

SOA Maturity Model

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Abstract

Organizations that tread the SOA path often find it useful to benchmark their current state of SOA maturity in order to plan ahead, or to compare their products and processes with those of similar organizations in the industry. It is often a challenge to standardize on a generic maturity model for all enterprises, as the SOA goals, objectives and requirements of every enterprise vary based on the type and size of business, market environment etc. In addition to this, a huge flux around existing best practices and SOA standards are adding to the confusion on an ideal SOA maturity model. In this context, one of the important early steps an organization will have to take is to define an SOA maturity model that is suitable to its requirements, business goals and objectives.

One must not forget the fact that people, technology and architecture alone will not take an enterprise through SOA journey successfully, unless they are supported by key processes and activities. A maturity model for SOA should therefore encompass both the effectiveness of the architecture (product) as well as the processes required to take it from the as-is state to the to-be state. This document discusses the various aspects of an SOA maturity model, and provides an indicative mapping of the activities and processes that need to be followed at each maturity level

The maturity model proposed in this document is based on a study of various SOA maturity models defined by IBM, BEA, Systinet etc., and takes into account both the process and product (architecture) maturity of an organization with respect to SOA.

The focal point of this article is the fact that “following technology or processes in isolation would not always result in the right product”. So, while assessing the maturity for SOA, it is required to assess the effectiveness of processes, people, technology choices and also the maturity of the architecture.

The SOA Maturity Model

An SOA maturity model is used to assess the current state of SOA adoption of an organization. The model is used as a yardstick to take stock of as-Is state and develop a transition plan to lead us to the To-Be state. The ultimate aim would be to achieve optimized business services that can nimbly adapt to changing business scenarios.

However, in order to completely gauge the SOA maturity of an organization, it is important to have a multi-point view that encompasses as many aspects of the organization's SOA implementation as possible, to arrive at its true state of SOA maturity.

The SOA maturity model proposed in this section takes the following aspects of SOA into consideration to get a full picture of an organization's current level of SOA maturity:

1. Scope of SOA adoption
2. SOA Maturity Level (capabilities of the architecture)
3. SOA Expansion Stages
4. SOA Return On Investment (ROI)
5. SOA Cost Effectiveness and Feasibility

The following diagram is a bird's eye view of the SOA maturity model, depicting the various aspects of SOA maturity.

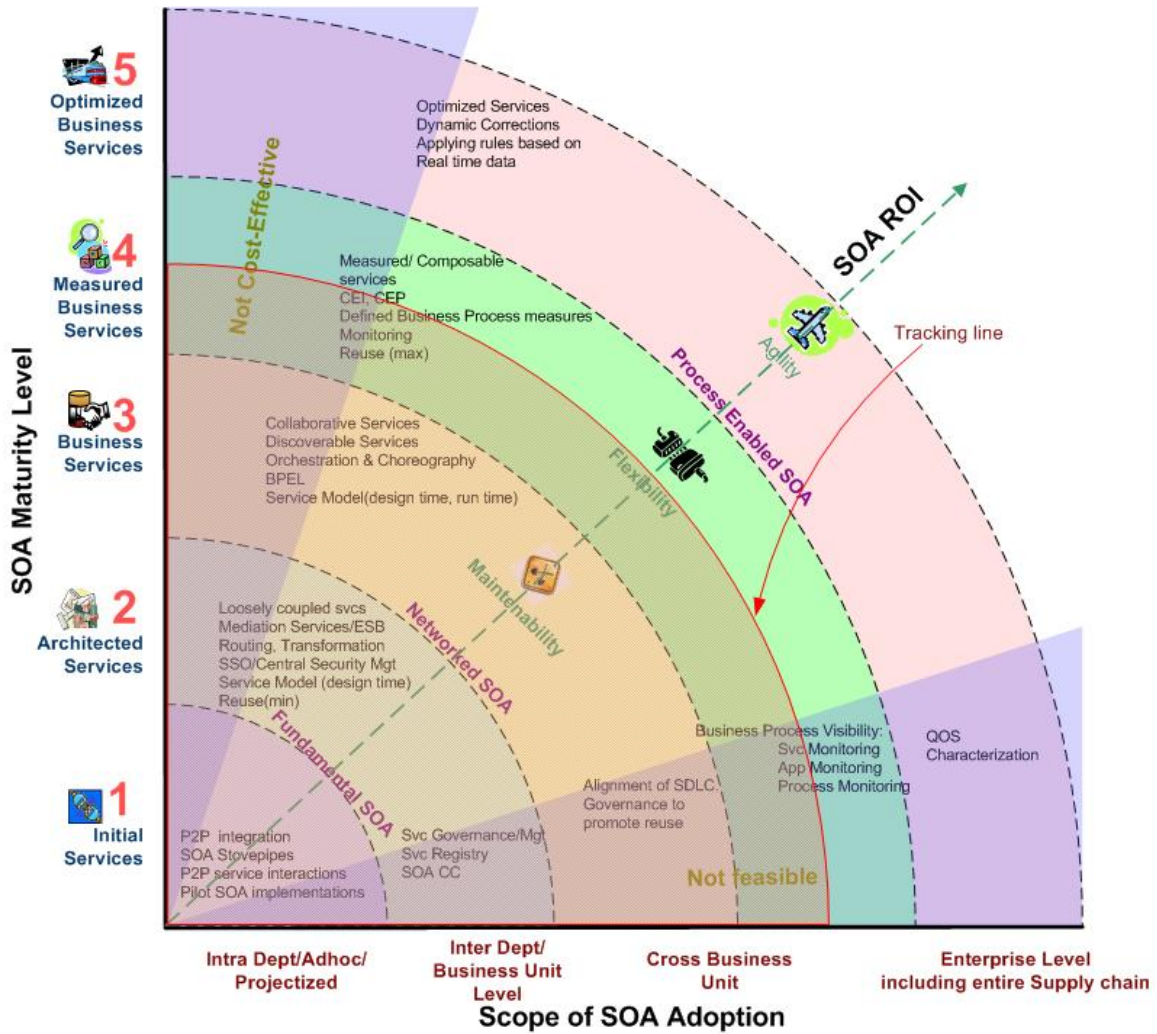


Figure 1. SOA Maturity Model

Salient features of the SOA maturity model

The salient features of the various aspects of SOA maturity described earlier can be summarized as follows. Please refer to the SOA Maturity Model diagram (Figure 1) for further details.

