

# Cloud-Enabled Edge Gateways for Industrial IoT

Powering Edge Intelligence with  
Advantech WISE-PaaS/EdgeLink

- ✓ Utilizing Edge Computing Applications
- ✓ Advantech WISE-PaaS/EdgeLink Introduction
- ✓ Case Study
- ✓ WISE-PaaS/EdgeLink Function List



## WISE-PaaS/EdgeLink



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# Transmit Data to the Cloud and Enable Edge Intelligence with WISE-PaaS/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-PaaS/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.

## Advantages of WISE-PaaS/EdgeLink



### Optimizing Efficiency with Connected Equipment

For industrial boilers, air compressors, chillers, power distribution cabinets, and other equipment, WISE-PaaS/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.



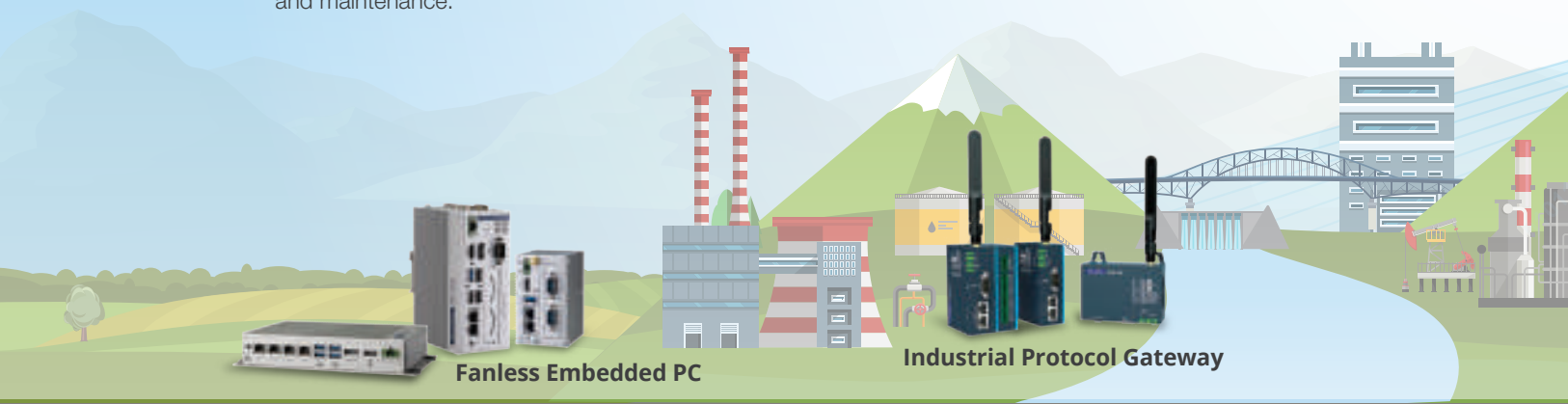
### Plug-and-Play Cloud Access for Rapid Deployment

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-PaaS/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.



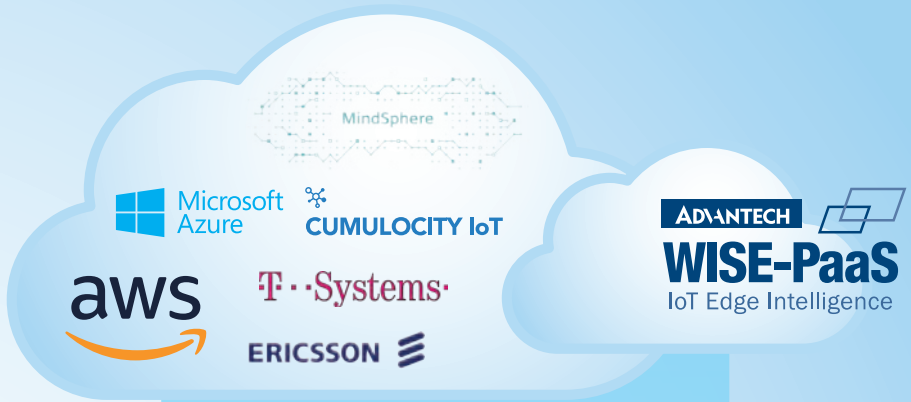
### Machine-to-Intelligence

- Leasing equipment management
- Overall equipment efficiency
- Pump status monitoring
- Flow pressure monitoring
- HVAC system operating status analysis

