Submission Date:
01/03/2024
Friday.

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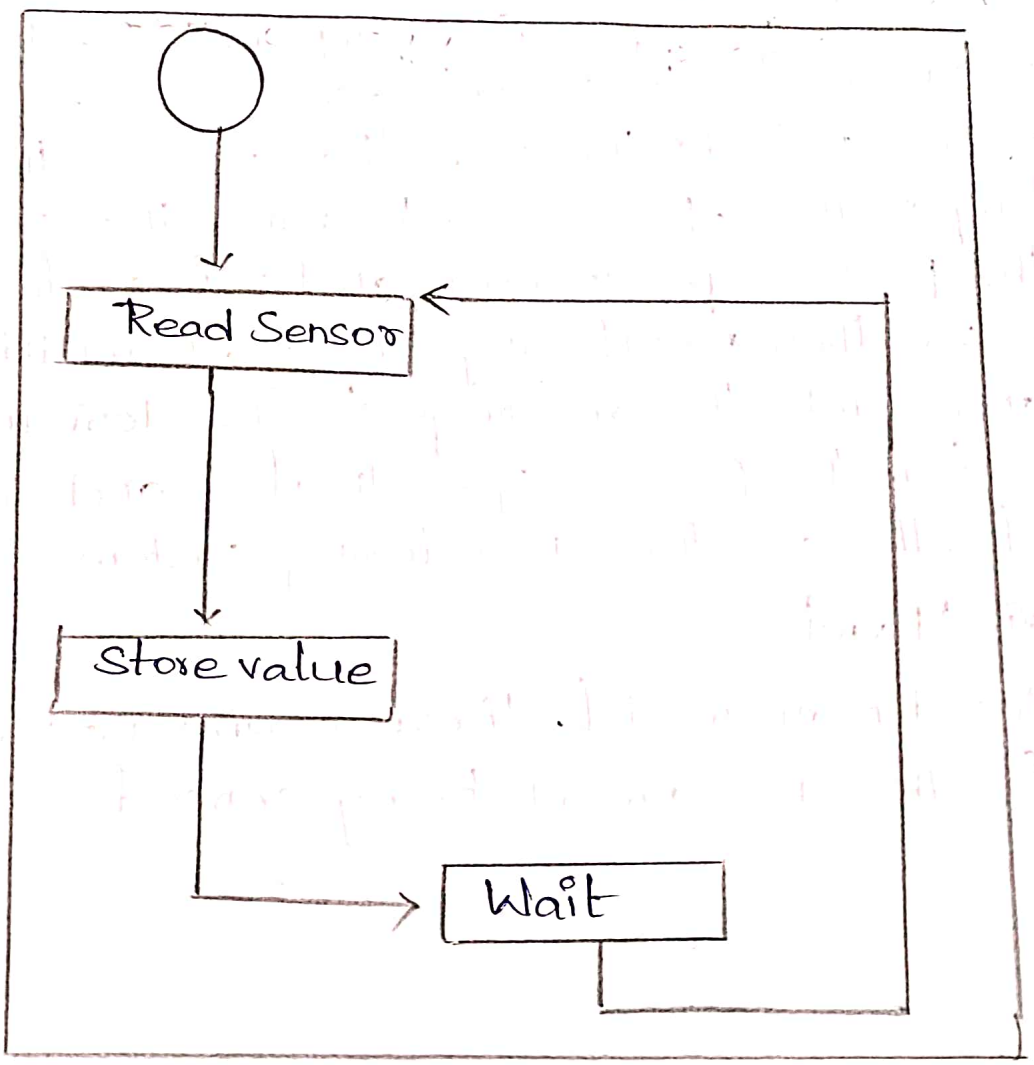
"Internet of Things"
Assignment-1

Case Study: Weather Monitoring System.

1. Purpose and Requirements:.

* The purpose of the weather monitoring system is to collect data on environmental conditions such as temperature, pressure, humidity and light in an area using multiple end nodes.
* The end nodes send the data to the cloud where the data is aggregated and analyzed.

