Chapter 7

Service Composition Based Software Solution Design: A Case Study in Automobile Supply Chain

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ABSTRACT

Service composition and Web mash-up are promising for meeting specific business requirements by integrating multiple distributed services and SaaS (Software as a Service) has become a popular way of software development and delivery paradigm. An application that meets the business challenges the customer faces in managing its supply chain by integrating two existing SaaS offerings into a newly developed technology presented to validate the service composition technologies. This paper contributes with a practice of a light weight approach of the problems that are inevitable in SaaS integration such as data synchronization, process control, and identification. The purpose of this paper tries to provide a reference for researchers and engineers in this domain.

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INTRODUCTION

SaaS (Software as a Service) is gaining a great deal of attractions today. More and more businesses are adopting SaaS for cost-effective software management solutions as well as business structure and process transformations (Koenig, 2006). The accelerating rate of SaaS adoption points clearly to the need for deeper integration with other enterprise applications, as well as other SaaS applications. This is one of the major IT concerns about SaaS viability. One potential solution for this emerging challenge is what Saugatuck calls the “SaaS Integration Platform” (West, 2006).

Some SaaS players are actually moving in the direction to various extents such as Jamcracker, nSite, Opsource, Salesforce.com, etc. The most notable one is the Salesforce’s unique multi-tenant platform, which provides different levels of integration capabilities based on its fundamental Web Services APIs (Salesforce.com). However, one common issue for these integration platforms is their self-centric design pays less attention to the integration with SaaS offerings from different providers. The only capabilities currently provided to connect to other external SaaS offering are Web Service calls. This is far from enough to address the issues including SSO (Single Sign On) and Web Service security caused by different identity management systems, service coordination for ensuring the integrity of business transactions across multiple SaaS offerings, etc.

Traditional middleware providers usually have a more complete view on integration, but the lacking of experiences in SaaS and lacking of industry standards and reference architectures currently available for SaaS integration make it difficult for them to get into the space. One of the challenges they are facing is how to radically simplify their products with significantly reduced footprint if they want to have their platform hosted as a service for a massive number of SMBs (Small and Medium Business).

This paper presents an SOA and Web 2.0 (Wiki) based lightweight approach for SaaS integration. It covers three levels of integration capabilities - presentation, function and data - with end to end security considerations. Most importantly, the approach allows SaaS providers to publish the integration specification of their SaaS offerings in a standard format. SaaS integrator can check out these standard integration elements and compose them together with drag-drop, point and click (DDPC) development tools. This makes the SaaS integration much easier than ever. The adoption of SOA makes the integrated solutions much more flexible and adaptive to changes, thus provides a level of business agility that was impossible to achieve before.

The paper presents a case study showing how we take the approach to compose two SaaS offerings using some of the key technologies we developed so far. Requirements of the case are picked up from supply chain management domain of a real-world automobile manufacturer, whose objective is to improve efficiency and quality of supply chain operation and delivery in its daily business, by importing a new SaaS named SNAP and integrating it with its existing SCM system.

The paper first gives an overview about the real business scenario and customer’s real requirements. Based on the analysis of this scenario, a tentative solution is proposed for the composition of two SaaS offerings. Then the issues surrounding the architecture design are discussed and related technologies and their implementation in the integrated system are introduced. At last, the case study is summarized and future works for improvement is briefed.

BUSINESS REQUIREMENTS AND ANALYSIS

AS-IS Business Scenario

An automobile manufacturer (named ABC) implemented an SCM software system five years ago and has been used extensively by its business. However, as the business grows and changes, the need for a more flexible and responsive system becomes more urgent. The existing system is not able to handle the demands of the business operations and the company wants to improve efficiency and quality of supply chain operation and delivery. The company is also looking for a solution that can be easily integrated with its existing system.

The company has identified the need for a new SaaS named SNAP that can provide a more flexible and responsive system. The SaaS can provide real-time data and insights to the company, which can help them make better decisions and improve their operations. The company wants to integrate SNAP with its existing SCM system to create a seamless and efficient supply chain operation.

The company has identified the following requirements for the SaaS integration:

- The SaaS must be able to integrate with the existing SCM system.
- The SaaS must provide real-time data and insights.
- The SaaS must be easy to use and integrate.
- The SaaS must be able to provide a level of business agility that was impossible to achieve before.

The company has also identified the following challenges for the SaaS integration:

- The existing SCM system is not able to handle the demands of the business operations.
- The company wants a solution that can be easily integrated with its existing system.
- The company needs a solution that can provide real-time data and insights.
- The company wants a solution that can be easy to use and integrate.
- The company wants a solution that can provide a level of business agility that was impossible to achieve before.

The company has decided to use a SOA and Web 2.0 (Wiki) based lightweight approach for SaaS integration. This approach covers three levels of integration capabilities - presentation, function and data - with end to end security considerations. The approach allows SaaS providers to publish the integration specification of their SaaS offerings in a standard format. The integrator can check out these standard integration elements and compose them together with drag-drop, point and click (DDPC) development tools.

The paper presents a case study showing how we take the approach to compose two SaaS offerings using some of the key technologies we developed so far. Requirements of the case are picked up from supply chain management domain of a real-world automobile manufacturer, whose objective is to improve efficiency and quality of supply chain operation and delivery in its daily business, by importing a new SaaS named SNAP and integrating it with its existing SCM system.

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