Accelerating digital transformation with software-defined... everything

Life Is On | Schneider Electric

Introduction

The promise of digitization: The race to make digital transformation a beneficial reality

The urgent need for simplification, flexibility, and faster-time-to-market has **accelerated digital transformation across all sectors**. Indeed, there is a race to come out on top as the COVID pandemic, supply chain challenges, new consumer behaviors, and unstable market dynamics have quickly — and perhaps forever — changed industry as we know, or knew, it.

One of the biggest motivators behind digitization is undoubtedly the **need for efficiency and sustainability**. The imperative to limit the global warming to 1.5 degrees Celsius is more than ever tied with the future of many businesses. "It has never been more visible that resource efficiency and energy sobriety boost the company's profitability" said Peter Weckesser, Chief Digital Officer of Schneider Electric.

Why is digital transformation the key? The journey toward sustainability is the combination of two elements. One is the decarbonization of the processes, where electrification of assets and green energy supply play a central role. The other is achieving higher efficiency at all levels through smart operations enabled by digital transformation initiatives at different levels in the company. These initiatives can include multiple goals like setting the right structure to drive digital operations, having a balanced set of skills and digital talent within the organization and evolving the processes with digital technologies so that they drive the expected level of efficiency, agility, and resiliency.

Is digital transformation a silver bullet for all enterprises? Unfortunately, it may not be enough. Some estimate that 84% of digital transformation projects fail.

How to address the technical limitations and other challenges that companies often meet along their digital transformation journey? An approach that has been gradually growing in importance is to turn to **software-defined technologies**.

Software-defined technologies in the industrial space are a part of the digital transformation that enables a completely new level of flexibility and agility in industrial operations.

They allow to **digitize assets**, which means to

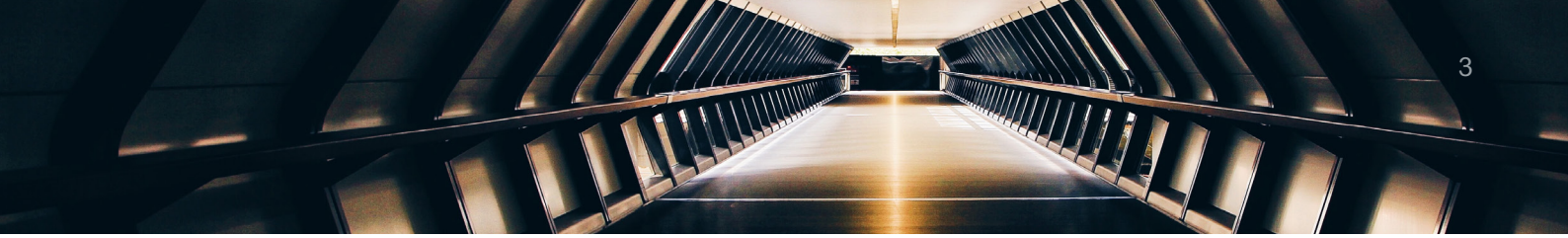
- **decouple the intelligence that runs on devices controlling and performing the operations from the hardware**,
- allow experts to **update and optimize** factories, buildings, data centers, etc. **remotely and securely, or even to automate the update for higher autonomy and efficiency.**

All sectors are turning to software (and the data captured therein) to save the day. A few years ago, Microsoft CEO Satya Nadella proclaimed that, "Every company becomes a software company." This observation was rooted in Netscape co-founder and venture capitalist Marc Andreessen's mind shift 10 years ago that "Software is eating the world."

It's simple: "If hardware is the heart of a company, pumping the innovative blood around the metaphorical body, then software can be seen as the nervous system. Its role is to check all parts are operating correctly and send signals when it detects that something's wrong," says journalist Rich McEachran. And this signals a great opportunity underlying the software-defined approach – to tackle some digital transformation challenges and make it a beneficial reality for your organization.

In this e-book, you will discover:

1. Top common obstacles to realizing full digital transformation
2. Benefits of turning to software-defined technologies to help you achieve the benefits of digitization in an easy and accessible way
3. Ways to leverage partners to scale your digitization efforts — with successful examples



Chapter 1: The promise of digital transformation

Removing the barriers of digital transformation

Despite the promise of digital transformation, the reality for many industries, including manufacturing, is that implementation continues to be a challenge. In 2018, $900 billion in digitization spending went to waste (HBR).

