

My WISE-PaaS

Co-Creating the Future of the IoT World

AUGUST 2019

Co-Creating the Future of Industry 4.0

In the world of IoT, how to integrate operational technology (OT) and information technology (IT) and rapidly upgrading legacy systems for successful transition into the Industry 4.0 era?



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ADVANTECH
WISE-PaaS
IoT Edge Intelligence



■ Power Insight

The Journey to a New Scalable Easy-to-Use Industry 4.0



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YCM Turns to Advantech to Co-Create a CNC Management Solution for Intelligent Metal Manufacturing



■ Customer Partnership

Revitalizing U.S. Manufacturing with Industry 4.0 Applications



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Advantech WISE-PaaS Industrial IoT Cloud Platform

Enabling AIoT Applications via Digital Transformation



ADVANTECH
WISE-PaaS
IoT Edge Intelligence



Microservices
Architecture



Data Acquisition



Remote Asset
Performance Management



Data Visualization



Cross-Platform
Data Integration

ADVANTECH

Enabling an Intelligent Planet

Advantech's WISE-PaaS industrial IoT cloud platform provides edge-to-cloud software and services, including edge data acquisition, data analytics, visualization, and equipment remote management. It helps system integrators and manufacturers by enabling real IoT-powered cloud business models in various vertical markets and quickly develops SaaS and domain-specific IoT solutions.

Edge Sensing

WISE-PaaS/EdgeLink

Machine-to-Intelligence
Edge Engine

WebAccess/MCM

Machine Condition
Monitoring Software

WebAccess/CNC

CNC Machine
Monitoring Software

Intelligent Connectivity

WebAccess/DMP

Mass Router
Deployment System

WebAccess/NMS

Cloud Network
Management System

Edge Computing

WebAccess/SCADA

IIoT Application
Software Framework

WebAccess/HMI

HMI Runtime
Development Software

Cloud Platform

WISE-PaaS/WISE.M+

Cloud-Based IIoT Monitoring
and Operating Platform



WISE-PaaS Portal

Industry 4.0 is Shaping Our Future

Every decade, the world experiences a revolution in technology. The 1990s was the decade for personal computers and at-home Internet. The 2000s brought us streaming, broadband access, virtualization and cloud delivery. This decade has brought us mass adoption of Internet of Things (IoT), artificial intelligence (AI) and machine learning (ML). Both technologies have provided a smarter, faster, more productive fourth generation in manufacturing progress labeled “Industry 4.0.” Together with IoT, AI and ML catapults legacy machinery into the future where productivity, efficiency, and connectivity are prime benefits.

The biggest hurdle for most manufacturers is design of technologically advanced infrastructure incorporated with expensive legacy systems. IoT changes require fully connected systems that “talk” to the cloud uninterrupted. Fragmentation is built into IT as a flexibility advantage, but by fragmenting systems manufacturers need resources that can seamlessly connect them.

These systems incorporate different protocols, brands and eco-systems that must all be able to “talk” to each other and work as a whole. With Advantech, we devise a system that’s plug-n-play with full IoT support in the cloud using a machine driver library integrated into a platform that supports more than 5000 different industrial devices.

High-mix low-volume (HMLV) production is inevitable in manufacturing today. As Industry 4.0 unfolds, it incorporates interconnectivity between complex machinery and the cloud. The benefit is rapid, precise and lean productivity, eliminating waste and costly errors. Industry 4.0 introduces the concept of a “smart factory,” and as artificial intelligence and machine learning continue to evolve, smart factories continue to be “smarter.”

Networking across manufacturing infrastructure and cloud connectivity are the primary foundation factors for smart factories. Machinery can now “talk” to each other and share data. Shared data can be used to provide a feedback system that balances productivity as an entire functional unit based on data distribution and custom protocols. With the massive amount of data available in an Industry 4.0 environment, machinery can learn to predict and change its behavior to improve efficiency.

While some industries have been slow to adopt new technology, others have leveraged it and reduced waste and costs by millions annually. Manufacturers have a unique opportunity to optimize efficiency by using intelligent sensors that provide feedback to automation infrastructure. Operations receive and send feedback in the cloud and artificial intelligence helps find the right solution to industry problems. It’s Industry 4.0 that makes a more efficient feedback system and optimized results a reality for the smart factory.

“First movers” in Industry 4.0 stand to gain the most benefit and insights, pushing them ahead of competitors slow to adopt the latest trends. While some dismiss Industry 4.0 as typical hype, others have harnessed the power of a smart factory and made significant advances including increased savings using advanced analytics, data mining, robotics, automation, and AI. With Industry 4.0, manufacturers reach a level of sophistication that has never been seen before. A new era of smart manufacturing has arrived as today’s success cases describe the way factories are moving forward with new technology and using Advantech’s solutions, products and services. As we work towards an Industry 4.0 transformation, more and more smart factory practices will become a reality. ■

The Journey to a New Scalable Easy-to-Use Industry 4.0

By Advantech with images provided by Advantech
Interview with Erik Josefsson, Head of Advanced Industries at Ericsson

Only few years ago, many Industry 4.0 observers were saying things like, “We stand on the brink of a technological revolution that will fundamentally alter the way we live, work, and relate to one another.” Grand statements were aplenty.

But, were they true? Or are we, today, taking things for granted like kids playing with smart phones that only 10 years ago were cutting edge. It’s worth stepping back to see where we are, now that the dust has settled.

The convergence of industrial production and communication technologies – commonly called Industry 4.0 – is an often discussed and often misunderstood topic from the perspective of business owners and management.

Although Industry 4.0 is a diverse and fragmented concept, there are some common notions of what it means in practice for today’s industrial manufacturers. This fourth phase of industrialization augments the mechanical with wireless digital communication technologies, robotics, and automated systems.

As a result, massive amounts of valuable data are generated for acquisition, processing, and critical analysis by AI-trained servers and cloud-based services to deliver better productivity, optimize processing efficiency, and proactively maintain the smooth and trouble-free running of assembly lines.

Entire productions lines can be visualized from start to finish, top to bottom, allowing management and machine operators to make smart decisions that eliminate human error and yield products that are better made, have fewer defects, and most crucially, cost less than other rival offerings.

Current Attributes of Industry 4.0

Wireless Connectivity: Wireless communication technologies and the IoT means that equipment, sensors, and “things” can be linked to cloud-based services that monitor processes for effectiveness and efficiency, while also collecting data for visualization and streaming to large dashboard displays that facilitate monitoring and management.

Big Data: Digital, wirelessly connected factories generate vast amounts of essential production line data. Interconnectivity between legacy equipment and new systems is achieved through protocol compatibility tools. This allows operators to manage all assets and capture immense amounts of data at all stages of manufacturing in order to identify key areas and processes for improvement through optimization.

Decentralized Decisions: The Artificial Intelligence of Things (AIoT) allows autonomous decisions to be made at the network edge both inside and outside of production facilities. This ability to combine local and global information simultaneously helps improve decision-making and boosts overall productivity.

5G: This fifth generation of wireless mobile communication technologies will have a major impact on how services are delivered due to their high data transmission rates, reduced latency, energy savings, cost reductions, and increased system capacity.

With the digitalization of all essential factory assets, the number of connected devices is increasing exponentially. Many manufacturers are already leveraging 4G to integrate and interconnect all factory equipment in an effort to realize smart manufacturing solutions. However, 5G will be the



next big catalyst for scaling up smart factories. Indeed, certain manufacturers are already betting on 5G and IoT to deliver the ultra-low latency, high bandwidths, and reliable communications needed to upscale production in their factories.

Ericsson: Cutting the Cables on 5G Scalable Smart Manufacturing

Many business owners recognize the changes Industry 4.0 promises, but they are not sure how to capitalize on the opportunities. Mr. Erik Josefsson, Head of Advanced Industries at Ericsson, is closely involved in the rollout of 5G and therefore ideally placed to provide a unique insight.

He recently said of Industry 4.0, “Manufacturers today are seeking efficiencies in production, and the ability to deliver a broader mix of customized products to their customers. They know that staying competitive will require operational processes and production lines to be integrated and adaptable in order to enable fast configuration changes and reduce lead times. And all of that needs to occur without compromising an inch on safety or quality.”

5G is already being rolled out and Ericsson is making big strides toward wireless manufacturing. In Estonia, Ericsson has partnered with a manufacturing plant to implement an intelligent automation system that incorporates machine learning and artificial intelligence into their production processes.

Their aim is to facilitate real-time data analytics and establish an end-to-end automated manufacturing chain powered by 5G robotic cell sensors.

The 5G solutions enabled by increased connectivity—sensors, cloud robotics, centralized asset tracking, remote quality inspections, and automated factory processes—don’t just mean all operations are interconnected within one facility.

Instead, there is also the potential to link multiple factories and even facilities of third-party partners together to form an ecosystem of smart manufacturing centers around the world.

“The so-called mobile Internet of Things is a way of connecting physical things, such as sensors, to the Internet by having them use the same mobile networks as smartphones. It might just be the answer for manufacturers. So, investing in mobile IoT and creating smart factories is a massive undertaking, but it is essential to driving a scalable Industry 4.0,” enthused Mr. Josefsson.

The Future of Manufacturing is Smart, Secure and Stable

New IoT technologies enable the development of smart factory infrastructures for the communication networks to be applied directly to industrial plants in the name of speed, security, and ease of use. “A connected factory leads to smarter manufacturing,” said Mr. Josefsson.

