

PAS sets out to map the 'Automation Genome'

PAS sets out to map the 'Automation Genome' Process automation users increasingly find themselves between the Scylla of growing complexity and the Charybdis of diminishing resource. OK, pretentious, but at least rather less cliché ridden than a rock and a hard place!

On the one hand typical measurement point counts have grown from the thousands of the mid-'60s to the hundreds of thousands of today's typical plants and are set to make a further potential order of magnitude leap with the advent of wireless, while the system and applications which manage and exploit them are accelerating in terms of their proliferation, sophistication and integration.

Aging workforce

On the other stands an aging workforce, backed by increasingly constrained resources, diminished by relentless downsizing and preparing to take their knowledge and understanding with them into retirement.

As a result, says Chris Lyden, until last year VP of Global Marketing at Invensys Process Systems but now president of Houston-based process software house PAS, "It is becoming untenable to manage safe and reliable production without help."

But process companies' vulnerability doesn't lie just in their ability to continue to maintain and operate their automation assets. "We believe, and our customers agree," says PAS founder and CEO Eddie Habibi, "that automation assets contain production knowledge in how you make products." Indeed they have strategic value which exceeds by many times their original cost, embodying as they do the IP relating to how their owners make their products, the proprietary techniques which give them competitive advantage and the means by which they fulfill their environmental and safety responsibilities which represent their 'License to Operate'. As a result, says Habibi, "Automation assets are worth more at their end of life than the day they are installed."

Extracting that strategic value from a plant's automation assets in a form which will protect the operating company's intellectual property and enable it to continue to do business as its current experienced workforce disappears into the sunset or to recover from a more abrupt catastrophe, is a challenge which Habibi compares with the mapping of the human genome. Indeed in some ways, he argues, it's even more demanding. Unlike those of organic life forms, he argues, 'automation genomes'

– the 'genetic structures' of DCSs, PLCs, historians and applications – interact with each other as a result of integration and are continually evolving. As a result they overwhelm conventional 'as built' documentation, version control and change management tools.

TDC 3000

PAS has been addressing this problem almost since its inception in 1993 and originally through its development in the mid 1990s of the DOC 3000 solution for Honeywell TDC 3000 systems. DOC 3000 was developed in response to the needs of users who found that they were spending as much as 10 or even 15% of their automation budget imply understanding their existing systems.

By treating complex integrated systems as single entities and mapping their signal genealogy both within and across traditional boundaries, DOC 3000 enabled users to document their existing systems in block diagram form and hence extract and maintain the proprietary intellectual property embodied in their automation assets.

What about us?

Pretty soon users of other DCSs, notably Foxboro I/A, had caught wind of DOC3000's capabilities and were approaching PAS with requests that they develop solutions for their own systems. However, by 2001 the company had recognized that, rather than reinventing the wheel for each new system, what they needed was a generic solution. The latest evolution of that concept, due for launch later this month, is known as Integrity and is claimed to map the 'automation genome' without human intervention. To do so it aggregates the data from the many disparate systems in a typical plant across the plant network and into a common system where the resultant information is contextualized by automatically identifying relationships and hierarchies, tracking changes and spotting what Habibi calls "genetic defects" – configuration errors to you and me. The objective is to simplify highly complex systems through normalizing and visualizing the disparate data. "It goes beyond visualization," says Habibi who claims that it is "a step change which is not too dissimilar to the DCS itself."

Integrity adopts a structure in which modules are built on a framework of common services and functions which aggregate and contextualize the data, capturing and archiving the knowledge from the various plant information sources, mapping the genealogy of the data flow and providing search and query and reporting services. Integrating with that framework, the Integrity Genome Essentials module provides the basic Integrity functionality, organizing the data into tree structures,

exposing the automation references such as DCS and historian tags, creating the block diagrams describing the automation relationships and tracking configuration changes and defects.

The Advanced Elements module then goes a stage further, providing, for example, a spares management capability, backup and disaster recovery, loop sheet drawing by interacting with Intergraph InTools and, extending the concept from automation to plant assets, providing insight into S88 and S95 plant configuration and correlating plant asset and automation asset data.

Despite these essentially automated functions, however, arguably the most important capabilities are those provided by the Collaboration module which aims to capture the empirical knowledge currently stored in the heads of engineers and operators. In essence it allows users, depending on their access level, to contribute to and edit the plant knowledge. Thus they can import information into the automation genome database or attach short notes to any asset or data object. Video and audio files can also be added and subsequently searched while tagged emails can be aggregated, contextualized, searched and shared. Similarly 'subscribers' can be notified of changes by email, webpage or pager and there's a data mining facility and an Amazon-like "You liked this, you might like these" smart guide.

Asset Models

Key to applying Integrity's generic approach to the real world of a specific plant are some 50 'Asset Models', each of which provides the specific user interface to a particular automation system, supporting the capture and aggregation of the data from it and converting it to a common data format for the Integrity database. These asset models don't just support control system assets from all of the major DCS, PLC and safety system vendors but pure software assets such as historians, SCADA/HMI packages and asset management systems as well as less automation specific applications such as Microsoft Office and Sharepoint.

According to Habibi, PAS has had little difficulty conveying the value of its approach to working control engineers with the result that it has a total of 800 instances of earlier versions of its solution in use, mapping the genome of some 3500 systems. His aim now is to "gain traction with other disciplines beyond automation" and sell the overall concept to management who, he suggests, "want to know the overall health of their systems."

Alliances

Automation vendors themselves have also not been slow to appreciate Integrity's capabilities. PAS has had a long standing alliance with Honeywell, currently focused on the Integrity derived DOC 4000, while most recently it has announced a formal agreement with Chris Lyden's former colleagues at Invensys Operations Management. That followed a nine-month pilot of the solution at IOM which now plans to integrate it into its project delivery operations and to offer Integrity to customers as their final, asbuilt documentation. IOM VP of Global Strategic Alliances Marty Kurowski believes it "will help us to deliver higher-quality projects worldwide at reduced risk for our customers while improving our delivery and customer satisfaction."