Ensuring Resiliency for Your Service Oriented Architecture

How HA Removes the Risks and Extends the Benefits of SOA

MIMIX®

by

LAKEVIEW TECHNOLOGY

Introduction

Let's face it—there aren't many certainties in business today. Across the globe, businesses are required to achieve greater accomplishments and overcome more challenges in less time and with fewer resources than ever before. Regardless of industry or geography, it's a punishing environment. Competition is at an all-time high. And IT budgets, while slowly expanding, are often not able to keep pace with the continuously evolving demands of the marketplace.

There must be a better way. Today's challenges require new thinking.

One answer for achieving a higher level of business functionality from your IT resources is to implement a service-oriented architecture (SOA). The promise of an SOA is the ability to fully leverage all of your disparate systems, applications and data to create highly flexible, highly effective business services that make your organization more agile and competitive.

However, realizing the substantial benefits of an SOA requires key components and techologies that ensure the seamless sharing of IT resources, as well as automated resiliency against both unexpected interruptions and planned system downtime. In this white paper, we'll examine how these elements can work together to create a true service-oriented architecture that fulfills your business objectives and solves your IT challenges.

Like It or Not, SOA Is HOT

While variations on the SOA theme have surfaced before in the not-too-distant past, from object-oriented design to component-based application development, the practical reality of a reliable, functional SOA has now arrived.

Even before it has achieved widespread adoption, SOA is evolving quickly. In fact, Gartner has already coined the term "Advanced SOA" to describe the latest improvements in SOA and predicts that by 2008 leading vendors will offer extensible platform technologies using pluggable SOA-style design in their internal architecture. Gartner also forecasts that by 2010 more than 50 percent of large organizations will have established a composition portfolio for SOA in their journey toward a business process platform.

Other analyst firms have taken similar approaches. Aberdeen Group has split SOA into three technology camps; SOA Lite, SOA ERP and SOA Enterprise. Aberdeen also reports the overall adoption rate to be quite strong, with 90 percent of survey respondents confirming that they will exit 2006 with SOA experience under their belts.

SOA and Your Business

From a business perspective, SOA is all about providing a way for you to realign your business and technology environments to fulfill requests for reusable business functionality. For example, you could enable collaboration between product inventory, online customer service and sales forecasting applications to make more accurate business decisions. Or integrate disparate applications to satisfy highly specific, niche requests from suppliers or global business units. An SOA makes your organization more efficient and nimble in accomplishing these business objectives.

The business drivers motivating the capabilities of an SOA can be summarized with the following key elements:

- **Focus** – Enabling your company to focus on core competencies; what makes you successful and what makes you unique. Strategic alliances are formed to meet needs that are external to these core competencies.
- **Responsiveness** – The ability to respond with agility to customer demands, market opportunities, or external threats. These responses are guided through insight-driven decision management features.
- **Flexibility** – To achieve operational and business process flexibility. To adapt variable cost structures (fixed to variable) to provide a high level of operational efficiency.
- **Resiliency** – Capability and robustness to respond to changes in both business and technical environments and to manage changes and threats with predictable outcomes.

Through SOA, companies can achieve these business imperatives by exploiting current technological developments while drawing on lessons learned from past architectural constructs.

SOA and Your Technology

These key technological attributes deliver the flexibility, responsiveness and efficiency that an SOA enabled business requires:

