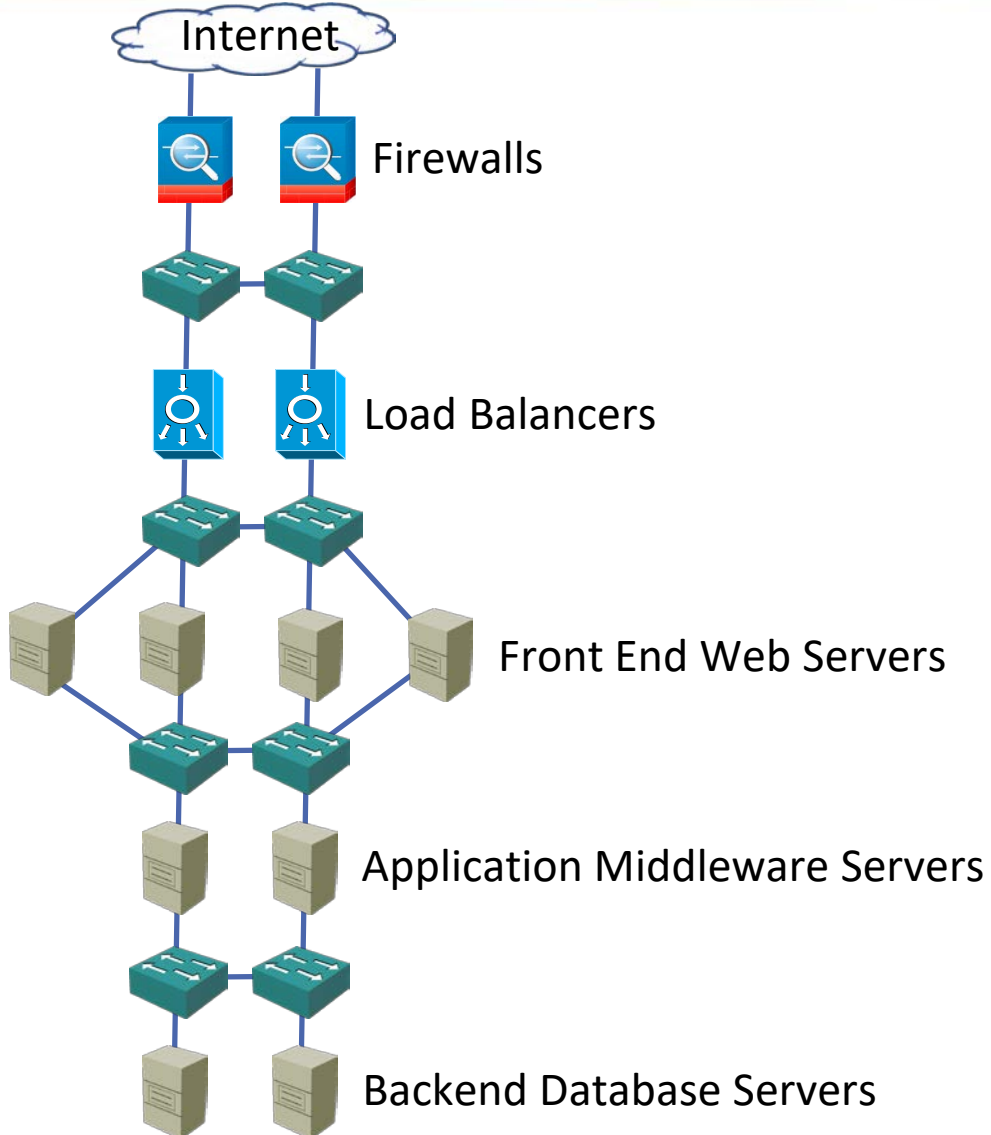


Virtualization



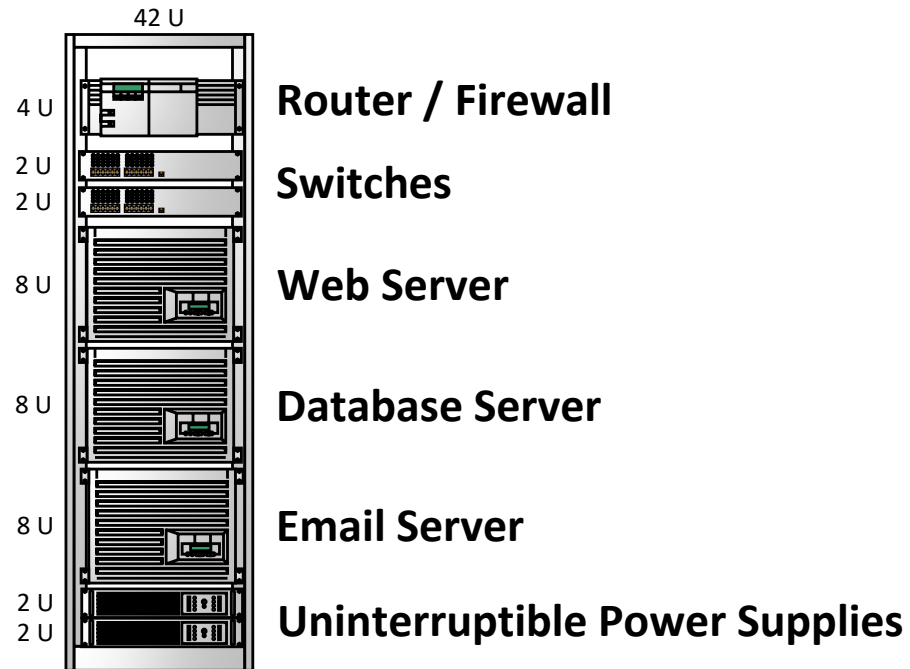
- Virtualization is one of the main enablers of Cloud Computing
- It allows for resource pooling where multiple customers share the underlying hardware
- Virtualization has been around a lot longer than Cloud Computing though
- This lecture focuses on server virtualization because it was the first type available, but the same principles can be applied to virtualize network infrastructure equipment

