Architectural Case: Volvo IT

2004-12-13

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SERVIAM-ARC-09

Version 1.0

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1 Introduction

This document describes the use of web services in Volvo IT a subsidiary of AB Volvo. The Volvo IT positions itself as a global IT partner employing over 4300 people with 2800 in Sweden. Its focus is on industrial companies with similar structure and demands as the Volvo companies.

The material in this report is based on presentations and discussions from a Serviam meeting with representatives from Volvo IT in September 2, 2004. Presentations were made by Jan Trydal, Lars-Åke Hedbom, Mats Andersson, Krister Hedström, and Janyngwe Linderhav. The presentations mostly covered system integration and web services.

2 The Volvo IT organization

The company is organized in four main functional areas, two support oriented functions; Application & Techniques, and Infrastructure & Operations, and two development functions; Commercial and Industrial Solutions.

2.1 IT infrastructure

On of the groups in Infrastructure area is Infrastructure Architecture & Solutions. This group is responsible for providing platform independent solutions within the areas: Directory, Integration, Mobility, Security, Systems management and Storage.

Volvo IT runs a large variety of IT platforms ranging from main frames to Unix systems. The overall infrastructure policy is described via a map of a dozen functional areas with attached recommendations and guidelines. This map is governed by CIOs from the Volvo Group companies, i. e. the customers.

3 Web services in Volvo IT

The interest in web services stems both from customer requests and from internal interest in providing technically and economically up to date IT services.

An example of a customer request comes from dealers who want a generic service for using internal systems. SOA and web services are investigated possible tools for system migration. Another area is how web services will help in B2B scenarios.

Currently three study projects are run. The goal is to build knowledge. Serviam is one of these projects. The other cover web services security and web services roadmap.

3.1 System integration

The functional area Integration Services includes the following sub areas: Interoperability, Application Integration, Business Process Integration, and Business Event and State Monitoring. They are all covered by the Business Integration Project. This is a typical city plan project. Starting from an identification of the current situation, a future vision, and a gap analysis the goal is to develop an integration strategy and an implementation plan with a two year target.

The integration levels range from business processes down to the basic technical infrastructure. In between

A set of core integration technologies have been identified and divided in a four level layered structure corresponding to the sub areas mentioned above (see fig 1). At the bottom is a set of basic middleware resources. Here is where web services are located.

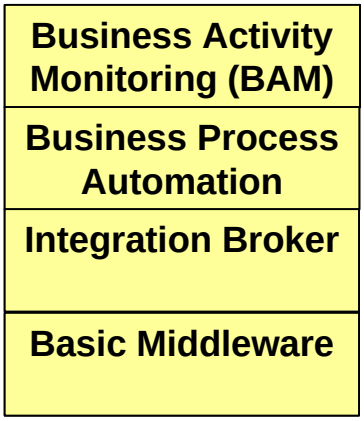

Figure 1. The core integration technologies are placed in this four layer structure.

The goal from Volvo IT to provide a Standard Integration Environment, SIE. The SIE will help integration of systems both within and between companies. In order to develop the SIE a Business Integration strategy is required, hence the interest in the Business Integration Project.

3.2 Application Development and Techniques, ADT

In this functional area work is going on to define a road map for introducing a service oriented architecture, SOA. The road map consists of the following parts

- Strategy
- Process. How to model for SOA, including service and component models
- Implementation concepts. Rules for how to define and build services

Since the focus is on the business content of the IT systems, ADT uses a slightly different view of the architecture as seen in fig. 2. Web services enter in the Service and Applications layers.

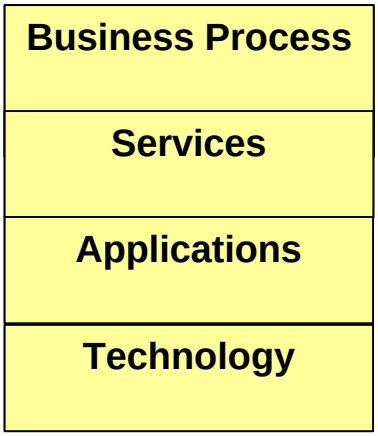

Figure 2. The architecture layers used by the ADT.

In this functional area work is going on to define a road map for introducing a service oriented architecture, SOA. The fist iteration of the road map identifies the following areas:

- Establish a Service Oriented Strategy
- Develop an Implementation Concept for SOA
- Establish a Service Oriented Process
    - Configure Volvo-RUP for Service Orientation

- Establish a modelling techniques for SOA
  - Service Modelling
  - Component Modelling
- Information and Training

In summary ADT works for at gradual introduction of a service oriented way of defining and developing IT–systems.

3.3 Infrastructure for web services

Volvo IT will most likely complement their infrastructure for web services with an Integration Broker and/or Enterprise Service Bus. They also see a need for establishing rules for management of integration solutions. For security solutions Transaction Minder from Netegrity will be evaluated.

The preferred service style is stateless and asynchronous The broker will aid with routing, transformation, and sending of messages based on the publish and subscribe pattern.

In management of integration solutions Volvo IT includes tasks such as supervising

Process flow

Message flow

Applications

This must be extended to web services. How this should be done needs to be investigated

3.4 Examples of WS use

3.4.1 File transfer

An example of web service use is for file transfer in a client server application. This example does not follow the prescriptions in the preceding section since it is a stateful long running transaction, about two hours in duration. Because of the long duration care has been taken to make the service fault tolerant. The service uses SOAP and both http and https. A variant of SOAP, DIME is used. This allows data to be handled outside XML which makes it possible to use data streaming to enhance performance.

3.4.2 Car diagnostics tool

This example is an application for car diagnostics used by the repair mechanic. Many programs are used from a PC and there is a need for a more unified interface with the back end systems. The application must be usable both on and off line. Off line function turned out to be a difficult requirement.

The following ides were used in the solution. Create web services residing both locally and in a server. Mix this the web services with a service manager using idea of application building blocks from Microsoft Enterprise Development Reference Architecture, EDRA. Let the service manager reside in the PC.this leads to a fat client solution. The service manager downloads services on demand.

The solution was base on Microsoft technology .NET, IIS, and XP SP2.

4 Comments

Although Volvo IT reports to have between 10 and 50 web services in operation they still regard themselves as investigating the concept. The reason is that a large scale use of the technology must be based on common principles for definition, development management, and maintenance. Otherwise the advantages may be lost. This is the reason for the projects presented in this overview.

5 References

Powerpoint presentations provided by Jan Trydal and Lars-Åke Hedbom.