

## Business and IT Strategic Alignment applying SOEA Framework

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**Abstract :** In order to enable business agility, different architectural styles for organizing information systems, business and technology have emerged. Architecture involves top-level management, the business entities in the organization down to the grass-root level views. While the value of IT in business is recognized but the strategic architecture and solution implementation that can accommodate successfully is not straight forward that it requires integrated, holistic architecture bounded by end-to-end governing guideline.

Service-driven architecture product is the new way to deal with changing business environments and to manage technology complexity by addressing the gap that exists between business and technology. Service-driven Enterprise architecture seamlessly aligns the needs of Business with the capabilities of the Technology. Therefore, to provide end-to-end alignment of business and IT, to avoid architectural complexity, to add new technologies to existing legacy technology infrastructure in an enterprise initiative leveraged the formation of SOEA Framework.

**Keywords:** Enterprise Strategic Architecture, Enterprise Solution Architecture, SOE Lifecycle, End-to-end SOA, Availability Window, SOE Governing guideline, BITS - Business and IT in Service.

### I. Introduction

To overview the Business and IT alignment feature as part and parcel of SOA and EA is the background perspective of this paper. This feature to be achievable it has to be in the process of upfront goal of design in the enterprise strategic architecture development. SOE allows business innovation to be marketable in less time by bringing IT and Business requirements with the reuse of IT infrastructure and business processes in a service.

Integration of business process and IT is the key design-rule of SOE. All processes in the business should be mapped with IT capabilities and should be thought of as Services. This will give an option of system development on demand with incremental implementation and interoperability [1]. This gives better return-on-investment (ROI) by avoiding redundant resource and enhancing accessibility to shared standard IT infrastructure (eliminating proprietary middleware by interoperable, technology-agnostic manner) [2, 3].

Establishing SOE governing guideline, which is described with brevity for the sake of page limits, is a key to maximize the benefits and reduce risks while the enterprise incrementally moves to full end-to-end SOA based implementations. This paper is organized having the following sections: Business and IT alignment, SOE Strategic Architecture, Preliminary investigation, Service-driven requirements, SOE Solution Architecture, SOE Solution Implementation, SOE Governing guideline and Conclusion followed by References.

### II. Business and IT alignment

Service centric architecture requires confirming the business strategy and goals valued by IT. Services are derived based on the overall business and IT requirements, mission and vision that are defined in the enterprise level business plan. Concepts or methods necessary to design services include: determining business strategy, identifying targeted services, and confirming service and business strategy compliance. Service alignments with compliance requirements are insured by confirming solutions are in compliance with principles, guidelines, standards, models, and roadmaps

The missing element to align business with technology is the integration of service oriented architecture within enterprise architecture. This is mostly neglected by the doubtful assumption that business driven service design serves the purpose. According to the data collected by Society of Information Management and The IDG survey also discovered business and IT alignment is the top concern of management as this directly impacts the organization's agility and flexibility to change according to business needs [4, 5].

Business strategy according to Dr. Tariq Aslam [6] is a course of action which explains how the enterprise will move from the current state to a future state (i.e. to the business it wants to be) with the intention of maximizing value with low cost. Companies accordingly should understand the impact of a change or capabilities to match the technology acquired.

Service Providers need to understand what the business is trying to achieve in order to maximize the effectiveness of the services provided. In the same token, the business strategy should be valued by technology and ultimately ensure maximum value is delivered to the business. So business becomes the driver of IT, and IT becomes the driver of business [7].

Key business drivers, goals, metrics and expectations should be backed by and aligned with IT strategy to achieve the aforementioned. When these strategic alignments are maintained then the service provider is able to define, design, implement and operate services that are fit for business purpose. This concept should not require reinventing the wheel rather explore EA and SOA to this endeavour.

For the success of EA and SOA the potential problems and challenges generated as the result of the overlaps, limitations and differences need to be closely examined. Some inevitable problems arise when usual attempts are performed on EA and SOA independently as identified by the IBM research group [8], The SOA Work Group of the Open Group [9] and other researchers.

