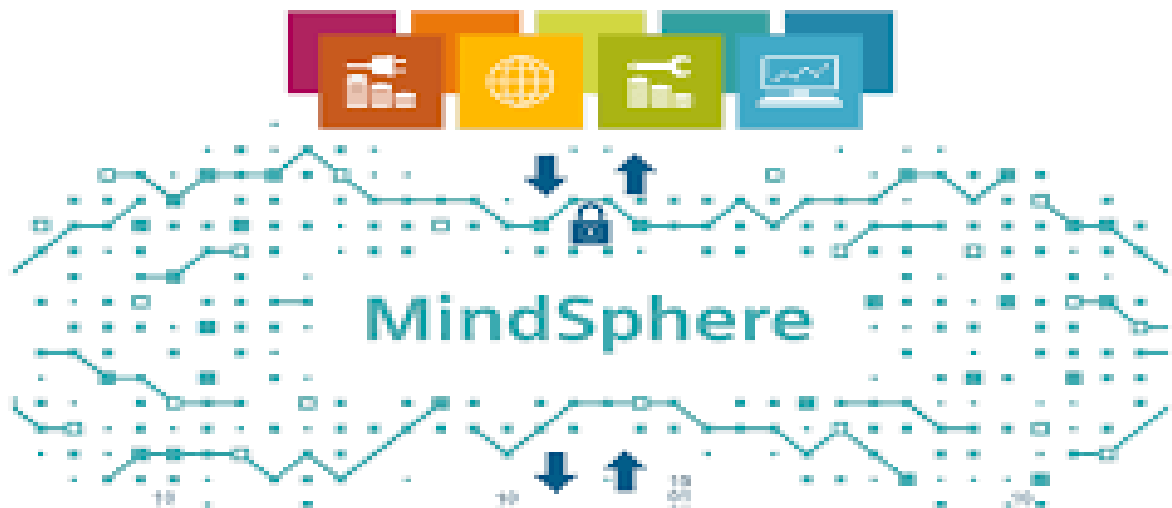


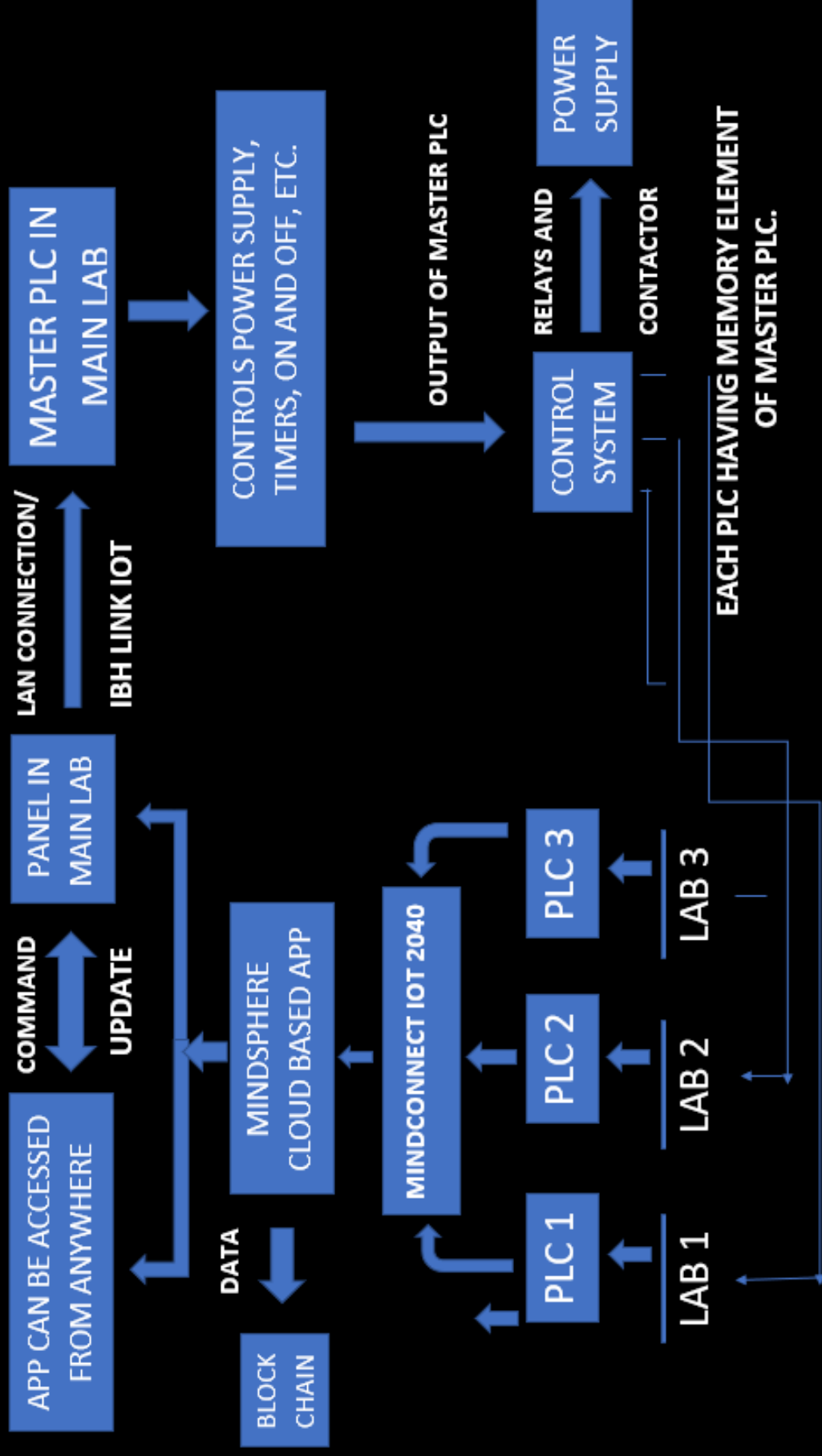
# CONCEPT OF AUTOMATION USING MINDSPHERE

