Andon I.App Solution Introduction

**Advantech Industrial IoT / AII/
iFactory Smart Manufacturing Solution**
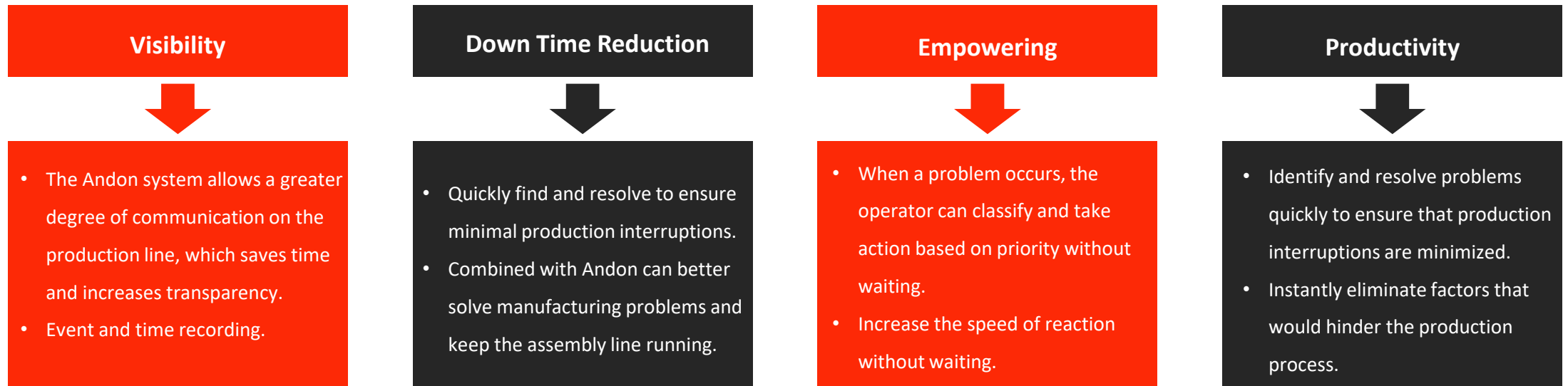
Outline

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Overview

In the event of abnormal machine failures, material shortages, security issues, and interruption of production, an operator can simply click a button on the TPC screen or mobile phone which sends out alerts.

Once Andon receives an abnormal message, it can automatically or manually dispatch a maintenance request to the relevant personnel. Web-based software application, relevant personnel can use any Internet-connected device, tablet computer, notebook computer, iPad, anytime, anywhere through the browser to send maintenance requests to the relevant personnel in real time, and the relevant personnel can also receive the maintenance work order immediately. Repair, and quickly report the repair progress, and record the repair process.

The factory can use the maintenance history collected by Andon as data for product iteration, preventative maintenance and other analysis, so that post-event remediation can be advanced to pre-event prevention, reducing downtimes and improving revenues and productivity.

Visibility

- The Andon system allows a greater degree of communication on the production line, which saves time and increases transparency.
- Event and time recording.

Down Time Reduction

- Quickly find and resolve to ensure minimal production interruptions.
- Combined with Andon can better solve manufacturing problems and keep the assembly line running.

Empowering

- When a problem occurs, the operator can classify and take action based on priority without waiting.
- Increase the speed of reaction without waiting.

Productivity

- Identify and resolve problems quickly to ensure that production interruptions are minimized.
- Instantly eliminate factors that would hinder the production process.

User Benefits

- **Quick Response**

    A visual dashboard can be better understood by reducing time involved in finding information about a shutdown of a production line.

- **Better Control**

    By predicting problems, Andon enables maintenance teams and managers to better control the production line. A real-time dashboard and Andon service interface can effectively reduce the communication cost between operators and supervisors

- **Data Collection**

    To develop and maintain an effective management system, information about production line functions must go from the lowest level of the organization to the decision-making top. This way, managers will have better visibility and be able to improve of all aspects of the production line.

Abnormal Handling Process

Andon Visualization Management

Real-time information significantly improves incident handling and management optimization

Reduce Abnormal Events

Abnormal Event Trigger

1. Production Issues
   - Abnormal machine failures, lack of materials, Information issues etc.
   - Andon button triggered after production exception.

Incident Analysis

2. Response
   - Incident analysis, delivered by multiple platforms.
     i. Dashboard
     ii. E-mail
     iii. Voice call
     iv. Message
   - Duration Calculation

Response & Process

3. Step by Step Response
   - Real-time process and monitoring.
     - Precise managed time node, related to the corresponding level.
   - Time limited (customize).
   - Corresponding level defined.

Abnormality Fixed

4. Abnormality Fixed
   - Event log created and delivered through multiple platforms
     - Dashboard
     - E-Mail
     - Voice Call
     - Message
   - Whole process analysis

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Anomaly Overview Dashboard

Anomaly Overview Dashboard shows real-time anomaly status of production lines and stations and allows maintenance teams and management to have more control over improvements on the production line.