2. Process Specification



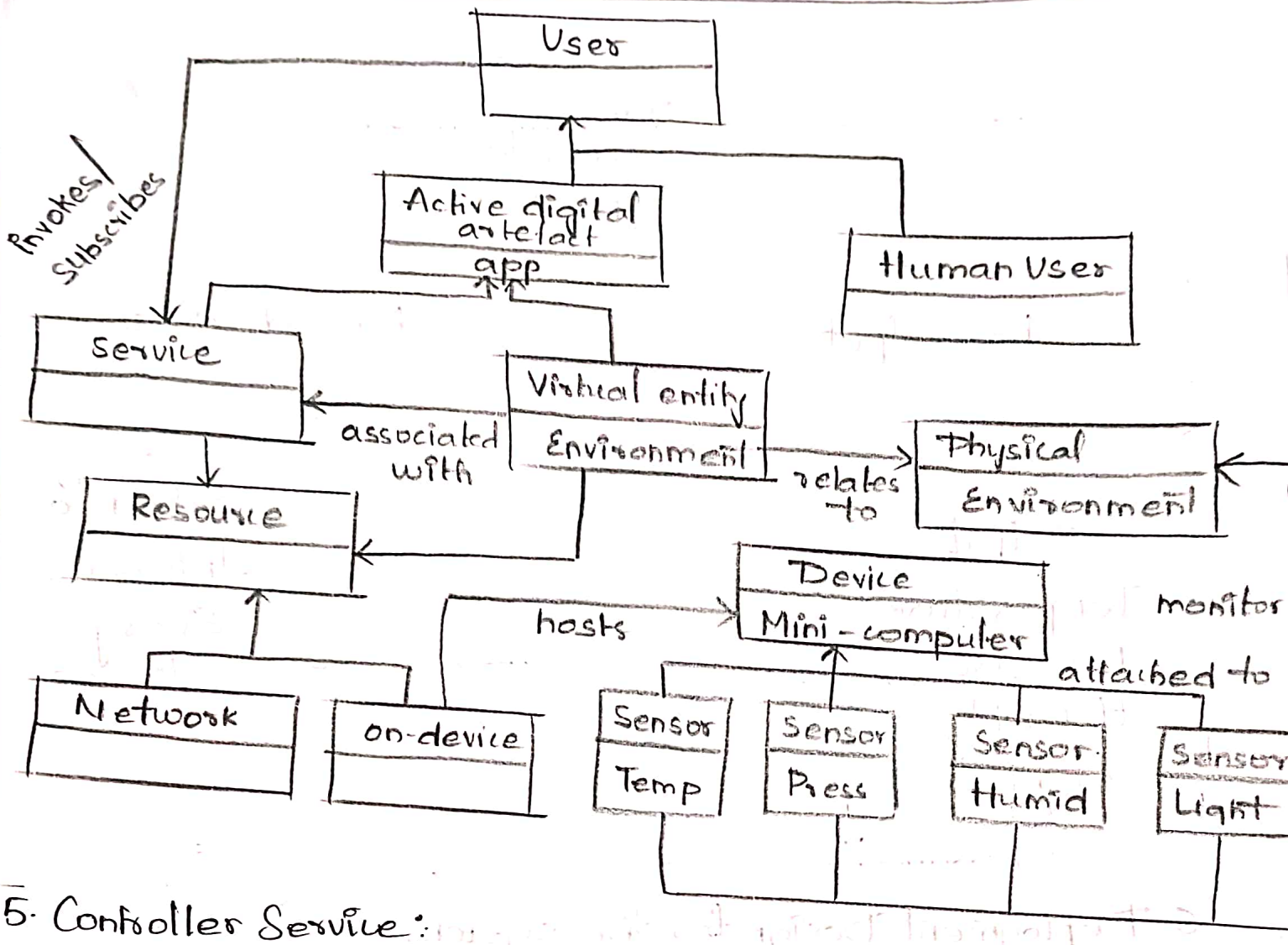
* The diagram shows the process specification for the weather monitoring system.
* The process specification shows that the sensors are read after fixed intervals and the sensor measurements are stored.

