A NEW SERVICE-ORIENTED ARCHITECTURE (SOA) MATURITY MODEL

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> FOREWORD

This whitepaper and the model it presents was created through the cooperation of SOA industry leaders Sonic Software, Systinet, AmberPoint, and BearingPoint to better enable organizations in their quest for business agility through service-oriented architecture (SOA). The SOA Maturity Model outlined in this paper was specifically developed to offer guidance to managers who may be struggling to communicate the business value of their SOA vision and to be able to benchmark SOA adoption within their organization.

We look forward to receiving feedback and commentary on this model, as we will continue to expand its content and share SOA successes. Enjoy!

In an environment where the strategic value of IT is questioned[1] and the pressure is on for every IT and software development organization to cut costs, even the discussion of the strategic business value of technology can get lost. Much attention has been devoted to methods of reducing costs such as outsourcing and offshoring, but less attention has been focused on the business enablement value of new technology.

The goal of this paper is to show a path where a new approach to designing and deploying information technology, specifically service-oriented architecture (SOA), can form the basis for the technology and business organizations to work in concert for the improvement of business performance along several dimensions including cost reduction and streamlining the implementation of new business models.

SOA is an approach to designing, implementing, and deploying information systems such that the system is created from components implementing discrete business functions. These components, called "Services", can be distributed across geography, across enterprises, and can be reconfigured into new business processes as needed.

All claims for new technology are subject to skepticism, so what makes SOA different from other approaches of the past? The key factors are:

> SOA is built on the standards of the World Wide Web leading to cost-effective implementations on a global basis with broad support by vendors.
> Services are "loosely-coupled" allowing for much more flexibility than older technologies with respect to re-using and re-combining the services to create new business functions both within and across enterprises.
> SOA best practices create designs which embody business processes — and enhance the ability to outsource and extend processes to business partners.
> SOA encompasses legacy (i.e. existing) systems and processes so that the usefulness of existing investments can be preserved and even increased.

This combination of factors makes SOA an approach which provides a winning strategy for all stakeholders as:

> The finance organization sees cost effectiveness.
> The business organization sees enhanced and expanding business models (as shown later in examples).
> The IT organization sees success in supporting their customers, meeting service goals, and having the flexibility to respond to future demands through increased agility.

As companies look to the challenge of figuring out how to obtain the benefits of SOA, how to justify the required investments, where to begin, and what vision to aim for, guidance is required. The solution presented in this paper is the introduction of a SOA Maturity Model (SOA MM) to show

[1] Carr, Nicholas G., *Does IT Matter?,* Harvard Business School Press, 2004.

the increasingly positive impact which SOA adoption can have from a business perspective. The SOA MM derives from two key inspirations:

> The successes of the Capability Maturity Model® (CMM) and newer CMM Integration (CMMI[SM])[2] from the Software Engineering Institute (SEI) in providing a common framework for defining and assessing process improvement in software and other engineering endeavors.
> Papers such as those by Randy Heffner of Forrester Research[3] showing the various successful paths taken by companies introducing SOA.

By putting SOA into a framework similar to the Capability Maturity Model®, we can show the goals, characteristics, and prerequisites to SOA's business impact progressing through levels as follows:

New Functionality	→	Cost Reduction	→	Business Responsiveness	→	Business Transformation	→	Business Optimization

The SOA MM includes goals, characterization of the scope and business benefits of each level, the important industry standards, key practices, and critical success factors, both technological and organizational. The SOA MM thus provides guidance to set SOA vision and a benchmark to measure progress.

Forrester Research has found that companies approach SOA through different paths, each with different business benefits, skills, and technology infrastructure requirements. For some companies a focus on internal integration and workflow is most important, while for others a focus on partner integration is most important. As companies pursue the specific paths appropriate to their needs, they can correlate their paths with the maturity model to see the organizational needs, technology needs, and goals as they move up the levels of SOA maturity.

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[2] Software Engineering Institute, *Capability Maturity Model® Integration,* http://www.sei.cmu.edu/cmmi.

[3] Heffner, Randy, "Your Paths to Service-Oriented Architecture", Forrester Research, Dec. 2004.

SOA is an evolution of distributed computing designed to allow the interaction of software components, called "services", across a network. Applications are created from a composition of these services — and importantly, the services can be shared among multiple applications.

For example, a Human Resources management application could be created from the following services:

> An Employee Administration Service to manage hiring, changes in status, and termination.
> A Salary and Review Administration Service to manage salaries and employee performance reviews according to corporate standards.
> A Benefits Administration Service to initiate and terminate benefits, and to process the annual enrollments.
> An IT Security and Provisioning Service to manage the addition and removal of access rights for employees according to their role and employee status.
> A Payroll Service provided securely over the Internet by an outside provider.
> An HR Department Portal Service providing a web browser based user interface for members of the HR department presenting the functions of the above services.
> A Business Process Management Service to manage the approval and notification processes.

With SOA, organizations can achieve greater reuse of existing assets and can respond faster to change requests. These benefits are attributed to several critical elements of SOA:

> *The services reflect logical business activities.* Each service typically performs multiple operations for a specific business function such as a Payroll Service providing operations including "issue checks", "issue W2s", and "provide payroll period report". Importantly, these services, often referred to as "course-grained", reflect business process concepts, not the capabilities or "fine-grained" API's defined by traditional packaged software applications.
> *New services can be added or created by composing existing services without impacting the existing service implementations.* So, in the example above, an Employee Self-Service component could be added making use of the existing services, filtering data and operations to those appropriate for the self-service users. This allows for an "incremental deployment" approach in implementing services.
> *The services can be on heterogeneous systems across networks and geography providing platform independence and location transparency.* There is no need for each service to be implemented using the same software or hardware technology nor to be on the same network or in the same location. The Salary and Review Administration Service could be implemented in a J2EE environment on a Linux server in one state while the IT Security and Provisioning Service could be implemented in a Microsoft .NET environment on a Windows server in a different state.
> *The services communicate by standard protocols providing broad interoperability*. Most commonly, especially for connecting heterogeneous systems, these are protocols based on World Wide Web standards. "Web services" are the implementations of services using these

A NEW SOA MATURITY MODEL   5

standards. Amazon and eBay are high-profile examples of corporations which have made their core applications accessible over the Internet as Web services.

> *Legacy application systems can be integrated as a service leveraging existing invest-ments.* SOA technology provides mechanisms to front-end (or "wrap") existing systems behind a services interface with no changes to the existing system. In addition traditional ERP vendors are quickly exposing their applications' functionality as Web services.

> *Services have an interface and are message-oriented.* The functionality provided by services is defined by meta-data describing the interface to the service and its operations. Information is transmitted to and from services as messages. The focus in the definition of the interface and messages is in "what" a service does rather than "how". The "how" is internal to the implementation of the service. SOA applications are usually designed to be "event-driven" responding to the messages as they arrive.

An implementation of SOA relies on skills, methods, and a SOA infrastructure to support the SOA application in a reliable, scalable, and secure manner. Some of the basic elements of this new approach include:

> *Analysis, design, and implementation methodologies* to guide project managers, developers, and IT operations personnel in the rapid design, assembly, and reuse of SOA components.

> *Modeling and Development Tools* to specify and create the services as well as the business processes linking the services.

