Q1. Explain mobile cloud computing with neat diagram.

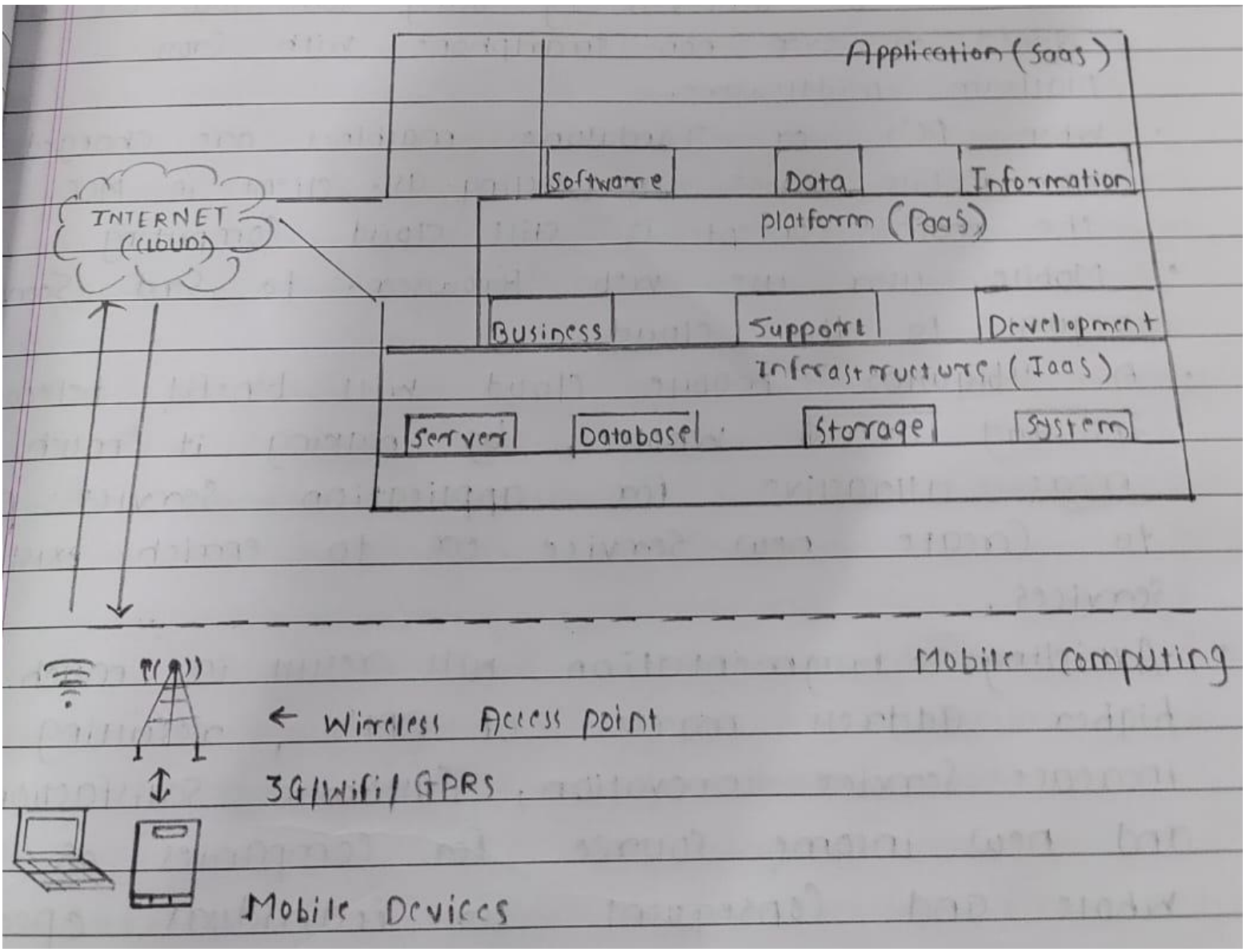
Ans. ~~There are two potential issues with the number of mobile devices (think~~

