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DIGITAL WORKERS:
HOW TOMORROW'S BUSINESS IS DONE TODAY

Drive productivity, safety and satisfaction for the technology-enabled worker

Co-authored by Capgemini Consulting

Manufacturing organizations, automotive companies, oil and gas companies, and utility providers are all facing increasing economic pressures on multiple fronts:

- **Customers** expect higher service levels and quality than ever before, and they demand rapid delivery
- **Regulators** and industry agencies continue to impose strict rules around safety, operational practices and financial transparency
- Hard-working **employees** want to use the latest tools, technologies and practices that enable them to perform at their best
- **Complex system integration** requires collaboration and effective sharing of information
- Stiff **competition** means businesses must operate as efficiently as possible to keep costs low and protect margins

In order to address such challenges, these organizations typically turn to technology to help transform operations and working practices from traditional methods and relying on manual processes to technology-enabled models that foster continued business growth. Part of this means providing today's employees with connectivity, enabling collaboration, and leveraging data to empower them to succeed.

Digital transformation is not just about introducing new technologies, it also involves training and implementing new processes and working practices to get the most out of these investments. Many organizations are employing a shared digital services model, whereby technology resources are adapted and allocated as needed to support specific business needs and use cases. To succeed, these organizations must ensure that the resources they invest in are flexible and can evolve to support an ever-growing variety of use cases. Further consideration must be made to work with employees to drive behavioral and cultural change within the company.

The Digital Worker Advantage

As part of its global Digital Manufacturing offering, Sogeti High Tech, the division of Capgemini and Sogeti dedicated to Industrial Engineering and Technological Innovation, has developed the Digital Worker solution in collaboration with Intel. This solution focuses on the 'people' part of the digitally transformed manufacturing landscape, and is designed to empower employees to work smarter, faster and with less hassle in a flexible, proven, or even more secured working environment. Using next-generation technologies such as augmented reality (AR), virtual reality (VR), the Internet of Things (IoT) and the latest hardware and software innovations helps provide workers with a reliable connection to data, information and guidance they need to perform each task, even when working remotely. Digital Worker also allows them to collaborate more effectively with colleagues at any time, from anywhere and with any device.

The Digital Worker offering provides manufacturing organizations with solutions that span the entire product lifecycle, from initial development using simulations to on-site maintenance of deployed assets. Based on the XIoT Capgemini platform that supports IoT, AR/VR services and supervision tools, this future-proof environment is ready to integrate with current, legacy and future systems as needed, fitting smoothly into existing infrastructure and long-term business strategies.

The flexibility of the solution enables teams to allocate combinations of resources as needed to each business unit or new project, depending on specific requirements. This makes the solution well suited to IT functions looking to provide digital workers with practical and helpful data from both inside and outside of the organization.

Capgemini and Sogeti recognize the importance of supporting and enabling quick user adoption when introducing a new solution to the workforce. For this reason, the Digital Worker offering comprises not only the latest technology but also in-depth, tailored support and training for teams and new users to ensure employees are engaged with new technologies from the outset, so the organization can gain value from its investment as quickly as possible.

Digital Worker Use Cases

The Digital Worker model can be applied to a wide variety of use cases, which span three key areas:

01. Collaborative Robotics

The traditional robotics model focusses on replacing humans in favor of automated processes that use machines designed to perform specific tasks.

Sogeti High Tech's vision for robotics is different. Its "collaborative robotics" platform and associated services enable humans and multi-purpose robots to work side by side, relieving the digital worker of repetitive or even risky tasks by equipping them with robotic "tools" that allow them to focus on adding value to processes and products.

This shift from task-oriented robotics to scenario-oriented, "as a service" solutions is enabled by the Sogeti High Tech platform that harnesses artificial intelligence (AI) enabled by the cloud and developed with partners such as Intel and IBM.

Use cases available today include:

An AI system enables robotic arms to repeat tasks when a digital worker technician physically guides the arm and demonstrates the action required the first time. This is enough

for the robot to immediately learn and understand the 3D space it is working in and the position of objects and people. The robot can share the task with other machines on the network, and learnings are also shared between units as the task is performed and perfected.

- An aerospace firm has integrated a Sogeti collaborative robotics solution into its test bench workflows, running simulations and tests on aircraft and helicopter controls faster than any human worker.
- For systems needing to be tested under various conditions, perhaps with multiple switches in different on / off combinations, a robot can adjust the switches while the digital worker monitors the results from their workstation and makes adjustments as required. Using the robot accelerates the process and the human operator is spared the repetitive strain and associated risk of intervening in the test themselves. This is particularly beneficial inside hazardous environments.
- Even the testing of mobile applications can be improved by using a robotics solution to simulate the actions of an end user while the digital worker monitors system performance and connectivity.

A natural gas transmission system operator used the Sogeti Digital Worker solution to streamline workflows and cut paperwork. Each time an operator went out to work on part of the pipeline, their manager would prepare a print-out of the specific workflow steps that should be followed. Newcomers often found these directions difficult to follow and so risked making a mistake. The company worked with Sogeti to create an application that allows managers to create a software simulation of the workflow, instead of writing it out on paper.

