

# SOA AND COMPLEXITY

## Discovering the New Business Value

**A**t its heart, service-oriented architecture (SOA) is about simplification—streamlining the way businesses use information so that employees can access knowledge when and where they need it.

But implementing SOA is anything but simple. According to a new survey, creating and deploying services across the heterogeneous environment common to many companies involve a number of unexpected issues.

IDG Research Services conducted in-depth discussions with CIOs at midsize and large enterprises regarding SOA and complexity. As they map the data sources to the business processes involved in creating complex, multisource services, many respondents touched on the unexpected complications arising from creating, deploying and managing services in a heterogeneous environment.

“The challenge has been the complexity that SOA brings,” says Larry Pickett, CIO of Purdue Pharma in Stamford, Conn. “The vision is, ‘Now that we have the process [mapped], let’s press a button or go through some type of efficient process and be able to generate code and systems and information.’ We are just so far away from that really happening, especially in the multi-vendor environment.”

The survey finds that as companies move to analyze the source of business data and pull it into services that draw data from a variety of platforms,

they must translate business processes into IT systems and information management approaches that make sense for the organization.

“That is really where the IT departments have their biggest challenge,” says Pickett. “It’s very, very complex.”

The research concludes that the final payoff is worth the effort. Respondents unanimously state that creating an SOA framework with the ability to manage complex services across a heterogeneous environment will yield a huge return on investment in terms of business productivity and improved decision making.

“SOA can be complex for the developers and the IT departments, but the biggest benefit is in the business where the majority of the people are and where the business gets done,” says Mike Odell, CIO of Pacific Coast Companies. “If we can make their lives considerably less complex, which for us is the primary driver for SOA, then it’s worth the effort.”

### Areas of Complexity

As CIOs build and manage services to operate across a disparate enterprise environment, they encounter several areas of complexity. The services must reflect complex business processes, which do not necessarily mirror the corporate IT infrastructure. This makes building, testing, maintaining and managing a growing stable of services increasingly challenging.



Take, for example, the task of building and testing a complex business process that incorporates numerous services. "If you achieve autonomous services and you're processing a complex event that touches a dozen different services, then you have to design your test cases so that you can easily tell which services have a defect or whether there's a defect in the business rules that govern how the services perform," says Marty Mosely, chief architect, integration architecture solutions, at Intuit Inc.

He cites the example of testing an order-processing event for the company's popular TurboTax® software. "You can go all the way back to the Web site that the customer uses when they want to buy the next version of TurboTax, and then trace that all the way through manufacturing

and placing an order for the shipment of a product. Or you only test the service that you're deploying and the surrounding client services that it interfaces with," he says. "Those are very, very different kinds of test strategies. It's harder than if you're analyzing a single block of code or a more tightly integrated system."

As SOA spreads across different divisions, CIOs can expect more complexity, particularly as the SOA framework allows different groups to diverge from monolithic software and customize processes to their own needs.

Another wrinkle: While SOA adds another layer of complexity with the need to deploy, manage, access and maintain an exploding population of services, it also exposes preexisting infrastructural complexity. "We had more complexity

## TIBCO PERSPECTIVE ON COMPLEXITY

The possibilities of SOA are alluring and the benefits are real. There are a growing number of cases showing that companies derive real business value from SOA implementations. But as SOA evolves from isolated pilot projects to more complex services, CIOs are running into the significant new challenge of trying to create, deploy and manage services across their distributed and diverse IT infrastructure.

The data from IDG Research Services supports this, as respondent CIOs discussed the challenges they face as they strive to reduce SOA complexity and simplify the deployment of new business services. Many noted the limitations of traditional SOA development, which is not designed to deal with the inherent heterogeneity of most IT environments. The reality is that most companies have

a variety of technology platforms in place, including Java, Java EE, .NET, C++ and more. This greatly complicates the time and effort involved in service creation and deployment.

The responses echo a stance that TIBCO has taken toward successful SOA implementation. "In order for complex SOA frameworks to produce true business benefits, CIOs must embrace an SOA strategy built around standards-based, platform-agnostic technology," says Matt Quinn, VP of product management and strategy at TIBCO.

The answer is to create a service virtualization layer that abstracts the complexity of heterogeneous platforms and enables companies to separate the management, deployment and reuse of services from service orchestration.

For instance, the company's TIBCO ActiveMatrix Service Grid software lies between the code that orchestrates services and the platform that the services run on. The code that governs how the service is used—configuration, security, availability—is separated from the business kernel of the actual service.

With service virtualization, developers don't have to worry about the technology of the underlying platform and don't have to embed the housekeeping code that can consume a lot of development time. The bottom line? "Service virtualization should give companies greater freedom in designing business services," says Quinn. "By abstracting such code as deployment and security from business-logic code, services can be built and deployed much faster and more effectively."

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before, but it never saw the light of day—it was all hard-coded as direct-file exchange programs that were undocumented or point-to-point interfaces or some kind of stored procedures,” says Mosely. “So it was very complex before and it was unmanageable because the complexities were hidden.”

