

PRONET — MULTIMEDIA COMPUTER BASED ON-LINE TRAINING AND SUPPORT SERVICE FOR PROFESSIONALS

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ABSTRACT

This paper describes PRONET, a project supported by the European Commission in the context of multimedia computer based training for three highly-competitive professional groups: telecommunications engineers and professionals, environmental scientists and remote sensing specialists, and biomedical engineers and medical physicists. The PRONET project develops, tests, and validates an integrated telematics network service for the education and training of researchers and professional specialists. The main objectives of the project include the development and validation of telematics learning services for researchers and professionals, multimedia communication systems based on open standards with applications for tutorials, guidance, and delivery of seminars, and an integrated service network including integrated service management systems and scenarios for broadening the service to meet the needs of other professional groups and geographic areas.

KURZFASSUNG

Dieser Beitrag beschreibt PRONET, ein Projekt, welches von der Europäischen Kommission gefördert wird und sich der rechnergestützten multimedia-basierten Ausbildung für drei wichtige Anwendungsbereiche widmet: Telekommunikationsingenieure, Umweltwissenschaftler und Fernerkundungsspezialisten sowie biomedizinische Techniker und medizinische Physiker. PRONET entwickelt, testet und validiert ein integriertes Telematiknetzwerkservice für die Ausbildung und das Training von Forschern und Fachkräften. Die Hauptzielrichtungen des Projektes beinhalten die Entwicklung und Validierung von telematischen Lernservices für Forscher und Praktiker, multimedia Kommunikationssysteme basierend auf offenen Standards mit Anwendungen für Tutorials, Leitung und Durchführung von Seminaren sowie ein integriertes Servicenetzwerk mit integriertem Servicemanagement sowie Szenarios für die Erweiterung des Angebotes in andere Fachbereiche und Regionen.

1. INTRODUCTION

There is a growing need for continuous training of professionals, in order to keep pace with technological innovations. Currently, this need is fulfilled by reading and subscribing to publications and magazines, attending training sessions, seminars and conferences, joining professional societies and user groups, browsing the World Wide Web (WWW) or communicating with other professionals in their respective fields.

Today, we see an increased use of telematics services in training and education. Terms like distance teaching and distance learning become more and more common in training and education environments. In 1995 a project proposal with the title *PRONET – Multimedia Computer Based On-Line Training and Support Service for*

Professionals initiated by EUROCOM Expertise S.A. of Athens, Greece, was submitted to the Telematics Education and Training Program of the European Commission. The proposal was successful and PRONET started in January 1996 as a joint activity of a consortium consisting of:

- EUROCOM Expertise S.A., Athens, Greece (consortium leader)
- FYCSA Formacion y Consultoria S.A., Madrid, Spain
- INTRACOM S.A., Athens, Greece
- International Institute for Aerospace Survey and Earth Sciences ITC, Enschede, The Netherlands
- University of Patras, Laboratory of Medical Physics, Patras, Greece
- Commission of the European Communities Joint Research Center - CEO, Ispra, Italy

- Panafon S.A., Athens, Greece
- Alcatel Telecom S.A., Madrid, Spain
- Airtel Movil S.A., Madrid, Spain

The project has a duration of two years.

2. PRONET OBJECTIVES

The PRONET project will develop, test and validate an integrated telematics network service for the education and training of researchers and professional specialists. The main objectives of the project include the development and validation of:

- telematics learning services for researchers and professionals,
- multimedia communication systems based on open standards with applications for tutorials, guidance and delivery of seminars, and
- an integrated service network including integrated service management systems and scenarios for broadening the service to meet the needs of other professional groups and geographic areas.

In addition to these main objectives the project also strives to evaluate the following aspects: operability of a trans-european training and support service network for professionals, and cost-effectiveness of the service.

The initial users of the PRONET service that will participate in the demonstration of the above objectives belong to the following professional groups:

- Telecommunications Engineers and Professionals,
- Environmental Scientists and Remote Sensing Specialists,
- Biomedical Engineers and Medical Physicists

These three groups form a user base of professionals that:

- demonstrate a fast pace of technological and scientific advances, thus creating the need for continuous education and training,
- are of great importance to the prosperity and competitiveness of Europe in three vital economic sectors, and
- provide a diverse set of user-requirements.

The above objectives will be achieved and verified during the life-cycle of the project by the following:

- six five-hour computer aided learning (CAL) modules for the initial professional groups delivered using telematics services,
- tutoring support for professionals attending the CAL sessions based on audio/video conferencing,
- integrated service management system demonstrating basic administration activities (user, CAL, professional group administration),

- validation scenarios that demonstrate the service between 2 European nations, and
- cost analysis report to be used in order to exploit the results.

The PRONET service will be validated by end-users belonging to the three professional groups.

3. PRONET TECHNICAL DESCRIPTION

The PRONET service network will be composed of three nodes. These nodes are named *Access Service Points* (ASPs) and contain all the necessary hardware, software, and networking infrastructure needed to support the service (figure 1). The three ASP nodes will be physically located at the premises of EUROCOM Expertise (GR), FYCSA (ES), and ITC (NL).

