Azure 900 Notes

Cloud Concepts

Cloud Computing

It's the delivery of computing services over the internet.

Cloud Models

Cloud Services

Computing (Virtual Machine) Storage Database Networking

Private Cloud

It's a cloud, used by a single entity. Everything is built on the company's data center.
Most expensive.
No guarantee it will be secure. But you can meet the security requirements.
You can configure the infrastructure.
You have to have complete knowledge of the infrastructure.

Public Cloud

Everything is built on the cloud provider.
Least expensive.
Security control but does not always meet security requirements.
Limited Configuration.
No knowledge of the infrastructure needed.

Hybrid Cloud

Private and public clouds interconnected.
You have to secure access to the cloud.
You have to have complete knowledge of the infrastructure.

Benefits of the cloud (Cloud Architecture terminology)

High Availability

The ability of the server to remain running at high performance.
Azure's Cloud provides 99% , 99.9% and 99.95% availability.

High scalability

Adjust resources to meet demand.

Vertical Scaling

Adding more CPUs or rams to your machines.

Horizontal Scaling

Adding more machines.

High Elasticity

The ability to automatically scale according to demand.

Fault Tolerance

The ability to ensure that there is no chance of failure.
Shift traffic from a primary to a secondary system in case the primary system fails.

Security
Globality

Conception based model

Capital expenditure

One time, upfront expenditure. Paying for a data center, buying a building etc.

Operational expenditure

Spending money on services overtime. Renting a house, leasing a company etc.
Cloud computing falls under operational expenditure, your pay only for what you use, as you go.

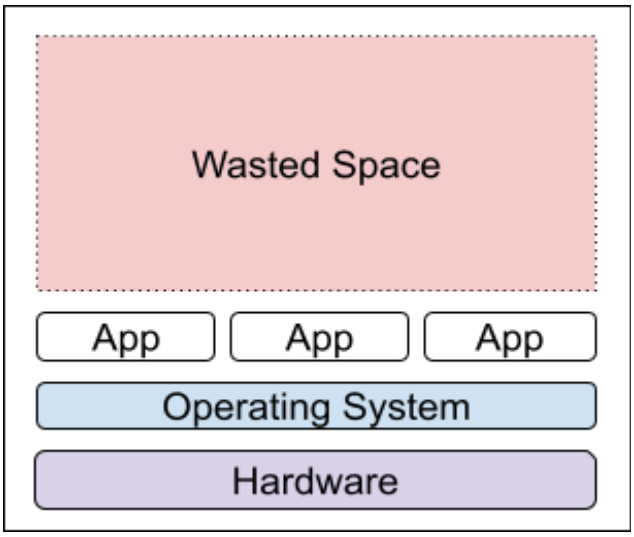
Types of cloud services

Infrastructure as a service (Iaas)
Application data OS Runtime = responsibility of the customer.
Virtualization storage networking = responsibility of the cloud.
provider.
Scenarios : Lift and shift , testing, development.

Performance as a service (PaaS)
Application data = responsibility of the customer.
Virtualization storage networking OS runtime = responsibility of the cloud.
Scenarios : Business, Analytics, development.

Software as a service(SaaS)
Everything is the responsibility of the cloud provider. You're basically renting a running up application.

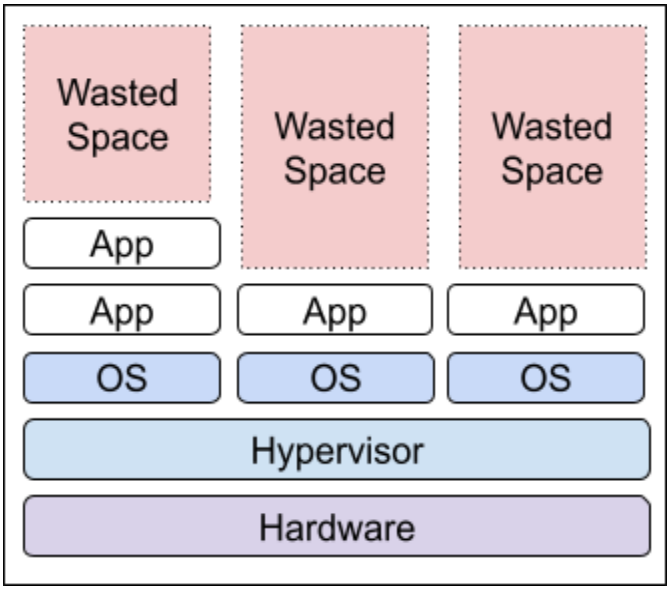
Describe Cloud Virtual Machines



Dedicated Server

Dedicated server

- You are the only one using the space.
- Underutilization of the space.
- Limited by operating system.



