

Process Frame Instances for Integrating Strategic, Tactical and Operational Information Management in Hospitals

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Abstract. An approach to reduce the complexity of information management is to distinguish it into strategic, tactical and operational management with each of the levels using its own software tools. In practice, the management levels are tightly connected and interact closely. The most evident information that has to be interchanged between the management levels is the information about finished, cancelled, running and planned activities or projects, respectively. We claim that the levels of information management should share information about the work done, and propose their integration by means of a network of so-called process frame instances. Process frame instances hold information about the activities of different information management levels in a structured and reusable way.

Keywords: Information Management, Hospital Information Systems, Health Information System, Organizational Models, Process Modelling

1. Introduction

There are several approaches to organize the management of hospital information systems. A helpful approach is distinguishing the tasks of information management into the levels of strategic, tactical, and operational management [1] with specific methods and software tools for each level. Nevertheless management activities at these different levels have a strong need for an extensive information exchange [2], especially across level borders.

Together with information managers from the department for information management of the Leipzig University Hospital we identified typical situations where information about activities in information management is involved. Examples for these situations are

- relating the current strategic management plan's migration plan to the projects actually initiated or completed ,

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- identifying several projects with similar topics and goals consistently and using synergy effects,
- communicating the responsibilities for activities in the operational management,
- acquiring the projects assigned to a specific goal in the strategic management plan, or
- reporting all ongoing projects to the hospital's board of management.

Evidently it is crucial for information managers to be fully aware of the activities going on in the department regardless whether the activity is assigned to the strategic, tactical, or operational level of information management. A central repository containing information about the activities can efficiently support the daily work of the information managers at the strategic, tactical and operational level. For implementing such a repository the following problem has to be solved:

- How can information management activities be described in a standardised way, regardless of the borders between the strategic, tactical and operational level?

In this paper we propose to represent an activity performed in information management by an abstraction of a process and call it a process frame instance. We describe their relationships by semantic links between them.

2. Methods

The daily work in a hospital's information management department consists of many activities like managing complex projects, running the helpdesk and preparing strategic decisions. Each of these activities can be considered as a process. Since business process models [3] focus on details inside of processes, information managers also have to have an appropriate overview on these activities or processes respectively. At least they need to know *who* performs (or performed) *which* activity with which *goal* since *when*, with which *deadline*, using which *resources* (and we expect this list not to be extensive).

We describe the activities in an information management department by a set of such properties. The set of properties can be chosen to the needs of the specific department, but should be the same for all activities in that department to guarantee a standardised description. This standardised set we call a *process frame*.

An activity is represented by an instance of the process frame. A *process frame instance* is a set of values assigned to the properties defined in the process frame. Let the tuple (PERSON IN CHARGE, GOAL, DEADLINE) be an example process frame. An example instance of this process frame might be the tuple ("Lutz Ißler", "Inventing a glossary of terms", "2005-12-15").

Process frame instances can be semantically related to each other. To express this semantic conditions on pairs of process frames can be formulated [4]. Whether two process frame instances are connected by a semantic link is determined by evaluating the semantic condition on the respective instances. Depending on the condition formulation semantic links are either directed or undirected. An example for a directed link is the "sub-project" relationship which connects the process frame instances B and A if the activity represented by B is needed to achieve the goal of the activity represented by A. Opposite to this an

example for an undirected link is a link connecting two process frame instances with the same person in charge specified in their properties.

With process frame instances we abstract from the formulation of process steps usually used in business process modelling [5]. Process frame instances only describe the “outline” of a business process instance. We claim this to be sufficient to keep track of the activities in information management from a mere strategic viewpoint.

3. Results

We used process frame instances to manually represent activities in the Leipzig University Hospital’s information management department together with their relationships between each other in order to prove the feasibility of the concept. Here, we present a simplified cut-out of this representation. The process frame in this simplified example consists of only three properties, namely a short description of the activity, the proposed deadline for the activity to support sorting the activities by time and a reference to at least one strategic goal as stated in the strategic management plan [1].

