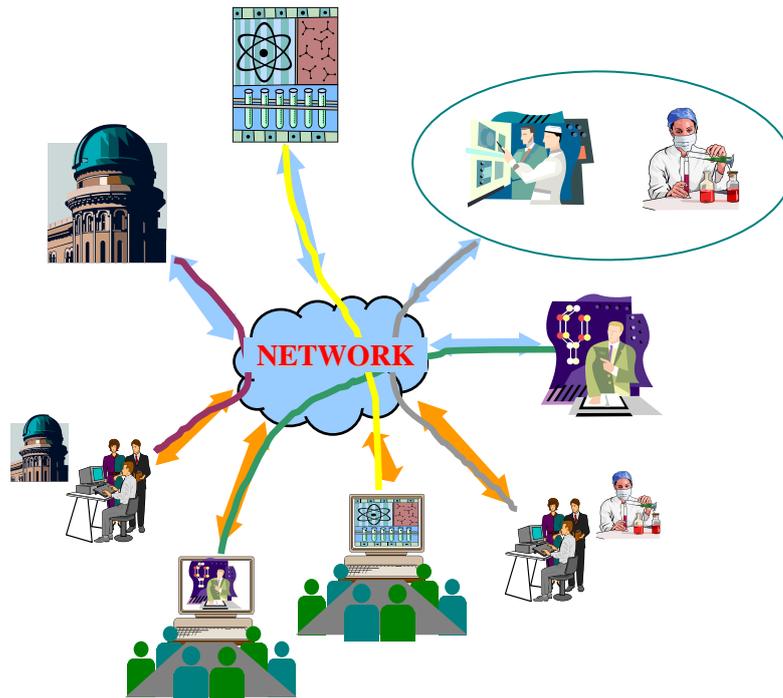# Project "LABNET"

Introduction

Both educational and industrial institutions have a growing need to test experiments in highly complex, expensive structures. On the other hand, high-speed networking opens up the possibility of accessing remote sites and performing experiments with a high level of quality of service. The main goal of the LABNET ("LABoratories on the NET") Project is the realisation of an Integrated Learning System that allows students and instructors, located in geographically dispersed areas, to access technological resources, such as sophisticated laboratory equipment, measurement devices and, in general, complex test systems, through a scalable networking infrastructure and a number of supporting multimedia technologies. The geographical locations where the Project is being developed are Naples (main site) and Savona.

Project status

Beginning: April 2000
End: April 2003

Goals

The project is aimed at
- Investigating the problems connected with the remote multi-party access to real laboratory environments.
- Finding innovative and efficient operative solutions concerning
  - network protocols
  - protocols to gain access to and control of specific laboratory instrumentation
  - graphical user interfaces
  - middleware architectures for the integration of multi-vendor domains
- Building prototypes to test the schemes designed on the field
- Providing increased and more efficient services to the final users

Services offered to the users

- Interactive use of remote laboratory infrastructures
- WEB based tele-learning
- Audio-visual interactions with both instructors and equipment
- Information retrieval

Telecommunication Infrastructure

The telecommunication network is composed by

- A high-speed telecommunication core infrastructure (Primary Labs Network, Primary access Network)
- A number of (possibly interconnected) high-speed LANs (Secondary Labs Network)
- A number of widespread commercial access points (e.g., ISDN, ADSL) to minor system sites (Secondary Access Network).

Classrooms and Laboratories Infrastructure

The system is composed by

- Primary and secondary classrooms (with respect to access speed, size, etc.);
- Primary and secondary labs (with respect to access speed, size, etc.);
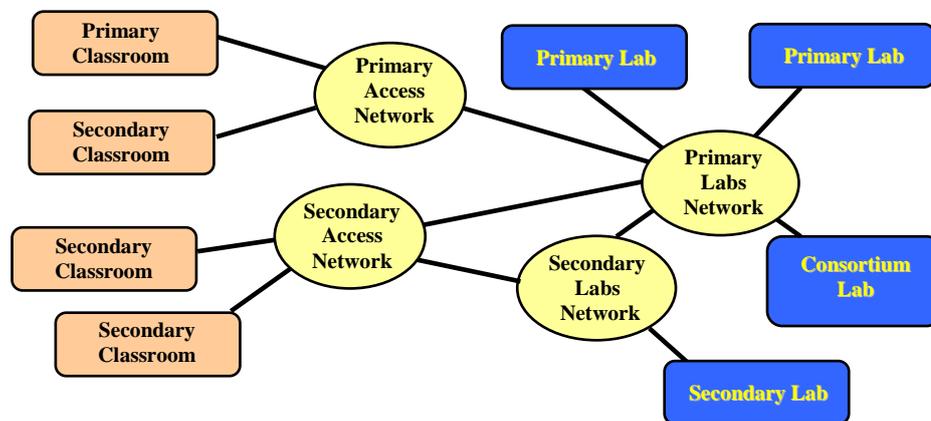
Available technology

The system is centred around a National Multimedia Lab, located in Naples, which is jointly managed by CNIT and CINI. The laboratory hosts a very high-speed networking environment (including Gbit Ethernet, Fast Ethernet, and other, specialised, Gbit networks), along with general purpose computing devices and specific test-beds. As regards the telecommunications test equipment, there are, among others, a cluster of high performance IP routers with configurable topology, and a multipurpose measurement system, with signal generation devices, spectrum analysers, configurable DSP devices.

This main lab is interconnected with the laboratories of two Departments of the University of Naples (Electronics and Telecommunications, and Systems and Computer Science, respectively), as well as with the main building of the Faculty of Engineering, by means of 34 Mbit/s. radio links with IP over ATM technology. Moreover, a number of complex laboratories in the area, such as the CNR Engine Institute, and a Wind Tunnel, among others, are connected to the core infrastructure over medium speed links (2 Mbit/s or higher).

Partners

The project is jointly developed by the Italian National Consortium for Telecommunications (CNIT - Consorzio Nazionale Interuniversitario per le Telecomunicazioni) and the Italian National Consortium for Computer Science (CINI – Consorzio Interuniversitario Nazionale per l'Informatica) and funded by the Italian Ministry of the University and Scientific and Technological Research (MURST).

People

Five full-time technical staff employees in Naples
One full-time technical staff employee in Savona
CNIT Research Unit, University of Naples
CNIT Research Unit, University of Genoa
CNIT Research Unit, University of Bologna

Technical and Research issues

- Telemeasurements and Telemanipulation
- Multiservice High-Speed Networking
- Telecommunications Test Equipment
- Satellite Communications
- Distance Learning
- Internet2 Experimental Testbeds