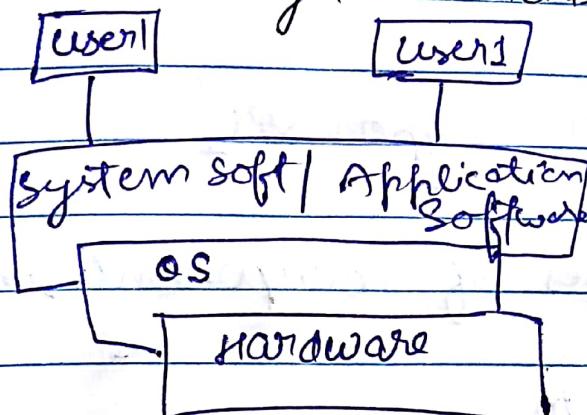


Abstract Environment  
is being given by some softwares for virtualising functionalities of hardware.

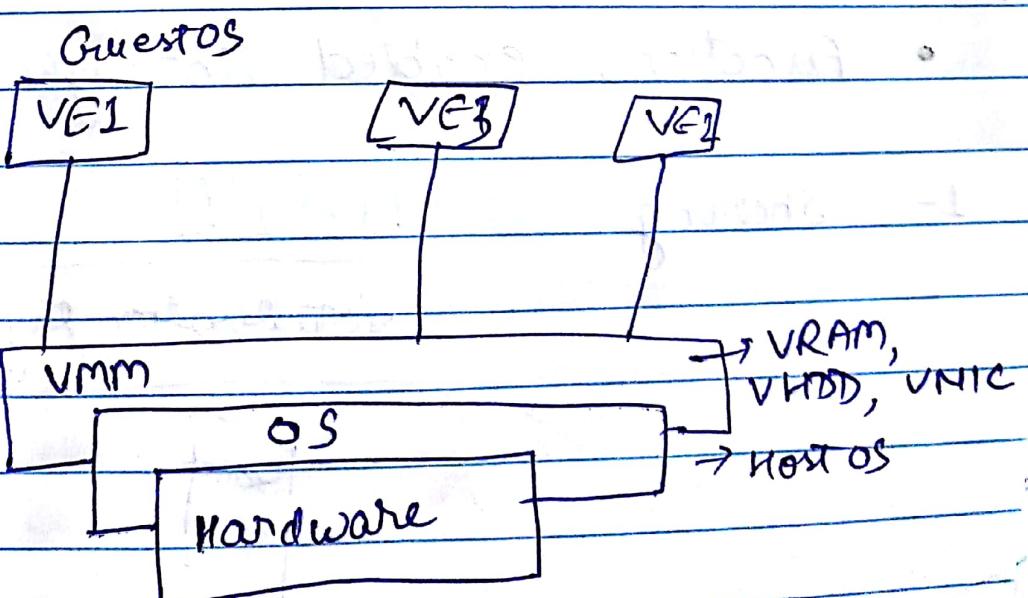
vmm  
VM ware workstation  
VM ware player  
KVM

Citrix Linux open Server

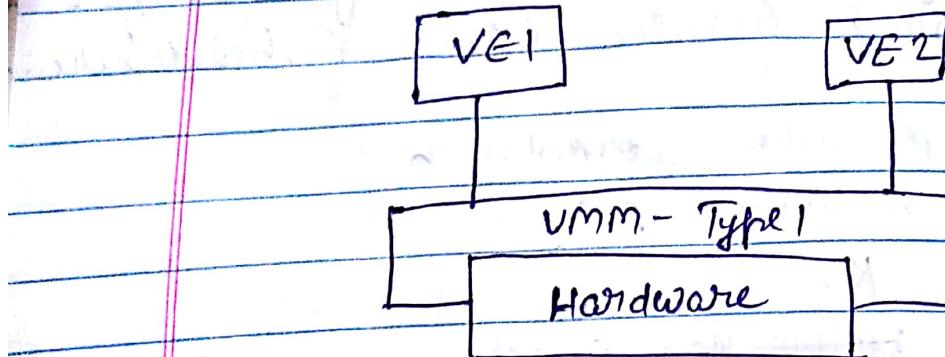
### Traditional System Architecture



### Virtualised System Architecture:



Type - 2 VMM  
Virtualisation Reference Model



Type-1 UVM

[vmm or Hypervisor]

