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The Case for Developing a Service-Oriented Architecture

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SINCE THE LATE NINETIES, COMPANIES HAVE SEEN THE NUMBER OF INTERNAL APPLICATIONS WITHIN THEIR NETWORK GROW SIGNIFICANTLY. IN AN EFFORT TO PROMOTE BUSINESS GROWTH AND MAINTAIN A COMPETITIVE ADVANTAGE, MANY LARGE ORGANIZATIONS DEPLOYED A MYRIAD OF APPLICATIONS THAT DIDN'T NECESSARILY INTEGRATE WELL WITH EACH OTHER, LEAVING IT OPERATIONS STRUGGLING WITH RISING COSTS AND INCREASING LEVELS OF SOFTWARE COMPLEXITY. AT THE SAME TIME, THE RECENT ECONOMIC DOWNTURN LEFT MANY IT DEPARTMENTS WITH THEIR BUDGETS CUT, FORCING IT STAFF TO SPEND THEIR TIME MANAGING THESE APPLICATIONS WITHOUT HAVING THE RESOURCES TO FOCUS ON NEW BUSINESS INITIATIVES NEEDED TO KEEP THEIR ORGANIZATIONS COMPETITIVE.

In the last year, Service-Oriented Architectures (SOA) have received a lot of attention because they offer a viable solution to the integration and consolidation problem that most IT departments are facing today. More importantly, this adaptable, flexible approach is setting a new foundation not only for cost savings, but also a greater ROI and new kind of competitive advantage.

This paper outlines the core concepts of a service-oriented architecture and how your organization should be structured to take full advantage of its benefits. It also presents a real-world example of how Molecular has helped one of its clients establish an SOA.

WHAT IS A SERVICE-ORIENTED ARCHITECTURE?

SOA is a simple concept: it is a blueprint that helps services operate together. A service is a well-defined software unit that performs a business function. To frame this concept in a more tangible way, consider a house. The blueprint of a house provides a framework for services such as heating, plumbing and electricity. Based on the specifications of the house, such as size and layout, the blueprint will determine how these services will operate independently of each other, and in conjunction with one another.

SOA is not a new concept — enterprise architects have embraced this concept for many years because, like in a house, if all the services are setup correctly, maintenance time and costs will be considerably reduced. What makes SOA even more pertinent today is that the technology used to connect these services — SOAP Web Services — is more mature and easier to implement than it once was. All the plumbing necessary to make different Web Services work together is now supported by all major software vendors, including Microsoft, IBM, BEA and Oracle, making them truly enterprise ready.

BENEFITS OF AN SOA

SOAs provide a number of benefits to both business and IT alike:

- **Reuse.** Every service performs a specific business function and can be reused across multiple internal and external applications, reducing the cost and effort required to maintain applications when functionality changes. For example, if a financial institution uses a CRM service to manage its customers, SOA enables this single service to be leveraged across their online applications, such as an account opening application, as well as their internal applications, such as an invoicing application. The logic necessary

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to perform customer relationship management does not have to be rebuilt for every new application, or across multiple applications when functionality changes.

- **Competitiveness.** Management of the services' business functionality can be kept closer to the business units, enabling them to continually improve the existing functionality to remain competitive.
- **Focus.** Allows developers to focus on providing an effective solution to the business problem, instead of implementing "patch-work" solutions on an ad-hoc basis.
- **Consolidation.** Concentrating common business functionality in shared services allows the IT organization to consolidate its own infrastructure, enhancing reliability, reducing hardware acquisition costs, and providing higher availability and scalability.
- **Platform independence.** Web Services provide an abstraction layer that can work on different hardware, networks, topologies and technologies, making integration among different applications faster and more robust. Functionality such as message routing and reliable delivery is provided by the underlying infrastructure.

HOW TO IMPLEMENT AN SOA

The challenge to implementing an SOA is to keep the organization — including both IT and business-side staff — focused on the architecture goals. It is very easy for large organizations to invest in new applications and technologies without regard to how they fit into the overall business objectives. Therefore, having a detailed development plan for an SOA is critical. The following steps will help guide you and your organization in how to best take advantage of the benefits offered by SOA.

The first step is to define an inter-department Services Taskforce comprised of business and IT representatives, and facilitated by an Enterprise Architect. An Enterprise Architect is the person that has deep technical expertise of all the systems deployed in your organization and with the technology used in your industry. At the same time, the Enterprise Architect must have considerable domain knowledge of your business. The Enterprise Architect may rely on other technical team members for specifics around some of the more complex applications.

FORRESTER RESEARCH REPORTS THAT ORGANIZATIONS THAT USE AN SOA CAN REDUCE INTEGRATION PROJECT DEVELOPMENT AND MAINTENANCE COSTS BY 30% OR MORE.

The goal of the Services Taskforce is to define the essential services that are needed to serve the core business, and those that are necessary to maintain a competitive advantage. This is a combined effort that technology and business teams in every organization have to perform together. At a minimum, these services must:

- Provide core functionality to the business.
- Support different applications with different purposes.

Returning to the house example, if a homeowner wants to upgrade their electric system today but knows that in 3 years an addition will be added, they will ask their electrician to account for the future electrical requirements. However, the homeowner doesn't have to tell the electrician "how" to do the upgrade. The electrician (and the electric company in this case) is responsible for how it is going to work. Similarly, the Services Taskforce will identify the necessary services and will leave the implementation to the IT organization. The IT organization will then decide whether to do the work themselves or to outsource it.

