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# IoT Projects Implementation Viewpoints

Owner

## Business View



### IoT = Digital Disruption

- Better decision-making
- Key Drivers : Competition / Technology

Users

## Functional View



### Define the Products & Features, IoT system must deliver

- Requirements : Feature/ Business/ Service/ System design
- Data & Device Management
- Reports & Dashboard

Architect

## Technical View



### How to Architect the IoT Infrastructure & Software

- IoT Devices & Protocols
- Event Processing
- Local Dashboard
- Security

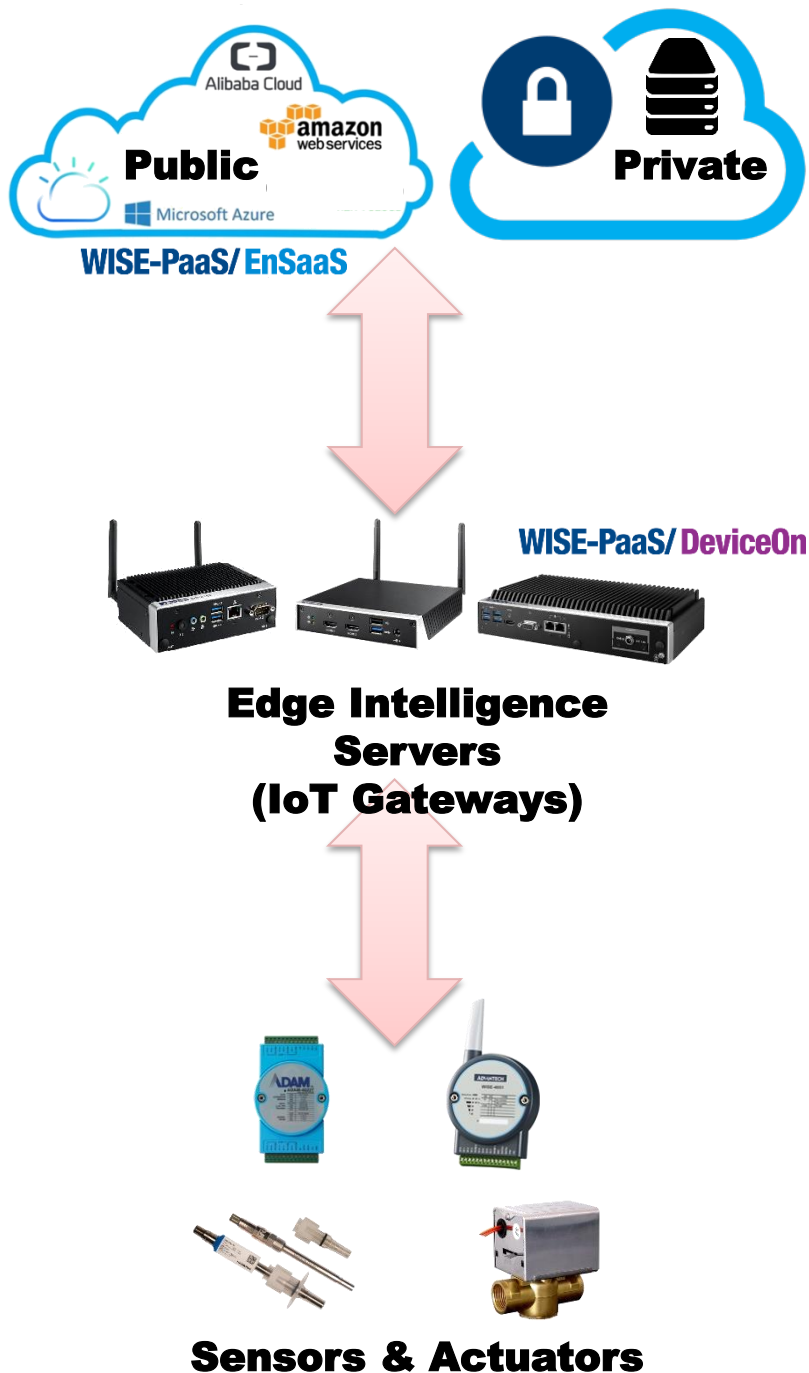
S.I.

