AVIRTECH

BIOTA – LONG RANGE IOT SOLUTIONS FOR PLANTATIONS

www.avirtech.co

VALUE PROPOSITIONS

AVIRTECH

DRONES-AS-A-SERVICE

Mapping

Inspection

Spraying

SOFTWARE SUPPORT

BIOTA

AI

RETINA

HARDWARE SUPPORT

AVIRO

LoRaWAN™

VALUE PROPOSITIONS

AVIRTECH

DRONES-AS-A-SERVICE

- Aerial data **acquisition and processing** for various **industrial use**
- **Customizable** to clients' precise needs and requirements
- Artificial intelligence (AI) for data processing and analysis
- Proven **highest data accuracy** & quality
- No capex to clients

SOFTWARE SUPPORT

- **Biota** solution for monitoring & connected plantations
- **Retina** Mobile solution for ground & aerial inspection
- **AI Machine Learning** with image/video recognition

HARDWARE SUPPORT

- **Drone Customization**, Manufacturing & Assembly
- **IoT** infrastructure & sensors
- Factory in Indonesia with **regional support and training**
- Project basis

TRUSTED BY

AVIRTECH

ST Engineering

SURVEYOR INDONESIA

BADAN INTELIJEN NEGARA REPUBLIK INDONESIA

sinarmas forestry

DSNGROUP

YL INTEGRATED PTE LTD

SJ SURBANA JURONG

RGE

pgn energy for life

WASKITA

GUTHRIE GTS Since 1821

MSAL GROUP

ASIAN AGRI

Telkom Indonesia

MIE Industrial Sdn Bhd

PT ARUTMIN INDONESIA

LIFE Interior Design

W&W Wire & Wireless Co., Ltd.

Garudafood

MEDCOPAPUA

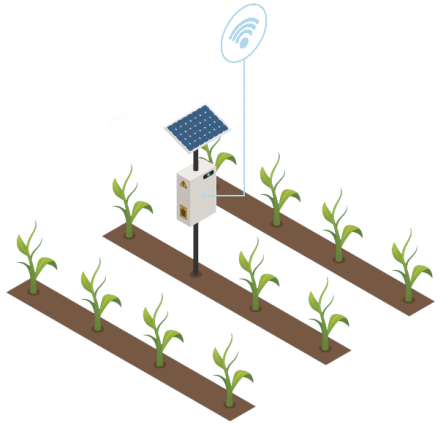
Puncak Masa Keemasan INDONESIA

PT. SADAS PANCAWIRATAMA

WHAT IS LORAWAN?

HOW BIOTA HELP ENTERPRISES?

AVIRTECH



1. Collection

IoT sensors deployed on field to collect data from environment, equipment & workers

2. Transmission

These raw data are transmitted securely using IoT network to Application servers

3. Process & Store

Received data, either on premise or in the cloud, shall be decrypted, processed and stored securely

4. Visualization

Transformed into actionable Infographics and Dashboard, with alerting rule for decision makers

5. Analytics & Prediction

Data analysis, Datasets & Models are created over time to result in actionable insights and better business decision

BIOTA - LORAWAN INFRASTRUCTURE

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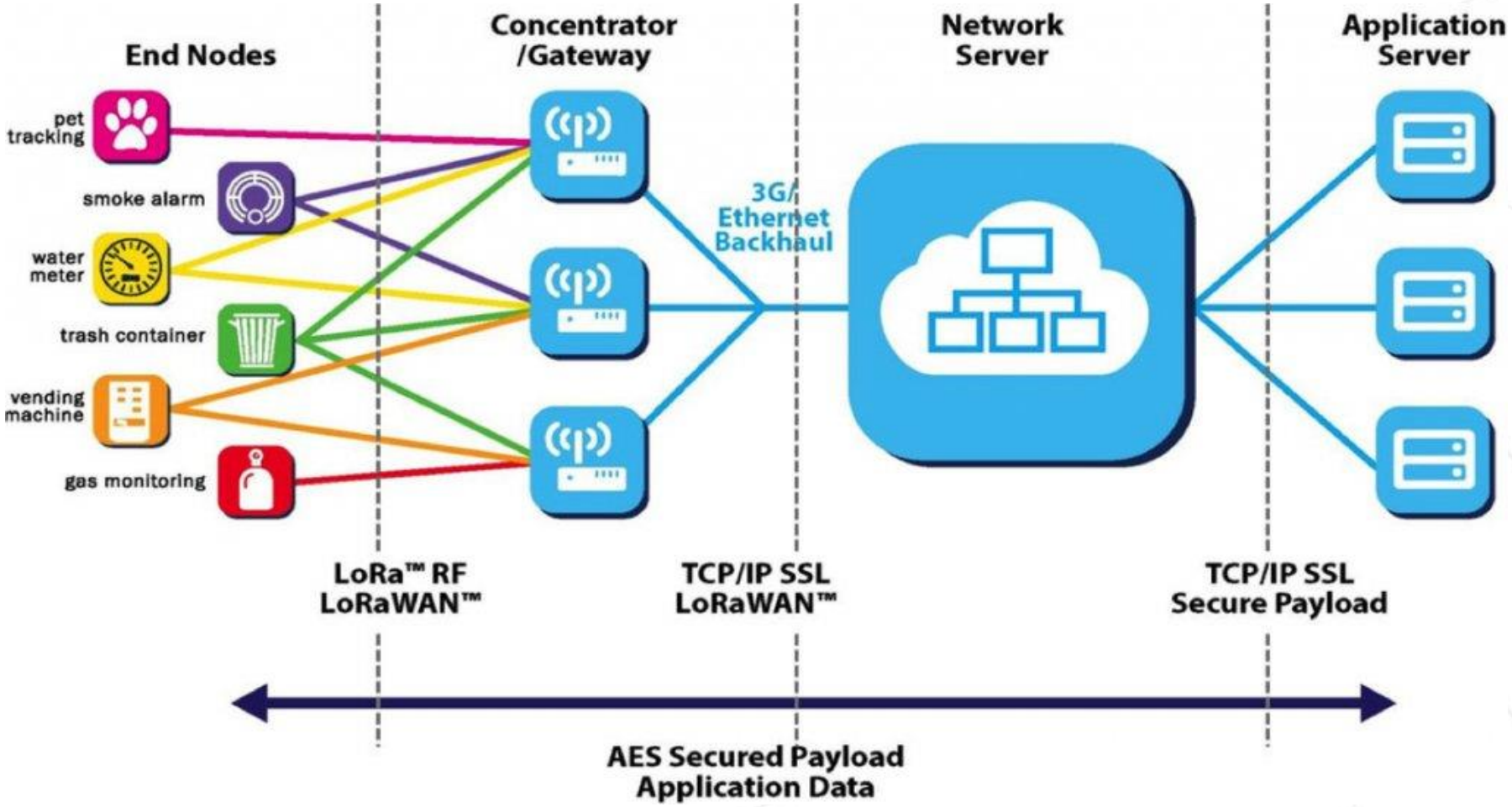


One of our Lorawan Outdoor Gateway installed in Jakarta: IP backbone (3G/4G) & Solar Panel with Battery (runs 24hours)

WHAT'S LORAWAN?