Three types of components in Hypervisor

- ① Host
- ② Guest UVM
- ③ Guest

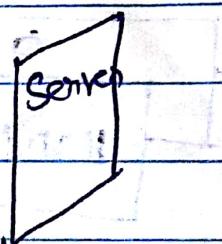
Ans

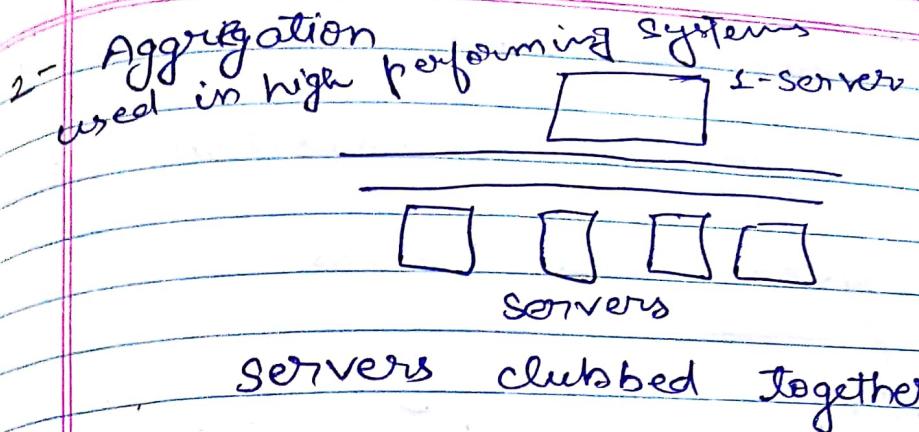
- Functions enabled through virtualisation

