Strategies for SOA Success

The business benefits to be gained by implementing a service-oriented architecture are significant and proven. The key to a successful SOA adoption is careful planning around the architecture's entire life cycle, from initial development of services through deployment, management and change.

Across industries and geographies, organizations of many types and sizes are answering market, competitive and regulatory challenges with service-oriented architectures (SOAs). That's because SOAs directly address the many hurdles that IT departments must overcome in order to deliver on the dynamic and rapidly evolving requirements of the business.

This is no small feat, given the complexities of IT infrastructure that make it difficult for those charged with running it to even find time to think about business challenges. Furthermore, the high cost of IT maintenance adds extra pressure to IT budgets. According to a study conducted by Stamford, Conn.-based market research firm Gartner, Inc., 80 percent of typical IT budgets are earmarked for maintenance, while the remaining 20 percent goes toward improvements or new functionality. Of that 20 percent, only 40 percent is spent on actual new functionality—integration expenditures consume the other 60 percent. The outcome is that as a percent of the total budget, only 8 percent is spent on new functionality.

The amount of money being spent on integration projects—$2.4 billion in 2004 according to Lexington, Mass.-based WinterGreen Research—is not surprising, given the state of many organizations' application infrastructures today. Companies worldwide spent billions of dollars in the past decade on monolithic applications like ERP, CRM and supply-chain solutions. More money was spent on the middleware needed to connect these behemoths to legacy systems in order to leverage existing data. While they certainly served the purpose at the time—bringing old systems and data into new, Internet-enabled environments—these monolithic suites have become burdensome as the pace of business has continued to quicken, for two key reasons:

- **Lack of leverage across existing systems:** Monolithic systems typically orchestrate their own business processes, use their own business rules and logic, and rely upon their own security schemes. These systems are inflexible and inefficient, and often the knowledge housed in one may not be accessible across the enterprise.
- **Costly to maintain:** Many of these monolithic applications must be maintained by trained professionals with highly specialized skill sets. Organizations often can't leverage this ongoing expense enterprisewide, particularly in the case of custom-built applications.

SOA meets these challenges head-on. Because it is based upon loosely coupled services rather than tightly coupled integrations, service-oriented infrastructures and applications can change as quickly as business needs change. Services can be constructed, deployed and reused virtually on demand, and easily integrated enterprisewide, across heterogeneous platforms.

The implementation of SOA can yield a cost-effective, efficient integration of systems and processes because it lets organizations rationalize and reuse services and easily automate processes based on those services. This directly addresses the two key burdens of existing IT environments—lack of leverage across existing systems and high maintenance costs.

CHARTING A COURSE TOWARD SOA SUCCESS

If the road to SOA adoption was measured like a 26-mile marathon, many corporations would still be in the first two miles—with a long way to go.

For example, one large financial services provider began its adoption of SOA with Web services in 1999, although its formalized approach to the architecture really took off in 2002. That's when the firm brought together its "architects' collective"—a group of enterprise architects from different lines of business—to create an enterprise reference architecture to which all future projects and applications would be designed.

In 2003, a team was formed to build out the reference architecture. "We were like a lot of companies when you first start out," a company enterprise architect explains. "The first tools you bring in are really based on the projects driving them. But we knew we were going to leverage these [tools], so we evaluated them from an enterprise perspective, and then started leveraging them out."

Governing the Platform
As more of the company business units heard about—and wanted to adopt—Web services, they knew it was necessary to look beyond the technology to the governance of SOA. That's because different groups began creating their own versions of existing services, which ran counter to the company's vision of an enterprise reference architecture.

So a process was put in place to score projects against both the reference architecture and a line-of-business blueprint. Each project receives a positive, neutral or negative recommendation, the latter of which can be overridden by a CIO if it's a question of being first to market with a new service. The only condition to an override is that the group must set budget aside in the future to retool the application to conform to the reference architecture. That way, the company can meet business needs while continuing to decrease its SOA maintenance costs.

Orchestrating the Future
For this company, the future of its SOA platform revolves around consolidating common functions across lines of business, as well as orchestration, which is driven by adherence to the BPEL (Business Process Execution Language) specification. With BPEL driving its orchestration efforts, says the company enterprise architect, "You get a large benefit from being able to get visibility into your process. Your BPEL engines will allow you to monitor the process and send out alerts or make changes. ... So if I want to transfer work in one center to another because of natural disaster or something similar, I can do that very easily."