-by **DHRUV TYAGI**



# PLC LAB AUTOMATION

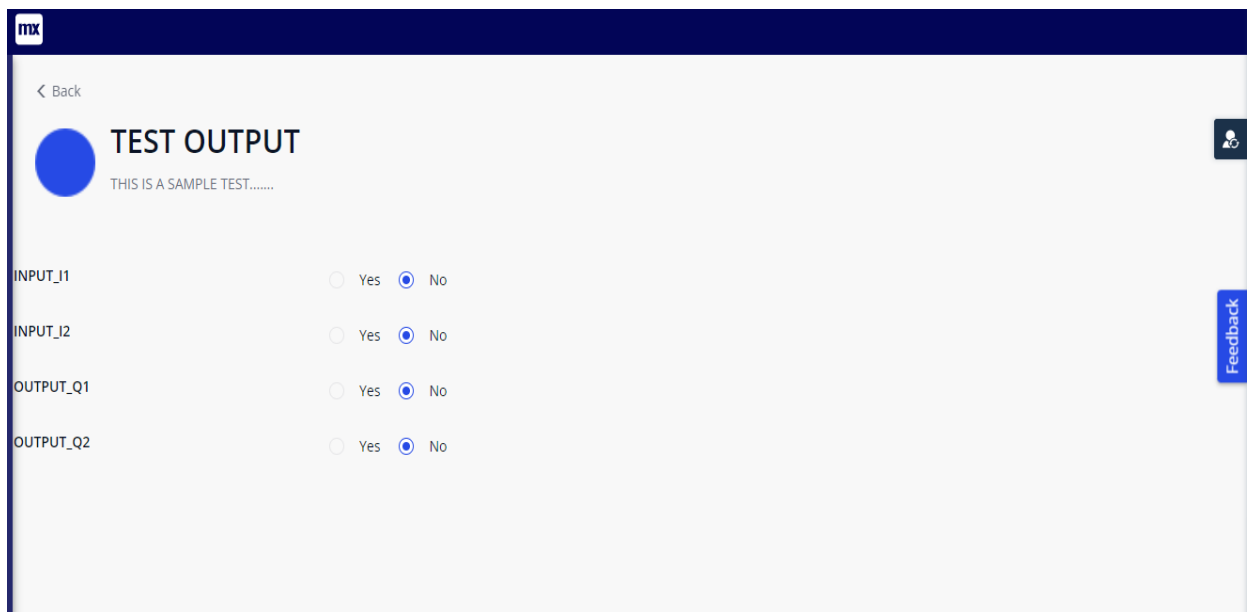
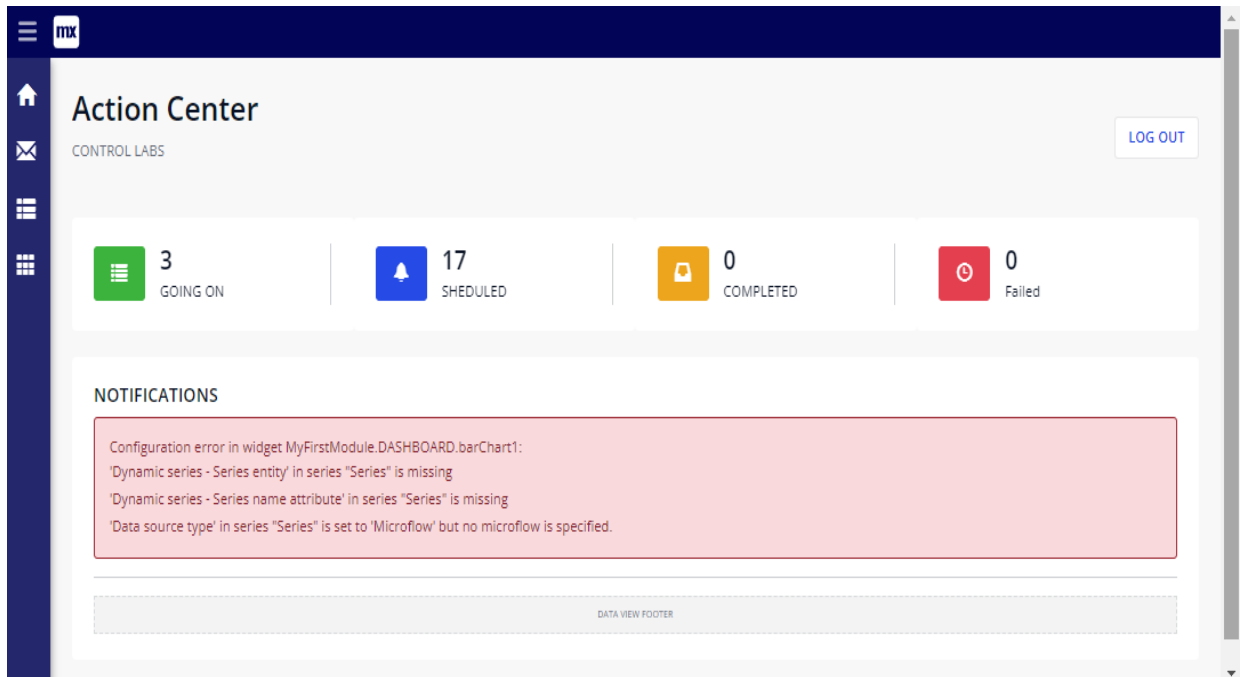
--BY DHRUV TYAGI



**THE ABOVE SHOWN IS THE WORKING PLAN FOR THE AUTOMATION OF PLC LABS USING MINDSPHERE. IN THIS THE DATA FROM ALL THE PLCS IS UPLOADED TO AN APP ON MINDSPHERE THROUGH MIND CONNECT IOT 2040. FURTHER THIS DATA IS ACCESSED THROUGH A MASTER PLC WHICH CONTROLS ALL OTHER PLCS. ACCESSED USERS CAN ACCESS THE MINDSPHERE APP FROM ANYWHERE. USERS THAN CAN SEE THE DATA OF ONGOING OPERATIONS ON THE APP AND CAN COMMAND ACCORDINGLY. THE APP WILL THEN GIVE COMMANDS TO THE MASTER PLC THROUGH IBH LINK IOT / LAN CONNECTION.**