Although 2/3 of manufacturers are accelerating the use of digital technologies in response to the pandemic, the reality of doing so is still quite daunting to them. Industrial IoT projects, for instance, notoriously don't move past the pilot phase. Among the most common mistakes, lack of alignment to business outcomes and lack of internal adoption are the success killers, according to Forbes. Many CEOs are overwhelmed with difficult efforts to digitize. Speaking of industrial transformation, Dan Miklovic of LNS Research notes that, "the industrial sector … faces many more challenges than other companies that don't operate in the industrial world."

The cash for digital transformation projects, however, continues to pour in — projected to top $6.8 trillion between 2020 and 2023 per IDC, especially given the urgent necessity to transform during the pandemic and post-pandemic business as usual. It is therefore imperative to address the complexities of digitization to ensure that strategic and financial commitments deliver meaningful business impact.

This assurance is especially critical for the industrial sector. The industries that will drive the largest spending throughout IDC's 2025 forecast are discrete and process manufacturing, accounting for nearly 30% of all digital transformation spending in 2025 (IDC), up from 13% in 2021 toward smart manufacturing (IDC).

How can manufacturing, and other sectors, get it right, reaping the efficiency and sustainability benefits of digital transformation enabled by digitized assets? 90% of industrial companies believe that digitization "offers their companies more opportunities than risks," yet only 6% describe their factories as "fully digitized" (PwC). The key to real progress is overcoming a few known hurdles.

What are some common digitization challenges?

1. Rigid infrastructure

One significant obstacle to realizing full digitization value for manufacturing is that legacy infrastructures are "rigid and a roadblock for advanced manufacturing technology capabilities" (NIST). It means they offer zero capacity to evolve and leverage technology. This inflexibility has a direct impact on cost, especially as customer demand for personalized products increases. Also, as many companies operate now in a supply-driven economy, the resiliency becomes number one preoccupation of C-level management. The slower the production line is to reply to changes, the higher the cost. Some estimate that reconfiguration downtime to accommodate a new run can cost $1.3 million an hour.

2. Code-specific machines

If manufacturers want to realize the value of product variance — that is, keeping up with fickle demand, unpredictable markets, supply shortages, and energy costs turning production patterns volatile — their machines must be agile and easy to integrate into a production module. Yet installation and integration can represent most of the overall cost of the investment.

Why? Because essentially the machine hardware and the software are one and the same. Accordingly, reprogramming for production changes is not an easy task.

As an example, this challenge led Schneider Electric to use a digital twin and one control system to directly manage all conveyors and connected assets in its smart distribution center in Shanghai, resulting in downtime cut of 25% and efficiency increase of 30%.

Watch Shanghai Smart Distribution Center story

3. Generational shift and new ways of working

Technology is one challenge. The human factor is another. Today's industrial configurations can be very complex. Decoupling the intelligence and control from the hardware and moving it to software, makes the management simpler and more accessible to new, digital savvy generations. The abundance of Information Technology (IT) skills versus ageing Operational Technology (OT) skills seems to be a driver for software transformation.

It's well known that the Energies and Chemicals sector, for example, is struggling to replace the existing generation with younger workers, who are not entering this field at sufficient levels to sustain the workforce and capture the domain knowledge owned by the ones retiring. One survey projected (2015-2020) that the loss of 50 to 80 percent of Energies and Chemicals workers age 55 and older would equate to 150,000 years of experience.

The same sector can be a great illustration of the growing need for remote operations, surfaced in many industries as a key challenge. This was especially visible during the COVID lockdowns, but there are also other numerous high-risk environments where the ability to remotely maintain and operate the assets in the field is of great value. Safe, remote, or unmanned control of systems through software is essential today in many industrial sectors.

Use case:

Plug-and-play digital machines for faster turnover

Schneider Electric has addressed digital transformation obstacles by developing IoT-enabled architecture that facilitates digitization in the field of industry, building, data center, infrastructure and grid. Schneider Electric's IoT architecture, EcoStruxure, links smart machines, edge control, software apps and analytics so that asset or facility managers can leverage the advanced connectivity inherent to digitization.

EcoStruxure is an open yet secure architecture designed for the multi-vendor environments of industrial and facility environments, where disparate systems from a variety of generations and vendors are common. The EcoStruxure architecture is designed to easily grow and expand when new pieces are added into the existing multi-vendor framework.

