SOA for Business Technology

A Snapshot of Current Findings

A White Paper by:

The SOA4BT Project of The Open Group SOA Work Group

July 2014

SOA for Business Technology

Document No.: W149

Published by The Open Group, July 2014.

Any comments relating to the material contained in this document may be submitted to:

The Open Group, 44 Montgomery St. #960, San Francisco, CA 94104, USA

or by email to:

ogspecs@opengroup.org

Table of Contents

Boundaryless Information Flow ™
achieved through global interoperability
in a secure, reliable, and timely manner

Executive Summary

This White Paper contains a snapshot of the current findings of the SOA for Business Technology (SOA4BT) project of The Open Group SOA Work Group. The SOA4BT project will provide guidelines and taxonomy based on capabilities, service categorization, and metrics, to align SOA and business with a mechanism to assess, improve, and express SOA in business terms. This White Paper contains an introduction to the problem, some definitions and motivation, an analysis of SOA and Business Architecture, and a Case Study. It represents the current thinking of the project team, but it will not necessarily be reflected in the final results of the project.

The output of the SOA4BT project will contribute to The Open Group vision of Boundaryless Information Flow™ by leveraging and fostering common understanding of business use of solutions delivered through various technology architecture styles including Service-Oriented Architecture (SOA).

Introduction

Objective

With the industry landscape rapidly changing, due to globalization, technology advancements, consumerism, etc., there is more pressure for organizations to be nimble, make adjustments to business strategies, and effect rapid business transformations.

Service-orientation has long been accepted as the most suitable approach to tackle these challenges, due to the inherent agility and reuse attributes of this architecture style, but the majority of Service-Oriented Architecture (SOA) implementations across the industry so far have been predominantly IT-focused. They have contributed to IT agility and reuse in a big way, but have not been very successful in meeting the promise of business agility – helping organizations rapidly realign to deliver new business capabilities or contribute effectively or significantly to business transformations.

This White Paper addresses the current gaps and challenges hindering the business adoption of the service-oriented approach, and provides a framework and a clear path to align business capabilities and processes to business services that help achieve business goals through the promise of SOA, in a cost-effective and faster way. Effectively, this White Paper should contribute to the linking of business agility directly to IT agility.

Cloud-based solutions and technologies, which are showing much promise in the business agility space today, are not a quantum leap but are basically an evolution from SOA. Embracing SOA and implementing it correctly, through a structured business service architecture approach, positions organizations to reap the benefits from internal, external, and/or cloud-based services, whichever may be optimal.

The output of the SOA4BT project, as an addition to the Guide to Using TOGAF® to Define and Govern Service-Oriented Architectures, contributes to The Open Group vision of Boundaryless Information Flow by leveraging and fostering common understanding of business use of solutions delivered through various technology architecture styles including SOA. Its main goal is to leverage the collective experience of the TOGAF standard and SOA practitioners to provide clarity and share best practices and lessons learned to improve the successful implementation of business solutions. The content is therefore pragmatic based on real experiences and projects.

In particular it will act as the bridge between business stakeholders and the realization of SOA. Its role is to bi-directionally associate Business Architecture and vision with SOA technology decisions.

Intended Audience

This document is intended for enterprise architects, business architects, IT architects, data architects, systems architects, solutions architects, and anyone responsible for the architecture function within an organization.

Overview

Some of the common challenges facing the business adoption of SOA are as follows.

- There is lack of prescriptive guidance on how to decompose business processes to business services and map them to IT services. This is an issue that most implementations of SOA encounter.

- User organizations fall into two categories: those that have not adopted a service approach yet (greenfield); and those that have implemented some services (brownfield). Greenfield organizations can follow a business-architecture-to-SOA roadmap through the TOGAF Architecture Development Method (ADM) and the SOA Reference Architecture. Brownfield organizations have mostly adopted the bottom-up approach but do not have a defined path to take it to the next level to transform from the top downwards. Currently there is a partial solution for IT and for Business Architecture, but the two are not cohesive and in concert with each other.
- How do we make both business and IT look at technology as a business enabler? How can business take advantage of the SOA approach experience from IT to help drive the desired changes from business back to IT?
- How do we identify metrics that can be used to show clearly the measurable benefits of business adoption of SOA for different organizations with different levels of maturity?
- How do we identify a business model that captures business value created by business processes and capabilities that are served by business services, their decomposition, and their ability to be reused and/or orchestrated to deliver other capabilities?

Companies in all industries and of all sizes have expressed a growing need to create agile flexible business and IT transformations using a service-oriented approach and style. The rationale is based on:

- Financial considerations (align business and services strategy, leverage investments in SOA)
- Execution of business transformation projects leveraging SOA4BT and avoiding current pitfalls on "rogue services" proliferation and legacy modernization
- Business capabilities and their mapping to a services Business Architecture enabling SOA adoption for business agility and reuse
- Application/services portfolio management
- Governance models using business-driven Key Performance Indicators (KPIs) and metrics; e.g., Return on Investment (ROI), Total Cost of Ownership (TCO), Time to Market (TTM), re-use, etc.
- Employee skill, training, and education (rather than replacing SMEs with software developers)
- Stability (retaining operational software benefits)
- Enterprises to implement Boundaryless Information Flow (using SOA for business agility)

Critical Success Factors

The experience of the members of the SOA4BT project team has identified pragmatic governance, organization, and process issues that need to be addressed. This is performed by the detailing of the following critical success factors:

- Enterprise Architecture Structure: Structural elements like Architecture Vision, Reference Architecture, Governance, etc. need to be detailed.

- Detailed Metrics to be agreed: The creation of a metrics system or scorecard to capture tangible metrics that will help demonstrate value.

Definitions and Motivation

Service-Oriented Architecture (SOA)

Introduction

Businesses face a fundamental need in today's landscape to be agile, foster and enable innovation, and improve quality at a lower cost. A service-oriented model, where business success is defined in terms of metrics aligning enterprise mission, vision, and goals, to enterprise business capabilities and business processes, enabled by services fundamentally facilitates this, by taking away the "how" from the "what". This enables organizations to focus on business value and not the underlying implementation, allowing them to be better, faster, and cheaper. SOA provides the framework around which this service enablement is supported. It also positions organizations to integrate and leverage cloud resources, which are inherently service-based.

In a world that is in the process of changing perspectives towards sustainable value creation, it seems only logical to focus on values added. This also goes for enterprises and supportive IT landscapes, where this concept unfolds as being focused on contribution to end products and services delivered in each and every process step.

Service-orientation is a way of creating autonomous building blocks of added value that in themselves are so independent from other building blocks that they can be optimized on whatever criteria, knowing that the contribution to the end product is safeguarded.

In that sense it is a strong means for separation of concerns especially in complex environments.

In this section we will elaborate on the main characteristics and the mechanism behind SOAs.

Business Drivers for Service-Orientation

What does it mean to be service-oriented? Putting it like this, every business representative nowadays would be able to produce a list of arguments and related benefits. Used in the context of IT, mentioning service-orientation can make IT people smile but often makes business representatives uncomfortable. Although effective in some parts of IT development and deployment, it never proved to be the big enabler or cost saver that it was told or expected to be. This makes it fundamentally necessary to be able to articulate service value in terms of business value and success. It is also important to make sure that service-orientation is understood in terms of organizational goals, which include, for example, agility and not cost alone.

Having said so, we do see a drive to focus on customers' needs and organize business in a way that is aligned with the dynamics in those needs. At the same time organizations try to improve the effectiveness and efficiency of their business processes by focusing on the added value of each process step. This means a change in focus from "what" and "how" to "why". This implies a change from internally focused to externally focused. Focused on why you do business, and who you serve, not how you implement it technically.

Some of the most common business drivers are:

- Provide agility for business to re-align business capabilities to meet ever-changing market drivers, in a quick and cost-effective manner
- Ability to meet constantly changing compliance and regulatory requirements
- Position organization to reap benefits from internal, external, and/or cloud-based services, whichever may be optimal
- Provide measurable cost and value metrics to help in timely and efficient procurement of external services
- Provide a clear and usable governance model to support and manage both internal and externally provided services

Service-orientation is a way of thinking that is closely related to value chain thinking. In that sense it is a way of thinking that should be easy to adopt in organizations focusing on effectiveness and efficiency.

It supports separation of concerns by using a disjunctive yet complete and consistent representation of a system based on autonomous components called services. It can be applied in (separate) parts and different levels of architecture. However, it should never be used without the notion and application of other viewpoints in order to be effective, the most important viewpoint being the orchestration viewpoint (process approach).

Business Technology

Introduction

Where the lifecycle of IT has brought us from directly taking over manual actions within the business processes, via centralized facilities finally governed as a separate business unit, we are now at the point where enterprises will have to reintegrate IT facilities and make them a key differentiator in doing business. Essentially, this new Business Technology view requires IT to include focus on business outcomes at all times while requiring business to include IT as an integral part of decision-making in implementing business capabilities. This approach pushes organizations towards a closer business-IT integration.

Although this is not fully recognized yet by current enterprise CxO levels, the newer CxO generations are growing up with direct access to and interaction with IT facilities and hence will start demanding more control over the IT facilities.

Industry Definition

Forrester defines Business Technology (BT) as:

"A slow but relentless revolution in which traditional technology management, historically delivered only by an IT organization, is changing to be pervasive technology use managed increasingly outside of IT's direct control and measured by boosting business results."

Business Drivers behind SOA4BT

The past years have shown that an autonomous IT department managed separately from the commercial and operational departments of an organization very rarely meet the expectations of the management. IT

departments put great effort into trying to meet these expectations leading to new methods, techniques, and organizational models. Despite all progress made in general, IT departments still fall short in meeting the expectations of the organization and are seen as a cost center giving a main focus on costs to cut.

