

Information Integration: Operational Excellence for the Enterprise

Empowering System Integrators to
Deliver Real-time Enterprise Solutions



PLUS

The Information Empowered Enterprise:
Driving Operational Excellence

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Integrated Development for IT
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A SUPPLEMENT TO

CONTROL ENGINEERING

The Information Empowered Enterprise: Driving Operational Excellence

The future is built on the past, a truism profoundly relevant to operational excellence in manufacturing, according to Dr. Peter G. Martin. “You can only know where you need to go by understanding how you got where you are,” says Martin, vice president of strategic ventures for Invensys.



Dr. Peter G. Martin

Martin sees himself as a futurist, but one solidly grounded in the legacy of the past. He's been engaged in peering over the horizon while simultaneously gazing back to the past for over 20 years. This provides him keen insight on developments at Wonderware, an Invensys business unit, regarding its recent release of InTouch 10.0 HMI, the most significant upgrade ever to the world's most widely deployed HMI application; concurrently with release of the System Platform 3.0 software, the Wonderware integrated industrial computing platform. They have great significance, he asserts, as a pivot point between the past and the future.

Of the present, Martin asserts “we have skilled professionals and experienced labor that know more about plant operations than anybody else in the enterprise, but we're not treating them as business performance managers. There's a huge gap in the way enterprises are organized — and that gap represents huge potential for performance improvement.”

What's required is redefining operational excellence — and subsequently delivering the systems and tools to empower all workers to be more effective performance managers. In the modern global enter-

prise comprised of multiple facilities around the world, this means having a standard platform deployed in all plants. A standard platform that enables greater collaboration across what are now deeply siloed domains and widely dispersed geographic locations. Only then can organizations begin to achieve greater operational excellence at lower costs, with increased agility.

Perfect Storm

How we got where we are, Martin posits, is the result of a perfect storm that has been brewing since formulation of “modern” 19th century scientific production management practices anchored in task and role specialization and greatly aggravated by late 20th century capital market and enterprise political pressures. The result, he argues, has been a very limited and constraining view of operational excellence. “With the reality of global business today, where everything moves much faster, the traditional view of operational excellence isn't good enough anymore,” he states.

Frederick Taylor's model for organizing functions of production was to specialize every role. Labor was largely uneducated and unskilled so a worker was trained merely to per-

form one function; i.e. turn a wrench or valve. It is a mindset perpetuated throughout the last century all the way up to specialized education at the university graduate level, such that we don't just have engineers, but multiple, specialized versions of engineers. In contrast, today's workers are universally educated; and professional staff are educated to the point of having very myopic views of the business. "All has resulted in highly siloed, islands of *organization*, where groups don't — and *can't* — talk to each other," Martin says. "You get operations people, control engineers and accounting together in a room and they can't communicate because they don't speak the same language."

Irrational capital markets fostered by the dot com bubble in the 1990s, resulted in focusing too intently on shareholder demands. This, coupled with shareholder lawsuits over management malfeasance increased the power of corporate boards, shortening the window executives are given to produce results. "CEOs have shorter tenures now than ever. In 2006, 27 percent lost their jobs in the first year. The only way to show results in that time is to cut jobs," Martin says.

What's required, Martin asserts, is a different way of thinking. "We need to rid ourselves of the old labor mindset and empower front line workers as performance managers by giving them the tools they need to become just that. We need

to collaborate more broadly in the organization. And we need to align strategic, business and operational metrics to achieve faster results. The only way we can do that is if they're all based on real-time — the speed at which the plant operates," Martin states.

What You Measure is What You Get

"If you can't get these three domains aligned, you'll have measures that destroy value rather than create it," Martin says. The problem traditionally has been that strategic excellence is measured quarterly, with business excellence monthly. "But the speed of business has accelerated. Strategy has to change more frequently to be effective."

The only way to do that is to model strategies at the real-time control layer to ensure total alignment to the real-time metrics driving all three. "With real-time performance measures across all three, KPIs reflect how behavior impacts operations, business and strategy. When the strategy changes, everybody gets new priorities. When it shifts from being about cost to production, you start measuring throughput. Everybody is collaborating around the right metrics," Martin says.

"The most critical enterprise best practice is measuring business performance the right way — allowing everybody to collaborate together in running the business. This makes them all business performance man-

agers. This is what creates agility."