Source: IBM

- **Integration** – Integration is the fundamental component of an SOA. It includes integration of people, processes, applications, systems and data.
- **Virtualization** – Virtualization is a set of pre-determined resource pools based on servers, storage and distributed systems.
- **Automation** – Automation is the ability of an SOA environment to run itself including self-healing, self-configuration, self-optimization and self-protection.
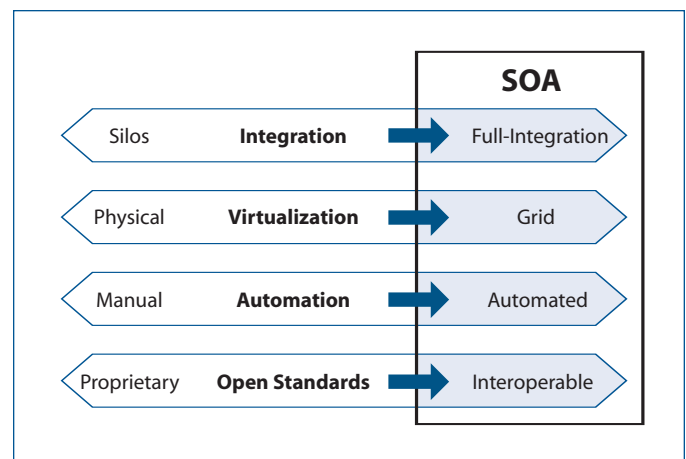
• **Open standards** – Open standards affects the SOA environment across the previously defined levels including automation, integration and virtualization. Each of these elements leverage open standards specifications in order to achieve their objectives. Open standards are the key element of obtaining the flexibility and interoperability across heterogeneous systems.

SOA and Web Services

The implementation of SOA using web services technologies is the current state of the art in systems integration. SOA defines concepts and general techniques for designing, encapsulating and invoking reusable business functions through loosely bound service interactions. Most of the techniques have been proven individually in previous technologies or design styles. SOA unites them in an approach intended to bring encapsulation and re-use to the enterprise level.

The web services role within SOA is to provide an emerging set of open-standard technologies that can be combined with existing, proven technologies to implement the concepts and techniques of SOA. These techniques and technologies give companies the tools that are required to implement flexible SOAs. However, at the current time and for some time to come, the technologies will be evolving rather than mature and stable. Therefore, individual SOA solutions must be carefully balanced among customized, proprietary and open-standard technologies. Which characteristics and components of SOA to implement must also be carefully determined as well as which areas of business functionality and process to apply them to. Of course, these decisions will be balanced between business benefits, technology maturity and implementation or maintenance efforts.

Introducing the Enterprise Service Bus

In addition to the ongoing evolution of basic SOA concepts and web services technologies, there is also an evolution of common components for SOA architectures and infrastructures. These components are increasingly forming the basis for packaged technologies offered by IT vendors. One of those technologies, the Enterprise Service Bus, is emerging as a critical component for implementing manageable SOA principles in a heterogeneous world.
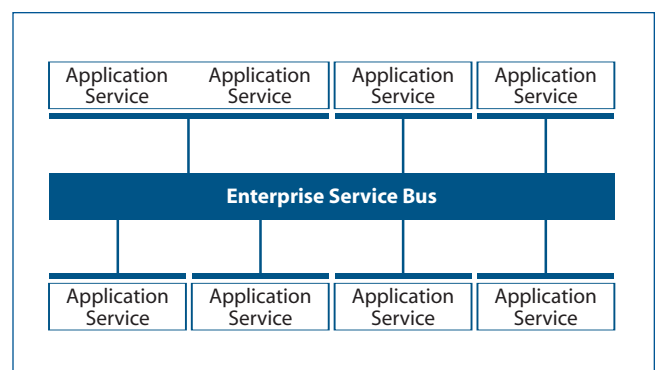
Source: IBM

Business services are built from application services, which provide a set of capabilities that are worth promoting for use in higher level services. Typically, a business service relies on two or more application services for its implementation. These application services interact via the Enterprise Service Bus, which facilitates mediated interactions between application services end users. The Enterprise Service Bus supports a broad spectrum of

ways to get on and off the bus, including on ramps for legacy applications or business connections that enable external partners in B2B interaction scenarios to participate in the service interaction game.

Although they all look the same from the perspective of the Enterprise Service Bus, application services implement different facets of an overall business service, including:

- Realizing interactions between people involved in the underlying business process.
- Providing adapters to existing applications that must be integrated.
- Choreographing the interaction of a number of services to achieve a business goal.
- Watching for potential problems in the execution of the process and taking action to fix them if they occur.
- Managing resources that are needed to perform required business functions.

