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SOA FOR SMBS

***LEVERAGING LOOSELY COUPLED WEB SERVICES FOR
B2B INTEGRATION***





SOA FOR SMBs

LEVERAGING LOOSELY COUPLED WEB SERVICES FOR B2B INTEGRATION

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Abstract

Small and midsize businesses face quite different integration challenges than large enterprises. Internal integration needs are more straightforward than at larger firms, while business models are more likely to focus on business-to-business integration with suppliers and customers. Traditional approaches to B2B integration like EAI, however, are notoriously inflexible and expensive.

Many such firms are leveraging Web Services to reduce the cost of older approaches to address their external integration needs. The simple addition of Web Services interfaces, however, typically remain as inflexible as the API approaches that came before. Only through the application of Service-Oriented Architecture can midsize firms build and leverage loosely coupled Web Services that are flexible enough to respond to ongoing change in the business environment.

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I. The Services Context for Small and Midsize Businesses

Information technology (IT) is much like thermodynamics, but instead of conservation of energy, IT exhibits conservation of the number of hats people wear. It seems that every IT organization, regardless of its size, has the same number of hats – the database hat, the integration hat, the desktop hat, etc. In a large organization, large teams may pass a single hat around from person to person. The smaller the company is, however, the fewer people share these hats. At the smallest companies, naturally, one person may actually wear all of the hats.

The midmarket IT environment

In fact, you might say that the number of hats per person distinguishes small businesses from midsize ones. A midsize firm, say one with 100 to 500 employees, is likely to have an IT organization with sufficient staff so that no individual has to wear more than a couple hats. For those small firms under 100 people, however, the IT department typically consists of a few people who have to share all the IT responsibilities.

The irony with this admittedly light-hearted hat-based analysis of IT at small and midsize businesses (SMBs) is that even small companies still have diverse IT needs. After all, just about every firm has desktop computers, networks, and miscellaneous internal hardware and software, in addition to a Web site and related external IT-related efforts.

Even though the IT needs of both small and midsize firms are diverse, however, they are typically quite different from one another. Small businesses rarely have any internal integration need to speak of, beyond simple file and print sharing. Midsize businesses do have additional internal integration needs, in spite of the fact that they often leverage a single platform for their back office.

Many midsize firms, in fact, have a legacy problem, in spite of their size. After all, midrange server and host systems have been available since the 1980s, and as a result, many midsize firms have long since built their IT on such capabilities. What differentiates these companies from their larger brethren is a combination of the differences in scale as well as the limited IT resources most midsize firms face.

The distributed computing infrastructures small and midsize firms have also tend to focus on single, industry-specific applications. For example, retailers often have accounting/point of sale solutions, hospitals leverage patient accounting software as well as dedicated clinical and lab solutions, and small manufacturers install focused shop floor applications. Even the smallest firms have accounting packages, but companies must be of a certain size before it makes sense for them to integrate those packages with other solutions, like customer relationship

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management, shop floor, or partner support packages.

The relationship between company size and integration need

The rise of the Internet and the World Wide Web, of course, transformed the business models of many SMBs, as well as their IT needs. After all, on the Internet, no one can tell you're a small company. Now everyone from the smallest mom-and-pop stores to midsize firms in every industry not only have Web sites but leverage them as an integral part of their business.

The next step beyond the Web is for SMBs to leverage the Internet for direct computer-to-computer connections between themselves and other companies, including customers, suppliers, and partners. Such Business-to-Business (B2B) integration has long been available to larger companies in the form of Electronic Data Interchange (EDI) and other related technologies, but these older approaches have largely been out of reach of the SMB, because of the significant setup and maintenance costs. The Internet has now changed this playing field, enabling dramatically less expensive ways for SMBs to connect directly to other companies.

For many companies, the rise of Internet-based B2B integration augments Web-based interactions, without replacing them. In fact, Web Services have become the preferred approach to enabling simple Internet-based integration between SMBs and other companies. Web Services are software interfaces based on a set of now widely accepted standards. By supporting such standards, companies can interoperate with other firms who also support the same standards, which dramatically facilitate such interactions. Web Services-based integration, therefore, has recently become the primary way SMBs integrate with other companies.

