

zapthink foundation report

SERVICE-ORIENTED MANAGEMENT

*HOW WEB SERVICES MANAGEMENT IS THE KEY
TO THE SERVICE-ORIENTED ARCHITECTURE*



SERVICE-ORIENTED MANAGEMENT

HOW WEB SERVICES MANAGEMENT IS THE KEY TO THE SERVICE-ORIENTED ARCHITECTURE

November 19, 2002

Analyst: Jason Bloomberg

Abstract

Web Services management applications provide software that helps companies manage the systems and applications that underlie their Web Services implementations. The Web Services management products on the market today offer functionality in five basic categories: system management, lifecycle management, business management, security management, and the most important, Service-Oriented Architecture enablement.

The latter category is especially important because many Web Services management products provide the critical infrastructure necessary for companies to take their fine-grained, atomic Web Services and other data sources and encapsulate and compose them into coarse-grained business Services that make up a Service-Oriented Architecture. Such architectures offer far more long-term business value than the point-to-point applications of Web Services common today.

Key Points:

◆ Market Overview

- Web Services management (WSM) software is software that helps companies manage the systems and applications that underlie their Web Services.
- Service-oriented management (SOM) software is software that supports the development and execution of a Service-oriented architecture.

◆ Facts & Figures

- By 2007, 60% of the total system management market will consist of large vendors who offer SOM solutions, and a full 75% of the system management market (both small and large vendors) will be SOM-enabled.
- The market for Service-Oriented Management is expected to grow from \$30 million in 2002 to \$9.2 Billion by 2007.

◆ Analysis

- Web Services Management solutions bridge the gap between the underlying systems and the Services that run on top of them.

◆ Future Trends

- Starting in mid-2004, the large system management vendors will begin to dominate the SOM space, to the extent that the SOM point solutions segment of the market will reach its maximum in 2005.

All Contents Copyright © 2002 ZapThink, LLC. All rights reserved. Reproduction of this publication in any form without prior written permission is forbidden. The information contained herein has been obtained from sources believed to be reliable. ZapThink disclaims all warranties as to the accuracy, completeness or adequacy of such information. ZapThink shall have no liability for errors, omissions or inadequacies in the information contained herein or for interpretations thereof. The reader assumes sole responsibility for the selection of these materials to achieve its intended results. The opinions expressed herein are subject to change without notice. All trademarks, service marks, and trade names are trademarked by their respective owners and ZapThink makes no claims to these names.



Table of Contents

- I. Report Scope 5
- II. Context for Web Services Management..... 5
 - 2.1. Business Drivers for Service Orientation..... 6
 - 2.1.1. The Fundamental Business Driver for Web Services Management : Business Agility 6
 - 2.1.2. The Key Technology Driver: Efficient Integration 7
 - 2.1.3. Service-Oriented Architectures: the key to business agility 10
 - 2.1.4. Encapsulation and Composition: The Keys to the SOA 10
 - 2.2. The Role of Web Services Management 11
 - 2.2.1. Crossing the Chasm: Thinking in terms of Service Orientation..... 11
 - 2.2.2. Service-Oriented Management and Web Services Management 12
 - 2.3. The Five Categories of Web Services Management Functionality 14
 - 2.3.1. System management 15
 - 2.3.2. Lifecycle management 16
 - 2.3.3. Business management..... 17
 - 2.3.4. Security management 17
 - 2.3.5. SOA enablement 18
- III. Web Services Management Technology Landscape 19
 - 3.1. Architectural Approaches 19
 - 3.1.1. Proxy mode..... 19
 - 3.1.2. Invasive vs. non-invasive 20
 - 3.1.3. In-server vs. standalone 20
 - 3.1.4. Centralized vs. distributed: the “Web Services network” 21
 - 3.1.5. Enterprise vs. B2B 21
 - 3.2. Architectural Elements 21
 - 3.2.1. Management dashboards 22
 - 3.2.2. Service grid 22
 - 3.2.3. Adaptation layer 22
 - 3.2.4. XML pipeline..... 22
 - 3.2.5. UDDI-compliant registry..... 23
 - 3.3. Standards efforts 23
- IV. Market Segmentation..... 24
 - 4.1. Web Services Management Market Map 24
 - 4.2. System Management Platforms 25
 - 4.3. Web Services Security Platforms 26
 - 4.4. XML Proxies..... 26
 - 4.5. Private Web Services Networks 26
 - 4.6. Transaction/Workflow/BPM Platforms and Tools 27
 - 4.7. Web Services Development Platforms and Tools 28
 - 4.8. Web Services Testing Tools..... 28
 - 4.9. Web Services Management Platforms 28
- V. Current State of the Market 29
 - 5.1. Q4 2002 – Q1 2003: “Everybody in the Pool” 29
 - 5.1.1. Current supported feature snapshot 29
- VI. Business and Technology Trends 32
 - 6.1. Long Term Trends: Relationship to the System Management Market 33
 - 6.2. Long-Term Trends: Relationship to Web Services Market 35
 - 6.3. Inhibitors to Growth of Service-Oriented Management Market 36
- VII. Conclusions..... 38
 - 7.1. Key Notes 38
 - 7.2. Decision Points 40
 - 7.3. Figures..... 40
 - 7.4. Tables 41
- VIII. Profiled Vendors 41



- 8.1. Web Services Management Vendors 41
 - 8.1.1. Actional..... 41
 - 8.1.2. Adjoin (acquired by Computer Associates)..... 41
 - 8.1.3. AmberPoint..... 42
 - 8.1.4. Blue Titan 42
 - 8.1.5. Confluent Software 42
 - 8.1.6. Digital Evolution 42
 - 8.1.7. Flamenco Networks 42
 - 8.1.8. Infravio..... 42
 - 8.1.9. Primordial 42
 - 8.1.10. Santra Technology 42
 - 8.1.11. Talking Blocks 42
 - 8.1.12. Westbridge Technology 42
 - 8.1.13. WestGlobal 42
- 8.2. Private Web Services Networks 42
 - 8.2.1. Grand Central Communications..... 42
- 8.3. System Management Platforms 42
 - 8.3.1. BMC Software PATROL 43
 - 8.3.2. Computer Associates Unicenter..... 43
 - 8.3.3. HP OpenView..... 43
 - 8.3.4. IBM Tivoli 43

 **Decision Point**

For companies to leverage the true value of Web Services, they must take the important step of building loosely coupled, standards-based Service-Oriented Architectures.

Web Services are an evolutionary step in the development of distributed computing techniques.

I. Report Scope

This report covers two closely related, but significantly different software product categories: Web Services Management solutions and Service-Oriented Management solutions. In the short term, as companies look to manage their growing Web Services implementations, they will be looking to Web Services Management products to provide the visibility and control into the systems and applications that underlie their Web Services. However, for companies to leverage the true value of Web Services, they must take the important step of building loosely coupled, standards-based Service-Oriented Architectures (SOAs). Many of the products considered in this report offer SOA enablement functionality that enables and supports enterprise SOAs—and these products are Service-Oriented management solutions.

Included in this report is a discussion of Web Services management and Service-oriented management within the context of the evolution of distributed computing; a discussion of the functionality that such products offer, and the technology concepts behind these products. Then the report discusses the market for Web Services management and Service-oriented management, explaining the different approaches the vendors in this space are taking. Finally, this report covers current and future trends for this market, including inhibitors to growth, followed by profiles of the vendors featured in this report.

The report specifically does not cover the following topics, although they may be mentioned in the context of discussing Web Services management approaches:

- Security solutions or platforms (see ZapThink's *XML and Web Services Security Report* [ZTR-WS104]).
- Service-Oriented Integration, EAI, or B2B Integration solutions (see ZapThink's *Service-Oriented Integration (SOI) Report* [ZTR-WS103]).
- XML Proxy solutions (see ZapThink's *XML Proxies: XML-aware Network Appliances and Firewalls Report* [ZTR-DI101]).
- Web Services testing tools (see ZapThink's *Testing Web Services Report* [ZTR-WS105]).

By reading this report, software vendors should be able to understand the competitive landscape for Web Services management. Industry users should gain a clear understanding of how such products can meet their needs, and all readers should gain a clear picture of the importance of Service-oriented management solutions to the development of Service-oriented architectures.

II. Context for Web Services Management

To put *Web Services management* (WSM) in the appropriate context, it's important to understand that Web Services are an evolutionary step in the development of distributed computing techniques. Building upon client/server, object-oriented analysis and design, and n-Tier, component-based architectures, Web Services take the next logical step: open standards based, loosely coupled distributed computing.

Fundamentally, however, this *Service orientation* is a level of abstraction placed on top of existing distributed computing infrastructure. Underneath the veneer of Web Services lies applications and systems. Managing Web Services, therefore,

necessarily involves managing the applications and systems that underlie them. This truism begs the question: what, if anything, is fundamentally different about Web Services management as compared to traditional system management? It doesn't matter if a Service is loosely coupled or coarse grained, because if the computer it's running on goes down, so too does the Web Service.

2.1. Business Drivers for Service Orientation

To manage Web Services, a management tool must manage the underlying systems and applications. Such management tools must also manage the Service orientation abstraction layer itself.

The answer to the question of what is unique about Web Services management is multifaceted. It's true that to manage Web Services, a management tool must manage the underlying systems and applications, to be sure. But more significantly, such management tools must also manage the Service orientation abstraction layer itself. In order to encapsulate the underlying software components, applications, and underlying systems with Web Services interfaces and then compose these fine-grained functional Web Services into coarse-grained business Services, companies must have a set of management tools that can establish and maintain the connections between the software on the one hand and the Services on the other. This research report shows that most vendors who are building Web Services management products are attempting to offer such tools.

To connect the business drivers facing companies today to Web Services management tools requires a multi-step explanation. To make this explanation clearer, the box below covers the high points of the argument.

- Business agility is a fundamental business driver.
- To achieve business agility, companies must have efficient integration.
- Efficient integration must be Service-oriented.
- Service-oriented integration requires that companies implement Service-oriented architectures.
- Service-oriented architectures require that fine-grained atomic Web Services be encapsulated and composed into coarse-grained business Services.
- Some Web Services management applications offer such encapsulation and composition functionality.
- ZapThink calls such applications Service-oriented management applications, to distinguish them from the broader category of Web Services management applications.

2.1.1. The Fundamental Business Driver for Web Services Management : Business Agility

As with any software market, to understand the full context of the WSM market, it is essential to uncover the fundamental business drivers that the market addresses. This understanding is particularly important with WSM, because the drivers for this market go beyond the short-term cost savings drivers that have motivated much of the demand for Web Services in general up to this time. WSM solutions do offer cost savings to enterprises in many ways, but there is an even more important business driver: business agility.

Business agility is the ability for businesses to proactively manage change and use changing business environments to their advantage. Change comes in many forms: changes in the marketplace, in technology, in the world at large. Companies that can make effective use of a changing environment are better

Business agility is the ability for businesses to proactively manage change and use changing business environments to their advantage.

The true goal of Service orientation—and hence, of Web Services in general—is to remove the bottleneck that IT has on businesses' ability to be agile.

able to compete and thrive in any business climate, but especially in tough economic times like those we have since the bursting of the dot.com bubble.

Information technology is often the area most relevant to discussions of business agility, because achieving agility begins with removing the bottlenecks that impede it, and IT is usually where the bottlenecks are. In addition, technology is so intertwined with the business processes at most companies that changing a process often starts by changing the technology. In fact, companies are so used to the fact that IT creates a bottleneck within their organization that technology and its limitations often drive business decisions. It doesn't take an MBA to know, however, that business should drive the technology, not the other way around. The unfortunate fact of the matter is that IT has never been flexible enough to respond to changing business requirements in a cost-effective manner. The true goal of Service orientation—and hence, of Web Services in general, and Web Services management in particular—is to remove the bottleneck that IT has on businesses' ability to be agile.

2.1.2. *The Key Technology Driver: Efficient Integration*

Of all the technology issues facing companies today, the one that is most likely to be a bottleneck is integration. The apparently simple act of getting two different machines to talk to each other in a flexible way that allows for cost-effective change has been a surprisingly persistent problem since the advent of distributed computing over thirty years ago. Some companies report anywhere from 40% to 70% of their IT budgets are spent on integration. Clearly, reducing the cost and complexity of integration will reduce the bottleneck that IT presents to business.

For information technology to be able to deliver business agility, therefore,

For information technology to be able to deliver business agility, integration among systems must be rapid and cost-effective.

TAKE CREDIT FOR READING ZAPTHINK RESEARCH!



ZapThink is an IT market intelligence firm that provides trusted advice and critical insight into XML, Web Services, and Service Orientation. We provide our target audience 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.

