



## **SOA – Savior or Nemesis?**

Assessing the Impact of Service Oriented  
Architecture (SOA) on Your Organization

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*“SOA has the potential to make IT the hero or the villain, depending on how SOA is communicated and implemented within their organizations.”*

—Damian Smith,  
Hitachi Consulting

## Introduction

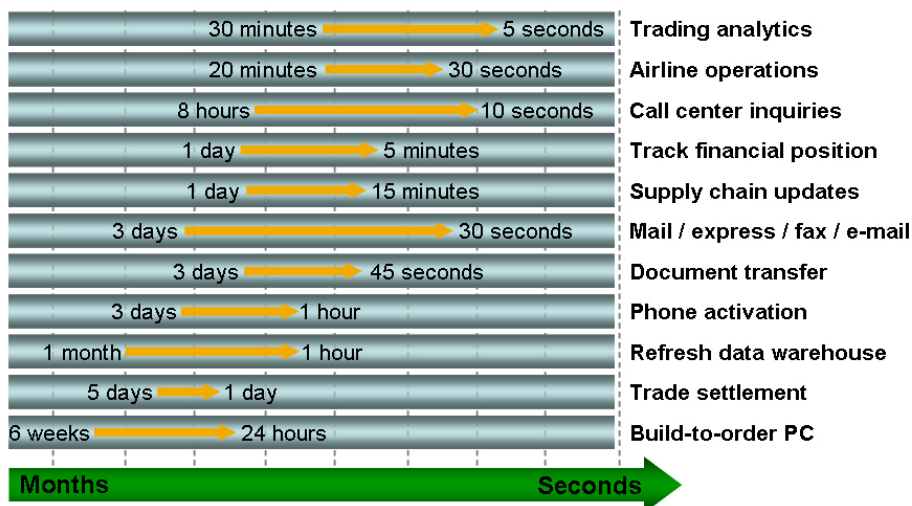
The hype around SOA is tremendous—it will revolutionize IT, make life easier, streamline business, and provide untold flexibility and responsiveness.

In reality, of course, it is not quite that easy, especially when you already have layers of legacy technical architecture, a high maintenance and support burden, and rabid business clients demanding new solutions now. So, how do you realize the potential of SOA without raising expectations so high that they will come back to bite you? Which issues do you need to address first? And, what is a realistic timeline and approach?

## “Faster, Faster, Faster!”

Over the last 20 years the pace of business has changed: it has gotten faster. Things that used to take days or weeks now take minutes or seconds. Products that used to sell for years or even decades are now obsolete in just two or three years.

## Speed in business is increasing dramatically



This change is not limited to electronic or technology products. The average product lifespan for toys, cosmetics, pharmaceuticals, and even food items has dropped from 15 or 20 years in the 1950s and 1960s to two to five years today. Even the average life of an S&P 500 company has dropped from 65 years in the 1930s to 20 years in the 1990s.

The end-result of this increase is that business is being forced to react to change far more frequently as the pressure to keep up with the market, competitors, and customer demands grows more and more intense. That pressure to be responsive and handle rapid change is being passed directly on to IT departments. Business clients are demanding faster, better, more flexible systems, while at the same time complaining about the rising cost of IT.