An interesting result of this trend is that small companies are able to leverage both Web and Web Services capabilities, even though they may have a simple internal IT environment with no need for integration to speak of. Many such companies outsource the hosting of their Web site, after all; in many cases, they outsource their Web Services as well. In such cases, much of their business actually runs at their service provider, with little need for integration with internal IT resources beyond simple interactions via Web pages.

The role of architecture in the SMB

In many cases, SMBs' technology requirements for Web Services-based integration are quite straightforward and can take advantage of the capabilities of HTTP, the protocol underlying the Web. HTTP provides a ubiquitous, sessionless, synchronous request-response mode of interaction that can support simple authentication or SSL security. As a result, virtually all SMB Web Services interactions with outside parties go over HTTP or HTTPS.

In fact, a portion of such traffic today takes the Representational State Transfer (REST) approach to Web Services integration. REST is a simplistic HTTP-based approach to Web Services-based integration and is adequate for some of the needs of many SMBs. Balancing its simplicity, however, are REST's limitations as a synchronous, point-to-point approach to integration.

Solving the limitations of the REST approach is SOAP, the most widely accepted protocol for Web Services messages. Not only can SOAP run over other transports than HTTP, it also supports standard approaches to security, reliability, and other value-added capabilities. Even though SOAP is the core Web Services communication protocol, however, simply implementing SOAP-based Web Services instead of REST does not resolve the limitations of the simpler

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protocol. In the absence of an *architecture* that provides for the loose coupling of such Services, many of the unused features of SOAP become nothing but needless overhead.

in fact, there is a growing need for externally-facing Services to be loosely coupled. When a Service is loosely coupled from the software that consumes it, then it's possible to update or modify the functionality of either the Service provider or consumer without breaking the other. To make such loose coupling a practical reality, however, companies must implement *Service-Oriented Architecture* (SOA).

SOA is an approach to organizing IT resources that abstracts software functionality as loosely coupled Services the business can access as needed and compose into flexible business processes. Today, SOA is still an emerging set of best practices, and most of the companies that have made progress implementing SOA are large enterprises. Such companies have been gravitating toward SOA because it's particularly useful in complex heterogeneous IT environments that experience frequent, unpredictable business changes.

SMBs, however, rarely have complex heterogeneous IT environments. They do, however, experience as many unpredictable changes in the business environment as do large companies, relative to their size. When such a dynamic business environment impacts how an SMB integrates with other companies, then it makes sense for its Web Services to be loosely coupled. And loose coupling, in turn, depends upon SOA.

II. SOA-Enabled SMB Business Models

The ability to either provide or consume loosely coupled Services enables a variety of business models for a range of SMBs in multiple industries. In spite of the wide range of industry-specific applications, however, there are some broad business patterns that such Services enable.

Serving large customers

One of the primary traditional reasons an SMB would want to perform B2B integration with another company is to act as a supplier to a large enterprise. In such situations, the larger company sets the rules for the suppliers, and the suppliers have little choice but to comply.

While EDI is still a predominant form of such enterprise-dominated supplier networks, loosely coupled Web Services are on the rise as a way to lower costs for both suppliers and purchasers, as well as to provide the inherent flexibility that such Services offer. Even the largest companies require new levels of flexibility in their supplier interfaces as they adopt new technologies like RFID.

For SMB suppliers, the extent of their ability to consume such Services may simply be to access those Services from a Service consumer with a user interface. Some midsize firms, however, will incorporate the large customer's Services into internal production or delivery processes. Taken to the extreme, the supplier can take advantage of such Services to integrate their internal processes into the customer's own requisition and purchasing processes.

Acting as an affiliate channel for a large supplier

The flip side of the situation where a large company is an SMB's customer is when the SMB serves as an affiliate channel for that company and its Web Services. Amazon.com and eBay, for example, have been leveraging the power of

Web Services to enable their affiliate channels, which consist almost entirely of SMBs who are building value-added businesses on top of Amazon's eCommerce capabilities and eBay's auction engine, respectively. For the most part, however, today's affiliate network Web Services are tightly coupled, in that they don't have an SOA-driven infrastructure that provides for the dynamic capabilities described above.

Dealer networks

While Web Services-enabled affiliate networks enable a specific channel model, even more traditional "bricks and mortar" channel partners can leverage Web Services as well. Such dealer networks include SMBs that have relationships with suppliers that have multiple touchpoints, including purchasing, product information, customer services, and more. In some cases such dealers also interact with each other, depending on the situation.

