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A Strategy for Merging Social Software with Business Process Support

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Abstract. Contemporary social software and business process support systems utilize different architectural principals. While social software employs the idea of shared spaces for communication/collaboration, most of the contemporary business process support systems employ a workflow engine to coordinate the work of people engaged in the given business process. There are two alternatives when developing a system that provides business process support enhanced with properties of social software. One alternative is to create a mixed shared spaces/workflow architecture. The other alternative is to find a way of both type of systems using the same architectural principle, either shared spaces, or workflow, before trying to merge the two types of systems into one. The paper explores the second alternative, namely, first, moving business process support to the shared spaces architecture, and then adding features typical for social software. The paper discusses the role of shared spaces in business process support systems, sets requirements on their structure and usage, and outlines potential benefits of using shared spaces from the business point of view. Then, the paper shows how the requirements set on the structure and usage of the shared spaces can be implemented in practice, and how typical features such as blogs/forums found in social software can be naturally introduced into a business process support system.

Keywords: business process, social software, groupware, communication, shared space

1 Introduction

One of today's trends is the growing usage of social software, e.g. Facebook, in private life. A new generation is growing up who are accustomed to communicate with each other through social software. Through this generation, the new way of communication is quickly spreading to the business life. Business-oriented sites, such as LinkedIn, are widely used for informal business networks, personal marketing and sales. The ideas built into social software has started affecting the design of business-oriented software systems, including Business Process Support (BPS) systems, which is reflected in the appearance of new directions in contemporary IS research, and new

scientific events such as the international workshop on Business Process Management and Social Software [1].

Summarizing the above, merging social software with business process support became an important issue for both BPM practice and theory. To complete such a merge, a number of theoretical and practical problems should be overcome. One of them is an architectural problem. Contemporary social software and business process support systems utilize different architectural principals, see solid boxes and lines on Fig. 1. While social software employs the idea of shared spaces for communication/collaboration, most of the contemporary business process support systems employ a workflow engine to coordinate the work of people engaged in the given business process.

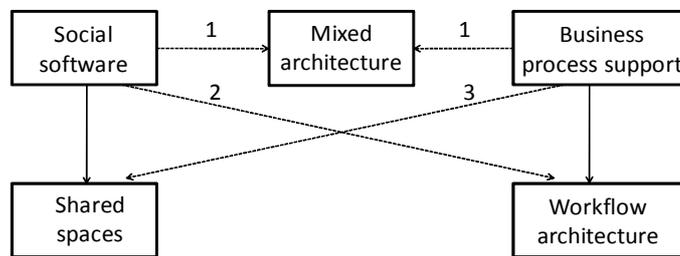


Fig. 1. Architectural alternatives for merging social software with business process support

There are two alternatives when developing a system that provides business process support enhanced with properties of social software for stimulating creative work. One alternative is to create a mixed shared spaces/workflow architecture in a style of Microsoft SharePoint, see dashed lines marked with number *one* in Fig. 1. The other alternative is to find a way of both type of systems using the same architectural principle, either shared spaces, or workflow, before trying to merge the two types of systems into one. These alternatives are represented as dashed lines marked with numbers *two* and *three* in Fig. 1.

We do not know whether social software can be built upon the workflow architecture, and whether it will gain anything from it. However, we believe that building business process support based on the “pure” shared spaces architecture might be beneficial both for business process support systems as such, and for the task of merging social software with business process support. This paper is devoted to exploiting the alternative marked by number *three* in Fig. 1.

While usage of shared spaces is more or less a must in social software, the same cannot be said about business process support. Therefore, first goal of the paper is to show that employment of shared spaces can benefit to the main objective of business process support – stimulating group efficiency in repetitive work. In addition, we show a number of other potential business benefits that could be attained by exploiting shared spaces architecture for business process support. The second goal is to present a practical example of using the shared spaces architecture for building BPS systems to show that it is possible to build a BPS system based on shared spaces without employing a workflow engine. Lastly, the third goal of this paper is to show

how a BPS system based on the shared spaces architecture can be enhanced with the features typical for social software, e.g., blogs/forums.