Failure Metric Tracking

By tracking and analyzing failure metrics, including MTBF/MTTR/MTTD ratios and abnormal root causes, managers can reduce downtimes.
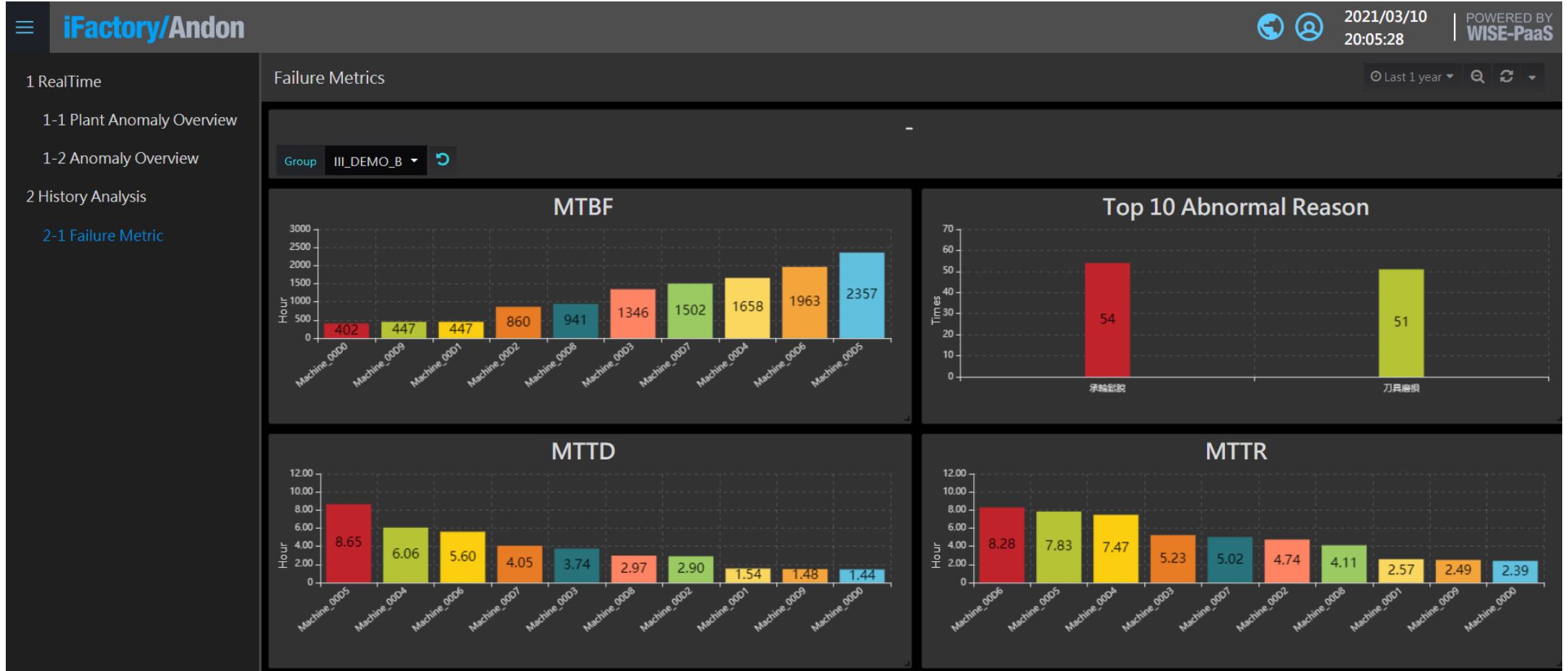
Abnormal Event Record

Field status layout shows real-time status of machines and stations, which helps users identify problems accurately to resolve issues and further improve processes.

Group ⫼ ▾ ↺

Number of Events	Average Detection Time	Average Resolve Time	Average Elapsed Time
12	23.3 min	6.9 hour	11.1 week

Event Name	Mode	Location	Repairer	Status	Time Created	Detection Time	Repair Started Time	Resolve Time ▾	Completed Time	Elapsed Time
Event02	Manual	-	-	Cancel	2022-01-25 09:35	-	-	-	2022-01-25 09:36	42.4 s
Event01	Manual	-	-	Overdue	2022-03-24 17:59	-	-	-	-	2.7 week
Event02	Manual	-	-	Overdue	2022-03-24 17:58	-	-	-	-	2.7 week
Event01	Manual	-	Test_User	Overdue	2022-02-16 18:17	-	-	-	-	7.8 week
Event01	Manual	-	-	Overdue	2022-01-25 14:44	-	-	-	-	11.0 week
Event02	Manual	-	-	Overdue	2022-01-25 14:42	48.6 s	2022-01-25 14:43	-	-	11.0 week
Event02	Manual	-	-	Overdue	2022-01-24 18:20	-	-	-	-	11.1 week

