Collaborative Processes of Enterprises

Harald Klein
Siemens CT SE 3
Otto-Hahn-Ring 6
81739 München
eMail: h.klein@siemens.com

Abstract: The following paper presents an overview of collaborative business and development processes, the area of research within my doctoral thesis. Since I am at the beginning of my thesis, just an overview of the topic is presented. Collaborative processes become more and more important since (software) development gets more distributed among appropriate organizations. The research activities should focus on collaborative (software) development processes on both low and high level (like Siemens Reference Process House Level 0 - 5). Existing research activities are mentioned as well as a differentiation to other topics like process families, supply chain management, SPEM. Furthermore, different definitions of collaborative processes within business processes are also considered as well as some collaborative models and methods.

1 Introduction

Modern (software) development nowadays focuses more on distributed development, especially on collaborative development. Collaboration within software development brings advantages concerning costs and product quality, because every single partner within collaborations can concentrate on his core competencies. Synchronization is one of the major challenges to these organizations, since the participating entities collaborate and contribute to the whole project, not only with a small software part like a 3rd party supplier. For this reason project management is not the central point of collaborations, but those processes organizations are following during development.

2 Goal

The Goal of this research activity is the analyses of existing and development of new process approaches needed for a collaborative environment between two partner organizations. Furthermore, templates for collaborative enterprises including, e.g. milestones or synchronization points have to be implemented.

3 Motivation

The existing approach of working together during (software) development refers more to the supplier management approach (SCM) meaning that a software supplier delivers a certain part of the whole product at a certain point of time during the development process.

In a collaborative approach different suppliers or partners work together and contribute to the product over the whole time the project is running. While (software) development is going to get more and more complex, e.g. increasing functionality and number of interfaces, collaborating entities can concentrate on their core competencies during development enabling them to produce better products qualitatively.

The challenge of a collaborative approach is the definition and coordination of single processes that is necessary to keep the participating organizations in the same direction. A particular challenge is the agility required by developers, e.g. in using incremental processes that allow users and partners to check intermediate results and issue frequent change requests. Another challenge is building trust between collaboration partners by adequate quality assurance.

4 Definition and Wording

Within this thesis and in the context of e-business[1] two types of processes are considered: Business and development processes. The difference between these two processes in the mentioned context (ebusiness → service-oriented) is that a business process must be executable. In contrast to business processes, development processes do not need to be executable but have to be understandable by the people following those processes.

The wording "Collaborative Processes" is used in several different contexts and needs to be differentiated in order to know those criteria relevant for the context of business and especially (software) development processes.

4.1 Definition within Business Processes of Services[2]

Concerning business processes of service orchestration and choreography are defined. Orchestration refers to an internal and external service process that is executable. With orchestration, the process is always controlled from the perspective of one of the business parties.

Choreography describes processes in a more collaborative way meaning that each party or entity participating in the process defines the part it plays in the interaction.

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[1] http://en.wikipedia.org/w/index.php?title=Electronic_business, 08.07.2006 13:49
[2] → see reference number [15]

Furthermore, collaboration is described in abstract processes. Abstract processes themselves model the "what" of a business process, but without any indication of its realization.
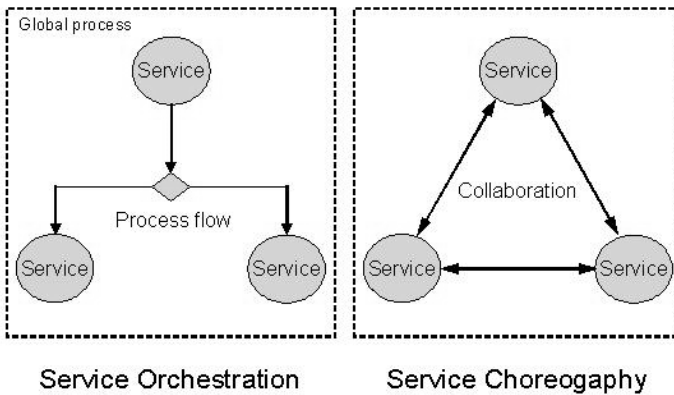

Figure 1: Different architectures of Service Orchestration and Choreography

4.2 Collaborative Processes[3] vs. Cooperation Processes[4]

Collaborative Processes refer to all abstract processes wherein people work together. These types of processes are dynamic processes with an open communication and mutual trust and respect. Additionally, complementary skills and knowledge of workforce is supported by intellectual agility. Finally, goals of collaborations are shared and highly dynamic.

Within Cooperation Processes acknowledgment of mutual benefit of working together is given. Goals are shared, too, but not dynamic and there is no further "relationship" of the entities beyond the accomplishment of the task.

4.3 Collaboration Processes[5] vs. Process Families/Lines[6]

Process Lines are analog to Product Lines. "Process Line" means one or more pieces of equipment linked by the process flow to produce a product or perform a service such that the product cannot be produced or the service cannot be performed if any piece of equipment is removed or not functioning.

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[3] http://en.wikipedia.org/w/index.php?title=Business_process, 08.07.2006 14:19
[4] http://en.wikipedia.org/w/index.php?title=Co-operation, 07.06.2006 17:41
[5] http://en.wikipedia.org/w/index.php?title=Collaboration, 16.06.2006, 18:04
[6] http://www.pesoa.org/pages/Publications/Fachberichte062005/PESOA_TR_18-2005.pdf, 18.05.2006, 22:06

When building a process for developing a concrete product a variant-rich process has to be instantiated using a configuration model. The variant-rich process results from domain engineering where variation points are modeled explicitly.

