

SERVICE ORIENTED ARCHITECTURE

CHANGING THE WAY WE THINK ABOUT IT



White Paper

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Introduction

In the worlds of business and IT, where the three letter acronym (TLA) abounds, one of the latest TLAs is causing a significant stir in both the business and technology communities. There is a lot of hype over the concept of service oriented architectures (SOA), and some are led to believe that they can buy some sort of "SOA-in-a-Box" and all their business and IT issues will be resolved. Nothing could be further from the truth.

Here we present the Atos Origin perspective on SOA, our intention being to spread awareness, explaining what it is and, equally importantly, what it is not. We provide a view on the current uptake of SOA and indicate how Atos Origin can help guide organisations to steer a controlled, incremental and low risk path through the journey towards becoming a service oriented business.

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“SOA is a philosophical approach to organisational design”

Facts

Service Oriented Architecture (SOA) can be defined at several levels. We believe that SOA is a philosophical approach to organisational design ensuring that businesses are architected, both from a business and IT perspective, using the concept of a service as the basic architectural component. Service oriented companies are able to meet the ever changing demands on them from the global or domestic economic environment, adapting faster than was possible before they became service oriented.

From a business perspective SOA is an approach to building systems that provide nearly instantaneous responsiveness to changing market conditions – “closing the gap between threat and opportunity” [Delphi]. SOA is a business architecture approach that involves transforming business and IT assets and aligning them to business services in a standard, flexible and architected manner, facilitating doing more with less, and faster.

SOA (and Web Services) change the design emphasis of business solutions from the ‘old world’ approach where application functionality was dominant and businesses were told to change the business architecture to suit the software, to a ‘new world order’ where the business process is of paramount importance. This new focus enables a much tighter alignment between business and IT – a goal that was often stated but hardly ever achieved in the old world.

From a technical perspective SOA is an evolution of a distributed computing model that started with remote procedure calls, and then marshalled those in second generation CORBA systems that delivered interoperability between applications and businesses, albeit without universal uptake. The perception was that building CORBA systems was ‘just too hard’, and, even more importantly, CORBA was not supported by all sections of the IT industry. The advent of, and seemingly universal take up of, several W3C web standards, based on the extensible mark-up language XML across the entire IT sector has changed everything. We now have a means of achieving universal system integration through XML-based ‘Web Services’, which has recast the old CORBA model in XML as a kind of ‘CORBA for the rest of us’ that now serves as the technology basis for SOA.

SOA is designed to allow the interaction of software components, called ‘services’, across a network. Business processes and applications are composed using these services which can be shared across several processes within a service-oriented enterprise architecture framework.

Myths

As well as the tremendous amount of hype surrounding SOA, about which more later, there are also a great many myths ‘out there’. To aid the understanding, we now debunk some of the common misunderstandings about SOA:

The myths of technology

Myth1: SOA is only about Technology

Absolutely not! If SOA is a philosophical approach to organisational design and business architecture it cannot be ‘just’ about technology. It is clear that correct technology choices have to be made to realise a successful SOA, but the drivers for SOA are business drivers, business vision and service oriented business processes which are then realised through technology.

Myth2: SOAs need Web Services

No. SOAs can be built using other technology agreed by partners in the ‘Service Chain’. An SOA could even be built using technology that’s proprietary. However, Web services are by far the preferred enabling standard in building and deploying services. To leverage the numbers of services likely to be on offer by third party service providers, the technological implementation of an SOA using a web services infrastructure would be wise. Ultimately, the technology employed by companies should be appropriate for their own unique requirements.

Myth3: To build an SOA, all you have to do is select a single vendor’s technology

Absolutely not! For a start, refer to Myth 1. Next, understand that, even for the technology part of an SOA solution, no one vendor has an end-to-end solution for building and deploying most SOAs.

“Conceptually, SOA is a kind of Enterprise Glue”

There is no “SOA-in-a-Box” solution. You should select from best of breed and manage any compatibility issues through proof of concept testing early in the project. Before considering technology, what you need to do is:

1. Understand your requirements
2. Do a business case
3. Architect and Design the processes
4. Use appropriate technology to implement the processes.

Building an SOA solution means doing a lot of work including understanding the context, security issues, integrity, any existing services, as well as the new services needed. Then, you need to orchestrate the services into a solution that can be changed flexibly and quickly to deal with changes in the business. Only at this point in the process are you ready to talk technology. We recommend proof of concept testing and validation of any technology before progressing to fully implementation via a project.