Abnormal Event Alarm

Integrates with iMobile alarm service, both manual and automatic call-outs are available :
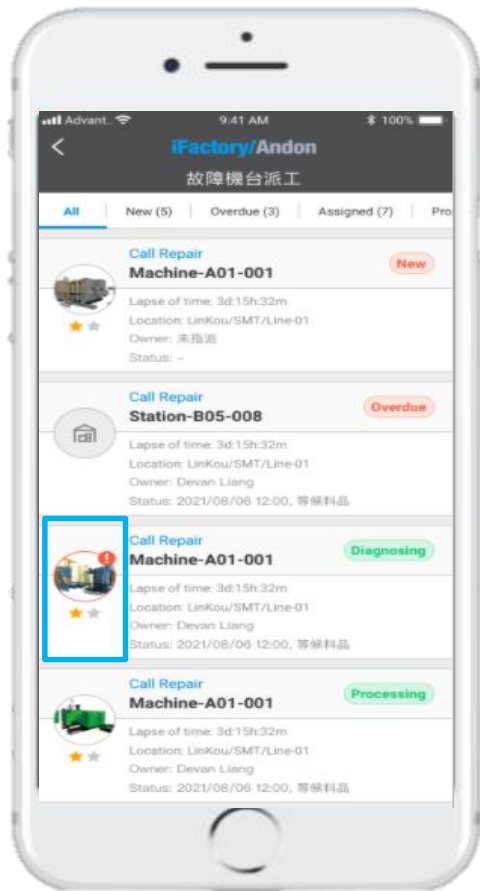
- Manual: operators use TPC
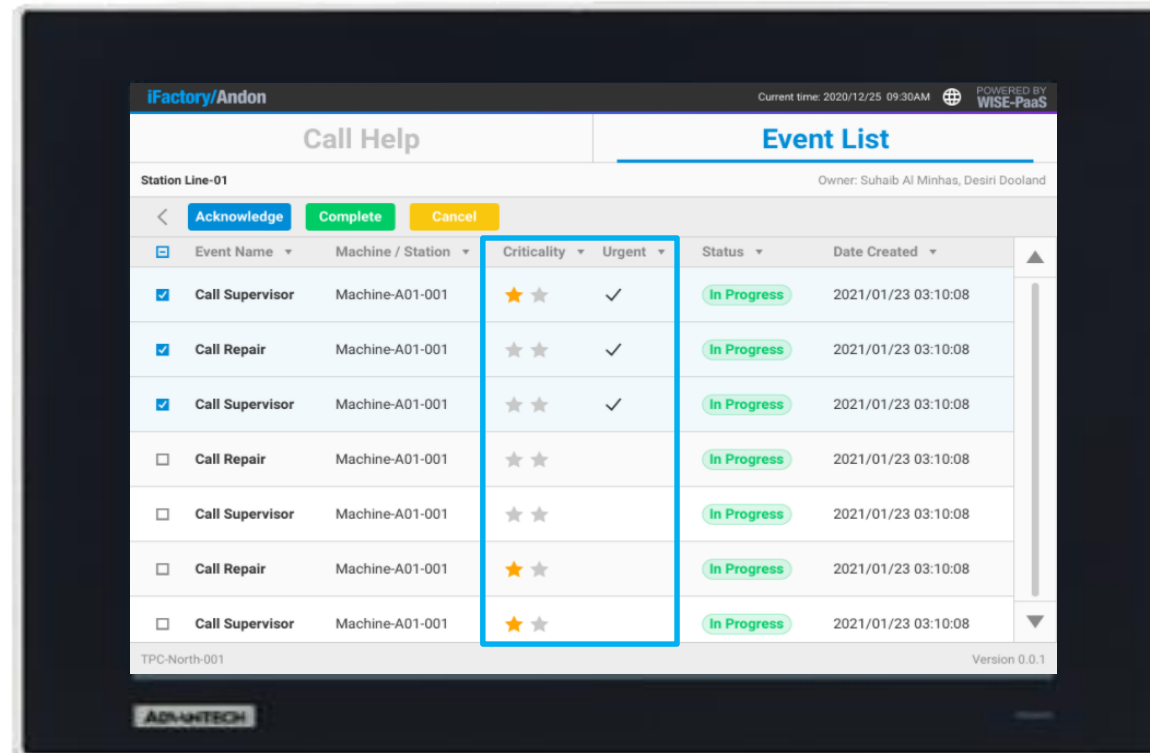
- Automatic notifications when abnormal events occur
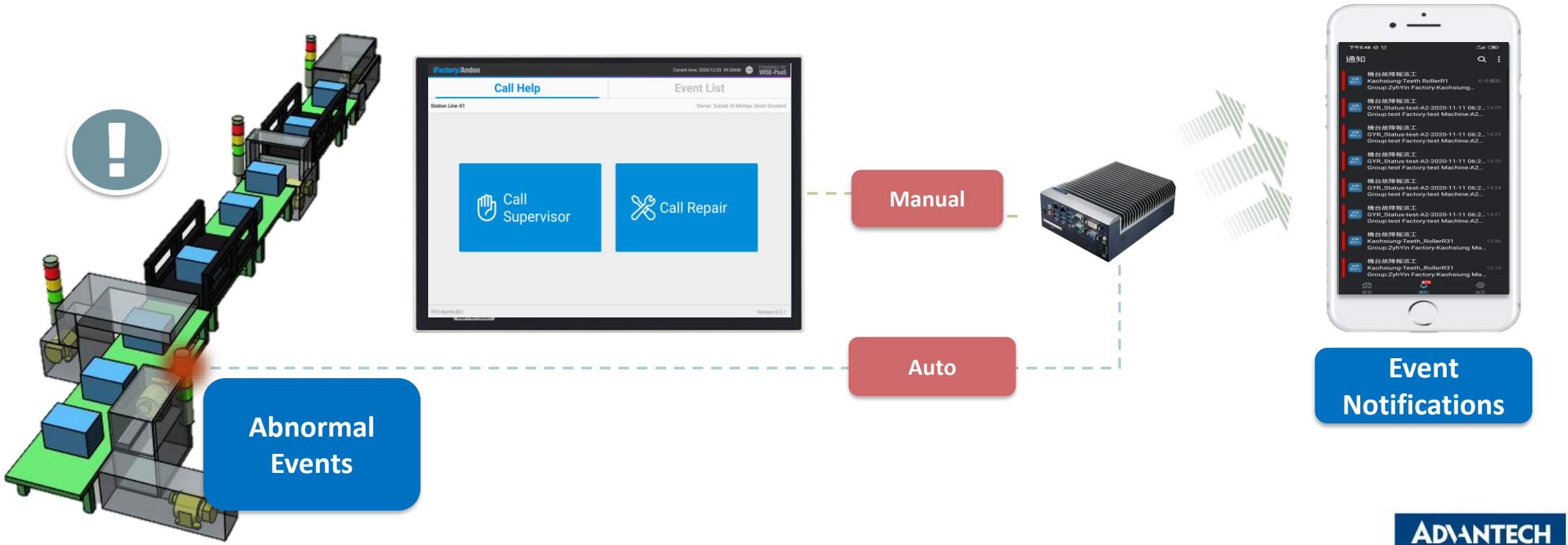
Abnormal Events - Job Dispatch & Report

iMobile service supports manual and automatic job dispatch, which reduces time wasted finding and transferring information.

