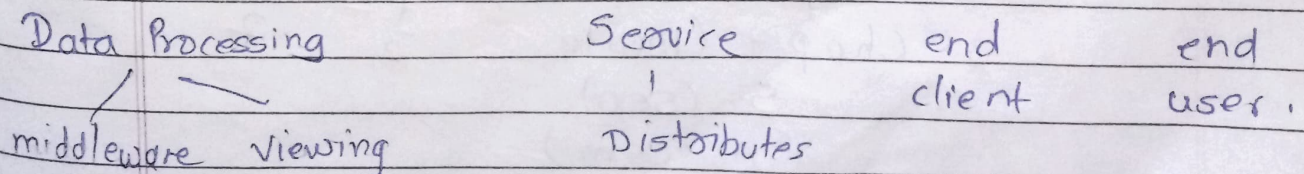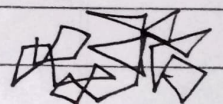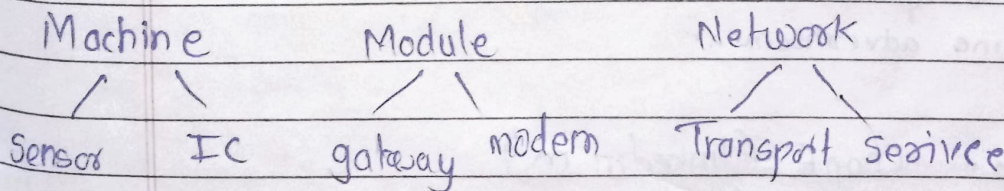| M2M	IOT
① Point to Point communication usually embedded with nlw	① Device communicate using nlw incorporating with varying protocols
② Many device use cellular or wired nlw	② Data delivery is relayed through a middle layer hosted in the cloud.
③ Device do not necessary rely on an internet connection	③ In the majority of cases devices required on active internet connection
④ Limited integration options as devices must have corresponding communication standard	④ unlimited integration options but required a solution that can managed all of the communication

M2M Value Chain

Smart MIC (objects)

Machine   Module   Network

/ \   / \   / \

Sensor   IC   gateway   modem   Transport   Service

Data Processing   Service   end   end

/ ~ | client   user.

middleware   viewing   Distributes

What is agent?

- In general, an entity that interacts with its environments to do the right things
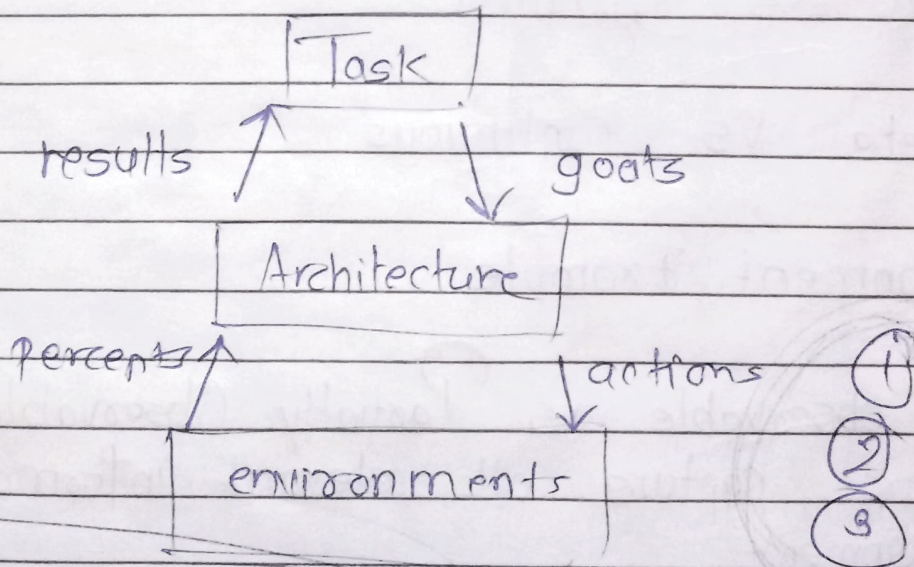 1. Perception through sensors
  2. Actions through effectors or actuators