Suppliers can leverage Web Services to provide additional value to such dealer networks in many ways, including catalogs, ordering Services, account management Services, product literature, and more. Any interaction between a dealer and its supplier that the parties can automate can move toward a loosely coupled Web Service interface for greater flexibility.

Customer-facing Services

SMBs can take advantage of Web Services by being on the providing side, as well. There is a nascent but rapidly growing marketplace for publicly available Web Services. Today's examples include basic Services such as sales tax and shipping Services, in addition to a range of informational and other value-added Services of different types.

It's not absolutely necessary for a company who wishes to sell access to customer-facing Web Services to have SOA in place, but without SOA, it won't be possible to offer the flexibility that loose coupling promises. SOA-based Services enable customers to find the appropriate Services and connect to them dynamically, based upon their available contract and policy metadata. In other words, SOA provides the flexibility needed for an SMB to build customer-facing Services that will allow their business to scale as demand grows.

Acting as an ISV

The final SMB business model to explore is an independent software vendor (ISV). ISVs who are SMBs typically serve a particular industry and frequently serve SMBs within that industry as well. There are a large number of such ISVs creating and maintaining products as diverse as physician office management software, auto dealership applications, and professional service management products.

Any such midmarket software products can leverage Web Services, either on the providing or consuming side. Physician office management software can submit electronic health insurance claims via Web Services. Auto dealership software can enable dealer networks in various ways. The list is endless.

III. SOA for SMBs: Enabling Loosely Coupled B2B Web Services

To understand the role of architecture when exposing external Web Services, it's important to see the big picture of the dynamic environment such Services participate in. On the Service provider side, companies will be implementing the following capabilities:

It's not absolutely necessary for a company who wishes to sell access to customer-facing Web Services to have SOA in place, but without SOA, it won't be possible to offer the flexibility that loose coupling promises.

- Customizing Service contracts for individual customers or departments within external parties.
- Updating Services with new capabilities.
- Adding new Services.
- Adding new customers, suppliers, or partners who wish to access the Services.
- Maintain the functionality of Services as traffic loads change.

Correspondingly, companies who will consume the Services will likely want to implement the following capabilities:

- Select among a range of Services to access.
- Incorporate Services into their own business processes.
- Change their own service levels to obtain better performance, less expensive access, or other changes in service levels.
- Take advantage of changes in Services in a seamless fashion.
- Switch from one Service to another as business needs change.
- Consume Services via Service consumers with multiple form factors (for example, portal, desktop application, mobile phone, or shop floor handheld device).
- Look up potential Services in a directory.

SOA-based Web Services: enabling change

The common theme across all of these capabilities, both on the provider and consumer side, is that of *change*. If the needs of the provider and consumer changed infrequently, then a simple API might be sufficient – and in fact, APIs have been the primary interface for SMB B2B interactions in the past. Making changes like those listed above with an API interface, however, requires reprogramming or replacing both the server and the client, since those interactions are tightly coupled.

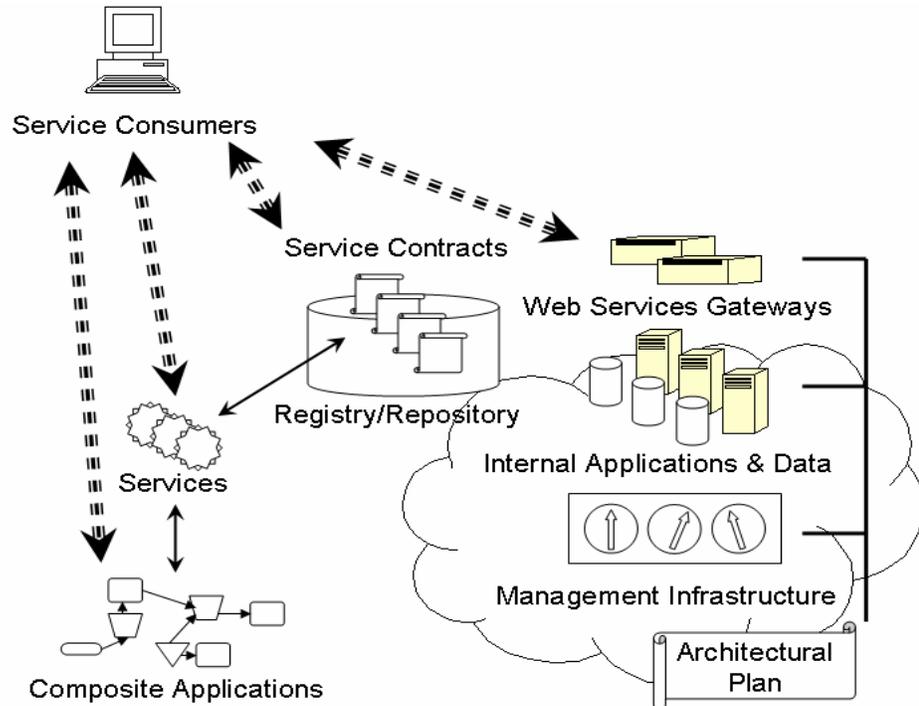
Simply replacing a tightly coupled API with Web Services, either SOAP or REST-based, doesn't provide sufficient flexibility. In order to achieve the desired loose coupling, companies that wish to provide Services must implement the following:

- A management infrastructure that can insure the availability and performance of Services as consumer loads change.
- A registry that enables Service consumers to discover available Services and find the contracts and other metadata that apply to them.
- A metadata repository that contains those metadata and other relevant artifacts corresponding to the available Services. The same product may serve as both registry and repository.
- A Web Services gateway that can provide the required level of security for the Services, enforce the Service level and other policies that apply to the Services, and also route Service requests to the appropriate Service.
- An *architecture* that provides the overall plan for how these infrastructural elements will provide for loosely coupled Services as the situation changes.

If the needs of the provider and consumer changed infrequently, then a simple API might be sufficient – and in fact, APIs have been the primary interface for SMB B2B interactions in the past.

Figure 1 below illustrates the SOA infrastructure a midsize firm would need to support B2B Web Services:

Figure 1: The Elements of a SOA Infrastructure



Source: ZapThink

When a midsize firm is providing the Services, it may or may not place the above infrastructure in-house. Small companies, however, will typically find a third party to host the Services. In either case, they will need the architecture –SOA – that provides the overall design of the implementation.

Correspondingly, when a company wishes to consume Services, they will need the following:

- A way to discover Service contracts and decide whether to bind to a particular Service based upon its contract.
- A Service consumer client that is able to access the Services by satisfying the requirements of the contract.
- The ability to satisfy the security policies and other policies that apply to the Services.

Consuming Services is generally simpler than providing them, and as a result, many SMBs won't require a formal architecture internally to take advantage of Service capabilities. It is true, however, that their Service consumers are essentially part of the SOA of their Service provider. Furthermore, most companies that consume Services will do so on their internal network or possibly via devices that access the Internet directly or through Wi-fi or cellular data networks.

Capabilities of a SOA-based solution

Some companies will wish to do more than simply consume Services at a computer or other device with a user interface. Midsize firms in particular may want to embed an external Web Service in some internal business process. For example, a small distributor may incorporate an external sales tax or shipping calculation Service into its distribution process. In such cases, the Service consumer will be the in-house application itself.

There are additional technical capabilities that SOA can provide that SMBs may wish to explore, including the following:

- *Multichannel interfaces* – Moving beyond the browser to various mobile devices and other interface technologies, today's mobile handheld devices are able to consume Services or otherwise participate in SOA-enabled business processes to support shop floor operations, distributed sales forces, or field personnel.
- *Midmarket integration* – For midsize firms with heterogeneous internal IT environments, SOA can provide a flexible approach to integrating those resources that makes it easier to get business value out of older, legacy applications and systems.
- *Composite applications* – Midsize firms with more advanced application environments may also want to leverage SOA to build composite applications, which are Service-oriented business processes composed of Services. Such Service-oriented business applications provide increased flexibility for the business, and enables businesspeople to get better control and visibility over their processes.

While all of these capabilities become increasingly practical in the context of SOA, it's critical to remember that flexibility comes with a price: the management, security, metadata, and integration infrastructure that underlies the SOA implementation. Loose coupling, after all, isn't magic, and isn't easy. It requires disciplined design and a sophisticated yet flexible infrastructure.

