

SOA and SaaS - new challenges

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Abstract: SOA is moving towards Software as a Service (SaaS), which extends known SOA approaches. This article discusses challenges and future directions and how communities can contribute to the paradigm change.

1 SOA challenges

The ability to design and reuse services across the enterprise is a primary driver for IT organizations that are working towards becoming more agile, both in providing technological solutions to meet current business needs and in building an infrastructure that is able to accommodate the changing business environments from mergers and acquisitions or from shifting business models.

Today SOA is an integral part of application architecture, nevertheless challenges when implementing SOA still remain. Integration effort and costs that companies incur when combining packaged software from different sources with custom build applications are high due to different granularity of services provided, mismatching data types for inbound and outbound interfaces and also differing business semantics.

Companies and software vendors learned how to implement SOA. They took formalized and collaborative approach which was put into place and helped to ensure the adoption and implementation of SOA.

On the one hand, as an example, a major business software vendor SAP has defined a set of reusable services (Enterprise Services) and semantic standards within SAP Business Suite providing a reference service model which assigns different Enterprise Services to business processes [1]. Global data types [2] have been defined simplifying integration between SAP products and third party vendors. In a collaborative process SAP Co-Innovation Lab [3] allows partners, ISV's and customers to participate in further development of new reusable services within SAP Enterprise Service Community. SAP Methodology and accelerators (such as reference architectures) for implementation and governance of SOA and BPM (Business Process Management) have been shared to communities [4].

On the other hand various industry driven communities defined appropriate service domains and service maps as well as business content standards to improve semantic interoperability, such as Open Applications Group (OAGi) for Cross Industry (cross-industry, manufacturing, chemistry) [5], GS1 (transport and logistics, retail) [6] and BIAN (finance industries) [7] to name only few.

Nonetheless SOA architecture remains challenging within IT organization especially when it comes to integration and reuse of services.

2 SOA towards Software as a Service (SaaS)

Software as a Service (SaaS) has become a common delivery model for business applications and it broadens the scope of how SOA will be implemented within enterprises in the future.

In a SaaS delivery model software and associated data are hosted centrally by a service provider or SaaS vendor and are typically accessed by users via a web browser over the Internet. See examples of SaaS such as Salesforce.com, Oracle CRM, SAP Business ByDesign and others.

In order to identify possible future challenges we recap the classical SOA architecture.

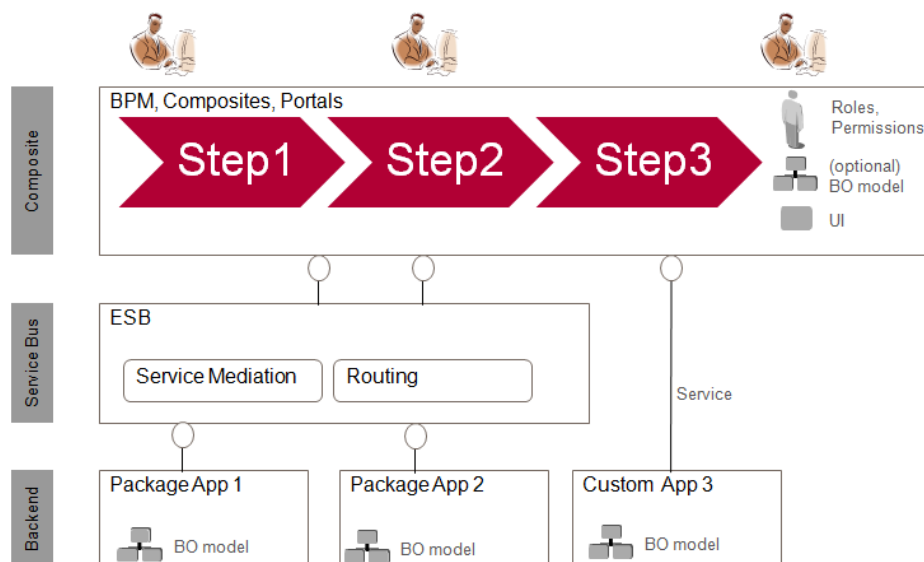


Figure 1: Classical SOA

In the classical SOA approach back-end applications provide business services (e.g. from package based solutions) or tailored individual services that are then reused in a new application layer called composite (see figure 1). Middleware such as Enterprise Service Bus provides routing, mapping and service mediation capabilities to adjust different data models, transport protocols, semantics and granularity of a service etc.

The composite application (sometimes including BPM and Portal capabilities) provides an end-to-end process, which is adapted to business needs by orchestration of underlying services. The composite further provides user interfaces (UI's) and manages end-user roles and permissions. Business objects (BO) can be stored on composite applications, if the business object model on the back-end applications cannot be extended as required.

SOA has been always dealing with remote or Internet based web services and their integration into IT infrastructure. SaaS integration goes beyond that, since instead of orchestration and reuse of different single or bundles of services - which are exposed to end users via a common UI layer - entire remote applications are incorporated into one or several end-to-end processes.

