

“Greek School Network: Networking and telematic services for the Greek schools”

www.sch.gr

1. Project Title

Title Greek School Network (Greece)

Acronym GSN

2. Date of the Collection of Information

23.04.2003

3. Summary

The Greek School Network (GSN) has as objective to create a national infrastructure for the elementary and secondary Education: interconnect Greek schools and the administrative offices of the Ministry of Education into an educational Intranet and provide and support advanced telematics services to the school communities. The project establishes a network infrastructure which:

- Supports, develops and renews the learning process in elementary and secondary education
- Offers teaching and learning through communication and collaboration
- Allows flexible information search related to the educational procedure
- Gives the possibility of exchanging information among people geographically distributed
- Gives the possibility to schools and teachers to develop their educational content.

The project is in full operation phase with plans towards more advanced service that includes e-learning and online collaboration.

4. Thematic areas

- Networking of schools
- Telematic Services in Education

5. Implementation of project

Organization of promotion

Ministry of Education and Religious Affairs – www.ypepth.gr

Professor Andreas Karamanos

General Secretariat of Ministry of Education

15 Mitropoleos Str., Athens

Tel. +30 210 3220373

Fax +30 210 3217659

Partners of the project

The Project has been designed as a Ministry of Education initiative and implemented in collaboration with 10 Greek Universities and 2 Research Centers (12 local nodes in total), that provide network administration and develop the necessary applications software and e-learning tools. As backbone network is used the infrastructure of the Greek Research and Technology Network (www.grnet.gr), which is also provides the Internet access to Greek Universities and Research communities.

Persons of reference

Professor Lazaros MERAKOS (Scientific Director)

National and Kapodistrian University of Athens

Department of Informatics and Telecommunications, University of Athens, 15784 Athens, Greece

Tel: + 30 210 7275323

Fax: +30 210 7275601

E-mail: merakos@di.uoa.gr

Dr. Michael PARASKEVAS (Technical Director)

Research and Academic Computer Technology Institute

Riga Feraiou 61, 26221, Patras, Greece

Tel. + 30 2610 960308

Fax: +30 2610 960350

E-mail: mparask@cti.gr

Internet Site (url): <http://www.sch.gr>

6. Area of implementation

National

7. Project Status

Opening Date: 1999

Status report: Operational

8. Motivations, context, objectives and results of the project

Motivations

The Greek School Network Project (1999 – 2006) has been designed and developed with the objective to provide an innovative environment for application, evaluation and usage of new educational methods, by using ICT technologies and e-learning applications. Essentially, the Project responded to Primary and Secondary Education institutions' requirements for innovative educational methods (by leveraging the potential of e-learning technologies and applications), access to digital libraries content and collaboration between distributed groups of users. GSN infrastructure development is funded by the Second and Third

Community Support Framework (Operational program for the Information Society – www.infosoc.gr), while Project operational costs are supported by National funds.

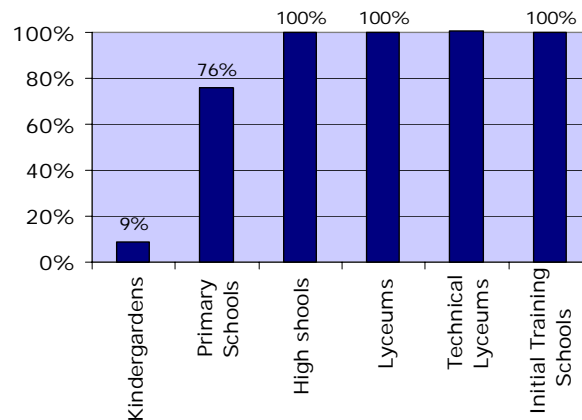
Objectives and results

Main objectives of the GSN refer to:

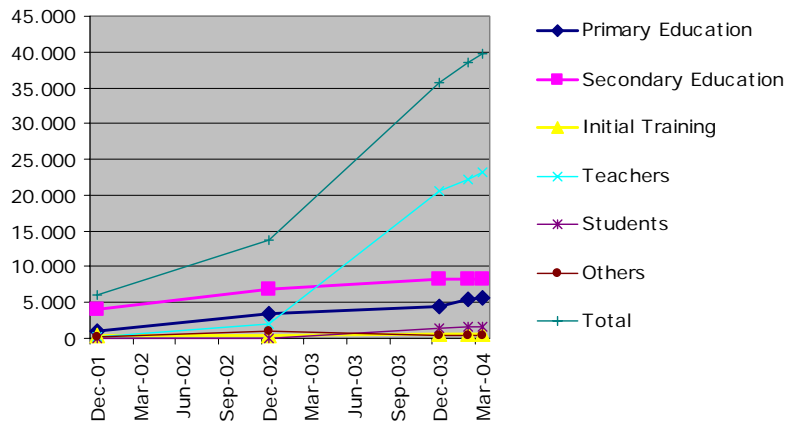
- Creation of a national infrastructure for innovative education methods and practices
- Connection of all the schools in an educational Intranet
- Connection of all the administrative offices of the Ministry of Education (including the administrative units located within schools)
- Provision and support advanced telematic services.
- Support the needs of the users of GSN services

The connection of schools and administrative units takes place simultaneously with the upgrade of telecommunication links to the Internet and with the provision of new advanced services to the users.

Currently, the total number of connected units (educational and administrative) is over than 11.000. The interconnection of the educational units of the secondary education has been completed in December 2001, in accordance with eEurope-2002 target-plans, as well as (approximately) 76% of the first degree educational units (estimated time of completion: June 2004)

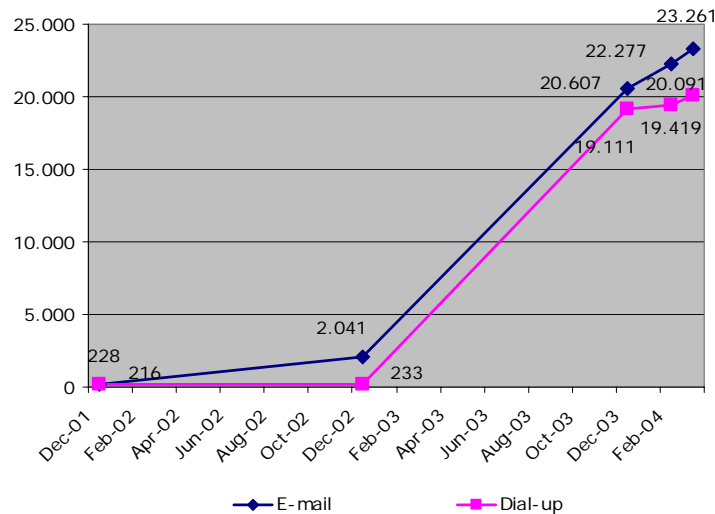


The Greek Schools Network Services have been broadly accepted by the educational community. A typical degree of usage is the number of e-mail accounts, which is constantly rising, as is evident by the next diagram. Another indication of this broad acceptance is the number of the web portal visitors (approximately 5.5 million during the last 34 months).



In order to facilitate the needs of the educational staff trained in Telecommunication and Informatics Technologies (<http://www.de.sch.gr/epimorfosi>), the Greek Schools Network offers personalized dialup accounts to the trainees, as well as the executive educational staff and Informatics professors.

The next diagram pictures the number of personalized email and dialup accounts granted to the educational staff. Also, more than 25.000 teachers have acquired personal account for access to the services of GSN, after registering through the web site www.sch.gr.



The Greek Schools Network is also exploited to interconnect other important units, such as Public Libraries, Second Opportunity Schools, the General State Archives, etc.