This document provides just a small glimpse of the intelligence ZapThink offers. To get the full picture, please visit our Web site at www.zapthink.com. You'll find information about the range of our research on XML, Web Services, and SOAs and more of our market insight. You'll also be able to sign up for our popular biweekly ZapFlash newsletter that can deliver our market-leading intelligence directly to your inbox.

Also, Take Credit for reading ZapThink research! Visit www.zapthink.com/credit and enter the code SOMKEY. We'll reward you with ZapCredits that you can use to obtain free research, ZapGear, and more! If you purchased this document, Taking Credit for it entitles you to free updates. If this document was free, then we'll notify you when updates are available if you Take Credit for it.

We hope that this document and our Web site help you understand the XML, Web Services, and Service Orientation marketplace better. However, our research is only a part of the value we offer our customers. For personal advice, press support, and competitive intelligence, subscribe to our ZapAccess research subscription service. Become a ZapThought Leader – let ZapThink help you understand the market-changing impact of standards-based, loosely coupled distributed computing, and use that understanding for competitive advantage.

For more information, please call us at +1-781-207-0203, or drop us an email at info@zapthink.com.

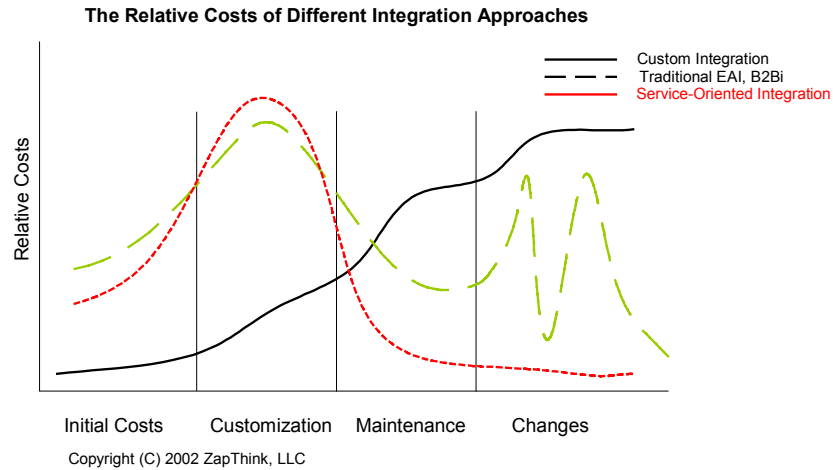
integration among systems must be rapid and cost-effective. Why, then, are the problems with integration still troubling companies, even though distributed computing has been around for a generation or more? On one level, the cause is the lack of standard ways of programming different systems to communicate. For any two different systems, the traditional approach to integration is to write programming code for each system that teaches it how to talk to the other system. Such an approach is expensive and time consuming, and doesn't scale well or respond to change in a flexible way. This approach to integration is *tightly coupled*, which means that one programming team must control the integration code on both systems to get them to communicate with each other. Such integration is also point-to-point, which means that the complexity of the distributed systems explodes as the number of systems goes up.

Enterprise Application Integration (EAI) addresses some of the problems with the point-to-point approach, providing an extra layer of software (often called a bus) that acts as an integration intermediary. With EAI, the various systems need only know how to communicate with the bus, which reduces the cost of connecting each system to each other. However, EAI buses are still typically tightly coupled, which means that any changes or upgrades to the EAI software or the underlying systems is expensive and difficult, thus limiting business agility. In addition, EAI doesn't work well across more than one company, because there is no single programming team that can control all the interfaces.

What companies need is a loosely coupled approach to integration—one that does not require that the same programmers control the systems on both ends. This loosely coupled approach to integration is called *Service-oriented integration (SOI)*. For SOI to be a reality, there must be standard, established ways of handling integration so that any company that follows the standards can be confident that their systems will interoperate with the other systems the company wishes to communicate with. Learn more about SOI in the ZapThink Report *Service-Oriented Integration: Using Web Services and XML to Integrate Systems* (ZTR-WS103).

SOI, however, is not a panacea. In fact, moving from traditional integration approaches to SOI involves substantial investment in rearchitecting the IT infrastructure, as illustrated in Figure II.1 below. This figure illustrates three approaches to integration: custom integration, EAI and SOI.

Figure II.1: The Relative Costs of Different Approaches to Integration



It is important to understand the relative costs to the enterprise of each approach to integration:

- *Custom integration* – dedicating internal IT resources to a project that requires results from multiple systems. Such custom integration involves the smallest up-front cost of the three integration approaches, because the skills and tools necessary to complete the integration task are typically already in-house, and simply need to be assigned to the project. However, as the project progresses, it consumes an increasingly large amount of developer time, in proportion to the complexity of the integration task at hand. During the maintenance phase, then, costs tend to skyrocket. The costs for both maintaining and changing systems can become exorbitant since developers must recode all applications that are impacted by changes.
- *EAI and business-to-business integration (B2Bi)* – presenting an architecture that efficiently manages and maintains connections among systems and between enterprises. The primary downside to EAI is that the up-front costs are much higher than custom integration, as shown in the first column of Figure II.1. In a typical EAI solution, end-users must spend from tens of thousands to millions of dollars on software licenses and server hardware. The labor involved in the integration project then can cost many times more than the initial costs. However, the true hidden cost of EAI is when business requirements change. In fact, EAI “pours concrete on business processes,” since EAI reinforces existing business processes rather than enabling an agile IT environment that allows companies to deal easily with change.
- *Service-oriented integration (SOI)* – rather than explicitly declaring how systems will interact through low-level protocols and object-oriented architectures, SOI provides an abstracted interface for system interaction. Systems expose their capabilities as Services, and other systems that choose to interact with them can discover those services and bind to them either at design-time or at runtime. To achieve SOI, an enterprise must first rearchitect their IT infrastructure, creating a *Service-oriented architecture (SOA)* that supports loosely coupled integration to underlying applications and other system resources.

To achieve SOI, an enterprise must first rearchitect their IT infrastructure, creating a Service-oriented architecture that supports loosely coupled integration to underlying applications and other system resources.

Because of this need to rearchitect, the cost of the SOI approach is the highest during the customization phase, as shown in Figure II.1. The true cost benefit of the SOI approach comes in the maintenance and changes phases of an integration project, where costs can be substantially lower, because of SOI's inherent flexibility.

With SOI, enterprises can think about how to expose a system in a Service-oriented manner to whatever (authorized) system cares to access it. In this way, integration is no longer thought of as being a point-to-point process, but instead as the ability to access freely available Services. Rather than planning in advance how a specific application will tie into another applications, developers should be thinking about how a specific application exposes itself to any application that cares to speak to it. The point of SOI is to allow arbitrary applications, systems, and data stores to communicate without concern as to the other system's requirements.

2.1.3. *Service-Oriented Architectures: the key to business agility*

The key to business agility is Service-oriented integration, and the key to SOI is the Service-oriented architecture. Loosely coupled, standards-based Service-oriented architectures (SOAs) are an approach to distributed computing that thinks of software resources as Services available on the network. Consumers of these Services (which are the systems that wish to integrate with the Services) can find and connect to the desired Services in a loosely coupled fashion. Ideally, the Services available on the network expose the functionality of the underlying software in terms of business concepts. Web Services that offer business-oriented functionality instead of detailed technical functionality are *coarse grained*. Coarse granularity is one of the most important features of SOAs.

In general, SOAs offer the following advantages over traditional approaches to distributed computing:

- They offer coarse-grained business Services, as opposed to fine-grained software-oriented function calls.
- They provide location independence: Services need not be associated with a particular system on a particular network.
- The Service consumers are loosely coupled from the underlying systems.
- Authentication and authorization of Service consumers, and in general all security functionality that applies to the Services, is also available via Web Services.
- Web Services consumers can find and connect to available Services dynamically.

Companies that successfully rearchitect their IT infrastructures into SOAs to take advantage of SOI are able to remove the integration bottleneck, connecting different systems in a flexible, cost-effective manner. Without the integration bottleneck, then, such companies are able to achieve their desired business agility.

2.1.4. *Encapsulation and Composition: The Keys to the SOA*

Encapsulation is one of the fundamental principles of object oriented analysis and design (OOA/D), and it is equally important to Web Services. A software object is encapsulated when its inner workings are hidden from view. All interactions with such an object take place through its interface via public

Loosely coupled, standards-based Service-oriented architectures (SOAs) are an approach to distributed computing that thinks of software resources as Services available on the network.

At its most basic, the rearchitecture process for creating an SOA involves encapsulating software components, applications, and underlying systems with Web Services interfaces and then composing these fine-grained functional Web Services into coarse-grained business Services.

method calls. Furthermore, encapsulated objects are defined by their functionality. Encapsulation is important because it breaks up large software projects into tasks that can be assigned to different developers. If the development team agrees on the object interfaces, then the team work in parallel.

Encapsulation in OOA/D is limited in that it provides for tightly coupled interfaces, because the developers must agree on the interfaces beforehand. If those objects expose their functionality via Web Services interfaces, however, then the developers don't have to agree with each other, they simply have to agree to use the Web Services standards. Web Services encapsulation, therefore, can be loosely coupled.

While encapsulation dates back to OOA/D, composition finds its roots in *virtualization*, which was important in even the very earliest software. Virtualization is a software design approach that provides an abstraction layer between the user and the software. Examples of virtualization include 3GL language compilers, mainframe timesharing, GUI windowing environments, storage-area networks, and remote procedure call-based distributed architectures. Each example takes a complex software environment and abstracts it into a simpler, more powerful set of tools.

As computers grew more powerful and complex, virtualization techniques continued to provide additional levels of abstraction. Now, Web Services herald the next evolutionary step in this inexorable progression to the next level of abstraction, which is Service orientation. At its most basic, the rearchitecture process for creating an SOA involves encapsulating software components, applications, and underlying systems with Web Services interfaces and then composing (virtualizing) these fine-grained functional Web Services into coarse-grained business Services.

2.2. The Role of Web Services Management

To understand the role Web Services management plays in the transition to the SOA, it is important to understand the context of the transition from the current point-to-point applications of Web Services to the broad application of Service-oriented architectures. This transition can best be illustrated by taking a look at Web Services in the context of the standard technology adoption curve.

2.2.1. Crossing the Chasm: Thinking in terms of Service Orientation

Many of the companies that are currently using Web Services are either innovators or early adopters. In today's Web Services' early adopter phase, most companies are using Web Services to solve straightforward integration problems. Often such projects are pilot projects, or have limited scope and importance within the enterprise. However, the number of such Web Services projects is increasing quite rapidly, and the number of companies using Web Services in mission critical ways is also expanding dramatically. However, for Web Services technologies to reach acceptance by a majority of companies, it must cross the technology adoption chasm, as shown Figure II.2:

Figure II.2: The Web Services Adoption Curve

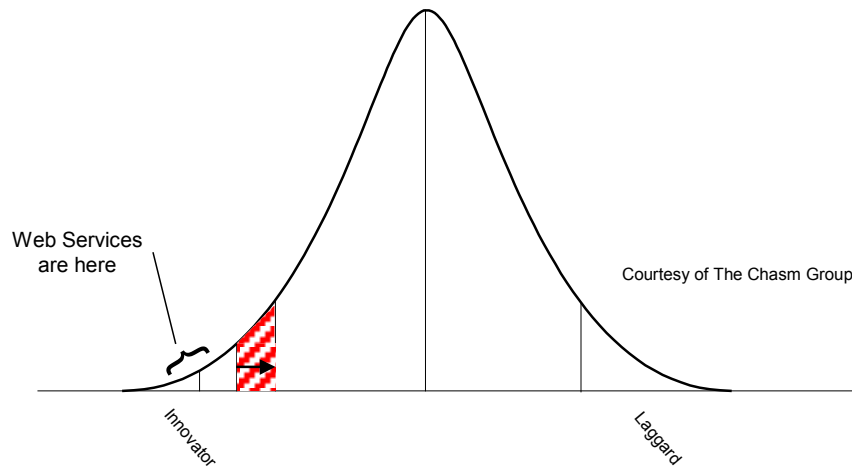


Figure II.2 shows the familiar technology adoption curve, illustrating how only a few companies are innovators or early adopters when it comes to a new technology. The new technology must then cross a “chasm” to get to the early and late majority phases, where most companies come to accept the new technology. Today, Web Services are in the innovator and early adopter phases, marked by the point-to-point use of Web Services. To cross the chasm to widespread adoption of Web Services, companies must move toward SOAs.

