

■ What is virtualization?

In the IT sector, virtualization refers to enabling a physical resource to perform in a manner that is different than its physical attributes or functionality. For example, this can mean making a single server behave as though it's many servers, making many servers behave as though they are one, or making a server or servers perform the functionality of servers with different capabilities. Virtualization allows for a much more efficient utilization of infrastructure.

■ How has virtualization evolved?

Virtualization first appeared in the 1960s as a method to segment massive and expensive mainframe computers into various portioned domains, serving multiple functions on the same machine. Until recently there were not viable virtualization solutions available for the x86 architecture used in Intel and AMD processors, but as this processor architecture became more prolific, the demand for virtualization technologies and implementations increased. Solutions are now available for using virtualization to optimize the performance and value of a broad range of IT infrastructure resources including:

- Server
- Network
- Memory
- Storage
- Security

■ How does server virtualization work?

There are two kinds of server virtualization: hosted virtualization (also called OS-based virtualization) and virtualization through a hypervisor.

With hosted virtualization, an operating system on a single physical server runs multiple instances of the operating system; each instance performs as though it is an independent server. These virtual servers all have to run the same operating system.

With hypervisor-based virtualization, a level of software (which is the hypervisor) sits on top of the physical server. The hypervisor allocates portions of the physical server's hardware resources to create multiple independent and secure virtual servers from the single physical machine. Unlike with hosted virtualization, hypervisor managed virtual servers can all be running different operating systems.

■ How can server virtualization optimize an IT environment?

Server virtualization allows unprecedented optimization of an IT environment through several unique capabilities.

- Each virtual server runs independently from the others on the same physical hardware, preventing application and OS incompatibilities.
- A running virtual server can be moved from one physical machine to another to manage workloads.
- Virtual servers can be copied from one physical machine to another without modifications or hardware alterations, creating a high availability similar to more expensive redundant physical servers.
- Virtualization allows for pooling server resources rather than managing individual servers, increasing server utilization rates.
- Virtualization can reduce provisioning and re-provisioning times. Individual machines can be removed for maintenance without interrupting application use.
- Virtualization improves environmental impact and costs. Pooling resources decreases power, cooling, and floor space requirements.

■ Who benefits from the use of virtualization?

Anyone with an IT infrastructure that includes servers can benefit from virtualization's increased server utilization capabilities. Additionally, anyone supporting applications running on multiple OS's will see a decided cost advantage in the ability to isolate operations and run multiple OS's on a single physical server. Benefits include:

- Hardware consolidation saves capital and energy
- Standardization of operating system reduces errors
- Rapid provisioning improves time-to-market
- Automation reduces staffing of facilities
- Abstraction makes individual servers interchangeable
- Portability improves availability, recovery, and flexibility
- Overall decrease in operational costs

■ How can virtualized server environments be used?

Virtualization provides a cost-effective means for creating and managing distinct server environments that are ideal for resolving key IT challenges, including:

- Business recovery
- Maintenance window and load balancing
- Abstraction layer
- Virtual labs (development / testing)
- Patching
- Security
- Thin client

■ How much does virtualization improve server performance?

Generally, x86 processors are dramatically underutilized due to application compatibility and availability issues—it is estimated that servers are currently utilized at a disappointing rate of about 5%. With virtualization, however, applications that are incompatible or require different OS parameters can be isolated to their own allocated hardware and OS resources, allowing a single physical server to run more applications and use more of its performance potential. This dramatically increases server efficiency and utilization by reducing the number of physical machines required and thereby reducing overall server infrastructure costs.

■ Is virtualization secure?

There is a misperception that virtualization decreases security. Virtualization actually can increase the safety and privacy of information by separating various applications and services, creating an additional level of security.

■ What vendors currently offer virtualization solutions?

Various providers offer software to build a virtual environment.

- **Microsoft®** Windows Server 2008 Hyper-V™ allows the separation of multiple server functions as distinct virtual machines that can run different operating systems (Windows, Linux, and others) in parallel on a single physical server.
- **Parallels®** Parallels Virtuozzo virtualizes the server at the operating system level (Windows or Linux), creating multiple, isolated containers that function as independent virtual machines to maximize server utilization and more efficiently manage workloads.
- **Citrix®** Citrix XenServer™ delivers powerful provisioning capabilities allowing it to integrate the deployment and management of virtual and physical servers into a unified dynamic virtualized environment.
- **VMware®** VMware ESX is a robust, production-proven virtualization layer that abstracts processor, memory, storage, and networking resources into multiple virtual machines.
- **3Tera** 3Tera's AppLogic grid operating system assembles applications using completely self-contained software components called virtual appliances. The software in the virtual appliance operates in a completely virtualized execution space consisting of a virtual machine and virtualized access to storage and networks.

■ What virtualization solutions do you currently offer?

SoftLayer® consistently partners and works with industry leaders and market innovators to provide the best possible IT solutions. As new virtualization solutions become available SoftLayer will offer them leveraging best practice methodologies and industry-leading support. The virtualization solutions we currently offer include:

- **Windows Server 2008 Hyper-V** For more information please visit: www.softlayer.com/partners/microsoft
- **Citrix XenServer** For more information please visit: www.softlayer.com/partners/citrix
- **Parallels Virtuozzo** For more information please visit: www.softlayer.com/partners/parallels
- **VMware** For more information please visit: www.softlayer.com/partners/vmware

■ How does SoftLayer enable virtualization to assist IT infrastructure needs?

SoftLayer is an industry leader in providing scalable, on-demand IT solutions by enabling and integrating hardware and software resources. SoftLayer's unique architecture and management tools, including an industry-leading API, create an ideal environment for hosting virtualization-based solutions. SoftLayer currently offers a comprehensive set of tools to enable the key advantages of virtualization, including:

- Automated delivery of IT infrastructure for the rapid scaling of solutions
- Best-practice OS builds and patching
- Private Network connectivity, ideal for hypervisor management
- Network storage based on iSCSI, SAN, and NAS for virtual machine storage to enable high-end virtualization features
- Virtual Private Rack to allow integrated network management and reporting
- Virtual Data Center for complex solutions

■ How do I add virtualization to a SoftLayer server?

Virtualization is an option with all SoftLayer servers for any new or existing customer. As with all SoftLayer services, virtualization can be easily ordered through our automated provisioning process, as can the desired OS(s) for the virtual servers. Our commitment is to make the entire purchase experience as simple as possible.