

Meeting Operational Challenges of the Future Energy & Environment

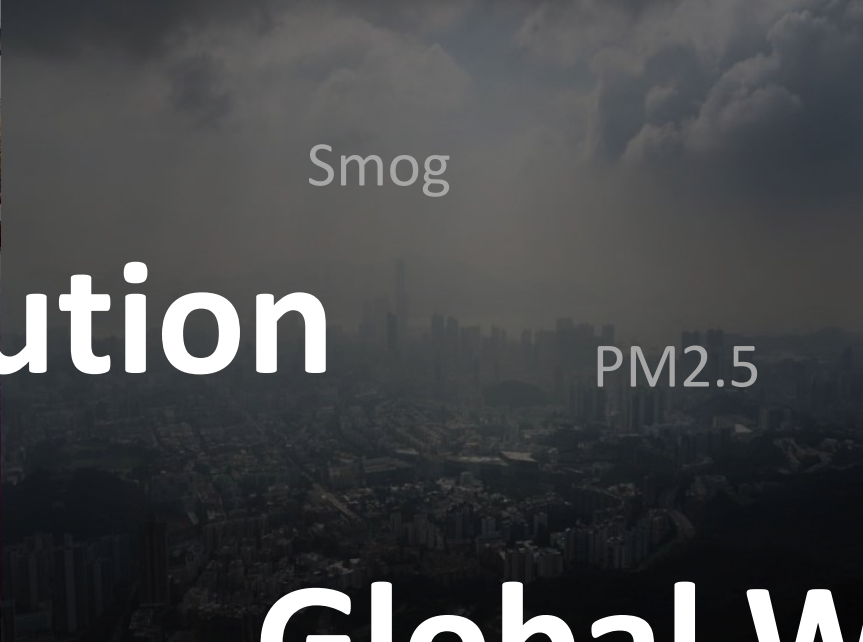
Chingpo Lin

AVP of Industrial IoT Group, Advantech





Water Pollution

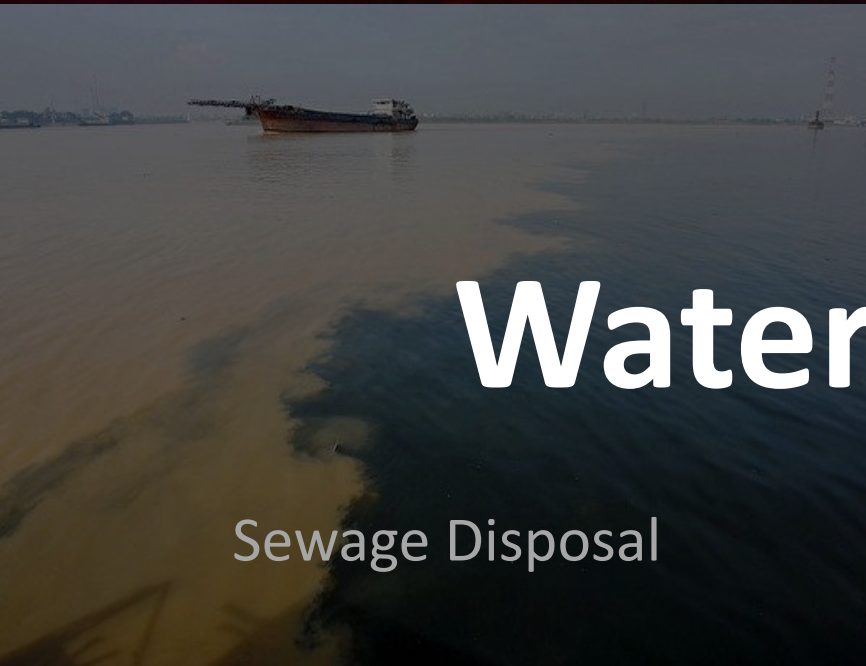


Smog

PM2.5



Air Pollution



Sewage Disposal



Water Shortage



Global Warming

Pollution

Global Warming

Water Shortage

Environment continues worsening

Key Technology for Three Key Applications for E&E

1 Remote
Monitoring,
Remote Control

Wireless Comm.
& OPC UA
Solution

2 Predictive
Maintenance
(Analytics)

Edge Intelligent

3 Optimization
& Intelligent
Operation

Cloud Platform &
Mgmt. Platform

Wireless Communication Map

Data Rate (bps)

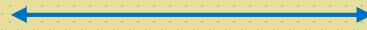


Find Your Best Solution



Cellular (Licensed)

Long Rang W/ Battery



Wide Area

Underground/Outdoor (**Nomadic**)

Latency in Seconds

- Real Time (LTE-M)
- Long Range
- Battery Life
- Device to Cloud



- Private Server
- Higher Data Rate

Low Power Wan

Long Rang W/ Battery



15KM (L.O.S)

Wide Area/Outdoor (**Static**)

Latency in Seconds

- Long Range
- Battery Life
- Confirm Data
- Frequency Hopping

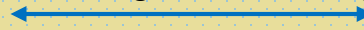


- Real Time
- Higher Data Rate



LAN

Short Range Communicating



100m

Real Time

SMART FACTORY
(Equip. Connectivity)

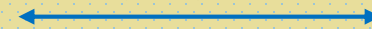
- Real Time
- Higher Data Rate
- Well Established