Inefficiency and inconsistency are some of the limitations that should have been controlled in any enterprise. Whereas inefficiency is encountered because of different teams parallel efforts to develop EA and SOA that result with duplicate efforts, unnecessary time spend and missed opportunities to leverage existing architecture artifacts.

Inconsistent and probably contradicting information models, infrastructure, system-management policies, strategies, and tools could occur when the focus is on SOA ignoring several aspects of EA. For example, legitimate needs for integration approaches and standards other than those supported by SOA but addressed on the enterprise architecture. Likewise enterprise may fail to identify and incorporate SOA specific needs as part of EA [10].

While both approaches are sharing the same vision of architecture EA's focus is at macro level whereas the SOA is at a micro level. Success and failures are dependent on cooperation of all business and IT units across the entire organization, unifying the efforts than duplicating, streamline the technology infrastructure, make small and incremental steps so that architecture is developed in evolutionary manner as a composition of services which will be a quick hit and fit to purpose.

By looking at SOA as a part of larger EA, success can be achieved by eliminating the limitations, utilizing best practices and adopting those guidelines. This also supports all-round effort and harmonization of capabilities to the objectives of the organization. Capabilities are then generated by a mix of people (knowledge, experience, talent, and skill), process (activities and collaborations), and technology (application solutions and computing systems), and supported by enterprise resources (financial and facilities) [3, 11, 12].

Both SOA and EA shares security, business and IT governance, intended to closely align IT with business, require similar strategies and planning activities, architectural domains, pursue agile and cost effective business, use input based on business objectives, goals as discussed by Ville Seppanen [13], Christopher Kistasamy et al. [14] and similarities and differences by IBM research group [15]. EA and SOA cannot be seen as alternatives to each other nor do they not exclude each other. SOA can provide an organization with tools and granularity to better align IT infrastructure with business strategies but as such it does not give a means to formulate and manage the strategic goals. On the other hand, EA does not provide any direct solutions for the problems it can recognize.

A good and right architecture that align business strategy with IT management to be successful should have to be implementable [16]. For this to be the case, the architecture has to be implemented that requires transshipping enterprise level vision into a quality business service rendered successfully to its clients. When you take this concept one layer ahead you discover one and one service oriented enterprise architecture framework – SOEA as shown in Figure 1.

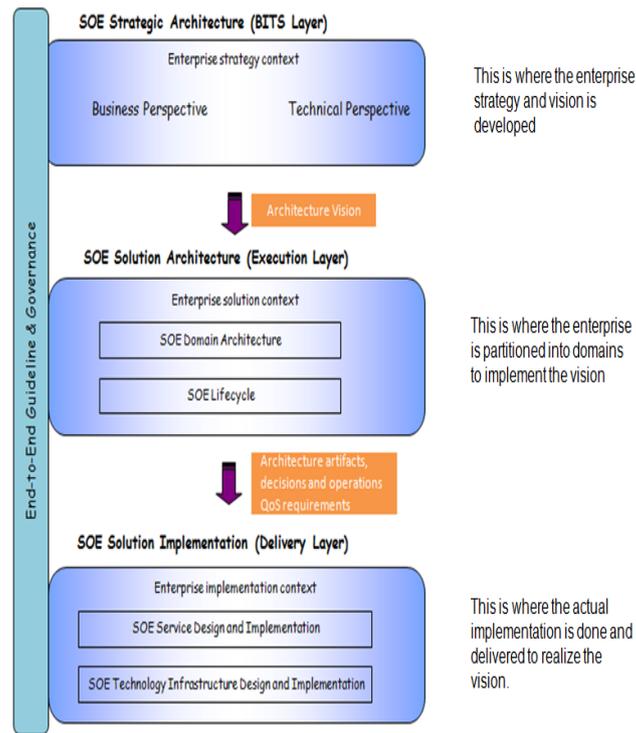


Figure 1: SOEA Framework

### III. SOE Strategic Architecture

Enterprise is organized in corporate, division or department wise but values its existence by providing quality services. The holistic view of enterprise includes people, business, IT and process. Using all the capabilities, enterprises dare to provide services that support to accomplish their Business, Technology and QoS delivery vision [13].