1- Sharing

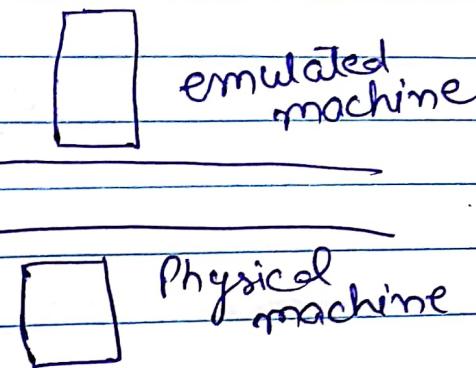


virtualisation layer

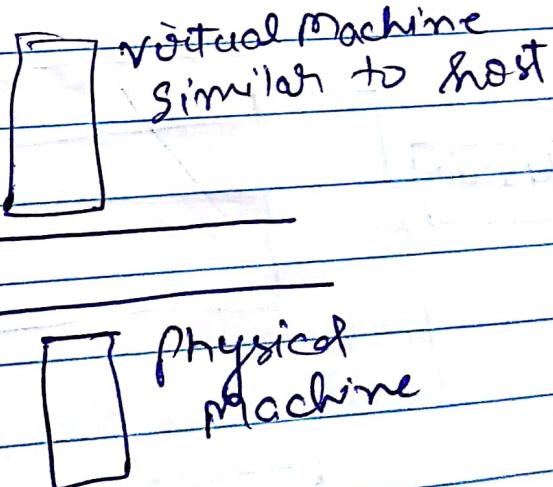




3- Emulation



4- Isolation

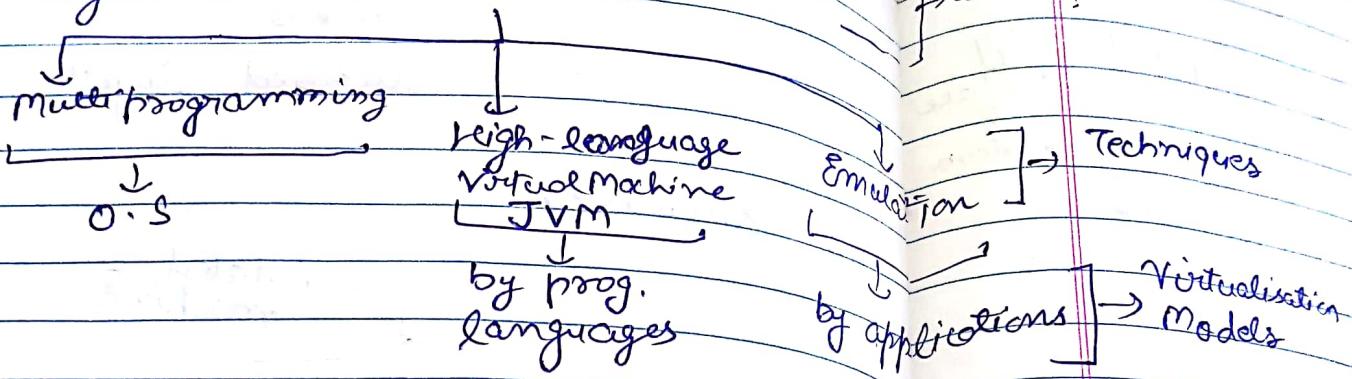


involves copying the machine,  
then isolating the original machine

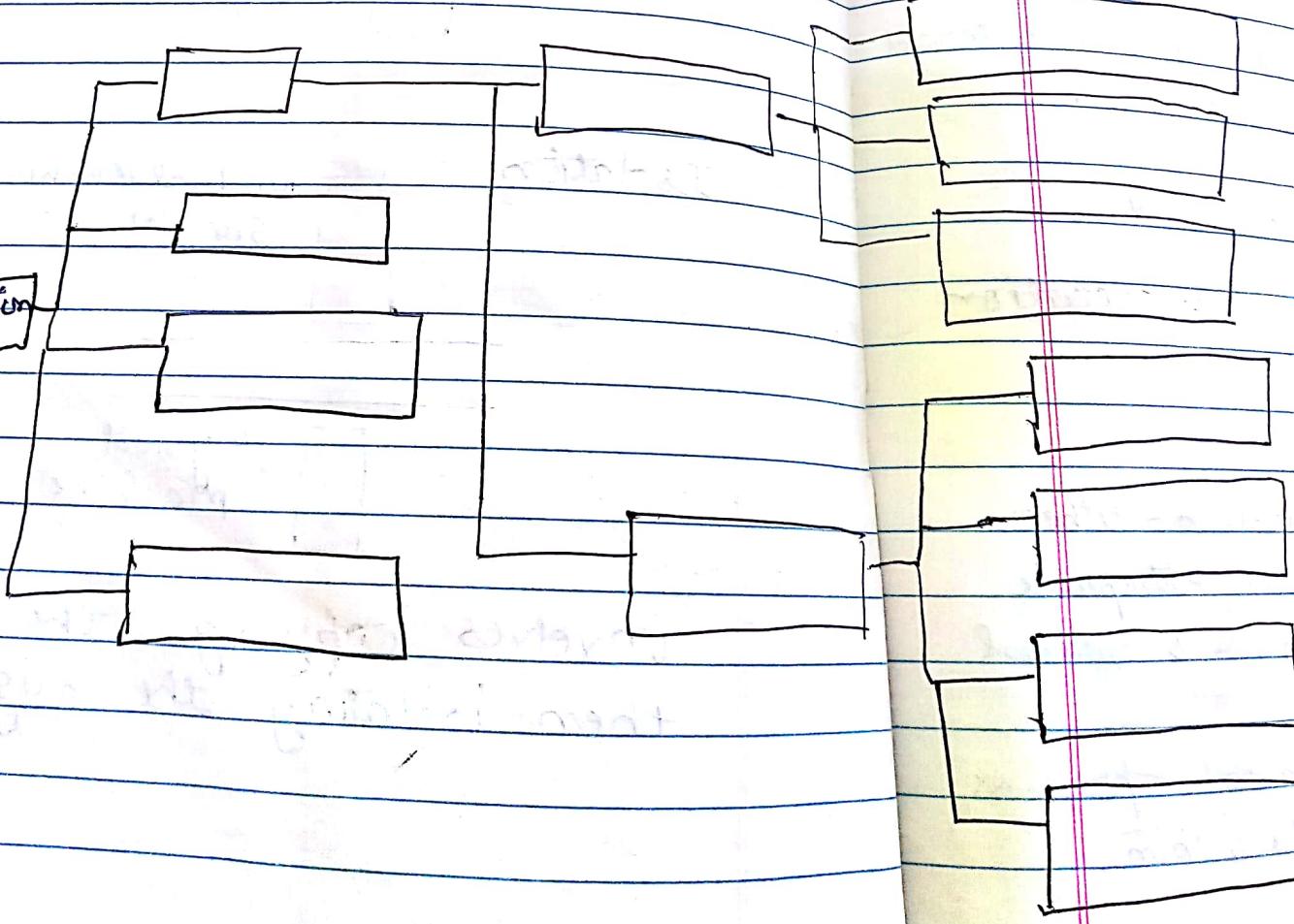
→ (Virtualisation / Abstraction / Managed environment)

- Taxonomy of Virtualisation Technique

### System and Process



Virtualisation



- Date: \_\_\_\_\_  
Page No.: \_\_\_\_\_
- Machine Reference Model: defines interface between hardware and software. Every API is linked with ABI (Application Binary Interface). ABI are system calls.
- System call is caused by Application Binary Interface.

