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Understanding Virtualization

Being able to simultaneously run multiple or different operating systems on the same computer, to manage hundreds of virtual desktops from a main server, or to partition a single server into multiple operating systems with each instance dedicated to one customer — these are all examples of virtualization.

Virtualization for Cloud Services Providers

For hosting and data centers, virtualization allows cloud services providers to consolidate multiple physical servers to a single server with complete isolation. Benefits include the ability to:

- Generate the highest revenues per square foot of dedicated server space.
- Have higher profitability per server than physical offerings.
- Make server management easier for you and your customers.
- Respond more rapidly to changes in the hosting environment.
- Improve server security through user isolation.

Virtual Private Servers (VPS)

[Virtual private servers](#) (VPS) use virtualization software to fill the gap between shared and dedicated hosting. VPS is less expensive than a dedicated server, but provides a higher level of flexibility not found on shared or dedicated hosting. By separating a physical server into multiple virtual servers, security is enhanced and costs are shared. On a VPS, the customers get root access and can reboot their portion of the server independently from the other VPS units. That means if one VPS fails, it won't affect the entire server.

Another cost-saving virtualization model is [virtual desktop infrastructure](#). A throwback to the era of mainframe computers, VDI allows large IT departments to consolidate end-user applications on a centralized server. The benefits to the VDI approach include lower cost, simplified patch management, and rapid provisioning of new applications.

Virtualization Technology Choices

[Parallels Virtuozzo Containers](#) and [Parallels Server Bare Metal](#) are two virtualization technologies popular with cloud services providers. Container virtualization takes a single copy of an operating system and layers virtual environments on top of it, while hypervisor virtualization operates at the hardware layer and each virtual machine requires its own operating system. Each is useful depending on the problem that virtualization is attempting to solve.

Container Virtualization

Pros: Since one operating system is being used to run all of the virtual environments on the server, container virtualization offers a much higher density. By way of comparison, containers can comfortably fit 2 to 3 times more virtual environments than hypervisor per server. This is because much of the overhead of a server is the operating system that runs it. This is great for running a high density solution where all the virtual environments on the same server can use just one operating system. Obvious examples are commodity VPS hosting and application hosting.

Also, because there is a single operating system to maintain, an update or upgrade impacts all the virtual environments on that machine simultaneously. Where 30 virtual machines would require 30 separate management process on 3 or 4 servers, the same 30 virtual environments would require only one management process. This is a huge time savings.

Cons: With container virtualization, you can only offer one operating system per server. If you wanted to offer both Windows and Linux, you would be required to have at least 2 servers. Similarly, some customers request special access to modify core system components like the kernel. These customers could never be accommodated with a container solution.

Hypervisor Virtualization

Pros: Hypervisor virtualization is ideal if you require a mix of operating systems. For example, many companies continue to use legacy operating systems in order to utilize end-of-life software. However, the vast majority of the operations to be performed by the same system require more modern software – hypervisor virtualization works best for this purpose. Hypervisors are also useful for optimizing a server for high availability and to create unique environments for software developers.

Cons: Since each virtual machine uses its own operating system, you can put far fewer virtual machines per server on them. This results in an increase in hardware deployment and higher costs for electricity and personnel. Deploying on hypervisor virtualization is also very labor intensive because each virtual machine requires a separate install process and must be maintained, patched and upgraded individually. This high-touch solution increases the total number of administrators to manage the servers.

The Best of Both

Parallels is the only company providing virtualization software to offer commercial software for both types of virtualization. In the future, we plan to extend this flexibility by offering a single software package that features both types of virtualization on one server.