



# Managing services connected to new educative technologies in a medium size university

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## Preface

The Nancy 2 University is a medium size institution located in the East of France. The facilities and buildings of the University are distributed in several sites in Nancy and its suburbs with some offshoots in other towns of the Lorraine region. It enrolls some 20 000 students involved in Humanities, management, Law, computer science. The user base varies in its academic levels and computer literacy, as one may expect in a community with computer specialists on the one hand, and common end-users in the Humanities or Law on the other. A faculty of 800 and some 300 administrative and technical staff are in charge of instruction and management of the university.

A specialised department is responsible for the computer resources and facilities for the whole university, i.e. the *Computer Resources Centre* or CRI (Centre de Ressources Informatiques). The CRI is manned with all of the computer staff of the University and all aspects involving computer technologies and networks as well as computer support in research, instruction, documentation, and administration fall within its technical jurisdiction. Its tasks also include technical assistance to all users, the administration of computer classrooms and the whole network infrastructure, as well as related services like web sites, ftp, email and forum servers. Additionally, members of this department develop specific software for the university. The Centre also establishes the University's computer safety policies.

In 1998, the University decided that every enrolling student should receive an email address and login. This email and login would provide access to the standard environment defined for the community they belong to, i.e. the group of students following the same curriculum. This effort was part of a general program dubbed "Internet for all". In its initial phase, almost all members of the faculty and staff received a professional email on a voluntary basis before this program was extended to all university members. Now, after two years of experimentation, it seems interesting to outline the main results of the project and to deduce from this analysis the desirable developments in the years to come.

## 1 The "Internet for all" project in short

The "Internet for All" project was mainly aimed at providing everybody in the University with basic utilities like email and web-browsing, and with resources like the catalogues of the University Library and its documentation centres, assistance for professional integration, distance learning and retrieving information from interactive terminals. Accessing such contents would impossible otherwise because of the distance between sites (up to 50 Kilometres).



Our effort is not to develop Internet access for all students not only because it is now a growing tendency within the educational world. This development may help achieve several objectives within the university:

- Using Internet may help prepare students themselves to their future career by offering them the opportunity to use an environment most likely in professional life.
- It is a means to improve academic achievement by offering help and assistance: the students can access educational contents, like online courses, former examination papers, etc.
- It is a good opportunity to prepare students to lifelong learning. Now, people have to adjust to ever-changing job requirements. They have to manage their own relationship to knowledge successfully. Students have to learn how to be the autonomous and responsible in the field of learning.
- Internet is a huge repository of information and knowledge that must be used together with usual campus libraries.
- An Intranet is a good way to disseminate administrative information to all students.

Of course, as the university numbers about 20,000 students, a manual creation of email and login was impossible and we had first to address the difficulty of automatic creation of the students email and login immediately when enrolling in the University. You will find further details on this effort in [Boy 98]. Let us only mention that all the students are now referenced in a LDAP file defining their access rights of everyone according to each service. This allows to take into account exceptions to common rule with students registered in multiple programmes within Nancy2 (a student can only use the computer classrooms of the site their programme belongs to, because we have an instructional server per site). A student will keep his email address along his time in Nancy2, year after year. So we have developed ad hoc procedures.

In 1998, we offered an email address and a login only to half the students in order to test our procedures; in 1999, this was extended to all students. After a few months of experience, we notice that only 25% of the students use the email service regularly. We can outline the following explanations:

- Students (especially freshmen) are aware of the existence of this facility. They are in **need for information** (information sessions take place at the beginning of the academic years, but students are at that time submerged by a huge amount of various administrative and programme data. It is not very relevant to inform them at this time of the term).
- Students do not feel in need for new technology. They do not realise the interest of such tools. Teachers should play an incentive role in having students use email or computers (word processor or spreadsheet for example). There is a **need for pedagogic integration** of such tools. Integration only works if teachers themselves have accepted new technologies. Some training sessions dedicated to the use of new technology in classes and courses have been organised: feedback from academic experiments has complemented some more formal presentations.
- Students do not know how to use a browser or a mailer: there is a **need for technical training**. We have developed several online lessons on our student web site (<http://etudiant.univ-nancy2.fr>) to address this primary need.

