Adopting Service Oriented Architecture increases the flexibility of your enterprise

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Introduction

Information Technology (IT) systems lasted longer earlier. Organization re-structuring was uncommon as business did not demand it. With ever-shrinking business cycles, IT must quickly adapt to changing business needs. Present day IT systems must be built to change. Organizational structure and culture now must reflect this change for efficiency. The modern day enterprise demands that its resources – technology, people and processes – should be plug-and-play ready, to help it become a flexible enterprise.

In this paper, we discuss how Service Oriented Architecture (SOA) enables flexibility in the enterprise. Flexibility leads to quicker adoption of business opportunities and thus, an increase in revenues.
Drivers

SOA brings a paradigm change in the organization structure and culture. Enterprises must adopt new trends in IT to accomplish their business objectives. For this, the IT effectiveness of any organization must be measured to help them achieve excellence in several objectives including:

- **Business Drivers**
  - New opportunities:
    - Innovative products and services form the key differentiator to gain competitive edge
    - Ability to leverage technology to adopt newer business models, thus enabling more channels to earn revenue
  - Cost Savings:
    - Cost reduction through reduced Total Cost of Ownership (TCO) adds to the bottomline. For instance, a Healthcare major was able to save over US$ 12 million in a year, by adopting SOA to achieve a higher degree of automation in claims adjudication process
  - Business Agility:
    - With cut-throat competition, every missed business opportunity positions an enterprise below its competitors. The ability of an enterprise to quickly respond to various business stimuli will be key to survival
    - Faster time to market increases customer satisfaction and also customer loyalty. This results in increased business and higher revenues. For instance, a Healthcare major was able to reduce time to market for new product launch from 12 months to 3 months by adopting SOA.
    - Ability to provide on demand service, in real-time, 24/7
    - Seamless collaboration with partners and customers helps to improve service quality and time to market

- **Technology Drivers**
  To achieve business goals, it is imperative to adopt an IT strategy that has openness and agility as intrinsic properties and results in cost savings:
  - Openness
    - Dependency on technology and platform vendors is an external risk to an organization on which it has little control. However, adopting open standards mitigates this risk
  - Cost Saving
    - Reduction in maintenance cost / TCO
    - Increased reuse of investment in IT leads to increased revenue productivity resulting in increased ROI
  - Agility
    - Loose coupling increases application agility and reduces time to market for a new application
    - Seamless scalability at minimal cost to cater to seasonal increase in load

SOA Defined

SOA helps enterprises meet all these business and technology drivers. SOA refers to an architectural strategy to help achieve business-IT alignment, by adopting a three-dimensional perspective of the enterprise namely, technology, people and processes (Figure 1). SOA facilitates implementation of business functionality as a set of well-governed, standards-based, loosely-coupled services and processes, defined in a flexible and agile manner.
SOA is an architectural strategy that helps achieve tighter Business-IT alignment by taking a three dimensional perspective of the enterprise, viz. technology, people and processes. The key aspect of SOA is to make business functionality available as a set of well governed, standards-based, loosely coupled services and processes, defined in a flexible and agile manner.

Service orientation involves re-structuring the organization (people and process) to align with this new paradigm designed to deliver effective and efficient services to end-customers.

To leverage technology capability through service orientation, it is a must to re-align business units, business-enabling units and sub-units within the organization. Bringing a centralized department, for instance, into the fold of another department to streamline processes or outsourcing to a unit as the external integration is being made simpler.

This also involves defining new organization processes, service providers and consumers both internally and externally. A new governance structure to manage and align the customers, business users and the IT staff to this structure is also imperative.

- **SOA: Technology**
  
  SOA specifies a set of principles and techniques to encourage encapsulation and modeling of reusable functions and processes. It essentially abstracts the actual underlying technology from the business services. This allows for the technology to change without affecting the business continuity. This also helps organizations to reuse their existing IT assets in terms of shared services (both infrastructure and business services).
• SOA: People
Efficient human resources enhance the IT effectiveness of an organization and increases competitiveness. However, SOA adoption brings a paradigm change in the organization's structure and culture. Service orientation forces organizations to realign their structure based on information ownership, business process ownership, governance roles, service providers and service consumers. This aids in optimal utilization of employees.

People include business users, IT staff, and customers. In a service-oriented enterprise, IT staff can assume the role of service vendors. Business users can become service providers while end customers become service consumers.