This layer helps the architect manage high level of abstraction focusing on the lower end of service delivery capabilities. This sets enterprise architecture vision and gives a contextual background with respect to governance, principles and standards to derive service oriented organizational structure required to support the execution of the enterprise vision. Therefore, at this stage you define vision, strategy and context for the enterprise and engage every stakeholder to facilitate the execution. This details of what goes into the BITS layer is shown in Figure 2. The outcome of this layer also includes what business goals can be enabled by IT rather than to take IT as a cost center for the enterprise. This is because every technology related decisions are driven by the enterprise business strategy.

In addition to alignment of business and technology, the strategic architecture work in this layer also guides the establishment of the required combination of expertise in the team, consistency and efficiency throughout the enterprise infrastructure resource and speed up system development.

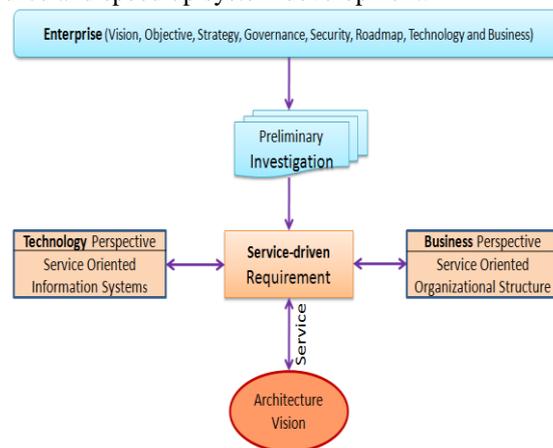


Figure 2: Enterprise Strategic Architecture

### **1.1. Preliminary investigation**

This will help to identify the scope of the project, context, environment and business and technology capabilities of the enterprise. The enterprise capabilities will be matched to their respective business and technology using service driven requirements.

This stage also guide the enterprise decision support to categorize services for out sourcing and in house development and other options based on availability of resource. Feasibilities regarding scheduling cost & benefit analysis and customer expectation within enterprise or outside of the enterprise can be taken from the preliminary investigation output.

This is the 'As-Is' study of the Business and Technology perspectives that leads a way to align IT and Business requirements in a Service. Common technology capability, principles, the current status of enterprise maturity will be evaluated to match the business lines or segments reuse elements, capability, and reference architecture accordingly. Finally, it defines the 'To-Be' state roadmap and vision of the Enterprise Business, Enterprise Technology (IT) and Enterprise Service.

### **1.2. Service-driven requirement**

Service driven approach can be top-down or/and bottom-up to implement SOEA framework. SOEA framework has Service Oriented Organizational Structure (SOOS) in one side and Service Oriented Information Systems (SOIS) on the other hand. SOOS includes a top-down business analysis (or architecture) whereby enterprise business capability requirements drive the requirement and identification of business services. Business services are composed of business processes automating various business activities and events. This high level business processes drive the lower level design and implementation of services.

The SOIS includes a top-down technology analysis in support of the business capabilities identified in the business analysis (or architecture). The corresponding IT resources are encapsulated for each service dynamically in a cost effective manner matching the business process requirement with the SOIS structure of the enterprise. Therefore, the top-down approach concentrates on an organizational capability to model itself as provider of service.

Through these analyses, from both business and technology perspectives, the enterprise architecture vision is developed based on identified service driven requirements by addressing all the stakeholders concerns. Before proceeding to the next architecture stage (i.e. SOE Solution Architecture), it is necessary that the architecture vision is effectively communicated and get approval from the key stakeholders.

The top-down business and technology analysis is based on the enterprise business vision to model the future state of the enterprise through the development of architecture vision. It is important to point out here that this top-down approach is also supported by a bottom-up approach of current business and technology analysis to help leverage the existing investment in a cost effective manner. This means existing application and technology portfolio are analyzed to support scalable and reusable service modelling.