## Layer Cake Architecture

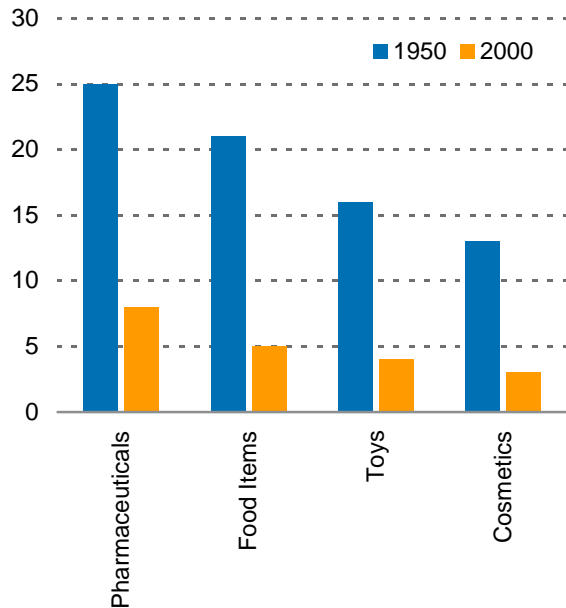
Unfortunately, in most large organizations, it is impossible for IT to keep up. Decades of investment in IT have left many with a layer cake architecture where solutions have been created by adding layers of new technology on top of older layers of technology. At the time, this seemed like a great idea: leveraging existing investments, avoiding reinvention of the wheel, and not fixing what was not broken. However, the problem now is that changing a system that could potentially consist of anywhere between four and seven layers of mainframe, mini, client server, ERP, N-tier, web, portal, and integration technology is a nightmare.

Also, because the foundational layers of legacy solutions still need to be supported, maintenance and support burden has been increasing with each new layer added. Many organizations’ ‘lights on’ costs now consume more than half of their IT budgets. Some are in a death spiral where their lights on costs are so high that they no longer have enough free IT budget to make any significant changes or investments. All they can afford now are band-aid solutions, which, of course, increase the lights on costs even more.

## The IT Catch 22

CIO's and IT departments are in a Catch 22. In order to become more responsive, more cost effective, and more flexible; IT must first become less responsive, more expensive, and less flexible.

### Average Product Lifespan (Years)



To deliver faster, better, cheaper solutions and to be more responsive to business change, IT must first clear out its layer cake architecture. In the next five to 10 years, the majority of people who have the skills and experience to maintain the bottom layers will be retiring, leaving behind an expensive ticking time bomb. Wholesale replacement and retirement of legacy solutions are now not only preferable—they are critical.

But even if a CIO could get the organization to buy off on the potentially massive investment necessary to replace its legacy systems, with what should they be replaced? There is no point in replacing them with new solutions that will be inflexible or expensive or both.

### Enter Service Oriented Architecture—IT Savior

According to the hype, the savior to IT's dilemma is Service Oriented Architecture, or SOA. According to the analysts, the press, the software companies, and the consultants, SOA will solve all IT problems. Here are just a few recent press and analyst quotes:

—*CIO Magazine*: "SOAs make it easier to integrate the 'everything but the kitchen sink' IT environments found in most companies... it can lead to a better dialogue between the CIO and line-of-business execs by forcing IT workers to think in terms of business—not technical—architectures."

—*ZapThink*: "SOA provides benefits in four basic categories: reducing integration expense, increasing asset reuse, increasing business agility, and reduction of business risk."

—*InfoWorld*: "The rise of SOAs will reap an unexpected benefit for many companies, eventually enabling them to take part in vast trading networks."

—*Gartner*: "Service-Oriented Development of Applications (SODA) is estimated to reduce total IT expenses over the long term by as much as 20 percent."

But perhaps the most illuminating quote is from the free online encyclopedia Wikipedia, a resource that is used and read not only by technical IT staff, but by everybody, including business clients: "SOA can help businesses respond more quickly and cost-effectively to the changing market conditions...It also makes interconnection of existing IT assets trivial."

Although current hype is mostly about its promise, SOA will deliver several real benefits to both IT and business when done right. It will lead to a simplified architecture more able to adapt to change. It will lead to standardization, allowing greater flexibility and interoperability. It will lead to greater integration of IT solutions with each other and with business processes and users. And, as a result of all of this, it will lead to IT cost reduction, reducing both new development expense and also, importantly, maintenance and support costs.

But, SOA will only provide those benefits if it is applied consistently across business processes, applications, and infrastructures. *And*, it will take many years of consistent and well-managed investment.

