Collaboration through Navigation: The Case of a Web-based Helpdesk System

Marios D. Dikaiakos **Dimitris Zeinalipour-Yiazti**

Dept. of Computer Science
University of Cyprus
PO Box 537, 1678 Nicosia
CYPRUS
Email: {mdd,csyiazti}@ucy.ac.cy

The World-Wide Web, along with other Internet based services, has emerged as a universal platform for information dissemination, sharing, and computer-mediated communication. Internet services, however, are not by themselves sufficient to successfully support the collaborative requirements of human processes. What is required, instead, are Internet-enabled integrated environments, tailored to the communication, information sharing and coordination needs arising in the context of human cooperation [**KRW96**,**MC94**]. Therefore, it is a real challenge to explore and address, in the context of the Web, the problems that led in the past to well-documented failures of Computer-Supported Cooperative Work tools [**Gru94**].

In this paper, we address these issues in the context of **Helpdesk** (http://www.cs.ucy.ac.cy/helpdesk/) a Web-based system that we designed, developed, and deplored to support the activities of our research and instructional computing laboratories. Helpdesk is comprised of a Web-database of requests, replies and announcements, wrapped with a system to support collaboration among users, system administrators and lab technicians. The design and development of a Helpdesk system represents a real challenge for a variety of reasons, including:

- The lack of clearly-defined processes and responsibilities in our

research labs that produced a confusion vis-a-vis the labs' role and capabilities, along with problems of miscommunication and misunderstanding between users and system administrators.
- The dynamic nature of requests arising in the context of computing research labs, which leads to highly flexible and informal cooperation patterns among involved actors.
- The technical difficulty of combining and integrating, under a common Web-based interface, the provision of services for: information dissemination and sharing, asynchronous communication, interactive discussion, activity coordination, and book-keeping of requests, assignments, and solutions. In our context, these services involve actors with different roles, needs and priorities.
- The lack of established guidelines and software engineering methodologies and tools for developing Web-enabled collaboration environments.

To tackle these issues, we employed an approach based on the use of rapid prototyping, participatory [**Kyn91**] and contextual design techniques that helped us achieve the convergence of supported work-patterns and group-processes, user-interface components, and underlying-system capabilities, into a coherent collaborative system and an acceptable policy of use.

Collaboration is supported through the navigational and full-text-search components implemented at the user-interface level. These components are integrated with the Web-database transparently to the user. Users interact with the system by navigating within and across its virtual spaces, following familiar navigational and interaction patterns found in successful Internet services, i.e.:

- Hierarchical navigation, via indices that guide the users directly to their topic of interest.
- Sequential browsing with "next" and "previous" buttons that enable users to review requests and on-going discussions sequentially, in a "newsgroup-like" approach.
- Direct location and access to information items of interest, through the implementation of full-text-search and date-search capabilities.
- Asynchronous notification of interested users, by monitoring events in the database and using automated emailing.

These navigational and interaction patterns are equally available to the three categories of Helpdesk users (lab users, lab technicians, system administrator, and lab coordinator) through, three *separate*

virtual spaces (one for users, one for technicians and one for the system administrator). Each virtual space is characterized by different interface cues and functionalities, in order to address the needs of each particular category of Helpdesk users, and minimize the disorientation of users that access two or more spaces (the system administrator, the technicians and the coordinator). Moreover, the system holds various information for users accessing the site with the use of cookies in order to simplify redundant procedures.

The architecture of Helpdesk (see **Figure 1**) is comprised of: a) a database built with Microsoft Access; b) Static HTML Pages and Active-Server-Page scripts for the front end, and c) the UNIX sendmail server for user notification on various events.