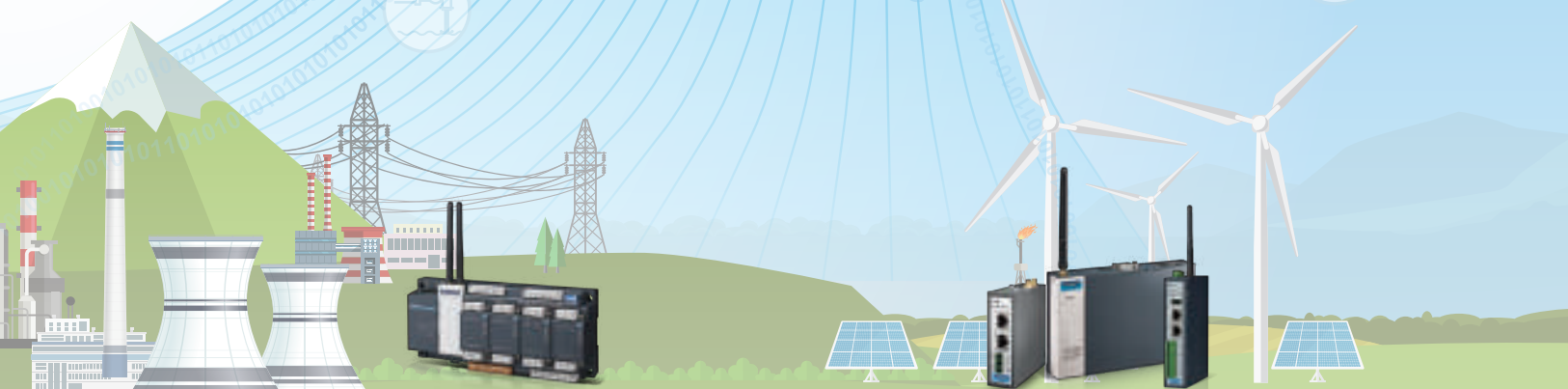


### Factory Environment

- Facility energy management
- Wastewater discharge
- Continuous emissions monitoring systems
- Volatile organic compounds monitoring
- Industrial park energy management



# WISE-PaaS/EdgeLink



Wireless Intelligent RTU

Industrial Communication Gateway



### Urban Construction

- Air quality monitoring
- Flood control systems
- Levee monitoring
- Wastewater systems
- Hazardous materials control



### Renewable Energy

- Solar power management
- Wind power management
- Geothermal energy management
- Weather station monitoring
- Power generation efficiency monitoring

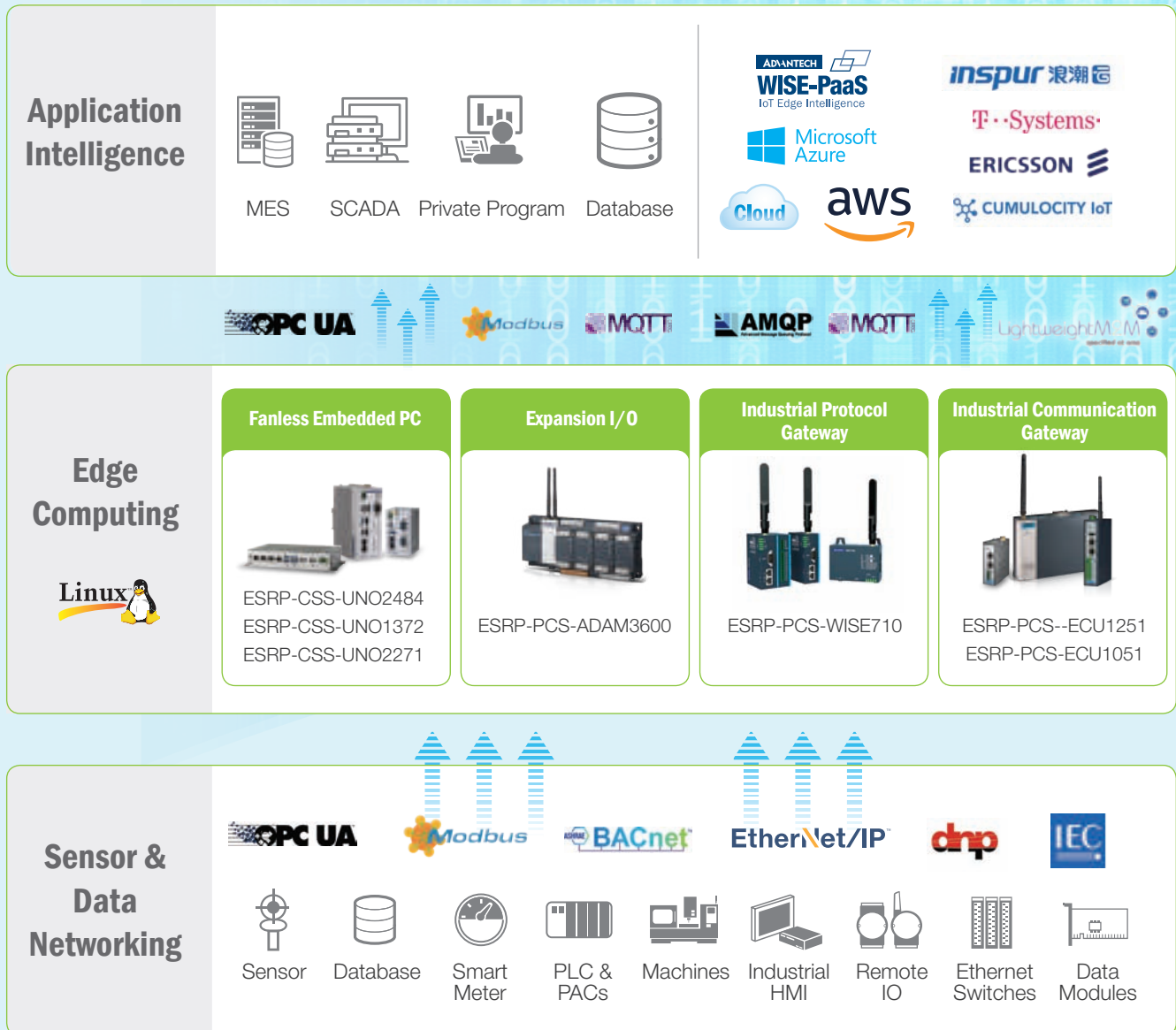
# Transmitting IoT Data from the Edge to the Cloud

Before data is ready for analysis, it must be preprocessed and transmitted to a server or the cloud using specific protocols. Advantech's WISE-PaaS/EdgeLink solutions are designed to convert and process acquired data without complex and time-consuming programming.