AVIRTECH

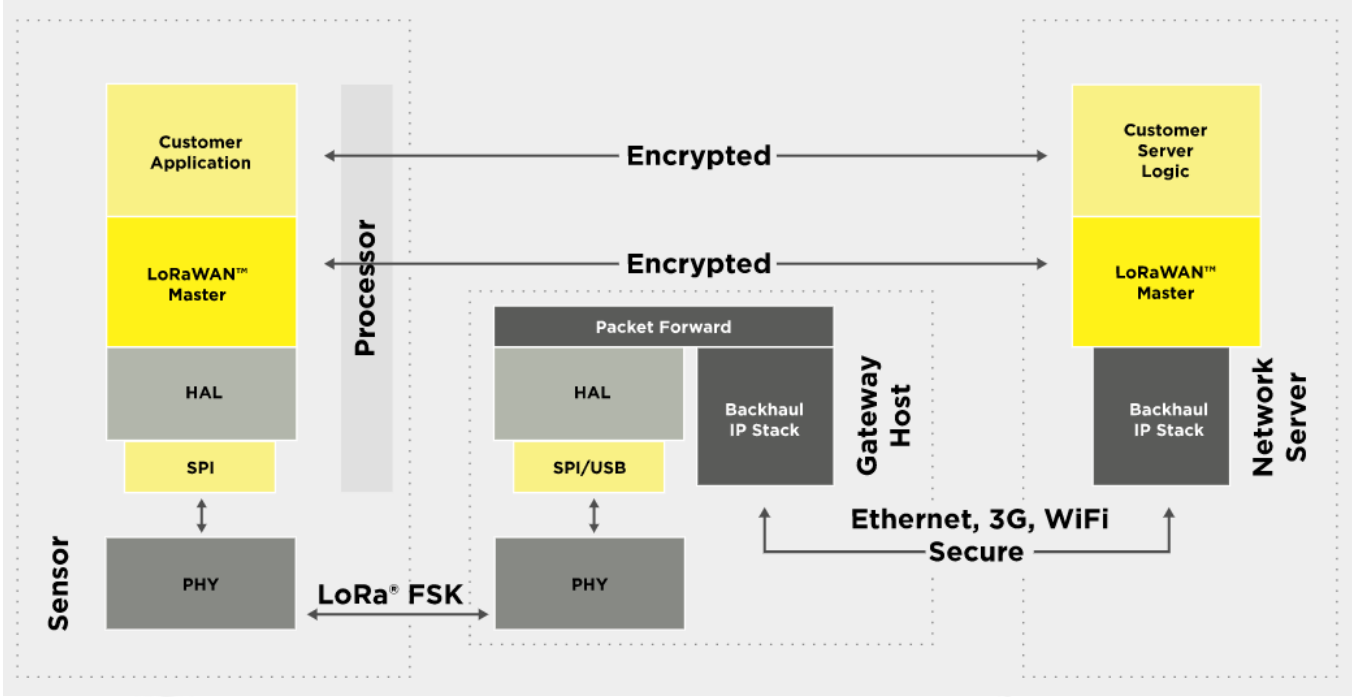
- IOT Radio Frequency Tech founded in France, and acquired by Semtech in 2012.
- Standardize as Global standard as of 2016, LoraWAN is Low Power, Wide Area (LPWA) networking protocol designed to wirelessly connect battery operated 'things' or Internet of Things **(IoT) devices**, enabling **bi-directional communication**, **end-to-end security**, mobility and localization services.
- Suitable for **Private long range network**, covering **up to 18km** between Gateways and Lora Node
- The LoRaWAN® specification is developed and maintained by the **LoRa Alliance®**

https://www.youtube.com/watch?v=m6IvwcjcxQc

WHY LORAWAN?

AVIRTECH

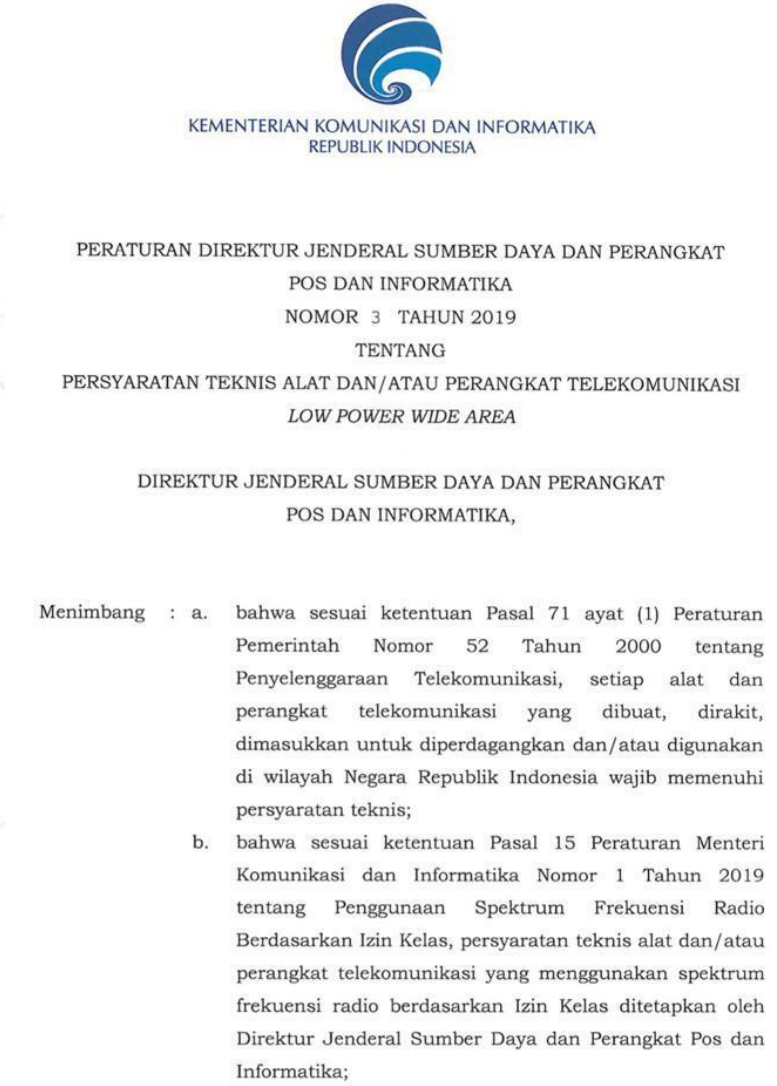
- **Long Range**, 1-5km in urban city area, up to 18km open space area for IOT devices
- **Low Powered**, battery can last up to 5years
- **Interoperability**, many use cases, end nodes and support for public or private network
- **Low cost infrastructure**, cost effective gateways that able to handle 10,000 nodes per gateway



LORAWAN REGULATION IN INDONESIA?