Business departments, while making business decisions, have in turn primarily focused on achieving immediate business value and involved costs with no consideration for long-term flexibility and constraints, which is compounded by lack of inclusion of IT.

Some organizations are starting to recognize this and include IT in decision-making rather than telling IT departments what to do within the constraints of a fixed amount of business assets allocated to these IT departments. They start making decisions based on the possibilities and constraints related to the facilitating IT. This also leads to more realistic expectations that can be met. One way or the other it means that business development and IT development should be aligned and (also within an architectural approach) should be looked at jointly.

IT cannot be structured and developed separate from the business and the business cannot be structured and developed separate from the IT.

Most senior executive (CxO-level) stakeholders distil this into metrics that align with mission, vision, and goal (strategy). Business cases based on cost-benefit analysis focus on specific, line of business, or business problem-related issues.

To summarize, Business Technology is not a new technology for doing business nor is it a business-related focus in technology. It is a more holistic way of business thinking including all IT-related aspects.

SOA4BT Taxonomy

Introduction

Where we see service-orientation as a valuable leading principle in current and future architectural approaches on the one hand, and a reintegration of IT facilitators in the day-to-day business on the other, it may be obvious that we feel a need to interconnect both phenomena.

In that perspective we recognized, or rather defined, the concept of SOA4BT, which focuses on applying the steering concept of SOA to guide the new challenges that enterprises are facing.

We will define a consistent set of concepts for SOA4BT and explain relationships between those concepts.

Defining Business Drivers

To understand the role of SOA4BT, we need to realize that technology plays an ever-increasing strategic and tactical role in organizational agility, cost efficiency, and quality. However, technology remains the enabler for business capabilities. A Service-Oriented Enterprise (SOE) over time becomes structured to operate based on services rather than organizational units. This is a fundamental difference in the way the business operates, shifting from a collection of silos, to a capability-based organization. Thus SOA enables an organization to become an SOE. This alignment of business and technology enabled by SOA is what makes SOA so important – it creates pervasive change, both in technology and in the way the enterprise is run.

We define business drivers as “processes, conditions, or events that influence and determine continued organizational success”.

Categorizing Business Drivers

Drivers impacting organizations can be categorized into three groups – strategic, market, and technical.

Strategic drivers are drivers that determine long-term organizational direction. In order to achieve the alignment provided by SOA, organizations need to understand their strategic drivers. Strategic drivers may be derived, for example, from Porter's five forces analysis[1] models and business operating models, to help determine long-term organizational direction.

Market drivers can be defined as trends that cause markets to develop and grow. They change market contexts and constrain organizational strategy. They may be slow-changing or disruptive in nature. For example, the emergence of renewable energy as a potentially feasible alternative to traditional options is changing the way in which utilities work. Another example is the Affordable Health Care for America Act[2], which has changed the business environment and models of numerous healthcare organizations.

Another factor that impacts an organizations business success is technical drivers. Technical drivers are drivers influenced by IT change. They can change the business environment – either directly or indirectly. For example, the advent of e-business has driven out of business organizations such as Borders as technology made their business models obsolete.

Thus strategic, market, and technology drivers help define the environment in which businesses operate and compete. In particular, they define the business drivers on which an SOE aligns itself.

This defines an organizational model for business – a strategic Business Architecture model. Figure 1 illustrates this model.

[1] Refer to: http://en.wikipedia.org/wiki/Porter_five_forces_analysis.
[2] Refer to: http://en.wikipedia.org/wiki/Affordable_Health_Care_for_America_Act.

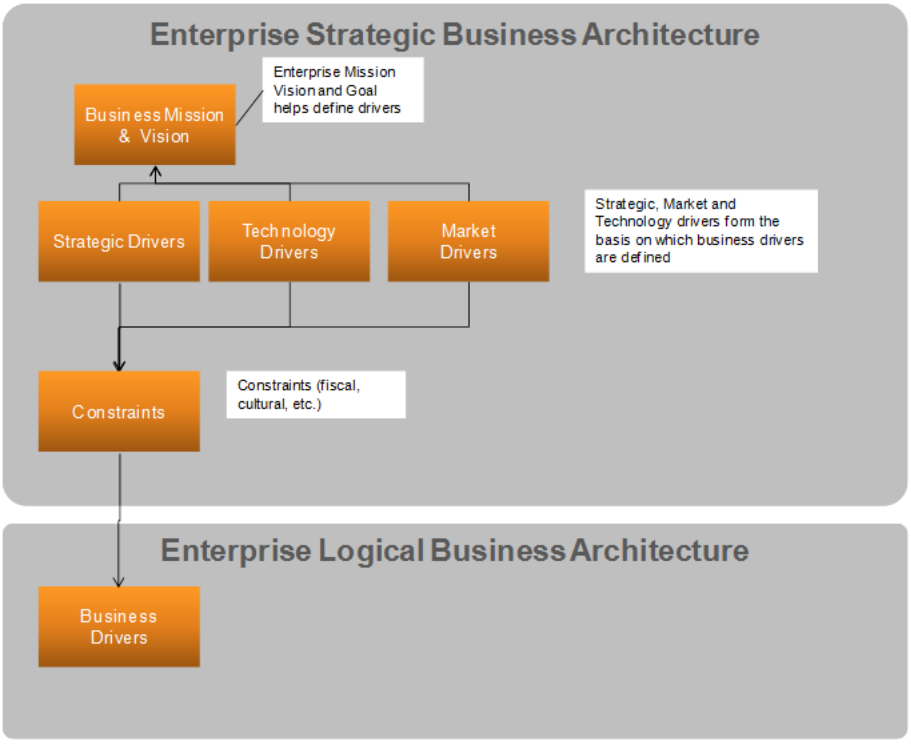

Figure 1: Strategic Business Architecture Model

Business Drivers Typically Most Impacted by Service-Orientation

A common set of cross-industry drivers most impacted by service-orientation adoption are:

- **Speed and TTM**: Leveraging common services (whether internal or external) and business processes forms the basis for an SOA. Common services in turn help reduce redundant activity, improving speed and TTM.
- **Agility**: Service-orientation enables agility. It provides a framework of reuse (the shared capabilities of services) and a framework to orchestrate and compose services in order to service consumers. It also provides support for governance and cross-domain consumption. *These fundamental attributes enable agility, enabling organizations to quickly respond to changing business drivers*.
- **Cost**: As services mature and both the underlying infrastructure and the services themselves are reused, costs are reduced. It should be noted that cost should normally not be a fundamental driver in SOA adoption, but understood as a corollary to the process of creating an SOE.

The Role of Business Drivers in an SOE

Traceability from organizational drivers through service-orientation starts with organizational alignment on mission, vision, and goals. Organizational vision is aspirational, defining what an organization aspires to become or believes in. The organizational mission lays out tangible direction and how it will be achieved. The mission gets decomposed into specific goals – things that are tangible and realizable. Finally we further decompose this into objectives that are measurable – which is where KPIs come into scope. This forms a quantifiable basis for aligning business strategy with architectural realization. Boards do not understand

services created or components reused. However, they do understand improved customer service numbers, or improved TTM or cost.

Thus understanding the business drivers, their impact on organizational vision, mission, and goal, and the metrics that can be used to measure them is very important for an organization adopting service-orientation through the enterprise.

In particular, businesses face a growing need to be agile and act both strategically and tactically on business drivers. In order to do so they need to view IT as an enabler rather than an organization or unit providing a supporting shared service. To achieve this, businesses need to define strategic plans that are focused and aligned on business drivers. Predictive models used to forecast and align strategic vision should use these drivers and associate them with actionable metrics. Service-orientation provides the framework to support this approach – translating into agility, cost reduction, improved TTM, and quality.

A Taxonomy for Business Drivers

Business drivers may be classified using the taxonomy provided below into the following kinds of driver:

1. Regulatory
2. Disruptive (either due to technology or business reasons)
3. Innovation (leading to disruptive drivers)
4. Complementary capabilities achieved through partnerships (typically establishing market drivers)
5. Substitute products (the threat of substitute products forces changes in business models)
6. Established rivals (established rivals drive competition, threatening margins and value)
7. New entrants
8. Supplier bargaining power
9. Customer bargaining power

These business drivers can be translated into drivers of IT strategy. In particular, SOA provides *a measurable model* to align and enable these business drivers.

Figure 2 shows this model and how enterprise strategy translates into SOA implementation. This model provides a basis for alignment and traceability.