The WISE-PaaS/EdgeLink Studio software provides an efficient interface that allows users to preprocess data with just a few clicks of the mouse. After configuration, data can be downloaded to hardware equipped with WISE-PaaS/EdgeLink Runtime. This software enables users to easily obtain and transmit equipment data to the cloud and third-party systems.

## WISE-PaaS/EdgeLink Architecture

Advantech's WISE-PaaS/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-PaaS/EdgeLink Benefits Data Management

### Data Acquisition

- I/O drivers
- WISE-PaaS/EdgeLink Benefits Data Management
- User tags
- System tags

### Connectivity

- Open VPN
- Active connection to WebAccess
- Store and forward
- Protocol support
  - MQTT/FTP/ODBC/AMQP
  - Webservice/RESTful

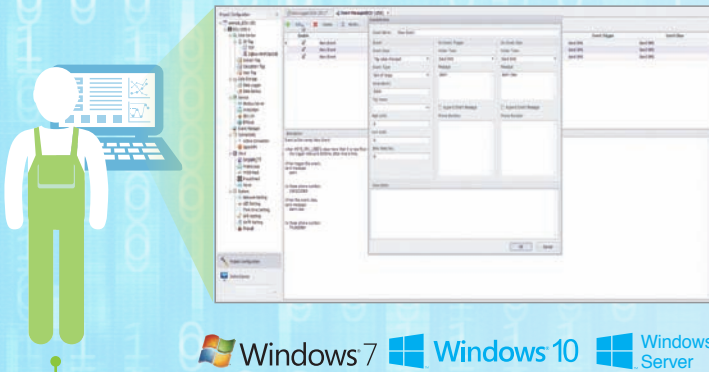
### Security

- Project encryption
- Whitelisting
- SSL encryption
- Data authority management

### Intelligence

- Event hub for SMS/email alerts
- SoftLogic runtime
- Data pretreatment
  - Event log
  - Time stamp
  - Data log
  - Tag quality