Everyone now sees the benefits of a mature Industry 4.0. Trends towards data visualization and analysis, adaptable production lines and customized products, ecosystems and partnering, are all transforming manufacturing and how we do business. The future of manufacturing will benefit companies, employees, investors, and global customers in the IoT era. ■

Co-Creating the Future of Industry 4.0

By Advantech with images provided by Advantech

In the three phases of IoT growth, Advantech is transforming from a hardware provider to a service provider and we are actively engaged in co-creating domain focused solutions with partners from various industries. Advantech strategies align with corporate initiatives in an effort to partner with our customers and guide them into their Industry 4.0 future.

Advancing Toward a New Era of Industry 4.0

In the world of manufacturing and IoT, fragmentation is commonly an advantage where each component has its precise operational value that passes on to the next component in the supply chain. This creates an issue for factories ready to move towards Industry 4.0 technology but don't have the capability to interconnect. Legacy and new infrastructure have different protocols, brands, and ecosystem which limit a corporation's ability to quickly migrate to a new cloud-based platform. Having a unified factory is imperative for production as well as interconnected data sharing.

Interconnectivity between operational technology (OT) and information technology (IT) is the biggest obstacle to overcome. As a leader in Industry 4.0 solutions, Advantech has focused on the industrial cloud and the WISE-PaaS IIoT cloud platform, as well as developed Solution Ready Package (SRP) that combines hardware and software into integrated industrial applications. Advantech provides SRPs for factories and manufacturing operations and provide a true "plug-and-play" provisioning option for customers. These provisioning tools create a multi-connectivity platform for wireless, cellular and wired technologies with dedicated software immediately available upon deployment. Our solutions are an easy and

fast way to integrate IoT and cloud data services with any number of industrial devices.

The Transformation of Corporate Strategies

Advantech proposed three major phases of strategy in response to the development of the IoT and Industry 4.0. In the first phase, Advantech addresses embedded hardware platforms and terminal products, involving the basic task of data acquisition and edge computing. The WISE-PaaS IIoT Cloud Platform and the Solution Ready Package (SRP) is at the core of Advantech's efforts for the second phase of IoT development. The final phase is Advantech's co-creation model to realize the development of cloud platform solutions that integrate IoT applications with vertical industry partners.

Advantech is in the transition from phase I to phase II of IoT development strategy, and heading to phase III business. Therefore, the WISE-PaaS cloud platform is key momentum for the SRP development. WISE-PaaS, an integrated IoT services platform with complete edge-to-cloud architecture, allows SRP developers and system integrators to easily and securely connect, manage, and assimilate IoT data on a large scale, as well as process and analyze/visualize data in real time. Featured with a complete set of development tools, WISE-PaaS streamlines IoT solution deployment and allows system integrators to focus on their domain of expertise.

We are enabling co-creation with domain-focused system integrators. We have recognized the need for SRPs and have evolved with rapid changes in technology to foster partnerships with domain-focused integrators to create innovative co-creation solutions in an Industry 4.0 environment and IoT future businesses.

True Connection with the Cloud

Not every service labeled “IoT” is truly internet connected and integrated with cloud platform solutions. With a true connection to the cloud, smart factories can amass data and share it within the corporation for better analytics and machine learning optimized solutions. Cloud and Industry 4.0 solutions are at the center of Advantech’s smart factory strategies to provide a global connection between machinery.

Plug-and-play provisioning easily connects smart factories to the cloud, but the biggest hurdle is finding the right cloud platform. Advantech’s WISE-PaaS cloud platform designed to empower cloud services provides a highly secure, multi-tenancy architecture with automatic expansion to create a highly robust data platform for Advantech’s domain-focused cloud services or customer’s own cloud services. Advantech isn’t just a hardware solution manufacturer anymore. We recognize the rapidly evolving future in IoT and the cloud and developed a software and hardware platform solution with AI and IoT (AIoT) edge to cloud architecture. Whether you need simple APIs already bundled with our hardware or complete software and hardware platforms, such as our SRP to help with your pain points, complete IoT solutions can be found in our Wise-PaaS software and services portal.

Advantech makes connectivity to the cloud easy where machinery can connect, quickly communicate and release data. This data is collected from a variety of machinery sensors and environment triggers and sent securely via the cloud. Data analytics is vital to an optimized factory, and Advantech solutions provide for PLM and ERP analytical tools. Advantech WISE-PaaS utilizes cloud technology, virtualization, elastic scaling and data infrastructure to facilitate data sharing with all devices throughout the corporation. This cloud utilization also brings better analytics as our partners can employ a wide range of intelligent and data-driven applications.

WISE-PaaS VIP Alliance and Co-Creation Model Are Key to IoT Success

In order to help partners solve IoT application challenges and take those applications to market, Advantech leverages its WISE-PaaS VIP Alliance to provide comprehensive development service, including development tools, professional consultant and

technical support services. WISE-PaaS VIP members with Advantech have several key benefits. We offer consulting and training services to rapidly get started with Industry 4.0 technology, global co-marketing with leading consultants, and an ecosystem co-prosperity collaboration. System integrators and software developers can join the partner program to obtain cloud-based software solutions that facilitate innovation for IoT. Collaboration with Advantech’s WISE-PaaS program helps our partners rapidly develop and deploy Industry 4.0 solutions.

With the foundation of around 150 WISE-PaaS VIP members worldwide, our co-creation business model was introduced to help partners adapt to the challenges of IoT deployment. Advantech will sign co-creation contracts with domain-focused system integrators (DFSI), providing partners with domain-focused solutions integrating software and hardware to co-create business opportunities and achieve a win-win scenario.

We plan to build business ties with 20 more DFSI partners in 2019 and then pursue an annual increase of 20 such firms from 2020 on. Our collaboration with worldwide partners gives customers comprehensive coverage for all phases of any IoT project.

Co-Creating the Future of Industry 4.0

It takes an army to move a mountain, so Advantech collaborates with partners with its co-creation business model to change the way our industry thinks. Our partners share resources and work with market specialist to find what would benefit corporations the most. To find the most advanced and beneficial solution in Industry 4.0, together our partners and Advantech change the way we think, invent and innovate. Our future is measured by our partners’ ability to dream. With Advantech strategies, corporations can catapult into the future and harness the power Industry 4.0 has to offer.

Building better solutions, helping customers save money, and optimizing smart factories to build an intelligent world will continue to be our biggest priority. We look forward to hosting over 60 Co-Creation Partner Conferences (CCPCs) around the world in the near future. Join Advantech and learn more about becoming a VIP member and see how together we can collaborate and create Industry 4.0 SRPs that turn your ecosystem into a smart factory using AI, IoT, and WISE-PaaS architecture. ■



Nippon RAD and Advantech Transform Japan's Industry 4.0 Centric Solutions

**By Advantech with images provided by Advantech
Interview with Nippon RAD**

Nippon RAD is a long-established IT system integrator with a pedigree in hardware and software integration and enterprise software development. In contrast to many of its competitors, Nippon RAD is independent and has continued to position itself to meet the needs of customers through expert resource management and flexibility.

With the benefit of foresight, Nippon RAD turned its attention to the development of IoT platforms for the smart manufacturing sector and in a significant move, joined forces with Advantech to strengthen its footprint in the Japanese Industrial IoT market.

Transforming Japan's IIoT-Centric Solutions

In order to accurately define solutions in the context

of sustainability, Nippon RAD closely examined the underlying opportunities and challenges as drivers for Industry 4.0 implementation.

At first glance, it found that many of its own customers, as well as their competitors, saw significant success over the years. However, the same infrastructure that facilitated the success was quickly developing growing pains with equipment and production management systems that became inefficient, inflexible and unprofitable. Upon closer examination, analysis showed a lack of real-time connectivity between people, machines, and devices, as well as information and communication technologies for the dynamic management of the ever-increasing complexity of the business process.

The automotive industry is one of the most important sectors in Japan. In fact, Japan's auto parts manufacturing market is said to be already mature.

However, lots of auto component manufacturers still face challenges to effectively collect and visualize machine data from production lines, especially from different machines purchased from different suppliers, each with multiple protocols. With an expanding portfolio of multi-branded production machinery acquired over a prolonged period of time, manufacturers felt unable to properly meet the challenges of increased competition and change management. With such daunting variables to consider, manufacturers viewed integration predominantly from a technical perspective, whereas the true solution required consideration for all dimensions including long-term sustainability.

One of Japan's auto parts manufacturers recently came to Nippon RAD for an easy-to-use solution. Nippon RAD quickly solved the data collection problem by using Advantech products and solutions.

From Advantech's Ethernet I/O module ADAM-6000 series with its Peer-to-Peer (P2P) and Graphic Condition Logic (GCL) technology used for remotely monitoring device status, to UNO-2484G edge platform that has pre-installed WebAccess/SCADA and WebAccess/CNC software used as a key to interlinking an end-to-end Nippon RAD style IoT solution, a solution was needed where equipment performance, tools for rapid data collection, and visualization all come together. To further implement predictive maintenance, the MIC-1816 DAQ platform with WebAccess/MCM machine condition

monitoring software was installed, providing easy sensor signal acquisition, signal analysis, data management, and warning alerts.