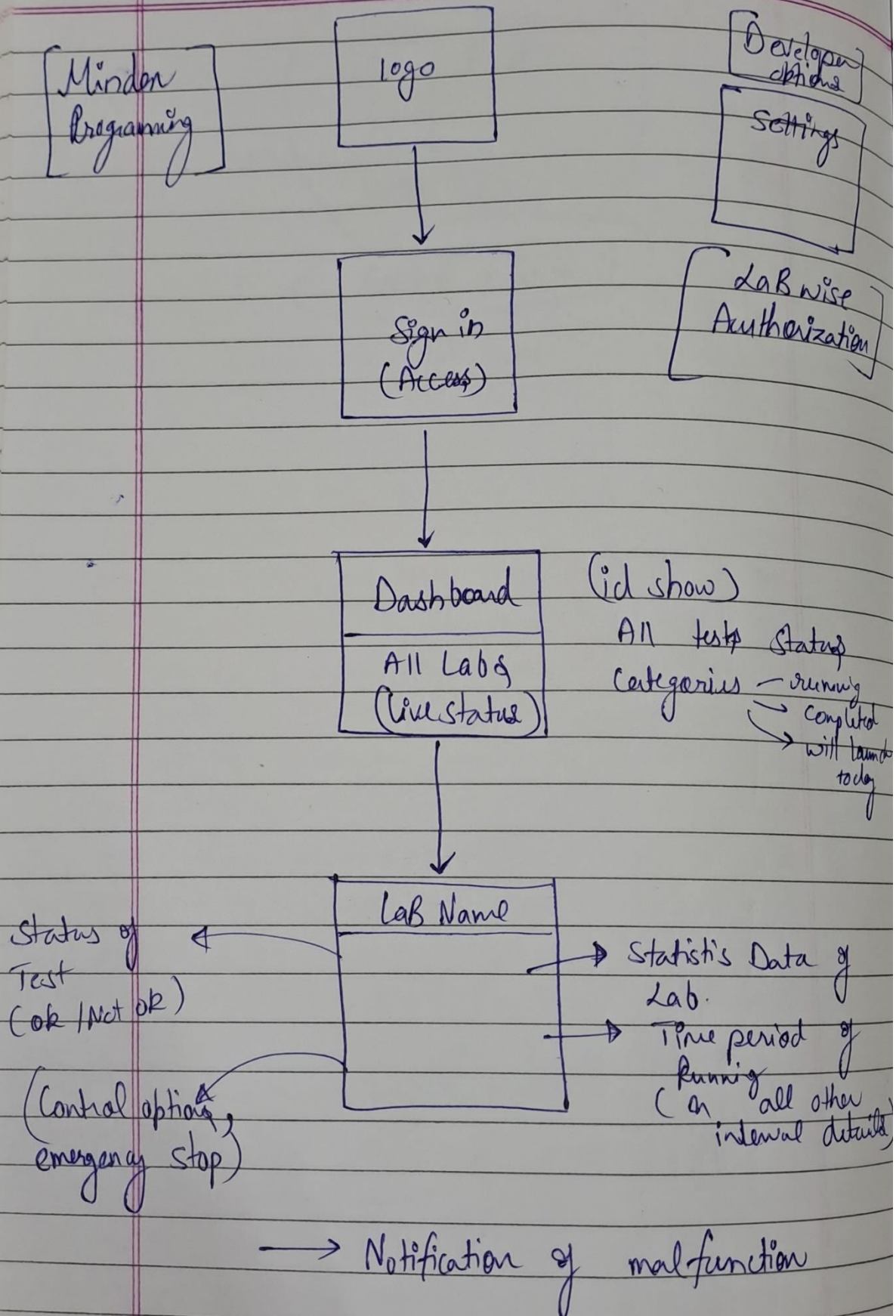
# MODEL OF MINDSPHERE APP

SAMPLE APP MADE BY **DHRUV** ON MINDSPHERE USING MENDIX.



