

The Business-Technology Drivers and Benefits of SOA

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Editor's Note: This article is an adaptation of a White Paper written for a conference attended by telecommunication employees. However, the issues discussed here apply as well to other industry segments.

Abstract

Today's telco faces enormous challenges – more demanding customers, increased competition, outdated infrastructure and network,, ever-growing regulatory requirements, and time-to-market pressure.

Many telcos have moved toward Next Generation Network (NGN) and the rapid convergence of IT and communications services to support emerging requirements, competition, and technology development.

This article examines the business impact and identifies the key business-technology drivers and benefits of Service Oriented Architecture and provides guidance and insight into the question of how SOA can enable companies to face current and future challenges of rapid business service delivery.

Executive Summary

Traditionally, telcos have been only voice services providers; i.e. most of their revenue has been generated by voice services with very limited revenue coming from data and video services. Recent technological developments; for example, Voice over Internet Protocol (VoIP), Internet Protocol Television (IPTV), WiMax, etc., have impacted the voice market revenue stream with some analysts predicting that voice services may be offered free of charge in five years' time.

One of the ongoing challenges that businesses are faced today is finding ways to do more with less. Telcos are not exceptional to this challenge; in fact, their current monolithic legacy systems restrict the provision of integrated on-demand services and impact telcos through lost business opportunities and bring about significant setbacks in delivering products and services to the market.

The convergence of IT and telecommunications is offering new types of services to customers. New business models & processes are being crafted to keep pace with the emerging requirements, competition, and technology development. At the same time, "Time-to market" pressures have resulted in a major impact on the way system development is carried out within the Service Provider's enterprise.

Many telcos have embarked on several projects to support new business models and the rapid convergence of information technology and communications services. Their strategy to augment product and service offerings will pay dividends to help retain existing customers, acquire new customers, and increase average revenue per user (ARPU). The ability to deliver innovative, value adding services at a reasonable price directly to customers is vital to the organization. The strategic decision to move towards Next Generation Network (NGN) will enable rapid delivery of innovative IP services and meet rapidly changing business needs. In order to support NGN initiative and rapid service delivery, telcos require, migrating from complex, static, tightly coupled silo-based systems architecture to the next generation's flexible and agile architecture.

Due to its characteristics, Service Oriented Architecture (SOA) is the industry's architecture of choice to face current and future challenges of rapid Business Service Delivery. It is also seen as best practice, as the next evolutionary step in software architecture and also as the business strategy that provides vital principles, guidelines, framework, and technique to help organizations to fully realize their business goals.

This whitepaper will assist to initiate the process of identifying and defining the primary drivers and business benefits for telcos' adoption of SOA.

Demanding Customers, Potential Partners & Competition—the primary business challenges

What's different today is that customers and potential partners have become increasingly demanding, they no longer just want voice services, in fact they are looking from ring tone download to order new accounts, choose service plans, check usage, billing information, file support requests and on-demand data and video services. In addition to this, highly competitive and rapidly changing markets put telcos under relentless pressure to deliver products and services to market faster, value adding to the customers with consistently high product quality and reliability – all at a reasonable price – for example, IP based products that meet the expectations of customers and comply with a growing list of regulatory requirements.

To meet these challenges, telcos need an integrated BSS/OSS environment that facilitates fast and efficient service rollout and the business agility that is essential for survival. The face of an enterprise is increasingly presented to customers through a front end underpinned by Internet based technologies, and that front end must be able to deliver required services over time, and in real-time. This demand puts a premium on a company's ability to create network-computing systems that are agile, flexible, and scalable.

In addition to this, telcos also need to overcome the following business challenges:

Reduce the time to realize business synergies from new acquisitions or sourcing partnerships, increase speed to market, and improve their competitive position

Improve customer service through improved response times and cycle time with better scalability for better responsiveness

Gain expertise not available internally, extend infrastructure, and acquire business function using others' skills while you focus on what you do best

Existing Technology and Network Infrastructure are not up to the task

Most telcos' existing BSS/OSS systems are inadequate in providing the requirements of automating business processes, flexibly responding to new requirements of next generation services, and easing the process of introduction of new services.

Many Communication Service providers have initiatives towards a "Next Generation Network" (NGN) infrastructure built on horizontal "planes" that will bring about a shift away from traditional vertical structure networks for fixed voice and data communication. IP Multimedia Subsystem (IMS) is user centric Service Oriented Architecture for communications systems part of wider network transformation to Next Generation (NG) Networks. The NGN will be a high-speed network with broadband capabilities that can deliver value adding services and applications over a wide range such as voice, video, and data. This innovation in the telecom industry promotes more intelligence moving to the edge of the network. It can be closely associated with another innovation in the IT industry where applications are being rendered as re-usable components or services and this refers to SOA.