Scope of SOA Adoption: The X- Axis describes the Scope of SOA adoption. As can be seen, it is not a one-to-one mapping between scope of adoption and maturity level. For example Business Unit Level SOA adoption would require a combination of Architected and Business Service maturity in order to achieve effective SOA.

SOA maturity Levels: The Y-Axis shows five levels of SOA maturity along with the key business impact of each level through adding new architectural capabilities with each level of maturity. The SOA characteristics of each maturity level are shown within each level in the concentric quadrant layers along with “Not Cost Effective” and “Not feasible” regions.

SOA Expansion Stages: Advancement in SOA maturity results in the use of new sets of SOA compliant tools for implementation. This gradual progress in SOA implementation from Fundamental SOA through Networked SOA, culminating in Process oriented SOA has been shown in the quadrant area of the maturity model. Refer [6].

Return on SOA investment: The gradual increase in SOA Return on investment (ROI) with increased maturity level and SOA adoption has been shown in the quadrant section of the model. Increased maintainability is the first ROI, followed by a greater Flexibility, finally resulting in an Agile, Enterprise level system at the highest level of SOA maturity. Refer [6].

SOA Cost Effectiveness and Feasibility: The shaded areas in the maturity model represent the non-cost-effective and infeasible areas of SOA adoption. These areas result when the level of service maturity does not keep up with the degree of SOA adoption. For example, implementing process enabled SOA for intra-department needs may not be cost-effective. Similarly trying to employ fundamental SOA techniques to achieve the goals of enterprise level SOA is not feasible.

Using the SOA maturity model

While the SOA maturity model can very well be used to gauge the current SOA maturity level of an organization, its other important utility lies in its ability to track the various other activities and processes that need to be followed in order to achieve a targeted aspect of SOA maturity.

For example, if an organization aspires to achieve a high ROI through business flexibility, a curved quadrant i.e. tracking line, can be drawn through that point as shown in Figure 1.

All the aspects of SOA maturity in the shaded quadrant thus need to be addressed before a ROI can be achieved due to business flexibility, which would mean a service maturity level of 4, a Cross Business scope of SOA adoption, and a Networked style of SOA implementation. It is also evident that the organization will cease to be cost effective unless there is at least a business unit level SOA adoption and a minimum Level 2 standard of service maturity. Note that a one-time investment is required to procure the licenses for service infrastructure components such as service bus, service bus gateway, service registry, service management, BPEL engine and Rules Engine etc. A gestation period of 3-4 years is required for any organization to start reaping the benefits from initial one-time SOA investments on infrastructure.

Similarly, if an organization wishes to have dynamic rule-based optimized business services, then it would need to be at service maturity level 5, and at an Enterprise level of SOA adoption. The style of service implementation would also have to evolve to one of process enabled SOA.

Subsequent sections in this document deal with how each of these aspects of SOA maturity can actually be achieved.

Scope of SOA Adoption

SOA enablement of an organization will not happen overnight. An organization has to increase the scope of SOA adoption gradually, from the inside out, starting with one department and moving on to others to include the entire supply chain. An increased scope of adoption would therefore require an increased level of service maturity.

The following categories represent the various stages in SOA adoption of an organization

Intra-departmental/Ad hoc SOA adoption: This is usually where most companies start off on their SOA journey, with individual departments slowly beginning to engineer their systems to be service oriented. Proof of concept projects, smaller SOA rollouts and integration projects are undertaken at this stage. There is little or no cross business interaction. The governance charter has not yet been instituted, and there are only the beginnings of an organization wide sponsorship and visibility for the SOA effort.

Business Unit Level SOA Adoption: This is the second stage of SOA adoption, where various departments within a business unit are SOA enabled and interact with each other using architected services. The beginnings of SOA reuse are found at this stage along with the evolution of a rudimentary governance charter.

Cross Business Unit SOA Adoption: A firm step in the direction of enterprise SOA enablement is the interaction of services across business units. Service reuse is maximized at this point, and a firmly established governance module institutes policies, processes and standards to be followed while creating new services. A service repository ensures maximum service reuse. Regular Business Activity Monitoring ensures the optimal functioning of services.

Enterprise Level SOA Adoption: This is a highly evolved stage of SOA adoption where the whole enterprise makes use of Optimized services that can be dynamically configured based on real-time data. Service reuse could, however, start to decline at this point, as the maximum capacity for reuse has been crossed, as shown in the following diagram.

