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Software and Industry Solutions

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ADVANTECH
WISE-PaaS
IIoT Solutions & Marketplace



WebAccess Software and WISE-PaaS/IIoT

Introduction

The recent emergence of the Internet of the Things (IoT) and its surround technology eco-system promises significant future business opportunities until the year 2025. With more and more investment going into developing integrated IoT applications and cloud services, software has become the crucial factor for success in the IoT era.

As one of its core IoT solutions, Advantech's WebAccess/SCADA offers not only a human-machine interface (HMI) and supervisory control and data acquisition (SCADA) software solution, but also an IoT software framework that serves as a software platform for IoT and cloud applications.

With Advantech WA/SCADA, a comprehensive browser-based IoT application software, users can easily monitor and manage projects via a web browser. For the IoT device layer, Advantech WA/SCADA supports multiple protocols and drivers for connecting up to 350 controllers and devices, making WA/SCADA a flexible and suitable software platform for all I-IoT applications and projects. Additionally, WA/SCADA provides a foundation for IoT data collection and management with its open architecture and open interfaces, which facilitate the development of various vertical applications.

To satisfy demands for industrial IoT (IIoT) and Industry 4.0 services, a variety of cloud-specific features, such as plug-and-play device configuration, cloud-based dashboards, and big data connectivity, are included in the WA/SCADA Cloud software package in an effort to provide an easy tool for connecting IoT devices and conducting big data analysis and predictive maintenance.

Industrial IoT Application Software Platform



Enabling IoT & Industry 4.0 with WISE-PaaS Alliance and WebAccess

Introduction

Advantech's key strategies for the next decade are to provide integrated IoT solution platforms. The Advantech WISE-PaaS Edge Intelligence Platform offers a diverse range of software that can be applied and integrated into domain-focused SRPs. This platform provides a wide range of software and cloud-based service solutions from industrial data/video acquisition, analysis, and visualization to cloud platform services and dashboard functions, thus enabling IoT at all system layers and realizing IoT-powered business models in various vertical markets. Join Advantech's WISE-PaaS VIP program and enjoy IoT success by leveraging WISE-PaaS's comprehensive solutions.



WebAccess/SCADA



WebAccess/CNC



WISE-PaaS/WISE.M+

WebAccess/SCADA

Industrial IoT application software platform

- Driver support for major PLCs, PACs, I/O modules, network switches, and computer platforms
- Redundant SCADA, ports, and devices for high availability
- Supports multiple databases for data connectivity and data fusion
- HTML5-based dashboard for cross-browser, cross-platform data visualization and data analysis
- Provides flexible open interfaces for easy development and integration of third-party applications
- Online software license authentication for cloud computing virtual machines

WebAccess/CNC

CNC machine networking solution

- Automatically generates CNC projects for WebAccess/SCADA software
- Supports CNC machine and I/O device monitoring
- Supports leading CNC network controllers
- Provides CNC machining status and PLC register monitoring
- Provides CNC availability queries and NC file transfer functionality
- Provides historical CNC alarm and operation queries
- Supports all features and full functions of WebAccess/SCADA software

WISE-PaaS/WISE.M+

Cloud management platform

- Plug and play centralized management on a unique platform
- Simple dashboard management interface as well as dashboard site templates for easy setup
- Profile based equipment configuration
- High scalability of device connections and equipment management service
- Fully cloud based and comprehensive interface for simple management



WISE-PaaS/Dashboard



WISE-PaaS/SaaS Composer

WebAccess/SCADA and WISE-PaaS/Dashboard

Data analysis and visualization software

- Efficient data visualization: provide a variety of panels and industry-specific plugins
- Supports plugin and image upload
- Dashboard and SRP-frame supports mobile devices
- Supports over 50 data sources
- Create dynamic & reusable dashboards with variables
- Notification channel supports email, webhook, LINE, slack, WeChat etc
- Annotate graphs with rich events from different data sources
- On-premise version bundled with WebAccess/SCADA with panels* compatible to WebAccess/SCADA data sources. (*Panels on WISE-PaaS/Dashboard cloud version may differ and limited by data source compatibility)

WebAccess/SCADA and WISE-PaaS/SaaS Composer

Cloud-based graphical control tool

- Reconstructs the on-site environment with 100% customization ability & simple/intuitive 3D modeling application
- Integrates WISE-PaaS platform services and data connections, also WISE-PaaS visualization tools
- Allows cross platform usage with browser-based infrastructure and supports diversified types of file import
- Updates critical data in a visually intuitive display
- On-premise version bundled with WebAccess/SCADA with based on WebAccess/SCADA data sources.

WISE-EdgeLink

Transmit Data to the Cloud with WISE-EdgeLink

With the emergence of industrial IoT, companies are seeking solutions that facilitate the use of data analytics to improve service levels, create superior products, and reduce operating costs. The first step in this process is the digitalization of all assets, which means increasing amounts of data collected from different equipment must be analyzed. Equipment manufacturers, owners, and maintenance personnel require an easy and reliable method for collecting data from field-based equipment. Advantech's WISE-EdgeLink provides a data acquisition solution that does not require frequent on-site maintenance and service trips. With this solution, users can monitor critical assets, track equipment performance, receive alarm notifications, and perform system management and configuration using handheld devices. This will substantially reduce costs and ensure field equipment and facilities are better monitored and controlled.