- Crowded
- Battery Life

Low Power Wan

Long Rang W/ Battery



3KM (L.O.S)

Wide Area/Indoor

Latency in Seconds

SMART FACTORY
(Utility/Facility Monitoring)

- Penetration
- Long Range
- Battery Life



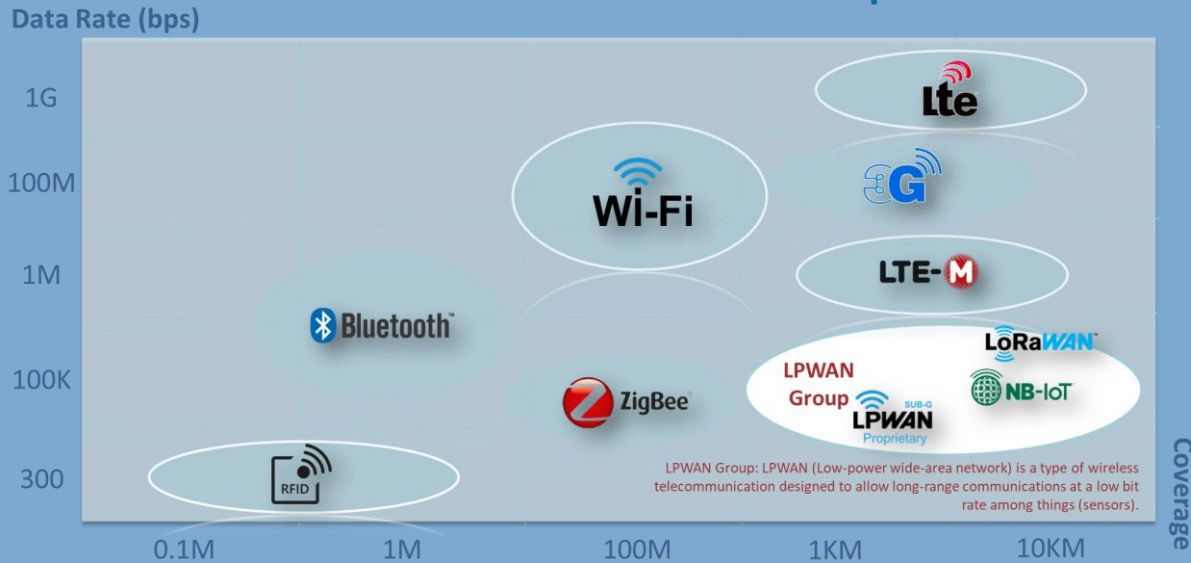
- Real Time
- Higher Data Rate



Advantech Wireless Sensing Node

1

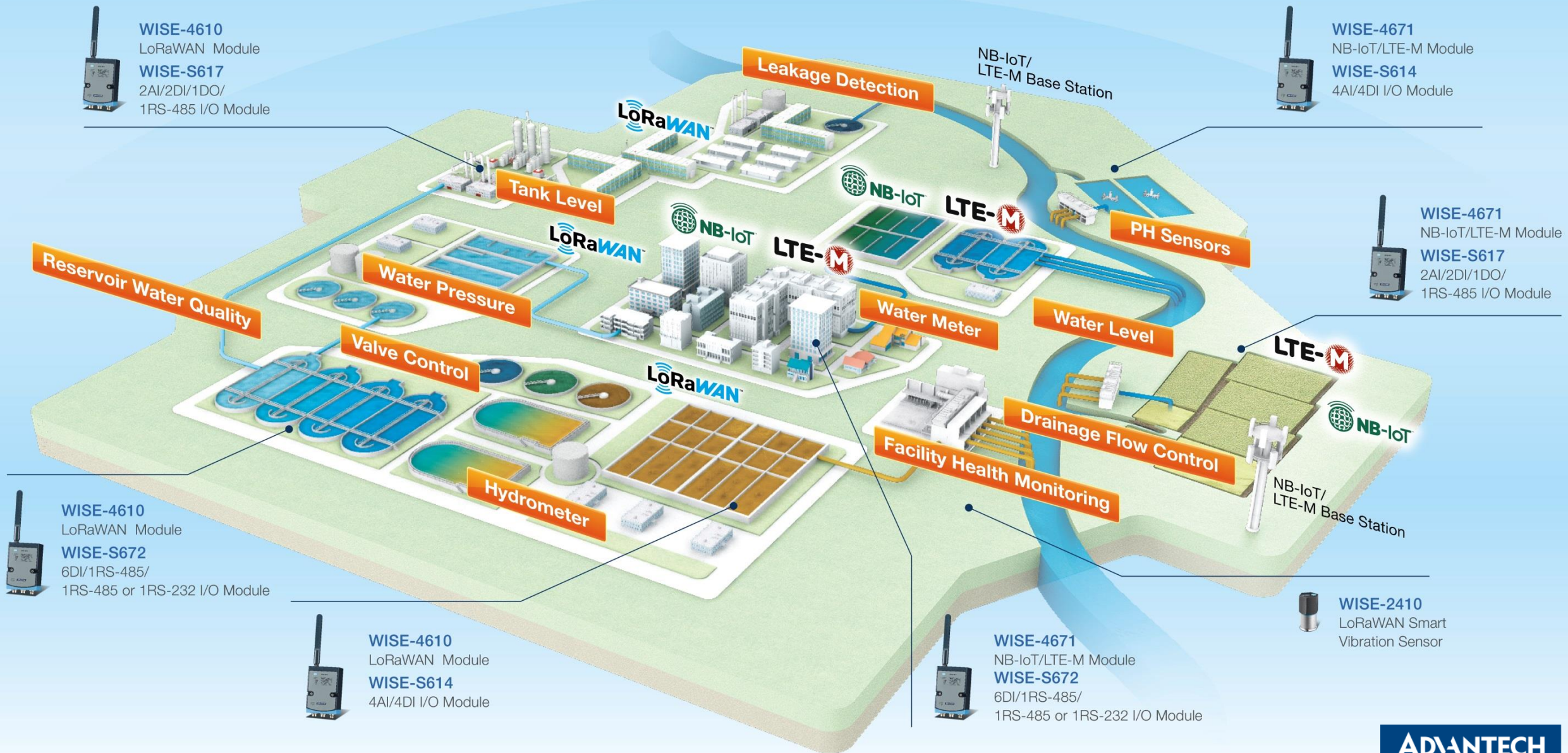
Wireless Communication Map



Modularized High Adaptability IoT Nodes



Intelligent Water Management



What should We Pay Attention to when Large Number of Modules in the IoT

- *More I/O demand for data analysis*
- *Privacy and security requirement*
- *Compatibility to integrate with system (Cloud ,SCADA ,MES..)*
- *IT / OT convergence*

- *Object-oriented*
- *standard protocols for Cloud/MES/SCADA system*
- *Security*
- *M2M decentralized structure*

Internet of Things

OPC UA & Security

Intelligent OPC UA Ready Solutions

IT Server
(MES/ERP)

ADVANTECH
WISE-PaaS
AIoT Solutions & Marketplace

Telecom/
Solution Provider

Public
Cloud

Plant & Enterprise

Integrated MES/ Increased Interaction/ Data Analytics



WebAccess/SCADA Intelligent HMI and Industrial Monitor



HMI / SCADA

Centralized Supervision



Modular Automation Box PCs



Intelligent Automation Controller



Intelligent Inspection System

Edge Controllers

Distributed Control & Virtual PLCs

ADAM-6300 Series

Edge Gateway & Sensing Devices

WISE-EdgeLink
Intelligent I/O Node



WISE-EdgeLink
Intelligent Communication Gateways



WISE-EdgeLink
IoT Edge Gateways



WISE-EdgeLink
Modular Edge DAQ Gateways



Industrial
Fieldbus Gateway



Open & Intelligent Integrated Sensing

Intelligent Edge Device