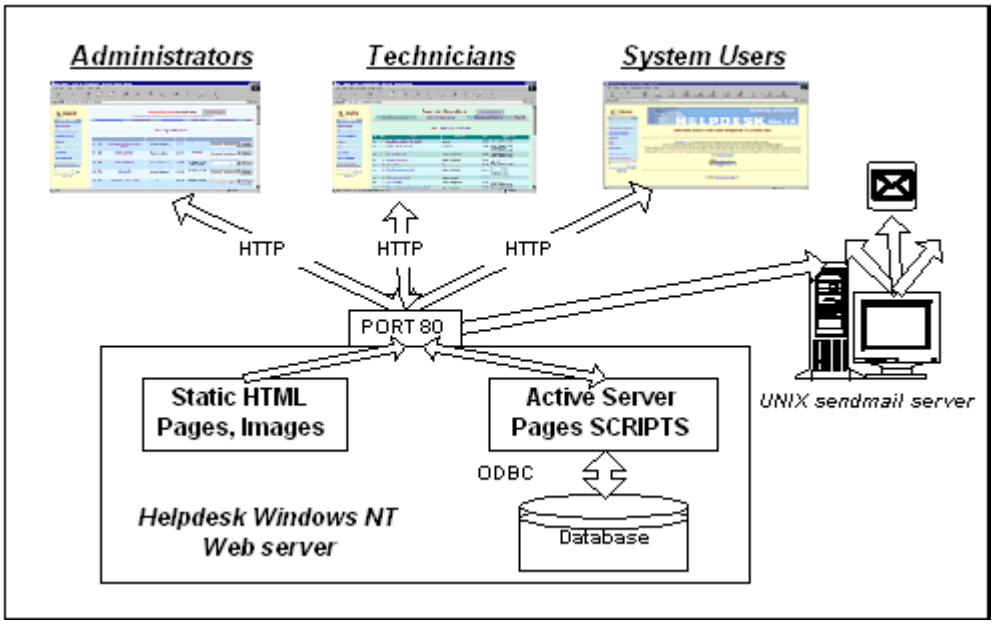

Figure 1 : The Architecture of Helpdesk

Helpdesk currently runs on a Windows NT server 4.0 and the Internet Information Server 4.0. The database can be easily upgraded to more sophisticated systems like Oracle or Microsoft SQL Server, since all accesses to its source are provided through ODBC calls. The Unix sendmail server has been chosen to distribute the mail notification, due to its stability and reliability. Into our future plans will be the transfer of the system from NT to Unix.

In our presentation, we describe: the steps we have taken to transform our knowledge about the human processes, work patterns and group dynamics [**Per91**] pertinent to our labs, into the

appropriate navigational metaphors, virtual spaces, and modes of interaction, and the implementation thereof. Furthermore, the experiences gathered from the application of Web-database and ASP technologies in the implementation of Helpdesk services and its user-interface metaphors, and the effects of the Helpdesk system in the re-organization of our labs. Our experiences show that state-of-the-art Web-database and Active-Server-Page technologies represent a powerful tool for implementing the functionality requirements and user-interface metaphors of challenging collaborative applications. Furthermore, that the deployment of such systems can have positive effects on streamlining the human processes supported, building user confidence, promoting synergies among their users and, last but not least, supporting the collection, organization and maintenance of the collective knowledge developed about systems, services and processes of our computing research laboratory.

BIBLIOGRAPHY

Gru94 J. Grudin. Groupware and Social Dynamics: Eight Challenges for Developpers. *Communications of the ACM*, 37(1):92-105, January 1994.

MC94 T. W. Malone and K. Crowston. The Interdisciplinary Study of Coordination. *ACM Computing Surveys*, 26(1):87-119, March 1994.

Nor91 D. Norman. Collaborative Computing: Collaboration First, Computing Second. *Communications of the ACM*, 4(12):88-90, December 1991.

Per91 C. Perin. Electronic Social Fields in Bureaucracies. *Communications of the ACM*, 34(12):75-82, December 1991.

KRW96 K. Kamiya and M. Roscheisen and T. Winograd, Grassroots: A System Providing A Uniform Framework for Communicating, Structuring, Sharing Information, and Organizing People. In the *Proceedings of theFifth International World Wide Web Conference*, World Wide Web Consortium, Paris, France, May 1996, **http://www.w3.org/Conferences/www5**.