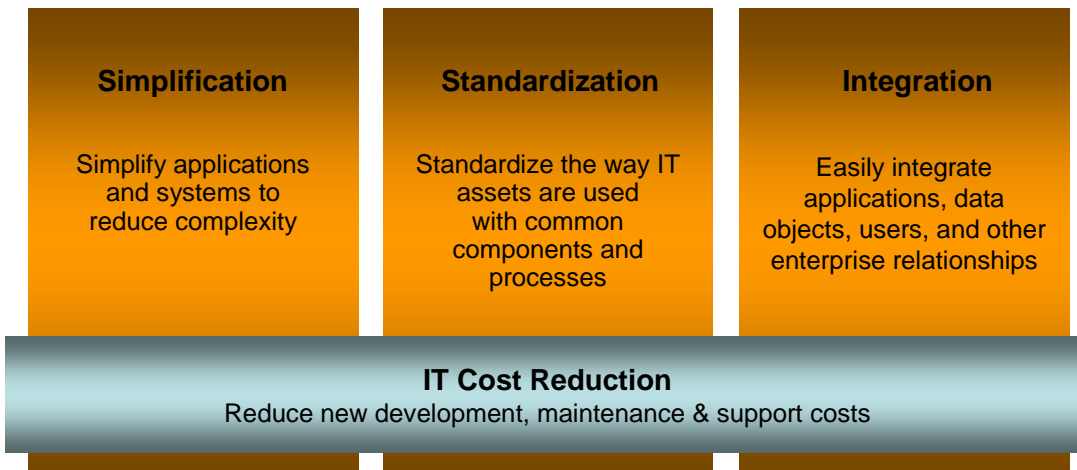
*"SOA can help businesses respond more quickly and cost-effectively to the changing market conditions...It also makes interconnection of existing IT assets trivial."*

—Wikipedia

## Keeping Up with the Jones's

Forecasts for the adoption of SOA are aggressive. Gartner predicts that by 2008, more than 60 percent of enterprises will use SOA as a 'guiding principle' when creating mission-critical applications and processes. IDC forecasts that worldwide spending on SOA-based external services will reach \$8.6 billion in 2006, a 138 percent increase from \$3.6 billion in 2005; and that by 2010 global

### The Benefits of SOA



SOA-based services spending will reach \$33.8 billion. Yankee predicts that 2006 will be the year of initial SOA project completion on a broad basis—not a hit or miss trend, but a rising tide of broad and deep adoption of SOA across the market. Also, a recent survey of IT executives conducted by CIO and Computerworld Research shows more than half (58 percent) of the IT executives surveyed have already implemented SOA or are considering implementation.

But haven't we heard all this before? Wasn't the

same said about CORBA, Dot Com, Client/Server, Object Oriented Programming, and portals? Yes, it was, but this time there is a difference: This time all the major software vendors are behind the same standard, and the next generation of software will all be based on SOA.