Intelligent Gateway
WISE-EdgeLink

Intelligent Sensing Node

Intelligent Gateway - WISE-EdgeLink

From Edge Device to Cloud without Coding

Public & Private cloud connection

- MQTT
- AMQP
- LWM2M



Wireless Connections:

- Wi-Fi
- 3G, 4G, GPSGPS

Multiple I/O interfaces



Modbus

BACNet

DNP3

Web API

Notification & reports



EdgeLink Studio (Windows)

- ✓ Project Configuration
- ✓ Online device monitoring
- ✓ Device configuration
- ✓ Data forwarding configurations
- ✓ System settings

EdgeLink Runtime (Linux)

- ✓ End devices connection
- ✓ Data acquisition and transfer
- ✓ 200+ Drivers support
- ✓ Real time / historical data log
- ✓ Connectivity to cloud or 3rd party systems

Data Collection

Protocol Conversion

Data Acquisition

- I/O Drivers
- Data Management
- Customized Tags
- System Tags

Connectivity

- Open VPN
- Connection to WebAccess
- Data forwarding
- Protocols
MQTT/FTP/ODBC/AMQP
WebService/RESTful

Security

- Project Encryption
- Whitelisting
- SSL Encryption
- Data Authority Management

Intelligence

- Event hub for SMS/email alerts
- SoftLogic Runtime
- Data Preprocessing

WISE-2410

LoRaWAN Smart Vibration Sensor

PHM Solution Provider

Automation SI



Water Pump

Blower Ventilation Motor

Industrial Compressor

Conveyor Motor

ISO 10816	
Vibration mm/s	Class I
0.71	Good
1.80	Satisfactory
4.50	Unsatisfactory
7.10	Unacceptable



Preventive Maintenance with ISO 10816

Operators can obtain the vibration condition of 4 classes of machine with 4 levels from WISE-2410. Then, based on the vibration characteristic values to have an immediate diagnosis for motors to plan preventive maintenance for unwanted downtimes.