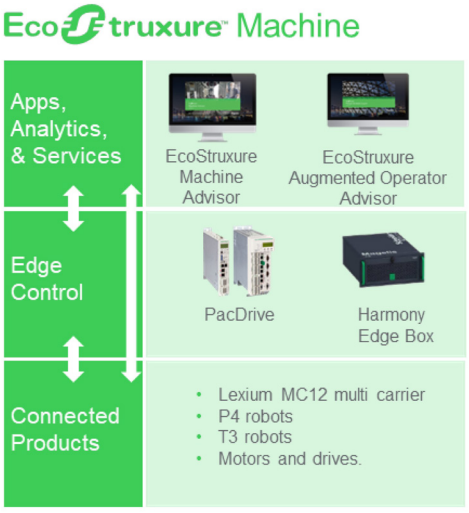
For example, for its robotic packaging systems used by the food industry, Livetech needed a solution that would:

- reduce changeover time,
- enable faster time-to-market for mechatronic module machines,
- optimize energy consumption,
- have a smaller footprint.

Livetech uses the latest EcoStruxure Machine technologies, including the Lexium MC12 multi carrier and digital twin software, to build its sustainable and efficient robotic packaging systems for the food industry. It helped Livetech design faster and more flexible machines with a smaller footprint, realizing 50% faster changeover time and easier maintenance.

Schneider Electric's EcoStruxure solution allowed Livetech to create a new machine that is totally modular, flexible, interconnected, and aimed towards sustainability with minimal energy consumption.

Offer architecture for Livetech:



With the use of sensors and the knowledge regarding its own capabilities and features, a smart machine can be monitored in terms of its own components as well as environmental conditions. The intelligence will correlate upstream and downstream behavior and adapt its own parameters within given business rules. Such optimization can be implemented with respect to energy, time, load shedding, quality or other parameters.

Current IoT open architectures already address many digital transformation challenges. Yet, the amplified need for resiliency and flexibility calls for a software-defined approach, also enabling the development of new business models.

Watch more

Chapter 2: A digital sea change

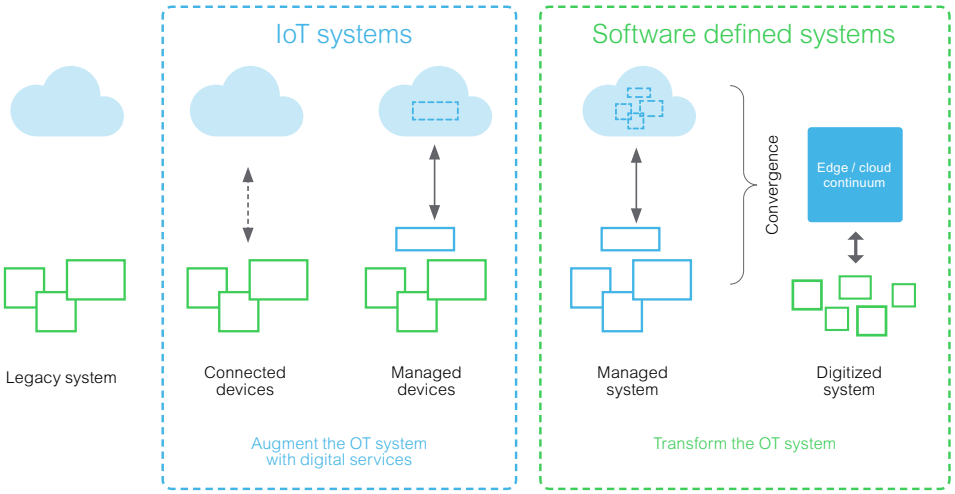
Capturing the value of software-defined technologies

While IoT-enabled architectures with plug-and-play technologies have eased the transition to digital, software-defined technologies open a wide array of opportunities and accelerate the full digitization of electrical, building, and industrial systems.

They allow the operational systems, whether it is in power, buildings, infrastructure, or industry, to be managed at the software layer.

In short, software-defined technologies shift the logic and intelligence traditionally embedded in the hardware itself to software.

The shift towards software-defined systems impacts the overall lifecycle of sites, making their design, engineering, commissioning, operations, maintenance, and upgrades much more flexible and scalable, reducing therefore the total cost of ownership and securing the investment since the intelligence would be portable to any new hardware, without need to redesign it.



