

**Technology Brief**

# **Build your Open Cloud with HP CloudSystem and KVM**

**Introducing KVM support for HP CloudSystem for  
enterprises and service providers**



## Executive Summary

As enterprises and service providers expand their use of Cloud within their IT environments, the use of public, private and hybrid clouds alongside existing IT infrastructures is now the rule rather than the exception. Increasingly, enterprises and service providers must create a hybrid delivery environment that provides the right mix of local and public services by leveraging the best of traditional IT, as well as private, managed, and public cloud services.

As these enterprises and service providers begin to blend their IT environments together, they are faced with disparate architectures, different management and security facilities, and inconsistent tools across the various cloud models. Different networking and storage technologies and vendors are now coexisting within a single cloud environment. Different virtualization technologies are also being placed together, ranging from industry-leading vendor hypervisors to open standard hypervisors and operating environments that are oriented more towards dev/test departments.

HP's Converged Cloud strategy is focused on delivering a common architectural foundation across traditional IT, private, managed, and public clouds. As a part of that strategy, HP offers HP CloudSystem, a complete, integrated and open platform for building and managing cloud services. A key tenet of CloudSystem is support for heterogeneous environments. With the next release of HP CloudSystem, HP is expanding this openness even further by adding support for Kernel-based Virtual Machines (KVM).

## HP CloudSystem at the Center of HP Converged Cloud

Based on proven, market-leading HP Cloud Service Automation and Converged Infrastructure, HP CloudSystem is tailored for the requirements of enterprises and service providers at various stages of cloud maturity with three offerings:

- Entry configuration for infrastructure as a service (IaaS) with **HP CloudSystem Matrix** that lets IT customers provision infrastructure in minutes for private and hybrid clouds
- Full-scale deployment of private and hybrid customers unify management across private, public, and hybrid clouds and adds advanced infrastructure-to-application lifecycle management
- Advanced capabilities for service providers with **HP CloudSystem Service Provider**, facilitating deployment of public and hosted private clouds that deliver complete service aggregation and management

## Manage heterogeneous environments in the same way

According to IDC, 50% of customers already use multiple hypervisors and another 35% plan to do so in the next 12 to 24 months.<sup>1</sup> HP CloudSystem already supports virtualization technologies from HP, Microsoft, and VMware, as well as physical provisioning for server blades. Now, HP CloudSystem is adding support for Kernel-based Virtual Machines (KVM) resource pools.

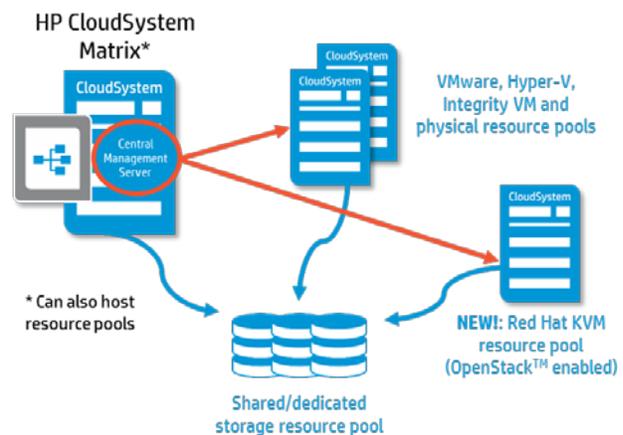


Figure 1 – CloudSystem Matrix KVM Integration

HP CloudSystem customers who create “Infrastructure as a Service” (IaaS) services, can now include servers running Red Hat RHEL KVM. When they design service templates in CloudSystem, architects can select KVM virtual machines in addition to currently supported resource pools, which include MS Hyper-V, VMware ESXi, and physical servers. In a multi-tier service templates they can mix and match KVM resources alongside other platforms supported by CloudSystem. They can use the storage and network infrastructure that is supported within CloudSystem today. The servers hosting the KVM resource pools can be located within any enclosure or HP server that CloudSystem Matrix supports today. Customers can add KVM resource pools to existing CloudSystem implementations, and mix/match the hypervisor and server types within these environments.

<sup>1</sup>IDC Buyer Insights: Storage in Virtualized x86 Environments, doc #236344, August 2012

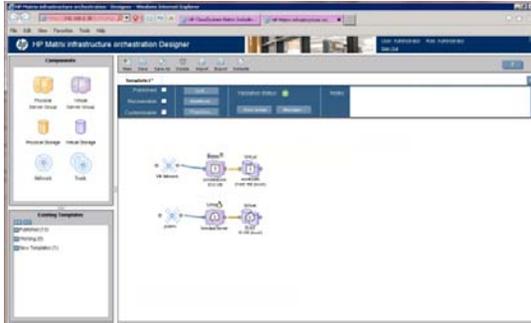


Figure 2 - Template showing a service example using KVM and VMware resource pools together

As is shown in Figure 2, the cloud architect creates the appropriate service template, and the cloud administrator ensures that the resources required for the service is available within the appropriate resource pools. The cloud user utilizes the Matrix self-service portal to choose the template and provision the service that is needed. This single request, in this example, automatically deploys both KVM and VMware resources to meet the needs of the request.

KVM support is enabled by leveraging OpenStack technologies, incorporated directly into CloudSystem, to provision and manage KVM virtual machines. HP clients using CloudSystem today can add KVM resource pools without disrupting management of their existing cloud services. This provides clients with expanded choice as well as increased flexibility to manage varying requirements for cost, security and availability.