Highlights critical & urgent events.

Users can also report events on touch panels from the shop floor.
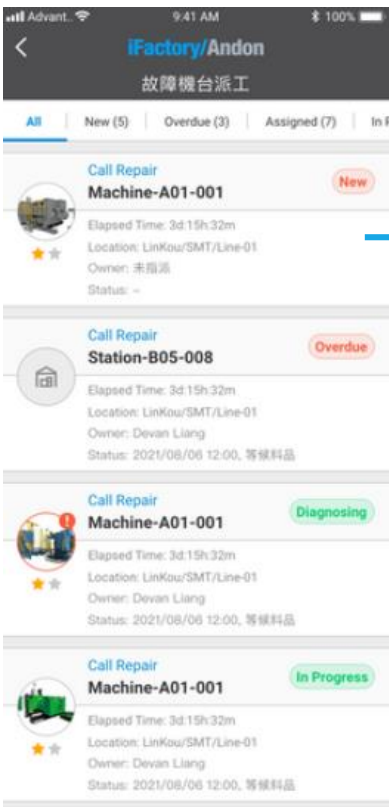
iMobile Abnormal Job Dispatch/ Report

Touch Panel Event List

Job Dispatch & Report Flow

After setting up, supervisors can assign tasks for abnormal events to team members directly with real-time notifications.

Visual or sound displays promotes a better flow of internal communication between the various operators.
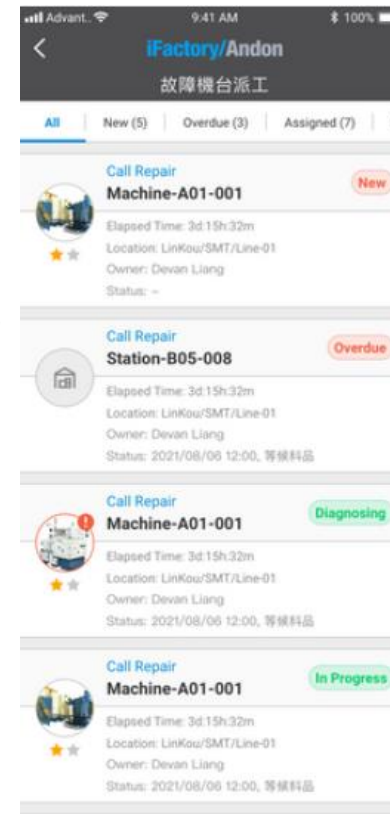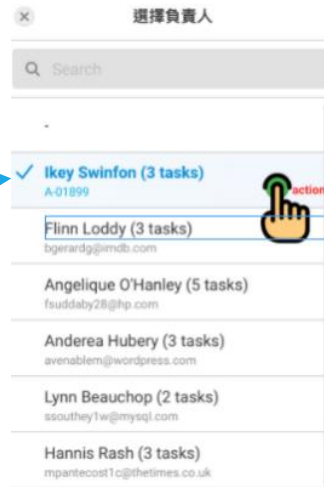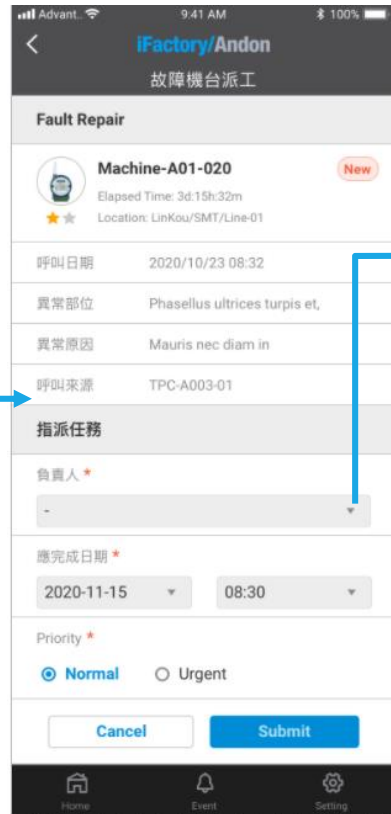
Job Dispatch by iMobile

Job Report by iMobile

Event Settings – Event List

Event settings provides a user-defined platform which includes notifications, processing flow modifications, and additional response information configuration, which makes the Andon service more flexible and able to fulfill different usage scenarios.

User modified event notifications and processing work flows.

Additional event response information settings.

Event Settings – Event Lists

Touch Panel – Calls Help

iMobile – Job Dispatch/Report

Event Settings – Display Setting

Event Settings also offers call-help service layout and button displays for user-defined functions. Users can adjust buttons and text colors as well as attach event icons to better illustrate events for other users.

Set up event buttons & text colors to attach to event icons.