What are the benefits of software-designed systems?

There is no question that today's consumers are demanding. One far-reaching influencer can skyrocket product demand by a single Instagram post, or a local shortage can fundamentally change buying preferences and behaviors. Can your company adapt on the spot?

A software-defined approach simplifies 4 main life-cycle phases:

1. Engineering: it simplifies test and validation of the solution
2. Commissioning: it simplifies the integration and deployment of the system
3. Operations: it enables system flexibility
4. Evolutions: it makes evolutions as simple as software updates

Software-defined systems deliver the following benefits, which bring to fruition the full value of digital transformation:

1. Engineering: simplified testing of new solutions

In a software-defined system, the complete behavior of the system, including the control loops, can be tested in a virtual environment implying that integrators, machine builders and users can engineer, develop, and test their systems with higher confidence on how they will practically behave.

Armed with a comprehensive system description maintained all along the system lifecycle — that is digital continuity — manufacturers and facility managers can improve and simplify testing and validation of the new solution without using hardware.

A good example is Veolia Water Technologies, the world's largest supplier of water services and a Schneider Electric customer. Veolia is now using cloud-based data and analytics to standardize the design of plants. Teams across the globe use shared, secure information and leverage simulation tools, to determine how to best optimize their operations. By pinpointing areas where risks for water losses are high, and quickly testing resilient designs, Veolia has cut water losses at over 100 of its worldwide facilities and saved 15% in energy each year with 20% higher production efficiency.

2. Commissioning: easy deployment

It is well known that commissioning can be a challenging phase, especially if any system dysfunctions are found and need to be fixed before bringing a new system online. Shifting commissioning to the software layer streamlines design fine-tuning and makes diagnostics much easier to manage. The fine-tuning will be faster to deploy, and remote experts can reduce their time on site.

In addition, integration — often the biggest headache of IoT project implementation — can be eased. A 2018 Bain survey revealed that integration challenges had "become more acute over the past two years," threatening a company's ability to accelerate digital transformation. Moving from a hardware-centric environment to a software-centric one alleviates many integration challenges — including time, incompatibilities, friction, and cost — by simplifying the deployment and configuration of the operational system thanks to system orchestration.

3. Operations: flexible and geek-friendly systems

One of the top business drivers for turning to a software-defined approach is improving a system's flexibility.

Guided by software, machines can be networked, configured, and updated quickly and seamlessly connected to other machines thanks to common, portable, re-usable code. In the manufacturing sector, for instance, the digitization of assets and systems allows companies to scale up or down operations to match market conditions, meet constantly changing consumer preferences, manage supply chain constraints, and marry production efficiency with sustainability mandates.

Consider the use case of software-defined manufacturing. In this scenario, all production processes — from building the line to assembling the products — can be managed at the software layer. Think about how easy it is to manage a smart home through a smart, voice-controlled assistant.

Now imagine having the same ease of managing machines across a factory floor. A production robot's skillset would live in the software instead of hardware itself.

Software-defined technologies also help to close the gap in traditional automation skills by making the systems manageable by a digital-native workforce. In hardware-centric environments, the need for specialized engineers proves to be a bottleneck. Software-defined systems, by contrast, can capture complex processes and controls (e.g., thermodynamics, hydraulics, high-performance motion, etc.) through sensors that aggregate data in one place. The results? Real-time data insights from a single dashboard. This approach is simply not achievable when an operator relies on a machine-by-machine view. As the complexity is moved behind the software interface, the user experience is more holistic, can be contextualized and doesn't require sophisticated IT skillsets. It also enables performing remote unmanned operations to cover tasks that are of high risk, high cost, or in unfriendly environments.

Use case:

Software on steroids: the power of digital twins

Today, capabilities such as vibration analysis and temperature profiles are frequently available and used to feed mathematical algorithms able to model assets behavior. These digital twins prevent assets failures, improving operational efficiency and preventing costly downtimes.

Now, as data becomes increasingly accessible, we can further contextualize data sets previously siloed and push digital twins to the next level. For example, helping companies to reduce their environmental footprint by enabling them to optimize their emissions profile from the initial design of their operations or during their actual operations using real-time data.