Konekti™, Nippon RAD's End-to-End IoT platform

This application used Advantech's solutions and products to connect with Konekti™ — Nippon RAD's end-to-end IoT platform. This platform effectively processes and analyzes big data obtained from the plant, displays real-time information, and visualizes the results, as well as performing predictive maintenance and optimization. This helped improve equipment uptime, performance, and safety, while greatly reducing maintenance costs. The data-backed products and services revolutionizing Japan's auto parts industry have given existing manufacturers the template to equip current production equipment for retrofitting.

The strategic alliance between Advantech and Nippon RAD, the WISE-PaaS Premier VIP partner, alleviates the risks and challenges faced by the transformation towards IoT platforms.

As one of the few industrial system integrators with the commitment to transform traditional business models to new IoT-centric solutions, Nippon RAD has officially become a co-creation partner of Advantech's IIoT sector in Japan through an equity investment in 2018. This creates a Nippon RAD style smart factory solution that fully leverages the hardware, software, and integration expertise of the two companies. The solution has allowed them to help manufacturers upgrade to Industry 4.0 and fully leverage production efficiency.■





YCM Turns to Advantech to Co-Create a CNC Management Solution for Intelligent Metal Manufacturing

By Advantech with images provided by YCM
Interview with YCM

Metal manufacturing industries have faced countless challenges in recent years. China is no exception to the challenge. Common problems that face China's metal fabrication industry include a lack of standardized communication interfaces, low level intelligence in existing equipment, and low level of informatization in existing systems.

With more than six decades of experience in machine tool manufacturing, YCM (Yeong Chin Machinery Industries Co. Ltd.®) have deep trade experience in China's metal manufacturing industry. However, with the advent of Industry 4.0 and new trends in IoT, even

leaders such as YCM face huge challenges in making their manufacturing smarter using digitized information and visualized data intelligence. Challenges such as rapid changes in the marketplace, emerging market competition, limited resources and sustainability, slow growth, labor shortages and transitioning business integration are common problems in China's metal manufacturing industry.

So how can China's metal manufacturers turn today's problems into tomorrow's success? The key is to focus on process management that yields decreased time-to-market while delivering high-quality and competitive

product pricing. To meet this challenge YCM looked to Advantech and its CNC Machine Management Solution, a Machine-to-Intelligence Solution Ready Package that implements CNC machine management (M2I/CNC SRP), to meet their demands and simplify manufacturing by rapidly upgrading legacy systems for successful transition into the Industry 4.0 era.

Advantech also has a wealth of industry experience in industrial automation, including metals processing. With more than 35 years in providing manufacturing customers across the globe with IoT hardware and software solutions such as the WISE-PaaS IoT Edge Intelligence Platform and AIoT SRP, Advantech delivers custom IoT solutions in an increasingly competitive global market.

By employing Advantech's M2I/CNC SRP, YCM has been able to integrate IoT cloud features directly with its CNC controllers to facilitate machine data acquisition through the WISE-PaaS industrial cloud platform.

In subscribing to the M2I/CNC cloud service on Advantech's WISE-PaaS Marketplace, YCM was able to easily examine overall equipment effectiveness (OEE), performance, and event history for individual CNC devices by viewing web-based dashboards. Cloud-based solutions allowed for the collection of data for instant machine-to-cloud management without having to install a server room infrastructure. The OEE dashboard, in

combination with historical performance data and real-time trends, provided a comprehensive operational overview. Through additional optimization, critical and non-critical issues alike are easily identified—minimizing system downtime and providing insight into proactive maintenance forecasting.

By utilizing Advantech's M2I/CNC SRP, YCM has been able to realize reductions in operational costs. In a recent metal processing order, YCM saw operational cost reductions through the rapid deployment of Advantech's SRP solution. By eliminating unnecessary costs and loss-of-business opportunities, YCM was able to rapidly deploy smarter manufacturing processes, and deliver customer products to market faster than otherwise possible.

As a new service business dedicated to further meet China's growing CNC and metals production and fabrication market demands, YCM has also teamed with Advantech to co-create Dot Zero®. By offering a broad range of smart manufacturing solutions, Dot Zero has been able to deliver significant savings across industries. With solutions such as CNC Machine Management, Equipment Management System (EMS), Work In Process (WIP), and Statistical Process Control (SPC), Dot Zero can assist in combining smart management with smart machines to realize the ultimate in smart automation – your Smart Factory Dream. ■





Net Surfing's Cutting-Edge Asset Management Solutions for Maximized Efficiency

**By Advantech with images provided by Advantech
Interview with Net Surfing Srl**

With an increasingly competitive global marketplace, major auto parts manufacturers require that their production lines exploit every available technological innovation to ensure that they maximize their value and efficiency.

Auto production lines, however, are highly complex; they rely on the seamless coordination of a complex chain of robotic arms, sensors, and other instruments, such that building upon their existing infrastructure requires a high level of expertise and understanding of relevant technologies.

Recently, an Italian manufacturer of transmissions, engines, drivelines, and fasteners sought to develop a company-wide optimization program aimed at enhancing the asset management and energy consumption of their existing machinery and infrastructure by improving the condition monitoring process and obtaining the scale to manage overall equipment effectiveness. Through close cooperation with Net Surfing Srl, our new WISE-PaaS Alliance VIP partner based in Italy, we determined that the parts maker required an open technology solution for data acquisition and monitoring.

A critical requirement was that it had to support a range of different equipment and machines such that no existing hardware would need to be replaced. Furthermore, the system would need to be user-friendly for operators, with an easy-to-use and intuitive dashboard that could be viewed on a range of devices including smartphones and tablets.

WebAccess/SCADA: Browser-Based Software for the Automation of Complex Industrial Processes

The client began the optimization program by applying high-tech sensors on ovens and in compressor rooms in order to facilitate heat treatment and consumption analysis. Concurrently, to develop the desired predictive maintenance and energy-saving system, they also needed to acquire production data from other equipment and machines such as PLCs and dedicated counters (e.g., relevant physical parameters such as temperature, pressure, flow, and vibration levels). To bring all of this field data together in a meaningful manner, an IT asset management system was needed.

Advantech's WebAccess/SCADA, combined with the Infor EAM platform, provided the foundation for the overall solution. WebAccess/SCADA provides businesses

with a browser-based software package used for supervisory control and data acquisition. The software facilitates intelligent analytics via the user-friendly HTML5-based dashboard. Users can quickly and easily create customized information pages by using widgets that show analysis charts and diagrams.

Open Interface for a Real-Time Database

WebAccess/SCADA technology made the integration of the entire system possible, allowing for the acquisition and monitoring of energy consumption and production data from each piece of equipment, including data for the aforementioned physical parameters in addition to data on the compressor room, electricity consumption, cooling system, pumps, and so on. In summary, all of the critical information from the client's factory floor could finally be brought together and visualized in a single intuitive platform.

In practice, with this optimized production process monitoring, the company was able to enjoy substantial energy savings and more easily implement regular production stoppages every 6 months for ordinary maintenance and repairs. They also gained the necessary knowledge to replace worn parts in advance before breakage, thus preventing costly unscheduled stoppages and thereby further enhancing production line efficiency. The system likewise lowered production waste while also making remote control of some machines (e.g., compressors) possible. Collectively, these outcomes improved the company's overall performance by 4%-5% without any replacement of existing machinery. Moreover, the system delivered an excellent return on investment; in fact, the system proved to be so beneficial that it was estimated that it would pay for itself within just one year.

Simple Solutions for Complex Problems

In summary, cutting-edge production lines require complex interactions among a wide range of sophisticated hardware and software, but while such systems are necessarily complex, the solutions to any production line problems do not need to be. By providing the manufacturer with a fully integrated software/hardware package, Advantech and its partner Net Surfing Srl quickly solved their data acquisition and visualization obstacles, enhancing the client's productivity by simplifying their production line optimization and maintenance needs. ■





Sistek Partners with Advantech to Boost Competitiveness in Turkey's Durable Goods Sector

**By Advantech with images provided by Advantech
Interview with Sistek**

In order to accelerate the advancement of Industry 4.0 in Turkey's consumer electronics sector, Sistek collaborated with Advantech to provide a suitable MES integration solution. Manufacturing execution systems (MES) are process-based computerized systems used to track and document the transformation of raw materials to finished goods. MES has direct connection to the various systems at the operating level and Sistek used Advantech's

WebAccess/SCADA software to help production managers understand how current conditions on the plant floor can be optimized to improve output to maintain a competitive advantage.

The durable consumer goods sector in Turkey is one of the biggest production centers in the European market and worldwide ranks second as a major producer for white goods. Local manufacturers are now looking



to upgrade their technological and manufacturing capacities to attain similar market success with their consumer electronics portfolio. With the developments in new industrial technologies such as Industry 4.0, and emerging trends in IoT, advancing the integration of new technologies and the digital transformation of manufacturing have become the primary strategies for gaining a competitive advantage.

Many manufacturers at the early stages of digitalization had to overcome the challenges of finding effective solutions to make their existing equipment smarter and better connected. Operations requiring personal management and direct manual operation caused unpredictable and undetectable results, and this inability to monitor their processes end-to-end also prevented them from making accurate decisions for improvements.

