



*A Made2Manage Systems White Paper*

# **Understanding Service-Oriented Architecture and Its Impact on Small Manufacturers**

**FEBRUARY 2005**

# INTRODUCTION

Service-oriented architecture (SOA) continues to emerge as the dominant technical platform for building next generation business applications. The potential of SOA to transform enterprise software applications has been well documented within leading industry trade publications. This white paper will attempt to cut through the hype surrounding the technology by (1) examining the manufacturing pains that are driving the conversion to service-oriented business applications, (2) breaking down the essence of SOA, (3) focusing on the relevance of SOA as a tool for continuous business process improvement, and (4) comparing and contrasting the Made2Manage SOA product development strategy with that of other ERP vendors.

## Market Trends

Within the manufacturing community, the arrival of the next latest and greatest enterprise software technology is often met with skepticism. Such doubts surrounding new technology are directly attributable to a software industry that has had a history of over promising and under delivering on results. As the software industry approaches yet another technology crossroads, this whitepaper will examine how the right SOA business applications can reverse this trend to positively impact your business.

Although the concept of SOA has been with us for some time, its more widespread use is a newer phenomenon. According to Gartner Research, “by 2008, SOA will be a prevailing software engineering practice, ending the 40 year domination of monolithic software architecture.” In addition, Gartner projects that “by 2008, more than 75 percent of then-current application packages either will be natively SOA or will expose SOA interfaces through a wrapping layer of interfaces.”

Software vendors, including Made2Manage Systems, are already reusing older and external applications and wrapping them within an SOA framework. As Gartner sites, “composition and integration of old and new business components into real-time transaction patterns are a natural fit with SOA.”

## Moving SOA Forward

So what’s driving the development of SOA business applications for small manufacturers? Enterprise software applications must fulfill many practical requirements in order to help small manufacturers succeed. Core needs include (a) mainstream, scalable and flexible technology, (b) IT that is easy to administer and delivers consistent performance, and (c) a common enterprise data platform for connecting internal systems and external supply chain partners.

Many small manufacturers have struggled with system limitations and obsolescence. These businesses require a long-term IT solution when replacing legacy systems. As their businesses change, their software solutions must be able to adapt to new business processes. Small manufacturers also are looking for ways to leverage IT

investments—building on initial expenditures throughout the years rather than scrapping software and starting from scratch every five years.

Small manufacturers lose millions of dollars each year due to unreliable systems and costs associated with maintaining poorly performing applications. These businesses are looking for high-quality systems that can be maintained with their smaller IT staffs. Lengthy down time and expensive IT fixes can negatively impact the ability of these organizations to compete in the marketplace.

Manufacturers are under increasing pressure to coordinate operations more closely with their supply chain partners. Smaller operations need to adapt to new standards for exchanging system-to-system data and provide automated customer service information to keep their customers happy. By using technology that ties in with their customers' business operations, small manufacturers can lock in key relationships. Without a common way to share data across the enterprise and with their partners, small manufacturers are incurring costs to maintain redundant internal systems and participate in electronic data exchange networks.

