iMachine

MachineUnite: Intelligent Industrial Equipment Management

Intelligent Equipment Management Upgrade Improves Overall Competitiveness

Solution Suite

M2I-31A M2I-31B

- Comprehensive Monitoring
- Operation and Maintenance
- Remote Maintenance
- Anomaly Warnings
- Fault Diagnosis
- Data Analysis

Electric Motor
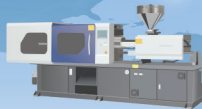
Injection Molding Machine

Air Compressors

Pump

Vulcanizing Machine

Steam Turbine

ADVANTECH
Enabling an Intelligent Planet

POWERED BY
ADVANTECH
WISE-PaaS

Solution Introduction

Digital transformation in the manufacturing industry has increased willingness to modify equipment. Advantech's MachineUnite is a one-stop, end-to-cloud intelligent equipment management solution aimed at industrial infrastructure equipment. This solution is adaptable to air compressors, electric motors, pumps, injection molding machines, vulcanizing machines, and steam turbines. It delivers equipment management and configuration templates to diverse industries; and empowers edge equipment connectivity, data collection, and equipment monitoring. It further accommodates fault alarms, operation, and maintenance/preventive maintenance. MachineUnite also supports multiple deployment options for WISE-STACK Edge and public/private clouds enabling users to complete equipment management deployment quickly.

One-stop integration with comprehensive services

One-click subscription, fast delivery of IaaS, PaaS, and SaaS; and automatic deployment of dependent services.

Ready-to-use low-code configuration solutions

Configure the interface of end-to-cloud equipment to access and upload data to the cloud. Avoid developing templates by directly applying pre-made equipment templates.

Flexible framework and service expansion

Provide an open-source microservice framework that supports tens of millions of point access and third-party service expansion.

Target Applications

| Electric Motor | Injection Molding Machine | Air Compressors | Pump | Vulcanizing Machine | Steam Turbine |

Solution Benefits

1 Economic benefits
- Improve equipment energy efficiency and maximize equipment value
- Unify equipment and parts management to increase asset value
- Regular operation, maintenance, tracking, and management extends equipment lifespan

2 Management benefits
- Unified management saves 50% more management time
- Comprehensive end-to-cloud solution reduces solution configuration complexity by 70%
- Replicated plan templates reduce integration cycle from 1 month to 2 hours

3 Cost-effectiveness
- Remote operation and maintenance interfaces save travel expenses by 66%
- Reasonable equipment resource arrangements optimize investment costs

Solution Architecture Overview

Software Diagram

MachineUnite

Public cloud

Comprehensive Monitoring

Operation and Maintenance

Private cloud

Remote Maintenance

Data Analysis

Third-party cloud platform

Fault Diagnosis

Anomaly Warnings

Equipment & Asset Management Microservice Framework

WISE-InsightAPM   Digital Twin technology

WISE-InsightAPM/OTA2.0   WISE-InsightAPM/VPN   WISE-InsightAPM/VideoService
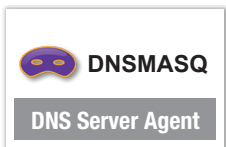
Database and Message Queuing

3rd Party Srv Controller	API Gateway Metric Plugin	Notifications	Device Metric Plugin	K8S Controller
NGINX	HashiCorp Consul	DNSMASQ	THE VAULT	Prometheus
API Gateway Agent	Discovery Agent	DNS Server Agent	Vault Agent	Alarm Collection Agent / Alarm Processing Agent

RabbitMQ   kafka   mongoDB   PostgreSQL

Equipment Data Collection

Gateway

IIoT Communication Gateway
ECU-1051

IIoT Communication Gateway
ECU-1251

Industrial embedded fanless computer
UNO-2484G

Edge Intelligence Server
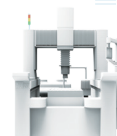**EI-52**

Device

Air compressor

Pump machine

Boiler

Drill press

Refrigeration equipment

Industrial Apps

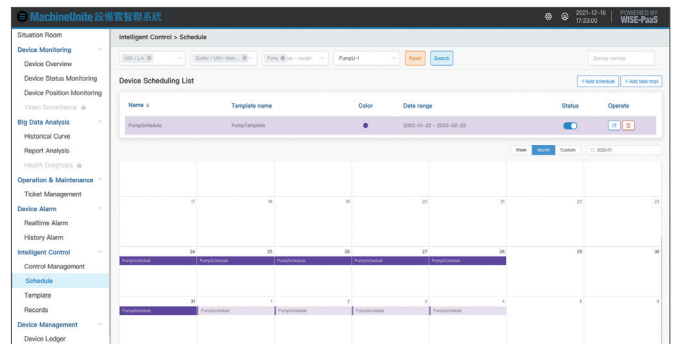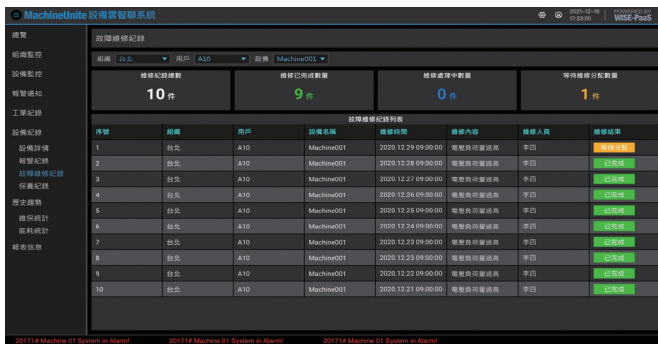## MachineUnite Industrial Equipment Management