Strong Collaboration to Lead the Market

From many years, Advantech has recognized that

Turkey offered ample business opportunities and market potential for industrial IoT, especially in the white goods sector. In 2018, Advantech entered a joint venture with Alitek, a VIP partner of Advantech's WISE-PaaS Alliance, to open a Turkish branch for expansion into the Middle East and North Africa. Advantech's decision to expand into Turkey is due to the country's strong strategic



advantage. These advantages derive from the country being situated on the Europe-Asia boundary and its close link with Europe, making it an ideal manufacturing and distribution hub for European manufacturing and the world's largest automakers. In 2019, the Advantech Turkey office was officially established to provide local services with industrial IoT products and solutions, as well as grow and support the local Industry 4.0 ecosystem.

Sistek, as one of the leading system integrators in Turkey, shares the same vision of Industry 4.0 with Advantech. With more than 25 years of experience, Sistek is a development house for hardware/software integration, cloud computing, machine learning, data acquisition and data analytics. Sistek aims to develop process-based innovative business applications to boost productivity of work and provide a competitive advantage. Sistek prioritizes data analytics in the sense that they aim not only at meeting customers' operational needs but also translate that data into valuable information that will pave the way for adding extra value.

Industry 4.0 Solution to Seamless Integration with MES/ERP

While looking for a suitable MES solution for one of its Turkish consumer goods customers, Sistek decided to utilize Advantech's WebAccess/SCADA software platform to facilitate data flow from the PLCs positioned at the four production lines. The business has over 80 conveyor lines at their new smart electronics manufacturing plant which has an annual production capacity of 3.2 million TVs. WebAccess/SCADA streamlined the installation process and strong global sales and technical support enabled local support whenever it was needed. The cost effectiveness of this approach gave Sistek a strong advantage and they were also reassured by their customers' positive experience with Advantech's hardware products during the evaluation period. They were confident that Advantech's solutions were not going to cause any problems that could delay 24/7 production.

WebAccess/SCADA software was used as the middleware software platform for this application. WebAccess/SCADA provides open interfaces for IoT application development suitable for various vertical



markets. It also acts as a gateway for collecting data from ground equipment and transferring data to the cloud or 3rd party applications via SignalR, RESTful API, C# APIs, etc. For this solution; WebAccess/SCADA communicated with Siemens PLCs that manage the production lines and Sistek's MES software collected production line data via RESTful APIs with support from WebAccess. Thus, production data and ERP/SAP information were merged successfully. Finally, the solution enabled the customer to visualize and control all aspects of each production line individually with real time data and detailed analysis. They are now able to track their conversion rates through ERP and quickly take measures to improve efficiency. Through the value chain synergy between Sistek and Advantech, the consumer goods sector in Turkey will keep growing, get smarter, and become more efficient.

Win-Win Partnership in the Industry 4.0 Ecosystem

To further encourage the Industry 4.0 business, Advantech has adopted a co-creation model for global deployment. The idea is to recruit more and more WISE-PaaS VIP partners to co-create an industrial IoT ecosystem that will foster the development of domain-focused applications.

Advantech is working with Sistek in Turkey to develop successful projects both in Turkey and elsewhere in the region. By working together, both companies are committed to the performance and success of the Industry 4.0 business in the next phase of IoT. ■

Digital Transformation in Manufacturing

Cloud-Enabled Industry 4.0 Solutions for Smart Factory Management

Industry 4.0

ADVANTECH

WISE-PaaS

IoT Edge Intelligence



ADVANTECH

Enabling an Intelligent Planet

WISE-PaaS Cloud Platform for Data-driven Industry 4.0 Applications (Solution Ready Packages) that combine hardware and software into industrial applications to drive OT/IT convergence. Industry 4.0 SRPs realize the intelligent factory through data acquisition, data visualization, and data dashboards for real-time KPI management. Using contextualized and visualized data in the situation room further enables managers to make data-driven decisions for optimizing efficiency through digital transformation.

Intelligent CNC Machine Management Solution



SRP Package

- CNC Edge: ESRP-CNC-UNO1372
- M2I/CNC Generic Cloud Service on WISE-PaaS

Overall Equipment Effectiveness Solution



SRP Package

- OEE Edge: SRP-IFS210-D36TAE
- OEE Lite Server: SRP-IFS230-M77F01A
- Industrial Application Solution for iFactory/OEE: 32OTLOEE0001A0

Factory Energy Management Solution



SRP Package

- FEMS Edge: SRP-IFS420-E12TAE
- FEMS Lite Server: SRP-IFS420-M77F01A
- Industrial Application Solution for iFactory/FEMS: 32OTLFEM0001A0

IBCON and Advantech Partner in Advancing Manufacturing in Thailand

By Advantech with images provided by Advantech
Interview with IBCON



In Thailand's export-oriented economy, manufacturing is the primary driver of economic development and growth. However, although globalization provides increasing opportunities to sell Thai products around the world, it also fosters fierce competition between rival companies. In this ever more competitive market environment, manufacturers must leverage every

innovation available to maximize the value and efficiency of their production lines.

Yet, most factories in Thailand have limited space for new equipment. Facilities also vary widely in terms of environmental conditions and the ease of adding new cabling. Moreover, with limited margins leaving little funding for infrastructure investments, most Thai

manufacturers cannot afford to even replace existing equipment. Considering these constraints, an effective equipment monitoring system must be sufficiently compact and flexible to allow installation in diverse factory environments and to support a wide range of machinery and equipment.

IBCON Co., Ltd., Advantech's WISE-PaaS VIP partner in Thailand, is an automation systems supplier and systems integrator that assists Thai manufacturers with overcoming technical challenges, and Advantech's intelligent wireless monitoring solutions have proven critical to their ongoing success.

Building Factories of the Future, Today

With more than 20 years of experience in Thailand's industrial automation industry, IBCON has gained considerable expertise in modernizing manufacturing infrastructure.

Because most Thai manufacturers still conduct manual machine monitoring, IBCON sought to improve management efficiency by developing equipment monitoring systems capable of automatic data collection, which would then reduce maintenance costs and streamline workflows. However, rather than developing such systems on a factory-by-factory basis, IBCON wanted an off-the-shelf SCADA-based platform that could be applied to a wide range of factory environments and equipment. Along with integrated software and hardware, this solution needed to include wireless I/O modules for data collection in order to minimize wiring and installation time. A compact yet durable industrial computer was also required to serve as a gateway for transmitting data to the back-end control room.

Fortunately, Advantech had all the required solutions as well as the expertise to combine them into a single package that offers tremendous functionality and maximum versatility. Specifically, Advantech supplied its WISE-4050 wireless I/O modules, UNO-2473G embedded automation computer, and WebAccess/SCADA browser-based software to provide a platform solution that is easy to develop, configure, and deploy. Using this platform, IBCON was able to quickly design an innovative and cost-effective monitoring system that could be easily deployed in a range of factory environments.

Massive Functionality in an All-in-one Package

Advantech's WebAccess/SCADA provides manufacturers with a browser-based software package for supervisory

control and data acquisition (SCADA) operations. With the provision of a user-friendly HTML5-based dashboard equipped with extensive libraries and development tools for designing unique animated graphics displays, real-time data graphs, and data/alarm log reports, WebAccess/SCADA also facilitates data analysis for intelligent management functions, such as scheduling control and trend analysis.

Because the WebAccess/SCADA platform acts as a web server and can support up to 1,024 client devices without additional licensing, users can access the platform remotely via any browser or mobile device. This enables remote monitoring and control of all machines in order to further enhance productivity.

Advantech's WISE-4050 wireless I/O modules feature 4 digital input/output channels and are currently well-known wireless I/O modules available on the market. The inclusion of wireless modules in Advantech's platform solution allows IBCON to implement wireless data collection with RTC timestamps to ensure transmission accuracy and provide expansion flexibility.

Compared to conventional 4U industrial automation computers, Advantech's UNO-2473G has a relatively small form factor, reducing the amount of space needed for installation. UNO-2473G also features a rugged fanless design, wide operating temperature range (-20~60°C), and rapid heat dissipation capabilities, making it well-suited for operation in harsh industrial environments. Considering these features, Advantech's UNO-2473G is ideal for IBCON's clients in Thailand, whose factories typically have limited space for new equipment.

Simple Solutions for Complex Problems

For manufacturers and systems integrators such as IBCON, Advantech's intelligent industrial automation solutions offer substantial development convenience and efficiency by integrating wireless hardware with powerful software, reducing system complexity and streamlining installation. Modern production lines rely on complex operations involving multiple computers and industrial machines. Although such operations are highly complex, production line systems and solutions don't have to be. By providing Advantech's fully integrated WebAccess/SCADA software/hardware package, IBCON enables Thai manufacturers to quickly modernize their facilities in order to increase productivity, maximize profitability, and remain competitive in the global marketplace of tomorrow. ■

From Manual Intervention to Real-Time Operations Management with Multitrade's Industry 4.0 Solution

By Advantech with images provided by Advantech
Interview with Multitrade

For many enterprises, factory automation is still performed without the use of intelligent systems. Instead, most processes are conducted manually, requiring extensive human intervention. To address this situation and enable the realization of Industry 4.0, various control systems must be employed to optimize equipment automation that enable accurate, precise, and rapid factory operations.

