TRONIX
IoT PLATFORM

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IoT Smart Public Lighting Integrated Control System

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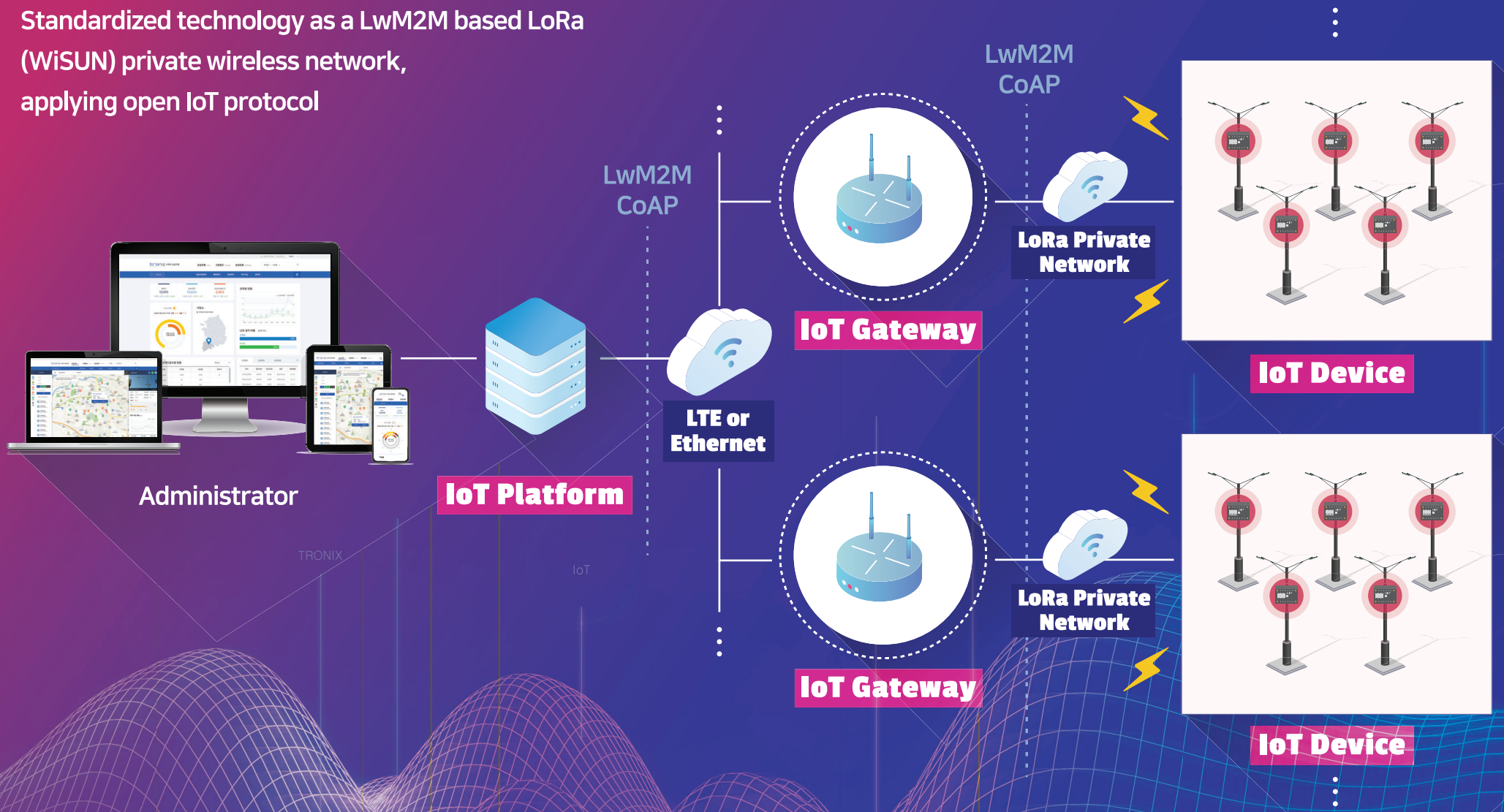
Connect all things
in the world

People / Coexistence / Technology

We want to connect 'everything in the world'
with 'people' through IT technology.

