How digital transformation impacts an OEM´s post-sales business

Considerations for how machine builders can benefit
from IoT-based digital services and tools

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Price pressure, volatile demand, new customer behavior, and rising competition are all disrupting the traditional machine manufacturing business model.

In this environment, machine builders can grow competitive advantage by incorporating the IIoT and new technologies while building smart machines and generating new revenue streams.

Access to real-time data drives machine design and development improvements. New IT/OT technology capabilities also generate valuable machine insights for advanced analytics.

Such developments pave the way for comprehensive new support and service approaches manageable from anywhere in the world:

• Remote monitoring, troubleshooting, and fixing of machines

• Agile maintenance that evolves from reactive to predictive

• Improved end user workforce visibility to data for faster decisions

Connecting machines to the IIoT and the cloud is no longer a big, expensive technology challenge. A fast-growing market of solutions with built-in internet connectivity simplifies integration and lowers the cost of post-sales maintenance.

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Traditional business model limits

Today, most servicing of machines in the field is conducted reactively. Often referred to as "run to failure", this strategy means that maintenance resources are only deployed after a failure occurs.

Such an approach can easily generate costs of downtime worth thousands of Euros per minute. In addition, fixes are oftentimes urgent.

End users and maintenance technicians are highly stressed, spare parts need to be express-shipped, and expensive experts need to be flown in. Under such a scenario, end-user customers are never happy.

Compare that to what suddenly has become possible as a result of Industry 4.0 advancements.

Digital tools and ample communication bandwidth enable easy remote access to complete machine installed base information.

These digital tools also drive increased efficiency. For instance, in many cases costly experts no longer have to be sent on site to solve technical problems.

"Digitization is comprised of a set of actions that help organizations use the power of digital in products and services, customer experience, analytics, and automation."

McKinsey & Company

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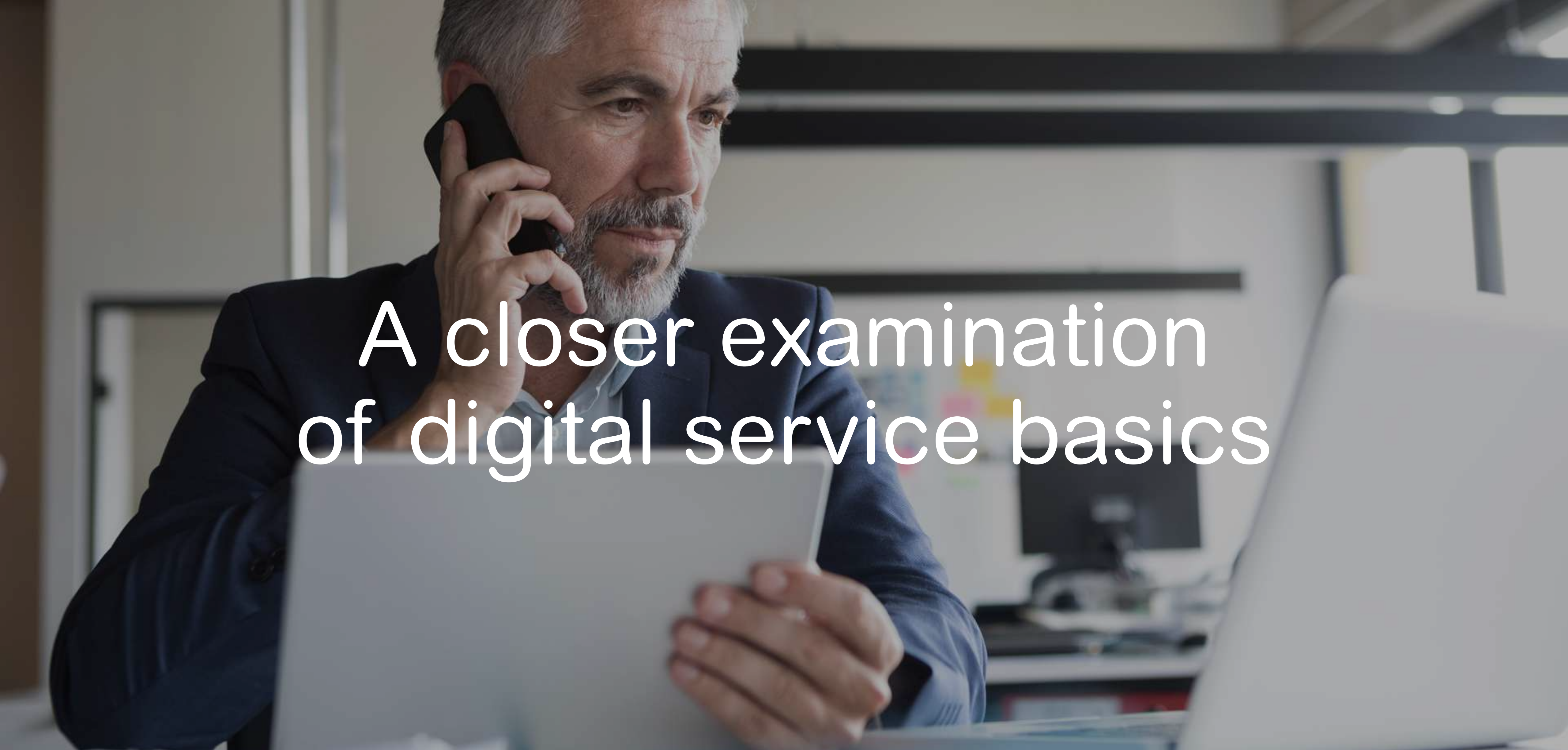Best practices for
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Forming alliances with partners

