DESIGNING COLLABORATIVE INFRASTRUCTURES FOR BUSINESS APPLICATIONS

I.T. Hawryszkiewycz
University of Technology, Sydney

ABSTRACT

Business processes are becoming more collaborative in nature to improve competitiveness through sharing knowledge. The goal is to capture knowledge as part of business activities and make it available throughout the organization. Knowledge capture is still not part of most design methodologies, which do not include collaboration as part of the design process but focus on business activities. This paper describes ways to include collaboration in design by using an extension of social networks to model collaboration. The extension is called enterprise social networks, which are used to define the collaborative architecture, which specifies knowledge sharing within enterprises. The paper then shows how to integrate enterprise social networks into process design with the goal of developing a technology infrastructure to support the collaboration architecture.

KEYWORDS

Social Networks, Collaboration, Lightweight technologies

1. INTRODUCTION

There is growing importance of collaboration in business networks especially in knowledge intensive [Grant, 1996] processes. There is also a need to define ways to use new communication technologies, especially those based on Web 2.0, to develop enterprise wide collaborative strategies to support enterprise wide collaboration. The trend is further defined in Enterprise 2.0, which was introduced by McAfee (2006) in his article in the Sloan Management Review as a natural trend towards obtaining additional competitive advantage by using the new technologies available through Web 2.0. He sees a business environment where collaboration extends from groups and individuals to organizational units and whole enterprises.

There is a general view that technology can facilitate collaboration (Tapscott and Williams, 2008). However, using technology for collaboration is still quite challenging and not often productive (Hansen, 2009). The challenge particularly applies where people are required to deal with increasingly complex situations that require a quick response. The processes followed here are no longer highly structured (Hall and Johnson, 2009) and depend on the kind of activity. Collaboration must be chosen to match the activity as described by Pisano and Vergatti (2008) who suggest the need to design a collaborative architecture to fit the needs of the business activities. Such architectures are required to support relationships between participants to share knowledge and to develop knowledge communities or hubs.

This particularly applies in knowledge work where in emergent situations knowledge workers themselves must change systems as their work practices change. The characteristics of knowledge work have been outlined by Chen and Eddington (2005) and Davenport (2005) who emphasize the changing nature of work and the ability to quickly make and maintain relationships.

There is thus a technology gap between most current solutions and knowledge work. Most technical solutions are based on preprogrammed activities which do not match the more emergent nature found in collaborative processes. This in general is not easily adopted and the more common approach is to provide the communication tools and allow users choose the most appropriate at any given situation. There is however a growing trend to approach collaboration in a more systematic and strategic way so that collaboration becomes enterprise wide and that knowledge created in the collaborations is made available throughout the enterprise. The strategic approach thus goes beyond small teams working on well defined projects, such as preparing a document. It focuses more on support for enterprise wide collaboration.

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This paper provides an approach for this purpose by defining enterprise social networks that capture collaboration within business activities to define a collaborative architecture within the organization and support it with a technical infrastructure based on Web 2.0 technologies.

2. A BLUEPRINT FOR THE DEVELOPMENT OF COLLABORATIVE ARCHITECTURES

The paper uses a blueprint shown in Figure 1 to define the collaborative architecture. This blueprint combines business activities, enterprise social networks, and knowledge requirements as the three basic constructs for any system. The business activities are seen as loosely connected and the connections can change over time. The business activities identify the collaboration within the activity. These local collaborations are then combined to specify a collaborative architecture that defines relationships within the organization. The collaborative architecture is specified using the enterprise social network (ESN). The ESN identifies the knowledge needed by the various roles in the business and the way the knowledge is shared and created.

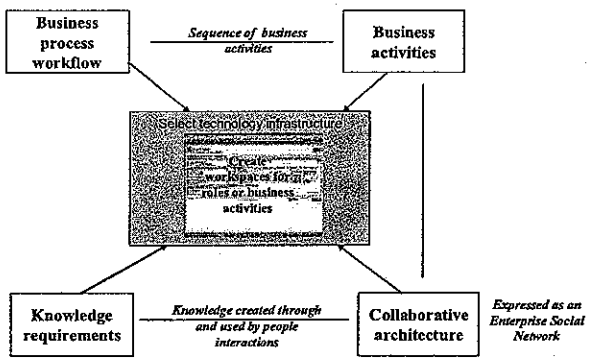

Figure 1. The blueprint for modelling adaptive information systems

The goal then is to convert the ESN to a technology infrastructure that provides the services to create and share knowledge. The collaboration is thus placed in the business context. The ESN can be used to generate role based workspaces that can be dynamically changed as a situation evolves. All process components and relationships relevant to a role are placed into the one workspace space thus placing collaboration in the business context.

3. DEFINING THE COLLABORATIVE ARCHITECTURE BY THE ENTERPRISE SOCIAL NETWORK DIAGRAMS

Social network diagrams have been widely used to model relationships between people (Hu and Racherla, 2008). These have been extended in a variety of ways to suit different purposes. In a large enterprise there are many activities and each activity has its own collaboration that can be defined using the ESN. Ultimately a collaborative structure in a business enterprise is made up of a set of interleaving small scale collaborations each with a particular goal and each following a different ESN.

Collaborative technologies are already widely used in industry but in most cases in an ad-hoc manner. This paper proposes a systematic approach to developing such infrastructures by defining a collaborative architecture that supports al business activities and shares knowledge across the activities. This architecture is derived from business activities.

