

# IoT Edge

## Device Networking and Edge Computing Services



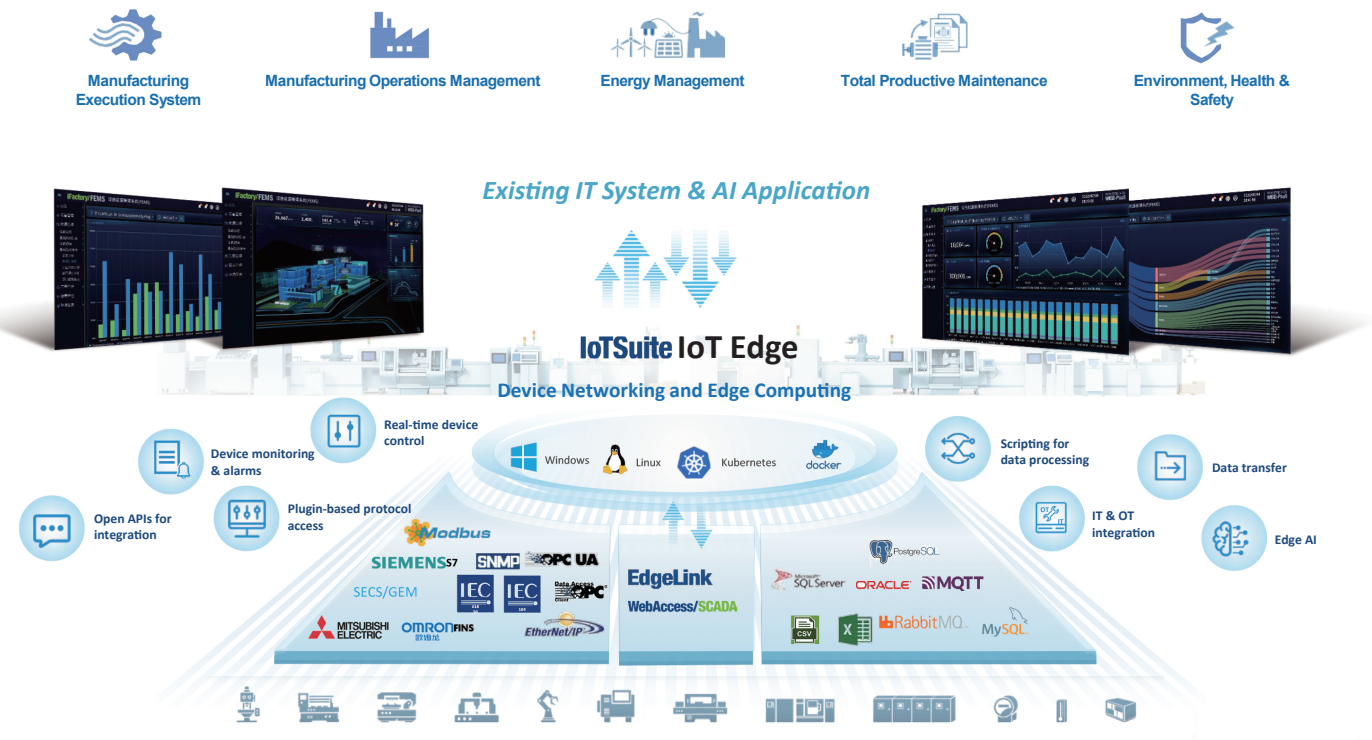
### Features

- A lightweight software-defined data aggregator for the edge
- Supports data collection from common industrial equipment and IT systems, with plugin-based protocol expansion
- Analyzes with math, transformations and statistics
- Visualizes IoT data right by the data source for faster decisions
- Runs on both Windows / Linux IPCs
- Enables cloud-edge collaboration and edge autonomy

### Introduction

IoT Edge extends industrial IoT platforms to the edge, facilitating data access, collection, computing, and transfer directly at the source. This enables real-time operations, intelligent applications, and ensures security and privacy protection, all while enhancing performance and reducing cloud bandwidth usage. The data is easily accessible via APIs, allowing users to rapidly develop their own business or AI applications.

### System Architecture



## Software Features

- Supports data collection from common industrial equipment and industrial systems, with the ability to expand data access through plugin-based methods
- Seamless integration with Advantech WebAccess, EdgeLink, and other data collection tools for faster deployment
- Unified access, management, and operation & maintenance of diversified devices
- Includes data pre-processing capabilities, supporting data cleansing and filtering
- Open architecture, allowing data to be easily forward to third-party services or platforms, facilitating system integration and application development
- Near real-time data collection, pre-processing, analysis, and visualization, meets real-time business needs
- Cloud-edge collaboration, enabling the management of edge nodes on the cloud, with edge data, applications, and services synchronized with the cloud
- Quickly build 2D and 3D visual interfaces using a drag-and-drop zero-code approach