3. Domain Model Specification

* In this domain model the physical entity is the environment which is being monitored.
* there is a virtual entity for the environment.
* Devices include temperature sensor, pressure sensor, humidity sensor, light sensor and single-board mini computer.
* Resources are software components which can be either on-device or network-resources.
* Services include the controller service that monitors the temperature, pressure deriving the services from the process specification and information model for the weather monitoring system, humidity and light and sends the readings to the deriving the services from the process specification and information model for the weather monitoring system.

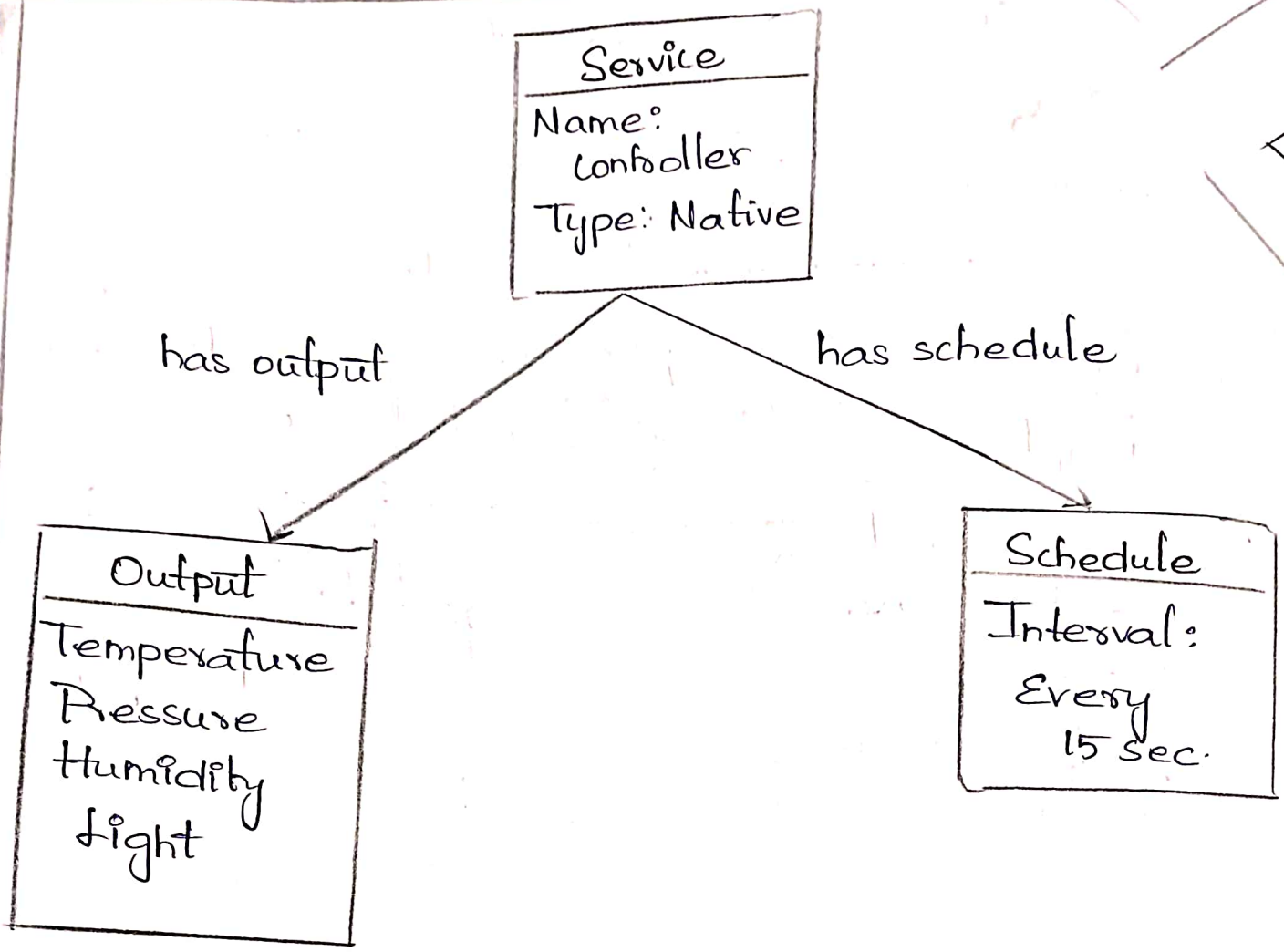
4. Domain Model

* In this domain model, there is one virtual entity for the environment being sensed.