What advice would this architect give to CIOs embarking on new SOA projects? "It has to be both a top-down and a bottom-up approach. ... You really have to think about how this is going to affect your organization, your business, and the benefits. It's not something you can buy—it's something that you really must plan out as a journey."

So why aren't more companies making the move to SOA?

STRATEGY IS KEY

Make no mistake—the move to a service-oriented infrastructure is not an initiative to be taken lightly. To tap the full benefits of SOA, organizations should view the technology as more than simply a convenient way to make components interoperate with each other. SOA is also a foundation upon which to introduce more technically sophisticated approaches to changing business requirements. But because it involves the foundations that support the business—processes, applications, data, security—formulating a clear strategy is critical.

In a recent survey, over 80 percent of companies responded that SOA was a strategic initiative for their organization, but 56 percent stated they did not have a well-defined SOA strategy[1]. This points to an understanding of the major challenges that a move to SOA embodies. Indeed, Framingham, Mass.-based market research firm IDC recently pointed out that while SOA can help cut costs and generate other improvements, it also may create more complexity due to the faster pace of change it enables.

These changes will trigger others. Businesses will change their rules to adapt, processes will change to become more streamlined, security needs will evolve, and organizations will have to adjust their reporting and auditing procedures to comply with new laws, among other possible changes in the business and IT landscape.

The new levels of complexity stem from the many combinations of management dynamics that IT departments must wrap their arms around with SOA: services, messages, composite applications, processes, security authentications, audit requirements, and service level agreements, among others. Many of these can be difficult to anticipate during the initial development or deployment of an SOA strategy.

"Each type of change will have its own life cycle and will progress independently from (and unaware of) other changes in the environment," IDC notes. "This proliferation of changes will create a life cycle management challenge beyond anything we have yet encountered in IT."

That's why it's important to develop a strategy that touches every phase of the SOA life cycle, and to evaluate SOA solutions based on how well they address the requirements of each stage of the life cycle.

SOA LIFE CYCLE

In order to be successful, an SOA strategy must address every phase of the services life cycle, from initial development of services through changes to services in order to meet new business requirements.

[1]ebizQ, Q3 2005 survey of over 200 CEOs, CIOs, and IT managers

The seven stages of the SOA life cycle are:

THE SOA LIFE CYCLE

Integrate · Orchestrate · Secure · Manage · Access · Analyze · Develop

SERVICES

1. **Develop:** During the development phase, companies design and build services that correspond to specific steps within a business process. Combining these services produces a composite service or application for carrying out a specific business function. For example, a composite service created for updating inventory might involve business services for reserving inventory and updating addresses. A service can be represented in a number of ways to the organization, such as through Web services interfaces. Plan for further development after the initial service is deployed because requirements will change over time, and managing those changes can increase cost. Proper service metadata management and service versioning allows organizations to productively and cost-effectively enhance services and manage the deployment of multiple service versions.

2. **Integrate:** Once the service is designed and the interface is developed, it typically needs to be integrated with other services or IT systems such as databases, transactional management systems and applications. These integrations often require transformation of data to map between different data schemas, as well as dynamic routing for connecting the appropriate services at run-time.

3. **Orchestrate:** Once a few services have been developed, companies can combine them in orchestrated steps to create seamless, reliable process flows. The process of "gluing" services together with flow logic is called orchestration.

4. **Secure:** Before services are deployed, access to them must be secured. Processes for authorizing and authenticating users, as well as provisioning them and managing

their identities, must be mapped out before potentially sensitive information is exposed as a Web service.

5. **Manage:** Management entails defining and enforcing service-level agreements for services, and operational policies for auditing and billing (if appropriate) for service usage. A well-managed SOA also provides the organization with the confidence that their services are reliable, available and constantly monitored for exceptions or failures.

6. **Access:** Services are typically exposed to users through a portal or a composite Web application, as well as through wireless devices such as cell phones and handheld devices. An SOA environment supports multi-channel access to services and enables organizations to adapt user interfaces without modifying the underlying services, making the user experience much more flexible.

