Laptop

1. Screen, keyboard, Mouse, Sound, Camera
2. CPU (core) + Motherboard
3. Storage (SSD, HDD)
4. RAM
5. Operating System
6. Network Interface Card / WiFi → Internet
7. Graphics card →
8. Battery
9. Power Source
10. FAN
11. Ports External Devices
12. External Monitor (HDMI, VGA)

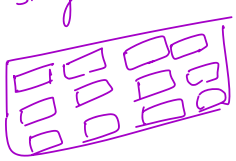
12

SERVER → 64 Core

Big Machine → High End configurations
centralised

Screen, Keyboard, Battery

Storage Devices



ON-PREM → website

E-commerce

Your own Data Centre

VM

Servers → Compute

Power supply

Battery / Generator

Storage (SAN) → SSD, HDD

Storage Area Network

NIC Card → Cable → Router / switch

Graphics Card

Air Conditioning → 14- 16°C

ON PREMISE DC

- CAPEX → YOU
- OPEX → YOU
- TEAMS → YOU

FULL CONTROL

CLOUD → Data Centre

Public / Private

AWS, Azure, GCP, IBM, oracle, salesforce, Alibaba, vcloud,

Compute Servers

P.S

Battery

SAN (SSD, HDD)

NIC, Card

Graphics Card

AC

CAPEX → AWS, Azure GCP

OPEX → "

TEAMS → "