This is the case of one industrial company in the Mediterranean area that has trusted Schneider Electric and AVEVA to optimize their greenhouse gas (GHG) emissions through a comprehensive GHG accounting model that includes renewable power sources, electrical grid components and process equipment. With such a digital twin, the customers can run different scenarios with clear visibility into scope 1 and scope 2 emissions, accounting for their sustainability goals in actual operations.

Download our white paper

4. Evolutions: robustness and flexibility

Finally, a software-defined system decouples the lifecycle of the hardware from the lifecycle of the functionality allowing for extensions and gradual upgrades, no longer limiting the system lifetime expectancy to the availability of hardware components. A software-defined approach is a key enabler in the shift from CAPEX to OPEX.

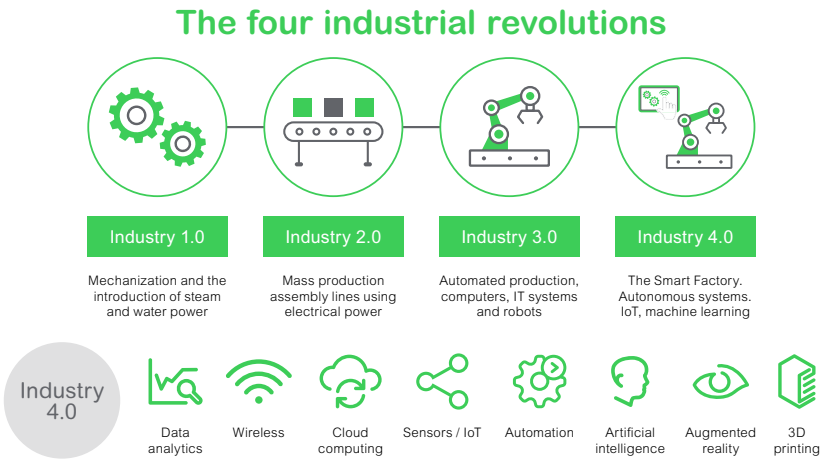
Software-defined technology makes system evolutions as simple as a software update. In a digitized environment, technology updates can be made without affecting the production line. The use of virtualization techniques, portable control and open APIs allows to build reconfigurable, modular production lines, versus rigid, linear ones. They enable both on-the-spot changes as well as future transformations to accommodate new business requirements and technology advancements. Complementary, the ability to make software updates seamlessly significantly improves the cybersecurity of connected assets.

Use case:

Improved sustainability: smart factory showcase

State-of-the-art software techniques (e.g., virtualization, orchestration) make the next generation of OT systems easier to design, build, and evolve. This approach will lead to better customer experiences and increased sustainability, thanks to zero engineering, zero commissioning, and autonomous systems. In addition, standard hardware means better reuse/repair/recycle capabilities, making easier for companies to advance the circular economy wherein waste itself becomes obsolete.

Schneider Electric's 62-year-old Lexington, Kentucky, factory has recently digitized end-to-end operations within the existing factory, now one of the group's leading smart factory showcases. Using the open EcoStruxure architecture, the team achieved a 26% reduction in energy usage and costs, translating to more than $6 million in savings over the last three years. The site's digital energy management strategy leverages IIoT connectivity, edge analytics and predictive analytics to drive energy efficiency and further sustainability goals – all enabled by Schneider Electric's and AVEVA's integrated software solutions. As a result, the site has been recognized as a World Economic Forum lighthouse facility, one of the world's most advanced factories leading the way in the adoption of Fourth Industrial Revolution technologies.



Automation is key – where the physical meets the digital to close the loop from **"insight to action"**

Achieving these benefits: The value of being part of a wider ecosystem

None of these benefits, however, is easy for any company to achieve alone. Fortunately, there are ways to leverage system integrations, independent software vendors (ISVs), and other partners to accelerate digitization efforts. Schneider Electric facilitates real-time collaboration — from finding the right partner to working together in real time along every step — via Schneider Electric Exchange.

With Exchange, Schneider is opening up EcoStruxure to third-party innovations developed via collaboration. Many companies are racing to meet fast-changing consumer expectations. Software-defined solutions allow for the flexibility and speed to keep up — changing up the production line architecture and operations without overhauling hardware and re-working embedded, proprietary code. Because many software-define systems bring together technologies and APIs from multiple providers, collaboration is critical for success. That's where Exchange comes into play.