## Implementation View



### Define the work required for IoT Implementation

- Roles & Responsibilities
- Define measureable objectives and results
- IT & OT conflicts
- Mindset changes



# IoT Implementation Challenges

**#1**

## Diverse Protocol Integration

- Too many Industries and sub-profiles
- Existing & new machines

**#2**

## Lack of IoT Development Teams

- IT vs OT concerns and co-ordination
- Lack of necessary skills & Resource

**#3**

## Security Concerns

- Business confidentiality
- Increase network nodes

**#4**

## IoT Investment Costs Justifications

- ROI
- Analytical Tools to use
- Scalability & Security for data
- Support Model

# Edge Intelligence & Data Service Servers

Simplify IoT Deployment from Edge to Cloud



## WISE-PaaS/ DeviceOn

IoT Device Operation Management



Device Management



Monitoring & Control



Update Management



EIS-D150

High Performance



EIS-D620

RISC-based



EIS-D210

LPWAN Connectivity



EIS-D120

Multiple I/O



EIS-D110

Wireless Connectivity

### Wireless

IoT Devices



Controllers



IoT Devices



Sensors

Industrial Protocols



Motors

PLC Controllers



Workstations



Robots

CNC Controllers



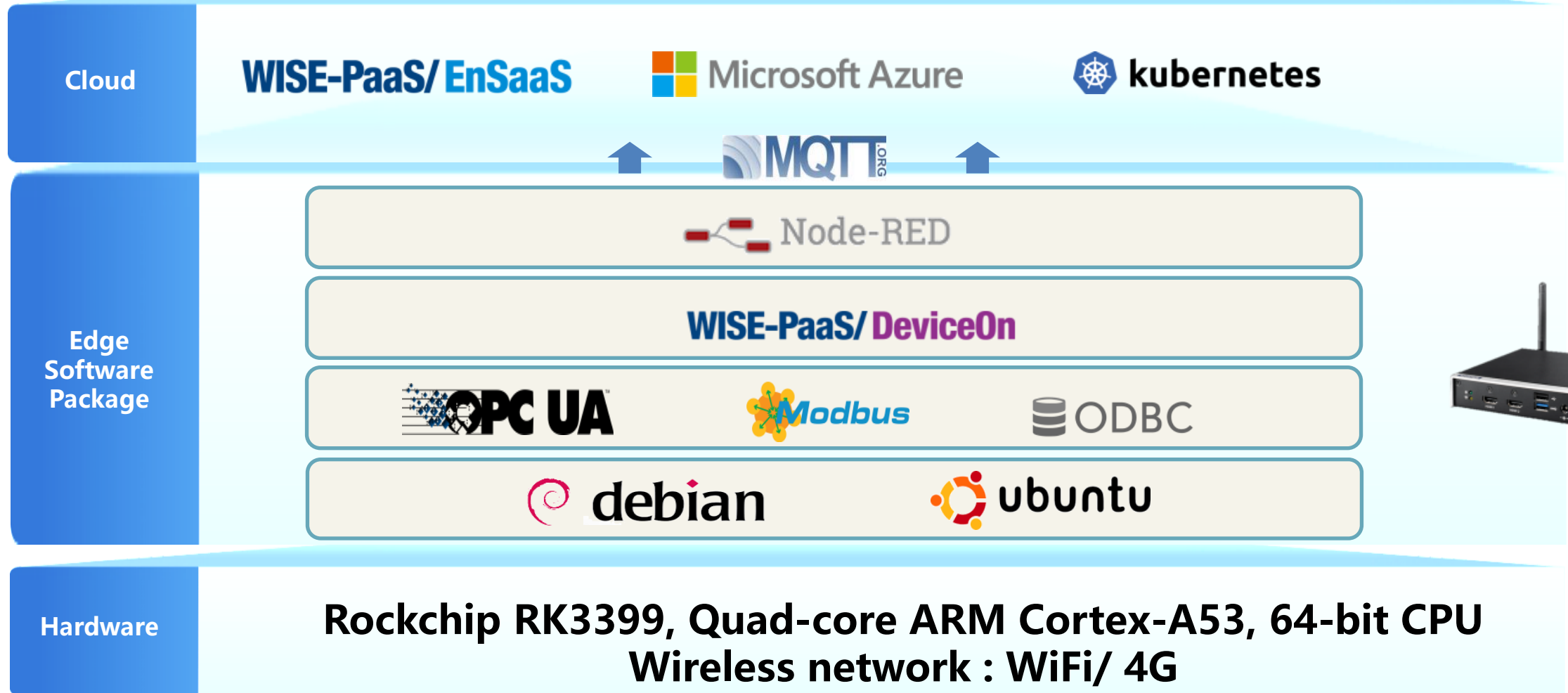
CNC Machines



IoT Solutions  
Alliance  
Premier

arm

# EIS-D620 System Diagram





# Application Scenario

Sensor  
(Mod Bus)



CNC/ Controller  
(OPC-UA)



Machine



Smart  
Building



- Collect simple data from sensors, equipment and devices
- Simple Data preprocess and Internet/Intranet connectivity for legacy devices
- Connect to cloud/backend for data visualization or analysis



- Replaces traditional manual practices in the PCB baking process with **automatic control and monitoring**, improving productivity and yield rate.
- Produces digital records for users to keep track of the **operational status** of the baking ovens and also establish production information traceability for future lookups.
- Enables cross-platform integration with the customers other information systems, such as MES, so as to optimize workflow to higher efficiency.

