SOA Adoption Challenges

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Introduction

SOA adoption is evolutionary rather than revolutionary. It is a journey and not an end state. There are many challenges in the SOA journey. First and foremost, the challenge is about when to start and where to start. But, having begun the journey, there are some adoption challenges that organizations have to attend. The objective of this paper is to list some of the key challenges in SOA adoption.

SOA Adoption Challenges

Challenges in SOA adoption can be classified and put into three categories. These three categories are People, Process, and Technology.

Adoption Challenge for People

When adopting SOA, a buy-in and awareness should be there at all levels in the organization. Real benefits of SOA can be realized only in the middle or long-term. It will be unrealistic to expect real benefits in the short-term. Having said that, SOA adoption should have good buy-in and commitment from the senior management team that is funding it. The CXO team should be willing to wait and continue to show the interest and commitment in SOA. SOA
evangelization/training is an important thing. Individual departments and project teams should have enough knowledge and commitment to SOA for the initiative to be successful. While the commitment from CXO is required for SOA adoption to continue, the commitment from individual departments and project teams is required to develop the applications using SOA principles.

With SOA, new roles, new products, and new processes are introduced. At the core of the SOA solution are the services that get reused. As organizations mature in their SOA adoption, they will involve new roles, such as service librarian. The service library will have a complete catalog of the services, and the service librarian plays an important role in taking care of the issue of service proliferation and the redundancy of services in the organization. People will need to learn these new roles. Current processes will be updated with these new roles, and new processes will be introduced. People in the organization should start following these new processes.

Generally, people are comfortable working in silos as they have complete control when working independently. SOA brings in a big shift towards sharing culture and working in teams. The complexity increases as more teams get involved and more collaboration is needed. Planning becomes more complex than the traditional application development.

Challenges in adopting new processes

As stated earlier, among the challenges for people, SOA adoption will bring in additional roles and processes. This section describes the challenges with respect to some of the key processes in SOA adoption.

**SOA Governance**

Governance is about establishing and communicating the policies that employees must follow. It is about giving employees the tools they need to be compliant with the policies. It is about providing visibility into the levels of compliance in the organization. It is about mitigating the deviations.

SOA governance extends corporate governance, IT governance, and architecture governance. In other words, SOA governance can be as good as the architecture governance; architecture governance can be as good as IT governance; and IT governance can be as good as corporate governance.

Some of the key challenges with respect to SOA governance are

- ROI for SOA
- SOA Investment & Funding
- Metadata Management
- Reuse Promotion

**ROI for SOA**

The EA teams in large organizations generally have good buy-in and are able to get the required funding to start SOA initiatives. But there are a good number of organizations that are asked to build a business case and develop an ROI model for SOA adoption. These organizations in most cases tend to forget to measure the real benefits after SOA implementation is done. Some of the issues that are hindering development and measurement of ROI are

- Historical data to make the estimates and to quantify reuse
- Differentiating the benefits from SOA vs. non-SOA

SOA business value can primarily be classified in two buckets. The first one is increased revenue, and the second one is reduced costs. With increased revenue (for example, higher sales, improved time to market, improved customer satisfaction, reduced risks), it is difficult to measure and pin down the benefits to SOA. However, when we look at cost savings, IT cost
savings (service reuse, hardware/software licenses, etc) is relatively easy to measure and can be pinned to SOA.

**SOA Investment and Funding**

Traditionally, departments allocate funds for IT projects that cater to their specific requirements. Typical funding in an enterprise is usually project-based. With SOA architecture, the all-pervasive nature of SOA architecture makes it difficult to find one single business sponsor to recognize and pay for the long-term goals that it would achieve.

When starting SOA adoption, initially it could be funded by mid level managers’ discretionary budgets, but as the adoption grows, higher levels of management need to become involved. Enterprise level SOA requires funding obtained from the highest level, which could be the CIO or CFO. The SOA library of components should be regarded as the line of business administered and funded separately. Several organizations are already having or going to have separately funded enterprise-wide architecture groups to govern and architect shared SOA solutions.

**Metadata Management**

It is the reuse and metadata-driven development that makes SOA solutions flexible. Examples of metadata are the service contracts that abstract the underlying implementation, the business rules that are not hard coded into the application code, the policies that are required to be enforced at right policy enforcement points, and the composite applications that are built by orchestrating the business services. All of these elements are called metadata. It is the data about the data.