IBM WebSphere MQ as the Enterprise Service Bus

A key IBM Enterprise Service Bus technology is WebSphere MQ. WebSphere MQ is a proven message queuing and message delivery technology that has been integrated into and extended by WebSphere to facilitate SOA implementation. The following diagram provides a high-level overview of a SOA implementation that has leveraged WebSphere MQ to integrate the following four business processes and technologies:
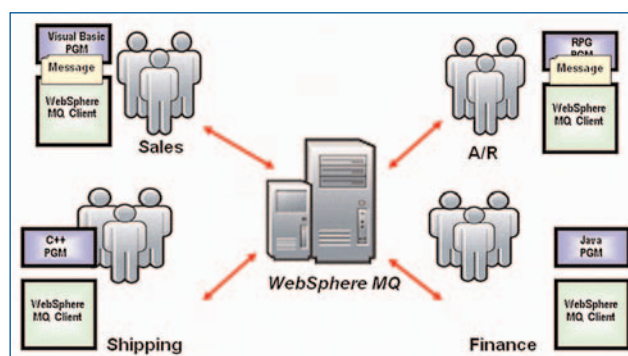
Source: IBM

Business Process	Technology(s)
Sales	Visual Basic – Windows – Intel
Shipping	RPG – i5/OS – System i
A/R	C++ – AIX – System p
Finance	Java – Linux – AMD

In this implementation, the four business processes leverage the business logic contained in their applications and in the applications that primarily serve other areas. WebSphere MQ enables this to occur by providing the technology to enable application to application messaging and data exchange.

Enabling Flexibility to Meet Business Demands

"SOA leverages a wide variety of technologies beyond just business applications..."

SOA implementations leverage a wide variety of technologies beyond just business applications and the WebSphere application to support the business processes. SOA projects may leverage application connectors from technologies such as Autonomic Management Engine, Solution Installation, Solutions Console, Self-Managing Autonomic Technology (SMAT) and business process management. In particular, the following six key technologies are always required to support SOA:

6 Key Technologies	Examples
• Servers	Intel, AMD, System i, System p
• Storage	Internal Storage, Storage Area Networks, Network Attached Storage
• Database	DB2, MSSQL, Oracle
• Applications	WebSphere Enterprise Service Bus (ESB), ERP, CRM, EDI
• Network	Local Area Network, Wide Area Network, Internet, Routers, Switches
• Security	User Profiles, Access Control Lists, Firewalls

As you can see, SOA virtualizes the technologies that support business processes. This enables you to combine, change, remove or improve business processes very quickly. Only a single technology update is required for the entire organization to take advantage of the changed business process.

SOA enables the technology and the organization to be very flexible in meeting the ever-changing needs of today's businesses. It offers tremendous benefits, but does come with some new technical challenges. The first and most obvious challenge is the requirement to become skilled in designing and implementing SOA-enabled applications and business processes.

New Business Benefits—and New Vulnerabilities

The next challenge comes after you have virtualized your business processes and their supporting technology and start to combine and integrate these virtual business processes to better support and grow your business. The challenge here is that it creates an environment where any one business process will leverage a wider variety of underlying technologies.

For example, prior to SOA, sales may have exclusively leveraged their CRM application to support their business processes. The sales CRM application ran on an Intel Server, running Windows 2000, MS SQL and the CRM application. In this scenario, if something happened such as a disk crash, it was easy to determine which of the six key technologies (Server, Storage, Application, Database, Network and Security) was at fault and quickly get the sales team up and running.

In a SOA-enabled world detailed above, the sales CRM may still run on the sales server, database, etc. But it now leverages the enterprise server business application and the six key technologies in its implementation. In addition, the sales process also leverages business processes via the SOA from:

• 3 other servers (system i, system p, AMD)
• 3 other storage technologies (NAS, SAN and Raid 5)
• 3 other applications (finance, A/R and Shipping)
• 3 other databases (DB2, Oracle, MYSQL)
• 3 other network connections
• 3 or more security layers (one per server and the network security technology)

Now, if there is a problem with the sales application you have to check 24 additional technologies to determine which is at fault in order to resolve the problem. In addition, this same problem may not only prevent sales from functioning but could impact the finance, shipping and A/R teams. Clearly, an SOA-enabled business can be far more vulnerable to technology failures than a non-SOA-enabled business.