7. **Analyze:** Analysis of services, events and business processes involved in business operations often needs to occur in real time so operational managers and workers can effectively monitor, analyze and respond to time-sensitive issues. This also allows organizations to identify bottlenecks in their processes and alert the appropriate personnel when a particular event warrants attention. By adhering to this life cycle, organizations may rest assured that their services are being deployed using a common approach that ensures proper security, reliability and availability.

EVALUATING SOLUTIONS

The next step down the road to a successful SOA implementation is to evaluate SOA solutions based on how well they address the requirements of each phase of the SOA life cycle. Some organizations may be surprised to learn that they'll be evaluating primarily middleware solutions.

Indeed, service-oriented architectures derive many of their core services directly from middleware. These capabilities include security functionality (including identity management) and deployment and management capabilities, as well as business integration, business intelligence and content and collaboration tools. Today's leading middleware solutions provide much more than just plumbing between disparate applications and data stores—they deliver critical business services that enable companies to:

- Support and accelerate business expansion
- Deliver greater insight into business issues and drivers
- Reduce exposure to risk and support governance initiatives

One vendor that delivers a complete product family of tools and solutions for every phase of the SOA life cycle is Oracle, with its Oracle Fusion Middleware family. Let's examine one of the major elements of the offering that addresses a key challenge for organizations in general, whether they're in the early planning stages or in the middle of an SOA deployment—business integration.

ADDRESSING INTEGRATION CHALLENGES

One of the most common aspects of any SOA project is integration—the step in the life cycle that connects newly developed services to data sources and other key applications. This step is particularly critical because many companies' integration projects will involve extending business processes and applications to outside partners or suppliers. An important consideration for any integration project, therefore, is standardization. Companies must ensure that any solution they choose complies with all relevant standards and

protocols in order to increase the probability of a successful deployment. In addition to reducing potential for vendor lock-in, implementing these standards provides greater access to skills and related technology innovations, and reduces solution costs.

Oracle Fusion Middleware is a comprehensive solution that offers complete support for the development, deployment and management of a service-oriented architecture. With Oracle Fusion Middleware solutions, companies can address their most important integration issues, whether they're dealing with a "pure-play" integration project (connecting disparate systems only) or building new applications that must leverage existing systems and data.

When companies undertake integration projects within a services-oriented environment, there are other elements to consider beyond data. Because of its structure and functionality, an SOA will call for integration of business processes and business partners, in addition to applications and data.

Oracle Fusion Middleware addresses each of these needs. First, it lets organizations *integrate their business processes,* enhancing efficiency by automating human and system workflows across applications and IT systems. Process delays are eliminated, and data need only be entered into the system once, which saves time and money, reduces errors and lowers risk.

Second, Oracle Fusion Middleware enables companies to *integrate their applications,* regardless of vendor, technology or platform. These applications might be packaged, legacy and mainframe applications, databases, messaging

SOA CURES THE M&A BLUES

For ING Lease Belgium, growth through acquisition allowed the company to expand its customer base and offer a more diversified portfolio of services to those customers. Yet as many other corporations have found, M&A has a downside—integration.

ING Lease Belgium is one of the largest leasing companies in Belgium, offering IT, car, truck and real estate leasing services. A member of the ING Group, a worldwide leader in integrated financial services, ING Lease Belgium is recognized as a pioneer in its sector, creating such services as real estate leasing.

This innovative company found itself stuck with a number of proprietary legacy systems after a series of acquisitions, including an AS/400 and various CRM and accounting platforms—none of which were integrated or capable of talking to each other. Market conditions weren't helping, as increased competition caused margins to decline. The company had no choice but to increase volume and lower operating costs in order to boost profits. So ING Lease Belgium brought in Accelior, a technology specialist in the areas of SOA, business process automation and middleware.

SOA to the Rescue
Achieving its top goal of decreasing operating costs demanded three things: automate systems and processes, integrate, and streamline. Says Accelior Business Architect Jean-Michel Van Lippevelde, "To restore shrinking margins and to [generate] more revenue, they needed not only to sell with low cost of operations, they also needed to cross-sell and sell more products. They needed that business agility, which needed to be covered by IT. But they were pretty much sunk because of legacy applications and the resources needed to maintain those systems."