AVIRTECH

- Indonesia designated to **frequency 920-923 Mhz**
- Deployment in many sites in Jabotabek for prepaid smart meters (gas, water, electricity)
- Bi-directional communications with baud rates range from 0.3 kbps to 50 kbps
- Gateways types:
  - Indoor
  - Outdoor for enterprise (1000 nodes per gateway)
  - Outdoor carrier-grade (up to 10,000 nodes per gateway)



KEMENTERIAN KOMUNIKASI DAN INFORMATIKA
REPUBLIK INDONESIA

PERATURAN DIREKTUR JENDERAL SUMBER DAYA DAN PERANGKAT POS DAN INFORMATIKA
NOMOR 3 TAHUN 2019
TENTANG
PERSYARATAN TEKNIS ALAT DAN/ATAU PERANGKAT TELEKOMUNIKASI
LOW POWER WIDE AREA

DIREKTUR JENDERAL SUMBER DAYA DAN PERANGKAT POS DAN INFORMATIKA,

Menimbang : a. bahwa sesuai ketentuan Pasal 71 ayat (1) Peraturan Pemerintah Nomor 52 Tahun 2000 tentang Penyelenggaraan Telekomunikasi, setiap alat dan perangkat telekomunikasi yang dibuat, dirakit, dimasukkan untuk diperdagangkan dan/atau digunakan di wilayah Negara Republik Indonesia wajib memenuhi persyaratan teknis;

b. bahwa sesuai ketentuan Pasal 15 Peraturan Menteri Komunikasi dan Informatika Nomor 1 Tahun 2019 tentang Penggunaan Spektrum Frekuensi Radio Berdasarkan Izin Kelas, persyaratan teknis alat dan/atau perangkat telekomunikasi yang menggunakan spektrum frekuensi radio berdasarkan Izin Kelas ditetapkan oleh Direktur Jenderal Sumber Daya dan Perangkat Pos dan Informatika;

APPROVED GATEWAYS IN INDONESIA (MENKOMINFO)

AVIRTECH

KOMINFO

KEMENTERIAN KOMUNIKASI DAN INFORMATIKA
DIREKTORAT JENDERAL SUMBERDAYA DAN PERANGKAT POS DAN INFORMATIKA
REPUBLIK INDONESIA

MINISTRY OF COMMUNICATIONS AND INFORMATION TECHNOLOGY
DIRECTORATE GENERAL OF RESOURCES AND EQUIPMENT FOR POST AND INFORMATION TECHNOLOGY
THE REPUBLIC OF INDONESIA

SERTIFIKAT | CERTIFICATE

NOMOR : 66489/SDPPI/2020

Referensi / Reference : PERDIRJEN SDPPI NOMOR : 3 TAHUN 2019,

PLG ID : 11019
Client's ID

Jenis Perangkat : Lora Gateway
Name of Equipment

Buatan : FRANCE
Country of Origin

Merek : Kerlink
Trade Mark

Model/Type : Wimet IStation 923

Diajukan Oleh : GERBANG TEKNOLOGI INFORMASI
Proposed by

Alamat : Soho Podomoro City Lt.40 Unit 4009, Jalan Letjend S. Parman Kav.28, 11470
Address

Tanggal Terbit : 12 Februari 2020
Date of Issue

Frekuensi Kerja : LPWA 920 Uplink, Downlink 920423 MHz
Operating Frequencies

A.N. DIREKTUR JENDERAL SUMBER DAYA DAN PERANGKAT POS DAN INFORMATIKA
DIREKTUR STANDARDISASI PERANGKAT POS DAN INFORMATIKA
ON BEHALF OF DIRECTOR GENERAL OF RESOURCES AND EQUIPMENT FOR POST AND INFORMATION TECHNOLOGY
DIRECTOR OF STANDARDIZATION OF EQUIPMENT FOR POST AND INFORMATION TECHNOLOGY

MOCHAMAD HADIYANA

DIREKTORAT STANDARDISASI PERANGKAT POS DAN INFORMATIKA | DIRECTORATE OF STANDARDIZATION
GEDUNG SAPTA PESONA LT 8, JL. MEDAN MERDEKA BARAT NO 17, JAKARTA PUSAT

SALINAN

*Kerlink iStation (Outdoor Gateway)

KOMINFO

KEMENTERIAN KOMUNIKASI DAN INFORMATIKA
DIREKTORAT JENDERAL SUMBERDAYA DAN PERANGKAT POS DAN INFORMATIKA
REPUBLIK INDONESIA

MINISTRY OF COMMUNICATIONS AND INFORMATION TECHNOLOGY
DIRECTORATE GENERAL OF RESOURCES AND EQUIPMENT FOR POST AND INFORMATION TECHNOLOGY
THE REPUBLIC OF INDONESIA

SERTIFIKAT | CERTIFICATE

NOMOR : 66932/SDPPI/2020

Referensi / Reference : PERDIRJEN SDPPI NOMOR : 2 TAHUN 2019, PERDIRJEN SDPPI NOMOR : 3 TAHUN 2019,

PLG ID : 11019
Client's ID

Jenis Perangkat : Lora Gateway
Name of Equipment

Buatan : FRANCE
Country of Origin

Merek : Kerlink
Trade Mark

Model/Type : Wimet IFemtocell 923

Diajukan Oleh : GERBANG TEKNOLOGI INFORMASI
Proposed by

Alamat : Soho Podomoro City Lt.40 Unit 4009, Jalan Letjend S. Parman Kav.28, 11470
Address

Tanggal Terbit : 03 Maret 2020
Date of Issue

Frekuensi Kerja : LPWA 920 Uplink, Downlink 920423 MHz
Operating Frequencies WLAN 2.4 GHz Frekuensi : 2.4 GHz- 2.4835 GHz