Inspection Standard



Without Coding or Algorithm implementation with ISO 10816 standard

Remote Detection



Long Range with Low Power Consumption

Computing On-Board



Directly calculate total 8 vibration characteristic values

3-axis Detection



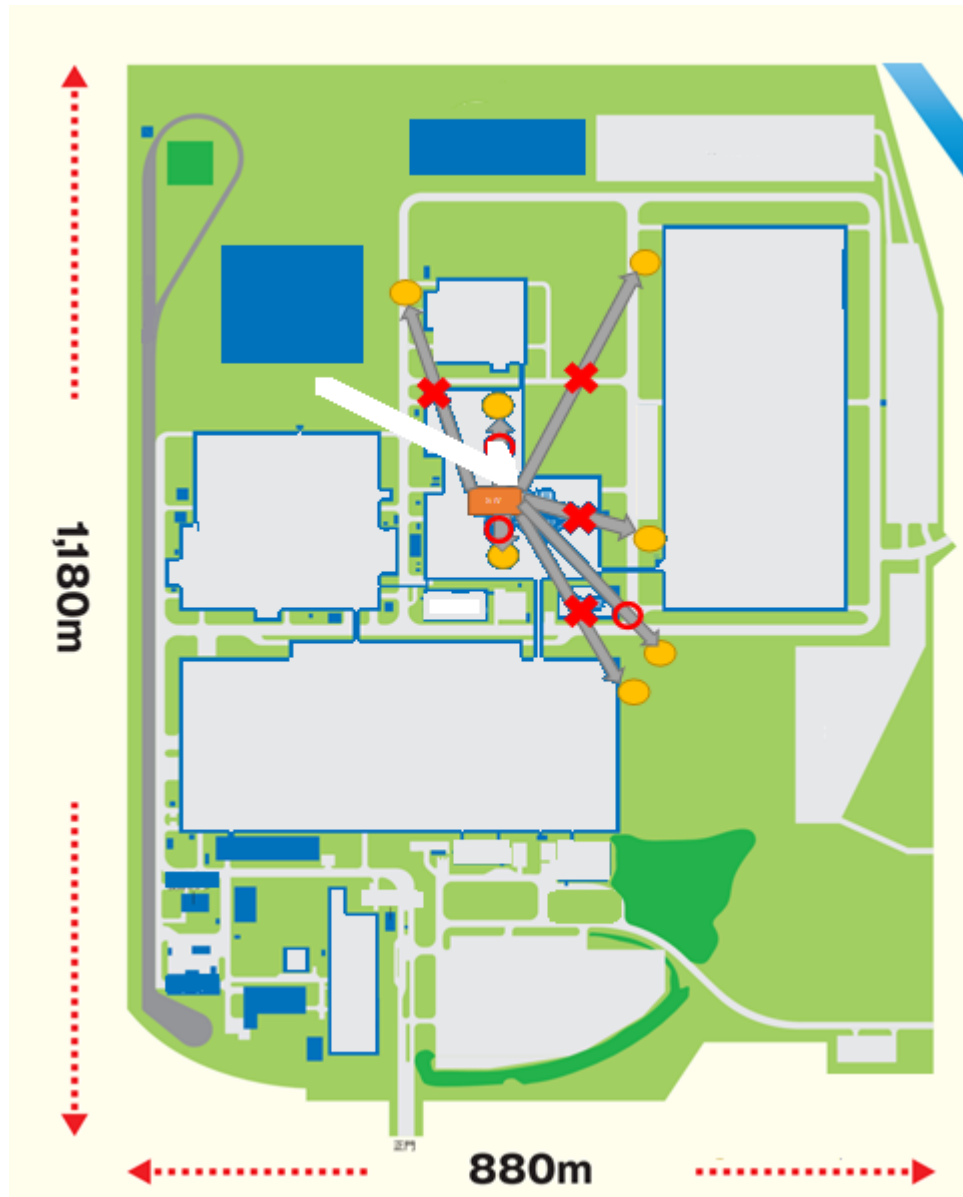
10 ~ 1KHz Frequency Range with max ± 16 g Measurement Range

Battery-Powered



2 years Battery life cycle

Pumps in Factory Facility



WISE-2410
Vibration Sensor



- ✓ Increase the Production Efficiency
- ✓ Decrease the probability of system sudden break
- ✓ Easy Maintenance with Long Wireless Coverage
- ✓ Cost Effective without wire installation and regular inspection by workers



Cloud Platform

Biz Integration Platform

Eco-system Partner

Advantech I.App

Enabling Your Digital Intelligence O&M Management



Domain-Focused
SI (DFSI)

Co-Creation

共創

Industrial
Domain I.App

*Huge Opportunity :
From Traditional SI Biz to
Operations , Services and
Optimization Model*

Key Values

- Domain Service Knowledge
- Solution Integration
- Customization O&M Services
- Online to offline Service



Partner:
I.App Developers

- Domain Industrial Application
- Open API to get Domain Service

ADVANTECH
WISE-PaaS
AIoT Solutions & Marketplace

DeviceOn/BI

Cloud Services
& SW Module

WebAccess/SCADA

WISE-EdgeLink

iSensing,
Automation,
Embedded
Platform

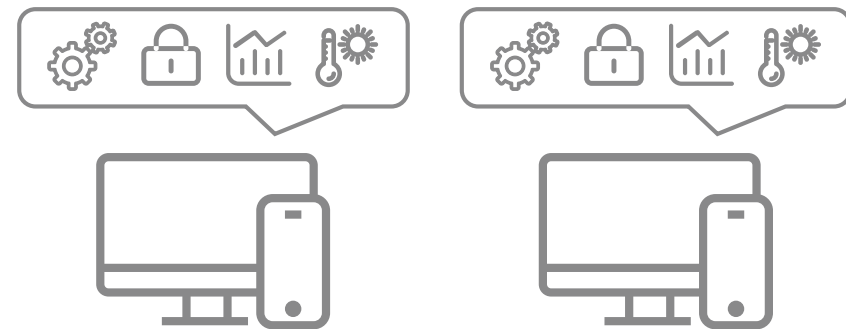


ADVANTECH

Quickly Build Your IoT Cloud Management Platform

Device Management Platform
设备管理平台

Vertical Application Services
垂直应用服务



3Step -Build up your Cloud Management Platform

1. Connect Device
2. Create your Digital twin object
3. Select your application Dashboard



ADAM / WISE / PLATFORMS

Edge sensing devices, platform
devices synchronize data and
configuration to cloud.