Applications in SOEA framework are taken as loosely coupled services that might seem technology (IT) centric but accommodate or encapsulate the business logic. This service can be reproduced or integrated on demand and enriched by the business processes and activities or events. What this means is that the architecture vision need to include aspects of existing business environment to guide how existing applications and technologies are leveraged or replaced.

The SOEA benefits from both top-down and bottom-up approaches by involving management support and bridging IT and Business in a service. This is further foreseeable in a service oriented enterprise paradigm allowing not only agility in IT but also flexibility of business logic, strategic alignment, encapsulation, resource sharing and other characteristics of architecture by avoiding duplication of effort and team.

In summary, the Enterprise Strategic Architecture Layer includes the Preliminary Investigation, Service-Driven Requirements (Aligning enterprise technical and business perspectives and drivers in a service) and architecture vision on how the enterprise business objectives are going to be achieved. The effort made on this activities result in Service Oriented Enterprise guideline, principles,, enterprise reference architectures and high level requirements that will guide the SOE Solution Architecture stage of the framework.

## **IV. SOE Solution Architecture**

Enterprise involves people, business processes and technology thus it requires the holistic view and approach. The inter relationships between the enterprise domain play a crucial factor in ensuring overall user, business and technology alignment. With the input from the SOE Strategic Architecture artifacts, the SOE Solution Architecture stage addresses the enablement of business capabilities identified at strategic level. A given enterprise may be composed of one or more business domains or segments.

The Execution layer, therefore, have two sub layers. The top layer is the domain architecture of the enterprise as depicted in Figure 3 that should be coherent with the service to be delivered for each of the viewpoints. The actual service identification, end-to-end SOA and compliance assessment with the enterprise guidelines and

principles are performed in the solution architecture layer. The second part of SOE Solution Architecture is SOE Lifecycle, the lower sub layer, is responsible for two key aspects of enterprise architecture, namely, governance and change management. Through the SOE Lifecycle every business process and technical capabilities identified in a given domain or business segment is checked with respect to the roadmap set in the architecture vision.

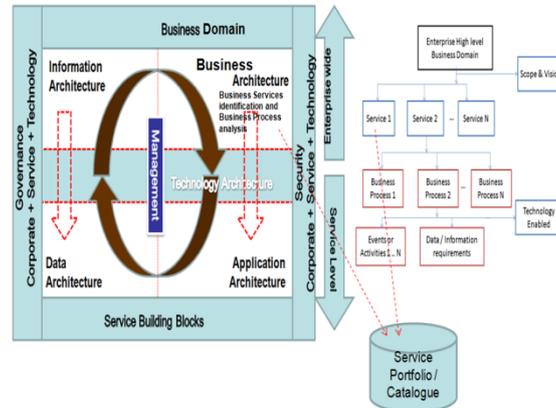


Figure 3: Domain Architecture

SOE Lifecycle is a three stage process which includes business initiative, evaluation and commits stages as shown in Figure 4. It is an iterative process where SOA based service architectures are enhanced iteratively based on a roadmap that has been developed in the architecture vision.

The initiation stage will clarify questions like reasons of the business process initiation, who initiated it? Why it is initiated? Stakeholders involved or affected and so on. The evaluation stage of the life cycle will clarify the business process against the enterprise and service level expectation, satisfaction of corporate criterion, standard, governances and related policies. Based on the outcome of the first two stages the service delivery commitment will be initiated. This will be checked against the availability of resource as shown in the availability window in the same Figure 4 and following the SOE end-to-end SOA.

