

Virtualization Technologies

Virtualization allows for more efficient utilization of physical computer hardware. The underlying technology supports creating multiple virtual computers or environments on a single physical machine using software to simulate hardware functionality; different operating systems and applications run on the same server, saving costs, increasing efficiency and improving security.

Virtualization uses software to create an abstraction layer over computer hardware, allowing the hardware elements of a single computer — processors, memory, storage and more — to be divided into multiple virtual computers, commonly called virtual machines. Virtual machines provide the functionality of a physical computer. Their implementation may involve specialized hardware, software or a combination of the two. Each virtual machine runs its own operating system and behaves like an independent computer, even though it is running on just a portion of the actual underlying computer hardware.

Hardware (platform) virtualization refers to the creation of a virtual machine that acts like a real computer with an operating system. Software executed on these virtual machines is separated from the underlying hardware resources. A computer running Linux may host a virtual machine that looks like a computer with the Microsoft Windows operating system.

In hardware virtualization, the host machine is the machine that is used by the virtualization and the guest machine is the virtual machine. The words host and guest are used to distinguish the software that runs on the physical machine from the software that runs on the virtual machine. The software or firmware that creates a virtual machine on the host hardware is called a hypervisor or virtual machine monitor.

Virtualization enables more efficient utilization of physical computer hardware and allows a greater return on an organization's hardware investment. It is a standard practice in enterprise IT architecture. Virtualization divides hardware resources into multiple virtual machines, thus creating a virtual (rather than actual) version of something at the same abstraction level, including virtual computer hardware platforms, storage devices and computer network resources. A virtual machine is the virtualization or emulation of a computer system. Virtualization is also the foundation of cloud computing, which delivers shared computing resources on demand via the Internet, enabling scalability, flexibility and accessibility.