Advantech's Edge Intelligence Solutions Power AIoT Industrial Application Development
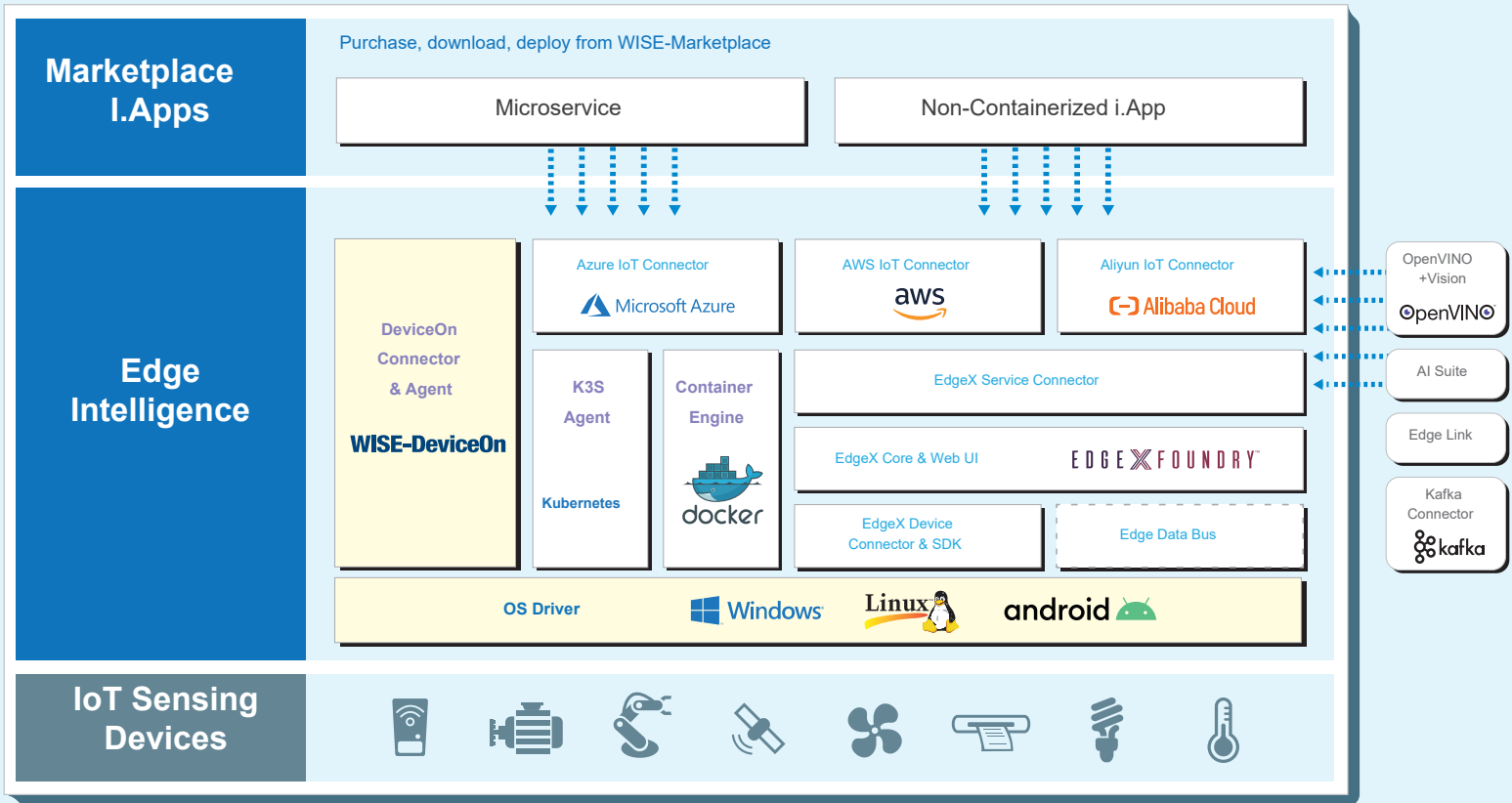
Information and communications technology has changed several times over the last few decades—from client-server, web based, to cloud computing, and recently the trend has shifted towards edge computing. Edge computing allows industrial customers to use virtualization technologies that makes it easier to deploy and run a wider range of applications at the edge. Edge computing brings computation and data storage closer to where it is needed, to improve response times and save bandwidth. Advantech believes in the potential of edge computing and is committed to promoting edge intelligence (Ei) solutions. Years of development has yielded solutions which include an integrated hardware and software architecture designed especially for the edge, server, and the cloud, and which also incorporates a containerized/microservice development environment. Wei-Chieh Chen, Senior Manager of Advantech stated, "Advantech's Ei solutions reshape the AIoT world. Ei solutions include niche hardware and software integration and more edge computing industrial apps (I.App) through WISE-Marketplace, which provides many additional software application services within a complete ecosystem. These edge intelligence enabled solutions allow customers to develop, deploy, and manage vertical applications in various fields to quickly achieve innovative breakthrough applications."