4.4 Collaboration Processes vs. SPEM[7] (OMG)

SPEM is the Software Process Engineering Metamodel Specification defined by the Object Management Group (OMG). SPEM is a meta model for defining and modelling software development processes and their components. For modelling purposes UML is used. Modelling conventions for cross organizational collaborative processes are not defined.

4.5 Collaboration Processes and Supply Chain Management (SCM)

The main difference between Collaborative Processes and SCM is the focus on project management. The goal of SCM is to handle the operative planning and execution as efficiently as possible using a coordination-driven approach. Whereas SCM focuses strongly on project management due to the coordination of incoming software parts of 3rd party suppliers for assembling, collaboration processes consider mainly the processes themselves. The reason is that entities within collaborations contribute to the whole project activities, not only with a small part that is built in the product.

5 Existing and Related Research Activities

There are several and different research activities concerning collaborative processes, mostly concentrating on business processes.

5.1 PIP Approach

RosettaNet (www.rosettaNet.org) has defined a Partner Interface Process (PIP). This RosettaNet standard defines the business process between trading partners. PIP consists of seven clusters, these are

> Cluster 0: RosettaNet Support
> Cluster 1: Partner Product and Service Review
> Cluster 2: Product Information
> Cluster 3: Order Management
> Cluster 4: Inventory Management
> Cluster 5: Marketing Information Management
> Cluster 6: Service and Support
> Cluster 7: Manufacturing.

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[7] http://www.omg.org/docs/formal/05-01-06.pdf, 21.04.2006, 16:17

Each cluster is broken down into segments. Within the segments partner interface processes are defined.

5.2 Mechanics of Collaboration

Gutwin and Greenberg have defined the mechanics of collaboration, which is based on four major categories of mechanics: explicit communication (spoken, written, or textual), information gathering (consisting of basic group awareness, activity information from objects and from people's bodies, visual evidence, and overhearing others' explicit communication), management of shared access (meaning how are objects accessed and used;   obtaining and reserving a resource, and protecting someone's work), and transfer (meaning handoff or handover the object or tool, and deposit in case of later use). The above mentioned instruments are necessary for effective collaboration.

5.3 Coordination Policies in collaborative sessions

Since session management is a key issue in applications, specific rules have to be defined for the session management scheduling and the session management execution. Scheduling a session includes things like invitation of participants or the configuration of a session.

5.4 Collaborative Processes vs. Enhanced Telecom Operations Map (eTOM)

eTOM is an initiative of the Telemanagement Forum providing a business framework for the telecommunication industry. The purpose of eTOM is to set a vision for the telecommunication industry competing successfully by defining and institutionalizing business processes within organizations. It is a reference framework and describes enterprise processes required by a service provider and analyzes them down to a certain level of detail. Furthermore, the eTOM process framework helps identifying the most needed processes and interfaces for integration and automation within the telecommunication business. In contrast to collaborative development processes, eTOM is a high level definition of business processes, like the Siemens Reference Process House (RPH).

5.5 Virtual Teams

Like other teams, virtual teams also have common and shared goals. These goals are highly dynamic and the team is based on complementary skills of the team members in order to fulfill a certain task that contributes to a product, which corresponds to collaborative teams. The main difference of virtual teams, in contrast to others, is the use of information technology for communication and interaction, so called non-face-to-face technology.

5.6 ATHENA – Project

ATHENA stands for "Advanced Technologies for interoperability of Heterogeneous Enterprise Networks and their Applications". The overall objective is the contribution to enabling enterprises to seamlessly interoperate with others. From this basis business objectives and science and technology objectives, and strategic objectives are derived. In order to meet the business objectives technological and scientific results are necessary. For the optimal fulfillment of business objectives strategic objectives are implemented where input of the European interoperability community is needed.

5.7 EU Trustcom – Project

The EU Trustcom Project has 5 main objectives.

1. The development of a coherent framework for on-demand creation of dynamically evolving scalable virtual organizations.
2. The development of software tools, documentation methods, and resources like design patterns, prototypes, and reference implementations concerning key aspects of the framework mentioned above.
3. A further objective is to demonstrate the practical effectiveness of gaining results.
4. In order to support the area of trust and security for networked businesses open standards are defined.
5. Finally, the development of social and economic models for the establishment of stable virtual organizations has to be implemented.

6 Collaborative Models

CollabNet Solution Architecture defines four domains of collaboration where several collaboration methods are applicable. Configuration management is a method within the domain Software Development. Furthermore, there is Knowledge Management (e.g. definition of Onthologies), Communication Management (e.g. usage of a forum), and Project Management (e.g. "project dashboard" at multi-project management or application sharing).

7 Conclusion

The goals of this research activity and the theme of my doctoral thesis are to analyze existing and to develop new process approaches for collaborative environments of enterprises by defining appropriate templates or models.

Research activities concerning collaborative development processes are rare, but there are a lot of themes that are covered around collaborative development processes, i.e. collaborative processes within business services, process families, or virtual teams. Existing results are an excellent basis for this thesis when approaching collaborative processes, since these results are sometimes already established among various organizations. Additionally, the increasing technology possibilities and the efficient usage of them are raising needs for defining collaboration concerning processes.

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