> *Enterprise Service Bus* (ESB)[4] to provide reliable, scalable, distributed communications and data transformations between services as well as providing adapters to legacy technology and various vendor implementations.

> *Services and Policy Registry and Repository* to provide a common place to organize, under-stand and manage SOA information including a catalog of available services, their interface definitions, and policies governing the use of services.

> *Provisioning and Infrastructure Management Tools* to provide the traditional elements of IT operations best practices in an SOA implementation including performance monitoring of services and derivation of Quality of Service metrics. The business-level orientation of SOA also allows for Business Activity Monitoring (BAM) at the business function/process level.

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[4] Chappell, David, *Enterprise Service Bus,* O'Reilly, 2004.

The introduction of SOA can provide a focus for the technology and business organization in a company to meet common goals of the enterprise. A SOA Maturity Model can provide goals and guidance on how SOA can have an increasingly positive impact on the enterprise.

Figure 1 shows the five levels of SOA Maturity along with the key business impact progressing from least to most mature as follows: Initial Services, Architected Services, Business Services and Collaborative Services (two different focuses at level 3), Measured Business Services, and Optimized Business Services. Also shown for reference are the corresponding CMMI[SM] levels[5].

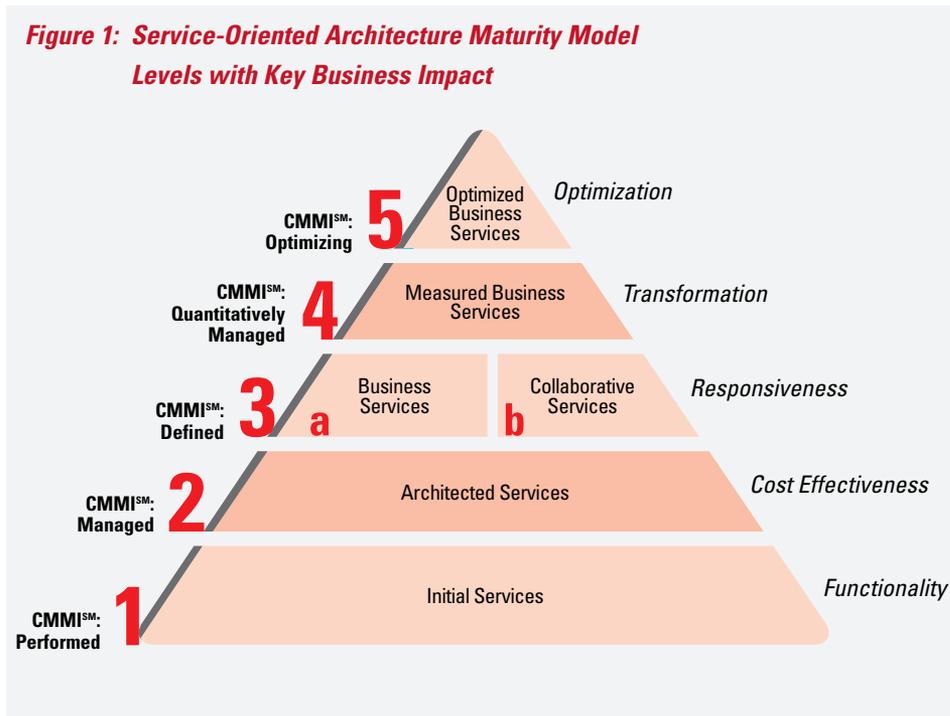*Figure 1: Service-Oriented Architecture Maturity Model Levels with Key Business Impact*

Table 1 shows the key attributes of each maturity level including business impact, scope, critical success factors, and relevant standards. Consistent with the approach taken by the SEI for the Capability Maturity Model®, Key Goals and Practices for each SOA maturity level are specified in Table 2. Attainment of these goals and the implementation of these practices is the measure as to whether a maturity level has been attained. Each maturity level has as a prerequisite the goals and practices of the lower levels.

It will often be the case that particular goals will be achieved, practices implemented, and technologies used at levels lower than those shown in Tables 1 and 2. This is to be expected and encouraged according to the priorities of the enterprise.

Subsequent sections will examine each of the SOA maturity levels.

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[5] In very short summary: CMMI[SM] Performed means that needed functions are performed, CMMI[SM] Defined means that standard processes are defined, CMMI[SM] Managed means that the standard processes are implemented and managed, CMMI[SM] Quantitatively Managed means that the results of the processes are measured against goals, CMMI[SM] Optimizing means that there is a continuous improvement process implemented based on the measurements.

Table 1: SOA Maturity Model

Maturity Level	Prime Business Benefits	Scope	Critical Technology Success Factors	Critical People & Organizational Success Factors	Selected Relevant Standards
1. Initial Services	New functionality	R&D experimentation, Pilot projects Web site, Portal, Custom integrations, Small number of services	Standards, Legacy Integration	Developers learn service development skills Developer Sponsorship	XML, XSLT, WSDL, SOAP, Java, .NET
2. Architected Services	IT cost reduction and control	Multiple integrated applications	Support for heterogeneity and distributed systems, Reliable Messaging, Mediation, Ease of deployment, Database integration, Versioning, Internal Security, Performance management	Architecture group provides leadership SOA Competency Center CIO Sponsorship	UDDI, WS-ReliableMessaging, WS-Policy, WS-Addressing, XQuery, WS-Security, SAML
3.a. Business Services	Business responsiveness — change business processes quickly and effectively	Business processes across business unit or enterprise	Reuse, Ease of modification, Availability, Business process rules, Event-driven processes, Composite applications	IT Partnership with Business Partnership across Organizations SOA Life-cycle Governance Executive commitment Event-driven design skills Business Unit Manager Sponsorship	WS-BPEL
3.b. Collaborative Services	Business responsiveness — collaboration with business and trading partners	Services available to external partners, Cross-enterprise	External services enablement, Cross-enterprise security, Translation of cross-enterprise protocols, Long-running transactions		RosettaNet, ebXML, WS-Trust
4. Measured Business Services	Business transformation from reactive to real-time, Meet business performance metrics	Business unit or enterprise, Cross-enterprise	Business Activity Monitoring, Event Stream Processing, Complex Event Processing, Event-driven dashboards and alerts	On-going business process evaluation and response CFO sponsorship	
5. Optimized Business Services	Business optimization — react and respond automatically	Business unit or enterprise, Cross-enterprise	Event-driven automation for optimization	Continuous improvement culture CEO sponsorship	

Table 2: SOA Maturity Model Goals and Key Practices

| Maturity Level	Key Goals	Key Practices
1. Initial Services	1. Learn SOA technology in R&D and pilot projects. 2. Apply SOA technology to immediate organizational needs. 3. Define initial ROI measurements for SOA projects and apply to initial projects.	1. Create services definitions. 2. Integrate SOA into project development methodology. 3. Quantify costs, time, and business benefits of pilot projects.
2. Architected Services	1. Institutionalize use of SOA. 2. Put in place architecture leadership for SOA. 3. Prove returns from use of standards technology.	1. Specify technology standards for SOA. 2. Integrate SOA into organization-wide development process. 3. Provide organization-wide SOA training and competency center. 4. Use incremental integration.
3.a. Business Services	1. Create ongoing partnership between business and technology organizations for SOA governance. 2. Support full business processes via SOA. 3. Prove returns from reuse of services and responsiveness to change.	1. Specify policies for use of SOA in creation or modification of business processes. 2. Take advantage of event-oriented and mediation functionality of SOA technologies, especially with regards to enhancing/extending business processes.
3.b. Collaborative Services	1. Create ongoing partnership between business and technology organizations for SOA governance. 2. Extend SOA business processes to external organizations 3. Prove returns from use of services for collaboration.	1. Specify policies for use of SOA in collaboration with business and trading partners 2. Implement cross-enterprise security.
4. Measured Business Services	1. Institute transformation from reactive to real-time business processes. 2. Define and meet business-oriented performance metrics.	1. Collect and analyze business process-oriented real-time performance metrics. 2. Implement ongoing business process evaluation and re-engineering.
5. Optimized Business Services	1. Provide enterprise-wide leadership for business and SOA governance. 2. Prove returns from SOA-supported continuous improvement.	1. Implement self-correcting business processes.