→ Mobile cloud computing

- At its simplest, it refers to an architecture where both the data storage and data processing happens outside of the mobile device.
- Mobile cloud applications move the computing power and data storage away from the mobile devices and into powerful and centralized computing platforms located in clouds, which are then accessed over the wireless connection based on a thin native client.
- Cloud computing exists when tasks and data are kept on individual devices. Applications run on a remote server and then sent to the client.
- Here the mobile devices are connected to the mobile networks through the base stations.
- They will establish and control the connections (air interface) and functional interfaces between

PTO

(for updated diagram)


Application (Saas)
Software
Data
Information
INTERNET
(CLOUD)
platform (Paas)
Business
Support
Development
Infrastructure (Iaas)
Server
Database
Storage
System
Mobile Computing
Wireless Access point
3G/Wifi/GPRS
Mobile Devices

Q2. Compare

1) Cloud computing vs ~~Grid~~ Jungle computing.

Ans.

Cloud computing	Jungle computing
• A distributed computing model offering on-demand resources (compute, storage, etc) over the internet.	• A distributed paradigm that integrates and utilizes a variety of heterogenous resources
• Resource type :- many cloud-based (public, private or hybrid).	• Resource type :- A mix of clouds, grids, clusters, etc.
• Scalable on demand, depending on cloud provider services.	• Scalable but complicated by heterogeneity and the need to manage diverse platforms.
• Applications run on a cloud-native environment	• Applications often need recompilation or re-writing to adapt to each resource.
• Pay as you go, usually requires a credit card.	• Can include force resources (eg: volunteer computing).

2) Distributed vs edge computing

Ans.

Distributed ✓ Computing cloud	Edge computing
1. Cost of operations and maintenance are higher.	• Cost of operations and maintenance are lower.

• More expensive than edge computing, takes more time to scale.	• Inexpensive and quick, as the idea is to enhance computing capability of the devices.
• Data processing location is at servers.	• Data processing location is on the device itself.
• Computing capability is high	• Computing capability is low.
• Response time faster than Client-Server architecture.	• Response time faster than cloud computing architecture.

Q3. Explain in detail Docker and Kubernetes.

Ans.

→ Docker:-

• Docker is a tool that promises to easily encapsulate the process of creating a deployable artifact for any application, deploying it at a scale into any environment, and streamlining the workflow and responsiveness of agile software organizations.

• Docker consists of a few components:-

1- A container runtime (called dockerd)

2- A container image builder (BuildKit), and

3- A CLI that is used to work with the builder, containers, and the engine (called docker).