Lights-out manufacturing refers to factories that operate autonomously and require no human presence. These robot-run facilities often do not need lighting, and may consist of several machines functioning in the dark. In Malaysia, the sugar production sector has seen the realization of lights-out manufacturing. However, although this process has not been widely adopted in other sectors, remarkable progress has been made with the assistance of Multitrade. Based in Malaysia, Multitrade is an industrial automation solutions provider

and systems integrator. The company integrates a wide range of products, including Advantech's IIoT solutions, to provide fully integrated turnkey solutions for Industry 4.0. Multitrade collaborated with Advantech to leverage its factory automation offerings and develop an integrated software/hardware solution aimed at Malaysian sugar manufacturers. Together, Multitrade and Advantech designed a two-pronged solution to satisfy demands for machine monitoring and power management.

Machine Monitoring System

Even with standard operating procedures, tasks such as equipment monitoring, startup/shutdown, and setup are generally conducted manually. This process involves inspecting every machine, checking all parameters, and setting or updating configurations. As a result, such operations rely heavily on the presence of skilled operators. For large-scale factories or companies with

multiple sites, the efficiency of these manual tasks is even more affected by the skillsets of the labor force. However, by automating procedures for irregular industrial environments, Multitrade was able to streamline operations and optimize factory management. Multitrade provided an easy-to-use solution for connecting various types of programmable logic controllers (PLCs) via the WebAccess/SCADA platform—Advantech’s browser-based SCADA software package aimed at supervisory control, data acquisition, and data visualization applications.

The solution comprised Advantech’s UNO-2483G fanless embedded automation computer equipped with WebAccess/SCADA for communicating with various branded PLCs (Siemens, Allen-Bradley, and Mitsubishi) to facilitate the collection of real-time machine data for visualization and alarm notifications. Using integrated hardware and software, this simple solution enhances the management of machine status and operating parameters, such as system availability, operating duration, equipment downtime, and causes of downtime.

After accurate, real-time information is collected and transmitted to the back-end server, data analysis allows managers to identify workflow bottlenecks and optimize subsystems for maximum efficiency. This not only drastically reduces equipment downtime, but also enables predictive maintenance for extending the equipment service life. By enabling the centralized monitoring of real-time machine data, Multitrade’s integrated software/hardware package provides an innovative solution for transitioning to intelligent automation, while enhancing overall productivity.

Energy Management System

To also satisfy customer demands for energy efficiency, Multitrade once again turned to Advantech for a cost-effective energy management solution. Accordingly, Advantech provided power meters that support the Modbus RTU and TCP protocols, an ADAM-4520 converter, and an EKI-2528 unmanaged Ethernet switch to enable network communication for power monitoring and energy management operations.

With this solution, Multitrade brought a critical tool for daily operation to the factory floor. The energy management system not only integrates diverse equipment data, but also provides actionable insights for proactively managing and optimizing production, maintenance, energy usage, and planning. The system provides the key components for effective factory

management by identifying potential equipment and system issues in advance and facilitating the diagnosis and prevention of machine failures.

With the growing deployment and cost of complex, high-density electrical equipment, manufacturers are facing increasing pressure to secure reliable sources of energy efficient power. To maintain optimal plant performance around the clock, Multitrade needed to deliver the power quality and reliability required to meet current and future equipment demands. The energy management platform developed by Multitrade harnesses Advantech’s data acquisition tools for collecting real-time equipment data in order to provide an overview of all power and energy systems.

Domain-Focused Industry 4.0 Solutions Provider

The benefits of remote management and data collection are clearly apparent. With Multitrade’s monitoring solution, power management can be integrated with machine management to enable managers to identify and preempt any production issues. Furthermore, all collected data can be used as an operational benchmark for machine learning in order to establish a management platform that is capable of automatically identifying faults or potentially critical conditions before they occur.

Leveraging 20 years of experience in the fields of factory automation, process automation, and software development, Multitrade has joined Advantech’s WISE-PaaS VIP Alliance in the hopes of fostering further opportunities to collaborate and develop fully integrated industrial turnkey solutions aimed at Industry 4.0. Although the typically large-scale scope and diversity of data collected can make factory automation highly challenging, Multitrade has proven that it has the knowledge and expertise to develop a solution for even the most complex tasks.

Moving forward, in keeping with their mission to better understand and serve customers, Multitrade plans to transform itself into a fully domain-focused Industry 4.0 solutions provider. Inspired by Advantech’s co-creation business strategies, Multitrade will continue to collaborate with Advantech on the development of application-oriented IoT solutions. By enabling real-time operations management, Multitrade’s solutions have propelled companies, such as those in Malaysia’s sugar manufacturing sector, to new levels of efficiency and brought them closer to realizing the Industry 4.0 vision. ■



Revving Up India's Automotive Industry with Lubi Electronics' Smart Manufacturing Solutions

**By Advantech with images provided by Advantech
Interview with Lubi Electronics**

With the world's fastest-growing major economy, India has a range of industries poised for extended long-term growth. The country's automotive industry is a prime example, as it races to meet ever-increasing domestic and international demand. At the same time, automakers must ensure precise coordination of their supply chains and production lines in order to maximize their advantages in the increasingly competitive global marketplace.

One means by which India's automakers are outpacing

their competitors is by obtaining products delivered by original equipment manufacturers (OEM) that make use of efficient production and testing of vehicle components and testing systems. Such a provider of these services is a client of Lubi Electronics. Headquartered in Gujarat, Lubi focuses on the development of IoT value-added integrated platforms to provide their customers with smart manufacturing solutions that consistently deliver the right products, services, and support on time and on budget.

Personalized Production that Puts Consumers in the Driver's Seat

Thanks to a variety of technological advances, the ways in which vehicles can be personalized are continuously expanding. Where buyers were once limited to deciding on features such as sunroofs and all-wheel drive, a far larger set of options are now available, with interior elements such as seating now being among the details that can be customized according to specific consumer preferences.

While a wide range of materials including textiles, plastics, metals, leather, and wood, has long been used in seating design, the capacity to optimize the use of these materials to give customers exactly what they want has never been so high.

The appearance and feel of seats are regarded as “feel-good factors” that ensure customer satisfaction, but more practical properties such as the stiffness, strength, and safety of materials and components are also possible to customize.

Not surprisingly, offering personalized seating designs while simultaneously ensuring that production lines operate at maximum efficiency is dependent upon the latest advances in smart manufacturing technology. Essentially, manufacturers need the ability to alter a wide range of details without slowing the flow of production through a complex production line of robotic arms, sensors, and other factory instruments.

WebAccess/SCADA: Browser-Based Software for Optimized Automation

This is where the automated seat testing solution provided by Lubi Electronics comes in. As a leading provider of value-added engineering solutions for industrial automation products, Lubi provides a wide range of innovative, efficient business processes for seamless data acquisition and visualization. One specific example incorporates a Lubi solution for a seat testing system designed to determine the quality of vehicle seats with unparalleled reliability and speed. The system's loading table is used for both loading and horizontal positioning of the seats in the y-axis. Simultaneous horizontal positioning of the load cell in the x-axis

enables the system to determine the axial stiffness of all areas of the seat surface, while the system is also used to test sensor mats incorporated into the seat that control elements of the vehicle's automatic settings such as airbag deployment.

Most critically, the testing system and the massive amounts of data it provides can be seamlessly integrated into the overall production line thanks to Advantech's WebAccess/SCADA IoT software, a browser-based

SCADA software package for supervisory control, data acquisition, and visualization. By combining Advantech's industrial grade PC with PCI DAQ card, such as the PCI 1245L DAQ card, a 4-axis stepping and servo motor control universal PCI card, and PCI 1711UL DAQ card, an entry-level 12-bit A/D converter, up to 100 kHz

sampling rate, 16-ch universal PCI multifunction card, the system has allowed Lubi to improve production line efficiency whilst reducing the downtime of their clients' manufacturing.

A Domain-Focused Industry 4.0 Solutions Provider

As India's automakers continue racing towards Industry 4.0, they want smart manufacturing solutions that simultaneously integrate data from a wide range of factory equipment while also providing actionable insights for proactively managing and optimizing production, maintenance, energy usage, and planning. By partnering with Advantech to leverage its factory automation offerings, Lubi Electronics provides fully integrated solutions that make it easy for production line managers to identify workflow bottlenecks and optimize subsystems for maximum efficiency.

Furthermore, as a member of Advantech's WISE-PaaS VIP Alliance, Lubi Electronics will continue to collaborate with Advantech to develop even more application-oriented smart manufacturing solutions, providing its auto industry clients with the cutting-edge solutions they need to stay at the forefront of industrial innovation. By providing manufacturers with fully integrated software/hardware solutions like this seat testing system, Lubi is putting its auto industry clients on track to leave the competition behind. ■

Lubi Electronics turned to Advantech to co-develop a seamless data acquisition and visualization solution for India's automotive manufacturing industry. Lubi's integrated automation solutions help automotive customers to achieve maximum flexibility and exceptional profitability.

Launching the Next Phase of IoT with Global Deployment of the Co-Creation Model

By Advantech with images provided by Advantech
Interview with Tony Liu, Investment Manager, Advantech Corporate Investment Division

With rapid ongoing progress in the development of IoT, Advantech is committed to working with its partners across a wide range of industrial sectors to achieve mutually beneficial outcomes through an innovative co-creation model.