> 3.1 SOA MATURITY LEVEL 1 — INITIAL SERVICES

SOA Maturity Level 1 is Initial Services (see Table 1 and Table 2). Initial Services represent the initial learning and project phase of SOA adoption. Projects here are typically done to simultaneously meet a specific need to implement functionality while trying out specific technologies and an approach to SOA. This maturity level also includes initial R&D activities testing the SOA technologies in a laboratory environment. Usually, the introduction of SOA is driven by the application development organization — often as part of an application integration project. New development skills are learned and attempts at quantification of ROI are created.

This is the level at which the most basic of SOA standards from W3C[6] are introduced such as XML for definition of message formats, WSDL for service interface definition and SOAP for invocation of services.

A typical example of an initial project as shown in Figure 2 is to link a corporate sales force Web portal directly to both a new application server implementing the sales forecasting and tracking service and a legacy CRM application front-ended with a Web services adapter. The "Services Interface" shown in this and subsequent examples provides the linkage and necessary translation between the application implementation and the chosen services communication protocols. The Services Interfaces can itself be provided though various types of products such as an application server or an ESB adapter as described later.

*Figure 2: Example Application for Maturity Level 1: Initial*
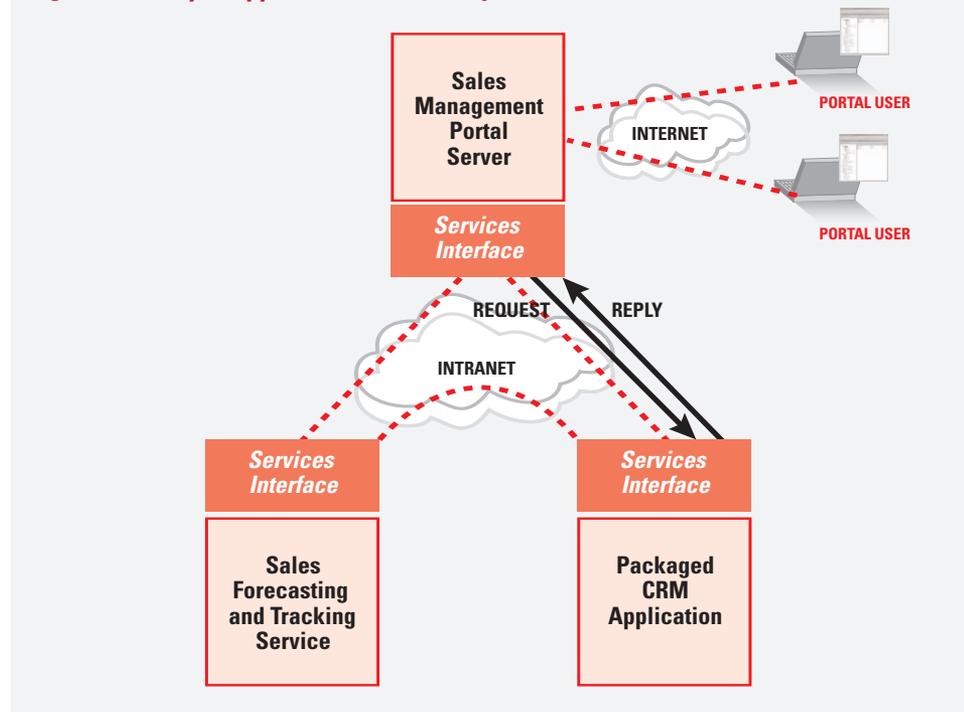
_____
[6] World Wide Web Consortium, "Web Services Activity", http://www.w3.org/2002/ws/.

The key benefits of this initial project are to provide the business functionality required while also learning how to develop and deploy a basic SOA application. Such an implementation would use the SOAP protocol between the portal server and the supporting services, as well as for the Sales Forecasting and Tracking Service to obtain information from the CRM Application.

However, even a basic initial application could benefit from using some of the key additional SOA infrastructure components. Beyond the learning gained from using the technologies early, the most important reason for the introduction of these technologies on initial projects is to put in place scalable technology so that as SOA encompasses more business functions, the right foundations are in place. For example, Figure 3 shows this same example with the addition of:

> An *Enterprise Service Bus* (ESB) such as Sonic's ESB which provides a standard interaction model for SOA components including Web services and relational databases as a scalable, easy-to-deploy distributed infrastructure. The ESB provides a large number of adapters to allow services implemented in disparate technologies to interchange messages allowing, for example, a .NET application to communicate with a J2EE application at a services level.
> A *Service Level Management Service* such as AmberPoint's which provides visibility into Web services performance and service level metrics.
> A *Services Registry* such as Systinet's Registry product supporting the UDDI standard. This provides a central store of service definitions across the initial projects and provides a single point of references for service developers to obtain services definitions.

Figure 3: Enhanced SOA Infrastructure for SOA Maturity Level 1: Initial
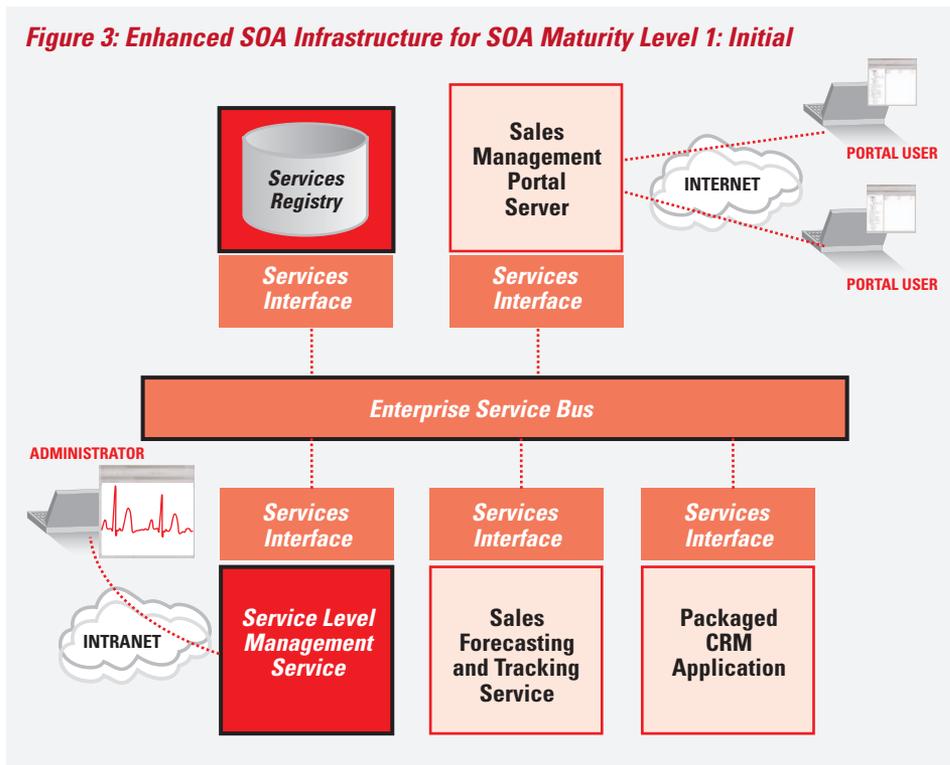
> 3.2
SOA MATURITY LEVEL 2 — ARCHITECTED SERVICES