- Intelligent agents - view provides framework to integrate the many subareas of AI

- The right action is the one that will cause the agent to be most successful

- An agent is autonomous if its behaviour is determined by its own experience

```
                    ┌──────┐
                    │ Task │
                    └──────┘
          results ↗          ↘ goals
                  ┌──────────────┐
                  │ Architecture │
                  └──────────────┘
        percepts ↗              ↘ actions      ①
                  ┌──────────────┐              ②
                  │ environments │              ③
                  └──────────────┘
```
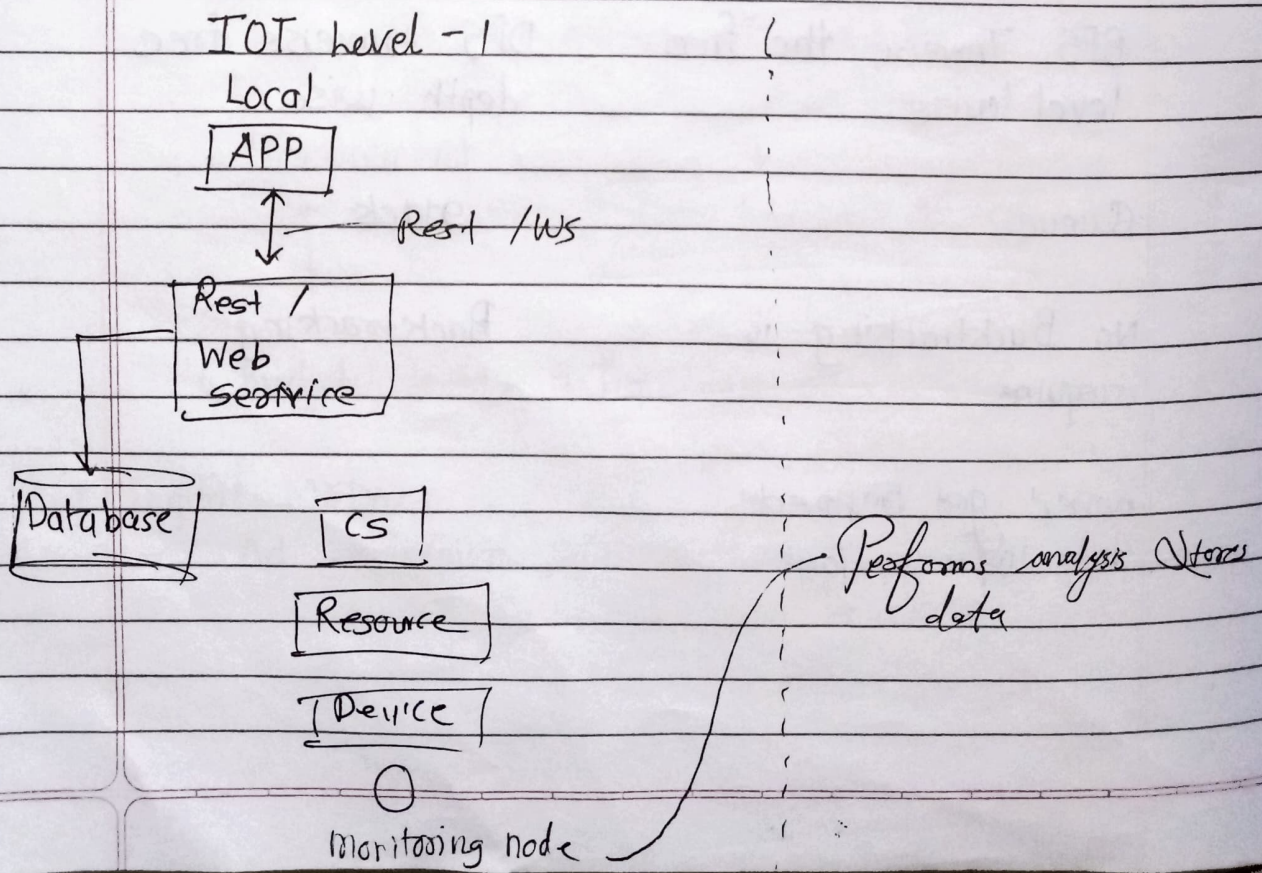
* <u>Devices</u> :- An IoT device all identification remote sensing, actuating and remote monitoring capabilities