offering cloud as a service

VM → on Azure servers

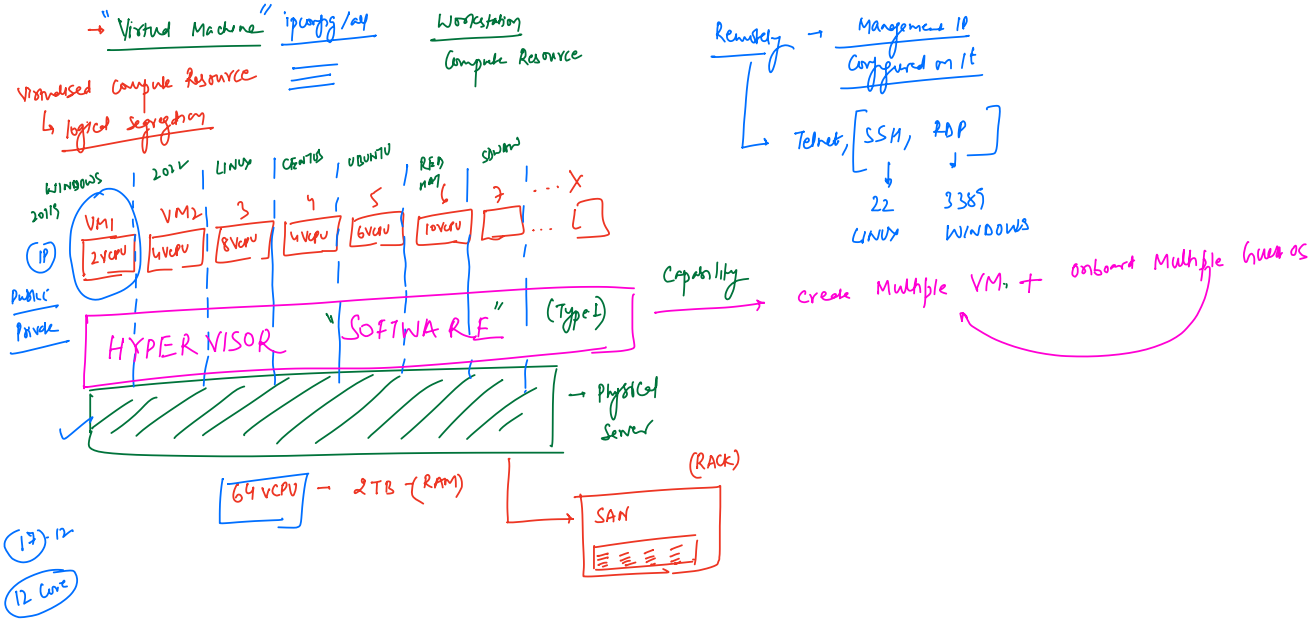
Renting this space

Pay as you use / go

Don't have full control

Hassle free

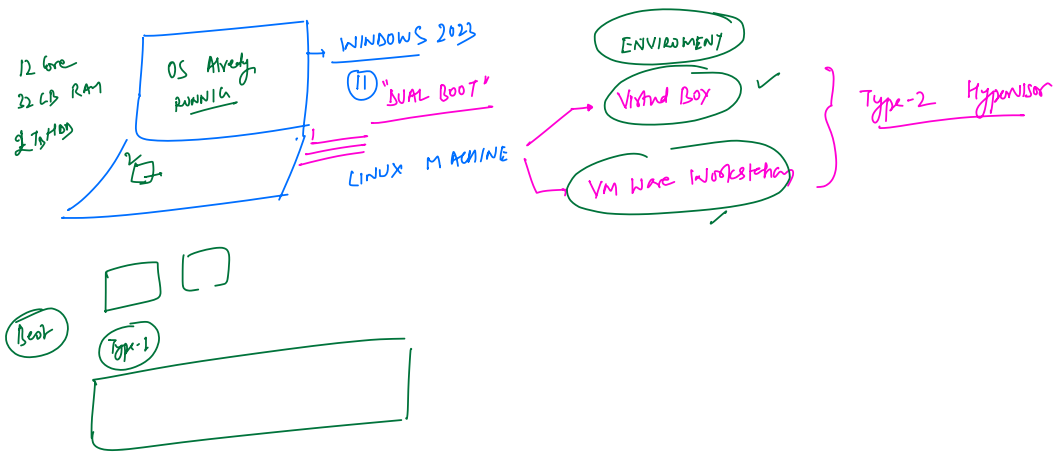
CORE → AWS / AZURE