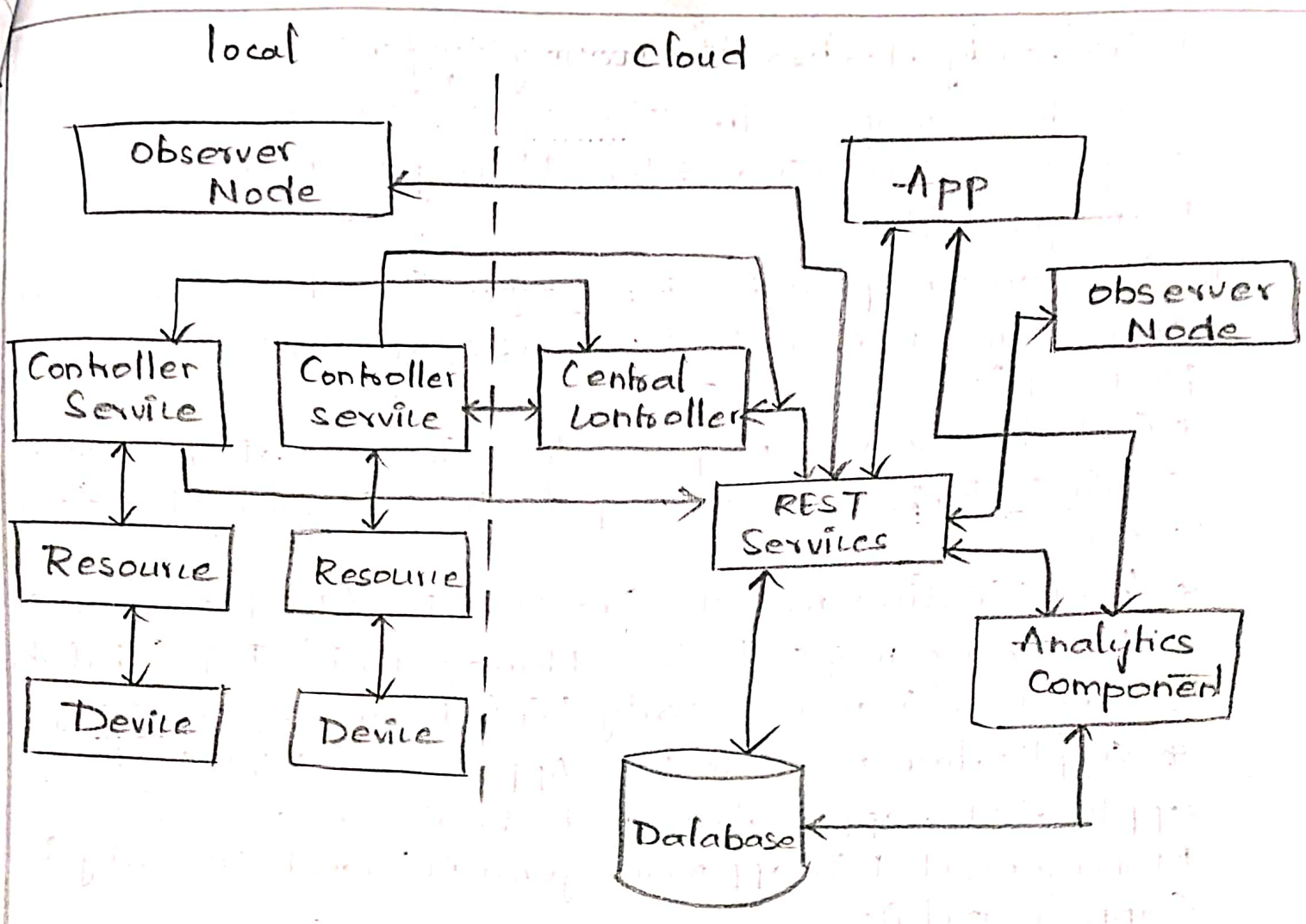
5. Controller Service:

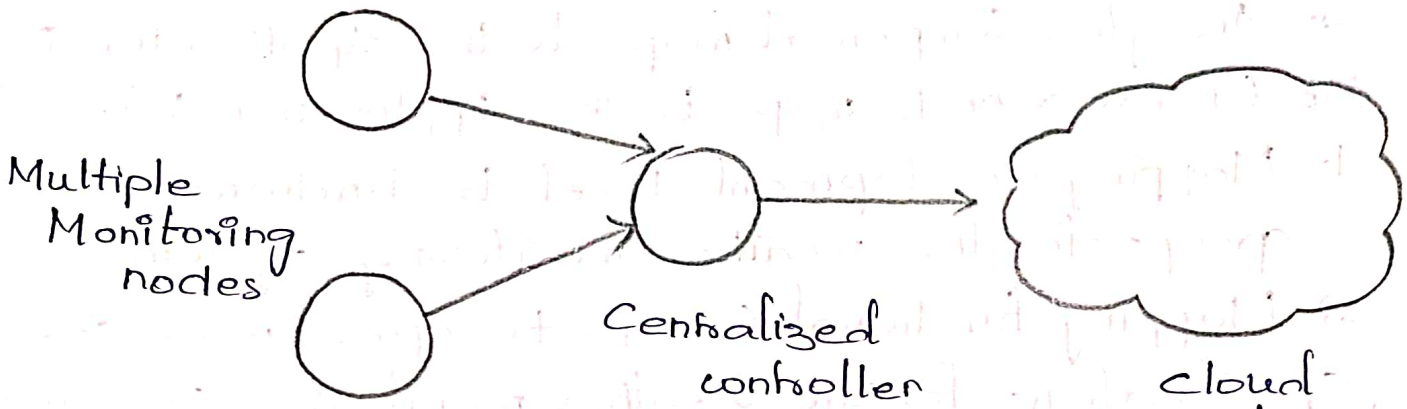
* The controller service runs as a native service on the device and monitors temperature, pressure, humidity and light once every 15 seconds.
* The controller services calls the REST service to stores these measurements in the cloud.



6. Deployment Design for the system:-

* The system consists of multiple nodes placed in different locations for monitoring temperature, humidity and pressure in an area.
* The endnodes are equipped with various sensors.
* The endnodes send the data to the cloud and the data is stored in database.
* The analysis of data is done in the cloud to aggregate the data and make predictions.





Deployment design for system.