Wonderware has always been effective at what it does, Martin says. "But System Platform 3.0 Software pulls all of the ArchestrA architecture capabilities together and puts them in a common data connection set so enterprise operational excellence can be achieved. It's added next-generation vector-based graphics so images can be easily scaled to fit any display, down to the smallest panel. Wonderware has always delivered great technology — but these new releases are about delivering technology that supports business processes and true enterprise performance excellence," says Martin.

"Empowering operators on the plant floor enables them to create a lot of value very quickly... and it only keeps building," he asserts.

The robust flexibility of System Platform 3.0 software makes it easy to engineer and manage development of standard operational metrics for strategic, business, and operational performance, and streamlines their deployment across multiple locations. As business strategy changes, as best practices evolve, new metrics are likewise easy to develop and deploy.

"Empowering people to be performance managers rather than just operators — in today's global world, that's true operational excellence," Martin says. [WW](#)

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All Together Now:

Integrated Development for IT and Automation Applications

All issues critical to single-plant system viability become exponentially more critical and interdependent with global plant system rollouts. Complex technical issues – from design, to integration, development, deployment, change management, and system sustainability – are greatly compounded, challenging the achievement of desired performance improvements across the extended enterprise.



Rashesh Mody



Steven Garbrecht

With System Platform 3.0 and InTouch 10.0 software, Wonderware has stepped up to the challenge by creating one common underlying integrated development environment to address all these factors with consistency, flexibility, and efficiency. Wonderware Development Studio, built on ArcestrA technology, supports developing and maintaining both System Platform 3.0 software, the company's industrial application services platform, and InTouch 10.0 software, its HMI visualization product. Additionally, the Wonderware Development Studio delivers loads of new tools and enhanced capabilities for greater ease and accelerated development, deployment, and extension of industrial automation and information applications.

"The Integrated Development Environment within the Wonderware Development Studio is where you define, develop and modify everything, starting with the common plant model, all object templates, and new vector graphics,"

says Rashesh Mody, vice president of the Wonderware HMI/SCADA business. "Both System Platform 3.0 and InTouch 10.0 software are standalone products — but joined together, you get significant additional benefit," with InTouch 10.0 HMI becoming the visualization client to the System Platform 3.0 software server — both built on ArcestrA technology. The Wonderware Development Studio is the centralized development, maintenance and networked deployment environment for addressing all user needs, including engineering, operations, and IT.

Plant Model is Core

"The plant model is central. It's where you depict the way the plant is laid out and where you view the entire enterprise," says Steven Garbrecht, Wonderware marketing program manager for platforms and SCADA. "The abstracted model is built-up using standard object templates." These are based on stored library elements that are re-used

to assemble application functions, equipment, graphics, alarms, messages, I/Os, KPIs, calculations, interfaces, and IT hardware — in essence, anything that can be represented and modified as a template. Scripting capabilities enables developers to uniquely configure and extend functions in one central space that subsequently are deployed as multiple instances with unique behavior across the enterprise. The common plant model provides a single consistent definition of physical equipment, data acquisition and processing, MES operations, process graphics and alarms.

“In the past there was typically a clear delineation between development and runtime execution,” says Garbrecht. “Now, when using the System Platform 3.0 software with ArchestrA technology, it’s blurred. Now, you can develop a template, drag and drop it into the System Platform 3.0 software model, right click, and it automatically binds to the runtime environment — without developing any code to connect anything. That’s the beauty and power of it,” he says.

The new development environment also makes it easy to embed Microsoft .NET controls to extend the application, with server side, managed code — something that was more cumbersome before, with earlier client side, ActiveX controls. Fluid, flexible encapsulation now empowers a straightforward hierarchy of embedding .NET controls within scripts; scripts within object templates; and the standard templates within the plant model. The encapsulation of all this power in a single standard template is then available for centralized deployment across multiple sites as instances that inherit all attributes and characteristics of the standard template within the model.

The dynamic power of the common plant model moves well beyond simple tag databases of traditional HMIs, resulting in improved development productivity, engineering reuse, and reduced lifecycle costs.

The Power of Templates

Standard templates can be custom configured for individual plant sites by using scripting capabilities in the Wonderware Development Studio. As best practices emerge from any individual plant based on custom configurations, or arise from site-specific objects developed to investigate and monitor isolated processes, those custom configurations or extensions can be added back to the standard template and model, and subsequently redeployed to all sites as the new standard template. This greatly simplifies maintenance management and extension of the central model with enforced consistency and economy of effort across the enterprise.