9. Description of the project

Services

On line services provided to Primary and Secondary Education schools by GSN Project belong to three particular categories, fundamental, basic, advanced:

i) Fundamental

- Addressing scheme and routing plan
- Domain Name Service

ii) Basic

- Dial-up service and connectivity to the network. This service is provided only to educational and administrative units as well as to a large number of teachers.
- E-mail service than can be delivered using various protocols, such as POP3, IMAP, or webmail (www.sch.gr/webmail).
- E-mail lists (www.sch.gr/lists)
- Greek School Network Portal (www.sch.gr). It provides useful information on the organization and the members of the GSN and the profile of the interconnected schools. It operates as the single point of access to the telematic services as well as the single point of reference for the schools' and user's web sites. (Information: info@sch.gr).
- Protected access to the World Wide Web through the Web Filtering service. It is transparent to users and establishes the exclusion of access to sites with harmful content.
- Web-page generator. It allows GSN's users to make their WebPages in a simple and fast way.
- Web hosting of static and dynamic web-pages (www.sch.gr/webhostnig)
- Users' Administration service (www.sch.gr/usersadmin). It supports a distributed operation and several hierarchical levels of administration.
- Discussion Fora (www.sch.gr/forums). They allows for communication among members of an educational group
- Instance messaging (www.sch.gr/im)
- News service(www.sch.gr/news)
- Chat service (www.sch.gr/chat)
- Electronic newsletter (www.sch.gr/magazine)
- Personal Calendar and Address Book.
- Voice over IP. A pilot service, which is provided on a limited scale, mainly to administration units.
- Statistics (www.sch.gr/statistics). They provide useful information on the network's operation, information that is very useful when the network's upgrades are designed.
- Help-Desk (www.sch.gr/helpdesk). It is based on a distributed structure and obtains the uninterrupted operation of the whole network. The service is accessed by the users mainly over a free phone line, but fax, email or web access is also provided.
- Directory Service (LDAP). It provides access to indexes related to users' information (it supports, in the background, the rest of services).
- Caching and Proxy Service: This service provides smart exchange of information and improves the whole network's operation.

iii) Advanced

- Asynchronous Distance Learning (www.sch.gr/e-learning)
- Synchronous Distance Learning
- Teleconference (www.sch.gr/conf)
- Video on Demand - VoD (www.sch.gr/vod)
- Real time services (www.sch.gr/rts)

iv) In pilot provision

- Secure Content Delivery (www.sch.gr/scd)

- Multicast
- e-cards

It is important to notice that the large majority of the above services have been developed using open source software.

To better understand the educational environment of GSN, we should focus on the different levels of functionality provided by GSN.

First, GSN provides in situ infrastructure: schools participating in the project obtain computer and local network hardware material to organize specific educational needs, called in the jargon of the project, “School Laboratories”.

Second, GSN provides network connectivity to these laboratories through a complex TCP/IP infrastructure, organized itself at 3 levels:

- A backbone network, provided by GRNET (www.grnet.gr). – The same network supports network connectivity needs of Greek Universities and Research Centers.
- A decentralized distribution network that interconnects points of presence (nodes) with the backbone network. Its topology has been designed in order to preserve the operational costs at low levels, which is particularly critical in large geographical region networks. These points of presence (nodes) are distinguished in two categories: Regional Nodes (Points of Presence interconnected directly with the corresponding point of presence of the backbone network) and Prefectural Nodes (Points of Presence interconnected indirectly with the backbone network through connections with the nearest regional node).
- An access network that interconnects School Laboratories (as well as the central services of the Ministry of Education and the Primary and Secondary Education Administration Offices) with the nearest points of presence (POP)¹.

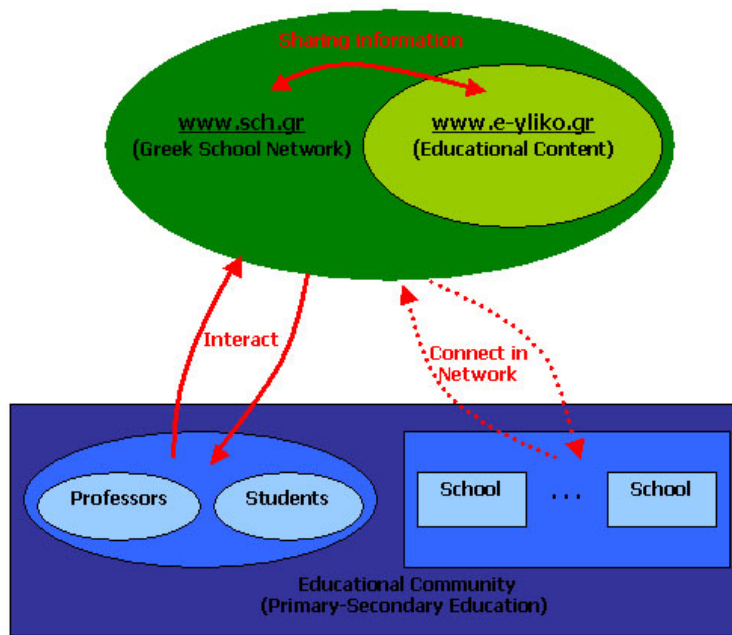
Third, GSN provides to its users (Primary and Secondary Education personnel and students), by using the above computer and network infrastructure, telematic services for education, collaboration and communication purposes (see list of on line services, in the beginning of this paragraph).