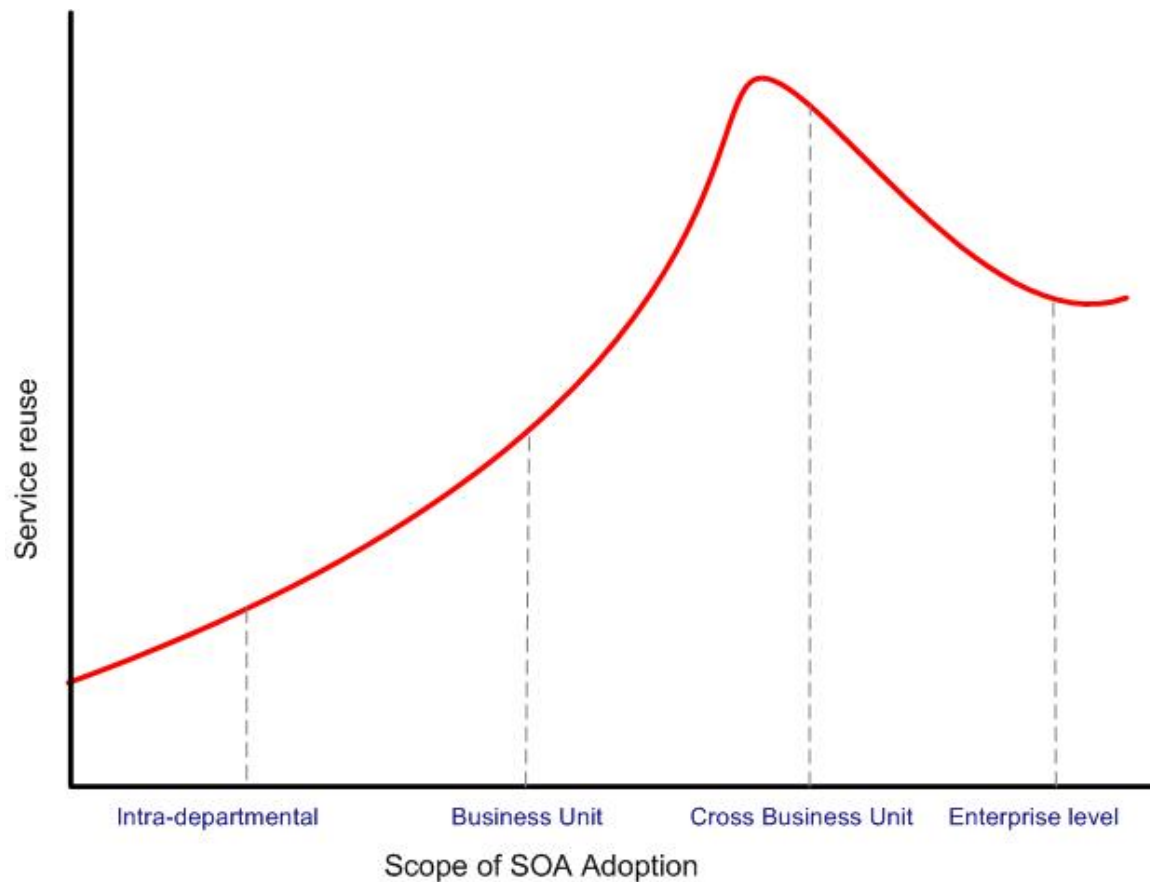


Figure 2. Service Reuse within SOA

SOA Maturity Levels

The degree of service rationalization in an organization is directly proportional to the scope of its SOA adoption. The following section describes each level of Service Maturity in an organization.

Level 1: Initial Services

This is the basic level of SOA maturity, where the thought of SOA architectures has just entered the designers' mindset. During this phase, the architecture and design will concentrate largely on

- Platform-dependent point-to-point integration among various applications. (not necessarily open standards based or SOA oriented)
- Minor R&D experimentation
- Small Pilot SOA projects
- SOA stovepipes for future implementations
- Portal implementations
- Custom integrations
- A small but steadily increasing in the number of web services

The above is an indicative set of the activities that are carried out at Level 1 of maturity. The subsequent levels of SOA maturity show more structured activities as described in the next sections.

Level 2: Architected Services

This is the second level of SOA maturity where services are engineered to be flexible and loosely coupled. IT costs begin to show a return on investment, and multiple applications within the enterprise are now integrated using open standards with a common middleware such as ESB. The critical success factors that need to be taken into account while designing these loosely coupled services are to support the following:

- Heterogeneity and distributed systems
- Reliable messaging
- Mediation services (ESB)
- Database integration
- Application Integration
- Versioning
- Central security management
- Routing and Transformation
- Minimal Service reuse
- Ease of deployment
- IT Performance management

An organization wide SOA Competency Center (SOA CC) functioning under the purview of SOA governance charter would ensure adherence to SOA design principles and institute guidelines and best practices for the proper adoption of SOA.

Level 3: Collaborative Business Services

This level of maturity can be reached when services are self-contained and fine-grained enough to function as an independent service and yet flexible enough to be part of process orchestration.

In the previous level, Service Identification was done using a bottom-up approach from the application portfolio. This level sees an introduction of the top-down method of service identification from the business level, for better business alignment.

Business process modeling tools and Business Orchestration servers and Business process rules would be introduced at this level. A mechanism of discovering existing services for reuse, such as Service Registry, would be used. This would enable business processes to change quickly and effectively. Business process rules, event driven processes, and composite applications would evolve at this stage. Some of the characteristics of the services at this level are

- Collaborative & Discoverable services
- Orchestration & Choreography
- BPEL
- Service Model(design time, runtime)
- Establishment of a governance model to maximize re-use and alignment to SDLC

Level 4: Measured Business Services

This is the 4th level of SOA maturity where composite business services are measured and fine-tuned for better performance, flexibility and re-use. The Business application would now be able to achieve the agreed SLA using right-sizing of the infrastructure using the measured performance metrics. The performance of the end-to-end u0i- processes would be measured at this level.