SOA Maturity Level 2 is Architected Services (see Table 1 and Table 2). It is at this level that standards are set as to the technical governance of SOA implementation, typically under leadership of the architecture organization. The key business benefit of this level is development and deployment cost reductions through the use of SOA standard infrastructure and components as compared to using older technologies or costs accumulated through multiple unique one-time projects. These benefits are greater in the heterogeneous environments typical of most enterprises.

Based on the learning and feedback from the initial services at Maturity Level 1, architectural standards and standard implementation technologies are defined. For example, standards are set for:

> Enterprise SOA protocols to be used chosen from industry standards, particularly those of W3C, OASIS[7] and WS-I[8].
> Implementation platforms to be used.
> Policies including reuse, compliance and security policies.
> Technical review process for definition of new services and reuse of existing services.

Figure 4 shows an example of an SOA deployment at Maturity Level 2 for a financial trading example. Maturity Level 2 includes the use of key components shown previously in Figure 3 including Service Level Management and the Enterprise Service Bus as well as the additional key aspects of this example:

> A *Services and Policies Repository* such as Systinet's Registry and Policy Manager which extend the Services Registry to provide a repository for full storage and support of SOA governance information including policies and service definitions with lifecycle management including notifications and approvals. Usage of such a repository with both development and runtime support is key to the processes supporting Maturity Level 2 Architected Services.
> An *Exception Management Service*, such as AmberPoint's, providing a mechanism to detect, diagnose and automatically remedy both system and application-level errors.
> *Message Transformation* to allow the integration of services with differences in expected message contents or formats. This is often done by the invocation of XLST transforms applied to an XML message—in this example as a "mediation" function under the control of the ESB.
> A *Single Sign-On Service* supporting user authentication and authorization across the organization. Such a service, typically supplied by a vendor, could be based on the OASIS SAML standard for the exchange of authentication and authorization information.

[7] OASIS, "OASIS Committees by Category: Web Services and SOA", http://www.oasis-open.org/committees/tc_cat.php?cat=ws.
[8] WS-I, Web Services Interoperability Organization, http://ws-i.org.

Figure 4: Example Application for SOA Maturity Level 2: Architected Services
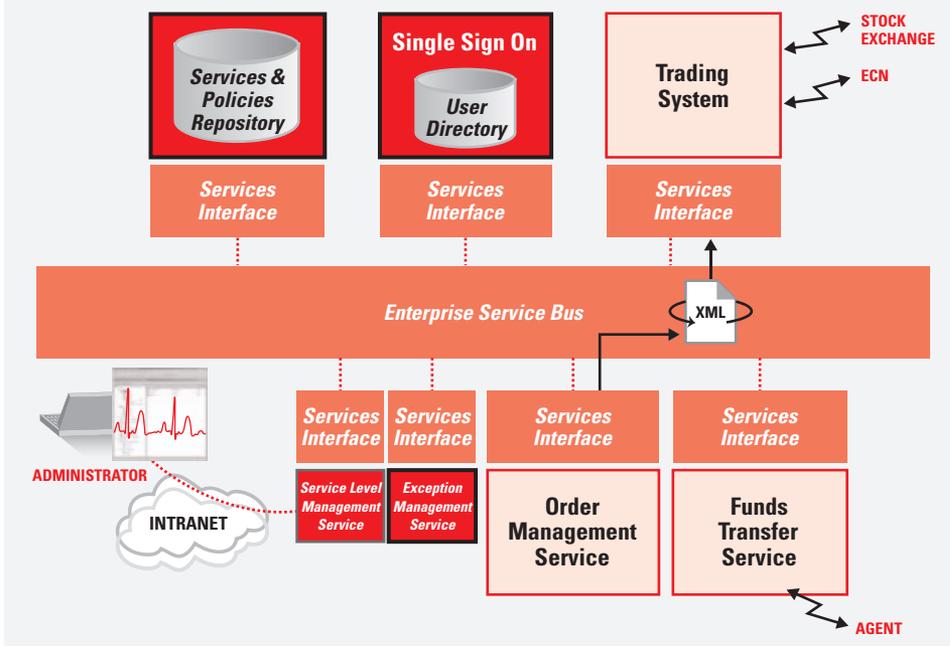
> 3.3 SOA MATURITY LEVEL 3 — BUSINESS SERVICES AND COLLABORATIVE SERVICES

The focus of SOA Maturity Level 3 is on the partnership between technology and business organizations in order to assure that the use of SOA provides clear business responsiveness. Core to the value of SOA is the linkage between business process and digital processes as shown in Figure 5.

Figure 5: SOA's Source of Power: It Models Business Processes (adapted from Forrester Research[9])
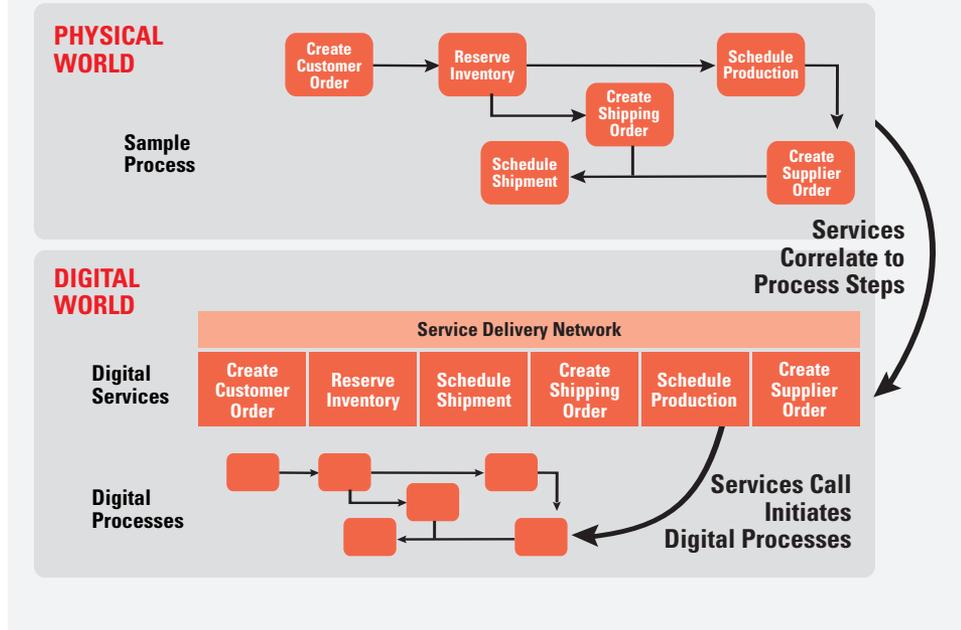
SOA Maturity Level 3 is defined with two complementary paths to attaining these goals — one, Business Services, focused on the improvement of internal business processes, and one, Collaborative Services, focused on the improvement of collaborative processes with external partners, (see Table 1 and Table 2). Certainly both can be done to get the greatest advantage from SOA, but Maturity Level 3 can be attained with only one path if this provides the greatest business advantage.