# Model of App

ARFAT  
Date \_\_\_\_\_  
Page \_\_\_\_\_



**INFORMATION ABOUT  
MINDSPHERE,  
ITS WORKING AND  
HOW TO DEPLOY AN  
APP IN IT.**

## Mindsphere (Siemens)

Idea → Realize it → Utilize it

- ① Virtual private cloud
- ② Data Management
- ③ Services & Compute Resources
- ④ Identity & Access Management.
- ⑤ Connectivity
- ⑥ Dev - Ops

(Developer ↔ Production)

- ⑦ 3<sup>rd</sup> party Integration  
[ Custom APIs      Data Streaming  
Client Credentials

API → Application programming Interface  
Software interface offering a service to  
other pieces of software.

- ⑧ Security

→ platform to help you in realization  
to make you focus more on  
the idea or make more  
utilization from it.



## Mindshare →

- ① Platform which connects to everything  
(all the existing devices)  
with New ways to connect.  
→ open API endpoint  
→ open Source library
- ② All types of General purpose tools  
to help you in all the  
steps of Realization.  
(like → Data flow Creator,  
Business Intelligence)
- ③ APIs which are Industrial focused  
[Anomaly Detector ~~ml type~~, for best  
conditions detection,  
• KPI calc. → put eye on couple of  
parameters defined by us]
- ④ APIs Applications with familiar  
languages. [python, node js,  
php, Java]

→ Also might already a solution  
exist for your problem.

→ platform that drives innovations.



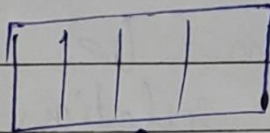
- Used by Siemens to Realize Industry (U.O)
- Australia for energy transmission.

- 
- It is an operating system for the Internet of Things with open standards & open interfaces.
  - The data can be easily linked & brought in relation with each other to obtain new insights. Apps available for precisely these tasks.
  - Companies can optimize their products by evaluating, how, where & under what conditions their product is used. These insights can immediately be fed back into the production & design process, to make products more efficient & <sup>more</sup> practical.

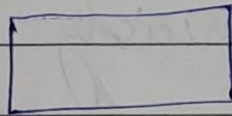
Mindsphere

SIEMENS

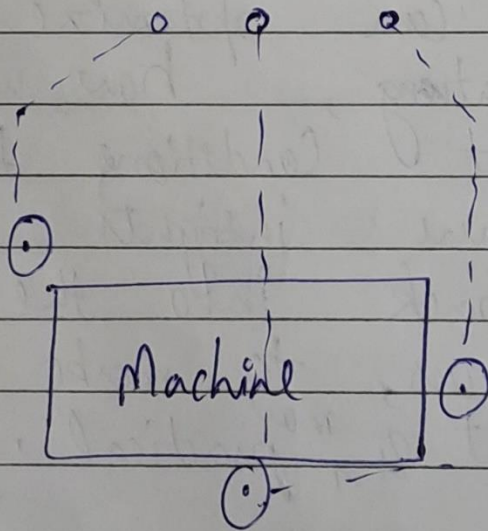
(uploading info to the cloud)



Edge Device



[CMS 1200]