Virtualization

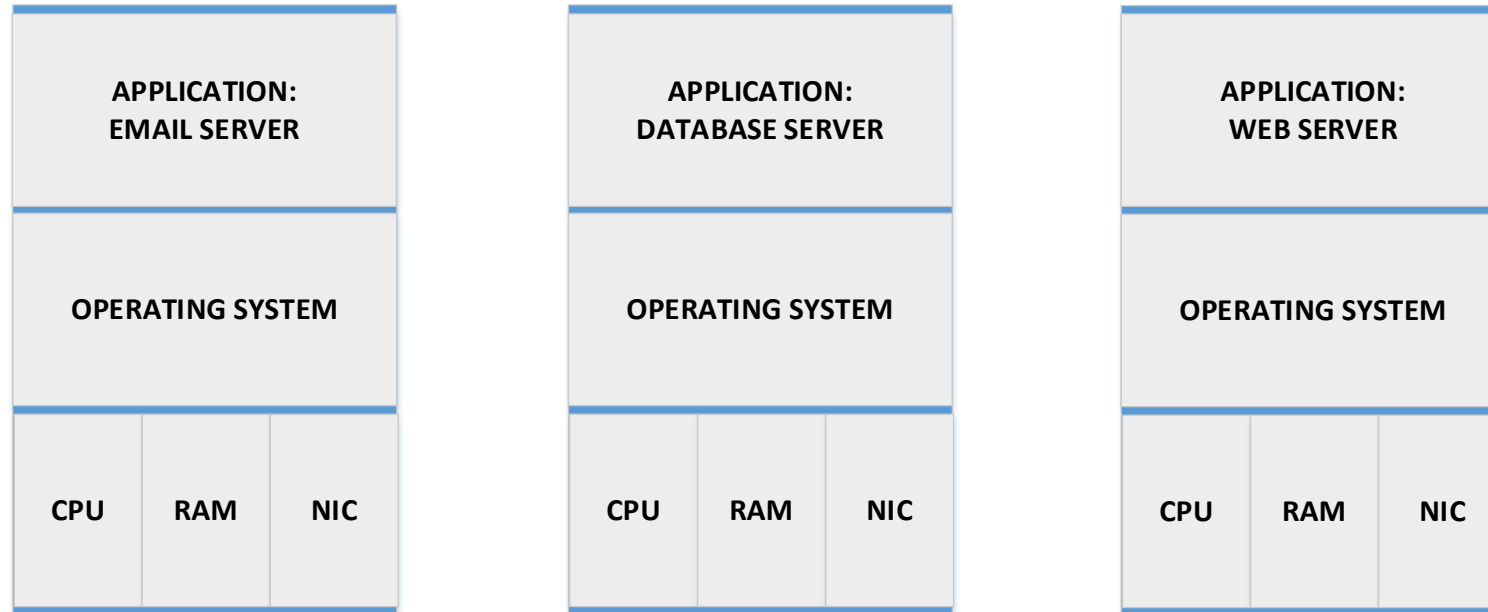


- The cloud provider does not provision separate physical hardware for every customer
- A customer can sometimes deploy selected dedicated hardware devices at additional cost.