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—Yankee Group

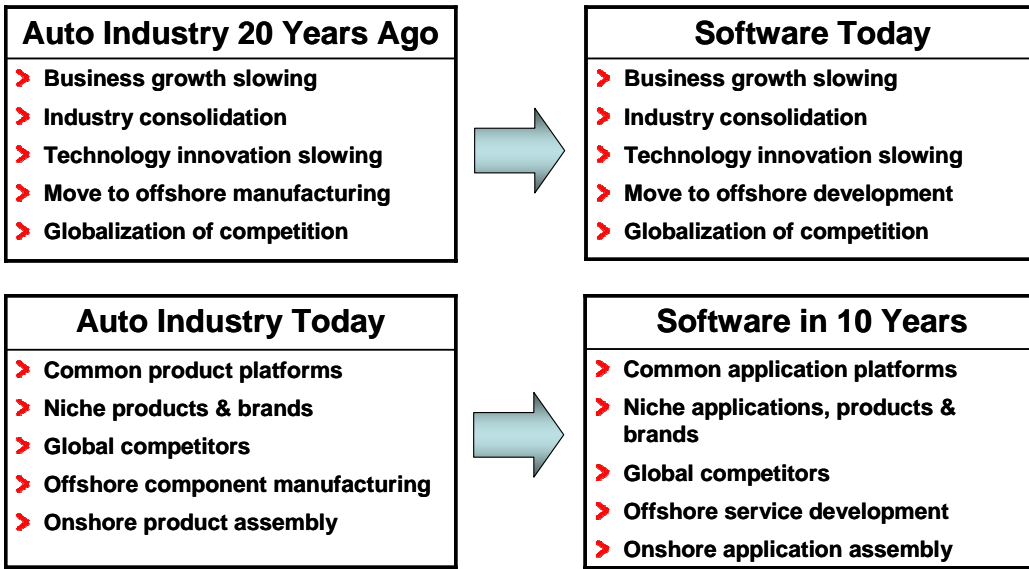
The major application vendors are creating what Hitachi Consulting is calling SOERPA (Service Oriented ERP Applications): Oracle is betting on Oracle Fusion, SAP has Project Vienna and ESA, and Microsoft has committed to SOA with Dynamics and Project Green. Equally, the major vendors are all creating technology to aid what Gartner is calling SODA (Service Oriented Development of Applications): Microsoft has Indigo, IBM has WebSphere, Oracle has Fusion, and BEA has AquaLogic. And finally, the network vendors are rapidly embracing what they are referring to as Application Oriented Networking, network devices that act as service registry and bus: Cisco has AON, IBM has DataPower, and Intel has recently acquired Sarvega.

## Auto Industry Parallels

Direct parallels can be drawn between the software industry today and the auto industry of 20 years ago. In the mid-1980s, the U.S. auto industry was going through a period of change. The domestic industry had consolidated to a couple of large players, there was increased global competition from new Asian and European competitors, growth curves had slowed, and the drive to control and reduce costs was leading to outsourcing. So, looking at the auto industry of today may provide some hints as to where the software industry is heading.

Today's auto industry is a truly global business with the same cars and brands competing in virtually every world market. Cars are constructed on common platforms using common components. Many different vehicles, brands, and manufacturers share the same platforms and components. Ford shares platforms and components with Mazda and Volvo; GM shares platforms and components across all their brands from Saab, Opel, and Vauxhall, through Chevrolet and Pontiac, to Cadillac and GMC. And Toyota uses the same

platforms and components to create products targeted at very different markets: Psion for youth, Toyota for middle America, and Lexus for affluent America.



Although components continue to be manufactured offshore by a wide range of component suppliers, the cars themselves are assembled onshore, close to the consumer, where they can be customized to their desires and needs.

### A Little Crystal Ball Gazing

Over the next five to 10 years, SOA will facilitate developments in the software industry similar to those that have taken place in the auto industry.

Although services will predominantly be developed offshore, applications will be assembled onshore where they can be customized to client

needs. Services will come from a variety of sources, including major software vendors, open source developers, and offshore niche vendors. If a suitable existing service is not available, new services will be home grown using custom development (SODA) technologies, Business Process Management (BPM) and/or Business Process Execution Language (BPEL) tools.

Applications and services will be deployed on both public and private open platforms. Organizations will provide private service platforms within their firewalls, probably using network devices, and will deploy services and assemble applications via those platforms. Public service platforms will be provided over the Internet and applications will be assembled and deployed using open source, home grown, and micro-charged Software as a Service (SaaS) offerings.

As integration will no longer be a barrier, assembled applications will be very specific to organizations' needs and desires. In effect, we will be back to best-of-breed, but at the service level rather than the application level. As a result, all applications will be 'custom' to some degree and services will be added, removed, and replaced as business needs change—plug and play concepts applied to applications.

### The Road to the Promised Land is a Rocky One

Although the future looks bright, getting there is going to be difficult, painful, and expensive. And, for most organizations, it is also going to take far longer than they might expect.