Business performance metrics would be collected at the business process level and reports and dashboards would be generated to measure them. Some of the activities that take place in a SOA Level 4 organization are

- Business Activity Monitoring (BAM)
- Business process and business service dashboards and alerts
- Defined business process measures
- Business process visibility

Level-5: Optimized Business Services

This is the final level of SOA maturity. The Enterprise's optimized services are dynamically reconfigurable, and would automatically sense and respond to change in service delivery of business processes during the runtime. Using autonomic grid-computing model, in order to meet the agreed SLA or policies, QoS characteristics such as scalability, availability, and performance could be achieved through addition of more memory, altogether new instance in the cluster or even adding more CPU resources. Services and processes would automatically change their behavior not only based on IT performance metrics but also on business performance metrics.

At this level the SOA becomes fully optimized and aligned with business. Maintaining architecture at this level of maturity would need the institution of semantic oriented modeling and dynamic application assembly.

SOA Expansion Stages

As the level of SOA adoption increases in an organization, so must its service maturity. Consequently, the focus of SOA implementation also undergoes a gradual change. While this change does not necessarily need to be quantified, it certainly helps for an organization to be aware of the style of service implementation required to achieve a certain level of service maturity or degree of SOA adoption. The three noticeably different SOA expansion stages that an organization passes through before reaching enterprise SOA stage are listed below, with some of their characteristic features

- Fundamental SOA
 - Starting point for SOA implementation
 - Front ends are complex
 - Reuse analysis not done while services are identified
 - Point to point service interactions
 - Increases the life of the applications due to services introduction. Services outlive applications if selected and designed properly. Note that data outlives both services and applications.
 - Increases maintainability
 - No need for data replication or ETL for data sharing across applications
- Networked SOA
 - Application Front ends can be simple compared to fundamental SOA
 - Service infrastructure such as ESB, registry shields the application front-ends from back-end systems
 - A lot more importance to reuse in service identification process
 - Loose coupling
 - Service Model (design-time and runtime)

- Required flexibility is achieved
- Process Enabled SOA
 - Application front-ends will cater to only user interaction
 - BPEL engine handles the business processes during runtime
 - Orchestration – sequence of activities to be executed
 - Choreography – sequence of messages that are exchanged between parties involved in the process
 - Workflow services handles the human interaction
 - Real-time monitoring of the business data and dynamic enablement of changes required in business through rules
 - CEI (Common Event Infrastructure) and CEP (Common Event Processing) are in place.
 - Required Agility is achieved

Return on SOA Investments

An evolutionary style of architecture such as SOA cannot be expected to give immediate returns on investment. The organization must attain certain level of service maturity and adopt a certain amount of SOA standards and practices before this happens.

The first return on SOA investment can be seen when business services begin to collaborate at a business unit level. The enterprise architecture becomes easily maintainable and system downtimes reduce. New services can easily be plugged in, and existing ones, removed and repaired.

Cross business unit SOA and measurable services provide a huge return on SOA investment in terms of Business Flexibility. The organization is no longer constrained by its IT to change and adapt itself to emerging or increased business needs.

Finally, an enterprise level of SOA adoption coupled with Optimized business services provides a huge ROI in terms of enterprise agility. Services are now dynamically configurable to respond to real-time data, and can nimbly adapt to business change with little or no maintenance.

SOA Cost Effectiveness and Feasibility

An increased degree of SOA adoption must necessarily be followed by an increase in service maturity. A failure in either department would lead to cost ineffectiveness, and/or infeasibility.

For example, it is not feasible for an organization starting off on an SOA journey with intra-departmental scope while aspiring for the benefits of an enterprise level of SOA adoption. In other words, trying to employ fundamental SOA techniques to achieve the goals of enterprise level SOA is not feasible. Similarly it is not cost effective for an organization at SOA maturity level 5 to utilize services that have not even reached the cross business level of service adoption. In other words, implementing process enabled SOA for intra- departmental integration needs may not be cost-effective.

Organizations have to be especially careful to ensure that the pace of service maturity keeps up with the degree of SOA adoption in order to avoid the lacuna of cost-ineffectiveness.

Combining Product and Process Maturity

An organization is quite likely to reap the benefits of SOA with just a strong architectural backbone that allows for loose coupling, interoperability and reuse. Conversely, not-so-strong architectures can be bolstered with defined, comprehensive processes that ensure ease of management, aggregation and enterprise agility, and still manage to reap the same benefits of SOA. While the former is an example or resultant of high product maturity, the latter is a case of a strong process maturity.

While one could perhaps survive without the other in small or medium scale enterprises, progress along the SOA track becomes virtually impossible as the size and complexity of the organization's business increases. Ensuring that the organization's processes keep up pace with the architecture is critical to the success of an organization's progress towards SOA.

The SOA Maturity model with Process Mapping

We notice that it is quite easy to classify incremental SOA architectural achievements into SOA maturity levels, as shown in the previous section. One might do well, however, to avoid classifying organizational processes in the same way. For example, it is not necessary for the SOA performance management charter to precede the SOA governance charter. In fact it might make more sense if both activities are started off simultaneously.

On the other hand an organization need not wait for these two activities to be completed in order to achieve an SOA maturity level of 2. As long as the two processes have been kicked off and are running smoothly, an organization does not need to halt its architectural progress in order let its processes catch up, or vice versa.

Keeping this in mind, a flexible, dynamic process model that continues to adjust itself with the increasing product maturity of the organization would be the ideal match for the SOA maturity model. The hybrid SOA maturity model, taking architecture and process in to account, is represented in the following diagram. An indicative guideline with respect to the recommended processes at each product maturity level is shown in the graph line through the center of the picture.