* <u>Resource</u> :- Resources are software components on IoT Devices for accessing processing and storing sensor information or controlling <u>actuators</u> connected to the Device

* <u>Controller Service</u> :- CS is a native service that runs on the device and interacts with the web service

* <u>Database</u> = web service

* Analysis component

IOT Level - 1
Local

```
┌──────┐
│ APP  │
└──────┘
   ↕ ── Rest / WS
┌──────────┐
│ Rest /   │
│ Web      │
│ Service  │
└──────────┘
```

┌──────────┐
│ Database │
└──────────┘

┌────┐
│ CS │
└────┘

┌──────────┐
│ Resource │
└──────────┘

┌────────┐
│ Device │
└────────┘

◯
Monitoring node
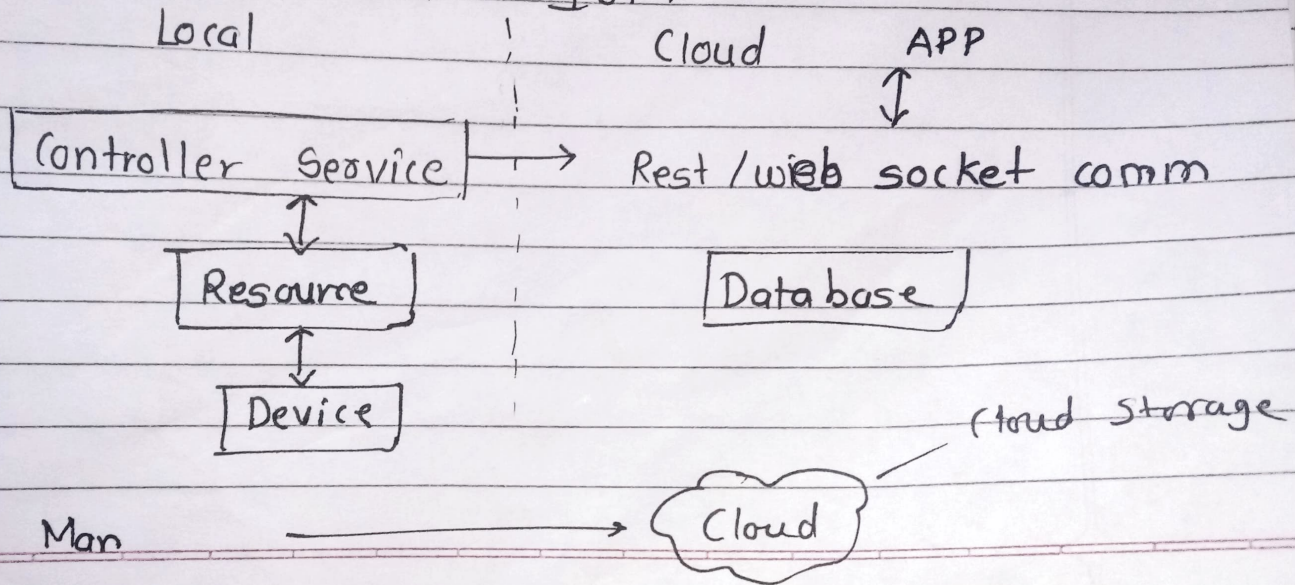
→ Performs analysis & stores data

SCADA – Supervisory Control and data acquisation

It is a system of software and H/w elements that allows industrial organization too

- Control industrial process locally or remote location
- Monitor → gather and process real-time data
- Direct interact with devices such as sensors, value, pumps, motors and more

IoT

Imp What are different challenge of IoT?