Event button display layout modify.
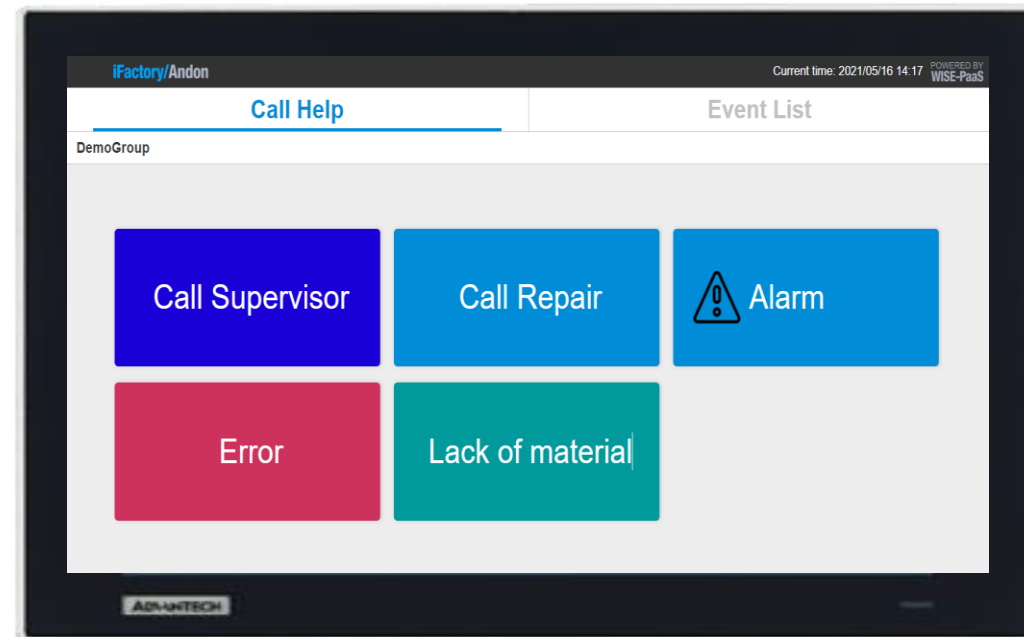
Display Settings

Touch Panel Call-Help

Automatically Trigger Event Settings

In addition to manually generating repair tasks, the event console for data acquisition machines also provides an automatic event trigger function. Users can trigger different events based on the parameters of different collected data through a simple configuration which also reduces the time from abnormal occurrence to notification.
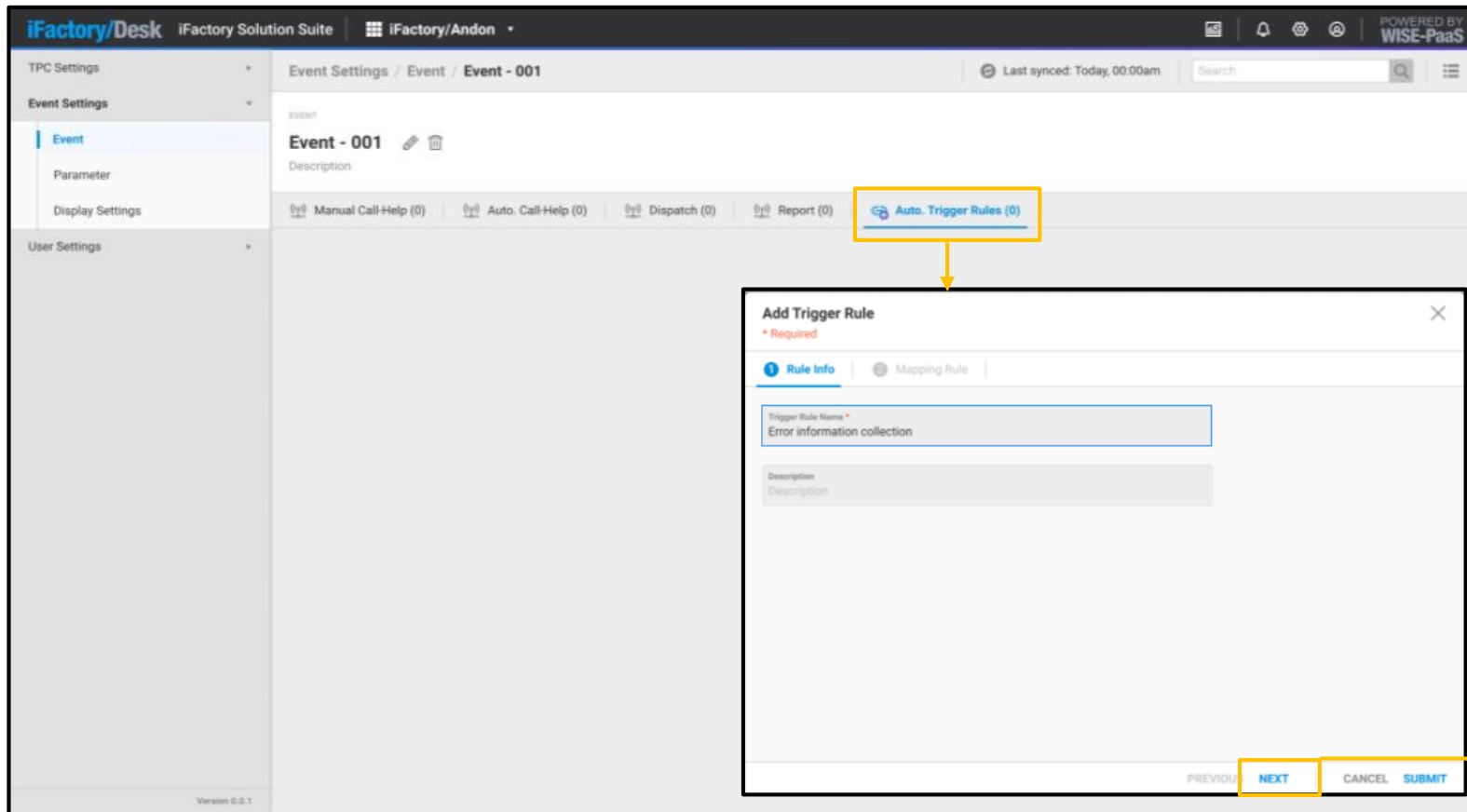
Create trigger rules & set up machine parameters.
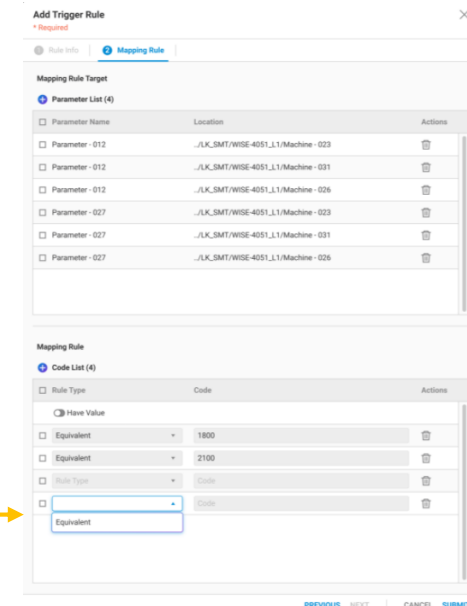
Setting Auto. Trigger Rule

