

MyAdvantech

The Magazine for Global Advantechers and Partners

Winter 2016 No.19



Fleet Management Systems

Technology that Crosses
Businesses and Boundaries

Innovative Thinking Drives World-Class Retail 4.0 in Taiwan
Standardized Open Interface Facilitates Cloud Data Integration
Advantech's Immersive CurveView™
A Key to Building an IoT Structure

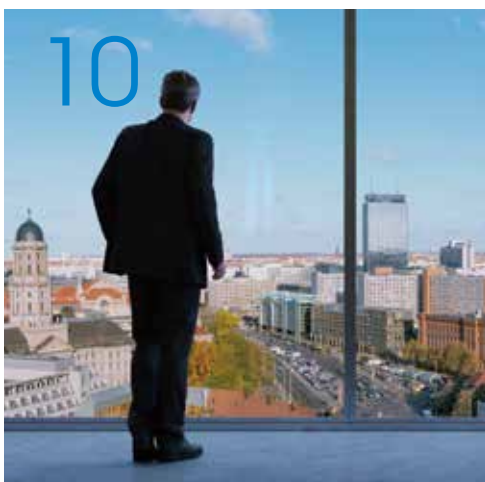
8



■ Power Insight

Innovative Thinking Drives
World-Class Retail 4.0 in Taiwan

10



■ HBR Select

Germany's Midsize Manufacturers
Outperform Its Industrial Giants

26



■ Technology Forum

Advantech's Immersive
CurveView™



CONTENTS

■ Editor's Desk

05 The Driving Trend in the Internet of Vehicles

■ Customer Partnership

06 Equipment Manufacturing Industry Takes on
the Challenge of Machine Interaction

■ Power Insight

08 Innovative Thinking Drives World-Class
Retail 4.0 in Taiwan



■ Application Story

Fleet Management Systems

Technology That Crosses Businesses and Boundaries

- 16 Strengthening Chile's National Defense
- 18 Heavy Mining Machinery Incurs High Maintenance Costs
- 20 Brilliant in Every Field Advantech-DLoG: A Great Manufacturing Asset for Egger

■ HBR Select

- 10 Germany's Midsize Manufacturers Outperform Its Industrial Giants

■ Technology Forum

- 22 Standardized Open Interface Facilitates Cloud Data Integration
- 26 Advantech's Immersive CurveView™
- 28 A Key to Building an IoT Structure

■ Inside Advantech

- 32 Advantech Acquires B+B SmartWorx to Become a Leader of the Global Industrial Networking Market
- 34 People

Published by
Advantech Co., Ltd.

Publisher
K.C. Liu

Address
No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District,
Taipei, Taiwan 11491
Tel +886-2-2792-7818
Website www.advantech.com

Editorial Supervisor
Brand Development & Public Relationship

Art Director
Jie Tang

Initial Issue 2007.09.15
All rights reserved. Reproduction without permission is strictly prohibited.

Editorial Lohas Technology Co.Ltd.
Director David Lai
Address 12F-1, No.169, Sec. 4, Zhongxiao E. Rd., Da'an Dist., Taipei City 106, Taiwan (R.O.C.)
Tel +886-2-2732-8899

The World's First 1U, 16 NVMe SSDs, Dual Intel® Xeon® E5 Storage Server



ASR-3100

ADVANTECH

Enabling an Intelligent Planet

ASR-3100 is the world's first 1U rackmount dual Intel® Xeon® E5-2600 v3 storage server, equipped with up to 512 GB of DDR4-2133 RDIMM and capable of supporting a maximum of 16 2.5" hot-pluggable NVMe SSDs for extremely high computing performance. The 16 NVMe SSDs offer incredible read speeds of up to 6 million IOPS - 30% higher than that of any existing product. ASR-3100 is designed to satisfy market demands for cache/hot data storage, virtual desktop infrastructure (VDI), advanced data mining, online transaction processing (OLTP)/online analytical processing (OLAP) for finance and eCommerce applications, 3D rendering, video broadcasting, as well as mass media editing/post production operations.



1U Rackmount

Offers high scalability



2 CPUs

Dual Intel® Xeon® E5 v3 processors



16 NVMe SSDs

Interchangeable with SAS and SATA



6 Million IOPS

30% performance increase



1100W

1+1 redundant power supply with 80 PLUS Platinum certification



The Driving Trend in the Internet of Vehicles

The Internet of Things (IoT) is changing all kinds of trades and businesses. In the past, the development of IoT was mainly focused on rudimentary applications, but with the rise of 4G mobile communications, IoT has now moved into a new era of innovative applications including the Internet of Vehicles or IoV for short.

Among the numerous disparate applications of IoT, the so called Internet of Vehicles can be regarded as a new major focus of attention. Through sensing and detection, data processing, wireless network transmission, and cloud computing, IoV has realized the connection and communication of vehicle to vehicle, vehicle to people, and vehicle to road. It is also the basis for the establishment of smart transportation. Since the applications derived from IoV can be quite varied, many developers are jumping in to gain market share, seeing it as the next major battlefield rich with development opportunities after the smart phone. Aside from the day-to-day management of commercial vehicle fleets in logistics and public transportation, fleet management systems work to create extra added value. So what are the management applications and business opportunities for vehicle fleets in the future?

Chan Ju-xing, editor of Logistics Technology and Strategy magazine, shares his observations about the opportunities for Taiwanese vendor suppliers. Chan Ju-xing considers that the management systems of vehicle fleets are rather mature products as viewed from their current market status. He believes that only

through changes to commercial models can software and hardware, and even business opportunities be integrated. As such, market segregation can be shaped, breaking loose of pricing competition, which he reckons should be the way and means that the management of vehicle fleets must head towards.

For instance, Advantech last year worked with Chunghwa Telecom and Hwacom to jointly develop a cooperation plan called, “4G ITS Smart Management System for Vehicle Fleets”. The project was led by Chunghwa, which provided the ITS cloud service and a vehicle integrated information management platform. Advantech and Hwacom provided the 4G smart in-vehicle terminal equipment and integrated the product and system to the application service. The new system not only enhanced the dispatch efficiency of taxis, but it also provided greater protection for passengers.

Advantech is convinced that “machine intelligence” has influenced all industries worldwide. Through intelligent structures, enterprise owners cannot only lower cost and enhance efficiency, but create new modes of operation. With such momentum, Advantech should not do all its own R&D and manufacturing, for it is crucial that they also encourage cross-trade and cross-industry cooperation. As such, it is essential that Advantech works with many more vendors from diverse industries and trades so as to create a fully-fledged eco system, and jointly establish global strategic partnerships to meet every kind of solution. Only then can we truly say it's win win for all. ■



Equipment Manufacturing Industry Takes on the Challenge of Machine Interaction

By Yeh Gan with images provided by Symtek Software
Interview with Symtek Software Development and Automation Business Group

The first step in realizing Factory 4.0 is upgrading non-automated equipment to automated equipment and upgrading existing standalone machines and equipment to enable mutual interaction. Symtek, an automated equipment manufacturer, followed these steps to establish their first smart factory.

Established in 1988, Symtek Automation started out producing automated equipment for the printed circuit board (PCB) industry. Over the past 30 years, Symtek has established itself in the automated equipment manufacturing industry, developing automation markets in many industry sectors, including ceramic substrates, electronic assembly, LEDs, IC packaging, and semi-conductors. They are particularly focused on equipment manufacturing for handling automation, and occupy a 70% market share of the China and Taiwan markets. However, a few years ago, Symtek sensed that the environment and requirements of the market were slowly changing. Customer demands were shifting toward small-quantity and diversified custom orders, presenting a range of new challenges. Symtek needed to be able to respond swiftly to market requirements, provide more diversified production, and design smart production processes that both forecast and integrate before- and after-process feedback in order to provide high-value products.

Enabling “Mute” Machines to “Speak”

At the TPCA exhibition held in October 2015, Symtek exhibited a dynamic unmanned smart factory that

occupied an area of 81 m², showcasing its vision for future smart factories with automated warehouse management systems, automatic transfers between stations, and integrated factory information flows. Such factories would allow for more flexible loading and unloading, and, with the implementation of smart manufacturing units, truly realize the concept of smart manufacturing without requiring substantial human intervention. Industry 4.0, which integrates new technologies such as automated production, robots, and the Internet of Things (IoT), has become the foremost trend in advanced manufacturing worldwide. The transformation of traditional production lines into next-generation smart factories represents an upgrade opportunity for electronics manufacturers such as Symtek. The first step in realizing a smart factory is to make formerly “mute” equipment “speak”. Symtek’s representative explained that this process involves first upgrading non-automated equipment to automated equipment, and then transforming existing standalone machines and equipment by interlinking them. Symtek asserted, “Only by making the machines interact can we collate and integrate a factory’s information flow. However, executing this step was a major challenge. The process of obtaining all the data read by the numerous types of sensor interfaces in the various machines is difficult, which hinders data collection. As for replacing all the equipment, frankly speaking, this would definitely not be a smart way of doing things.” Since Symtek launched its smart factory strategy, identifying the best solution



that could allow new and old equipment to co-exist and interact smartly represented the key breakthrough for implementing Industry 4.0. Such a solution would enable “mute” equipment to instantly report its operation and production status and “blind” equipment to sense the things it is doing, thereby transforming machines that could not make decisions into smart machines. Symtek said, “This is a very challenging job. A good platform and tools are required to achieve the best results with minimum effort. Advantech has developed the cloud services software platform WISE-PaaS, which includes its Remote Monitoring and Management (RMM) and Data Flow Management development tools that simplify the management of production data and reduce development time by two-thirds. Of course, a stable hardware system that is widely available in the market is another important factor for consideration.” To be specific, new equipment must be “intelligent”, and existing equipment must be equipped with “plug-in upgrades”. In addition to the WISE-PaaS/RMM platform for creating data processing services, Advantech’s WISE-Agent has become Symtek’s key software for implementing the IoT. At the production and maintenance site, an open and standard information architecture was created using WISE-PaaS, allowing formerly standalone equipment to achieve cross-device data acquisition and communication after integration. In this case, previously manual and paper-based tasks became digitized, reducing costs and significantly increasing efficiency. Connecting the machines to facilitate communication in order to make them “intelligent” was the first step in realizing a smart factory.

