpenStack cloud environment for production operations.



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## ADVANCE YOUR CLOUD STRATEGY WITH OPENSTACK

IT plays an increasingly critical role in business success and many organizations are implementing cloud technologies to improve IT flexibility, business agility, and cost-effectiveness. In fact, 69% of enterprise organizations have a cloud adoption strategy in place.<sup>1</sup>

With a thriving community of enterprise, commercial, and individual developers and users, OpenStack® has become the leading cloud platform. Immense scalability, centralized operations, and interoperability with popular enterprise and open source technologies make it ideal for business operations. As a result, 65% of cloud adopters worldwide list OpenStack as an important part of their overall IT strategy.<sup>1</sup>

Even so, deploying OpenStack can be challenging. The number and variety of components make setup and configuration complex—especially in terms of security and governance—and require cloud-specific skills and experience in-house. Numerous new projects and a rapid six-month release cycle make it difficult to keep up with innovation while still achieving return on your investment. Coordinating support and services with multiple vendors and the open source community can result in slower response and resolution times, delaying business operations.

Cisco, Red Hat, and Intel offer a Cisco Validated Design (CVD) that provides proven guidelines and tested configurations to simplify and speed deployment and operation of an OpenStack cloud environment. Deploying this integrated solution gives you a reliable, secure, and supported OpenStack cloud environment that is ideal for building enterprise private cloud and delivering cloud applications and services.

## BUILD YOUR CLOUD ENVIRONMENT WITH TRUSTED PARTNERS

Nearly 7 out of 10 enterprise organizations are planning to adopt cloud technologies.<sup>1</sup> The potential to innovate faster and safely broker both internally developed and externally sourced services are significant cloud adoption motivators for organizations that want to gain a competitive advantage. Cisco, Intel, and Red Hat work closely together to meet these needs with joint solutions that simplify deployment, streamline operations, increase flexibility, and reduce risk, including:

- **Application development and testing.** Build an agile, responsive foundation for application development and testing with on-demand access to IT resources.
- **Cloud-native application deployment and life cycle management.** Develop, deploy, and manage applications efficiently with the flexible, self-service capabilities of a cloud environment.
- **Application expansion and scaling.** Deliver proven, cost-efficient platforms on demand to support application growth and global expansion.
- **IT-as-a-Service capabilities.** Transform IT into an internal service provider with an innovative Infrastructure-as-a-Service (IaaS) foundation that can extend to Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS) as your business evolves.

<sup>1</sup> IDC, "Don't Get Left Behind: The Business Benefits of Achieving Greater Cloud Adoption," August 2015.



Simplify and speed cloud deployment while reducing risks with a tested, proven, and integrated platform.

## SPEED OPENSTACK CLOUD DEPLOYMENT WITH A PROVEN SOLUTION

Jointly developed by industry leaders Cisco, Intel, and Red Hat, Cisco® UCS® Integrated Infrastructure for Red Hat® Enterprise Linux® OpenStack Platform (Cisco UCSO) combines computing, networking, storage, management, and cloud orchestration into a single platform for deploying IT-as-a-Service environments and beyond. With documented design and deployment guidelines, proven configurations with bills of materials, coordinated support, and expert services, this integrated solution speeds deployment and delivers the scalability, manageability, reliability, and high availability needed for production operation.

Deploying Red Hat Enterprise Linux OpenStack Platform on Cisco UCS Integrated Infrastructure provides broad functionality for your cloud environment without requiring complicated integration. The following are some examples of how this jointly engineered solution can help your business.

### REDUCE DEPLOYMENT COMPLEXITY AND RISK

Building a cloud infrastructure in-house requires configuring a wide variety of components. This complexity also increases the risk of compliance, security, and performance issues. Together, Cisco and Red Hat simplify and speed cloud deployment and reduce the risks associated with cloud adoption. Proven guidelines and tested configurations make building your cloud environment easier and provide a secure foundation for applications, services, and virtual machines while avoiding time-consuming mistakes. Integration between Red Hat Enterprise Linux OpenStack Platform director and Cisco UCS Manager further accelerates deployment, configuration, and provisioning of both OpenStack and the underlying physical and virtual infrastructure. This also ensures your Cisco infrastructure is accurately and securely deployed as the foundation of your OpenStack cloud environment. Scalable, automated provisioning lets you deploy only the resources you need today and expand easily and quickly as your business grows. Cisco's unified, centrally managed datacenter architecture makes your cloud applications and services more secure.