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DIRECTOR OF STANDARDIZATION OF EQUIPMENT FOR POST AND INFORMATION TECHNOLOGY

This certificate has been digitally approved

MOCHAMAD HADIYANA

DIREKTORAT STANDARDISASI PERANGKAT POS DAN INFORMATIKA | DIRECTORATE OF STANDARDIZATION
GEDUNG SAPTA PESONA LT 8, JL. MEDAN MERDEKA BARAT NO 17, JAKARTA PUSAT

SALINAN

*Kerlink iFemtocell (Indoor Gateway)

WATER LEVEL MANAGEMENT

WATER LEVEL MANAGEMENT

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Nodes

Gateway

Network Server

Water Monitoring Application Server

Hardware
(in-situ Troll Data Logger + RS485-Lora Bridge)

Hardware
(Outdoor Gateways)

Software
(Servers)

Hardware
(Servers)
Software
(Apps/Web)

ABOUT RS485 LORA BRIDGE

- RS485-LoRa bridge is a data channel between traditional devices like in-situ troll data logger with RS485 output **(Modbus Protocol)** and LoRa gateway.
- RS485 Slave Devices can be any device with RS485 output compliant with the standard Modbus protocol.
- RS485-LoRa bridge access the registers of RS485 slave devices every interval period set by system and report the data to LoRaWAN server via gateway.
- One LoRa-485 allowed to connect with multi slave devices which also subject to the number of register to be visited.
- IP67 certified for outdoor use

Require Data sheet of in-site troll data logger for register interface specifications

1. Power Supply	: 8-30V DC
2. Application	: Indoor
3. Standby Current	: 20mA
4. MCU	: Arm® 32-bit Cortex®-M0
5. Frequency	: 470-510MHz, 863-870MHz, 902-926MHz
6. TX Power	: Up to +20dbm
7. RX Sensitivity	: Down to -137dBm
8. Channels	: 8 settable channels
9. Data rate	: Adaptive data rate
10. Listen Before Talk(LBT)	
11. LoRa Class	: Both Class A & Class C
12. Power supply isolated & RS485 interface isolated	
13. Compatible with IEC 61000-4-2 (ESD): Air 15kV, Contact 8kV	

SUPPLEMENTARY TO FIRE MANAGEMENT

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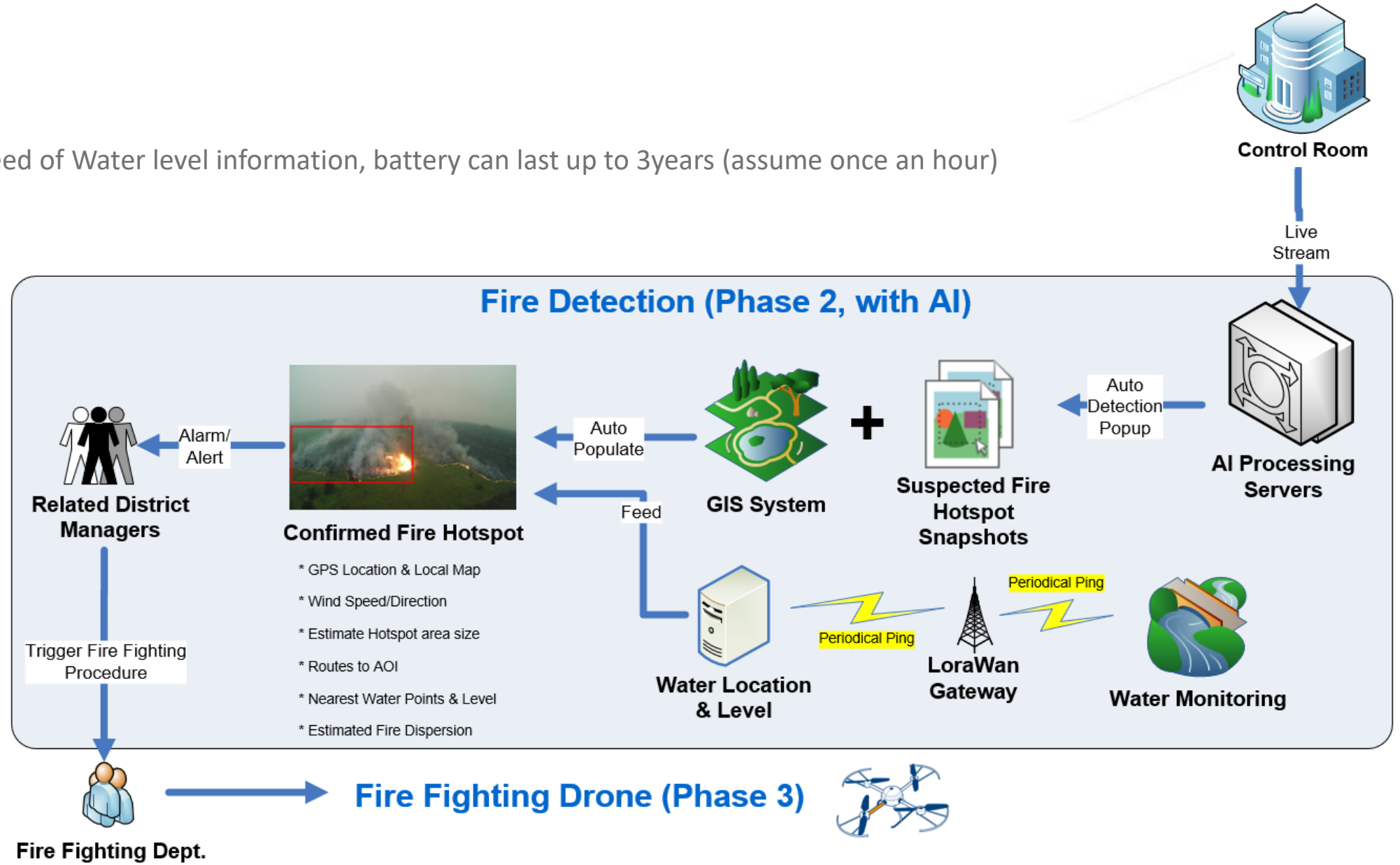
*Periodical feed of Water level information, battery can last up to 3years (assume once an hour)



RS485 LORA BRIDGE TYPES

AVIRTECH

NPL485-IN

1. Power Supply: 8-30V DC
2. Application : Indoor
3. Standby Current: 20mA
4. MCU: Arm® 32-bit Cortex®-M0
5. Frequency: 470-510MHz, 863-870MHz, 902-926MHz
6. TX Power: up to +20dbm
7. RX Sensitivity: Down to -137dBm
8: Channels: 8 settable channels
9: Data rate: Adaptive data rate
10: Listen Before Talk(LBT)
11: LoRa Class: Both Class A & Class C
12: Power supply isolated & RS485 interface isolated
13: Compatible with IEC 61000-4-2 (ESD): Air 15kV, Contact 8kV

