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A strong digital experience drives efficiency and productivity at the edge.

by Philippe Gelin

Executive summary

Needs for data management and flexibility is always increasing, for efficient visualization, smart manufacturing, digitization, IIoT, Edge computing.

New IIoT-enabled devices, gateways, edge boxes, and industrial PCs running at the edge control, improve productivity and performance. They provide the next stage for digital transformation and experience. They are reliable and part of end-to-end cybersecurity, for more efficient operations and maintenance of capital assets.

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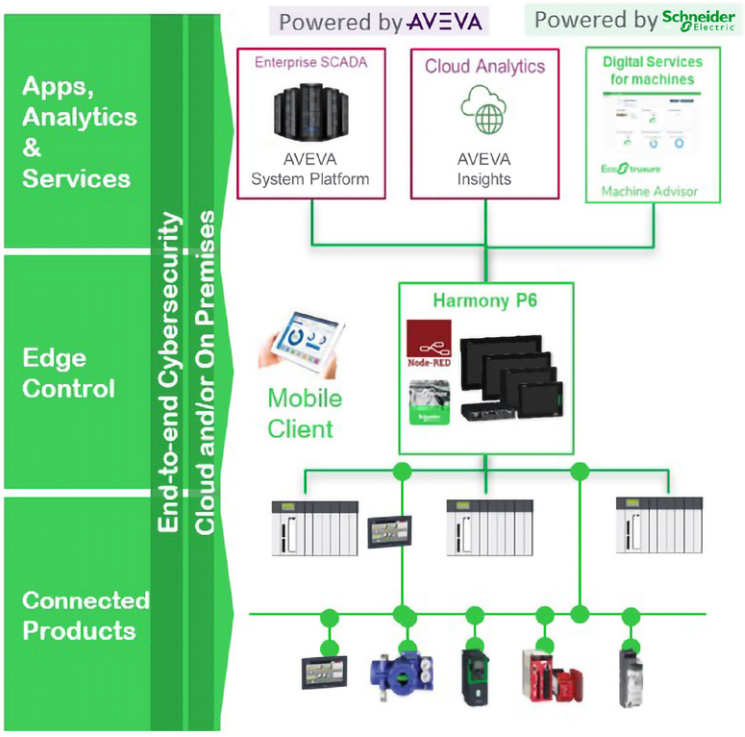
Introduction

Industrial demands for data management and flexibility are constantly growing in areas such as efficient visualization, smart manufacturing, digitization, Industrial Internet of Things (IIoT), edge computing.

IIoT-enabled devices, gateways, edge boxes, and industrial PCs running at the edge of industrial automation control systems can all improve productivity and performance and are the next step in digital transformation and digital experience.

Nowadays, these devices are highly reliable and contribute to end-to-end cybersecurity for more efficient operation and maintenance of capital assets. Leveraging digitization, flexibility, efficiency, and cybersecurity protection, they make the most of data to drive profitability, efficiency and productivity, to digitize industrial machines and processes.

For people working with automation, these components can cut down implementation time and are becoming more and more cost effective. They empower the workforce by improving visualization and control, running associated software. They connect OT and IT for data management and optimization of asset performance. The best of these devices is delivered ready to enable end-to-end cybersecurity, including for remote connection. They are also the most reliable and offer optimum user experience throughout the lifecycle, ensuring investment continuity.



A strong digital experience drives efficiency and productivity at the edge.

Smart design & engineering speed up implementation

The best edge control devices enable smart design and engineering which reduce implementation time. They offer an online configurator with an enlarged line-up for millions of possible configurations (CPUs, memory, storage, operating systems, extensions slots, screen displays, associated software…) linked to a design tool that makes it easy to define complete automation architectures and solutions. Then, fast delivery from regional centres further speeds up the commissioning of customized applications.

These devices are versatile and open to any application running Linux or Windows software at the edge: HMI, SCADA, IoT edge boxes, engineering and maintenance tools, thin clients… They may come with preferred software associations that have been tested and validated with the optimum corresponding hardware configuration. Ultimately, they can be delivered as bundles, pre-installed with activation licences, or as kitting services for repetitive business, answers on demand, to customized operating system and software image requirements.

Today, these devices have become more and more economical along their entire lifecycle, with optimized design and easy maintenance.

Numerous software applications for digital plants and machines can run at the edge control level, with Windows or Linux operating systems.

For workforce empowerment, a lite SCADA system meets the needs for machine line management and lite supervision applications. Preferably, the lite SCADA should run on the Edge Box with an entry-level Intel ATOM CPU. For larger applications, though, it can also work with the iCore CPUs of industrial PCs, like a stand-alone full plant SCADA and Historian. The online configurator makes it possible to deliver the solution in a bundle, pre-installed with the software activation license. A kitting service is also available on demand for repetitive business when customized operating systems or software bundles are required.

