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INTERFYS: An Internet-based Professional Publication System for a Process Oriented Management of Wildly Distributed Editorial Work

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Abstract

Publishing work is in general connected with diverse review and revise processes. Due to awkward paper based information flows and lacking in control this task is often characterized by exceptionally lengthiness, spontaneous, unsystematic work, high error frequency and lack of transparency which results in insufficient quality.

INTERFYS is an innovative Internet based system concept for making editorial processes more efficient by applying the concepts of Workflow Management just using Web technologies. The paper sketches and evaluates the conceptual and technical aspects of the System INTERFYS 1.0 which has just been realized and was presented on the CeBIT 1998 in Hannover.

Starting Point

INTERFYS, a project of the Institute for Information Systems, Münster (Germany), originates from working on innovative Online (Electronic, Internet) Publishing Concepts. The extensively leading market position of paper-based professional publications on the one hand and the missing profitability of existing online publishing systems on the other hand indicate that available Internet technologies are not used efficiently for publishing purposes in the scientific and professional domain. This situation is even more astonishing considering the obvious disadvantages of print publishing, e.g. the high costs of logistics (which do not have any value for readers and make 90% of the total cost), strongly limited search features, the lack of actuality and quality caused by inefficient review and publishing processes, limits of contents etc. In contrast to this, progress in science and business requires an efficient long range exchange of specialist knowledge. Therefore, modern professional publication systems need to operate within widespread nets of authors, reviewers and editors who provide a readers oriented range of high quality papers. The target of the INTERFYS project is the conception and realization of a system which supports an efficient process oriented management of wildly distributed editorial work, overcoming the severe disadvantages of conventional paper-based publishing systems.

Management of Editorial Processes: State of the Art

There are numerous products called "Online Publishing System". Generally, these Systems only support the presentation of hypermedial documents in the World Wide Web (WWW) and dynamic search functions. In most cases these documents are simple copies or extracts of articles published in print journals before [see also Kirstein, Montasser-Kohsari (1996); O'Reilly (1996)]. This way an informational surplus value can be offered, but the problems outlined above are not overcome. However, even pure Electric Journals (Magazines, e-zines) - although they cope with the problem of awkward and expensive paper based logistics - leave out the potentials supporting Process Management with information technology like Workflow Management Systems. On the opposite editorial work is mostly organized by divisions and not by processes, although it has been evaluated as harmful in numerous publications about Business Process Reengineering (BPR) [see for example Hammer, Champy (1993)]. Moreover, editorial work is often done in an individual way for each article disregarding the potentials of standardizing and automating the corresponding processes.

Workflow Management means "the automation of business processes, in whole or part, during which documents, information or tasks are passed from one participant to another for actions, according to a set of procedural rules" (workflow model) [Workflow Management Coalition (1996), p. 11]. It has become very popular in the commercial as well as in the research world. The development in this area is enormous [see also Fischer (1997); Geakopoulos et al. (1995); Jablonski, Bussler (1996), Lawrence (1997a); Sheth et al. (1996)]. Currently some Workflow Management Systems have already been upgraded by interfaces to the Web. However, the quality of web support varies strongly from product to product. Only a few systems permit workflows to be initiated via WWW. Work list handling and workflow control from browsers are still seldom, too. For example STAFFWARE [<http://www.staffware-inc.com/>] and DIGITAL [<http://www.digital.com/>] provide workflow systems with relatively sophisticated support. workflow applications dedicated to an integrated support of entire editorial processes - from first submission to final publication within the Internet or any Intranet - are not known [see also Kueng (1997)].

Systems Architecture

The first stage of the project already resulted in a productive system (INTERFYS 1.0) which was presented on the CeBIT 1998 in Hannover (Germany) and will be the platform for a pure electronic professional magazine for business information systems (for the present German-speaking). The system is realized in an innovative way integrating Internet, Data Management and Workflow Management. *Data Management* is related to data integration while *Workflow Management* supports controlling and monitoring of editorial processes. This Integration is realized exclusively by standard WWW system components, i.e. without using dedicated Workflow Management systems (see figure 1).