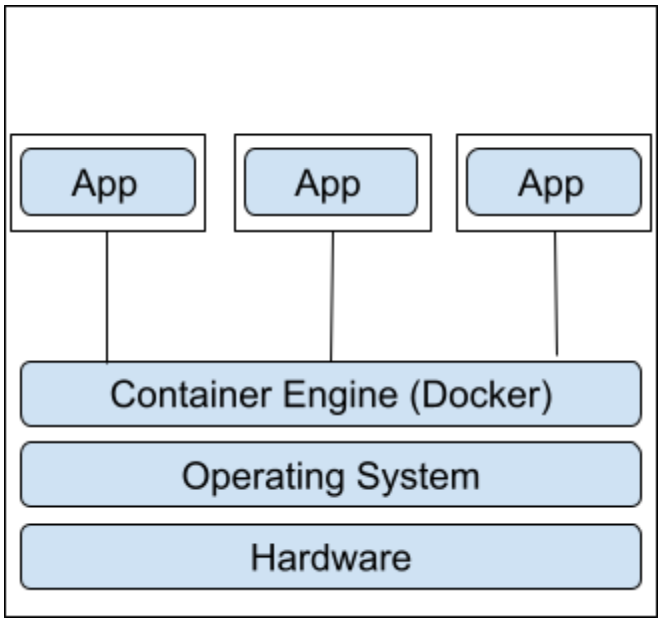
Virtual Machines

Virtual Machines

Shared space

Simulates an entire server to run an application

slow to boot



Containers

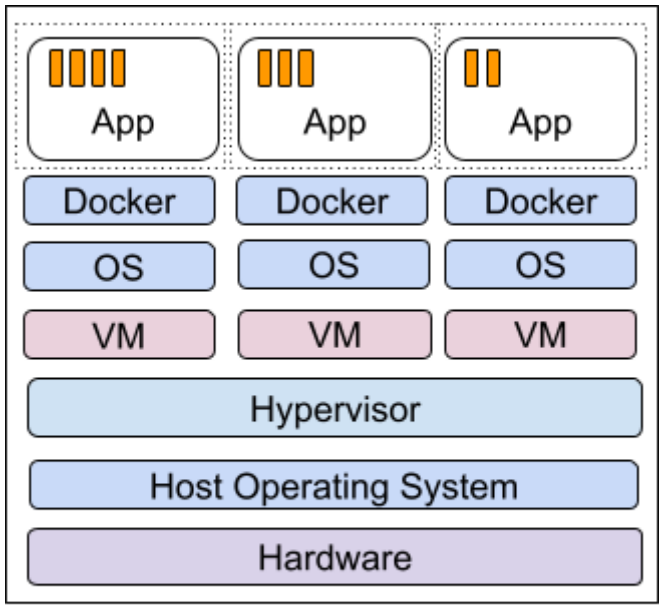
Containers

Containers contain only what is necessary to run an application.

Very efficient and cost effective.

They share the same underlying Operating System.

Virtual machines can run multiple containers.



Functions

Functions

- Managed Vms
- Managed Containers
- You are only responsible for the code and data
- Extremely cost-effective you pay only for when the code is running
- Known as **serverless compute**

Infrastructure

Physical Infrastructure

Region

- Regions are multiple datacenters (Availability Zones) - 58 regions for Azure.

Geography

- Two or more regions
- Data residency (if you use United States geography the data won't leave the United States)

Pair Regions

- Each region is paired with another region 300 miles away. (in the same Geography).
- Only one region is updated at a time.
- Disaster Recovery : The secondary region backs up the primary region.
- Azure Geo-Redundant Storage(GRS) replicates data to a secondary region automatically.

Special Regions

- They exist for legal reasons
- Ex : US DoD of Central, US GOV of Virginia , US GOV of Iowa and more…
- Other Examples : China North , China East (Collaboration between Microsoft and Via-Net)

Availability Zones

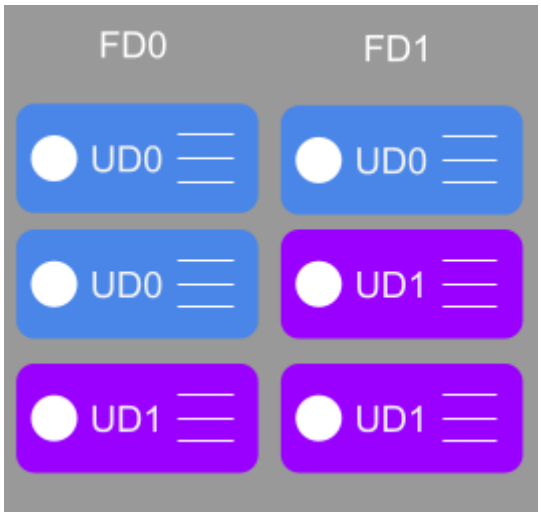
- Availability Zones are one or multiple datacenters.
- Each region contains generally 3 availability zones.
- Run workloads in the 3 availability zones so the services remain available in case of failure. (High Availability)

Support for availability zones

- Not all regions support availability zones.
- Recommended Regions (contains generally 3 availability zones)
- Alternate or other (contains only 1 so no support for availability zones)

Fault and Update domains

Each availability zone is composed of fault and update domains
Fault domain : A single point of failure
Update domain : Resources within the same update domain update at the same time
You can configure the FD and UD using availability sets in Azure.



(Management infrastructure to be added later)

Services

Computing Services

Virtual Machines
Windows or Linux
Configuration of Operating Systems, Memory, CPU, Storage

Azure Containers
Run containerized apps on Azure without VMs or services

Azure kubernetes service
Uses the open source Kubernetes software K8

Azure service fabric
Manage and deploy scalable microservices

Azure functions
Bites of code that you upload and it just works. You don't have to worry about the servers or the OS etc
Cost-efficient because you pay only for what you consume
Serverless service

Storage services