Myth4: To build an SOA, you don't need EAI, an ESB would do

No. Although the service orientation approach can make application integration much easier, core integration technology like adapters, for example, will still be required. An Enterprise Service Bus (ESB) allows information to be moved within and between applications, including through Web Service interfaces. Fundamentally, they are both more information and messaging-oriented rather than service oriented in nature. Therefore we conclude that both are essential components in the technical implementation of an SOA, but they are no more than that: essential components of an SOA, not an SOA in and of themselves.

The myths of architecture

Myth 5: SOA is different from Enterprise Architecture

No. SOA is a type of enterprise architecture and SOA architects must deal with all the same issues facing enterprise architects. SOA is a service oriented instance of an enterprise architecture, no more, no less.

Myth 6: SOAs are intrinsically highly scalable and reliable.

No. SOA scalability and reliability, and all the other key considerations of enterprise architecture, are a function of the technology solution and the enterprise architecture selected. The phrase SOA is not a magic wand; hard work is still required. The SOA still has to be designed correctly, understanding the properties of all of the parts, and selecting the most suitable enabling technologies and development and delivery platforms.

The Myths of Security

Myth7: Security can be added at the end.

Absolutely not! By mapping an organisation's business processes onto loosely coupled services, SOA brings with it new and different challenges for security and information risk. The ability to add appropriate security controls at the “front door” of a well defined application is no longer possible. With SOA, there are multiple entry points, called by a dispersed users, applications, and related services.

SOA also means that “defence in depth” becomes a business imperative for the enterprise security architecture. The traditional security perimeter has been around the logical boundary of the enterprise, with a limited focus on the controls around information systems. To realise the business benefits of an SOA architecture, it is counter-productive to cast a single security perimeter around the whole SOA infrastructure - each service component needs to be responsible for the confidentiality, integrity and availability of the information and functions that it provides.

As a result, security and information risk is an intrinsic requirement that runs throughout a Service Oriented Architecture. SOA can be a key business enabler, exposing an organisation's business processes to well-intentioned stakeholders in the value chain: customers, suppliers and partners. Secure SOA is required to defend exposing the same processes to those less well-intentioned.

“SOA is a profound opportunity to improve Enterprise Effectiveness”

The risks inherent in exposing business processes and information through services needs to be assessed when specifying to SOA architecture in order that the appropriate controls are specified and implemented as part of the solution architecture.

Identity services, authentication, authorisation and audit are also critical to providing security for SOA. Those entities calling a service need to be authenticated and authorised. The identifying credentials then need to be passed through to each of the associated services, as defined in the business process, in order to maintain end to end security. All this simply cannot be accomplished as an afterthought.

Myth8: Security is too complicated to do anything about

Not really. SOA system designers may not be familiar with all the risks to the data being passed through the SOA, but regulatory authorities will require businesses to be able to track privileged access to particular critical systems at all times in order to protect against security breaches and “insider attacks” by corrupt people in privileged positions, such as system administrators. The requirements for user authentication, efficient transaction level authentication, tamper-proof audit information, effective logical access controls to all sensitive sources of data and the ability to create an audit trail of an end-to-end transaction are all challenges that need to be considered in today’s business environment

Fortunately techniques for single sign-on, federated identity and centralised audit are increasingly being built into the toolsets provided by vendors, and incorporated into shared Identity Data Services. Yes, they do come in the box, but standards are still maturing. To get the maximum benefits from these technologies, security and information risk best practice needs to be applied across SOA. This is seldom configured “out of the box”, but requires an architectural approach across the SOA.

