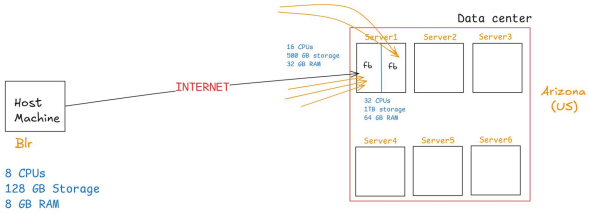
VIRTUALIZATION

Virtual -> something that exists in effect, but it is not present physically.

Virtualization -> Virtualization is the technology we use to create a virtual representation/version of any physical compute resources such as servers, storage, processors, networks.



Components of Virtualization:

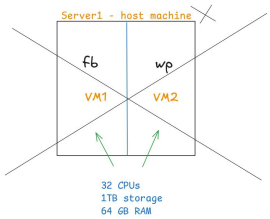
1. Virtual Machine (VM)
2. Hypervisor

1. Virtual Machine (VM)

>> VM is a software-defined computer that runs on a physical computer.

>> VM allows multiple application/software to run on a single machine/server by simulating hardware.

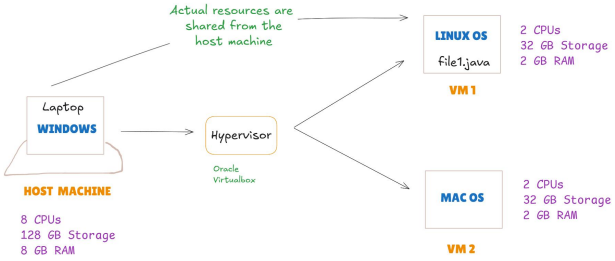
pretending to be a real machine - but in reality - it is just a portion of the host machine.



2. Hypervisor

>> Hypervisor is a software that allows one machine to create and run multiple Virtual machines.

>> It allocates & controls the sharing of a machine's resources that each VM gets.



>> These VMs are running inside the host machine itself, by taking the resources for the host machine only.

>> These VMs, VM1 & VM2 will act as a separate system/machine & is independent of host computer; but it shared all the resources from host computer only.

>> Since, these are 2 independent machines/systems, and every machine needs an OS to function, that's why every VM will have their own OS.

Advantages:

1. Cost-efficient: Run multiple VMs on a single server, this reducing the hardware/server cost.
2. Isolation: Each VM is isolated from the others, so issues in 1 VM doesn't effect the others.
3. Scalibility: Quickly create, update or scale VMs are per need.

Disadvantages:

1. Scalibility: There's a limit to scalability as it is based upon the physical resources of the machine.
2. High Capital Expenditure: There is a large up-front cost because:
   - Setting up virtualization requires powerful servers.
   - Scaling requires additional purchasing of physical resources.
   - In servers, virtualization software can be very costly.
3. Single point of failure: If the server which is running multiple VMs fails, all the VMS are effected and they will go down.