

# **Production Supporting Systems in Factories**

**ระบบสนับสนุนการผลิตในโรงงานอุตสาหกรรม**

# Topic

- อุปกรณ์ตรวจวัดอัจฉริยะ
- ระบบสารสนเทศ
- **Industrial Control System (ICS)**
  - SCADA (Supervisory control and data acquisition)
  - DCS (Distributed control systems)

# SCADA

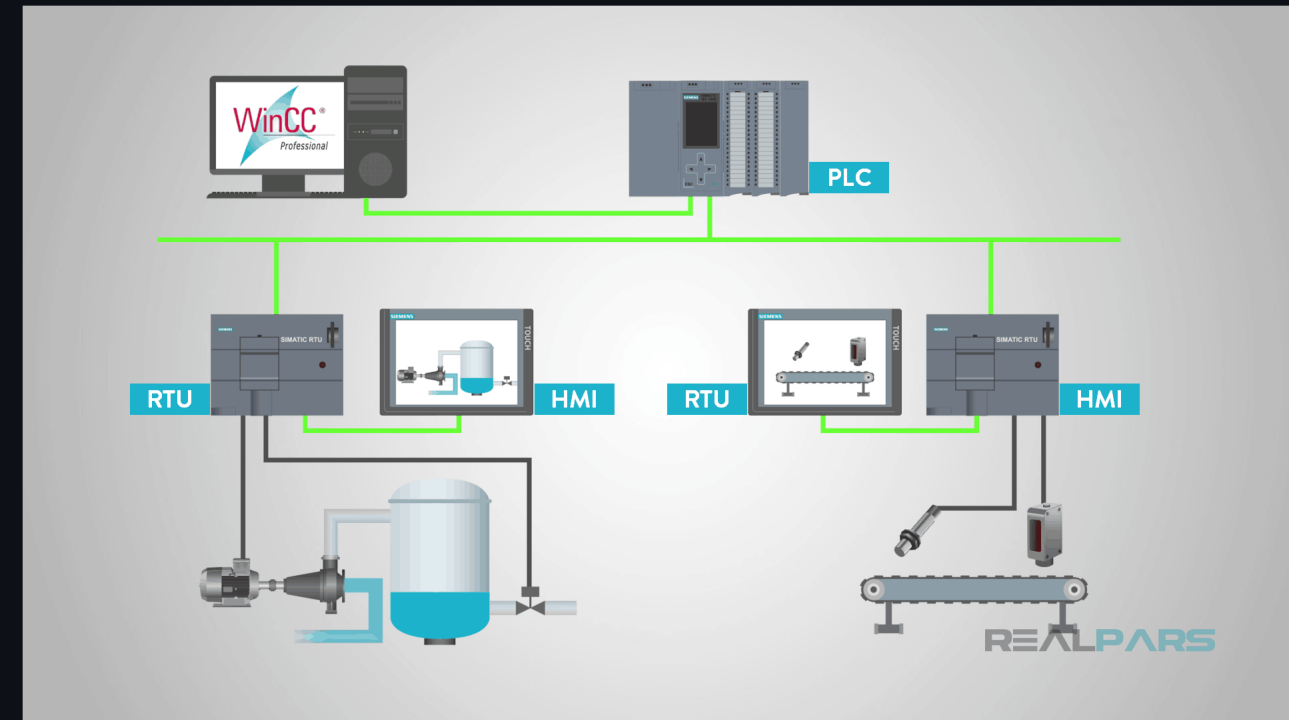
Supervisory control and data acquisition

# SCADA

- A system of software and hardware elements that allows industrial organizations to:
  - **Control** industrial processes locally or at remote locations
  - Directly **interact** with devices such as sensors, valves, pumps, motors, and more through human-machine interface (HMI) software
  - **Monitor**, gather, and process real-time data
  - **Record** events into a permanent storage.

