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Experience of World-Class Electronics Manufacturer Validates Workflow Automation

Factory control automation strategies have changed significantly over the last two decades for a world-class electronics manufacturer with global operations. For individuals on the frontlines of implementing automation technologies, the path has not been without its bumps. In the 1990s, the goal was stability; this was achieved through what seems today like rudimentary technology: photo labels, paper logbooks, manual data collection, and paper SPC. Stability gave way to controllability as a strategy, with new tools including DOS logbooks, DOS key process output variable (KPOV) SPC, and Paradox databases.

The next evolutionary step was predictability, advanced by an array of new tools and techniques, including key process input variable SPC, Windows SPC, manufacturing execution systems, Windows logbooks, SECS/GEM equipment interfaces, Oracle databases, run-to-run control, advanced process control, fault detection, and recipe editors.

Predictability as a strategy was superseded by optimization, a phase marked by the emergence of real-time data, application integration, and for those in batch manufacturing, recipe management. Currently, optimization has evolved into workflow automation as a strategy, in which automated out-of-control action plans (OCAPS), paperless operations, RFID, business process management (BPM), back office integration, and yield management are indices.

The Evolution of Expectations

Almost a decade ago, a young manager in process engineering at one of the world's leading electronics manufacturers was on the company's original team charged with purchasing and implementing its first factory workflow automation system. He remembers the experience vividly:

"One of the things I asked for was a fully integrated system," he says. "I couldn't get it. Today, I can see that I was asking for the Holy Grail. The system has to be fully integrated, a system where everything can talk to each other. The company that can deliver that will be successful beyond their dreams."

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One of the first tasks of the original team was to look for an out-of-control action plan system (OCAPS); what was available on the market was inadequate at that time: promises made could not be kept on the factory floor. Now, nearly ten years later, the company has worked with Savigent to successfully build the automated OCAPS system it was seeking based on Savigent Workflow™ (workflow automation software).

"We learned that we needed to work with a company that has a flexible tool, such as Savigent with its suite of products," he says. "The flexible tool needs to talk to the different systems in the factory; this is especially true in high-tech manufacturing."

The company has numerous systems from different vendors: an SPC system from one company, a tool management system from another, a recipe management system from yet another. "Each one of these systems communicates differently," says the engineer. Since products from different vendors typically do not communicate well with each other, a flexible, modular system is needed to build bridges between the factory systems.
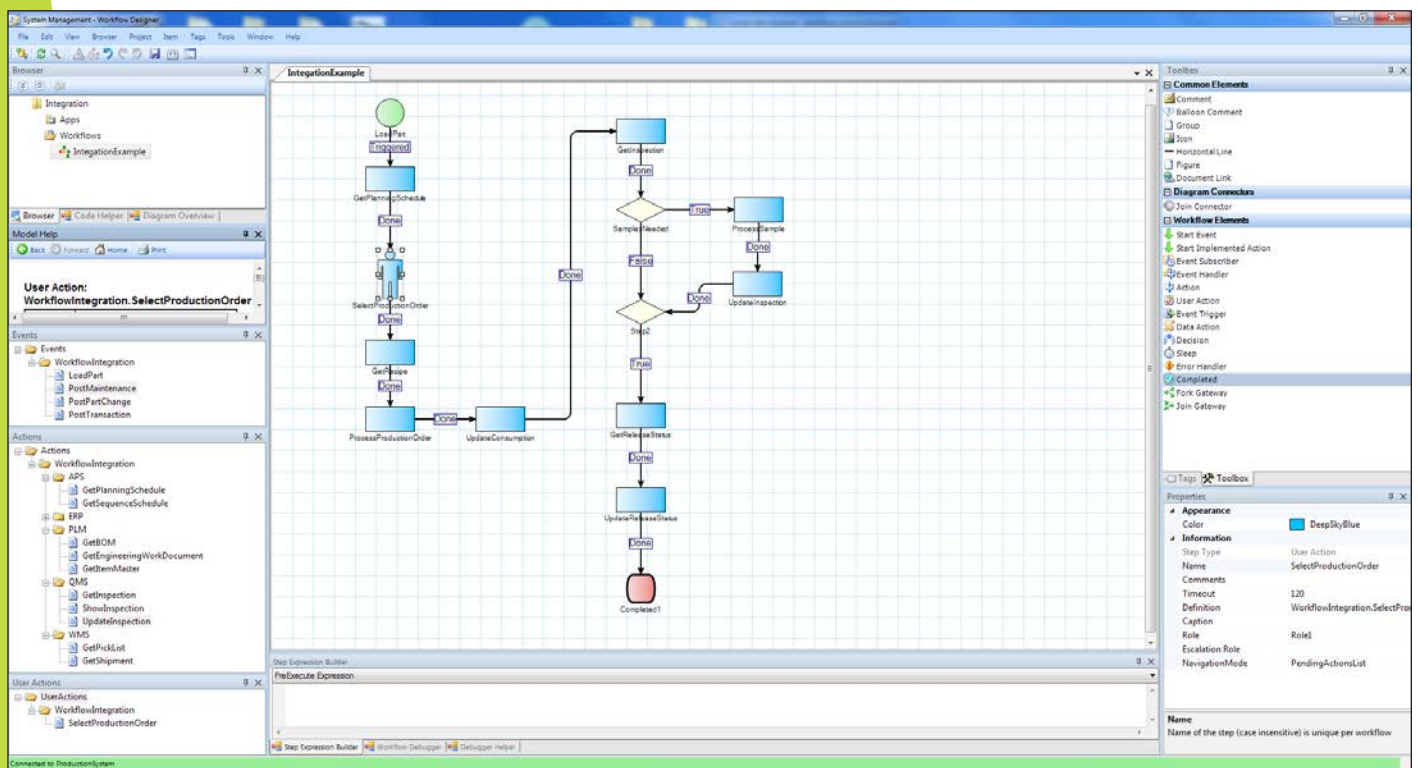
"That's what Savigent Workflow does for us," he says. "It is purposefully designed in modular blocks of functionality that can be arranged so that it can talk to products made by different vendors. Together, these blocks form a comprehensive, integrated workflow automation system. That's the strength of Savigent."