Following section will elaborate on the activities or processes at each maturity level, that comprise the SOA journey.

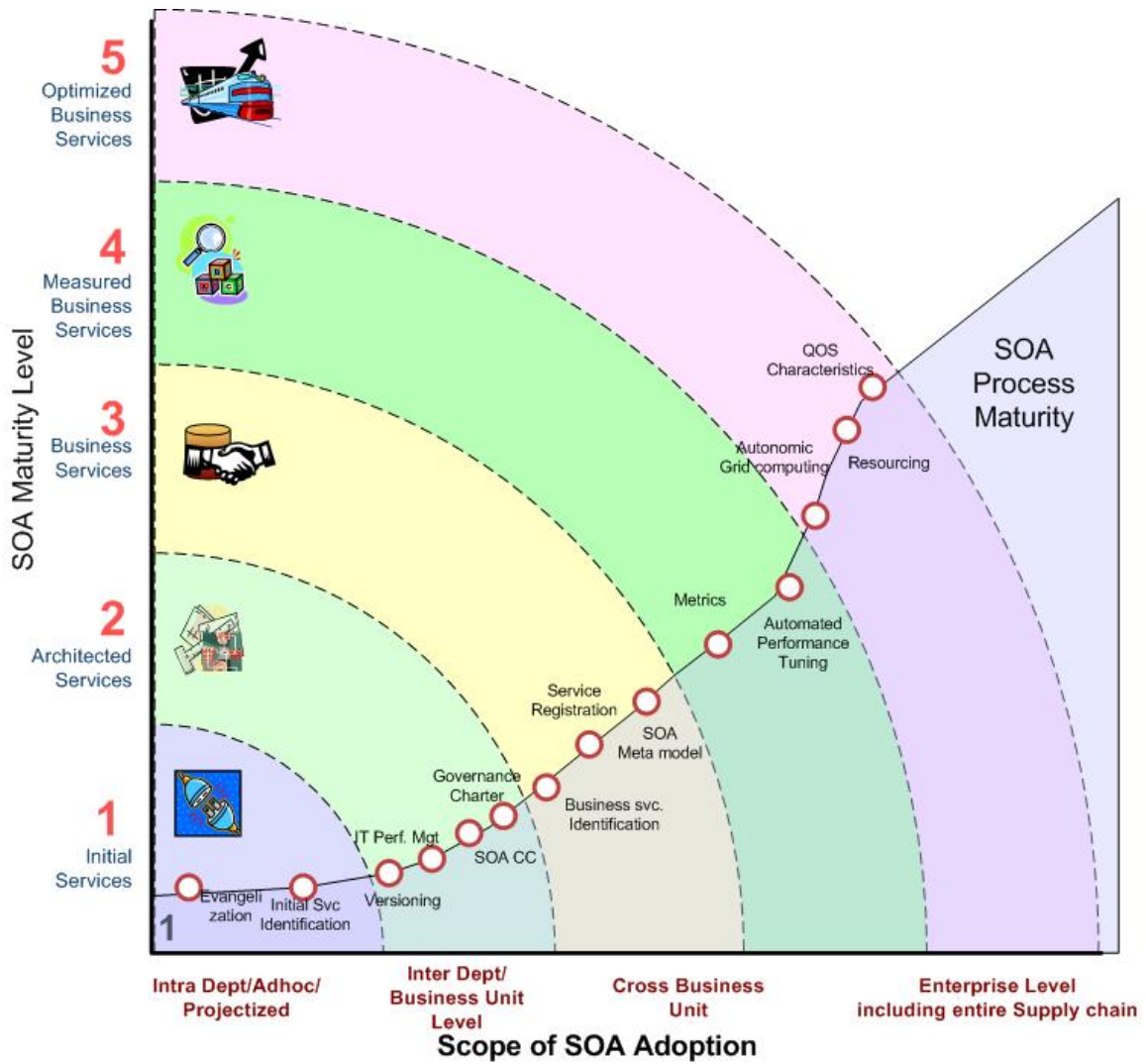


Figure 3. SOA Maturity Model with Process Mapping

The SOA Product/Process Maturity Model – Activities and Artifacts

The activities in SOA journey can be classified in to the following areas:

(i) SOA Evangelization (ii) SOA Business Case Development (iii) SOA strategy, SOA Readiness Assessment (iv) SOA Business Discovery (v) SOA Plan & Define (vi) SOA Design (vii) SOA Construct (viii) SOA Test (ix) SOA Deploy (x) SOA Governance.

SOA Evangelization encompasses the following people and technology activities.

- (i) Communicating benefits of SOA with respect to various stakeholders within the organization
- (ii) Technology evangelization through Centers of Excellence in the areas of integration, security etc.
- (iii) Conduct trainings and workshops related to SOA standards, technologies, products, best practices, worst practices and lessons learned if any
- (iv) Promoting the reuse culture by developing communication packages on
 - Benefits communication and how they augment organizational goals
 - Reiterate changes to be brought in to organization working

The rest of the section provides an indicative list of all the activities to be performed at various stages in the SOA journey. The activities have been mapped to the various SOA maturity levels as shown in the following table.

Note that some activities map on to multiple maturity levels. This would mean that these activities either recur at various stages of SOA journey or transitional across maturity levels. For example, SOA business case development can either be done at the end of maturity level-1 or at the beginning of maturity level-2. In other words, this is a transitional activity. Having completed this activity would qualify the organization to be placed at maturity-level 2.