## WISE-PaaS/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



### 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

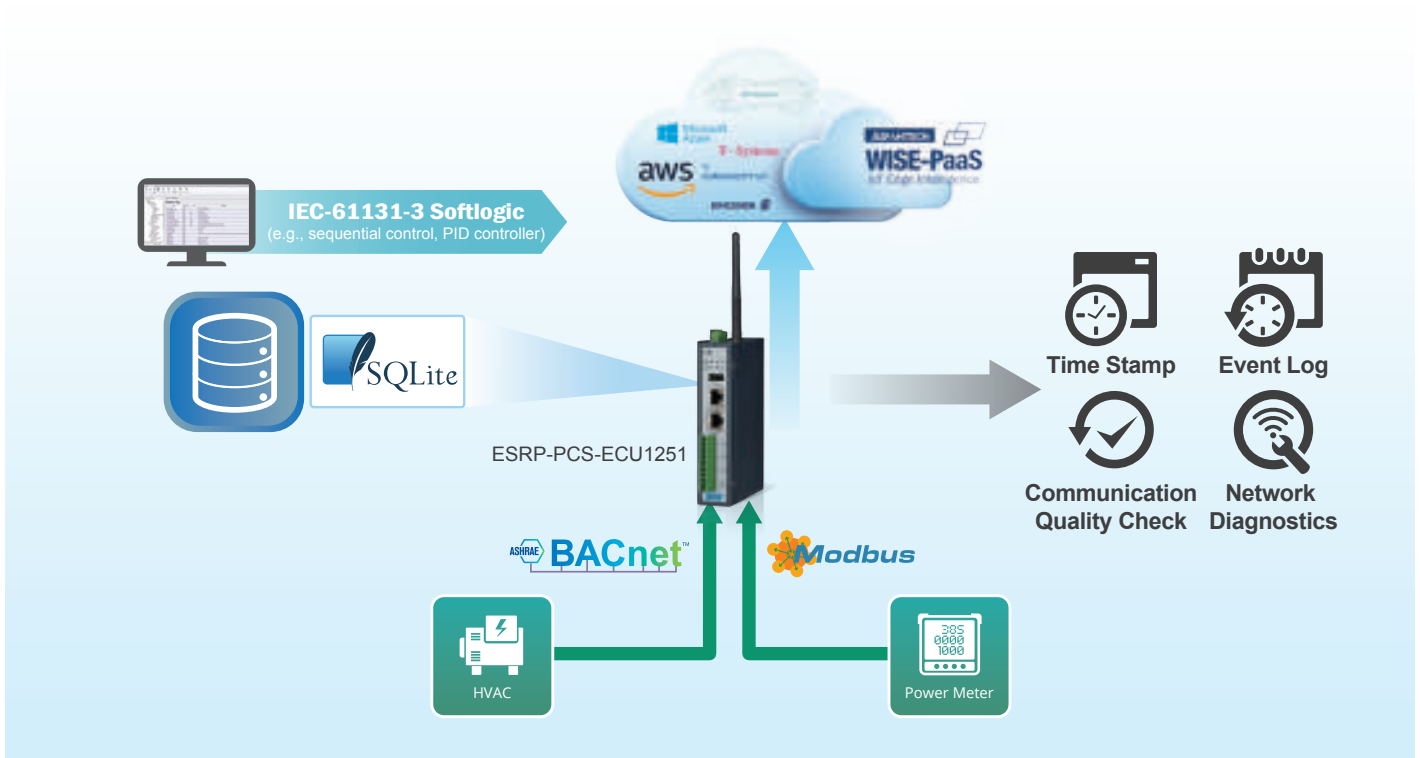


# Remote Equipment Monitoring for Equipment Builders



## Requirements

Equipment builders who thrive on improving equipment efficiency understand the importance of quality data in the analysis of component status. Given the high level of energy consumption for heating and cooling, being able to monitor and control heating, ventilation, and air conditioning (HVAC) systems can have a sizable effect on operation costs. Energy controllers can be used to monitor and control HVAC systems via a mobile or cloud system. With customizable software, they also accommodate customers who require customized functionality and input assemblies as well as cloud access.

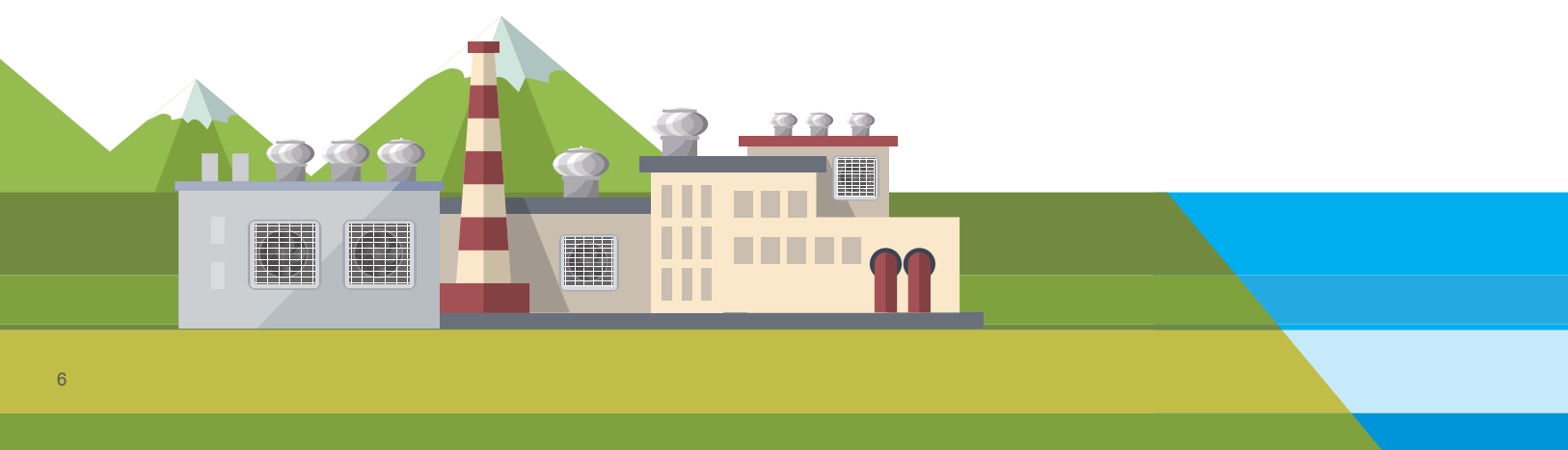


## Features

- Communication protocols: BACNet & Modbus
- Data time stamping and event logging
- Cloud solution with Microsoft Azure & MQTT
- Various I/O options

## Benefits

- Compact design and customized service
- Operational technology engineers can easily establish cloud access
- Scalable I/O & Comm. interface to different projects