The paper is written according to the following structure. In section 2, we briefly summarize the basic ideas of using shared spaces in BPS systems and set some requirements on the structure and usage of shared spaces in BPS. In section 3, we analyze the environment in which a modern enterprise/organization functions, and show how a BPS system with shared spaces can help the enterprise/organization to survive and grow in this environment. In section 4, we present an example of the BPS system architecture based on shared spaces proven to be working in practice. In this section, we also suggest a natural enhancement of this architecture to introduce some features typical for social software into business process support. Section 5 contains concluding remarks, and plans for future research.

2 Shared spaces in BPS systems

The concept of shared spaces is well known in the area of Groupware, and CSCW (Computer supported Cooperative Work), see for example [2]. It became widely used in the Internet era in connection with advances of social software. A blog, personal journal, and even a photo album are all examples of shared spaces, as all these things are aimed to be shared with others and be commented by them.

As the usage of shared spaces in BPS system is not yet widely spread, we summarize the main ideas of using shared spaces in BPS systems. To start with, we clarify our understanding of the concept of business process support systems. Under a BPS system, we mean a system that helps the process participants to run their process instances/cases according to a process (type) definition. A BPS system does not need to automate all operations/tasks. If a system supports information exchange, communication/collaboration in a frame of a process case/instance, it is enough to call such a system a BPS. With such a definition, both workflow-based systems, and so-called case-based systems [3] belong to the BPS class.

The main feature that differentiates the BPS with shared spaces from other kind of BPS systems, is that the former employs a so-called “construction site” information logistics [4]. Such a system has no explicit data/information flow. A shared information space is created for each process instance/case to hold all information that is relevant to the process instance, e.g., documents received and sent, information on tasks planned and completed, reports on results achieved when completing these tasks, etc. All this information is easily available each time a process participant is invited to visit this space and complete some task related to it. A shared space is similar to a construction site where different kinds of workers are invited to complete their own task and leave the rest to the others.

The functioning of a BPS system based on shared spaces can be described in the following way:

- When a new process instance/case starts, a new shared space is created. It gets a unique name, an owner (responsible for the case), and possibly, a case team.

- When the process instance reaches its operational goal, the shared space is closed (sealed), but remains accessible for reading (a case goes to the archive).
- A person who is assigned a task in the frame of the process case “goes” to this case’s shared space to get information he/she needs for completing the task and reports the results achieved in the same space.

For the shared space technique to work efficiently in a BPS system two conditions should be fulfilled:

- Shared spaces should be properly structured. In a normal business environment, a person participates in many process instances, and, often, in parallel. For the shared space technique to work efficiently, he/she needs to understand the situation in a shared space he/she is visiting at a glance, and quickly find all information related to the task at hands.
- An invitation technique gives to the process participants a clear understanding why he is invited and what he is expected to do in each particular shared space

3 Potential benefits of using shared spaces in BPS systems

To move business process support from workflow to shared spaces architecture just to be able to easier introduce some social software features would not be wise. The move should be justified by getting potential benefits even when no social software features are introduced. To discuss potential benefits of using shared spaces in BPS systems, we start with discussing the environment in which a modern enterprise/organization functions. The main characteristic of this environment is hardening global competition for all resources that the enterprise/organization needs for its normal functioning, more exactly competition for:

- Customers
- Labor (manpower, working force, competence)
- Capital (investors)

One thing that helps in this competition is to become more productive/efficient, which allows producing goods/services that cost less with less manpower, and less capital. However, just being efficient/productive is not enough. For example, acquiring and retaining customers requires establishing and maintaining customers trust; just having lower prices may not be sufficient. Acquiring and retaining competent people requires an inspiring working environment as much as high salaries. Attracting investors also requires creating trust in the enterprise's ability to survive and grow in the age of global competition.

In the subsections below we discuss how a BPS system with shared spaces architecture can help an enterprise/organization to function in the age of global competition.