In the context of huge flux on SOA standards and market adjustments caused by mergers and acquisitions in the SOA space, we would like to suggest a cautious approach in selecting consulting or professional services vendors for enterprise level SOA initiatives who claim to have end-to-end SOA expertise. Another challenge would be the finalization and selection of product vendors for all SOA platforms. For example, whether to choose platform vendor products or integration specialist vendor products for service infrastructure will not be an easy decision considering the product interoperability issues. For more details, we recommend further reading on Governance Interoperability Framework that tries to address similar issues. Issues such as these require a careful study of the existing IT landscape, IT standards, risks associated with technology advancement and long term organizational goals. Given this context, the “Type of Engagement” column in the following table would depict the range of skills required from business consulting to test and deploy for SOA transformation initiatives. It would be cost-effective to go for multi-sourcing with appropriate handshakes between vendors working on different projects/activities, with one or two vendors chosen as overall Systems Integrators. This would bring in and sustain the broad perspective.

SOA Maturity Level Mapping				Phase	Activity	Deliverable	Type of Engagement
1				SOA Evangelization	SOA Overview and benefits workshop SOA principles & best practices SOA Change Resistance Plans	SOA Overview presentation	Consulting
1	2			SOA Business Case development	Val IT framework ROI models TCO models	Business Case Document	Business Consulting
	2			Selling SOA to Executive Management	Understanding the business domain and areas of improvement Relate those with existing IT environment - how IT is contributing to the pain areas!! Discuss the latest business trends, What competition is doing, Discuss SOA and it's benefits, How current SOA technology trends would resolve the current business issues	SOA presentation consisting of benefits forecasted	Business Consulting
	2			SOA Readiness Assessment	Questionnaires surrounding the existing business processes, security, integration technologies, governance models etc.	Maturity model assessment (high-level) - To-be maturity level finalization	Consulting
				SOA Strategy	Business Process Analysis		
	2				Understand the enterprise value chain	Michael Porter's diagram: Core functions, support functions etc.	Business Process Analysis
	2				Understanding the existing business processes and their interaction model Evaluate As-Is business process	Business process details document OR visio diagrams, List of optimizations required	Business Process Analysis

SOA Maturity Level Mapping				Phase	Activity	Deliverable	Type of Engagement
					interaction model		
2					Understand the areas of improvement based on the evaluation	N/A. Input to high level SOA initiative goals and requirements.	Business Process Analysis
2					Capture the To-Be process interaction model	Vision diagram(s)	Business Process Analysis
IT Landscape Analysis (Portfolio Analysis): Top Down							
2	3				Business process to Applications/systems mapping	List of critical business applications	IT Architecture/Business Process Re-engineering
2	3				Identify the disconnects (system wide disconnects)	Integration requirements analysis	IT Architecture/Business Process Re-engineering
2	3				Identify the revamp opportunities	List of projects (small/medium/large)	IT Architecture
2	3				Identify reuse opportunities with respect to business logic	List of components, services	IT Architecture
IT Landscape Analysis (Portfolio Analysis): Bottom Up							
2					Identify the consolidation, sun-setting opportunities	Application inventory enhancements	Portfolio Analysis
2					Identify the redundancies (i) same functionality implemented with different COTS packages (ii) common infrastructural related services like mailing, printing,	List of technical and infrastructural services	Reuse Analysis

SOA Maturity Level Mapping				Phase	Activity	Deliverable	Type of Engagement
					faxing, scanning, auditing, logging, exception handling, search etc.		
					Define the Overall SOA Roadmap		
	2				Define the overall scope: List of projects (identified services, affected applications), List of pilot projects to be carried out	Scope document for elaboration, Architectural Vision, Changed/Updated Technical, Data, Information and Process Architectures	IT Strategy
	2				Define the high-level SOA requirements/expectations for the enterprise based on IT landscape study and To-Be process interaction model	Business/SOA Requirements Document	IT Strategy
	2				Dependency Analysis b/w services and affected applications	Sequence of identified projects	IT strategy
	2				Crare individual project plans	Individual project plans	Project planning
	2				Capture the SOA platform requirements - Assessment for required platforms	Need for service infrastructure like ESB, Orchestration Engine, registry, repository, service management tool kit etc	IT Architecture [technology architecture needs]

SOA Maturity Level Mapping				Phase	Activity	Deliverable	Type of Engagement
2					Define the Service Orientation metrics – to measure the performance down the line	Performance indicators to be finalized with the enterprise architects/program managers	Program Management
2					Implementation Road map Definition: Determine number of stages/phases required within SOA, sequencing of SOA phases, identification of projects in various phases and prioritization	Enterprise SOA roadmap document containing list of projects identified, priority, various phases and high level ball park time lines	IT strategy - Execution plan
2					Specify the SOA execution methodology tailored to the enterprise	Document explaining Wipro's SOA methodology and its correlation with customer's IT processes	IT process consulting
2					Create a high level master SOA project plan – amalgam of all the identified projects	Project Plan	Program Management
				SOA Governance	Understand Current IT processes and Governance		
2	3				Assess the reuse culture, if any Reuse promotion/enforcement Architecture review process & it's	EARB (Enterprise Architecture Review Board) review	EA Consulting

SOA Maturity Level Mapping					Phase	Activity	Deliverable	Type of Engagement
						hand shake points with SDLC processes	process document	
		3				Integration COE	Goals, Organization structure, RACI charts	EA Consulting
	2					Security COE	Goals, Organization structure, RACI charts	EA Consulting
	2					Regulatory compliance methodologies	Suggested compliance architectures	EA Consulting
	2					IT standards definition & enforcement	IT standards, Enforcement process via toll gates	EA Consulting
	2					Program Management methodologies and controls		IT process consulting
	2					Evaluate various governance models: (i) Centralized (ii) Distributed (iii) Federated	Comparison of various governance models	ITG Consulting
	2	3	4	5		Determine overall governance structure for SOA and its integration with IT governance	Org chart for SOA initiative	IT Governance Consulting
	2	3	4	5	SOA Business Discovery	Services		
	2	3	4	5		Service identification & validation [Top-down, Business process driven]	List of Services	Business Process/SOA consulting

