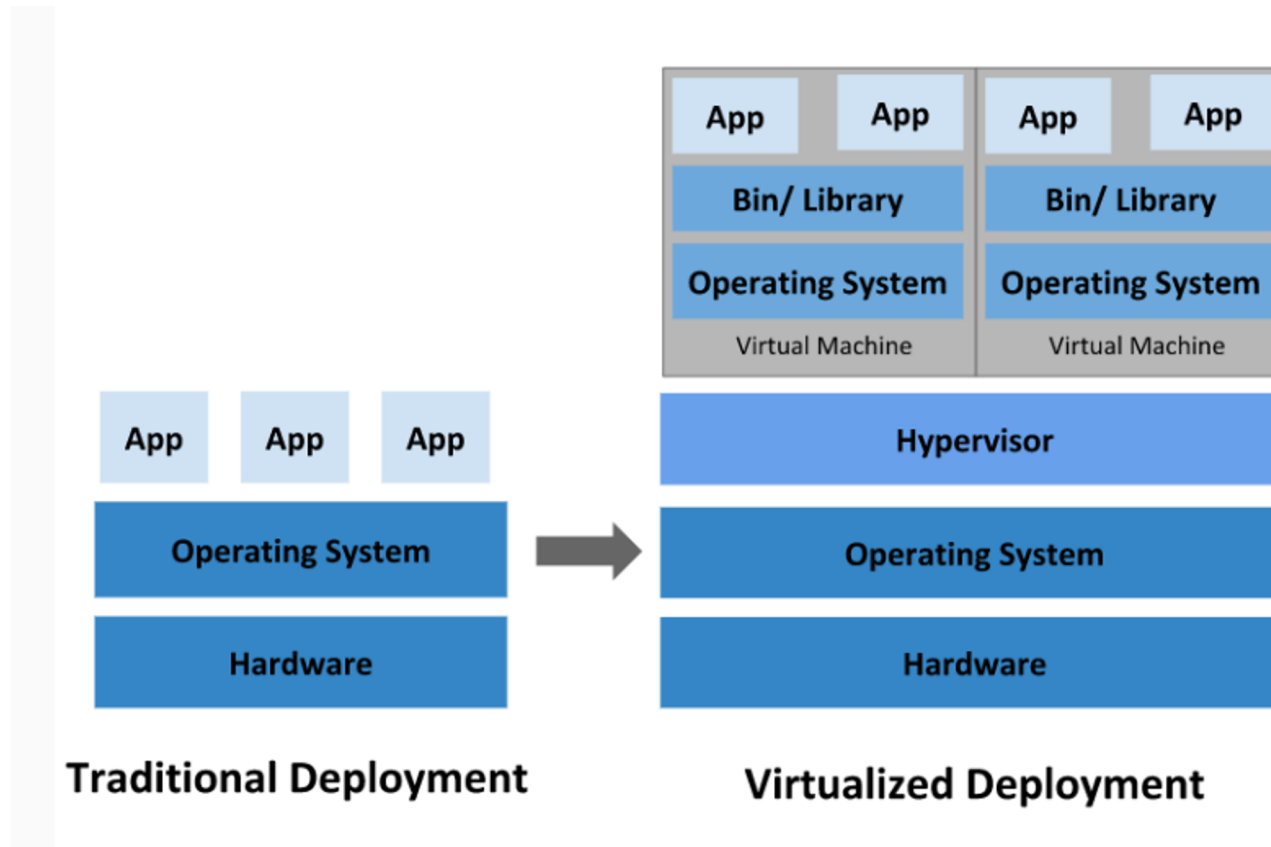# Azure Virtual Machines

Virtualization

What is Virtualization ..?

Create a software-based—or virtual—representation of applications, servers, storage and networks to reduce IT expenses while boosting efficiency and agility

Virtualization relies on software to simulate hardware functionality and create a virtual computer system

This enables IT organizations to run more than one virtual system – and multiple operating systems and applications – on a single server

What is Virtualization..?

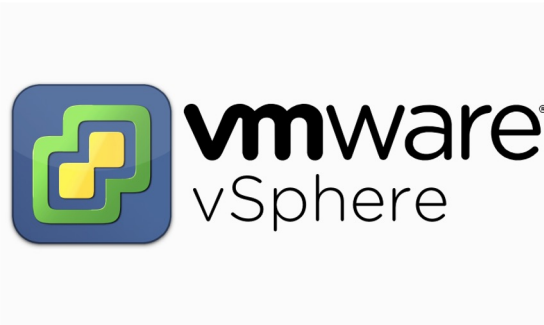**Traditional Deployment**   **Virtualized Deployment**

What is Hypervisor..?

