Virtual platforms: Past, present and future
Virtualization technology has affected data centers in all kinds of ways. What was once used as a tactical way to save space, power and cooling, virtualization is now also a corporate strategy that can respond to increasing business demands. In this e-guide, from SearchServerVirtualization.com, discover how virtualization has redefined efficient data centers over time and learn how the cloud will help shape the future of IT. In addition, obtain an overview of RHEV and its advanced features including high availability, load balancing and live migration.

How the evolution of virtualization redefined efficient data centers
By: Mike Laverick

The evolution of virtualization has affected efficient data centers of all sizes. Within a blink of an eye virtualization had been transformed from a tactical technology that businesses adopted to save space, cooling, power—essentially to do more with less—into a corporate strategy that responded to business demands.

Virtualization has been around for many decades. In the beginning there were many naysayers and sceptics. But in the last 10 years, customer demand and the maturing x86 hardware platform has created a “perfect storm.” Within the space of just few years virtualization became the way to do things in an efficient data center. And as consequence, companies began adopting “virtualization first” policies.

The evolution of virtualization: Starting from modest beginnings
Starting from relatively modest beginnings, virtualization was introduced in late 1990s in the form of virtual machines (VMs) on PCs. One of the first of these was VMware Workstation, which was seen at the time as technology for geeks and developers who wanted to run multiple operating systems on computers without the need for complicated dual booting.
But the real impetus for server virtualization was customer demand. For years IT shops had been straightjacketed by the belief that each application or service should have just one OS.

This led to the proliferation of servers in data centers to the degree that few organizations even knew how many they had or where they were located. In fact, early capacity planning exercises for physical to virtual processes showed that there were servers on the network that some folks didn’t even know even existed.

Nowadays, it is fashionable to talk about VM sprawl. It’s amazing that we have forgotten about the situation that was often 10 times worse—physical machine sprawl.

**Grappling with growth**

In the previous decade, physical limits pushed data centers rapidly toward a brick wall as businesses grapple to cope with unchecked growth. Such was the case with data center capacity.

Organizations were literally running out of physical space, physical power and physical cooling. Building a new data center was a budget expenditure that many people could no longer accommodate. At the same time, a new generation of commodity-based hardware developed that was both relatively cost-effective and efficient in terms of incrementally growing in memory density and CPU horsepower.

In a short period of time, we have seen the ratio of VMs to physical machines—the server-consolidation ratio—increase as more powerful servers appear on the market each year for roughly the same price. This happened because of—rather than despite of—the recent downturn in the global economy.

The evolution of virtualization has bucked the market with its expansion while most areas have either stagnated or declined markedly. The reason is that although virtualization has start-up costs, it saves money in the long run.
Although the terms return on investment (ROI) and total cost of ownership have evolved into empty marketing phrases applied to sundry technologies, virtualization remains one of the few technologies that actually delivers on its promises for an efficient data center.

But it’s not like the evolution of virtualization hasn’t had its pain points, especially as businesses began to progress to a more application-focused way of leveraging virtualizations benefits. So as we moved away from the initial benefits of virtualization—server consolidation, among them—businesses with efficient data centers found that virtualization doesn’t always mean that every technology backed by virtualization is an automatic winner in every case.

Virtualization ecosystem matures

It’s only in recent years that the ecosystem that surrounds virtualization with supporting technologies has really matured. VM backup has become advanced in the sense that it now outperforms conventional in-guest agent-based backups.

The early promises of virtualized disaster recovery didn’t arrive as quickly as many people had hoped. Indeed, virtualized DR was one of the typical early usage cases for virtualization. But many organizations found this to be an expensive proposition, considering that the licensing costs made virtual DR quite a pricy insurance policy that they hoped they would never have to use.

At the same time, many businesses were sceptical that virtual DR software was mature enough to accommodate the complexity of their needs. This space has now started to mature. The imminent re-release of VMware’s SRM should bring built-in replication and automated failback features.

Similarly, this will become a more competitive market with companies like VirtualSharp and Zerto going head-to-head with VMware. Competition is always good for customers—it leads to competitive pricing and companies raising the game against their foes rather than resting on their laurels.
The cloud has opened up a new phase of virtualization that adds another layer of abstraction above the virtualization layer itself. Just as consumers don’t need to know how the telephone works, it doesn’t matter to them how virtualization works in the cloud. The cloud seeks to hide the hypervisor, management layers, virtual switches and clusters that make virtualization work.

At this stage, it’s difficult to see whether the cloud will deliver on its potential or whether it will add yet another layer of complexity to the environments we manage. Between the continuing evolution of virtualization and the emerging cloud offerings, it’s going to be an interesting decade ahead for IT professionals.

Red Hat Enterprise Virtualization: Overview of RHEV-M, RHEV-H and RHEL

By: Sander van Vugt

Red Hat Enterprise Virtualization is a powerful and versatile server virtualization platform that’s often overshadowed by vSphere and Hyper-V. Because the underlying KVM hypervisor is integrated into the Linux kernel, Red Hat Enterprise Virtualization (RHEV) can sometimes offer superior cost, security and performance than other virtualization offerings. But to get the most out of RHEV, you must understand how it’s architected.

The RHEV Manager, also known as the RHEV-M management console, is the core component of Red Hat’s server virtualization platform. It provides a Web interface for managing virtual machines (VMs) that are running on physical nodes.

The other important part of the RHEV environment is the nodes themselves, on which you host the VMs. Nodes can be configured with the RHEV-H hypervisor or as Red Hat Enterprise Linux (RHEL) servers with a virtualization entitlement. Both types of nodes use KVM as the underlying hypervisor.
The RHEV-H hypervisor is the default choice when setting up a RHEV node. It’s a bare-metal hypervisor, containing just a subset of RHEL code for running virtual machines. As such, RHEV-H hosts are easier to maintain. Additionally, these hosts require less patching and effort to secure.

RHEV-H base file system is just more than 100 MB and runs in the memory, which prevents changes to the base image. This configuration also reduces the chance for human error when changes are made to the host.

Also, the RHEV-H node is secured by a dedicated Security-Enhanced Linux policy and a firewall that blocks all traffic, with the exception of traffic directed to the virtual machines and management traffic to the hypervisor.

In addition to RHEV-H nodes, the RHEV Manager also supports RHEL hosts running KVM. This capability makes it easier to deploy RHEV in an existing RHEL environment.

The importance of VDSM for Red Hat Enterprise Virtualization
The RHEV-M management console gathers information about and interacts with individual nodes using the Virtual Desktop Server Manager (VDSM). VDSM is a management agent that resides on the node, and it facilitates communication between the management console and hosts. VDSM also allows RHEV-M to manage the virtual machines and storage, and collects performance statistics that pertain to hosts and guests.

But VDSM cannot function when libvirt is active. Libvirt is the library that manages the RHEL virtual environment. So if you’re planning a RHEV implementation, make sure that libvirt is deactivated on every node that RHEV manages. Otherwise, neither libvirt nor VDSM will function properly.

The central repository for RHEV
Another vital component of a RHEV infrastructure is the central storage repository. It consists of two main parts:

- the data storage domain, which is used for storing VM images, templates and snapshots; and
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- the ISO storage domain, which houses the ISO files used for virtual machine installations.

RHEV does not mandate any specific storage requirements.

After installing RHEV-M and configuring the virtual hosts, you are all set. Red Hat Enterprise Virtualization contains all of the advance features that are typically found in a virtual environment, including high availability, load balancing and live migration.
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