Production Supporting Systems in Factories

ระบบสนับสนุนการผลิตในโรงงานอุตสาหกรรม

Topic

- อุปกรณ์ตรวจวัดอัจฉริยะ

- ระบบสารสนเทศ

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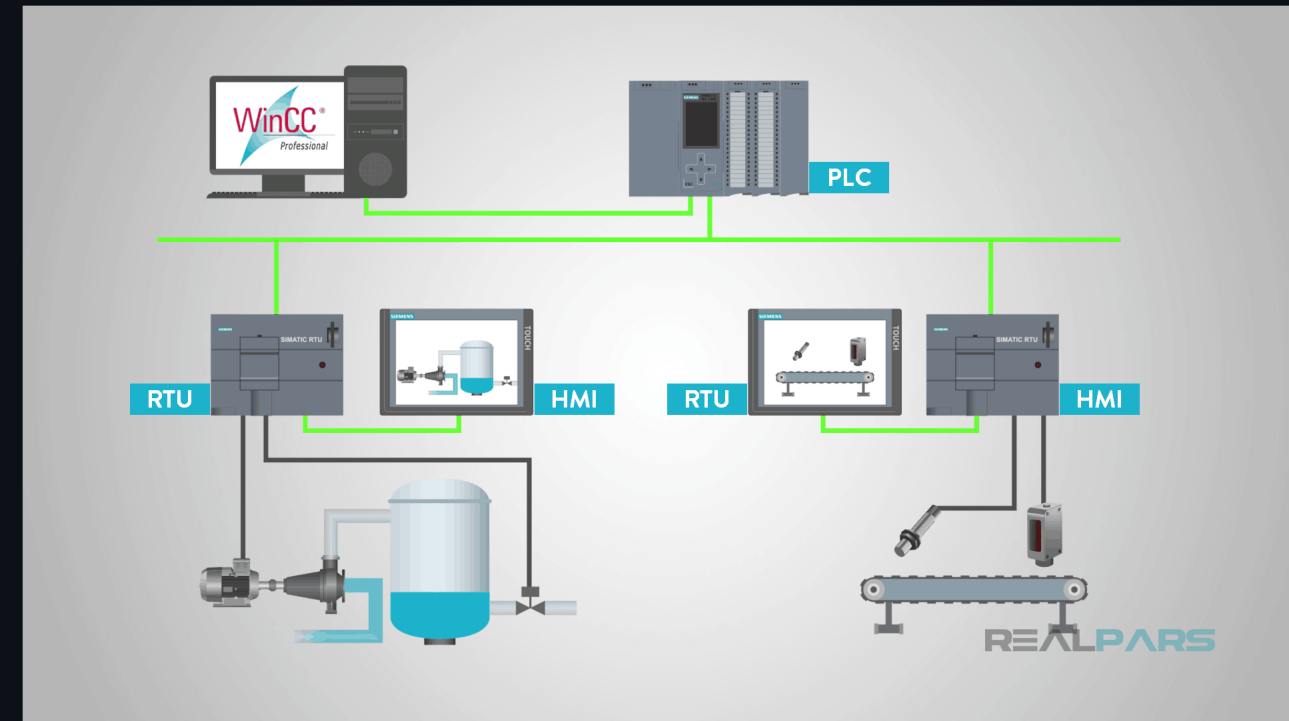 - DCS (Distributed control systems)

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
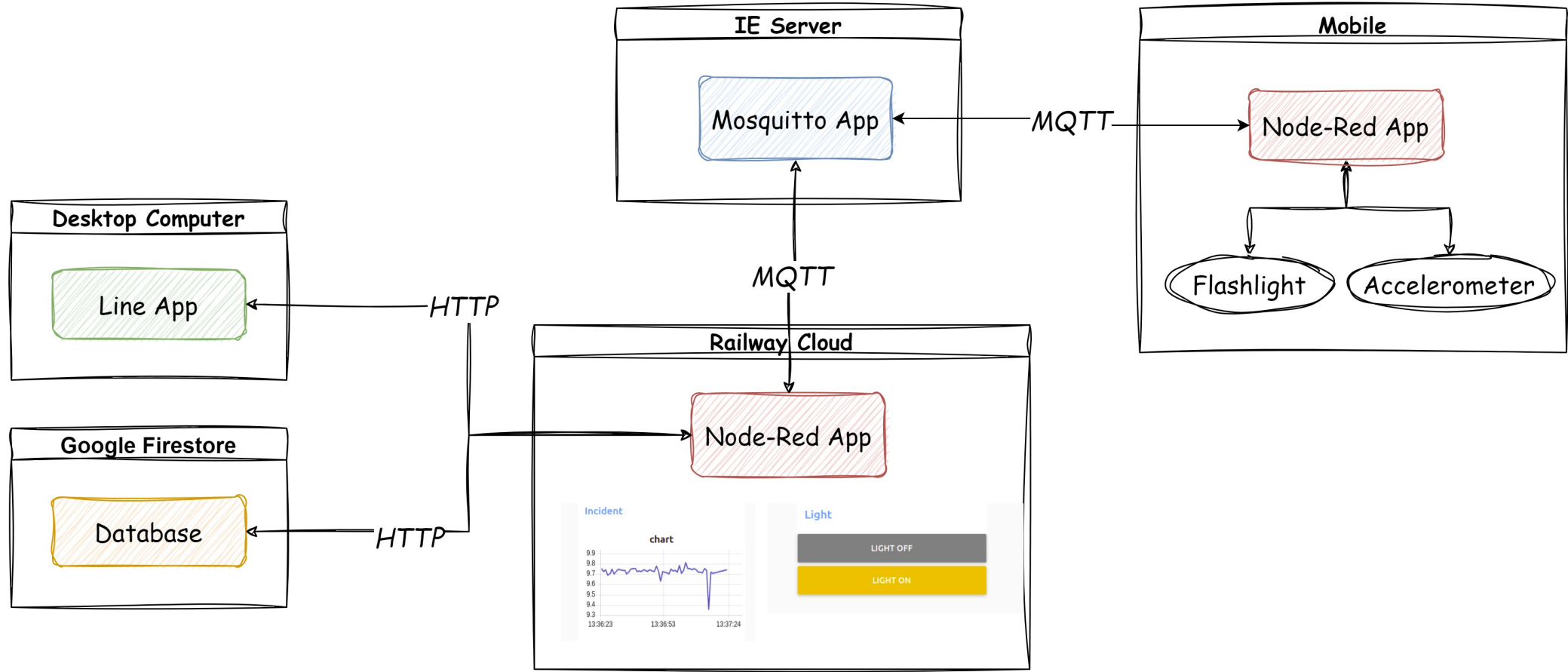
- **SCADA computer**

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` runnign on mobile
  - Receive command to toogle 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