SOA for Business Technology

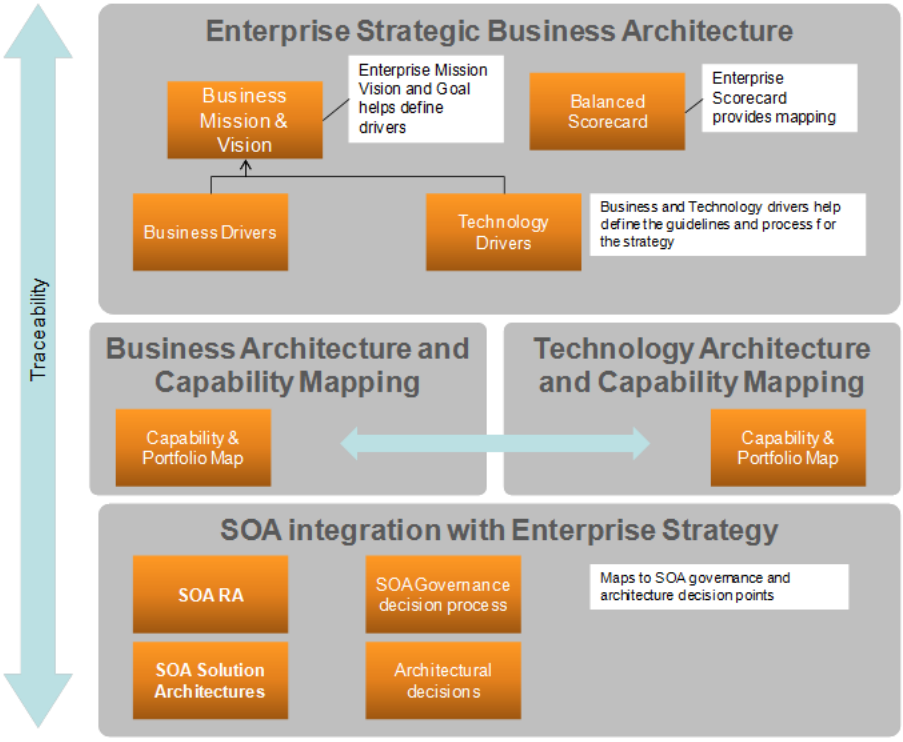

Figure 2: Business Driver Alignment Model

As the figure shows, the ability to align business drivers, metrics, and actual implementation in an agile manner is one of SOA's differentiators.

SOA for Business Technology

Figure 3 shows how SOA4BT works, how business aligns technology implementation in an SOE.

SOA for Business Technology

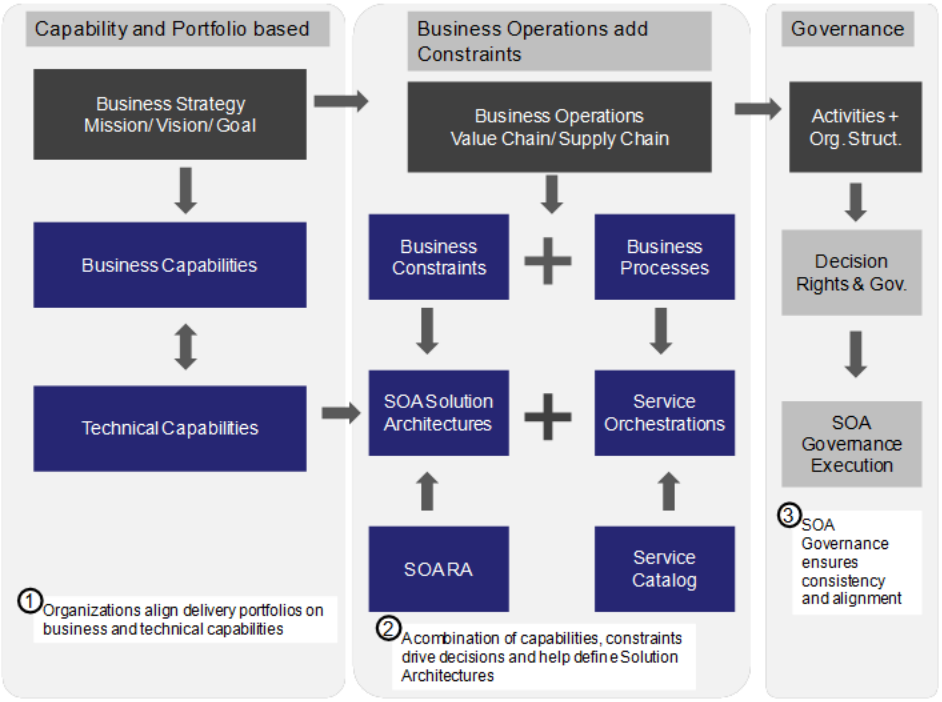

Figure 3: Business-Technology Alignment

SOA and Business Architecture

Introduction

SOA is integral to the formulation of SOEs, organizations whose business models are aligned on capabilities and service-based models, as opposed to traditional organizational silos. SOEs possess fundamental attributes such as flexibility, agility, consistency of data quality, cost efficiency, and adaptability that modern organizations require. This includes the ability to use emerging technologies such as the cloud and Internet of Things (IoT) seamlessly. In particular, in such organizations, *operation is based in terms of business services*. To be able to understand SOA4BT, we need to take the model for business and technology and the role of SOA further.

Business Architecture establishes a context around what the organization does and how it does it. For an organization to become an SOE, there needs to be the ability to align the business along business services and have a business strategy and model to align the business and the underlying SOA. SOEs think in terms of *capabilities* and *services*. They are able to measure, adapt, and apply SOA and operate in a service-oriented manner.

As organizations become service-oriented, the process involves *enterprise* and *operational* aspects. It normally evolves from establishing a capability-based business model aligned with an SOA, evolving to a business expressed in terms of business services – in short, an SOE. This involves the process of alignment and business modeling in a service-oriented context, the establishment of a metrics model that allows measurement of business goals in terms of services, and the realization of the alignment and establishment of the SOE.

In this section we define a model for the Business Architecture for such an enterprise, and how it translates an organization from traditional silos to an SOE. We also describe how an SOE's business is translated into the implementation of an SOA.

The Pillars of Alignment of Business and SOA

Business and technology enablement and alignment occur along three *pillars:* Strategic, Operational, and Operating Model.

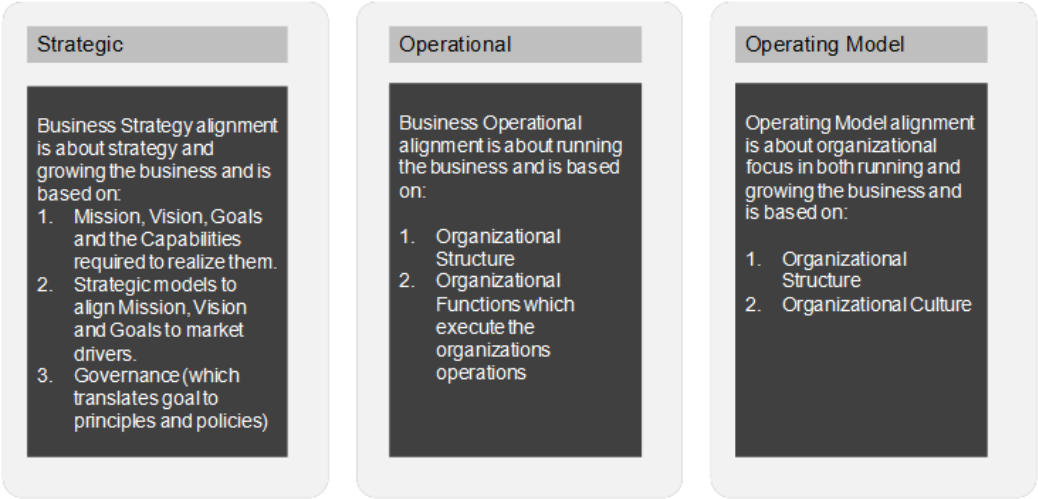

Figure 4: Pillars of Alignment

Strategic Pillar

The Strategic Pillar addresses organizational strategy, orienting the organization around the organizational mission, vision, and goal, which can then be mapped to:

1. Capabilities for aligning technology and business strategy and delivery
2. Alignment along business strategic models such as Porter's five forces analysis
3. Governance, by deriving goals, principles, and policies

Operational Pillar

The Operational Pillar addresses how an organization executes, which includes:

1. Organizational structure
2. Organizational function which is the expressing of the operation in terms of large processes
3. Alignment of the functional operation of the enterprise in terms of business processes and business services

Operational alignment addresses how an organization runs itself. It answers questions such as: "What are the operations (functions) that address how an organization runs?", "What are the business processes and business services around which these operations are structured?", and "How does the organization structure support its operations?".

Operating Model Pillar

The Operating Model Pillar addresses the manner in which an *organization is run*. It includes:

1. Fiscal models
2. Cultural structure

Operating model alignment addresses questions such as: "How does the organization structure itself?", "How does that structure support sharing?", "How are business executives, and in effect organizational units, measured for success?". The last question is very different from how the organization itself measures success, and focuses more on the effective organizational culture. If business unit executives are measured by individual and business unit success as opposed to organizational success – effectively potentially competing against each other – the inclination towards a shared services model is much lower.

The operating model impacts the effective adoption of SOA and the organization's adoption of business services, and its successful transition becoming an SOE, because the operating model influences funding, focus, and the appetite and ability to share resources and services. Operating models can have significant impact on organizational efficiency and effectiveness in the context of SOA, because fiscal governance and decision rights are impacted by the operating model's service-oriented context. When we further extend this to consider that organizations that become service-based inherently show greater agility and reuse, then the kind of operating model becomes more important.

Once taken in that context, we can see that:

1. Strategic business alignment is brought about through the use of capabilities which act as the point of integration between SOA and the business.
2. Operational execution of the business is aligned along the business processes which form the point of alignment, where business "hows" translate to SOA "dos".
3. Operating models form the alignment for determining structural funding and operational decision rights, feeding to governance frameworks.
4. Business strategy maps through goals, principles, and policies to actionable SOA governance.

Strategy Realization

This section describes the realization of pillar 1 (strategy), from business strategy to IT capabilities.

Business Strategy

Business strategy is enabled by business capabilities, which are enabled by IT capabilities. These IT capabilities form the basis on which the industry SOA models are further filtered to form a particular organization's SOA.