But most respondents find this untangling worthwhile as doing so simplifies things in the long run. “We already had a high degree of complexity, and as our growth has accelerated over the last few years, that complexity has also grown. We were looking for something that would help us manage it,” says Chuck Lewis, vice president of SOA at Commerce Bank. “SOA, even though it adds complexity, should in the end add simplicity for our delivery of service to our true customers.”

### IT Challenges

Although the end goal of SOA implementations should ultimately result in streamlining and simplifying the way businesses work, survey respondents say that it will not do so without a sea change in the way IT develops SOA technology. Survey respondents cite the difficulty of getting architects and developers to switch from an application-centric development focus to a one based on an enterprise-wide view.

“A lot of developers have theories as to how things should be done [based on] how they were trained to do things,” says Andres Gutierrez, CIO of Family Health Centers of San Diego. “Sometimes you have to compromise and make changes in your approach. I think that adaptation was the hardest challenge for staff.”

For example, learning to reuse existing services is cited as both a benefit and a challenge. “Creating reusable XML has been harder than we thought,” says Mosely. “There are a variety of ways to use XML and different techniques for reusing

XML schemas, and you can accomplish the same thing in a variety of ways. Each of those has pros and cons in terms of understandability, reuse and performance. There aren't any rules and guidelines to guide us along the way.”

Complexity also plays out around security issues. Max Taylor, the director of IT infrastructure at Colgate-Palmolive, is wrestling with the company's multiple logins and passwords for different applications. “If I am going to tie databases and applications from different services where the person may have access to all of them, but each one of them requires one or two different passwords, now I am also reengineering my log-in and security processes,” he says. “In the end, if you want to have a true SOA implementation, you really want to have a single sign-on.”

As services become more complex, CIOs must analyze the SOA framework for processing speed to ensure that service transaction speeds stay at a high level. “With SOA, the complexity that is introduced there is figuring out where we need to position the quickening for a best process in speed,” says Taylor. “We compare it to a relay race—who should be the fastest at the end, who should be in the middle and who should be the lag.”

As a result, some CIOs expect to add a layer of technology to manage SOA services.

“In order to do SOA well, it requires a couple new infrastructure technologies that store information about the services and track the execution of the services,” says Mosely. “So it requires another layer or two in the infrastructure and then it creates new services that have to be managed as first-class citizens. And that is complexity because it didn't exist before.”

But, says Mosely, while that adds technology, it could simplify the overall infrastructure. “From another complexity measure—which is, ‘How

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complex are our systems?'—then I think it's much less complex than before."

### The Benefits

Respondents say that while SOA is not simple, the initial complexity is not unexpected. "We went into it with our eyes wide open," says Pickett. "We knew it was a long-term process."

And the work has been worth it. Respondents wholeheartedly agree that SOA will pay huge dividends down the road in terms of business value. "SOA, like all high-function, robust infrastructure, is complex," says Kent Seinfeld, CIO of Commerce Bank. "But what you can build on top of it—in this case, our application integration capabilities—that will be simplified, and that is more important to us."

However, along with the confidence comes some frustration. In particular, many respondents are unhappy with some vendors' efforts to position SOA in more proprietary frameworks. The overwhelming opinion is that if SOA is to succeed, it will be with standards-based technology that interoperates across heterogeneous environments. Respondents expressed concern that if vendors make SOA more proprietary, the current momentum for the technology will be lost.

"SOA is really a platform-agnostic way of looking at technology, and how to deliver systems and services, and integrate data and access data in a multi-vendor environment," says Pickett. "However, vendors have their own self-interest in wanting to keep you on their platform. They are not necessarily motivated to help us."

Pickett adds, "I think that it's key that SOA continues to be developed as a standards-based solution set or architecture, because I think if anyone starts making SOA more proprietary, then it will break down and we will not have the

momentum that we have right now."

CIOs also voice a desire for a deeper, more consultative relationship with SOA vendors that can customize their approach to fit specific needs.

"We have a core group of people that are driving SOA within IT, and if we had the vendors on-site helping and mentoring for, say, a 60- to 90-day effort, that would be helpful," Pickett says. "It would help ensure the adoption of some of the vendor's

technologies, and it would help the vendor because then they would have a more realistic idea of what the company or client computing environments look like."

Several respondents also want better tools, particularly troubleshooting technology that provides a dashboard-level view to help identify where problems lie. Some CIOs say that those tools are still in their infancy.

"For me, it's the operational aspects of SOA—you make sure you can monitor and troubleshoot so it can be maintained at 99.9 percent availability," says

Gutierrez. "You're looking at utility-type stuff, so you have to make sure the services are there. I think the tools are still early [in development] and need to mature. You have to look at it holistically from the infrastructure to the technology and the software."

Ultimately, CIOs agree that while SOA will undoubtedly bring at least initial complexity for IT and for developers as services spread across enterprise-wide IT environments, they expect it. And if it results in greater simplicity for the business, SOA is well worth the effort. ■

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