## Software Specification

| Module                  | Feature                                | Description   |
|-------------------------|--|---|
| Device Management       | Device model definition                | Defines device models, including sub-modules, properties, events, and commands  |
|                         | Device management                      | Provides device create, update, delete, and status management functionality.  |
|                         | Device shadow                          | Supports device data query and threshold settings. Provides a caching mechanism to buffer data transmission for unstable networks.  |
|                         | Device control                         | Supports remote control of managed devices  |
|                         | Batch operations                       | Supports batch operations to create, update, and delete devices in bulk.  |
| Data Acquisition        | Proprietary PLC drivers                | Siemens, Mitsubishi (FX, Q series), Beckhoff, Omron, etc.   |
|                         | Industrial automation protocol drivers | Modbus (RTU, TCP), OPC-UA, OPC-DA, S7, SNMP, BLE v4.0, Ethernet/IP, CAN OPEN, GPIO, Profibus DP, DLT645-2007, DNP3.0 and more   |
|                         | API & database interfaces              | HTTP, MQTT, ODBC (MS SQL Server 2019, MySQL 8, PostgreSQL 10, Oracle 11g)   |
|                         | File-based input                       | CSV, Excel  |
|                         | Custom data plug-ins                   | Expands data acquisition abilities with your own custom data plug-in in any programming language  |
| Data Forwarding/Export  | Data sourcing                          | Uses any data captured by IoT Edge as your data source  |
|                         | Data processing                        | Processes your data with math calculations, filtering, selection, de/serialization and custom scripts.  |
|                         | Data forwarding/export                 | Pushes your data to databases (InfluxDB 1.8, MongoDB 4.0, MS SQL Server 2019, Oracle 11g, MySQL 5.0), cloud IoT services, other message queues (e.g. Kafka) or existing IT systems via APIs |
|                         | Message transmission security          | Based on TLS1.2 encryption protocol, providing a secure transmission channel  |
|                         | Data download                          | Selects and download data as CSV files for analysis   |
| Historical Data Storage | Device historical data                 | All captured data is stored by IoT Edge (MongoDB)   |
|                         | Data historian                         | Stored historical data can be queried and retrieved for further usage   |
| Gateway Management      | Gateway management                     | Manages your data acquisition gateways & remote I/Os. Easy set up with Advantech WebAccess, EdgeLink and WISE-series of gateways  |
|                         | Sub-device management                  | Monitors the status of sub-devices under each gateway, including data writeback thru gateway devices  |
| Basic Device Alarms     | Alarm notification                     | Provides equipment status monitoring, alarm condition setting, abnormal alarm and notification function   |
|                         | Alarm history                          | Real time & historical alarm record   |
| Data Visualization      | Data sourcing                          | Uses any data and alarms captured by IoT Edge as your data source   |
|                         | Visualization refresh rates            | Displays data in real-time, with configurable refresh rates   |
|                         | Supported visualizations               | Data table, line chart, bar chart, bar gauge chart, heatmap, column charts, donut charts, sankey charts, radar chart, time line chart, pie charts, maps (OpenStreetMap) and more            |
|                         | Custom visualization plugins           | Extends visualization capabilities with your own plugins and charting libraries (e.g. eChart)   |
| OTA Upgrades            | Remote updates                         | Supports remote deployment and update of device services  |
| Logs                    | Service logs                           | Supports system service logs and user operation logs  |
| Deployment Option       | Windows native install                 |   |
|                         | Docker                                 |   |
|                         | K8S                                    |   |

## Dashboard for Device Networking and Edge Computing

### 1.1.1 Data Acquisition Protocols List

| Protocol   | Interface                           |
|--|-------------------------------------|
| Modbus (RTU, TCP)  | SERIAL & TCP/IP                     |
| OPC-UA   | TCP/IP                              |
| OPC-DA   | TCP/IP                              |
| Siemens S7   | TCP/IP                              |
| SNMP   | TCP/IP                              |
| MQTT   | TCP/IP                              |
| HTTP (IoT Edge protocol)   | TCP/IP                              |
| Kafka  | TCP/IP                              |
| ODBC (MS SQL Server 2019, MySQL 8.0.29, PostgreSQL 10.5, Oracle 11g) | TCP/IP                              |
| * BLE v4.0   | BLE v4.0 (Linux)                    |
| * Ethernet/IP  | TCP/IP                              |
| * CAN OPEN   | CAN Bus                             |
| * GPIO   | GPIO (Linux)                        |
| * CSV  | local, http server, ftp server, smb |
| * Excel  | local, http server, ftp server, smb |
| * ProfiBus DP  |                                     |
| * Mitsubishi PLC (series FX and Q)                                   | TCP/IP                              |
| * Beckhoff PLC   | TCP/IP                              |
| * Omron PLC  | TCP/IP, UDP                         |
| * DLT645-2007  | TCP/IP                              |
| * DNP3.0   | TCP/IP                              |
| * SNMPTrap   | UDP                                 |
| * BacNet   | UDP                                 |

\* Private protocol (plugin) can be downloaded additionally.