- Most of the students are not familiar users of computers and software. They are technology shy. There is a **need for assistance**. We propose help (unfortunately only sporadic) in the computer rooms to guide students through their first interactions with PCs. Students in computer science are hired by the CRI to assist new students assistance by being present in computers rooms to answer any question about the use of usual software . . .
- Some students already have their personal email (at home for example, via providers). They do not need to have several addresses and favour their family one. This situation causes a problem because contact students only through their academic address that is the only one referenced in the University's email directory. There is a **need for everyday life integration**. Since the beginning of this term, we propose a web-mail service. Students can access their personal mailbox from any connected point, inside or outside the University. They can manage mail redirection themselves if necessary. This web interface does not require any particular installation on their personal computer: Webmail is a simplification compared with traditional software (you do not have to initialise any parameters or options). Thus, students can use their academic email even if they are away during training periods in companies or stays in foreign universities or term vacations.
- There is a crucial lack of public computers. For example, there are only 150 computers for 10 000 students within our main campus, together for free access and teaching. There is a **need for infrastructure**. The management staff of the university is keenly aware of this shortcoming, but the University is suffering from a terrific lack of buildings.
- It is necessary to incite students to use new technologies. They must find further motivations around the basic use of mailer or particular software: there is a **need for services**. For example, students are permanently in need of finding administrative information together with educational material and data.

These various observations show the need for a new architecture of services. We have to propose an attractive and easy to use environment to students, in order to motivate them for the use of new technologies. Our strategy is based on the LDAP technology.

## 2 Technical overview

The current email service used by our 20 000 students runs on Sun/Solaris server with 27 Gigabytes disk space and one Gigabyte RAM. We use the email server software "postfix". We also implemented a student directory based on LDAP to allow student name searching and the output of students list by programmes.

The LDAP server is at the core of all processes. It provides access to email but also is used to identify restricted access to particular W3 pages. We developed bi-directional password synchronisation between unix and Ldap.

LDAP has been structured to take the organisation of the University into account (<http://docs.univ-nancy2.fr>).

The implemented structure is the following:



The server base is ou (Organizational Unit)=Etudiants, dc=univ-nancy2.fr, dc=fr

Which is then broken down by campus.

We defined two objects :

- The «etudiant» object (*student*), which includes the name and first name of the student, email address, the registered programmes, an encrypted password, the date of enrolment in the University and the date of account validation;
- The «formation» object (programme), which includes the literal name of the programme, an ID to allow for email aliasing for students registered in the programme, and the members of the programme.

We use OpenLdap v1.2.6 and we will update to OpenLdap v2 in order to standardise our diacritics and to use the latest features of this application. In order to ensure the highest possible reliability we replicate the Ldap base which contains over 20 000 students. The operation of the server has been notably stable, since no downtime occurred in an 18 months period of service.

The batch processes to access LDAP were built in Perl (*perldap* by Mozilla), web access routines were written in perl and PHP.

The webmail solution we implemented uses "IMP" on a "cyrus" server (for "Imap") and OpenLap (<http://etudiant.univ-nancy2.fr/mail>).



The existence of a complete LDAP database containing our students associated to their programme memberships has facilitated the implementation of a web server containing course material accessible to each student according to their access rights as defined in the LDAP base.



To build the contents, teachers want to be able to do the following tasks:

- Update the website contents easily;
- Restrict access for specific groups of students and colleagues from the University;
- Use an easy interface to be able to administer by themselves browsing and publishing rights on this website.

In addition, we have developed an interface (in PHP) for teachers to easily define who is entitled to place course material and to which programmes they are accessible. We developed all these applications and environments using public domain software.

### 3 Towards a new architecture for services

To summarise the first observations made in the last section, we have two major problems to address:

- how to generalise and popularise email and web browsing among all kinds of users; and,
- what kind of specific services are to be developed in order to satisfy student expectations ?



The first question (addressing needs for information, pedagogical integration, computer training, assistance, infrastructure and everyday life integration) is crucial. Without free access computers, new educative technology opposes a new social barrier between students with Internet access in their families and the others. One of our main objectives is to guarantee each student with access to a computer and the many facilities offered by computer technologies in the field of education. At that time, this objective has not been achieved yet, due to a crucial lack of human and financial resources and buildings in our university.

It is necessary to keep in mind that both teachers and students are partners of such projects, and that both do feel concerned. Without any motivation from the faculty members, the project will fail. Information must be done for all of them, with the will to support all initiatives, even the smallest. It is essential that teachers could easily develop course materials and deposit them on the Internet. The technology must not introduce a technical complexity: the teacher is eager to keep his autonomy and even if assistance could be required at the beginning. The increasing teachers' awareness is particularly raised through conferences and experiment feedback reports.

The second question on specific services and students' expectations is more complex. We can distinguish three different kinds of elements to be integrated in the architecture: tools, resources and services (see figure 1).

"Tools" are the products required by an academic programme. These tools can be specific or more general. Students in Geography for example require software specialized in maps visualisation. All the students use word processors. Each student must find the tools required by his programme and the useful tools have to be defined by the teachers involved in the formation.