ADVANTECH

DeviceOn/BI Business Integration Management Portal

Built to fit into your business organization flexibly

Equipment twin object and dashboards are categorized in the organization with respect to owner and role privileges within the organization, designed from management perspective.

Advanced features such as API plugin and data forwarding making DeviceOn/BI a true accelerator to domain ecosystem.



Equipment Twin Object Management



Dashboard & Command Center Wizard



Hierarchical User Role & Group Management



Event Configuration & Rules



Notification & User Group Management



Patrol Inspection



Domain Data Sources & Calculations Plugin



Customized Format Data Forwarding

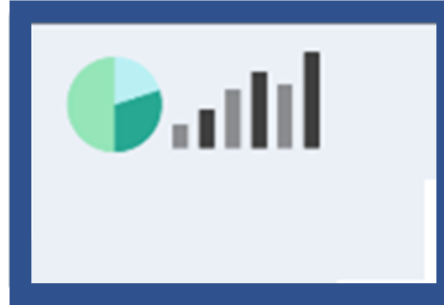


Automated Data Sorting & Archiving

DeviceOn/BI

Business Integration

Patrol Inspection Workflow



Equipment Mgmt.

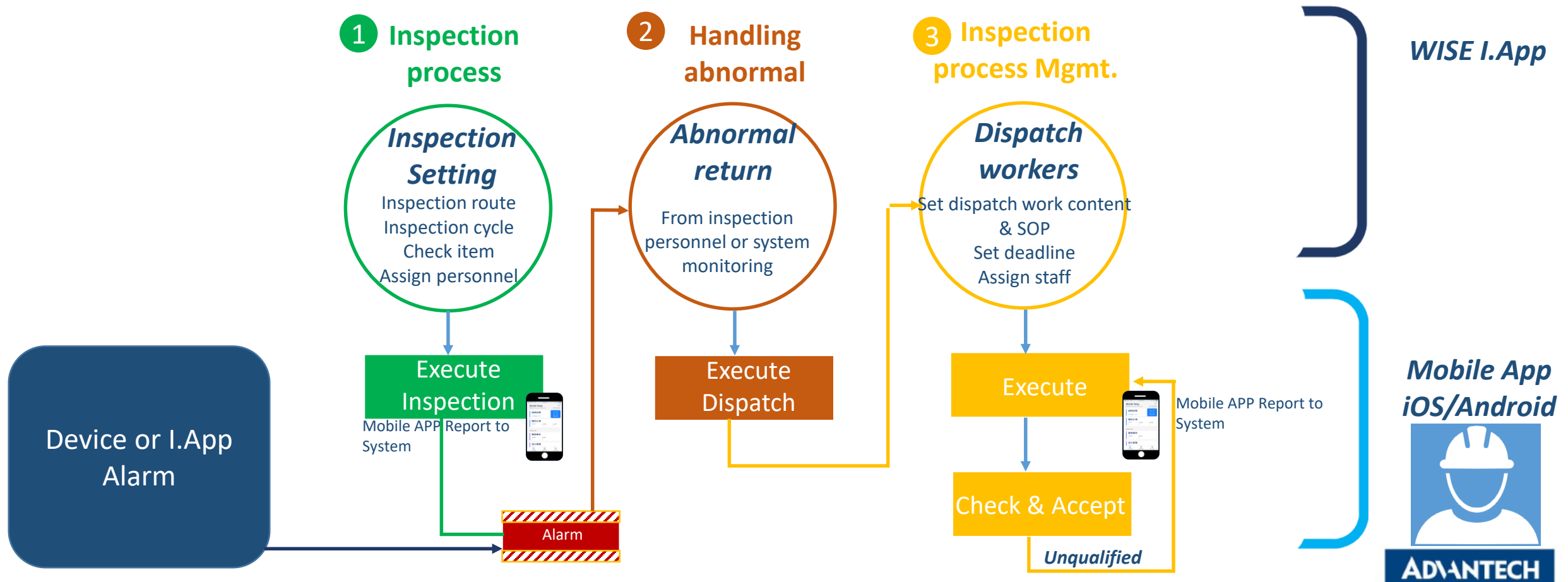
Create site & automatically generate QR Code

