# Role of SOA & Cloud Computing in IT Industry

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## *ABSTRACT*

***Software building and its architecture, as a vital feature of software expansion procedure has a range of methods and roadmaps that all of them have some common philosophy and initiation. Architecture-based approaches have been promoted as a means of streamlining the intricacy of system building and advancement. Thus, SOA acts as an application topology in which the business logic of the application is planned in modules (services) with clear uniqueness, principle and programmatic-access across boundaries. [4]***

***Cloud computing depict wide-ranging advancement towards the operation of wide area networks, such as the Internet, to facilitate interface between information technology service supplier and clients. Cloud computing has a numeral profits and threats that should be looked at, by any higher-ranking guidance group taking into account the relocation of its enterprise computing IT portfolio. SOA and cloud computing are complementary activities and both will play important roles in IT planning.***

**Keywords:** SOC, REST, SOAP, EAI, WSDL

## 1. Introduction

Service Oriented Architecture (SOA) has emerged as a lightning rod for dissention among enterprise architects, solution builders and application developers. Enterprise architects analyze SOA as a business inventiveness stating that how information technology assets obtain deal and how they recount it to the business objective and task. Solution builders view SOA as a way to carry out revelation more rapidly by utilizing the principle of loose-coupling and finer-grained services, which enable faster assembling. Finally, application developers recognize SOA as an infrastructure on which one has to extend applications based on service interfaces. Inspite of viewpoint, SOA is considered to be linked with software architecture sphere; until the arrival of cloud computing.

SOA builds on computer engineering approaches of the past to proffer an architectural approach for enterprise systems which are oriented around the offering of procedural services on a network of clients. As a whole, the focus of this service-oriented approach is on the definition of service interface and predictable service behaviors.

A set of industrial aspects tagged as "Web Services" in this paper; provide and implement the general SOA concept and have become the key collection of various rational tools which are being used by project engineers for several SOA projects. Some web service standards have become preliminary and more widely acknowledged, while many are still looking for wide-range industrial or management authorization.

## 2. SOA

SOA, as applied through the common web services standards, offers centralized management teams a channel ahead, specifying the varied and elaborate IT portfolio that they have inherited, by allowing for incremental and focused enhancement of their IT infrastructure. With solicited engineering and an enterprise realm, SOA provides profit such as:

- ✓ **Front-End based unbiased combination:** The introductory web services standards use Extensible Markup Language (XML), which is related to the establishment and utilization of enclosed content. Regardless of the development language used, these systems can provide and cite services through a familiar system. Programming language impartiality is a key differentiator from past combination methodologies.
- ✓ **Reutilizing component:** With the advent of latest web service based technology, once an association has assembled a software component and presented it as a service, the rest of the group

of people in the association, can subsequently exploit that service. With proper service governance, emphasizing topics such as service provider dependence, service security, and loyalty, web services provide the impending for supporting the more efficient management of an enterprise portfolio, by allocating the capability to be developed once and then shared.
Multiple components can be pooled to provide better capabilities in what is frequently termed "Conglomeration".

- ✓ **Industrial liveliness:** SOA defines building blocks of software capability in terms of offered services that meet some portion of the organization's requirements. These building blocks, once defined and dependably operated, can be recombined and integrated rapidly.
- ✓ **Controlling pre-existing systems:** One general use of SOA is to classify essentials or function of in hand application systems and make them available to the enterprise in a traditional predetermined manner, controlling the extensive venture previously done in pre-existing applications. The most convincing business case for SOA is often made regarding controlling this legacy deal, facilitating assimilation between novel and mature system components.

Thus, SOA and its realizing principles, such as the web services values, come to us at a particular point in computing history. While numerous key enhancements, such as language neutrality, differentiate today's web service technologies. There has been a long history of integrating technologies with qualities corresponding to web services, including a field of study often referred to as enterprise application integration (EAI).
In contrast to SOA, Cloud computing focuses on the several aspects of the Information Technology computing along with, the commodities that can be purchased incrementally from the cloud based providers and can be considered as a type of outsourcing in many cases. For example, large-scale online storage can be acquired and automatically allocated in terabyte units from the cloud. Similarly, a platform to operate web-based applications can be borrowed from redundant data centers in the cloud.
One of the key trends driving the adoption of Web Services is the increasing span of integration being attempted in organizations today. Systems integration is increasing both in complexities within organizations and across external organizations. We can expect this trend to continue as we combine greater numbers of data sources to provide higher value information.

As mentioned by one of the researcher, "Industrial setups often have impenetrability in justifying the significant costs allied with amalgamation but, nevertheless, in order to deliver gripping solutions to customers or improve operational efficiency, sooner or later an organization is faced with an incorporation challenge" [5]. Thus, SOA attempts to rationalize integration across systems by providing components that are architected and described in a reliable manner.