Optimizing efficiency with connected equipment

For industrial boilers, air compressors, chillers, power distribution cabinets, and other equipment, WISE-EdgeLink serves as a hub for data acquisition, storage, and reports, as well as alarm notifications, maximizing equipment efficiency with the provision of accurate data.



Plug-and-play cloud access for rapid deployment

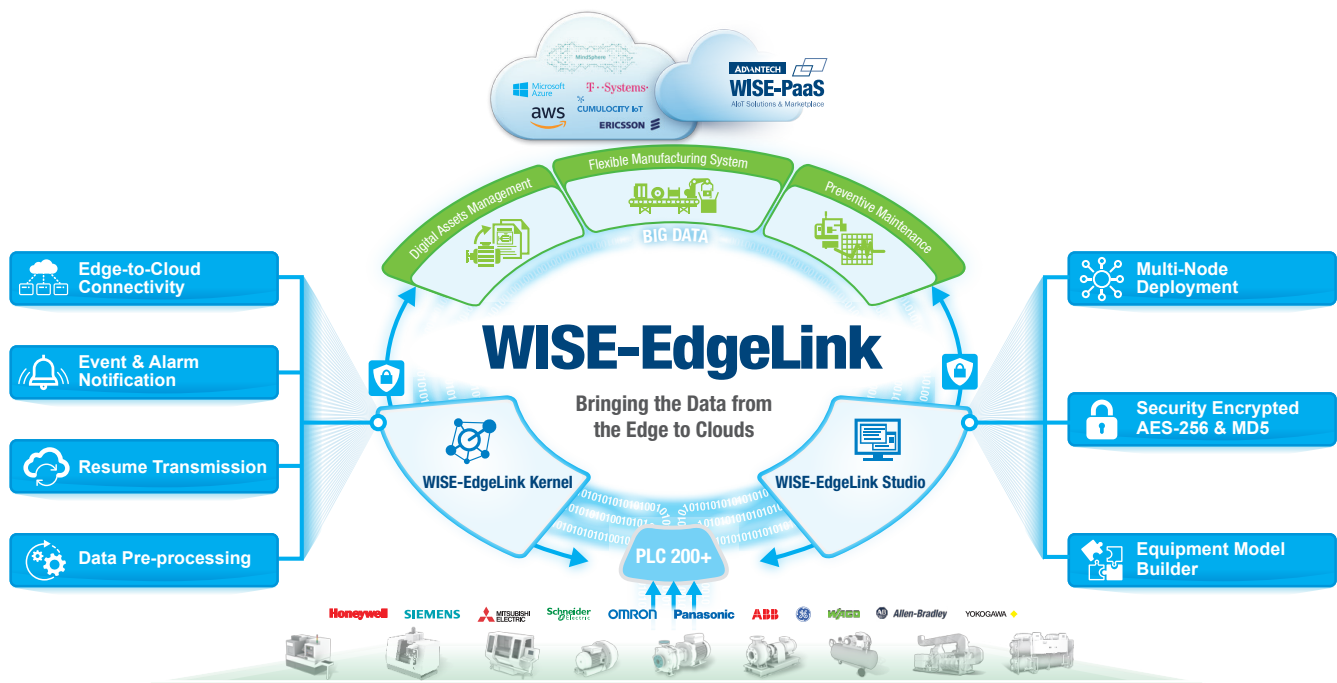
Plug-and-play functionality for data transmissions to the cloud eliminates complex programming and configuration. This ensures data can be easily uploaded for analysis and visualization to provide a useful reference for operational optimization.



Secure data conversion for integrating data with third-party systems

WISE-EdgeLink supports data conversion, enabling equipment used for mass production, such as PLCs, sensors, and inverters, to be directly integrated with SCADA, MESs, and ERP systems for convenient operation and maintenance.

