

Chapter 5.3

E–Business Interoperability and Collaboration

Alexander Kipp

High Performance Computing Center Stuttgart, Germany

Lutz Schubert

High Performance Computing Center Stuttgart, Germany

ABSTRACT

Current e-business frameworks lack the capability of abstracting the underlying resource infrastructures in order to allow for seamless integration and thus smooth interaction between business entities. Mainly, such frameworks are unable to abstract human, as well as computing resources in a fashion that allows seamless integration into high-level distributed workflow descriptions. Usually, workflows or distributed processes are defined by managers with little background in IT specifications and platforms. Ideally, this should not be necessary at all; however, current solutions

do not provide such abstraction support. In this chapter an approach is presented that will overcome this issue allowing for a high-level resource virtualization approach, in particular enabling the integration of human as well as computational resources within high-level workflow descriptions in a SOA fashion.

INTRODUCTION

Increasing business dynamics, changing customer preferences, and disruptive technological shifts pose the need for two kinds of flexibility that inter-enterprise information systems must address—the ability of inter-enterprise linkages to support

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changes in offering characteristics (offering flexibility) and the ability to alter linkages to partner with different supply chain players (partnering flexibility) (Gosain, Malhotra, El Sawy, 2004). From a technical perspective this enforces a new kind of infrastructures allowing for the transparent communication interception as well as the corresponding transformation considering the business partners needs accordingly.

Service provisioning over the internet using web service specifications becomes more and more difficult as real business requirements start to shape the community and thus have to be respected in the transactions. One of the most important aspects relates to dynamic service provisioning: whilst the straight forward web service usage would aim at exposing individual resources according to a fixed description, real organizations would want to expose a flexible description of their complexly aggregated products (Haller, Schubert, Wesner, 2006). Additionally, due to globalization and environmental challenges, there is a growing interest in adopting collaboration technologies so as to support distributed enterprises to work together as virtual teams, thus reducing time and cost. This chapter presents an approach to reduce the technological overhead in virtual service exposition over the internet, and implicitly allowing for more flexibility. To this end, we introduce a dynamic gateway structure that acts as virtual endpoint to message transactions and can encapsulate complex business processes on behalf of the provider, thus abstracting the actual complexity of the provider for the consumer.

Furthermore, this chapter discusses an enhancement of the mentioned Gateway towards a "Dynamic Session Management System" which dynamically integrates decision taking and communication tools within an entire collaboration framework. This will allow for the role-based integration of humans in eBusiness collaboration environments, in particular allowing for a synchronous collaboration between humans within an eBusiness workflow. Therefore, the introduced

infrastructure enables establishing a communication channel basing on decision making and communication tools, allowing the involved persons at a specific state of the workflow to interact with each other. The mentioned infrastructure also ensures that the corresponding applications are setup accordingly. It also outlines on how data management and sharing within this dynamic infrastructure is handled while addressing the security concerns of certain individual companies.

By providing a virtualisation system that expands directly on the messaging infrastructure, we enable a dynamic communication framework that allows for various extensions according to the usage needs. Let's investigate this in a simple example:

Bob is a manager of a large European airplane manufacturer and has designed a workflow (process) describing the steps for the construction of a specific part of an airplane. Since design as well as construction of the airplane is distributed all over Europe, management and process planning is of utmost importance. Additionally, the construction of an airplane involves a couple of external service providers which also have to be integrated in the execution of the process. For the sake of simplification, we are just considering a small extract from the workflow, namely the aerodynamic simulation of a wing design, which results are stored for the purpose of discussion with external experts. Figure 1 shows this simplified workflow.

In this example, Bob designed a workflow representing the construction of an airplane and is responsible for its execution. To this end, Bob requires strong computational resources to execute the actual simulation, and therefore negotiates with different HPC providers to acquire their services. We may safely assume that the airplane manufacturer company for which Bob works, already has a series of existing contracts with different computing providers. In order to enable the communication, Bob had to contact his IT department a couple of times in order to set up a

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