3.1 Efficiency/productivity

A typical workflow-based BPS system helps to increase efficiency/productivity via:

1. Full or partial automation of some operations (activities/tasks).
2. Routinization of handling of process instances. The workers do not need to devise a unique plan to handle each process instance. A BPS system leads the workers through the predefined sequence of operations (activities/tasks) when they handle a process instance.
3. Optimization of human resource usage through specialization. While leading through the sequence of operations (activities/tasks), the BPS also assigns execution of these operations to the right people. Such assignment is meant to ensure that people who complete these operations have right competence. For example, experienced workers complete complex operations, while less experienced complete simple ones. Such a scheme can ensure high quality of process-handling with optimal use of human resources.

A workflow-based BPS system creates a kind of a conveyor belt for handling process instances. In production, the conveyor belt represents the best solution when producing the same kind of goods, e.g. cars of the same model. It is questionable that the conveyor belt can be of much use when there is a need to produce different vehicles, like a personal car, a bus, a lorry, etc. at random. In the same way a workflow-based BPS system supports well a process for which deviations between the process instances are small and/or rare. If a considerable number of process instances cannot be handled according to the predefined scheme, the efficiency of the workflow business process support degrades:

- A plan for handling a deviated process instance should be devised and executed outside the BPS system with the help of some conventional means.
- A mechanism for engaging different competences does not work any more. As a result, some operations are likely to be completed by workers who do not have enough competence, and some by the workers who are overqualified for these operations.

Shared space for each process instance helps to solve problems that arise due to deviations from the standard pattern of handling process instances. This is done by having a special subspace of a shared space to handle deviations. It can be loosely structured, for example, as a journal where process participants leave their comments on how they handle or want to handle a deviation. Having such a subspace allows the process participants to continue using the system even in case of serious deviations. It also helps to continue using special competences through manually inviting various kind of specialists to visit a “deviation” subspace and help in handling it. The instance shared space, including the deviation subspace, contains full information about the process instance, which should encourage seeking help from a specialist who has not

been previously engaged in the particular process instance. You don't need to retell the whole story of the instance to him, as it is already there in the shared space.

3.2 Strengthening trust with the customers

Having shared spaces in a BPS system makes it easier to invite a customer to visit the process instances that concern this particular customer. To do this, a special view on the instances shared spaces should be created. This view should not include all technical details of the process handling, but show the general progress achieved in the process so far, what is expected to be done in the nearest future, and who will be doing it.

The customer can also be encouraged to leave his/her comments, suggestions, or complaints in the same shared space. Providing that the customer reactions are answered in the process instance shared space, the customer will have more incentives to visit this space and thus become a participant of the process instance. This may lead to the abolishment of the separation between the provider and consumer [5], especially in the service sector, by realizing the idea, that service provisioning is a mutual process of service exchange. Thus both service provider and consumer provide services to one another in order co-create value [6].

We believe that making a customer to a full-fledged participant of the process can help in both, attracting new customers, and retaining the existing ones. The former because it gives a customer a feeling of control over the delivery. The latter because it creates closer, personal, ties between the customer and vendor. These ties are normally much more difficult to break than the formal relationships on the level of sales/purchase departments.

3.3 Attracting and retaining employees

An organization cannot function without people. Thus constant efforts are needed for attracting new employees and retaining the existing ones. Both experienced workers, and the younger, less experienced, ones are needed to create a proper blend that can function as a highly qualified team at a reasonable costs. A successful enterprise, while providing competitive salaries, needs also provide an attractive environment for both categories of employees. Here, a BPS system with shared spaces can be of help.

An obvious attraction for a highly competent, experienced person is an environment where he/she can focus on the expert job, leaving less complex operations to the others. Shared spaces structure of a BPS system provides such a possibility. An experienced worker can ask a less experienced colleague to help via inviting him/her to a process instance shared space to do some task. Such invitations can be issued on the fly without being in details regulated by the BPS system through the process model. As the instance shared space includes all information about the process instance, handing over some job to another person becomes easier. The person that asks for help does not need to retell the whole history of the process

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instance, the information is easily available to any participant of the process through the instance shared space. Note that using the experts only for doing expert job raises their efficiency and thus provide a possibility to offer them higher salaries.

There are two obvious (interrelated) attractions for a novice:

1. become an expert (and get a higher salary as a result) as soon as possible,
2. could do the job on the limits of his/her capability, but not be left alone in the situations where more knowledge/experience is required.