Diversified I.App Ready on WISE-Marektplace to Facilitate AIoT Applications

Advantech's WISE-Marketplace is an online app and software services store that offers pre-made industrial apps (I.App) to meet the needs of industrial users such as Domain Focused Integrators (DFSI), hardware/software developers, and system integrators. WISE-Marketplace forms part of a larger ecosystem that helps industrial manufacturing customers realize their digital transformation potential. Wei-Chieh Chen described the creation of a typical industrial app, "To develop an industrial app, companies need to spend considerable time conducting R&D, collecting data, preparing SDK/APIs, deploying edge devices, and designing a cloud interface. WISE- Marketplace replaces this process with pre-tested and certified I.App/utilities for download and plug-and-play functionality. This enabled Ei solutions to configure for peripheral equipment integration, data and cloud connectivity, and AI model execution, as well as solution ready for data and security management and storage applications.

From the layered architectures of IoT perspective, Ei solutions come in three categories. These include Ei-Edge, Ei-Servers, and WISE-Marketplace solutions. Ei-Edge solutions have multiple peripheral data acquisition interfaces. If users want to connect data sources from outside a preset range, they can easily access them using the EdgeX API. Moreover, Ei-Edge integrates cloud interface functions such as AWS, Azure, and AliCloud, and supports the deployment and management of Docker Container and K3s.

Ei-Servers form the connecting link from the cloud to the front end. They centrally manage all devices, applications, or microservices in the environment, and also provide management functions such as load balancing, horizontal expansion, and seamless updates for K8s/K3s clusters. Advantech's WISE-Marketplace app and software services store provides a convenient Ei landing page, which contains more I.App offerings, technical documents, and other useful tools. In addition, there are specific release mechanisms for I.Apps, microservices, and containerized or non-containerized environments, as well as self-developed or third-party packages. WISE-Marketplace provides a forum and authentication mechanism to guide target customers such as industrial users, DFSI, peripheral equipment vendors, and I.App developers to ensure that I.App listings, procurement, and usage processes are consistent and of the highest quality; it also ensures that all I.App or utilities are compatible and integrate well with each other.

Ei software integration architecture

Powerful Management Functions from Data, Device to Computing Resource

EdgeX API + DeviceOn + K3s are combined with powerful management functions. If the main functions of Ei are explored from a horizontal perspective, they can be summarized into three main areas: data management, device management, and computing resource management. In terms of data management, the open source EdgeX API can be called the core, ensuring that developers are able to retrieve various data sources. Moreover, Ei data management is connected to multiple cloud platforms, allowing users to directly upload collected data to mainstream public cloud services and Advantech's WISE-PaaS/APM without any code needed.

The core of the device management layer is DeviceOn that features edge device maintenance and management functions, which support remote monitoring, control and OTA updates, and serve as a bridge between WISE-Marketplace and the network edge. If a user's environment has 100 edge devices, a specific I.App must be installed on all of them. For this, the user can purchase a 100 user license from WISE-Marketplace and deploy to all devices at once via DeviceOn, eliminating the time-consuming task of installing the app on one device at a time. The computing resource management layer is shouldered by K3s, like a set of lightweight K8s, which is a container management suite suitable for edge computing environments.

Ei contains many unique advantages, being able to be used quickly and easily with little or no code, and part of its appeal is that it ensures a high degree of integration between different services and apps. Moreover, users can not only use the application ready environment of Ei out of the box, but also flexibly extend it with more application upgrades.

ADVANTECH

Enabling an Intelligent Planet

Ei Solutions and WISE-Marketplace Assists Businesses to Level Up

A China-based surgical mask manufacturer needed to lower production failure rate, so they deployed Ei-A110 edge systems in their factory AOI inspection. Ei-A110 could detect and analyze the deficit of face mask production, while sending the data to an AIR-300 edge inference system for AI training to improve production efficiency. The key benefit of Ei-A110 lies in the built-in WISE-DeviceOn remote monitoring and device management software which enables preventive system management such CPU and key components temperature and loading and delivering.

Ei-A110   **AIR-300**

Many other successful Ei applications have already been tried and tested in industrial and retail domains. Taking industrial as an example, a metal processing plant was looking for a more economical way to update their device management. So, they partnered with Advantech and after careful consultation integrated edge devices, EdgeLink, and I.Apps into their industrial environment. They now have a much better understanding of their production capacity and the health status of their CNC production lines.

In the retail industry, many advertisers use Advantech's digital signage player solution (with DeviceOn and SignageCMS software package) to remotely manage digital signage devices and schedule playback of advertising content. Other retailers have downloaded and activated various iRetail apps from WISE-Marketplace to implement smart POS applications or construct smart retail scenarios.

Through WISE-Marketplace, Advantech aims to promote change in their sales model so customers can order Ei products from their online platform, as well as obtain technical services through dedicated business lines, carry out technical consultation through forums, and obtain software services for application expansion through the WISE-Marketplace. This model simplifies market communication and helps users quickly deploy their smart solutions and services.

ADVANTECH

Enabling an Intelligent Planet