Now, the manager can send this simulation to the operator, who views it on their mobile device as they carry out the work, following along step-by-step. The manager can also supervise the work in real-time, providing an extra layer of support for field workers to ensure that the task has been completed accurately and to a sufficiently high standard. As a result, lead time for complex maintenance operations performed by a typical pair of field operators has been reduced from one full day to half a day, allowing twice as many operations to be performed per month.

Sogeti first helps manufacturing customers understand the value of robotization for their specific use cases through its consultancy services. Then, through its framework of assets and solutions, Sogeti shares its learnings with customers resulting from many years spent undertaking hundreds of real life robotics deployments.

Cognitive APIs allow the Sogeti High Tech platform to connect modular operational software and data analysis solutions and unify them to create a centralized and transferrable 'skill set' that is not locked into a particular robotic device. This intrinsic skillset can be deployed anywhere and at any time. Seamless IoT connectivity also enables continuous monitoring of the machine's condition and security, as well as the safety of its human counterpart, where appropriate.

02. Improve Efficiency in Maintenance and Operations

Whether they're checking on a piece of equipment in a large factory or fixing a piece of gas piping in a remote forest, field workers spend a lot of time on the move. Often they are miles away from their office and colleagues, meaning they must have all the information they need with them wherever they go. Traditionally this meant carrying a heavy laptop with a satellite phone and/or lot of paperwork in the form of records, guidance and reference materials. They also need to create a clear record of any maintenance they carry out, which means going back to the office and typing up scribbles, fleeting memories, and paper notes made on-site.

These manually intensive processes create inefficiencies and frustrations for workers, and increase the chances of errors or multiple trips to the same site, especially if the field worker does not happen to have predicted exactly the information they needed before they left for a job.

A digital worker equipped with a connected mobile device such as an Intel® technology-powered tablet or 2-in-1 device can overcome these issues by accessing whatever system, database or application they need, exactly when they need it. They can then make all their notes and reports directly into the right application and so remove the need to type up their paperwork later. The solution therefore enables the organization to:

- **Ensure digital continuity** by easing the interaction between design and/or engineering teams and the plant or field operators
- **Streamline quality inspection** by enabling managers to compare “as designed” scenarios with “as built”
- **Enhance on-floor manufacturing processes** with richer and more in-depth recording, producing more enriched and optimized activity data
- **Ensure traceability** and access to documentation on the floor
- **Secure and monitor critical operations** by allowing managers to supervise complex workflows while minimizing the number of personnel on-site

03. Improve Accuracy and Reduce Risk

Even the most highly skilled worker sometimes faces challenges. If working on a particularly complex task or following a new workflow, they may need to check their progress from time to time and ensure that, if any mistakes are made, they are rectified at once and not left to cause bigger problems later.

By integrating AR into the manufacturing process, organizations can help these operators stay on track and avoid mistakes. In 2017, Capgemini announced it had joined forces with DIOTA, the European leader in AR software solutions for industry, to offer AR services as part of its Digital Manufacturing offering. Thanks to this partnership, Sogeti High Tech developed a solution that uses AR to project schematics and guidance onto an asset that an operator is working on. For example, when a worker performs maintenance on a reactor, and to ensure every action is carefully monitored, his team can project a digital mock-up of the reactor on top of the actual equipment, and highlight next steps in real-time, right down to the specific hole where a screw needs to go. Actual real-time engineering data feeds these activities, leaving minimal margin for human error.

Manufacturing organizations can use the Digital Worker solution to enhance accuracy and mitigate risk:

- **Simplify complex assembly processes** and reducing delays or complications caused by mistakes
- **Locate, track and guide** field operatives in dangerous areas

04. Facilitate Communication and Collaboration

When working on large-scale manufacturing projects, timing is critical. Production deadlines must be met, and downtime must be minimized. This means that if an operator has a question mid-workflow, he needs the answer as quickly as possible. When the expert with that answer is in another building, or even another country, time can be lost in going to find them or hoping to catch them near the phone.