Task Data Acquisition from Desk

Besides manually entering task information by the user, information can also be obtained through the iFactory/ RTM app or from third-party systems, such as machine orders or shipment information from ERP, etc.

Create RMS automatic parameters and associate those with RTM parameters.

Setting Auto. Acquisition Parameter

Location:

Taiwan

Company:

Tien Kang Co., Ltd

Overview:

Tien Kang Co., Ltd was founded in 1982, mainly engaged in high-tech footwear machinery and equipment. Base of shoe production, and has been developing shoe machinery equipment in the direction of "independent development" over the years.

Challenges / Requirements:

- Humanized operation interface - Graphical operation and display are convenient for general assembly operators and management supervisors to use.
- Improve event processing efficiency - Combining with ERP to replace paper forms and manual labors' time-consuming of reporting.
- Data Digitization - Digitize each work report data for follow-up statistics.

Solution :

I.App Andon provides service with touch panel interface on production site. Once abnormal event occurred, all relevant personnel immediately been noticed and could start processing.

I.App Shop Floor collects defective output by operator reporting and connect ERP through Data Fabric to issue manufacturing quality abnormal order.

Benefits:

- In an integrated ERP, managers can shape each component of the business process tightly to ensure optimal implementation from the start.
- Enhance data value in use; Statistical analysis of data to improve factory operation efficiency.

System Diagram

Dashboard & BI

Private Cloud

ERP

Event Notify
Event Dispatch & Report

Job Report
Call-Help

M7700

Edge Computing
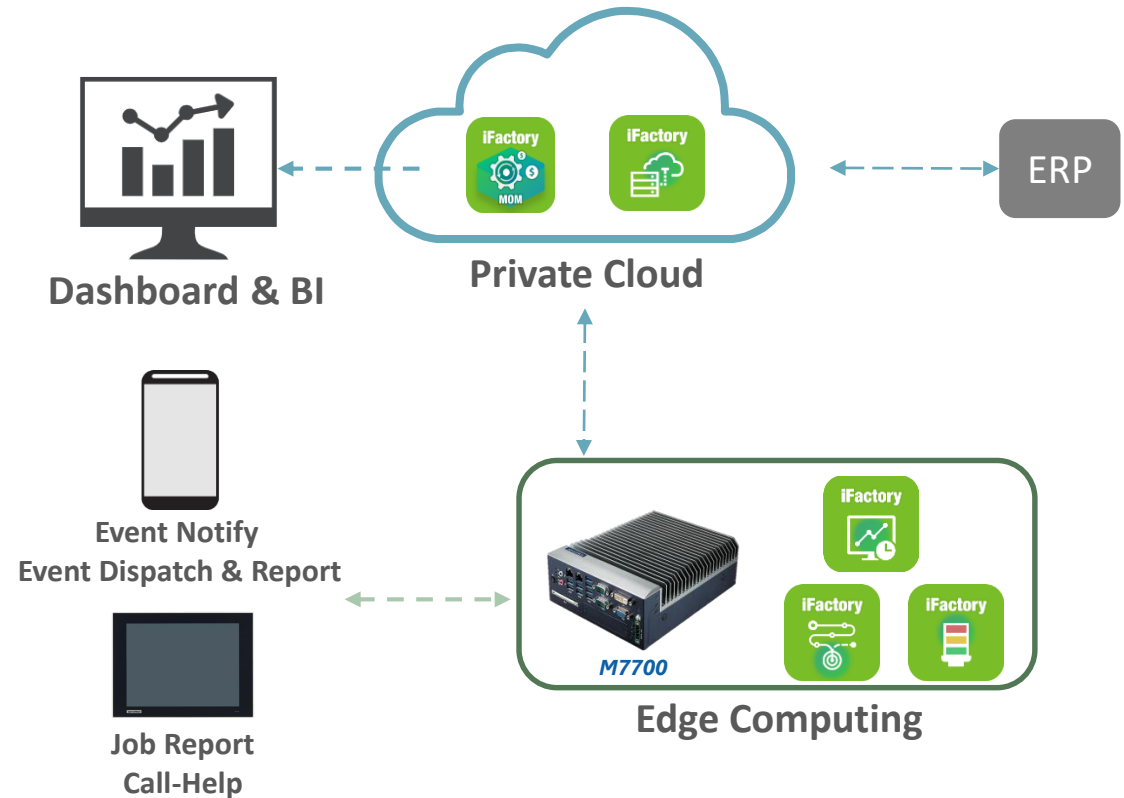
Location:
Taiwan

Company:
Advantech Co., Ltd.