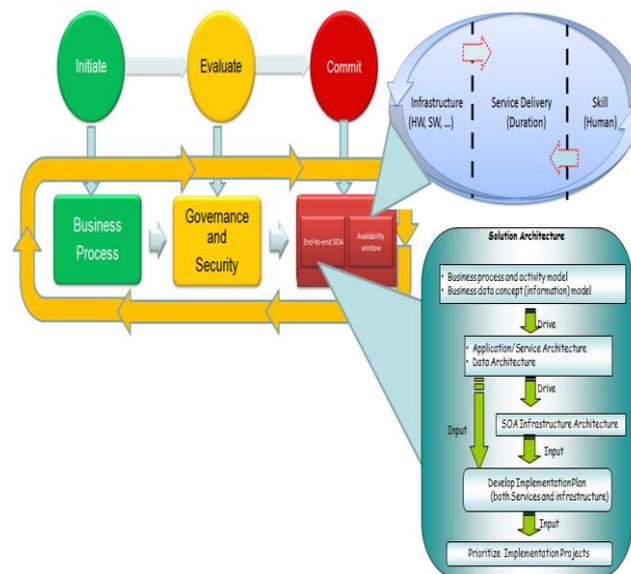


Figure 4: SOE Solution Lifecycle

## V. SOE Solution Implementation

The various architectures accomplished in the previous layers can only be of value when the services are implemented, deployed and available to the consumers. SOE Delivery layer is where the architectures developed in the strategic and domain levels are realized through SOE Solution Implementation. As shown in Figures 5 and Figure 6, SOE Solution implementation consists of detail service design and implementation and the implementation of the actual infrastructure upon which the services are deployed and managed. This

includes coding, testing, service deployment, service publication for reuse, and service management as per service level required by the business.

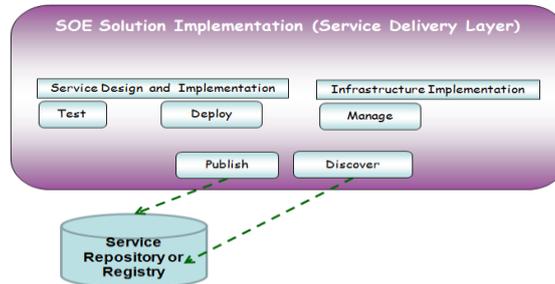


Figure 5: Solution Implementation

The main goal of converging Business and IT is to develop and deliver optimal Service. The service can be resource cognizant and operationally integrated business processes that can be implemented independently by business domains or business units, and business partner networks. Enterprises aim for service centered efficient and effective use of the IT infrastructure that is flexible and adaptive enough to keep pace with continual changes in the organization's business processes and business models. The SOE Delivery layer is where such an expectation is delivered and measured against pre-defined service level metrics.

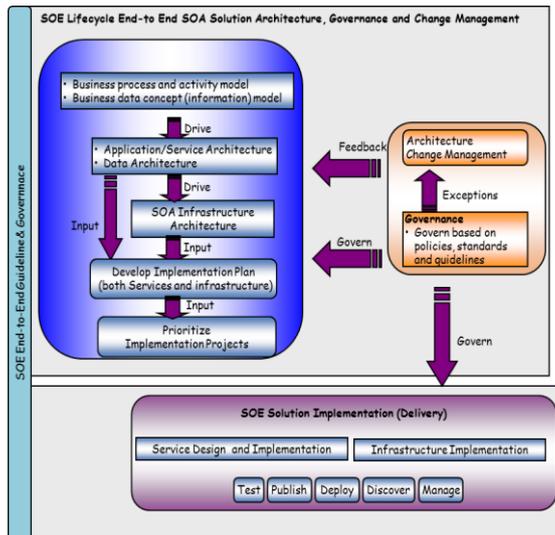


Figure 6: Linkage between Execution and Delivery layers

## VI. SOE Governing guideline

Good governance is indispensable and hence very essential, so that the service users are assured that service provision will be maintained in the manner that they expect and agreed. To avoid business inefficiency matching with organizational capabilities of technology acquired have to be underlined in planning guideline for sustainable service governance.

Enterprise wide service initiative would be either a failure or a partial success unless strategic efforts are made in enterprise wide service integration, Leadership skills and service governance. The service governance encompasses service level agreement, security perspectives like privacy, authorization, authentication, encryption, Business and IT governance.

A Service might be requested by one stakeholder or several of them from different perspectives. In the same token a stakeholder can request for several services for a single perspective. In all cases there is at least one provider and consumer and therefore, should be identified as who is the stakeholder or whose demand (vision) should be concerned with and why.