For example, a hospital health system may want to be able to view the impact of a treatment of a group of patients in a particular demographic distribution. In order to do this there needs to be the ability to view information from multiple patient data sources in a de-identified manner. The SOA now needs to have the ability to provide services that can easily compose this data from different sources, and its security and quality of service layers need to provide the ability to support de-identification. *This ability to express organizational strategy in terms of business capabilities that are in turn realized by IT capabilities is an integral part of the relationship between SOA and business strategy.* While the business may not need to understand the details of how this works, the ability to clearly show how the business capabilities are being realized in a quantified manner is one of the success factors in the effective use of SOA.

Figure 5 shows the relationship between business strategy and the technology elements in an SOA in an SOE.

SOA for Business Technology

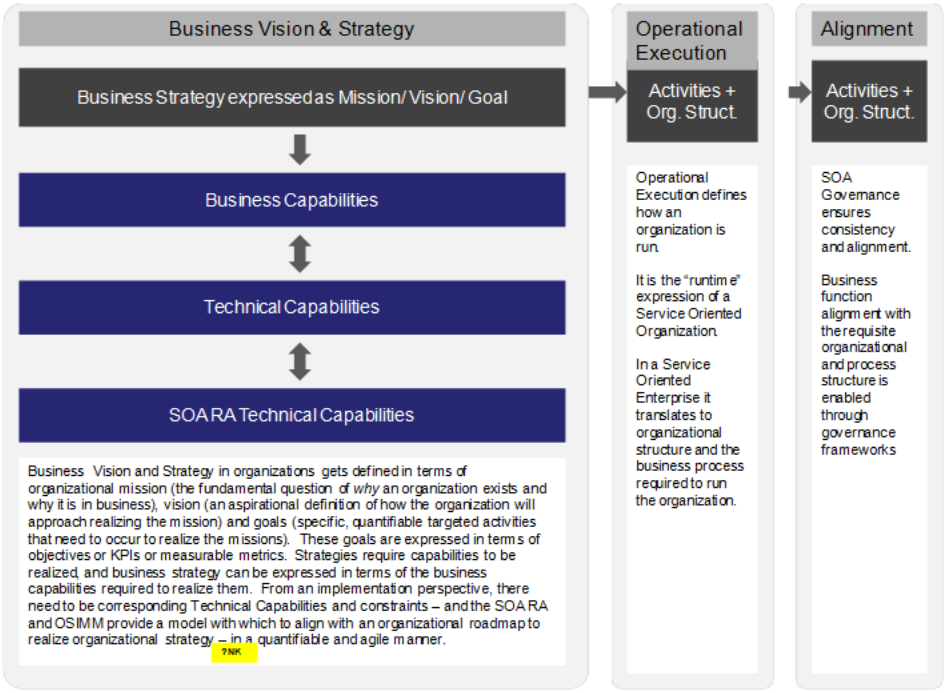

Figure 5: Business Strategy and Technology Elements

Capabilities

Capabilities are the granular elements that define what organizations can do. Capabilities, accompanied by business processes, provide an agile and flexible mechanism to define business and technical elements which are focused on how the business executes and are organizational unit-agnostic. Changes in the organizational structure do not normally impact a capability. Thus capability maps form a good basis for the creation of resilient roadmaps.

Capability maps (collections of capabilities hierarchically grouped) can easily then form the basis for organizational portfolios of programs or projects that help realize roadmaps. These roadmaps form the manner in which services are rolled out. Co-relation between services translates into service categories. Service categories have significance in terms of governance and skill-set and so form a key aspect of realizing the enterprise portfolio.

Capabilities and their alignment with the realized SOA provide other significant advantages – in particular agility and impact assessment. Dropping a capability has direct business and IT impact. This allows immediate visibility and agile changes in architectural and SOA direction.

Operation Realization

This section describes the realization of pillar 2 (operational), from business function to business process.

The Operational Model of an organization combines organizational structure and business functions as required to "run-the-business". How an organization runs is expressed in terms of *business functions*.

SOA for Business Technology

A business function is an organizational perspective on behavior. It is not the same as a business capability. A business function defines the "what" behavior that is associated with an organizational unit and modeled in a target operating model. A business function is typically named with a suffix of "management" (e.g., "Customer Relationship Management"), but could also be a single noun (e.g., "Billing"). Business functions can be decomposed into component business functions, resulting in a business function hierarchy.

Business functions can also be decomposed into business processes or service compositions. This is the point where the business execution aspects of service-orientation map to the solution SOA. In the case of an SOE, business functions and business processes are orchestrations of business services. *Business services* are operational entities which may have a technical manifestation.

For example, a business function may be *Provider Reimbursement*, and decomposed functions may be *Incentive-based Reimbursement Management* and *Payer Deal Negotiation*. The business processes associated with Incentive-based Reimbursement Management could be *Conduct Patient Satisfaction Survey* and *Prepare Payer Risk Pool by Outcome*. The triggered SOA services for the business process Conduct Patient Satisfaction Survey may invoke the *Validate Patient Information*, *Update Survey Information*, and *Update STAR Scores* services. Reuse, data quality improvement, and agility improvement are obvious from this example – for example, the Validate Patient Information service could be reused in numerous scenarios.

Figure 6 illustrates the mapping of the operational pillar of an enterprise to an SOA.

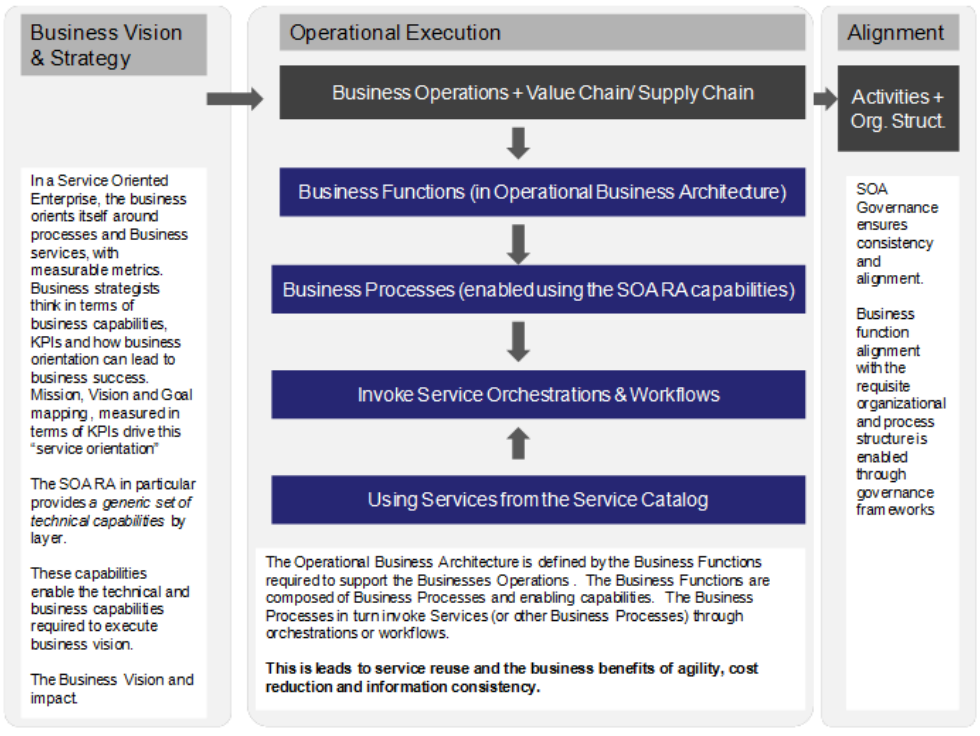

Figure 6: Operational Pillar Mapping to SOA

Operating Models

This section describes the realization of pillar 3 (operating model).

SOA for Business Technology

Operating models determine how a business operates in terms of its culture and its fiscal funding model. This impacts how funding is provided for SOA, how fast organizations transition from legacy application-centric models, and the extent of impact of SOA adoption on an organization. Without a proper understanding and incorporation of the operating model into IT strategy and Business Architecture specification there is the likelihood of trying to fit a square peg into a round hole, and a lack alignment.

People are a critical part of any business, and the way in which an organization manages funds, interacts, and is structured is impacted by this operating model. SOA, through its governance models, allows for alignment with organizational operating models.

Implications

There are three implications of organizational operating models in the context of Business Technology and SOA:

1. In the context of an organization which is relatively early in its SOA adoption (i.e., SOA is considered more from a technology perspective rather than a business perspective), the operational model defines organizational unit focus.
2. Operating models drive executive championing of organizational adoption of service-orientation as a business.
3. Operating models determine fiscal commitment towards SOA – both at a business and technology level.

From an implementation perspective, this translates into governance and organizational structure.

Understanding Operating Models

The term *operating model* is defined in Generating Business Value from Information Technology (Ross) as: "The desired level of business process integration and business process standardization for delivering goods and services to customers.". It defines how a firm will profit and grow. From an SOA perspective, it determines funding models, organizational structure, culture, and the efficacy of shared services. Operating models typically get grouped into four categories based on how organizational units relate to each other. Organizations may fall into these groups based on the structure and prioritization of executive management – thus defining organizational culture and focus.

The four types of operating models are coordination, unification, diversification, and replication.

Coordination Models

Coordination models occur where unique business units exist, but need to understand each others' transactions. Good examples may be insurance companies such as MetLife. The operating model promotes the sharing of some aspects of business value chains, shared services, and shared data. In such an operating model, executive management is effectively typically making a conscious decision to keep organizational business units separate, but share information. From a technology perspective, this leads to a robust shared services model to support the loose organizational coupling and a focus on factors such as data quality. Trusting the shared information is critical for success of such a model.

Unification Models

Unification models occur where there is a single, central, global organizational view and all business units are structured around it. Delta Airlines is a good example of this. In a unification scenario organizational value chains are structured around this unified view. This model supports rationalization and unification of shared value chain processes, and shared services.