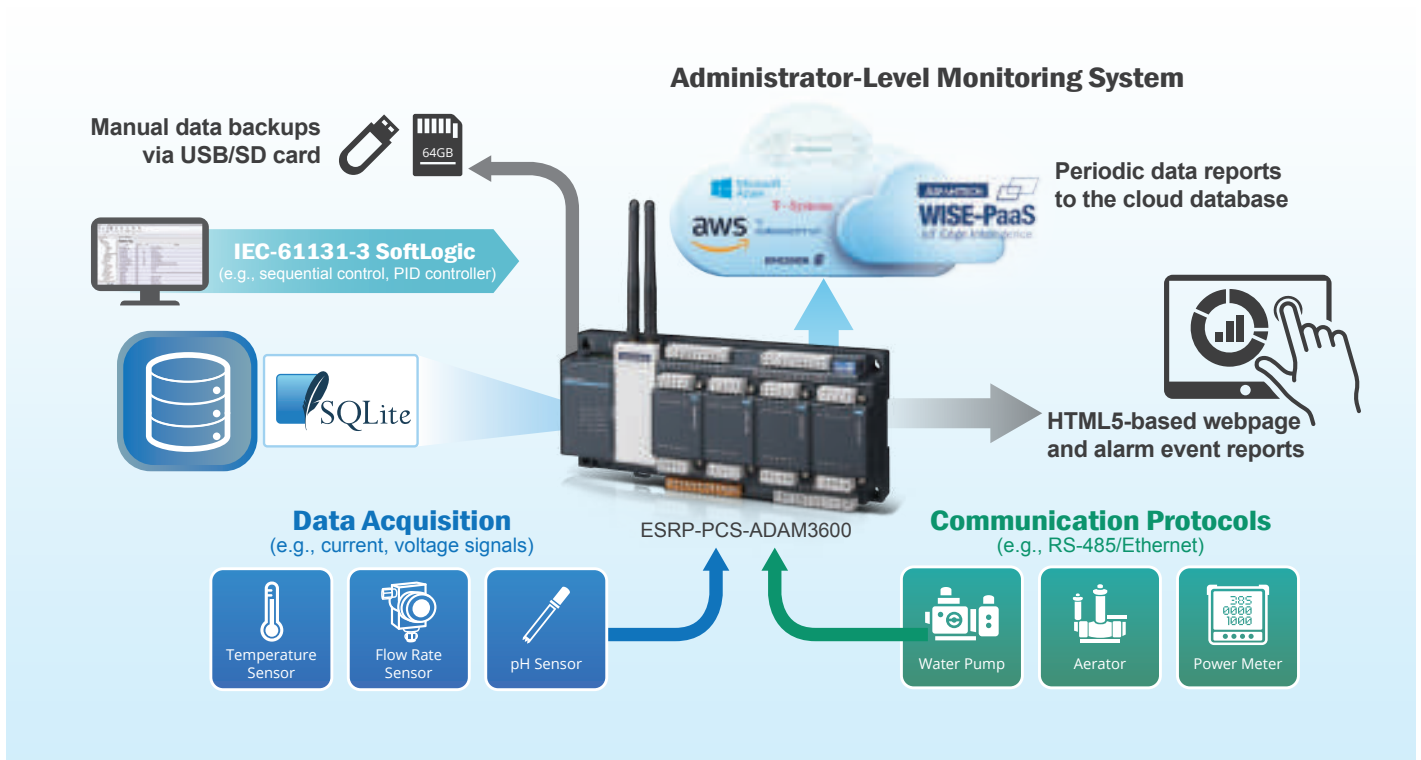


# Monitoring System for Waste Water Treatment and Reclamation Infrastructure



## Requirements

Wireless connectivity is required for monitoring a water pump station to enable reliable data transmissions to a surveillance center. The use of PLCs for monitoring and controlling pump stations is expensive and necessitates complex system integration procedures. Accordingly, many customers prefer to use all-in-one devices for data collection and transmission, as well as system monitoring and alarm reporting.

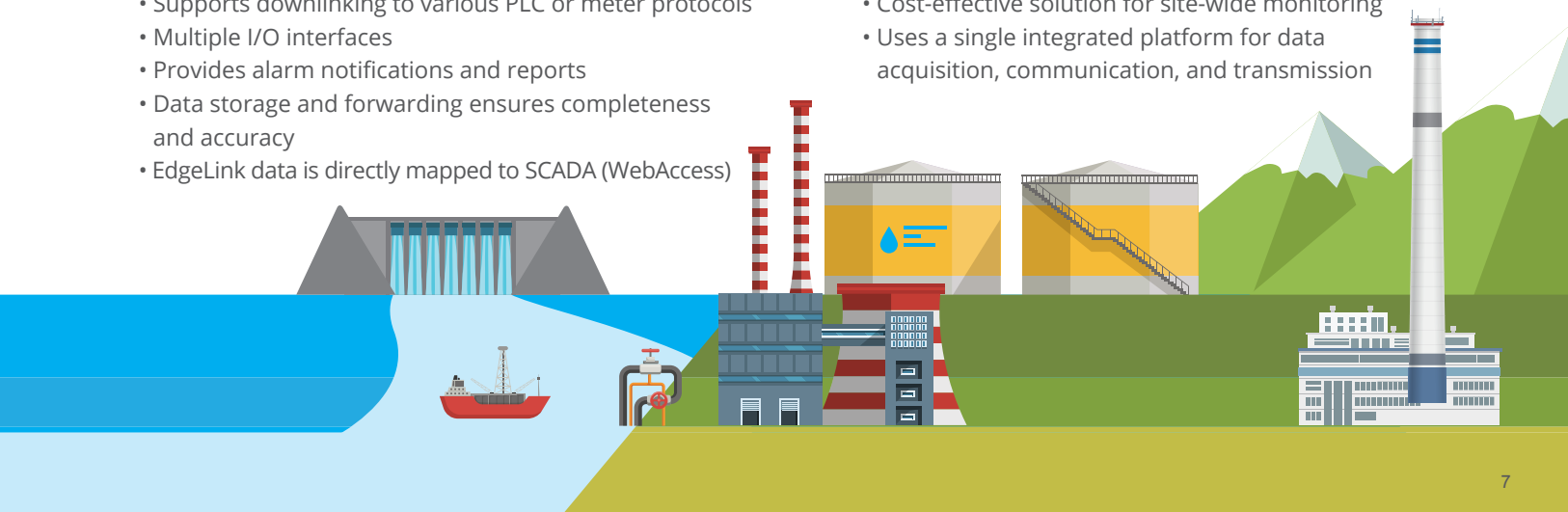


## Features

- Supports uplinking with DNP3 and Modbus protocols
- Supports downlinking to various PLC or meter protocols
- Multiple I/O interfaces
- Provides alarm notifications and reports
- Data storage and forwarding ensures completeness and accuracy
- EdgeLink data is directly mapped to SCADA (WebAccess)