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[9] "The Big Strategic Impact Of Organic Business And Service-Oriented Architecture", Forrester Research, Inc., June 2004.

Figure 6 shows an example of an SOA deployment at Maturity Level 3 for the financial trading example. Key to this Business Services implementation is:

> Business Process Management (BPM) involving the management of long-running processes involving sequential messages between services. This could be done for example by the Sonic Orchestration Server which can manage the state of each process along with intermediate results.

Figure 6: Example Application for SOA Maturity Level 3: Business Services
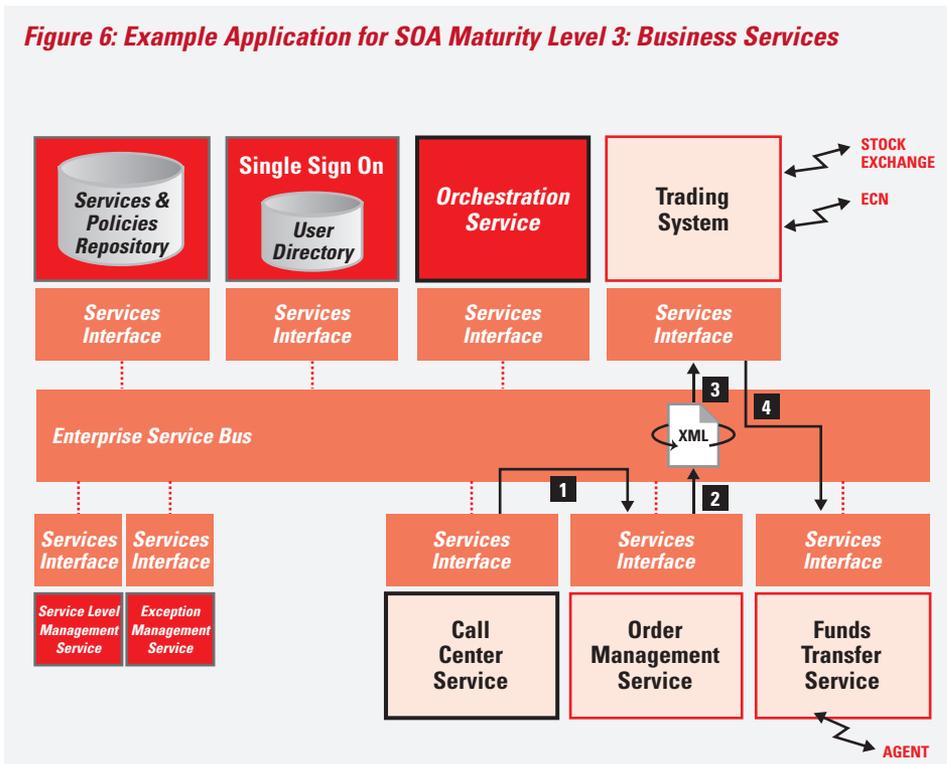
Figure 7 continues the evolution of Business Services with the addition of:

> *Straightforward enhancement of business processes.* A principal advantage of SOA is its enablement of business process modification through the reconfiguration of services. In this example, a new Compliance Service required for regulatory compliance is inserted in the message flow between the Order Management Service and the Trading Service without any changes to the implementations of the existing services.

> *Reuse of services.* In this example, reuse is shown as through a *multi-channel application* (e.g. provide access to the same application through different customer communication methods) in which the Order Management Service is shared by both the Call Center Service and the Online Service.

Figure 7: Continued Evolution of Application for SOA Maturity Level 3: Business Services
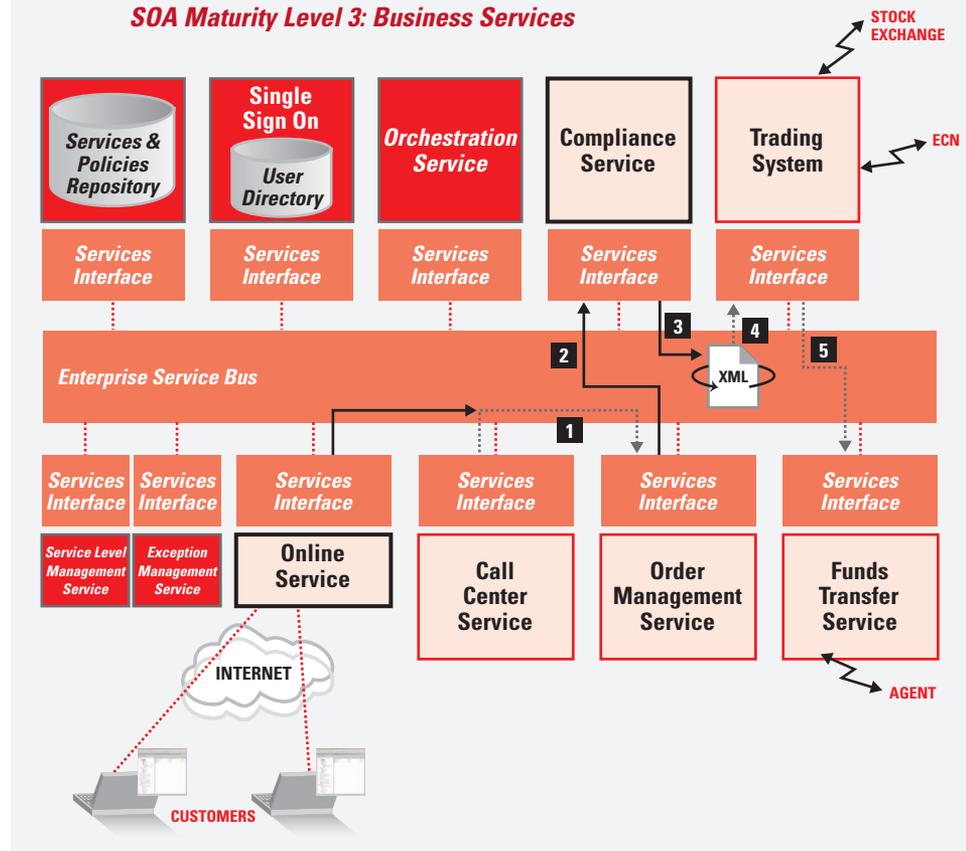
The alternative focus at Maturity Level 3 is Collaborative Services with a focus on linking with external partners. Figure 8 shows an example where the trading company expanded into a new business of foreign exchange transactions offered over the Internet.

