INTEGRATED WORKFLOW AND TELECOOPERATION SUPPORT FOR THE GERMAN GOVERNMENT

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ABSTRACT

PoliFlow is a research project sponsored by the german government to support processes in the public administration by innovative information technology. After a short introduction of the project we will discuss some important requirements from the user scenario that influences our work in PoliFlow.
In the second part, we will present an integrated solution approach to support structured and unstructured process parts under consideration of various security aspects and give an overview of the current state of our work.

INTRODUCTION

POLIKOM is a research program which was funded by the German Secretary for Education, Science, Research, and Technology (BMBF). It has been initiated after the decision of the government to move parts of the administration from the former capital Bonn to the new capital Berlin. The mission of the POLIKOM [2] projects is to close the arising gap between departments of the german government, as in future these are to be spatially distributed over both cities with a wide gap.

PoliFlow is one of four POLIKOM projects dealing with reliable, secure and adaptive workflow for widely distributed application environments with integration of groupware and telecooperation services. A major goal of PoliFlow [3] is the development of an integrated solution to support workflow management across heterogeneous platforms as well as teleconferencing between Bonn and Berlin.
Due to the distribution of departments and the variety of business processes, there is a need for highly flexible workflow management of intra and inter department business processes with different levels of structuring. In addition,we need teleconferencing services in the context of workflow processing. Planned conferences under workflow control as well as spontaneous conferences between workflow participants will improve the quality and efficiency of process management.

In this paper we discuss three major research directions of PoliFlow:

- integration of asynchronous workflow and synchronous telecooperation support
- adaptive workflows by integration of ad-hoc modifications during runtime
- security aspects concerning distributed and heterogeneous workflow management systems.

Furthermore, we will shortly describe a first prototype presented at CeBIT'96.

REQUIREMENTS FROM THE PUBLIC ADMINISTRATION

One of the main problems to support processes in the public administration is the heterogeneity of the user scenario. Participants of working groups who have to perform common processes are assigned to different organizations at different locations (e.g. Berlin and Bonn). Equipment and computer experience at different workplaces vary extremely.

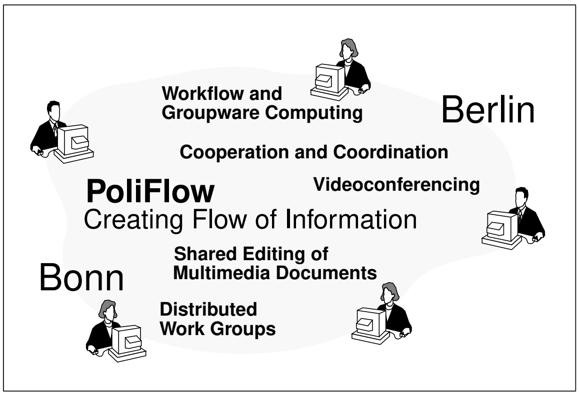

Fig. 1: Process and application environment of PoliFlow

Processes that have to be supported may be very complex including long running activities, decision points and exceptions. They include predefined and clearly structured parts as well as unstructured parts which can not be defined exactly during buildtime. Typically, workflow management systems focus on asynchronous coordination of activities within static processes. Existing systems do not cover synchronous cooperation and communication between running activities. Adaptive support must be integrated to perform modifications and extensions of processes during runtime.
Moreover, security and confidentiality are important requirements for the public administration, and workflows have to be executed between different departments. Typically, these departments have their own security mechanisms and policies to be considered. For that reason security aspects of workflows must be modeled in a mechanism and policy free way.

The great challenge of the PoliFlow research project is the development of a suitable integrated solution that allows support of a wide spectrum of business processes, including communication facilities as well as teamwork support.