Before Virtualization



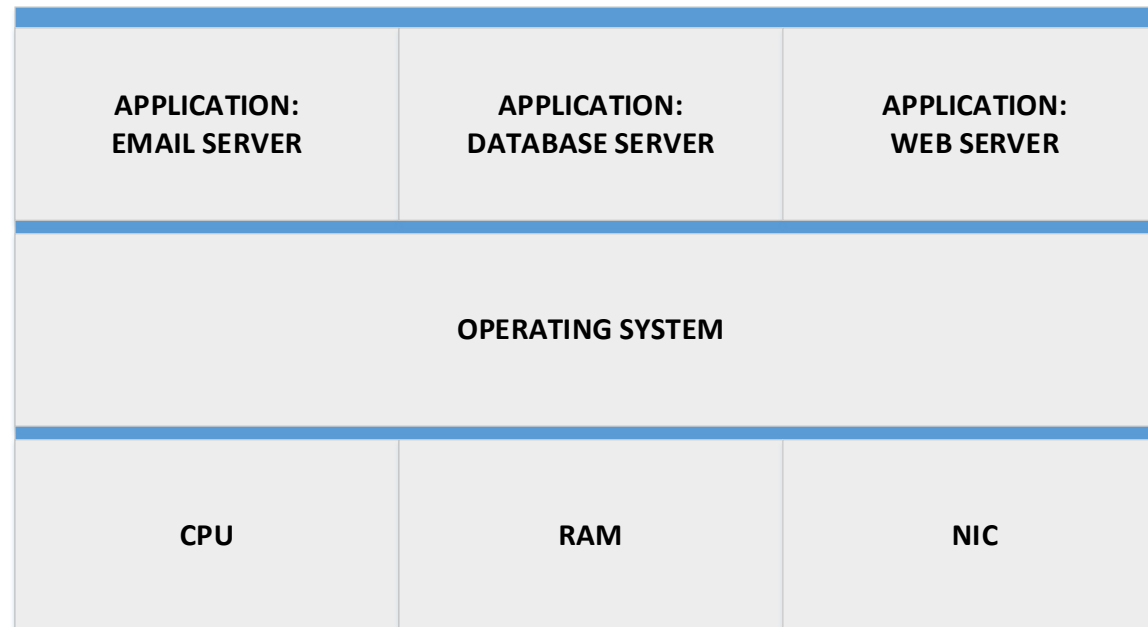
Before Virtualization



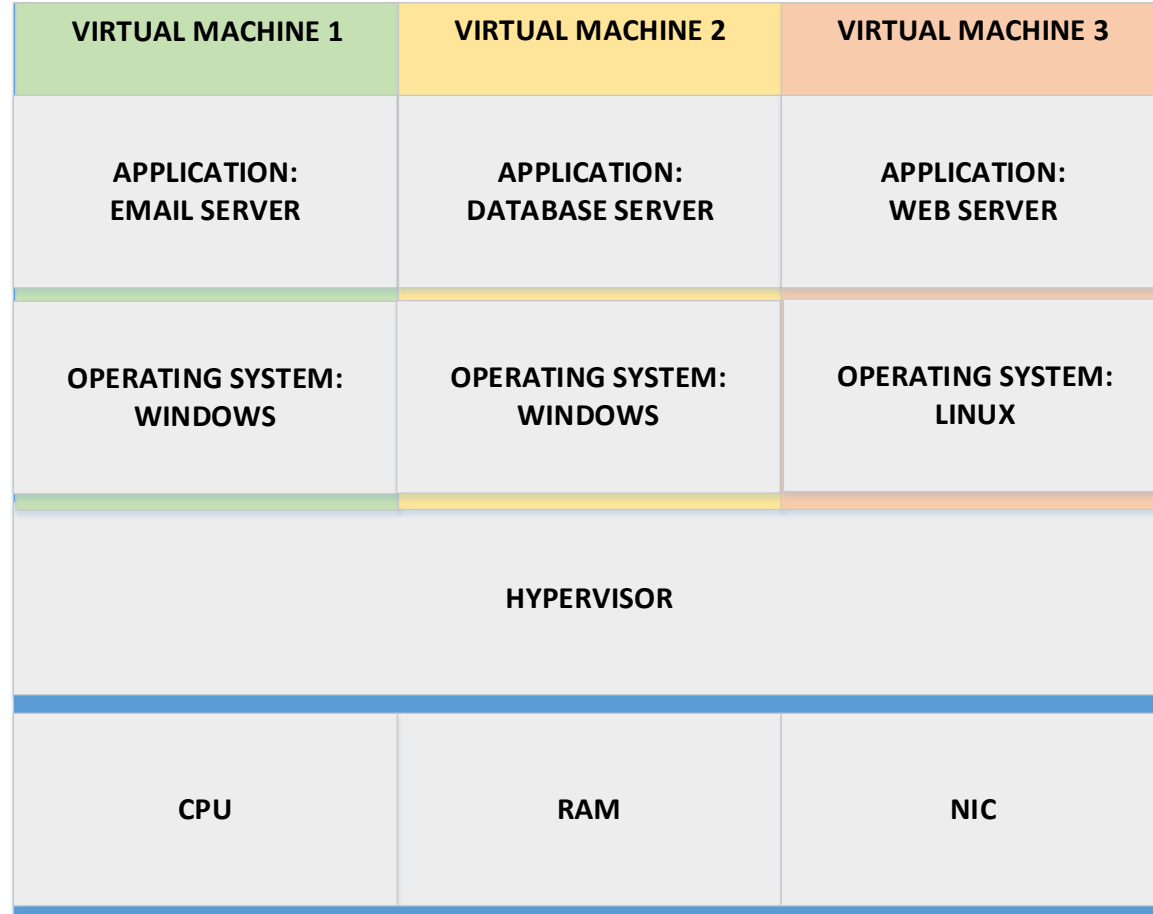
- Server utilization (CPU, RAM, NIC etc.) around 15%
- You have to pay for each separate server, and they're all using power, space and cooling

Multiple Applications on Same Server

- Putting multiple applications on the same server would improve utilization
- But it is very bad practice, because if you have a problem with any of your applications they will all be affected