Key features in this implementation of Collaboration Services include:

> Use of standard *SOA protocols supporting specific business-to-business (B2B) function-ality* such as those defined by RosettaNet[10] which includes standard XML messaging functions for such cross-enterprise operations as obtaining product information, obtaining inventory information, and ordering.

> A *Collaboration Server*, such as Sonic's, which implements the B2B protocols and supports necessary transformations between the messages used internal to the enterprise and those needed for external processes.

> The ECN connection has *moved from a proprietary protocol to a standard industry services protocol* and hence is managed through the Collaboration Server.

Figure 8: SOA Maturity Level 3: Collaboration Services

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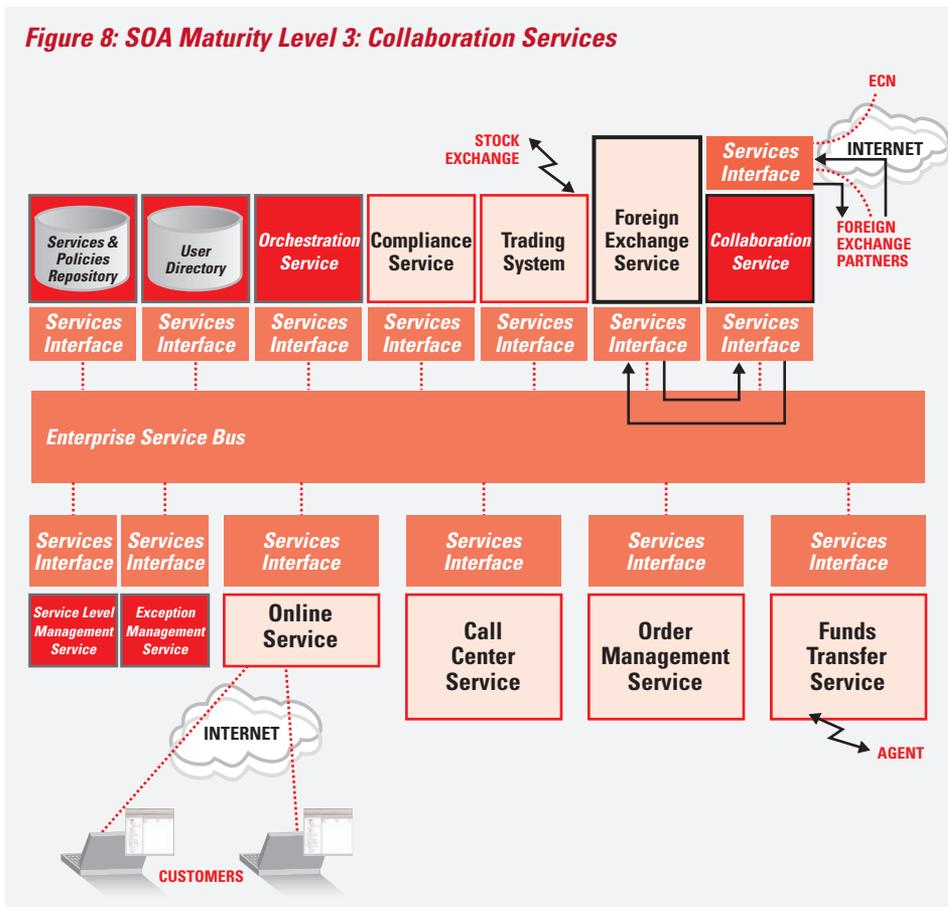
[10] RosettaNet, "Standards", http://rosettanet.org/standards.

> 3.4 SOA MATURITY LEVEL 4 — MEASURED BUSINESS SERVICES

While SOA Maturity Level 3 focuses on the implementation of internal and/or external business processes, SOA Maturity Level 4 focuses on measuring and presenting these processes at the business level so as to provide continuous feedback on the performance and business impact of the processes implemented at Level 3 (see Table 1 and Table 2).

Figure 9 shows an example process to configure, order and manufacture, with services for each key function distributed across geographic locations.

Key features in this example are:

> *Real-time Event Stream Processing* which in this example collects all RFID events into an event DB and filters out the business-meaningful events based on rules and forwards them on for use in other services. As explained in *The Power of Events*[11] and "Event Stream Processing — A New Physics of Software"[12], event stream processing and "complex event processing" allows the *transformation* of business processes from being reactive to being based on real-time intelligence.

> *Business Activity Monitoring*, which provides feedback to management as to real-time business performance metrics, shown here as a dashboard. The Service Level Management Service, such as AmberPoint's, can provide such monitoring for events which are directly tied to the SOA infrastructure. In other scenarios, the events generated by the Service Level Management Service could be passed on to more generic services for processing and display.

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[11] Luckham, David, *The Power of Events,* Addison-Wesley, 2002.
[12] Palmer, Mark, "Event Stream Processing - A New Physics of Software", DM Direct Newsletter, July 29, 2005, http://www.dmreview.com/editorial/newsletter_archive.cfm?nl=dmdirect&issueid=20226.

Figure 9: Example Application for SOA Maturity Level 4:
**Measured Business Services**
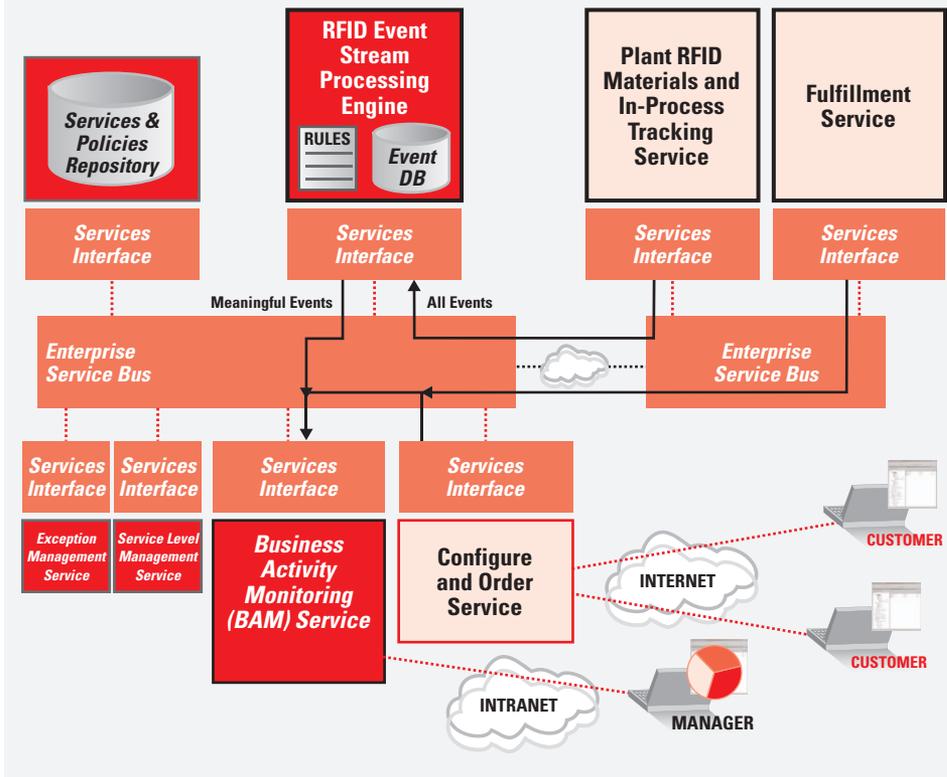
> 3.5 SOA MATURITY LEVEL 5 — OPTIMIZED BUSINESS SERVICES

SOA Maturity Level 5, Optimized Business Services SOA, adds automatic response to the measurements and displays of Level 4. In this way, the SOA information system becomes the "enterprise nervous system" and takes action according to events occurring at the business level according to rules *optimizing* business goals (see Table 1 and Table 2).

