

USER IN MOTION TO PLEASE...

Nikolaj Lazić¹, Mihaela Banek Zorica², Jasmin Klindžić³, Dragan Dosen³
¹ Department of Phonetics ² Department of Information Sciences ³ IT Department
Faculty of Humanities and Social Sciences, University of Zagreb,
Ivana Lučića 3, 1000 Zagreb, Croatia
e-mail: nlazic@ffzg.hr, mbanek@ffzg.hr, jklind@ffzg.hr, ddosen@ffzg.hr

Abstract

Increasing number of users wanting to access information services via their mobile devices demanded infrastructural changes of the Faculty of Humanities and Social Sciences network and services. Therefore, at the beginning of the year 2006 we have started the project *Users in motion to please* which was supposed to gather and transform the entire faculty's information services in order to respond to the users growing demands and to keep the pace with the technological changes. Our goal was to offer end-users (teachers, students, employees) easy access to information and information services even when they are "in motion" i.e. accessing them via their mobile phones, PDAs, smartphones and laptops from the faculty or anywhere in the world.

Certain phases of this project called for hardware-based changes (i.e. installation of numerous wireless access points in the Faculty buildings), while others have relied on minor software changes (i.e. adaptation of the information services interfaces – like webmail, CMS and so on), but the most important part of all these changes are security, access and privacy measures, most of them relying on introduction of the uniform system of authorization/authentication at the Faculty and University level. Information services that are modified and adapted during this project are: central web pages of the Faculty (online notice boards – departments' news and announcements, announcement boards of the dean's office, online notice board of student administration service, online telephone directory), faculty-wide LMS called Omega, webmail service and library catalogue. The access to both wired and wireless network available in the open-access parts of the Faculty's buildings (hallways, libraries, classrooms) are enabled for authorized and authenticated users that have valid AAI@EduHr electronic identity issued by the faculty.

1. Introduction

Croatia is still a transitional country and it is subject to many changes, in education as well as the economy. Present changes can be observed at all levels of education, from the primary schools to the universities. In elementary schools we have implemented Croatian National Educational Standard whose aims correspond to the objectives that dominate the educational sector in the EU and are directed at building a knowledge-based society in which the school system is primarily intended to prepare pupils for lifelong learning. The *Standard* was generated as a result of the recognized problems of overloading pupils, inadequate teaching methods and insufficient monitoring and evaluation of the quality of education. In its essence, it acknowledges the importance of relieving pupils from encyclopaedic content and directing them toward creativity, problem-solving abilities and lifelong learning. Reform aspirations in tertiary education, inaugurated by the Bologna agreement, refer to employability, quality assurance, mobility, compatibility and imply lifelong learning as a core concept. These principles have stimulated universities to restructure their curricular offerings and bring them

in line with societal needs that predominate in the knowledge economy. Universities have also implemented ECT System in order to be compatible and comparable to other European universities. This change will enable exchange of both European and Croatian experts and students. This is one kind of mobility we are looking for.

The other kind of mobility we need is making students able to move from one faculty to another without changing connection parameters. This is done using AAI@EduHr [1, 9] electronic identities issued by the faculty. Each faculty is responsible for providing their students with usernames and passwords which are also stored centrally for backup purposes. Mobility between countries is maintained by Eduroam [2, 3].

Educational institutions are expected to transform themselves in accordance to the challenges confronting the contemporary society. ICT is perceived as a catalyst for these transformations, which will enable the essential transition from traditional educational paradigms, manifested in instructor-led models (passive knowledge reception, teacher as the «gatekeeper» of information, individual effort) to 21st century paradigms manifested in student-centered models (problem solving, teamwork, interacting and processing information, active involvement learning, construction and discovery, problem exploration, customized learning).

Institutions of higher education have purposely and seriously begun to position themselves with regard to e-learning. They have made serious efforts to move ahead from the public-relation rhetoric of suggesting innovation towards becoming leaders in drafting vision, policies, and goals with regard to e-learning [4]. This is absolutely true and the fact is that countries worldwide are establishing institutions (like UK's Joint Information Systems Committee [6]) and publishing documents and standards that deal with the implementation and improvement of e-learning at the higher education institutions, in giving guidelines as well as evaluate e-learning at universities [5].