Server Virtualization



Popular Type 1 (Bare Metal) Hypervisors

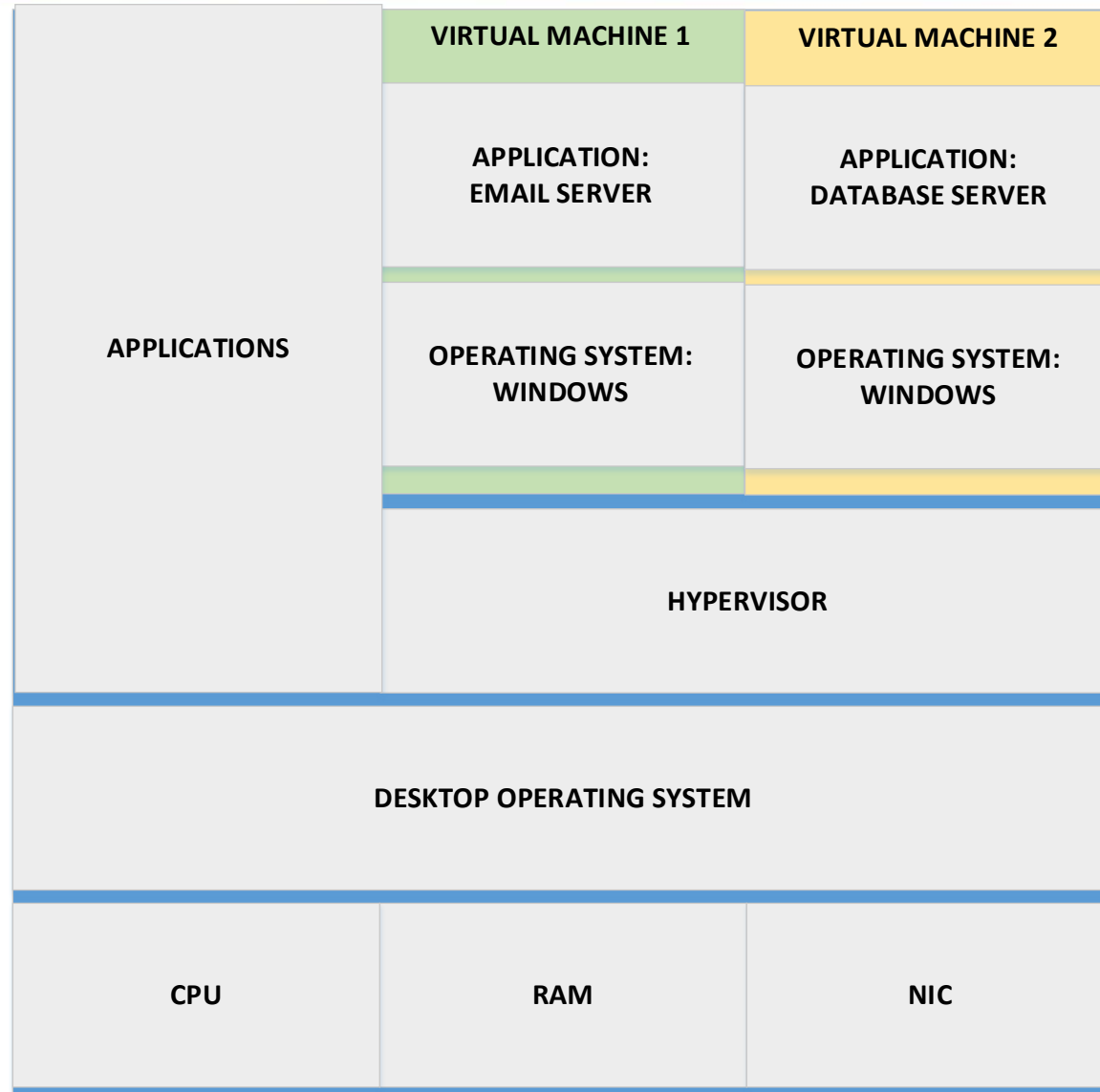
- Type 1 Hypervisors run directly on the system hardware
- VMware ESXi (part of the vSphere suite)
- Microsoft Hyper-V
- Red Hat KVM
- Oracle VM Server
- Citrix XenServer

Popular Type 2 Hypervisors



- Type 2 Hypervisors run on top of a host operating system
- VMware Workstation, Player and Fusion
- VirtualBox
- QEMU
- Parallels

Type 2 Hypervisor



Type 1 vs Type 2 Hypervisor

