



## What You Need to Know About Transitioning to SOA

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Organizations are increasingly turning to service-oriented architectures (SOA) and process integration as a way of increasing their business agility and IT productivity.

SOA is an architectural approach that makes it not only feasible, but practical, to build business applications through a collection of loosely coupled services. Unlike traditional IT architectures that lock business and process logic tightly within a single application and user interface, SOA approaches enable organizations to build applications by assembling discrete application components and orchestrating reusable business or presentation services, to greatly increase IT productivity, agility and business flexibility.

SOA can be particularly helpful in the area of integration, where organizations have to struggle with a range of requirements—data integration to unite customer or product data across the enterprise, application integration to invoke tasks or services across departments, business process integration and Web services orchestration to automate multi-step processes and B2B integration for improved collaboration with business partners.

But — no real surprise here — moving to SOA takes planning. Organizations considering implementing SOA should make sure they not only understand what SOA is and how it can benefit them, but they should also analyze and understand the lifecycle implications of SOA — what will it take to make the transition and manage the entire SOA lifecycle?

This paper is designed to help business and IT managers understand the requirements on how to transition to SOA, it also includes exclusive results of a survey conducted by ebizQ on SOA and SOA lifecycle strategies. Throughout the paper we'll highlight important findings from this survey and how they relate to successfully deploying SOA.

In addition, this paper looks at the types of business benefits that organizations plan to receive from a move to SOA, and explores a practical approach for implementing SOA, including outlining the concept of an SOA lifecycle and the different steps that organizations must identify and manage as part of transitioning to an SOA infrastructure. To put this in perspective, we also examine how one vendor, Oracle, is architecting products to support SOA lifecycle requirements.

### Why Organizations Are Making the Move to SOA

Regardless of a company's business or technology structure, today's competitive business environment is continuing to drive the need to increase business agility and the ability to rapidly respond to changing business needs.

As a result, most organizations are looking for ways to make their applications, business processes, data and IT infrastructure more modular and flexible. The move to SOA is a response to these pressures and a proven way for organizations to not only increase flexibility but also decrease the overall cost of management and modification to their business processes in the future.

To better understand what is driving organizations toward SOA infrastructures, ebizQ, in conjunction with Oracle, undertook an on-line survey in Q3, 2005 of over 200 CIOs, CEOs, managers, directors, and project managers from a wide range of industries, including financial services, telecommunications, manufacturing, retail, healthcare and public sector. 26% of the respondents were from companies larger than 10,000 employees, while 30% came from companies with 1,000 – 10,000 employees. 63% of the respondents had staff dedicated to defining their SOA architecture and standards. The overwhelming majority of these respondents — 80% — indicated that SOA was a strategic initiative for their company.

Improving business efficiency and streamlining business processes are key drivers for many companies today. In addition, today's companies need to connect more closely with partners, leverage more value out of their existing resources, integrate disparate data sources and automate business processes across applications and the supply chain.



**While SOA approaches can help organizations accomplish all of these objectives, ebizQ research shows that increased developer productivity was one of the key reasons that many survey respondents were moving to SOA, followed by the need to do composite application development. After addressing those requirements, other factors, such as increased agility and flexibility, potential cost savings, better reuse and easier integration were equally important.**



## Transitioning to SOA

Knowing what you want to achieve from a transition to SOA is one thing, but actually achieving it is another. One of the keys when transitioning to SOA is to take an evolutionary approach—not a big bang, “throw it all out and start over”-type approach. Instead, organizations should consider taking existing assets and transitioning them to SOA over time.

“Unfortunately, as the survey results highlight, many organizations are still struggling with how to successfully manage this transition. While over 80% of the companies responded that SOA was a strategic initiative for their organization and over 50% already have already implemented some type of SOA solution, 56% of companies stated that they did not have a well-defined SOA strategy.