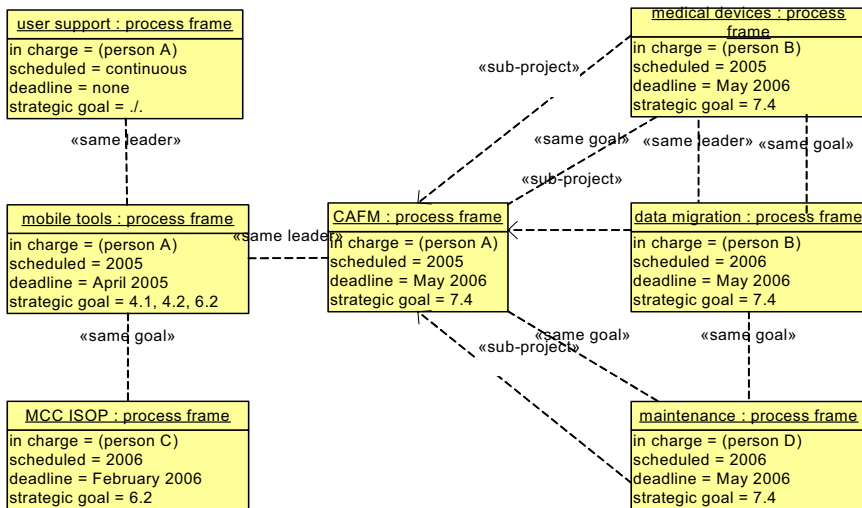


Figure 1: An example network of process frame instances with interconnections between these instances.

Figure 1 shows a sample network of several process frame instances. In the figure we used the Unified Modeling Language (UML) [6] to denote the process frame instances, but the concept is independent of a specific representation language. The figure shows several sample activities in information management based on real activities in the Leipzig University Hospital’s information management department. The activities are semantically linked to each other by three different relationships: a “same leader” link if they have the same value of the “person in charge” property, a “same goal” relationship if they are assigned to fulfill the same strategic goal (denoted by the same numbers as in the

corresponding strategic management plan), and a “sub-project” link if an activity contributes to another activity’s result. The sub-project link is an example for a directed relationship (from the sub-project to the main project), while the other links represent undirected relationships.

A repository of process frame instances together with the links between the instances represents information about the activities in an information management department in a standardised and structured way. A repository as shown in figure 1 can be used to

- collect the projects from the last strategic management plan, denoting which projects were finished in time, delayed, postponed, or cancelled,
- initiate projects with similar topics and goals consistent and using synergy effects if the repository contains not only finished but also planned activities,
- identify the persons in charge for activities in the operational management (in figure 1, the only activity represented from the operational management is the user support),
- easily acquire the projects assigned to a specific goal in the strategic management plan by starting at a process frame instance with a specific goal and following the “same goal” links, and
- report all ongoing projects to the hospital’s board of management by converting the repository’s contents into a list of activities, for example sorted by the deadline property value.

Figure 1 shows that activities can be represented on arbitrary levels of granularity. The “CAF” project which introduces a Computer Aided Facility Management is split up in several sub-projects from which three are shown in the figure. The process frame instances representing the sub-projects are connected to the CAF process frame instance by a sub-project link. Based on the desired level of detail such links can be followed or not when interpreting the repository contents.

4. Discussion

In order to support the work in a department of information management there has to be a central repository containing information about finished, cancelled, running and planned activities, and the semantic relationships of these activities. Such a repository could be the central working tool for employees on all levels of information management. Strategic managers could use the repository to get information for the preparation of a strategic management plan and to implement the results of the plan [7]. Tactical managers could plan and document their particular projects. Managers on the operational level could use the tool to report on their activities and responsibilities. In this paper we propose the representation of the activities in such a repository by process frame instances.

Process frame instances are a general concept for reflecting activities. Dealing with activities, process frame instances are closely related to the concepts of process modelling (which describes the abstract steps of a general activity) and project planning (which describes the concrete steps of a concrete activity). Process frame instances abstract from activity steps and thereby form a generalization of both process modelling and project

planning. This enables them to deliver an integrated view on all activities of all management levels, regardless of the existence of process models and project plans.

Process frame instances represent all activities in the same structured and standardized way. The structured and standardized representation of activities allows for an easy access to the data and using the repository for example to formulate queries on the network of process instances, to define views on the network, or to use text-generation algorithms to create reports about the activities as natural language text. A standardised description is also helpful for knowledge-engineering and reasoning about the department's activities like project controlling and information flow analysis.

5. Outlook

In information management departments complex networks of possibly several hundred process frame instances need to be managed. An appropriate software tool would be extremely helpful. Currently, we are developing such a tool. It shall be introduced iteratively into the department for information management of the University Hospital Leipzig.

Information managers as we know them are usually overwhelmed with work. Of course no one can expect them to enter information about their activities in an additional software tool. To make the metaphor of process frame instances a useful tool we plan to extend process frame instances with the functionality to manage the documents created during an activity, for example, project plans, meeting reports, and financing plans. This way process frame instances will become the main environment for project file management. A similar approach was successfully taken by process-oriented knowledge management [8].

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