# Architecture

- **PLC** (Programmable Logic Controller) and/or **RTU** (Remote Terminal Units)
- **HMI** (Human Machine Interface)
- **Field devices** - sensors and actuators
- **SCADA computer**



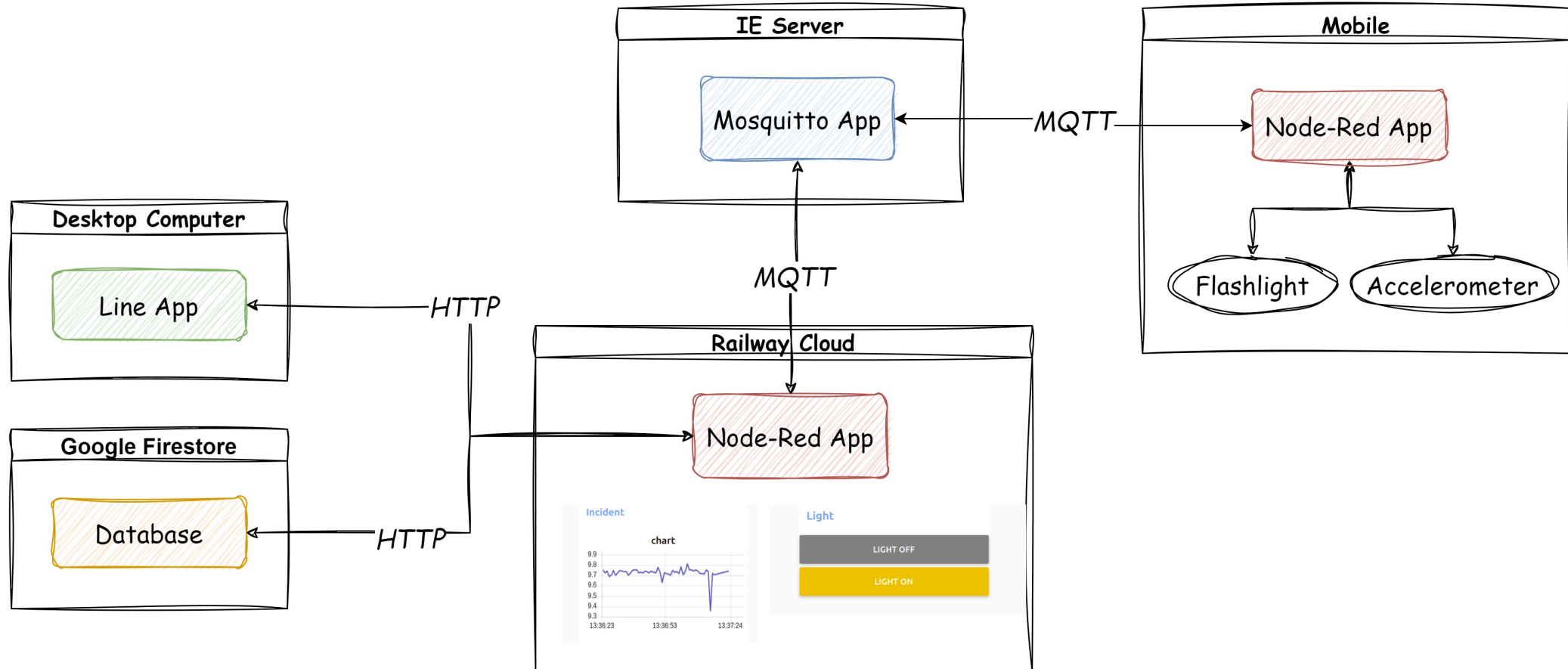
**We will come back to this topic later.**

- Now, let's learn about a control system by making a DIY "SCADA".

# Project Demo

[Link](#)

# Diagram





# Components

- **Node-Red App** running on a cloud server (Railway Cloud)
  - Collect sensor data
  - Displaying sensor data
  - Notifying operator of the incident through **Line App** (on a desktop computer)
  - Writing and reading from **Database** (on Google Firestore)

## Components (cont)

- Node-Red App running on mobile
  - Receive command to toggle a flashlight
  - Process and send accelerometer data
- Mosquitto App running on a cloud server (IE Server)
  - Receiving and broadcasting data from and to both Node-Red App.

# Protocol

- HTTP (Hypertext Transfer Protocol)
  - Basically the "internet" protocol
- MQTT
  - Leading open source protocol for connecting internet of things (IoT) and **industrial IoT (IIoT)** devices.

# Comparison to SCADA components

| Component          | Function          | SCADA Equiv.   |
|--------------------|-------------------|----------------|
| Node-Red (Railway) | Collect data      | PLC / RTU      |
|                    | Display data      | SCADA computer |
|                    | Notify to Line    | SCADA computer |
|                    | Write to Database | SCADA computer |

# Comparison to SCADA components

| Component         | Function             | SCADA Equiv. |
|-------------------|----------------------|--------------|
| Node-Red (Mobile) | Control sensors      | PLC / RTU    |
| Accelerometer     | Measure acceleration | Sensor       |
| Flashlight        | Light                | Actuator     |