Accounts and groups

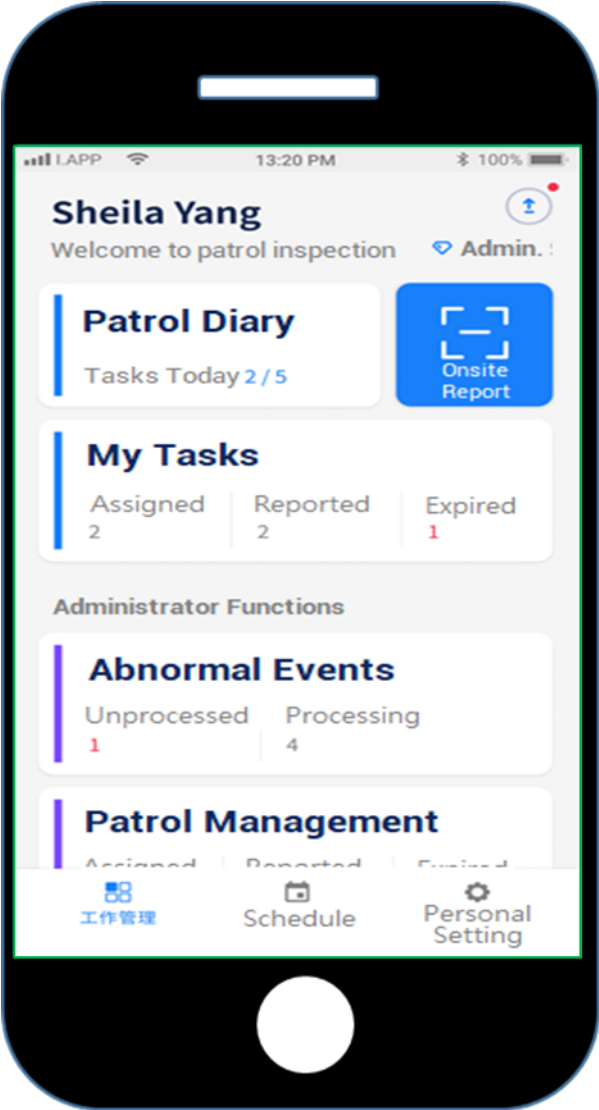
Quickly create account groups

Report analysis

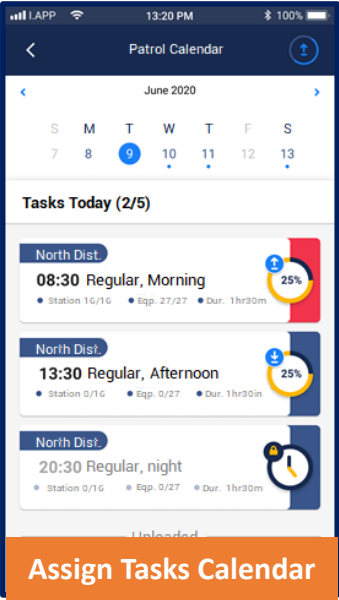
Display, query the statistics of Patrol inspection