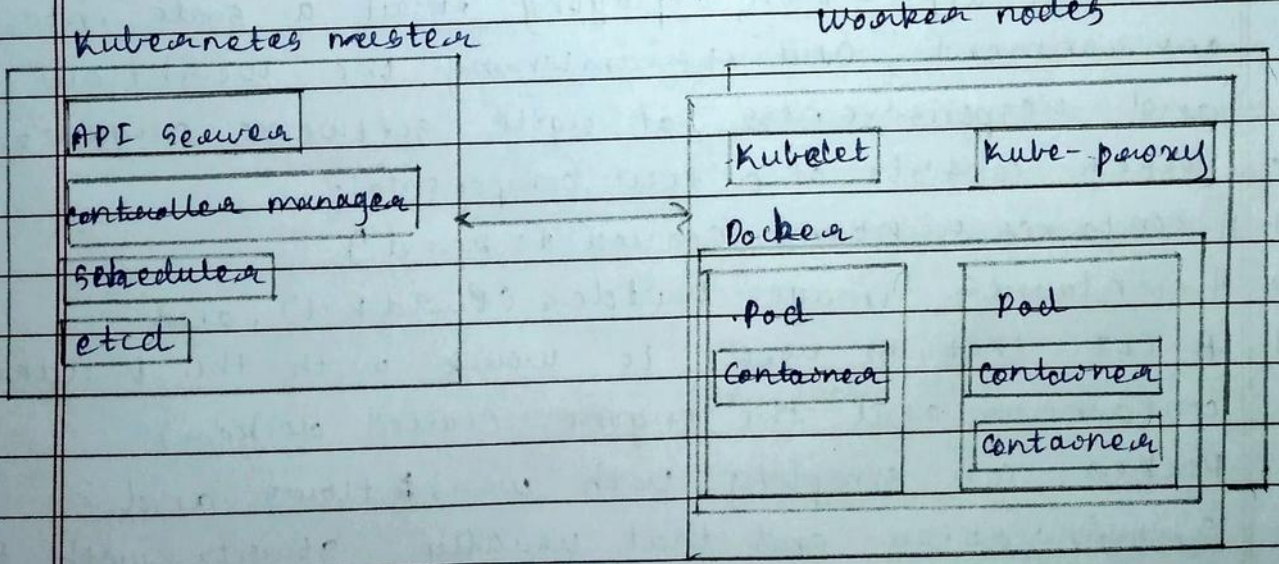
• Docker can simplify both workflows and communication and that usually starts with the

deployment story.

→ Kubernetes

- It is an open source container management platform that unifies a cluster of machines onto a single pool of compute resources.
- With kubernetes, you organize your applications on groups of containers, which it runs using the Docker Engine, taking care of keeping your application running as you request.
- Kubernetes is a master-slave communication model where there is at least one master and usually several worker nodes.
- The master has 3 components and a data store:-

1. API server - exposes the kubernetes API for controlling the cluster.
2. Controller manager :- responsible for watching the clusters objects and resources
3. Scheduler - responsible for scheduling compute requests on the cluster.
4. etcd - it is used to hold the cluster data.



Q4. Write a case study of IOT and cloud on automobile.

Ans. → Remote Vehicle ~~Prog~~ Diagnostics :-

- Remote vehicle Diagnostics solution monitors the health of the vehicle, determines the root cause of the problem / failure and provides real time information of vehicle parameters to assess its performance against benchmarks.
- The solution monitors the health of the electric vehicle, commercial vehicle, utility vehicle and provides insight to field ~~of~~ support staff to determine the root cause of the problem.

→ Iot components :-

1. Sensor readings and data-collection :
- Sensors on vehicle monitors parameters like performance, faults and system health.

2. ii. Vehicle components
contains hardware like :
i) Microprocessors : Used for processing & transmissio
ii) Data storage : Used for storage & diagnosis
iii) GPS modules etc : For Emergency & onsite assistance

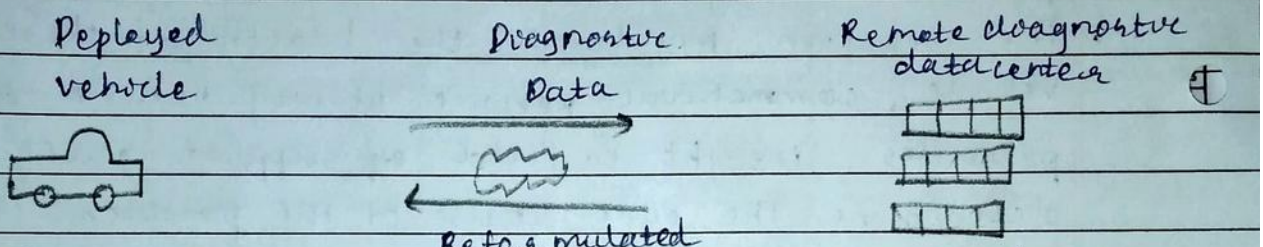
3. Data Transmission to Centered systems
4. On-board connectivity.