Progressing Towards Smart Production

“Establishing a truly automated and smart factory is not about pursuing brand new equipment. Intelligent production must come from an intelligent enterprise,” Symtek emphasized. According to Symtek, their smart factory strategies are being progressively implemented. Currently, they are engaged in the first stage of implementation, which involves upgrading non-

automated equipment to automated equipment. For the second stage, this automated equipment will be made to communicate, that is, interconnected. The third stage would be data collection, in which data is collated for all linked automated equipment. The fourth stage would involve building a database for processing big data, analyzing data, and conducting predictive maintenance and monitoring. Symtek’s intelligent transformation is occurring gradually. Over the last two years, Symtek first committed itself to develop smart automated equipment and integrated products and services, such as smart warehousing systems, automated guided vehicles (AGV), and rail guided vehicle (RGV) systems, as well as integrating robots and data collection. Symtek then proposed Productivity 4.0 solutions and began to actively establish PCB 4.0 intelligent system integration applications. However, Industry 4.0 is not simply about replacing humans with robots. Instead, it utilizes man-machine cooperation to realize intelligent production. “We use robots to replace humans for tasks that are vulnerable to error, and assign humans to more innovative jobs,” Symtek said. In smart factories of the future, every machine in the manufacturing process will be able to interact through the IoT, or even collate data from upstream raw material supply units, allowing staff to determine the raw material supply status and make real-time adjustments. Whether processing a last-minute order or fulfilling urgent orders, staff can have a complete understanding of the production line status.

Acknowledging the trend towards intelligence in industry and upgrading to Industry 4.0 represents the collaborative vision of the entire industry. “Within the industry, upstream and downstream partners should collaborate on implementing technology integration, rather than trying to do everything on their own,” Symtek emphasized. Indeed, with the increasing development of intelligent manufacturing technologies and solutions, Industry 4.0 looks set to penetrate the entire manufacturing sector. After which, the work of the entire industrial chain will be reallocated and traditional industry boundaries will disappear. ■

Ming-Chang Tsai, Director of the Taiwan Council of Shopping Centers

Innovative Thinking Drives World-Class Retail 4.0 in Taiwan

By Pei-Chun Liao with images provided by Advantech

Retail 4.0 is a direction in which many retailers are advancing. The purpose of Retail 4.0 is to help retailers understand their consumers and provide better quality goods and services. In order to do this, we need to consider the traditional approaches to consumer analysis before discussing the influences introduced by Retail 4.0.

Integrating Virtual and Physical Channels to Understand Customer Behavior

Operations in the retail industry involve many types of processes. Consider shopping malls as an example. A shopping mall may initiate a market survey and analyze customer preferences while inviting various enterprises to occupy imminent retail spaces. After the official opening, the mall builds customer loyalty and observes consumer behavior by issuing membership cards. The data collected is used to inform the shopping mall's marketing activities, stimulating consumption. Although such methods have been practiced for years, they still only generate a limited number of members and some shopping malls have operated for many years but still have the same number of customers.

However, the emergence of IoT and ICT has changed the situation. These two technologies enable retailers to collect consumer behavior data and apply it to physical channels for more precise marketing. For example, after analyzing customer traffic flow, a shopping mall discovered that customers who visited a luxury handbag counter often moved on to the counter selling Japanese-style clothing. Without statistical analysis, these two counters would appear unrelated. However, by understanding consumer preferences, the shopping mall could now send push notifications to consumers' mobile phones via Wi-Fi/Beacon and other technologies. So the essence

of Retail 4.0 lies in the blurring of boundaries between virtual and physical channels and based on consumer behavior and preference, demand-oriented and omni-channel services can easily be developed.

In the Retail 3.0 era, many brick and mortar businesses believed that consumers collect product and price information from the web, but make their actual purchases in physical stores. But e-commerce businesses have a different opinion. They believe that the convenience of e-shopping may eventually result in the withering or even elimination of physical channels. However, the fact remains that although the market has grown substantially through years, the physical channels have not entirely declined. The key to understanding this situation is consumer behavior.

Consumer behavior is very diverse; they have never shopped exclusively online or just at physical stores. This is the reason Retail 4.0 focuses not on the integration of physical and virtual channels. Integration that will include not only marketing or trading, but also cash and material flows involving payments, delivery and returns. The maximum convenience that a business can provide its consumers is the foundation for developing omni-channel services.

Australian Westfield and Burberry Create Consistent Online and Offline Shopping Experiences

As it stands, we see the gradual expansion of physical outlets established by many retail chains, as well as platforms or shopping websites built by physical retailers. However, the overall connection between the virtual and physical channels is incomplete. The Australian Westfield Shopping Mall project is a good example. Westfield is the biggest chain shopping center in Australia, and has



expanded its business to Europe, Japan, America, and other areas over the years. To understand the application of IoT and ICT to services provided, Westfield Shopping Mall established a special laboratory and employed approximately 70 R&D personnel to create various Retail 4.0 applications that were implemented at several of their branches around the world.

For example, kiosks in shopping malls for customers to check information about shops and mobile apps for consumers to shop directly from their phones; receiving goods via home delivery or personal pickup.

The physical channel can serve as the return point for virtual channels. In other words, consumers can place an order on the Internet, pick up their purchases at a physical store, and in cases where they are not satisfied, return the product directly to the store. In terms of a direct communication platform for designers and customers, some branches of Westfield Shopping Mall established a semi-open exhibition space where designers and consumers can communicate directly.

Fashion brands like Burberry provide another successful example of the integration of virtual and physical channels. Since Burberry appointed a new CEO in 2006, the company has introduced new technology to increase consumer interaction, which has doubled revenue growth. Social media can be used to deliver first-hand messages about the brand, such as live fashion shows, which might transform customers into loyal fans. Social media also develops e-commerce by allowing consumers to place orders on the official website immediately after the fashion show. In addition, Burberry's flagship store, newly opened in 2014, implemented many innovations, such as the installation of over 100 digital signage units that showcase the latest

products. When a customer picks up a product and passes an interactive monitor, it senses the RFID label and displays product information. What's more, each sales person is equipped with an iPad that can be used to view the customer's purchase history and personal preferences, which enables the salesperson to upsell other appropriate products.

Combining Software and Hardware to Enhance the Advantages of Retail 4.0

As we can see, the potential applications of Retail 4.0 are limitless. Discovering a customer's need and satisfying that need using the appropriate technology is what Retail 4.0 is all about.

But analyzing real customer requirements is never easy. This is why many enterprises are establishing consumer laboratories like "Explorium" in Shanghai's Li & Fung Square where consumers can trial new products or services. Based on the trial results, the laboratory makes additional modifications.

Retailers know that it all comes down to customer loyalty, regardless of how the implementation of Retail 4.0 may develop. That is to say, the implementation of Retail 4.0 is aimed at providing a consistent shopping experience and atmosphere across both online and physical stores.

Finally, considering the slow development of Retail 4.0 in Taiwan, the high-tech industry offers an advantage that may enable retailers to catch up. Retail 4.0 emphasizes software applications, while the strength of Taiwan's high-tech industry is based more on hardware and manufacturing. Providing Taiwan's IT industry is willing to collaborate with the retail industry to identify new customer needs, while also leveraging new operating concepts combined with the advantages of new technology, a globally competitive Retail 4.0 industry can boom in Taiwan. ■

Germany's Midsize Manufacturers Outperform Its Industrial Giants

By Winfried W. Weber from Harvard Business Review



Stop for a minute and think of some of the most successful German companies. BMW and Siemens and Bayer might come to mind. But if you really want to learn from the best of German business, you'd be smart to turn your attention to companies named Rimowa, Jungbunzlauer, and Strama-MPS. They belong to a class of small-to-medium German enterprises that are outperforming the country's top public companies.

Most of these companies are private and don't publish their balance sheets. But a new analysis from the German Savings Banks Association shows that, in the last fiscal year, its midsize company clients managed, on average, profit margins of 7.3%. By contrast, the 110 largest German companies had margins of just 6.3%. This success is no blip. The 300,000 companies in the association's data set have more than doubled their profits from operations over the past 13 years, outpacing their corporate counterparts in the country.

Called the *Mittelstand* in German, this class of highly specialized, often family-owned businesses makes up the backbone of the national economy. Germany is ranked fourth in the global economy, but it's home to only 28 companies in the Fortune 500. Great Britain and France each have more. But when it comes to little-known leaders in their market, Germany has 1,307 "hidden champions," nine times as many as those two countries combined.

These midsize manufacturers make adhesives for mobile phones, food for ornamental fish, and the world's most expensive set of headphones. What makes the companies so successful? They vary in export orientation, organizational structure, and ownership, but their highly

specialized nature has led many analysts to say they're all following a niche strategy.

I believe the model is much more than a niche strategy. The German *Mittelstand* is at the forefront of a modern management model that builds flatter, more-innovative, and more-networked enterprises.

In my work at the Mannheim Institute of Applied Management Research, I have identified five success factors that characterize *Mittelstand* champions.

They possess an extreme focus on the wishes of global customers.

Talk to these midsize firms and you will hear the same thing: "We want to be the best in our field" and "We want long-term commitment to this field." At the company Heidelberg Druckmaschinen, you can still order replacement parts for a 100-year-old printing machine, which sends a message of strong commitment to their customers.

These companies are dedicated to mutual technological leadership with their customers. Joachim Kreuzburg, CEO of Sartorius, a cell cultivation company, says, "We are not in the gold seeker business. We sell shovels to gold seekers." *Mittelstand* companies strive for nothing less than to work with the state-of-the-art in their sector.