Usage of ICT in Croatian educational environment is strongly supported by the government, but there is still a lack of documents and guidelines for implementation and evaluation of e-learning in higher education. Nevertheless, Universities and Ministry of Science, Education and Sport are working on the documents and standards that should evaluate and benchmark e-learning programs, and we expect it to be released very soon. Currently initiatives are not organized on the university level but are coming from the single faculties. On the other hand there are initiatives coming from governmentally financed Croatian Academic and Research Network (CARNet) who has established an E-learning Academy in cooperation with University of British Columbia, Canada. It offers three one-year certificate programs: E-learning Management, E-learning Tutoring and E-learning Course Design. The whole program is offered through WebCT which is also offered to whole academic community for creating and offering their own programs i.e. providing e-learning support free of charge. Still faculties are a bit skeptical towards the commercial solutions due to the fact that it is not know until when they will be financed and therefore are oriented to Open Source solutions like Claroline and Moodle [7].

Currently, the largest faculties at University of Zagreb are favoring Moodle and faculties from other universities are following them and the number has grown to 25 higher education institutions i.e. faculties and colleges. Therefore one could say that the Moodle community in Croatia is very strong, and due to that fact Moodle has its translated Croatian version. Especially with the transformation and conciliating university programs with the EU university programs under the Bologna process, the faculties are becoming more aware of the

necessity of transformation of teaching regarding the new pedagogical methods and the full usage of the opportunities that ICT offers.

In order to solve all student needs at the Faculty of Humanities and social sciences some fundamental changes had to be made. Hardware based changes and changes in information services.

2. Hardware-based changes and addons

One of the most important and time-consuming hardware-based changes that we had to implement was the installation of wireless network infrastructure in several buildings belonging to the Faculty. The access to both wired and wireless network available in the open-access parts of the Faculty's buildings (hallways, old department libraries, classrooms, the new library building) is enabled for authorized and authenticated users that have valid AAI@EduHr electronic identity issued by the Faculty.

Wireless network infrastructure currently consists of 15 Linksys WRT54GL Wireless Access Point Routers powered by open-source DD-WRT Linux firmware version 2.3 sp2. Aforementioned firmware has given us a number of additional capabilities and functions not available in the original firmware provided by the manufacturer: transmit power adjustment (especially good for additional signal coverage of those «hard to reach places/locations»), support for 802.1x Extensible Authentication Protocol (EAP), client mode (that supports multiple connected clients), IPv6 support, port forwarding support, Syslog, SSH server & client, VLAN support, WDS repeater mode, WPA/TKIP support, and number of others.

In the following 2 months, we are planning to purchase 30 additional Linksys WRT54GL devices in order to cover all three Faculty buildings with more than 90% signal coverage. After the construction phase of the fourth building (the new 6-story library), we will extend both wired and wireless network infrastructure to that building as well.

The users of the wired network infrastructure in the open-access parts of the buildings can access it with 100MB/s or 1GB/s, depending on their location, as well as the deployment of the gigabit-enabled network switches throughout the building. Wired network ports in the open-access parts of the Faculty buildings will require 802.1x authorization from June 2007.

The users of both wired and wireless network infrastructure in the open-access parts of the Faculty buildings are forced into a separate VLAN that gives them access only to a basic set of network services, like: e-mail, web browsing, instant-messaging, ftp and similar. The usage of peer-to-peer applications/services/ports is not permitted in that VLAN, because of the security, performance and legal issues.

The daily number of wireless users is currently around 150 (roughly equal number of teaching staff and students), mainly because of the limited signal coverage (due to lack of wireless access point devices). The previously mentioned number is rather small in comparison to the number of users that connect through the wired infrastructure – around 250 to 320 a day. There is an estimate that there will be more than 1200 users of both wired and wireless network infrastructure available in the open-access parts of the buildings in the near future based on the increased availability of the laptops, network-aware PDAs, next-generation mobile phones and other network-aware portable devices.

We have not forgotten the financially-challenged users or ones who do not have mobile computers (and we are also not trying to force our end-users to buy some piece of communication device just to be able to access our network infrastructure), so we have provided a number of Linux-powered terminals that require authentication with AAI@EduHr electronic identity issued by the Faculty.

3. Modification of information services

In order to access certain information services that enable the end-users to publish/change/remove some of their content, users will have to authorize/authenticate with AAI@EduHr electronic identity issued by the Faculty of Humanities and Social Sciences in Zagreb.

We have recently started the second phase of our project that consists of the minor modifications of the central information services provided by the Faculty. Those changes will bring information services closer to the end-users, enabling them to access those services on the move, as well as removing unnecessary clutter of multiple username/password pairs required to access different information services located on more than dozen servers.

We are certainly not trying to implement automatic SSO solution (Single-Sign-On), although we are trying to come as close as we can to the comfort and ease-of-use that SSO-like solution provides to the end-user.