Comprehensive Monitoring
- Comprehensive equipment monitoring
- Key data monitoring
- Equipment performance monitoring
- Remote parameter configuration

Anomaly Warnings
- Various alarm rules
- Alarm push notification
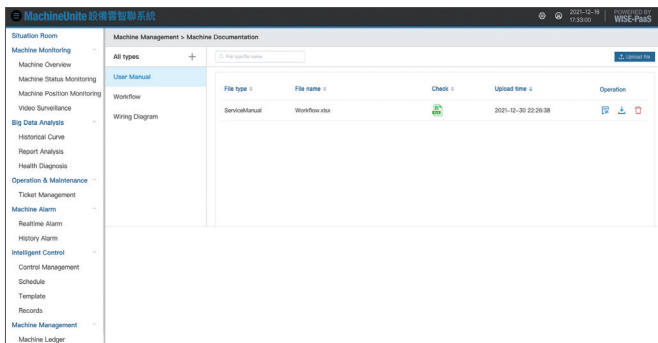- Automatic workforce dispatching
- Abnormity statistics

Operation and Maintenance (M2I-32B)
- Schedule regular maintenance services
- Notify alarm events in advance
- Maintenance execution tracking
- Monitor maintenance analysis

Remote Maintenance
- Remotely set device values
- Set up scheduled plans and automatically execute value settings

Data Analysis
- View equipment documents, maintenance manuals, and wiring diagrams online
- Check equipment information from anywhere

Fault Diagnosis
- Predict machine health
- Predict machine degradation

Application Story

MachineUnite Enables Air Compressor Equipment Manufacturers to Create Service Value During Operation and Maintenance

Overview

Tong Cheng Iron Works Co., Ltd., an established air compressor manufacturer in Taiwan, has been selling products worldwide for 60 years. With a view toward the Internet of Things (IoT), Industry 4.0, factory automation, and growing customer demand, Tong Cheng recognized the urgency of industrial transformation. Tong Cheng cooperated with Advantech to develop a cutting-edge, intelligent solution aimed at maintaining their leading role in the industry.

Challenges

- Traditional air compressors cannot effectively manage operating times and prevent business owners from saving production costs
- High machine loads prevent the early detection of data abnormalities
- Difficulties calculating the maintenance cycle of air compressor parts results in air compressor component failures which affect factory supply
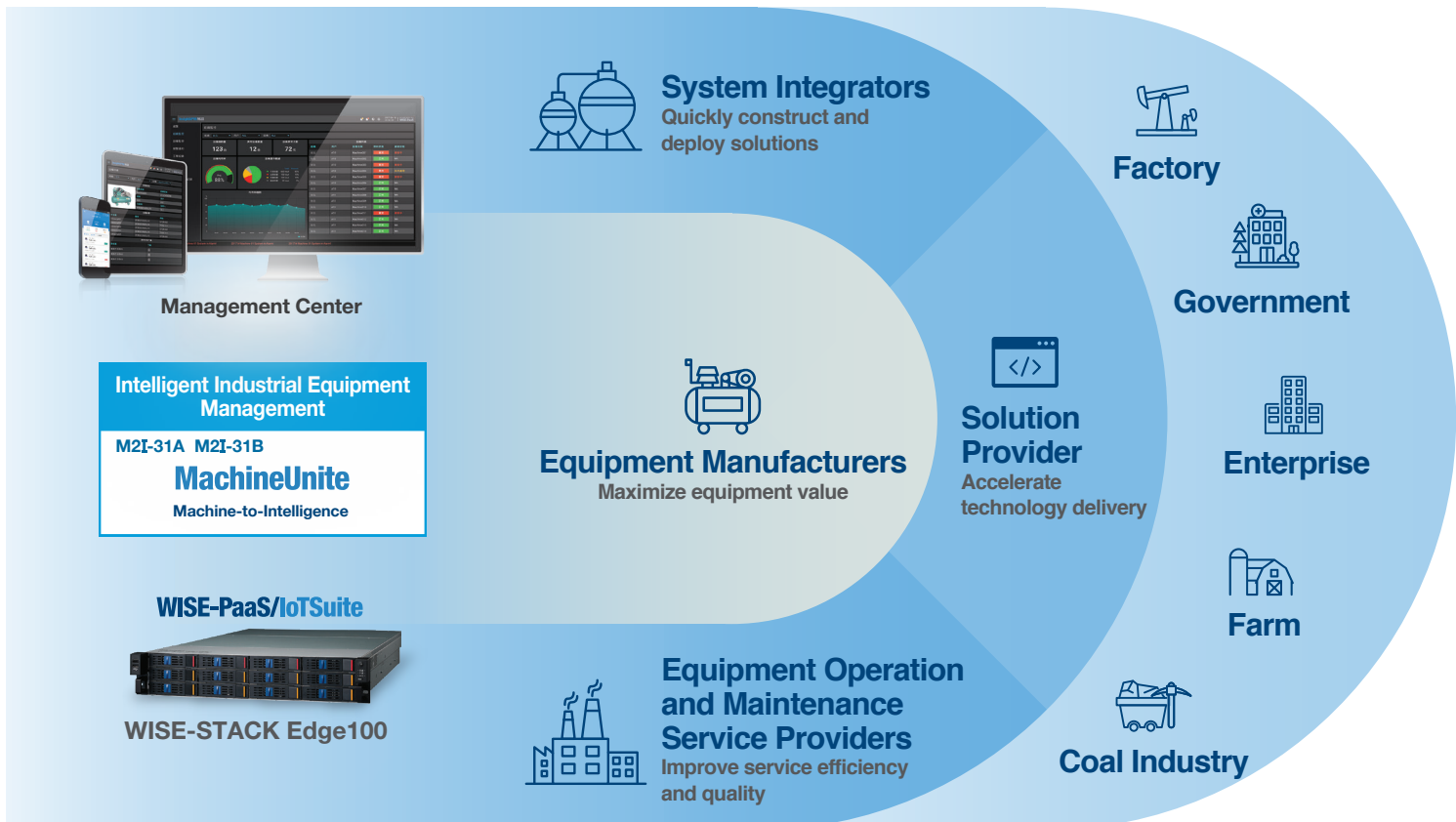
Solution