Unfortunately, you cannot buy SOA—there is no magic bullet application or product. SOA also has higher initial upfront costs than traditional IT system development, as it requires more upfront design and architecture and an initial investment in service platform and infrastructure.

SOA will also require a paradigm shift within IT teams. A cultural change to create and use reusable services will have to be facilitated. IT professionals will have to be taught to trust other people's code and to use other people's services. More formal methodology and tighter management and governance will have to be adopted. Carrots and sticks will need to be created to encourage and enforce reuse. Rules and guidelines will need to be developed regarding service

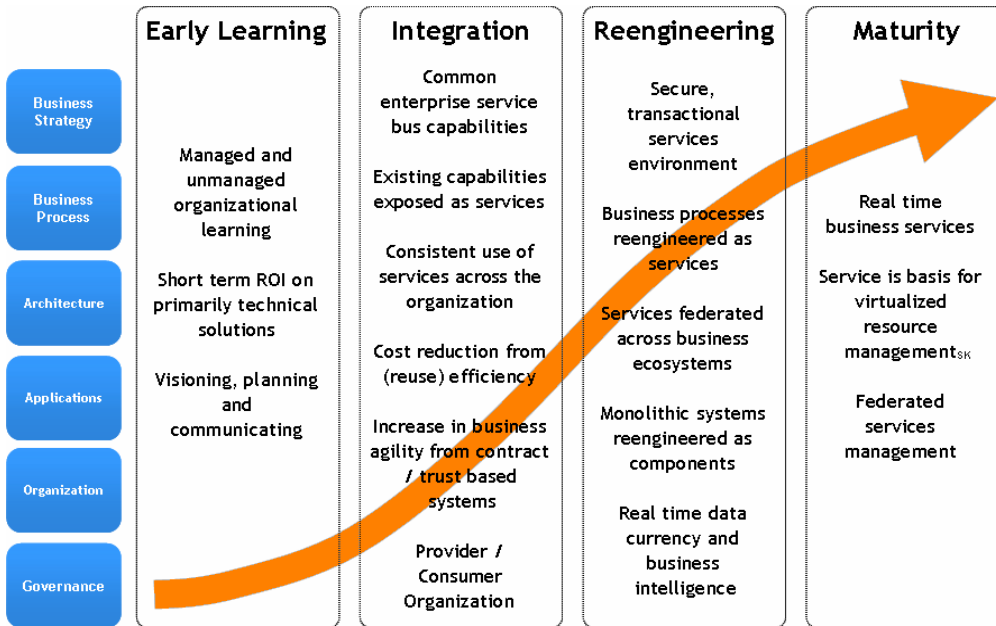
*"You cannot buy SOA. There are no magic bullet applications or products. And, SOA will initially have higher upfront costs than traditional IT system development."*

— Sa'd Kanan,  
Hitachi Consulting

ownership, sharing, and accountability. For example, who will be responsible for fixing the problems caused in major application when a shared service fails?

Initial SOA projects will likely be very expensive as they will include lots of foundation work and will require lots of lessons to be learned. One key lesson, that will likely require several rounds of trial and error, will be determining at the level of granularity to provide services.

## SOA Adoption Curve



Fully realizing the benefits of SOA will take years, maybe a decade. And while organizations are getting there, the situation in IT will likely get worse before it gets better. The best way to think of it is like a major highway project: you have to close some lanes while you are adding the new lanes and mass transit that will eventually make traffic run more smoothly. As a result, implementing SOA will require buy-in and commitment across the organization, not just within IT.

## SOA—IT Nemesis

SOA is potentially very dangerous for CIO's, IT leaders, and IT departments. Expectations are already way too high. People are talking about SOA as if it will solve world hunger. Business clients are reading and hearing that SOA will make IT more responsive, that solutions will get developed quicker, and that IT costs will go down. This is in an environment where IT client relationships are already strained and expectations from business clients are often already unrealistic. SOA could be oil on that fire.