While there is the promise of substantial cost savings resulting from more efficient integration, much work remains to tackle the difficult rearchitecting work involved in moving toward a Service-oriented architecture. The most important change is the one of *perspective*: changing companies’ thinking about IT from a point-to-point integration model to a Service-oriented model. Once companies make this conceptual change, then the necessary technical changes start to fall into place. ZapThink believes that this change in perspective is a critical transition for the adoption of Web Services generally.

Once companies make the conceptual leap to Service orientation, the hard work of crossing the chasm begins. Companies must rearchitect their distributed computing infrastructures to create an SOA. This rearchitecture means encapsulating existing systems and applications by providing them with fine-grained Web Services interfaces and then composing those fine-grained Web Services interfaces into coarse-grained business Services.

2.2.2. Service-Oriented Management and Web Services Management

However, rearchitecture does not take place in a vacuum; companies must transition their systems from the existing architectures to SOAs in a manner that does not impede the ongoing necessary functionality of the technology. Furthermore, the act of rearchitecting is not sufficient to guarantee that the resulting business Services will meet the needs of the business. The enterprise also needs to have a management infrastructure in place that can support the performance of the Services as they are being moved into production as well as once they are live. ZapThink calls the management infrastructure needed to support the ongoing functionality of a SOA *Service-oriented Management (SOM)*.

Today, Web Services are in the innovator and early adopter phases, marked by the point-to-point use of Web Services. To cross the chasm to widespread adoption of Web Services, companies must move toward SOAs.

Decision Point

Companies must rearchitect their distributed computing infrastructures to create an SOA, which means encapsulating existing systems and applications by providing them with fine-grained Web Services interfaces and then composing those fine-grained Web Services interfaces into coarse-grained business Services.

Web Services management (WSM) --
 Applications that help companies manage the systems and applications that underlie their Web Services.

Web Services management applications include:

Service-oriented management (SOM) --
 Applications that support the development and execution of a Service-oriented architecture.

Therefore, to cross the chasm to Service orientation, an enterprise needs to accomplish three tasks:

- Changing their perspective on IT to a Service orientation perspective.
- Rearchitecting their IT infrastructure to create a SOA.
- Implementing SOM to support the creation and ongoing functionality of the SOA.

Some of the problems illustrated by the chasm to Service orientation is illustrated below in Figure II.3.

Figure II.3: The Chasm to Service Orientation



Copyright © 2002 ZapThink LLC



Change in perspective
Rearchitecting IT infrastructure
Service-oriented management

On the left of Figure II.3 is the early adopter view of Web Services. This perspective centers on providing SOAP interfaces to software components in order to solve point-to-point integration problems. Companies typically perform

this kind of integration inside their own firewalls in order to reduce the cost of conducting such internal integration projects. WSM in this context means managing the systems and applications that underlie the Web Services.

On the right of Figure II.3 is the majority adopter view of Web Services, which is the Service orientation view. (In fact, the term “Web Services” may finally move to the background as Service orientation comes to the fore). In the Service orientation perspective, IT provides coarse-grained business Services in a location and connection-independent way. Many such Services will be for the use of more than one company, as appropriate, with the requisite Service-oriented security infrastructure controlling access to the Services. Web Service consumers can dynamically discover and bind to the necessary Services at runtime. The nuts and bolts of the software that makes such Services available takes place behind the scenes from the business user, because the applications and systems that actually provide the Service functionality are fully encapsulated and separated from the Web Service consumers by a composition, or virtualization layer. This encapsulation and composition is provided by Service-oriented management software.

2.3. The Five Categories of Web Services Management Functionality

It is important to remember that even when an organization has the Service orientation perspective on IT, the systems and applications that provide that Service orientation are still present—they are simply hidden from view. Nevertheless, IT departments must still manage these systems, only now they must also manage the Web Services they provide as well. Web Services management is therefore a combination of traditional system management techniques and the new Service-oriented management techniques that are a critical part of running SOAs in the enterprise.

In today’s IT environment, IT management is tightly coupled to the systems being managed. System management products provide visibility and control into the various systems that make up an enterprise’s IT infrastructure. In an SOA, however, what is important are the Services, not the systems *per se*. It is still just as important to manage the systems that underlie the Services, but even more important is the ability to manage how the systems enable business Services to function as they should—in a location independent, coarse-grained fashion. WSM solutions bridge the gap, therefore, between the underlying systems and the Services that run on top of them.

Bridging the gap between systems and Services is logically more complex than simply managing the underlying systems. As a result, several software vendors are offering new products, called *Web Services Management Platforms*, that provide a range of functionality for managing SOAs and the Web Services they contain. These features fall into five general categories: system management, lifecycle management, business management, security management and SOA enablement, as shown in Figure II.4:

Web Services management is a combination of traditional system management techniques and the new Service-oriented management techniques that are a critical part of running SOAs in the enterprise.

Web Services Management solutions bridge the gap between the underlying systems and the Services that run on top of them.

Figure II.4: The Five Categories of Web Services Management Functionality

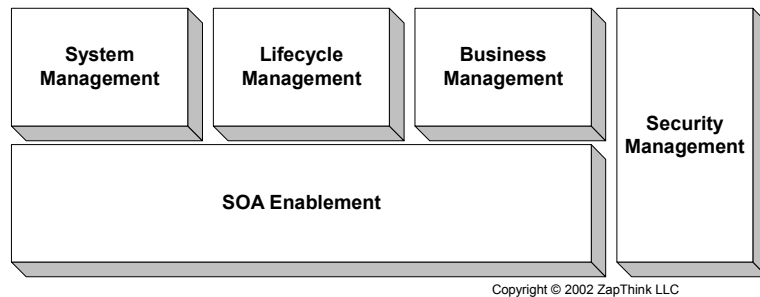


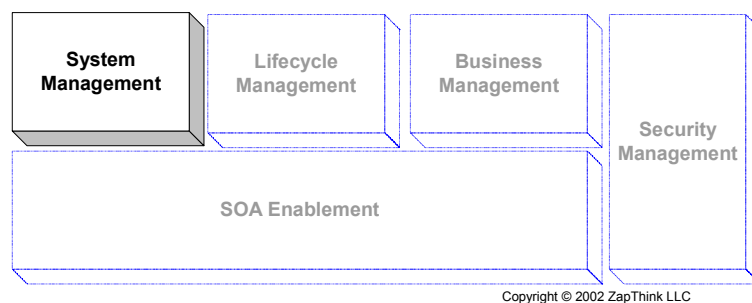
Figure II.4 shows the relationship of each of the five categories of Web Services management, which will be discussed individually below. System management, lifecycle management, and business management form the core management functionality that WSM inherits from traditional IT management. Security management is tangential to the issue of Web Services Management, for two reasons: first, security must be comprehensive to be effective, and second, Web Services security management is often considered a different market segment from WSM. ZapThink covered Web Services security management in its report *XML and Web Services Security (ZTR-WS104)*. However, this report includes a discussion regarding security to some extent, because many Web Services management platforms also manage security.

The fifth box represents SOA enablement, which contains those functions that specifically enable the coarse-grained business Services that form the core of the SOA, including encapsulation and composition. Web Service management products must offer SOA enablement functionality to be considered Service-oriented management products.

2.3.1. System management

The first category of management that Web Services management must address is system management, as shown in Figure II.5:

Figure II.5: System Management



Since Web Services run on software that in turn runs on systems, all WSM platforms typically begin with system management. The functions that fall into the system management category include:

- *Monitoring* – insuring that underlying systems are up and running.

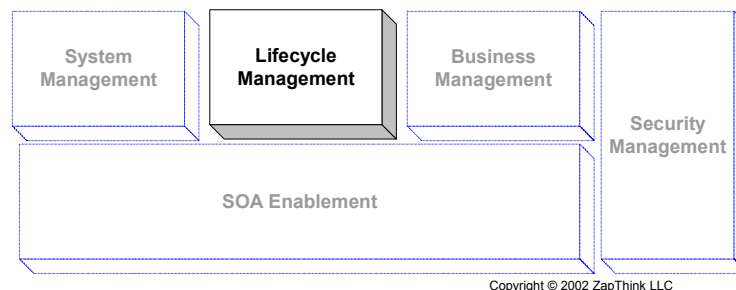
Web Service management products must offer SOA enablement functionality to be considered Service-oriented management (SOM) products.

- *Alerts* – notifying the appropriate people or other systems when there's a problem with a system.
- *Auditing & reporting* – tracking the usage of Web Services and making that information available to reporting systems.
- *Control* – providing human managers with the ability to stop, restart, and adjust the configuration parameters of Web Services.
- *Service-level agreement (SLA) and quality of service (QoS) management* – tracking the quality of service offered to particular customers (uptime, latency, etc.) and adjusting various performance criteria to insure that each customer is getting the service they contracted for.
- *Exception management and problem resolution* – handling problems that occur by following policies set out for dealing with such problems.
- *Root cause analysis* – digging down through various layers (Web Service, application, application server, network, operating system, hardware) to find the actual cause of particular problems.

2.3.2. Lifecycle management

In addition to making sure the underlying systems are working properly, WSM platforms often handle the process for putting new Web Services into production, and dealing with them when they change. These functions are in the lifecycle management category, as shown in Figure II.6:

Figure II.6: Lifecycle Management



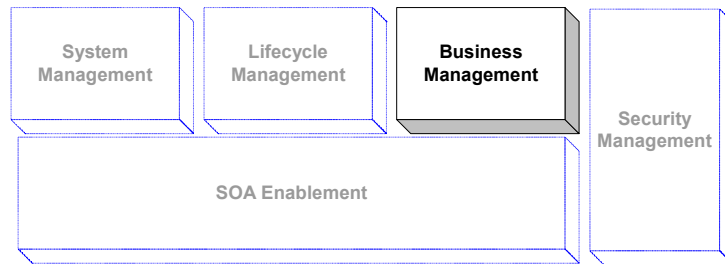
The functions in the lifecycle management category include:

- *Provisioning* – putting new Web Services into production and getting the Web Service consumers to access them properly.
- *Versioning of Web Services* – managing different versions of Web Services that may be in production at the same time.
- *Deprecation* – retiring out-of-date Web Services gracefully, without breaking any Web Service consumers that may be accessing them.
- *Dependencies* – handling changing Web Services when one Web Service may depend on another.
- *Configuration management* – managing different configurations of one or more Web Services as companies upgrade or change the Services.
- *Web Service emulation* – simulating one or more Web Services for the purposes of testing.

2.3.3. Business management

IT administrators are typically in charge of the system and lifecycle management functionality of a Web Service management platform. However, several platforms also provide visibility and control for the line of business manager. These functions fall into the business management category, as shown in Figure II.7:

Figure II.7: Business Management



Copyright © 2002 ZapThink LLC

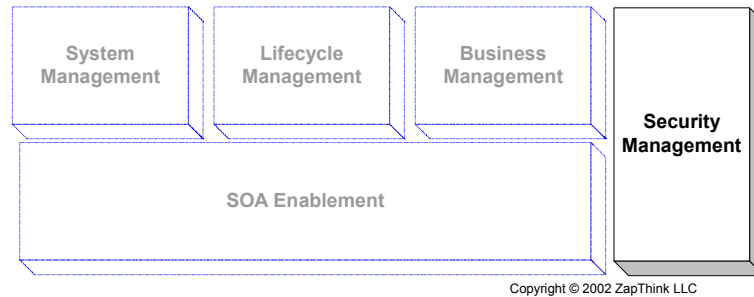
The following functions fall into the business management category:

- *Business process management* – managing the business processes that are enabled by Web Services.
- *Transaction management* – monitoring and controlling the business transactions that go through Web Services.
- *Message prioritization/differential quality of service* – controlling which customers get access to particular Web Services, especially when those Services are not able to serve all customers equally.
- *Business activity monitoring and decision support* – accessing the critical business information in an IT infrastructure needed to make business decisions, including the flow of revenue through the managed Web Services.
- *Billing & metering* – calculating each customer’s use of particular Web Services and feeding that information to a billing system.

2.3.4. Security management

Overlapping the area of Web Services management is the Web Services security segment of the market. In many ways, security is a category in its own right, but many WSM products also manage Web Services security. Security management is shown in Figure II.8:

Figure II.8: Security Management



Copyright © 2002 ZapThink LLC

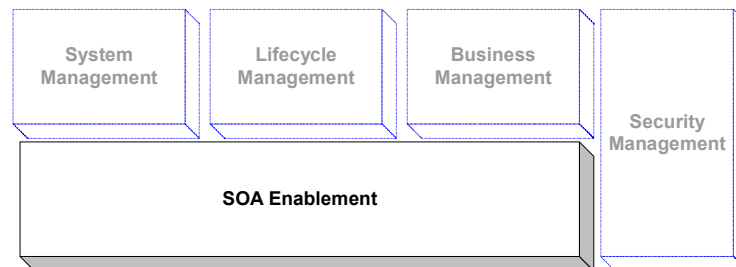
The sorts of functions that Web Services security management products manage include:

- *Authentication and access control* – making sure that only authorized Web Services consumers can access individual Services.
- *Encryption/decryption* – Encrypting messages to make them more secure and confidential. May also involve decrypting incoming messages to inspect them and then re-encrypting them.
- *Malicious attack protection* – preventing unauthorized access to Web Services, including those that are actively seeking to penetrate the Services.
- *Non-repudiation* – providing an audit trail for incoming or outgoing messages to guarantee their delivery.