## 3. Cloud Computing

Cloud computing is related to the concept of deploying network-based applications in a highly flexible, virtualized IT environment. It is flattering a key enabler of better service delivery and greater value in today's business landscape. It offers a number of foremost advantages over more traditional application deployment models, including the more efficient use of IT and development resources, easier and less costly safeguarding, and the ability to deliver consistent services across a range of channels. Cloud computing also makes it easier for companies to partner and bring improved composite service assistance to market promptly.
To realize, the true benefits of cloud computing, it is necessary to take its exclusive uniqueness into account when burgeoning applications intended for cloud deployment. Even the most skilled developers need to take a bright look at how applications are developed and optimized.
Cloud Computing vendors combine virtualization (one computer hosting several "virtual" servers), automated provisioning (servers have software installed automatically), and Internet connectivity technologies to offer the service. These are not new technologies but a new name applied to a collection of older technologies that are packaged, sold and delivered in a new way.
While cloud computing, is currently a term without a single consensus meaning in the marketplace, it describes a broad movement toward the use of wide area networks, such as the Internet, to enable interaction between IT service providers of many types and consumers. Service providers are expanding their available offerings to include the entire traditional IT pile, from hardware and platforms to application components, software services, and applications

## 4. Advantages & Risk of SOA

Like cloud computing, SOA has numerous advantages and risks, involving:

- **Network Reliance:** SOA is basically reliant on the network to unite the service supplier with the buyer. For example, Web service protocols are used on internet protocols to cite software role spread transversely on the network. Underperforming networks can instill a huge brunt on the accessibility of web services to the customer.
- **Supplier Overhead:** Actualizing all-purpose reclaimable software constituent for wide recipients utilizes more imaginations than evolving a smaller amount of general elucidation. The cost of regaining, therefore, swings to the service contributors, which repays it to the customers.

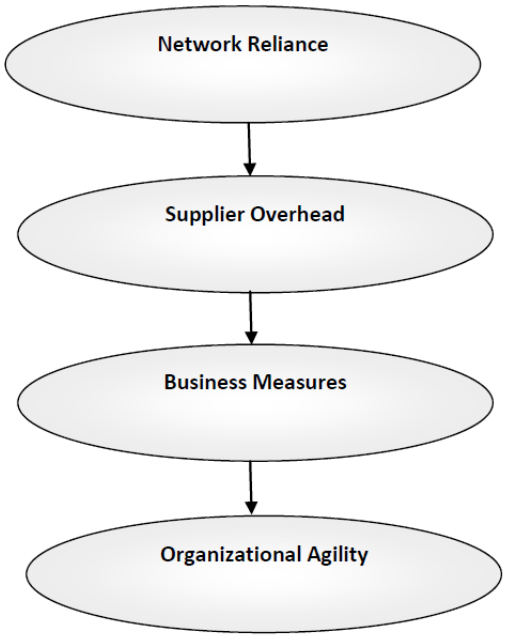


**Fig.1** Advantages & Risk with SOA

- **Business Measures:** When several constituents are being formulated at the same time by individualist teams, it becomes substantial for the interface of a supplier's service to affirm to the terms of a consumer. Likewise, it aids everybody involved, if the interfaces alongside services have a little solidity in configuration and security access procedures. Selecting and transmitting a complete band of business measures is a reliable in coming near to help in business SOA assimilation.
- **Organizational Agility:** It relates to SOA, where we are often pertaining to organizational agility, or the cognition to more rapidly getting used to a centralized organization's supplements to match their up to date necessities. An organization's demands of IT might alter over time for a numerous factors, including alterations in the enterprise or organization, modifications in enterprise-wide describing requirements, adaptations in the ordinances, novel technologies in the lucrative business enterprise, endeavors to unite varied data accumulation resources, to meliorate the organization's functional impression, and several other rationalities.

The better sureness of an business-wide SOA is that once a adequate content of legacy-wrapped constituents exist, and are approachable on the internet protocol, wide area network, they can be put together more speedily to figure out novel difficulties. Thus, Cloud computing and SOA have significant coinciding interests and common cerebrations. The most significant overlap happens close to the pinch of the cloud computing flock, in the domain of Cloud Services, which are network accessible application constituents and software services, such as contemporaneous web services are in state of beingness. However, cloud computing is currently a comprehensive term than Service-oriented architecture and addresses the whole encumbrance from hardware through the software systems. SOA though not bounded conceptually to software, is often enforced in practice as constituents or software services, as exemplified by the web service benchmarks used in many effectuations.

## 5. Unification of Functions

As mentioned by Wardley, "The ability to switch between providers overcomes the largest concerns of using such service providers, the lack of second sourcing alternatives and the fear of vendor lock-in (and the subsequent weaknesses in strategic control and lack of pricing competition)." This is likely to change over time as offerings at each layer in the stack which become more homogenous. The computing stack, from the applications we write, to the platforms we build upon, to the operating systems we use are now moving from a product- to a service-based economy [3]. The shift towards services will also lead to standardization. Thus, the components of software services can be tied together and carried out on several platforms over the network to cater a business purpose.

The several functions involved are:

- **Network Dependence:** Both cloud computing and SOA count on a robust network to unite consumers and producers and in that sense, both

have the identical initial morphological blemishes, when the network is not operating or is unavailable. A researcher has intricate on this concern by mentioning that "with gigabit ethernet connections in local area networks, and progressively quick internet services; network operation has bettered to the extent where cloud computing looks like a feasible forgoing [1].