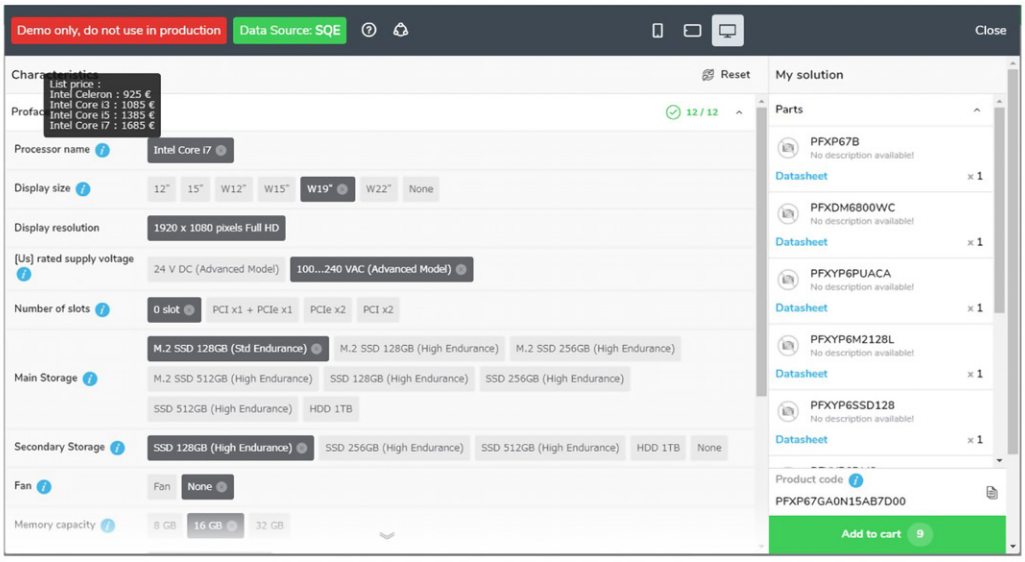
Windows Remote Desktop Services are available to run the Edge Box as an industrial thin client in the field, connected to a Windows server in a control room or micro data center. This is useful, especially for a large client/server distributed SCADA, but also MES, batch management, or any application in client-server mode.

EcoStruxure Augmented Operator Advisor, tested and validated in the Edge Box or industrial PCs, can be used for larger applications, to connect with remote tablets to empower operators and managers in the field.

In fact, there are several software associations that can support asset performance within the Industrial Internet of Things (IIoT). Running at the edge, on Edge Box and iPCs, they connect OT from the field to IT and cloud applications, for data management and optimization. First among these is Node-RED which provides the essential IIoT data wiring at the edge. An IIoT starter pack is available to ease the deployment of a complete IIoT application for smart factories, supported by services and project teams. Advanced IIoT edge software, or application-oriented software like EcoStruxure Maintenance Manager or EcoStruxure Pumping Performance Advisor, tested and validated with the Harmony Edge Box and iPCs, meet the needs of deeper applications at the edge, providing analytics for Artificial Intelligence for automation systems. Finally, secured remote solutions provide end-to-end cybersecure infrastructure for remote connection to automation sites, through Harmony Edge Box and iPCs in the field.

Associated software can be selected from the device's online configurator and delivered as a best-in-class pre-installed bundle to improve business. From a single, configured order, the Harmony Edge Box and iPC hardware, pre-installed with the latest software version and activation license, can be dispatched quickly. A dedicated support team is the single point of contact for the complete bundle to resolve any issues. An extensive testing and validation process and easy integration of hardware, software, and operating systems make complete commissioning faster, saving time, money, and resources. Having a single supplier for both software and hardware requirements also facilitates a stress-free migration when new releases become available, addressing long-term industry requirements.

The online configurator is a powerful tool that shortens design time by offering millions of possibilities. Select CPUs, modular displays, power supplies, storage, memory, optional interfaces, extension slots, operating systems, and associated software. A complete bill of material of the configuration is built on the spot, with access to the data sheet describing each component. The product code of the complete configuration is provided for price information and order placement. Once this is complete, a regional center organizes fast delivery within days to optimize commissioning time.



The best edge boxes and industrial PCs are modular, with improved interfaces that make them easier to mount and replace, including:

- 2.5” HDD/SSD and optional interfaces with a slot-in design for easy mounting
- Dual HDD sets as hot swappable redundant RAID
- Optional interfaces for additional serial lines, audio connections, wireless connections, and I/Os
- Optional PCI/PCIe high-end PCs have available slots for additional extensions of standard powerful graphical cards from the marketplace
- Modularity of displays to make a panel PC, for a large selection, easy screen replacement, and quick delivery

Wide displays are available with multi-touch screens to navigate much like with a smartphone or tablet. The 4:3 displays have resistive technology to accommodate thick gloves and facilitate mounting in legacy systems. They also offer the benefit of innovative multi-touch screens.

Empowering production managers and operators in the field

Harmony Edge Boxes and industrial PCs provide best-in-class visualization and control, with associated software that enhances the operator experience: HMI, Lite SCADA, IIoT dashboards, EcoStruxure Augmented Operator Advisor server, engineering and maintenance tools, thin clients to access server applications (SCADA, MES, ERP…).

They leverage operator reactivity, to maximize business activities, with the latest high-performing 4-core Intel CPUs and stylish wide displays that have high-resolution visibility for better operability. They feature a glass-top capacitive, multi-touch panel with narrow frames and a thin design. The configurable and noise-resistive touch drivers are innovative with three settings: the default standard mode, the glove mode with higher sensitivity, and the water mode which cancels abnormal touch input.