### 1.1.2 Data Forwarding Protocols list

| Protocol      | Supported Version/Format | License Mode |
|---------------|--------------------------|--------------|
| MQTT          | Generic MQTT format      | Private      |
| InfluxDB      | InfluxDB 1.8             | Private      |
| MongoDB       | MongoDB                  | Private      |
| SQL Server    | MS SQL Server 2019       | Private      |
| Oracle        | Oracle 11g               | Private      |
| MySQL         | MySQL 5.0                | Private      |
| Kafka         | Kafka                    | Private      |
| iFactory      | WebAccess payload format | Private      |
| OPC-UA Server | TCP/IP                   | Private      |

## Minimum Supported Computer Hardware

| Category             | Description  |
|----------------------|--|
| Operating System     | Windows 10 IoT Enterprise LTSC, Ubuntu 20.04 LTS, Windows Server 2019 Standard |
| Container Deployment | Docker, Kubernetes   |
| Hardware             | Intel® Core™ i3 with 4 GB RAM  |
| Network Environment  | Standalone; Requires external Internet access for cloud-edge collaboration     |
| Browser              | Windows Edge, Google Chrome, Firefox   |

## Purchase Information

|               | Software  | Licenses                                  | Part Number |
|---------------|---|---|-------------|
| WISE-IoT Edge | WISE-IoT Edge includes the following services within a purchase:<br>A. IoT Edge<br>B. Visual Suite – 2D Dashboard | WISE-IoT Edge<br>x100 parameters (tags)   | 9803EBISL00 |
|               |   | WISE-IoT Edge<br>x1,000 parameters (tags) | 9803EPISL00 |

## Advantech Hardware Add-on

| Category                        | Description  |   |
|---------------------------------|--|---|
| Intelligent Edge Control Device | <b>AMAX-5580 Modular Edge Controller</b> <ul style="list-style-type: none"> <li>Sixth-generation Intel® Core™ i7/i5/Celeron processor</li> <li>Expandable plug-in EtherCAT I/O and various bus interface modules, supporting Windows 10 or Linux systems, can be equipped with CODESYS real-time kernel, realizing high-performance edge computing and safe real-time control integration</li> </ul>   |    |
|                                 | <b>ADAM-3600 IoT Intelligent Remote Terminal Unit</b> <ul style="list-style-type: none"> <li>8AI/8DI/4DO/4-slot wireless intelligent RTU</li> </ul>  |    |
| Intelligent Gateway             | <b>ECU-1051/1251/1252 Intelligent Communication Gateways</b> <ul style="list-style-type: none"> <li>TI Cortex intelligent edge gateway, RT Linux system with 2 x LAN, 2 x COM ports, 4 x COM ports for 1251, 2 x CANBUS for ECU-1252.</li> <li>Built-in software "EdgeLink", can be equipped with CODESYS for real-time control.</li> </ul>  |    |
|                                 | <b>EKI-9000/7000/5000/2000 Series Edge Industrial Switches</b> <ul style="list-style-type: none"> <li>Industrial Ethernet Switches and Communications</li> </ul>   |    |
| Node Data Acquisition           | <b>WISE-2410/EVA-2000 Series LoRaWAN Wireless Sensors</b> <ul style="list-style-type: none"> <li>LoRaWAN wireless monitoring of vibration and temperature and more.</li> </ul>   |  |
|                                 | <b>ADAM-6000/4000, WISE-4000 Series Data Acquisition Modules</b> <ul style="list-style-type: none"> <li>Module-like data acquisition device for various industrial data acquisition scenario.</li> </ul>   |  |
| Edge Computing                  | <b>UNO-2484 Modular Compact Embedded Box PC</b> <ul style="list-style-type: none"> <li>High-performance industrial PC equipped with Intel Core i7/i5/i3 processors for edge computing applications.</li> </ul>   |  |
|                                 | <b>UNO-137 Small-Size Integrated DIN-Rail Industrial PC</b> <ul style="list-style-type: none"> <li>Industrial PC equipped with Intel Atom E3940 processor</li> <li>Supports Windows and Linux operating systems. Can be equipped with CODESYS real-time control software.</li> <li>DIN-rail mounting, and Operates in a wide temperature range of -40°C to 70°C</li> </ul>   |  |
|                                 | <b>UNO-348 Expandable Embedded Box Embedded Industrial PC</b> <ul style="list-style-type: none"> <li>Supports 10th-generation processors</li> <li>4 x USB 3.2, 2 x USB 2.0, 3 x GigaLAN, 2 x RS-232/422/485, and 1 x RS-232 ports, 1 x Mic-in, 1 x DisplayPort, and 1 x HDMI</li> <li>Supports 1 x PCIe x16, 2 x PCI expansion</li> </ul>  |  |
|                                 | <b>MIC-770 Desktop Processor Compact Fanless System</b> <ul style="list-style-type: none"> <li>Supports a wide temperature range (-10°C to 50°C) and provides VGA and HDMI outputs.</li> <li>Versatile I/O: Equipped with 2 Gigabit LAN ports, 8 x USB 3.0 ports, and 1 x 2.5 port</li> <li>Wide Voltage Input: Accommodates a wide input voltage range from 9 to 36 VDC</li> <li>Rugged Design: Built with an IP40 rating to resist dust and withstand harsh environments.</li> <li>Flexible Expansion: Supports FlexIO and iDoor modules for customizable configurations with additional HDMI, DVI, DIO, and remote I/O interfaces.</li> </ul> |  |