

# Demystifying SOA

## SOA is an architectural blueprint that:

- Supports software system design in which business functionality is provided through a collection of loosely-coupled services to either end-user applications or to other services
- Can incorporate many different technologies, and does not require specific protocols or technologies
- Creates business value through:
  - Alignment of business services and technical solutions that support them
  - Facilitation of continuous improvement of both business processes and IT management processes
  - Increased IT agility in support of business process change
  - Reduced cost of integration between existing applications
  - Re-use of solutions, including legacy systems that can be leveraged without rewriting
  - Increased leverage of Best Of Breed solutions

## Some Things Never Change

### IT-Related Challenges are FAMILIAR

Although much has changed (and with seemingly ever greater speed and impact) with regard to information technology in the recent past, the challenges faced by today's IT service providers remain very familiar. IT organizations remain challenged to:

- Align system solutions with business needs,
- Respond to changing business needs, and
- Leverage investment in heritage IT solutions

And, as ever, IT organizations are tasked with meeting these challenges in the most cost-effective manner possible.

## So What HAS Changed?

### IT-Related Pressures are GREATER

In the eyes of many, IT has become commoditized to the point where it represents little more than an “infrastructural technology” to be provided at the lowest possible cost and risk. As a result, the pressure on IT organizations to reduce cost — and the resultant pressure to improve the effectiveness and efficiency of IT management processes — continues to increase.

In addition, business environments that are changing increasingly faster and often more dramatically have increased the need for IT agility. Today, IT organizations find themselves needing to respond to changing business needs more quickly than ever. On top of this, they are faced with the need to integrate with third-party package solutions (including ERP solutions), the need to replace aging legacy systems and/or technology platforms, and — in the case of certain industries — the need to respond to increasing regulatory pressures.

In order for IT organizations to resist the pressures to become commoditized and to remain strategic in nature, it is clear that they must create business value (see sidebar). The only way to achieve this is through complete IT alignment with the business organization. And the best way to begin achieving this is through a thorough understanding of the core business processes to be IT-enabled.

CSC believes strongly that IT organizations should remain strategic in nature, and that the means to achieve this exist, and are better today than ever before.

## Solutions Exist to Ensure On-going Strategic Value of IT

While IT organizations are being asked to provide solutions more quickly and more cheaply, the good news is that significant advances have been made with regard to two of the primary enablers of high value-added IT solutions. These are:

- Business Process Modeling,
- and Application Integration

**In both of these fields, the available tools and technologies, in addition to the enabling standards have recently become significantly mature.** For example, WS-BPEL (Web Services-Business Process Execution Language) has emerged to describe how services (specifically Web services) are coordinated to create processes. It is through these types of standards, and the tools and technologies that embrace them, that today's IT organizations are able to thoroughly understand and model business processes, and thus finally begin to realize the goal of aligning completely with the business organization(s) that they support.

Similarly, with regard to application integration, standards like XML, WSDL and SOAP have emerged, as have a host of message oriented middleware, enterprise application integration (EAI) and enterprise service bus (ESB) products. The best of these products today are functionally very rich, and are widely available.

**The advances related to business process modeling and integration technology have essentially made possible the practical use of Service Oriented Architecture (SOA).**

## What is SOA?

Besides being the latest IT buzzword (remember BPR, ERP, OO and so on?), SOA is an architectural blueprint that supports software system design in which business functionality is provided through a collection of loosely-coupled services to either end-user applications or to other services. An SOA can incorporate many different technologies, and does not require specific protocols or technologies. In essence, SOA enables software applications to be built as collections of collaborating services that can interact without regard to each other's platform, data structures or internal algorithms.

### Business Process Modeling

Unlike many previous architecture models, SOA focuses on, and is driven by, business processes, as opposed to technical components. It is this emphasis that allows software developers to deliver business functionality as a set of services that can be deployed and configured to address new and changing business needs at minimum cost and with minimum delay. Increasingly mature modeling technologies and standards enable the expedient and accurate modeling of business processes such that they may be translated into technical services as part of an SOA.