## Summarizing the SOA Development Process

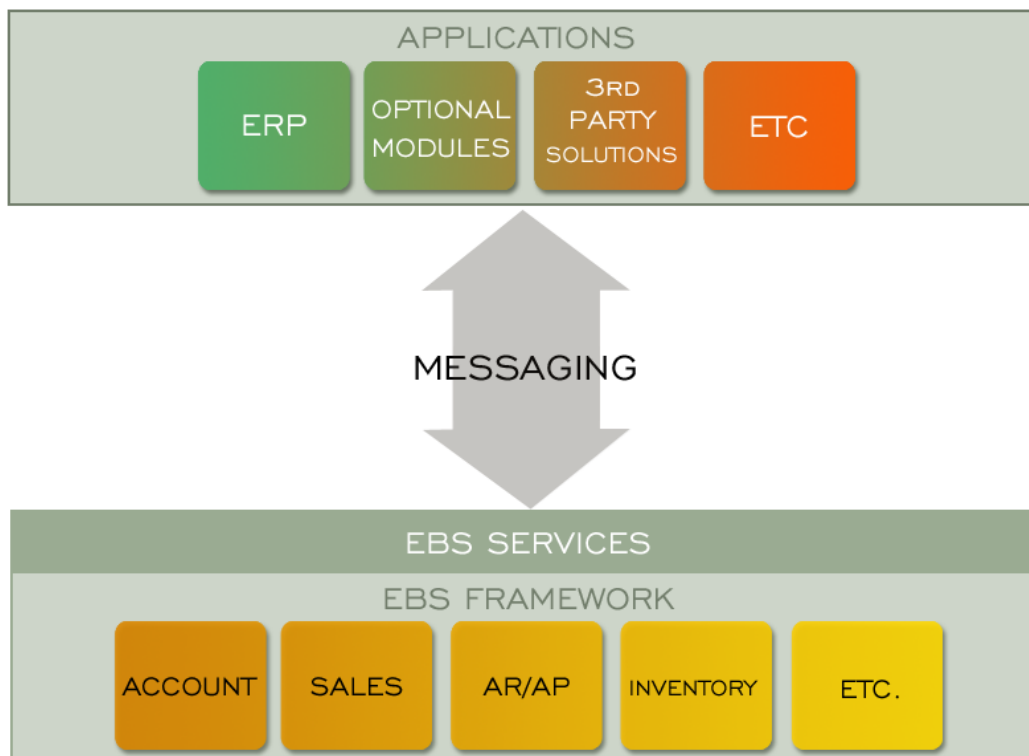
To define SOA, it is useful to review how traditional software is built. Today, ERP software is commonly built in large, monolithic blocks of code. A user interface (UI), business logic, and data elements are wrapped within a large executable or block. Changes made to the business logic in one area of the code can impact processes within the whole executable.

By contrast, SOA uses Web services (standard protocols and languages) to distill large blocks of software into smaller, more loosely joined segments of code. These free-standing, self-describing, modular units of functional code (known as services) possess a published interface that:

- Does not require knowledge of the programming language used to develop and deploy it.
- Can communicate with other services about specific activities within a business process or IT landscape.
- Can be arranged into comprehensive software applications.

SOA maps these capabilities and interfaces (see figure 1), similar to a network, so that they can be orchestrated into processes. As a result, data

Figure 1.



elements and business logic from the back office, redundant and dissimilar systems can be consolidated into a single interface. This common interface enables greater system connectivity within an organization and throughout its supply chain.

## Modeling Manufacturing Processes With Services

Services are at the heart of SOA. Services are like process steps within your business model and form an outline of your operations. An ERP vendor with strong domain expertise in manufacturing can use services to closely mirror applications to your business processes. The various services within your manufacturing operation are supported by the SOA architecture which enables their deployment, delivery and administration.

When changes occur within a manufacturing process, new services can be created within the architecture of an ERP system without altering the application code of the software. Since changes in your software can be made independent of your full application, the potential for programming errors is greatly reduced while gains in quality can be consolidated. With an SOA-enabled ERP system, small manufacturers can continuously build on business process improvements throughout the years.

## Realizing the Benefits of SOA

The right approach to SOA product development will yield many practical applications for small manufacturers. For example, current and future Made2Manage Systems customers can expect:

- *Secure IT Investments:* Customers will not have to switch platforms, re-implement software, and/or incur additional hardware and training costs to receive expanded capabilities.
- *Connectivity:* SOA provides the flexibility to collaborate via the sharing of data across a manufacturer's supply chain and the ability to view application programming interfaces (APIs) for augmenting existing functionality.
- *Enhanced Product Quality:* SOA reduces the number of areas within the Made2Manage product where code must be manipulated in order to deliver new functionality. By invoking

one segment of code and reusing it across the application, Made2Manage can quickly and easily make global changes to the software while greatly reducing the lines of code in your application. With less code, there also is less maintenance required to move your software forward. Therefore, gains in product quality are consolidated as the software is enhanced.

- *Accelerated Development:* The SOA architecture greatly reduces the amount of time required to perform quality assurance (QA) – a significant factor in product development. With less time needed for QA, Made2Manage Systems will be able to accelerate development cycles for expanding the functional depth and breadth of the product.
- *Simplified Upgrades:* As new versions of the Made2Manage Enterprise Business System are released, customers will not have to deploy an entire executable. Instead, they will receive only those modules that have been impacted by changes made in the latest release.
- *Remote Access:* Remote employees can easily access data without having to connect through VPN or use terminal server.
- *Scalability:* SOA will provide the foundation for new business processes on the horizon. As customer relationship management and supply chain management processes evolve, SOA business applications will be equipped to integrate new practices.
- *Flexibility:* The SOA framework enables you to tailor the way your information is grouped and displayed so you can better support your unique business processes.