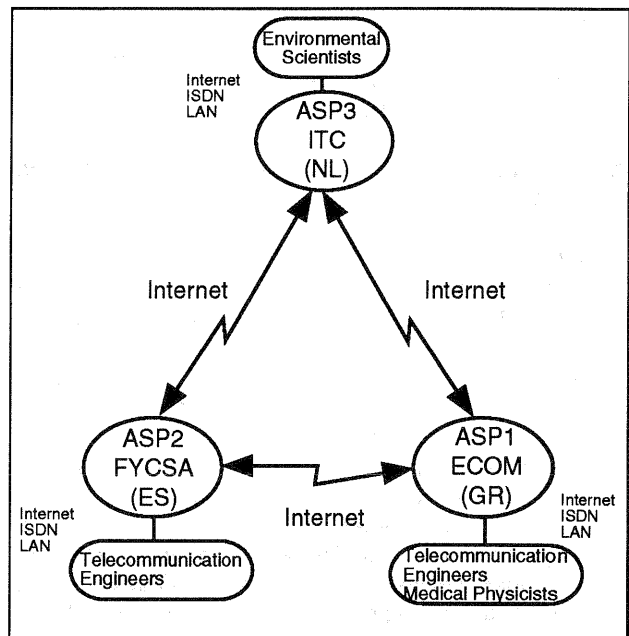


Figure 1: PRONET Service Network

The PRONET ASP network will make use of Internet services in order to communicate between ASP nodes. These Internet services will be used to allow service providers (ASP operators) share their material with other service providers (for a fee). This network will be structured in such a way to form a seamless service. E.g., users accessing the PRONET network from the FYCSA (ES) ASP will be presented with material from all other ASP nodes (EUROCOM Expertise (GR), and ITC (NL)). This is accomplished using mirroring mechanisms where each ASP operator mirrors its material and services to all other ASP operators.

PRONET users have three methods of accessing the service. These methods are:

- LAN Access: Each ASP operator will provide local area access to the ASP hardware. Access terminals will be established on the ASP premises to allow high

speed access to the PRONET service. Users can make use of this LAN access by physically visiting an ASP providers premises.

- **ISDN Access:** Each ASP operator will provide the infrastructure for PRONET service access via local ISDN connections (intra-country). These connections can be established at any one of the major validation sites. A Euro-ISDN connection will be established between the CEO premises (Ispra, Italy) and the ITC ASP site (Enschede, The Netherlands).
- **Internet Access:** Each ASP operator will provide Internet access to the PRONET service. Users may use personal workstations (appropriately equipped) and basic Internet services in order to access the PRONET service.

It is obvious that the above methods offer different bandwidth to the end user. This in turn, influences the quality of service provided to the end-user. E.g., the tutoring service on the LAN access method (or ISDN access method) will be based on video conferencing whereas the tutoring service on the Internet access method will consist of white-board technology and email.

The PRONET service is composed of the following functionalities:

- *Multimedia computer aided learning sessions* (estimated 10 hours per professional user group for a total of 30 hours). These sessions will be based on existing material appropriately adapted in order to be compatible with the PRONET specifications. Use of latest state of the art multimedia system development tools will assist in this matter.
- *Tutoring support* where users completing the above training sessions may request real time or deferred time assistance (depending on access method and time). Video/audio conferencing hardware/software, white-board software, and electronic mail systems will be used (depending on available access bandwidth).
- *Information database access* allowing professionals to access data that is relevant to their field. This data includes technical reports, training availability, legal issues, professional bodies, etc. RDBMS software will assist in this matter.
- *Special Interest Group support* where users can exchange messages and attend on-line text conferencing. RDBMS software and applications will support this function.
- *Service administration support* where ASP operators can add PRONET users to the user database, add new training sessions and new professional groups. Billing and security issues are also addressed here.

3.1 Tutoring Support

The tutoring support service refers to the need to complement the training activities with real-time or deferred time assistance. This tutoring is not intended to replace the multimedia training sessions. In fact the tutoring support intends to clarify any problems or questions arising

from the viewing of the training material. This service may include any combination of the following:

- Electronic mail tutoring (deferred time, low bandwidth),
- White board tutoring (real time, low bandwidth),
- Audio conferencing (real time, medium bandwidth), or
- Video conferencing (real time, high bandwidth).

All the above approaches will be available and demonstrated during the validation of the PRONET service.

3.2 Information Database Access

The PRONET service includes access to customized information database systems. These systems must support the basic access retrieval capabilities provided by most database systems. We assume that data stored in these database systems include different media types.