In addition, the survey showed that there are a wide variety of relatively equally weighted concerns that organizations have about transitioning to SOA. For example, while the three leading concerns in the survey were: waiting for standards, having to retrain or acquire new skill sets, and management considerations, a broad range of other concerns followed closely behind, including: security issues, performance considerations, complexity and the need to adapt existing applications. On the positive side, though, over 60% replied that their company’s executive management understood the value of transitioning to SOA.”

One of the easiest ways to do this is through specific projects. For example, let’s say an organization has the requirement to update both a sales order entry application and a Web self-service application to add a new form of payment, a debit card. Instead of creating specific application logic for each of the different applications, the IT team could take advantage of this opportunity to create an SOA-based service that processes debit cards, and call it from each individual application.

A second important consideration when transitioning to SOA is the understanding that it takes more than simply creating a service, such as the one described above. In order to create an effective SOA platform for future applications, organizations need to go beyond the definition and development perspective of SOA. Organizations need to consider the entire SOA lifecycle and how they’ll manage services and service components over time. It’s especially important to consider aspects such as manageability, security, availability and usability.

### SOA Lifecycle: Making Your Transition Pay Off

To better understand what it takes to make SOA successful, it’s important to look at the complete SOA lifecycle, which includes a range of steps — everything from the development of services to the sequencing of them to the management and use of them. Any organization, moving to or considering a move to SOA, should make sure they research these areas and make them part of their SOA strategy.

- **Develop.** One of the first steps (beyond creating a strategy) in a transition to SOA is creating the actual application components that will be exposed as services and used by business processes and other applications. Important considerations include using standards to develop and define these application services and their services interfaces, as well as making sure to encapsulate and separate the presentation, business logic, and data access aspects of an application. Such services typically run on a J2EE infrastructure.
- **Discover.** This pertains to having a services directory. This can be based on an open standard such as UDDI. This directory will act as the “yellow pages” for the company’s internal and external web services.
- **Integrate.** Once services are developed, they will need to be integrated with applications and other services. Integration may include the need for data transformation services, reliable message delivery with routing, monitoring, and management.

- **Orchestrate.** While integration is the connection of services and application components, orchestration is the sequencing of services to fulfill a business task or process. BPEL (Business Process Execution Language) is a key SOA standard designed to help companies define the process sequence. Rather than “hardwiring” integration connections or services, organization can use BPEL to create an adaptable approach to sequence services. Using a standard like BPEL to orchestrate services has a number of important benefits, including: the ability to incrementally develop and deploy new business software, the ability to reuse business components easily in multiple applications, and a lower cost of assembly for new business processes. BPEL also enables process portability thus enabling the company to avoid vendor lock-in. In addition, BPEL also enables long-running asynchronous processes.
- **Deploy.** Of course, creating and orchestrating services won’t solve the business problem until the resulting business processes are deployed. Organizations need to make sure they consider the deployment considerations that will be important when putting SOA-based applications into production, such as, will the services require 24/7 availability or how important is scalability?
- **Monitor.** Once you have developed components, integrated them into existing applications or new business processes, orchestrated and deployed those services, you’ll want to be able to analyze the results and monitor the process in real-time. Analysis of services enables organizations to identify process bottlenecks and issue pro-active alerts and notifications so that users or managers can take corrective actions. For example, analysis of services typically supports the creation of key performance indicators (KPIs), business rules and other analytic metrics so that users can monitor process performance.
- **Manage.** Organizations also need to consider the manageability aspects of SOA-based applications prior to deployment. For example, how does your SOA infrastructure support the management of the services, metrics, and users? What services gets deployed on which servers? How do you define & manage service-level agreements (SLAs)?
- **Secure.** For most organizations, security is an equal consideration to management, particularly in an SOA environment that might have ten, hundreds, or thousands of potential services that could access important business logic or data. For example, it’s important to define web services policy and user access in SOA environments.