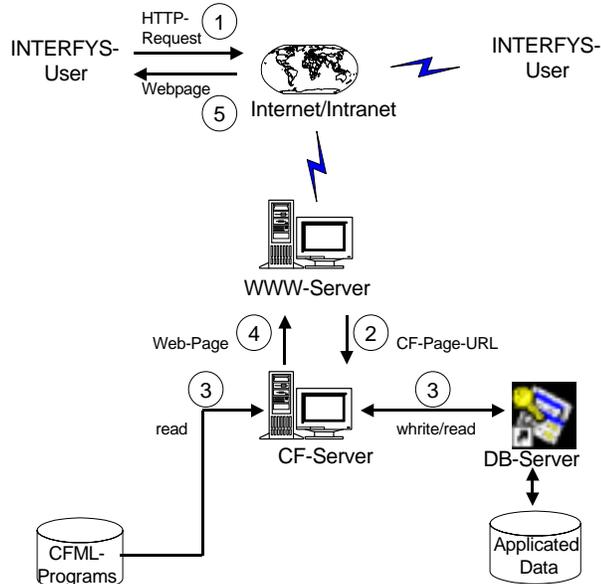


Figure 1. Architecture of INTERFYS

Consequently, for reviewing, administrating, submission and reading of documents the system can be accessed solely via Web browsers which are used as telework workplaces from all participants in editorial process. The core of INTERFYS is formed by a *gateway application* (Cold Fusion (CF)), which allows users to interact with the system, integrating browser, WWW server and Database Systems into a dynamic Web application. Each request submitted by the users Web browser (1 of figure 1) is transmitted to the WWW-server via http. It launches (2) a gateway function (3), which provides the results (for example through a query to the database (3)) which are transferred in HTML (4) and transmitted back to the browser (5).

Management of Editorial Workflows

Differently from prevailing Online Publishing systems INTERFYS takes into account that the characteristics of editorial processes [see also Kirstein, Montasser-Kohsari (1996), pp. 88-89] implicate a high potential benefit derivable from process automation. Consequently, one goal has been a workflow based support of the entire editorial processes - from first submission to final publication. Within the editorial process implemented authors submit documents via a Web page authorizing themselves and

triggering (simply by click) a FTP upload of the authors document. The review is executed respectively by two reviewer and one arbitrator, who judges the document finally on the basis of the two reviews. The arbitrator and reviewer do neither know the author nor each other (double covered review). For ensuring the quality and faithfulness to deadlines there are numerous loops in the process structure.

In INTERFYS Workflow Management is not realized using a dedicated Workflow Management System but is implemented exclusively as CFML (Cold Fusion Markup Language) programs in the Cold Fusion Server. It could therefore be argued, that - because there is no workflow engine - INTERFYS has nothing to do with Workflow Management. The answer to this is that two constitutive criteria of Workflow Management are fulfilled here

1. There is realized an automation of process control executing core functions of Workflow Management:
 - *Coordination of activities* - automation of the transition of single activities within an editorial process. The knowledge, which activity follows another, is handed over to INTERFYS completely (this approach is regarded as transactional or production workflow by some authors. The workflow-based coordination of activities enables to reduce non-value activities like asking for information and supports learning effects.
 - *Coordination of actors* - automation of editors deployment for the execution of process activities. In this respect tasks related to certain activities are assigned to editors depending on their knowledge and workload. Coordination instruments are the notification and synchronization mechanisms via work lists which can be handled solely through web browsers. This approach accelerates the identification of qualified personal and eliminates respective search activities .
 - *Coordination of data and application systems* - automated provision of the relevant data for the editorial work and triggering of the appropriate application system for reading, writing and printing via remote data and procedure calls respectively. The efficient provision of data is said to be one of the most important economical arguments for the implementation of Workflow Management systems [Fisher (1997), pp. 54].
 - *Monitoring and controlling of process instances*: Automation of the extraction, comfortable graphical presentation of information referring to running and finished processes. Additionally there are realized automated warning messages, escalation workflows (see figure 2).
2. There is a separation of task logic, i. e. of programs which support tasks referring to activities to be executed within workflows (individual text editors, FTP-Server, Web-Server, Mail-Server, Acrobat Writer™, Acrobat Reader™, see paragraph 3.3) and process logic, i.e. programs for automation of process control in the sense of the core functions of