- **Forms of Outsourcing:** Both constructs require forms of contractual kinship and belief between service benefactors and service enjoyers. Reuse of an SOA service by a group of other systems is in effect an "outsourcing" of that capability to another organization.

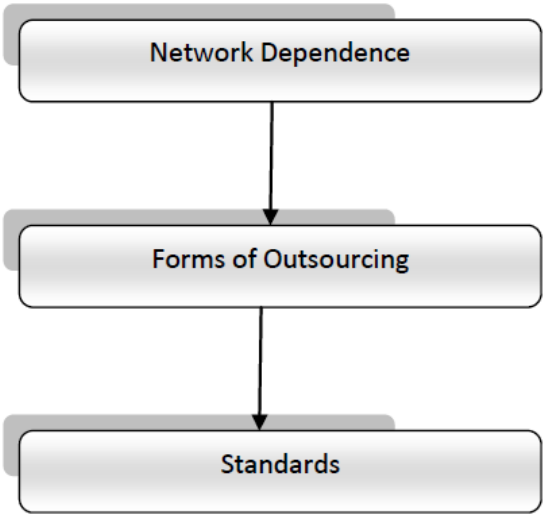


**Fig. 2** Functions of Software Services

With cloud computing, the outsourcing is more conspicuous and frequently has a fully fruitful gusto. Storage, platforms, and servers are acquired from business benefactors who have economies of degree in providing those cater to vast addressees. Cloud computing allows the customer organization to leave the detailed IT administration issues to the service benefactors.

- **Standards:** Both cloud computing and SOA provide an organization with aspect to select common standards for network accessible capabilities. SOA has a rather constituted set of principles, with which to implement software services, such as representational state transfer (REST), simple-object access protocol (SOAP) and web services description language (WSDL), among many others. Cloud computing is not as mature, and many of the interfaces offered are unique to a particular vendor, thus raising the risk of vendor lock-in.

## 6. SOA Hype

The hype around SOA had multiple industry impacts:

- SOA became a catch-all phrase representing a spectrum of IT-related efforts and outcomes.
- The term SOA was co-opted by various factions in an attempt to corner the market for purposes of selling products and/or services.
- Demand for SOA resources skyrocketed, but lack of clarity of surrounding SOA made it difficult for businesses to identify appropriate resources, which resulted in vendor-specific experience becoming a primary factor in decision-making.

The net result of the hype was that it was quickly followed by strong disillusionment, because, as businesses soon learned, SOA is not about application development; it's about the architecture and to support the framework.

## 7. Lesson Learnt from SOA

Alternatively, SOA's concepts of decoupling is grave to the future of cloud computing. Through SOA the industry has learned the importance of loose-coupling between services as a means of protection from changes and lack of availability. While cloud is young enough right now that it's plausible for service providers to meet their current demand, in the future, as demand grows with cloud maturity, service providers may reach points of saturation where they may not be able to meet customer demand. This may be due to insufficient funding, delays in the supply-chain delivering critical equipment or geopolitical instabilities. In these cases, the tight coupling that dominates cloud architectures today will result in possible system-wide outages and rendering customer systems unavailable without opportunity to change providers without significant re-investment.

SOA also has fostered a new collaboration between development and operations. In the past, most IT applications were deployed on the desktop and communicated with a database over network protocols. As long as the network was available and the database server was accessible and operational, most users were capable of using the application without problems. In certain cases, however, the application would conflict with other desktop applications resulting in a small population of users having problems. With the switch from desktop to web-based applications, problems magnified as any operational problems impacted a much larger number of users. Extend this concept from a single multi-

tiered web-application to a mesh of communicating software services and the potential for failure increases exponentially.

## 8. Conclusion

A difference in emphasis—while there are important overlaps between cloud computing and SOA, they have a different emphasis, resulting from their original focus on different problem sets. SOA implementations are fundamentally enterprise integration technologies for exchanging information between systems of systems. SOA focuses on the problem of making systems integration more efficient, and if systems integration as a trend continues to increase as described, efficiency in this task will become increasingly important to Federal leadership teams. SOA implementation technologies, such as the group of Web Service standards, allow a consumer soft ware application to invoke services across a common network.

Further, they allow integration across a variety of development languages and platforms, providing a language neutral soft ware layer. A key benefit of enterprise SOA efforts is the ability to make system-to-system interfaces consistent in the enterprise architecture, thus saving resources on future integration and hopefully improving the speed at which integration can occur—or organizational agility. The emphasis of cloud computing is to leverage the network to outsource IT functions across the entire stack.

While this can include software services as in an SOA, it goes much further. Cloud computing allows the marketplace to offer many IT functions as commodities, thus lowering the cost to consumers when compared to operating them internally. John Foley describes cloud computing as "on-demand access to virtualized IT resources that are housed outside of your own data center, shared by others, simple to use, paid for via subscription, and accessed over the Web" [2]. Therefore, while the two concepts share many common characteristics, they are not synonymous and can be pursued either independently or as concurrent activities.

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