Both can be arranged when a BPS system with shared spaces architecture is employed:

1. As all details of the history of each process instance is recorded in the instance shared spaces, a novice can learn how the experts handled various cases, and solved the problems that had arose.
2. In the same way as it is easy for an expert to pass a less qualified job to a less experienced colleague, it is easy for a novice to turn to an expert for help. It is done by invitation to a shared space which already contains all information about the current situation.

Note that a novice can learn from an expert that has handled a (difficult) case even when the latter has already left the enterprise/organization. A BPS with shared spaces helps to retain organizational knowledge making it a property of the organization, (and not only of the individuals). More on that see [7].

3.4 Strengthening ties with investors

In the same way as a BPS with shared spaces can help in strengthening ties with the customers, it can help in strengthening ties with the investors (e.g. shareholders of an enterprise). This, certainly, cannot be done by inviting the investors to visit customer related process instances, as the latter will give too much of detailed information that is impossible for the investor to interpret. However, having a BPS system with shared spaces employed for support of strategic decision-making, e.g. budget planning, enterprise board meetings, etc. will provide an opportunity for creating tighter connections between the enterprise and its investors.

4. Realizing the approach in practice

4.1 Moving business process support to the shared spaces architecture

As was mentioned in section 3, shared spaces in a BPS system should be properly structured. Below we show an example of such structuring based on our experience of

developing BPS systems with shared spaces. Our latest experience has been “materialized” in a web-based tool (service), called iPB, that assists in designing BPS systems [4, 8]. iPB is built based on the state-oriented view on business processes [9] extended in a way described in [4]. (On difference between the state-oriented view and the traditional workflow view, see [10].)

Several BPS systems have been developed with the help of iPB. The biggest one (about 300 end-users) is employed in the social office of one of the Swedish municipalities, where it helps to conduct investigation on suspected child abuses.

In a system designed with iPB, shared spaces are structured according to the process map designed for a particular process type. A process map in iPB is a drawing that consists of boxes placed in some order, see Fig. 2. Each box represents a step inside the process, the name of the step appearing inside the box (no lines or connectors between the boxes). A textual description is attached to each step that explains the work to be done in this step.

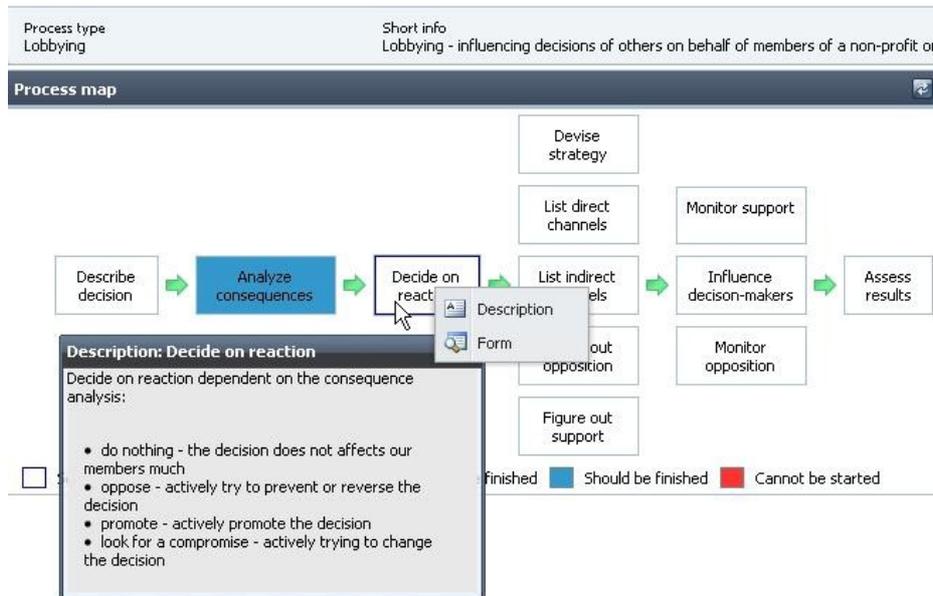


Figure. 2. A process map in iPB

A step in an iPB map represents a work-package (a phase) to be completed in the frame of the process. A step does not correspond to a standalone task/activity, and normally it is not completed at one go. Completing the step, usually, requires performing several tasks at different times. In between, tasks from other steps of the same process can be completed. This makes the map relatively simple and easy to understand for all participant of the process, even for those that work only with one, or few steps. This is important because the map is used directly in the operational practice, not just for process analysis, or staff training. The details of each step are represented differently, namely as an electronic form (see below).