This level of dedication to their mostly B2B customers demands especially strong investment in innovations and R&D. *Mittelstand* champions have five times more patents per employee than large companies — but their costs per patent are one-fifth of large companies'.



They believe short-term profit isn't everything.

It's not a coincidence that only a small minority of Mittelstand companies are listed on the stock exchange. Those that are often leave a controlling stake in the hands of the family. The persistent goal is long-term value. For example, Andreas and Daniel Sennheiser, the co-CEOs of audio equipment manufacturer Sennheiser, told me:

It's important to us to retain a high equity ratio and not to bounce from one financial quarter to the next. Some might say that we have an aversion to taking risks. Our philosophy is that the only risks worth taking are those which won't endanger the stability of the company, and this strategy has worked well for us throughout Sennheiser's history. Since its founding our company has achieved growth every year, and only once, in 2009, did we experience a drop in revenue, of one percent.

Other family-owned businesses in this class have demonstrated the ability to keep the principle of long-term orientation and a sustainable customer relationship even as they recruit top managers from outside the family (which tends to happen in the fourth or fifth generation).

They pay major attention to the workplace.

Mittelstand managers give their workers a great deal of their time. I've observed them wandering around the factory floor in order to deeply understand their knowledge workers. A manager takes to heart that it is their job to reach out to their employees and help them grow. These personal relationships last and support a collaborative spirit and a shared culture of trust and commitment. One measure of this focus on people is employee retention: Mittelstand companies have a turnover rate of less than 2%. Long-term employment relationships are the key to high performance and enduring levels of employee motivation.

This attention is not just focused at the factory. The Friedhelm Loh Group is a good example, working with the Mittelhessen University of Applied Sciences to combine theoretical and practical teaching in a cooperative degree program. Outside of the school term, students apply their academic knowledge directly to real-world projects.



The company also looks outward for global management development and recruits and deploys up-and-coming managers abroad. These efforts to cultivate students and managers for the international stage are one reason the Friedhelm Loh Group has been named one of Germany's top employers for the eighth straight year.

They set ambitious goals.

The management of Mittelstand companies sets ambitious goals that orient each worker and fuel a unique collaborative spirit. Martin Herrenknecht, CEO of Herrenknecht AG, believes that ambitious goals give his workers the drive to persistently pull in the same direction and eventually reach the objective.

The company has the obsession to be the worldwide market leader in mechanized tunneling technology, having just finished the 35-mile-long Gotthard Base Tunnel, the longest railway tunnel in the world. Such entrepreneurs don't have interests; they carry out a mission. Herrenknecht started his business 40 years ago as a one-person engineering company. His persistence and enthusiasm are legendary, his workforce has quadrupled over the past decades, and he counts on his team of 5,000 "reliable specialists" to achieve the company's ambitious goals.

They draw strength from their tradition of family business.

Mittelstand companies have excelled by taking advantage of some of the enduring traits of family businesses: equity built up over decades, long-term orientation, a familial atmosphere, and a willingness to allow entrepreneurial space.

Of course, this distinct orientation comes with a risk. These businesses are quite vulnerable when there are no succession plans for the next generation. Another danger is the threat of tribalization and warring clans when envy, malevolence, or rivalry among siblings occurs; Haribo and Fischerwerke are recent examples of companies that have hurt themselves this way. But some well-known historic failures have made these businesses generally more enlightened. Many of their executives have read Thomas Mann's novel *Buddenbrooks*, a cautionary tale about the decline of a multigenerational family business that's part of the German literary canon.

The size of the Mittelstand has led to a strong service and consulting business to prevent and solve interpersonal conflicts. At Freudenberg, now in its eighth generation, more than 300 family members have developed a charter with clear values, long-term culture, and strict rules to keep family tiffs out of business.

I believe these so-called "midsize giants" embody the heart of the German economy much more than the big industrial brands. The country's economic success story is based mostly on the humdrum capitalism and patient enterprise of its Mittelstand sector.

These companies understand that excellent products and services are the foundation of a long-term customer relationship, and that leading in technology and innovation builds sustainable strengths. Their core value is trust with both their workers and their customers. These unorthodox, innovative companies hold important lessons for the rest of us on how to survive in turbulent times. ■



Roaming Wifi

RFID



The Rugged Tablet Designed for Warehouse Forklift Mount with Portability

ADVANTECH

Enabling an Intelligent Planet

Delivers Reliability of VMT with Portability of Tablet

Aimed at satisfying industrial warehouse management and mobility demands, DLT-M8110 is a next generation detachable VMT that offers the portability of a tablet with the ruggedization of an industrial VMT with the hardware and software necessary to enhance industrial warehouse operations.

Vehicle Docking with Rich I/O for Mobile Operation

DLT-M8110 comes with a vehicle docking station enable installation in a variety of forklifts, thereby reducing the total cost of ownership. The overall design ensures quick and single-handed terminal docking / undocking, saving time and increasing operational efficiency. Besides, DLT-M8110 vehicle docking station also features switchable external and internal Wi-Fi antennas enable fast roaming for unrivaled connectivity.



Vehicle Docking



DLT-M8110
10" Vehicle Mount Tablet



Desk Docking



External Battery & Multiple Charger



360 Degree Hand strap



Fleet Management Systems: Technology That Crosses Businesses and Boundaries



The market for fleet management systems has gradually gained prominence. In spite of small technological changes, fleet management systems can be applied to an increasing variety of industries. In addition to general commercial fleets such as those in logistics, heavy haulage, waste disposal and taxis, fleet management systems can also be applied to vehicles that are rarely seen on the road, creating different kinds of value. For example, managers can remotely monitor and control heavy machinery and utility vehicles that operate in mines, which helps reduce overall repair and maintenance costs. In military fleets such as tanks or combat vehicles, vehicles can operate as communication centers to command and control fast-changing, dynamic, battlefield scenarios.

According to a statistical survey conducted by Taiwan's Ministry of the Interior (MOI), at least 18 types of industries have successfully introduced satellite fleet management systems, such as dangerous goods transportation, general haulage, container logistics, buses, taxis, waste management, police, fire, ambulance, and many more. With higher market acceptance of fleet management systems, it is believed that advanced fleet management technology can not only be applied to multiple businesses but also multiple domains in the near future. With new business models gradually being developed, fleet management systems will continue to thrive and prosper into the near future. ■



Strengthening Chile's National Defense

Because national defense and military security operations cannot tolerate even the slightest error, strict standards are required for devices that are installed in naval ships, tanks and other military vehicles. Moreover, communication systems must maintain continuous connectivity and function normally under all adverse conditions.

By Chen, Yu-Feng with images provided by Advantech
Interview with Jose Miguel, Telecommunications Projects Engineer of SISDEF

In relation to national defense applications, communication systems can be regarded as the central nervous system, responsible for directing various operations at each node. Similarly, ICS-DAS, an integrated communication system developed by SISDEF, can support a command center with internal and external communications. Several versions of ICS-DAS have been developed for diverse installation, for example, in a command center, naval ship or aircraft. Notably, the Mobile Data Terminal (MDT) adopted by ICS-DAS is none other than Advantech's TREK-753.

Since its establishment in 1983, SISDEF has been developing and providing integrated communication systems to national defense, military security, and industrial markets, and has become a leading supplier of command/control systems and system integration throughout the entire Latin American market. All national defense institutions in Chile have adopted the SISDEF integrated communication system. In addition, four other Latin American countries have also adopted SISDEF communication systems.

SISDEF headquarters is located in Quintero, a coastal city in Chile, with its regional offices distributed in Santiago, Antofagasta, Valparaíso and Talcahuano. Additionally, a branch office has also been established in Mexico City. Of SISDEF shares, 90% are held by naval shipbuilding and ship maintenance companies in Chile, while the remaining 10% are held by SISDEF itself. All SISDEF's standard operating procedures have passed ISO 900:2008 standards.

Since the beginning of 2010, ICS-DAS has been adopted by the Chilean and Columbian government for national defense, government, and military security applications. Jose Miguel from SISDEF said, "The first challenge when building communication systems is enabling the device (remote terminal) to process vocal messages from both internal and external communication systems." Such telecommunication devices include Satcom, U/VHF, HF, IP, PABX, public announcement systems, mobile phones, and cellular networks.

TREK-753 Serves as the Core Device for Stable Operations

Because ICS-DAS uses a single device to operate and manage all communications, the remote device must be able to receive and deliver messages from internal and external communication systems. ICS-DAS also features the capacity to store all input/output communication by transforming radio waves into digital backups to enable replays as required.

To satisfy usage demands, SISDEF adopted Advantech's TREK-753 Mobile Data Terminal (MDT) as the core device for its ICS-DAS. TREK-753 is a multifunctional MDT equipped with a 7-inch touch-controlled LCD screen. Miguel reasoned that, "Advantech's components protect our telecommunication devices from electromagnetic disruption when connected to a power supply."

TREK-753 is designed to allow stable operation even with power fluctuations and telecommunication interruptions. Moreover, the MDT functions on a 12V/24V power system, can be operated from 6V to 36V, and is compliant with ISO7637-2 and SAE J1113. TREK-753 not only tolerates a wide voltage range, but also uses intelligent software to overcome unstable power conditions. Furthermore, for vehicle environments where temperatures can soar or drop drastically, TREK-753 supports an operating temperature of -30 to 60 °C. Because all devices installed in an ICS-DAS system must

meet IP54 standards and MIL-STD-810 specifications (verified through environmental engineering and laboratory testing), Advantech developed TREK-753 to meet or even exceed the industry-required specifications.

Miguel further highlighted that, "Advantech's products provide substantial enhancement and a long Mean Time Between Failure (MTBF), making our system more stable than ever." Because these products are installed in mobile vehicles such as naval ships, they must be capable of reliable operation despite long-term exposure to vibration and movement. In fact, in the year since Advantech's TREK-753 MDTs have been integrated into ICS-DAS systems, no malfunctions or incidents have been reported. To date, more than 20 TREK-753 units have been integrated with the ICS-DAS system. With the establishment of a long-term, cooperative relationship between SISDEF and Advantech, public demand for the product is expected to continue to increase in the future.