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Once the essential services are identified and implemented, the second step is to upgrade existing applications to take advantage of these services. This upgrade should be done initially on internal applications to make sure that the development team gains the necessary expertise. The immediate benefit of this approach is hardware consolidation. Future benefits include ease of maintenance, enhanced reliability and reduced hardware acquisitions costs.

Similarly, the third step is to build new applications as a simple, thin layer that use these services to provide the desired functionality. If a new application requires a new service, the taskforce must identify it and define its functionality. In the long run, the SOA will provide independent business services across different platforms that can be used to build composite applications. Most importantly, the Services Taskforce will have created an SOA that is built of reusable and extensible business functionality.

Finally, since SOAs are designed to integrate a large number of services, don't expect – or plan – to get every component or service into your first release. Rather, plan a phased approach to ensure project success. Concentrate on developing services that are low exposure and internally facing first, and gradually increase the number of services deployed over time.

MULTI-CHANNEL OPPORTUNITY: A VALUE-ADD OF SOA

In the past, organizations were often required to develop multiple applications to perform a single business function across every delivery channel they support. Today, SOAs enable businesses to deliver these same services, and new services, in a consistent manner across all channels.

For example, consider a service that offers product or brand suggestions based on consumers' past buying behavior. This same service may be used to generate consistent merchandising suggestions across every channel, and as such, enable orga-

nizations to learn more quickly about consumer preferences and habits. This service also provides a single point of control to expand business functionality, such as managing prices across channels.

To provide a real-world example, consider a consumer electronics company that wants to increase product promotions on their web site and in their retail stores. A service can be used to send product promotions to customers based on items they have purchased in the past, and the channel they used to make that purchase (i.e., web site, catalog, retail store). If a customer purchases a camera online, then the web site can leverage a service to offer a discount on related accessories, such as memory cards. The retailer could then use the same service to email those customers a 25% discount on photo printing at their local retail store.

In the process of implementing an SOA, the Services Taskforce will have implicitly identified the services that can be reused across multiple channels in support of multi-channel interactions. The ability to reuse existing business services not only reduces costs and accelerates deployment, but enables companies to devote maximum resources to building new functionality in support of emerging business opportunities.

MOLECULAR SOLUTIONS AT WORK

Analog Devices, Inc. (ADI), based in Norwood, Mass., is a world leader in the design, manufacture and marketing of high performance analog, mixed-signal and digital signal processing (DSP) integrated circuits (ICs) used in signal processing applications. ADI's products are sold to a wide diversity of customers in the communications, computer, consumer and industrial markets.

ADI's existing Site Server platform, which supports the manufacturer's entire security and commerce infrastructure, was scheduled for retirement by Microsoft in January 2004. As a result, ADI needed to convert their existing ASP applications to a new platform, and implement a new user directory in-

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frastructure that would enable the company to centrally manage access to applications by its full community of users, including customers, distributors and employees. At the same time, ADI was looking to develop a new merchandising program across all of its online applications to drive up-sell and cross-sell opportunities.

In order to position themselves for future growth while leveraging investments in existing ASP and Java Web applications, ADI turned to Molecular to help lay the foundation and build a Service-Oriented Architecture.

APPROACH

Following the steps outlined above, Molecular worked with ADI to establish an SOA and implement two new web services. Utilizing Microsoft .NET Web Services technology with Active Directory, the team implemented Single Sign-On (SSO), a service that enables users to log-in once and gain secure, authenticated access to all of ADI's applications and resources. Existing applications that used different technologies, including ASP and Java, were updated to leverage this new service.

Similarly, the team created a 'shopping cart' web service that enables ADI to manage merchandising information seamlessly across the enterprise, rather than forcing individual business units to manually coordinate merchandising activities across numerous applications. Combined with a new interface, this service provides users with a more unified and

consistent experience while navigating across different sections of the site. The shopping cart web service was integrated with new and existing applications that were written on different platforms, reducing the development time that would have been necessary to implement the same functionality across all applications.

BENEFITS

Following the completion of these projects, ADI was able to:

- Utilize a single application to control access to all its external and internal applications, drastically reducing the administrative and security overheads associated with managing its multiple constituents.
- Develop an extensive merchandising program that provides consistent information across a range of customer facing applications.
- Reduce the complexity of existing applications by leveraging a service that can be easily integrated to solve specific business problems.
- Share services across multiple applications, lowering implementation costs and accelerating the deployment of new applications over time.
- Effectively align technology with business goals to achieve competitive advantage.

CONCLUSION

To achieve competitive advantage, enterprises must effectively align technology with business goals. Unfortunately, many business are forced to forego these opportunities because their core IT systems cannot respond in time. Service-Oriented Architectures are beginning to revolutionize the way IT is structured by integrating IT functionality with business process. The result is more rapid development and more reliable delivery of new and enhanced business service.

While migrating to an SOA takes more effort up-front, the potential payoffs are compelling. Forrester Research reports that organizations that use an SOA can reduce integration project development and maintenance costs by 30% or more. From reusable services to better security, scalability and availability, the benefits of implementing an SOA far outweigh the cost and extra effort involved.

Molecular, an Internet consulting firm, designs and builds digital solutions to help companies increase revenues and decrease operating costs. Since 1994, Molecular has directed successful Web initiatives for the nation's top companies, including The Finish Line, Inc., Fidelity Investments, MFS Investment Management, Hewlett-Packard and Talbots.