## Benefits

- Eliminates programming for increased efficiency
- Cost-effective solution for site-wide monitoring
- Uses a single integrated platform for data acquisition, communication, and transmission

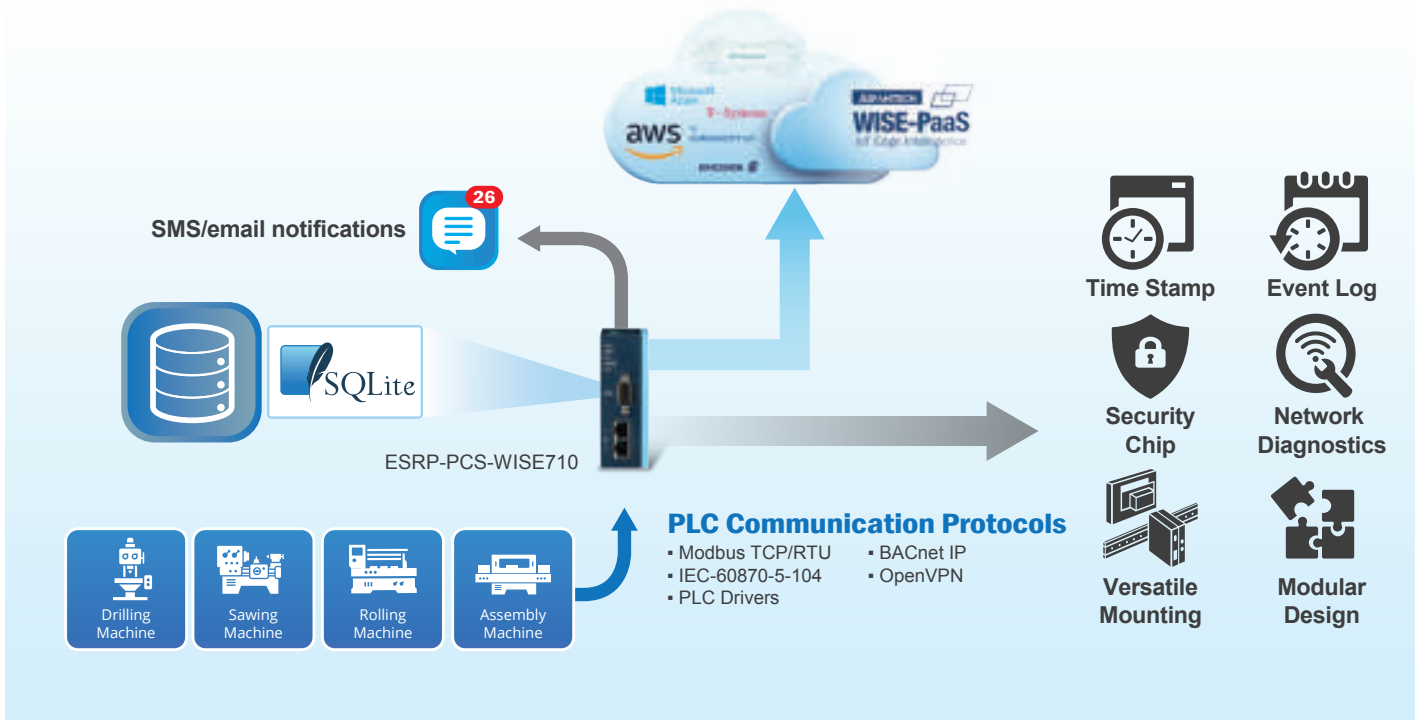


# Connecting Machines and Equipment to the Cloud



## Requirements

Digitalizing factory equipment is the first step to realizing Industry 4.0. Since this transformation affects all aspects of assembly, machining, rolling workshops, and production line processes, a wide variety of equipment and machines are involved and diverse protocols and communication ports are required. Equipment is geographically dispersed and located in environments with limited space for installation. To allow the customer to collect information from PLCs in proprietary system to information system or cloud space, a compact, distributed, multi-protocol convertor solution is required. Advantech's WISE-710 protocol converter provides the ideal solution for collecting data from PLC-controlled equipment and performing protocol conversion that enable the data to be used for machine intelligence. The modularity design of WISE-710 also provides the flexibility of functionality expansion for diverse applications.