4. MODELING BUSINESS ACTIVITIES

Figure 2 shows a way to model business activities using a set of collaborative concepts (Hawryszkiewycz, 2005). Here each clouded shape is a business activity. The roles associated with activity are shown as black dots and the artifacts used in the activity are shown by the disk shaped activity. Activity details can be described by scenarios. Briefly the activities describe process outsourcing where an organization provides a process service, in this case managing a sales system for a client organization. It uses software provided by a vendor. The operations manager coordinates service delivery. One major issue is resolution of service reports, which often includes collaboration between three organizations. More details can be found in Hawryszkiewycz (2007).

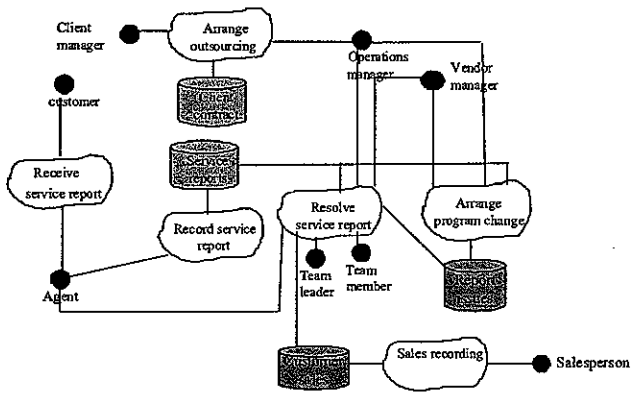

Figure 2. Business Activity Model

Definition of the collaborative architecture begins by looking at the collaboration in each of the activities. A different pattern is constructed for each of the teams, which are primarily collaborative at the operational management level and focus on task execution. All of these are then combined into the ESN. The ESN is illustrated in the top part of Figure 3, which shows:

The roles and role participants. The roles are shown as dots whereas the participants are shown as faces,
The role responsibilities shown by the dotted boxes linked to the roles,
The interactions between the roles shown in dotted boxes linked by dotted lines to the interaction.

Here we show the responsibilities and interactions on the diagram. These tend to be brief for illustrative purposes. Actual documentation is more complete and can be provided separate from the diagram.

5. SUPPORTING THE COLLABORATIVE ARCHITECTURE USING SOCIAL SOFTWARE

Once the ESN is developed the next step is to identify interactions between the roles and then select the social; software to support the interactions. This process is illustrated in Figure 3 where web services are identified for each of the interactions in the ESN or at least those interactions that are considered critical in the first instance.

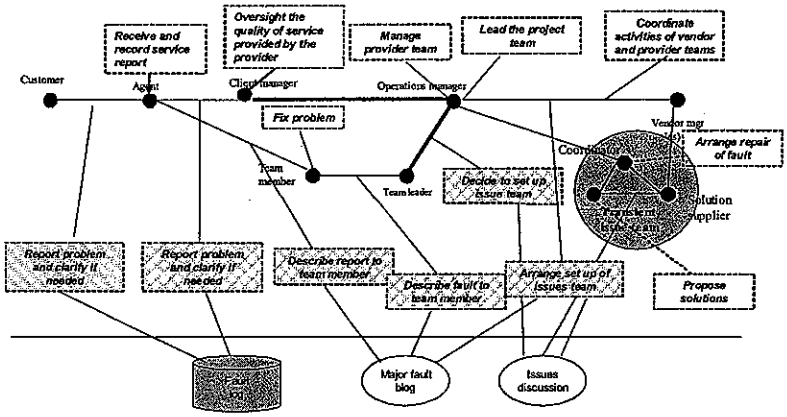

Figure 3. Extending to selecting the collaboration infrastructure

Once the services are identified the next step is to integrate them into platforms that can be shared between the different business activities.

Implementation

The implementation is generally based on lightweight platforms (Hawryszkiewycz, 2007) that can be easily composed by users as their interactions evolve (Fruchter, 2001). Technologies here include the newly emerging middleware such as Websphere or the use of groupware. Implementation can focus on customizing workspaces for roles or business activities (Hawryszkiewycz, 2009). Figure 4 illustrates an example using IBMs websphere with the interface customized to the role.

6. SUMMARY

The paper described the development of a collaborative architecture for business enterprises. The collaborative architecture is described by an extension of social networks called here the enterprise social structure (ESN). It then showed how ESNs can be used to specify the collaborative architecture and use the specification to implement the collaborative infrastructure.

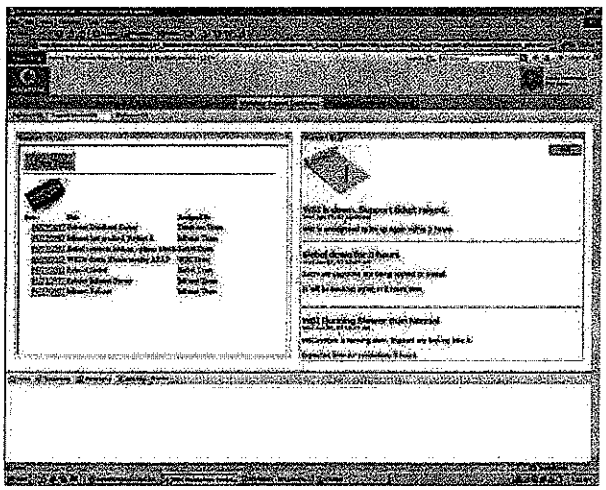

Figure 4. A role based interface

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