BUSINESS

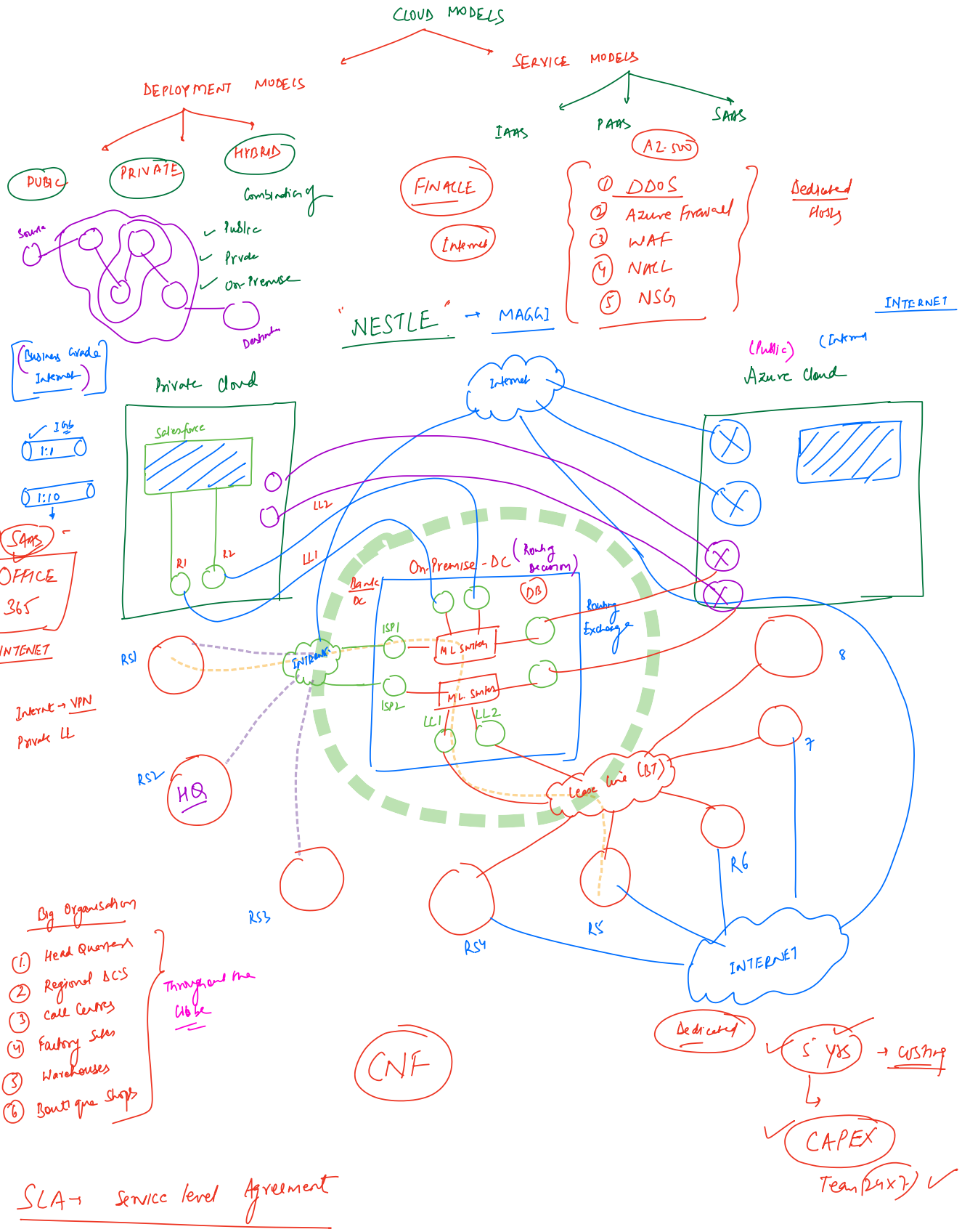


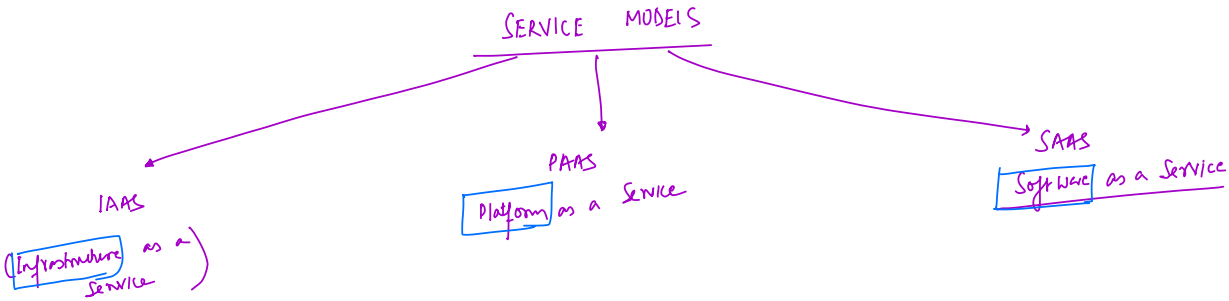
Hypervisor

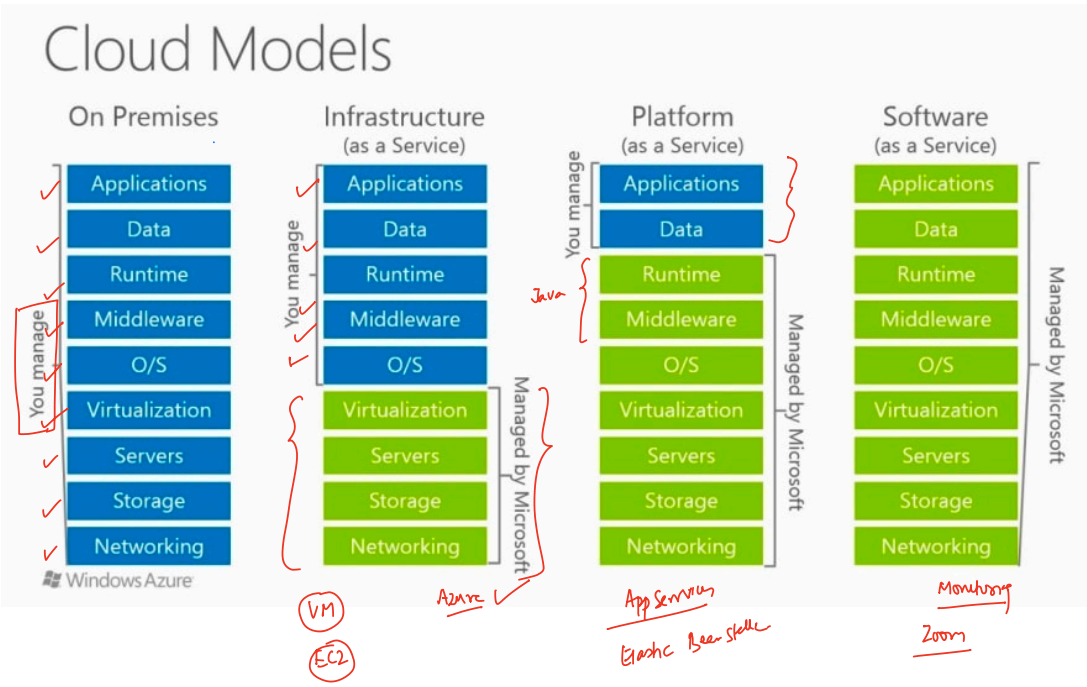
- → XEN (AWS) – Type1
- → ESXI (VMWare), NSX – Type-1
- → Hyper-V (Azure) – Type1
- →