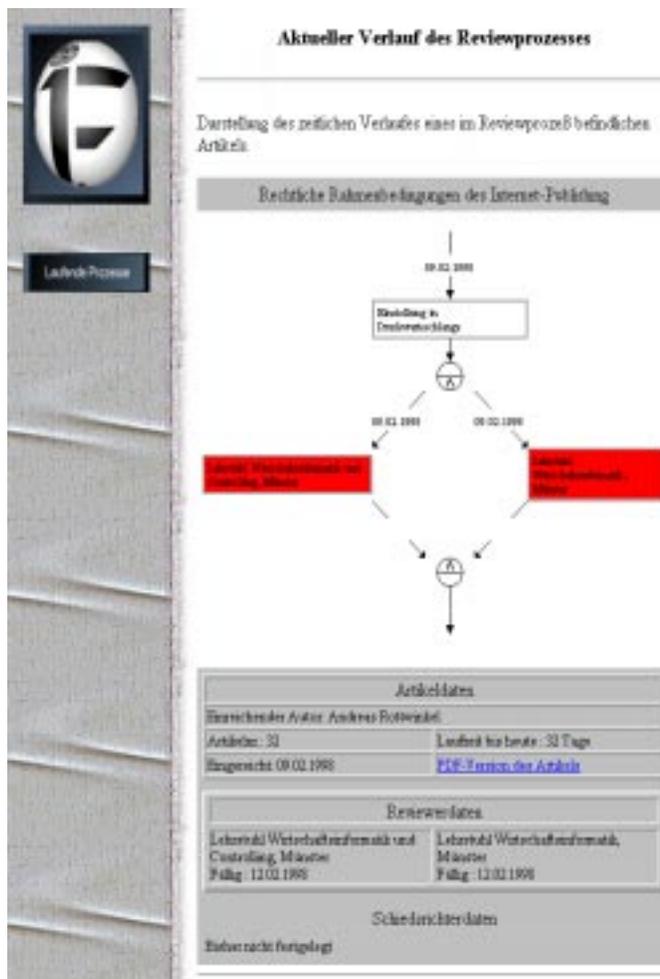


Figure 2. Monitoring Screen for an INTERFYs Controller

Workflow Management outlined. This is because the latter ones are implemented exclusively in the Gateway Server as a CFML programs.

Hence, the gateway application acts as a controlling middleware, i.e. a layer between applications supporting activities and data which are needed for that. Exactly this is the characteristic of a Workflow Management System. While regular Workflow Management System usually provide graphic-based languages dedicated to define workflow types CFML is a purely textual languages for describing interactions between Web servers and data base systems.

Consequently, there has been worked out a manual, which contains a set of CFML statements to realize elements of workflow definitions i.e. logical workflow structures (sequence, AND, XOR etc) role resolutions, remote function calls, monitoring etc (see fig. 3). The resulting subset of CFML forms a textual workflow definition language which can flexibly be used to specify different workflow types.

Distribution of Documents

Table 1 comprises some distributive functions of INTERFYs.

Summary and Perspectives

Unlike prevailing Online Publishing systems INTERFYs does not only support the widespread presentation of documents but also improves the management of editorial processes with flexible IT support of process control. By increasing transparency and controllability of processes by systematic feedback control circuits, higher process and resource efficiency can be reached.

Table 1. Selected Distribution Functions

Distribution Goal	Functions of INTERFYs
Inter, Intra and Extranets	Access of documents can be world wide or can be restricted by applying passwords, as they are already used within the editorial Intranet.
Simple Document Retrieval	Readers are offered comfortable <i>document search</i> functions referencing fields, headword and abstracts (full text).
Dynamic Contents	Through <i>versioning</i> utilities INTERFYs supports the publication of draft documents which are continuously updated or documents whose period of validity is limited.
Active Information	There is the possibility of being automatically informed about all new documents related to certain fields or headword through a <i>digest service</i> .
Feedback	Hierarchical structured <i>discussion forums</i> support the mutual exchange of views about single documents special fields.

Currently there are just a few Workflow Management systems available which have the capability to work sufficiently in the context of web. But even in comparison to solutions based on such Workflow Management Systems, INTERFYs has three significant advantages [see also Lawrence (1997b)]:

- Workflow Management system would be an additional component which is itself costly and does not have the functionality that let's the gateway server appear obsolete.
- Editorial processes are pretty simple and would utilize only a minimum of a functionality brought by Workflow Management systems. On the other hand specific requirements occur which these ones may have problems to cope with, like assigning one work item to exactly two workflow participants on the basis of a credit point system.

- INTERFYS is a very simple system which can probably be customized more easily than Workflow Management systems which due to their high functionality tend to be very complex. Especially because of the internet focus of the gateway system and the relatively simple workflow structure the implementation costs could be kept very low without using a dedicated workflow engine. Using an workflow engine would lead to more complex API programming and the advantage of graphical workflow modeling and the higher flexibility is not needed in the context of professional online publication systems. Against this background INTERFYS provides not only a working environment for editorial work but shows a very powerful and cost efficient way to realize Workflow Management with Web technology.

References

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