So the frustrated expectations created at the outset of this automation journey are now being met in the factories of world-class manufacturers.

Multiple Problem Solver

As an integral part of the overall factory system, Savigent Workflow has helped solve a range of problems for the manufacturer by automating processes. These include:

- ➤ Real-time analysis
- ➤ Custom diagnostics and documentation
- ➤ Request systems
- ➤ SPC/KPIV and OCAPS
- ➤ Standard routines

"The benefits we're realizing are huge," says an application engineer at the manufacturer. "This tool connects to all our systems. For OCAPS, as an example, we now have the capability to get data from systems throughout the factory to determine root cause."

He notes that Savigent Workflow's versioning capability is a huge advantage in helping manage growth. "One of the beauties of the system is that it can scale, not in terms of numbers of users, but in terms of capability," he continues. "Software that has the capability to run multiple versions of a workflow simultaneously is much easier to deal with in terms of transitions, migrations, and expanding system capabilities."

This feature is particularly important in high-tech manufacturing, where technological development ceaselessly accelerates and continuous improvement is imperative. "Without that versioning capability, we would have to shut everything down when making a change," he says. "Further, there is always learning involved in using a system like this, and learning results in changes. To be well-designed, the system must be able to accommodate changes that couldn't have been seen going into the project. Savigent provides the necessary flexibility to accommodate and manage change in a controlled manner."

Currently, the Savigent-based workflows integrate directly with manufacturing equipment, capturing information directly in real-time. They preprocesses data, and then send it to higher-level systems and other workflows. In addition, Savigent Workflow integrates directly with legacy systems, allowing the manufacturer to leverage existing functionality. It orchestrates activities and can act as a "wrapper" around legacy software, extending its useful life.

A number of important elements comprise a Savigent Workflow based system. When a system is completely built and running, it automates many pieces of work that would normally require some person's involvement. The system executes workflows, which look like and are assembled like a Visio diagram, except there is live code behind each of the symbols.

"Just as important, we wanted a system that didn't need IT experts to create workflows," says the manager of the company's factory controls group. "Savigent Workflow gives us the ability to have our engineering organizations build their own workflows, without a heavy dependence on IT."

Relationships and Results

While engineers and managers throughout the company have praised the Savigent product, they've also had positive things to say about working with Savigent personnel. "It's hard to overstate how effective our relationship has been," says the factory controls group manager. "They are very good to work with. They were able to use their expertise to quickly develop a solid design. The fact that they've been working with us for more than seven years is a testimony to our satisfaction. That is a value-add in itself: their familiarity with our organization is something we, and they, have leveraged to move this project forward."

The new system is what the factory controls group manager calls "business important." "It is making us significantly more efficient," he says. "We'll be able to have people working on things that are much higher value than what they've been chasing down in the daily workflow. Workflow automation frees up our people to do more, and better, work. In a high-tech manufacturing sector such as ours, it's essential to be improving continuously."

According to the manager, while the system is still evolving, the implementation of OCAPS, the request systems, and standard work automation has already shown a strong, positive ROI.