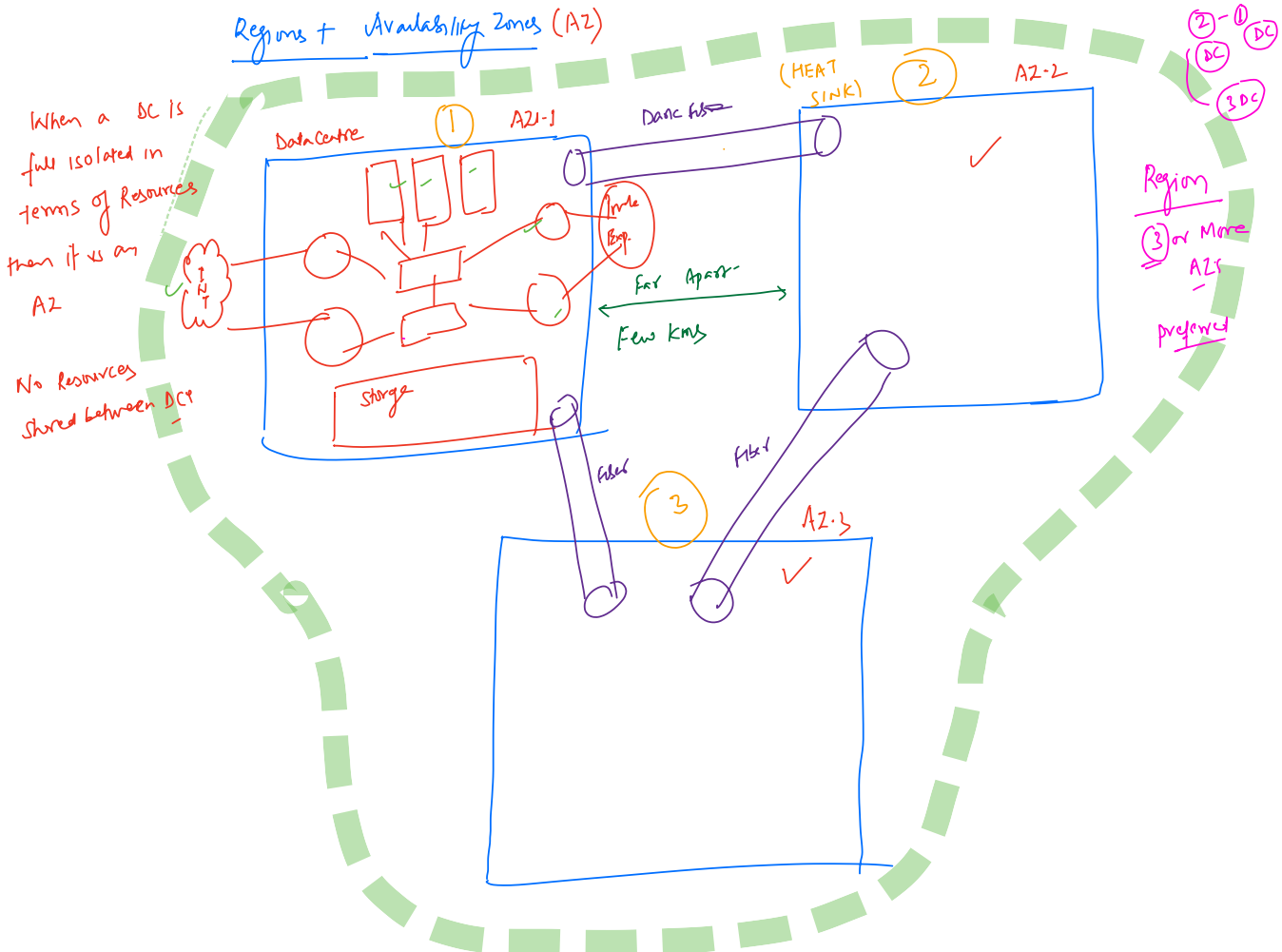
TYPE-2 HYPERVISOR

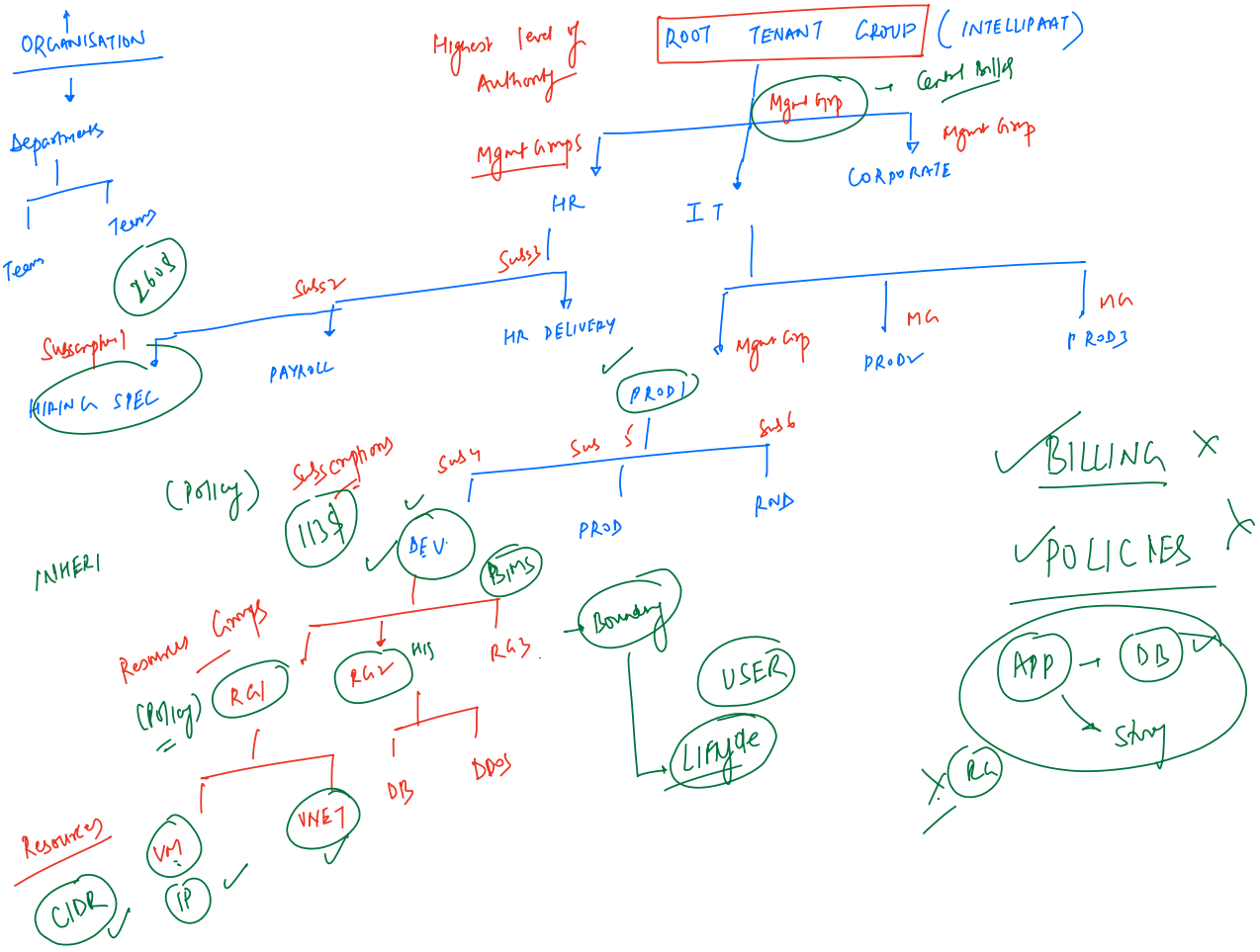



CLOUD MODELS
DEPLOYMENT MODELS
SERVICE MODELS
PUBLIC
PRIVATE
HYBRID
IAAS
PAAS
SAAS
AZ-900
FINACLE
Internet
DDOS
Azure Firewall
WAF
NACL
NSG
Dedicated Hosts
Public
Private
On Premise
Source
Destination
"NESTLE" → MAGGI
INTERNET
(Public)
Azure Cloud
Private Cloud
Salesforce
Internet
LL2
LL1
R1
R2
On Premise - DC
Routing Protocols
DB
ISP1
ISP2
ML Switch
ML Switch
LL1
LL2
Routing Exchange
Leased line
(BT)
INTERNET
HQ
RS1
RS2
RS3
RS4
RS5
R6
7
8
Internet → VPN
Private LL
Big Organisations
1. Head Quarters
2. Regional DCs
3. Call Centres
4. Factory Sites
5. Warehouses
6. Boutique Shops
Throughout the Globe
CNF
Dedicated
SLAs
CAPEX
Team (24x7)
SLA → Service level Agreement


SERVICE MODELS
IAAS
Infrastructure as a Service
PAAS
Platform as a Service
SAAS
Software as a Service


Cloud Models
On Premises
Infrastructure (as a Service)
Platform (as a Service)
Software (as a Service)
Applications
Data
Runtime
Middleware
O/S
Virtualization
Servers
Storage
Networking
You manage
Managed by Microsoft
Windows Azure
VM
EC2
Azure
Java
App Services
Elastic Beanstalk
Monitoring
Zoom


Regions + Availability Zones (AZ)
When a DC is full isolated in terms of Resources than it is an AZ
No Resources Shared between DCs
Data Centre
1
AZ-1
Dark fibre
(HEAT SINK)
2
AZ-2
Inside Bldg.
Far Apart
Few kms
Storage
Fiber
Fiber
3
AZ-3
Region
3 or More AZs
preferred
2-DC
DC
3DC


ORGANISATION
Departments
Teams
Teams
Teams
Highest level of Authority
ROOT TENANT GROUP (INTELLIPAAT)
Mgmt Grp
Central Billing
Mgmt Grp
Mgmt Grps
HR
IT
CORPORATE
Subscription1
HIRING SPEC
Subs2
PAYROLL
Subs3
HR DELIVERY
Mgmt Grp
MG
PROD1
MG
PROD3
PROD1
Subs4
Subs5
Subs6
PROD
R&D
(Policy)
Subscriptions
ITSM
DEV
BIMS
INHERI
Resource Groups
(Policy)
RG1
RG2
HIS
RG3
DB
DDOS
VNET
VM
IP
Resources
CIDR
Boundary
USER
Lifecycle
BILLING
POLICIES
APP
DB
Storg
RG

Azure → 104

Basics of Cloud Computing

Laptop

1. Screen, keyboard, camera, mouse, touchpad,
2. CPU (Motherboard)
3. Storage (SSD, HDD)
4. RAM
5. Operating System (OS)
6. Graphics card
7. Network Interface Card
8. External Ports (USB, HDMI, VGA)
9. FAN
10. Internal cooling
11. Battery / SMPS
12. Power supply
13. Applications

OWN Data Centre → ON-PREMISE

ON-PREM

Servers → Compute + (RAM)

Storage → (SAN - Storage Area Network)

Operating System (OS)

Graphics Card

NIC

External Ports (Monitor, USB)

Air Conditioning (14°C to 16°C)

Power supply (Redundant)

Battery → Generator

Hypervisor → Server

Virtual Machine → Remote Accessible

Applications

Accessed Remotely - SSH, RDP

MONEY → "CAPEX" - Capital Expenditure

OFFICE + TEAMS → OPEX

SECURITY - GUARDS

BREAKING - SUPPORT

Public → AWS, MICROSOFT, GCP, ORACLE, ALIBABA

↳ PRODUCT

CLOUD (DATA CENTRE)