A significant benefit of the new vector-based graphic templates are that they are resolution neutral. This makes them eminently scalable with complete fidelity, from wall panel displays down to hand-held devices. The Wonderware Development Studio comes equipped with a symbol library of graphic elements as well as graphic primitives.

Every graphical element can be edited with ease. Every attribute can be individually animated. The complexity of graphical-display richness is simplified at the same time that screen presentation control is amplified, adding dynamic morphing of any element via gradient color change or resizing as critical importance increases. This adds contextual intelligence to graphics.

“All graphics have intelligence

behind them, with the graphic and associated application logic now together in the graphic template,” Mody says. “If you want to change the graphic, you change the standard template and it gets propagated across all deployed instances.”

Centralized Power and Control

Through the power of the Wonderware Development Studio, System Platform 3.0 software and InTouch 10.0 HMI provide an industrial-strength technology infrastructure that delivers critical domain services. These include:

- Robust, reliable, real-time, peer-to-peer communications with no additional engineering
- Microsoft Windows security extended to the physical equipment layer
- Inherent fault-tolerant reliance without additional hardware
- Fully distributed, comprehensive alarm management
- Common name space for simplifying information integration
- Easy import/export migration and integration to legacy systems
- Centralized control of host computers with powerful diagnostics

“The Wonderware Development Studio is used to establish comprehensive standards for assembling common templates for driving consistency across the entire enterprise,” says Garbrecht. “It unlocks the potential of collaborative operational performance through one common means of integration, pulling everything together and providing better coordinating of development, maintenance, and extension of all applications. It enables you to get started today — and change and extent your system tomorrow to be more agile and responsive to changing competitive pressures.” *WW*

Unquestionable Quality:

Inside the Wonderware System Platform 3.0 & In Touch 10.0 HMI S.I. Beta Program

In bringing to market System Platform 3.0 and InTouch 10.0 software – representing major advances in the integration and power of its industrial application platform and HMI visualization systems – Wonderware placed considerable value on ensuring superior system quality. Similarly, it sought to build a solid base of domain expertise among system integrators (SIs) to ensure their successful launch. To achieve both objectives, Wonderware enlisted a cadre of capable SIs earlier this year to put the new products through rigorous, comprehensive Beta testing.



Wade Harsy

“Systems integrators have much broader experience than end-users in applying the products in many different ways,” says Wade Harsy, president of **IPACT**, a factory automation SI based in Valparaiso, Ind. “It was an opportunity for us to provide a lot of feedback that ended up in the product that will help Wonderware be effective in hitting the market with the best solutions possible.”

Participation represented “a significant investment, a couple of man-months in time,” says Mike Peters, account manager at **Aseco Integrated Systems** of Oakville, Ontario, Canada. But it was an investment — and opportunity — well worth the time.

“The beta environment gives you an opportunity to perform deeper exploration of the application without the time constraints of a customer project, where you can fully investigate new and better ways of doing things,” says Brian Fenn, technical manager of **Advanced Automation**, a global SI located in

Exton, Penn.

By all accounts, the opportunity grounded the SI participants in both expertise and confidence in the new products. General consensus: “The new releases represent a huge leap forward along a variety of fronts, enabling us to do more with greatly reduced efforts,” says Peters.

Stellar Richness

The list of enhancements to both systems earning praise is extensive, but several key elements consistently stood out among participating SIs. Chief among these include

- Tighter integration between System Platform 3.0 and InTouch 10.0 software, enabling centralized development and deployment, as well as streamlined change management
- New vector graphics with embedded intelligence enabling fluid scalability and greater multi-dimensional display
- Embedded Microsoft .NET controls for more efficient and dynamic application development



Brian Fenn

■ More comprehensive troubleshooting diagnostics

"To me, the biggest improvement is that the two products are more tightly integrated. Before you had to develop an element in both systems and then build a link between them," says Fenn. "Now if I'm developing a graphical element, I simply create it in the System Platform 3.0 software and drop it into InTouch 10.0 HMI. I don't have to manage two distinct elements to ensure alignment."

Says Mike Grasley, director of consulting for Aseco: "The Wonderware Development Studio enables engineering and development to work in a single environment all the time, rather than hopping back and forth. System Platform 3.0 software is orders of magnitude more powerful than the traditional approach, enabling SIs to be more productive, resulting in customers getting more value."