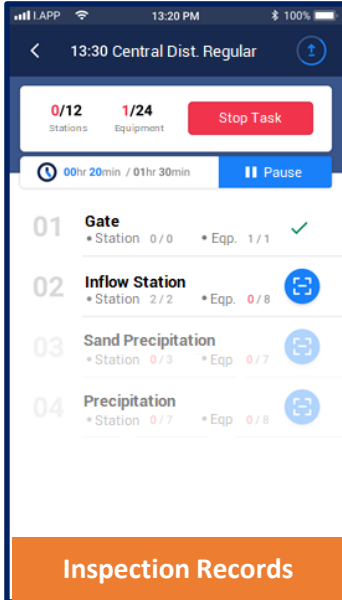
Patrol Inspection Mobile App



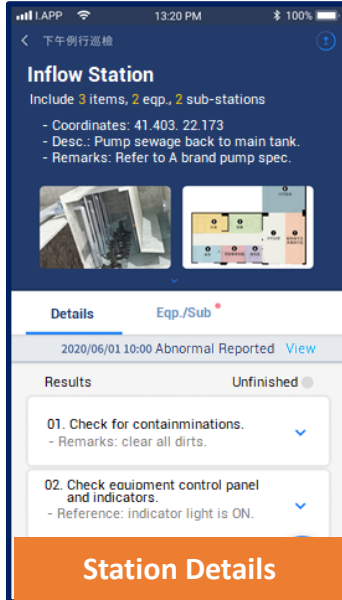
Total Tasks



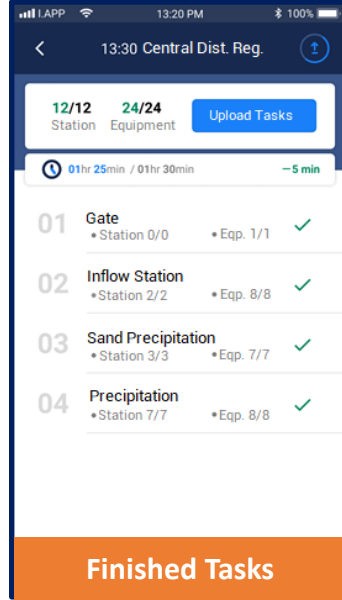
Assign Tasks Calendar



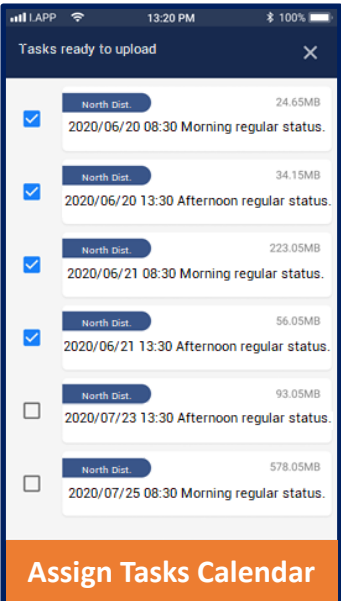
Inspection Records



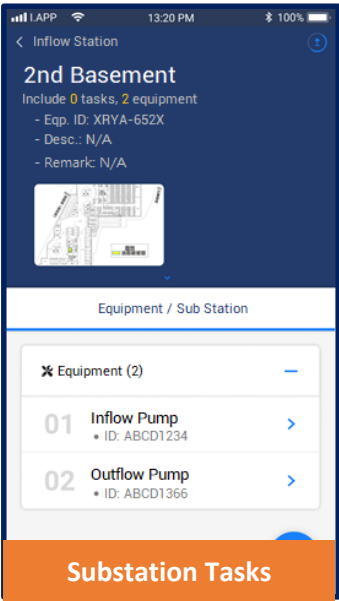
Station Details



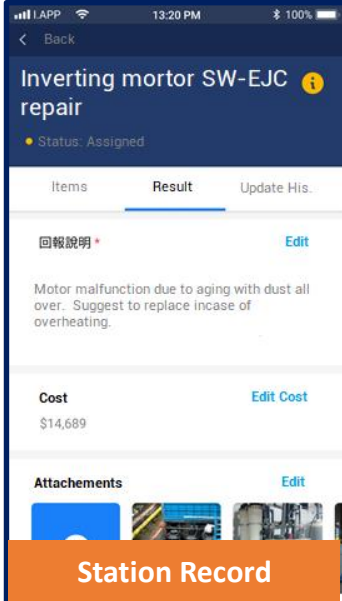
Finished Tasks



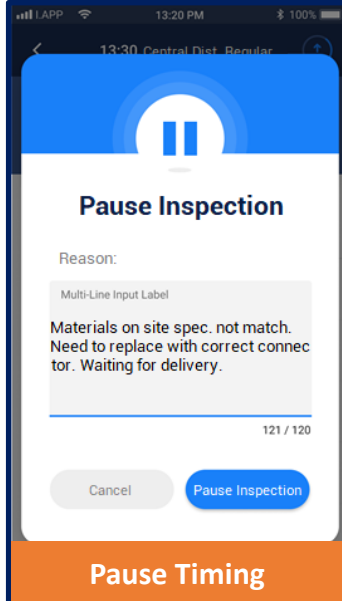
Assign Tasks Calendar



Substation Tasks



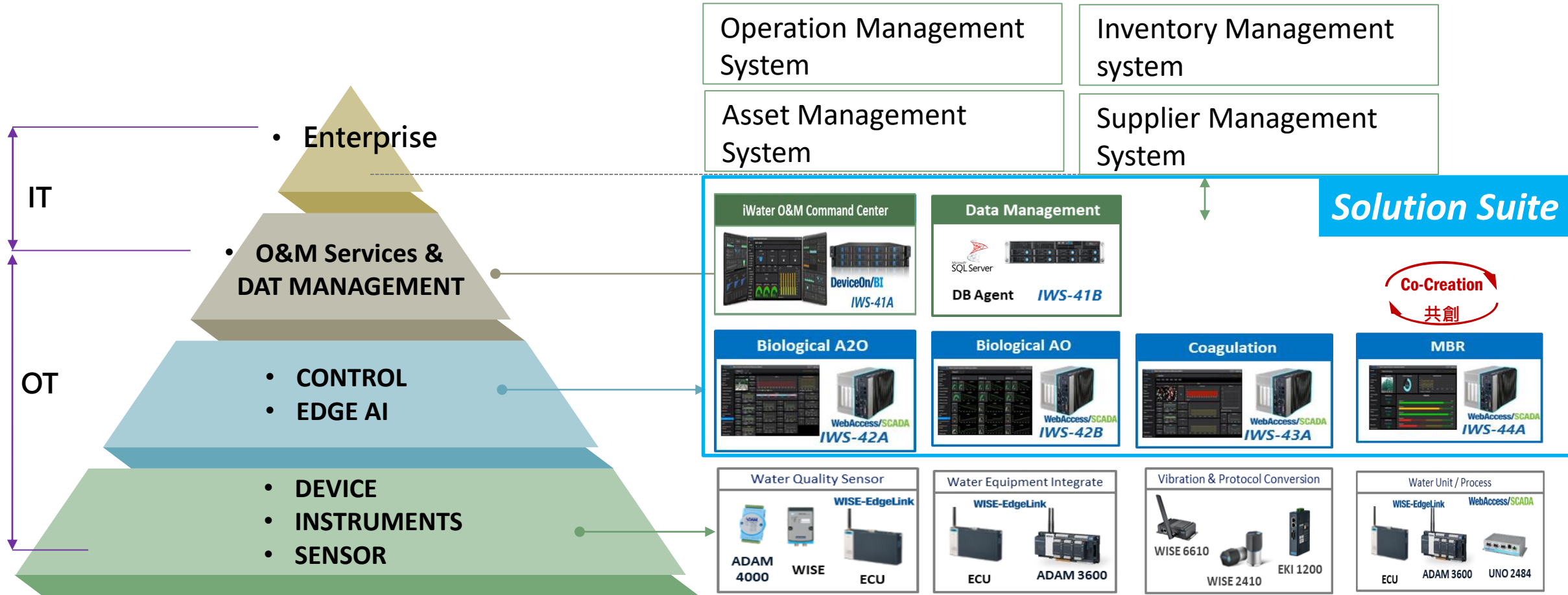
Station Record



Pause Timing

Energy & Environment Solution Suite

iWater Multiple Control and Data Management Layers

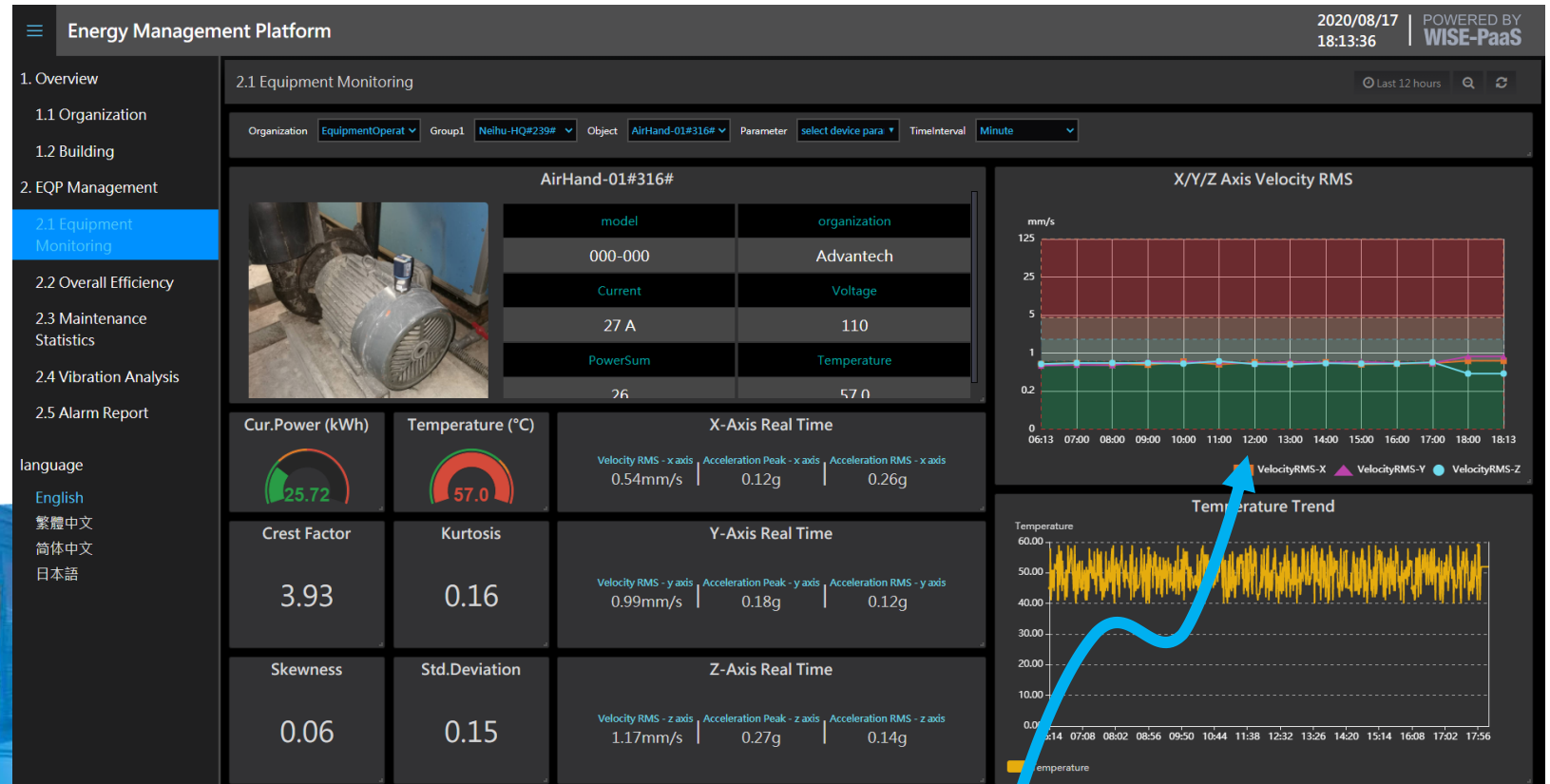


Case Study: Equipment PHM Monitoring

Wireless Vibration Sensor Node
Directly to connect
DeviceOn/BI

WISE-2410

PHM Solution Provider



Preventive Maintenance
with ISO 10816-3

ISO 10816

Vibration mm/s	Class I
0.71	Good
1.80	Satisfactory
4.50	Unsatisfactory
7.10	Unacceptable



Water Pump



Blower Ventilation Motor



Industrial Compressor



Conveyor Motor

Case Study: Industrial Park Wastewater Treatment



Application industry : Wastewater Treatment
Application area : Pingtung , Taiwan

Solution :
- Biological A2O (IWS-42A)
- ADAM-3600
- WebAccess/SCADA

Case background :
Pingtung Agricultural Biotechnology Park

Solution Suite

H/W+SW+ Domain Know-how → Intelligent Water Quality Control

Coagulation



Water Quality Parameters

Range Value

Average value
+/- Standard error

Emission Standard

COD (mg/L)

11.57 ~ 16.97

16.01 ± 1.57

100

NH₄-N (mg/L)

6.23 ~ 8.82

8.13 ± 0.59

75

NO_x-N (mg/L)

1.06 ~ 1.94

1.56 ± 0.29

50

PO₄-P (mg/L)

0 ~ 0.57

0.04 ± 0.11

4

Energy efficiency greater than 23%

*Go Together,
We Go Far and Grow Big*