It has now become necessary for Telcos to organize their underlying system platform for scalability and agility by moving from existing OSS to NGOSS through BSS/OSS Modernization and Consolidation. Architectures must provide high performance and rapid scalability, and must also be able to change to accommodate emerging requirements.

The key to an agile infrastructure investment for services-based deployment are to prepare a transaction/user scaling model, develop a comprehensive architecture that is deployed on a flexible infrastructure, and monitor performance while being prepared to adapt to changing loads and emerging requirements.

One way to look at the demands of the globally networked economy is to realize that companies need to rapidly connect their applications, whether old or new, with their “e-constituents.” They must also be highly cognizant of the changing nature of their underlying business requirements.

Many telcos (including many fortune 2000 companies) are looking to leverage SOA to provide better, more flexible products to their customers and to roll out those products more quickly. They are also beginning to look at the merits of migrating from complex, static architectures to a new generation of flexibility.

How Service Oriented Architecture Cans Support Telcos

A Brief History of SOA

Gartner coined the term Service Oriented Architecture (SOA) acronym in 1990. The foundational concepts of SOA are not new. Someone once described SOA as an “old concept in new term.” What is new is the broad organizational will to share, reuse, and leverage capabilities inside and outside the organization.

SOA brings a paradigm shift in the organization structure and culture; it is imperative to adopt an SOA, as business strategy, that has openness and agility as fundamental properties that result in an an agile and flexible telco.

SOA is not another new technology. It is a whole philosophy about sharing – decoupling business processes from technology to enable a fluid enterprise that can change and change quickly. The vision that has been touted for so long within enterprise architecture regarding the “spontaneous enterprise” now becomes possible.

SOA supports the overall enterprise architecture by enabling agility. Thus the enterprise can indeed respond, and respond quickly to environmental trends and disruptions such as market and regulatory changes. What is really going on with the “advent” of “SOA” is that there is finally an understanding of the value of architecture, reuse, and services.

In summary, the value of SOA isn’t in technology. It is the ability of telcos to respond to change and to optimize services more quickly ,utilizing heterogeneous technologies as vehicles for maximizing constituent value.

What is Service Oriented Architecture?

Even though there are myriad definitions of SOA, here follows the most appropriate and business perspective definition.

SOA is based on a concept called a service.

Set of services that a business wants to expose to its customers and partners or other portions of the organization [5].

The SOA perspective does not culminate in web services or application development nor is it restricted solely to technology.

What is the “S” in Service Oriented Architecture?

A service is a discoverable resource that automates and executes a business task or even an entire business process. A service does not refer to or imply any specific implementation technology.

Why SOA?

There has been an introduction of numerous computing architectures over the years that were designed to support distributed processing. However, today it is evident that various systems are deployed using a tightly coupled architecture with different components of an application tightly bound to each other. This makes it complex for the sustenance of the applications through changing business requirements.

SOA focuses IT on being business driven. The underlying assumption of SOA is that “not everything in technology can be the same;” hence, standard methods and processes must be defined to enable disparate technologies to communicate, regardless of manufacturer or language. Web Services technologies are perhaps not absolutely necessary to implement SOA, but they greatly facilitate the task.

Process Centric View

The basis for any service orientation and Service Oriented Architecture starts with business processes.

SOA provides flexibility and the capability for adjustment of business processes.

SOA services are components constructed so that they can be easily linked with other components. A service is simply a business task. To successfully gain IT flexibility and solve real business problems, such as increasing customer service, integrating with business partners, or gaining a unified view of customers, just to name a few, a strong and tight link between business and IT is key.

Today, companies can gain flexibility while aligning business and IT by managing business processes through a Service Oriented Architecture. SOA uses flexible connections with well-defined, standards-based interfaces to help companies build flexibility into their existing infrastructure. SOA services can be re-used extensively regardless of whether they are new services or existing IT assets [5a].

What SOA and Web Services mean for Telcos

SOA is the business operations strategy for leveraging information to meet telcos’ objectives, such as,

- Increasing overall revenue,*
- Increasing business agility and flexibility,*
- Improving development efficiencies*
- Improving integration efficiencies*
- Improving operational efficiencies*
- Improving customer satisfaction*
- Improving product delivery and quality*

Service Oriented Architecture proclaims the intention to build all the software assets in the company, employing service orientation as its fundamental design principle.