Co-Creation Strategies and Business Models

Advantech found that the process and development of IoT solutions is hard to fully realize and complete for a single person, business, or entity, so it was important to establish a supportive ecosystem for different sectors with the aim of accelerating business growth together with partners and joint venture companies. In 2018, Advantech announced its co-creation strategies for the next phase of IoT development. Mr. Tony Liu, Investment Manager of Advantech Corporate Investment (ACI) Division, described the co-creation strategy and business model. “We provide our hardware and WISE-PaaS software to two types of developers: solution-ready package (SRP) developers and domain-focused systems integrators (DFSI).

SRP developers typically have their own unique solution in a specific domain. We bundle our platform together with their solution to produce new SRPs. Then, we help them promote and sell these SRPs to customers worldwide.

Our DFSI partnership model is focused on regional and vertical markets, whereby we offer existing SRPs to our regional partners with system integration services for their end customers. This involves training to help DFSI partners become more familiar with our SRPs and the WISE-PaaS platform so they can deliver the ‘last mile’ service to customers. They also offer customization and

after-sales support while establishing themselves as key domain specialist partners to work with in that region in the future. This creates a win-win situation going forward.”

Besides mergers and acquisitions, the co-creation program will be the new key initiative of ACI for the upcoming years. Advantech looks for new businesses to engage with and potentially partner with; then starts discussions to identify the key actions and directions of the co-creation plan, as well as the roles and responsibilities of each party. Mr. Liu further stated, “ACI team members act as program managers and team facilitators of the co-creation program or joint venture.”

Co-Creation Partners and Industry 4.0

The attributes and capabilities of the ideal co-creation partner are extensive domain knowledge of specific sectors and a strong regional presence with sufficient resources. Mr. Liu mentioned, “A couple of the typical DFSI co-creation partners we have joint ventured with are Nippon RAD and YCM. Based in Japan, Nippon RAD is an IT-oriented SI for various enterprise and factory solutions with an emphasis on ERP, CRM, customization, and consultation.

Last year, Advantech invested almost 20% equity in Nippon RAD so we could empower them to become our DFSI partner in the factory sector. We trained their people to use our WISE-PaaS software solution, and our sales team in Japan started to provide iFactory-related projects that they adopted for their own projects. Our sales people trained them to offer the last mile of sales and customization support.

In this way, Advantech’s sales team was able to enjoy



key DFSI partner support for other projects throughout the region. We were also able to benefit from the establishment of a WISE-PaaS competence center with the invaluable support provided by Nippon RAD.”

Mr. Liu continued, “YCM is a Taiwan-based CNC manufacturer with expert domain knowledge in their field. We provided hardware and WISE-PaaS software, and they told us what their CNC factory management team would like to see in their customers’ factories, what they care about, and what their pain points were. So we worked closely with them to create new SRP solutions specifically designed for CNC factory management, their existing CNC equipment, and the factory environment. To achieve this, we even created a brand-new company called Dot Zero that is focused on CNC and cloud service solutions. Dot Zero is a joint venture co-creation company owned by both Advantech and YCM.”

Benefits of Co-Creation

The benefits of co-creation are deep and wide-ranging for all participating partners. These include new business opportunities whereby Advantech sales teams prioritize and refer the most suitable projects directly to our co-creation partners based on their specific domain expertise. Advantages in marketing are also another key benefit. The branding expertise of Advantech can help smaller, less-experienced businesses generate more opportunities. We invite these businesses to our trade shows and solution days, and introduce them to many joint-marketing initiatives and deliverables, namely eDMs, brochures, white papers, and much more.

Finally, from a technical perspective, our WISE-PaaS platform acts as a catalyst for transitioning from a more

traditional SI into a true IoT-based SI, whereby we can co-develop new SRP solutions with them.

Future Co-Creation Plans and Industry 4.0

In 2018, Advantech hosted its first hugely successful IoT Co-Creation Summit in Suzhou, China. Starting this year, Advantech has hosted Co-Creation Partner Conferences (CCPCs) around the world. Advantech aims to host a total of 60 CCPCs worldwide, which means Advantech will identify new partners, and give its global regional business units access to key strategic partners with which to co-create with.

Mr. Liu finished off by expressing his thoughts on Industry 4.0, stating, “Industry 4.0 is such a fragmented market, and this is why we need to establish an IoT ecosystem that develops domain-focused solutions that meet the demands of all types of factories and industrial markets. One of the trends we’ve noticed is data visualization and analysis, which will be an important aspect of Industry 4.0. Moreover, cloud storage and services combined with powerful AI algorithms will be a key tipping point for generating new value and maintaining a competitive advantage for factory owners. We will be focusing on partners that can provide these types of solutions and SRPs.”

With its three phases of IoT growth, Advantech has transformed from a hardware provider into an IoT service provider actively engaged in co-creating domain-focused solutions with partners from various industries. Going forward, Advantech hopes to make its IoT CCPCs prodigious events for showcasing AIoT SRPs with strategic partners, potential new partners, and industrial customers globally.■

AI Framework Service

WISE-PaaS/AFS

Asset Performance Management

WISE-PaaS/APM

IoT Cloud Platform

WISE-PaaS/EnSaaS

Data Analysis & Visualization

WISE-PaaS/Dashboard



Azure



aws



阿里云
aliyun.com

WISE-STACK

ADVANTECH



WISE-PaaS

IoT Edge Intelligence

Advantech WISE-PaaS IoT Cloud Platform Helps Users Accelerate the Development of Innovative AIoT Applications

By Advantech with images provided by Advantech

With the release of WISE-PaaS 3.0, the three application development frameworks—Visualization, Asset Performance Management, and AI Framework Service—now form a complete PaaS application architecture.

To successfully integrate IT and OT and realize data-driven industrial IoT application models, Advantech launched the WISE-PaaS industrial IoT cloud platform in 2014. The platform has now advanced to version 3.0. The latest WISE-PaaS provides three application development frameworks—Visualization, Asset Performance Management (APM), and AI Framework Service (AFS)—to help users accelerate the development of AIoT services.



3D Visualization with Workflow

WISE-PaaS/SaaS Composer

Advantech's Software Product Manager, Jamie Su, describes WISE-PaaS 3.0 as, "The most comprehensive AIoT edge-to-cloud architecture possible." The bottom layer features edge intelligence, which contains a variety of edge software such as SCADA, M2I (machine-to-intelligence) device connection, remote device management, and video/image management that acquire data and upload it to the PaaS service layer. The PaaS service layer is the core of Advantech's WISE-PaaS Industrial IoT cloud platform. It supports public networks such as AWS, Azure, and Alibaba Cloud, as well as Advantech's WISE-STACK private cloud. WISE-PaaS provides services such as database storage and IoT Hub services, in a microservices framework.

Visualization services contain two major components: WISE-PaaS/Dashboard and WISE-PaaS/SaaS Composer. The WISE-PaaS/Dashboard is developed by Advantech based on Grafana open source technology. It supports more than 49 data sources and 51 visualization plug-ins and can dynamically switch the display of information

according to the data source, markup, time range, and other variables and users can define alarm rules and notification paths. Through the dashboard, administrators can see at a glance the utilization rate and alarm reports of each area of the plant, production line, or equipment.

The WISE-PaaS/SaaS Composer is a cloud configuration tool with visible workflow that supports customized component plotting for simple and intuitive 3D modeling application and interaction; allowing users to monitor parameter changes of various on-site equipment. More importantly, the 3D model built by the WISE-PaaS/SaaS Composer can be linked with APM, SCADA, or RMM data sources. Its screens have a millisecond refresh rate and it can be directly embedded in the WISE-PaaS/Dashboard to show real-time dynamic information in the 3D flowchart. It can also control the equipment remotely in WISE-PaaS/SaaS Composer screen.

Combine WISE-PaaS/APM Asset Models with WISE-PaaS/AFS to Easily Implement AIoT for Equipment

WISE-PaaS/APM provides key elements such as asset models, management configuration, alarms and notifications, and asset data analysis, to help users reduce unplanned downtime, increase availability, reduce operating and maintenance costs, and reduce the risk of equipment failure. The WISE-PaaS/APM import can be completed quickly in three simple steps: connecting the equipment to WISE-PaaS, opening the APM Portal to configure the asset model and management configuration, and automatically generating the dashboard.

The setup procedure for the WISE-PaaS/APM asset model and management configuration is very simple. Users can set parameters such as the factory areas, production lines, and equipment through the GUI, and then configure the event rules (high/medium/low alarm conditions) and metrics (status values such as equipment run and idle), and define the management logic via a tree structure to then automatically generate the dashboard based on the topology configuration, which clearly shows the A/P/Q utilization rate of the entire plant, production lines, and equipment.

Specifically, WISE-PaaS/APM generates availability information through statistical computing. If users want to satisfy advanced analysis requirements such as automated flaw detection, they must use AI technology. For this, Advantech launched an AI unified development framework service—WISE-PaaS/AFS—which makes

it more convenient for developers to accelerate the implementation of model training and deployment.

WISE-PaaS/AFS is compatible with different data sources such as image data, time series data, label data, and IT data. It provides computing resource integration (including Kubernetes, CloudFoundry, and GPU) and data source selection (including PostgreSQL, InfluxDB, MongoDB, Ceph, and WISE-PaaS/APM) on the platform, provides infrastructure services such as machine learning (ML) and deep learning (DL) development frameworks (including Scikit-learn, PyTorch, Keras, TensorFlow, ONNX), and includes an analytical development environment with Jupyter Notebook online development tools and multiple algorithm modules.