NPL485-BAT

1. Power Supply: 3.6V battery-8500mAh
2. Application: Outdoor (IP67)
3. Standby Current: 40μA
4. MCU: Arm® 32-bit Cortex®-M0
5. Frequency: 470-510MHz, 863-870MHz, 902-926MHz
6. TX Power: up to +20dbm
7. RX Sensitivity: Down to -137dBm
8: Channels: 8 settable channels
9: Data rate: Adaptive data rate
10: Listen Before Talk(LBT)
11: LoRa Class: Class A
12: Battery Life: up to 2 years

FIELD DEPLOYMENT

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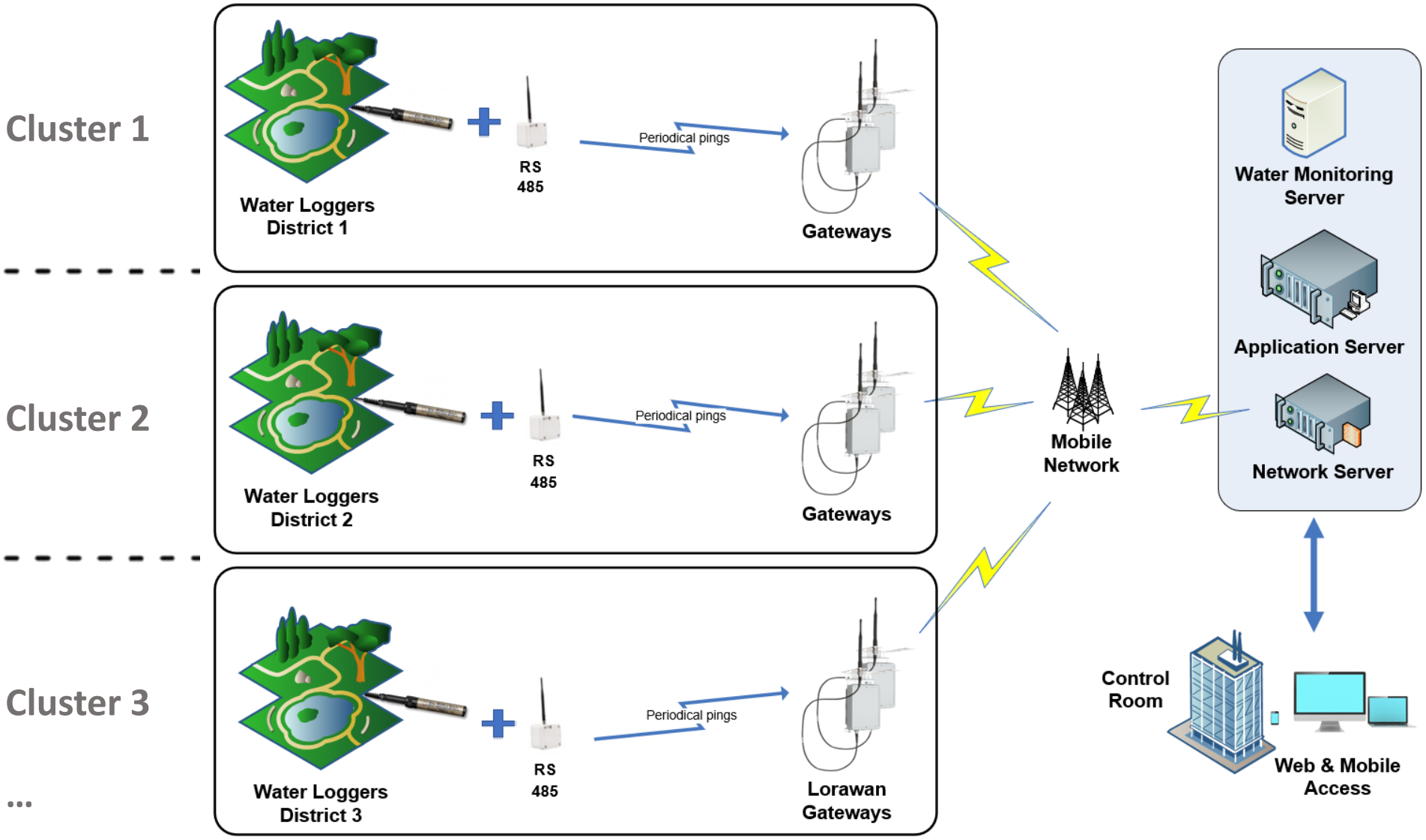


*Multiple districts connected to its own gateways (cluster), consolidated into single Water Monitoring backend

