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Managing Your Virtualized Environment: Migration Tools, Backup and Disaster Recovery

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The Business Case for Open Source Virtualization

Virtualization is one of the single most important technologies for efficiently operating servers. It should not be surprising to learn that open source options are available for this essential technology. Just as open source initiatives have produced widely used operating systems (OSs), databases, application servers, and even desktop applications, there are open source options for virtualization as well. Do you wonder if open source virtualization is right for your business? Perhaps you are concerned about how it might fit with your existing virtualization platforms? Are you unsure about why you should even consider open source virtualization?

In this first part of the series, you will learn about:

- Current trends in virtualization adoption
- Risks associated with single vendor virtualization
- Benefits of open source virtualization

The benefits of virtualization are well established, as are the benefits of open source software. Now it is time to consider in detail the benefits of the two combined.

Current Trends in Virtualization Adoption

A few trends are apparent in the options and use of server virtualization platforms:

- Increasing use of virtualization
- Emergence of multiple virtualization options
- Growing use of multiple hypervisors within organizations

These trends reflect the economic and business benefit of virtualization to the enterprise.

Increasing Use of Virtualization

It is no surprise that virtualization adoption is on the rise. With virtualization, organizations can increase the overall utilization of their servers. Prior to the development of hypervisors that allowed multiple OSs to run together on a single server, businesses often followed a "one application-one server" rule of thumb. This was not because one application demanded all the resources of a server but because applications often required specific configurations, OS versions, or code libraries. Trying to run two or more enterprise applications on a single server could be more trouble than it was worth. For example, one of the applications might require an OS patch but the other application might break if that patch were applied. Rather than find out too late about unanticipated dependencies between an OS and application, IT professionals often opted for the one application-one server approach.

Server virtualization solved the unanticipated dependency problem. With a hypervisor allowing multiple OSs to run on a single server, systems administrators could host multiple applications, each with their own optimally configured OS, on one server. Systems administrators are not even constrained to run the same OS on virtualized platforms. Windows Server and Linux can operate on the same physical server as easily as can multiple versions of the same OS.

The Emergence of Multiple Virtualization Options

One of the advantages of a maturing software technology is that multiple vendors will promote their products. In some cases, a single vendor may come to dominate such markets. For example, in the early days of personal computers—before Microsoft's DOS—users could choose PCs that ran a different OS; later, Windows dominated the PC market. In the early days of the relational database market, new and existing software vendors offered viable products to a growing community of users. Virtualization appears to be following the trajectory of relational databases more so than that of PC OSs.

Businesses have choices when it comes to virtualization. They can choose from vendors specializing in virtualization, from large-scale software vendors or from open source options. All have advantages and disadvantages, so, like so many IT decisions, the choice of virtualization is driven by your requirements and budget.

Growing Use of Multiple Hypervisors Within an Organization

Virtualization does not require you to use a single hypervisor for all your virtualization needs. An IT department can run their email servers and LDAP servers on one hypervisor while choosing a different virtualization platform for their Web servers and application servers. The marginal costs of learning to manage two different virtualization platforms can be easily outweighed by the benefits of choosing the optimal hypervisor for each requirement. Another consideration is the risks associated with using a single virtualization product.

Risks with Single Vendor Virtualization

There are certainly conveniences that come with using a single virtualization platform. For example, you will have a single toolset to work with and one licensing model to understand. These are also two examples of the risks associated with using a single software provider.

Risk of Vendor Lock-In

When you select a single software provider for any enterprise application, that choice is often followed with decisions that promote vendor lock-in. This decision is not intentional—who would want to limit their future choices? The driver is economics. Once you have selected a virtualization platform, you will build an array of supporting systems and procedures for deploying virtual machines (VMs), managing images, reporting on usage, and performing other management tasks. You could design these in sufficiently abstract ways that enable you to swap in or out any virtualization platform, but we rarely do. Why? The cost of such efforts is difficult to justify when deploying a single virtualization platform. It is faster and less expense to use the tools provided with your chosen virtualization platform.