Each process instance gets its own copy of the map that serves as a table of contents for its shared space. The map is used for multiple purposes: as an overview of the case, guidelines for handling the case, and a menu for navigating inside the shared space, see Fig. 3 (do not pay attention to the box in the upper left corner, it will be explained later). The user navigates through the shared space by clicking on the boxes of the steps with which he/she wants to work. Not all boxes are clickable at the beginning, those that are grayed require that one or several previous steps are dealt with first, see Fig. 3.

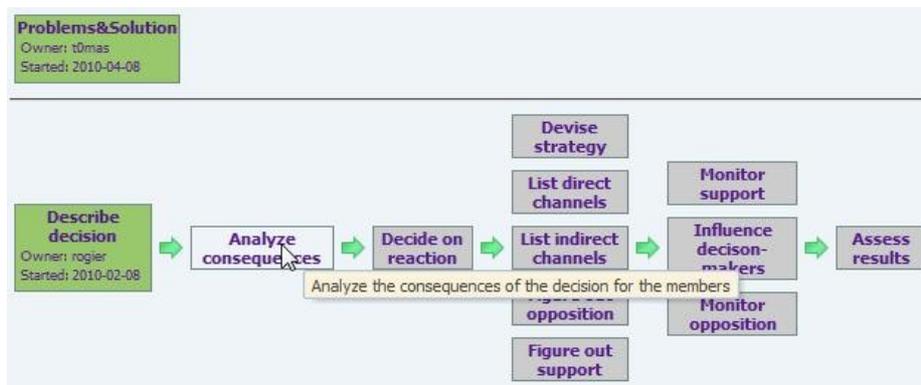


Figure 3. The map used for structuring an instance shared space

A click on a step box redirects the end-user to a web-form that assists him in completing the step, see Fig.4. The form contains text fields, option menus and radio-buttons to make choices, checkboxes, as well as more complex fields. The form may also include “static” texts that explain what should be done before one can fill some fields. Besides being a guideline for completing the step, the form serves also as a reporting tool, through filling the fields the participants report completion of certain activities. It also serve as a tool of communication between the people engaged in completing the same step.

From the shared space architecture point of view, the iPB solution can be interpreted as follows. The total process instance shared space is divided into a number of subspaces called process steps. The steps are graphically represented to the end-users as boxes. Subspaces may or may not intersect. The structure of a step subspace is represented to the end-users as a form to fill, see for example Fig. 4. Intersecting subspaces means that web forms attached to different steps may contain the same field(s). Usually, in this case, the intersecting fields can be changed only in one form; they are made read-only in the second one.

The progress in filling the step forms is reflected in the map attached to the shared space via steps coloring. A gray box means that the step form has not been filled and cannot be filled for the moment. A white box means that the step form is empty but can be filled. A step with a half-filled form gets the green color, and additional information about when the work on it has been started, and who started it. A step

with a fully filled form gets the blue color, and additional information about the finish date.

The main way of inviting a person to visit a particular shared space in iPB is by assigning him/her to become an owner/co-owner of some step. Such an assignment results in an email message delivered to this person, and the process to appear in his/her list of “My processes”. When visiting a process shared space, a person can see directly on the map what step(s) are assigned to him. Such an invitation presumes that a person invited to a step subspace knows what is expected from him there.

To add a possibility for ad-hoc invitations a special subspace called Notes&Tasks was added to a process instance shared space to allow collaborative planning as described in [4, 9]. For an ad-hoc invitation a task is planned and assigned to a person to be invited. An email message is dispatched to this person in this case asking him/her to visit the process instance for which the task has been planned. All tasks planned for a particular person appears under “My tasks” lists in his/her user interface screen.