## Case Study : Automatic PCB Baking Process and Intelligent Asset Management





# Data Service Server

## Scalable Data Management Platform for Private Cloud Solution



- ✓ **Lightweight**
- ✓ **Developer Friendly**
- ✓ **Easy to Deploy**



Max. Scale-out to 16 Instances



High Availability

**All-in-one Platform**

### Open Standard Structure

- Kubernetes built in
- Multiple DB connections
- On-demand microservices

### Integrated IoT Software

- Environment deployment
- Platform management
- Application development

### Sustainable Management

- Condition monitor
- Load balance
- Self-health



# Software Stack

## Platform Management

### Message Broker



- Lightweight and easy to deploy on premises and in the cloud. It supports multiple messaging protocols..

### Backend Management



- Deployment, scaling, and management of containerized applications.
- Ceph stores data as objects within logical storage pools. The algorithm enables the Ceph Storage Cluster to scale, rebalance, and recover dynamically.



### Database Management



PostgreSQL



- A powerful, open source object-relational database system.
- MongoDB is a document database, which means it stores data in JSON-like documents.

## WISE-PaaS/ DeviceOn

### Operation Management



#### Device Management

- Automatic device registration
- One-key to dashboard
- Device security



#### Monitoring & Control

- Real-time operations
- Power on/off
- Remote control



#### Update Management

- Batch provisioning
- Firmware updates
- Software updates

## Applications



Grafana



Prometheus

### Data Visualization & Monitoring

- Grafana allows you to query, visualize, alert on and understand your metrics.
- Prometheus is an open-source software application used for event monitoring and alerting.



Kubeapps



Docker



CHARTMUSEUM

### Applications Management

- Kubeapps is a web-based UI for deploying and managing applications in Kubernetes clusters.
- The Docker Registry is a stateless, highly scalable server side application that stores and lets you distribute Docker images.
- ChartMuseum is an Helm Chart Repository server written in Golang. It provides an API for uploading charts.