PLANTATIONS TELEMETRY

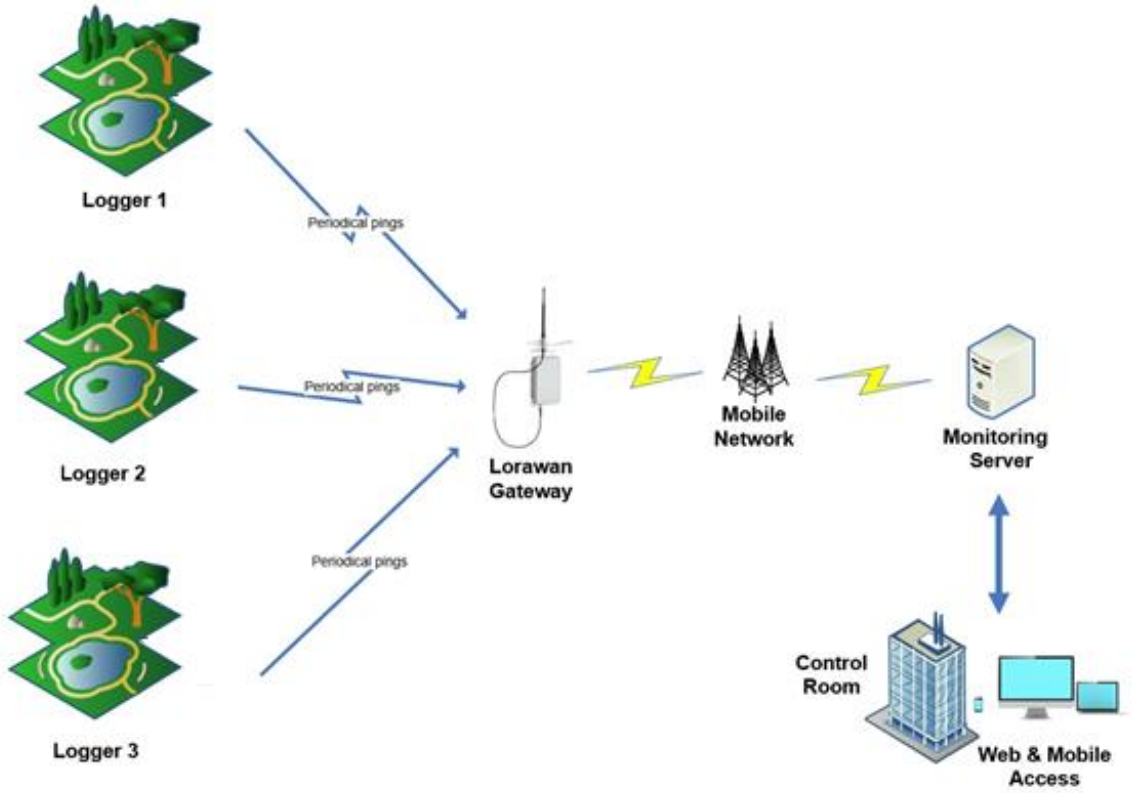
MOBILITY TRACKING SENSORS

AVIRTECH

Human & Asset Tracking

Monitoring of workers behavior and location of assets such as cars and heavy machineries' within plantation to ensure optimal distribution and coordination for the plantations. End nodes battery can last up to 4 years per charge depending on ping time.

Wearable like
Employee Tag ID



ENVIRONMENT & SOIL SENSORS

AVIRTECH

Know Your Plantations in almost Real Time

Monitoring of plantations soil & environment information including any behavioral changes after certain treatment or chemical to ensure necessary action and follow up can be done timeline. Depending on measurement interval and type of sensor, battery can last up to 5years (replaceable)

Available sensors:

- Soil Temperature & Moisture Sensor
- CO2 Sensor
- PAR (Photosynthetically Active Radiation) Sensor
- Temperature sensor
- Humidity Sensor and many more

MULTI SENSORS LORAWAN NODE

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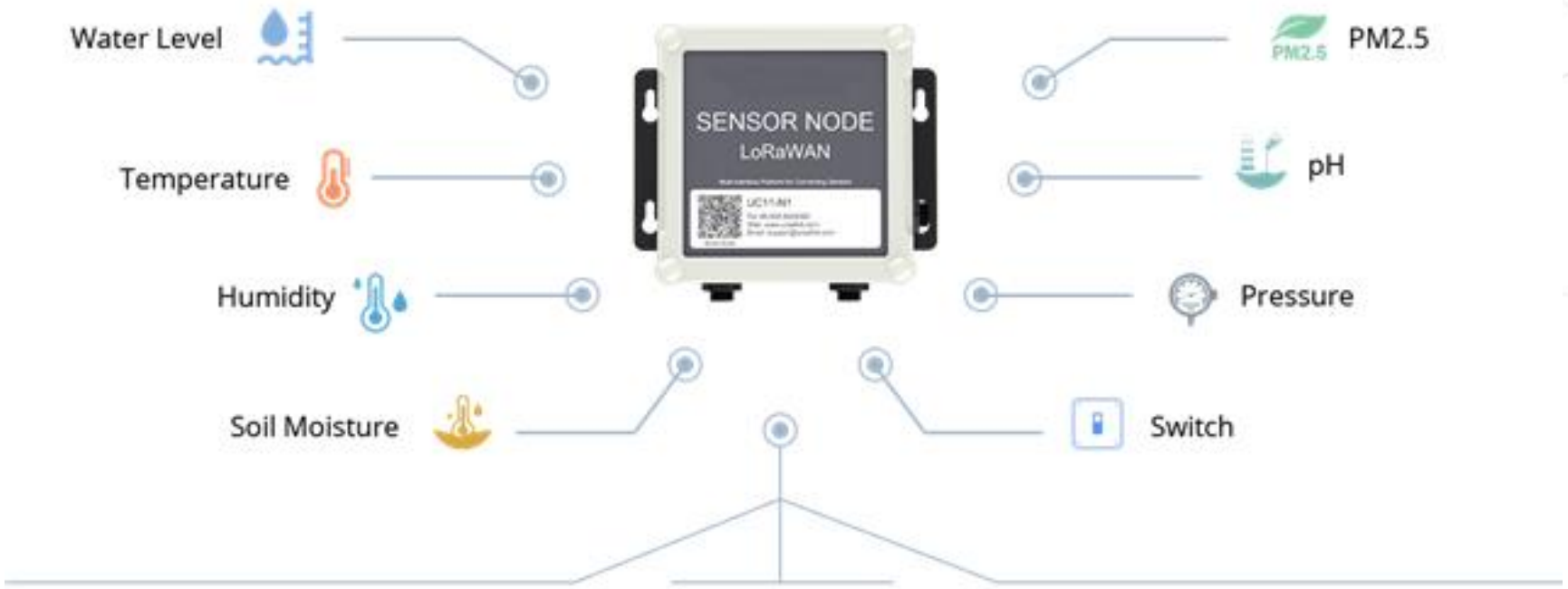
Extensible Node for Multiple Sensors

A fully integrated, battery powered LoRaWAN node with multiple communication interfaces for connecting to a wide range of external sensors, future proof.



