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A Project Model for the Design of Intranets

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Introduction

The implementation of Intranets provides an efficient and economical way to support business processes with necessary information and knowledge. However, there is a lack of systematic approaches for the planning and realization of Intranet solutions. In general, existing approaches and techniques usually focus on software engineering issues such as information structuring and navigational design (e.g. Araneus (Atzeni, et al., 1997), HDM (Garzotto, et al., 1993), OOHDM (Schwabe and Rossi, 1998), RMM (Isakowitz, et al., 1998) and W3DT (Bichler and Nusser, 1996)) or integration of heterogeneous information sources (e.g. (Garcia-Molina, et al., 1995)). So far a comprehensive method which also includes strategic and organizational issues is missing.

This paper gives an overview on PROMET I-NET - a project model for planning and implementing Intranets. It covers all phases of an Intranet project starting from the requirement analysis to the implementation and rollout of the system. Unlike existing approaches, PROMET I-NET not only deals with technical issues but contains strategic and organizational aspects as well. However, the project model does not replace existing development and integration methods but rather embraces them into its framework. The model was developed in the context of a research project in cooperation with leading German and Swiss enterprises where it has been validated in several projects.

The advantages of a project model follow:

- *Quality*
The project model can be used as a template for project plans. Thus, it ensures that all relevant aspects of an Intranet are being taken into account.
- *Cost efficiency*
It enables more efficient project planning and controlling by keeping the project team from doing things twice or wasting time with unnecessary tasks.
- *Best practices*
It allows for standardized documentation and reuse of experiences from former projects. It can also be used as a tool for the creation of process or architecture reference models, respectively.

- *Common language*
A corresponding manual guarantees that all project members have the same technical and methodical background and are able to communicate well from the very start.

Elements of PROMET I-NET

We define an I-NET as that part of an enterprise's information system that is based on Internet technology, in particular Web technology. It consists of a common infrastructure (e.g. TCP/IP network) and one or more I-NET applications using this infrastructure. An I-NET application is based on hypermedia whose distinguishing feature lies in the navigation through links and nodes (Lee, 1997). We classify I-NET applications in Internet, Extranet and Intranet applications according to their respective user group. While the latter are available only to an enterprise's employees, the former are open to the public and to closed user groups being made up of an enterprise's customers, suppliers and partners respectively.

PROMET I-NET consists of a reference model and a procedure model which again base on a common model of an Intranet's design elements and their interactions on strategic, organizational and technical level (so-called meta-model). Referring to this meta-model not only allows the design of an Intranet from scratch but also the redesign of existing, uncoordinated, bottom-up solutions for better management by serving as a framework.

The reference model provides templates for design elements on all three levels, like standards, policies and guidelines (strategic level), roles and processes needed to run and maintain the infrastructure, the applications and their content (organizational level), software and hardware components of the infrastructure and single applications (technical level).

The procedure model consists of both an enterprise-wide part and a business process-specific part. The enterprise-wide part includes the specification of an Intranet strategy, Intranet architecture as well as the creation of structures that make sure that the system works properly. These specifications are valid within the whole enterprise and do rarely change. The business process-specific part

focuses on individual Intranet applications, each one supporting one or more business process with information and knowledge. It is based on the enterprise-wide specifications. Usually both parts are realized as separate projects. As the enterprise-wide part does not change very often, it mostly has to be carried out only once per enterprise. It then is valid until changed conditions either in business or technology require readjustments. The business process-specific part, however, has to be carried out for each Intranet application project.

PROMET I-NET divides any project into four phases: project setup, analysis, design and implementation. Parallel to these four phases other project and change management activities have to be carried out. As these activities are not I-NET specific, they are not considered in our project model. Of course the overall structure of our method does not differ from traditional projects, however, it is the activities within each phase, which are very specific to the use of Internet technology.

Fig. 1 shows PROMET I-NET's procedure model in a simplified form. Light gray boxes represent major project activities. For each box PROMET I-NET provides a step-by-step technique describing how to develop a solution adequate to the enterprise's requirements. The activities are shown in a temporal and logical sequence and matched with the project phases. Activities that concern enterprise-wide questions are drawn on the left side, business process-specific activities on the right side. Arrows depict logical relationships and dependencies.

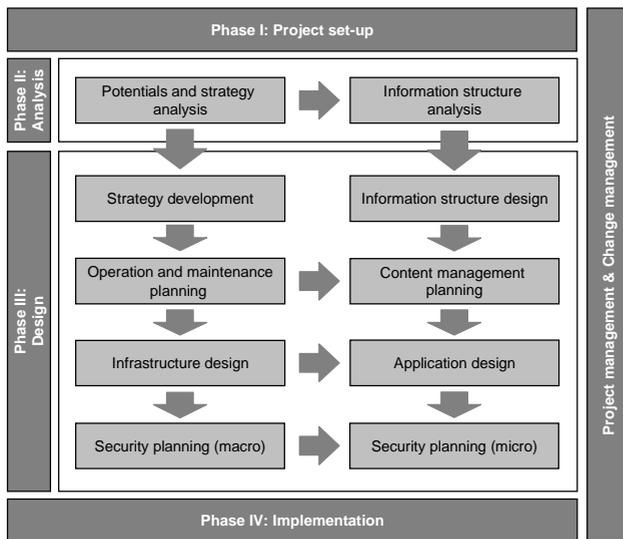


Fig. 1: Procedure model of PROMET I-NET

Below we describe the activities in more detail beginning with the enterprise-wide part followed by the business process-specific part.