Service Oriented Architecture (SOA) is favorably positioned as the next evolutionary approach in software architecture. When used properly, it will help organizations alleviate complex challenges they encounter as a result of tightly coupled silo-based systems through loosely coupled shared services adopting open standards. The proliferation of emerging technologies that are based on proprietary standards (closed standards) exacerbates the integration complexity through the creation of application silos, thereby restricting seamless integration and data flow between systems.

Several IT software providers are engaging in SOA adoption projects to certify their applications as SOA compliant. Systems Integrators are also attempting to work closely with organizations to generate revenue from SOA type engagements. The concept of Software as a Service (SaaS) is the theme behind Service Oriented Architecture (SOA).

Web Services (WS) are based on industry standards protocols, and they are platform and language independent. Technologies like XML and HTTP are commonly accepted and supported by virtually any enterprise software vendor.

Web Services enables building of composite applications using a standard set of network services to find and link loosely coupled, shared services. Web Services can be used to integrate disparate systems without one system having to have any knowledge of another system's architecture. Web Services abstract any implementation details of the other system.

Meeting the Needs through Flexible Business Processes

As business requirements or market conditions change, creating new business opportunities, new functionality needs are introduced to tap into such opportunities. Businesses need to quickly change their business model.

Essence of an SOA Project

The goal of an SOA projects

- To create flexible business processes – with the ability for adjustment or dynamic re-configuration of business processes
- Through loosely coupled services – that hide the complexity and minimize dependencies between applications
- Through orchestration – performs an orchestration of many services by controlling workflow logic and invocation sequences
- To form composite applications – collections of services that have been assembled to support a company's business processes

Business processes based on SOA must be capable of adapting to change more readily than those that are written as stovepipe applications or those that were hard-wired together through some other means.

SOA promises to alleviate the past experience of business processes closely tied to information management applications.

Leverage the existing assets through Service Oriented Business Architecture

SOA is the core of business process management (BPM) that allows us to leave existing IT assets as is and implements as a Service Oriented Business Architecture (SOBA), which is a composition of Services that implements a business process by layering additional functionality onto them to add new features, extend the asset's life, and integrate the systems to share data.

Service Oriented Business Architecture is therefore an unbundling of monolithic applications and systems containing the implementation of myriad complex business processes into suites of self-contained services that perform specific business functions. These services can be invoked over standard and recognized protocols to ensure their availability across the enterprise and beyond.

Once this is in place, new applications are no longer developed from scratch but rather assembled from a set of services published by multiple providers internal and/or external to the enterprise. All services are accessed through a common set of standard protocols, which make the service location-independent. The set of all available services is managed through a central registry. Consumers of services can look for desired services in the registry and then retrieve details about a specific service descriptor. Once the description has been obtained, the consumer and the service can negotiate a suitable interface and transport mechanism to perform the desired function.

Leveraging SOA in this way promises more flexibility for the telcos as they develop such convergence products more rapidly and cost effectively.

What SOA is not?

- SOA is not a new concept

- SOA does not requires a big bang approach
- SOA is not a technology or product
- SOA is not about ripping out and replacing current IT assets.

What are the Key TELCO Drivers?

Business Drivers

Revenue Generation

Any solution must provide some level of assistance in Revenue Generation. All development and deployment costs must have a traceable impact on positive revenue generation within a defined investment timeframe.

Should a solution not directly affect cash flow from Telco customers it must as a minimum offer a reduction in the cost to operate revenue-generating services.

Ability to offer innovative products and services form the key differentiator to gain a competitive edge over the competitors and the potential to increase revenue.

Cost Savings

Cost Savings may be realized through better system efficiencies, improved or removed licensing requirements or improved process efficiencies or automate manual process through economies of scale.

Business Agility

Highly competitive and rapidly changing markets mean that every missed business opportunity ranks telcos below their competitors. The ability to respond quickly to various business needs will be key to survival.

Ability to provide on demand services, in real-time

Time to market

Time to market will be the key driver in future direct revenue-generating products. IT systems must become flexible and agile enough to permit new product roll-outs to be achieved, in compliance with both BSS/OSS and business requirements, in aggressively short time frames.

The shift from physical service-based products to IP service based products will inevitably drive delivery times down (potentially to months rather than years).

Technology management processes must evolve as rapidly as the technology delivery systems in order to remain competitive.

Customer Retention and Loyalty Program

Customer retention is linked to the technological product development, innovative services and customer centricity to attempt to deter them from leaving and taking up similar offers from other Communication Service Providers (CSP).

Customer loyalty is linked to the customer services – telco can launch a loyalty program to reward existing customers by offering special packages and bonus.