Midsize firms with more advanced application environments may also want to leverage SOA to build composite applications, which are Service-oriented business processes composed of Services.

IV. The NetManage Solution

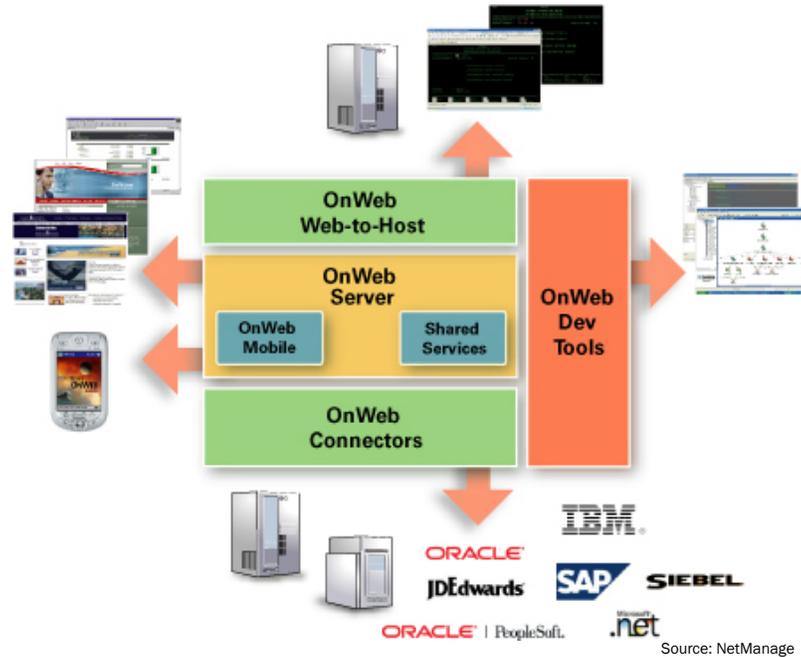
NetManage provides companies with a range of solutions for obtaining access to corporate information sources as well as integrating data and business processes from existing applications to build loosely coupled Services and create Service-oriented composite applications. Their core product in this space is *OnWeb*, an environment for creating new applications by first identifying the important corporate information within existing applications or data sources, exposing that information either via Web interfaces or Web Services, and then combining that information in new ways to create a single application that presents all the information to both internal or external users.

Introduction to OnWeb for the midsize company

OnWeb offers a comprehensive development and deployment platform that enables midsize firms to create new business-oriented Web Services by leveraging existing enterprise information systems, including databases, legacy systems and other applications without having to make any invasive changes to those systems. OnWeb enables the transformation of host applications into Web applications or Web Services that companies can then use to build composite applications, as shown in Figure 2 below.

OnWeb offers a comprehensive development and deployment platform that enables midsize firms to create new business-oriented Web Services by leveraging existing enterprise information systems.

Figure 2: NetManage OnWeb



OnWeb runs on Microsoft and UNIX servers, as well as IBM System i5 servers (formerly iSeries), and it can integrate host transactions with Java or .NET applications, or it can provide the entire mobile solution itself as a composite mobile application server. In fact, OnWeb has the application connectivity, process management and application presentation capabilities needed to be a standalone composite application server.