2.3.5. SOA enablement

Putting all the system, lifecycle, business and security management functionality together offers a broad range of management capabilities to the enterprise, but still does not provide the critical connection between coarse grained business Services and the systems and applications that support them. WSM platforms must also provide a set of functions we call SOA enablement. Platforms that provide SOA enablement capabilities help companies take collections of fine-grained Web Services and roll them up into coarse-grained business Services. SOA enablement is shown in Figure II.9:

Figure II.9: SOA enablement



Copyright © 2002 ZapThink LLC

The functions that fall into the SOA enablement category include:

- *Caching/virtual Web Service* – creating instances of Web Services that serve as fully functional copies of those Services. Should the original service become unavailable, the cached copy can serve automatically.
- *Synchronous/asynchronous conversion* – if an underlying system is unable to respond to a Web Services request in real time, the management platform can respond with an automatic “your request is being processed” message, and then send the desired result when it is ready.
- *Encapsulation and composition* – Taking fine-grained, atomic Web Services (typically wrappers for existing applications) and combining them into coarse-grained business Services.
- *Web Service instance management/resource mobility* – preserving the location independence properties of a SOA by enabling different systems in different locations to provide particular Web Services.
- *Dynamic routing* – sending Web Service consumers’ requests to different systems depending on availability, and also to preserve location independence.
- *Transport protocol translation* – Translating among different messaging formats including SOAP, Java messaging (JMS), and message-oriented middleware like IBM WebSphere MQ (MQSeries), DCOM, etc., so that systems that are not exposed as Web Services can participate fully in an SOA.

III. Web Services Management Technology Landscape

Because the vendors in the WSM space typically offer several functions in two or more of the categories discussed in section 2.3 above, it is impossible to delineate the technology underpinnings of each of the vendors into separate categories. Instead, there are certain differences in architectural approaches to WSM as well as common architectural elements that vendors share. This section first discusses the contrasting approaches to building WSM technology, and then pulls together the common threads among many of the vendors’ approaches to discuss architectural elements that many of the various WSM products have in common.

3.1. Architectural Approaches

The fundamental principles of IT management are *visibility* and *control*. In general, an IT management product should provide certain personnel with visibility into how the technology under management is behaving, and then allow those personnel to control the technology. Depending on the focus of the vendor, however, the personnel may be different, and the particular technology under management differs as well. Nevertheless, the concepts of visibility and control are constant; the questions each vendor must answer are *what* and *how*: what is made visible, and how does the product make it so, and likewise, what can users control, and how is that control enabled.

3.1.1. *Proxy mode*

ZapThink’s definition of an *XML Proxy* is a hardware or software solution that actively listens for XML traffic on the network and either passes it along unmodified or performs some action on the XML content. XML Proxies can operate either transparently or as auxiliary applications on the network. As

The fundamental principles of IT management are *visibility* and *control*.

★ Vendor Focus

Actional
Adjoin
AmberPoint
Digital Evolution
Flamenco Networks
Primordial

★ Vendor Focus

Blue Titan
IBM

While the broad acceptance of a non-invasive approach indicates that most vendors are taking a Service-oriented approach to management, it does reduce the ability for non-invasiveness to be a competitive differentiator.

★ Vendor Focus

Actional
AmberPoint
Digital Evolution
Flamenco Networks
Infravio
Talking Blocks
Santra

discussed in section 4.4 below, there is an XML proxy product category that contains some products that offer some WSM features. It is important to note that such XML proxy products are different from WSM platforms that can work in proxy mode.

A WSM platform contains components that work in proxy mode when those components can be used to proxy Services within the IT organization. These proxy components can proxy externally available Services on the local network, or provide a single gateway for all internally available services that the company wishes to expose externally. These proxy components act intercept SOAP messages in order to implement several key pieces of WSM functionality, including authentication, digital signing, encryption, reliability, compression, streaming, and state management. Vendors who use proxies as part of their WSM platforms include **Actional**, **Adjoin**, **AmberPoint**, **Digital Evolution**, **Flamenco Networks**, and **Primordial**.

3.1.2. *Invasive vs. non-invasive*

An invasive approach is one that requires the Web services code in the managed system to conform in some way to the WSM platform's APIs or management framework. For example, a WSM system that is linked to a development toolset may contain a SOAP runtime library that the managed Services calls directly, making it impossible to run the Services without the library. With the invasive approach, the WSM system is implemented during development of the managed Web Services and is therefore closely tied to the Web Services at deployment. The advantage of the invasive approach is that it puts greater power in the hands of the developers of the Web Services. **Blue Titan** is an example of a vendor who offers an invasive WSM platform, and **IBM's** plans for Tivoli also take an invasive approach.

In contrast, a non-invasive approach offers the ability to make any Web Service production-ready without changing any of its code or recompiling the application's Web Service API. The non-invasive approach also provides the company with the flexibility to manage Web Services outside their control. Essentially, a non-invasive approach allows the WSM platform and the managed Services to remain loosely coupled from each other, which is essential for Service-oriented management. As a result, most WSM vendors offer non-invasive solutions. While this broad acceptance of a non-invasive approach indicates that most vendors are taking a Service-oriented approach to management, it does reduce the ability for non-invasiveness to be a competitive differentiator.

3.1.3. *In-server vs. standalone*

A WSM platform runs in-server if it requires an existing runtime environment to execute. Typical runtime environments include J2EE application servers and Java Servlet engines; on the Microsoft platform, an in-server platform accesses a .NET server on the CLR (common language runtime) level. One advantage of an in-server approach is that it allows the WSM platform to manage the underlying execution platform (i.e., the application server) directly, as opposed to over the network. Another advantage to the in-server approach is that an IT organization that favors one platform over another can select a WSM product that runs on their platform of choice. **Infravio** and **Santra** take the in-server approach.

A WSM platform runs in standalone mode if it comes self-contained with its own runtime engine. Sometimes standalone mode is referred to as "proxy managed," but this term is needlessly confusing, as a platform may run as a proxy either in-server or in standalone mode. The advantages to standalone mode include platform neutrality, because the WSM software operates separately from

★ Vendor Focus

Blue Titan
Digital Evolution
Flamenco Networks
Primordial

★ Vendor Focus

Adjoin
AmberPoint
Blue Titan
Confluent Software
Digital Evolution
Flamenco Networks
Grand Central
Infravio
Primordial
Santra

proprietary systems or suites, and is thus able to monitor and manage Web Services that are provided from a number of different systems. **Actional**, **Flamenco Networks**, and **Talking Blocks** take the standalone approach. In addition, **AmberPoint** and **Digital Evolution** offer platforms that can be placed in either in-server or standalone modes. AmberPoint in particular offers native J2EE and .NET support for their in-server mode, providing value to companies who insist upon one platform or the other.

3.1.4. *Centralized vs. distributed: the “Web Services network”*

Most WSM solutions take a centralized approach to their architecture: running the core management engine on one server (or a cluster of servers). Centralized WSM architectures might have components that are distributed throughout the network or on other companies’ networks, but the core software that provides the bulk of the management functionality is located in a particular place.

However, a few vendors have taken a decentralized, distributed approach to architecting their WSM solutions. Instead of having a central control point, these vendors essentially set up a peer-to-peer arrangement of their software. **Blue Titan**, for example, distributes “engines,” “switches,” and “servers” throughout the managed network, forming what they call a Web Services network. Each of these components provides a different part of the WSM functionality set.

Flamenco Networks also offers a Web Services network, which is a combination of peer-to-peer communications and centralized management. **Digital Evolution** and **Primordial** are two additional companies that have distributed architectures.

3.1.5. *Enterprise vs. B2B*

Traditional, tightly coupled system management takes place entirely within the perimeter of the enterprise. Web Services, however, provide the loose coupling that makes it possible for one company’s WSM system to provide some management capabilities for other companies’ Web Services. While some WSM vendors like **AmberPoint** and **Infravio** focus on managing one company’s Web Services, other vendors, like **Flamenco Networks**, **Grand Central**, and **Primordial** offer active B2B solutions. By “active,” we mean that they require the participation of the parties on both sides of the Web Services exchanges to take advantage of the full management capabilities of the platform. Grand Central is a private Web Services network that operates entirely outside the firewalls of its customers, while Flamenco and Primordial offer optional software that can be placed on a business partner’s network.

Adjoin, **Blue Titan**, **Confluent Software**, and **Digital Evolution** are vendors who can passively manage external Web Services. By “passive,” we mean that the business partner need not install any software or make any changes to the systems under management—the only changes that the business partner must make are policy changes to allow the managing company to have access to their systems.

Finally, **Santra** is a special case, in that they focus on managing individual company’s Web Services from outside the firewall, similar to the way certain service providers provide Web site monitoring.

3.2. Architectural Elements

It is out of the scope of this report to discuss how each WSM platform works, because every vendor has a different approach to the problems—a familiar characteristic of an emerging market. However, this report is able to cover some of the elements common to most of the WSM products on the market. Even

★ Vendor Focus

AmberPoint
Confluent Software
WestGlobal

A Service-oriented management platform is a Service grid—using the word “platform” is somewhat of a misnomer, casting Service orientation in terms of the n-Tier architecture world that preceded it.

★ Vendor Focus

Actional

though each individual solution will need to be judged on its own merit, these common architectural elements will provide some of the foundation for understanding how each of these products approaches the market.

3.2.1. Management dashboards

Almost all of the WSM products contain one or both of two kinds of management dashboards, typically presented via a Web interface. There are management dashboards for IT managers and for business managers. The IT dashboard typically allows IT managers to centrally control, monitor and administer Web Services, and coordinate all participants in the process, including components, Services, and Service endpoints. This dashboard enables the IT manager to monitor Services activities, receive alerts, and perform diagnostics. **AmberPoint** and **Confluent Software** offer notable examples of IT management dashboards.

The business management dashboard enables line of business managers to understand and visualize how Web Services are being used, who is using them, and why. These dashboards provide business managers with real-time and historical data on the activities of coarse-grained business Services. They help with the planning of IT requirements and expenditures, avoiding system failures and improving the quality of the business Services a company offers its customers and business partners. **WestGlobal** and **Confluent Software** are two companies that offer business dashboards. (Note that Confluent offers both kinds of dashboards. This feature is a competitive differentiator for Confluent).

3.2.2. Service grid

There is no widely accepted term for this profoundly important concept, so we have chosen the term “Service grid” from John Hagel’s book *Out of the Box: Strategies for Achieving Profits Today and Growth Tomorrow through Web Services* (John Hagel III, Harvard Business School Press, 2002). The Service grid is that part of a SOM solution that provides the SOA enablement—taking fine-grained, atomic Web Services and other sources of data and encapsulating and composing them into coarse-grained business Services. Broadly speaking, a Service-oriented management platform is a Service grid—using the word “platform” is somewhat of a misnomer, casting Service orientation in terms of the n-Tier architecture world that preceded it. As companies make the conceptual leap discussed in section 2.2.1, they will think less about WSM platforms and think more in terms of Service grids.

3.2.3. Adaptation layer

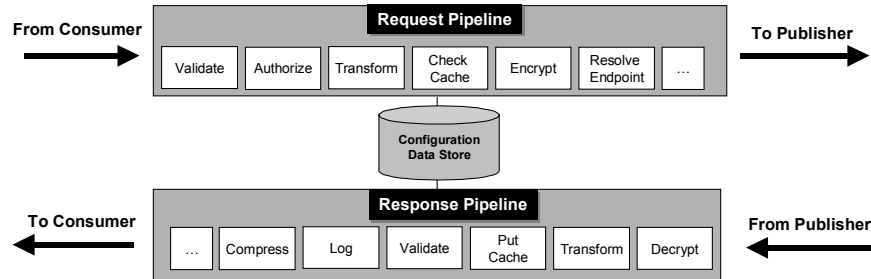
The adaptation layer essentially provides the fine-grained, atomic Web Services that are the raw material for the Service grid. Adapters in this layer allow software to browse APIs and metadata and expose those as atomic Web Services. Adaptation layers like **Actional**’s generate WSDL and maintain a directory of Services that can be published to UDDI-compatible servers. Most SOI and Web Services platform vendors also offer adaptation layers of their own. If the interface to an atomic Web Service must change, the adaptation layer can regenerate new WSDL files, thus providing a critical measure of loose coupling between the back-end data sources and the Service grid.