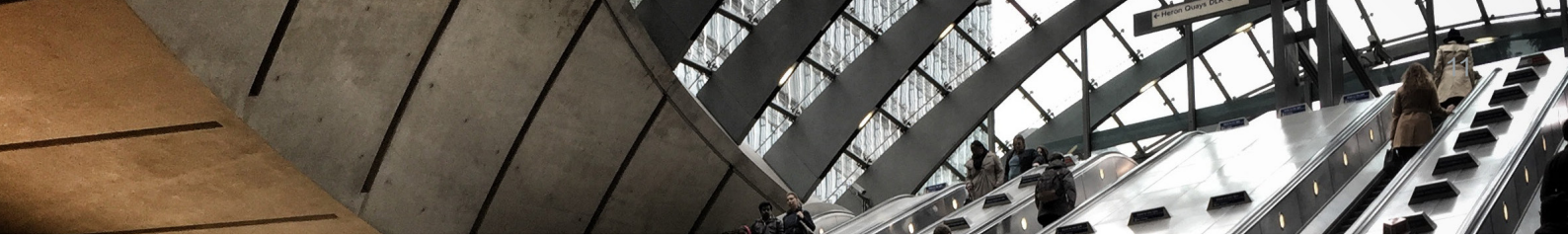
Whether you are an end-user, ISV, or system integrator, you can take advantage of Schneider Electric's unique position for advancing co-innovation efforts. Thanks to decades of accumulating deep domain expertise in the industrial automation, building, data center, and energy management spaces, Schneider now offers a variety of open APIs and software development kits (SDKs), as well as domain expertise-infused analytics and datasets, to speed up and perfect collaborative projects.

Use case:

A snapshot of recent Exchange collaboration and innovation

Watch the video below to learn about how Schneider Electric Technology Partner IGE+XAO Group helps electrical panel builders build and manufacture efficient solutions for their customers via EcoStruxure data and its own software featuring digital twin technology and 3D modelling.

Click to watch



Chapter 3: A stepwise approach

Speeding up on digital transformation journeys

Schneider Electric's own digital transformation is driven by changing customer challenges and technological advancements.

Today, with a new suite of solutions of automation systems and software, the company supports multiple customers in their digital transformation initiatives, wherever they are in their specific journeys: from industrial customers with regulatory constrains on operational safety, security, reliability, and performance to machine builders with new remote management needs or building owners with urgent net-zero goals. The journey towards a sustainable scenario can be achieved as of now in a stepwise manner, in sync with business constraints, preserving existing investments, and including third-party installed based.

Depending on customers' digital maturity and the type of challenges they need to address, here are the possible steps to advance digital transformation with a software-defined approach:

1. Make IT-OT convergence possible

The IT world has realized the benefits of open operating platforms; now it's industry's turn. To fully realize the promise of the Fourth Industrial Revolution, all industrial stakeholders need to reimagine their technology model and use open platforms, decoupling software from hardware to radically improve system agility and flexibility.

Our answer: EcoStruxure Automation Expert

Schneider Electric is delivering on the universal automation vision with the release of EcoStruxure Automation Expert. The first universal automation offering based on the IEC61499 standard begins a new era of software-centric, interoperable industrial automation.

Quite simply, advanced applications require advanced algorithms that cannot run adequately without IT/OT convergence. EcoStruxure Automation Expert is Schneider Electric's answer.

Schneider Electric EcoStruxure Automation Expert enables this transformation to a "software-defined everything" production line, which in turn can connect to back-end systems for procurement and other business operations. EcoStruxure Automation Expert is designed for digital, supporting the drive to 100% engineering efficiency.

Automation Expert redefines engineering by taking a software-centric approach that:

- Automates low-value engineering tasks so engineers are free to innovate and focus on high-value add.
- Enables efficient wrap and reuse of automation objects to ensure you can make the most of what you already have and easily update and upgrade.
- Provides rapid agility to process changes – so you can design and reconfigure processes on the fly.
- Bridges the divide between IT and OT systems so you can create operational effectiveness we could only dream of a decade ago.
- Is vendor-agnostic - EcoStruxure Automation Expert is based on the IEC 61499 standard for portability and interoperability.
- Is future-proof by enabling increasingly short innovation cycles in industrial automation that require new strategies to secure investments for end-users.
- Minimized engineering costs by eliminating delays associated with system refactoring.
- Decouples lifecycles between hardware/software technology layers for zero effort to migrate an existing application to a new hardware platform.
- Increases developer productivity by providing access to automation for IT skillsets and modern labor markets.