## Features

- Supports various public clouds or private cloud connection
- Provides data time stamping and event logging
- Supports downlinking to PLCs with various protocols
- Modular design for flexible configuration and customization of functionality
- Enhanced cyber security with an embedded security chip

## Benefits

- Easy deployment to cross the barrier of OT and IT integration
- Data tagging ensures readability and comprehension
- Cost-effective system integration solutions
- Enables convenient tracking of historical data



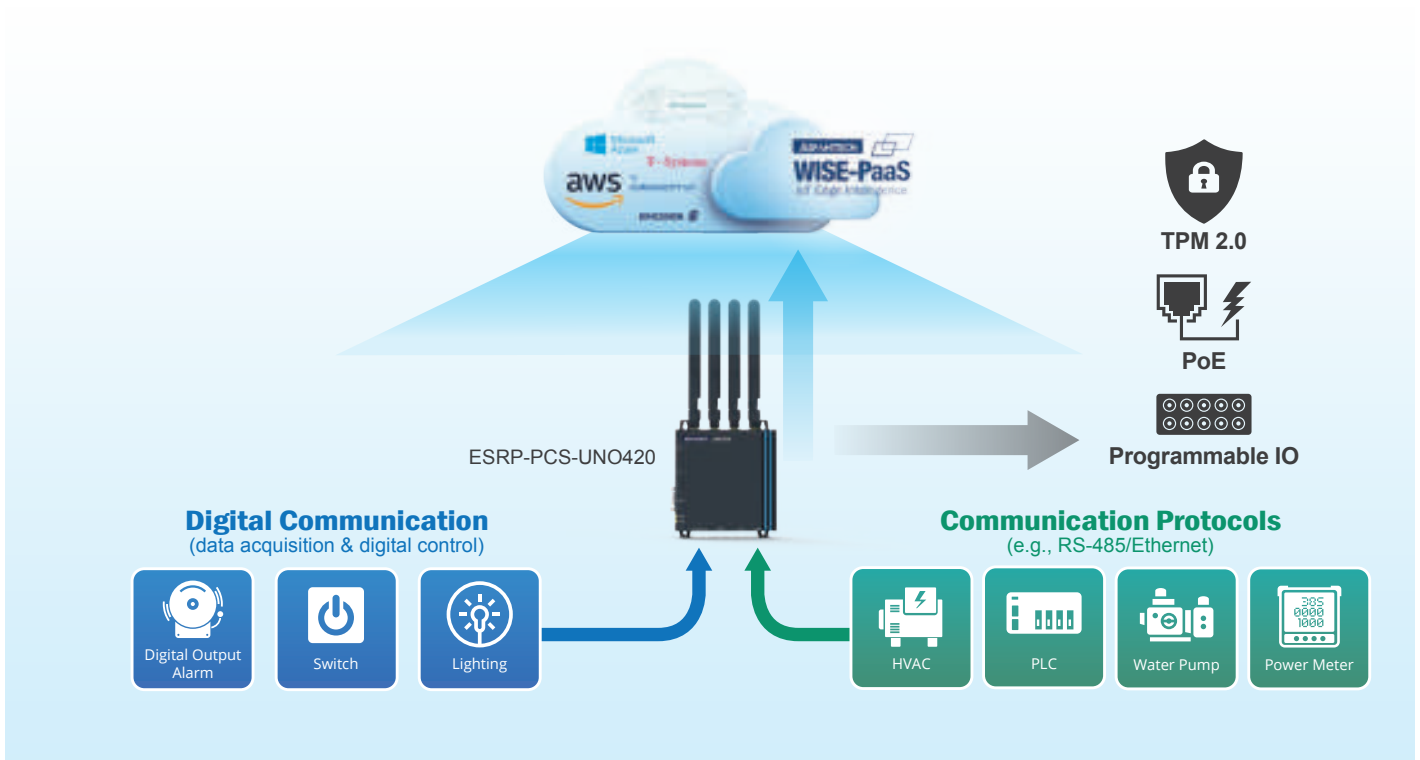


# PoE-Powered Sensing Gateway Solution



## Requirements

For enabling intelligence of industrial infrastructure and facility, sensors and controllers are widely deployed to detect operating information for remote monitoring and controlling. Advantech's rugged UNO-420 edge sensing gateway acts as a bridge between sensors/controllers and the control center or cloud. The sensing gateway supports a wide operating temperature range and power input via POE, making it suitable for installing in harsh environment and easy for power distribution.

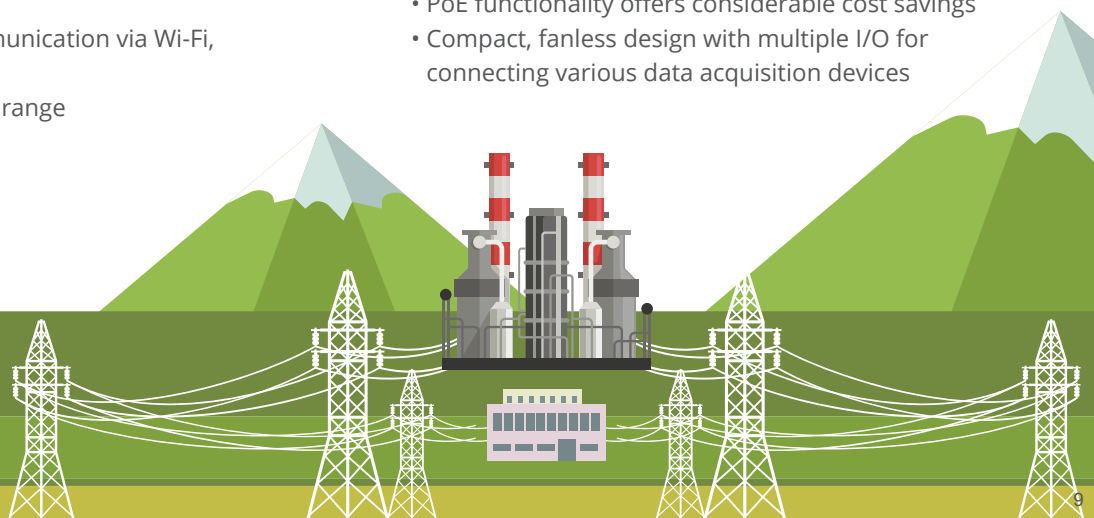


## Features

- Programmable GPIO and selectable COM for flexible functionality
- Supports dual wireless communication via Wi-Fi, 3G, 4G, and GPS
- Wide operating temperature range (-20 ~ 60 °C/-40 ~ 140 °F)

