

Production Supporting Systems in Factories

ระบบสนับสนุนการผลิตในโรงงานอุตสาหกรรม

Topic

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

SCADA

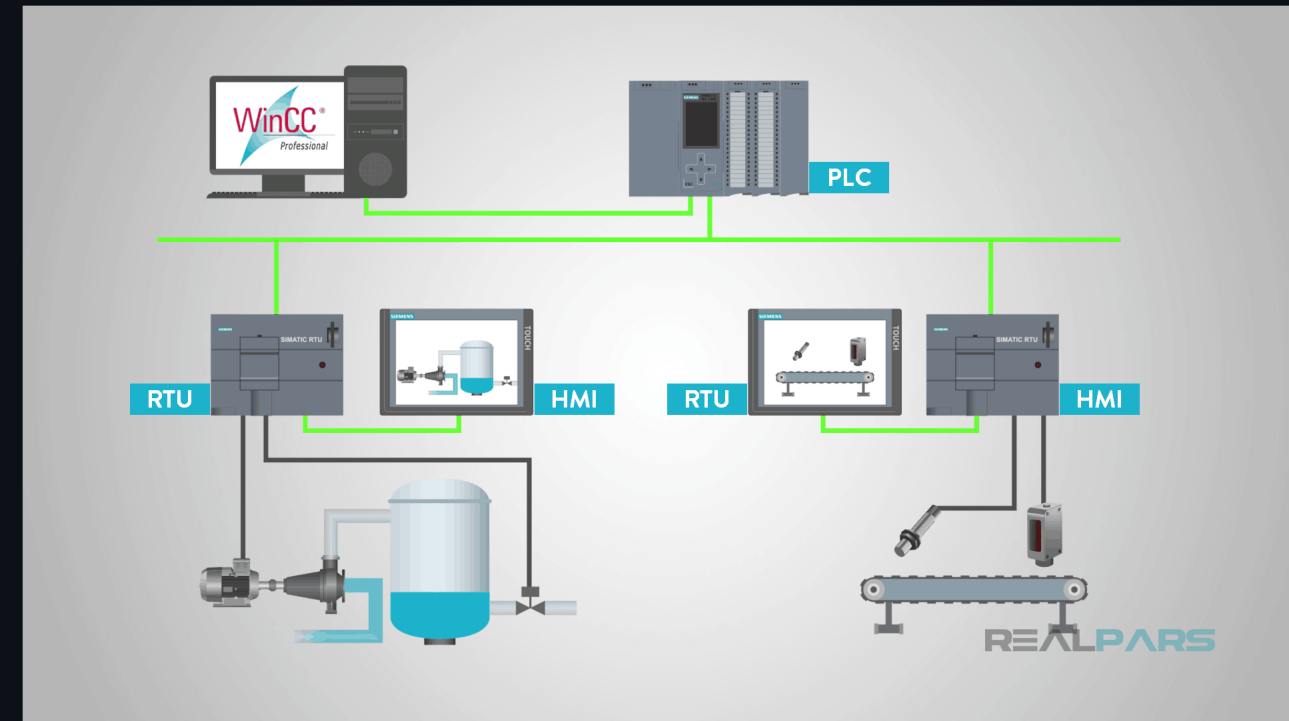
Supervisory control and data acquisition

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**



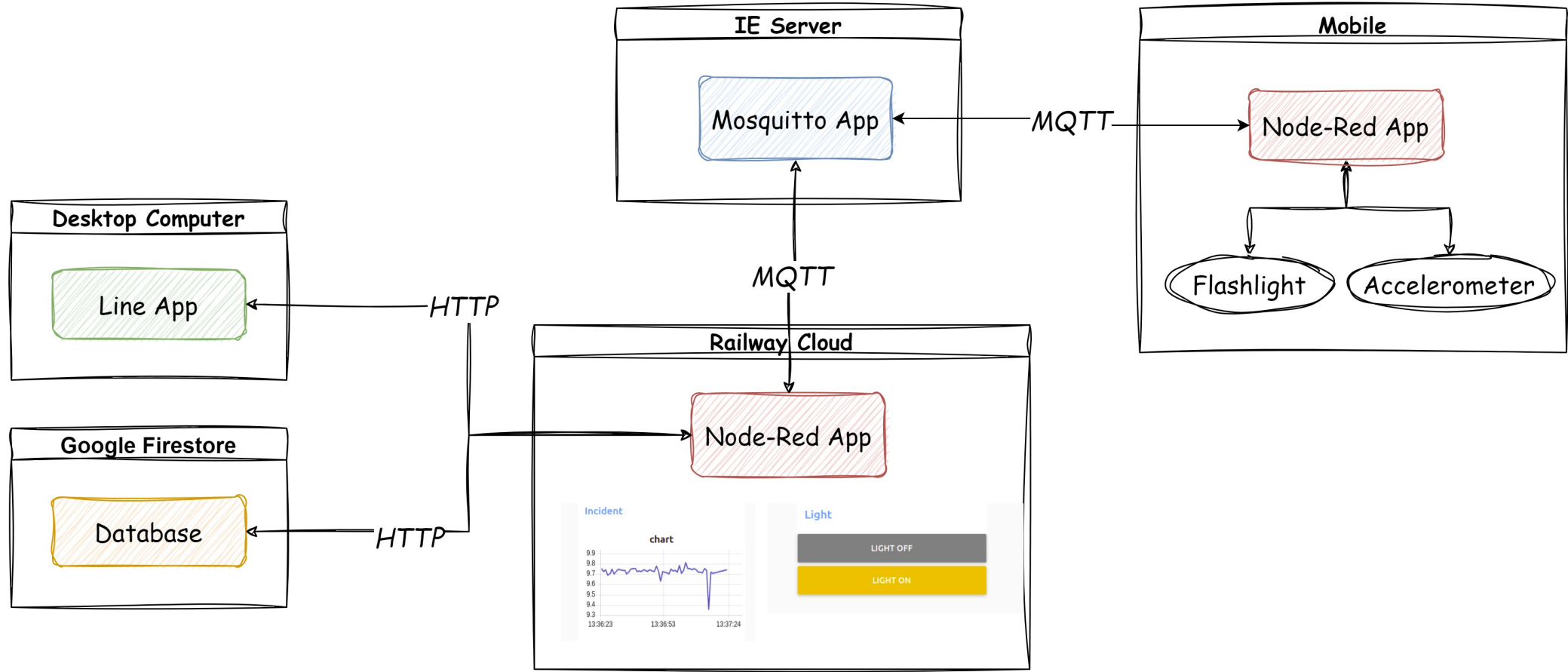
We will come back to this topic later.

- 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 (Google VM)
 - 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