Technological Support Provides Advantages and Competitiveness

From the beginning of 2010, SISDEF has integrated Advantech products and technologies into its company solutions. "By leveraging this long-term, collaborative relationship, as well as Advantech's excellent products, technological support, and software integrations, our system efficiency has improved significantly," said Miguel regarding the benefits of collaborating with Advantech. "Additionally, because Advantech produces many types of products, we can select the most cost-efficient solution based on our budget, thereby effectively reducing overall costs while significantly increasing turnover rates."

Because of Advantech's knowledge and understanding of vertical industries and local market trends, SISDEF can better operate and expand its business. Miguel stated, "We can now provide our customers with solutions that offer superior efficiency, quality, value, and competitiveness. By cooperating with Advantech, our customer satisfaction has improved significantly."

After initiating sales, market demand for ICS-DAS has steadily and sustainably increased. By enhancing system functions and adopting new technologies, SISDEF has continued to meet customer demands. Miguel asserted, "Advantech is a solid partner who works with us through the entire process. We can now develop innovative solutions with more cost-efficient approaches, helping us achieve success in a highly competitive market." ■



Heavy Mining Machinery Incurs High Maintenance Costs

Unlike automobiles for conventional road use, the heavy machines employed in mining such as excavators, must be able to negotiate rough landscape and harsh environments. Additionally, on-site maintenance and repairs require highly skilled technicians, which generates substantial costs. A remote engine monitoring system provides an indispensable asset for operations in mining environments.

By Chen, Yu-feng with images provided by Advantech

Mines are often located in remote areas. In such demanding geological environments, even the slightest mistake when operating heavy machinery can result in injury, financial loss and worse. Additionally, the provision of on-site maintenance and repair services necessitates the employment of highly skilled technicians which generates substantial cost. Therefore, for mine operators, preventative measures against these risks are preferable to cures.

To address these requirements, smart monitoring devices are being increasingly developed for the various heavy machines employed in mines. These monitoring devices are designed to record relevant statistics and instantly identify and report abnormal conditions in order to improve safety. So considering all the industry

demands, Digital Instincts Teknologi (DIT) and Trakindo collaborated to create a remote engine monitoring system for their Cat® 6030 excavator.

TREK-570 Built to Withstand Harsh Operating Environments

DIT is a systems integration consultancy company located in Jakarta, Indonesia that offers various tools to assist clients in complying with mining and energy laws and regulations required by the Indonesian government. Trakindo is an Indonesian heavy equipment solutions provider that supplies machines made by Caterpillar. Cat® 6030 features an 1140 kW (1,530 hp) engine output and a maximum operating weight of 300 metric tons, and is Caterpillar's widely employed and bestselling hydraulic excavator.

Under DIT and Trakindo's combined effort, a remote engine monitoring system has been successfully integrated into Caterpillar's Cat® 6030 excavator that provides diverse capabilities, including remote engine monitoring, instant reports/alarm notifications, real-time statistical data updates and cloud access for constant engine monitoring.

In order to deliver these capabilities and withstand the environmental extremes, the vehicle computer installed in the system had to satisfy a number of stringent standards. DIT Chief Technology Officer Kenny Marchel pointed out that, "The vehicle computer employed for this system needed to have powerful yet flexible processing capabilities and unique features such as high stability, extreme temperature tolerance, and water and anti-vibration resistance. The TREK-570 in-vehicle computer developed by Advantech offered all these features, making it the ideal system for our requirements."

In-vehicle computing systems are designed to improve fleet management efficiency. Advantech's TREK-570 is equipped with an Intel® Atom™ E3826 processor that ensures reliable operation, supports -30 ~ 70 °C wide temperature operation, and its anti-vibration and anti-impact features exceed MILSTD-810G and 5M3 standards.

Advantech's TREK-570 is also equipped with multiple I/O ports for integrating tire pressure monitoring and video surveillance systems. Furthermore, the inclusion of CAN bus enabled instant detection of engine problems. Marchel also emphasized that, "Because communication conditions differ between mining sites, in-vehicle computers must be designed to support diverse communication technologies to ensure the collection

of various types of data for subsequent integration analysis." With the introduction of this system, mining managers can obtain instant status reports, significantly improving data digitization.

Using a range of communication technologies, including WWAN, WLAN, Bluetooth, satellites and GPS, TREK-570 is able to transmit data such as vehicle information and status, location, driver behavior, images and cargo to the back-end server for monitoring and real-time management, and thus serve as a highly functional fleet management system.

Enhanced Technical Support and Streamlined System Integration

In only two months, Advantech's TREK-570 in-vehicle computing systems were installed in 40 Cat® 6030 excavators, which were distributed among four mines (10 machines per mine). Marchel stated, "Because Cat® 6030 machines can be widely employed in a variety of mines, the integration of TREK-570 will be ongoing. Therefore, we expect to continue our long-term cooperation with Advantech."

"From among the countless vehicle hardware companies currently operating, we choose to collaborate with Advantech because of its products' stability, low maintenance and repair costs, and competitive price compared to similar American and German products", Marchel asserted, elaborating that, "Advantech's in-vehicle computer is a product with a high price-performance ratio. Furthermore, Advantech provides comprehensive service and premium technical support to ensure efficient system integration. These are the main reasons that we decided to establish a collaborative partnership with Advantech." ■





Brilliant in Every Field Advantech-DLoG: A Great Manufacturing Asset for Egger

The German-based wood panel manufacturing company Fritz Egger GmbH & Co. OG, replaced their traditional computers that had low impact resistance and high failure rates with Advantech-DLoG's sturdy tablet computers, which not only enhanced support for Egger's manufacturing production lines and package controls, but also improved production efficiency for the company's panels.

By Chen, Yu-feng with images provided by Advantech
Interview with Gunther wallinger, Fritz Egger GmbH & Co. OG

In today's world where computers are ubiquitous, all businesses have experienced computer shutdowns at one time or another. But for manufacturing industries, computer shutdowns can not only disrupt production lines, but also waste valuable time, deplete human resources, and raise production costs due to subsequent maintenance, repair and mechanical restoration. Frequent computer shutdowns can even lead to postponed deliveries, which not only affects business credibility but also incurs huge financial losses. There are several reasons behind computer shutdowns, so businesses must maintain their hardware regularly. But if shutdowns are still too frequent they may need to consider drastic remedial action.

Eliminating Frequent Computer Shutdowns

Fritz Egger GmbH & Co. OG, are a well renowned manufacturer of wood-based panels; they have 16 factories in Austria, Germany, UK, France, Russia, and Romania. They introduced the HYDRA manufacturing execution system (MES) into their factories more than 15 years ago. By digitizing production documents, all production lines and regional factories can easily be supervised. However, since the original computer systems went down frequently, both production line workers and managers were constantly delayed, which cost the company valuable time and money.

Because the computers in Egger's wood panel

manufacturing factories operate in a harsh environment with a lot of dust, heat and vibration, computers must resist temperature fluctuations, tolerate a great amount of dust and debris generated from the manufacturing process, and withstand constant impacts. But it was not until the original computers started exhibiting frequent shutdowns that disrupted the entire production line did the company finally decide to replace all its old computers with new and sturdy industrial computers. At that time, the company had great difficulty finding an industrial computer that met their needs. Not until the company tested Advantech-DLoG computers did they find a solution that eliminated the frequent shutdowns.

According to Advantech-DLoG Project Manager Richard Rieger, back in 2006 it was almost impossible to get hold of an industrial computer like Advantech-DLoG's MPC6, which not only operates well under harsh working environments, but also meets all of Egger's ADC/MDC specifications. Since the MPC6 has a touch interface, it was easy for Egger workers to familiarize themselves with operations, without the need for further training. MPC6 industrial computers not only meet the demands of Egger's managers, but also those of on-site operating personnel.

New Product Captivates Customer Hearts

Over the years, Egger has integrated several Advantech-DLog products into its factories and has recently added DLT-V83 tablet computers. According to Egger's Project Manager Gunther Wallinger, "Advantech-DLoG has been our long-term partner, and they are well-renowned for their robust industrial computer products. Ultimately it was a no-brainer to introduce DLT-V83 machines into our factories."

The super-sturdy DLT-V83 tablet is used on their automatic production lines where it is accessed by both management and workforce. The built-in Intel® Core™ i5-4300U processing unit is equipped with the latest OS, and its excellent computing capacity supports Egger's HYDRA system. In addition to extreme temperature resistance and fanless design, the DLT-V83 also boasts IP66 waterproof and anti-dust protection, which means that the DLT-V83 can soldier on even when faced with temperature fluctuations and showers of foreign matter. Meeting 5M3 standards, the product resists vibration and impact levels three times higher than those tolerated by its military-grade counterparts. The resistant and reliable touch screens tolerate high levels of wear and tear, and

users can easily select functions even with protective gloves on.

DTL-V83 tablet computers were installed not only in the Egger production line as a communication platform between the operator and the MES system, but were also adopted by the logistics department for shipping control. Workers operating on the production lines can easily log-in or out to perform their everyday tasks, while managers can monitor order processing and machinery operation status. Through DTL-V83's scanning functions, the logistics department can also monitor product inflow and outflow, with lots of information being recorded to maintain product traceability. Furthermore, if items or quantity errors arise they are quickly corrected at an early stage, well before product delivery.

Excellent Product and After-Sale Service

Unlike a typical tablet computer, DTL-V83 has a bold, sturdy design with anti-vibration, anti-scratching, shatterproof, waterproof, and dustproof features. In addition to providing DTL-V83 and other products, Advantech-DLoG also offers Egger unsurpassed after-sale services. Having passed the tests, the same solutions will be rolled out to other Egger factories to fully realize the goals of transparent management and improved production efficiency. ■



Standardized Open Interface Facilitates Cloud Data Integration

Advantech's WebAccess Empowers Industrial IoT and Cloud Applications

Through a standardized open interface and cloud platform, Advantech's WebAccess eases data integration and exchanges, enabling businesses and system integrators to better integrate data while realizing Industry 4.0 and big data analysis.