One way of thinking about it is that SOA-enabled applications put all the business process "eggs" in a single SOA "basket." In addition, if you attempt to reduce the number of technology "eggs" that might fail via server, storage, database consolidation or virtual- ization, you may actually reduce the number of "eggs" in the basket, but it does nothing to make the basket more reliable or easier to recover.

Keeping SOA Highly Resilient

The risk of avoiding an SOA strategy includes the loss of competitive agility for your business and the inability to adopt new tools and packaged applications. So how do you keep SOA productive and ready to meet the challenges of your business?

A potential downside to adopting a single, unified WebSphere ESB architecture to support your SOA strategy is that you are more vulnerable to planned and unplanned downtime due to the single point of failure that can have a ripple effect throughout your organization. For instance, one web service failure could disable other services and applications and one ESB failure could disable everything. Without warning, your entire business infrastructure could be at risk.

In order ensure the benefits of SOA and protect against the new risks it may pose to business uptime, a high availablity solution is a critical component to include in any SOA implementation. However, the high availability solution must be able to protect all of the essential SOA technologies mentioned above from both planned IT downtime and unexpected outages. And it must work with any combination of applications used within the SOA and be compatible with multiple operating systems that may exist within the environment.

MIMIX SOAR—Automated Resiliency for SOA

Enter MIMIX SOAR –or MIMIX SOA Resiliency. To keep SOA optimized and ready, MIMIX high availability solutions are architected to exploit and extend all of the key IBM technologies, such as AIX, WebSphere and SMAT, that are needed to keep your SOA-enabled business keeps running. MIMIX SOAR ensures the continuous availability and resiliency of all of the essential SOA elements, including:

• Multi-Server or Platform Support	System i, System p, Intel, i5/OS, AIX, Linux, Windows
• Multi-Storage Support	Direct Storage, NAS, SAN, etc
• Multi-Database Support	DB2, MS SQL, Oracle, etc
• Multi-Application Support	Any application include WebSphere ESB
• Multi-Network Support	LAN, WAN, Internet, TCP/IP, SNA, etc
• Multi-Security Support	Works with any security setup

How Does It Work?

MIMIX SOAR is a pragmatic, highly innovative and scalable option for the SMB to the large enterprise. Simple to install and easy to use and manage, MIMIX software is the powerful yet affordable option for your cross-platform high availability needs. MIMIX software ensures that the technologies that support your business stay up and running regardless of which IBM server, storage or application technologies you use because it protects practically everything.

The MIMIX Availability Manager user interface provides a unified view of your entire high availability environment, so you can monitor the readiness of your SOA environment with a single glance. This means you can quickly be certain that your SOA-enabled business processes are protected from both planned and unplanned downtime and from the loss of critical data.