## What is OpenStack™ and why is HP using it?

HP Converged Cloud builds on flexible OpenStack technology, using open, Web-based APIs to provide a consistent management interface across hybrid clouds and heterogeneous technologies. OpenStack is an open source IaaS cloud-computing project. It provides a framework that exposes an open API and decomposes infrastructure provisioning and management into compute, storage and network services. It enables an extremely flexible cloud environment, composed of multiple heterogeneous underlying resource pools. OpenStack ([www.openstack.org](http://www.openstack.org)) has quickly become the leading open source cloud technology.

OpenStack technology provides cloud-enabling technologies for IaaS, and is driven through a collaboration of developers and a technologist in the open source community. HP is using OpenStack technology to provide an open approach to driving infrastructure as a service. The main reasons HP has selected OpenStack are:

- Dynamic community and ecosystem. It has been adopted by HP and many other technology providers, whom are all investing heavily in OpenStack
- It has an open, Web-based API that is widely used by developers building tools, capabilities, and next-generation applications
- It has flexible plug-in technology that will accelerate time to market. Modular plug-ins enable connection to specific hypervisors, servers, storage, and networking in the cloud infrastructure
- It enables a consistent management interface across hybrid clouds and heterogeneous technology

### A sampling of the OpenStack projects include:

- **Nova Compute** - Accessed via an API, it starts, stops, and manages virtual machines
- **Nova Volume** - Provides a thin API that allows providers of block storage (eg. HP 3PAR) to make virtual block devices available to Nova Compute virtual machines
- **Swift Object Storage** - Provides resilient and highly available object storage
- **Glance Image Management** - Provides discovery, registration, and delivery services for virtual disk images
- **Cinder Block Storage** - Provides interface to highly scalable block storage
- **Quantum (Nova Network)** - An abstraction layer that allows “network connectivity as a service”
- **Keystone** - A set of APIs that can be used to implement identity and authorization services
- **Horizon** - Provides a dashboard view of the OpenStack projects and services

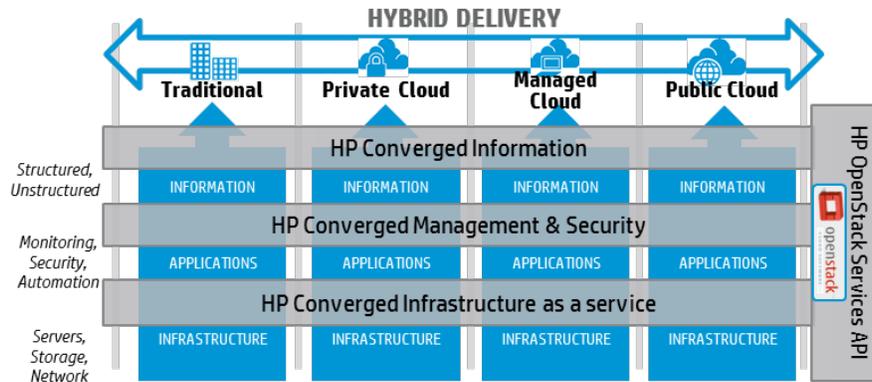


Figure 3 – HP Converged Cloud architecture

For the CloudSystem Matrix KVM implementation, HP utilizes the Nova, Glance and Keystone OpenStack projects to provision services to the KVM resource pool. As an active member of the OpenStack community, HP contributes changes and enhancements into the community. With this release of CloudSystem, HP has made bug fixes and enhancements such as health monitoring to these OpenStack projects, and created a “hardened” version of OpenStack that is integrated into the CloudSystem Matrix solution. Additional projects within HP that utilize OpenStack, such as HP Cloud Services, follow a similar process.

### HP CloudSystem and KVM use cases

As customers begin to embrace a broader spectrum of cloud environments, HP CloudSystem continues to provide enhancements that support these environments, while ensuring that existing customer investments can continue to be leveraged. HP CloudSystem Matrix support of KVM resource pools can be fully utilized by customers who want to standardize only on KVM, as well as customers who want a true heterogeneous environment. In either case, all resources are licensed and managed by the same HP CloudSystem Matrix solution.

Customers who want to build a cloud environment strictly with KVM resource pools can enjoy the full benefits of CloudSystem, including flexible design and provisioning, as well as robust lifecycle management. CloudSystem Matrix allows KVM resource pools to exist within single enclosures, multiple enclosures, and even across non-blade servers where the KVM hypervisors reside. Enterprises and service providers can leverage the full benefits of CloudSystem Matrix while building an environment that is centered around open-source flexibility and cost effectiveness.

Existing CloudSystem customers, or those customers who desire an environment beyond just KVM resource pools, can realize the true heterogeneous benefits of the CloudSystem Matrix architecture. Building complex, heterogeneous service templates, and provisioning multi-tiered services, is easily accomplished using CloudSystem Matrix, leveraging existing business processes, and adding in additional KVM resources either to existing service definitions, or new service definitions that meet the customer’s evolving business needs.

#### Find out more

To find out more about HP CloudSystem and the KVM support, visit [www.hp.com/go/matrix](http://www.hp.com/go/matrix)

Sign up for updates  
[hp.com/go/getupdated](http://hp.com/go/getupdated)



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