Accelior implemented a leasing automation solution at ING Lease Belgium, utilizing its Work Process Manager (WPM) framework. WPM is built on top of Oracle BPEL Process Manager, which provides ING Lease Belgium with a standards-based process integration solution and a real-time, graphical view of the business and its activities. The new service-oriented infrastructure is powered by an Oracle technology stack comprised of Oracle Application Server 10g, Oracle Database 10g, Oracle XML/DB and Oracle Grid Control 10g.

Bountiful Business Benefits
SOA and the Accelior WPM framework are delivering major business benefits to ING Lease Belgium. Business processes that used to require days may now be executed in a few minutes. The company now connects seamlessly with banking agencies throughout Belgium, which helps them to provide better customer service through more streamlined processing of information.

Sales reps have increased closure rates due to better data quality and visibility across business units that also allows them to cross-sell and up-sell—a stated goal of the SOA project. And amazingly, the project was completed in only six months and is now scheduled for roll-out across all of ING Lease in Europe.

Says Accelior's Jean-Michel Van Lippevelde, "The top-down approach, and starting small and then expanding without losing the global perspective, is the key. We didn't start exposing systems for the sake of exposing systems. We exposed exactly the functionality we needed to cover the step of the process that needed to be accomplished. … The biggest challenge is to have people around the table and start making things happen."

And make things happen, they did—as ING Lease Belgium's customers can certainly attest.

middleware, Web applications, or file systems distributed throughout the enterprise.

Oracle Fusion Middleware facilitates communication among these applications because it includes adapters and tools for accessing and exposing applications as standards-based Web services—the foundation of an SOA environment. Once a Web service interface has been built for an application, that application may then plug into any standards-based SOA tool that is used to connect applications and unlock data and information assets. Oracle Fusion Middleware supports over 250 adapters for connecting Oracle E-Business Suite, JD Edwards, PeopleSoft and other applications to other databases as well as packaged and legacy applications.

Third, Oracle Fusion Middleware allows enterprises to *integrate their information,* even if it's scattered across many data sources—a common issue facing many organizations today. This opens a gateway to accurate, consistent information across applications, portals, analytics and business processes. As a result, organizations can improve their decision-making, streamline operations, and better service customers, because they have access to up-to-date, accurate and consistent information.

Fourth, companies can use Oracle Fusion Middleware tools for *B2B integration* tasks involving applications and systems residing externally with business partners. Hastening the establishment of online B2B alliances and automated processes is Oracle Fusion Middleware's use of protocols such as RosettaNet, Electronic Data Interchange (EDI), Applicability Statement 2 (AS2), and UCCnet.

ORACLE FUSION MIDDLEWARE SOLUTIONS FOR INTEGRATION

Oracle's portfolio of solutions for business integration lets companies attack their integration challenges holistically, as part of the SOA life cycle, as well as at the micro-level for those working their way toward an SOA deployment. Key solutions in the family include:

- Oracle BPEL Process Manager
- Oracle Enterprise Service Bus
- Oracle Business Activity Monitoring
- Oracle Web Services Manager
- Oracle Business Rules

Let's take a look at the capabilities of each.

Oracle BPEL Process Manager. The Oracle BPEL Process Manager solution provides seamless process integration that connects applications, IT systems, and business part-ner interactions into orchestrated, reliable process flows.

BPEL, or Business Process Execution Language, is the industry standard for orchestration. BPEL coordinates the execution of multiple discrete services, exposed from any IT system, as an end-to-end process flow. The end result is a composite application that leverages existing systems, yet is orchestrated to enable a new business process.

Oracle BPEL Process Manager enables companies to model, deploy and manage processes. Several characteristics of this solution make it stand out from the competition:

- **Native BPEL support:** Oracle BPEL Process Manager supports the BPEL standard natively—eclipsing solutions that import and export BPEL. Native BPEL support provides completely portable processes and reduces complexity of managing multiple process definition types.
- **Extensible binding framework:** In addition to orchestrating existing Web services, including Web services built on JCA (J2EE Connector Architecture) adapters and JMS (Java Message Service), Oracle BPEL Process Manager supports an extensible binding framework that enables connections to IT systems that are not natively Web service-enabled. This allows Oracle BPEL Process Manager to orchestrate functionality of any system as part of a BPEL process.
- **Cross-platform support:** Oracle BPEL Process Manager supports Oracle Application Server, BEA WebLogic, IBM WebSphere, and JBoss, providing maximum flexibility for IT deployments.