INTEGRATED SOLUTION APPROACH

To fulfill these requirements, a new generation of enterprise process management systems will be necessary which combine the functionality to support structured and unstructured process parts under consideration of various security aspects. Our solution policy is the integration of existing workflow systems, groupware systems and synchronous telecooperation services, adding enhanced features like performing ad hoc modifications or ensuring security aspects

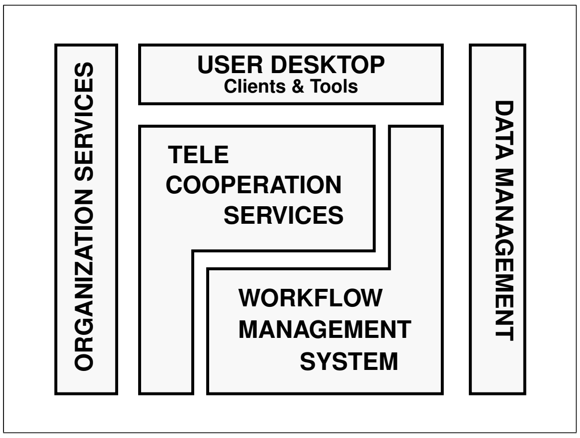

Fig. 2: Integration of workflow and telecooperation

Integration of Synchronous Telecooperation and Asynchronous Workflow

Structured working modes can be supported by existing workflow systems. Besides, it is important to support unstructured working modes (e.g. desktop-conferences), too. This focuses on the analysis and development of concepts necessary to enable cooperative activities and on the integration of telecooperation and workflow. Telecooperation services should be available in the context of the process and with all the required knowledge. Examples are:

- spontaneous checkbacks to previous workers in cases of uncertainties using synchronous or asynchronous telecooperation services,
- shared editing of multimedia documents and
- fixing appointments within a group calendar.

Integration of Unstructured Processes with Ad Hoc Modifications

Flexibility and adaptability constitute relevant characteristics of future workflow management systems. In various situations, it is required to refine, to extend, or to modify predefined workflows during execution. On the one hand external influences, rare exceptions, or unexpected events can cause these modifications, on the other hand the workflow has to be adaptive because some details are not known at buildtime. For example if there is an explicit planning task included in the process, results of the task may determine further activities, so that the workflow has to be adapted after completion of that task.
Offering some workflow modification services is the first step but various aspects of the modifications have to be controlled. Therefore, workflow modeling must be extended by modification rights and integrity rules and consistency of the modifications has to be guaranteed.
Combined with a graphical workflow editor and workflow libraries, users should be enabled to perform ad hoc modifications easily [1].

Security in Workflow-Systems Supporting Multi-Level Structured Processes

To ensure the security requirements in a widely distributed and inter department workflow management system, there is the need to extend the process definition language by elements for the description of security aspects associated with workflow activities, documents etc. Furthermore for each security environment there has to be a mapping of the security constraints into mechanisms of the given platform. During the runtime of a workflow instance, mapping of the security constraints to the workflow definition will be done dynamically step by step. In cases where the target environment does not fit the needs for security, an exception handling is necessary.

CURRENT STATUS

Our solution approach is based on three major parts. The first part, a seamless integration of workflow and teleconferencing, has been completed. We are now able to support checkbacks to other workflow participants in the case of uncertainties. Depending on the current state of the workflow instances synchronous telecooperation services will be offered to communicate with persons involved in earlier workflow activities or in editing special documents. During the checkback, the participants are interconnected with desktop-based audio, video, and an application sharing facility. In most cases, the problems which caused the checkback can be solved in a couple of minutes