When users complete the development of the model, they can use the model lifecycle management service of WISE-PaaS/AFS to develop training task rules, configure dashboard models, complete OTA (over-the-air) remote deployment, and subscribe to pre-built algorithms or solutions to improve secondary development efficiency.

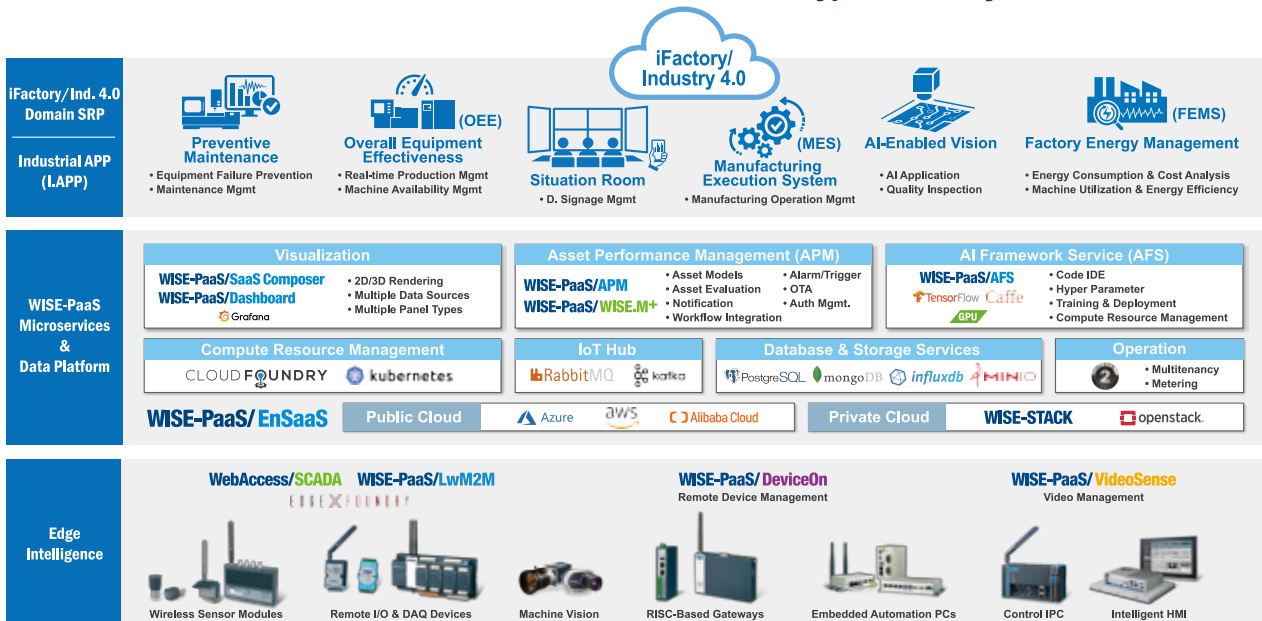
For example, if a user wants to establish an equipment abnormality monitoring system, the user must first collect equipment vibration information on

the edge side, configure the settings of the asset model on the WISE-PaaS/APM in order to send the vibration information to the cloud, launch the Jupyter Notebook development algorithm in WISE-PaaS/AFS, use the APM data as training material, then enter the training task and add the data labels and labels through the dashboard.

After completing the model training, the user needs to use the inference engine to deploy to the site and then configure the event rules in the WISE-PaaS/APM asset model. Once signs of abnormality of the on-site equipment are detected, it will drive the WISE-PaaS/Notification to notify the administrator by LINE and email, or notify the notification service system via the Restful API, linking all the elements together form a complete AIoT application scenario.

The Advantech WISE-PaaS provides a complete architecture from edge-to-cloud. Its three application services—Visualization, APM and AFS—help our industry partners extract the value of industrial data efficiently and accelerate the intelligentization of equipment and workflow management to jointly develop innovative industrial solutions based on data-driven AIoT cloud platforms to deliver results for the AIoT industry.■

WISE-PaaS Architecture for iFactory/Industry 4.0



Digital Transformation in Industry 4.0 By OPC UA Enabled Edge SRP



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OPC stands for Open Connectivity and it is the world's most widely used standardized data exchange process for automation technology. Advantech provides a series of OPC UA enabled Edge Solution Ready Packages (Edge SRP), including Data Collector for protocol conversion; Edge Controller for real-time soft-logic machine control; Visualizer for process visualization; Analyzer with data management for insights; and Networker enabling a non-stop, multi-directional and remote network management. Software is all based on OPC UA as the communication core. Thus, Advantech Edge SRPs not only transfer data from field to cloud with OPC UA, but also communicate with each other based on it. OPC UA provides a method for secure and reliable exchange of data, letting Advantech's Edge SRP play a flexible role in integration and communication. End-users benefit from faster and better decision-making as the integrated enterprise architecture that is at the heart of Industry 4.0 becomes a reality.



Edge Data Collector



WISE-PaaS/EdgeLink

ESRP-PCS-WISE710
ESRP-PCS-ECU1251
ESRP-PCS-ADAM3600

Edge Controller



CODESYS

ESRP-SCS-W5580
ESRP-SCS-UNO1372

Edge Visualizer



WebAccess/HMI
WebAccess/SCADA

ESRP-SCA-TPCB200
ESRP-HMI-TPCB200

Edge Analyzer



Microsoft
Azure
Certified

ESRP-CSS-UNO2484
ESRP-CSS-UNO2271
ESRP-CSS-UNO1372



Revitalizing U.S. Manufacturing with Industry 4.0 Applications

Using Advantech's professional services and products, IS International Services, LLC (IS) provides turn-key solutions in the process control and automation industry. Both IS and Advantech will continue cooperation to advance smart manufacturing in US.

By Advantech with images provided by Advantech
Interview with Al Dimassi, General Manager of IS International Services, LLC

With Donald Trump's promise to restore American manufacturing jobs, the U.S. manufacturing sector is hoping to change the narrative that jobs are being lost overseas by establishing high-tech "factories of the future". Therefore, efforts to reinvent U.S. manufacturing by leveraging the latest technologies to establish intelligent factories will have a substantial impact on the nation's long-term economic growth. The growing use of interconnected intelligent machines to support activities

along the entire value chain, as well as the adoption of Industry 4.0 and the Industrial Internet of Things (IIoT), is creating a fully digital manufacturing landscape. In this smart manufacturing landscape, IS provides turn-key solutions in the process control and automation industry to help customers implement smart factory for maximizing operational excellence.

As a global services and engineering company focused on client satisfaction, with an emphasis on

providing quick and high quality deliverables, IS specializes in system integration which spans PLC, HMI, SCADA and DCS specification, configuration and commissioning. Their role is to ease any strain between customers and general contractors by coordinating with all of the other disciplines on the projects, as well as other vendors and skid manufacturers to provide a complete solution for projects, from general manufacturing, to renewable energy, to health and pharmaceuticals. Manufacturing needs durable, strong infrastructure to thrive. IS has deep knowledge of industrial networking protocols, hardware design and programming with expertise in many different platforms. The substantial amount of expertise development in many of the major fields of industrial controls, I&C and systems integration has led IS to achieve many successful projects.

Advantech's Professional Services

The implementation of smart factory solutions involves placing sensors on equipment, leveraging software to collect data, and using data insights and analytics to optimize the entire manufacturing process. Because most existing manufacturing assets will need to be retrofitted with intelligent sensors and programmable logic controllers, for some companies, particularly small and medium-sized businesses, high upfront costs pose a significant barrier. Most products currently available offer smart connectivity (i.e., remote access and control from a wide range of internet-based devices) and can be easily monitored from web-enabled SCADA management software, such as Advantech's WebAccess/SCADA, using Ethernet or wireless networks, and increasingly do not require the services of a gateway. The challenge for manufacturers now is how to use the same software to monitor legacy equipment. This is where Advantech plays an important role.

As a platform agnostic systems integrator with 170 combined years of experience in control systems upgrades, IS has been constantly looking for innovative integration solutions for its business. These integration solutions must sometimes be off the shelf, supportable and cost-effective. IS has many choices, and the fact that they chose Advantech for their current projects substantiates the partnership selection. IS's win-win business model relies heavily on lowering their partners' overall cost through innovation and cost-effective solutions.

Advantech's SRPs (Solution Ready Packages) that

combine hardware and software into integrated industrial applications are quick-start tools that enable a step-wise approach to achieving Industry 4.0. Advantech has a wide variety of SRPs and products that present novel solutions for many of the applications that IS encounters with customers. Additionally, with Advantech, IS has had access to engineers who have intimate knowledge of the products, their history, and their in-development enhancements. This has been a key to planning and executing solutions and installations that are forward-facing for IS's clients. "I would have to say that we have found the access to people beyond just the technical support staff of the current products to be the single largest benefit in working with Advantech," says Al Dimassi.

Future Cooperation on Industry 4.0 Applications

In many regions of the US, the process controls industry has been undergoing serious contraction as production facilities have moved off-shore. Software companies have attracted younger talent while the senior leadership retires. In order to fill the gap created by these circumstances, it takes IS's results-oriented engineering practices to be used in conjunction with creative tools like those made by Advantech. IS possesses the engineering and production expertise to lead its clients to Industry 4.0 solutions that will provide them with maximum benefits. However, it takes the hardware, software and WISE-PaaS platform tools of Advantech, along with IS's industrial leading support, to make it a reality. "Most clients are looking for reliable, secure, cost effective and off the shelf solutions; Advantech provides all of this and more," says Al Dimassi.