Investments in IT architecture changes are always extremely difficult to justify, and with an ROI that may take a decade to realize, SOA projects will be difficult or impossible to justify on architecture alone. Therefore, the temptation will be to leverage the raised expectations for SOA to help justify the investment, but that path is littered with the bodies of the many IT leaders who were not able to meet raised expectations.

There are other dangers as well. Done wrong, SOA will just add another layer to the layer cake and increase maintenance and support costs. Although wrapping legacy functionality as services provides some level of flexibility, it does not remove the need to maintain and support the legacy solutions providing that functionality. The best strategy will always be to leverage SOA to create services and applications that can replace legacy systems.

Finally, giving in to the temptation to ignore SOA could be even more dangerous. The hype is so intense that IT leaders will be under pressure from all sides. It will not be long before CEOs and peers start asking their IT leaders to articulate their SOA strategy.

*“SOA is potentially very dangerous for CIO's. Expectations are already way too high and now business clients are reading and hearing that SOA will solve world hunger. SOA could be oil on the fire of IT client relationship breakdown.”*

—Damian Smith,  
Hitachi Consulting

SOA is coming and it will likely become the default standard within the next few years. Depending on your organization and architecture, you may or may not need to kick off an SOA initiative tomorrow; but it is important to start preparing for the inevitable shift to SOA as it will impact your IT organization soon.

## Start Building the Necessary Skills and Culture Now

The first step in getting ready for SOA is to start building the skills and culture you will need in your organization.

### Holistic Approach to SOA



The true art of SOA is identifying and defining services at the correct level of granularity. Service identification and definition will therefore not just be key skills in the new SOA world, they will be critical. The best service identification and definition starts with business processes. That means IT analysts will need to become experts at uncovering, defining, and mapping business processes. Preferably they will also become experts at streamlining and improving business processes.

The temptation to simply wrap existing system functionality and expose it as service will be too hard to resist for many, if not most organizations. In fact, in the SOA adoption curve, it is even included as a step in the integration stage. But, as you do this, regard it as simply a step in the right direction and not the end solution. Remember that by taking this approach, long-term maintenance and support costs will not be reduced and system complexity will actually be increased. So, the increased flexibility you will achieve will come at a cost.

Another key step in your preparations will be the creation of a culture that embraces reuse and application assembly. Many developers suffer from 'not invented here' syndrome, preferring to recreate code themselves rather than reuse an existing library or component or service. Reasons for this are probably many, and range from a lack of trust and developer ego to a cynicism and disbelief that the benefits of reusability will ever truly be realized.

It is therefore critical that you build trust within your team, prove that you and the organization are committed to reuse, and that it will make IT and developers more productive and efficient. To do that you will likely need to require, and provide incentives for, developers to use existing services. You will also probably need to demand detailed justification whenever existing services are not used.

Effective IT governance will therefore also be critical. By its very nature, SOA offers more flexibility, and also requires more loosely coupled moving parts. As a result, there are more opportunities to lose control of your IT environment and lose visibility of who is responsible for maintaining and supporting the critical services that make up your mission critical applications.

Effective IT governance that defines and enforces the rules and policies for managing, securing, and using services is essential. As well as ensuring simplicity, interoperability, and scalability based on open standards, effective governance will also reduce the likelihood of issues in the future.

But, even with good IT governance, for SOA to be truly successful, a commitment by the enterprise (i.e. senior business leadership) to operate more efficiently and effectively is necessary. And, gaining that commitment will require effective change management.