The Myth of Universality

Myth9: An SOA is always justified

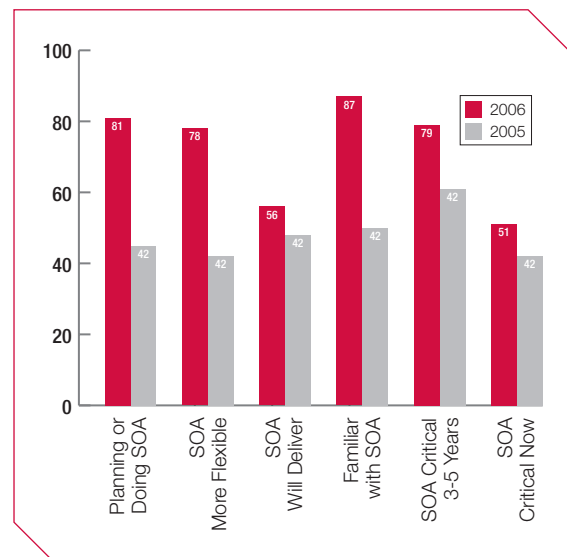
Not necessarily. It is crucial to perform an assessment before an SOA programme is undertaken. It is also important to build a business case based on your understanding of the benefits and the cost of the programme. It may transpire that either the costs are not justified or that the particular characteristics of your business, like the size of the company and value chain, means that another approach must be found. The other approach, however, should still lend itself to facilitating two of the key cost-beneficial areas of implementing SOA: 1] reusing existing services software, and 2] enhancing corporate agility and flexibility

Is SOA Real?

SOA is happening right now. In the majority of cases the move towards SOA is happening incrementally rather than as a ‘big bang’. This is understandable given the amount of legacy systems and business models that exist, against the much fewer ‘green field’ opportunities that would exist in a start-up company.

A survey from IDG that covered many aspects of SOA amongst 500 senior IT and Business managers tried to detect trends in the SOA market:

Percentage of SOA awareness 2005 vs 2006



“SOA is not hype...its happening Now”

It is clear that the awareness and appreciation of SOA has increased significantly along with confidence that it will deliver and lead to a more flexible and agile company. The almost doubling of those companies planning or actually doing SOA is significant. Other key insights included:

- > SOA spending has increased at the expense of spending on more traditionally architected solutions
- > The move towards SOA will continue as more and more companies perceive SOA to be critical to their short and long term needs.

Benefits

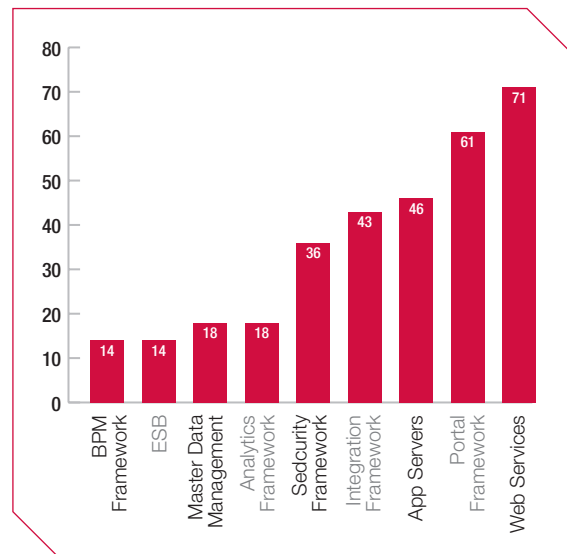
Throughout the last year there has been a lot of exposure to and expectations of SOA. Notwithstanding all the hype, SOA is a profound opportunity to improve business effectiveness at the enterprise level, where business leaders envision an enterprise that can quickly adapt to its changing environment with immediate and complete support from its business and IT systems. SOA delivers the business agility required by companies to keep up with, or better, stay ahead of the competition.

An AMR survey in 2005 surfaced the following expected benefits of SOA from senior IT and business executives:

- > Faster & more flexible reconfiguration of business processes
- > Decrease in It operational costs
- > Secure and reliable service levels
- > Implementing upgrades and product enhancements on the fly
- > Seamless plug'n'play of different technology providers and/or legacy code.

The survey also highlighted the key components of an SOA solution, as well as indicating that the drive towards SOA, although essentially a business philosophy, is being driven by technologists – compare the uptake of BPM frameworks against the uptake of the more technical components of the overall SOA solution:

Percentage of SOA components actually in deployment



In a service-oriented business the design emphasis of business solutions is transformed from being based on packaged application functionality to being driven by the business process. This enables tighter alignment between business and IT, the alignment being manifest through the technical realisation of services that can be composed and orchestrated by business people using standards-based modelling tools.

The benefits accruing from SOA implementations are generally held to fall into three main areas:

Business Effectiveness

- > Flexibility and Agility in response to market and competitive demands
- > Improved Business Process Efficiencies where business analysts are empowered to react quickly to the need for business change and to be the prime mover in quickly changing both the business and underlying technology
- > Business and technical resources are configured and deployed based on business needs

“There is no such thing as “SOA-in-a-Box”

Cost Efficiency

- > Reduced operational costs
- > Reduced skills and effort needed to support business change
- > Quicker and Cheaper selection and implementation of new services without worrying about the underlying technology

Reduced Risk

- > Business Process and IT Quality improved
- > Incremental deployment of service-oriented business processes, allowing smaller, cheaper incremental changes in a controlled manner
- > Improved ROI and TCO.