SOA Maturity Level Mapping					Phase	Activity	Deliverable	Type of Engagement
2	3	4	5			High level service requirements, refinement	High level responsibilities for each service	Business Analysis
2	3	4	5			Service (architecture vision) Implementation Methodology (i) Business Logic/function Wrapping with a service (ii) Business Logic/function Wrapping with a service and replace the function with service (iii) Using adapters that are amenable to invoking as services (iv) Integrate function in to a service	Architecture Vision - Service	IT Architecture
2		4				Mark the changes required in the infrastructure, operations		IT Architecture
2	3	4	5			EARB review	Review comments document	IT Architecture
						Setup Service Management Team (under overall SOA program)	Refined SOA org structure	SOA Governance
						Float RFP(s)	Project proposals	IT Procurement
Applications								
2	3					Define/specify the new architectural changes to each of the affected applications	Architecture Vision for each application	IT Architecture
2	3	4	5			Re-evaluate the dependencies (identified in SOA strategy phase)		IT Architecture

SOA Maturity Level Mapping					Phase	Activity	Deliverable		Type of Engagement
2	3	4	5			Mark the changes required in the infrastructure, operations		IT Architecture	
2	3	4	5			EARB Review		IT Architecture	
2	3	4	5			Setup Application Management Team (under overall SOA program)	Refined SOA org structure	SOA Governance	
2	3	4	5			Float RFP(s)	Project proposals	IT Procurement	
				SOA Governance	Procurement Process				
2	3	4	5			Evaluate the proposal responses (as against the SOA program responses)	Evaluation Criterion, Justification for selection	IT Procurement	
2	3	4	5			Select the vendors for services and applications	Vendor selection methodology, Justification for selection	IT Procurement	
2						SOA implementation program kick-off	SOA program overview presentation, Meeting minutes	Program Management	
				SOA Plan & Define	Application (Iterations) Note: Pilots can also be run as applications.				
2	3			SOA Define	Capture and Analyze Requirements/Use cases	Identified sub-systems, services that can be reused		Requirement Analysis	
2	3			SOA Plan	Planning	Project Plan		Project Planning	
2	3			SOA Define	Define the application architecture	SAD		Application Architecture	

SOA Maturity Level Mapping					Phase	Activity	Deliverable	Type of Engagement
						Product evaluation (TBD) as required	Product Evaluation Criterion	Application Architecture
						Identify the Pilots, Proof Of Concepts (POCs) to be done	List of POCs/Pilots	Application Architecture
						Specify high level design principle, best practices & guidelines	HLD (High Level Design)	Application Architecture
	2	3				Define the enterprise SLAs for services [Note: After services are identified.]	Non functional requirements (could be part of the overall requirements document)	Application Architecture
	2	3			SOA Design	Design Application	SDD (System Design Document)	Implementation
	2	3			SOA Construct	Implement Application (Orchestration & Choreography)	Code	Implementation
	2	3			SOA Test	Test Application	Test cases and reports	Implementation
	2	3			SOA Deploy	Deploy Application, Monitor the applications	Operations Guide	Operations Management
						Services (Iterations)		
1	2	3			SOA Plan & Define	Service Identification (based on use cases)	List of services	IT Architecture
		3	4	5	SOA Plan & Define	Update Service Meta Model	Updated service relationships and meta-data	IT Architecture
1	2	3	4	5	SOA Design	Service specification	Service specification	IT Architecture

SOA Maturity Level Mapping					Phase	Activity	Deliverable		Type of Engagement
1	2	3	4	5	SOA Design	Service design	Service specification	Implementation	
	2	3	4	5	SOA Construct	Service implementation (Orchestration & Choreography)	Code	Implementation	
1	2	3	4	5	SOA Deploy	Service Deployment, Monitoring	Operations Guide	Operations Management	
						Integration & Testing (for each iteration)	Test Cases and Reports		
	2	3			SOA Construct	Application - Service Integration	Service specification	Integration	
	2	3			SOA Test	Application - Service interaction testing	Test Cases and Reports	Testing	
	2	3	4	5	SOA Governance	Service Management	Service management description document	Service Management	
1	2	3	4	5	SOA Governance	Monitoring SOA initiative progress – portfolio management tools	Progress Measures, Metrics	Program Management	

The SOA Maturity Assessment Process

An organization needs to take stock of its current processes, policies, skill sets and technologies in order to assess its SOA maturity, and lay down a plan for its SOA strategy or to try and continuously improve the implementation aspects. The following diagram represents the various key inputs for SOA maturity assessment, and the outputs that would help in laying down the SOA strategy of the organization.