Costly Changes in Licensing Structure

Another aspect to factor in when considering the use of a single virtualization platform is that vendors may change their licensing model at any time. There are many ways to license virtualization software:

- Number of physical servers
- Number of virtual servers
- Amount of memory in physical servers
- Amount of memory allocated to VMs
- Number of CPU cores in a physical server
- Number of CPU cores allocated to VMs

When a vendor changes the way it charges for licenses, the change can cause substantial modifications in your charges. For example, if a vendor starts with a charge based on physical servers, you will likely optimize your licensing according to that model. For example, you might minimize the number of physical servers you purchase while maximizing the number of CPU cores and amount of memory. If the vendor then changes the licensing model to be based on the amount of memory or number of CPU cores, you might find yourself with a larger virtualization bill than you planned for.

Once a vendor makes such a change in licensing structure, you have several choices:

- Pay any additional licensing charges
- Change your strategy for deploying VMs to lower your costs under the new pricing scheme
- Change virtualization platforms

The first option might be the only choice in the short term. Changing your strategy for deploying VMs might require changes in your hardware, which can be too costly to consider, at least during the useful lifespan of your current set of servers. Changing virtualization platforms might be the best option but will take time to plan and execute.

Limited Tools Provided by Vendor

A third factor to consider about risks associated with working with a single virtualization platform is the potential limited toolset provided by the vendor. Tools are essential for deploying, managing, and monitoring your virtualized environment. If vendor-provided tools do not offer the functionality you need, you might find yourself scripting your own tools, which of course, you will then have to maintain.

As you evaluate your virtualization platform options, consider the tools provided by the various frameworks, including those for:

- Deploying VMs
- Creating VMs
- Monitoring performance and altering system managers to specific events
- Generating utilization and billing information

Working with a single vendor for any enterprise application has appeal, but there are risks to consider too. Fortunately, there are several virtualization platforms available today, including open source options, that give you the choice of using multiple virtualization platforms in your organization.

Benefits of Open Source Virtualization

Open source virtualization should be considered because of the potential benefits of adding it to your virtualization environment. Some of the key considerations are:

- Cost
- Maturity
- Scalability
- Integration with existing infrastructure

These benefits can be realized without limiting yourself to a single virtualization provider. Open source virtualization can be considered in addition to commercial virtualization products.

Cost Benefits of Open Source Virtualization

Perhaps the most obvious benefit of open source virtualization is cost. With open source products, there are no licensing charges, so the cost of working with these products is minimal. The open source model also limits the risk of increased future costs—unlike commercial vendors that might change their pricing scheme after you have made substantial commitments based on the existing licensing model.

With open source software, you have the choice to purchase maintenance support from commercial providers. This supplement can provide the benefits of both open source and commercial offerings: low initial costs with assurances of support in the future.

Maturity and Scalability

Open source virtualization products are widely used and have demonstrated their maturity and scalability. Open source hypervisors have demonstrated high levels of performance and the ability to run large numbers of VMs in the industry-standard benchmark SPECvirt. Open source hypervisors also deliver performance comparable with bare metal performance for widely-used enterprise applications.

Integration with Existing Infrastructure

Open source virtualization platforms integrate with existing infrastructure. Commonly used OSs from Microsoft and open source OSs run within open source hypervisors. Enterprise applications from major vendors such as Microsoft, Oracle, and SAP are running within open source virtualization environments. Open source hypervisors do not come with restrictions on how they can be used in the enterprise. In fact, the largest public cloud provider uses an open source virtualization hypervisor in its cloud.

Summary

Virtualization is a mature technology. Organizations are using virtualization to improve the efficiency of their IT operations and provide greater flexibility in how they deliver business services. They are also increasingly using multiple virtualization platforms. Doing so allows users to choose the best virtualization solution for their particular requirements without the risk of single vendor lock-in. Open source virtualization has demonstrated its cost advantages as well as its maturity and scalability without sacrificing integration with existing infrastructure.