The screenshot shows a web form for a decision step. It is divided into several sections:

- Decision level:** A dropdown menu currently showing "Municipality".
- Decision status:** A dropdown menu with a list of options: "Discussion", "Proposal" (highlighted), "Decision taken", "Became law", and "Implemented".
- Decision maker:** A section for assigning a person, with fields for "Name", "Street", "Phone", "Type", "ZIP", "City", and "Email". Below these fields are three buttons: "Clear", "Edit", and "New".
- Description & Comments:** A large text area for notes, featuring a rich text editor toolbar with options for bold, italic, underline, text color, background color, and list creation.

Figure 4. A step form for the first step from Fig. 2

4.2 Adding social software features

We start with explaining the upper area of the map in Fig. 3. The part of the map above the line, not represented in Fig. 2 due to the lack of space, is reserved for so-called general “steps”. A general step has no place in the flow sequence, and can be started and finished at any time. As any other step in an iPB-based application, a general step has a form connected to it. Such a step can, for example, be used for reporting and solving problems arising when completing some step in the flow below the “general” line”, as shown in Fig. 3. A form attached to this step, in the simplest

case, can just have one field – a journal, as shown in Fig. 5. As iPB allows to attach multiple instances of the form to one step, a new form can be activated for each problem encountered when running a particular process instance. By assigning more co-owners to the Problems & Solutions step, a person encountering a problem can get their attention and help in resolving the problem.

A process map of any process can be extended by any (reasonable) number of general steps. For example, we can add such steps as “Suggestions for improvement”, “Process blog”, “Photo/video gallery”, that are typical for social software. The only thing that is needed for adding them to an iPB application is devising field types that can represent photos, blog/forums, etc. As this is a purely technical matter solved in many social software systems, we cannot see any principal problems in adding these types of fields to the iPB tool (except finding human resources, i.e. time for doing it).

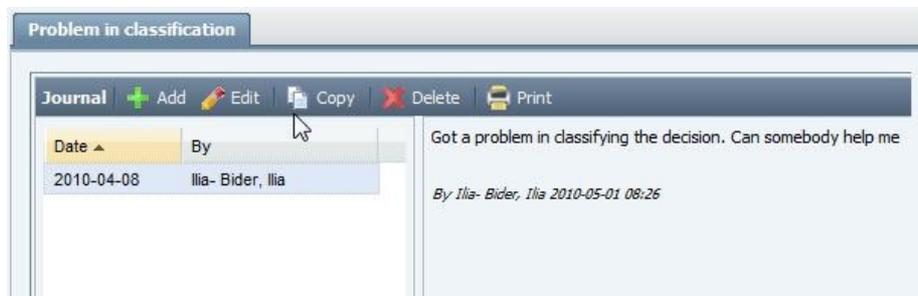


Figure 5. A form attached to the General step “Problems&Solutions”

Another direction that needs improvement to make an iPB application feel more like a real social software system is to add a more elaborated scheme of issuing invitations. This can be connected to the introduction of new types of fields as suggested above. Once more, the methods of issuing invitation in social software are well-known, adding them to iPB in connection to adding new type of fields is a purely technical matter.

5 Conclusion

In the first part of this paper we formulated a hypothesis that one approach of merging social software with business process support lies through accepting the shared spaces architecture for BPS systems. We summarized the main ideas behind using shared spaces in BPS systems and set requirements on their implementation. Furthermore, we discussed potential benefits of using the shared spaces architecture in a BPS system regardless of the goal of implementing social software features.

In the second part, we demonstrated feasibility of development of BPS support based on the “pure” shared spaces architecture. We also described potential enhancements to the system used for demonstration. These enhancements, when implemented, would give a BPS system real look and feel of social software. We

showed that these enhancements extended the system architecture in a natural way, and that they required only proper technical solutions, which are quite attainable given the state of the art in the area of WEB technologies.

We believe that business arguments and practical experience presented in the defense of our hypothesis are strong enough to continue exploiting the ideas presented in this paper. Our plans for the future consist, in the first place, in continuing implementation of the proposed approach in practice. The research question here is to investigate user perception of this kind of systems, as well as evaluate how much of the social software capability will actually be used in practice.

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