Kubeflow

### Machine Learning

- Making deployments of machine learning (ML) workflows on Kubernetes Device Management

# Application Scenario

**Equipment  
Management**



**Optimizes  
Manufacturing**



**Energy-efficient  
Building**



**Smart  
Retail**

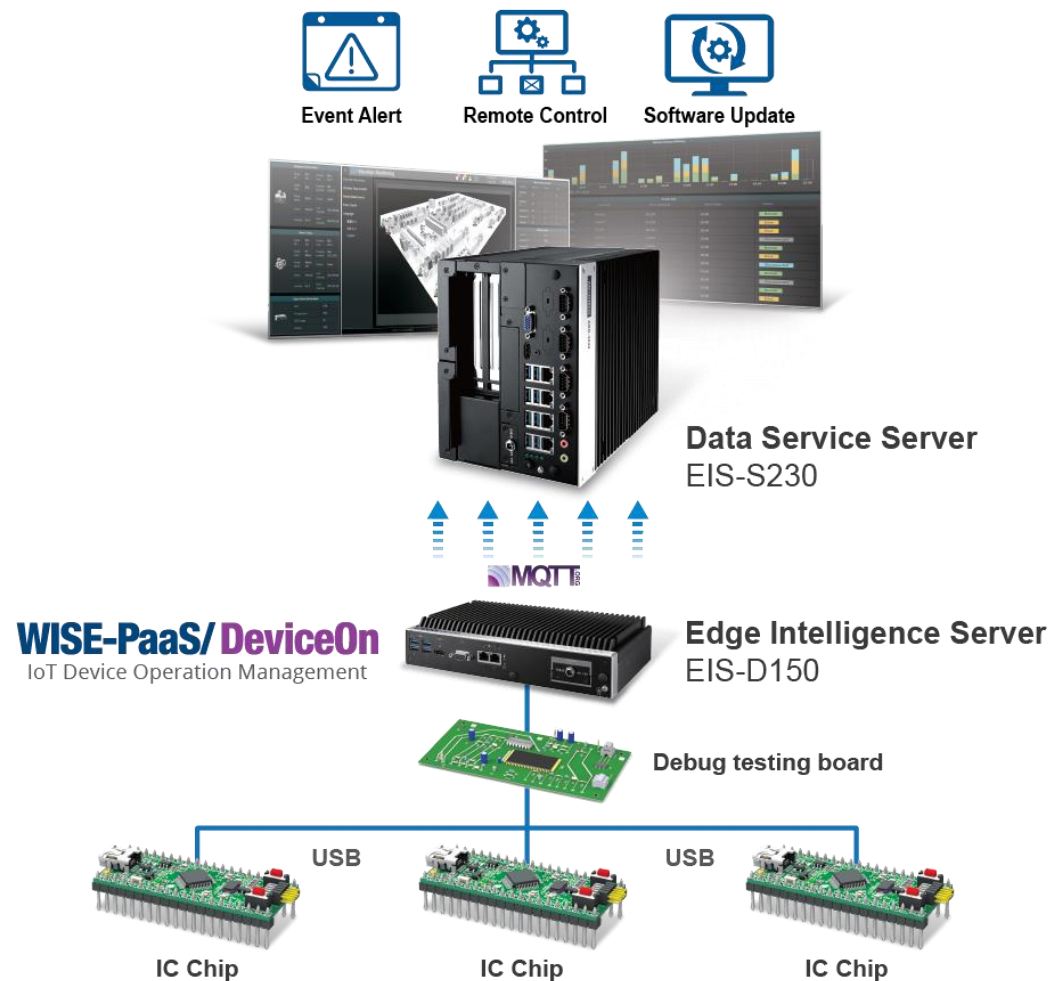


- On premise IoT solution adopting Advantech SRP
- Local cluster platform
- Typical Kubernetes solution with specific HW and expansion ready solution
- Require AI with ML/DL in next step



- Enhances equipment management, optimizes the IC test process, and improves overall productivity and efficiency.
- The implementation of remote monitoring and software updates via OTA technology reduces the workload of the IC testing department.
- Industrial-grade computers provide higher robustness and reliability on the production line environment