Additionally, Red Hat and Cisco offer professional services to help you fill temporary skills gaps and take advantage of both companies' expertise. Using industry best practices, Red Hat and Cisco's cloud experts can design and install a secure, reliable, and efficient cloud environment that meets your requirements. Streamlined, coordinated support gives you a single point of contact for faster case resolution, so you can deploy with confidence.



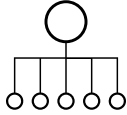
Prepare for the future with open source interoperability and a large ecosystem of certified partners.

### GAIN FLEXIBILITY FOR THE FUTURE

In a fast-paced business environment, your infrastructure must be able to evolve for your organization to remain competitive. Using industry-standard, open technologies, an OpenStack environment built with Cisco and Red Hat products delivers more flexibility while reducing vendor lock-in and increasing interoperability. A large ecosystem of certified partners for both Cisco UCS and Red Hat Enterprise Linux OpenStack Platform lets you customize and adapt your cloud environment as your needs change.

### IMPROVE OPERATIONAL EFFICIENCY

IT staff are increasingly asked to support strategic business operations, but much of their time is spent maintaining existing infrastructure. Simplifying infrastructure management increases operational efficiency and improves IT productivity. With automated workflows, centralized management, and streamlined operations, Cisco UCSO helps you work more efficiently and effectively, so you can deliver more value to your business. Cisco's OpenStack plug-ins for servers, switches, and virtual network interface cards (vNICs) provide seamless configuration and end-to-end administration. These plug-ins eliminate setup delays and errors due to manual intervention and optimize



### CISCO UCSO SOLUTION COMPONENTS

- Cisco UCS computing and storage servers with Intel Xeon processors
- Cisco Nexus 9000 and 1000v switches
- Cisco UCS Manager unified infrastructure management software
- Red Hat Enterprise Linux OpenStack Platform
- Red Hat Ceph Storage
- Coordinated support and professional services

infrastructure resources. Virtual machine life cycle management delivers consistent provisioning, configuration, and decommissioning. Live migration of virtual machines lets you distribute and manage application workloads and perform hardware maintenance without downtime.

### REDUCE COSTS AND ACCELERATE RETURN ON INVESTMENT

While IT spending is slowly increasing, budgets are still limited and funding strategic projects remains challenging. As a result, many IT organizations are implementing OpenStack to reduce virtualization costs. Cisco UCSO lets you take advantage of the cost savings of cloud technology and achieve faster return on investment for your cloud environment. The solution's scalable architecture lets you install only what you need and expand on-demand to meet business needs. Centralized management streamlines operations and reduces operational expenses (OpEx). Incorporation of industry standards, best practices, and proven expertise deliver higher cloud efficiency to further reduce OpEx. Rapid deployment coupled with professional design and implementation services quickly generate cost benefits.

### ADOPT DEPENDABLE, INDUSTRY-LEADING TECHNOLOGIES

Based on leading, industry-standard technologies, Cisco UCSO integrates Cisco UCS servers, Cisco Nexus switches, Red Hat Enterprise Linux OpenStack Platform, Red Hat Ceph Storage, and related support and services, as shown in Figure 1.



*“Cisco, Intel, and Red Hat solutions for OpenStack offer a superior platform for continuous application development and delivery, providing the high availability, security, and scalability our customers need.”*

SATINDER SETHI  
VICE PRESIDENT OF PRODUCT  
MANAGEMENT, DATA CENTER  
SOLUTIONS, CISCO

#### USE CASES



Private cloud environments (IaaS)



Application development environments



Cloud-native application deployment

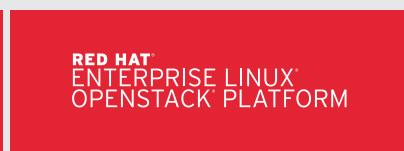


IT-as-a-Service (ITaaS) environments



Network functions virtualization (NFV)

#### PLATFORM



UCS-M ML2 plugin

NIKv ML2 plugin

Nexus ML2 plugin

ACI plugins\*

#### INFRASTRUCTURE

Cisco UCS Integrated Infrastructure



Compute



Networking



Storage



Management

\* Currently in development

Figure 1. Cisco UCSO integrates computing, networking, storage, management, and cloud orchestration into a unified cloud solution for private cloud and IT-as-a-Service environments.