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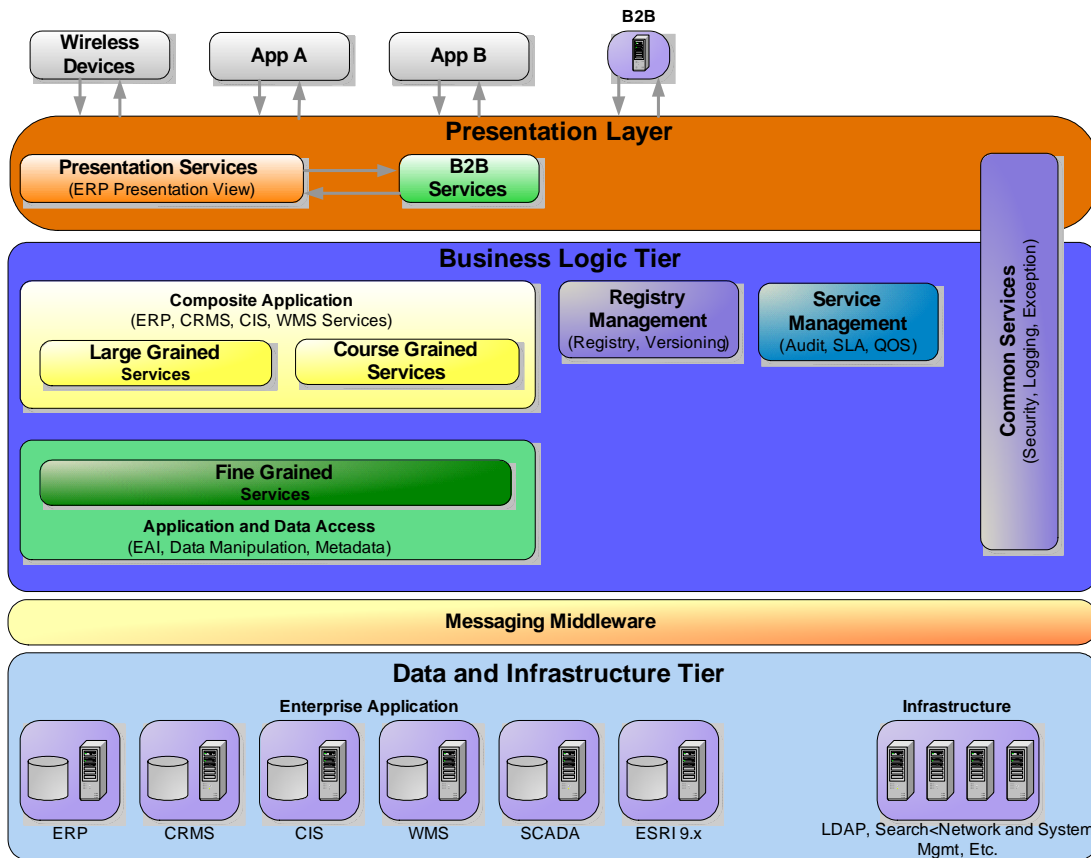
—Gartner

### Show Progress without Raising Expectations

The key will be to start making some real progress with SOA while avoiding setting expectations too high, especially among your business clients. Start by piloting SOA in a small way within IT. Find a small-scale project with which to experiment, build skills, and learn from mistakes. Don't publicize this effort; treat it as a “Skunk Works” if you can, but make sure that key members of your team are involved and are learning.

At the same time, start educating your business clients about the benefits and realities of SOA. Use the hype to your advantage, but control it and leverage it on your own terms. Perhaps you might hold a workshop, or a series of workshops, targeted at IT staff and at key business stakeholders. Use these workshops to build support for tackling SOA and long-term transformation within IT, but also make sure to explain the realities of adoption and the level of commitment necessary. Explain the adoption curve and set realistic expectations about returns, timelines, and results.

### SOA Logical Architecture



Following the workshops, identify a friendly business unit with which to partner. Work with that partner to develop an SOA roadmap for that business division or area. That roadmap should outline all of the major services and architecture that will be deployed over time. It should also identify an initial project that you can use to prove the SOA concepts and ideas, likely something to do with customer data integration, or a self-service portal, or a single view of something. Whatever it is, it should have a limited scope and a small number of services, several of which should be easily reusable. It should also solve a key business issue and preferably result in the retirement of some legacy IT solutions.

