

and I/O devices such as disk drives, keyboards, mice, monitors, USB devices, and so on.

- » It creates pools of these abstracted hardware resources that can be allocated to virtual machines.
- » It creates virtual machines. A virtual machine is a complete implementation of an idealized computer system that has the hardware resources of the host available to it. The hardware for each virtual machine is drawn from the pools of available hardware resources managed by the hypervisor.
- » It manages the execution of its virtual machines, allocating host hardware resources as needed to each virtual machine and starting and stopping virtual machines when requested by users.
- » It ensures that each virtual machine is completely isolated from all other virtual machines, so that if a problem develops in one virtual machine, none of the other virtual machines is affected.
- » It manages communication among the virtual machines over virtual networks, enabling the virtual machines to connect with each other and with a physical network that reaches beyond the host.

There are two basic types of hypervisors you should know about:

- » **Type-1:** A type-1 hypervisor runs directly on the host computer, with no intervening operating system. This is the most efficient type of hypervisor because it has direct access to the hardware resources of the host system.

The two best-known examples of type-1 hypervisors are VMware's ESXi and Microsoft's Hyper-V. ESXi is part of a suite of popular virtualization products from VMware, and Hyper-V is the built-in virtualization platform that is included with recent versions of Windows Server.

- » **Type-2:** A type-2 hypervisor runs as an application within an operating system that runs directly on the host computer. Type-2 hypervisors are less efficient than type-1 hypervisors because when you use a type-2 hypervisor, you add an additional layer of hardware abstraction — the first provided by the operating system that runs natively on the host, and the second by the hypervisor that runs as an application on the host operating system.



TIP

For production use, you should always use type-1 hypervisors because they're much more efficient than type-2 hypervisors. Type-1 hypervisors are considerably more expensive than type-2 hypervisors, however. As a result, many people use inexpensive or free type-2 hypervisors to experiment with virtualization before making a commitment to purchase an expensive type-1 hypervisor.