• SOA: Processes
In SOA, a business process refers to a systematic composition of context-free business services into a logical unit in a given business context, to achieve a complex business goal. SOA helps seamless information sharing across enterprises with implications on business process execution. Most human interventions in business processes can be potentially automated, resulting in greater efficiency. Workarounds in business processes used earlier to fill gaps due to technological limitations can be completely eliminated. Most airlines, for instance, now provide e-ticketing and allow their passengers to print boarding passes at home. This benefits both the airlines and the passengers. Airlines save staff cost and stationery cost; passengers get flexibility and better customer service.

Business Process Modeling (BPM) is a technique in which the business solutions are defined as a set of reusable, dynamically alterable business processes connecting services (or software components) and human interactions. The business process defines the sequence of flow, how external events must be handled, human interaction requirements and conditional processing.

SOA Governance
SOA governance is related to Enterprise Architecture (EA) governance. SOA governance is a set of mechanisms through which SOA is adopted in the enterprise. It is an integrated set of dimensions that provides the mechanism for defining, implementing, managing and measuring the effectiveness of SOA in the enterprise.

SOA governance taps into an enterprise's technology and business processes to provide direction and control, ensuring that the expected value of its investment in IT is realized. It also addresses external influences such as global business drivers, industry trends and the corporate strategy, along with technology trends and opportunities.
Similar to EA governance\(^1\), SOA governance has seven disciplines as depicted in Figure 2.

![Figure 2: SOA governance disciplines](image)

**Leadership:** Executive sponsorship provides access to an audience with the decision-making power to influence implementation of architectural guidelines. Making this select group understand and influence the SOA roadmap definition will not only bring in the organization's experience, but also foster adoption.

**Organization:** SOA governance team's responsibilities cover a broad range of business, technical and managerial activities such as:
- Understanding business strategies
- Envisioning, leading and guiding the development of the SOA
- Technology incubation, product evaluation and recommendation
- Management of exceptions

The SOA governance team has a two-tier structure with a core governance team and an extended governance team. The extended governance team also includes vendor partners.

**Investment:** This includes investment and funding models that drive the adoption and proliferation of SOA architecture principles and design practices. SOA requires a different investment and funding model from the traditional EA. An SOA investment and funding model must be addressed from the following perspective:
- Development of enterprise-wide artifacts such as standards, guidelines, policies and processes
- Assessment and compliance activities
- Shared business service development and provisioning

Development of enterprise wide artifacts and ensuring compliance is handled by the centralized SOA governance team, hence it requires executive sponsorship.

\(^1\) See Enterprise Architecture Governance framework (http://www.infosys.com/enterprise-architecture)
Shared business service development and provisioning is usually handled by respective business units that own the business functionality. Hence, this requires a distributed funding model. One of the primitive models for funding such shared services is pay-per-use or charge-back. However, this model may not have universal acceptance. Organization restructuring to reflect the end-user segmentation based on the services they use, could address this issue.

**Processes:** Processes define how architecture content is planned, developed, ratified and communicated, maintained and complied with by projects. SOA governance processes manage technology that aligns it with the business goals, adopted in the IT Strategy. These processes enable the architecture team to integrate with other enterprise processes such as project funding and portfolio management to enable effective decision-making.

**Policies and Principles:** The policies and principles define guidelines for decision-making on architecture development, implementation and management, to ensure transparency and objectivity. Governance principles address interaction between architecture and the organization it is embedded into. Policies reflect an organizational decision about architecture governance. Well-defined principles and policies for architectural arbitration and decision-making improve acceptance of results and reduce decision-making time.

**Measurements:** Metrics help not only in quantifying business benefits of SOA but also help in continuous improvement to achieve higher business agility. Hence, appropriate metrics should be defined and tracked for all three dimensions of SOA – people, processes and technology.

- Metrics for people: Activity-oriented metrics, tracking the performance of the group
- Metrics for processes: Reduction in process completion time, percentage automation
- Metrics for technology: Availability of services, adherence to service level agreements, reduction in maintenance cost, turn around time for new / improved business processes

**Tools:** SOA is an architectural style that manages people, processes and technology. Tools play a significant role in an SOA process. SOA tools include:

- **Tools for SOA definition:** Tools that create, manage and organize enterprise-wide artifacts such as policies, standards, guidelines, models
- **Tools for SOA analysis:** Tools that help perform as-is analysis, business process analysis
- **Tools for SOA infrastructure:** Tools that provide a runtime environment for SOA. This includes tools to monitor and manage shared services for instance, enterprise service bus, business process execution engine, etc.