By Yu Hsiao-Ching with images provided by Advantech

Interview with Advantech Smart Automatization Business Group Senior Manager Lu Wen-Cheng / Product Manager Hsiang Kun

As the thriving Internet of Things (IoT) begins to gradually change global economic prospects, traditional industries are facing dramatic changes. According to the Global System for Mobile Communication Association (GSMCA), the IoT market value is estimated to reach US\$4.5 trillion by the end of 2020. Additionally, according to the McKinsey Global Institute, current projections put the market potential for IoT at US\$11.1 trillion by 2025. Advantech, an avid developer of smart applications and solutions for the promising IoT industry, has categorized IoT development into three key growth areas: IoT devices, IoT Solution-Ready Platforms (SRPs), and IoT cloud services.

According to Lu Wen-Cheng, Senior Manager of Advantech's Smart Automatization Business Group, "The IoT has diverse applications and can be integrated into Intelligent Services, Smart Cities, and Industry 4.0 solutions. So far, the industry remains in the stage where embedded hardware is primarily employed to construct IoT equipment. However, with increasing hardware installation, the industry has begun to implement Service Ready Platforms. Through software and hardware integration on established solution platforms, customers can not only deliver substantial front-end data to back-end cloud platforms for management or services, but also accelerate the development of unique IoT applications. As progress in the first two key growth areas gains

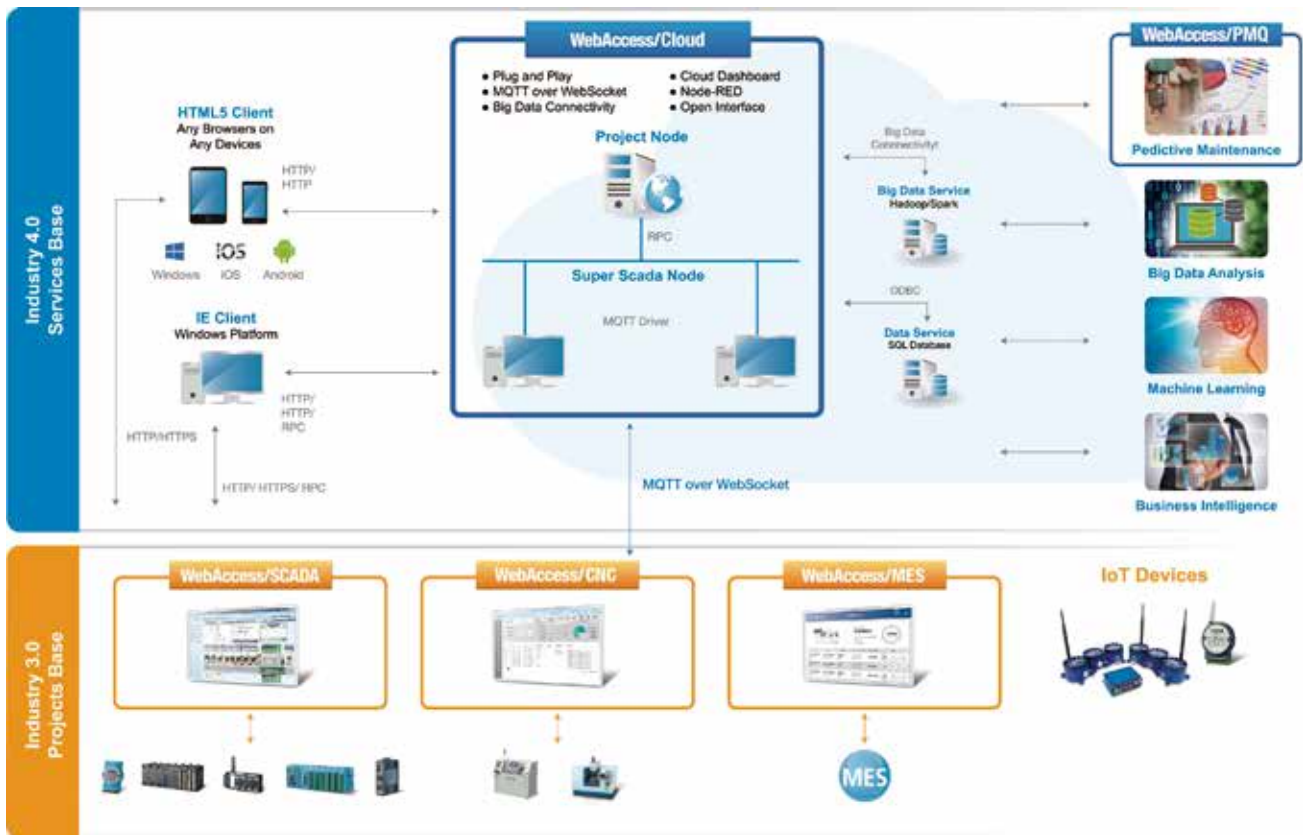
maturity, the IoT cloud service area is expected to exhibit significant growth by the end of 2030."

Communication Interface

The IoT Requires a Standard

Although the IoT is gaining momentum, actually achieving a comprehensive understanding in the equipment aspect, reliable delivery in the network aspect, and smart computing in the application aspect are extremely difficult. Because independently developed hardware and software systems must be integrated, a standard communication interface must be developed to enable the interconnection of all "things". Consequently, Advantech has applied an IoT development blueprint to its business strategy. Lu asserted that, "Besides providing IoT devices that collect basic equipment data, Advantech also develops standardized platforms that can be easily integrated to enable system integrators to conveniently access basic equipment data stored by software."

For example, Advantech's WISE-PaaS platform employs the open-standard application interface RESTful API as a connection interface between heterogeneous systems to allow various upper-level industrial applications and lower-level data management software to communicate seamlessly. To date, the systems included in the WebAccess core of Advantech's IoT software solution are Remote Monitoring and Management (RMM), Security, HMI/



SCADA, Interactive Media Management (IMM), Intelligent Video Surveillance (IVS), and Network Management Station (NMS); providing over 150 RESTful APIs.

Establishing a WebAccess Package for Industrial IoT

In June of this year, Advantech launched its latest WebAccess software package (including WebAccess/SCADA and WebAccess/Cloud) aimed at industrial IoT applications. To facilitate communication and integration, Advantech also included several functions developed for IoT terminals and cloud applications. For example, in addition to the original intelligent graphics control, the latest WebAccess/SCADA package (V8.2) provides system integrators with an open interface for accessing relevant data. This dashboard feature allows managers to review statistics and/or trend reports remotely. The integration function allows users to open IVS, NMS, and RMM systems on their personal computers using the same WebAccess/SCADA software package, enabling users to search various systems simultaneously.

Advantech's WebAccess/Cloud (V9.0) package is an application platform integrated with cloud technology and an open interface that enables users to conduct cloud

management and big data analysis through an easy-to-integrate platform. Lu said, "Because, previously, projects developed using WebAccess/SCADA lacked integration, Advantech has made a special effort to promote the WebAccess/Cloud platform. Users can integrate diverse monitoring projects (that collect various types of data) on a cloud platform through MQTT. Subsequently, system integrators can use this data to conduct big data analysis, machine learning, or equipment maintenance in order to develop intelligent IoT applications, ensure efficient application, and improve overall productivity."

To enable users to easily manage a range of different projects, WebAccess/Cloud software is equipped with several useful capabilities, for example, Plug-n-Play functionality. With this feature, the system automatically delivers all types of collected data to the WebAccess/Cloud platform, which then analyzes and disseminates the data according to pre-set instructions, thereby reducing resource cost and potential errors. Regarding development tools, in addition to customizing the data styles and display patterns using Advantech's HTML5 dashboard, users can also employ the Node-RED integrated visualization development tool included in the

software to establish data processing procedures and applications. Furthermore, Node-RED can also be integrated with Advantech's dashboard and Microsoft's Power BI.

Lu explained that Advantech provides a variety of data integration tools according to user requirements. For system integrators who can allocate several IT personnel to conduct design tasks, open interfaces such as RESTful APIs can be employed for accessing relevant data. For projects with limited human and time resources, Node-RED or Advantech's dashboard can be employed to rapidly establish data formats or to design trend analysis charts.

Solutions Aimed at Industry 4.0

WebAccess is at the core of Advantech's industrial IoT integrated application platform. Through WebAccess/HMI/SCADA/Cloud, data can be comprehensively collected from machines, motors, sensors, mechanical arms, controllers, and utilities. Additionally, various Advantech WebAccess Management Systems (such as IVS, NMS, and RMM) can also be horizontally integrated. Finally, data can be exchanged between various application systems (such as MES or ERP) before transmission to the upper-level cloud platform for big data analysis and predictive maintenance.

Thus far, IoT solutions that meet Industry 4.0 standards have been integrated into Advantech manufacturing centers located in Kunshan, China, and Linkou, Taiwan, enabling them to serve as iFactory 4.0 demonstration sites. By integrating all data into an information center, managers can use the cloud to easily access production and factory data and monitor production systems, machinery controls, power management, and equipment maintenance.

Advantech also collaborates with partners to develop solutions for intelligent factory management. Lu reported that, "In the past, the operating conditions of upstream and downstream production lines were primarily recorded by hand. This approach was time consuming and prone to inaccuracies. Furthermore, managers had to wait until all hand written data was collated before they could

assess the production line operating conditions. Nowadays, automated and digitalized reporting systems provide factories with more accurate, instant, and paperless methods of collecting data, thereby saving substantial production and maintenance costs."

According to the largest automobile manufacturer in Taiwan, Advantech's intelligent management solutions have saved the company several millions in annual costs for paper, ink, and printer maintenance. Introducing intelligent solutions enables manufacturers to recoup investment costs within 3 years and realize the transparent management of factory information.