Fourth, GSN users can also benefit from educational content, provided through a portal, specifically designed for the needs of the Project (<http://www.e-yliko.gr>): articles and information material, teaching material, software tools for preparation of classes and monitoring of students, useful links, news etc².

The figure below summarizes the four levels of functionality provided by GSN.

¹“ Out-of-GSN” schools (for example private schools) interconnect with GSN with dialup lines. Schools connecting with dial-up, may have access to the network services like e-mail (one or more accounts), access to the Internet, web hosting etc. The minimum required equipment is a PC, a modem and a PSTN or ISDN line. In this case the school is responsible for the telecommunication charges.

² Generic information and educational content, especially content that is locally produced, by the personnel and students of schools connecting to GSN, is also available from the web pages of GSN main portal (<http://www.sch.gr>).



Target groups

GSN addresses educational needs of students, teachers and administrative staff in Primary and Secondary Education levels as well as their communication and collaboration needs.

Financial data

The development of the network and applications infrastructure supporting the GSN e-learning environment is estimated, for the period 1999-2006, at 44 MEuros (covered by the 2nd and 3rd Community Support Framework of the European Union). GSN management evaluates the operational cost at 4MEuros per year, cost that is covered by National funds.

10. Phases of Implementation

Stages of realisation and role of the partners

The Project has been developed in two main stages:

- i) Infrastructure deployment (implementation of School Laboratories, network and applications development)
- ii) Creation of e-learning tools and educational-informational content (this particular activity has been developed during last year).

Although, the Project has been designed as a Ministry of Education initiative, it has been implemented in collaboration with 10 Greek Universities and 2 Research Centers (12 local nodes in total). As a result, a series of GSN activities (i.e. development of applications software and e-learning tools, operation of Help Centers to handle School Laboratories requests, network management and administration etc.) are distributed and locally organized and supported by the teamwork and experience of scientific-technical experts with acknowledged international experience and qualifications.

Technologies

Various technologies and open-source solutions are used at the different levels of network/application hierarchy, from the backbone network to user interface:

Backbone network: GSN uses Greek Research & Technology network, GRNET, with 7 entrance points and total capacity over than 2 Gbps.

Distribution network: The Distribution network consists of 51 nodes (one in each prefecture): 9 main nodes, 42 secondary nodes, equipped with 75 routers, 80 servers, a large number of telecommunication circuits and the appropriate software. These nodes are located in central installation points of the Hellenic Telecommunications Organization in each prefecture.

Access network: Is the part of the network, which interconnects educational and administrative units with the nearest node – using a variety of access technologies (xDSL, Wireless junctions, analog (M.1020) or digital leased lines, dial-up over ISDN or PSTN, etc.)³.

School Laboratory: In School Laboratories, computing devices and Ethernet networking equipment are installed. This equipment consists of a powerful server (with operating system Windows NT, 2000 or XP Server), approximately 10 multimedia stations (with operating system Windows 98, Me, 2000, XP or Linux), a color printer etc. The Administration Offices use more powerful networking equipment and interconnect through a high-speed line of 1 – 10 Mbps. This equipment provides besides the basic network services, the possibility of voice transmission through the school network.