Figure 10 shows the configure, order and manufacture process enhanced to provide dynamic pricing according to the status of materials and in-process work in the manufacturing plant. For example, if parts for a particular version of an item are in short supply, pricing can be created to encourage purchasers to order an item using alternative parts. This example is inspired by the success of Dell Corporation's use of dynamic pricing in which a shortage of a particular capacity disk drive, for example, causes the dynamic creation of a special offer to encourage buyers to configure and purchase a computer with a larger drive.[13,14] Using SOA components allows such an approach to be more easily implemented and evolved than through the construction of proprietary systems.


Figure 10 — Example Application for SOA Maturity Level 5: Business Optimization

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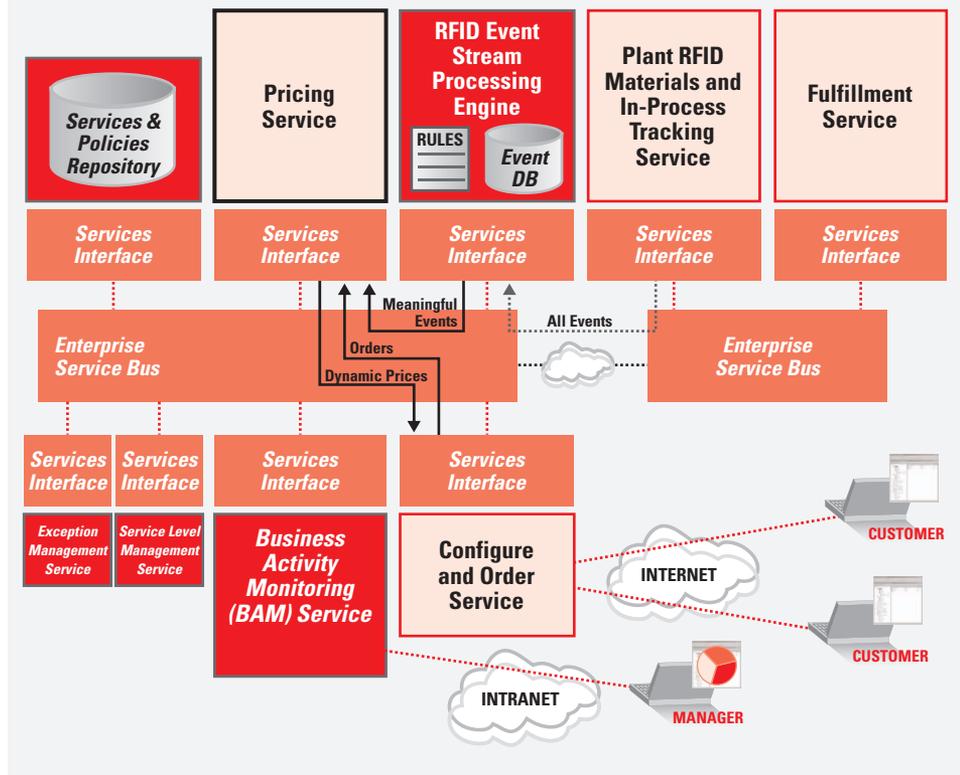
[13] Friedman, Thomas L., *The World is Flat,* Farrar, Straus and Giroux, 2005.

[14] McWilliams, Gary, "Lean Machine: How Dell Fine-Tunes Its PC Pricing to Gain Edge in a Slow Market", *The Wall Street Journal,* June 8, 2001.

The SOA Maturity Model provides a framework supporting both the vision and the assessment of increasing levels of business benefits from the adoption of SOA. The levels and key benefits are as follows:
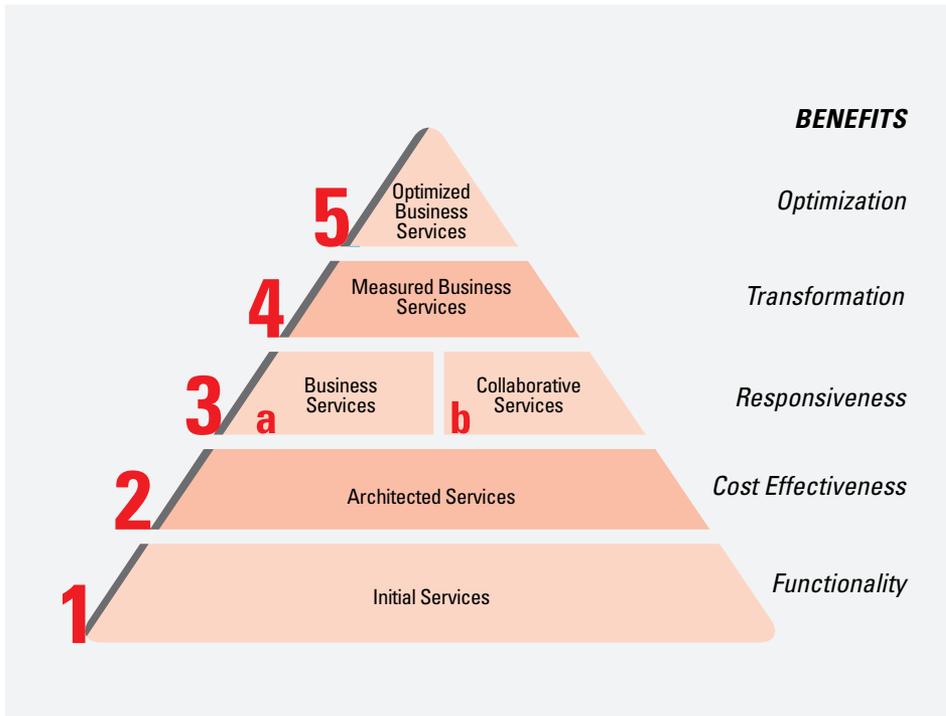
Key to the success of SOA introduction and subsequent success is an evolving partnership between the technology and business organizations. This partnership is predicated on the ability for the technology organization to support the business in both responding to competition and in rapidly implementing new business models such as new distribution channels, new information services products and new pricing models—all with continuously improving metrics such as profitability and customer satisfaction.

The goal of SOA is to allow this business agility in a way different and better than previous technologies—different due to the capitalization on Web standards, due to the inherent flexibility of SOA design, due to the inclusion of legacy systems, and due to the availability of off-the-shelf SOA infrastructure and services. Ultimately, a company's success in achieving an increasing level of maturity will depend on the methodology and rigor that is either created within the enterprise or fast-tracked by engaging a systems integrator.