ISA

{ Instruction Set }  
Architecture

C is middle level, it can interact directly with the hardware.

- Multi-tenancy in cloud.  
correlate it with 4 execution environments.

- A tenant is any application - either inside or outside the enterprise that needs its own secure & virtual computing environment.

~~A departmental app that processes sensitive financial data within~~

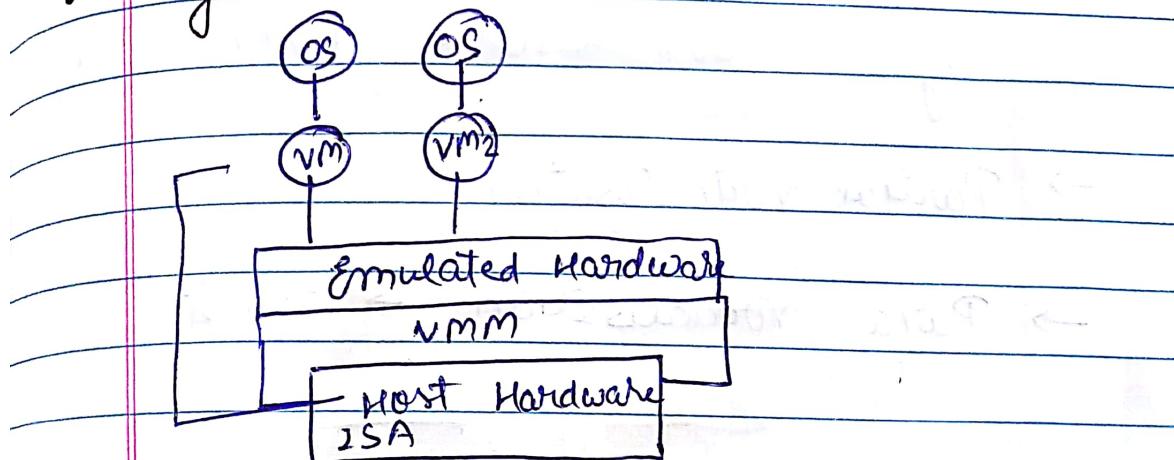
Representation of details

This env. can encompass all or some select layers of enterprise architecture from storage to user interface. All the interactive application or tenants have to be multi-user in nature.

```
graph TD; Application -- API --> Application; Application -- ABI --> ABI; Library -- ABI --> ABI; OS -- ISA --> ISA; Hardware -- ISA --> ISA
```

ISA, for process, register, interrupt management

### System Level Virtualisation



Virtual images are known as swift services.

Two operations in OS:

User mode

System / Supervisory mode

When OS works for user, then it is called as User mode, when OS instructs hardware, it is called System mode.

Type - 2 hypervisor → VM is itself a process.

- Full virtualisation is also known as system virtualisation. (Xen Server)
- Partial virtualisation
- Para virtualisation → Do it

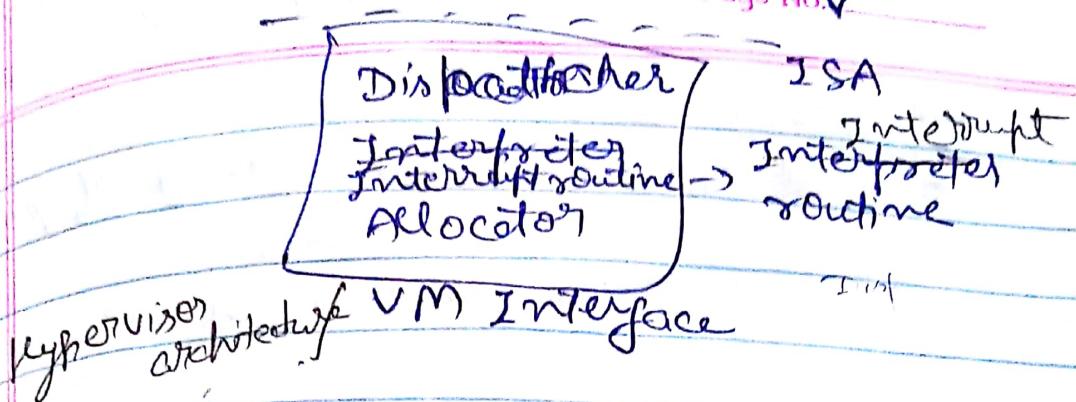
Dispatcher sends instruction to interrupt routine → then to allocator

(69)

ISA virtualises the hardware at the level it is applied.