Diversification Models

Diversification models occur where you have independent business units with different customers and expertise. Examples include the McGraw Hill companies (prior to their division into McGraw Hill Financial and McGraw Hill Education) and GE. Holding companies with disparate subsidiaries doing different kinds of business are a good example. In a diversification scenario, from a business service perspective there are few value chain processes to share, though supply chain processes may be shared. From a technology perspective, an organizational sharing of infrastructure services and platforms is usually feasible.

Replication Models

Replication models occur where there are independent but similar business units. In such organizations, executive management often encourages competition between organizational units in terms of some clearly defined KPIs, typically centered on shared value chain processes. Due to this internal competition between organizational units, value chain sharing is disincentivized, with business unit leaders trying to develop and run their own implementations and variations. The value proposition behind SOA4BT in this context centers on the creation of effective shared processes, and the isolation and identification of the explicit value proposition on which the business units compete and the KPIs associated with them. This allows for maximum organizational agility and cost reduction. Examples include Marriott, ING, etc.

Operating Models and SOA

Figure 7 illustrates operating model types and their implication from an SOA perspective.

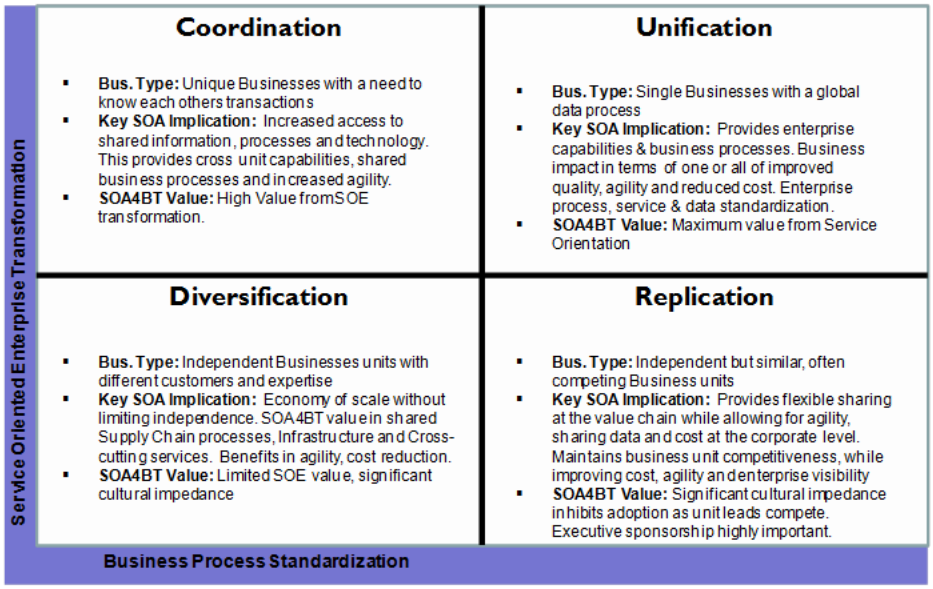

Figure 7: Operating Model Types

SOA for Business Technology

Operating Models and Business Process

The operating model directly correlates with organizational support for business processes and in particular for business process standardization and integration. The reasons are obvious – operating models reflect organizational focus – and if the operating model does not support a shared service model, there is a fundamental gap in terms of organizational readiness for business process integration and standardization. Business executives engaged in adopting an SOE model should incorporate this into their assessment. IT executives and enterprise architects when adopting SOA should also factor this in. Unification involves the greatest integration and standardization.

Operating Models and Business/IT Culture

Operating models should also be factored in when considering organizational cultural readiness for service-orientation. Service-orientation is not solely about technology adoption – it is as much about business change. Business adoption is occurring because businesses get more agile and efficient.

Operating models are a good indicator of cultural readiness for SOA adoption. If the organization's basic structure does not support sharing and alignment, then the extent of adoption of service-orientation gets impacted.

Enterprise Adoption of SOA

Service-orientation in a business context implies organizational orientation in a service-based model. This can be expressed in terms of business process, capabilities, and services (most business strategies factor that in). Business process integration thus becomes a measure of the level of reuse and successful adoption of service-orientation. This also has a direct impact on IT service-orientation – the "how" of service-orientation implementation. This includes business services and service categorization and shared service models. All these factors need to be aligned and factored in when defining an enterprise's adoption of SOA.

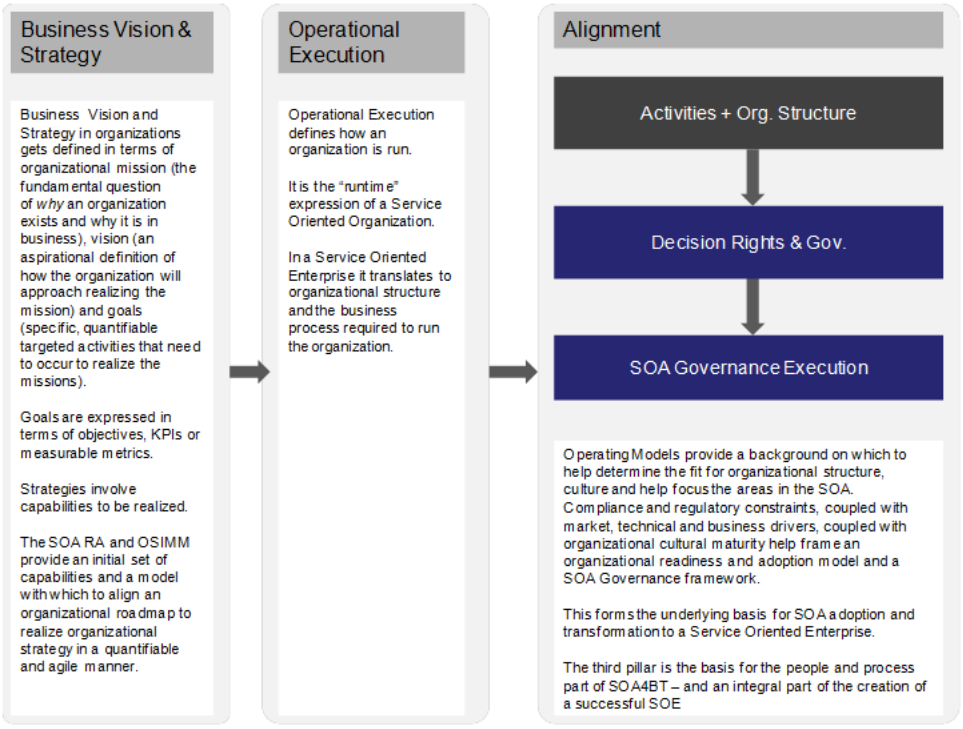

Figure 8: Enterprise Adoption of SOA

Thus operating models play an important part in defining the fit for organizational adoption of service-orientation. They help determine how much of a fit exists, how it can be applied, and what kinds of cultural barriers may exist. It also helps determine the level of governance – and the extent to which it can be applied. Finally it helps focus an organization's roadmap towards service-orientation, as well as where and what aspects of the technical architecture need to be focused on. For example, an organization fitting a unified model would be very good for a core business service model, with business units organizing against shared services and business processes. In that scenario, service-orientation brings great value – speed to market, cost, data consistency, etc. However, in a scenario where an organization has a diversification model the organization does not fit service-orientation very well, and the only aspects that might be service-oriented may be infrastructure services in the operational systems layer, with business services not being a total fit.

Metrics

This section describes the use of metrics for aligning business and SOA on measurement and governance.

The quantification of the outcomes of SOA to organizational delivery is important in order to have long-term sustained adoption of SOA, and in rolling out an SOA roadmap, as well as to the migration of an enterprise to an SOE or business. This aspect helps us answer the questions: "How does the business evaluate the impact of SOA and how do we track success?". As shown in Figure 9, organizational metrics (balanced scorecards, etc.) can be used to define and determine SOA governance, in particular policies and architectural decisions.

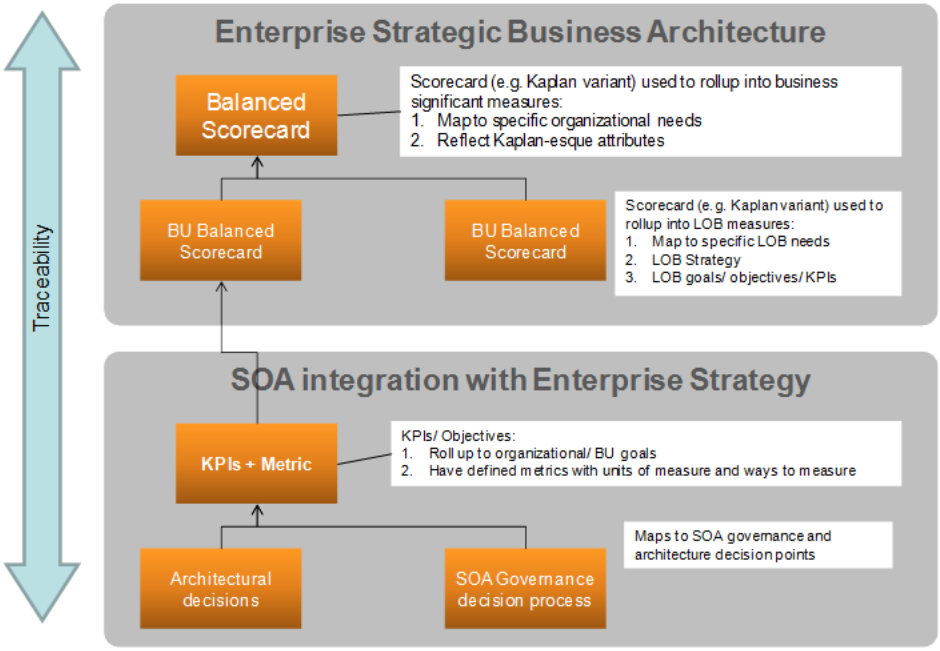

Figure 9: Use of Metrics

Organizations typically align on capabilities and functionality. Industry standard measures drive success measurement (in non-trivially sized organizations). Typically, some flavor of a balanced scorecard (e.g., Kaplan scorecard) tailored to meet the organization's line of business drivers is created; that is, what the board and executive measure by and organizational performance is typically assessed. Service-orientation – both from a business level, as well as from a technology level – can be thought of as a style. In the context of architecture, The Open Group defines it as an architectural style. The biggest struggle has been to align IT initiatives to business goals. However, service-orientation by its nature supports that very alignment. KPIs and metrics are easily captured for services – and a good SOA governance framework supports easy mapping of those KPIs to the business KPIs. This capability is a key feature of the service-oriented style.