### Application Integration

Because individual services must be accessed in a consistent manner and configured in such a way as to meet potentially dynamic business process requirements, the integration function of an SOA becomes critical. Services must be clearly defined, with well-defined inputs and outputs, and must be accessed consistent with a well-defined "service contract" that defines the "rules of engagement" for services. Again, increasingly mature integration technologies and standards enable the standard, reliable and economic invocation of services.

### What Defines a Good Service?

Critical to designing a good set of services is deciding how much work each should perform. If services are too large (or course grained), the options for assembling them into system solutions are reduced, and the benefits of reuse are decreased. On the other hand, if services are too small (or fine grained), they become difficult to integrate and assemble into system solutions, and to subsequently maintain.

A good service conceals its implementation from other services and the applications that it enables. If well designed, it can be implemented in any combination of technologies as cost and agility dictate. In fact, its technical implementation can be changed without affecting the business processes in which it participates.

## Why Should I Care?

Despite the advances that have been made over the past 20 years with regard to system development (structured programming to object-oriented development to component-based development), no approach has proven acceptably effective in transforming system development into a discipline that can be planned and controlled, and can adequately meet the requirements of most business organizations.

This results in two major issues for most businesses. First, IT initiatives have proven very difficult to consistently and accurately estimate with regard to time and money, and second, it has proven very difficult to adapt existing systems to changing requirements in anywhere near the timeframe that most businesses require today.

### Reduced Costs and Complexity

SOA represents a major step forward in addressing these issues. When defined and built properly, services become “building blocks” for creating new system solutions. This enables IT initiatives to be estimated with greater certainty, and solutions to be built in less time and therefore at lower cost. It also reduces the impact of change, as the platform, data structures, and internal algorithms of services are hidden from the applications that utilize them.

### Increased Agility and Strategic Value of IT

Further, properly defined services facilitate and enable proactive changes in business process (and therefore continuous improvement of business process) that otherwise would prove difficult and/or costly, if not impossible. Because services represent coarse grained business functions, such as a payment process or a process to create a new customer, these functions can be configured in a variety of ways that are bound only by the creativity of business process owners. This results in IT organizations once again being viewed as strategic enablers of business strategy and success.

### Increased Leverage of Existing Assets

SOA platforms can also help solve the age-old problem of the need for legacy applications built on disparate platforms to communicate with one another. They can enable legacy systems to participate as services in end-to-end business processes without major internal modification, thereby prolonging the life of existing assets, and leveraging the investment in them.

## What Does This Mean for IT Organizations?

While by no means an easy task, the successful adoption of strategic SOA (i.e., SOA that enables continuous business improvement) becomes more pragmatic by concentrating first on certain elements of an SOA strategy.

### Establish an Enterprise SOA Vision

The main purpose of an SOA vision is to educate both your IT organization and your business organization about SOA, and to establish principles upon which all thinking related to SOA (and in fact to all enterprise architecture) will be based. It is important that this vision make clear the impacts on both the IT and business organizations, and the likely changes in the working relationship between the two.

### Practice Collaborative Design

It is absolutely critical that business and IT resources work together to design both business processes and the IT deliverables required to support them, and that this work is driven by the requirements of the business process. Forrester refers to this as “collaborative business design.” Without it, an SOA approach simply will not work.

### Defining Services – the Trade-offs

Design Stance Analysis offers a rich and effective alternative to the traditional triple constraint (scope, cost and time) technique that is currently widely used in establishing criteria by which to evaluate design decisions in systems development initiatives.

Through facilitated work sessions, business users, IT resources and project managers can collaboratively establish prioritized design criteria, thus laying the groundwork for principle-guided decision-making related to definition of services.