End users who manage manufacturing plants are searching for new ways to help maximize their overall equipment effectiveness (OEE).

But OEMs today are challenged with successfully providing faster, and increased support and service for minimizing machine downtime.

The answer lies in combining new techniques to address troubleshooting and preventive and predictive maintenance while rendering maintenance scheduling more efficient.

By embracing digital models for post-sales support and service, OEMs position themselves to both streamline maintenance operations and better serve the installed base of customers.

However, most OEMs today do not possess the deep financial pockets or proper skillsets to build their own digitization tools from scratch. In addition, regardless of the size of the enterprise, no company can execute effective digital transformation on its own.

Aligning with the right technology partners can both lower risk and simplify the implementation of new business models.

Leveraging end-to-end solutions

Long recognized as a global leader in machine and plant industrial automation products, solutions, and services, Schneider Electric is in a unique position to support OEMs' maintenance modernization and digitization efforts.

As an early adopter of digital transformation, Schneider Electric has developed a mature, multi-layered, and open IIoT-enabled architecture.

This platform, called EcoStruxure™, easily integrates maintenance-related intelligent field devices and edge control with apps and analytics within a cybersecure envelope.

EcoStruxure integrates end-to-end solutions across design and engineering, commissioning and operations, maintenance and service support phases of a machine life cycle.

EcoStruxure tools collect digital data at the machine level, utilize that data to improve the precision of edge control (which represents the interface between machines and cloud-based digital remote services), and analyze that data in the cloud so that both OEM staff and end users can make better decisions.

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Understanding smart support and services attributes

For OEMs, rolling out digital maintenance services involves two fundamental steps:

Step 1. Generating and collecting comprehensive machine-level digital data which is remotely accessible via the internet. Service technicians would have insights about actual machine status and would know exactly what they need to be equipped with.

How it's done: Cloud-based software platforms enable remote management, monitoring, and access to machines. This allows both remote fixing of issues and real-time support of local technicians who perform the maintenance. Use of Software as a Service (SaaS) augmented reality tools provides visual issue-relevant information and guidance.

Benefit: OEM post-sales service managers drive more efficiency when servicing their customers through instant access to machine performance field information.

This includes machine location, owner history, maintenance update records, relevant and up-to-date machine documentation, and performance parameters to name a few. The information is provided in both textual and graphical formats.

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Understanding smart support and services attributes (continued)

Step 2. Creating business value from collected/monitored remote machine data

How it's done: Cloud-based services allow for worldwide condition monitoring, predictive and preventive maintenance of machines across production sites.

The intelligence gathered allows OEMs to report to their customers on ways to limit downtime while enhancing machine performance.

Benefit: Both OEM marketing managers and post-sales service managers can now develop new business models that generate new services-based revenues and can better support end-user machines.

End users get an up-to-date status regarding their machines' performance. Issues are responded to quickly and time-per-service-job is minimized. Maintenance technicians' travel costs are reduced.

This agility creates a strong differentiator vis-à-vis the competition.

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Examining scenarios for selecting the right solution

Listed below are three possible scenarios that illustrate how digital transformation can positively impact the productivity of both OEM post-sales service managers and marketing managers:

First scenario: Methods for increasing operational efficiency

Post-sales service manager:

"I need to efficiently manage my installed base. All information related to each delivered machine should be accessible via a single database.

That information should include documentation, architecture, location, the history of owners, service job history, and updates. Best case, I would like to avoid working with databases that only provide generic information. The ability to map individual service contracts would be ideal!"

Second scenario: Best practices for developing remote service efficiency

Post-sales service manager:

"Fewer and fewer educated and experienced service specialists are available.

I need to address this shortage of skilled workers.

Our service execution needs to be more efficient. Avoiding travel time through remote support and shortening the time per on-site service job would be great. But I also need a more holistic approach."

Third scenario: Unlocking new service model revenue streams

Marketing manager:

"Today, 25–30 % of our company's revenues are generated through services. This is a continuous and stable revenue stream.