## Finding the Right SOA Approach

Understanding and planning for the SOA lifecycle isn’t the only thing that’s important when making a transition to SOA. Organizations should consider a number of other important aspects that affect the benefits and effectiveness of a SOA solution, including standards, deployment infrastructure, security requirements, and management issues. Let’s look a little more closely at these four issues:

- **Standards.** Open standards is one of the key principles and benefits of SOA. Standards such as XML, SOAP, JMS, WSDL, and JCA are providing the foundation by which organizations can ensure that a wide variety of enterprise resources can be enabled to interoperate and cooperate as part of an SOA. While some of the standards are continuing to evolve, most (such as J2EE and BPEL) have matured to the point where they provide practical solutions to today’s application development, deployment and management issues. Unlike proprietary distributed computing standards of the past, standards-based SOA solutions enable organizations to build open, heterogeneous solutions that are not locked into specific vendors or platforms. Long-term risk is reduced and development and deployment flexibility is increased.

“ The top SOA-related standards that organizations identified in the survey included: BPEL, XML, Web Services (SOAP, WSDL & UDDI), with a smaller segment of the companies evaluating Web Services security standards and Java Business Integration (JBI) ”

For example, BPEL is one of the new SOA standards for business process orchestration and execution. It provides a standard method for defining how to send and receive XML messages to remote services, how to manipulate XML data structures, how to manage events and exceptions, and even undo parts of processes when exceptions occur. As an open standard, BPEL has achieved critical support from leading vendors, and as organizations move toward deploying SOA-based applications in production environments, they’ll need servers to

orchestrate and run those services on — and for most organizations, BPEL servers will be the logical choice. BPEL servers are one of the key components of an enterprise SOA infrastructure that will enable portability and re-use of services.

- Deployment infrastructure.** An important part of moving to SOA is an understanding of what type of deployment infrastructure is required to deploy SOA services effectively. For example, SOA is more than just connecting business systems together — you also need to be able to manage the different services and manage service level agreements. That's where grid computing comes in. Just as SOA could be considered the distributed environment for applications, grid computing is the distributed environment for hardware and IT resources. Implementing a grid computing infrastructure when deploying SOA has a number of important benefits. For example, it enables an organization to use lower-cost commodity hardware in a distributed architecture to deploy services. Grid computing architectures typically also provide built-in security and management capabilities that operate across the entire infrastructure, from hardware to databases to application servers to application services, enabling organizations to have a centralized access point for management or security information. Grid infrastructures also enable organization to deploy SOA-based applications on a 24/7 basis, ensuring that services are available.

“ Over 43% of the survey respondents indicated they were considering using hardware or applications virtualization technologies such as grid computing infrastructures ”

- Security.** Much like management, organizations need to consider the security implications of their SOA infrastructure before they build it. As organizations create more and more services that provide access to a wider range of business logic and enterprise data, organizations will want to make sure they have a centralized and manageable security framework. In addition, organizations will want to consider Web Services Policy specifications for communicating policies related to a service, and considerations like user access.

- Management.** Lastly, the reason that organizations are interested in building SOA infrastructures is because they're trying to address specific business needs. Simply transitioning an organization to SOA is useless unless there's a way to ensure that SOA-based applications and SOA services can actually meet the appropriate service-level agreements (SLAs) required by business units or users. Thus, being able to manage the SLAs of SOA-based applications, as well as being able to manage the hardware and IT resources that those services are running on, is an important consideration. And as organizations move into production deployment, they'll find that SOA-based applications typically require a 24/7 infrastructure that's scalable, reliable and secure.

Organizations need the right combination of these four elements to successfully and cost effectively transition to SOA.

### Meeting SOA Lifecycle Requirements: Oracle Fusion Middleware

Oracle Fusion Middleware enables organizations to address the needs that organizations face when transitioning to a Service-Oriented Architecture (SOA) infrastructure, including application integration, business process automation or data integration — through targeted products, while supporting an integrated architecture across the products, enabling organizations to use a single solution set to address multiple integration problems.

Oracle Fusion Middleware delivers a J2EE and open standards-based integration framework that leverages the Oracle Application Server to help organizations address these problems and connect disparate information sources across an enterprise. The solution is differentiated from competitive offerings in a number of important ways. Oracle Fusion Middleware provides strong support for open standards, including one of the first native BPEL engines for business process management and Web services orchestration.