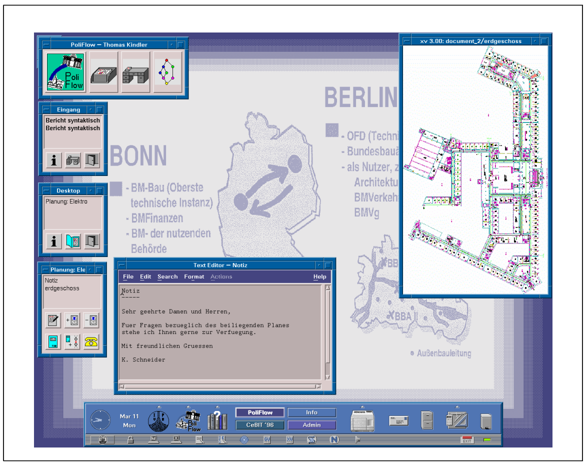

Fig. 3: Individual applications and workflow user interface

The screen shots have been taken from a prototype presented at the CeBIT' 96 on the stand of the BMBF. The first picture shows a typical user environment with the workflow user client and client applications (e.g. CAD-applications). On the second picture the checkback has already been initiated from the workflow viewer. The workspace includes different components of the used teleconferencing environment and the - now shared - application.

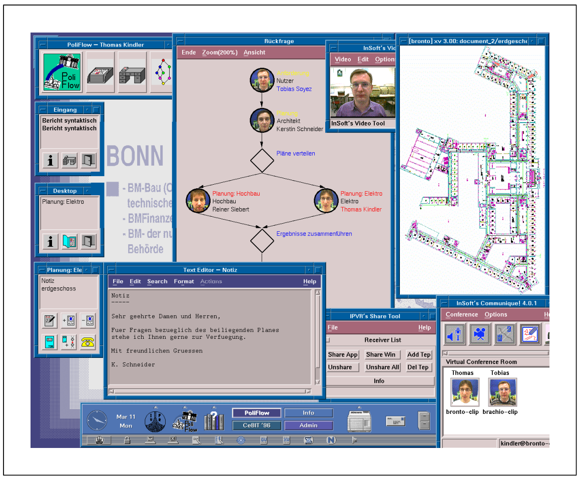

Fig. 4: Synchronous checkback in the context of workflow

Both systems, workflow and teleconferencing system are existing products. The integration had to be done by adding components like user interfaces and the graphical instance viewer. The viewer collects all the runtime information that must be provided to enable users to easily initiate a checkback. The process information was taken from the workflow instance description, to which the task belongs. Furthermore, the system holds information about availability and current addresses of workflow participants, required to start the conferences.

SUMMARY AND OUTLOOK

The growing number of computers in industry and administration and the distribution of organizations all over the world will heavily influence enterprise process management. In this paper we have talked about some new challenges, arising from the movement of the german government. We discussed some problems and requirements that must be solved to support various processes in the public administration. Finally we presented our solution approach and gave an overview over the current state of our work.

The paper shortly introduced the project PoliFlow but focused on special aspects concerning the research topics of the authors [4]. Our work will be proceeded in the future and we expect that the results can be easily applied to other user scenarios or workflow management systems.

Further Work

Due to the growing impact of the internet and intranets in information technology our further work will be heavily influenced by Web-based technology.

Recently we have developed a new prototype build on a powerful CORBA-based workflow engine. The workflow client has been written in Java, so that the users can perform processes via a browser which is able to run Java applets. Following this new approach lots of problems concerning heterogeneity can be solved and the users will be able to interact with the workflow server via a well known, intuitive and user friendly interface.

References and Further Information

[1] Siebert R.: Adaptive Workflow for the German Public Administration. In Proc. of the First Int. Conf. on Practical Aspects of Knowledge Management (PAKM), Workshop on Adaptive Workflow. Basel 1996.

[2] http://www.gmd.de/IBE/bmbf/polikom/index.html

[3] http://www-uktm.external.hp.com/~poliflow/index.html

[4] http://www.informatik.uni-stuttgart.de/ipvr/as/projekte/poliflow/poliflow.html

BIOGRAPHY

After their degree in computer science the authors are working as research assistants at the University of Stuttgart, Institute of Parallel and Distributed High-Performance Systems (IPVR). Since about three years they have been focused on the research direction of workflow management in distributed and heterogeneous application environments. Topics of special interest are security (Kindler), adaptive workflows (Siebert) and cooperative work (Soyez).