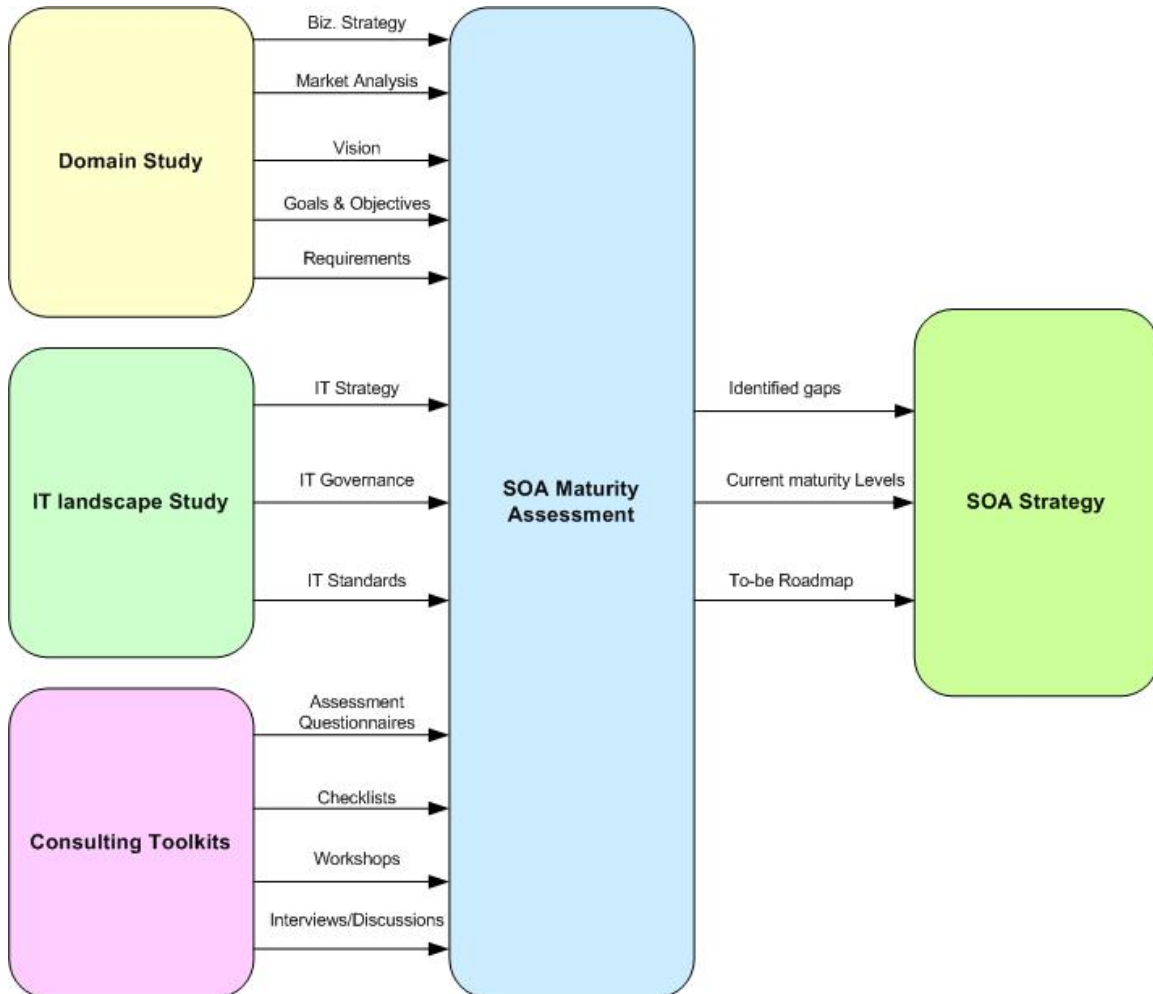


Figure 4. SOA Maturity Assessment Process

The major realms from which inputs are derived for the SOA maturity assessment process are

1. **Domain Study:** This set of inputs for the assessment of SOA maturity is resultant from a detailed study of the enterprise's business domain.
2. **IT Landscape Study:** A detailed analysis of the company's IT landscapes, the applications, coding standards, documentation, IT policies and governance mechanisms is conducted, and the findings are consolidated to arrive at the IT maturity of the organization
3. **Consulting Toolkits:** The company's people, practices and tools are analyzed by means of questionnaires, checklists, workshops and discussions, in order to assess the overall process maturity of the organization

Based on the inputs gathered during the assessment stage, existing architecture and process gaps are identified. Finally, the overall SOA strategy of the organization is laid out based on the established maturity level and company strategy.

Conclusion

In this article, we examined the need for SOA maturity models that depict process as well as product/architecture maturity, and not just service types and their characteristics. This article also stresses the need for key IT processes to be in place for taking an enterprise successfully through SOA journey, and lists the major activities that are to be carried out at various stages of SOA maturity. This proposed maturity model is an amalgam of best features from several industry SOA maturity models mentioned in the references section.

A prototype maturity model such as the one described in this document would assist in providing a blue print for creating a maturity model for SOA. This article would serve as a starting point to consultants and architects in creating questionnaires to assess the SOA maturity of an organization, on both architecture and processes. This article also mentioned the key parameters or the skill sets to be considered for selecting consulting or professional services vendors for SOA transformation. In the process, this article highlighted the SOA linkages to EA, BPM, IT Strategy, IT Governance etc.

It can be quite acceptable in an SOA context, for an organization to be at a different process maturity, product maturity, and overall SOA maturity. This model has its greatest utility in not only assessing the SOA maturity but also guiding an organization through SOA journey.

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Glossary of Terms

Acronym/Abbreviation	Definition
CEI	Common Event Infrastructure
CEP	Common Event Processing
COE	Center of Excellence
EA	Enterprise Architecture
EARB	Enterprise Architecture Review Board
POC	Proof Of Concept
QoS	Quality of Service: This is a pointer to all non functional aspects of a system like Performance, Security, Scalability, Availability etc.
RFP	Request For Proposal
ROI	Return On Investment
SAD	System Architecture Document
SDD	System Design Document
SLA	Service Level Agreement
SOA	Service Oriented Architecture
SOA CC	SOA Competency Center
TBD	To-Be-Determined

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