3.2.4. XML pipeline

An XML pipeline is essentially a two-way sequence of components arranged in queues that act on XML traffic going from a Web Service consumer to the Web Service publisher and back, as shown in Figure III.1. The components in the

pipeline are typically configurable. There is also typically a metadata store that manages these components for the WSM platform.

Figure III.1: XML Pipeline



Copyright © 2002 ZapThink LLC

★ Vendor Focus

Actional
Digital Evolution
Primordial

Companies that explicitly use XML pipelines include **Actional** (who calls them Service groups), **Primordial**, and **Digital Evolution**.

★ Vendor Focus

Digital Evolution
Infravio

3.2.5. UDDI-compliant registry

Digital Evolution and **Infravio** are two WSM vendors who have incorporated UDDI-compliant registries into their solutions. As part of the management process, WSM platforms must keep track of the Web Services they have under management—in a Service-oriented manner. As a result, UDDI registries are a natural part of such a platform. When a WSM platform provides Web Service instance management, for example, the UDDI registry can play an important part in tracking the instances.

What is most interesting about these platforms' use of UDDI is that while the UDDI registries can serve the enterprise in their role as UDDI registries, they also provide additional functionality as part of the management solution. ZapThink believes that this application of UDDI is part of a greater trend for the "ugly duckling" of core Web Services standards. We predict that many UDDI-compliant products coming to market in 2003 and 2004 will serve specific purposes that may not simply be performing as UDDI registries.

3.3. Standards efforts

The primary motivation for the development of standards is to provide for interoperability between heterogeneous systems. As a result, there is a need in the industry for a Web Services management standard that can enable interoperability between systems located at different businesses. The standards group OASIS has decided to tackle the creation of such a specification in their OASIS Management Protocol Technical Committee. This committee has the task of defining a new inter-enterprise protocol that would enable developers and system administrators to manage Web Services interactions between companies.

Because of its ambitious scope, this protocol is very complex. The committee intends the protocol to provide views and management controls to the entire lifecycle of Web Services transactions and events. As a result, the new protocol will provide views into network, application logic and business logic elements of XML traffic. The protocol must also support more than one application model.

The approach the committee is taking is to leverage, where appropriate, much of the prior management protocol work that has been done by earlier IT management efforts, including the Distributed Management Task Force's work on the Common Information Model (CIM), SNMP, HP's Open Management Interface and the Java Community Process' JMX. From those earlier efforts the committee is making a list of the features that they feel they can agree should go into the new Web Services management protocol. On this list of features at this point is security, event notification, exception handling, asynchronous communications, service level agreement enforcement and state management for traffic between legacy and Internet resources.

The OASIS Management Protocol Technical Committee's work is still in its early stages, so final agreement is still many months away. However, for companies that have Web Services or are looking to build SOAs, there's no reason to wait for the standard to become established. This standard is for B2B applications, which isn't where most companies will start with WSM anyway. For those companies that do want to tackle B2B Web Services management, there are products like Flamenco Networks, Grand Central, and Primordial that offer B2B solutions, as covered in section 3.1.5.

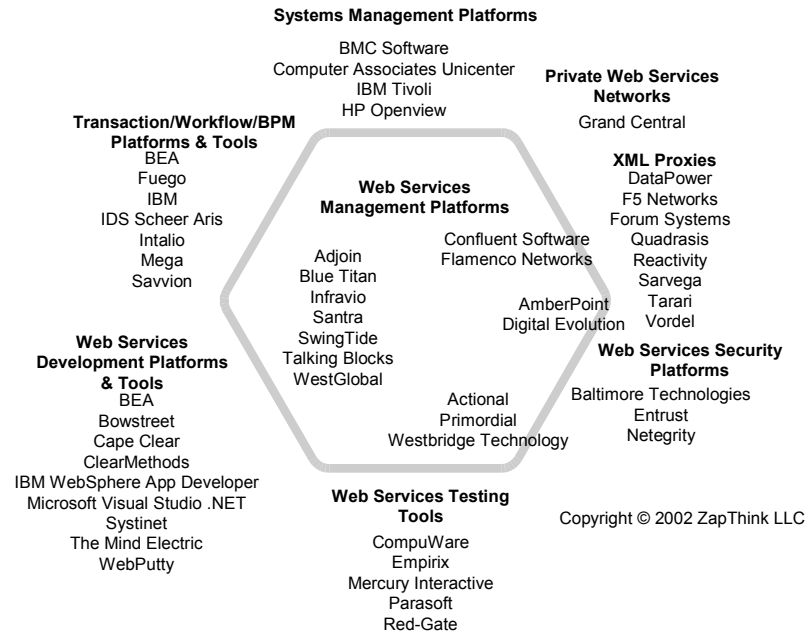
IV. Market Segmentation

By its nature, IT management bridges multiple elements of the IT infrastructure. As such, a variety of different categories of software products contain some elements of IT management. The overlap between management products and products from other categories is even more pronounced when considering Web Services management (WSM) products, both because WSM products overlap existing IT management segments, as well as because Service orientation abstracts the system and application layers, essentially spreading the Web Services under management across the infrastructure. Therefore, before this report can discuss the specifics of each WSM product and how they compare on the five categories of functionality described in section 2.3, we must first consider the relationship WSM has to categories that overlap the WSM market segment.

4.1. Web Services Management Market Map

The WSM platform market segment overlaps seven other market segments, as illustrated in Figure IV.1:

Figure IV.1: The Web Services Management Market Map



Copyright © 2002 ZapThink LLC

In Figure IV.1, the hexagon contains those companies who identify their products as WSM platforms. Companies in groupings whose names overlap the hexagon have products that also fall in one or more of the neighboring product segments. In many cases, the list of companies in each segment is meant to be representative of the companies who offer such products, rather than being an exhaustive list of companies in that segment.

This report will cover each of the eight market segments from the perspective of how products in that segment offer some of the functionality described in section 2.3. ZapThink has prepared (or will prepare) reports on many of these segments, as well; the reference to the appropriate report will be included in the discussion.

★ Vendor Focus

BMC Software
Computer Associates
Hewlett-Packard
IBM

System management vendors' products must be ready to meet customer demand when it materializes, but it is too risky for them to develop Service-oriented management capabilities before such demand becomes significant.

4.2. System Management Platforms

WSM finds its heritage in the market segment containing system management platforms. There are many vendors who compete in this space, but ZapThink looked closely at the four current market share leaders: **BMC Software**, **Computer Associates**, **IBM**, and **Hewlett-Packard**. These four companies have established products in what has become an established enterprise market. The world's largest companies rely upon these vendors' products to keep their IT infrastructures running every day.

Each of these vendors understands the power of Web Services and Service orientation, and each one has a product roadmap that includes Web Services management. However, as with any established vendor with an existing enterprise customer base, none of them can risk pushing their product strategies "too far ahead of the headlights," as one vendor put it. In other words, their products must be ready to meet customer demand when it materializes, but it is too risky for them to develop Service-oriented management capabilities before such demand becomes significant.

★ Vendor Focus

Actional
Baltimore Technologies
Entrust
Netegrity
Quadrasis
Westbridge Technology

★ Vendor Focus

Actional
Confluent Software
DataPower
Flamenco Networks
Forum Systems
Primordial
Quadrasis
Reactivity
Sarvega
Tarari
Vordel
Westbridge Technology

Therefore, these large vendors are downplaying the importance of Service orientation, instead offering products that manage Web Services as interfaces to existing software and hardware assets. Nevertheless, their two-year product roadmaps generally include many of the SOA enablement features that are necessary for offering SOM.

4.3. Web Services Security Platforms

Web Services security platforms offer comprehensive enterprise security functionality (including policy-based access control, authentication, authorization, confidentiality, and administration) in a Service-oriented manner. Such platforms are covered in depth in ZapThink's report *XML and Web Services Security* (ZTR-WS104). Web Services security platforms are mentioned here because managing security is a critical part of the management puzzle. Products like **Westbridge Technology's** *XML Message Server* and **Actional's** *SOAPswitch* and *SOAPstation* explicitly manage Web Services security as well as providing other core WSM functionality. Other products like those from **Quadrasis** manage security as part of a comprehensive *Enterprise Application Security Infrastructure* (EASI) that manages the security aspects of a SOA. The Web Services security platform products from **Baltimore Technologies** and **Entrust**, as well as the **Netegrity** *TransactionMinder* product also offer Web Services security management that can work in conjunction with a WSM platform.

4.4. XML Proxies

XML proxies are hardware or software solutions that actively listen for XML traffic on the network and either pass it along unmodified or perform some action on the XML content. XML proxies can operate transparently or as applications on the network. ZapThink covered the XML proxy space in depth in our *XML Proxies: XML-aware Network Appliances and Firewalls* Report (ZTR-DI101). The XML proxy space is relevant to the WSM space for two reasons. First, many WSM platforms have components that can act as XML proxies as part of their management functionality, including **Actional**, **Confluent Software**, **Flamenco Networks**, and **Primordial**. Second, several vendors have XML proxy solutions on the market that offer some WSM functionality, including software XML firewalls from **Quadrasis**, **Reactivity**, **Vordel**, and **Westbridge Technology**, as well as hardware products from **DataPower**, **Forum Systems**, and **Sarvega**. **Tarari**, a spin-off of Intel, has begun to offer specialized chipsets aimed at offloading the critical processing steps required to handle high volume Web Services Management capabilities as well.

The software XML firewalls as well as Forum Systems' XML/Web Services security devices typically offer a range of XML and Web Services auditing functionality in addition to their core security functionality, which includes data integrity and confidentiality. Sarvega's XML switch product offers dynamic routing and quality of service functionality, and DataPower's XML accelerator device offers some resource mobility functionality.

4.5. Private Web Services Networks

Private Web Services networks are an outgrowth of the value-added network (VAN) concept familiar from the EDI world. As with a VAN, a private Web Services network connects business partners in a secure, fault-tolerant manner for the purposes of conducting B2B transactions. However, the similarity ends there. VANs are typically store-and-forward private networks that connect pairs of business partners and allows them to transmit specific documents and

★ Vendor Focus

Bang Networks
Flamenco Networks
Grand Central
Sterling Commerce

Being able to manage business processes among companies in a flexible, agile manner is one of the goals of Service orientation.

★ Vendor Focus

AmberPoint
BEA Systems
Blue Titan
Confluent Software
Digital Evolution
Fuego
Grand Central
IBM
IDS Scheer
Intalio
Mega
Savvion
Talking Blocks

messages. Private Web Services networks, on the other hand, combine synchronous and asynchronous communications among two or more business partners over the Internet. Most significantly, such networks also provide the management infrastructure necessary to loosely couple the participants, which provides a substantial advantage in flexibility over the traditional VAN.

The one vendor that has established themselves as a private Web Services network vendor is **Grand Central Communications**. **Flamenco Networks** also offers their WSM platform via a hosted model, as well as in an OEM version that network service providers can use to offer Web Services networking to their customers. What distinguishes the Grand Central network and the Flamenco Networks hosted service from the Web Services efforts of traditional VAN operators like **Sterling Commerce** and private network vendors like **Bang Networks** is that Grand Central and Flamenco offer the encapsulation and composition functionality that is essential to SOA enablement, as well as dramatically different business models and value propositions for participating companies.

4.6. Transaction/Workflow/BPM Platforms and Tools

As with the system management segment, the business process management (BPM) tools segment is a relatively mature market segment separate from Web Services and Service orientation. This segment is particularly relevant for Web Services discussions because being able to manage business processes among companies in a flexible, agile manner is one of the goals of Service orientation. As a result, as Web Services standards and tools mature, managing business processes, including transactions and workflow, will become central to the efforts of software vendors. In fact, ZapThink's Web Services Roadmap (introduced in the *XML and Web Services Security* report) identifies transactions, orchestration and workflow, and business web process automation as three key roadblocks for Web Services adoption over the 2003-2005 timeframe. For this reason, ZapThink will cover this topic in our upcoming *Web Services Flow: Transactions, Orchestration, and Composition* report.

What the market is doing, therefore, is approaching the Web Services transaction management/workflow/BPM space from two directions: on the one hand are the Web Services-focused companies who are looking to offer functionality in this category, and on the other hand are vendors who are currently offering tools in this category who are now moving into Web Services and SOAs. WSM companies who offer transaction management capabilities include **Digital Evolution** and **Talking Blocks**. **Grand Central** also offers transaction management as part of its private Web Services network. WSM companies who offer business process management functionality include **AmberPoint**, **Blue Titan**, **Confluent Software**, and **Digital Evolution**.