- A thin Layer of Software
- Decouples the Virtual Machines from Host
- Dynamically allocates Computing resources to each virtual Machine
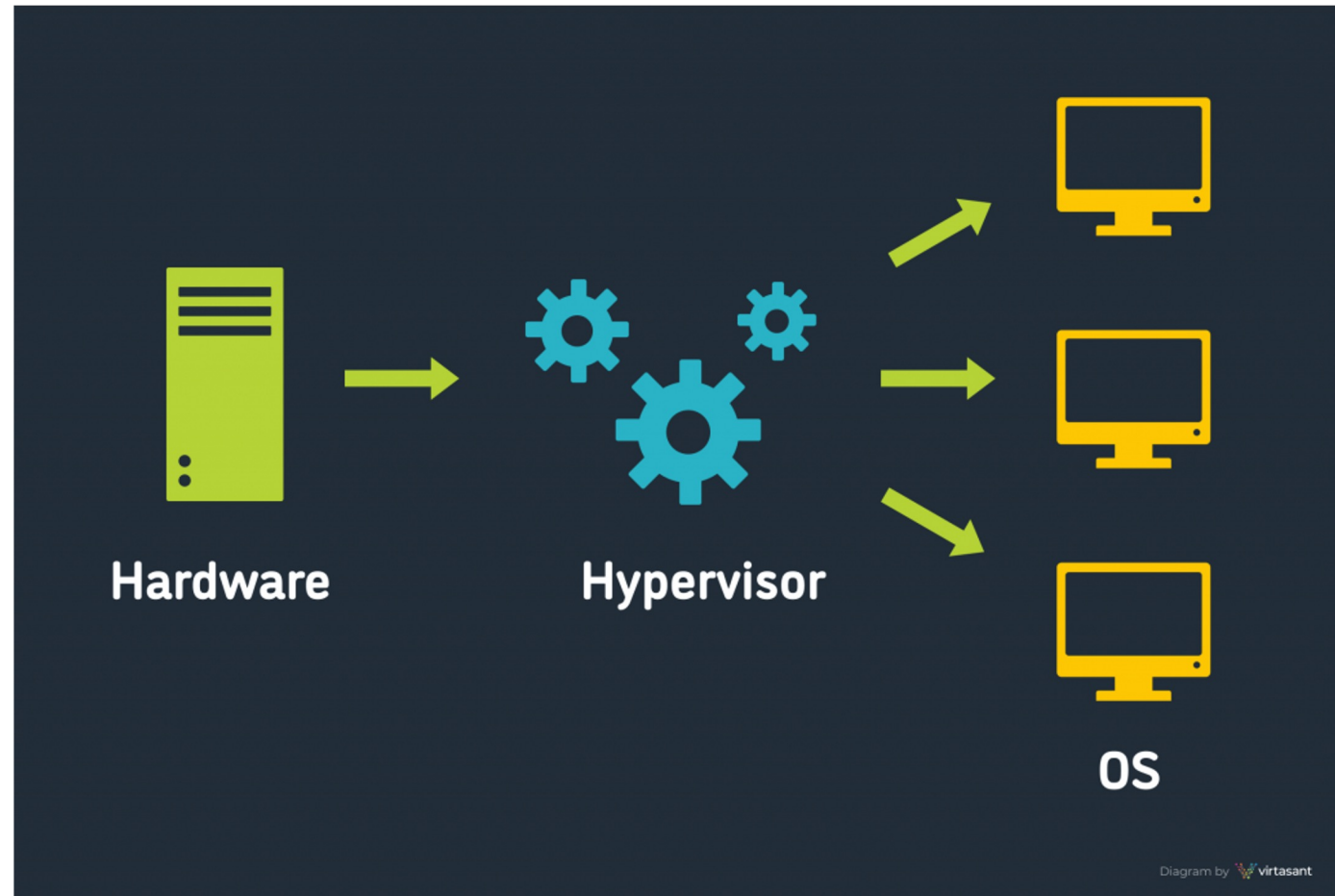
Top Hypervisors..?

Azure Virtual Machines

- Create Linux and Windows virtual machines (VMs) in seconds and reduce costs

- Deploy virtual machines featuring up to 416 vCPUs and 12 TB of memory

- Get up to 3.7 million local storage IOPS per VM

- Select the underlying processors – AMD, Ampere (Arm-based), or Intel - that best meet your requirements.