WISE-EdgeLink Framework



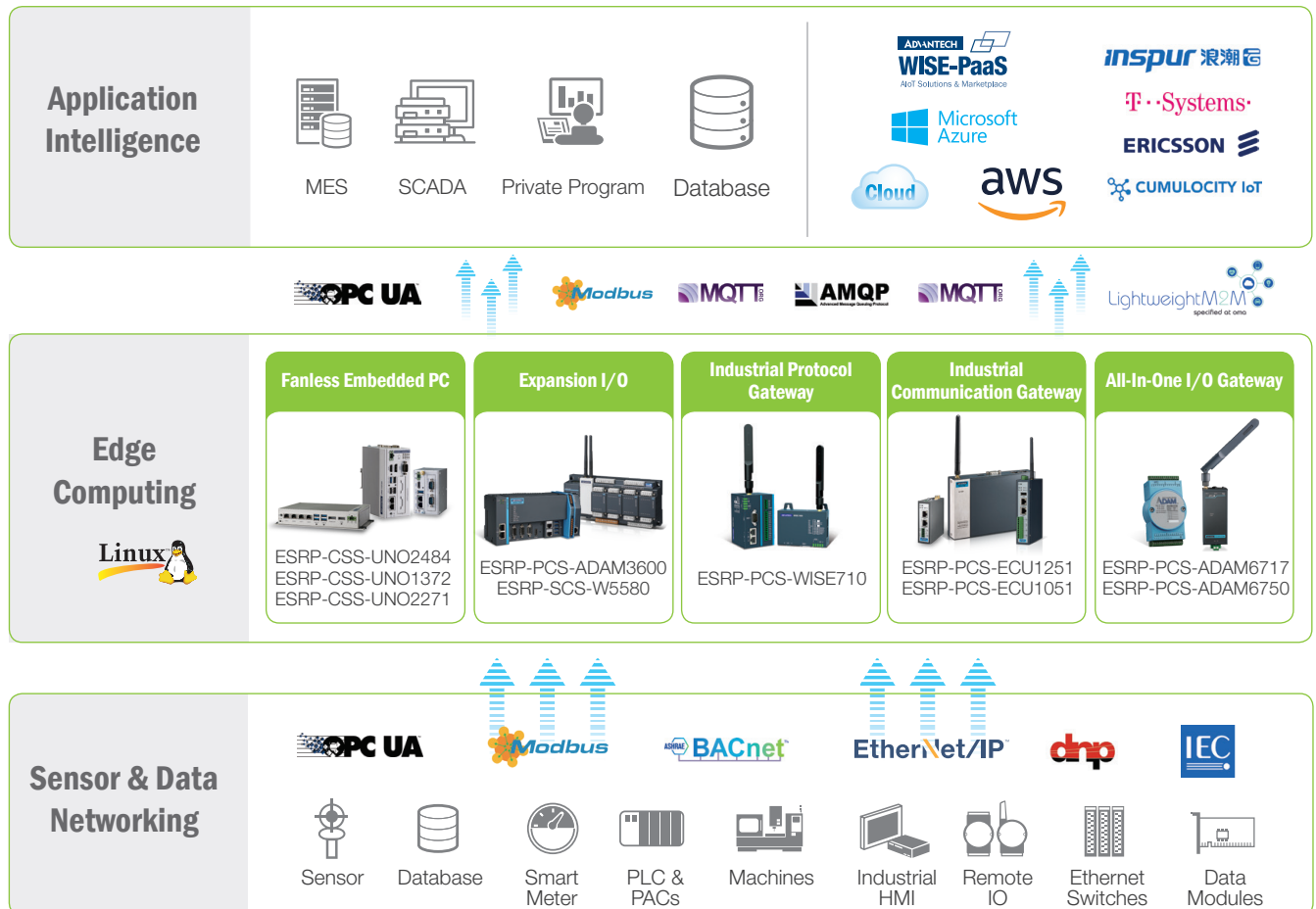
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Advantech's WISE-EdgeLink is equipped with key functionalities aimed at edge applications. With downlink data acquisition capabilities integrated with uplink connectivity, security, and intelligence functions, transmitting field data to the cloud becomes an easy task.

WISE-EdgeLink Kernel



WISE-EdgeLink Kernel Architecture



Application Intelligence

- MES
- SCADA
- Private Program
- Database

- ADVANTECH WISE-PaaS IoT Solutions & Marketplace
- Microsoft Azure
- Cloud
- aws
- inspur 浪潮信
- T-Systems
- ERICSSON
- CUMULOCITY IoT

- OPC UA
- Modbus
- MQTT
- AMQP
- MQTT
- LightweightM2M specified or omo

Edge Computing

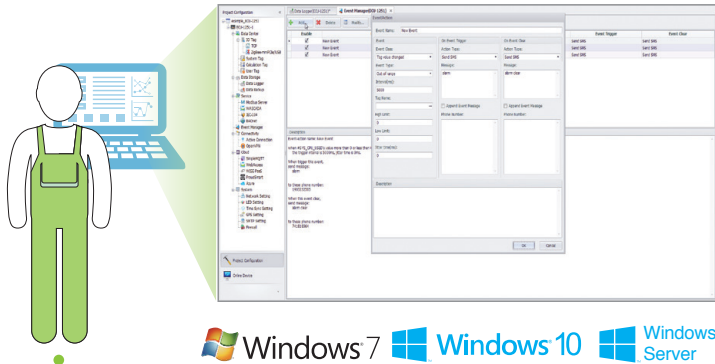


- Fanless Embedded PC**
ESRP-CSS-UNO2484
ESRP-CSS-UNO1372
ESRP-CSS-UNO2271
- Expansion I/O**
ESRP-PCS-ADAM3600
ESRP-SCS-W5580
- Industrial Protocol Gateway**
ESRP-PCS-WISE710
- Industrial Communication Gateway**
ESRP-PCS-ECU1251
ESRP-PCS-ECU1051
- All-In-One I/O Gateway**
ESRP-PCS-ADAM6717
ESRP-PCS-ADAM6750