How can I grow this revenue stream knowing that the traditional service business is limited? How can I differentiate myself in the marketplace through services, as the competition is becoming tougher?"

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Methods for increasing operational efficiency

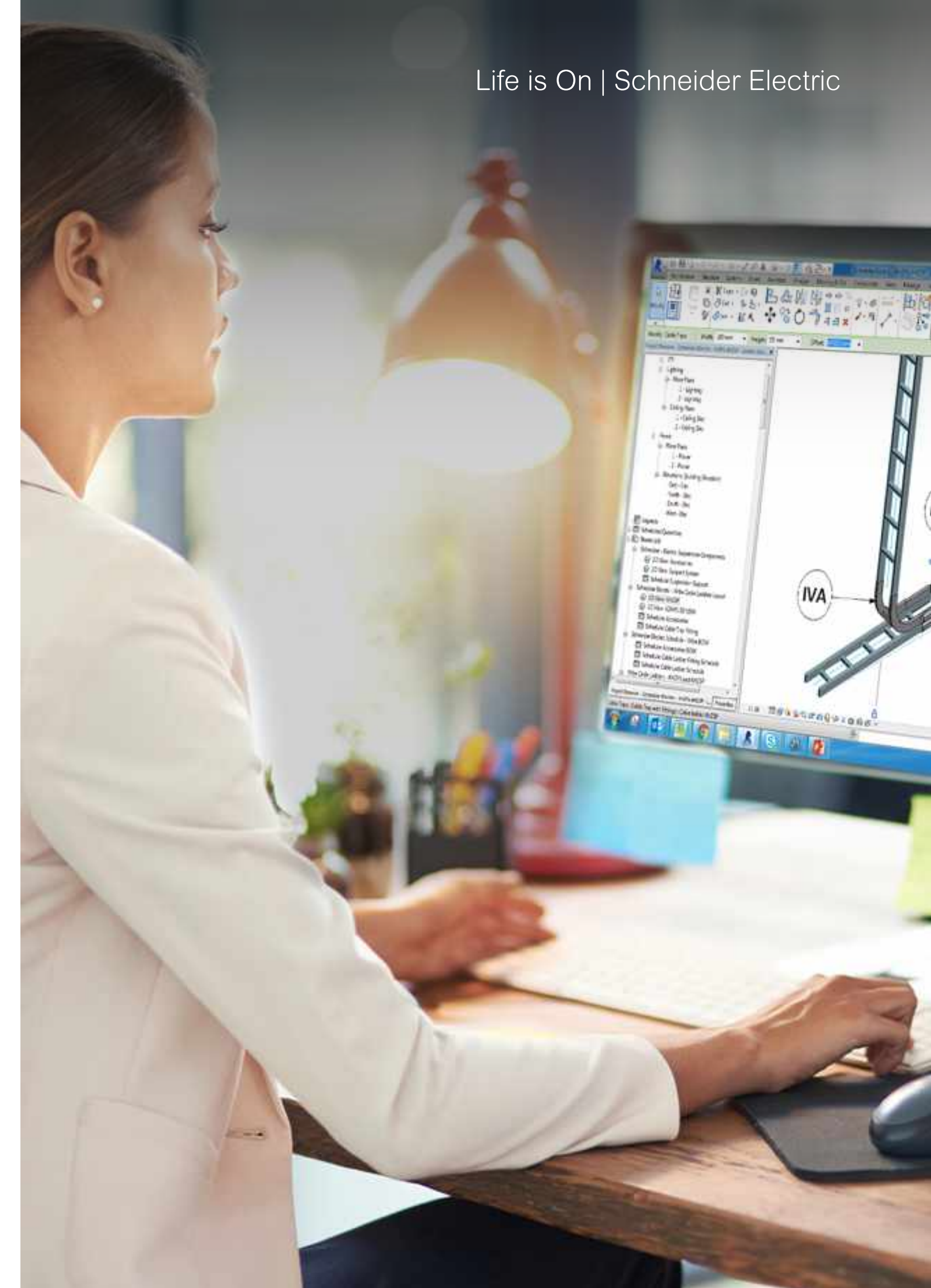First scenario
Methods for increasing operational efficiency

Service managers are focused on resolving customer issues in an expeditious and reliable manner.

Achieving this goal is difficult given the way most OEM maintenance services are managed today. Service managers are often unsure of the status of the machine in question (is it old or new?) and have poor visibility into the issue (what's wrong?).

Many times, when dispatching a service person, they don't know how to best equip that individual (the right spare parts? the right software?) to handle the on-site intervention.

A digitized maintenance approach minimizes this confusion by first capturing complete machine installed base information. This grants the service manager quick and easy access to a complete field inventory database across accounts and regions.