→ Cloud computing components

1. Real time data processing :
- Processes sensor data to detect problems and failures.
2. Remote diagnostic center :
- Cloud-based centers analyze data and assist users on predicting issues.
3. Remote commands :
- Supervision commands can issue commands back

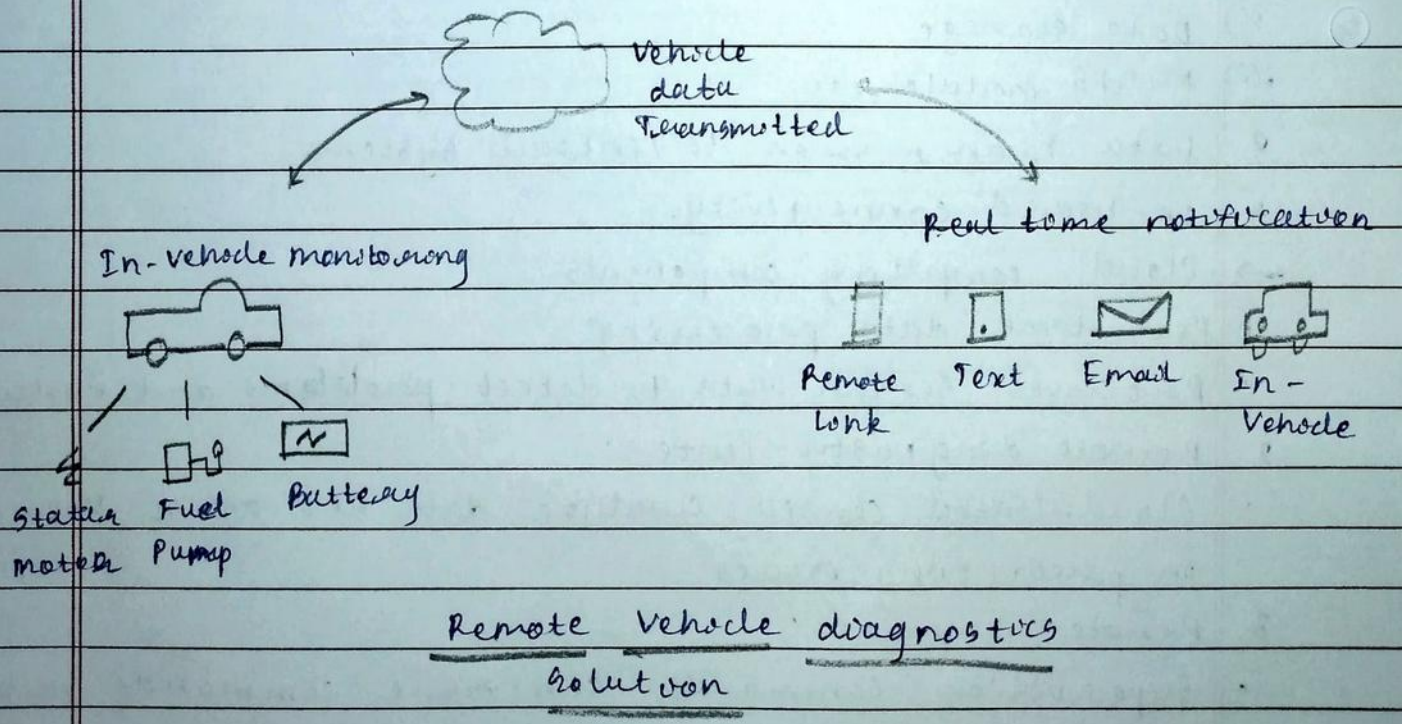
to the vehicle based on Analysis.

- In vehicle, sensors connect to the vehicle terminal which is responsible for collecting, storing, processing and reporting information and responding to commands from supervision platform.



- Fault detection and isolation
- Fault tolerant controllers
- Remote code update
- Runtime testing

- Data analysis
- Code reformulation
- Verification profile generation
- Remote recalls management



Remote Vehicle diagnostics solution