Sensor & Data Networking

- OPC UA
- Modbus
- BACnet
- Ethernet/IP
- dnp
- IEC
- Sensor
- Database
- Smart Meter
- PLC & PACs
- Machines
- Industrial HMI
- Remote IO
- Ethernet Switches
- Data Modules

WISE-EdgeLink Components



EdgeLink studio
(for Windows)

- Project configuration
- Online device monitoring
- Device communication setup
- Data forwarding settings
- System settings



Download projects to the platform via a network

Configuration files



EdgeLink runtime
(for Linux)

- Connect end devices to network
- Data acquisition and transmission
- Supports 200+ device drivers
- Real-time/historical data log
- Connectivity to the cloud and third-party systems



WISE-EdgeLink Enabled Product List

Model Name	Description	Hardware Spec
UNO-420	PoE Powered Device Sensing Gateway	Intel® Atom™, 3 x COM, 2 x LAN (1 x PoE), 8 x GPIO, HDMI, USB3.0
WISE-710	Industrial Protocol Gateway	NXP i.MX 6 Dual Core, 2GbE, 3 x COM, 4DI/4DO, 1 x Micro USB, 1 x Micro SD Slot
UNO-1372	Azure IoT Edge	Intel® Celeron® J1900 4G DDR3L, 2 GbE, iso. 4 COM, 4 DI, 4 DO, 4 USB, HDMI, DP, TPM2.0
UNO-2271	Azure IoT Edge	Intel® Atom™ 2 x GbE, 1 x mPCIe, HDMI, eMMC
UNO-2484	Azure IoT Edge	Intel® Core™ i5-7300U (2.6 GHz) (MBP) with 4 x GbE, 1 x mPCIe, HDMI, DP
UNO-2372	Azure IoT Edge	Intel Atom/Celeron, 2 GbE, 4 USB, 4 COM, 2 x mPCIe, HDMI, DP
ADAM-6700	Intelligent I/O Gateway	CPU Arm@ Cortex-A8(32-bit,1GHz) with 512MB RAM, Linux-based 2 x LAN, 2 x RS-485 ports, 2 x USB
ADAM-3600	Wireless Intelligent RTU	T1 Cortex-A8(600MHz) with 256MB DDR3L, Linux-based 4 x expansion slots, 1x SD slot, 2 x LAN ports, 2 x wireless comm. interface(miniPCIe), 8xDI, 8xAI, 4x isolated DO channels
ECU-1051	Cloud enabled Intelligent Communication Gateway	T1 Cortex A8 600MHz CPU with DDR3L 256MB RAM, 2 x LAN, 2 x COM (isolation optional), 1x MiniPCIe
ECU-1251	Industrial Communication Gateway	T1 Cortex A8 800MHz CPU with DDR3L 256MB RAM, 2 x LAN, 4 x COM, 1 x MiniPCIe
ECU-4553	T1 Cortex4 A8 Power Automation Computer	T1 Cortex A8 800MHz CPU with DDR3L 1GB RAM, 4 x LAN, 16 x COM, 2 x MiniPCIe
AMAX-5580	EtherCAT Enabled IoT Edge Controller	Intel Core i7-6600U (2.6 GHz) Controller IPC with EtherCAT Slice IO, 2xGbE, HDMI+VGA, 4xUSB3.0, 2xCOM and 4x Expansion slot for WISE-54XX series

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XNavi Software Series

Introduction

In the future, intelligent industrial automation will need to be real-time adaptable and agile, and edge solution ready packages are designed to meet this trend. Edge Solutions are software-hardware bundled products developed for use on the network edge, and are thus situated much closer to where the processing takes place. This helps manufacturers deal with issues cropping up in their systems as and when they occur without any lag in the time taken to act upon them. Edge solutions bridge the gap between the cloud and connected devices in the factory. These include specially written application-focused software such as DAQNav, MotionNavi, VisionNavi, HMInavi, and AINavi, for use on the edge for data collection, motion control, vision inspection, process visualization and AI analysis. This brings processing, communication, and decision making, much closer to edge devices.

Integrated Software Development Suite



Connecting Data, Motion, Vision and HMI from Edge-to-Cloud

DAQNavi

DAQNavi is software package used to enable edge intelligence for your DAQ device. It includes an SDK (Software Development Kit) used to get data from Advantech DAQ cards and modules, but also adds further data processing algorithms in order to gain a better insight from acquired data. The software has 6 parts: 1. Data Acquisition 2. Data Processing 3. Feature Extraction 4. Interpretation and Output 5. External Device/Cloud Connectivity 6. Data Visualization.

Featuring easy configuration and development support tools, the software can easily be deployed in Machine Condition Monitoring, Automated Testing Equipment and Machine Control scenarios. This makes it easier to realize an edge automated monitoring and control system.

MotionNavi

IEC 61131-3 is the third part of the open international standard IEC 61131 for programmable logic controllers (PLC), DCS, IPC, CNC and SCADA, and was first published in December 1993 by the IEC. Applying IEC 61131-3 programming standards has become mandatory in the automation control field. If the software follows the IEC 61131-3 international standard, any user can understand the programming logic because it follows all the familiar structure of the same programming languages.