ADVANTECH

System Diagram

Dashboard & BI

Private Cloud

MES

Event Notify
Event Dispatch & Report

Call-Help

Overview:

Advantech Co., Ltd. is one of the leading electronic manufacturers in Taiwan, well-known for the supply of various industrial automation control products and parts, many assembly product lines are to built in the plant to fulfill such types of production to meet specialized customer demands.

Challenges / Requirements:

- The assembly lines needed to shift lines and schedule work orders flexibly to meet their production targets, therefore, production process interruptions sometimes happen, which result in unplanned downtime of machines.
- To figure out the interconnection between machines and assign manpower to different tasks to improve abnormal event management

Solution :

I.App Andon service to reduce downtime on the assembly lines at the factory. Solution suits were applied to the on premise networks to meet plant information safety rules. Event alarms and notifications were developed on different devices for relevant workers.

Benefits:

- With the Andon system, the real-time machine status of assembly lines could be better controlled and communication enhanced when interruption events happen. With less downtime, production has grown steadily.

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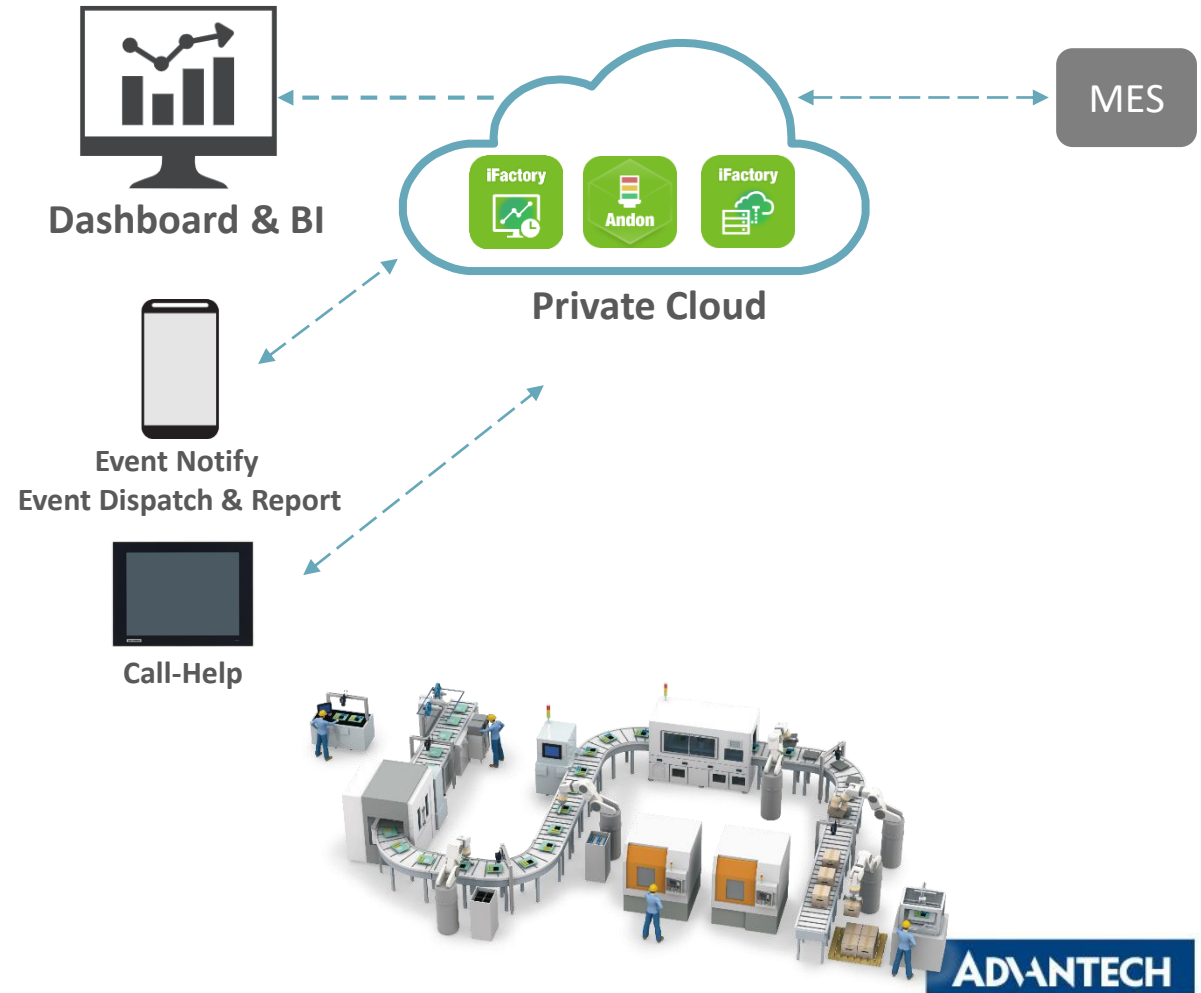
iFactory Andon Architecture

I.App

Andon

Desk Connection

APP Register

Front Office for User Interface

Touch Panel	**iMobile Service**	**Portal**
Call-Help /Event List	Job Dispatch/ Report	TPC/ User/ Event Settings