Technology Drivers

Convergence and Virtualization

Telco's Networks comprise multiple, physically separated networks. Linkages between these networks are achieved by firewall and router configurations. The need to optimize physical architecture, reduce installation and operational costs leads to the concept of a single physical network infrastructure based on wire-line and wireless technologies. All internally used devices will connect to this single physical structure, but will operate within appropriately assigned logical network segments.

Cost Saving

Reduced time to market (TTM) for new services

Reduced total cost of ownership (TCO) of IT infrastructure and business services.

Openness

Adopting open standards and technology as a technology strategy reduces vendor lock-in and provides flexible and agile technology platform.

Reuse

Reusing services may equate to Telco's not having to discontinue legacy systems, constantly rewrite software or purchase new packaged applications. It allows Telco to effectively leverage existing assets rather than being compelled to create yet another redundant silo for each business need. This, in turn, also makes IT more efficient, allowing for shorter cycle times and quicker project delivery.

Agility

Loose coupling increases application agility and reduces time to market for a new application

Seamless scalability at minimal cost to cater to seasonal increase in load

The Business benefits of SOA

The major business benefits of moving to a Service Oriented Architecture in telcos are

- Reduced time to market (TTM) for new services
- Bundling of existing services

The first of these, reduced TTM, is achieved by enabling IT architects and developers to focus their efforts more on developing, assembling, and delivering unique business service logic and less on middleware. Service designers are able to "compose" applications by integrating one or more services. The chance of achieving reduced TTM is increased by defining standard business processes and associated infrastructure to allow choreography of services based on "business process management" (BPM).

Reduced total cost of ownership (TCO) of IT infrastructure and business services

The next SOA benefit, reduced TCO, is achieved in two ways:

1. Utilizing existing middleware, and incrementally adding with equally capable, open standards-based services technologies
2. Consolidating well-defined business functions into services that can be shared by multiple business units. Thus, the SOA theme is enable reuse via shared services

SOA provides rapid business change

SOA provides agility and the capability for adjustment of business processes. As the business changes, developers can more easily map business process changes to applications and then implement the appropriate IT changes

SOA enables business connections

Business processes packaged as reusable, modular, accessible business services. SOA uses flexible connections with well-defined, standards-based interfaces to connect these services where

and when they are needed to improve process across customers, potential partners, suppliers, vendors, and internal applications.

SOA improves business control

The flow of information and transactions through service-oriented applications provide valuable business information. SOA infrastructure actively manages service flows and can provide flexible and dynamic access to this data, which can be used to analyze and optimize business results and process costs.

SOA reduces development cost

SOA promotes assets reusability – one of the important promises of SOA – and thereby reduces overall development cost of convergent products and increases productivity.

The Technical Benefits of SOA

Even though SOA is a technology-agnostic, it enables a number of technical goals that could not be implemented previously.

SOA enables solution interoperability

SOA enables the creation of solutions that can interoperate with almost everything – a long held dream of IT.

SOA leverages existing assets

SOA leverages existing assets by exposing as reusable services and composing them to deliver a composite application that automates business process, thereby extending the asset's life.

SOA promotes vendor-neutrality

Taking a vendor-independent software strategy solves the problems of vendor dependence but is only cost effective when certain conditions are met:

- A “best-of-breed” approach makes sense because the market is mature enough to offer competing packages of sufficient quality.
- There is a broadly accepted integration framework that allows for inexpensive integration of different packages, both within companies and between companies.
- The Service Oriented Architecture has the potential to meet both of these conditions. In particular, services loose coupling is the key to flexible, inexpensive integration capabilities.

Conclusion

The adoption of Service Oriented Architecture serves as a bridge between business and IT. It allows them to work together by creating more collaborative environments leveraging existing standards, middleware, and applications. The results – agile telcos with more business flexibility and the ability to rapidly deploy innovative converged products and new services that can easily integrate with other component applications, both inside and outside the organization. This decentralized environment provides a great deal of flexibility for business units and IT departments and can improve customer satisfaction, reduce costs, enhance regulatory compliance, and boost competitive advantage.

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Glossary of Terms

Acronym/Abbreviation	Description
BP	Business Process
BPEL	Business Process Execution Language
BPM	Business Process Management
BPO	Business Process Outsourcing
BR	Business Rule
EDA	Event-Driven Architecture
ESOA	Enterprise Service Oriented Architecture
IMS	IP Multimedia Subsystem
NGN	Next Generation Network
SOA	Service Oriented Architecture
SOAD	Service Oriented Analysis and Design
SOBA	Service Oriented Business Architecture
SODA	Service Oriented Development of Applications
WS-*	Web Services- Related Specifications

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