MIMIX is the only high availability solution to comply with critical IBM SMAT requirements. This exclusive level of integration provides core self-managing components that enable Lakeview to deliver high availability software with outstanding performance and improved manageability. Furthermore, SMAT-enablement is a key product differentiator that helps you lower costs and evolve to a more self-managing IT environment.
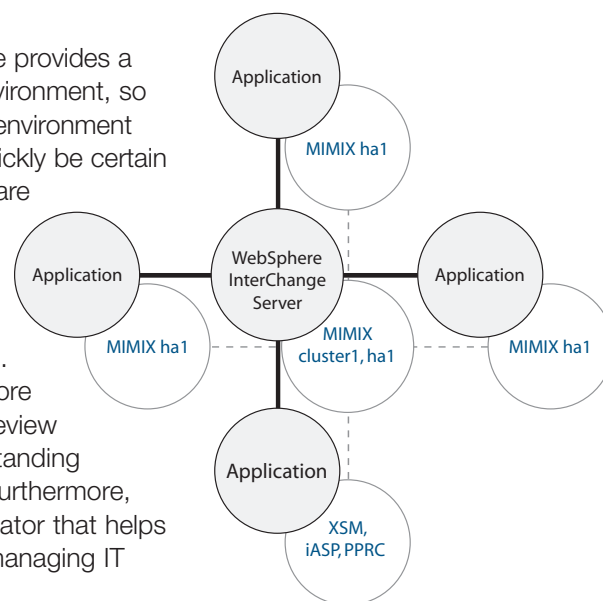
In addition, MIMIX AutoGuard™ goes beyond the standard autonomics of other high availability solutions to continuously seek out and and resolve any issue that can affect the integrity of your HA environment quickly, efficiently and thoroughly. And when you need to perform high availability switching within your SOA, MIMIX Switch Assistant™ ensures a successful process every time. It helps you prepare, initiate and complete a planned or unplanned switch using proven HA best practices and fail-safe audits.

SOA is your key to making the IT department a catalyst for business growth and innovation. Protecting your SOA investment with MIMIX enables you to shift from platform-centric computing to a true service-oriented architecture to achieve the powerful benefits of virtualization and cross-platform just-in-time IT.

MIMIX SOAR in Action—Quixtar Achieves Optimum Uptime for SOA-Enabled Online Commerce

When online retailer Quixtar built its eCommerce infrastructure in 2000, the company wanted to ensure availability for all its inventory and order management data and processes to support 24 x 7 operations, even in the event of a system outage.

Quixtar turned to IBM and Lakeview Technology. Their solution includes IBM WebSphere MQ V5.3, IBM WebSphere Application Server V6, IBM System i5 570, IBM DB2 Universal Database for iSeries and MIMIX for WebSphere MQ and MIMIX ha1 from Lakeview Technology.

The solution implemented at Quixtar has helped the company become the No. 1 online retailer in the health and beauty category based on sales and fourteenth among all eCommerce sites, according to Internet Retailer's "Top 400 Guide." Quixtar Individual Business Owners and customers generated revenues exceeding $1 billion (US).

First and foremost, the solution satisfies Quixtar's initial business requirement that its backend order management system will never be down for more than two hours in the event of an unplanned outage. Moving operations to the backup system maintains application continuity with no loss of data.

A key aspect is that during the two-hour transition to the backup system, customers can continue to place orders at Quixtar.com because WebSphere MQ will queue purchases and deliver them to the backup system once it's up and running. As a result, no business transactions are lost and customer satisfaction is sustained.

Another benefit of the solution is that Quixtar can now perform scheduled swaps between its primary and backup systems in order to maintain and upgrade its primary system. In planned circumstances, Quixtar can move operations to the backup machine in just 20 minutes or less—with no interruption to the business.

MIMIX SOAR in Action—
Lakeview Technology Standardizes on SOA

Lakeview Technology decided to standardize on a service-oriented architecture utilizing an IBM WebSphere application server running on an IBM System i 520 platform.

The value of an SOA platform to Lakeview is significant. It would provide interoperability between applications, enable delivery of a portal solution and empower the company to create new business processes and supporting applications from existing web services. In addition, standardizing on SOA will reduce Lakeview Technology's overall IT costs by 20 percent.

Lakeview Technology's existing application environment comprises multiple disparate applications with varying application architectures. There is a mix of client/server and web applications, multiple back-end databases, lack of standards and inability to reuse code. Furthermore, extracting business information across the multiple applications is very difficult if not impossible. This has resulted over time in high administration costs, inefficient processes and an inability to react in a timely manner to the needs of a dynamic, fast-growing organization.

Lakeview has begun to execute its strategy by implementing a single, unified IBM WebSphere SOA environment consisting of a WebSphere application server and a WebSphere Portal. Web services will enable existing "closed" applications to be easily integrated and developed into new, custom applications. For example, Lakeview is currently in the process of developing a license management application that can be accessed via multiple entry points. Web services enables this development exercise.