Imp Explain Level 2 and 3 IoT?

Local	Cloud	APP

Controller Service $\longrightarrow$ Rest/web socket comm

$\updownarrow$ (APP)

Resource

$\updownarrow$

Device

Database

Man $\longrightarrow$ Cloud

Cloud Storage

✭ ZigBee - IEEE

```
                                                    ┌─ PIR
                                              vouth  GND   P
                                                │     │    │
        ┌───────────────────┬──────────────┬───┘
   ┌────┤           GND  5V  2│              │                │
   │ Ardiuno                 │              │                │
   │                         │              │                │
   └─────────────────────────┴──────────────┘                └─
```
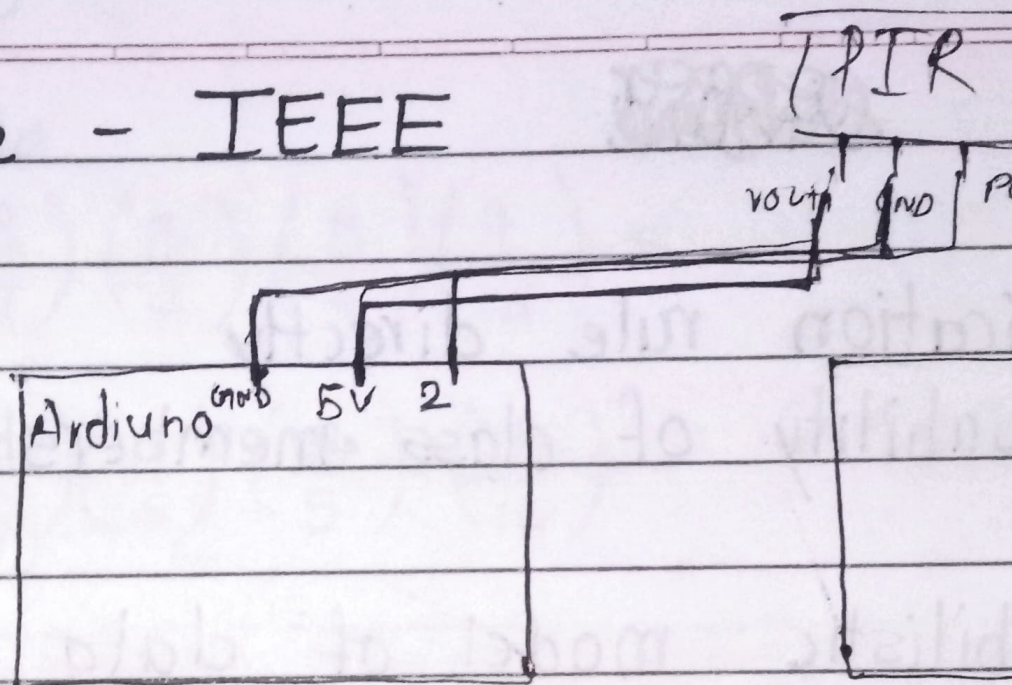
Home Automation   Case study.