It provides complete documentation of hardware, software, architecture and all available information about location, the history of owners, service jobs and updates. The service manager can pinpoint where his maintenance technician needs to be, and what tools and diagnostic kit he needs to bring with him. Such a database can even map individual service contracts to a machine.

First scenario – Methods for increasing operational efficiency

Solutions for reducing support costs by 20 to 50%*

For an OEM to build such a database from scratch can be costly and time consuming. Recent breakthroughs in digital technologies, however, are addressing these challenges by providing new ways of gathering, centralizing, and displaying machine-generated data.

Solutions like Schneider Electric's **EcoStruxure Machine Advisor**, with fleet management capabilities, now make it possible to track, monitor, and fix machines in the field while reducing support costs by 20 to 50 percent.

When a new machine is delivered and added to the installed base, the **EcoStruxure Machine Advisor** track tool can be used to populate a comprehensive technical profile – automation architecture, firmware/software-releases and updates – and all other service-relevant information.

For example, documentation, operating/service manuals, history of owners, modifications, and service job activities can be included. A complete record of a machine is made available, if a request or a call for help comes through.

Watch the success story

* McKinsey survey – "How to succeed: Strategic options for European machinery"

First scenario – Methods for increasing operational efficiency

Solutions for fleet management as a starting point

How to get started:

EcoStruxure Machine Advisor is a digital service, which runs in the cloud. No software package has to be ordered. It can be initiated from any personal computer or laptop that accesses the Schneider Electric web site.

The fleet management function of its track module can be used in online mode (with connected machines) or offline mode (without the tracking function for locating machines).

Purchase options are flexible and can include either pay-per-use or a subscription (for longer-term support) to a pre-defined package per machine or number of machines.

The fleet management module of EcoStruxure Machine Advisor is an ideal digitization entry point.

Making available the comprehensive information on each delivered machine is a must for efficient service management of a worldwide installed base.