The new vector graphics capability received high praise from all participants as well. "One of the problems with the old graphics was that when you tried to scale them from the original design, things got funky," says Harsy. Says Dean Ford, director of enterprise application for St. Louis-based **Maverick Technologies**: "As new mobile technologies pick up, you can develop a graphic once and deploy to any screen, including those on handheld devices. That's huge."

Additionally, scripting of intelligence embedded in a graphic object creates smart symbols that are easily deployable and re-usable. The new graphics also convey a lot of information quickly. For example, changes in underlying conditions will dynamically change the graphic display, causing elements to change color, but also grow in prominence

— clearly alerting operators to take action. "We're going to see development of some very interesting, complex screens, with multiple uses of InTouch symbols, buttons and lights that were extremely difficult to create before," says Harsy.

The rich world of Microsoft .NET Windows controls has also been fully tapped, enabling them to be easily embedded behind all applications without reverting to ActiveX features, which was time consuming and cumbersome. "You can now natively interact with .NET controls without having to jump through hoops," Harsy says. Common in many MES applications, they're now readily available for SCADA implementations as well.

"Another really big thing for us is diagnostics for troubleshooting," says Ford of **Maverick Technologies**. "When testing an application in our office, we can easily eliminate everything in the model design and configuration except field problems." Now, explained Ford, instead of having to run through a score of possible root causes, new diagnostic features automate much of the effort.

Better Product - Better Value

"We're extremely pleased with the whole suite," says Brent Humphreys, MES system engineer for St. Louis-based **Stone Technologies**. "Everything is simpler, quicker and easier."

All of this translates into significant benefits for SIs seeking to deliver the greatest value in the shortest time to their customers. But beyond the new system features and capabilities, participation in the Beta program delivered sizeable intangible benefits to SIs, end users, and Wonderware as well.

"It provided us with greater depth of knowledge of the new products, where we'll be better able to execute our work," says Fenn of Advanced Automation. "It gives us peace of mind in understanding where Wonderware is going; and gives Wonderware peace of mind knowing they've got capable SI partners implementing their systems. That close tie assures customers that they've got a seamless team focused on providing the best value."

Increased knowledge and confidence in the new solutions were widely viewed as big benefits of participation. "We work with customers in developing roadmaps for new technology adoption," says Grasley of Aseco. "Having gone through the learning curve already, we can speak confidently about the implications of the new technology and put any concerns customers have to rest. We don't have to wait for the solutions to come to market. It helps differentiate us as leading edge."

Says Ford: "It enables us to hit the ground running to deliver those first early-adopter projects that will foster overall faster adoption."

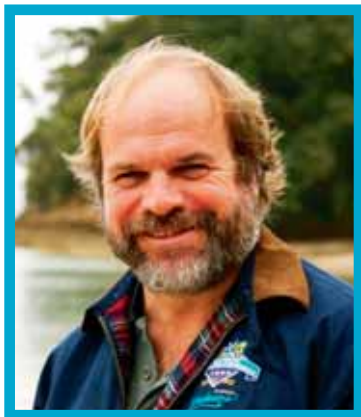
Humphreys states that Stone Technologies was able to incorporate the new capabilities in one customer's project plans before the products were even formally available. "It allowed us to leverage the technology well ahead of the market. We were able to include and InTouch 10.0 software during the design phase. This enables our customer to gain the benefits of using these new applications that much sooner, keeping them on the cutting edge." [WWW](#)

Standardization for Multi-Site Implementations: Best Practices for Multi-Site Rollouts

While globalization has made the world much smaller, it has concurrently become more complex. There are greater pressures to reduce costs and improve agility by increasing collaboration across the plant and the global enterprise. These market pressures exhort corporate executives to manage their extended enterprises not as a collection of disparate operations, but as one unified entity. This necessitates common metrics for measuring operational performance to derive universal best practices that can be deployed and replicated globally.



Mike Grasley



Tim Sowell

The individual plant-system *project* approach of the 1990s has morphed to embrace multi-site global rollout *programs*. “The sheer size of global system deployments make them risky — unless you manage them properly with technology that can support them,” says Mike Grasley, director of consulting for **Aseco Integrated Systems** of Oakville, Ontario, Canada.

Says Don Ulrich, president of **Stone Technologies**, a St. Louis-based system integrator: “A key challenge in rolling out systems to multiple facilities is getting every plant to feel its requirements have been heard. And that they understand how the whole system deployment will benefit them. If you don’t, it can get ugly quickly.”