## Case Study I: Remote Monitoring System Optimizes IC Testing Workflow Efficiency and Productivity





# Equipment to Intelligence (E2I) I.APP

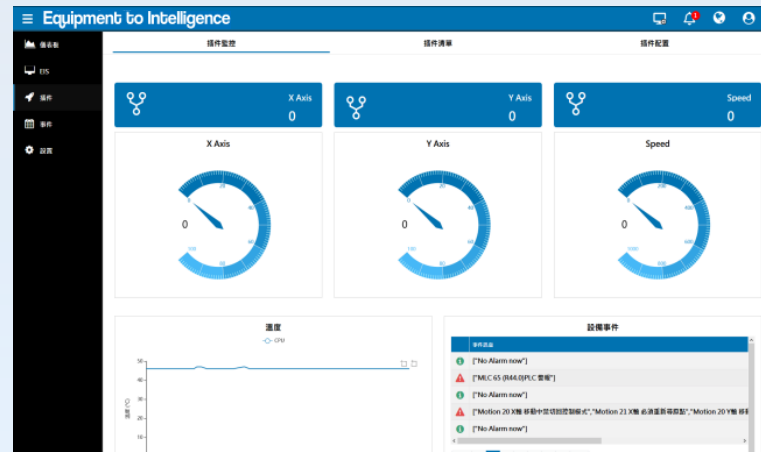
Enabling Effective Equipment Management and Productivity



Industrial Equipment  
Manufacturing



Semiconductor



Energy Management



Intelligent Building



## Operation Efficiency

Equipment working status  
monitoring and management

## Preventative Maintenance

Auto-alert, history data tracking  
and re-action rule engine

## Cloud Ready Solution

Support Azure, AWS and K8S  
Microservice structure

## Easy Integration Platform

Support multiple-equipment protocol  
integration and SDK

# E2I.APP Architecture

## Industrial APP

### IEM



Equipment  
to  
Intelligence

Plug-in Manager

Data Intelligence

Event Manager

Dashboard

## IoT - PaaS

### Generic I.APP & MicroServices

#### DeviceOn

- Device Management
- Zero Down Time
- OTA update

#### Dashboard

- Data visualization
- Alarm & Event
- Mobile devices support

#### Database

- IoT Data management
- Auto scaling

#### Backend

- Load balance
- Self Healing

3<sup>rd</sup> Party  
IoT PaaS &  
MicroServices

## IaaS

### Public Cloud

Azure



### Private Cloud

WISE-Stack  
Data Service Server



kubernetes

## Edge Intelligence



### Event Processing

- Rule Engine
- Alarm
- Action

### Data Intelligence

- Plug-in Management
- Data pre-processing
- Zero Down Time

### Security

- Data transfer encryption
- User Authentication
- Watchdog

# E2I.APP Functions Highlight



## Equipment to Intelligence Industrial APP



## Equipment Connectivity

- Protocol convertor (Plug-in)
- OPC-UA/ Modbus/ ODBC
- Standard Plug-in Editor and deployment