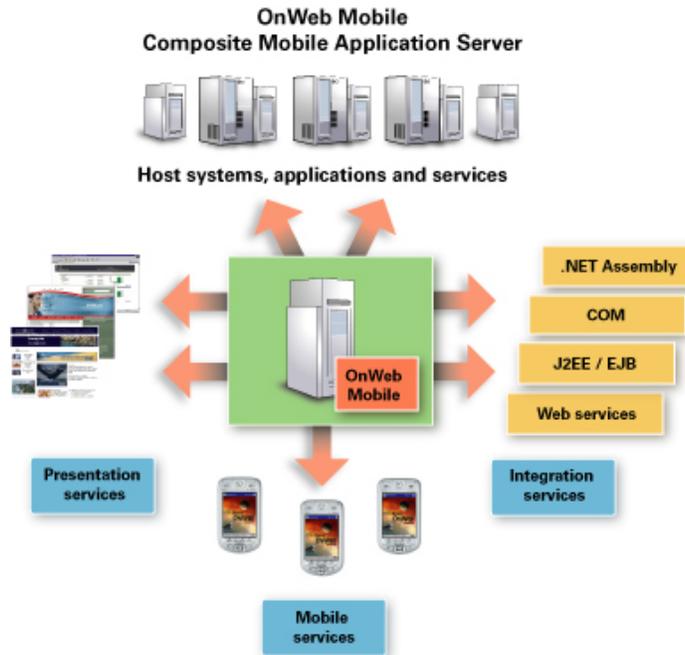
Building multichannel capabilities

OnWeb can determine dynamically how to present various types of information depending upon the consumer of that information. For example, OnWeb will display information as HTML for a Web page, as an XML file for another program to process, as a Web Service, or in a device-specific presentation format for mobile phones or mobile communication-enabled PDAs. In other words, OnWeb allows the same application to Web-enable, Web Service-enable and mobile-enable the same underlying corporate applications.

In fact, a primary advantage of OnWeb is its scalable presentation capabilities, which allow organizations to use the same application integration technology for everything from mainframe terminals, Web publishing, Web integration, Web Services, and various types of mobile Internet applications. The OnWeb Mobile Application Server makes it straightforward to render corporate information in different presentation formats for virtually any mobile device, as shown in Figure 3 below:

OnWeb can determine dynamically how to present various types of information depending upon the consumer of that information.

Figure 3: OnWeb Mobile



Source: NetManage

Web Services-based integration in the midmarket is predominantly B2B, and OnWeb excels at the B2B aspects of integration, including the support for Web interfaces and mobile devices in addition to Web Services. As a result, midmarket firms will find substantial value in NetManage OnWeb as they build out their SOA implementations.

V. The ZapThink Take

Small and midsize businesses face quite different integration challenges than large enterprises. Internal integration needs are more straightforward than at larger firms, while business models are more likely to focus on B2B integration with suppliers and customers. Traditional B2B integration, however, is notoriously inflexible and expensive. The simple addition of Web Services interfaces reduces some of the costs, but when those interfaces are still tightly coupled, they remain as inflexible as the API approaches that came before.

Only through the application of SOA can SMBs build and leverage loosely coupled Web Services that are flexible enough to respond to ongoing change in the business environment. Fortunately, SOA for midsize firms is not as difficult a problem as it is for large companies with complex, heterogeneous IT environments – but it is complex enough to require a variety of infrastructure capabilities like those that NetManage OnWeb provides.

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ZapThink is an IT advisory and analysis firm that provides trusted advice and critical insight into the architectural and organizational changes brought about by the movement to XML, Web Services, and Service Orientation. We provide our three target audiences of IT vendors, service providers and end-users a clear roadmap for standards-based, loosely coupled distributed computing – a vision of IT meeting the needs of the agile business.

ZapThink helps its customers in three ways: by helping companies understand IT products and services in the context of Service-Oriented Architecture (SOA) and the vision of Service Orientation, by providing guidance into emerging best practices for Web Services and SOA adoption, and by bringing together all our audiences into a network that provides business value and expertise to each member of the network.

ZapThink provides market intelligence to IT vendors and professional services firms that offer XML and Web Services-based products and services in order to help them understand their competitive landscape, plan their product roadmaps, and communicate their value proposition to their customers within the context of Service Orientation.

ZapThink provides guidance and expertise to professional services firms to help them grow and innovate their services as well as promote their capabilities to end-users and vendors looking to grow their businesses.

ZapThink also provides implementation intelligence to IT users who are seeking guidance and clarity into the best practices for planning and implementing SOA, including how to assemble the available products and services into a coherent plan.

ZapThink's senior analysts are widely regarded as the "go to analysts" for XML, Web Services, and SOA by vendors, end-users, and the press. Respected for their candid, insightful opinions, they are in great demand as speakers, and have presented at conferences and industry events around the world. They are among the most quoted industry analysts in the IT industry.

ZapThink was founded in October 2000 and is headquartered in Baltimore, Maryland. Its customers include Global 1000 firms and government organizations, as well as many emerging businesses. Its analysts have worked at such firms as IDC, marchFIRST, and ChannelWave, and have sat on the working group committees for standards bodies such as RosettaNet, UDDI, and ebXML.

Call, email, or visit the ZapThink Web site to learn more about how ZapThink can help you to better understand how SOA will impact your business or organization.

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