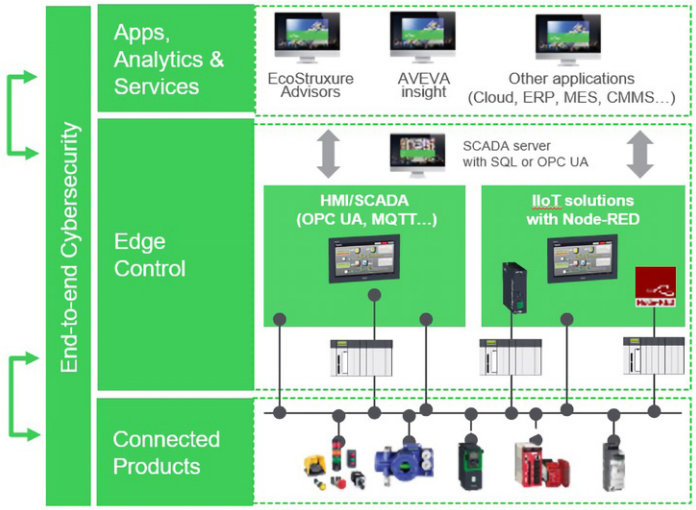
This modularity gives the Harmony Box PC, panel PC and monitors the right fit and allows the configuration to be adjusted for each use while preserving the same environment for the operator. This consistency in operator workstations at the edge provides the optimum ergonomic solution for the application.

Lite SCADA is an easy-to-use, powerful, and affordable software for HMI, SCADA, and Overall Equipment Efficiency (OEE) dashboard projects which complements HMI software for line management and lite supervision applications. Developers can design advanced HMI applications as well as standalone SCADA systems. Such software can be commercialized in a bundle with the Edge Box and industrial PCs for demanding, data-intensive, advanced visualization and monitoring of machine line performance. It includes advanced capabilities like a built-in database interface, data trending, report generation, email and FTP support.

Asset performance

Edge Boxes and industrial PCs are creating a new digital experience at the edge. They combine asset performance with predictive maintenance, IIoT edge-to-cloud connection, smart factory features, and digitization to address the increasing demand for data management, analytics, and dashboards at the edge.

They can run on two main IIoT architectures. The first is the “traditional” one, based on HMI and SCADA, for visualization and connections to drivers through software like OPC UA, MQTT etc. to connect to IT or even cloud applications. The second architecture is based on Node-RED for essential data wiring of the connected products to the apps, analytics, and services at the IT and cloud levels. For more capabilities, these IIoT architectures can also be built with dedicated edge software to offer more advanced connectivity (OT & IT), data modeling and processing, store and forward possibilities, as well as system monitoring. Running on Edge Box and industrial PCs natively open to any Windows, cloud applications, protocols, and connected products, such connections eliminate manual operations for data collection and computing, improving agility and performance.



Ready for end-to-end cybersecurity

Edge Box and industrial PCs are ready for end-to-end cybersecurity systems to protect data and assets. They are validated according to the ISA/IEC-62443 international cybersecurity standard for industrial automation and control and designed according to standard recommendations: security analyses, threat models and tests, user documentation etc. They can also comply with Achilles certification.

McAfee whitelisting can be available as an optional cybersecurity software. Hardware encryption of OS, storage, passwords etc. can be activated with Windows BitLocker running the Trusted Platform Module available as default on the motherboard. These devices also have Secure Boot and Secure Operating System settings (passwords, patches etc.). Finally, they can be validated with secure remote solutions to ensure end-to-end cybersecure infrastructure for remote connection to automation sites in the field.

Reliability all along the full lifecycle for investment continuity

Edge Boxes and industrial PCs are reliable throughout the full lifecycle for investment continuity. They are as robust as an HMI industrial panel for asset reliability and optimization, with reduced failure rates, easy maintenance and replacement, advanced industrial certifications, high environmental resistance with conformal coating, high availability with optional battery back-ups, redundant storage, configurable and noise resistive wide touch screens, and a long lifecycle of industrial ARM or Intel CPUs, in the market for 15 years.

An emphasis on the customer experience ensures business continuity, with easy selection and migration from legacy systems, expanded service support, the efficiency of regional centers for a fast supply chain, express delivery for both new machines and spare parts, as well agile repair.

Conclusion

Get ready for the best digital experience at the edge with Schneider Electric's EcoStruxure and Harmony Edge Box and P6 performance industrial PC, running associated software. They will become the cornerstone of your plant and machine digitization to drive new efficiency and productivity.

Find more information at se.com

About the author

Philippe Gelin is global Industrial PC and Edge box marketing manager at Schneider Electric, with 29 years' experience in automation. He manages the complete life cycle of the automation products (strategic investigations, product development, launches, offer management…). With a double background in automation and Business to Business Strategy and Marketing, including for innovations, he contributes to adoption of Industrial Ethernet and Modbus TPC. He also made publications on Communities of practices management in the domain of Human Machine Interfaces.

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