Advantech's WebAccess Facilitates the Implementation of IoT Applications

As IoT and big data analysis gradually increase in popularity, businesses have begun employing IoT technology to plan future business developments. Through professional analysis, big data collected by IoT devices is transformed into valuable information or knowledge that assists enterprises in creating high-value business opportunities by having an accurate understanding of their operations. Advantech's ongoing plan is to continue introducing businesses and system integrators to the emerging trends and technologies of the future.

Whether enterprises adopt Advantech's WebAccess/SCADA, WebAccess/Cloud software or not, an open standard interface must be established for convenient data integration and exchanges. This will enable developers to easily integrate big data for analysis and Industry 4.0. Additionally, management strategy can shift from single-project methods to using system integrators that provide several IoT services. Finally, Lu asserted that Advantech will maintain its commitment to developing relevant systems and platforms, such as WebAccess/MES for managing integration and manufacturing systems, and WebAccess/PMQ for equipment maintenance and quality control that can enhance data analysis and stimulate the development of more diverse IoT applications. ■

Enabling Industry 4.0 with Advantech WebAccess - The IIoT Application Platform



ADVANTECH

Enabling an Intelligent Planet

Advantech WebAccess

Advantech WebAccess, as the core of Advantech's IIoT solution, supports a variety of standard industrial communication protocols to determine the operational status data of field equipment.

It also provides open interfaces to extend applications, cloud services, and integration with MES and ERP system, as an IIoT platform for partners to develop IIoT applications in various vertical markets.



Advantech WebAccess/Cloud
Cloud-Based Application Platform



Advantech WebAccess/SCADA
Web-Based HMI/SCADA Software



Advantech WebAccess/HMI
HMI Runtime Development Software

Advantech's Immersive CurveView™

Improving the Visual Experience with Curved Screen Displays

The ongoing growth of the global monitor industry has prompted the introduction of new technologies that have led to the development of various new products and applications. The curved screen touch monitor is one such new product. Besides consumer products that feature curved monitor designs, certain industrial and commercial applications also adopt curved monitors in an effort to create an immersive visual experience.

**By Yu-Feng Chen with images provided by Advantech
Interview with Advantech Product Manager Nicholas James How**

From handheld mobile phones screens to eye-catching billboards, in today's society various active displays are continually vying for attention. However, because everyday life does not transpire in a flat, 2D world, flat monitors no longer satisfy people seeking the optimal visual experience. Enter curved monitors that provide new horizons of developmental space. According to a research report by market survey institute TrendForce, the total shipments of curved monitors last year (2015) was nearly 900,000 units; total shipments this year is estimated at 1.8 million. There is a demand, and it's growing. Promising applications for curved monitors include televisions, gaming monitors, automotive instrument panels, digital signage, and industrial applications.

Gamers Drive Demand for High-End Machines

Target applications for Advantech's newly launched CurveView™ monitor series include digital billboards, information kiosks, casino gaming machines, control centers, situation rooms, medical displays, non-gambling video games and more. The casino gaming machine market is expected to be particularly profitable for curved monitors. The trend which highlights the introduction of big and curved monitors for casino game machines is deemed as a potential market. Competition for gaming dollars is fierce, and the progressive slot machine with the most colorful, flamboyant, and immersive appeal is the one that will most attract consumers. As curved monitor technology improves and prices decline, casinos

worldwide are expressing more interest in upgrading flat gaming monitors to curved monitors.

Nicholas James How, the Advantech Product Manager responsible for promoting curved monitors said, “For consumer goods, the price of a curved monitor is only 30 to 50 percent of that for a flat-screen product, but in the industrial market, the price of a curved monitor is double that of a flat screen.” This, however, is not a deal killer for casinos because they a) have the capital, and b) know that the optimum user experience generates the optimum return on investment.

Multi-Touch Control and Flexible Screen Splits

Much like those from the gaming industry, the demand specifications for monitors from other markets are also changing. This is the reason that Advantech Display Systems pursue technical and product innovations relentlessly. CurveView™ is the latest monitor series launched by Advantech that comprises of the 42-inch TRP-342CP model and the 34-inch TRP-334CP model. “The sweeping arc of the CurveView™ design opens new horizons for industrial applications and user interfaces,” Mr. How asserted.

CurveView™, with its industrial-grade display card and power supply, is suitable for standard video output and can support 10 multi-touch controls. With gaming machines as an example, the more intuitive and immersive a game is, the more attracted players are to the game. Direct contact with a touchscreen makes the game more immersive, trumping traditional input devices such as gamepads or joysticks. Moreover, the CurveView™ series products support both landscape and portrait orientation. With the exception of VESA mounts, CurveView™ products do not require any additional mechanical components for installation. The metal base plate provides a strong and stable platform.

Remarkably, CurveView™ also features triptych software for splitting the screen into four sections. “The division function of an ordinary monitor can only divide the screen into same-sized sections, while Advantech’s triptych software can divide the screen into sections of varying size,” said How. This increases user flexibility by facilitating improved control over discrete split screen settings.

Customized Services Satisfy Diverse Demands

Different industrial applications require different monitors. Advantech strives to provide the most appropriate, customized monitor system solutions. For example, Advantech promotes concave curved monitors for general environments with a limited number of viewers. However, for large, open public spaces, such as airports or train stations, Advantech recommends convex monitor systems that can deliver detailed information to numerous scattered viewers. Nonetheless, for both installation environments, Advantech staff will suggest the optimal comprehensive solution that customers can easily install/retrofit.

Further emphasizing that the world we live in is a 3D world, and curved monitors are naturally better at presenting the world in depth, Mr. How stated that, “by taking advantage of the curved monitor, we can add more aesthetic elements to the environment and enhance our visual experience.” ■



Your Gateway to the IoT: **A Key to Building an IoT Structure**

The Internet of Things (IoT) has initiated a global information technology (IT) revolution. The first step toward building the IoT involves data collection and system management. Advantech offers an IoT gateway development kit that includes integrated hardware and software, as well as relevant technical support. By delivering good value and reducing development time, Advantech's IoT gateway kit enables customers to rapidly build unique IoT applications.

By M.D. Wan with images provided by Advantech
Interview with Michael Chiu, Advantech Embedded Computing Group

The Internet of Things (IoT) is widely regarded as the third IT revolution, following those of the PC and Internet. However, unlike the previous two IT revolutions, the IoT departs from the conventional IT framework and integrates almost everything into the Internet, resulting in a much greater impact than that of the past two. According to American research firm Gartner, the economic impact of the IoT is expected to reach US\$11 trillion by 2025. An IT revolution on such an astounding scale will of course generate unprecedented challenges. To connect and integrate almost every object, the IoT must possess a comprehensive developmental structure. Yet, most existing equipment and devices have neither a suitable gateway for accessing information, nor sensors for providing accurate data. These capabilities are regarded by Advantech as the essential starting point for establishing a complete IoT ecosystem.

Overcoming Data Problems

Unlike IT architectures of the past, the IoT must integrate information technology (IT) and operation technology (OT) into a brand new management and application platform. OT refers to any equipment with monitoring, communication, and control functions. In order to secure entrepreneurial investment, most current OT applications are merely upgrades that use existing devices or machinery. Therefore, to establish a working IoT system, the first task is to build a sensor network for all on-site equipment. With the implementation of

enhanced sensor networks, basic and comprehensive equipment information can be acquired.

Advantech also asserts that in terms of IoT sensor networks, there are two major challenges to be overcome at this current stage – hardware and software. Firstly, regarding the hardware equipment interface, typically some first-level equipment on site is already equipped with sensors. However, because of insufficient IoT awareness in the past, these devices are largely type I and type II equipment, and the existing sensors do not support IoT functions. Even if these devices are equipped with communication capabilities, there are numerous difficulties connecting them to equipment of the same or higher levels due to incompatible serial communication and I/O interface. Secondly, in terms of communication protocols and data formats, an unlimited number of market standards currently exist due to divergent development by different firms and associations. If data formats newly created by system integrators and entrepreneurs are to be added as well, achieving instant Internet access from just-purchased equipment will be almost impossible. Therefore, the centralization of complex communication protocols and data formats will be an essential part of the solution to this issue.

In addition to hardware and software, another challenge remains to be overcome when establishing the IoT. That is, data standardization for different levels of the Internet overall, which is another critical problem for IT and OT integration. In the past, IT and OT belonged