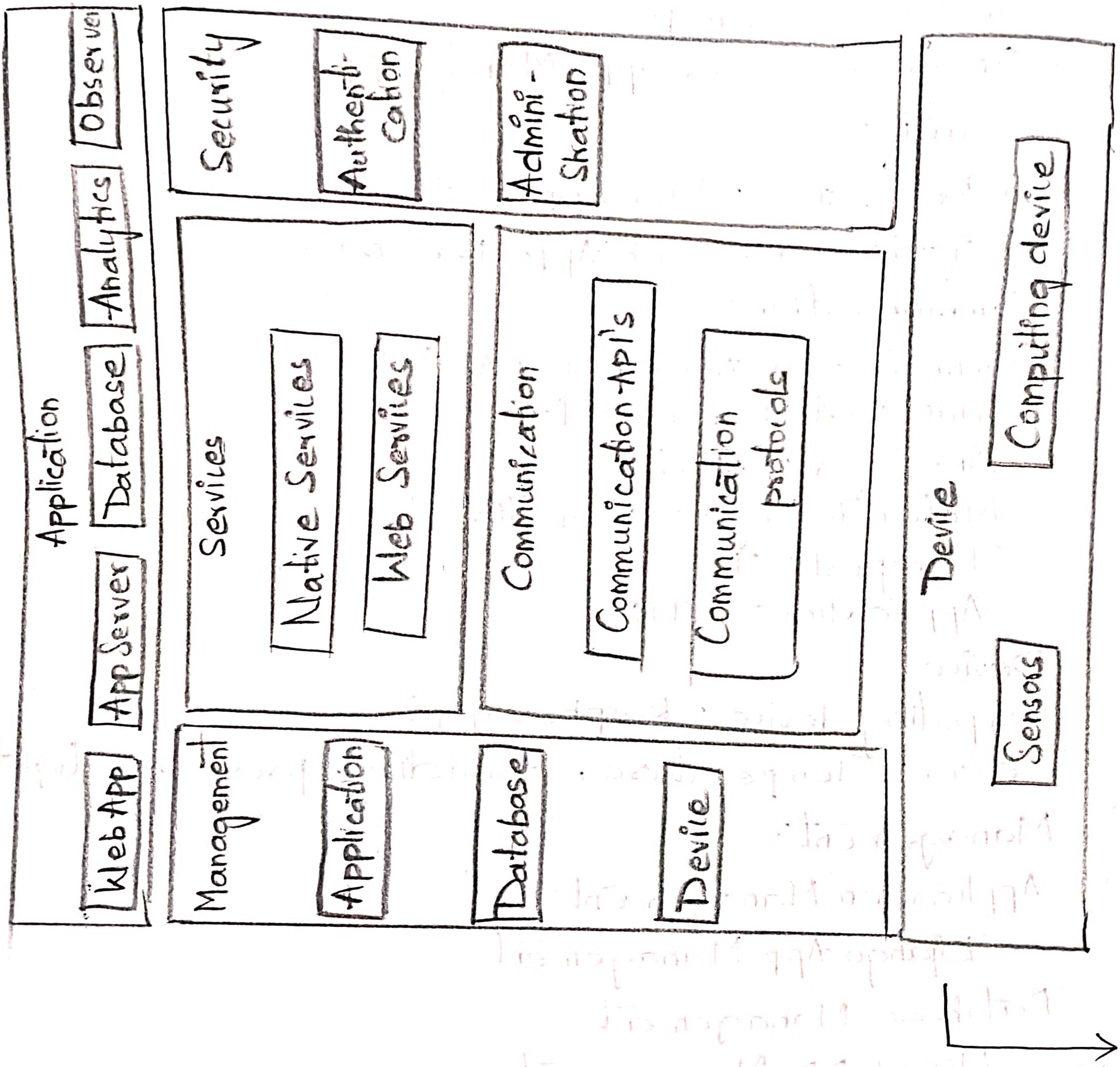
7. Case Study Weather Monitoring System:

* IOT devile maps to the Devile FG (sensors, and computing devileS) and the Management FG (devile management).
* Resources map to the Devile FG (on-devile resources) and communication FG (communication APIs and protocols).
* Controller servile maps to the Services FG (native servile). Web Services map to the Services FG (web services).
* Web Servileс map to Servileс FG (Web servileс).
* Database maps to the Management FG (database management) and security FG (database security).
* Application maps to the Application FG (Web application, application and database servers), Management FG (app management) and Security FG (app security).
* Analytics Component maps to the Application FG.
* Observer node maps to the Application FG.

1. Mapping development level to functional groups for the weather monitoring system.
2. Mapping functional Groups to operational view specifications for the weather monitoring system.