## Benefits

- Easy installation with a combined power and data cable
- PoE functionality offers considerable cost savings
- Compact, fanless design with multiple I/O for connecting various data acquisition devices



# WISE-PaaS/EdgeLink Function List For Supported Platform

	ESRP-PCS-ADAM3600	ESRP-PCS-ECU1051	ECU-1152TL-R11ABE
<b>Hardware Specifications</b>			
CPU	A8 AM3352BZCZD60	Ti Cortex A8, 600MHz	Ti Cortex A8, 800MHz
RAM	DDR3L 256 MB	DDR3L 256 MB	DDR3L 512 MB
On-Board IO	8AI/8DI/4DO	-	-
Slot	4 Expansion Slots	1x Micro SD slot	1x Micro SD slot
Wireless Communication	Zigbee/WiFi/Cellular/ NB-IOT	Zigbee/WiFi/Cellular/ NB-IOT	Zigbee/WiFi/Cellular/ NB-IOT
Mini-PCle	1 x Half-Size 1 x Full-Size	1x Full-size	1x Full-size
SIM Card Slot	Single SIM card slot / Dual SIM card slot	Dual SIM card slot	Single SIM card slot
LAN	2	2	2
COM	2	2	6
USB	1	1	1
OS Version	Linux 3.12.10-rt15-ti2013.12.01 #9 PREEMPT RT		

## EdgeLink Function List

Data Center	Maximum number of IO Tag	3000	2000	2000
	Device Model	√	√	√
	Excel Import/Export	√	√	√
	Data Logger	√	√	√
Online Monitor	DataBackup			
	iCDManager	√	-	-
Data Forwarding Service	Device Search	√	√	√
	Modbus Server	√	√	√
	IEC 60870-104 Server	√	√	√
	DNP3 Outstation	√	-	-
	WASCADA (WebAccess)	√	√	√
	BACnet Server	√	√	√
	OPC UA Server	√	√	√
EventManager (SMS/eMail)		√	√	√
IEC-61131-3 Softlogic		√	√	√
OpenVPN		√	√	√
Cloud Agent		SimpleMQTT / WebAccess / WISE-PaaS / ProudSmart /		
System Setting	Support IPv4/IPv6	√	√	√
		-	√	-
	LED Setting	√	√	-
	Time Sync Setting (NTP/GPS)	√	√	√
GPS Setting		√	√	√
SDK				

	ESRP-PCS-ECU1251	ESRP-CSS-UNO1372	ESRP-CSS-UNO2271	ESRP-CSS-UNO2484	ESRP-PCS-WISE710
	TI Cortex A8, 800MHz	Intel® Celeron J1900, 2.0GHz processor	Intel® Atom™ E3825, 1.33GHz Processor	Intel® Core™ i5-7300U, 2.6GHz Processor	CPU Freescale i.MX 6 Dual Lite A9
	DDR3L 256 MB	DDR3L 4GB	DDR3L 4GB	DDR4 8GB	DDR3 1GB
	-	4DI/4DO			4DI/4DO
	1x Micro SD slot				1x Micro SD slot
	Zigbee/WiFi/Cellular/ NB-IOT	3G/GPS/GPRS/Wi-Fi Communication by iDoor Technology	3G/GPS/GPRS/Wi-Fi Communication by iDoor Technology	3G/GPS/GPRS/Wi-Fi Communication by iDoor Technology	WiFi/3G/4G/NB-IoT
	1x Full-size	2 x mPCIe	1 x mPCIe	1 x mPCIe	1x Mini-PCIe (Full-size)
	Single SIM card slot	Single SIM card slot	Single SIM card slot	Single SIM card slot	
	2	2	2	4	
	4	2	2	4	
	1	4	1	4	1x Micro USB2.0
					Linux imx6dl 4.1.15

	2000	3000	5000	8000	3000
	√	√	√	√	√
	√	√	√	√	√
	√	√	√	√	√
FTP/SQL Server					
	-	-	-	-	-
	√	√	√	√	√
	√	√	√	√	√
	√	√	√	√	√
	-	-	-	-	-
	√	√	√	√	√
	√	√	√	√	-
	√	√	√	√	√
	√	√	√	√	√
	√	-	-	-	-
	√	√	√	√	√
AWS / Inspur / WLTX / T-System / OpenIoT / RootCloud / Azure / LwM2M					
	√	√	√	√	√
	-	-	-	-	-
	√	-	-	-	-
	√	√	√	√	√
	√	-	-	-	√

DCTag SDK/DataLogger SDK/Board Resource SDK

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