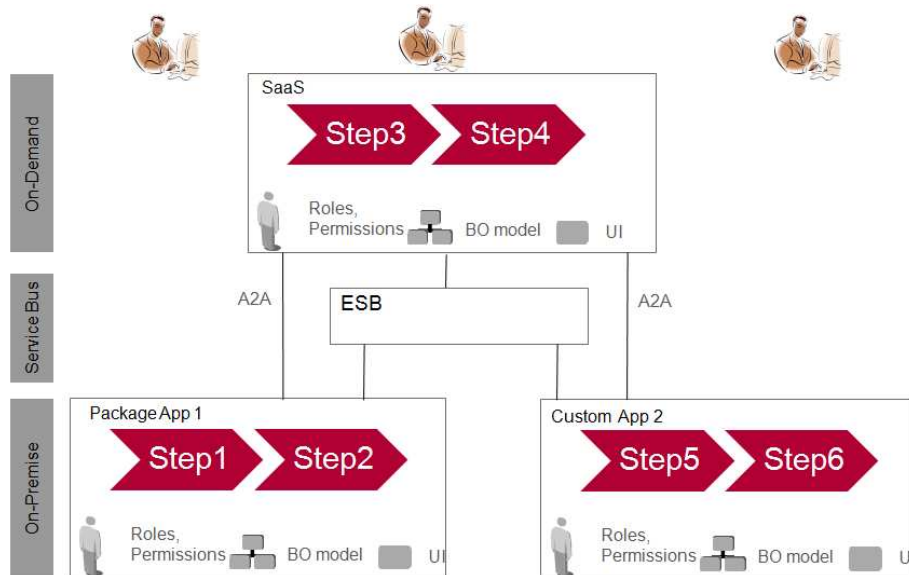


Figure 2: Integration of SaaS

Extending an existing or creating a new business process with involvement of SaaS applications creates an architecture where sub-processes are distributed over different applications (see figure 2). Applications can be classically hosted within corporate IT (on-premise) or in the cloud as SaaS application (on-demand). Each participating application holds typically its own UI's which are exposed to the end user directly without any intermediate layer.

Business objects as well as end-user roles together with permissions are distributed over different applications, which require synchronization and distribution capabilities in order to provide smooth operations. Applications communicate with each other either point-to-point or mediated via Enterprise Service Bus; in doing so rather asynchronous communication via events prevails.

An example of SaaS application integration into existing IT landscape is the extension of business applications with Internet based collaboration capabilities. This provides additional value and improves the business process (SAP Business Suite integrates with SAP StreamWork [8]).

Another example of SaaS integration into existing infrastructure is an enhancement of a global process within core on-premise CRM suite by a line of business (LOB) specific sub-process. (e.g. Salesforce.com integrates with SAP CRM [9])

3 SaaS challenges and role of SOA communities

In order not to jeopardize the key advantages of SaaS delivery model:

- more predictable costs
- “pay as you go” investments
- rapid implementation timescales.

IT organizations and vendors will need to extend their SOA approach to enable faster and more reliable integration of SaaS applications into existing infrastructure (on-premise and on-demand).

Following future directions and challenges can be outlined, which have to be addressed:

- **Business Processes Management:** Within SOA a Service Registry is used to search for appropriate services in order to reuse existing resources. A similar approach can be taken if searching for (sub) business processes implemented in SaaS applications from different vendors. A normalized description standard is needed in order to provide information (business semantics, data types, interfaces, events) for business analysts and for BPM suits. Thus common standard for Business Process Management such as BPMN 2.0 [10] could be used since it already supports event notations.
- **Master Data Management:** Master data as initial mass upload and continuous synchronization activities between applications will need a common data model and master data governance framework which spans over SaaS and on-premise applications.
- **Data & Process Integration:** Now the integration of on-premise and SaaS applications into one end-to-end process require a considerable effort comparable to classical A2A integration between on-premise solutions where middleware is used to map business object models and data structures as well as to orchestrate services. Though some pre-configured solutions exists e.g. between Oracle CRM on demand and Oracle on-premise products [11], these remain vendor dependant.
- **Data Security & Data location:** Data security is a key element for SaaS applications which has to be taken into account since IT organization does not control data and its location any more.
- **Bandwidth and Security:** SaaS applications may require considerable amounts of data from on-premise applications. Secured and accelerated data transfer for initial and ongoing data transfer should be considered as part of SaaS integration scenarios.
- **Identity Management:** Management of end user identities across different on-premise and on-demand applications.
- **Authentication and Authorization:** Authentication and Single-Sign-On between on-demand and on-premise applications as well as management of permissions in different systems.
- **Common UI Experience:** Ideally the end user will expect seamless integration of UI elements coming from different applications with the same look & feel. This will require highly customizable UI's of SaaS and of future on-premise applications.

Additional challenges arise due to the fact that SaaS applications are out of reach of corporate IT which makes it difficult to manage the overall application lifecycle process such as monitoring, change and release management.

Since on-premise business software vendors such as Oracle and SAP recognize SaaS market as future direction, they will have to provide above capabilities or at least support them within their on-premise and on-demand portfolios.

How can SOA communities contribute to solve the challenges?

Further community work is required to provide concrete recommendations and best practices on:

- Reference architectures for integration of on-demand and on-premise applications e.g. with regards to BPM suits, portals and ESB's which on their own can be on-premise or on-demand solutions.
- Data governance and data security recommendations for managing data across on-demand and on-premise applications.
- Recommendations and standards for identity management and authentication across on-demand and on-premise, e.g. usage of SAML 2.0

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