SERVERS (COMPUTE) + GC + PORTS

STORAGE

OS

AC

Power Supply

Battery

Hypervisor

VM

Applications

User

Internet

On-Prem

Provider

Private Connectivity

COSTLY

✓ CAPEX → Public CSP

AWS, Azure / Microsoft

GCP

✓ OPEX → Microsoft

✓ RENTING THE Services

↳ Pay as you use Model

Support → Azure / Microsoft

SERVER

DESKTOP / LAPTOP

OS1 OS2 OS3

Bigger Machine

Huge Computing Power

↳ Computing capacity 128 cores

RACK

- Servers
- Router
- Switches
- Firewalls
- Storage

↓

Data Centre

Multiple VMs

↓

Multiple Guest OS

Windows Linux Unix Red Ubuntu

2vCPU-8 4vCPU 16 6vCPU-16 10vCPU 16 12vCPU 32

HYPERVISOR SOFTWARE - TYPE 1

Physical Server

→ 64 vCPU . 256 GB RAM

WINDOWS-11

OS

i11 → 12 core

32 GB

LINUX

↓

INSTALL Virtual Box → Software

VMware Workstation

↳ Type 2 - Hypervisor

LINUX

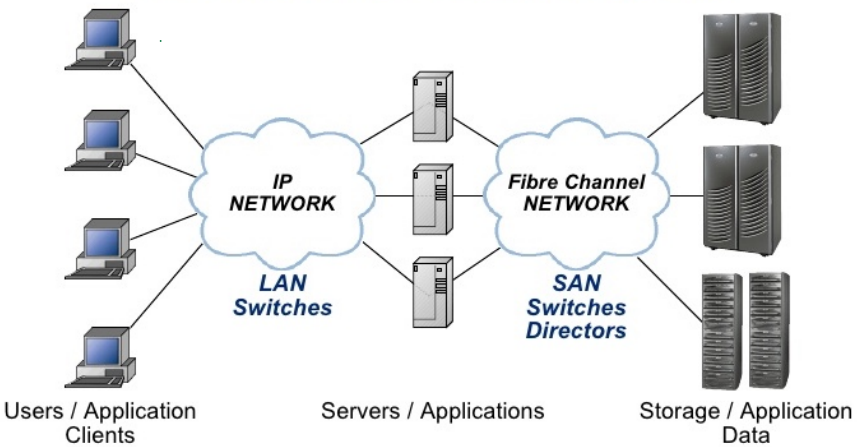
2vCPU

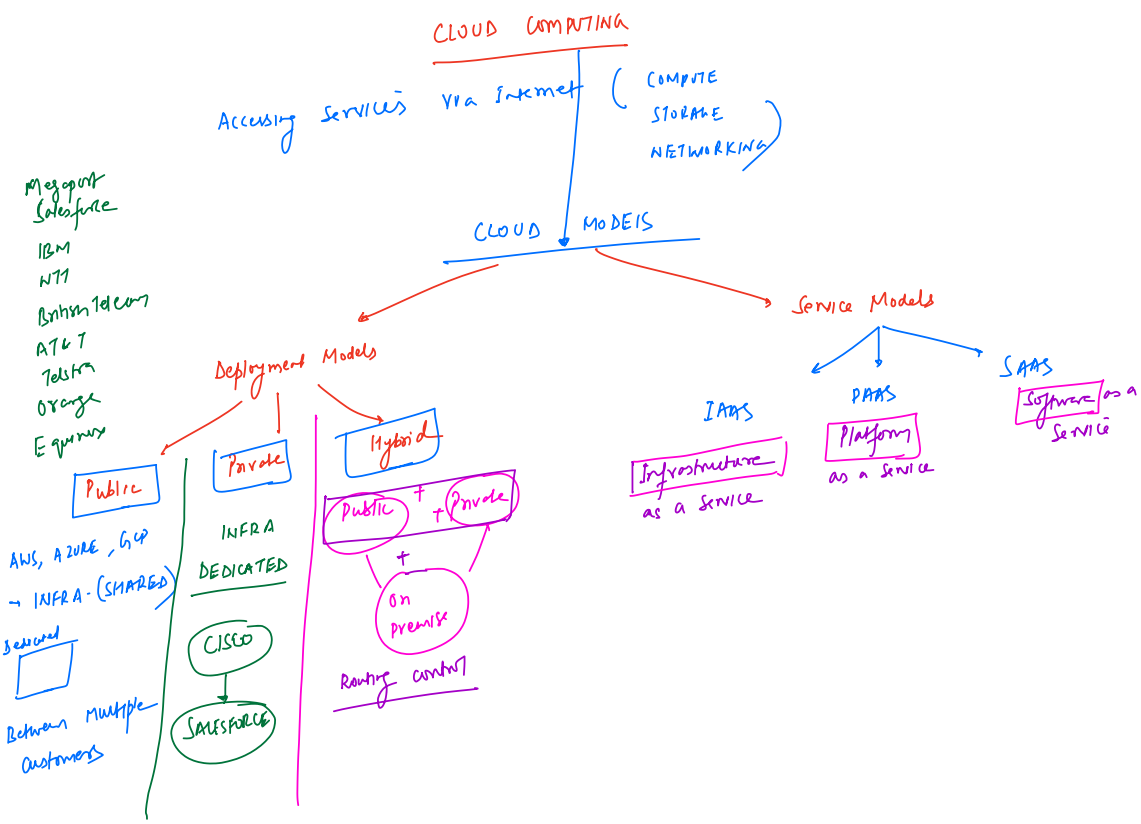
4GB

Start VM

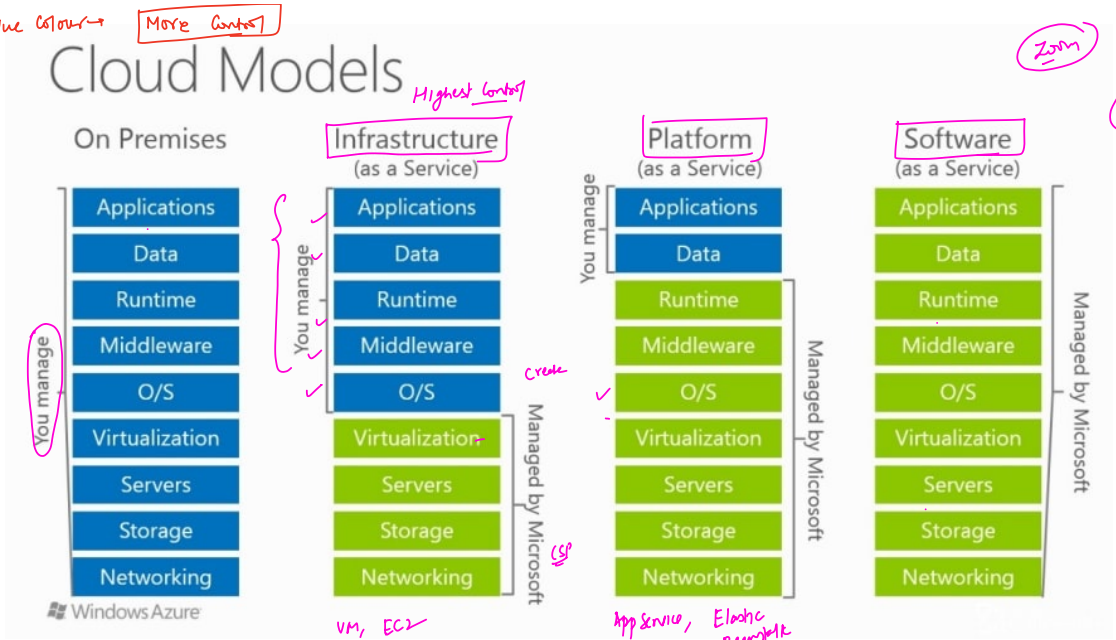
What Is a Storage Area Network (SAN)?