Oracle BPEL Business Process Manager uses a graphical, model-driven approach that gives business analysts a visual tool to define, then automate, connect and synchronize business processes across many disparate systems. The technology lets organizations manage key steps in the SOA life cycle, including developing, orchestrating, monitoring and changing business processes.

The ability to orchestrate Web services, in particular, is a key linchpin of Oracle's SOA technology because it is an essential step to changing the application development environment from traditional code development to service-oriented assembly—building applications through the assembly of services is a much faster, more robust method than writing code.

Oracle Enterprise Service Bus. Oracle Fusion Middleware includes an Enterprise Service Bus (ESB) infrastructure that provides messaging, routing and data-transformation services geared for service-oriented and event-driven architectures. Oracle Enterprise Service Bus simplifies environments by connecting disparate systems across a common

foundation, thereby enabling a reusable framework that helps businesses increase agility.

Oracle Business Activity Monitoring. Organizations deploy service-oriented architectures to increase their ability to respond faster and more effectively. Oracle Business Activity Monitoring (Oracle BAM) gives companies the tools they need to build interactive, real-time dashboards and alerts for monitoring business services and processes. Using these solutions, executives and operations managers can get the information that they need to make better business decisions as change occurs.

Oracle Web Services Manager administers service-oriented architectures by letting IT organizations centrally define and enforce policies that govern Web services operations such as access policy, logging policy, and content validation. Oracle Web Services Manager supports Web services deployed on any platform, including Java and .NET-based systems, and its policies can be integrated with existing services without modification. Oracle Web Services Manager also collects and displays monitoring statistics in a Web dashboard, improving control and visibility over Web services.

Most importantly, Oracle Web Services Manager works hand-in-hand with Oracle BPEL Process Manager. These applications can call each other and share metadata, greatly simplifying the process of building processes that are secure.

Oracle Business Rules. Organizations use business rules when developing new applications because they help meet requirements for agility and transparency. Implementing a business rules solution creates a new level of agility by enabling rules to be modified or customized very quickly without reprogramming. Business rules solutions also enable transparency by allowing auditors or business analysts to view business rules and determine whether an application correctly implements business policies—especially critical to insurance, health care and financial services companies that have strict requirements around transparency. Companies can also leverage new opportunities or answer competitive threats while trimming the costs of modifying applications by using business rules.

Oracle Business Rules consists of a rule authoring tool for defining rules; an SDK that provides rules access and update for embedded programs; and a rules engine, where rules are executed. Oracle Business Rules can be seamlessly integrated with BPEL flows to create very flexible business processes. Overall, it provides the infrastructure for the development and deployment of business rules for both the business analyst developing the rules and the programmer integrating rules into business applications.

Using these tools within an SOA environment, organizations can:

BPEL EXPLAINED

The Business Process Execution Language (BPEL) specification, which is defined, managed and updated by the Organization for the Advancement of Structured Information Standards (OASIS), gives enterprises a standard around which they can orchestrate and execute their business processes.

Many proprietary products address this computing dynamic, but a BPEL standard can help smooth the flow of information when integrating with external processes.

For instance, BPEL offers a standard language for a broad range of functions relating to XML messages—how to send and receive them to and from remote services, manipulate XML data structures, manage events and exceptions, define parallel sequences of execution and disengage parts of processes when exceptions happen.

An open, common, standard language and interface is an important precursor for organizations implementing SOA, which uses shared services on a network, so they can identify and automate key business processes.

In essence, BPEL helps organizations move their process definitions between disparate authoring tools and execution platforms no matter what technology lies at the foundation.

Oracle is among leading software vendors supporting the BPEL standard via the Oracle BPEL Process Manager solution, a cornerstone product of Oracle Fusion Middleware.