Virtual Machine Series

Series	Description
A	Entry Level VM's for dev and test. **Example workloads include** development and test servers, low traffic web servers, small to medium databases, servers for proof-of-concepts, and code repositories., going to retire on August 31st 2024
Bs	Economical Burstable VM's, low-cost option for workloads that typically run at a low to moderate baseline CPU utilization **Example workloads** include development and test servers, low-traffic web servers, small databases, micro services, servers for proof-of-concepts, build servers
D	General Purpose Compute, The D-series Azure VMs offer a combination of vCPUs, memory, and temporary storage able to meet the requirements associated with most production workloads **Example workloads include** many enterprise-grade applications, e-commerce systems, web front ends, desktop virtualization solutions, customer relationship management applications, entry-level and mid-range databases, application servers, gaming servers, media servers, and more..
E	**Example workloads include** SAP HANA (e.g., E64s v3, E20ds v4, E32ds v4, E48ds v4, E64ds v4), SAP S/4 HANA application layer, SAP NetWeaver application layer, and more broadly memory-intensive enterprise applications, large relational database servers, data warehousing workloads, business intelligence applications, in-memory analytics workloads, and additional business-critical applications, including systems that process transactions of a financial nature
F	Example workloads include batch processing, web servers, analytics, and gaming.
G	large SQL and NoSQL databases, ERP, SAP, and data warehousing solutions
H	High Performance Computing virtual machines

Virtual Machine Series

Series	Description
Ls	Storage Optimized NoSQL databases such as Cassandra, MongoDB, Cloudera, and Redis. Data warehousing applications and large transactional databases are great use cases as well
M	SAP HANA, SAP S/4 HANA, SQL Hekaton and other large in-memory business critical workloads requiring massive parallel compute power
N	GPU enabled virtual Machines, simulation, deep learning, graphics rendering, video editing, gaming and remote visualization.

Source KB: https://azure.microsoft.com/en-us/pricing/details/virtual-machines/series/

Virtual Machine Features

- Keep your budget in check with low-cost, per-second billing. You only pay for the compute time you use

- Scale from one to thousands of VM instances in minutes with Azure Virtual Machine Scale Sets

- Encrypt sensitive data, protect VMs from malicious threats, secure network traffic, and meet regulatory and compliance requirements

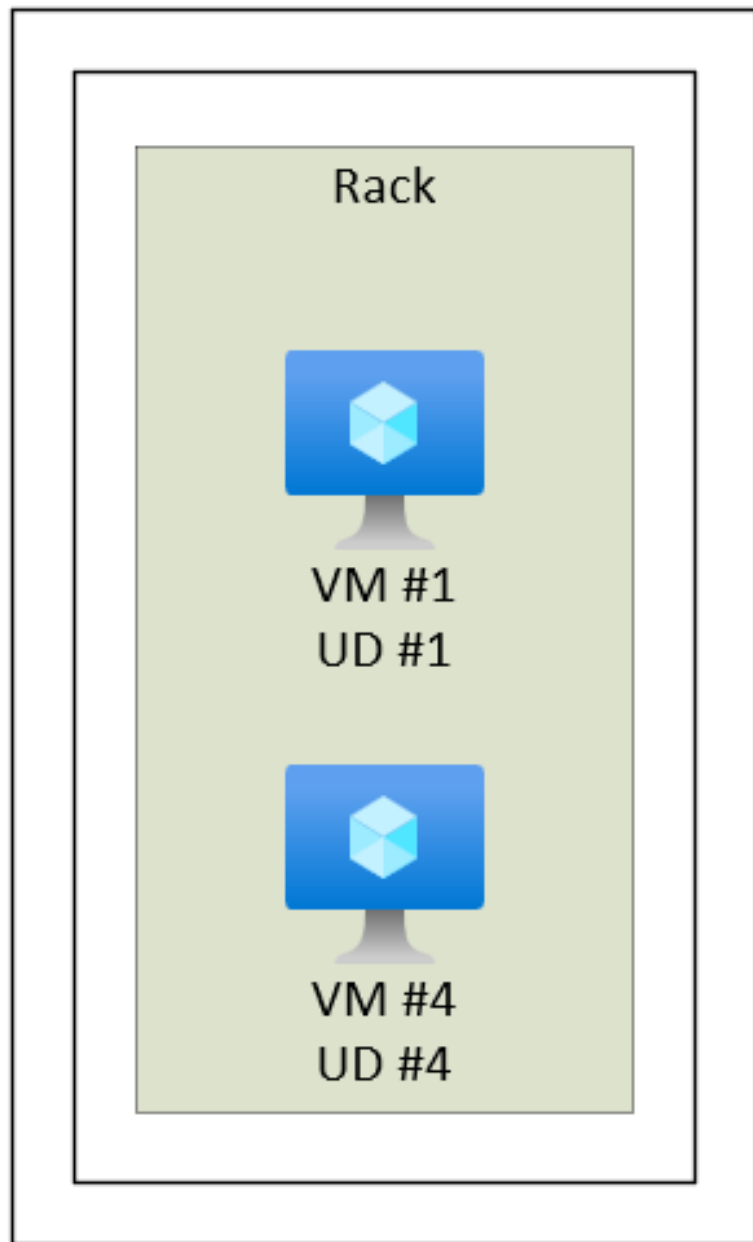- Choose Linux or Windows. Deploy your own VM image or download images from the Azure Marketplace

