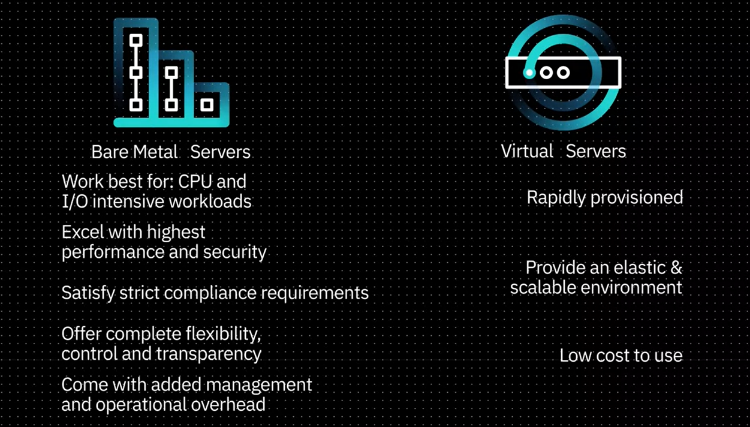
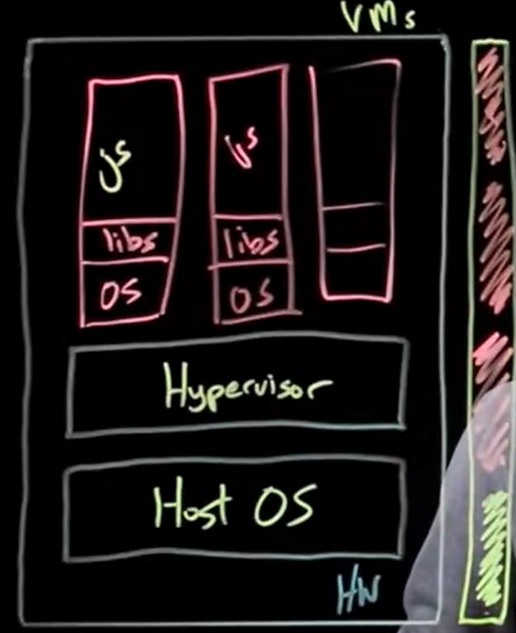
Module 3 (Components of Cloud Computing)

1. **Overview of Cloud Infrastructure:**
   1. A cloud service provider provides its cloud infrastructures/services **in different regions** (e.g. AWS has regions in US East, US Ohio, Asia East etc). This is done such that if there’s disruption in one of the regions (e.g. due to earthquake/natural disasters), the other regions won’t be affected.
   2. Each region can have **multiple Availability Zones**, each AZ has their own computing resources (e.g. in AWS -> you have US East-1 and US-East-2 zone)
   3. Cloud providers in general provide the following computing resources – **Virtual servers** (VMs – software based), **Bare metal servers** (Physical servers, not virtualized software), **Serverless computing resources** (Abstraction layer on top of VMs).
   4. Each Virtual Server or Bare metal server has their own **local storage** (which will be **deleted**, when the VS or BMS is **deleted/decommissioned**). Hence there are other types of storage options available, such as **Block storage, File storage, Object storage** (to **ensure more persistent data storage**). **Object storage** is the **most commonly used type** in the cloud… as it is resilient & highly distributed.
2. **Virtualization & Virtual Machines Explained:**
   1. Virtualization is the **process of creating a virtualized/virtual environment**
   2. This is done by using a **hypervisor**, which is a piece of software, that runs on top of the **physical server/host.**
   3. The hypervisor pulls **the resources from the physical server (e.g. processing power, storage space, memory etc) and allocates it to your virtualized environment.**
   4. **Two main types of hypervisors – type 1** (a hypervisor installed directly on the physical server – **aka bare metal hypervisors**) **and type 2 (a host OS sits between the hypervisor and host – aka hosted hypervisor**). Type 1 more common than type 2. Type 1 is more secure and lower (better) latency than type 2
   5. **You can run multiple VMs on the hypervisor.**
   6. **Benefits of Virtualization -> Cost savings, Decrease downtime, agility + speed**
   7. **Types of Virtual Machines (VMs): VMs** are also known as **Virtual Servers/Virtual Instances/Instances. VMs can be single tenant or multi tenant (multi users).**
3. **Bare Metal Servers:**
   1. A BMS is a **single tenant & dedicated physical server.**
   2. Needs to be preconfigured with certain settings first beforehand -> can take longer to provision than virtual machines/servers.
4. **Virtual Servers VS Bare Metal Servers**:
5. **Containers:**
   1. Containerization essentially eliminates the need to have guest OS -> reduce bloatware/bloating -> frees up available computing resources for other purposes
   2. See diagram below for more explanation:



VMs vs Containers (bottom the 3 -> is to create settings, then image for the container, then create the container itself with the necessary libs/dependencies for your app code to run in)

1. **Cloud Storage and Content Delivery Networks (CDNs):**