Wise-PaaS/ Dashboard

Backend Worker
Data Broker /
Notification /
Calculation Daemon

Front Office for Visualization & Dashboard (WISE-Dashboard)

iFactory Switch Panel Plugin
Group / Machine / TimeType

iFactory DataSource Plugin
Failure Metric / Event Overview /
Floor Plan / Event Work Order

User Settings
User Team/
Authorization

Event Settings
Event List /
Parameter /
Display

TPC Settings
Touch Panel Association / Machine &
Station List/ Group

RTM

Desk

User & Role Management	**Enabler** Group / Machine Parameter	**Command Center** Browser / iMobile	**API Hub**

I.App Micro Services

System Settings
Languages/ Alarm Levels License

RAW Data Alarm & Event Management
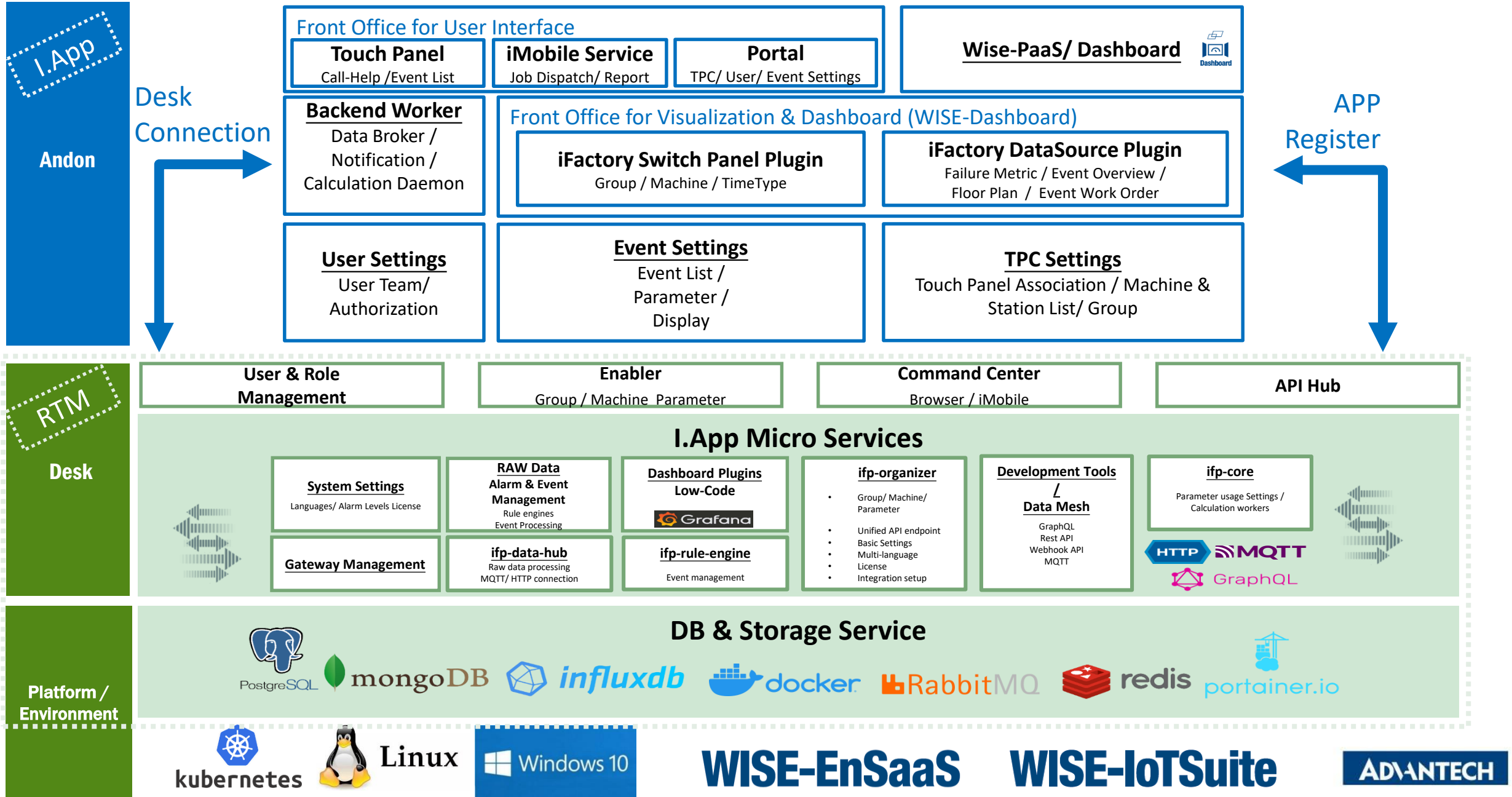Rule engines
Event Processing

Dashboard Plugins Low-Code
Grafana

ifp-organizer
- Group/ Machine/ Parameter
- Unified API endpoint
- Basic Settings
- Multi-language
- License
- Integration setup

Development Tools / Data Mesh
GraphQL
Rest API
Webhook API
MQTT

ifp-core
Parameter usage Settings /
Calculation workers

Gateway Management

ifp-data-hub
Raw data processing
MQTT/ HTTP connection

ifp-rule-engine
Event management

HTTP · MQTT · GraphQL

DB & Storage Service

PostgreSQL · mongoDB · influxdb · docker · RabbitMQ · redis · portainer.io

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Platform / Environment

kubernetes · Linux · Windows 10 · **WISE-EnSaaS** · **WISE-IoTSuite** · ADVANTECH

Co-Creating the Future
of the IoT World