The future of U.S. manufacturing is being redefined. The next step in creating a successful future with the Industry 4.0 is collaboration. To gain an advantage, technology companies should establish partnerships aimed at advancing a particular field or building end-to-end customer solutions that harness the best of their assets and capabilities. The resulting emergence of ecosystems and platforms will deliver a whole new level of value and business opportunities. In the Advantech IoT Co-Creation Partner Conference held in Philadelphia on May 15th, IS signed DFSI (Domain Focused System Integrator) agreement with Advantech and joined Advantech's WISE-PaaS VIP Partner Alliance program. "We look forward to a long and successful Win-Win partnership with Advantech," says Al Dimassi. ■



Advantech IoT Co-Creation Partner Conference

Embracing the IoT era, Advantech is transforming from a hardware provider to a service provider with the launch of “Co-Creation” strategy to actively engage with partners from various industries to co-create domain focused solutions. To foster the development of IoT co-creation ecosystem, Advantech has started 2019 IoT Co-Creation Partner Conference (CCPC) world tour, after its successful IoT Co-Creation Summit held on November 1-2, 2018 in Suzhou, China. The CCPC is a great platform of inspiring keynote speeches, provoking panel discussions, innovative solution demonstration and professional networking for partners from industry, government, association and academia.

Co-Creating Industrial IoT Solutions and Industry 4.0 Ecosystem

The CCPC events focus on WISE-PaaS platform, Advantech’s industrial IoT cloud platform providing edge-to-cloud software and services to help system integrators and manufacturers to enable IoT-powered cloud business in various vertical markets. Along with its partners, Advantech aims to co-develop easy-to-use Industrial IoT applications with domain focused “Solution Ready Packages”, as well as build a complete Industry 4.0

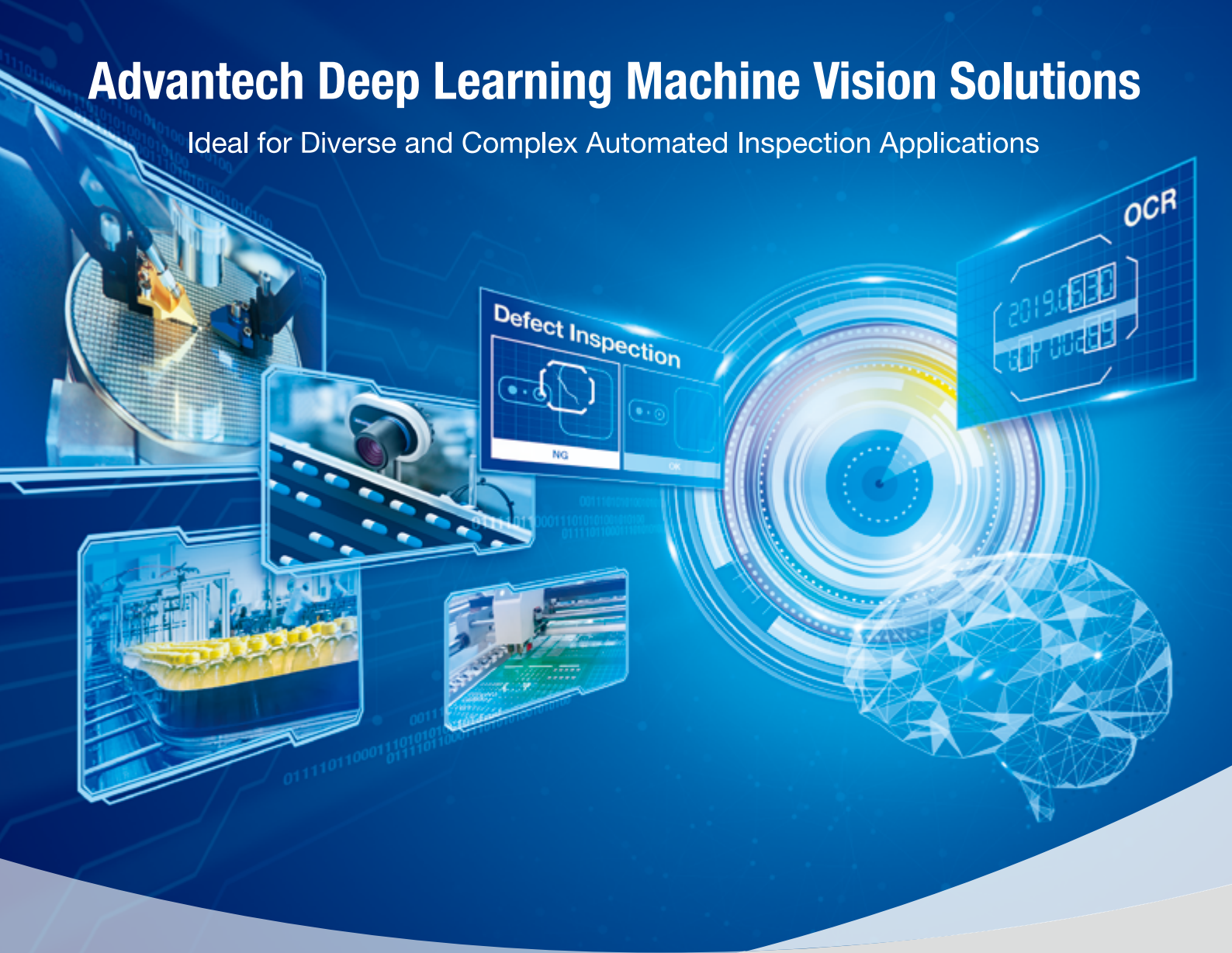
ecosystem through the unique co-creation model.

To that end, a total of 60 CCPC events have been globally scheduled throughout 2019, which toured through Taiwan, China, Saudi Arabia, United States, Poland, Germany, Spain, Turkey, Australia, Malaysia, Singapore, Japan, Korea and so on. Through these events, Advantech is working to accelerate the development of data-driven solutions on the WISE-PaaS platform to realize the AIoT digital transformation in global IoT industry chains, as well as to connect and build Industry 4.0 partnerships to co-create the future of the IoT World together.■



Advantech Deep Learning Machine Vision Solutions

Ideal for Diverse and Complex Automated Inspection Applications



Machine vision systems are being increasingly applied to the manufacturing processes to improve productivity and quality control. Conventional machine vision solutions are crucial for obtaining measurable results in terms of code reading, alignment, and gauging. However, the visual inspection/quality assurance processes still incur bottlenecks, especially when operators are required to review and verify objects or when the automatic optical inspection (AOI) machine parameters must be changed to reduce overkill rates.

Advantech's deep learning machine vision solutions take a new approach that involves image labeling and training for inference in order to reduce complexity and increase the consistency and flexibility of defect inspection. These deep learning machine vision solutions include an industrial training server and an edge inference engine equipped with powerful and scalable accelerators, Advantech Vision Suite, and OpenVino SDK to simplify the development and deployment of deep learning training models.

Solutions



Inference

- Hardware solutions
 1. Optical character recognition (OCR): smart camera
 2. Defect inspection: industrial computer, frame grabber, industrial camera
- Integrates Advantech Vision Suite Software and Intel® OpenVINO™ Toolkit
- Equipped with an intuitive graphical user interface and EzBuilder machine vision software



Training

- Intel® Xeon® industrial server
- Integrates Advantech Vision Suite software

ADVANTECH

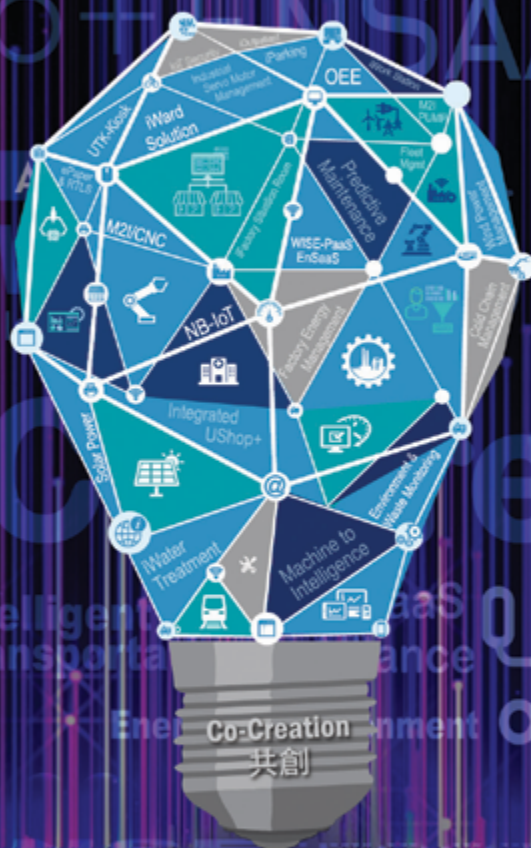
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Realize Digital Transformation with AIoT and WISE-PaaS



Advantech IoT Co-Creation Partner Conference

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What

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2. iFactory
3. Edge Intelligence and AI
4. Energy & Environment
5. Smart City
6. iHealthcare
7. iRetail & iLogistics