*“Intel’s work with Red Hat and Cisco in producing the Cisco UCSO solution provides customers an enterprise-ready OpenStack solution that takes full advantage of this unique technical collaboration. Delivery of solutions like Cisco UCSO is a critical element to meeting our goal of creating tens of thousands of new cloud environments.”*

JONATHAN DONALDSON  
VICE PRESIDENT AND GENERAL  
MANAGER OF SOFTWARE-  
DEFINED INFRASTRUCTURE,  
CLOUD PLATFORMS GROUP, INTEL

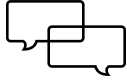
## CISCO UCS INTEGRATED INFRASTRUCTURE

Designed for converged datacenter operations, Cisco UCS integrated platforms simplify your hardware infrastructure, drastically reducing the number of devices requiring setup, management, power, cooling, and cabling. Cisco UCS provides:

- **Superior performance, scalability, and high availability.** Cisco UCS computing and storage servers deliver performance and simplicity at scale. The unified architecture allows you to easily add computing and storage resources as demand increases without additional supporting infrastructure or expert knowledge. The system’s high-density design increases the number of virtual servers that can run on each physical host, saving on capital, operational, physical space, and licensing costs. Support for large amounts of high-speed memory per server lets you host more cloud applications using less-expensive servers without sacrificing performance or availability.
- **Unified network fabric.** The backbone of Cisco UCS Integrated Infrastructure is Cisco’s high-performance, high-density, low-latency, power-efficient Nexus 9000 series and virtualized Nexus 1000v series switches. This unified network fabrics connects your cloud infrastructure, spanning both physical and virtual network layers. Cisco Nexus switches are integrated with Cisco UCS for streamlined management, increased efficiency, and optimized performance. Layer 2 and 3 programmability gives you flexible configuration options. Cisco Modular Layer 2 (ML2) plugins for OpenStack Networking let you deploy, configure, and manage Cisco switches through the cloud platform.
- **Centralized infrastructure management.** Cisco UCS servers and Nexus switches are managed through the embedded Cisco UCS Manager, which can control multiple chassis and administer resources for thousands of virtual machines. Policy- and model-based management together with automatic deployment and provisioning of system components streamlines infrastructure administration. Open application program interfaces (APIs) let you customize and use third-party tools within your cloud infrastructure. Cisco OpenStack plug-ins and integration with the OpenStack Horizon dashboard enable broader infrastructure management within OpenStack to further increase operational efficiency.
- **Application-centric design.** Cisco UCS Integrated Infrastructure works with Cisco’s Application Centric Infrastructure (ACI) technologies to deliver automated, policy-driven application life cycle management. By applying a business-relevant software-defined networking (SDN) policy model across networks, servers, storage, security, and services, Cisco ACI reduces total cost of ownership (TCO), automates application administration, and accelerates application deployment.

## INTEL XEON E5 AND E7 PROCESSORS

Intel® Xeon® E5 and E7 processors deliver high performance computing to Cisco UCS servers. Large memory capacity and I/O bandwidth enable increased performance and virtual machine densities. Designed to recover from more I/O, Machine Check Architecture (MCA), and PCIe errors, Intel Xeon processors provide 99.999% uptime for highly available operation. Enhanced error log information improves diagnostic and predictive failure analysis so you can correct issues faster and proactively manage your infrastructure. Hardware-embedded security features—including Intel Data Protection Technology with Security Key and Intel Platform Protection Technology with OS Guard—help to protect your environment from threats.



*“We have raised the standard for production-ready OpenStack with the most recent release of Red Hat Enterprise Linux OpenStack Platform. With increased adoption of OpenStack, we are excited about addressing the need for reduced time to solution with a truly open approach that enables automated deployment and life cycle management of the infrastructure.”*

RADHESH BALAKRISHNAN  
GENERAL MANAGER,  
OPENSTACK, RED HAT

## RED HAT ENTERPRISE LINUX OPENSTACK PLATFORM

Commercially hardened and proven across vertical industries, Red Hat Enterprise Linux OpenStack Platform is a production-grade cloud platform for building private or public cloud environments. A longer, three-year release life cycle and enterprise-quality support let you deploy Red Hat Enterprise Linux OpenStack Platform without continually upgrading your environment. Red Hat co-engineers its OpenStack distribution with Red Hat Enterprise Linux to address OpenStack-Linux dependencies and provide better stability, security, performance, and interoperability. Massive scalability supports even the largest organizations and lets you expand your cloud as your business grows. Fault-tolerance and highly available configuration options support business-critical applications. Open APIs and interoperability with a trusted, certified ecosystem of more than 350 technology and service partners lets you customize your cloud environment to meet business needs.