...A dedicated network carrying storage traffic





More Blue Colour → More Control



Zoom

PDF

Physically separated for Distance

Not sharing any resources

Completely Isolated

Region → 3 or More DC

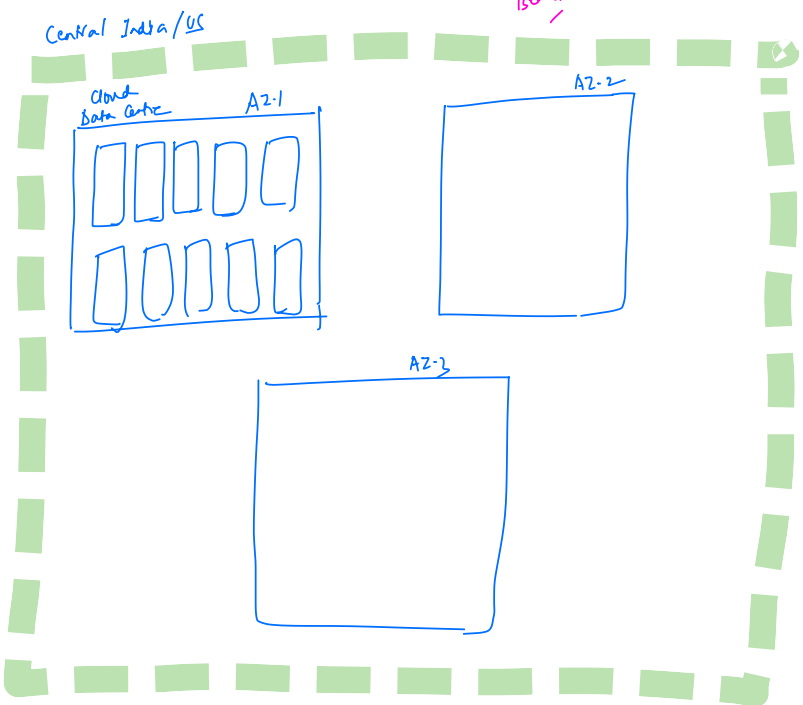
1 or 2 → Pre Mature Stage

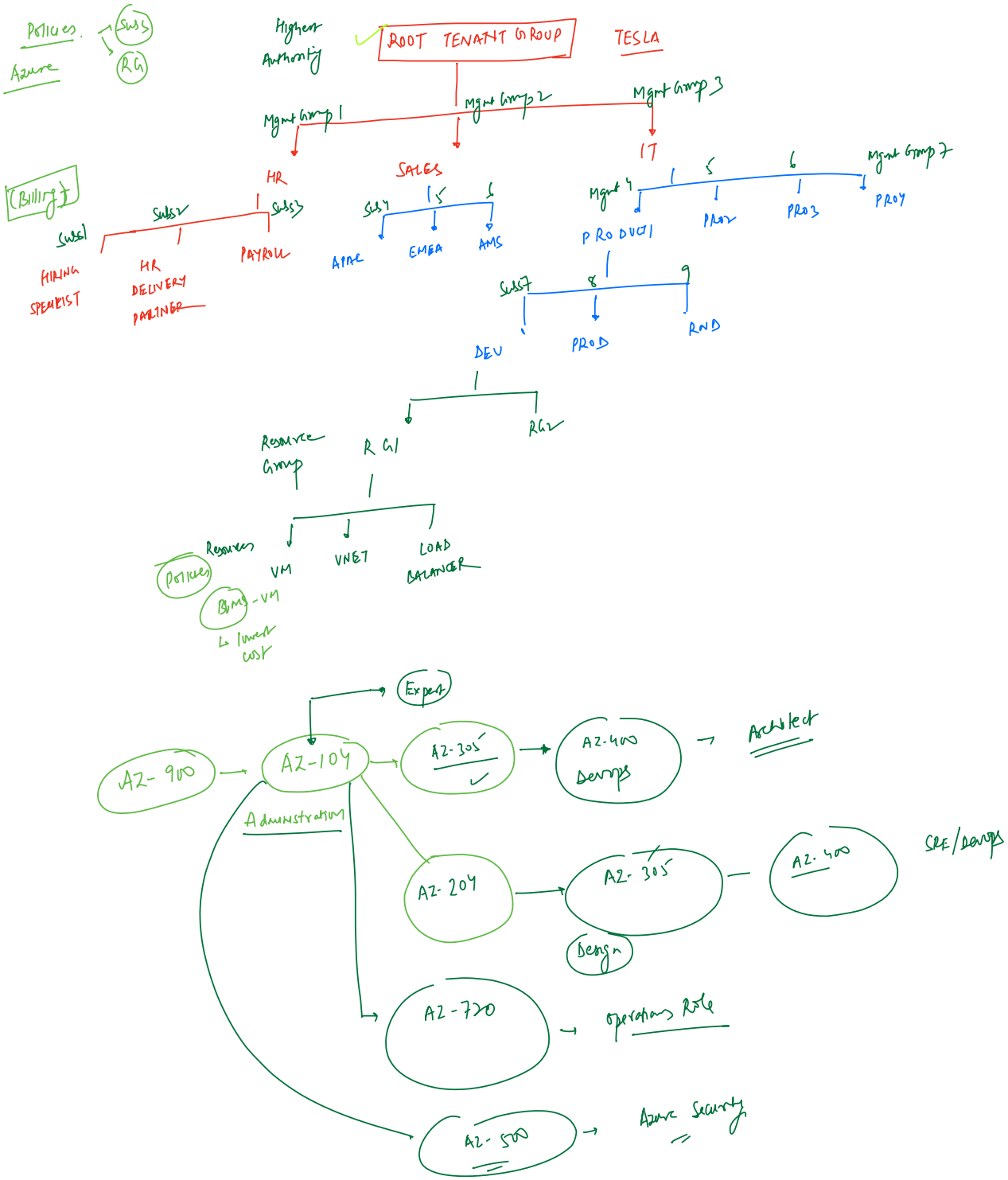
3 datacentre - in a Region

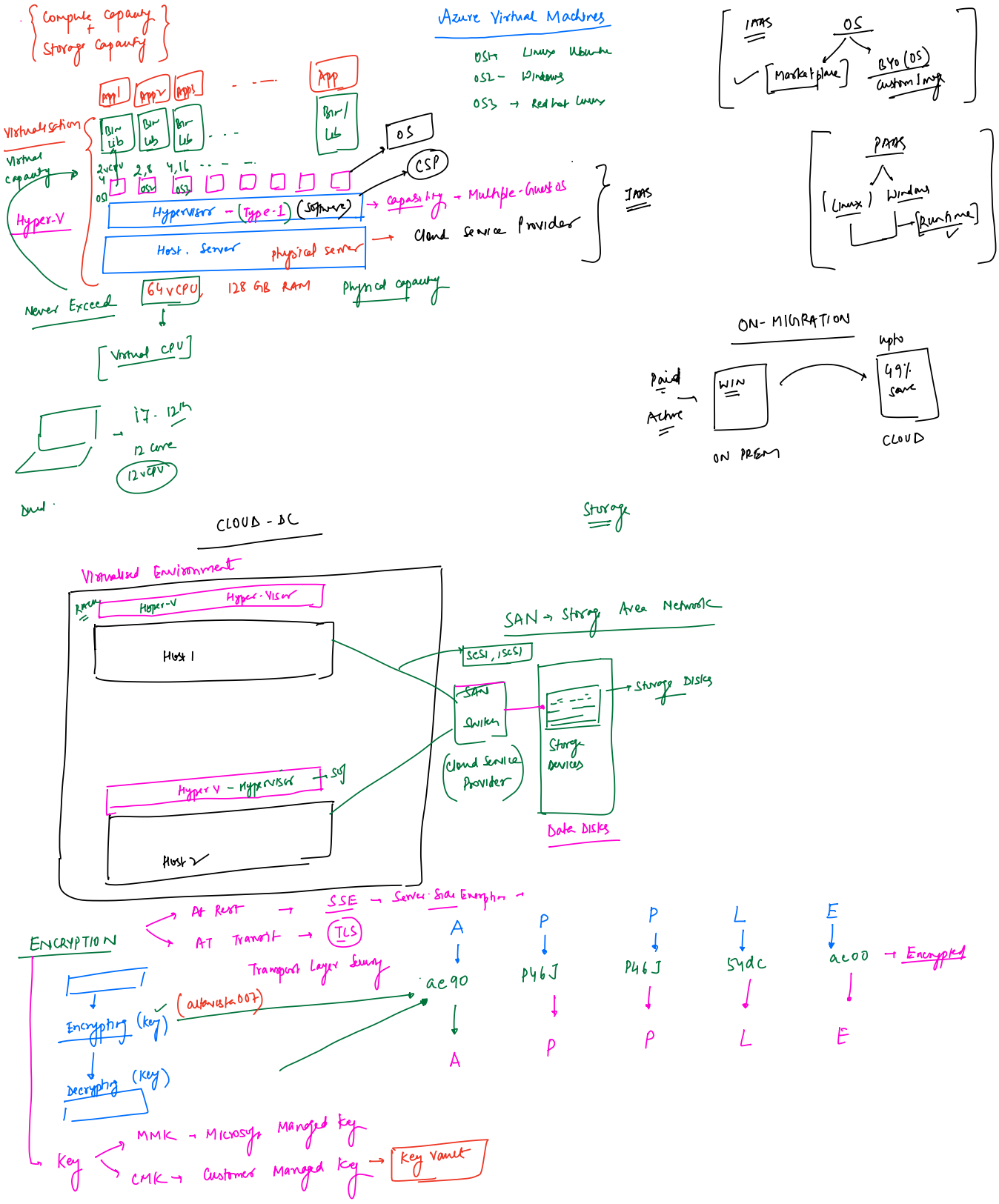
2 - DC or 1 - DC ✗

Resiliency, Redundancy, Failover

Failover (1 DC)




Policies
Subs
RG
Azure
Higher Authority
ROOT TENANT GROUP
TESLA
Mgmt Group 1
Mgmt Group 2
Mgmt Group 3
HR
SALES
IT
Billing
Subs
Subs
Subs
Subs
HIRING SPECIALIST
HR DELIVERY MANAGER
PAYROLL
APAC
EMEA
AMS
Mgmt 4
5
6
Mgmt Group 7
PROD
PROD
PROD
PROD
Subs
8
9
DEV
PROD
RND
DEV
RG1
RG2
Resource Group
RG1
Resources
VM
VNET
LOAD BALANCER
Policies
Blue - VM
Lower cost
Expert
AZ-900
AZ-104
AZ-305
AZ-400
Devops
Architect
Administration
AZ-204
AZ-305
AZ-400
SRE/Devops
Design
AZ-720
Operations Role
AZ-500
Azure Security


Compute capacity + Storage capacity
Azure Virtual Machines
OS1 → Linux Ubuntu
OS2 → Windows
OS3 → Red hat Linux
IMAS
OS
Marketplace
BYO (OS) Custom Img
PAAS
Linux
Windows
Runtime