Oracle also provides a comprehensive solution for data management to help organizations drive consistency across the enterprise, through the Oracle data hubs and a series of data cleansing and data quality services that are built into the infrastructure. In addition, Oracle Fusion Middleware can run on Oracle's unique Grid computing infrastructure, enabling not just scalability but ease of manageability as a solution grows. Last but not least, Oracle Fusion Middleware products are hot-pluggable with certified support for non-Oracle environments and they can run on top of any J2EE application servers including Oracle Application Server, BEA WebLogic, IBM WebSphere and JBOSS.

Oracle Fusion Middleware includes comprehensive SOA support that enables organizations to build, integrate and

orchestrate Web services, as well as provide a consistent management interface from development through deployment for all components of a solution. A key strength of the Oracle Fusion Middleware is the comprehensive nature of the solution — spanning data integration to application integration to B2B collaboration to Web services orchestration and BPEL-based process automation, through the use of an integrated stack of technologies and management support. In addition, open standards support is another key strength of the Oracle solution, with its native BPEL engine, J2EE-based architecture and support for key industry standards.

Important for some organizations — especially those thinking about the deployment and production part of the SOA life-cycle — is the support for grid computing, which provides scalability and easy management across a wide range of deployment scenarios — all the while using the same interface and tool sets to manage the integration solutions, databases, hardware infrastructure and security components. In addition, advanced security capabilities with support for Web Services Security and SAML standards enable organizations moving to SOA to handle deployment and management issues securely. In Oracle terms, the grid computing and security capabilities make Oracle Fusion Middleware unbreakable, meaning it won't break down and you can't break in.

While Oracle Fusion Middleware can address a wide range of integration problems, it's particularly well suited for five main integration challenges:

- Connecting data sources and increasing data accuracy across applications
- Enabling enterprise application integration
- Automating multi-step processes and enabling the creation of composite applications
- B2B collaboration and integration across firewalls
- Building an SOA

In short, Oracle Fusion Middleware is an integrated platform that enables organizations to address all these challenges with a single, service-oriented solution set. Its support for open standards, multiple deployment environments (including grid) and a range of integration requirements makes Oracle Fusion Middleware a logical choice for organizations that seek to have a consistent approach for meeting inconsistent integration requirements.

## Moving Forward With SOA

Business and IT agility isn't something that an organization can simply achieve, check off their "To Do" list and move on. Instead, creating a business and IT organization that deliver agility requires building an infrastructure that can continually adapt and adjust to new and changing requirements. It requires an integration strategy that can not only encompass a broad array of requirements — everything from data integration to business process management to B2B integration — but that can be modified over time in a cost effective and practical way.

For most organizations, SOAs are the solution to these problems. SOA enables organizations to cost effectively build and manage composite applications and integration services. But transitioning to SOA requires more than simply implementing a few "wrappers" or extensions to existing applications — in order to take full advantage of the possibilities of SOA, organizations need to consider and plan for the entire SOA lifecycle — from SOA development through integration on to deployment, management and end user access. Organizations that take the time up front to create an SOA lifecycle strategy will end up with not only flexible SOA deployments, but one that can cost-effectively scale up to meet real-world productions requirements in a secure and manageable way.

In recognition of these needs, Oracle has implemented broad support for SOA and SOA lifecycle requirements across its product line. Oracle Fusion Middleware provides an integrated platform that supports an SOA infrastructure, while providing support for SOA lifecycle issues such as security, manageability and availability through related components, including Oracle Application Server, Oracle Enterprise Manager, and Oracle Database.

SOA provides a huge potential opportunity for organizations to create more agile and adaptable IT and business infrastructures. By considering and planning for the entire SOA lifecycle, organizations transitioning to SOA can ensure broader and longer-term success and ensure that their transition will deliver direct and measurable business benefits.