EcoStruxure Machine Advisor facilitates the task of building a database tailored to the needs of machine builders, and provides a path for an expanded scope of functions and services in the future.
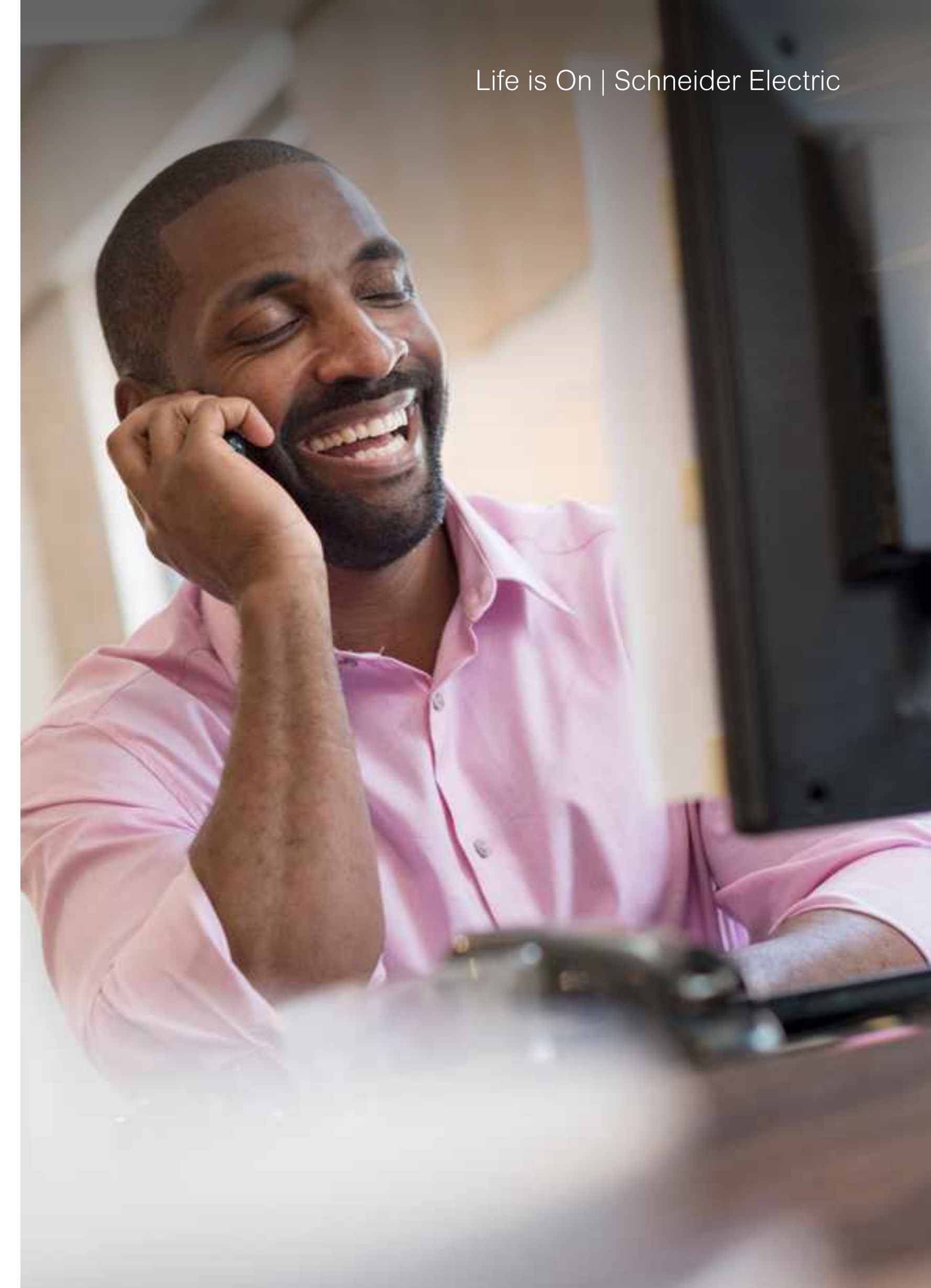
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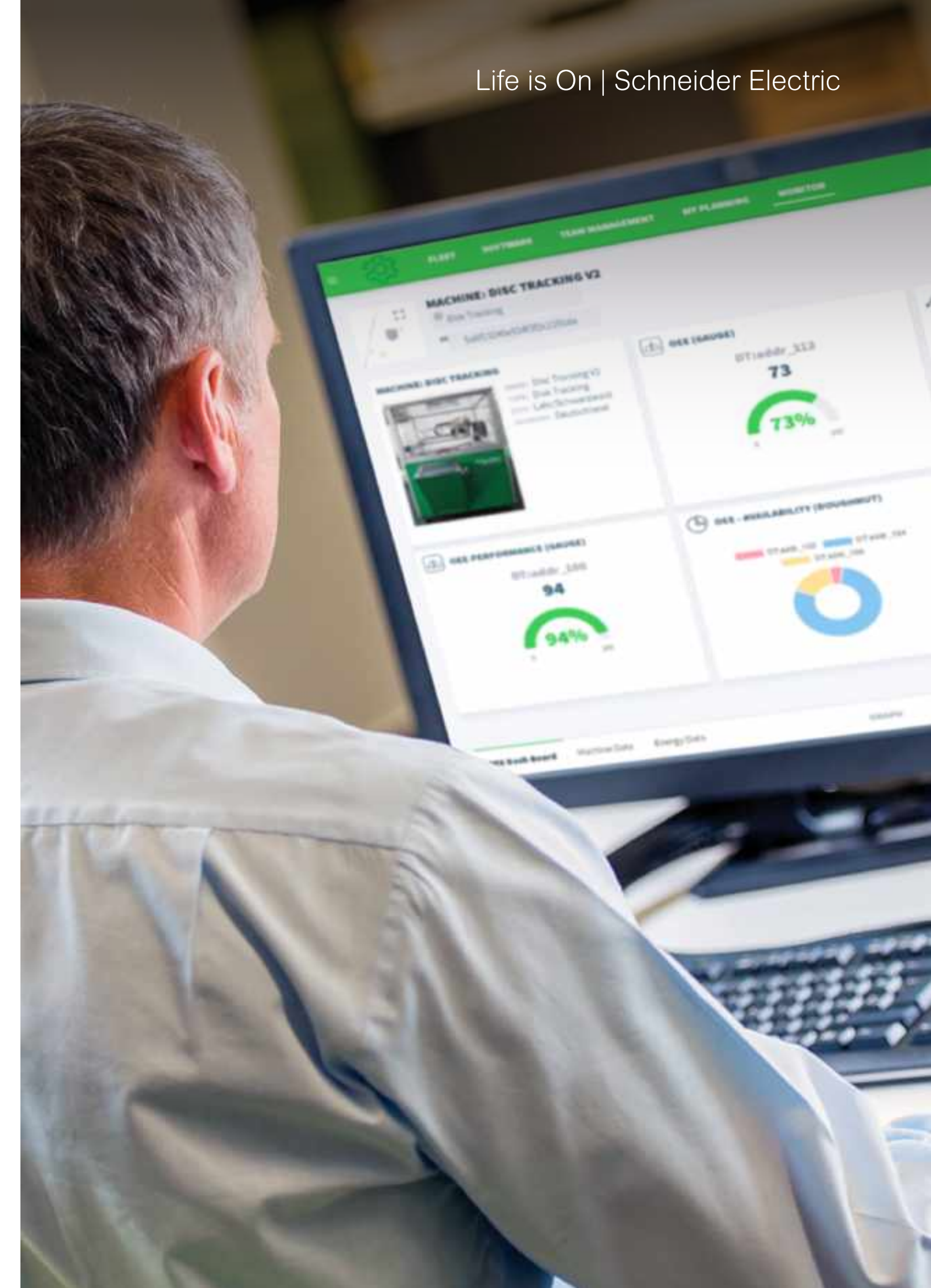# Best practices for developing remote service efficiency

Second scenario
Best practices for developing remote service efficiency

Increased on-site and remote servicing efficiency can help reduce time for corrective actions by up to 50% (think about just the amount of time saved when quickly locating needed documentation). When working with digitized machines, diagnostics and troubleshooting tasks are both faster and more accurate.

