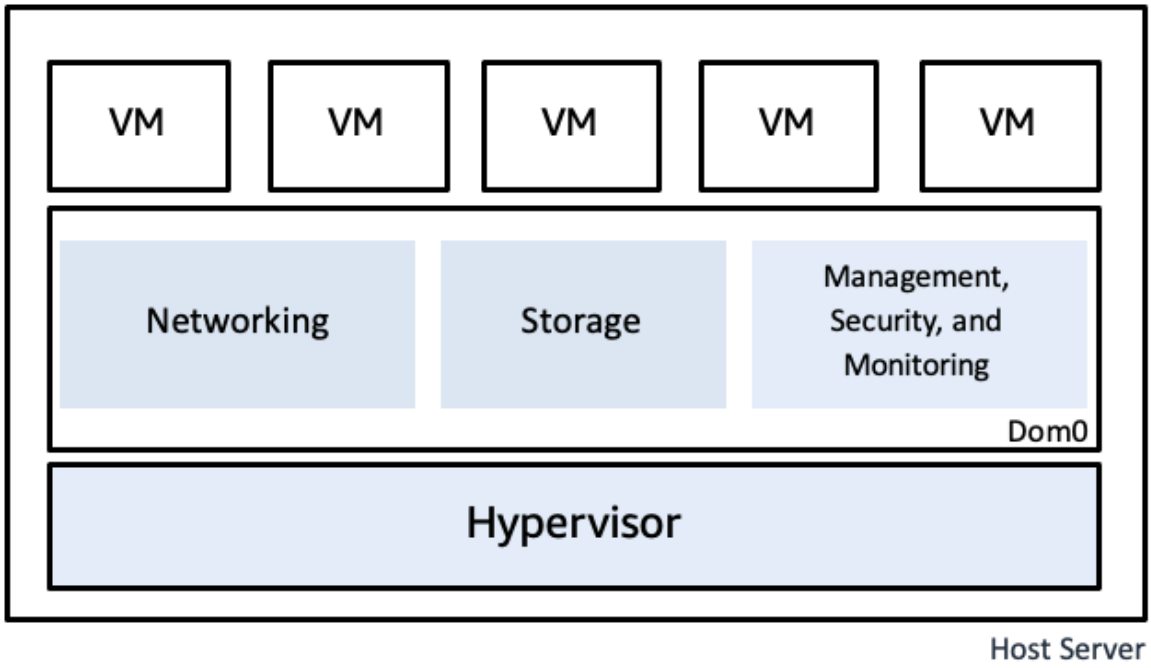
How they work: type 1 vs. type 2 hypervisors

The hypervisor is the coordination layer in virtualization technology. It supports multiple virtual machines (VMs) running at once.



Type 1 hypervisor

A type 1 hypervisor, or a bare metal hypervisor, interacts directly with the underlying machine hardware. A bare metal hypervisor is installed directly on the host machine's physical hardware, not through an operating system. In some cases, a type 1 hypervisor is embedded in the machine's firmware.

The type 1 hypervisor negotiates directly with server hardware to allocate dedicated resources to VMs. It can also flexibly share resources, depending on various VM requests.

Type 2 hypervisor

A type 2 hypervisor, or hosted hypervisor, interacts with the underlying host machine hardware through the host machine's operating system. You install it on the machine, where it runs as an application.

The type 2 hypervisor negotiates with the operating system to obtain underlying system resources. However, the host operating system prioritizes its own functions and applications over the virtual workloads.

Key differences: type 1 vs. type 2 hypervisors

While type 1 and type 2 hypervisors share the common goal to run and coordinate virtual machines (VMs), they have some significant variations.

Resource allocation

Type 1 hypervisors directly access underlying machine resources. They can implement their own custom resource allocation strategies to service their VMs.

Type 2 hypervisors negotiate resource allocation with the operating system, which makes the process slower and less efficient.

Ease of management

Managing a type 1 hypervisor and its VM configuration requires system administrator-level knowledge, as it's relatively complex.

In contrast, you can install and manage type 2 hypervisors as an application on an operating system. Even nontechnical users can operate them.

Performance

Type 1 hypervisors offer greater performance to their VMs. This is because they don't need to negotiate resources with the operating system or travel through the operating system layer. The type 1 hypervisor offers dedicated underlying resources without any negotiation required.

Type 2 hypervisors must only use the resources that the operating system is willing to provide.

Isolation

Type 1 hypervisors offer a greater degree of isolation for each virtual environment. There's no shared layer like there is with the operating system for a type 2 hypervisor. This makes virtual machines running on the type 1 hypervisor inherently more secure. However, updating and patching your virtual machine operating systems is a critical security activity.

When to use: type 1 vs. type 2 hypervisors

Type 1 hypervisors are typically used in data centers, enterprise computing workload situations, web servers, and other primarily fixed-use applications. Cloud computing environments run bare metal hypervisors to offer the most performant virtual machines (VMs) for the underlying physical hardware. Cloud providers also abstract away type 1 hypervisor management and offer VMs as cloud instances you can access through APIs.

Type 2 hypervisors are most often used in desktop and development environments, where workloads are not as resource-intensive or critical to operations. They're also preferred in cases where users want to simultaneously use two or more operating systems but only have access to one machine.

Summary of differences: type 1 vs. type 2 hypervisors

	Type 1 hypervisor	Type 2 hypervisor
Also known as	**Bare metal hypervisor.**	**Hosted hypervisor.**
Runs on	Underlying physical host machine hardware.	Underlying operating system (host OS).
Best suited for	Large, resource-intensive, or fixed-use workloads.	Desktop and development environments.
Can it negotiate dedicated resources?	Yes.	No.
Knowledge required	System administrator-level knowledge.	Basic user knowledge.
Examples	VMware ESXi, Microsoft Hyper-V, KVM.	Oracle VM VirtualBox, VMware Workstation, Microsoft Virtual PC.

Reference:

https://aws.amazon.com/compare/the-difference-between-type-1-and-type-2-hypervisors/#:~:text=Type%201%20hypervisors%20directly%20access,process%20slower%20and%20less%20efficient.