**Approach**

Enterprise architecture (EA) is the practice of applying a comprehensive and rigorous method to describe a structure for an organization's process, information systems, personnel and organizational sub-units, to align them with the organization's core goals and strategic direction. EA must adopt SOA as the architectural style for the organization to meet its stated goals and benefits.

An organization embarking on a large business transformation initiative should have clarity on the purpose and means of achieving it. An un-initiated organization should build a business case, identify their key pain points, document business goals and articulate business vision. These artifacts provide clarity on who are the key stakeholders and why they have to undergo the transformation. Analysis of as-is business processes, governance processes and the application portfolio are critical inputs in defining a roadmap. Service orientation is a slow and gradual process. Hence, stakeholders should have a clear understanding on where they stand in the SOA ladder (see SOA Evolution model) and where they want to go.
Figure 3 depicts a four-phased approach to SOA led business transformation. The envision phase addresses the “why, when and who”, elaborate phase addresses “what and where”, execute phase addresses “how”.

**SOA Evolution Model**

Businesses use IT, both as a strategic change agent (for competitive differentiation) as well as a tactical change agent (for operational effectiveness) leading to business transformation. Service Oriented Architecture fuels this transformation when used in the right context. Such a transformation is an evolutionary process that includes the harnessing of technology, processes and people. This evolution is captured in the form of a road map comprising a five-stage process (Figure 4) depicted in the SOA evolution model.

Not every enterprise must aim to adopt SOA at the highest level. Each enterprise has unique business objectives and hence this decision should be taken based on the factors such as:

1. The vision
2. The business goals and objectives
3. The industry domain in which they operate
4. The size of the enterprise
5. The competition
6. The budgetary constraints
Benefits of SOA

SOA is the IT strategy to be considered to transform an enterprise to a flexible enterprise. It addresses all aspects of IRACIS\(^2\) – Improve Revenue, Avoid Cost and Improve Service.

**Improve Revenue:** Due to improved business agility, it is possible to improve revenue by adopting newer business models, offering innovative and timely products and services.

**Avoid Cost:** By isolating the implementation aspects from the service consumers, SOA enables harvesting existing business knowledge form legacy systems (through legacy modernization). Also, by providing a platform of “Shared Services” SOA helps re-usability at the macro level. This reduces the recurring operational cost. SOA also eliminates unnecessary duplication of systems, applications and storage, thereby, reducing the maintenance cost significantly.

**Improve Service:** The composition of services (through BPM) is a powerful technique to define and deploy a new product (a logical application unit) which gives rise to a concept of “pluggable business”. This reduces the “time-to-market” quantum thus helping gain competitive edge.

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\(^2\) Acronym coined by Chris Gane and Trish Sarson

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Conclusion

Enterprise transformation into service orientation is a gradual process and requires careful and controlled adoption. Most often such an exercise is looked upon as an IT transformation initiative rather than a business transformation initiative. This is because the business sponsors do not see a direct benefit of the investment until SOA stabilizes. Though solving integration issues seems to be the obvious and biggest advantage of service orientation, the real value for money is in the business agility achieved through it.

Adopting SOA provides enterprises several advantages. However, it does not solve all problems. It is important to understand the limitations of SOA and plan its adoption with these limitations that include:

- Mindless service orientation leads to over engineering
- Arriving at the right level of service granularity is very important. Too much granularity leads to “Service Hell” situation which leads to increased maintenance costs. Similarly, too less granularity limits re-use and becomes progressively inflexible
- Service orientation without proper governance processes in place will lead to a chaotic mesh of IT assets
- Enforcing adherence to the defined governance processes is a challenge. If not done efficiently, there is a risk of SOA not yielding the promised benefits
- Arriving at a consensus on financial models for revenue and cost sharing is a challenge

Abbreviations used in this Document

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>BPM - Business Process Management / Modeling</td>
</tr>
<tr>
<td>2</td>
<td>EA - Enterprise Architecture</td>
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<tr>
<td>3</td>
<td>IRACIS - Improve Revenue, Avoid Cost, Improve Service</td>
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<tr>
<td>4</td>
<td>IT - Information Technology</td>
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<tr>
<td>5</td>
<td>LOB - Line of Business</td>
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<tr>
<td>6</td>
<td>ROI - Return on Investment</td>
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<tr>
<td>7</td>
<td>SOA - Service(s) Oriented Architecture</td>
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<td>8</td>
<td>TCO - Total Cost of Ownership</td>
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