OVERALL SYSTEM DEPLOYMENT

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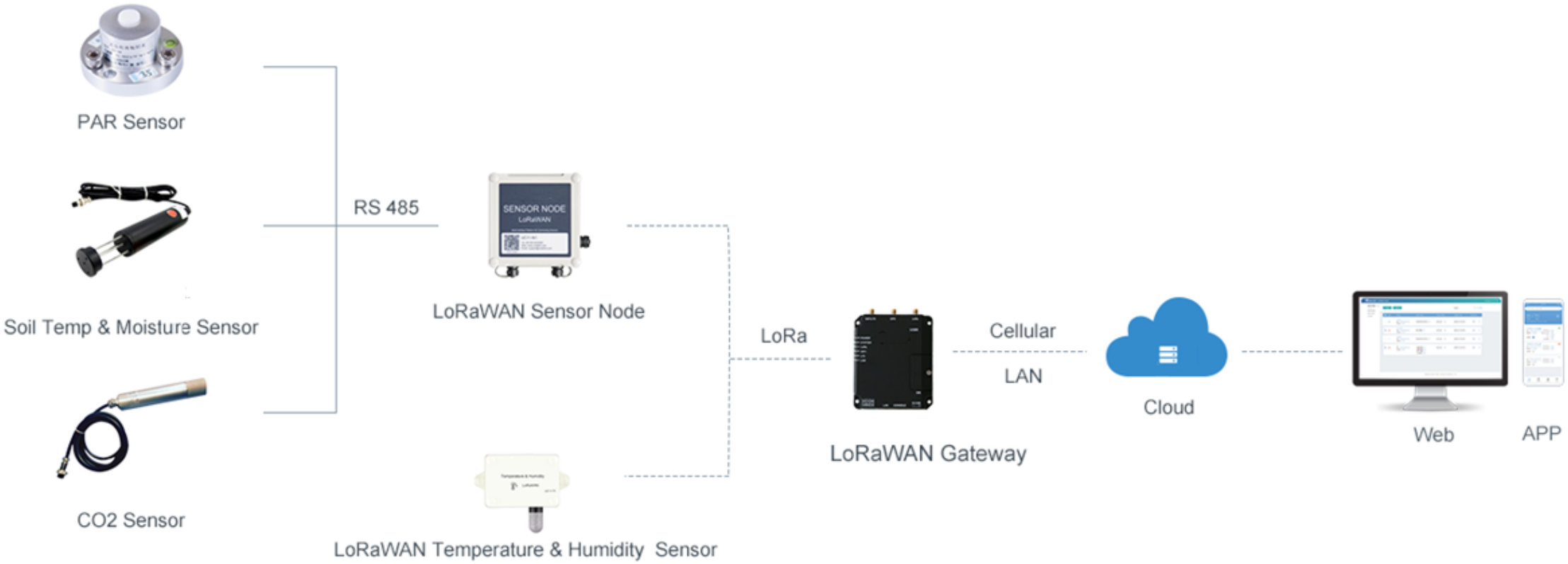
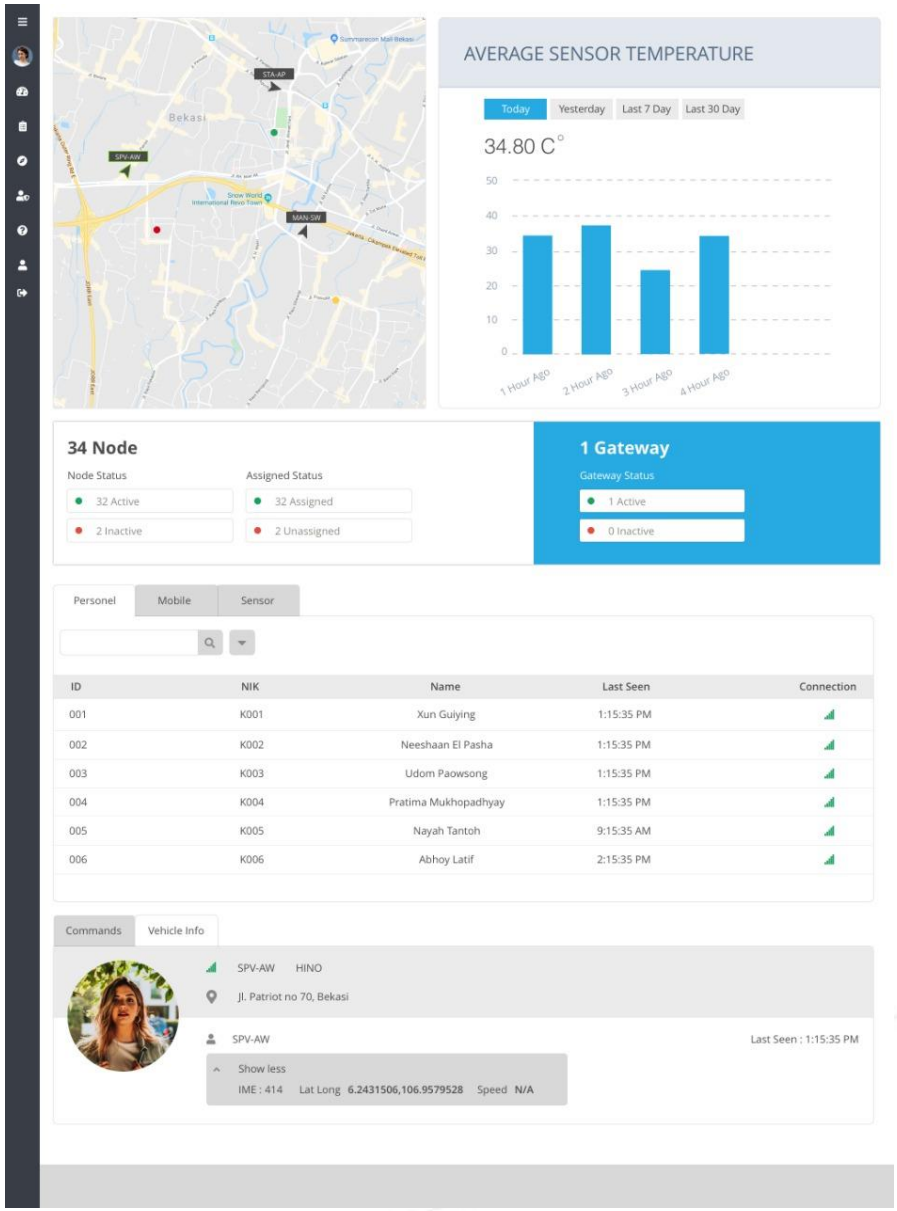