SYSTEM CONFIGURATION

Standardized technology as a LwM2M based LoRa (WiSUN) private wireless network, applying open IoT protocol



Next generation integrated control system for public lighting "that provides not only lightings but also various information such as traffic, weather and environmental information by integrating and processing multiple sensors and surrounding information, away from simple management and maintenance of lightings.

Value 01

IoT standards and open source

Break from dependency through the modularity to send and receive the data with other devices by using open standard interface with e-IoT standardized wireless communication

Value 02

Reduce energy with efficient management

Automatic dimming control for each change such as weather, seasons, environment, scheduling, etc. **reduces existing power consumption by 30%**

Value 03

One stop handling system for civil affairs

One stop handling system for civil affairs from reporting to resolution with pre failure diagnosis feature and immediate response for 24 hours, 365 days

"Optimized system that reduces unnecessary expenses

and reliably and efficiently operate the public lightings by solving various problems and connecting multiple devices with standardized system"

Remote Control and Power Measurement

- Technology for measuring electric energy of public lightings
- On/Off control, scheduling control, light pole control, block control
- Diagnosis of failure and judgment of short circuit and location of failure depending on the types of lighting
- Able to apply in existing lightings such as Metal Halide, sodium lighting, etc.
- Reduce energy by 30% through dimming control and application of scheduling

Smart intelligent control system

- IoT platform applied IoT standard technology even in Cloud environment
- Application technology for electric energy data, environmental condition information data and big data
- Cooperation of unit pricing system by applying electricity metering data of KEPCO and local governments

IoT standard protocol

- Information interworking protocol standardized in IoT environment
- Private wireless network based on low power wide area communication LoRA
- High-density cellular network protocol and topology between IoT GW and IoT platform
- Establishment of IoT platform in the 4th industry with expandable GW device

User-friendly UI/UX

- Provide customer-centered (administrators, repair companies, residents, etc.) service (UI/UX design)
- Provide various statistical data (graphs) by hour, day, week, month and year
- Printing feature of condition report by devices, section, etc.
- Inventory management, management of maintenance companies and payment system

PRODUCT COMPOSITION

Features

- Remote control (by light pole, alternate lightings, block, section, etc.)
- Program for checking failures (diagnosis)
- Dimming control feature (by time, weather, seasons, etc.)
- Monitoring program for electric energy (Provide daily, weekly, monthly and year statistics)
- Development of technology for efficient work process system of administrators and repair companies
- Report printing by establishing statistical data (year, month, day)
- Used as a data for Big Data
- Inventory management for equipment, materials, etc. that are required for maintenance

Specifications

- System
  - OS : linux
  - CPU : Intel(R) Xeon(R) CPU E5-26090@ 2.40GHz
  - Memory : 4 Gbyte
  - HDD : 300Gbyte

Features

- Remote on/off control
- Judge diagnosis for failure
- Dimming control
- Check electric energy

Features

- Transmit data to operating server through broad-band communication by collecting information using control / measurement devices and low-cost area network (LoRA)

Specifications

- System
  - OS : Mbed OS
  - CPU : 32bit ARM Cortex-M4
  - Memory
    Flash : 1.5Mbyte, SRAM : 320Kbyte
- Communication
  - RF communication: LoRa
  - RF frequency : 917~923MHz
  - RF antenna : Dipole
  - RF receiving sensitivity : 2dBm
- Power
  - Input power (VAC) I/O :
    220 VAC Single phrase 60Hz
  - Input power (VDC) I/O :
    C-Type USB 5 VDC
  - Operating power (VDC) :
    2.7 ~ 3.3 VDC 550mA or 1.2A
  - VDC power for dimming :
    1 ~ 10 VDC

Specifications

- **System**
  - OS : Mbed OS
  - CPU : 32bit ARM Cortex-M4
  - Memory
    Flash : 1Mbyte
    SRAM : 512Kbyte
- Communication
  - RF communication: LoRa
  - RF frequency : 917~923MHz
  - RF antenna : Dipole
  - RF receiving sensitivity: 2dBm
- Power
  - Input power (VDC) I/O :
    Micro USB 5 VDC
    Circle DC zender 12 VDC
  - Operating power (VDC) : 2.7 ~ 3.3 VDC