- Increase efficiency
- Drive better business decisions
- Process more accurate information
- Adapt to changing business needs

ORACLE FUSION MIDDLEWARE

Products within the Oracle Fusion Middleware family benefit from the offering's comprehensive support for the complete SOA life cycle—from development and deployment of services to integration and orchestration, security and management, and monitoring and change of services. There are three characteristics of the Oracle Fusion Middleware platform that set it apart from competing platforms: It's comprehensive, hot-pluggable and unbreakable.

First, Oracle Fusion Middleware offers a comprehensive and integrated SOA platform. Its tools support every phase of the SOA life cycle, and they're engineered from the ground up to work together, easing integration and de-

ployment. Companies may deploy only those solutions that they need, as they need them, to meet changing business requirements.

Second, Oracle Fusion Middleware's hot-pluggable architecture means that companies can leverage their investments in any existing application, system or technology. They can deploy Oracle Fusion Middleware's capabilities without having to replace existing middleware and infrastructure technologies such as J2EE application servers, directory servers, databases and system management tools—regardless of which vendor's solution they've implemented. The Oracle Fusion Middleware family indeed interoperates with middleware technologies and business applications from IBM, Microsoft, BEA and SAP, as well as non-Oracle J2EE runtime, tools, messaging and security components.

Third, with Oracle's grid computing technology, the Oracle Fusion Middleware family inherits scalability, 24x7x365 availability and other computing efficiencies that can be leveraged enterprisewide. Comprehensive security features—including provisioning, single sign-on and federation for Oracle and non-Oracle applications—enable companies to reduce risk and comply with evolving regulatory and governance initiatives.

BUILT TO DELIVER

A major portion of IT maintenance costs are delegated to integration of existing applications. Costs of integration remain high for many companies due to incompatible data structures, undocumented and non-existent interfaces, tightly coupled communications and data models, and lack of understanding of how the existing systems operate.

Service-oriented architectures provide a means to gain control of and expose well-defined subsets of existing applications with known interfaces that are accessible through standards-based protocols. The resulting services more closely match the needs of the business and introduce loosely coupled sets of functionality that the organization can cull together quickly using orchestration or process management capabilities to drive greater agility and lower integration costs.

Developing these services using a comprehensive SOA life cycle ensures that the resulting services will be available, reliable, scalable, secure, measurable and performant. Oracle Fusion Middleware provides the necessary tools and products to manage the entire SOA life cycle end-to-end and deliver 100 percent on service-level agreements.

For more information on Oracle Fusion Middleware visit www.oracle.com/middleware. To view an eSeminar on SOA, visit http://go.eseminarslive.com/soa. ■

ORACLE FUSION MIDDLEWARE IN PRACTICE

- A major European telecommunications company that provides fixed-line telephony, mobile communications, and broadband services wanted to stay competitive, improve customer service, introduce new products, and shore up its bottom line. The company rolled out Oracle BPEL Process Manager, a cornerstone of Oracle Fusion Middleware. As a result of using the standards-compliant technology, the company has been able to fully automate its complex workflows and improve visibility into its underlying business processes. The company reports that it is running thousands of transactions daily through Oracle BPEL Process Manager and expects that number to rise.

- A major U.S. car-rental company with domestic and international rental offices that serve 15 million travelers a year decided that it needed to upgrade the platform supporting its popular Web site. It turned to Oracle for a more modern, robust environment. The new site has run efficiently since its launch, and has delivered tangible business benefits. For example, the company's IT outsourcing partner discovered that the previous

architecture limited the number of reservations that the company could take. This problem has been resolved with the new Oracle-based platform.

The car rental company also had its eye on the future in adopting Oracle tools. Just as important as current functionality, the company reported, was the ability to build on the foundation and garner support for SOA and grid computing. The company expects to leverage BPEL to integrate its processes with external partners and e-commerce processes.

- A popular family restaurant with more than 1,100 U.S. locations wanted to help its franchisees by making available vital customer data in a useful, accessible way. Much of the data, however, was stored in disparate applications from a variety of vendors. The restaurant chain adopted Oracle Customer Data Hub, an Oracle Fusion Middleware product, to integrate with third-party data sources. As a result, the restaurant was able to get a single, holistic view of its customers while continuing to deploy applications from many vendors.