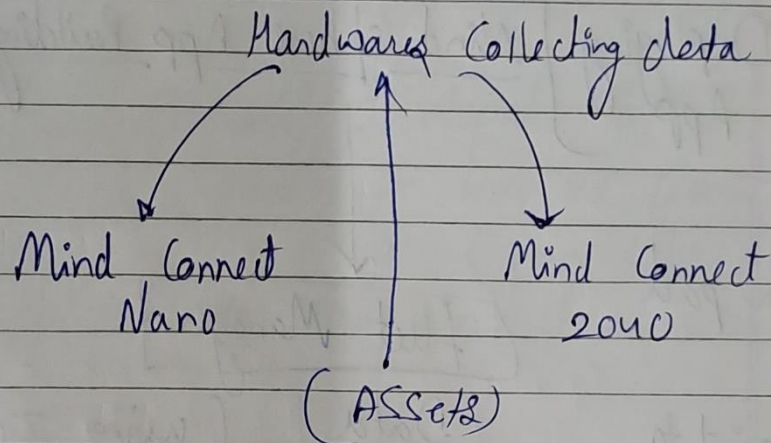


Preprocess data using edge computing



- Create Condition Monitoring Project.

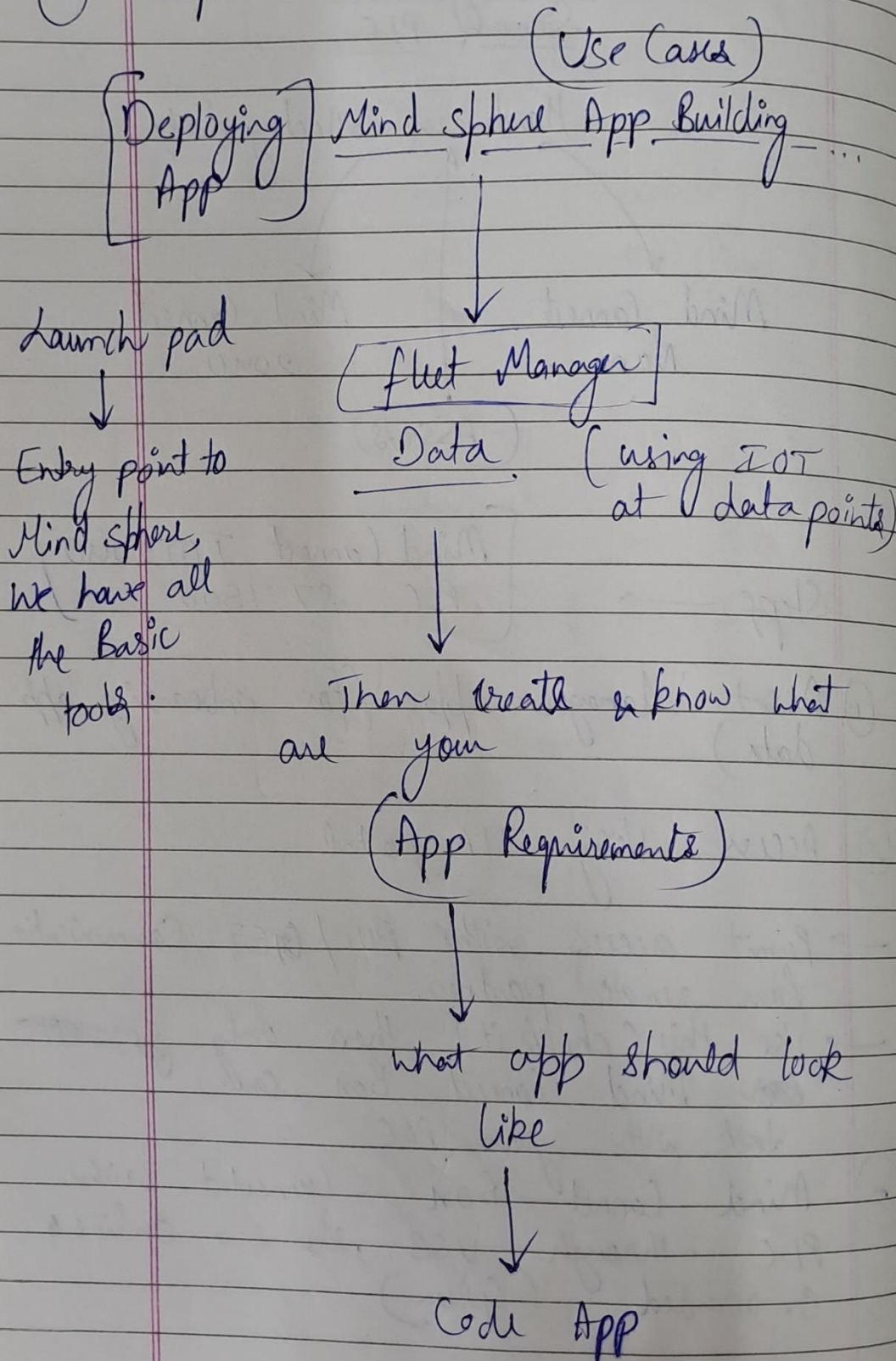
## Connecting to a Siemens PLC



Steps → Mind Connect IOT2040  
PLC S7 1500

- ① Asset Manager app (for onboarding app data)
- ② Access Using TIA portal
  - Permit access with PUT/GET Communication from remote partner.
  - Use this (check it) then only ~~you can~~ Mind Connect Box can talk with your PLC.
- ③ Mind Connect Box connected with PLC through USB, then → Online & On boarded (Green)

(4) Aspect





↓  
Visual Studio Code

(in Python)

or any other existing language

↓  
locally developed app,  
putting it into the cloud  
(Mind sphere)

App needs to run in cloud environment

↓  
Install cloud foundry.

[ Comes with developer options of  
Mind sphere ]

→ Contains a bunch of functions to  
run locally . . . . .

Command: cf - push .

↓  
Launch pad

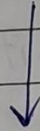
↓  
Developer Cockpit

↓  
Create new application



JIA?  
how to use  
APIs?

Copy the App Cloud Route from  
cf-push Command line.  
Then paste it in  
cf Direct link in App Detail



Roles & scopes.

(Give access & permission to app  
to read/write data from  
database).



User Management  
[Give Rights to who can  
access]



After this App is seen  
on Launch pad.



If Any issues in the App, Any  
questions, Code Snippets,  
Go to [Developer Documentation]  
(Publicly Available)

Developer.mindsphere.io

(All the documentation)

→ APIs by Service → 101 Time Series  
Service API