Managing this metadata is a challenge in SOA adoption, particularly when the SOA adoption increases in the organization. Registry and repository solutions will be key players in simplifying or automating the metadata management-related processes and artifacts. However, it also requires manual processes in addition to the use of tools for metadata management.

**Reuse promotion**

Promoting reuse is a key to the success of SOA adoption. Without reuse, the benefits of SOA are not realized. With no proper reuse promotion, organizations will end up with the same old silos of solutions with no reuse. Reuse becomes after the fact requirement and will not be considered or valued during the development time. Organizations will end up having a proliferation of services with the same set of services implemented again and again.

One of the key things in promoting reuse is to make the service information available in the organization. Create awareness in the project teams about the available services, and, more importantly, reward for building and utilizing services. These processes need to be put in place in the organization to promote reuse and to realize better benefits of SOA.

**Service Identification**

Services need to be at the right level of granularity to be able to have better reuse. Service granularity refers to the scope of functionality a service exposes. Fine-grained services might be services that provide a small amount of business-process usefulness, such as basic data access. Slightly more coarse-grained services might provide access to operations that are valuable to system experts, but are not of much value to a business-process expert. Services of the most value to business experts are constructed from lower-level services and components that are intelligently structured to meet specific business needs. These coarse-grained services can be created from one or more existing systems by defining and exposing interfaces that meet business-process requirements. Services cannot be too coarse-grained or too fine-grained.

The diagram below shows the two extreme cases of service identification:
There can be different categories of services at different layers in the architecture. The services should be at the right level of granularity, applicable to the layer that they belong to. The important thing in service identification is the identification of the consumers and an understanding of the requirements of those consumers.

There is no universally accepted prescriptive methodology to arrive at services. A hybrid model analyzing business processes and underlying applications, with a goal-oriented approach, is the recommended approach for service identification. Service identification is an art rather than a science. The ability to identify the right set of services will improve as people gain more experience.

Brainstorming sessions are required among the people who have experience in service identification methodologies, experts on the subject matter on the business domain, and system experts. Service design principles can be useful in identifying the services at the right level of granularity. It is also true that sometimes the architecture/design of a system will influence the service identification decisions.

**Service Contract Definition**

To be completely effective, service contracts should clearly articulate the business operations they perform as well as the required input parameters, possible errors or exceptions, and results. A service contract should have clearly mentioned SLAs for the consumers. Service interfaces should be easily understood by business experts who do not necessarily possess in-depth technical skills. This allows business experts to use the services productively to compose business processes and applications.

A service contract should have functional requirements (the service operations) and non-functional requirements (security, transactions, rules, semantics, QoS like availability, reliability, and scalability).

Having a right service taxonomy and having right service contracts are key in promoting the reuse and in making services more reusable.
SOA Adoption Challenges with Technology

SOA is not something new. SOA concepts have been there for a long time now. Advancements in web services and WS* standards are key in SOA gaining momentum. New products like ESB, Process Orchestration, WSM, XML gateways, and Registries & Repositories are available as foundation for SOA implementation. Some of these products are still maturing with the addition of new features and by new ways of complying with the standards. Interoperability standards for web services are improving. Dealing with these maturing standards and products is a challenge to the SOA teams. In order to avoid vendor lock-in, teams should try to avoid using proprietary features offered by product vendors.

People have to learn these new technologies and products. They will have to learn new products across the development lifecycle. Teams should learn new products for building services, and for testing and deploying them. They will have challenges with doing capacity and sizing exercises for the solutions based on these new product stacks. The team will have challenges in doing QoS testing for this new set of products.

Glossary of Terms

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<th>Acronym/Abbreviation</th>
<th>Definition</th>
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<tr>
<td>SOA</td>
<td>Service Oriented Architecture</td>
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<td>ROI</td>
<td>Return on Investment</td>
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<td>CXO</td>
<td>Chief Technology/Information/Financial Officer</td>
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<td>CIO</td>
<td>Chief Information Officer</td>
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<td>CFO</td>
<td>Chief Financial Officer</td>
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<td>QoS</td>
<td>Quality of Service</td>
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<td>WS*</td>
<td>Web Services Standards</td>
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<td>ESB</td>
<td>Enterprise Service Bus</td>
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<td>Web Services Management</td>
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<td>XML</td>
<td>Extended Markup Language</td>
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<td>SLA</td>
<td>Service Level Agreement</td>
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About Author

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