Furthermore, the technology capabilities of SOA support this. Why is it important from an SOA4BT perspective? It is important because SOA4BT is the point of alignment between SOA and business. Business services provide the linkage – we can capture metrics for business processes and business services, and a well-designed SOA governance framework aligns these to business metrics in alignment with service-orientation.

SOA for Business Technology

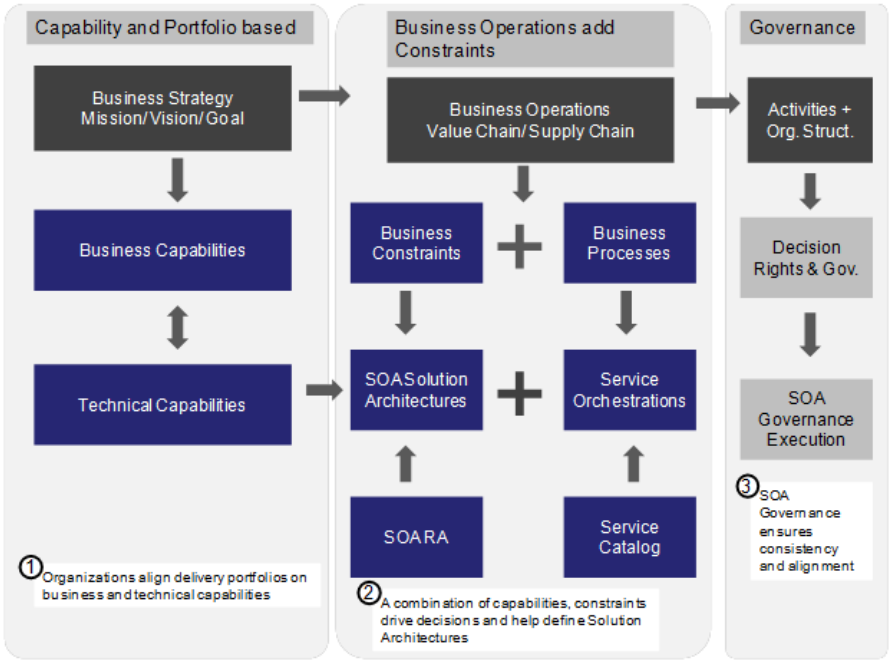

Figure 10: Alignment through SOA Governance

Case Study

Introduction

The Case Study elaborates on the business drivers, challenges, and results of a project where service-orientation was applied to reshape an organization and the way it was set up (organizational, operational, IT). As it was driven by top-level management, it is an example of applying an SOA within a Business Technology environment.

The study illuminates how to apply the service concept especially in the architectural set-up of an organization, and how to link it to the more commonly used IT-service concept.

The Case Study is structured as follows:

1. Background and Environment
2. Business Drivers
3. Challenges
4. Approach
5. Use of ArchiMate® Models
6. Business Services
7. Strategic Benefits and Goals
8. Results Achieved

The Case Study first elaborates on the background and environment and the drivers of the project. Then it discusses the challenges and prerequisites of the project in order to be effective and go into more depth on the approach and main deliverables. Finally, it points out the main results and benefits achieved in this case. It provides a useful reference for the often-heard challenges to align IT development with business development. For each subject area, we first share some general thoughts and then focus on the specifics for this Case Study.

Background and Environment

The organizational silo and division into different units of management is a common theme across many global enterprises. In the organization in this Case Study, the IT departments and with them the IT resources and IT knowledge have through time been separated from the rest of the organization. Along with this, IT was mainly seen as a generic cost center to the business units of the organization. The goal here was synergy and cost efficiency in the IT facilitation. However, the past years have shown that an autonomous IT department, managed separately from the commercial and operational departments of an organization, does not work. Management expectations are hardly ever met despite the efforts put into new methods, techniques, and organizational models within the IT departments. The many mergers and takeovers of the past years have not made it easier for IT departments to meet management expectations. On the other hand, it may be questioned whether management expectations related to IT performance are realistic. Too often organizations

require and expect flexibility in their facilities to support business developments without defining any degrees of freedom or leading principles related to the dynamics in business development itself. Hence it would be a miracle if any management expectation would be met as business development and IT development are not aligned in the sense that they are looked at jointly. It shows that IT support cannot be structured and developed in a way that really facilitates business development if the organization as a whole is not structured for change.

One way or another we see that responsible management does not feel it is in the driver's seat when it comes to deciding on business developments and allocating the right IT assets to facilitate these.

In this case we see a common situation for companies that have grown and globalized in the past years. We look at a business unit within a large Dutch based international bank where IT and operations are located in a separate generic cost center in the Netherlands. The business unit is active in all time zones where local entities are established based on takeovers, mergers, and greenfield set-ups.

IT support for the Netherlands entity of the business unit is provided out of the central Netherlands IT department. The operational support, however, is provided out of the business unit itself. The business unit is the only one within the bank where off-shore local operations and IT facilities are set up. The nature of the set-up on the different locations depends on the origin of the location (e.g., takeover, merger, or greenfield).

Business Drivers

In a world that becomes smaller, the competition gets bigger. In order to accomplish client retention or trying to create new business there is a strong client focus together with an internal focus on cost-effectiveness, quality of service, and agility. As technology plays an ever-increasing role in organizations, it is important that the related assets are set up and managed properly. In order to understand the environment in which organizations operate and compete they need a clear view on market drivers, their own strategic drivers, technological changes, and related operating models.

An enterprise is about a group of stakeholders that want to reach a certain goal. In order to do so they need to set up an organization that will facilitate this. This organization will consists of people performing activities, supported by facilities like money, housing, machines, working procedures, and technology. This shows that IT facilities, although often essential for an organization, are no more or less than facilitators in reaching the goals of the organization.

The general goal of the business unit management in this Case Study was to keep up with the demand of globally operating clients. At the same time, service should be of the right quality level and delivered at competitive costs. Given the IT-intensive character of this industry, it was clear that in order to do so a total review and re-alignment of IT facilities and related operations was needed.

Challenges

Too often there is a gap between commercial ambitions and delivery capabilities within an organization. The important issue here is that there is no interconnection anymore between those responsible for expressing commercial ambition and those held responsible for meeting them (e.g., IT and operational facilities are located in an independent business unit with its own P&L responsibility, acting as a cost center to the commercial business units).

Where delivery capabilities are often one-to-one connected to and restricted by IT facilitation, it is often the IT department that is seen as the cause for not meeting the organization's goals. But on the other hand, how and why can commercial ambitions be stated that cannot be met? A primary cause here is that there is no end-to-end responsibility to deliver. It is not realistic to expect flexibility in IT facilitation towards business developments if no characteristics whatsoever are recognized for the flexibility of the organization itself (e.g., areas of change, financial boundaries).

In order to manage that an organization meets its goals, accountabilities and responsibilities should be assigned in a consistent, top-down way. Together with these come related goal-based KPIs and facilities (based on the business case). These should drive the choices on facilities to be actually made available in the different parts of the organization. IT in this sense should be seen and treated as an enabler.

In this Case Study the business unit management was very much aware of the above and was prepared to challenge the current central set-up of the IT departments. But at the same time it was recognized that goals and responsibilities together with clear KPIs should be defined in order to allow the IT and operational set-up to align with them.

Approach

"Cheaper, faster, better IT facilitation" are often-heard words that reflect the urge to be competitive but lack any changing power if not translated into achievable goals. This means that the people expressing this, or sometimes just demanding it, should not only provide predefined ambitions and boundaries, they should take responsibility and set up a roadmap to create the necessary changes and stay in charge by taking decisions and refine the goals along the way.

It is not about allocating budget as a way to express the relative importance of a change. It is about recognizing the changes that provide value for money and seeing to it that they get realized. It is about aligning enterprise mission, vision, and goals to enterprise capabilities.

Service-orientation in this perspective is a way of thinking that is closely related to value chain thinking. In that sense it is a way of thinking that should be easy to adopt in organizations focusing on effectiveness and efficiency.

It supports separation of concerns by using a disjunctive yet complete and consistent representation of a system based on autonomous components. It can be applied in (separate) parts and different levels of an architecture. However, it should never be used without the notion and application of other viewpoints in order to be effective, the most important one being the orchestration viewpoint.

Today's organizations are also thinking SOA where they are searching for cloud-related support. However, often it is no more than looking at the existing IT landscape and seeking for replacement or using additional cloud next to the existing IT landscape.

