

RED HAT ENTERPRISE LINUX OPENSTACK PLATFORM – A COST-EFFECTIVE PRIVATE CLOUD FOR YOUR BUSINESS

INTRODUCTION

The cloud is more than a marketing concept. Cloud computing is an intentional, integrated architecture comprising a suite of tools that help automate your business operations on a service-provider's infrastructure, your infrastructure, or a hybrid combination of both.

A private cloud solution uses the accessibility and redundancy advantages of the public cloud, but on your business's own infrastructure. The advantages gained are greater control over your data with a level of auditing that meets enhanced security needs for financial records, medical records, and other highly sensitive data. As the private cloud tends toward vendor-agnostic open-source solutions, vendor lock-in is avoided and interoperability is enhanced.

WHAT DOES A TYPICAL CLOUD SOLUTION LOOK LIKE TODAY?

A cloud solution comprises many components, each integrated with one another into a single architecture supporting business operations. A typical solution may be composed of the following modular elements:

Hardware: A cloud network will be composed of a wide variety of physical hardware located at multiple geographical locations. The hardware may comprise networking equipment (switches, routers, firewalls, load balancers), storage arrays, backup devices, and servers.

Virtualization: Computing equipment such as servers may be dedicated (standalone) or shared (virtualized), the latter being supported by virtualization software that manages these shared instances. On the physical devices, software called a hypervisor manages the creation of virtualized server instances and manages resources (memory, computing power, local storage) allocated to each instance.

Storage: Data may be stored on arrays located in multiple data centers. Within a single datacenter, data may be stored in a redundant manner across many disks in a single storage array. Storage management ensures data is correctly being backed up, that outdated backups are deleted on a regular basis, and that data is readily indexed for retrieval in the event any storage component fails.

Network: A typical cloud network configuration is composed of multiple sub-networks, each with varying levels of visibility. Each device in the cloud network has a unique, configurable identifier address so other devices can locate it across the network. The cloud permits the creation of virtual local area networks (VLANs) and assigns static and/or dynamic addresses as needed for all network resources.



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Identity and access management: Managing access to devices and services across a cloud environment is complex, given the variety of users involved and the access rights they need. The identity and access management component ensures that rule- and role-based access control is implemented across the cloud environment to maximize accessibility with the least impact on security controls.

Cloud dashboard: Finally, tying all these components together in a manner visible to engineering management is a dashboard component. It will have a graphical user interface (GUI) that displays performance metrics and is often integrated with management tools to enable easier configuration changes and device setting changes across the cloud architecture.

CLLOUD ADVANTAGES FOR INDUSTRY VERTICALS

Telecommunications vendors can use their position as both providers and adopters of cloud technologies to their advantage. As the number of devices accessing their networks explodes, these telecom vendors can use cloud technologies to efficiently and rapidly ramp up capacity to meet burgeoning demand.

Service providers can use these telecom-vendor efficiencies to lower the cost of entry for their customers and speed the delivery of products to market. Massively scalable leased infrastructure will ensure that customer demand can be met at a cost-effective, pay-as-you go cost structure.

Financial services providers can use the security provided by data and network segregation to ensure that their cloud implementations meet regulatory demands and the security expectations of their customers.

The U.S. Government's Cloud First Policy decided that up to one quarter of its annual IT spending would benefit from a cloud environment. Among other advantages, cloud initiatives preclude the government from needing to purchase, install, secure, and manage computing assets. It also frees agency Chief Information Office personnel to focus on those critical needs that require a hands-on approach.

Based on this assessment, the government has begun overseeing the security aspect of its recommended cloud migration through the FedRAMP third-part security assessment program for cloud services. The Cloud First Policy is encouraging major investment in cloud technologies and FedRAMP is assuring the services provided meet the needs for data and network segregation, access control, encryption for data at rest and data in transit, and that backups and data redundancy meet the needs for agency Continuity of Operations (COOP) policies.

THE PRIVATE CLOUD MARKET

Although the term "cloud computing" may be new, the leading companies bringing these technologies to market are well-known brands. Amazon, Google, HP, IBM, and Microsoft are household names. Others, such as VMware, Citrix, and Red Hat are well known in the business community. So while cloud nomenclature may be new, the market is mature.

The private cloud market is composed of two categories: 1) proprietary solutions offered by large, well-known vendors that are largely restricted to their own ecosystems, and 2) open offerings that integrate with components developed by industry and are well-integrated in the corporate IT market.

With open source systems, like OpenStack®, customers have much broader integration options than with proprietary solutions. Open source systems typically embrace open Application Programming Interfaces (APIs) that allow customers to choose from a broad range of products or services from an equally broad range of vendors to incorporate into their cloud environment.

OPENSTACK PLATFORM

More than any other open-source cloud solution, OpenStack was designed from the outset to be open and portable. Created in July 2010 by Rackspace Hosting and NASA, OpenStack is based on an open standard that maximizes portability and the use of commodity technology. The guiding organization, OpenStack Foundation, is committed to maintaining openness and interoperability throughout the development of the technology.