Now, service personnel can monitor their installed base of machines from anywhere across the globe and track, in real-time, the condition of each machine.

If there are deviations from normal operating parameters, alarms and warnings can be triggered directly to the OEM and EU maintenance teams simultaneously. This will allow OEMs to guide their customers to solve technical problems even before they occur and cause unplanned downtimes.

End users can move from reactive to predictive maintenance which will reduce their services costs and increase asset utilization.

Second scenario
Best practices for developing remote service efficiency

Such digital tools also help OEM service managers to compensate for the loss of skilled technicians who retire or leave. According to a study by Deloitte Development LLC ('2018 Deloitte and The Manufacturing Institute skills gap and future of work study'), over the next decade, in the US alone, 2 million of the 3.5 million needed manufacturing jobs likely will go unfilled due to the skills gap.

As the pool of educated and experienced service specialists dwindles, the staff that remain are forced to do more with less. Digital tools empower them to multitask in several ways:

- Enhanced client support efficiency –
  By transitioning to remote maintenance, tech-nicians can manage more accounts due to re-duced travel times. Even when traveling, they can work on multiple accounts from one location.

- Shorter repair times
  On-site service jobs are done is faster as data and documentation are much easier to access.

- Expedited training –
  Machine information is available with a click, and digitized interfaces can serve as a mechanism for training new employees.

Once a digitized maintenance model is deployed, the track, monitor, and fix components begin to connect and link, and key business processes become more streamlined.

But this can only happen when combining the proper set of tools. Some key tools that enable digital service operations are shown on the next page.

Second scenario – Best practices for developing remote service efficiency
Solutions for remote services

Watch the success story   Watch the success story

Second scenario
Best practices for developing remote service efficiency

How to get started:

In order to define smart maintenance deployment objectives, the following key questions should be considered:

- How can the end user's workforce be empowered?

- How can OEM service staff members be empowered?

- Should the OEM service staff only perform remote monitoring of machines?

- Should the OEM staff also remotely access machines at the end user sites?

How to empower the workforce?

EcoStruxure Augmented Operator Advisor provides an attractive option after such questions are addressed. It enables setting the optimal level of staff empowerment, defining access points around the machine that need to be transparent and visible via augmented reality, and assigning the right interface information flows.

The service can be run on devices like tablets or other handhelds, with no additional hardware needed. EcoStruxure Augmented Operator Advisor allows immediate access, in real time, to relevant field information (such as known variables and process documents) for operations and maintenance.

These can include machine history, process variables, and product, installation, and electrical diagram documents and instructions.

Second scenario – Best practices for developing remote service efficiency

Empower OEM service staff to remotely monitor and manage machines

Using **EcoStruxure Machine Advisor** Track, Monitor, and Fix functions, machines can be followed remotely to perform diagnostics or condition-based monitoring with an option for performing predictive maintenance analytics.

All information necessary for servicing the connected machine is remotely available to OEM service staff for helping to guide the on-site end user team. Notifications can be generated when machine health anomalies are encountered or when thresholds are exceeded.

Both **EcoStruxure Augmented Operator Advisor** and **EcoStruxure Machine Expert** provide the on-site software needed to manage any issues or exceptional events.

Second scenario – Best practices for developing remote service efficiency
Empower OEM service staff to remotely monitor and manage machines

EcoStruxure Secure Connect Advisor
is an effective tool for remotely accessing a machine at a customer site. This service is an ideal supplement to EcoStruxure Machine Advisor and expands on its benefits.

Connecting machines to the IIoT:
In addition to a router, if a hardware system for running software is needed, the **Harmony Edge Box** can serve as a web/cloud interface.

For monitoring a single machine, the machine´s controller can be connected directly to the IIoT. Many of Schneider´s machine controllers such as **Modicon M262** and **PacDrive 3**, are already equipped with internet protocols.

Digitizing at the machine level:
The more information is available, the better the decisions and the more efficient the actions. The following tools enable the extraction and acquisition of needed information from the different levels of machines and production lines:

• EcoStruxure Industrial Device "Pocket Service"

• EcoStruxure Machine SCADA Expert

• Harmony Hub

• XIOT Cloud Connected Switch

For motor management, **TeSys island** provides options for acquiring data from AC loads and channeling that data to edge control devices and the IIoT platforms.