PLCopen motion standard provides a way to have standard application libraries that are reusable for multiple hardware platforms. PLCopen motion serves as a basic layer for ongoing definitions in different areas.

Advantech's MotionNavi is a software based on the CODESYS Software Platform (3S), which follows the IEC-61131-3 and the PLCopen motion Part 4 standard for developing function modules. The functions include 2-axis linear interpolation, 2-axis circular interpolation, 3-axis linear interpolation, 3-axis circular interpolation, 3-axis ellipse interpolation, and 3-axis spiral interpolation.

VisionNavi

Advantech VisionNavi is a programmable machine vision software that facilitates development of menu-driven user interface and helps deploy multiple tasks. It supports a wide range of Advantech industrial PCs and cameras, provides easy system installation and project development while reducing maintenance costs. It is suitable for automated applications aimed at defect inspection and quality assurance which need different conditional branches, steps or loops to complete each task. Any programmer can easily configure each process and determine the next action depending on the results, while the results can be inherited to the next step and become the reference or parameters for that process.

HMINavi

HMINavi is a powerful and intuitive software program for creating comprehensive human machine interface solutions. HMINavi is an easily integrated development tool with proven value in many application fields. Features include solution-oriented screen objects with built-in functionality, high-end vector symbols, graphics, and support for 450 PLC communication protocols. HMINavi also supports online/offline simulation and utility programs such as Data Transfer Helper (DTH), recipe editor, and text editor, ensuring easy development of all HMI applications.

AINavi

AINavi is deep-learning-based image analysis software that includes AI defect inspection tools and independent AI training software. It is designed for inspection in multi-product lines and multi-defect applications. AI defect inspection tool can be easily used in any defect inspection application. It reduces software development times and provides high-tolerance to environmental factors. It can also be implemented to replace manual inspection. The AI trainer software uses the latest neural network recognition judgment and it can train models with only a few images. AINavi lowers the threshold difficulty of applying AI algorithms in automation production lines. It provides a faster and more efficient way to deploy defect inspection tools.

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Industrial Communication

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EtherCAT Solutions and Automation Controllers

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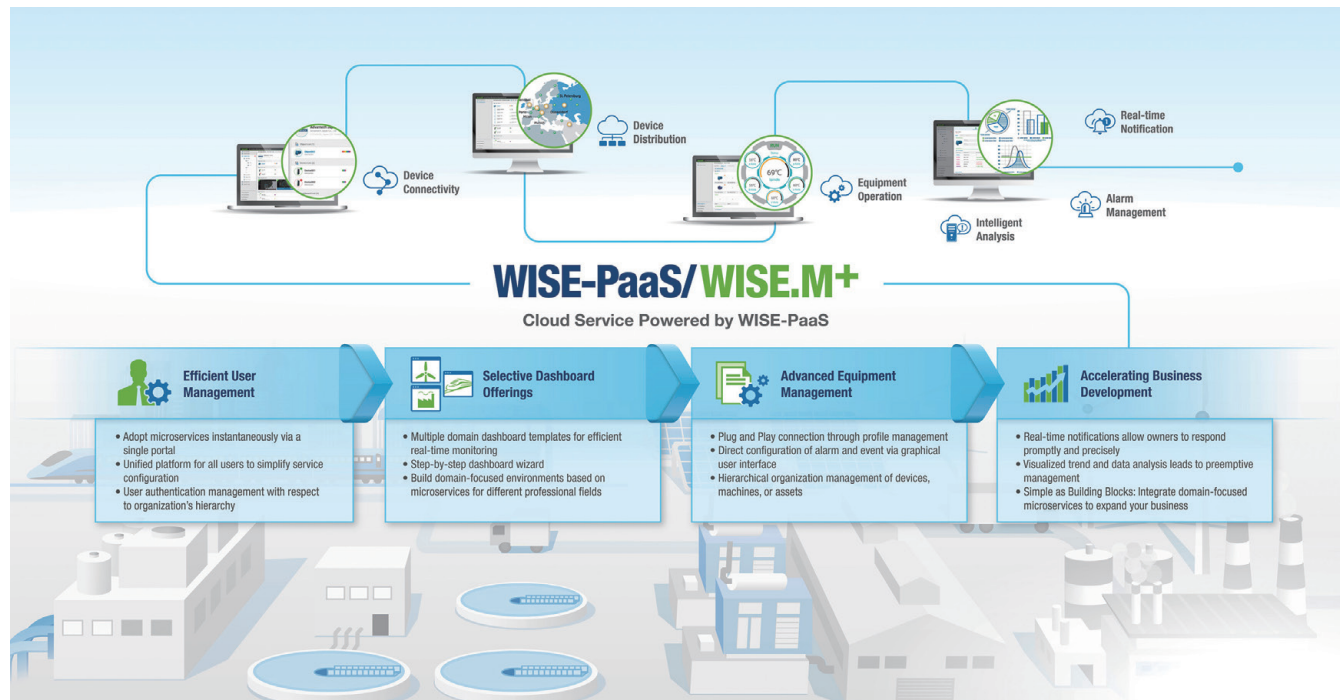
Intelligent Transportation Platforms

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Utility and Energy Solutions

WISE-PaaS/WISE.M+

WISE-PaaS/WISE.M+ is an open cloud-based industrial IoT platform on WISE-PaaS that aims for real-time monitoring and optimized operations management to provide smart equipment management that helps businesses enjoy IoT success. Acquiring data, getting devices connected to the cloud, and performing big data management and analysis are all crucial aspects to consider. To achieve this goal, Advantech developed WISE-PaaS/WISE.M+ services to facilitate deployment, configuration, and direct access to these equipment to improve overall performance and efficiency and enable seamless business digital transformation.