App
Bin/Lib
Virtualization
Virtual capacity
Hyper-V
2vCPU 4
2,8
4,16
OS
Hypervisor - (Type-1) (Software)
Host. Server
physical server
CSP
capacity
Multiple-Guest os
Cloud Service Provider
IMAS
Never Exceed
64 vCPU
128 GB RAM
Physical capacity
Virtual CPU
i7. 12th
12 Core
12 vCPU
ON-MIGRATION
Paid
Active
WIN
upto
49% save
ON PREM
CLOUD
CLOUD - DC
Storage
Virtualized Environment
Hyper-V
Hyper-Visor
Host 1
Hyper V - Hypervisor
SSJ
Host 2
SAN → Storage Area Network
SCSI, iSCSI
SAN switch
Cloud Service Provider
Storage devices
Storage Disks
Data Disks
ENCRYPTION
At Rest → SSE → Server Side Encryption
At Transit → TLS
Transport Layer Security
Encrypting (key)
(alphanumeric007)
Decrypting (key)
ae90
A
P
P46J
P
P46J
P
L
5ydc
L
E
ae00 → Encrypted
E
Key
MMK → Microsoft Managed key
CMK → Customer Managed key → Key Vault

Tags → Name, Address, location, Role No → Role Tag → app-server → Filtering

Business Unit → CIO, CTO

Firewall

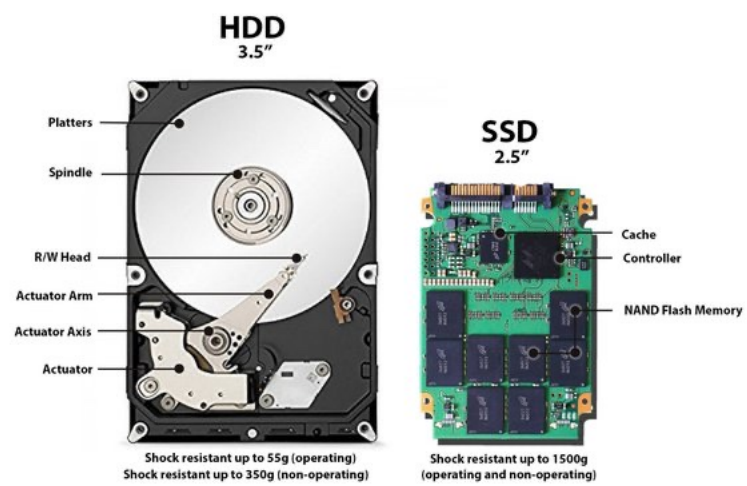
Pass -

app-server

Disks → Standard HDD → Slower (Hard disk Drive)

Standard SSD → faster → HDD + Caching option

Premium SSD → Fastest → Pure SSD (Solid State Drive)