The OpenStack platform and component technologies are maintained on an ongoing basis by more than 12,000 people in the community overseen by the OpenStack Foundation, and supported by more than 100 companies in private industry in 130 countries around the globe. OpenStack isn't married to any one proprietary operating system, any one brand of hardware, or any one hosting company. OpenStack is the antithesis of vendor lock-in.

Well-known technology companies such as IBM, HP, and Red Hat have adopted the OpenStack platform based in part on the open, collaborative nature of the architecture. Given the evolving state of the private cloud market, interoperability is paramount to future-proof the decisions you may make today. OpenStack is the technology that meets these needs.

CONTINUED OPENSTACK SUPPORT: MAKING THE RIGHT CHOICE

Despite broad corporate sponsorship across a variety of industries, the majority of the OpenStack development effort is still being led by a handful of companies.

Commitment to interoperability between vendors and external cloud technologies such as AWS is not always shared equally among the companies leading development efforts. In addition, because OpenStack is an open standards platform built on open source technology, it has been developed in a modular fashion. Each module is configurable separately and the end result can be complex.

The ideal solution, therefore, would be an open source platform like OpenStack, provided by a core OpenStack contributor to manage the complexity, provide the stability of an established player in the market, and provide enterprise-class core components. That solution is Red Hat® Enterprise Linux® OpenStack Platform.

RED HAT ENTERPRISE LINUX OPENSTACK PLATFORM

You already recognize the value of a private cloud solution – that migrating parts of your business applications to a cloud solution will ease your mind and lighten your load. It will have the stability required to support your business at all hours of your business cycle. And, it will have a knowledgeable team available in case you experience any challenges in meeting your needs.

With its open source roots and demonstrated expertise, Red Hat has proven that open source software is not only profitable, but is a viable business model for the distribution of enterprise-class software. Red Hat brought enterprise-class stability and support to the Linux operating system, taking the OS from the hands of researchers and aficionados to the data centers that host critical automated business functions. Red Hat Enterprise Linux became successful through trust. Businesses trusted the uniformity and quality assured by the Red Hat brand. Businesses were also able to purchase and receive the product support required to ensure their business processes would be transacted without technology disruption.

STABILITY, SECURITY, SCALABILITY, SUPPORT

Staying true to its vision of bringing the best open source products to market, Red Hat is a premiere OpenStack provider. Red Hat Enterprise Linux OpenStack Platform is composed of two core technologies optimized for and integrated with each other: Red Hat Enterprise Linux and the OpenStack Platform. The first brings enterprise-class stability, security, and support; the second brings the innovation of the open source community coupled with the open standards and interoperability of an intentionally vendor-neutral technology.

Red Hat Enterprise Linux OpenStack Platform also brings scalability. It may be implemented within your environment on a limited test basis – by downloading software from Red Hat – and is scalable from that one node in your test environment to thousands of nodes in production. Scalability can be dynamically expanded or reduced to meet changing demand in real time, across geographically disparate networks, without bottlenecks introduced by the need to purchase dedicated hardware and negotiate hosting contracts with static service levels.

Red Hat Enterprise Linux OpenStack Platform is supported by a large partner ecosystem. This ecosystem, the Red Hat OpenStack Cloud Infrastructure Partner Network, comprises more than 120 vendors. This ecosystem is amplified by the Red Hat Certified Solution Marketplace, a directory of technologies and products Red Hat has certified to support Red Hat Enterprise Linux OpenStack Platform. These shared commitments ensure vendors are available to provide a broad variety of mature products over the cloud implementation life cycle. These product lines are well-tested, stable, and secure, and interoperability is assured by standard interfaces and APIs.

In addition to Red Hat Enterprise Linux OpenStack Platform, Red Hat also provides its own ecosystem of cloud-based offerings that all work in conjunction with one another: Red Hat Enterprise Virtualization, Red Hat CloudForms, and Red Hat Cloud Infrastructure.

- **Red Hat Enterprise Virtualization** combines the Red Hat Enterprise Virtualization Hypervisor, based on KVM, with an enterprise-grade virtualization management platform to offer traditional datacenter virtualization capabilities at an ideal cost-to-performance ratio.
- **Red Hat CloudForms** enables management across Red Hat Enterprise Virtualization, Red Hat Enterprise Linux OpenStack Platform, and a variety of other hypervisor and cloud platforms. CloudForms serves as a self-service portal that permits automated provisioning of cloud assets and services, service-level oversight, and interfaces with third-party cloud platforms made by VMware, Amazon, and Microsoft. Rather than a proprietary toolset that only works with Red Hat branded products, CloudForms gives you control over your cloud environment across datacenters in multiple geographic locations. It also gives you insight into the capacity and workload in those environments, irrespective of vendor.
- **Red Hat Cloud Infrastructure** combines Red Hat CloudForms, Red Hat Enterprise Virtualization, Red Hat Enterprise Linux OpenStack Platform, and Red Hat Enterprise Linux guests to provide virtualization and cloud infrastructure managed through a common cloud management platform.