How does SOA relate to ...?

There are three topics that are closely associated with SOA – one business facing, one technology facing, and one business/IT alignment facing: Business Process Management, Web Services, and Enterprise Architecture.

Defining and aligning business processes to the business vision is essential to delivering an SOA. The business processes will be defined in a service-oriented way, probably using business modelling tools. Then the services will be orchestrated to provide maximum business benefit by a Business Process Management System (BPMS). The orchestration will be subject to implementation in accordance with business policy that is realised through business rules, under which the services are controlled. The output from all this is ultimately translated into the Business Process Execution Language (BPEL) that provides a connection to the service implementation part of the architecture.

The synergy between SOA and the BPM movement and supporting tools are essential to the definition and delivery of an SOA. As stated earlier, SOA is essentially a business-focused approach to architecting a business to make that business both flexible and agile in its ability to respond to the demands of the modern business and economic environment. Any SOA that excludes BPM isn't really an SOA.

Notwithstanding what we covered in the 'Myths' section above, the second topic closely associated with SOA is Web Services.

Although not essential as an implementation vehicle for SOA, the vast majority of SOA solutions will be built using web services, since they offer a widely accepted and adopted standards-based means of implementing the services to be architected. The trend to web services actually predates the SOA movement. This is evidenced in the AMR survey reported earlier where 71% of respondents stated they already had web services implemented in their business. Compare that with the only 14% of respondents who claimed to have a BPM framework in place.

This seems to be clear evidence of the earlier implication that the move to SOA has been led by technology vendors. This is probably inevitable, but has a potentially worrying knock-on effect: because the move to SOA is technology led, the impression left with many people, probably unintentional, is that SOA is only about technology.

We presented the case earlier in this paper why this is a misperception. SOA is a business led process that offers the best chance yet for organisations to achieve real business and IT alignment.

According to the US Chief Information Officers Council, “Enterprise Architecture (EA) links the business mission, strategy, and processes of an organization to its IT strategy. It is documented using multiple architectural models or views that show how the current and future needs of an organization will be met”. As such, EA is a vehicle for aligning business and IT. An SOA is a kind of EA which focuses the business and technology architectures around the concept of a service, a concept whose definition will likely have different levels of granularity between the business service definition and the technical services that realize the business service. All of these services within an SOA implementation reside within an EA framework.

Caveat Emptor

Be very aware that there is too much hype 'out there'. In the UK there is a significant amount of anti-SOA-hype in evidence. A survey of 100 UK IT directors reported in IT Week stated that 66% of respondents thought SOA was just marketing hype. It was also reported that the hype was making it difficult for IT directors to get SOA project sign-off from corporate boards.

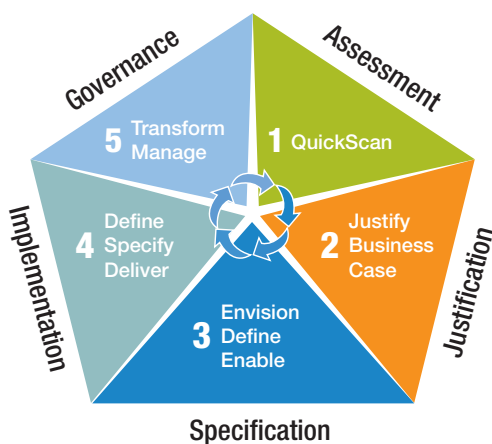
“SOA Enablement Approach”

Be aware of those, especially from the traditional integration, application server and middleware vendors who, while talking about SOA in terms of business and technology, really only are interested in selling technology. Most of their messages on SOA relate only to technology, and the uninitiated could be lead to believe that all they need for SOA is an application / integration stack. Some of these vendors are now adding business modelling tools to their product portfolios, but we should always remember that they are software product vendors, primarily interested in selling software.

A fundamental change of thinking is needed for information risk: think information centric, rather than the traditional application centric. It is up to consultancies like Atos Consulting to talk to customers about the holistic approach to a complete SOA solution that heavily involves a service-oriented view of the business and its processes, as well as the service-oriented IT to support and deliver secure service-oriented business.

