

# **Production Supporting Systems in Factories**

**ระบบสนับสนุนการผลิตในโรงงานอุตสาหกรรม**

# Topic

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

# SCADA

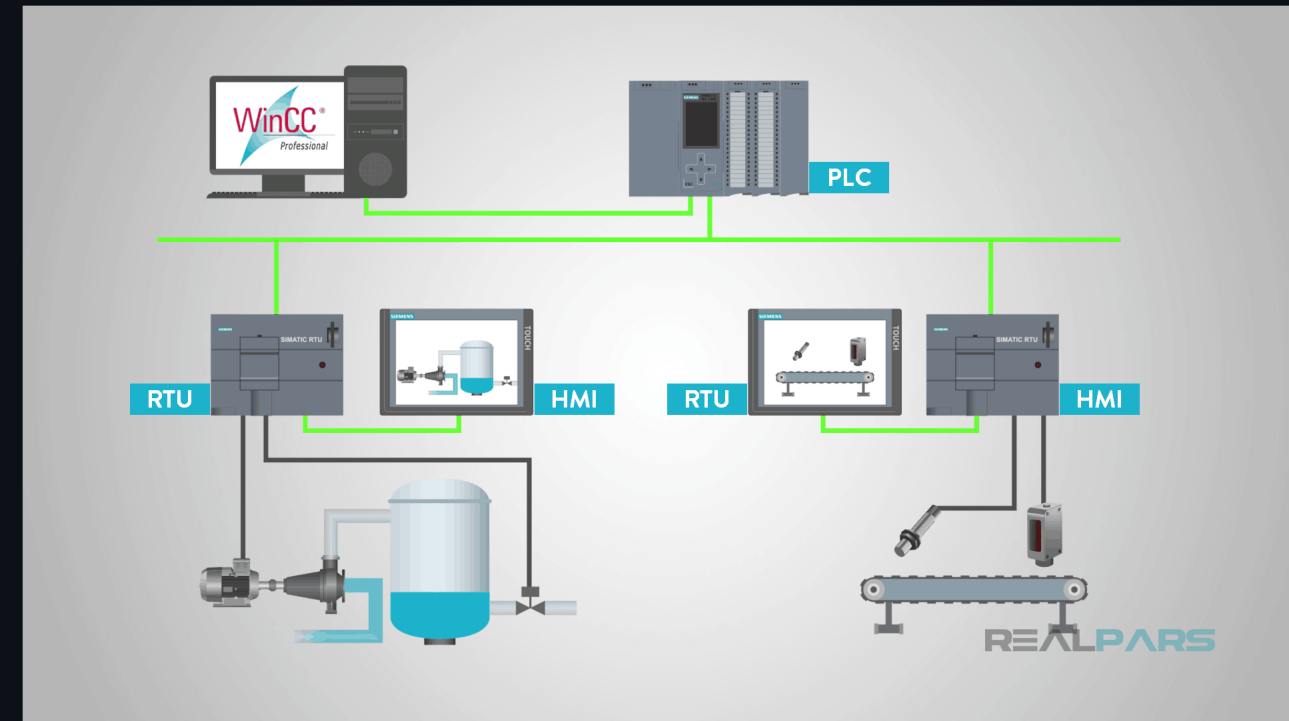
Supervisory control and data acquisition

# 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**



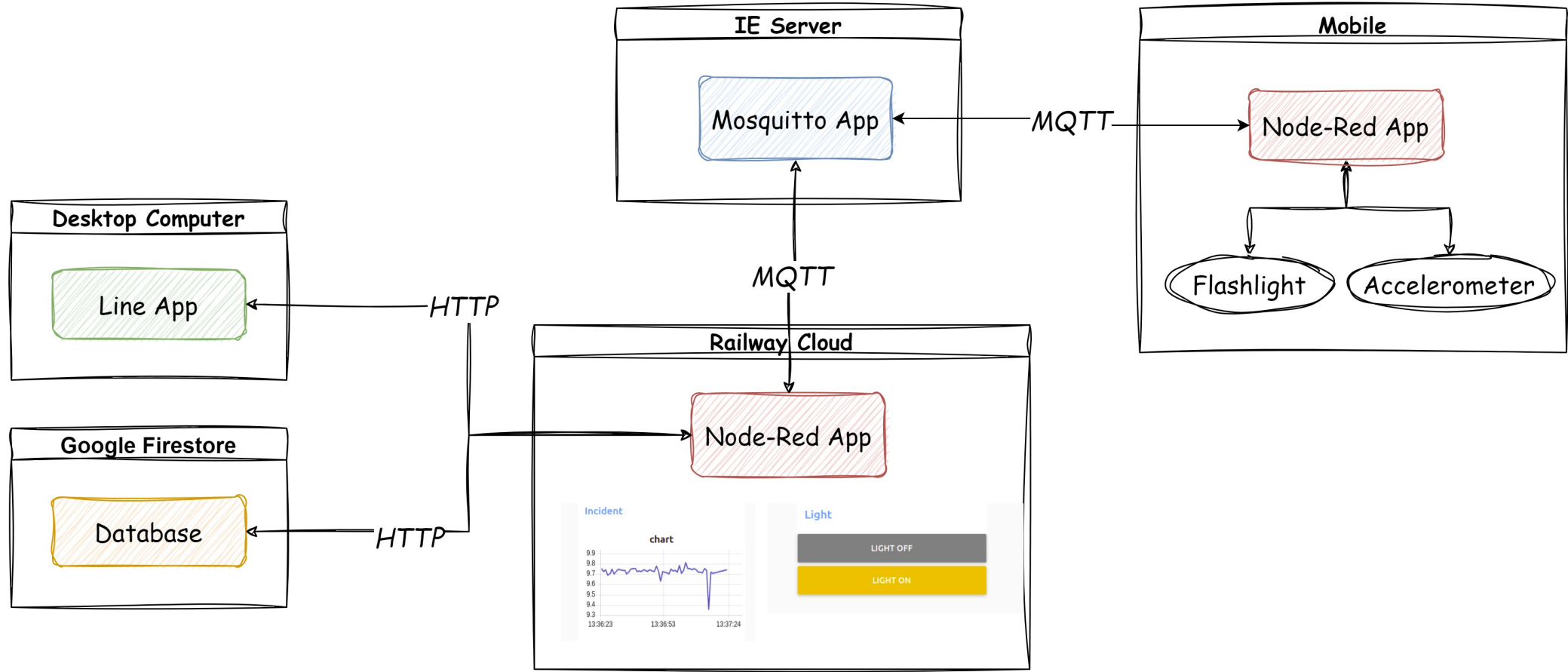
**We will come back to this topic later.**

- 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