Date ✓

Page No. ✓



Paravirtualisation is an enhancement of virtualisation technology in which, a guest OS is recompiled prior to installation inside a VM. This capacity minimises overhead & optimizes system perf. by supporting the use of VMs that would be underutilised in conventional or full virtualisation.

Trapping means handling unexpected or unallowable conditions, can be time consuming, but paravirtualisation eliminates the need of trap.

Paravirtualisation provides an interface to VMs that are similar to their underlying hardware

⑨ //

Dispatcher gives control of CPU to process selected by short term scheduler

19 Sept.

Scanned converter  
→ isolation  
Date. \_\_\_\_\_  
Page No. \_\_\_\_\_

Not in taxonomy, but it exists.

### ① Server Virtualisation -

- benefit → safety, security of physical machine
- prevents overall shutdown (accidental)
- sharing, reliability

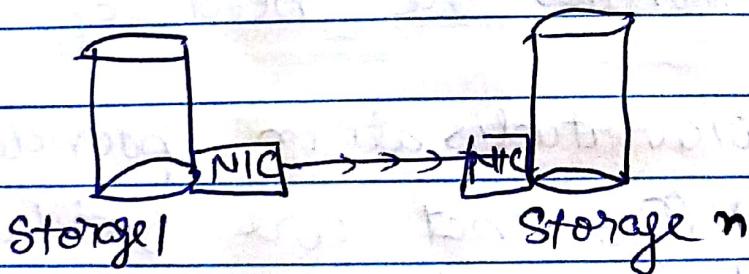
### ② Desktop Virtualisation -

thin clients  
process level virtualisation as desktop requests for an application

### ③ Storage Virtualisation -

Two types: SAN

RAID



Started with NAS → Network Attached Storage

no disaster recovery in NAS

④ Network Virtualisation -

Virtual NICs, Loop back adapter  
virtual LANs, VPN,

NFV → Network Function Virtualisation  
(IP, Mac Address etc.  
can be configured)

[SDNs → Software Defined Network]

A cloud is a type of parallel and distributed system consisting of a collection of interconnected and presented as one or more unifying computing resources based on SLA bet'n user and server providers.

NIST - Model for enabling ubiquitous convenient, on-demand network access to shared pool of configurable computing resources. (Ex - network servers, storage, application and services that can be rapidly provisioned and released with minimal management.)

"

ter converts  
→ isolates

physical

shutdown  
incident)  
ity

desktop

hed

IAS

## Drawbacks of Virtualisation

Date \_\_\_\_\_  
Page No. \_\_\_\_\_

- Security
  - Can't connect without internet
  - System performance degradation
- 1 - Scalability
  - 2 - Dynamic Provisioning
  - 3 - Load Balancing
  - 4 - Multi-tenancy

## Web 2.0 ?

Date. \_\_\_\_\_

Page No. \_\_\_\_\_

→ Delivery of Cloud :-

IaaS - Instruction as a Server (PaaS)

PaaS - Platform AAS

SaaS - Software AAS

Microsoft Azure - PaaS Programming  
Amazon EC2 - IaaS → for virtual machine.