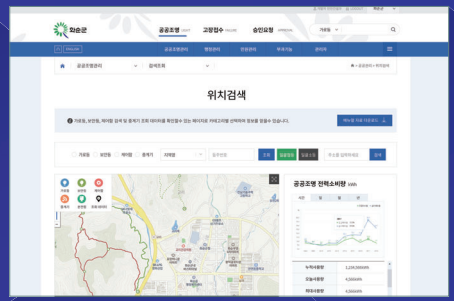
MAIN FUNCTIONS and EFFECTS

System environment and Security

- HTML5 based web service enables the use without installation of client system
- Able to be operated in all user environment including PC, tablets and smart phones
- Grant system access and menu authority by each person in charge

Real-time control

- Real-time monitoring such as on/off public lightings, dimming conditions, measurement of state electric energy, etc.
- Automatic control based on schedule and program by using stable local networks
- Remote control through individual and group control feature
- Real-time detection for failures of ballast, lamps, communication, etc. through fault detection alarm
- Notify real-time alarm message to administrators
- Designate company to request for real-time resolution of civil affairs



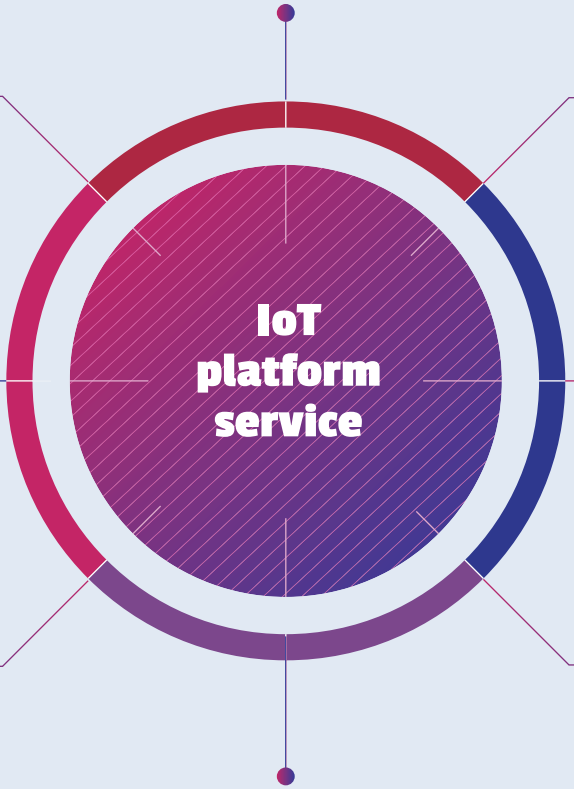
Efficient management and maintenance

- Inquire histories for new installation, status of installation and operation and failure report
- Immediately notify maintenance companies, inform the location of failure through APP
- Report the site situation to administrators through APP after repairing

Cost saving

- Realize 30% of savings through dimming control based on sunrise and sunset time by each season
- Save operational management costs by identifying failures, defects, aging, etc.

EXPANDED APPLICATIONS



Energy

Smart street lamp

Reduce power consumption through on/off control, dimming control, scheduling control, etc.

Measure traffic of pedestrians by using smart CCTV

Measurement and analysis of floating population by hour / day / season / region

Counting of visitors in tourist destinations, festival sites, etc.

Monitorair quality

Monitor air quality

Sensor certified by the Ministry of Environment measures and monitors fine particulate matter, UV light, and solar radiation quantity with multi-function printer

Check real-time traffic

Check traffic volume through the speed of vehicles

Biomass (food treatment facilities) odor monitoring service

Track the effect of odor and its sources and predict odor diffusion by using odor diffusion model

Identify spatial distribution and process data in real-time for odor based on GIS

Check real-time use of public parking lots and public restrooms

Check empty parking space using parking sensor and empty restrooms by using door lock sensor of toilet

Smart quarantine service

Automatic counting of mosquito collected by smart automatic collector for mosquito

Predict the place mosquitoes are from based on real-time data transmission and accumulated information

Public service

Safe service for senior citizens living alone and vulnerable social groups

Prevent 'dying lonely' by attaching sensors in the door of refrigerators, bathroom, etc.

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We provide the foundation as the infrastructure to connect between people by using IT technology that is developing faster and will lead the change in the world with human-centered technology combined with people, not the one after human.

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