3.2.1 Remote Sensing Database: The purpose of this information database is to support the users with up-to-date information on the development of GIS and remote sensing technology and their applications in environmental study. The contents will include:

- courses offered by other universities or training centers in Europe in the related fields.
- a clearing house for job announcements. This information can be added by environmental, GIS and remote sensing organizations and ITC will act as a center for distributing their announcements.
- up-coming conferences in the related fields. The library of ITC is currently building this information database and it can be linked to the PRONET information database directly.
- list of literature references and contents of the literature when possible. The library of ITC can also be one of the main sources for this information.
- digital spatial and attribute data. This information database will serve as a point to indicate to the users who has what data (in digital form) in Europe.
- Major GIS and remote sensing software, suppliers, and functional comparisons. This information database has already been built by some other organizations, such as NexpRI at the University of Utrecht, The Netherlands. ITC can act as a link to these services.
- Major GIS, remote sensing and environmental (research) projects in Europe. The information can be obtained from various newsletters and research reports.

3.2.2: Medical Information Database: The information base for medical specialists will include topics such as :

- Scientific/Professional organizations of medical physics (MP) and biomedical engineering (BME).
- European universities offering courses and programs in MP and BME.

- European organizations responsible for directives and recommendations, with respect to MP and BME applications.
- Planned conferences and events on MP & BME in Europe.
- Scientific/Professional journals.

3.2.3: Telecommunications Information Database: The information database for telecommunication engineers will include topics such as:

- Standards reports
- Telecommunication services offered in EU countries
- Planned conferences and events
- Scientific journals (information sources, etc.)
- Offered training courses
- Job announcements

3.3 Special Interest Group Support

Since the PRONET service intends to support the needs of various professional groups to exchange information and requests assistance from each other the following activities must be examined:

- Electronic bulletin boards,
- Multimedia electronic mail, and
- On-line conferencing (text and/or audio depending on bandwidth availability).

These items can be supported integrating available software packages based on applications developed using commercial RDBMS products.

3.4 Service Administration Support

The PRONET service will support the following activities:

- User administration (login/password),
- User access log (activity; timestamp),
- Billing support interface, and
- Security interface (authentication, encryption).

4. PRONET ARCHITECTURE

PRONET users will be able to access the service via a set of Access Service Points (ASPs). These sub-networks will in turn be interconnected in order to form a Pan-European network of ASPs. PRONET users may access the service by either physically visiting an ASP or by remote login procedures using personal computers and conventional telecommunication services (LAN, Internet, ISDN).

In addition to the above the PRONET service will be able to operate in the following environments:

- A PRONET service provider must be able to operate independently of the other providers on the PRONET network. In other words all CAL packages, information database, and SIG support services that are sup-

ported locally should be available even in the event that other nodes are down.

- User accounts will be characterized by the triplet <login;password;access-node>. Users must access the PRONET service from their respective node. However, sharing of PRONET user accounts between ASP nodes could be allowed.
- A PRONET user will be presented with a complete menu of all CAL packages and databases available at all ASP nodes. Users may then select a specific service item from this menu. The item might in fact be stored at some other service provider on the network. Appropriate billing considerations support this activity.

Figure 2 shows the layered architecture of PRONET and the envisaged software systems used for the development and deployment of the services.

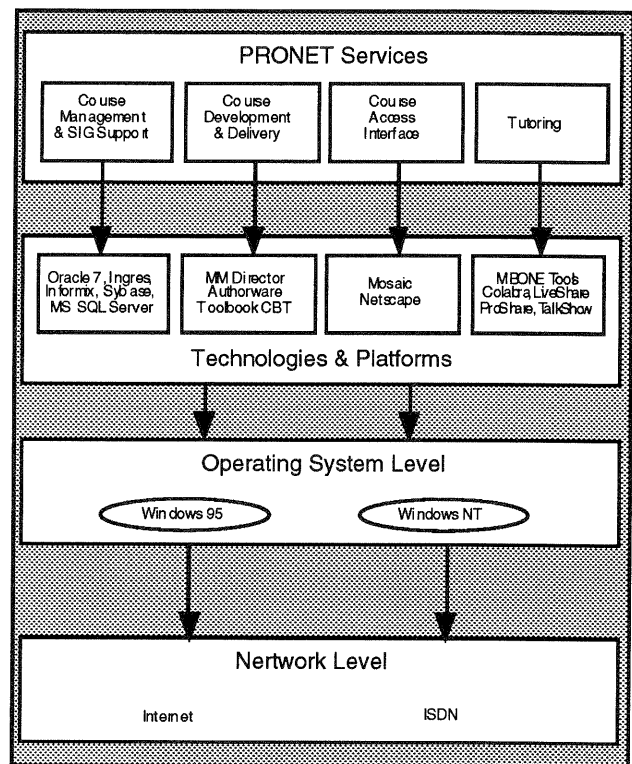


Figure 2: PRONET Components

5. CONCLUSIONS

PRONET is an innovative approach towards integrated training for professionals. It uses state-of-the-art telematics tools to provide services for its users that allow them to follow educational and training lessons at their own pace and from their own working or living environment. PRONET has economic and social impact through its on demand training service, promotion of expertise to highly skilled professionals from all over Europe, reduction of transportation costs, and creation of new business opportunities.

6. ACKNOWLEDGMENT

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7. REFERENCES

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