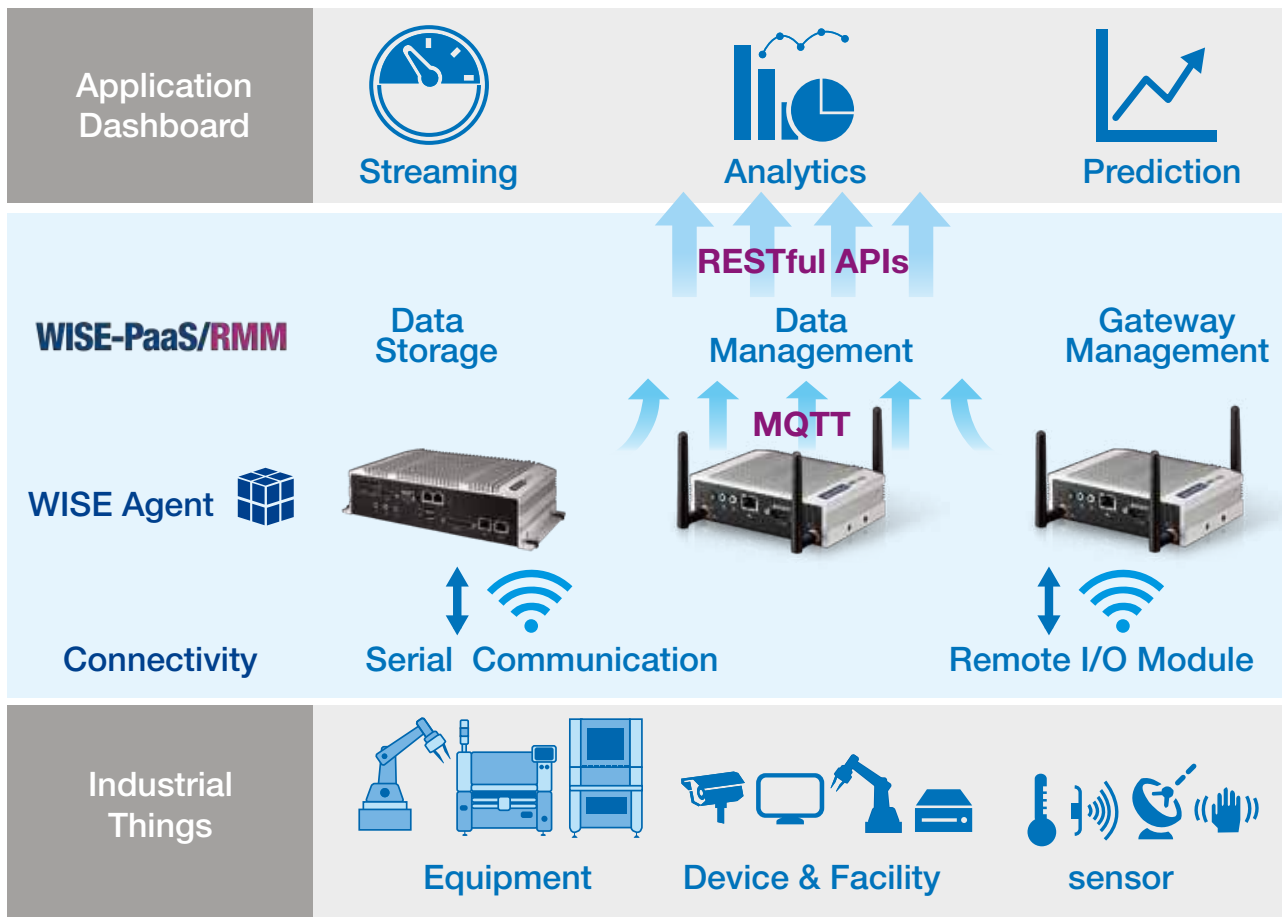
to two separate structures without problems related to serial communication. However, when IT and OT are integrated into the same IoT Internet structure, data must be delivered rapidly and seamlessly to different system levels. Specifically, information collected by basic equipment sensors must be transformed into standard application service data in order to realize the ultimate IoT system goal. Therefore, whether communication issues can be resolved rapidly given existing fixed cost considerations presents another final challenge in the development of IoT applications.

How to Select an IoT Gateway

Considering the trends, the aforementioned challenges are now the most critical issues for IoT establishment. Additionally, all these challenges require the same solution: the selection of a good gateway. Advantech asserts that in order to provide type I and type II equipment in established systems with Internet communication functions, an IoT gateway is an essential

device. However, considering the complex hardware and software standards in the current market, the ideal IoT gateway must include serial COM/IO and network integration functions. This type of product must have external network connectivity and data format integration capabilities. In terms of software, the IoT gateway must be compatible with data collection software and open developmental tools. Data collection software facilitates the collection and transformation of data with different standards into the MQTT format. This enables the sensor network to be extended from conventional LANs that comprise various pieces of local equipment to the Internet, which can be connected to a remote management system.

The installation of a gateway is the first step in building for the IoT. Upon first introduction, the following four key aspects must be considered: the equipment operating environment, equipment input and output interface, data collection volume, and network communication capacity. In response to these four



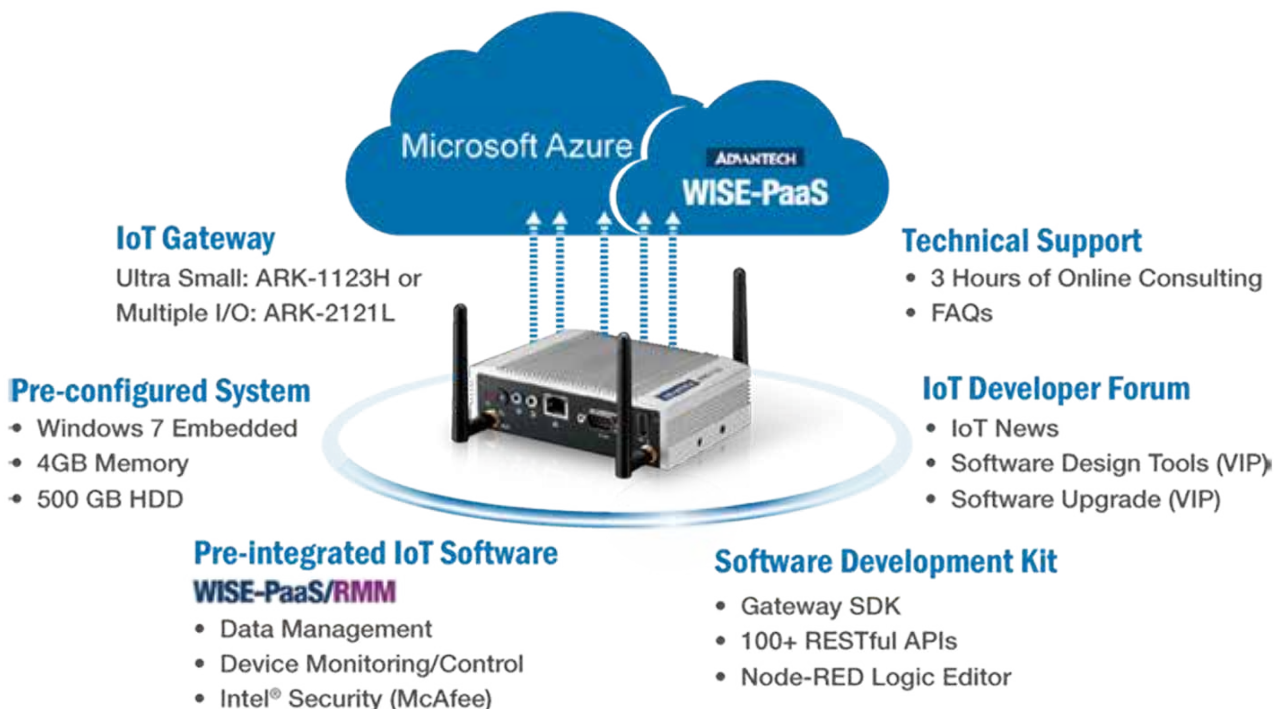
considerations, three corresponding gateway products have been developed and are available on the current market: power-saving gateways, multifunctional gateways, and application gateways. The first type, the power-saving gateway, is a universal gateway that can be employed for general equipment. The second type, the multifunctional gateway, is built to industrial-grade specifications and features extreme temperature resistance for operation in harsh environments. Moreover, an expandable I/O interface is also provided to enable the connection of special equipment. The third type, the application gateway, is designed exclusively for vertical applications and boasts certified stability and reliability.

The IoT gateway software must be in compliance with the data management platform, which has three objectives: saving data collected by the IoT gateway, standardizing data formats, and remotely controlling IoT gateways at different terminals. The data management platform must be specifically designed to achieve these goals. Consider Advantech WISE-PaaS/RMM for example, this data management platform provides a terabyte-grade data carrier that is capable of saving all data collected by the gateway at each terminal, transforming collected data into a standard MQTT format, and converting the data into hundreds of RESTful APIs for use with diverse back-end and databank management and monitoring systems.

Additionally, because WISE-PaaS/RMM is also equipped with remote control capabilities, managers can supervise front gateway operations via the Internet.

The Ideal IoT Development Kit

The stable operation of an IoT system is highly dependent on the design and development explained previously. In terms of a development kit, Advantech has collaborated with two leading IT software firms (Intel® and Microsoft®) to develop its IoT Gateway Starter Kit, which features Intel's Celeron® J199 processor and Microsoft's Windows 7 Embedded operating system. In addition to the ready-to-use gateway system, the kit includes Advantech's WISE-PaaS/RMM platform. The joint efforts of these three leading enterprises have produced an IoT gateway integration and development kit aimed at controlling development costs, accelerating development, and shortening development time. Advantech statistics indicate that approximately 60% of resources can be saved by employing this IoT gateway integration and development kit. As technological concepts continue to mature and IoT gateways and development kits diversify, consumers must be sure to select the most suitable product for their needs to enable the resulting system to provide the greatest benefits. ■



SQFlash Enterprise SSD Solutions

With Advanced Security and Industrial-grade Reliability



Software Protection



Data Security



AES 256



ADVANTECH

Enabling an Intelligent Planet

Advantech's SQFlash Enterprise SSD product line includes 2.5" SATA SSD, 2.5" U.2 PCIe SSD (SFF-8639), and M.2 2280 SSD in both SATA III and PCIe III x4 interfaces. This latest SQFlash product series is designed with the most advanced multi-core SSD controller technology which pushes SSD performance to next level for enterprise applications. What's more, the whole product series comes with our SQFlash Utility with McAfee Anti-virus built-in that provides an ultimate security solution for software protection, data security, and internal encryption; helping build a more secure system with minimal effort.



Powered by quad-core
CPU in SSD



Reliable power
management



Complete storage
security solution



SQF-S25 910S
2.5" SSD

- SATA III
- Up to 2TB



SQF-C25 910C
U.2 SSD (SFF-8639)

- PCIe III x 4
- Up to 2TB



SQF-SM8 910S
M.2 2280 SSD

- SATA III
- Up to 1TB



SQF-CM8 910C
M.2 2280 SSD

- PCIe III x 4
- Up to 1TB

Advantech Headquarters

No.1, Alley 20, Lane 26, Rueiguang Road,
Neihu District, Taipei, Taiwan, 11491, R.O.C.
Tel: 886-2-2792-7818
Fax: 886-2-2794-7304



Advantech Acquires B+B SmartWorx to Become a Leader of the Global Industrial Networking Market



At the end of 2015, Advantech acquired the U.S. industrial networking firm B+B SmartWorx. By integrating B+B SmartWorx with Advantech's industrial automatization business group and jointly developing new products for the industrial IoT market, a new intelligent networking business was born.