Industrial IoT Cloud-Based Monitoring & Operating Platform

Advantech WISE-PaaS/WISE.M+ aims to take the complexity out of implementation procedures, with a focus on strategy and planning. It is designed for managers to easily monitor connected equipment and help facilitate successful digital transformation. Engineers can also spend less time sifting through raw data and more time improving the reliability and performance of equipment or devices.



Hierarchical key performance index management

The clear roles and responsibility (R&R) defined in terms of organization structure over equipment management enhances risk assessment control with aid of stacked indexes via dashboard visualization. This provides straightforward KPI monitoring and comparison.



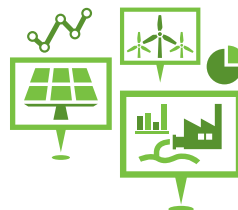
Comprehensive equipment management

Concise equipment effectiveness monitoring together with visualized operation status demonstrates prompt assignment monitoring where proactive decision can be made precisely.



Equipment profile management

Profile templates for equipment in terms of customer defined objects can be stored and used over and over upon site setup once equipment is connected.



Easy visualization setup

In practice, visualization of domain focused scenarios become true plug and play. When transmitting data, the domain scenario dashboards obtain data automatically from equipment and objects will be displayed without any extra work.

Energy and Environment I.Apps

As energy and environment issues are important concerns for the public, Advantech has developed industrial applications (I.Apps) for energy and environment solutions with industrial IoT technologies focusing on the process of sensing, control monitoring, remote communication, and smart data management. By combing these technologies with WISE-PaaS/WISE.M+ cloud-based monitoring and operating platform that performs information integration and data analysis, Advantech I.Apps are designed to be widely used in a wide variety of energy and environment industries.

Data acquisition using multiple communication protocols

There are many types of electrical equipment in energy applications, such as inverters, combiner boxes, and intelligent or non-intelligent power meters, which need the support of a diverse range of communication protocols. With WISE-EdgeLink to realize device data acquisition, Advantech provides communication platforms compatible with these protocols.

WebAccess/SCADA based application solution

For energy monitoring, Advantech WebAccess/SCADA software is able to implement remote management, energy consumption status overview, energy saving potential assessment, and recommend practical measures, energy monitoring and reporting analysis, etc. to effectively achieve energy savings and cost control.

Visualized and integrated WISE-PaaS/ WISE.M+ cloud platform

Integrated data is gathered from a wide area and big data analysis and information visualization provides management level intelligence for decision-making to optimize operational efficiency.

Remote equipment monitoring and efficiency optimization

Each energy and environment solution is integrated with intelligent sensing, communication, and real-time analysis capabilities that allow users to obtain the operating status of any machine at any time to ensure efficient resource usage.