"Resources" are materials providing students with assistance to their programme or administrative data. Information about scholarships or examination grades is a very common need. Teachers will have to distribute bibliographies, auto-tests, notes, etc. These resources could be reserved to a group or accessible to everyone. Furthermore, students need access to the library and to the major virtual libraries around the world. "Services" are related to the use of the network: now students and teachers could benefit from network communication with emails and forums.

Collaborative tools can bring additional benefits to bridge the possible distance between people who want to work together. The production of common documents requires the ability for all the partners to work with the same file.

As we can see, it is also possible to classify these tools, resources and services in two categories: some are specific to a group, the others are useful for everyone.

It is obvious that the global structure must be adaptive and easy to use. It must be adaptive because new tools or services will appear and must be easily integrated (plug and play like). Furthermore this structure must accept links to all other platforms and facilitate usage. Teachers participate in consortiums creating distant learning contents. It is obvious that there is no normalisation about their development and that the structure we propose must be able to connect all platforms. Our structure must be easy to manipulate because

students are non-professionals. They have to be able to use this "educational intranet" with a minimum of assistance. This is why we develop a unified access based on the use of an LDAP directory: the student will only have to remember their password to access to all the services, tools and resources they are entitled to.

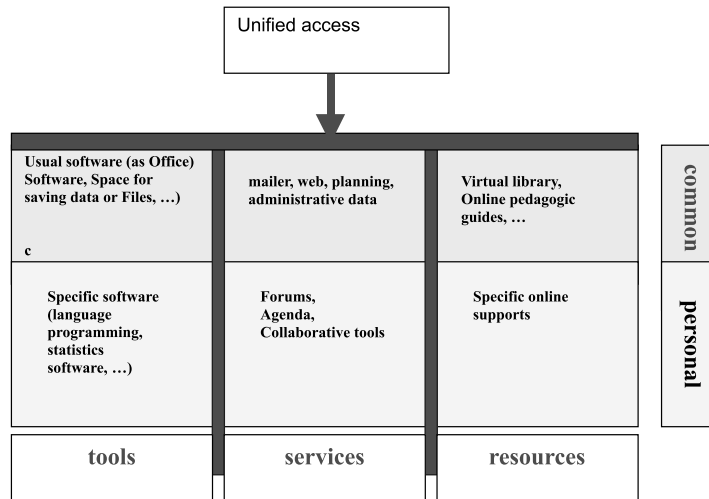


Figure 1: architecture for multiple services.

The standard environment is defined according to this basic requirement. Of course, each student should have the capacity to customize his environment, for example by adding into it links to pertinent Internet sites. We plan to develop procedures to save and restore individual environments.

The "student virtual desk" is a project we plan to implement within two years. It relies on several experiments we are testing. For example, the parts "tools" "common services" and "resources" will soon be operational pretty soon, only the integration in a standard desk is missing. We propose since the beginning of this academic year an "educational intranet" (<http://cours.univ-nancy2.fr>). Teachers can post any course materials and decide upon access authorisations: any student or students belonging to a given group. To read a document with restricted access, students must identify themselves with their personal password (the same password is used for email and services).

Some other opportunities are given to students:

- An Internet site (<http://etudiant.univ-nancy2.fr>) houses all the practical information and software facilities provided to students for their access to University information and the World Wide Web.
- An Internet site is dedicated to administrative information (accessible from the previous site): Mondossier web gives a student their examination upon personal identi-



fication by login in with their personal INE number (national university registration number).

- An online directory of the University has been set up. It allows name searching, but also to view list of students in a programme, etc.
- Some forums have been created for specific common interest groups.

## 4 Conclusions

Such a project can only succeed if all partners feel concerned: it is necessary to motivate the students but also that teachers and administrative staff are aware that they have to add information (administrative or educational) on these servers and to update it regularly. It requires mind changes and new practices. Information, technical training and assistance are also essential for the faculty. We have to encourage domestic productions: to produce packages is not the only an objective, all the initiatives are valuable. In a similar way as we develop user-friendly tools for students, we have to provide teachers with very simple content production tools. For the time being, we opt for Macromedia's Dreamweaver 2. It is a free and easy to use software. With a short presentation and a minimum of assistance, people are quickly able to produce small documents. We design a platform for the distribution of educational resources that allows restricted access. The teacher has only to decide whose groups can use their production (by selecting the groups in a menu). There is no technical difficulty. After several years devoted to courses production in collaboration with teachers, we notice that the most important things for them is to be independent. They wish to master all the steps of the process, from the definition of objectives to the beginning of teaching exploitation.

Designing a reliable and useful educational intranet is a crucial challenge for a university. It is a very powerful tool to extend the teacher and student relationship. It requires from both partners an active motivation and a strong intention to participate. Such an intranet is a global project for a university: it is a good way to restore interaction (even virtual) between all the members of the community (administrative or technical staff, teachers, students). Success depends of the implication of all to use, produce or update information.

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