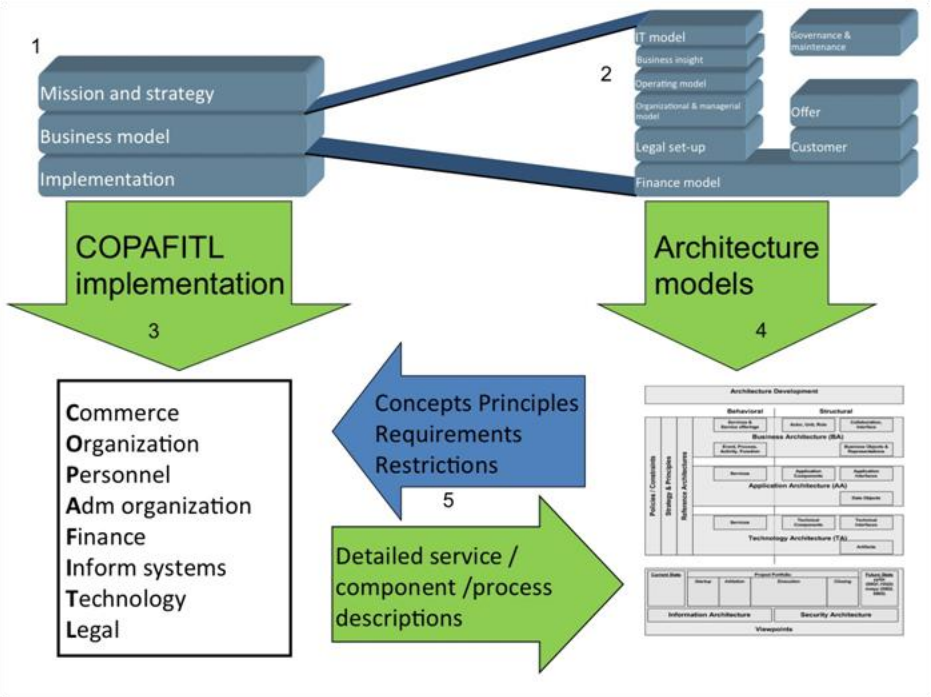

Figure 11: Modeling Approach

In this case the CEO expressed his ambitions in words like "cheaper, faster, and better", emphasizing the importance of the right IT support. But it was recognized at the same time that it would need fundamental changes throughout the organization that could never be recognized and implemented successfully if not supported by top-level management. This meant a full strategy definition stage was performed at CxO level, where a realistic, consistent, and mutually accepted mission and strategy were set up. Based on that, a business model was drawn up to cover the goals and restrictions on the different aspects (e.g., commercial and operational). This new business model was then validated with local senior management on a global level. First this was meant to create awareness of the ambitions, but at the same time to make local management co-responsible.

For the architectural models a service-oriented approach was chosen in order to create a fresh and more analytical view on the organization. From an IT perspective the general ambition was to have one solution for each business service recognized, based on a "best of breed" principle. The ArchiMate language was used for modeling as it supports a three-layer model of the architecture (business, information, and technology). In order to create insight in the actual coverage of the IT landscape, an initial mapping would be made of the current solutions on the business services.

In order to define consistent and independent change projects, a roadmap was to be set up in line with commercial priorities. Each project here should implement not only the related IT changes but all related organizational changes in the area of commerce, personnel support, operational and administrative set up, financial, and legal structure.

Use of ArchiMate® Models

ArchiMate modeling allows direct connection of IT facilities, such as infrastructure and software, to business services. This creates insight into the IT structure and costs related to these services. By doing so it creates a management tool for IT allocation and set up. This will help to set expectations on IT performance and costs based on consistent and understood criteria by responsible management. By taking away the "how" from the "what", it enables organizations to focus on business value and not on the underlying IT implementation.

Use of a service-oriented approach also allows organizations to integrate and leverage cloud resources which are inherently service-based. "Cloud-thinking" is not a quantum leap in itself but just an extra means for optimal allocation of IT facilities to support the delivery of business services. With the SOA way of thinking, certain parts of the business can be recognized that are "fit for cloud" together with the related KPIs and restrictions. It also allows you to link agility needs in business development with requirements on IT agility.

A point of discussion in this Case Study was whether software solutions were available in the market that would map to the business services so that "best of breed" would really be applicable. And indeed in recent decades software vendors have created more and more end-to-end solutions covering the entire value chain of organizations. However, new initiatives in the market did indicate that it was recognized by both demanding parties and vendors that package solutions should match with a more service-oriented architecture. The BIAN initiative is a good example of this in the banking industry (see the reference Open Group White Paper: Integrating the TOGAF® Standard with the BIAN Service Landscape).

Business Services

Business Services Model

Figure 12: Business Services Model

In an SOA approach it is essential to structure the business based on the services it provides. This means before starting to set up business services you should look at the client services, being the core services to be

delivered to their (potential) clients. In a layered service model the client services are at the very top level above the business services.

Next to business services that are more or less directly related to the client services there will be more generic business services that should be recognized and looked at. One of them is the business service covering the facilitation (e.g., housing, IT) covering for operational availability, maintenance, and development. Another one is the business service that covers performance management, which is about managing the organization in line with their goals. This should be done based on clear and predefined KPIs that are understood by both management and supporting departments. Defining KPIs for the organization as a whole helps to align IT facilities with business goals.

Further, it is essential to recognize and define business services in a strict way, based on functional capabilities that should be in place (the "what") in order to deliver the client services. This means a business service model breaks down the organization into units of responsibility in contradiction to a process model which breaks down an organization into units of work (the "how"). Although the two models are separate, they are directly related and should be set up jointly (see later).

Business Services Orchestration

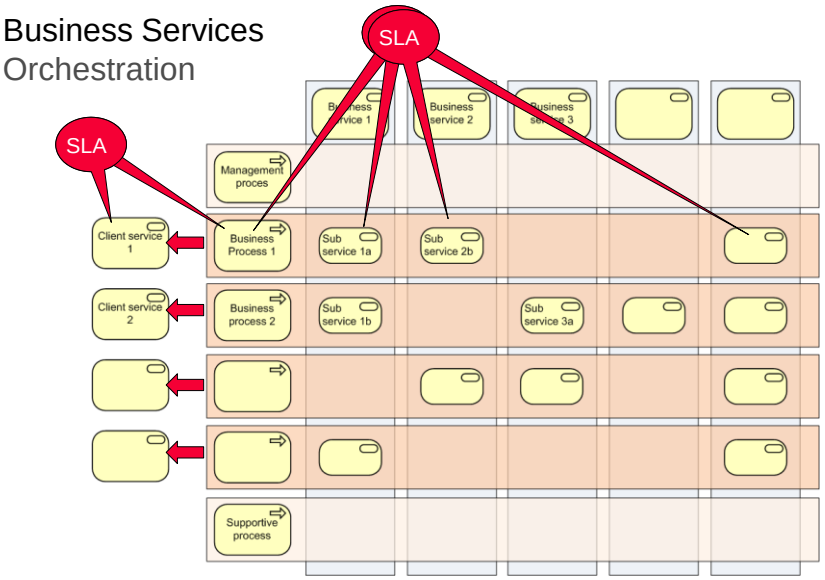

Figure 13: Business Services Orchestration

Setting up a top down SOA is not an academic exercise in itself. The main goal is to support decision-making in the organizational set-up. It is not about right or wrong. It is about creating insight into the different aspects of an organization towards its participants (whether in the management or operational area). This means that any representation should of course be complete and consistent and in line with reality, but at the same time it must be recognized by the people within the organization.

Most of us will recognize that people prefer to talk about activities than about responsibilities, where the former is merely the consequence of the latter. It is obvious, however, that in order to set up an SOA we have

to describe an organization in terms of services. So one way or the other we should combine services and processes in our SOA. While recognizing services we will also have to model the way these services are combined (at the different levels) and provide insight into the process of delivering the client services. First to prove we are complete in our services, secondly to create detailed insight into what a service covers, and finally to reveal interaction patterns relevant for recognizing non-functional requirements.

In this case the IT department had already drawn up a business service model. Although it was recognized and accepted within the organization, it only described the 0-level, still combined a service and a process view, and was not fully complete and consistent. However, to safeguard acceptance, this model was used as the starting point for the service model. In close connection with the people involved it was reshaped on some points to really reflect a service representation of the organization. Because at the same time a business process model was drawn up, which in general is closer to day-to-day business, the service model was accepted as such.