## Data Visualization

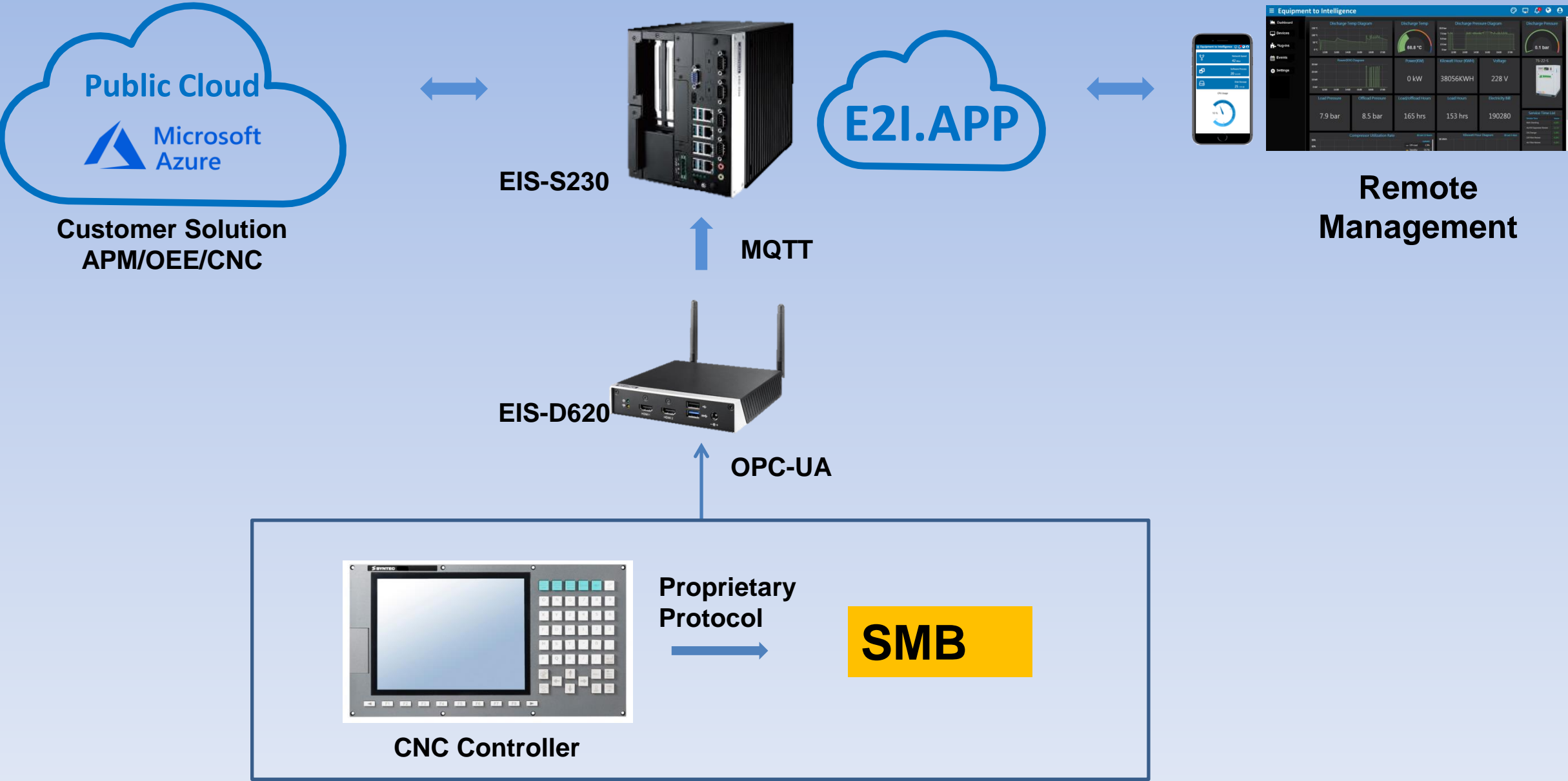
- Status overview
- Auto-generate dashboard by Equipment
- Easy customization and Integration