Over time, Lakeview will replace existing client-server applications with web-based SOA compliant applications (where deemed feasible based on a positive ROI). For example, recently Lakeview replaced its front-office CRM application with Salesforce.com. Lakeview developed a web services integration between Salesforce and its back office applications to allow for a 360 degree view of its customers.

In Lakeview's SOA strategy, high availability is a critical consideration. The web services that are now integral to the business operations are also the source of single point of failures. For example, if Lakeview's web service that integrates its front-office with its back-office is not available, critical order information would not be available to the finance team. Similarly, if the license generation web service is not available, customers will not be able to obtain license codes required to install and run Lakeview software. To eliminate this exposure under both planned and unplanned outage scenarios, Lakeview plans to use MIMIX ha1 to make its most critical web services highly available.

High Availability for SOA-Enabled Clustering—
MIMIX ha1 and WebSphere Make it Happen

IBM and Lakeview Technology performed a trial of WebSphere Application Server V4.03, Advanced Edition and MIMIX in a clustering environment. This trial verified that WebSphere Application Server V4.03, Advanced Edition and MIMIX can provide a cluster-enabled managed availability solution. This includes many different failover scenarios, including both automatic failover and cluster partition scenarios.
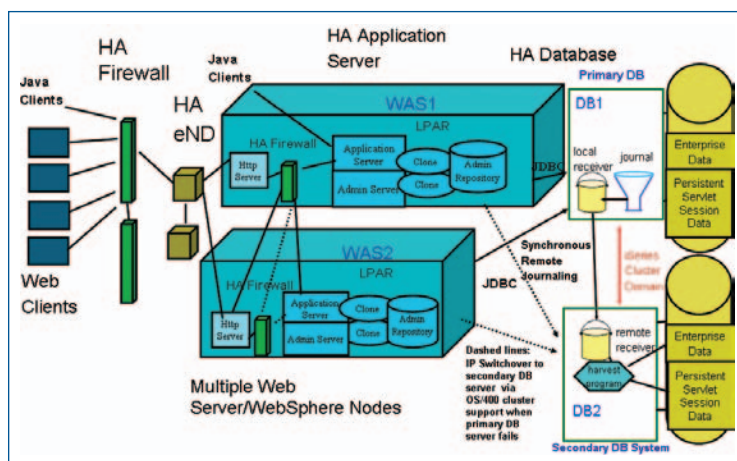
Source: IBM

The results of this trial showed that planned failovers could be performed in two to three minutes and unplanned failovers can be completed in less than one minute. The diagram above provides a high-level overview of the technologies used in this trial. In particular, this trial leveraged i5/OS, DB2, LOBs, remote journaling and MIMIX. For more information on this trial, please refer to **www.MIMIX.com** where the entire results of the trial are available.

Conclusion

A services-oriented architecture is a powerful, cost-effective way to leverage all of your IT systems to create high-level business services that make your organization more agile and competitive.

However, because SOA relies on many different technologies within your environment, it also poses new risks to your business continuity. In order to achieve the full benefits of SOA, a high availability solution is required to protect those elements against both planned and unplanned downtime.

MIMIX high availability solutions protect all of the technologies required for building and executing an SOA strategy. In particular, the combination of MIMIX and IBM solutions have already proven themselves in real-world implementations to provide the flexiblity, performance and resiliency benefits that make SOA such an attractive option for today's businesses.

Easy. Affordable. Worry-Free.
MIMIX Solutions from Lakeview Technology Inc.

Lakeview Technology is the information availability company, providing high availability, data protection and recovery, and data management software solutions to businesses of all sizes. Lakeview's innovative technology ensures the availability of business information so customers can increase productivity, reduce costs and satisfy service level and compliance requirements. Easy to install, manage and use, Lakeview solutions support applications in i5/OS™,Windows®, AIX® and Linux® operating environments. For more than 15 years, companies around the world have made Lakeview Technology the one to count on for information availability. Please visit LakeviewTech.com for more information.

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