By moving away from traditional, heavily engineered, and proprietary systems to user experience-driven systems, engineering firms can realize **operational efficiency gains by a factor of 3 to 4X**. For example, in a recent test, EcoStruxure Automation Expert **saved 68% in application engineering hours** when compared to another vendor. It took only one third of the time to perform the same tasks when using the EcoStruxure Automation Expert system.

In another test, EcoStruxure Automation Expert demonstrated **a reduction of 50% to 80% in the time it took to perform proper system diagnostics**. The work involved the creation of the maintenance canvas, debugging of issues, and the roll-out of various steps involved in the troubleshooting process.

There are many plants in operations – and even under construction– using engineering automation systems that fail to optimize engineering and operational processes. New, disruptive digitized systems like EcoStruxure Automation Expert address these issues.

Use case:

Improving water and wastewater systems

Today, automation engineers may use many different tools to design an industrial automation system.

Without a common source of data, engineers must manually repeat tasks from tool to tool and discipline to discipline, fueling inefficiency.

Royal HaskoningDHV has chosen Schneider Electric as global preferred supplier for its Nereda wastewater treatment solution. Royal HaskoningDHV is now combining the capabilities of Nereda Process Control with EcoStruxure Automation Expert to create a complete picture of the digital lifecycle of the industrial automation system for water and wastewater applications. The control system will improve plant process efficiency and allow wastewater customers to have complete lifecycle management, seamless integration of IT/OT services, and improved system diagnostics for their automation systems.

Engineers, for instance, are free to design processes using an asset-centric perspective and with great hardware flexibility. Once the design is complete, the engineer can deploy the application on the hardware in just a few clicks.

Learn more about EcoStruxure for Water and Wastewater

2. Augment and update current systems

Current systems can be digitally augmented with IoT solutions to offer remote expert capabilities and enhance operational efficiency.

Use case:

Saudi Arabian hospital maximizes reliability with remote monitoring

Remote services are helping a hospital in Saudi Arabia boost resilience and minimize risks. In this example, the health system includes a 300-bed hospital, as well as many other facilities, including an on-site data center to support critical emergency and administrative services. With medical procedures and data to protect, downtime is not an option. In this case, the challenge was to achieve 24/7 uptime while minimizing costs.

EcoStruxure Asset Advisor services from Schneider Electric were chosen to oversee the secure power and cooling infrastructure. This cybersecure solution enables remote monitoring and troubleshooting for 25 critical assets, including UPS, in-row cooling units, and PDUs.

Remote services are enabled through a Connected Service Hub, where experienced engineers use advanced analytics, including machine learning algorithms, to quickly identify any critical issues at the site. For example, a remote expert may alert the hospital about the estimated remaining lifetime of UPS batteries so that an optimal plan is made for replacement. And beyond equipment health, network connectivity and security issues can also be flagged and resolved.

The hospital facility team now has the peace of mind that they will receive a call from the service hub within 5 to 10 minutes. Along with direct consultation, facility personnel gain mobile access to data and reports to enable data-driven decision-making.

The addition of remote services enabled the onsite data center to streamline work shifts, resulting in an annual savings of $120K and 30X ROI with services costs recovered in the first year.

Read more

3. Replace end-of-life systems

When systems approach their end of life, either because they can no longer keep up to date with security requirements or because hardware components are no longer available, it is crucial to understand the new business imperatives and deduct from there what type of system will satisfy the business needs.

A well-known example of the above is the on-going work by the Open Process Automation Forum (OPAF) that is defining a software-defined reference architecture for continuous process industries aiming to remove vendor lockdowns and costly updates whilst enabling unknown levels of collaboration between partners thanks to a software-defined approach (hardware abstraction paired with orchestration technologies) and edge to cloud integrations.

Use case:

Open Process Automation: OT/IT convergence in practice

ExxonMobil, Schneider Electric, SuperMicro and CPlane.ai teamed up to explore and prove the benefit of system orchestration technologies in the digital lifecycle management of an open process automation system. The collaboration was based on the standards and goals of the Open Process Automation Forum and addressed the concerns about the manageability of new open systems and converged IT/OT industrial control systems.