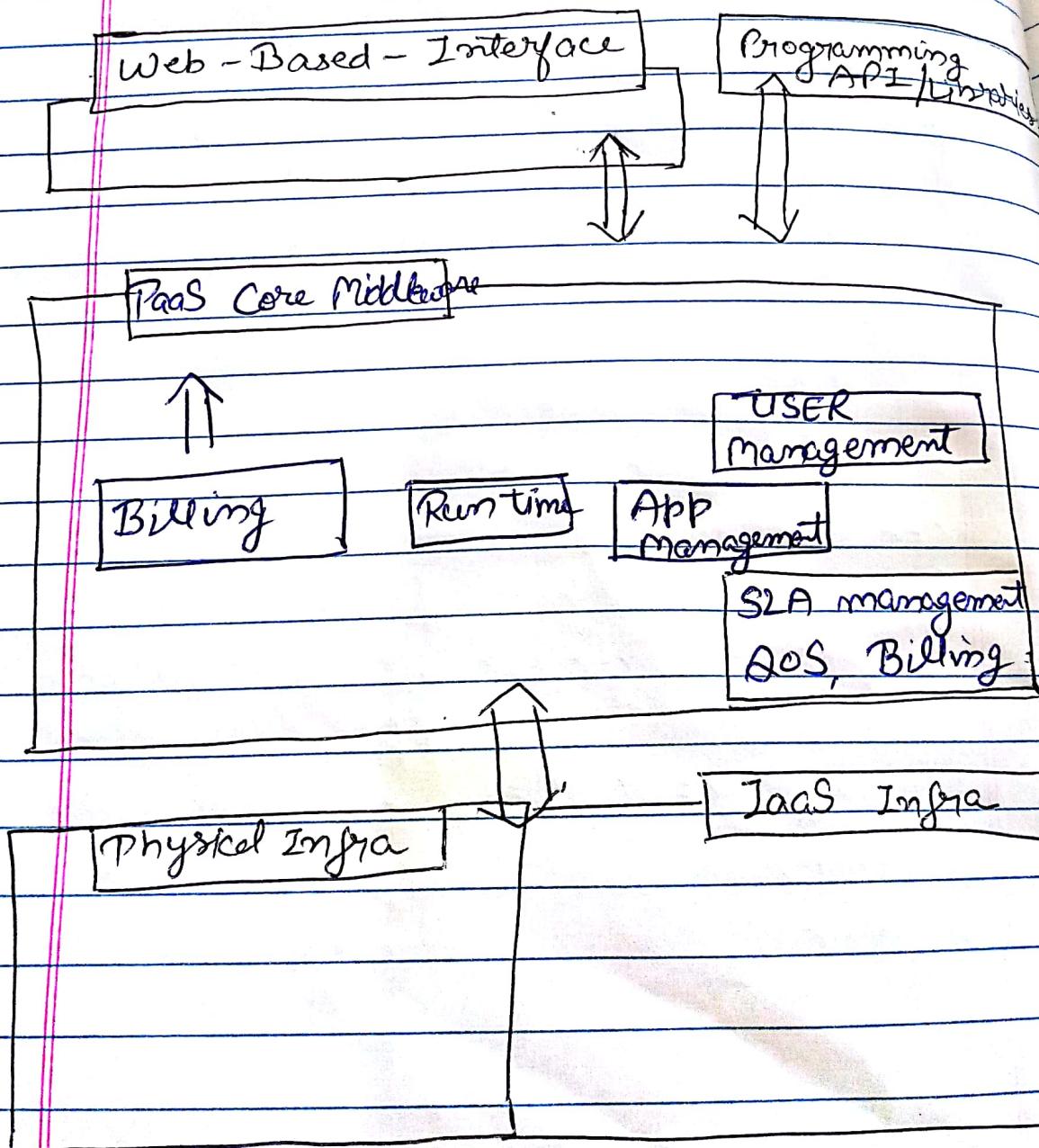
IaaS

PaaS

SaaS

Distr  
categ

→ JEE



IaaS - Open Stack, Amazon EC2

PaaS - MS Azure, Google App Engine, Heroku, online compilers, Aneka

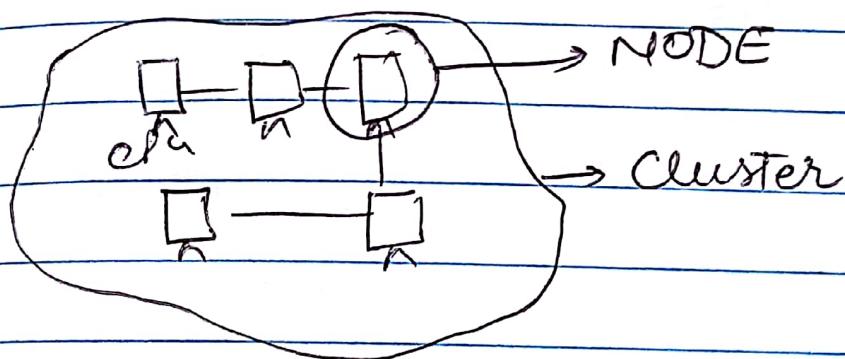
SaaS - Google Apps, Salesforce

coding platforms

Distributed System - Comes under category of multi-processing systems.

→ history of cloud computing  
① Grid computing  
→ not successful because of scalability and availability, security

## ii) Cluster Computing -



One node whose services are higher, is known as master node or cluster head while other nodes are known as slave nodes.

→ When master node goes down, all nodes go down.  
Used in Hadoop.