In addition, GSN uses open-source content management tools to build portal functionality and provides a series of administration and support tools to 12 GSN nodes that, in turn, provide network administration and develop applications software and e-learning tools for the project needs.

Methodologies

The principal strategy for the deployment of the Project is based on the formation of local structures for support and day-to-day operation (12 local nodes in total), that are located within Universities and Research Centers and provide, as explained above, network administration and development of applications software and e-learning tools. In many cases, GSN local nodes intersect with Go Online – Training Support local structures (Regional Consortia).

Actions of information and communication

Information and communication activities include:

- Publication of a monthly electronic newsletter (www.sch.gr/magazine)
- Organization of workshops
- Frequent interactions with GSN users

³ Regarding wired connections, ADSL (Asymmetric Digital Subscriber Line) is the common broadband technology. ADSL supports maximum a capacity 8Mbps/800Kbps (downstream/upstream), using the existing local loop infrastructure for a distance until 5.5 Km, approximately. Then, as the optical networks are progressively extended, the VDSL (Very high rate Digital Subscriber Line) becomes an attractive choice, especially for the large school units.

Also, a wireless network can be a very attractive solution when the construction of a wired broadband network is impossible for technical or economical reasons. Today, there is a large number of wireless products available in the market. Wireless bridges (IEEE 802.11b – WiFi), which operate in the ICM band (2.4 GHz) and support capacities up to 11 Mbps. Next generation wireless technologies and protocols, such as the IEEE 802.11a and LMDS, supports data rates in the range 34 – 50 Mbps and they can be used in the future by the GSN in order to interconnect its nodes or schools. As a matter of fact, 12 projects are now in operation to provide wireless interconnect to schools. They are designed to include, each one, 20 schools units that are grouped in zones. Each zone contains 3-4 schools that are interconnected with high-speed LANs. One of them host the wireless bridge, directional antennas, router and switch device that support VLAN technology.

The ultimate objective for the access network, is the wide use of optical fibers, where it is possible (long term solution). The deployment of optical fibers will give to GSN the flexibility to select itself the desirable data technology transmission.

11. Evaluation of the project

Implementation of the objectives

The GSN Project seems to have obtained significant results in terms of:

- Promotion of ICT related innovations in the education field
- Connection of Greek schools to the Greek Educational Intranet and to the Internet
- Effective network implementation and reduction of operational costs
- Provision of a wide range of telematic services
- Formation of local structures (local human networks) to support GSN operation and evolution

Strong points and critical aspects

Strong points:

- Infrastructure rigor and large spectrum of services
- Extended coverage
- Early familiarization of students with ICT applications and services

Weak points:

- School Laboratories (dedicated spaces within schools for using computers) instead of “computers in every class”
- Non-sufficient educational content (up to now)
- Incomplete training of educational personnel

Prospects for evolution

Progress in GSN life-cycle targets the creation of rich educational content and the provision of advanced collaboration and e-learning services.

12. Evaluation of the project by an expert

Impact

The impact of GSN environment to Primary and Secondary Greek Education is obvious: it improves information flows and allows for non-stop knowledge acquisition processes (with instant access to GSN, teachers can easily work at home), familiarizes young generations with ICT applications, collective learning through communication / collaboration (e-mail, discussion fora etc.), renders the school environment more friendly to students (the educational process becomes visual...). Of course, the creation of rich content, together with a more application/content focused approach, will increase GSN impact to its user communities.

Transferability

The project has the potential to be deployed in other countries, at a regional or national level. Network deployment and distributed management and development structures seem to be the more interesting project aspects.

Sustainability

Key factors for sustainability include:

- Continuous public funding in improving School Laboratories and, more generally, local GSN infrastructures
- Continuous and carefully designed creation of education content and useful / user friendly applications.

Innovation

Use of ICT technologies and applications in traditional education activities is always a source of innovation by itself.

Author of the document

Dr. Michael PARASKEVAS

Technical Director of the Greek School Network

Research and Academic Computer Technology Institute

Riga Feraiou 61, 26221, Patras, Greece

Tel. + 30 2610 960308

Fax : +30 2610 960350

E-mail: mparask@cti.gr