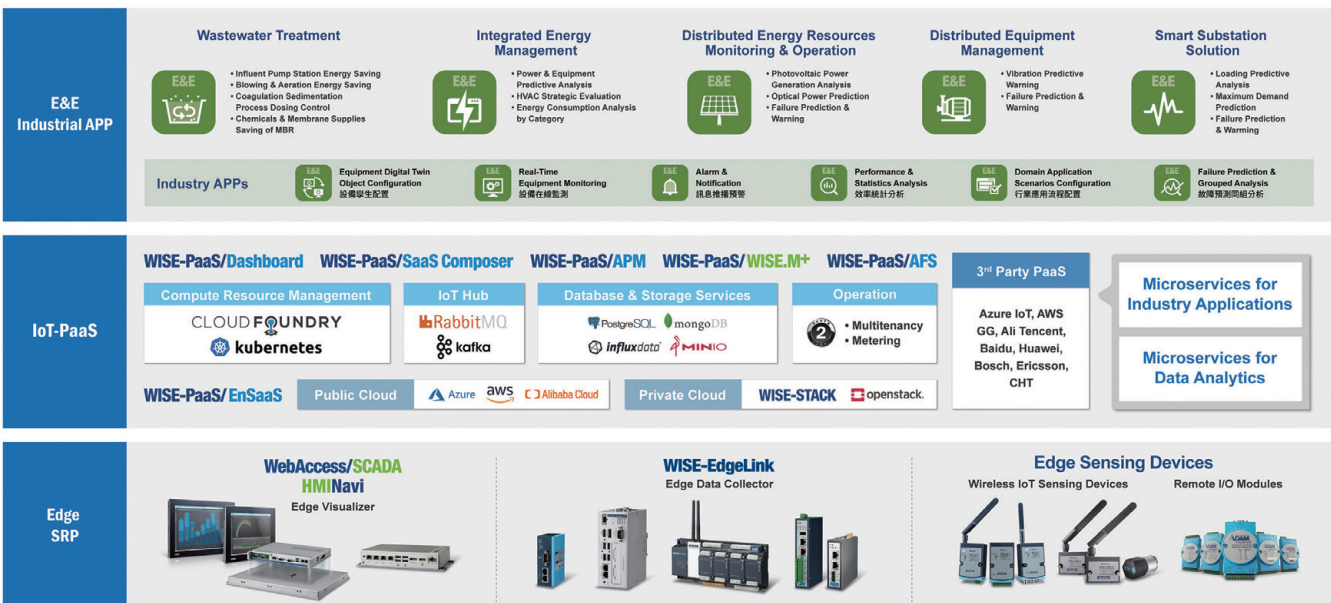
Event monitoring for real-time alarm

With wireless communication technology, event alerts can be transmitted in real-time from remote sites to the control center, allowing field personnel to respond promptly to minimize accidents and losses.

Remote equipment diagnostics and predictive maintenance

Collates operating status data from key components, thereby increasing equipment life, while reducing maintenance costs.

Energy and Environment System Architecture



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Solar Power Management Solution (SPMS)

Transforming Distributed Energy Resources to Drive the Growth of the Renewable Energy Market

Due to the ever-growing renewable energy industry, more solar power plants are planned for construction and operation worldwide. Current concerns among power plant owners and grid companies include data accuracy, operation efficiency, and asset management. Advantech's SPMS solution offers a unified monitoring management system, machine-to-intelligence technology, and a solid IoT data framework that can meet most managerial demands.

E&E
SPMS

Field site solar power management system

- Real-time monitoring of string/inverter/meter and other equipment operating parameters
- Visualized alarm management and intelligent power generation analysis



E&E
SPMS

Distributed solar power operation and maintenance management system

- Decentralized control and centralized management
- Qualified for local regulations for seamless real-time process monitoring of station equipment



E&E
SPMS

Centralized solar power operation and maintenance management system

- Centralized operation of unmanned remote sites
- Scalable architecture that works in plants of any size
- Analyze and optimize power station efficiency



Intelligent Water Management Solution

Cloud-Enabled Remote Equipment Management for Water and Wastewater

Advantech's intelligent water management solution integrate domain-specific knowledge on water equipment and processing technologies, and the WISE-PaaS/WISE.M+ industrial IoT cloud platform to provide cloud-based remote equipment I.Apps covering water pumps, blowers, pump stations, and bio-tank applications.

E&E
SPMS

Water management solution

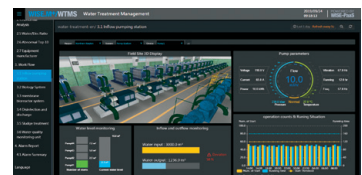
- Real-time equipment monitoring scenario and dashboard setup
- Data visualization and analysis for water and wastewater treatment management



E&E
SPMS

Turbo blower management system

- Integrated turbo blower monitoring and management for energy saving
- Failure prediction and warning for minimal equipment downtime



iFactory I.Apps

To confront the challenges in the future through digital transformation in Industry 4.0, Advantech developed an Industrial app platform to resolve this challenge. Through the utilization of WISE-PaaS platform functions, Advantech provides iFactory I.Apps that allow DFSI (Domain-Focused Solution Integrator) partners to have easy access to all the featured modules so they can collaborate with Advantech and develop complete industrial solutions. All iFactory Apps are available on WISE-Marketplace and can be easily subscribed via WISE points.