Key, says Tim Sowell, vice president of Wonderware product strategy, is “to understand that it is a *discovery* process. You need a system architecture that enables you to go down the discovery path, starting small in getting some application functionality out there, validating and reaping benefits quickly. You

need an architecture that can be easily extended to capture best practices so they can be deployed across all plants. You have to manage it from Day 1.”

Object-based Modeling

“The ArchestrA technology-based System Platform 3.0 software approach enables you to model the plant and all your requirements with object-oriented templates, allowing you to build libraries of applications that can be easily extended and re-used,” says Wade Harsy, president of **IPACT**, a factory automation SI based in Valparaiso, Ind. “It enables you to deploy common objects that have common facilities across multiple sites. It certainly makes it scalable. The platform’s abstraction level is its greatest strength.”

The plant model is at the heart of the System Platform 3.0 software architecture and power. It provides the foundation for capturing the physical description of the global manufacturing enterprise within standard object templates. More significantly, it powers them with

all the intelligence they need by embedding intelligence directly in the templates — all application logic, security configuration, I/O, graphics, messages and alarms and routing, and data storage requirements. Templates are developed once and deployed as multiple instances to individual plant servers running separate facilities.

“It enables you to build a strong template set where you can centrally standardize applications and normalize information, and then deploy instances to each site with the ability to customize the application at the local level,” says Harsy.

The tools in System Platform 3.0 software make it the central engineering space for creating uniform presentation to end users and other enterprise systems. “Best practices include not only what the deployed applications can provide — but how you use the tools,” Harsy says. “It starts with building a good set of templates that are critical to a global rollout. You can test and validate and deploy; and then leverage by evolving your templates over time. The system is very capable of supporting an evolving process.”

Encapsulating Best Practice Intelligence

The unified plant model is what ensures standardization of practices from plant to plant. People making strategic comparisons on OEE, for example, must have confidence that the data is being captured consistently across the enterprise, regardless of variety of equipment or control systems or idiosyncrasies of engrained plant preferences. “You have to have the concept of a global standard,” says Grasley. “It has to be implemented in the same way. In a non-object environment, that was very hard to do. But with objects,

you create templates centrally and deploy instances that inherit those global standards at every site.”

In addition to the local instance having all the requisite intelligence embedded within it, each site can customize a template to support execution of local best practices without impacting the global standard. When multi-site comparisons are made, they’re based on the standard, enabling confidence in identification of best performance instances. Modifications from a particular site that support best practice performance can then be made in the standard template in the global platform model — and then subsequently deployed to all sites, instantly updating all sites simultaneously with the new global standard.

“One customer had 60 packaging lines running 20 different versions of a particular control system — even though all the machines were identical,” says Mike Peters, Aseco account manager. Though the company had an improvement process in place, any change to a process required repeatedly making changes to multiple systems.

“The benefit of the Wonderware System Platform 3.0 software is that it is a lot easier to maintain and enhance the system to capture performance best practices because the templates encapsulate so much functionality in each object,” says Ulrich of Stone Technologies.

Building Best Practices

The flexibility and power of System Platform 3.0 software makes the discovery process integral to global system deployment across multiple sites. “You’re constantly building up and improving best practices that you discover from having deployed a standard set of applications to multiple locations,” says Sowell of

Wonderware. “The model provides you with a consistent measurement based on uniformly consistent practices — plant to plant. With each discovery, you’re adding to the standard model and then re-deploying.” As a result: “You’re always improving the model,” he says.

Where you might start, for example, with a template for quality, you can easily add and deploy additional functionality to dive deeper into monitoring processes to determine the root cause of problems. That discovery process can then lead to modification of the overall process by modifying the standard object template in the standard model.

“You need unified, consistent data to see the all information in the correct context,” Sowell says. “First you understand; then you analyze; then you take action based on what you discover. You’re constantly leveraging the lessons you learn. It enables you to embrace and absorb change.”

The process is seamless and without complex disruption to what is already in place. “You can start with gross level functionality and add to it as you gain understanding of what you need,” says Harsy. “You can propagate change across all plants with a few clicks of the mouse. Being able to make centralized modifications and deploy globally is the greatest strength of the platform. It enables you to sustain and evolve your investment.”