SONIC SOFTWARE

Sonic Software provides a full range of products to help organizations move through the Maturity Model and incrementally adopt SOA. Sonic's Enterprise Service Bus (ESB) is a core component for an intelligent, distributed, and scalable SOA communications infrastructure. Sonic Orchestration Server extends the intelligent routing capabilities of the Sonic ESB to enable the modeling, execution, and management of complex, stateful business processes across the extended enterprise. Sonic XML Server provides high-speed XML processing, storage, and query services for near real-time management of Sonic ESB in-flight XML messages. To measure and optimize business services, products are provided through sister company, Progress Real-Time Division (PRTD).

REALIZING SOA MATURITY WITH SONIC

The following chart outlines how the Sonic products relate to each level of the Maturity Model:

Level 5: Optimized Business Services & Level 4: Measured Business Services	Business Optimization/Event Stream Processing through PRTD's Progress® ESP™ Event Manager™, Progress® Apama® Algorithmic Trading Platform, and Progress® RFID
Level 3b: Collaborative Services	Partner Collaboration with Sonic Collaboration Server™
Level 3a: Business Services	Business Process Management through Sonic Orchestration Server™
Level 2: Architected Services & Level 1: Initial Services	Foundation SOA Functionality through Sonic ESB®, Sonic XML Server™, Sonic Database Service™, and Sonic Workbench™, Stylus Studio®

ABOUT SONIC SOFTWARE:

Sonic Software is the inventor and leading provider of the enterprise service bus (ESB), a new communication and integration infrastructure that supports the enterprise requirements of a service-oriented architecture (SOA). Sonic's technology delivers the scalability, security, continuous availability and management capabilities necessary to connect, integrate and control distributed, mission critical business processes. Over 1,000 customers use Sonic products to achieve broad-scale interoperability of IT systems and the flexibility to adapt these systems to ever-changing business needs.

Sonic Software is an independent operating company of Progress Software Corporation (Nasdaq: PRGS), a US$360+ million global software industry leader.

FOR MORE INFORMATION:

www.sonicsoftware.com
Phone: 781-999-7000
Email: eval@sonicsoftware.com

Jonathan Bachman
Email: jbachman@sonicsoftware.com

SYSTINET

Systinet provides the foundation for SOA governance and lifecycle management, making IT simpler, faster and standards-based. With its suite of award-winning and proven products, Systinet enables organizations to leverage and reuse their existing applications and data assets, provide interoperability among heterogeneous systems, and better align business processes with IT. Systinet's products enable, publish, discover and manage SOA business services, and make it easy to build secure and reliable Web services with Java and C++ applications.

REALIZING SOA MATURITY WITH SYSTINET

Systinet maps to the SOA Maturity Model as follows:

Level 5: Optimized Business Services & Level 4: Measured Business Services	Governance Interoperability Framework
Level 3: Business Services	Systinet "Blizzard"
Level 2: Architected Services & Level 1: Initial Services	Systinet Server, Systinet Registry & Systinet Policy Manager

ABOUT SYSTINET:

Systinet is the leading software provider of the foundation for SOA governance and business service lifecycle management. Founded in 2000, Systinet's award-winning, proven, and standards-based products enable IT organizations to rapidly leverage existing technology investments, provide interoperability between heterogeneous systems, and better align business processes with IT. Customers receive the benefits of a simpler, faster, standards-based way to dramatically improve IT responsiveness and technology asset reuse, while maximizing the ROI for SOA. Systinet's customer base of over 150 Global 2000 clients includes Amazon.com, BMC Software, Interwoven, JP Morgan, Motorola, Defense Information Systems Agency (DISA), and SAIC. Headquartered in Burlington, Mass., Systinet is a privately held company with over 100 employees.

FOR MORE INFORMATION

www.systinet.com
Phone: 781-362-1324

Sean Kline
Email: sean.kline@systinet.com

AMBERPOINT

AMBERPOINT

AmberPoint provides the runtime governance layer that is critical for realizing the return on investment from distributed, heterogeneous service-oriented systems. It can be used across the maturity levels with increasing functionality—from Initial Services through Business Process Optimization. For example, AmberPoint provides basic performance monitoring for Initial Services, ensures compliance with service level agreements and handles exceptions for Business Services, and monitors business activity for Measured Business Services. Through all levels of the Maturity Model, AmberPoint delivers automatic dependency tracking to reduce system complexity and help organizations understand the impact of system changes.

REALIZING SOA MATURITY WITH AMBERPOINT

The following chart outlines AmberPoint capabilities at each level of the Maturity Model:

Level 5: Optimized Business Services & Level 4: Measured Business Services	Business activity monitoring. Advanced service level management, exception management and endpoint security. Automatic discovery and dependency tracking.
Level 3b: Collaborative Services & Level 3a: Business Services	Service level management, exception management and endpoint security. Automatic discovery and dependency tracking.
Level 2: Architected Services & Level 1: Initial Services	Basic performance monitoring and management. Fault detection. AmberPoint Express complimentary developer's edition management software.

ABOUT AMBERPOINT:

AmberPoint is the industry's leading provider of SOA visibility, management and security solutions. Customers such as British Telecommunications, H&R Block, Motorola and the U.S. Department of Defense have chosen AmberPoint for its comprehensive runtime governance capabilities, its non-invasive approach and its native support for Java and .NET. Complimentary developer's editions of AmberPoint are available from the AmberPoint website at www.amberpoint.com.

FOR MORE INFORMATION

www.amberpoint.com
Phone: 510.663.6300
Email: info@amberpoint.com

BearingPoint

BearingPoint's *SOA Roadmap* gives companies the ability to create an agile IT architecture. BearingPoint has made significant investments in building its SOA-based Next Generation Business Systems Integration framework, which provides a holistic business/technology platform to enable clients to become far more agile than at present. This integrated platform includes:

> SOA Assessment & Roadmap
> SOA Governance
> Business Composite Applications
> Enterprise BPM

> SOA Delivery & Implementation
> SOA Competency Centers
> SOA Architecture Services
> Tools and Plateau Selection

BearingPoint's ProvenCourse℠ is a single, consistent delivery methodology and framework for clients across the globe to design, develop, and deploy Service-Oriented Architectures. These service offerings are closely aligned with the strategic goal of moving enterprises through the progression of SOA Maturity — assuring tangible and quantifiable benefits at each step.

REALIZING SOA MATURITY WITH BEARINGPOINT

The following chart outlines how BearingPoint's SOA solutions relate to the Maturity Model:

Level 5: Optimized Business Services & Level 4: Measured Business Services	Business Activity Monitoring
Level 3b: Collaborative Services	Tools & Plateau Selection, Productivity Layer
Level 3a: Business Services	Enterprise Business Process Management, Business Composite Applications
Level 2: Architected Services Level 1: Initial Services	SOA Current State Assessment & Roadmap, SOA Architecture Services, SOA Delivery & Implementation

ABOUT BEARINGPOINT:

BearingPoint provides business and technology strategy, systems design, architecture, applications implementation, network, systems integration, and managed services. BearingPoint's goal is to bridge the gap between business and IT by providing a more direct link between business strategy, business process design, and IT execution. Based in McLean, Va., BearingPoint has been named by Fortune as one of America's Most Admired Companies in the computer and data services sector.

FOR MORE INFORMATION:

www.bearingpoint.com
Phone: 408.930.0020

Bobby Soni
Email: bobby.soni@bearingpoint.com