Pilot overview

The pilot aimed to simulate a chemical processing plant using a heterogeneous mix of IT/OT technologies. To bring the simulated plant to an operational state, Schneider Electric's EcoStruxure Automation Expert and SoftdPACto were used to enable the process control software and control logic. With support of the CPLANE.ai Industrial Orchestrator it was all performed in approximately ten minutes with just a few clicks of the mouse compared to an estimated 50-100 person-hours by conventional methods.

Key findings

- Multi-vendor, open process automation can be integrated into a wholistic system using application portability and system orchestration technology.
- Open standards make inter-operability of a heterogeneous system much easier to manage and more reliable to implement and operate.

Pilot turned into project

After the successful pilot, ExxonMobil sought to install an open process automation system in one of its production facilities.

The co-innovation project purpose was to become energy-efficient, improve workforce productivity, future-proof ExxonMobil's architecture, while meeting sustainability goals and increasing profitability.

Five global industry leaders have joined forces to deploy a new era for open process automation solutions. For the field trial, they all offered components using open Industrial Internet of Things (IIoT) standards.

More specifically, each co-innovation partner provides on their side:

- ExxonMobil: requirements and specifications,
- Yokogawa: system integration and support,
- Schneider Electric: EcoStruxure™ Automation Expert Soft dPAC Runtime, a software package that is hardware agnostic, making applications portable and therefore simplifying the deployment and maintenance of control strategies
- Intel: Intel Xeon Processors for provisioning and security,
- Dell: EMC hyper-converged infrastructure and networking switches,
- VMware: tools for management and virtualization.

Schneider Electric is playing a big role in this vendor-agnostic field trial to offer solutions for architectural challenges that all industries are facing. EcoStruxure architecture is at the heart of this endeavor, it is expanding the ecosystem of Industry 4.0 and adding value for end users across multiple segments.

With this open approach, hardware, software, and applications are fully decoupled and evolve independently during the lifecycle of a plant. Different components from different companies interoperate with each other, running together in harmony.

Read more

4. Leverage open ecosystems with partners

The appetite for enlarged communities of practice is not exclusive of continuous process industries but a global trend encouraged by the usage of digital technologies permitting an effective sharing of data and an unprecedented level of interoperability between applications from different vendors.

As an example, today Schneider Electric Exchange offers a growing portfolio of APIs developed not only by Schneider but also by the ever-growing community of EcoStruxure partners, so making data easily accessible to be consumed and shared.

Use case:

The city of Stockholm aspires to lead the rankings of the most sustainable places in the world and to be fossil-free by 2030, with a maximum CO2 emission of 105,000 tonnes from their operations.

All building data coming from EcoStruxure Building Operation and Building Advisor are collected in real time and saved into a cloud database from Schneider Electric's technology partner, Myrspoven. These data points are combined with other datasets generated from different energy providers, weather forecasting systems, and other sources.

AI algorithms and machine learning are applied to all data retrieved per building to generate predictions so that, every 15 minutes, new optimized control signals are sent back to the buildings.

The solution comprises the following tools:

- EcoStruxure™ Building Advisor
- EcoStruxure™ Building Operation
- EcoStruxure™ Building Operation SmartConnector
- MyrspovenAI by Myrspoven, available on Schneider Electric Exchange

Customer benefits:

- Reduced energy consumption
- Reduced electrical consumption
- Increased comfort for occupants
- Fewer error reports
- Reduced CO2 emissions
- Increased lifetime of units in the building with 24/7 digital predictive maintenance
- Reduced travels back and forth to sites with 24/7 digital fault detection and diagnostics also leading to reduced CO2 emissions

Discover Developer Portal on Schneider Electric Exchange

Conclusion

Where will you go from here?

Digital transformation is a journey and both IoT and software-defined are part of it. Alone, IoT will not take anyone to new heights in terms of sustainability and energy efficiency.

But there is more: **The software-defined approach** is opening new capabilities and concrete ways to fulfill the vision of digital transformation at the operational level.

IoT has brought us to where we are today, but to get to next level, we need to do more.

Whilst software-defined technologies are not an imperative in all digital transformation projects, they play a fundamental role securing users' investments by decoupling the intelligence from the operational hardware.

Also, they enable a comprehensive remote management of the automation infrastructure and the effective deployment of edge applications, whilst allowing accurate pay per use monetization models of those applications.

A software-defined approach can truly transform your business so your efficiency and sustainability goals are always visible, always in your control.

Schneider Electric

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