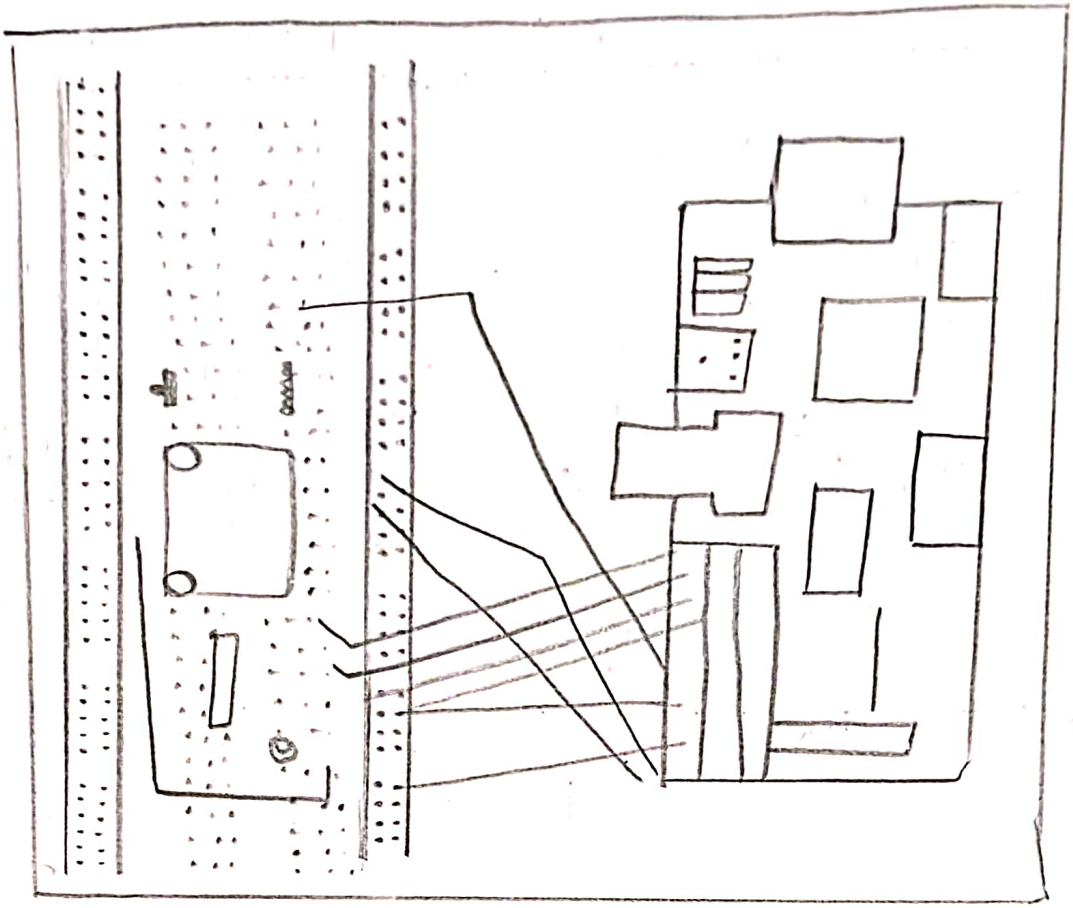
The diagrams are depicted below:-

1. Mapping functional Groups to operational view specifications for weather monitoring system.



Application:-
Web App: Django Web App
Application Server: Django App Server.
Database Server: Xively cloud server
Analytics: Hadoop
Observer: cloud app, Mobile app
Security:
Authentication: Web App, Database
Authorisation: Web App, Database
Communication:
Communication API's: REST API's
Communication protocols:
Link layer: 802.11
Network layer: IPV4 / IPV6
Transport: TCP
Application: HTTP
Devie:
Computing devie: Raspberry pi
Sensor: Temperature, Humidity, pressure, light
Management:
Application Management:
Django App Management.
Database Management:
MySQL DB Management.
Devie Management:
Raspberry Pi devie Management.

(8,9,&10): Controller Servile:



* The schematic Diagram of the weather monitoring system.
* The devices and components used in this example are Raspberry pi mini computer, temperature sensor, humidity sensor, pressure sensor and LDR sensor.

Conclusion:-

This depicts the generic design methodology for IOT system design which is independent of specific product servile or programming language.

In the first step, system design methodology is to define purpose and requirements. In second step, the use cases were formally described. The third step is to design the domain model which describe main concepts entities and objects in the domain of IoT system to be designed. The same way the fourth and fifth steps to define structure of system and to define functional view which defines the functional groups. The sixth step to define the servile specifications, The seventh step is to define Deployment & operational view specifications. The last 3 steps has controller servile. The ultimate aim is to design IoT methodology for application.