By Lin Long with images provided by Advantech
Interview with Advantech Investment Department Project Manager Su, Song-Kai

Industrial networking is an important part of Industrial IoT (IIoT) development. For the past 5 years, Advantech has invested in IoT research and development. At the end of 2015, Advantech acquired B+B SmartWorx to expand its IIoT portfolio. By leveraging B+B SmartWorx's renowned brand image and established marketing channels in the U.S., European, and Middle Eastern regions, Advantech expects to expand its global market share and become a powerhouse of the global industrial networking field within the next 3 to 5 years.

Advantech Investment Department Project Manager Su Song-Kai revealed that after the acquisition, B+B SmartWorx retained most of its original corporate business structure while collaborating with Advantech's Automatization Business Group to integrate and leverage product development and strategy. In terms of organization, two business units were developed for wire/optical fiber industrial networking solutions. Regarding business and marketing, Advantech will rely on B+B SmartWorx's brand power to gain access to the European and American markets and mutual resources will be integrated to expand the channel models for IIoT.

Wireless and Smart Terminals: A Future Trend for the Industrial Networking Market

Su also stated that a major reason for this acquisition was that B+B SmartWorx had been concentrating on the industrial networking market for a long time, with its business group gaining prestige and credibility. Additionally, the two companies' products and services complimented each other, creating a win-win situation for both parties. In terms of channels, B+B SmartWorx owns a complete channel distribution network in America, as well as a 58% U.S. market share, 28% European market share, and 14% for other regions and sectors. Coupled with Advantech's resources in Asia, the newly formed enterprise is expected to become a dominant player in the global industrial networking market.

B+B SmartWorx primarily manufactures fiber media converters, 3G/4G wireless cellular routers, edge intelligent industrial routers/gateways, and Wzzard™ wireless sensor networks. These sectors represent the markets that Advantech has not yet gained access to as well as the future trends in industrial networking equipment.

Considering the overall development of industrial

networking, several developmental stages can be identified. The first stage involved sensor and network terminal equipment that gave mechanical devices networking capabilities, with the benefits of remote access. Then as the entire industry moved into the industrial networking phase, mechanical equipment adopted IP-based protocols. Because the equipment already possessed networking capabilities, the devices could not only interact with other devices but also search for and upload data to the cloud 24/7. Finally, by analyzing the data now available, managers can devise superior strategies for improving efficiency and productivity.

Over time, wireless technology will become less costly and more ubiquitous, while network terminal equipment will feature built-in processing capabilities. According to U.S. research institute estimates, the wireless network and smart terminal equipment markets are expected to grow rapidly, presenting great opportunities for B+B SmartWorx and Advantech.

Advantech and B+B's Complementary Products Provide the Most Comprehensive Industrial Networking Solution

According to Su, B+B SmartWorx products not only complete Advantech's blueprint for industrial networking, but also shorten total R&D time. Consider wireless cellular routers for example, at least 2 years are normally required for product R&D before the final product is introduced to the market. Because the specifications of several certifications and telecommunication laws and regulations must be strictly followed (with different countries and regions enforcing different laws and regulations), the R&D period is typically quite long. However, since merging with B+B SmartWorx, Advantech's R&D timelines are expected to decrease, as

About B+B SmartWorx

B+B SmartWorx was founded in 1981. In the early days, the company primarily provided dealership services. In 2006, B+B SmartWorx created its own brand and began emphasizing the development and marketing of various wireless or wired smart industrial networking products and solutions. As a well-established, profit-oriented company, B+B SmartWorx achieved an annual revenue of US\$5.5 million in 2014, with a gross profit margin of 50%.

Due Diligence in the Shortest Time

The acquisition of B+B SmartWorx by Advantech marks the beginning of an outstanding chapter in which Advantech has invested substantial financial and human resources. Su revealed that after visiting America to negotiate with B+B SmartWorx's top management in August, Advantech submitted a letter of interest (LOI) at the end of September. With the support of an accounting advisor, Advantech compiled teams from the human resources, legal affairs, financial, and production departments to participate in a due diligence investigation, which was completed in just one month. By November of the same year, a formal offer was tendered.

Because Advantech's determination to gain access to the emerging global IIoT market is widely recognized, they were extremely thorough and diligent in completing the administration procedures for the acquisition. Su reported that while Advantech was negotiating with B+B SmartWorx, three other companies were also vying for the opportunity to acquire B+B. However, because Advantech's products better complement B+B's products and Advantech was the first to propose an offer, Advantech successfully won B+B SmartWorx's business.

many products already comply with global regulations and can be brought to market quickly.

Regarding organizational adjustment after the acquisition, Advantech's business department has adopted a low integration strategy to maintain B+B SmartWorx's business independence. B+B SmartWorx remains responsible for the American and European markets, while Advantech is responsible for introducing B+B SmartWorx products to the Asian market. Su stated that because industrial automation fields rarely overlap, B+B can focus entirely on the industrial networking sector while also expanding its market share. At the same time, B+B can also upsell Advantech products to satisfy new customer demands.

The IIoT value chain has great coverage, from the lowest level to the highest level, including hardware, networking, system platforms, software/APP, customization services, and system integration. By acquiring B+B SmartWorx, Advantech can provide the most comprehensive IoT solutions to both customers and partners, enabling them to better concentrate on developing value-added software/APPs or services without distraction. ■



Wesley Liu

**AiS iRetail Business
Development Manager
Advantech China**

Hi everyone, my name is Wei-Chih (Wesley) Liu and I am Taiwanese. I am currently located in Shanghai, China, serving as an AiS iRetail Business Development Manager. About 8 years ago, I worked at Advantech IAG as an Application Engineer. I am very happy to have re-joined this big family again in 2014. In Greater China, I see a bright future and big opportunities for IoT in the Smart City industries, especially retail. Physical retailers in China are facing critical challenges from e-commerce. However, they realize that customer experience and refined management are keys to overcoming these challenges and regaining customers. Thus, they have gradually become more willing to invest in quality enhancement, generating substantial business opportunities! My role is to seize these opportunities, create value for retailers and thereby increase our revenue.

In regards to my personal life, cycling and volleyball used to be my favorite hobbies. But after having two young kids (one was born recently), being a father and playing with the kids have become my new habits. My goal is to teach my two sons how to cycle so we can go cycling together all over the world!



Zoey Foo

**IAG AE
Advantech USA**

Hi All,

My name is Zoey, and I'm based in Milpitas, USA. I have been with the USA IAG AE team for the past 17 years and will continue. I am responsible for providing PC tech support for the entire IAG Sales team in the USA.

I was an immigrant to the USA and joined Advantech when it was still considered a mid-range company. I have grown personally while Advantech grew into the company it is today, that is, one of the world's leading industrial DAQ and PC providers. Although the journey has been bittersweet, it was worth the fight.

Working with customers, R&D, AE, production, operations, and sales teams is always challenging. Every day there are new things to learn from them, and you always have to be up-to-date with technologies. That we have such strong team support is really great; it has sustained me all these years and will continue for many more years to come.

My mottos in life are: "sleep to give my brain a break", "eat to sustain my weight", and "exercise to prove that I am still alive". Like everyone else, I enjoy exploring, tasting good food, and traveling and I communicate with many people to stay connected in the world.

Enjoy and appreciate life while it lasts. Nothing is impossible; it's just a matter of how you perceive it and how your environment and surrounding friends and family support you. For everything and anything, there are always two sides. To forgive and forget is very hard, but try your best. Don't create problems because the problems will come back to you. Never leave today's work for tomorrow. Finally, work smart, not hard.

Modular Embedded Systems

For Quick Equipment Integration



ADVANTECH

Enabling an Intelligent Planet

Complete various applications with modular systems

Customers who need a box computer for equipment integration may find that standard product offerings leave a lot to be desired. And if they choose to customize one of the standard offerings, they soon run into time-consuming sample processes and budget issues, not to mention hardware and software integration, re-verification, and re-certification. But with Advantech, they can bypass these problems. Advantech provides a modular ARK customization service that helps customers build their applications on best-fit box computers with a series of ready-to-order I/O modules.

ARK-1124



Intel® Atom™ E3930/E3940 DC/QC SoC

- Ultra small for IoT gateway solution
- Modular expansion for iDoor and wide range power add-on
- Flexible mounting kit and lockable I/O cable selection

ARK-2250



6th Gen Intel® Core™ i3/i7 ULV Processor

- Compact rich I/Os with Core i computing
- Modular iDoor/ARK Plus and upgradable 9-36VDC power input
- Optional 3rd display(HDMI/DVI/DP) module

ARK-3520



6th Gen Intel® Core™ i7 QC Processor

- Quad Core 45W high performance computing
- Flexible Expansion Via PCI/PCIex4, iDoor and display module
- Two removable 2.5" drive for RAID and enterprise application

Advantech Headquarters

No. 1, Alley 20, Lane 26, Rueiguang Road,
Neihu District, Taipei 114, Taiwan, R. O. C.
Tel: 886-2-27927818
Email: sales@advantech.com.tw

Partnering for Smart City & IoT Solutions

驅動智慧城市創新 共建物聯產業典範



ADVANTECH

Enabling an Intelligent Planet

Partnering for Smart City and IoT Solutions

Advantech holds “Enabling an Intelligent Planet” as our corporate vision, and “Partnering for Smart City & IoT Solutions” is our concrete goal; we will continue collaborating with various partners to build new paradigms in each vertical field. Advantech will consistently follow our LITA (Altruistic) spirit, positively cooperating with partners and engaging in innovation to develop every Smart City opportunities.

研華科技 推動智慧城市創新 共建物聯產業典範

研華以「智能地球的推手」作為企業願景，將「驅動智慧城市創新」作為具體目標，並與各產業夥伴協同合作深耕各垂直領域，共建各式物聯產業典範，期望能持續以利他的精神，積極創新並與夥伴共創智慧城市的每一個可能。