Red Hat Enterprise Linux OpenStack Platform includes a variety of features for accelerating OpenStack adoption and management, including:

- **Simplified deployment and management.** The Red Hat Enterprise Linux OpenStack Platform director simplifies and automates cloud resource installation and checks for proper deployment, ensuring your OpenStack cloud environment is set up and configured correctly. Automated ready-state provisioning of bare-metal resources streamlines deployment and on-demand repurposing of hardware resources. The director also establishes a new framework for live orchestrated cloud deployment and easier updates.
- **High availability.** Integrated, automated monitoring and failover services through Red Hat Enterprise Linux let you run traditional business applications that require highly available resources in an OpenStack cloud environment.
- **Snapshot-based backups.** New storage options let you make incremental changes to backups between full-state backups for faster block storage backup and reduced capacity needs. Support for Network File System (NFS) and Portable Operating System Interface for UNIX (POSIX) gives you more storage flexibility.

## RED HAT CEPH STORAGE

An open, software-defined storage platform, Red Hat Ceph Storage runs on Cisco UCS servers to deliver cost-effective, unified, petabyte-scale cloud storage. Tightly integrated with Red Hat Enterprise Linux OpenStack Platform, the self-managing storage platform streamlines and automates data management within your cloud environment. Fault-tolerant design increases data availability. Flexible deployment options let you start with block or object storage and extend your environment as needed.

## COORDINATED SUPPORT AND PROFESSIONAL SERVICES

Coordinating support and services between multiple infrastructure vendors can be tedious and time-consuming. Cisco UCSO provides a single point of contact for end-to-end solution support, simplifying and speeding issue reporting and resolution. Once an issue is reported, Cisco and Red Hat work together to resolve it quickly without requiring you to coordinate between multiple vendors.

To help you gain the benefits of an OpenStack cloud environment faster, Cisco and Red Hat also offer expert professional services, including solution design, sizing, and deployment. Validated pilot deployments and streamlined purchasing give you a simplified, cost-effective path to a production cloud environment.



*“Together, Cisco, Intel, and Red Hat help organizations achieve faster application rollout and time-to-value for their OpenStack cloud.”*

SATINDER SETHI  
VICE PRESIDENT OF PRODUCT  
MANAGEMENT, DATA CENTER  
SOLUTIONS, CISCO

### CONCLUSION

Implementing a cloud environment is a challenging—but essential—step to transform your organization to remain competitive. Together, Cisco, Red Hat, and Intel deliver an integrated solution that lets you quickly deploy a reliable, secure, and supported OpenStack cloud environment. Industry-leading components combined with a tested, proven CVD and deployment guidelines help you build an open private cloud environment that aligns with your business needs and streamlines operations, increases productivity, and reduces costs. Open source interoperability and a large certified partner ecosystem prepare you for industry and business changes. Contact your Red Hat or Cisco representative to find out how you can take advantage of cloud innovation with less risk.

- Learn more about the Cisco and Red Hat partnership at [redhat.com/cisco](http://redhat.com/cisco).
- Learn more about Cisco solutions for OpenStack at [cisco.com/go/openstack](http://cisco.com/go/openstack).
- Learn more about Red Hat Enterprise Linux OpenStack Platform at [redhat.com/en/technologies/linux-platforms/openstack-platform](http://redhat.com/en/technologies/linux-platforms/openstack-platform).



### CONTACT CISCO

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed at [cisco.com/go/offices](http://cisco.com/go/offices).

#### AMERICAS HEADQUARTERS

Cisco Systems, Inc.  
San Jose, CA

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Cisco Systems (USA) Pte. Ltd.  
Singapore

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Cisco Systems International BV  
Amsterdam, The Netherlands



### ABOUT RED HAT

Red Hat is the world’s leading provider of open source software solutions, using a community-powered approach to reliable and high-performing cloud, Linux, middleware, storage, and virtualization technologies. Red Hat also offers award-winning support, training, and consulting services. As a connective hub in a global network of enterprises, partners, and open source communities, Red Hat helps create relevant, innovative technologies that liberate resources for growth and prepare customers for the future of IT.



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**NORTH AMERICA**  
1 888 REDHAT1

**EUROPE, MIDDLE EAST,  
AND AFRICA**  
00800 7334 2835  
[europa@redhat.com](mailto:europa@redhat.com)

**ASIA PACIFIC**  
+65 6490 4200  
[apac@redhat.com](mailto:apac@redhat.com)

**LATIN AMERICA**  
+54 11 4329 7300  
[info-latam@redhat.com](mailto:info-latam@redhat.com)

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