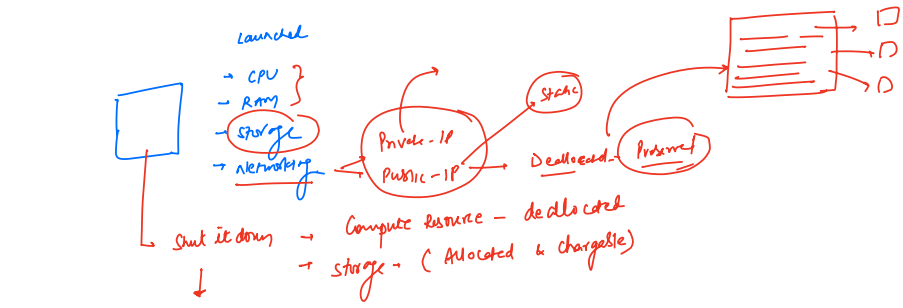


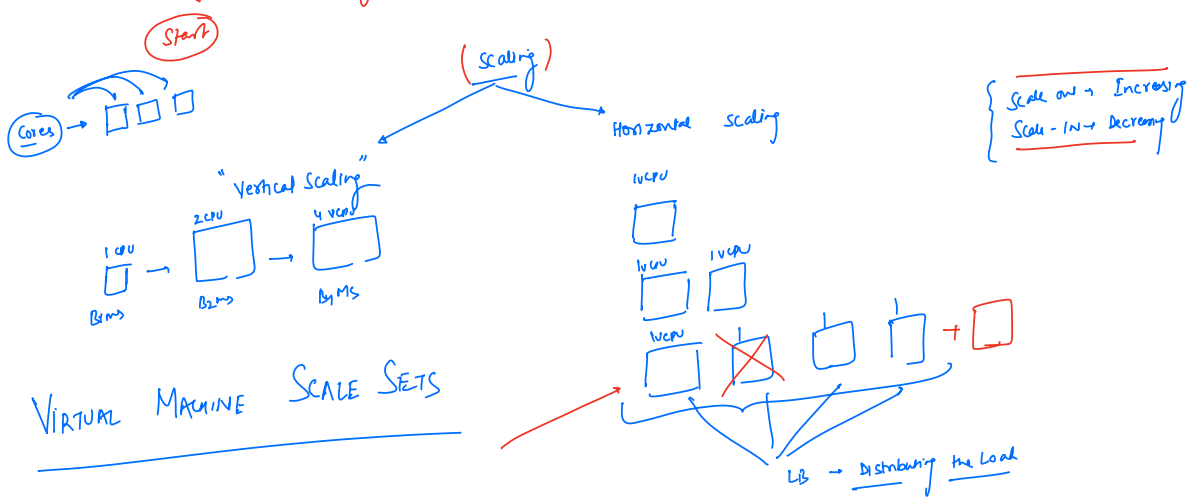
HDD vs SSD

VMtoday
Storage Basics

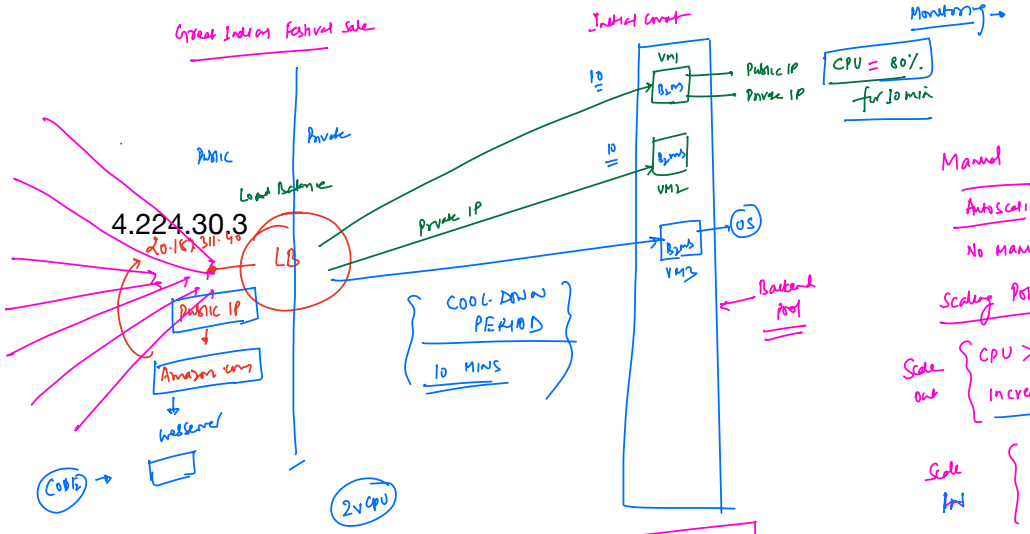
$$IOPS = \frac{1000}{(Latency^{R} + Latency^{S})}$$

Part II





VIRTUAL MACHINE SCALE SETS



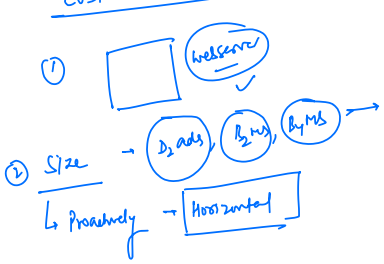
Manual
Autoscaling →
No manual Intervention

Scaling Policy ✓

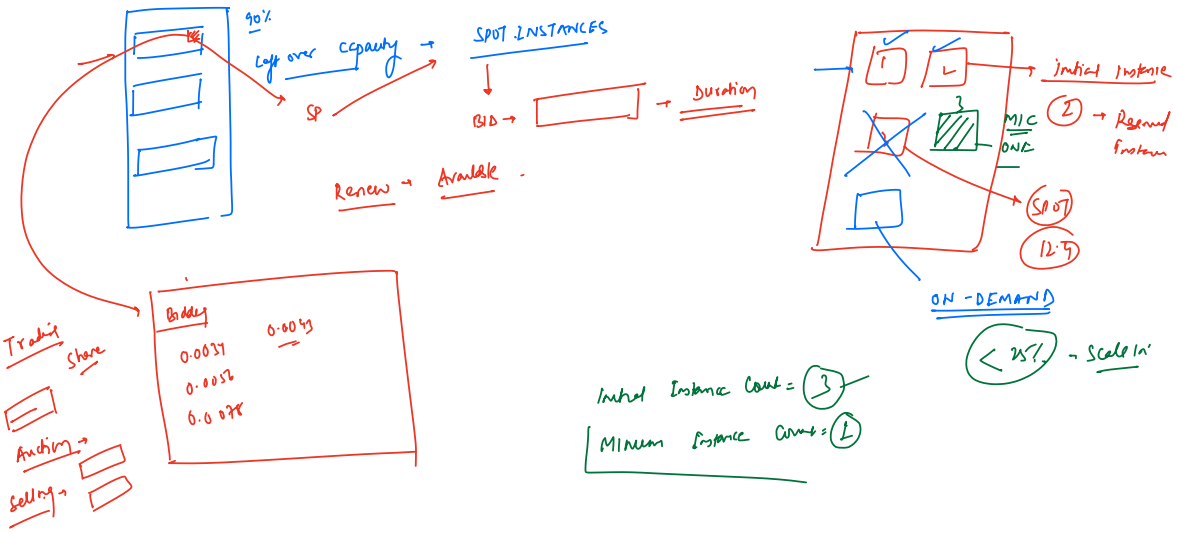
Scale out: CPU > 70% → increase by +1

Scale in: CPU < 25% → decrease by -1

CUSTOM IMAGES



→ Instance → Uniform / Non-Uniform



Initial Instance Count = 3

Minimum Instance Count = 1