## Embracing a Practical SOA Strategy

Made2Manage Systems does not pursue technology for technology's sake. Although the company has been working with the SOA product architecture since 2000, Made2Manage Systems has been careful to avoid committing its customers to this technology path until it emerged as a widely adopted standard for developing software. First and foremost, the Made2Manage Systems SOA product development strategy is predicated on our existing customers' need for quality, scalability, and minimal business disruption. Since development plans will not impact the software's

current UI, our customers' existing IT investments are protected without compromising the development of new capabilities. The Made2Manage Systems SOA strategy removes the common roadblocks that small manufacturers often face when considering a migration from an older to a new software version by leveraging existing applications.

## **Minimizing Business Disruption**

The company's principal product, the Made2Manage Enterprise Business System, will evolve into an SOA-enabled application within two or three iterations of the software. By design, changes to the software will be transparent to existing and future customers as we strive to limit business disruption. Made2Manage Systems is following the Microsoft development roadmap with its SOA initiative. We are taking advantage of state-of-the-art tools, such as Visual Studio 2005, to develop the Made2Manage SOA enabled product. Since the Made2Manage solution is currently built on the Microsoft technology platform, there is no need to re-architect the product to meet the new SOA standard. This is an important distinction between Made2Manage Systems and other ERP vendors in the industry. Manufacturers should approach ERP solutions that are being re-built from the ground up with caution as such efforts often result in less functionality for the customer.

Still other ERP vendors are allocating significant resources toward merging together dissimilar applications. Small manufacturers considering this alternative may incur many potential risks. First, research and development funds may be diverted away from enhancements that aid your business to expand functionality for customers and applications that serve non-manufacturing industries like health care and government. In addition, the outcome of merged applications for customers may entail new hardware and training costs and/or a full system reimplementations. Each of these scenarios demonstrates a common characteristic among such software vendors—a lack of focus on the needs of existing customers.

## **Drawing Upon Experience**

Although other software vendors are currently touting an SOA product development strategy, Made2Manage Systems has performed more than four years of research and development on this method of software engineering. The company is an early adopter of SOA and has served as a SOAP (Simple Object Access Protocol) beta participant for Microsoft. In fact, Made2Manage Systems has already implemented SOA applications at our customer sites. Through the development of such CRM and supply chain tools as M2M Sales Center, M2M VIP and M2M EDI-XML, we have gained a firm understanding of the security considerations and programming protocols necessary to connect our customers with supply chain partners using internal and external applications.

## **Enabling Continuous Business Process Improvements**

Made2Manage Systems specializes in serving the unique software requirements of small manufacturers within such niche industries as industrial and commercial machinery, electronics, plastics and fabricated metal. Utilizing the Made2Manage SOA product development strategy, we are uniquely positioned to leverage our existing applications while developing future capabilities to improve your specialized business processes. As a recent report from Forrester Research states, "certain business processes will likely be too specialized for large vendors to cover; therefore small and midsized niche vendors will fill the gaps, using service-oriented business applications." Made2Manage Systems has more than 19 years of experience as an ERP provider for small manufacturers. The company is leveraging this intimate knowledge of manufacturing operations to build an SOA-enabled product that will deliver continuous business process improvements for our current and future customers.

# S U M M A R Y

## **SOA Is Here To Stay**

The right SOA-enabled business applications have the capabilities to provide the scalability, performance and connectivity that small manufacturers demand. As an ERP vendor with a specialized focus on the needs of small manufacturers, Made2Manage Systems is applying our unique expertise to develop an SOA product that is tailored to the specific business practices of the industry. By breaking down software into smaller, modular components known as services, SOA enables our software engineers to more rapidly build applications for independent operational processes while consolidating quality and business process improvement gains within the whole application.

Made2Manage Systems' SOA product development efforts will minimize risk for our current and future customers by evolving the application (transparent changes) over the course of the next two or three releases. By comparison, other ERP vendors are following more uncertain strategies by re-writing products from the ground up and/or stitching together incompatible systems. In charting a course for our product development strategy, Made2Manage Systems has placed the interests of our customers before all other concerns. Existing and future customers will continue to receive ongoing value as Made2Manage moves its systems forward with minimal disruption, while delivering continuous business process improvements and protecting IT investments.

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