Says Ulrich of Stone Technologies: “the Wonderware System Platform 3.0 software concept has been steadily evolving over the last three or four years — getting better and better. It’s truly a world-class solution.” [WW](#)

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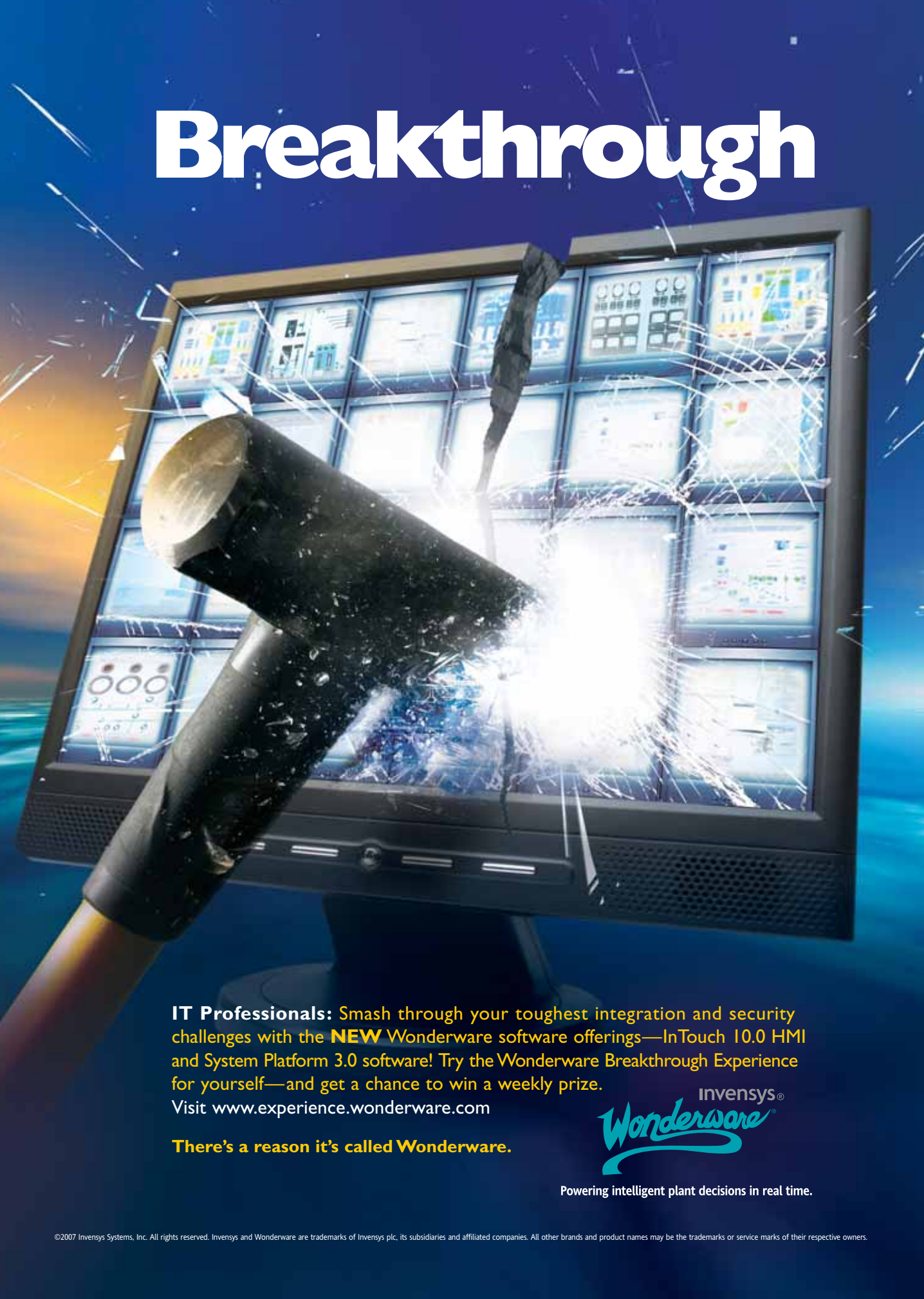
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The Program and its Resources

The Wonderware System Integrator program both trains and helps users locate high-quality system integration assistance worldwide. A total of 185 Wonderware Certified SIs are available to integrate and support Wonderware products such as In-Touch® HMI software, IndustrialSQL Server™ historian, Wonderware Information Server, DT Analyst software or QI Analyst™ SPC software. Seventy-three of those also have more extensive training in products built on the latest ArchestrA technologies, such as the Wonderware System Platform.

To find a Wonderware Certified or Wonderware ArchestrA Certified SI near you, search www.wonderware.com/solution_providers/si.

Breakthrough



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