- Potentials and strategy analysis*
The first step in developing an Intranet is the identification of application areas within the enterprise. This requires analysis of business and IT strategies, current business processes and technology capabilities. The main result is a prioritized list of possible Intranet applications.
- Strategy development*
After identifying application areas existing strategies, standards and policies within the enterprise must be reviewed and revised for reflecting the properties of Internet technology. These guidelines include security rules, design standards, legal issues, etc. Templates are available in our reference model.
- Operation and maintenance planning*
Like traditional IS an Intranet and its applications require technical services. However, there are some Intranet specific tasks (e.g. access rights, usage control, security audits), which usually are under central control. Here suitable procedures for these tasks are planned. Our reference model contains processes for maintenance, technical support, monitoring, user administration, and training (see Schmid, et al., 1999).
- Infrastructure design*
Infrastructure design summarizes all technical design activities relevant to the enterprise as a whole (e.g. browsers, web-servers, search engines). It is based on an ideal Intranet architecture again being part of our reference model and showing possible Intranet components. In this step it is customized in order to get a company-specific architecture. Comparing current and future architecture results in a list of components that have to be added, replaced or removed.
- Security planning (macro)*
Due to its importance there are separate activities to analyze possible security risks and threats. Based on a detailed assessment a set of required measures (e.g. firewalls, network segmentation, cryptography standards) is defined and the infrastructure is adjusted to prevent security problems.

The business process-specific activities follow:

- Information structure analysis*
Before starting with the design of an Intranet application, a business processes' information needs has to be analyzed (unless already existing). This includes process activities, organizational structures, information structures, information flows, and current deficits. The resulting documents provide the project team with a detailed overview of the status quo of the problem domain under consideration.

- *Information structure design*
In this step the future information architecture is being designed. Required information objects are specified, improved information flows between business processes are designed, conceptual data models, and navigation structures for the planned Intranet application are derived.
- *Content management planning*
It is crucial for the success of an Intranet application to provide for content management in advance. Processes for creation, distribution, maintenance and removal of content must be defined and linked with a set of suitable roles (author, editor, content manager, etc.). Such a set of processes and roles is part of our reference model (see Schmid, et al., 1999).
- *Application design*
Unfortunately, Internet technology is a heterogeneous group of technologies (e.g. HTML, CGI, ActiveX, Java), which can hardly be managed by traditional software engineering approaches (Coda, et al., 1998). Our reference model, therefore, provides a technology-independent framework for Intranet applications. We use well-known approaches such as use cases (Jacobson, et al., 1994), event-trace diagrams (Booch, et al., 1998) and others in order to create a design specification for user interfaces, application functionality and middleware services.
- *Security planning (micro)*
While security planning (macro) specified security measures that affect the enterprise-wide Intranet infrastructure, security planning (micro) deals with application-specific security issues (e.g. access rights).

It should be noted that in our approach an Intranet is a tool to solve business problems. Each single Intranet project has to be justified by an appropriate business case. However, there is no major business process redesign. Improvements in efficiency result from shorter time to localize information or fewer mistakes due to out-of-date or wrong information.

Case Study: LGT Bank in Liechtenstein

LGT Bank in Liechtenstein is an internationally active private bank. In 1996 the bank revised its corporate strategy with the aim of changing from a product-driven to a customer-centric organization and thus improving client benefits. As a result, new demands were made on its information system. The bank decided to overcome the deficits with an Intranet application (so-called KUNO front system) and thus to integrate front- and back-office processes. Accordingly, the bank built up an appropriate company-wide Intranet infrastructure.

The project at LGT Bank in Liechtenstein covered most of the activities suggested in our model. In March 1997 the bank began working on the project. Immediately prior to this date the bank's executive management laid down the basic I-NET strategy. This decision was based on the experience the bank had gained with a pilot application and a general assessment of the business potentials offered by the technology. Following the project initialization, the planning and realization of the infrastructure were accomplished quite quickly and decisions regarding development environment were taken. The infrastructure was designed not as a platform for the KUNO front system, but for subsequent Intranet applications (e.g. a portal and a project information system) and its Web presence (www.lgt.com) as well. Parallel to this, the project team held workshops with representatives of the bank departments concerned in order to identify information needs, to determine user requirements and to specify the solution. Three months before the production rollout, the content managers were selected, their tasks were specified and they were trained in the operation of the application. They subsequently produced the information objects. The system went live in February 1998

The KUNO front system offers substantial quantitative benefits. Thanks to the integration of information in the KUNO front system, the bank expects to reduce the number of Reuters terminals by 50, which would provide savings of about \$200,000 per year. The bank also expects to make annual savings of \$110,000 in the distribution of printed information material for individual products. In the provision of support for client advisors, the bank hopes to attain substantial capacity savings of up to 30% in the administrative sector.

For a detailed description of the complete project at LGT Bank in Liechtenstein see (Kaiser, et al., 1998).

Conclusion

In this paper we presented PROMET I-NET - a project model for planning and implementing an Intranet. It consists of both a reference model and a procedure model. While the reference model provides templates customizable in individual projects, the procedure model structures Intranet projects according to logical dependencies among design areas. Future work will include further refinement of the project model as well as the development of information structure templates for certain business processes (e.g. customer relationship management). Another direction of research is the development of a project management tool to support the use of our project model.

References

References are available upon request from the author.