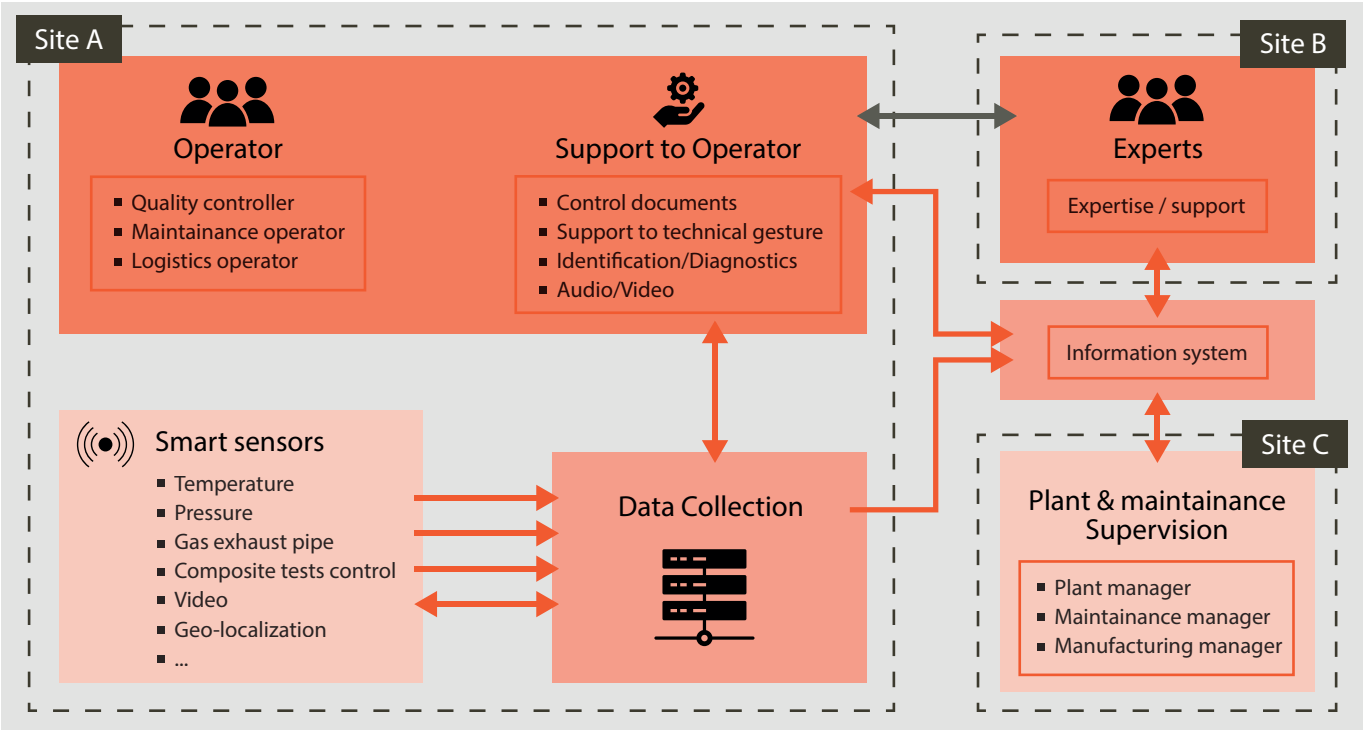

Figure 1: The Digital Worker ecosystem

Using a combination of cameras and supervision and communication applications, Sogeti can empower dispersed teams to work together as one. Remote assistance solutions enable remote experts and managers to share pictures and documents, and even to use live-stream video and AR or VR capabilities to demonstrate complex tasks to colleagues anywhere in the world. With these advanced collaboration capabilities, they can:

- **Provide remote assistance** for field workers from back-office experts
- **Secure complex and/or non-recurring procedures** in-situ
- Improve **operational traceability** enhanced with media content
- Improve **guidance and geolocation** for field workers
- Provide **training** to newcomers or support **ongoing learning and skill improvement** by displaying workflows and procedures in-situ

Technology Building Blocks

The Sogeti Digital Worker is a flexible offering, made up of a number of technology components that can be deployed and combined as needed to create the bespoke solution to best suit your business. Some of the core components include:

- EWOK (Embedded Wireless On-field Kernel): This gateway connects the field worker to their work environment and the network. Sensors positioned on the worker, and those measuring ambient data such as pressure, temperature and geo-location, pass the data they collect to the EWOK card. The EWOK is powered by Intel® IoT Platform elements, which are optimized for low power high utilization IoT use cases.
- ARHWIP (AReva Hybrid Wireless Platform): The heart of the system, the ARHWIP device connects to sensors and EWOK gateways to centralize all available data and connect it to existing systems and applications. The 'master' ARHWIP device is supplemented by additional 'extender' ARHWIP devices to help scale the Digital Worker solution across multiple sites.
- ARA-AREVA: This remote-assistance software module underpins multiple maintenance, testing, training and remote support usage models, using data pulled from the ARHWIP.

The solution also leverages strategic investments that Sogeti has made in AR and VR. In addition to providing solutions running on tablets and smartphones, we work closely with Intel and other ecosystem players to ensure all hardware and software elements of the Digital Worker solution are available to support virtual networks that will power tomorrow's manufacturing industry. New features now available include "free hand" Digital Worker solutions.

Interested in learning more about Digital Worker solutions?

Capgemini, Sogeti and Intel are ready to help you jumpstart the implementation of digital manufacturing strategies for lasting competitive advantage. Get started with a workshop or a meeting today!

Learn more about the Digital Worker solution from Sogeti: http://www.sogeti.com/digital-worker

About Sogeti

Sogeti is a leading provider of professional technology services, specializing in Application Management, Infrastructure Management, High-Tech Engineering and Testing. Working closely with its clients, Sogeti enables them to leverage technological innovation and achieve maximum results. Sogeti brings together more than 20,000 professionals in 15 countries and is present in over 100 locations in Europe, the US and India. Sogeti is a wholly-owned subsidiary of Cap Gemini S.A., listed on the Paris Stock Exchange.

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