## Edge Intelligence

- Data pre-processing
- Re-action rule engine
- Abnormal Notification



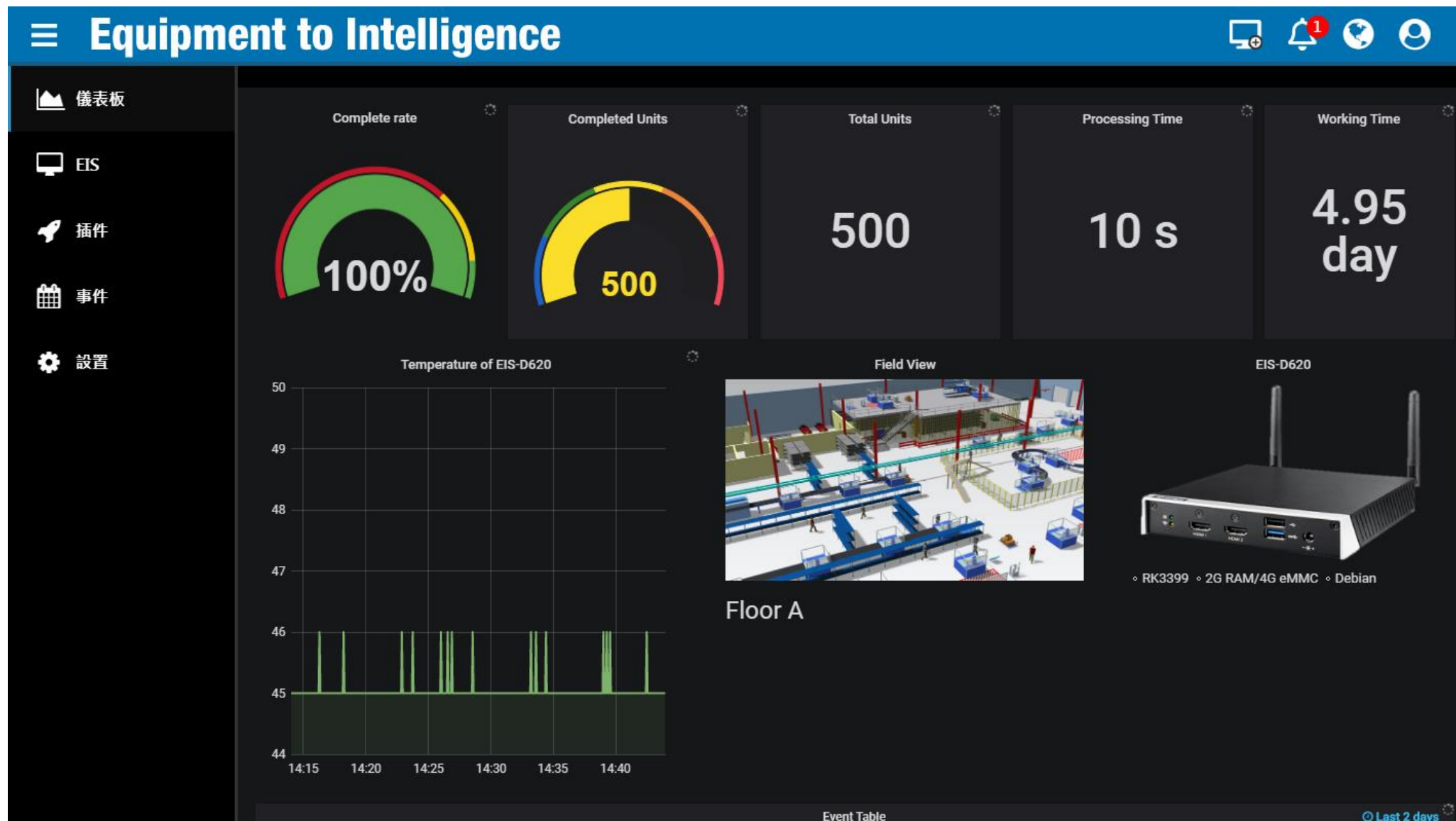
# E2I.APP WPC Demo Secnario



# Demo QR code



# Overall Dashboard





# IoT Application Landing

# Year 2019

## Project Discussed : 126

# Design-in : 62

NTT, CRRC, Maevi, NTT,...

## Design-win : 26

# Shin-Kong HealthCare, Syntec, Micron, ASE,...



## Solution Partner & DFSI



# Edge Computing and Intelligence Solutions

## ADVANTECH WISE-PaaS

AIoT Solutions & Marketplace

Multi-Cloud Interoperability &  
Application Services



Equipment  
Mgmt.



Asset  
Mgmt.



Face ID  
Recognition



License Plate  
Recognition

### Edge.SRP

Edge.SRP  
Signage  
CMS

Edge.SRP  
EdgeLink

WebAccess  
SCADA

WebAccess  
CNC

### DeviceOn.App

DeviceOn  
OTA

DeviceOn  
E2I

DeviceOn  
ePaper

DeviceOn  
FaceView

### 3rd Party App

McAfee

Acronis

Alleantia

Azure



m2.com

Wireless Gateways



Embedded Computers



OPC UA Modbus

Edge Intelligence Servers



Digital Signage Players



AI Inference Systems



CO2 / Temp. / Vibration / pH Sensors



Machines/ Manufacturing/KIOSK



Air Compressor / Energy Storage/ Robotic



Display/ Signage



Camera

# *Co-Creating the Future of the IoT World*