WEB MANAGEMENT WITH APPS

BACKEND MANAGEMENT FOR MONITORING

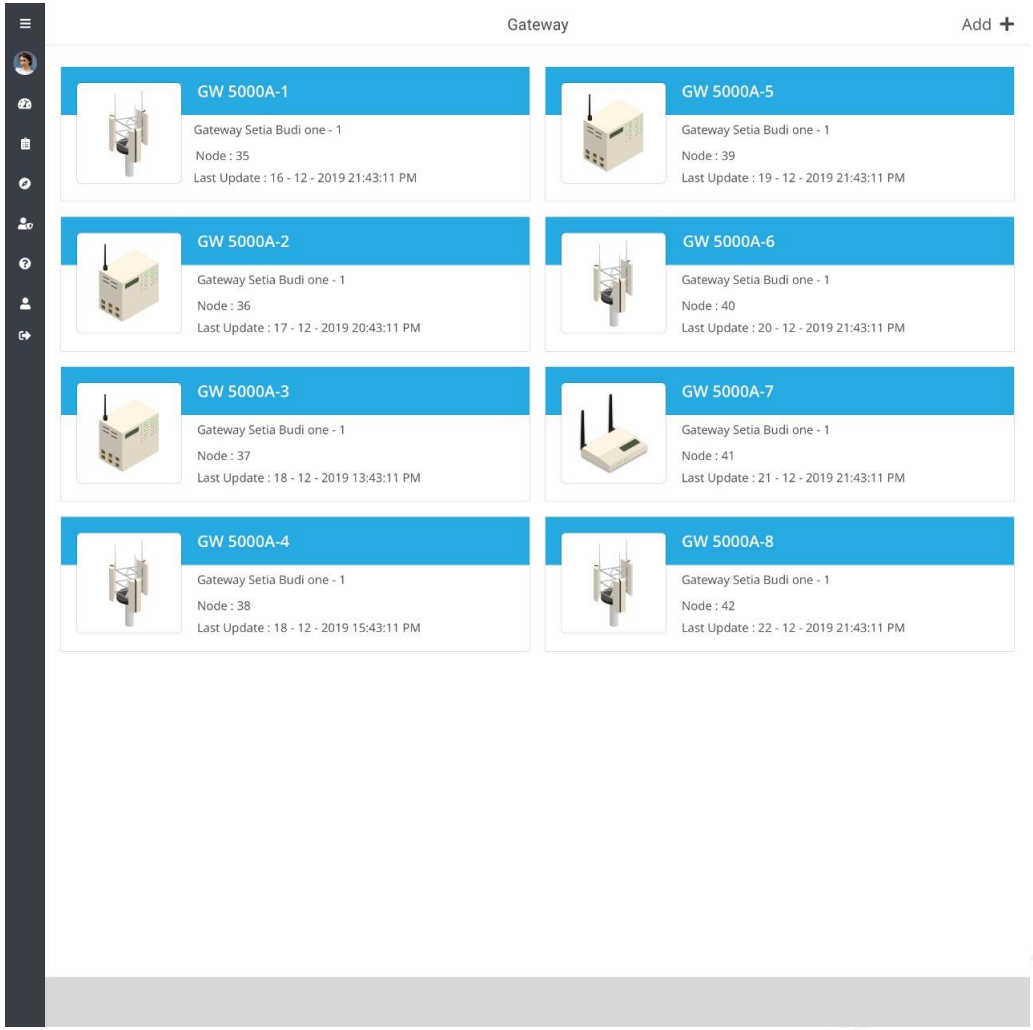
AVIRTECH

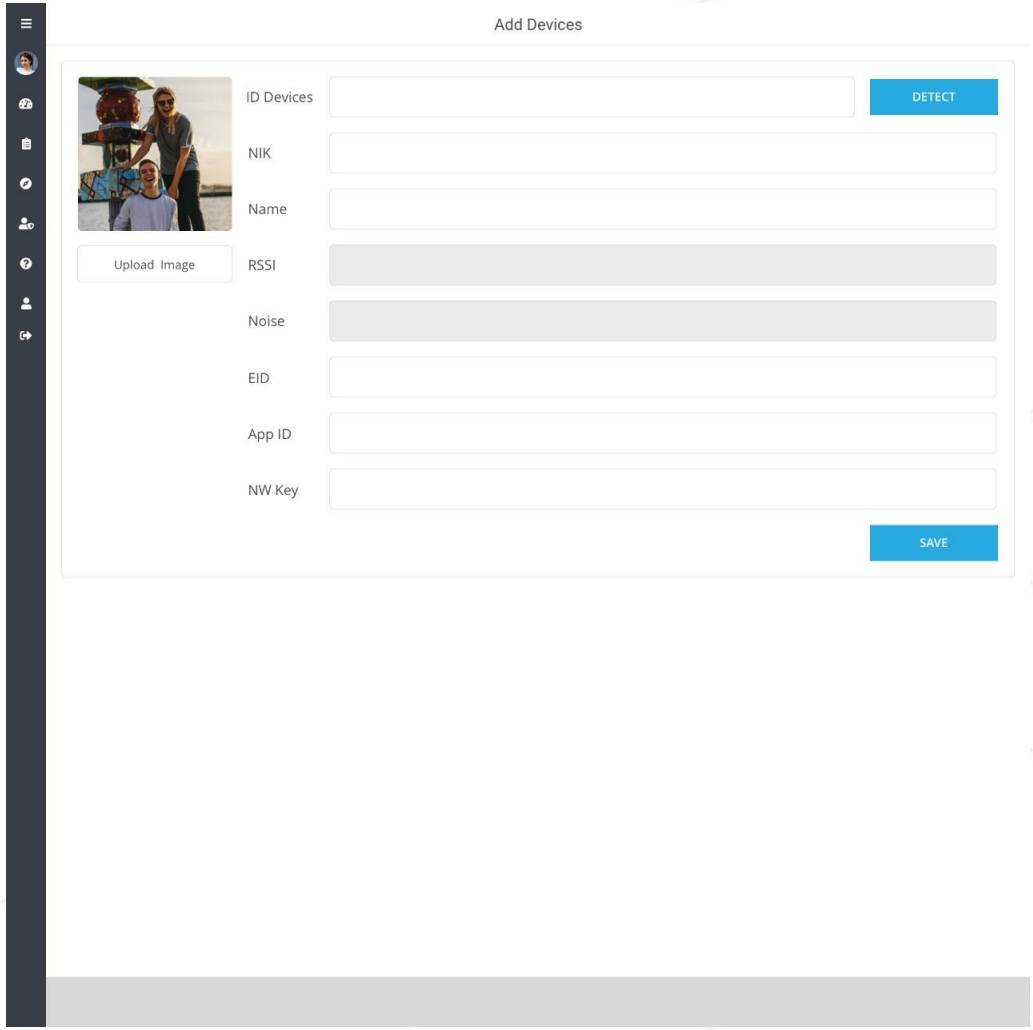


Web-based Dashboard for Administration Monitoring, based on location and updated real time depending on feed/ping period configured for the node

BACKEND MANAGEMENT

AVIRTECH





YOU CAN'T MANAGE WHAT YOU CAN'T TRACK

AVIRTECH

1st Phase	WATER LEVEL MONITORING
2nd Phase	PLANTATION TELEMETRY
3Rd Phase	FIRE FIGHTING SUPPORT

1. Precision Plantation starts with Data Collection using connected plantation and monitoring platform
2. Able to monitor precise water level in plantation in almost real time
3. Monitor all others devices or telemetry in plantation, ex. Soil moisture, humidity, NPK, temperature etc.
4. Important support for fire fighting effort, also Flood and drainage monitoring and control efforts

THANK YOU

FOR FURTHER QUESTIONS,
PLEASE CONTACT

info@avirtech.co