/timeSeries / {entity} / {propertySetName}



Asset

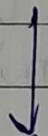


Pump

Change errors in Terminal

build --prod

(Check in video) [Mindsphere: an app in 20 minutes].



push again from logo system  
to mindsphere



App working properly.



Alarm / Notification / pop-up  
When Anomalous Activity happens

↓  
Commercialize App

- Industrial IOT App  
[Use APIs & UI Components]

cloud foundary.

↓  
for Test, host, manage, sell App

→ Mind Access Dev Ops plan

- Single Command line can update the app in mind sphere.

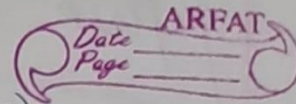
↓  
operator Cockpit  
(Managing & Distributing)

↓  
Customer launch pad

/ Mind Sphere App Store



Dhruv Tyagi  
CEO / Manager (KPIs)



Mind Sphere & Mendix - Building App  
(easy).

[Get Access to Mendix]  
(mendix.com)



[Do training in Mendix Academy]



[Download Desktop modeler]



[Create App locally]



[Push App to Mind sphere]



[Register App & See it on Launchpad]



Enjoy Using your New App

for APIs → use [Mindsphere  
APIs & Services]

# → [Read what are malformed & well-  
formed API request, which APIs to  
use.]

→ check how to make. app by  
accessing APIs.

# [Ask about the Docker use]

# How to assign the APIs initially.  
before connecting Mind Connect.

3 → [on Visual flow creator] KPI (Key Performance  
Indicator)  
→ for performance measurement. to  
evaluate the activity of a project  
or equipments.

→ 5 key indicators :-

- ① Revenue growth
- ② Revenue per client
- ③ Profit Margin
- ④ Client Retention Rate
- ⑤ Customer Satisfaction.