Restating what we said earlier about the many myths surrounding SOA, be aware of anyone telling you that EAI or Web Services is SOA, that security can be left to the end of the process, or that you can buy an “SOA-in-a-Box”. Nothing could be further from the truth.

Supplying SOA Solutions



The Atos Origin SOA Enablement Approach to providing SOA services to customers is based on what we believe to be the 5 facets of SOA:

Facet 1: SOA Assessment

We use our SOA QuickScan service to define the client's 'As-Is' state both from the business and technology perspectives. This enables us to assess the client's SOA readiness. We develop high-level SOA Road-Maps, 'To-Be' scenarios through which the client could implement and SOA in a controlled, incremental programme that helps with budgetary and risk management simultaneously. Finally, our QuickScan recommends Quick-Wins and the Next Actions to be taken by the client to achieve the desired incremental implementation of SOA, transforming the business in a controlled manner.

Facet 2: SOA Justification

Having selected one or more of the suggested SOA Road Maps, this SOA service builds one or more business cases to justify the possible 'To-Be' scenarios the customer selected from the QuickScan. This service develops a deeper understanding of the Road Maps and then recommends the best SOA Road Map for the customer, based on our understanding of the client's internal business drivers and corporate direction.

Facet 3: SOA Specification

During this facet everything required to take the make the client ready for the actual transformation of the business to becoming service oriented takes place. The work done here lays the foundation for the next stage: SOA Implementation. Here we set the corporate Vision and Strategy in general, as well as for the SOA 'To-Be' scenario selected.

We then gather both the business and technical SOA requirements. We work with the client to define the key set of KPIs against the requirements, so that we can monitor progress and success. We also specify the standards, tools, frameworks and techniques to be used for the implementation of the SOA strategy. In addition, this facet defines and models the business processes and incorporates business policies as business rules. We then define the services and map the processes to the services. We define the enterprise service business and technology architectures within the SOA instance of the enterprise architecture.

Facet 4: SOA Implementation

This facet is by far the longest in that it realises all that was specified in the previous facet. We define the programme governance model and define the SOA implementation programme. Finally we then implement the SOA technology landscape and implement the business processes and services and corresponding business rules (Process Enablement) and then implement the service supporting technology layer to realise the required services, thus achieving alignment between the business needs and the technology solution.

Facet 5: SOA Governance

The final facet deals with SOA programme supervision, business transformation and organisation structure and culture change. It sets out the framework within which the entire SOA programme is carried out, monitored and managed. It is the link between the client's Board and the programme of work and ensures that the programme delivers what it set out to deliver against the constraints provided by the client's Board. Finally, this facet deals with also with the managed operation and continual improvement of the SOA enabled business.

What Now?

Having reached this point the reader should have a reasonable understanding of the Atos Origin view of SOA and be clear on the benefits available to service oriented businesses. Equally, the reader should understand what SOA is not and now be clear that the hype and myths surrounding the concept of SOA are just that.

The Atos Origin five stage SOA Enablement Approach has set out how we can help clients not only start, but continue the journey towards SOA enablement. Since one of the key benefits of the SOA approach is that the journey can proceed in small increments that help companies reduce risk and manage cost effectively, we suggest that the reader contacts us to discuss how we can help his or her business move forward on the SOA journey. There is no need to 'boil the ocean' here, we can help you understand where you are in SOA terms and work with you to agree where you would like to be, and help you get there in small manageable steps. We all realise that a long journey starts with a single step. We suggest you take that first step.

To gain a deeper understanding of SOA and explore the SOA services provided by Atos Origin, please contact:

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About Atos Origin

Atos Origin is an international information technology services company. Its business is turning client vision into results through the application of consulting, systems integration and managed operations. The company's annual revenues are more than EUR 5 billion and it employs over 46,000 people in 40 countries. Atos Origin is the Worldwide Information Technology Partner for the Olympic Games and has a client base of international blue-chip companies across all sectors. Atos Origin is quoted on the Paris Euronext Market and trades as Atos Origin, AtosEuronext, Atos Worldline and Atos Consulting. For more information, please visit the company's web site at www.atosorigin.com

About Atos Consulting

Atos Consulting is a leading provider of business, process and technology consulting services. With more than 2,500 staff globally, it focuses on delivering proven, pragmatic solutions to the telecom, manufacturing, financial services and public sectors.