Advantech's MachineUnite helps Tong Cheng manage cloud data to create new business opportunities and services.

- Visualized management enables customers and distributors to view air compressor operation in real-time, and accurately track machine statuses
- Alarms are triggered instantly following the detection of machine abnormalities; replacement parts are prepared according to equipment status and service lifespan
- Template-based configuration empowers IT personnel to deploy solutions quickly
- Comprehensive management of equipment used in various branches and offices helps manage equipment maintenance statuses and predict the quantity of spare parts needed

Benefits

MachineUnite allows users to survey the trends and changes of energy use efficiency at any time. This feature empowers the recording of power consumption information and efficiency optimization configuration — saving 30% more energy.

Co-Creating an Intelligent Connectivity Ecosystem

Management Center

Intelligent Industrial Equipment Management

M2I-31A M2I-31B

MachineUnite

Machine-to-Intelligence

WISE-PaaS/IoTSuite

WISE-STACK Edge100

System Integrators
Quickly construct and deploy solutions

Equipment Manufacturers
Maximize equipment value

Solution Provider
Accelerate technology delivery

Equipment Operation and Maintenance Service Providers
Improve service efficiency and quality

Factory

Government

Enterprise

Farm

Coal Industry

Ordering Information

Industrial Equipment Management Solution	**M2I-31A** License for 1000 tags	Intelligent Industrial Equipment Management **M2I-31A M2I-31B** **MachineUnite** Machine-to-Intelligence

Optional Services

Additional Licenses	**9803M2I0100** Additional license for 1000 tags	
InsightAPM/Patrol Inspection	**9806DISPB00** Asset inspection, task dispatching, and tracking system	**WISE-InsightAPM/Patrol Inspection**
WISE-PaaS/VPN	**9806WPVPN01** 50 clients, 10Mbps Bandwidth, and 100GB Traffic **9806WPVPN02** 100 clients, 20Mbps Bandwidth, and 200GB Traffic **9806WPVPN03** 200 clients, 50Mbps Bandwidth, and 400GB Traffic **9806WPVPN04** 500 clients, 100Mbps Bandwidth, and 800GB Traffic	**WISE-InsightAPM/VPN**

Optional Purchases

Edge Data Collector	**ESRP-PCS-WISE710** WISE-710, Yocto 2.1, and WISE-Edgelink	**WISE-EdgeLink**
	ESRP-AWS-UNO2271 UNO-2271-E23AE, Linux Ubuntu, and WISE-Edgelink	**WISE-EdgeLink**
	ESRP-PCS-ECU1251 ECU1251, real-time Embedded Linux, and WISE-Edgelink	**WISE-EdgeLink**
	ESRP-PCS-ECU1051 ECU1051, Real-time Embedded Linux, and WISE-Edgelink	**WISE-EdgeLink**
	ESRP-SCS-W5580-7C0 WES7, CODESYS Softlogic RTE with Softmotion CNC, and WebAccess/SCADA	**WebAccess/SCADA**

Edge to Cloud Solutions

Edge-Cloud Solution Suite	**WISE-STACK Edge100** Hardware: SKY7221/ 10 cores/ 64GB Memory/ 16TB HDD/ 1TB SSD Software: WISE-PaaS/IoTSuite E100	**WISE-IoTSuite**