BEA and **IBM** are taking a different approach to this space. Their core application server platforms (*WebLogic* and *WebSphere*, respectively) are becoming commodities in the maturing application server market, so both vendors are looking to build additional functionality on top of their core platforms, which includes BPM capabilities. Both vendors also have strong transaction management products that they are looking to leverage in a Web Services environment. Finally, there are several vendors who offer BPM tools, including **Fuego**, **IDS Scheer**, **Intalio**, **Mega**, and **Savvion**. Each of these vendors has a Web Services strategy that recognizes the power of Service orientation.

★ Vendor Focus

BEA Systems
Bowstreet
Cape Clear
ClearMethods
IBM
Microsoft
The Mind Electric
Systinet
WebPutty

4.7. Web Services Development Platforms and Tools

The Web Services development platforms and tools market segment has unusual economics, in that many of the most popular of such tools are free for developer use (including those from **Cape Clear**, **The Mind Electric**, and **Systinet**), or are typically purchased in conjunction with broad enterprise infrastructure products (which includes tools from **BEA**, **IBM**, and **Microsoft**). The remaining vendors in this space typically offer tools to solve specific problems, like those from **Bowstreet**, **ClearMethods**, and **WebPutty**.

For the companies that give away developer versions of their tools, they are each struggling with how best to build upon their tools to offer a suite of products that has solid commercial potential. The Mind Electric, for example, is rolling out their **GAIA** product, which they call a Service-oriented grid-computing platform. **GAIA** offers many SOA enablement features as part of its offering. Likewise, **Cape Clear** offers provisioning, configuration management, and transport protocol translation as part of its *Cape Clear Product Set, Version 4*. **Systinet's WASP 4.0 Product Suite** also offers configuration management and monitoring of the enterprise Web Services environment.

While products like **BEA's WebLogic Workshop**, **IBM's WebSphere Application Developer**, and **Microsoft's Visual Studio .NET** do not focus specifically on Web Services management, they each offer lifecycle management capabilities, as well as offering developers visibility into many aspects of their respective vendors' Web Services platforms. **ZapThink** plans to cover this space in an upcoming *Web Services Development Platforms and Tools* report.

4.8. Web Services Testing Tools

In the traditional software development world, there is a clear dichotomy between design time and runtime activities. Projects have lifecycles with clear launch dates, and testing activities generally take place before launch while management activities take place after launch. However, in the Service-oriented world, the distinction between design time and runtime blurs, as IT organizations can roll out new Web Services on the fly, without a formal project launch. As a result, WSM products that offer lifecycle management capabilities overlap the testing tools space.

In addition, testing tools vendors like **Mercury Interactive** and **CompuWare** have been offering runtime testing as well as design time testing capabilities for some time, and **Mercury Interactive** in particular has clear plans to move into the WSM space as well, either directly or through partnerships. **Empirix**, **Parasoft**, and **Red-Gate** also have testing tools that offer WSM capabilities. See **ZapThink's Testing Web Services Report (ZTR-WS105)** for more information.

4.9. Web Services Management Platforms

Finally, at the center of the hexagon in **Figure IV.1** are vendors who offer WSM platforms. For these vendors, "Web Services management" usually means more than software that manages Web Services; it also means using Web Services to provide a Service-oriented approach to managing IT infrastructures generally. Vendors such as **Infravio** and **WestGlobal** are using this approach to gain traction with customers.

Another important point to make about the WSM platform market segment is that some vendors are taking a broad approach, offering most or all of the five functionality categories discussed in section 2.3. Key vendors taking this broad approach include **Confluent Software** and **Digital Evolution**. However, many

★ Vendor Focus

CompuWare
Empirix
Mercury Interactive
Parasoft
Red-Gate

★ Vendor Focus

Adjoin
Confluent Software
Digital Evolution
Infravio
Santra
SwingTide
Westbridge
Technology
WestGlobal

vendors believe that to gain headway in the management space as a small company, they must concentrate on offering functionality in two or three of the categories. Still other vendors look to concentrate on just one category, including **Adjoin** and **Santra** in system management, **SwingTide** and WestGlobal in business management, and **Westbridge Technology** in security management. The last two of these also offer SOA enablement as a strategic part of their solution offering.

V. Current State of the Market

There is no question that the WSM space is an emerging market. ZapThink believes that 2003 will be the main build-out year for these products; 2002 is more of the year of introducing the products to the market. As a result, it is meaningless to discuss market leaders at this time. Instead, we can discuss the trends that we see occurring in the WSM market in relation to the overall Web Services and IT markets, and then characterize the current situation as a snapshot in time of these trends.

5.1. Q4 2002 – Q1 2003: “Everybody in the Pool”

The main trend that we see occurring in the WS management space in the fourth quarter of 2002 into the first quarter of 2003 is the “everybody in the pool” phase. Many companies are in the process of coming out of stealth mode. Company names are changing, early rounds of financing are falling into place, and pilot customers are being signed up.

A very important fact that characterizes the “everybody in the pool” metaphor is the large number of new vendors who are offering products in this emerging market, in advance of clear customer demand for such products. ZapThink believes that there are simply far too many companies vying to define and participate in this market. As a result, there will likely not be enough funding to go around, and company failures, mergers, and acquisitions are likely in 2003.

But, even though we predict some of the featured vendors in this report will not be able to obtain sufficient funding, it is still important to point out that there is significant funding activity going on in the WSM space. VCs do recognize the potential of this market and are willing to invest in the right companies. However, to obtain funding, a vendor must have all the elements an investor is looking for: solid management and technical teams, a rational product strategy, and existing customers and revenues. What those requirements mean to the current market is that the participants who have obtained VC funding do typically have all of these factors going for them, including real customers and real revenues.

Another result of the emerging market/everybody in the pool phase that WSM is in now is that marketing messages are still generally in flux. There is no well-defined vocabulary for many of the features and value propositions that these products offer, so each vendor is struggling with how to explain its own features and benefits. One interesting consequence of this confusion is that few vendors have been able to express the value proposition behind the SOA enablement functionality that ZapThink believes is the most important part of what these vendors offer—in spite of the fact that about two thirds of the vendors featured in this report offer SOA enablement capabilities.

5.1.1. Current supported feature snapshot

Keeping in mind that this market is in an extremely dynamic phase, we still wanted to present which functionality each of the featured vendors offer in their

Decision Point

There are simply far too many companies vying to define and participate in this market. As a result, there will likely not be enough funding to go around, and company failures, mergers, and acquisitions are likely in 2003.

Decision Point

To obtain funding, a vendor must have all the elements an investor is looking for: solid management and technical teams, a rational product strategy, and existing customers and revenues.

current products. This functionality is summarized in Table V.1. To understand this table, it is essential to keep in mind the following:

- The table indicates that a vendor offers a particular feature if that vendor has explicitly stated they offer such a feature, either in their marketing material or in their conversations with ZapThink. Therefore, vendors may offer some features not reflected in this table that they did not deem significant enough to mention.
- The table seeks to reflect the current functionality of the current version of each vendor’s software, or at best, the functionality to be included in an imminent version release. The table does not include planned functionality beyond the next immediate release.

Table V.1: Web Services Management Feature Grid

		Actional	Adjoin	AmberPoint	Blue Titan	BMC	CA Unicenter	Confluent	Digital Evolution	Flamenco Networks	Grand Central	HP OpenView	IBM Tivoli	Infracore	Primordial	Santra	Talking Blocks	Westbridge Tech.	WestGlobal
System Mgmt	Monitoring, alerts, auditing & reporting, control	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
	SLA/QoS management	X	X		X			X	X	X	X	X	X	X	X	X		X	X
	Exception management & problem resolution		X	X		X	X	X	X		X	X	X						
	Root cause analysis	X	X			X	X	X	X			X	X						
Lifecycle Mgmt	Provisioning	X		X	X		X	X		X		X			X				
	Versioning of Web Services			X		X			X				X				X		X
	Deprecation			X									X						
	Dependencies		X		X			X					X						
	Configuration management												X						
	Web Service emulation			X				X	X										

Source: Copyright © 2002 ZapThink, LLC

		Actional	Adjoin	AmberPoint	Blue Titan	BMC	CA Unicenter	Confluent	Digital Evolution	Flamenco Networks	Grand Central	HP OpenView	IBM Tivoli	Infravio	Primordial	Santra	Talking Blocks	Westbridge Tech.	WestGlobal	
Business Mgmt	Business process management			X	X			X	X											
	Transaction management					X			X		X	X					X			
	Message prioritization/ differential QoS							X	X			X					X		X	
	Business activity monitoring & decision support	X		X				X	X	X			X		X					X
	Billing & metering									X			X	X	X		X	X	X	
Security Mgmt	Authentication and access control	X		X	X		X	X	X	X	X	X			X		X	X	X	
	Encryption/ decryption								X	X	X				X				X	
	Malicious attack protection								X										X	
	Non-repudiation	X		X				X	X	X	X							X	X	
SOA Enablement	Caching/virtual Web Service								X		X				X		X			
	Synchronous/asynchronous conversion				X			X	X	X										
	Composition and Encapsulation	X		X	X			X	X	X	X			X	X		X	X	X	
	Instance management/ resource mobility				X															X
	Dynamic routing	X		X	X			X	X	X								X	X	X
	Transport protocol translation	X			X		X		X	X	X			X	X		X			

Source: Copyright © 2002 ZapThink, LLC

Important conclusions to be drawn from Table V.1.

- *Having more features is not necessarily better than having fewer features* – There is a strong likelihood that vendors who focus on a small number of key functions will be able to implement those functions more effectively than vendors who try to offer a large number of features.

Vendors are finding that potential customers are caught in a “Catch-22” situation: why buy Web Services management before there are many Web Services in production, yet how to run many Web Services without being able to manage them?

★ Vendor Focus

Actional
Cyclone Commerce
Infravio
IONA
WestGlobal
WRQ

⚡ Decision Point

Web Service-enabling existing systems provides a key value proposition for Web Services. To make full use out of these newly unlocked data assets, however, companies must have the Web Services management layer on top of the adaptation layer to provide the infrastructure necessary to use such Web Services on an enterprise level.

- *The fact that the large, established vendors offer limited functionality should not be taken as a sign of weakness – it is important to remember that the products from the large system management vendors (**BMC, CA, HP, and IBM**) offer a broad set of functionality beyond the WSM category. In addition, all four of these vendors have WSM strategies in the works, which they will roll out at the appropriate time by considering the demands of their customers. See sections 4.2 and 0 for more information.*
- *SOA enablement has broad support among many vendors – as a rule, WSM vendors have been struggling with how to market the SOM aspects of their products, and as a result, there is limited awareness among potential customers of the breadth of such products. Nevertheless, an important conclusion of this report is that most WSM vendors are serious about SOA enablement.*
- *There is no broad agreement as to the necessary features within each of the functionality categories – reading across the bands in Table V.1 shows that while some features are common to all vendors who offer a particular category of WSM functionality (for example, monitoring, alerts, auditing and reporting within the system management category, which this report lumped together because vendors either support all or none of them), there are many functions that have spotty support, even among those vendors that specialize in the particular category.*

VI. Business and Technology Trends

The largest impediment to the early adoption of WSM products is that the value proposition for WSM is not immediately obvious to many companies. Vendors are finding that potential customers are caught in a “Catch-22” situation: why buy WSM before there are many Web Services in production, yet how can companies run many Web Services without being able to manage them? It is up to the vendors, then, to identify customers’ current pain points and show those customers how WSM products can address those problems.

What many vendors are finding is that the solution to the Catch-22 is to manage existing systems and services as Web Services gradually roll out. **WestGlobal** is notably taking this approach. Other vendors are focusing, such as **Infravio**, are focusing on SOA enablement. A third approach is to help companies Web Service-enable existing IT assets. The advantage to this “Web Service wrapper approach” is that such companies will be better prepared to rearchitect their infrastructures to an SOA if many of their legacy resources are already Web Service enabled, and in the meantime, the value proposition for WSM is clearer, as they have an increased number of Web Services in production. Companies who are taking the Web Services wrapper approach include **Actional**. Service-Oriented Integration companies like **IONA, WRQ, and Cyclone Commerce** also have a hand in Web Service enablement. WSM vendors may want to consider working with an SOI vendor, or at least consider talking to their customers.