3.1. Modified information services

Information services that will be modified and adapted during this project are: central web pages of the Faculty (online notice boards – departments' news and announcements (24 instances), announcement boards of the dean's office, online notice board of student administration service, online telephone directory), faculty-wide LMS called Omega [8], webmail service and library support staff will modify online library catalogue.

3.2. Modification of the central CMS-a

The work on the modification of the central CMS (Content Management System) user interface was finished in 27 workdays, mainly because of the open-source nature of the CMS solution (CMaster IV) that we are currently using. Currently the CMS supports publication/change/removal of content through Opera Mobile browser on Symbian S60 platform (although we are trying to test and implement solution that will work on other mobile browsers, too).

Additional changes in the end-user interface will include removal of all image files present in the interface, modification of code to enable access for the low-bandwidth devices, simplification of interface navigation, adaptation to the larger number of mobile web browsers (although browsers for mobile devices that are standards compliant have only some slight issues with the presentation of content that can be easily circumvented on the server side). Authorization/authentication method of the editors and authors in the central CMS will be transferred from the internal user database to the AAI@EduHr electronic identity method by the end of year 2007.

3.3. Modification to the Omega LMS

Modifications to the user interface and several modules of our faculty-wide LMS Omega, based on the open-source solution MOODLE are scheduled to last for some 6 to 12 months. Since there are more than 3300 students and over 170 teachers and their TAs who are using the LMS, we have to take into consideration that there is a large number of different and incompatible user-provided mobile communication devices, driven by various operating systems running their proprietary and standard non-compliant web browsers. We have realized that there is no reasonable way or need to optimize the system to work satisfactory on all the available platforms, partially because of the underlying issue of incompatibility between the mobile device platforms coming from proprietary vendors (who are reluctant to comply with web standards or provide an easy way for a user to change the default web browser on their devices). Proprietary solutions provided by the mobile device vendors and proprietary sub-standards for web content rendering on different mobile devices are the two largest obstacles we are facing. Fixing one issue with one proprietary platform/web browser provided by mobile device vendor would inevitably raise two or even three more on devices that are using different combination of platform/web browser, and so on. Therefore, we have focused on providing the content that can be rendered properly on as much combinations of handset platforms/web browsers, while trying to comply with the standards as much as possible. We would especially like to give as much praise as we can for Opera Mobile/Opera Mini browsers, as well as all those mobile devices that support their installation.

The official MOODLE site offers a package named «MOODLE for Mobiles» meant for the mobile devices on the Japanese market (according to the documentation provided by the Japanese team, more than 98% devices in Japan support CHTML standard – which makes the implementation and function of the similar solution rather painless and easy). We will try to modify our testing installation of MOODLE using some of the solutions provided by that package (taking into consideration the inevitable differences and incompatibilities because of the different eco-systems). The final goal of this modification (which actually means that we have to install alternative user interface modified for the mobile devices) is to enable at least third of our mobile users to access their online classes and learning materials without major speed or content rendering issues, while retaining most of the security and/or functionality. The necessary changes that will have to be done on MOODLE template/theme will include: removal of Javascript support, removal of cookies support, removal of MOODLE standard redirection, removal of css, tables, removal of image files and so on.

Omega LMS authorization/authentication method for the past 2,5 years has been IMAP-based (only users with the e-mail address @ffzg.hr were able to use/access the system). Authorization/authentication method based on AAI@EduHr electronic identity will be implemented by September 2007.

3.4. Modification of the webmail service

Webmail service at the Faculty of Humanities and Social Sciences runs on rather popular open-source solution called SquirrelMail, which is de facto standard in the CARNet institution-members (Croatian Academic and Research Network). The adaptation of the webmail service interface that we will try to implement is based on SquirrelMail Lite package, enabling easier and less bandwidth-consuming access to the users with mobile devices, mainly PDAs.

Interface changes include removal of frames, fixing frame target tags, removal of all color and background color tags, hiding several settings (Javascript address book, e-mail creation in new window and so on. Some plugins could also be disabled as a way of improving the navigation on mobile devices: bug_report, fortune, newmail, calendar. Login page can easily be simplified by removing logo picture file, as well as the Javascript that detects default language.

4. Conclusion

Changes on the information services done at the Faculty of Humanities and Social Sciences were done by the employees. Knowledge based society for knowledge based society, self maintained and self improving. Investing in hardware could not be avoided, but it couldn't be compared to investing in people.

Investing in people makes it possible to maintain the pace with European countries but also facilitates fast changes in services provided to students and academic staff which are based on Open Source projects.

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