WISE-PaaS AIoT Cloud Platform

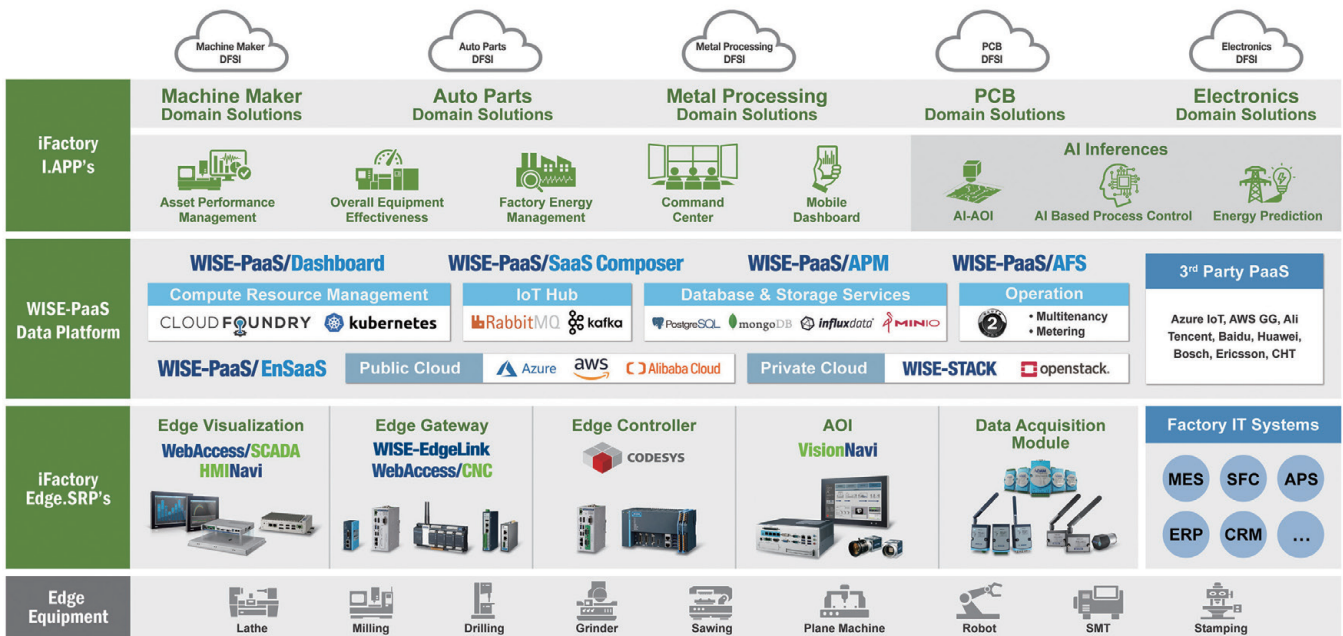
Advantech's WISE-PaaS AIoT cloud platform provides edge-to-cloud software and services to help system integrators, manufacturers, solution developers, and industrial end customers; enabling real AIoT-powered cloud business models in various vertical markets. Leveraging Advantech's extensive hardware portfolio, WISE-PaaS integrates diverse software services for edge connectivity. Data collected on hardware can be sent to the WISE-PaaS/EnSaaS industrial IoT cloud PaaS to help its ecosystem partners quickly develop SaaS and domain-specific IoT solutions based on our data-driven AIoT cloud platform, WISE-PaaS.

WISE-Marketplace

WISE-Marketplace is a trading platform for IIoT solutions that provide customers with subscription services for Industrial apps (I.Apps). The platform invites its ecosystem partners to launch their solutions via the platform. Users are able to subscribe Edge.SRP, General I.App, Domain I.App, AI modules, as well as consulting services, and training services provided by Advantech and partners on WISE-Marketplace.

iFactory I.Apps for Industry 4.0 Applications

Based on WISE-PaaS platform, Advantech has developed some significant industrial apps that can be easily integrated and customized for various industries. Moreover, Advantech invites DFSI partners to connect with WISE-PaaS platform and co-create iFactory I.Apps for Industry 4.0 applications, to help vertical industry customers implement rapid digital transformation.



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Overall Equipment Effectiveness (OEE)

Real-time Machine Availability Management for Maximizing Operational Excellence

Many manufacturers find it hard to identify those specific losses that contribute to low machine productivity as they are difficult to identify, record, and analyze, so manufacturers are looking for support in making the move toward smart factory transformation. Overall Equipment Effectiveness (OEE), one of the most vital industrial apps, realizes intelligent factory through data acquisition, aggregation, and analysis of machine availability to improve productivity, reduce loss, and increase profit.

Feature Highlights

- Complete data acquisition from heterogeneous machines for machine availability management and production information analysis
- Dashboard visualization of real-time machine status and stoppages to enable root cause analysis for maximizing machine utilization and productivity



Key Functions

- **Real-time production management.** Machine status can be monitored as machine running, error, idle, and machine stopped.
- **Machine availability management.** The runtime of each machine can be counted to calculate machine availability that reflects the percentage of planned production time the machine is available for operation.
- **Changeover efficiency management.** The average changeover time can be calculated to analyze daily efficiency.



iFactory/OEE

Factory Energy Management Solution (FEMS)

Centralized Monitoring and Management for Optimizing Factory Energy Efficiency

In today's harsh economic climate, most manufacturers are seeking ways to save cost. Best-in-class manufacturers are already road mapping plant strategies to implement energy management in the factory for decreasing energy consumption per unit production. Based on real-time data obtained from smart meters, Factory Energy Management Solution (FEMS) allows users to monitor energy consumption information, accurately evaluate energy costs, and optimize energy efficiency, aiding business intelligence strategies for energy management.

Feature Highlights

- Intuitive dashboard management to visualize data and easily generate analysis reports
- Energy consumption statistics and analysis to identify energy wastage and reduce business energy cost



Key Functions

- **Energy consumption overview.** An overview of past energy profiles and current energy consumption data provides a systematic approach to identify problem areas and prime targets for energy reduction.
- **Energy KPI management.** KPI settings allow users to measure and review energy usage and efficiency of each department, reducing energy waste and improving energy efficiency.
- **Energy consumption and cost analysis.** Production is usually the largest energy consuming part of a factory. Energy consumption data and costs can be analyzed and compared with utility bills to help improve energy efficiency and wastage.



iFactory/FEMS