Furthermore, Web Service-enabling existing systems provides a key value proposition for Web Services by getting increased value out of the data and functionality locked in legacy applications. Today’s legacy IT projects typically target a very specific bit of information on the legacy system, for example, inventory or account balance. By providing a Web Services interface to the legacy system, far more of the data stored within that system is potentially available for access via a Web Services interface. To make full use out of these newly unlocked data assets, however, companies must have the Web Services

The survivors will be the vendors that can successfully offer Service-oriented management solutions. As a market category, we do not expect Web Services management to exist for more than about two years.

There is a “window of opportunity” for WSM vendors running to mid-2004. Even the best funded vendors will need to be self-sustaining at that point, which means becoming successful SOM vendors on their own, or being absorbed into a vendor that is itself successful.

★ Vendor Focus

BMC
Computer Associates
Hewlett-Packard
IBM

⚡ Decision Point

Starting in mid-2004, the large system management vendors will begin to dominate the SOM space, to the extent that the SOM point solutions segment of the market will reach its maximum in 2005.

management layer on top of the adaptation layer to provide the infrastructure necessary to use such Web Services on an enterprise level.

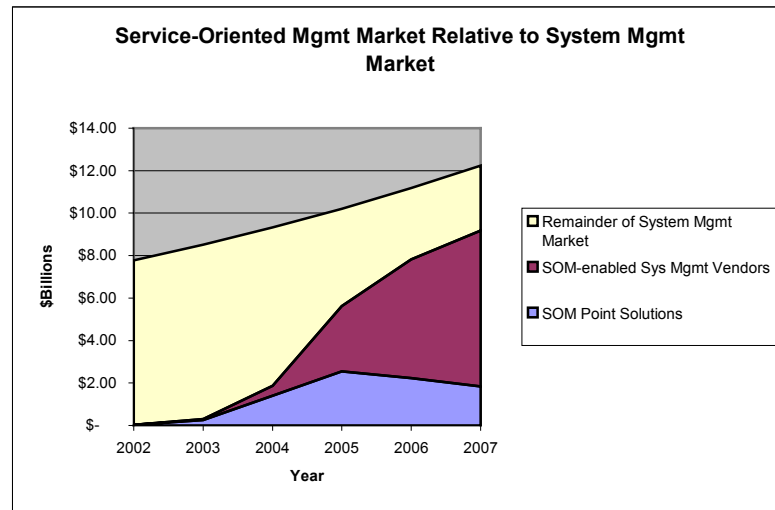
Even though there are several approaches for gaining traction in the WSM space, ZapThink cannot emphasize enough that there are enormous challenges ahead for this market. The combination of the value proposition Catch-22 discussed above, the Web Services adoption chasm discussed in section 2.2.1, and the fact there are too many vendors entering this space (as covered in section 5.1) will limit the chances for success for every vendor in this space. The survivors, ZapThink believes, will be the vendors that can succeed in enabling SOAs for their customers—that is, the vendors that can successfully offer Service-oriented management solutions. As a market category, we do not expect Web Services management to exist for more than about two years. Companies who consider themselves WSM vendors will either go out of business, merge or be acquired, or become SOM vendors.

6.1. Long Term Trends: Relationship to the System Management Market

In fact, ZapThink believes that there is a “window of opportunity” for WSM vendors running to mid-2004. Even the best funded vendors will need to be self-sustaining at that point, which means becoming successful SOM vendors on their own, or being absorbed into a vendor that is itself successful. Furthermore, there is an additional market force bearing on the startups in the WSM space that time limits their window of opportunity: the established system management vendors.

The four system management vendors we interviewed for this report—**BMC, CA, HP, and IBM**—all have product roadmaps that include SOM in the mid-2004 to 2005 timeframe. In addition, IBM and HP in particular are exploring partnership arrangements with smaller WSM vendors to round out their offerings in the meantime. But in any case, starting in mid-2004, ZapThink believes that the large system management vendors will begin to dominate the SOM space, to the extent that we believe the “SOM point solutions” segment of the market (that is, SOM vendors who are not general system management vendors) will reach its maximum in 2005. These trends are shown in Figure VI.1, with supporting figures in Table VI.1:

Figure VI.1: The Service-Oriented Management Market vs. the Total System Management Market



Source: Copyright © 2002 ZapThink, LLC

Table VI.1: The Service-Oriented Management Market vs. the Total System Management and Web Services Markets

	2002	2003	2004	2005	2006	2007
SOM Point Solutions	0.03	0.26	1.40	2.55	2.24	1.84
SOM-enabled Sys Mgmt Vendors	0.00	0.04	0.47	3.06	5.59	7.34
Total System Mgmt Market	7.77	8.51	9.32	10.21	11.18	12.24
Total Web Services Market	0.98	3.30	7.70	15.40	25.72	32.21

\$Billions

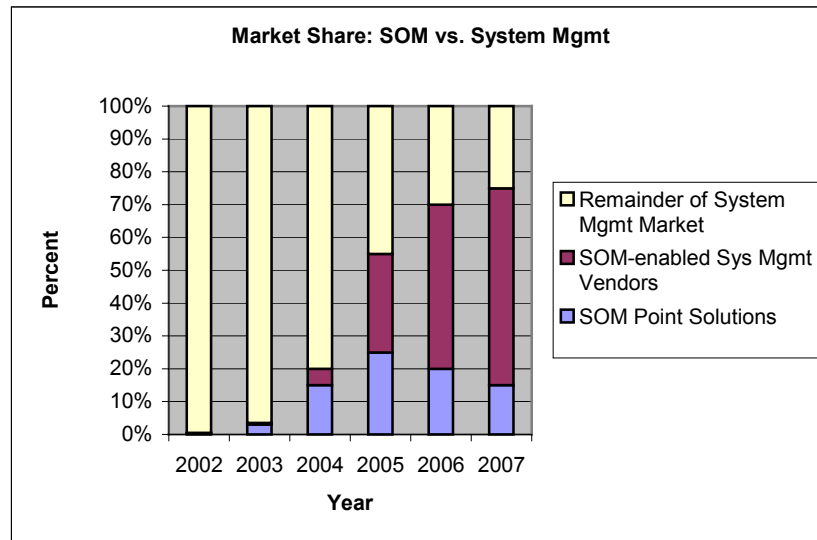
Source: Copyright © 2002 ZapThink, LLC

The large system management vendors will acquire key players in the SOM space, and a few others will achieve long-term growth on their own.

By 2007, 60% of the total system management market will consist of large vendors who offer SOM solutions, and a full 75% of the system management market will be SOM-enabled.

While the SOM point solutions market will decline starting in 2005, that doesn't mean that some companies won't be quite successful. On the contrary, ZapThink believes that the large system management vendors will acquire key players in the SOM space, and a few others will achieve long-term growth on their own. However, the portion of the system management market that consists of system management vendors who are offering SOM solutions will be the fastest growing segment of the system management market starting in mid-2004, and continuing at least through 2007. By that time, 60% of the total system management market will consist of large vendors who offer SOM solutions. A full 75% of the system management market will be SOM-enabled, as shown in Figure VI.2:

Figure VI.2: The Service-Oriented Management Market vs. The total System Management Market



Source: Copyright © 2002 ZapThink, LLC

While achieving success as a SOM vendor will be difficult, Service-orientation itself will be very successful.

The fundamental conclusion from these predictions is that while achieving success as a SOM vendor will be difficult, *Service-orientation itself* will be very successful. By 2007, most enterprises will have made the move to SOAs, and as a result, they will need SOM. Most companies, however, will turn to system management vendors for these solutions.

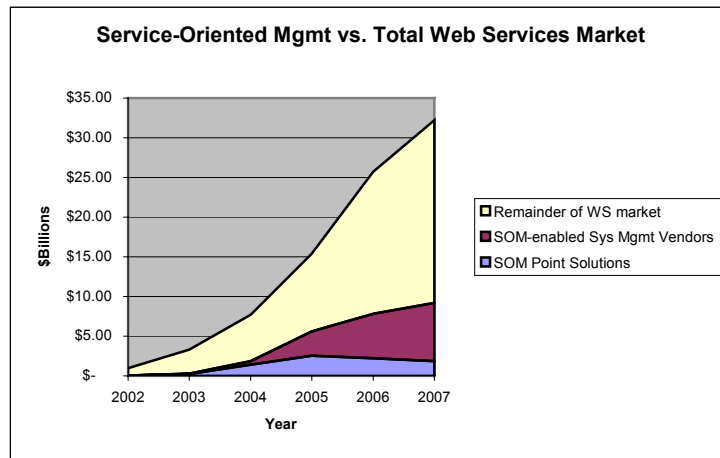
ZapThink predicts that the global Web Services market (hardware, software, and associated services) will grow from \$15.4 billion in 2005 to \$32.2B in 2007.

6.2. Long-Term Trends: Relationship to Web Services Market

ZapThink predicts that the global Web Services market (hardware, software, and associated services) will grow from \$15.4 billion in 2005 to \$25.7B for 2006 and \$32.2B in 2007. These numbers represent a gradual slowing of growth, with a compound annual growth rate of 67% in 2006 and 25% in 2007. The most important contributing factor to the growth of the Web Services market is the trend of existing IT products and services becoming Web Service-enabled in the short term, and fully Service-enabled over the next several years. So, just as the system management market becomes mostly Service-enabled by 2007, so too the overall IT market.

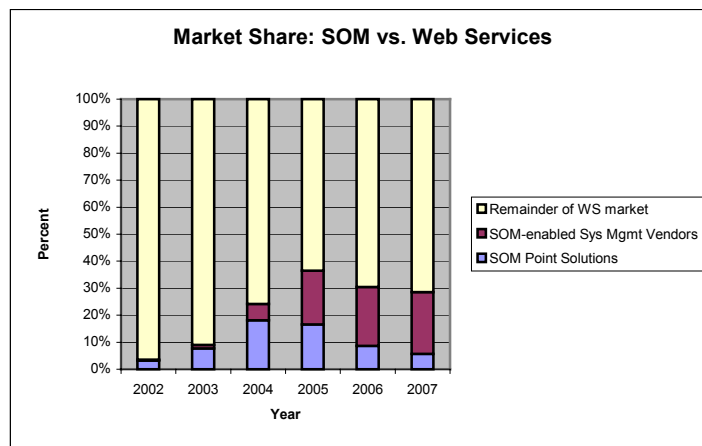
As a result, the portion of the total Web Services market that SOM represents reaches a relatively stable percentage, once the growth period during the initial window of opportunity is complete in mid-2004, as Figure VI.3 and Figure VI.4 illustrate:

Figure VI.3: The Service-Oriented Management Market vs. the Total Web Services Market



Source: Copyright © 2002 ZapThink, LLC

Figure VI.4: The Service-Oriented Management Market vs. the Total Web Services Market



Source: Copyright © 2002 ZapThink, LLC

Even though the SOM market continues to grow at a good clip in the 2005-2007 timeframe, the growth of SOM is slower than the overall Web Services market, primarily because SOM products will have reached a level of maturity by that time. However, the Web Services market will continue to experience rapid growth for several additional years, as vendors resolve some of the later roadblocks to Web Services adoption, including orchestration and workflow, billing and metering, and business web process automation (the automation of multiple-company business processes).

6.3. Inhibitors to Growth of Service-Oriented Management Market

To summarize the challenges facing the SOM market, the four factors identified above are in the box below:

Challenges facing the Service-oriented management market

- **The Web Services management Catch-22** – why buy WSM until you have many Web Services, yet how will you implement many Web Services without WSM?
- **The Web Services adoption chasm** – WSM vendors must become SOM vendors, helping companies must move from point-to-point applications of Web Services to SOAs, but that transition is difficult and expensive.
- **Too many swimmers in the pool** – there are too many WSM vendors for the market to support, creating challenges for all of them.
- **Dominant players** – large system management vendors will take over the WSM space in a few years, providing a narrow window of opportunity for new companies.

By far the greatest challenge facing the SOM space is the one facing the overall Web Services market: the move across the chasm to SOAs. The history of distributed computing seems to repeat itself, with each generation often recasting the mistakes of the past. After all, didn't client/server and then n-Tier architectures have many of the same promises that Service orientation has? CORBA and DCOM were Service-oriented in their own right (albeit tightly coupled and proprietary). Will the promise of loosely coupled, standards-based SOAs really materialize, or are we headed for a CORBA redux?

Another inhibitor to growth could potentially be slow or ineffective development of standards. The IT industry as a whole realizes the importance of standards, and there's no question that adequate standards for all aspects of IT will eventually become established. However, markets move faster than standards bodies. Also, standards are set by consensus, which necessarily means a slow process. The easy part—putting together core standards like XML, SOAP, and WSDL—is mostly behind us. What remains are tougher problems, including the completion of the various security specifications and business process and orchestration specifications. The Web Services management standards work is less problematic, not because of the experience the industry has in developing system management standards, but because SOM touches all parts of the IT infrastructure. Therefore, slowdowns in the progress of standards in many areas can inhibit the growth of the SOM market.