- Red Hat offers a certification credential for Red Hat Enterprise Linux OpenStack Platform, the Red Hat Certificate of Expertise in Infrastructure-as-a-Service (RHCEI), that ensures certified engineers and architects are experts in building and operating private clouds using Red Hat OpenStack technologies
- Certification organizations such as CompTIA and the Cloud Security Alliance provide certification exams that can result in vendor-neutral cloud certifications such as CompTIA Cloud Essentials and the Certificate of Cloud Security Knowledge (CCSK). A certified team may be critical to the success of your cloud initiatives.

IMPLEMENTING RED HAT ENTERPRISE LINUX OPENSTACK PLATFORM

Red Hat Enterprise Linux OpenStack Platform has been tested and packaged to be implemented in your network to support your business's needs for private cloud service.

Red Hat Enterprise Linux OpenStack Platform can be implemented in your environment with two different evaluation methods.

- The first is a 90-day evaluation that can be downloaded from Red Hat and installed on a test server in your environment. This evaluation version permits you to create a three-node cluster for testing the OpenStack technology. With this version, you can create and manage virtual machines to evaluate how the cloud technology functions.
- The second is by contacting Red Hat sales and becoming involved in the Early Adopter program. Using step-by-step instructions, you can deploy OpenStack to a single server, configure networking for the instance, and add additional nodes as necessary to permit a full evaluation of the technology.

Red Hat sales can additionally assist with developing a plan to construct a fully-functioning private cloud solution in your environment.

Once you've made the decision to implement Red Hat Enterprise Linux OpenStack Platform, there are several additional things you can do to prepare:

- Define the workload that will best be served within a cloud environment, to ensure the technologies chosen meet the identified needs
- Choose applications that are specifically built to operate within a cloud environment by providing distributed load balancing, as opposed to having the underlying hardware handle that capability
- Choose the best team for the job. Technical personnel who have already built a cloud from scratch using tools such as KVM technology and scripting tools are ideal candidates to lead a Red Hat Enterprise Linux OpenStack Platform effort for your private cloud initiative.
- Ensure your implementation team takes cloud-specific training and earns cloud-specific technology certifications

WHAT THE FUTURE HOLDS

RED HAT ENTERPRISE LINUX OPENSTACK PLATFORM

Red Hat Enterprise Linux OpenStack Platform permits heterogeneous environments supporting cloud deployments to integrate with the open standards-based OpenStack technology, all with the flexibility for changes in the future. As innovation is made within the OpenStack community and released by the OpenStack Foundation, Red Hat will ensure its platform maintains full interoperability to ensure ongoing integration of all cloud infrastructure components in your environment.

Perpetual interoperability coupled to the broad vendor ecosystem ensures companies that adopt Red Hat Enterprise Linux OpenStack Platform can continue to purchase low-cost commodity hardware to meet demand and replace end of life equipment. With the Red Hat platform, customers are not subject to cost and availability pitfalls that can happen within a proprietary approach.

CONCLUSION

Whether you're moving all your business processes to a private cloud or you're simply looking for a way to lighten your technology load, Red Hat Enterprise Linux OpenStack is the most cost-effective and customer-friendly implementation of OpenStack on the market today. It has the stability and support you have come to expect from Red Hat Enterprise Linux, the technical innovation brought by the open source community and the OpenStack Foundation, and a broad partner ecosystem from hardware and software vendors to hosting companies to household-name integrators.

A private cloud solution takes advantage of the economy, redundancy, and massive scalability of the public cloud, but brings it into the network you own and control. Because it's built from the ground-up on open standards, you will never find yourself locked into a vendor's product line and subject to that single vendor's pricing scheme.

More than 100 vendors have joined Red Hat's OpenStack efforts and provide technologies and services that are certified to work with Red Hat Enterprise Linux OpenStack Platform. Red Hat offers training and certifications that ensure your technical team has the knowledge to support your private cloud implementation. And through corporate cloud offerings, Red Hat brings virtualization and management tools that integrate seamlessly with Red Hat Enterprise Linux OpenStack Platform. This frees your technical team to focus on providing critical support for your business needs.

Scalable, supported, and seamlessly integrated into your existing infrastructure, Red Hat Enterprise Linux OpenStack Platform is the clear path to your enterprise's private cloud future.

ABOUT RED HAT

Red Hat is the world's leading provider of open source solutions, using a community-powered approach to provide reliable and high-performing cloud, virtualization, storage, Linux, and middleware technologies. Red Hat also offers award-winning support, training, and consulting services. Red Hat is an S&P company with more than 70 offices spanning the globe, empowering its customers' businesses.

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