Borland®
THE OPEN ALM COMPANY

Siemens

FAST FACTS

Company
Siemens is an electronics and electrical engineering conglomerate with group revenue of 74.2 billion euros.

Industry
Manufacturing

Geography
France

Challenges
- Deliver on advanced quality & security requirements
- Standardize through developer-oriented modeling

Solution
- Borland® StarTeam®
- Borland® Together®

Results
- Increased flexibility and quality
- Improved product safety

COMPANY

Siemens is an electronics and electrical engineering conglomerate with group revenue of 74.2 billion euros. Siemens Automation & Drives (A&D) Division generates 9.6 billion euros for the company annually. Siemens A&D employs approximately 17,000 people with 4,000 in it Process Instrumentation (PI) sub-unit staff, 450 of which reside in France.

What is the connection between a machine-tool, a refinery and an incineration plant? It is the Automation & Drives systems of Siemens A&D – one of the most trusted and profitable of the 13 business units of this leading electronics and electrical engineering group, Siemens.

"As one of the 11 branches of A&D, the PI sub-unit (Process Instrumentation Analytics) delivers automated processes instrumentation, and is primarily focused on producing pressure, temperature, level and flow transmitters, valve positioners, and plant and automobile gas analyzers," said François Bille, project manager at Siemens Production Automation in Haguenau, one of the group's main PI production sites.

CHALLENGES

Deliver on advanced quality & security requirements

Before implementing a process on an automobile production site or testing a combustion gas, mechatronic device, it must go through a certification testing phase. "We carry out very extensive tests," said Bille. "Whenever a device is shipped to a petrochemicals customer, it is delivered with a certificate. For example pressure transmitters, which measure pressure changes according to temperature, must be certified to be accurate for measuring temperatures ranging from -40° up to +85°. In order to properly certify according to our standards, we need automated processes."

The hardware and software implementation underlying these test benches is developed internally and its use far exceeds the passive testing approach and allows for the integration of the specific adjustments required for each technical item in the mechatronic chain at the testing stage. To meet the diverse range of scenarios and reduce configuration and implementation costs, the development team of Siemens Production Automation implemented Siemens A&D's TIA-based (Totally Integrated Automation), innovative modular automation platform based on an IEEE bus ensuring communications between the different tools.

"Our team is responsible for implementing a test process monitoring software infrastructure via a component-based automated chain to collect, measure, analyze, and report data to the Production Department," explained Bille. For this purpose, each type of tested material has its own specific test application based on common underlying components. The framework encapsulates the lower communication layers, which is the IEEE bus, and the hardware components of the test chain.

Standardize through developer-oriented modeling

Devices have their own industrial protocol to remotely set and retrieve measures. Those protocols were first modeled based on common items, then supplemented with the devices' specific controls. "We have a standard set of APIs providing for a higher level of abstraction. For example, we can define the settings of a scanner-type object without going through the protocol aspects, whatever its manufacturer. This allows us to monitor equipment changes by easily modifying any object to ensure the application's continuity of service," explained Bille.

Siemens

> "We have long focused on getting products to market quickly, opting for improvements through later iterations of a product. We now work on quality, lifecycle-wide traceability and load increase by leveraging tools to refocus on quality. Our close relationship with customers allows us to offer fast corrective iterations. Borland StarTeam and Borland Together help us serve this purpose."
>
> — François Bille, project manager at Siemens Production Automation

SOLUTION

With a heterogeneous skill set in the development team, the company needed an out-of-the-box solution. "Borland® Together® came as an ideal solution with its easy-to-use capabilities such as reverse engineering, which allowed us to gradually improve the existing code via rapid and simple views and allowed us to better document applications," explained Bille. Borland Together also allowed for the gradual replacement of the existing PCI Basic code. Bille stated, "By converting PCI code in C++ pseudo-code to be parsed by Borland Together's syntax analyzer, we have a better understanding of the architecture and can retrieve function names for a simplified migration."

For developers who have had no UML® training, its pragmatic use, based on sequence and class diagrams and use cases, meets their core need to improve productivity. "As a next step, we will focus on making our requirements management process more formal than simple word processing to improve traceability. Indeed, the vast majority of our problems stem from this upstream phase, as we often develop capabilities that are not used to develop required features." Bille stated.

Code-Centric Development Process

The team generates about 20% of the C++ code from diagrams, including comments, after adjusting various templates.

"However, too much significance should not be placed on this, since the components we develop are not yet shared among our different teams (e.g. Transmitters & Plant Gas Analyzers teams). In terms of code reuse, there is no common basis, as our businesses are slightly different, although we tend to share certain rules, libraries, or GUIs," stated Bille. The pooling is carried out via Borland® StarTeam® hosting each team's project assets and common resources. Borland StarTeam is used for source code management and as a centralized change request repository for bug tracking, forums and for task assignment. "Borland StarTeam brings us visibility that did not exist with our previous system," stated Bille.

RESULTS

Increased flexibility and quality

After 4 years, the team is still finding new opportunities to leverage Borland in their application lifecycle management process. "We're constantly looking for ways to speed up our development cycles. It's a challenge, because our products change a lot," stated Bille. To avoid re-inventing the wheel, the company must have easy ways to adjust and reuse existing hardware and software solutions while maintaining the level of flexibility they need to accommodate change in their environment.

Siemen's ALM processes must support the company's hardware and test bench processes, as products are often enhanced to extend their sellable life in the market. While new versions of their products may be launched every other year, equipment is in operational maintenance (e.g. replacement of defective items) over a period of 10 years, implying that test benches must be traceable over time.

"We have long focused on getting products to market quickly, opting for improvements through later iterations of a product. We now work on quality, lifecycle-wide traceability and load increase by leveraging tools to refocus on quality. Our close relationship with customers allows us to offer fast corrective iterations. Borland StarTeam and Borland Together help us serve this purpose," added Bille.

Improved product safety

The certification documents generated directly from the metrics returned by the test bench play a key role. These Borland generated reports and the Firebird database ensure that Siemen's devices, even defective or worn-out devices, will not create a danger for customers that have them in use.

Borland is the leading vendor of Open Application Lifecycle Management (ALM) solutions - open to customers' processes, tools and platforms - providing the flexibility to manage, measure and improve the software delivery process.