What sort of technical and non-technical (Architecture, Development, Operations) teams to be formed, tools required for the operation and implementation, process standard that can guarantee the service management, deliverables or artifacts (catalogues, diagrams, and matrices that make up the content of the Architecture Repository) related ones as depicted in Figure 3 should be defined for every service driven requirement.

The following are general guidelines that help the use of SOEA Framework in practice:

#	SOE Guideline
1	<p>Aim to <b>develop architecture vision and prepare roadmap</b> to guide to that target vision. To help quick realization of business value:</p> <ul style="list-style-type: none"> <li>• Start simple and move towards the vision incrementally.</li> <li>• Understand current state and think of leveraging what is in house</li> </ul>
2	<p>Identify <b>service reuse, interoperability and simplicity</b> as your key objectives/goals. The proper service reuse is not an easy task to achieve unless the following issues are addressed:</p> <ul style="list-style-type: none"> <li>• Clear understanding of business processes</li> <li>• Granularity of services</li> <li>• Funding to implement reusable services</li> <li>• <b>Establishment of a common service definition team</b> or similar central funding approach</li> </ul>
3	<p>Evolve infrastructure based on business needs and aim for reuse by various business domains or Lines of Businesses.</p> <ul style="list-style-type: none"> <li>• If infrastructure is not based on business requirement, the resulting infrastructure may be over architected causing unnecessary cost.</li> <li>• Aim for a common infrastructure that can be leveraged and reused by all business domains in the enterprise to <b>maximize return on investment (ROI)</b>.</li> </ul>
4	<p><b>Develop lower level principles and guidelines that guide the technical capabilities implementation.</b></p>
5	<p><b>Develop end-to-end governance process</b> to minimize risks and maximize business benefits.</p> <ul style="list-style-type: none"> <li>• The governance processes would make sure that the various architectures and service implementations are compliant with the defined and approved guidelines.</li> </ul>
6	<p>Prepare for the following major challenges associated with EA and SOA implementations:</p> <ul style="list-style-type: none"> <li>• Enterprise is diverse in many ways, so plan to handle issues related to culture and service development processes.</li> <li>• Developing services for reuse and promoting service reuse requires careful planning and senior leadership support. Make sure that the approach of dealing with such challenges is described in the architecture vision and proper guidelines are developed.</li> <li>• Clearly plan for handling issues related to <b>ownership of shared services</b> and their ongoing <b>maintenance</b>. For example, what is the incentive for a given business domain to develop a service for reuse in other domain? Is it centrally funded? How can you managing changes and service version control?</li> </ul>

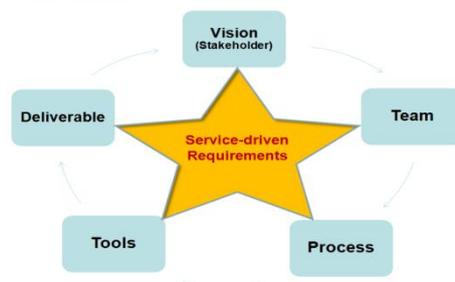


Figure 3: SOE End-to-end Guideline parameters

## VII. Conclusion

Integrating the business as well as information aspects in a holistic way (People, Processes, Business and Technology), guarantees a natural alignment of Business and Technology. The convergence of software and services through the rise of software as a service (SaaS), Infrastructure as a service (IaaS) and others enables IT

departments of big enterprises and practitioners to operate more strategically. With the strategic use of technology, IT can help organizations improve and transform business processes, react quickly to changing market condition, comply with new federal regulations, cut cost of operations, reduce product time to market, and enhance employee mobility and flexibility.

Service Oriented Enterprise Architecture Framework applies service orientation principle to the traditional frameworks and allows for service orientation concept to be applied at all architecture levels. Large and complex systems can be analysed, partitioned and provided as service.

Validation of the framework is done using a case study that produces substantial improvement to a traditional problem solving more than a mere theoretical proposal by confirming the solution using empirical material [17].

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