Overview

Component

Application

IoT Level-3

Local | **Cloud**

App

REST/WebSocket Communication

REST/WebSocket Communication

REST/WebSocket Communication

Controller Service

Resource

Device

Database

Monitoring Node

Cloud Storage & Analysis

IoT Level-2

Local   **Cloud**

App

REST/WebSocket
Communication

REST/WebSocket
Communication

Controller Service

REST/WebSocket
Services

Resource

Device

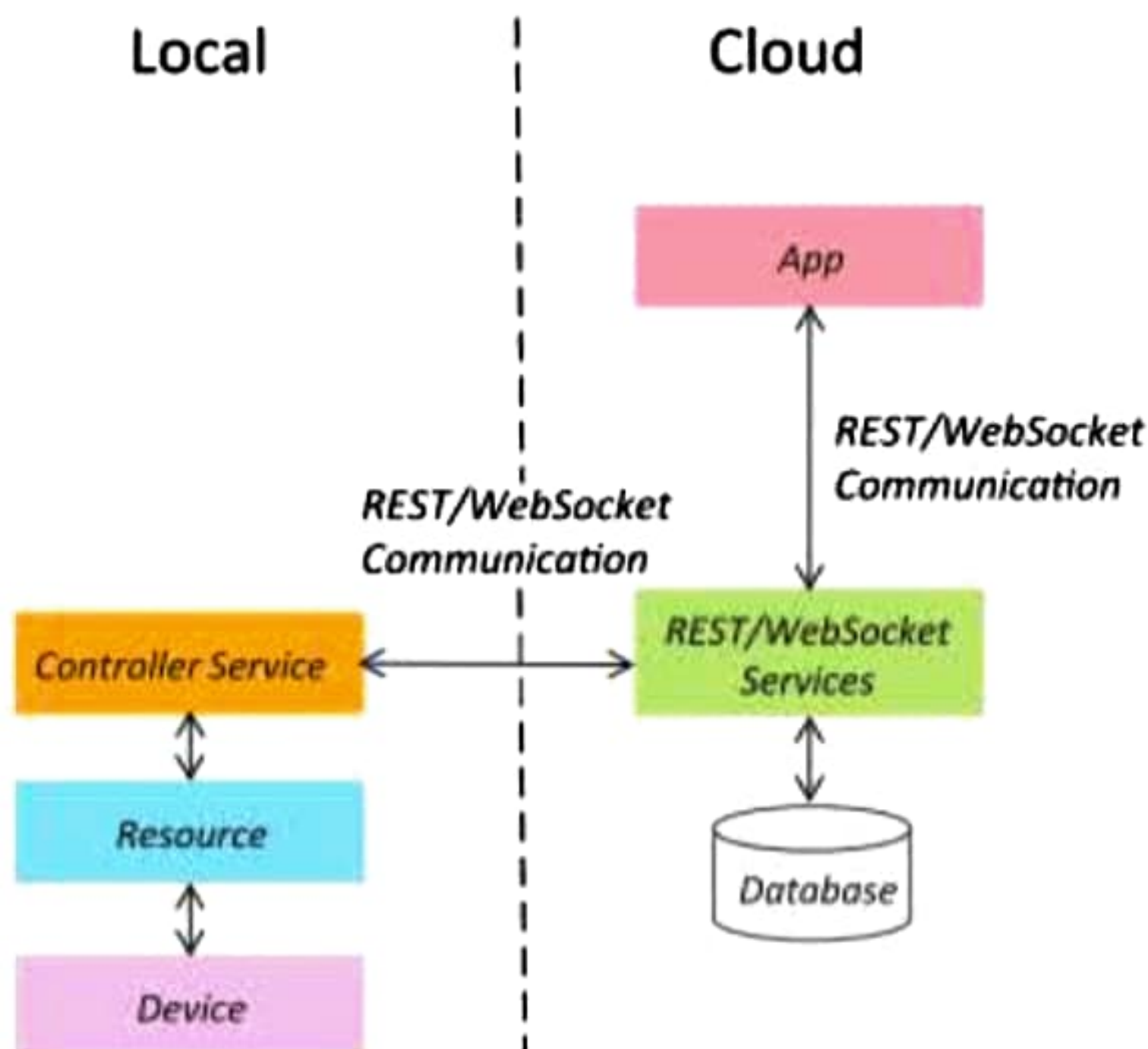Database
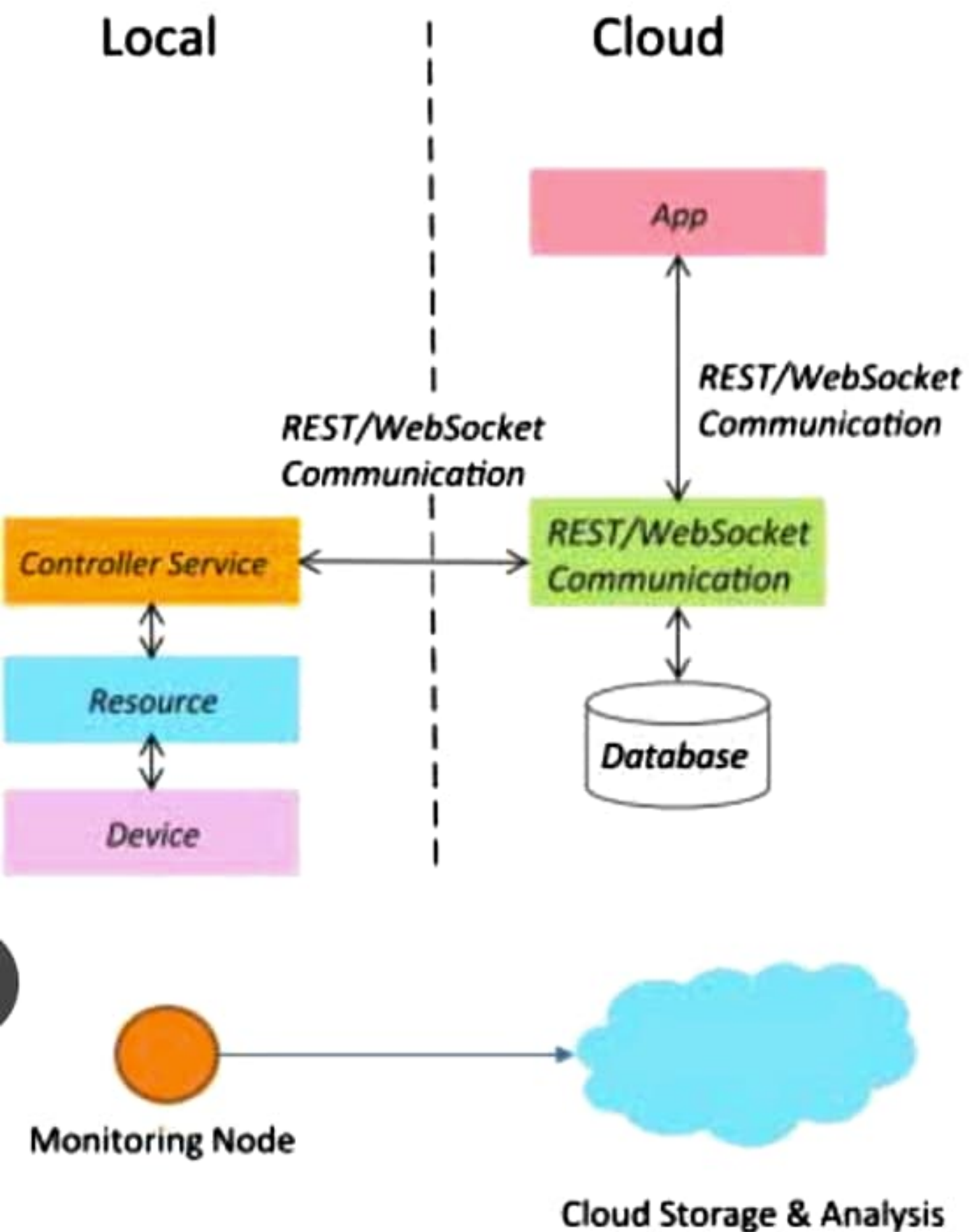
Monitoring Node
performs analysis

Cloud Storage