VM Scale Sets

- Azure Virtual Machine Scale Sets let you create and manage a group of load balanced VMs
- The number of VM instances can automatically increase or decrease in response to demand or a defined schedule

- Scale sets provide the following key benefits:

  - Easy to create and manage multiple VMs

  - Provides high availability and application resiliency by distributing VMs across availability zones or fault domains

  - Allows your application to automatically scale as resource demand changes
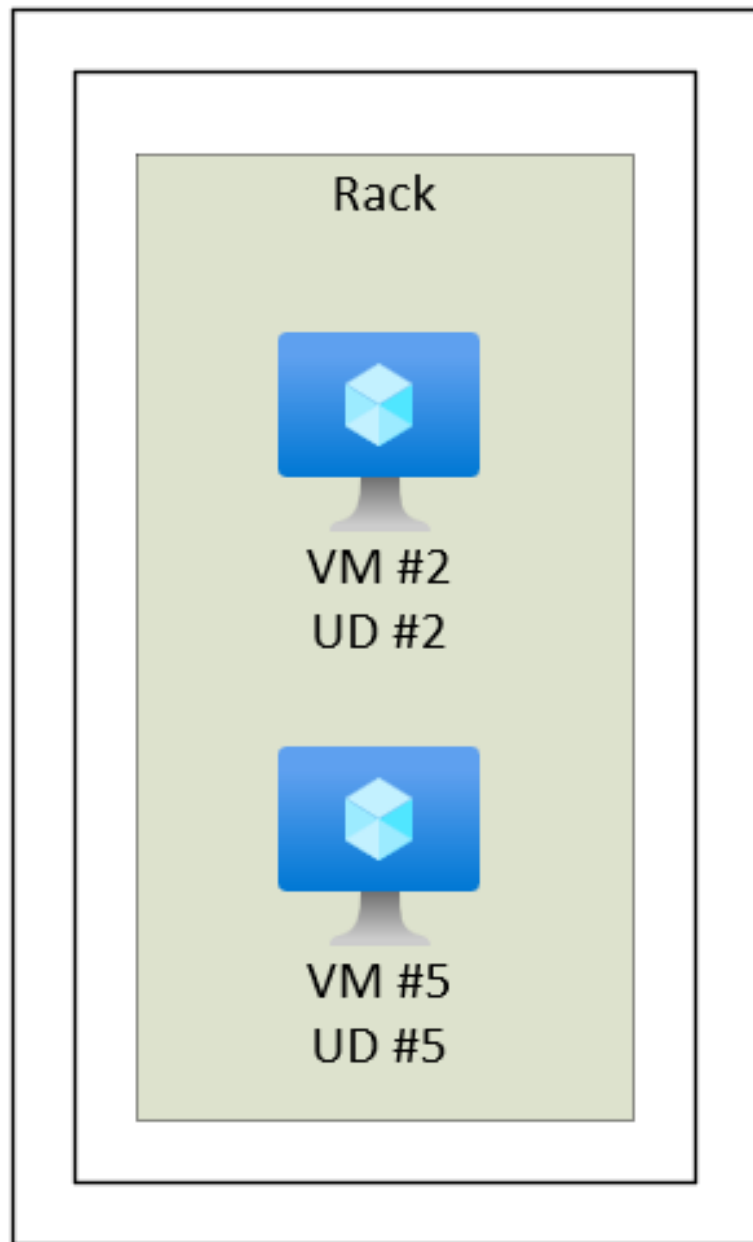
  - Works at large-scale

Availability Set?

- An availability set is a logical grouping of VMs and allows Azure to understand how your application is built to provide for redundancy and availability

- Each virtual machine in your availability set is assigned an **update domain** and a **fault domain** by the underlying Azure platform

- Each availability set can be configured with up to three fault domains and twenty update domains

- These configurations can't be changed once the availability set has been created

- Update domains indicate groups of virtual machines and underlying physical hardware that can be rebooted at the same time

- Fault domains define the group of virtual machines that share a common power source and network switch