Obtain buy-in from the business unit sponsors for the roadmap and the initial project and start moving. Use the first few projects to lay the foundation architecture and infrastructure so your cost per service will decrease over time.

## Conclusions and Next Steps

SOA is real and it is really coming. Unlike other hyped technologies and standards like CORBA and EJB etc., all the major software vendors are adopting SOA. In our opinion, there's no avoiding it—you can delay, but it will hurt you long term if you do.

Managed well, SOA offers IT a tremendous opportunity to make some real positive changes and lay a foundation that will allow them to become the responsive, cost-effective IT organization their business clients are demanding. But, SOA is also a potential minefield that can destroy an IT leader's reputation and career. Hype is raising expectations beyond reality in an environment that is already stressed. No matter how you do it, SOA will require investment and commitment across the organization and managed poorly, it can be an expensive and spectacular failure.

Hitachi Consulting recommends that most IT organizations adopt SOA as quickly as possible, but be realistic about timelines and control expectations. Gaining control of the hype cycle as soon as possible so expectations can be set is critical. Also critical is reducing risk by starting small, learning from mistakes, and building the skills and culture you will need.

For more information on Hitachi Consulting's SOA services and examples of how we have helped IT leaders and IT organizations plan, control, and move forward with their SOA strategies and initial projects, please do not hesitate to call Hitachi Consulting today at 1.877.664.0010.

## Author Bio



**Damian Smith**  
*Managing Vice President, Hitachi Consulting*

Damian Smith is the Managing Vice President of the Corporate Management Solutions practice at Hitachi Consulting which encompasses all of Hitachi Consulting's services and solutions for IT, Finance, HCM and Corporate Operations. Smith has over 15 years of consulting and management experience gained serving some of the largest and most influential corporations in the US and Europe in areas that include business strategy and planning, business transformation, business process improvement, strategic technology planning, IT effectiveness and information systems development and implementation.

Having worked both within, and as an advisor to, IT departments and leadership; and as a business client to IT, Smith has been able to develop a relatively rare combination of business and technology skills and experience. As a result, Smith has been able to command the respect of both business and technical / engineering teams and develop several practical solutions and best practices to common IT issues. A people oriented collaborative leader who is not afraid to tackle the tough issues or broach difficult subjects with team members and executives, Smith's

specialty is working with clients to facilitate agreement, and progression towards, common business and technology goals.

## About Hitachi Consulting

As Hitachi, Ltd.'s (NYSE: HIT) global consulting company, Hitachi Consulting is a recognized leader in delivering proven business and IT solutions to Global 2000 companies across many industries. We leverage decades of business process, vertical industry, and leading-edge technology experience to understand each company's unique business needs. From business strategy development through application deployment, our consultants are committed to helping clients quickly realize measurable business value and achieve sustainable ROI.

With offices in the U.S., Japan and Europe, Hitachi Consulting's client base includes nearly 35 percent of the Fortune 100, 25 percent of the Global 100, as well as many leading mid-market companies. We offer a client-focused, collaborative approach, which integrates strategy, people, process and technology, and we transfer knowledge throughout each engagement. For more information, call 877.664.0010 or visit [www.hitachiconsulting.com](http://www.hitachiconsulting.com).

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## About Hitachi

Hitachi, Ltd. (NYSE: HIT/TSE: 6501), headquartered in Tokyo, Japan, is a leading global electronics company, with approximately 356,000 employees worldwide. Fiscal 2005 (ended March 31, 2006) consolidated sales totaled 9,464 billion yen (\$80.9 billion). The company offers a wide range of systems, products and services in market sectors including information systems, electronic devices, power and industrial systems, consumer products, materials and financial services. For more information on Hitachi, please visit the company's Web site at <http://www.hitachi.com>.

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