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Unlocking new service model revenue streams

Third scenario
Unlocking new service model revenue streams

As OEM maintenance business models evolve across the globe, a new reality is emerging. Those who fail to adapt to key digital transformation trends will be left behind, with their ability to compete eroded.

For OEM marketing managers, an opportunity now presents itself not only to generate new, profitable service-based revenue streams, but to also better support customers who are also facing their own digital transformation challenges.

Plant managers are focused on boosting machine production. Oftentimes, warning signs from machines are ignored and, as long as a machine keeps functioning, operators are not too concerned.

However, this risky behavior can be avoided. Since digitization technologies allow OEMs to monitor warnings and alarms remotely, service teams are made aware of the behavioral anomaly before an actual breakdown or failure occurs.

By taking proactive steps, an OEM can prevent unanticipated production stops. When the long-term health of the machine is left to the OEM, machine operators can redouble their focus on achieving production targets.

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Digitization enables an OEM to shift from a predominately reactive on-site servicing model, to a more predictive remote servicing model that is more efficient, less costly, and results in higher customer satisfaction.

This enables an OEM marketing manager to expand beyond only generating revenues from building and delivering machines. Since digitization and cloud computing allow the creation of many services, new, diversified sources of revenue are available to drive OEM profitability. This helps to build a predictable annuity stream of revenues.

In a remote maintenance services scenario, data that reflects how end users are utilizing their machines can be gathered in a very affordable manner.

For example, based on monitoring machine utilization, OEMs can increase their revenues with warranty extension sales, lease or rental machine business for seasonal or changing demands. Collecting machine data can also help them optimize machines based on field information.

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Solutions for remote services

Watch the success story

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How to get started:

EcoStruxure Machine Advisor can serve as a base for a variety of business models. A first step is to create complete critical machine data records in the Track/Fleet Management modules. Based on the joint end user and OEM deployment strategy, a number of options are possible:

- Using Augmented Operator Advisor in tandem with EcoStruxure Machine Advisor

- Offering premium support based on data monitoring and machine function health requirements

- Creating predictive maintenance service plans based on machine utilization and condition monitoring

- Deploying energy consumption analytics in support of energy optimization efforts

- Relieving end users of the burden of |managing maintenance services

- Using cloud-based Machine as a Service (MaaS) business models to enhanced connectivity and transparency

- Creating premium services for preventive maintenance that include registered machine history and static or geolocation information. Gradually integrating, over time, the leasing of machinery as a possible business model

- Offering machine benchmarking as a new service opportunity now that machine performance and quality data offer more comprehensive and accurate OEE and KPI information

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EcoStruxure Secure Connect Advisor:
The ability to remotely access machine program and configuration data supports the development of OEM services like online troubleshooting, firmware updates, and diagnostics analysis, which enriches engagement with the end user's staff.
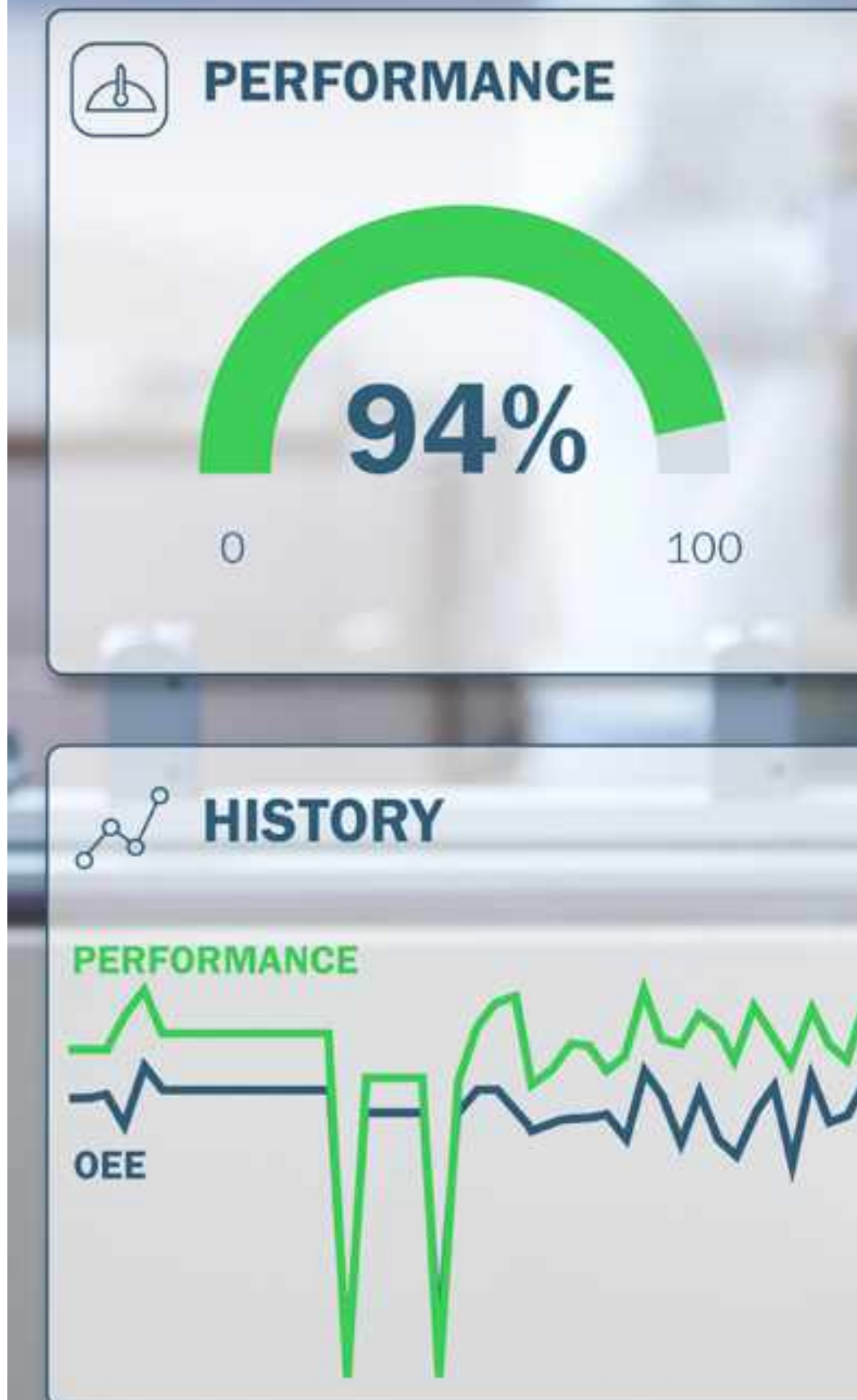
EcoStruxure Augmented Operator Advisor
– possible methods for deploying:

• Offer the standard Augmented Operator Advisor implementation

• Provide access to all "high performance design" documentation and manuals for components

• Offer a premium implementation that includes step-by-step operator guidance up to complete maintenance procedures

EcoStruxure Industrial Device "Pocket Service"
– Options for future business models:

• Use in advanced maintenance trainings

• Use to supplement new services connected to EcoStruxure Machine Advisor (e.g. PM8000 energy measurements with library support)

• Introduce premium features (e.g. motion commissioning, third-party electronic motor labels – some draft IEC libraries are already available)

PERFORMANCE

94%

0   100

HISTORY

PERFORMANCE

OEE

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Deploy a comprehensive cybersecurity strategy

Cybersecurity is a decisive element for the adoption of digital services

Digital tools will require all stakeholders – manufacturers, machine builders, and end users – to pay special attention to addressing potential cybersecurity issues.

Schneider Electric embraces the Secure Development Lifecycle (SDL) process, a framework for secure product design that establishes product security from the very beginning of development and throughout the asset's life cycle.

Within the context of SDL, secure architecture reviews are performed, threat modeling of the conceptual security design takes place, secure coding rules are followed, specialized tools are utilized to analyze code, and security testing of the product is performed.

These actions help to "harden" products, making them more resilient against cyber attacks. In this way, as new products replace old, entire systems evolve to become more cybersecure.

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The digitization of machines and the emergence of digital machine maintenance services can be overwhelming at times for those who have yet to reinvent their businesses. However, by initially focusing on simple tools and ready-to-use solutions such as those described in this eGuide, OEMs can take the first steps towards digitizing their service approach.

OEMs need not face the digitization challenge alone. A partner like Schneider Electric can help pave the way with a simple start-up tools that can get implemented quickly and at a low cost. Schneider Electric's strength in this arena, compared to other technology providers, lies in its development of a complete and more universal service offering, and a corporate culture where digitization is embedded. Schneider Electric's EcoStruxure architecture is fully open. The entire repertoire of functionalities of EcoStruxure Machine Advisor, for example, is available not only to Schneider Electric automation devices but also to machines and automation solutions from other vendors. This is important, for the consumer packaged goods industry, in particular for the packaging machine sector, where end users demand that OEMs offer alternative automation solutions for the same type of machine. This open, digitized architecture accommodates this requirement by allowing one service approach for all machines in the portfolio, regardless of automation vendor.

At Schneider Electric, our objective is to help machine builders start their digital transformation. We hope the scenarios we have presented reflect your reality. We have aligned the appropriate products to each of these cenarios in an effort to help simplify your deployment strategies. In this way, we present OEMs with not just a laundry list of products and services, but with bricks that will help build a profitable digital future.

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