A thorough design stance analysis will address at a minimum the following elements:

- Response time/performance
- Throughput/scalability
- Security
- Survivability
- Reliability/availability
- Flexibility/extensibility
- Openness
- Portability
- Maintainability
- Traceability
- Economy of build
- Economy of operation

Such an analysis, performed early in a project, will allow the focus of the project team to remain on defining clear service contracts with a clear business orientation, and on keeping both business people and IT people focused on the architecture goals of the organization.

### What is the Strategic Value of IT Today?

Service Oriented Architectures provide the basis for enabling true differentiating capabilities in the organizations that embrace them. That differentiation will likely come not from IT itself, but rather from the potential new business practices that it enables. As stated by John Seely Brown and John Hagel III in a June, 2003 letter to *Harvard Business Review*, "The strategic differentiation emerges over time, based less on the specific innovations in business practices at any point in time and much more on the ability to continually innovate around IT's evolving capabilities."

Business differentiators are rooted in an organization's people, information and business processes. As IT solutions become more aligned with the business they support, and more service-oriented, the "information" in information technology can truly be utilized to better understand customers, apply that understanding to products, services and processes, and integrate those to consistently deliver greater value to customers.

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### Evaluate Tools and Technology

In determining the specific components to deploy as part of your SOA infrastructure, it is important to first understand and evaluate the potential components that may already comprise the existing infrastructure. It is likely that many of the required incremental components will be commercially available products (ESB products, XML gateways, etc.) or even custom-built infrastructure solutions. Regardless, it is important to ensure that all tool and technology decisions are consistent with the overall SOA vision.

### Plan for Required Organizational Changes

The introduction of strategic SOA will likely result in several people- and process-related changes for your current organization. In some cases, new roles may be required (e.g., business modeler). In others, current resources may require new or improved skill sets, thus resulting in additional training requirements. In addition, processes related to IT planning and budgeting, and architecture planning and governance must be defined or refined to accommodate the introduction of SOA elements.

### Measure Service Value

As with any solution, it is imperative to measure the business benefit or value derived from a given service, or indeed a service oriented architecture, in order to make informed decisions regarding its future direction. To this end, it is possible to compare the cost of creating, maintaining and operating business services with the business benefit provided by the processes enabled by those services. Thus, your SOA vision should accommodate the ongoing value measurement of services in the context of the overall business goals.

## What Does CSC Know About SOA?

### Business Process Modeling

CSC has a long and successful history of providing system solutions that are focused heavily on business process modeling and application integration. CSC's system development methodologies have forever prescribed that development efforts begin with development of a Business Area Architecture that includes business process models. As a result, CSC has developed significant expertise in this field with regard to tools, techniques and methods. In fact, as part of its standard methodology, CSC has developed and practically applied C-RUP, an engineered set of tools, techniques and methods that works with IBM's Rational Unified Process.

### Application Integration

CSC has also developed a very strong core competency with regard to application integration that is also founded in many years of successful experience (in fact, at one time, CSC's Consulting Group was known as the Consulting and Systems Integration group). CSC has forever played a leading role in this field as evidenced by its thought leadership related to message oriented middleware, object oriented development, application server technologies, EAI (enterprise application integration), and business process management. As a result, CSC has also developed significant expertise in this field with regard to tools, techniques and methods.

### Enterprise Architecture

CSC has also developed a core competency with regard to enterprise architecture that is also — you guessed it — founded in many years of experience. In fact, CSC currently maintains a dedicated group of senior technologists that focus solely on the discipline of enterprise architecture. One of those technologists, Dirk Slama, has co-authored the highly regarded "*Enterprise SOA — Service Oriented Architecture Best Practices*" published in 2005.

Given CSC's historical and continuing focus on business process modeling, application integration, and enterprise architecture, **CSC has essentially practiced SOA techniques for many years** prior to the introduction of the SOA buzzword, and continues to do so. As a result, CSC stands best positioned to continue its leadership in the SOA world of the early 21<sup>st</sup> Century.