VII. Conclusions

At ZapThink we are optimistic that real progress will be made on many of the fundamental issues facing IT—including business agility and simplified integration. However, we're optimistic for a reason: we connect technology developments to the underlying business forces that drive them. As the economy gradually comes out of the downturn, companies will be looking for growth, and IT infrastructures that can enable that growth will be worth investing in.

So, even though we see that crossing the chasm to SOAs is a difficult transition for companies to make, we believe that there is sufficient business motivation for many companies to make the necessary changes. One of the key investments companies will need to make to implement the SOA is a SOM solution.

Many vendors see this new opportunity, and as a result, the market for WSM vendors is already crowded. There will be roughly a two-year window of opportunity for these new companies to become established SOM vendors, at which time the large system management vendors will come to dominate the market, through a combination of internal product development, partnerships, and acquisitions.

7.1. Key Notes

- Web Services are an evolutionary step in the development of distributed computing techniques.
- To manage Web Services, a management tool must manage the underlying systems and applications. Such management tools must also manage the Service orientation abstraction layer itself.
- *Business agility* is the ability for businesses to proactively manage change and use changing business environments to their advantage.
- The true goal of Service orientation—and hence, of Web Services in general—is to remove the bottleneck that IT has on businesses' ability to be agile.
- For information technology to be able to deliver business agility, integration among systems must be rapid and cost-effective.
- To achieve Service-oriented integration (SOI), an enterprise must first rearchitect their IT infrastructure, creating a *Service-oriented architecture* that supports loosely coupled integration to underlying applications and other system resources.
- Loosely coupled, standards-based Service-oriented architectures (SOAs) are an approach to distributed computing that thinks of software resources as Services available on the network.
- At its most basic, the rearchitecture process for creating an SOA involves encapsulating software components, applications, and underlying systems with Web Services interfaces and then composing these fine-grained functional Web Services into coarse-grained business Services.
- Today, Web Services are in the innovator and early adopter phases, marked by the point-to-point use of Web Services. To cross the chasm to widespread adoption of Web Services, companies must move toward SOAs.

- Web Services management is a combination of traditional system management techniques and the new Service-oriented management techniques that are a critical part of running SOAs in the enterprise.
- Web Services Management solutions bridge the gap between the underlying systems and the Services that run on top of them.
- Web Service management products must offer SOA enablement functionality to be considered Service-oriented management products.
- The fundamental principles of IT management are *visibility* and *control*.
- While the broad acceptance of a non-invasive approach indicates that most vendors are taking a Service-oriented approach to management, it does reduce the ability for non-invasiveness to be a competitive differentiator.
- A Service-oriented management platform *is* a Service grid—using the word “platform” is somewhat of a misnomer, casting Service orientation in terms of the n-Tier architecture world that preceded it.
- System management vendors’ products must be ready to meet customer demand when it materializes, but it is too risky for them to develop Service-oriented management capabilities before such demand becomes significant.
- Being able to manage business processes among companies in a flexible, agile manner is one of the goals of Service orientation.
- Having more features is not necessarily better than having fewer features.
- The fact that the large, established vendors offer limited functionality should not be taken as a sign of weakness.
- SOA enablement has broad support among many vendors.
- There is no broad agreement as to the necessary features within each of the functionality categories.
- Vendors are finding that potential customers are caught in a “Catch-22” situation: why buy Web Services management before there are many Web Services in production, yet how to run many Web Services without being able to manage them?
- There is a “window of opportunity” for WSM vendors running to mid-2004. Even the best funded vendors will need to be self-sustaining at that point, which means becoming successful SOM vendors on their own, or being absorbed into a vendor that is itself successful.
- The large system management vendors will acquire key players in the SOM space, and a few others will achieve long-term growth on their own.
- By 2007, 60% of the total system management market will consist of large vendors who offer SOM solutions, and a full 75% of the system management market will be SOM-enabled.
- While achieving success as a SOM vendor will be difficult, *Service-orientation itself* will be very successful.
- ZapThink predicts that the global Web Services market (hardware, software, and associated services) will grow from \$15.4 billion in 2005 to \$32.2B in 2007.

7.2. Decision Points

- For companies to leverage the true value of Web Services, they must take the important step of building loosely coupled, standards-based Service-Oriented Architectures.
- Companies need a loosely coupled approach to integration—one that does not require that the same programmers control the systems on both ends. This loosely coupled approach to integration is called *Service-oriented integration*.
- Companies must rearchitect their distributed computing infrastructures to create an SOA, which means encapsulating existing systems and applications by providing them with fine-grained Web Services interfaces and then composing these fine-grained Web Services interfaces into coarse-grained business Services.
- There are simply far too many companies vying to define and participate in this market. As a result, there will likely not be enough funding to go around, and company failures, mergers, and acquisitions are likely in 2003.
- To obtain funding, a vendor must have all the elements an investor is looking for: solid management and technical teams, a rational product strategy, and existing customers and revenues.
- Web Service-enabling existing systems provides a key value proposition for Web Services. To make full use out of these newly unlocked data assets, however, companies must have the Web Services management layer on top of the adaptation layer to provide the infrastructure necessary to use such Web Services on an enterprise level.
- The survivors will be the vendors that can successfully offer Service-oriented management solutions. As a market category, we do not expect Web Services management to exist for more than about two years.
- Starting in mid-2004, the large system management vendors will begin to dominate the SOM space, to the extent that the SOM point solutions segment of the market will reach its maximum in 2005, and then enter a period of decline, never to recover.

7.3. Figures

- Figure II.1: The Relative Costs of Different Approaches to Integration
- Figure II.2: The Web Services Adoption Curve
- Figure II.3: The Five Categories of Web Services Management Functionality
- Figure II.4: System Management
- Figure II.5: Lifecycle Management
- Figure II.6: Business Management
- Figure II.7: Security Management
- Figure II.8: SOA Enablement
- Figure III.1: XML Pipeline

- Figure IV.1: The Web Services Management Market Map
- Figure VI.1: The Service-Oriented Management Market vs. the Total System Management Market
- Figure VI.2: The Service-Oriented Management Market vs. the Total System Management Market
- Figure VI.3: The Service-Oriented Management Market vs. the Total Web Services Market
- Figure VI.4: The Service-Oriented Management Market vs. the Total Web Services Market

7.4. Tables

- Table V.1: Web Services Management Feature Grid
- Table VI.1: The Service-Oriented Management Market vs. the total System Management and Web Services Markets

VIII. Profiled Vendors

These ZapNotes do not list the functionality each vendor's product provides; that information can be found in Table V.1. Instead, the feature support is summarized in a small feature category figure provided for each vendor. The key to these figures is as follows:

- A *black box* indicates that the vendor offers a significant number of features in the category, and that the category is a prominent part of the vendor's product positioning.
- A *gray box* indicates that the vendor offers some of the features in the category, but the category is not prominent in the vendor's product positioning, or the vendor's product positioning does not broadly support the features in the category.
- A *box shown in outline* indicates that the vendor offers few if any features in the category, and/or that category does not have a place in the vendor's product positioning.

In any case, these figures indicate the vendor's current or imminent release of its WSM solution, rather than planned releases, and indicates which features the vendor wishes to talk about than whether particular features might be uncovered upon close inspection of the technology.

The focus, then, of these vendor profiles is to indicate what is different or unique about that vendor's products—in other words, what is each vendor's strategic differentiator.

8.1. Web Services Management Vendors

8.1.1. Actional

Please see ZapNote ZTZN-0280

8.1.2. Adjoin (acquired by Computer Associates)

Please see ZapNote ZTZN-1002

8.1.3. AmberPoint

Please see ZapNote ZTZN-0607

8.1.4. Blue Titan

Please see ZapNote ZTZN-0299

8.1.5. Confluent Software

Please see ZapNote ZTZN-1023

8.1.6. Digital Evolution

Please see ZapNote ZTZN-1029

8.1.7. Flamenco Networks

Please see ZapNote ZTZN-0150

8.1.8. Infravio

Please see ZapNote ZTZN-0226

8.1.9. Primordial

Primordial is no longer in business

8.1.10. Santra Technology

Please see ZapNote ZTZN-1085

8.1.11. Talking Blocks

Please see ZapNote ZTZN-1097

8.1.12. Westbridge Technology

Please see ZapNote ZTZN-0612

8.1.13. WestGlobal

Please see ZapNote ZTZN-0272

8.2. Private Web Services Networks

8.2.1. Grand Central Communications

Please see ZapNote ZTZN-0623

8.3. System Management Platforms

The four vendors ZapThink profiled for this section are all large, established vendors who are leaders in this market, as well as many other markets. Their system management products tend to be complex and multi-faceted, often consisting of several individual products and services that have been combined over the years into a portfolio of management products. Discussing the contents of these system management product portfolios is beyond the scope of this report.

Instead, this report focuses on the Web Services management aspects of these products, which are for the most part in the future product roadmaps for these vendors. This section, then, discusses these vendors' product roadmaps more so than the current functionality of their system management products.

8.3.1. BMC Software PATROL

Please see ZapNote ZTZN-1013

8.3.2. Computer Associates Unicenter

Please see ZapNote ZTZN-1021

8.3.3. HP OpenView

Please see ZapNote ZTZN-1048

8.3.4. IBM Tivoli

Please see ZapNote ZTZN-1050

Related Research

Reports

- *Web Services Technologies and Trends Report (ZT-WEBSRV)*
- *Service-Oriented Integration Report (ZTR-WS103)*
- *XML Proxies: XML-aware Network Appliances and Firewalls Report (ZTR-DI101)*
- *XML and Web Services Security Report (ZTR-WS104)*
- *Testing Web Services Report (ZTR-WS105)*
- *XML Data Store Technologies and Trends Report (ZTR-ST100)*
- *XML in the Content Lifecycle Report (ZTR-CL100)*
- *Service-Oriented Process Report (ZTR-WS108)*
- *SOA Tools & Best Practices Report (ZTR-WS107)*

ZapNotes

- *Actional ZapNote (ZTZN-0280)*
- *DataPower ZapNote (ZTZN-0132)*
- *Forum Systems ZapNote (ZTZN-0212)*
- *Primordial ZapNote (ZTZN-0259)*
- *Sarvega ZapNote (ZTZN-0271)*
- *Vordel ZapNote (ZTZN-0238)*
- *Westbridge Technology ZapNote (ZTZN-0612)*
- *WestGlobal ZapNote (ZTZN-0600)*

Copyright, Trademark Notice, and Statement of Opinion

All Contents Copyright © 2002 ZapThink, LLC. All rights reserved. Reproduction of this publication in any form without prior written permission is forbidden. The information contained herein has been obtained from sources believed to be reliable. ZapThink disclaims all warranties as to the accuracy, completeness or adequacy of such information. ZapThink shall have no liability for errors, omissions or inadequacies in the information contained herein or for interpretations thereof. The reader assumes sole responsibility for the selection of these materials to achieve its intended results. The opinions expressed herein are subject to change without notice. All trademarks, service marks, and trade names are trademarked by their respective owners and ZapThink makes no claims to these names.

About ZapThink, LLC

ZapThink is an IT market intelligence firm that provides trusted advice and critical insight into XML, Web Services, and Service Orientation. We provide our target audience 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's role is to help companies understand these IT products and services in the context of SOAs and the vision of Service Orientation. ZapThink provides market intelligence to IT vendors who offer XML and Web Services-based products to help them understand their competitive landscape and how to communicate their value proposition to their customers within the context of Service Orientation, and lay out their product roadmaps for the coming wave of Service Orientation. ZapThink also provides implementation intelligence to IT users who are seeking guidance and clarity into how to assemble the available products and services into a coherent roadmap to Service Orientation. Finally, ZapThink provides demand intelligence to IT vendors and service providers who must understand the needs of IT users as they follow the roadmap to Service Orientation.

ZapThink's senior analysts are widely regarded as the "go to analysts" for XML, Web Services, and SOAs by vendors, end-users, and the press. 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 Waltham, Massachusetts. Its customers include Global 1000 firms, public sector organizations around the world, and many emerging businesses. ZapThink Analysts have years of experience in IT as well as research and analysis. Its analysts have previously been with such firms as IDC and ChannelWave, and have sat on the working group committees for standards bodies such as RosettaNet, UDDI, CPExchange, ebXML, EIDX, and CompTIA.

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

ZAPTHINK CONTACT:

ZapThink, LLC
11 Willow Street
Suite 200
Waltham, MA 02453
Phone: +1 (781) 207 0203
Fax: +1 (786) 524 3186
info@zapthink.com