Business Services Layering

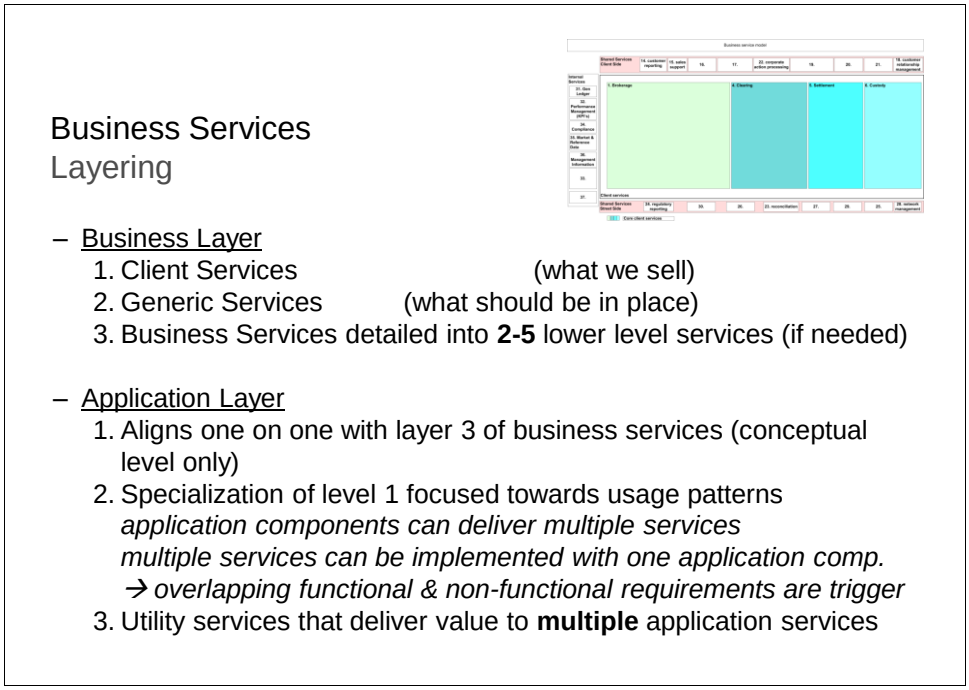

Figure 14: Business Services Layering

In this case we did a very detailed exercise where, on the highest level, for each client service, a business process was recognized. Each business process was described by the sequence of the different business services involved. Going into the different levels of the service model in the end for each business (sub)service, a process was described telling how the service was provided using other sub-services.

Combining the set up of business service and a business process model also facilitates decisions on the level of detail.

Paradigm Shift

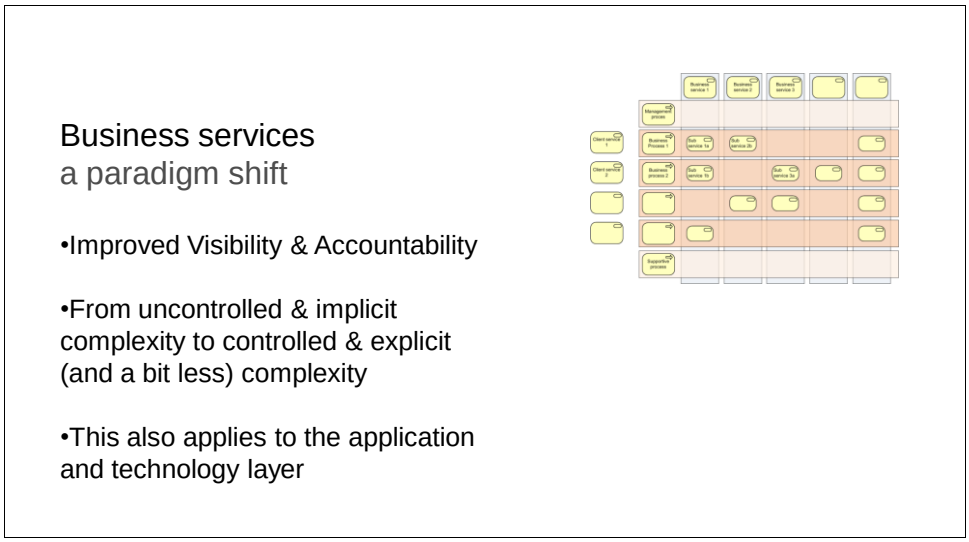

Figure 15: Business Services Paradigm Shift

As described above, we ended up with a very detailed model combining the process and the service concept, that was still recognized by the organization. By doing so, we also created a detailed multi-level service model of the business that could be used as the base for drawing up the application service layer.

Strategic Benefits and Goals

The strategic benefits and goals are shown in the following two tables.

Generic	Matching Requirement
Increased ROI	One functionality, one solution
Reduced IT burden	Lower overall IT TCO, single point of maintenance
Increased organizational agility	T2M for new clients, inst types, markets

Table 1: Strategic Benefits

Generic	Matching Requirement
Increased federation	Clear separation of responsibilities
Increased intrinsic interoperability	Better changeability of IT architecture
Increased vendor diversity options	T2M for new clients, inst types, markets
Increased business/technology alignment	One functionality, one solution, best of breed

Table 2: Strategic Goals

Results Achieved

The results achieved so far are:

- Business Architecture community in place with key role in all developments.
- Every change in business needs runs through the Business Architecture model to decide on IT changes needed.
- Business confronted with its own expectations, limitations, and inconsistencies, allowing IT to take the role of facilitator rather than obstructer.
- Business was allowed to manage issues, based on real business considerations, and without losing sight of the overall picture (e.g., on location of operations and IT sourcing).
- Business Architecture department has set up and maintains a glossary, used as the single source for communication between, and documentation within, the different departments (business, development, operations, maintenance, IT).
- Dedicated IT organization for the business unit.
- Reallocation of IT platforms and operations into a more centralized set-up.
- Some shared applications (on a bank level) replaced by dedicated solutions based on specific business unit needs (e.g., quality of service, availability).

References and Further Reading

(Please note that the links below are good at the time of writing but cannot be guaranteed for the future.)

- Assessing Security Risk in Legacy Systems, US Department of Homeland Security, December 2006; refer to: https://buildsecurityin.us-cert.gov/bsi/articles/best-practices/legacy/624-BSI.html.
- Business Gets Social, Gartner; refer to: www.gartner.com/technology/research/business-gets-social.
- Business Technology Practice, McKinsey; refer to: www.mckinsey.com/client_service/business_technology.
- Gartner Glossary; refer to: www.gartner.com/it-glossary.
- Generating Business Value from Information Technology, Jeanne Ross, Massachusetts Institute of Technology: MIT Open Courseware, Spring 2009 (accessed April 25, 2013); refer to: http://ocw.mit.edu.
- Guide to Using TOGAF® to Define and Govern Service-Oriented Architectures (G113), published by The Open Group, November 2011; refer to: www.opengroup.org/bookstore/catalog/g113.htm.
- Open Group Standard: SOA Reference Architecture (C119), published by The Open Group December 2011; refer to: www.opengroup.org/bookstore/catalog/c119.htm.
- Open Group Standard: Service-Oriented Architecture Ontology, Version 2.0 (C144), published by The Open Group April 2014; refer to: www.opengroup.org/bookstore/catalog/c144.htm.
- Open Group Standard: SOA Governance Framework (C093), published by The Open Group, August 2009; refer to: www.opengroup.org/bookstore/catalog/c093.htm.
- Open Group Standard: The Open Group Service Integration Maturity Model (OSIMM), Version 2 (C117), published by The Open Group November 2011; refer to: www.opengroup.org/bookstore/catalog/c117.htm.
- Security Considerations in Managing COTS Software, US Department of Homeland Security, December 2006; refer to: https://buildsecurityin.us-cert.gov/bsi/articles/best-practices/legacy/623-BSI.html.
- The ArchiMate® Standard; refer to: www.opengroup.org/archimate.
- The Future of Business Technology Governance, Forrester; refer to: www.forrester.com/The+Future+Of+Business+Technology+Governance/quickscan/-/E-RES79981.
- The Open Group Security Forum; refer to: www.opengroup.org/security.
- The Open Group SOA Work Group; refer to: https://collaboration.opengroup.org/projects/soa.
- The Open Group SOA4BT Project; refer to: https://collaboration.opengroup.org/projects/soa4bt.
- The TOGAF® Standard; refer to: www.opengroup.org/togaf.
- US Government Cloud Computing Roadmap, NIST; refer to: www.nist.gov/itl/cloud/upload/SP_500_293_volumeII.pdf.

- White Paper: Integrating the TOGAF® Standard with the BIAN Service Landscape (W135), published by The Open Group, October 2013; refer to: www.opengroup.org/bookstore/catalog/w135.htm.
- White Paper: Security Principles for Cloud and SOA (W119), published by The Open Group, December 2011; refer to: www.opengroup.org/bookstore/catalog/w119.htm.
- White Paper: World-Class Enterprise Architecture (W102), published by The Open Group, April 2010; refer to: www.opengroup.org/bookstore/catalog/w102.htm.

Abbreviations

ADM	Architecture Development Method (TOGAF)
BIAN	Banking Industry Architecture Network
BT	Business Technology
CxO	Chief Executive, Information, Operating, or Technical Officer, or someone at a similar management level
IoT	Internet of Things
IT	Information Technology
KPI	Key Performance Indicator
ROI	Return on Investment
SME	Subject Matter Expert
SOA	Service-Oriented Architecture
SOA4BT	SOA for Business Technology
SOE	Service-Oriented Enterprise
TCO	Total Cost of Ownership
TTM	Time to Market

About the Authors

This White Paper was written by members of the SOA4BT project of The Open Group SOA Work Group. The Open Group gratefully acknowledges the contribution of the following people in its development.

- Nikhil Kumar, Applied Technology Solutions, Inc. (ApTSi)
- Bhavish Madurai, CSC
- Martin Neuhard, Hewlett-Packard (Project Chair)
- Gerard Peters, Capgemini
- Sundararajan Ramanathan, EY (Project Chair)
- Sriram Sabesan, Microsoft
- Mukund Srinivasan, Capgemini
- Ahmad Yaghoobi, The Boeing Company (Project Chair)

About The Open Group

The Open Group is a global consortium that enables the achievement of business objectives through IT standards. With more than 400 member organizations, The Open Group has a diverse membership that spans all sectors of the IT community – customers, systems and solutions suppliers, tool vendors, integrators, and consultants, as well as academics and researchers – to:

- Capture, understand, and address current and emerging requirements, and establish policies and share best practices
- Facilitate interoperability, develop consensus, and evolve and integrate specifications and open source technologies
- Offer a comprehensive set of services to enhance the operational efficiency of consortia
- Operate the industry's premier certification service

Further information on The Open Group is available at www.opengroup.org.