Computer Technology Institute & Press
"DIOPHANTUS"

Research Unit 6

http://ru6.cti.gr

Networks, Telematics and New Services

2011

Computer Technology Institute & Press "DIOPHANTUS"

The Computer Technology Institute & Press "DIOPHANTUS" (CTI) was founded in 1985 as a non-profit organisation (presidential decree 9/1985) under the auspices of the General Secretarial of Research and Technology of Greece, with its head office in Patras. It is a financially and administratively independent research institution, currently supervised by the Greek Ministry of Education, Lifelong Learning and Religious Affairs.

CTI is closely affiliated to academia and in particular to the Computer Engineering and Informatics Department of the University of Patras. Today it constitutes an integrated research environment for the design and development of products and solutions in the area of Information Technology and Telematics Applications. In continuous interaction with the academic community, the national and European Informatics Industry, the international scientific community and the public sector, CTI has evolved to an internationally renowned research institution in Computer Science and Technology.

CTI exhibits substantial research activity, both in the basic research areas and in applied research areas. CTI's objectives, are defined as follows:

- The conduct of basic and applied research in computer software and hardware technology.
- The design and development of products as well as the support of activities related to computer software and hardware technology pertaining to production, education, services, science and technique.
- The support of Greece's Informatics Industry.
- The development of know-how and technology transfer.

CTI currently employs over 300 persons: researchers (including faculty members of the Computer Engineering and Informatics Department of the University of Patras), technicians (computer engineers), administrative employees and postgraduate students.

The vast majority of CTI's income is derived from external projects (research programs, EU projects or contracts with the private sector), basic research funding as well as revenue from scientific conference organisation. Since 1985 CTI has undertaken more than 100 research and development projects. In particular, approximately:

- 50% of the projects funded by the EU,
- 35% of the projects funded by the State Authorities
- 15% of the projects funded by the private sector

Research Unit 6

Research Unit 6 (RU6) consists of 11 people and exhibits substantial research activity in the following areas:

- **Networked Virtual Environments (NVEs)**: RU6 is working on the design and development of NVEs, where the user can navigate through the 3D virtual worlds and interact with different objects and with other users. Main aim is the exploitation of the functional characteristics of NVEs in order to support advanced services such as CSCW, e-learning, etc.). Detailed topics are the research on both the technical and functional characteristics of NVEs, design and development of platforms to support NVEs, development of 3D objects and worlds for use in NVEs etc.
- **Telematics and New Services**: RU6 works on the developments of advanced Telematic applications, focusing in Distance Learning (both Synchronous and

Asynchronous), Teleconference, and Voice over IP (VoIP). RU6 contacts research in advance Telematics services with the use of Real Time Protocols (RTP, RTCP, RSVP), multicast technologies (simulcast, multicast congestion control, multicast of layered video) and new session initialisation protocols (SIP) over next generation networks (IPv6 networks). The above technologies will support the next generation Telematics applications.

- **Web Technologies and metadata integration.** The matter of web technologies and particularly the management of dynamic data of the web is of huge importance, especially with the rapid development of the Internet. In the context of its research work, research unit 6 (RU6), is working on the fields of Information Retrieval of the Web, text pre-processing, automatic categorization and automatic summarization of texts as well as data personalization to the user through web interfaces. As far as Information Retrieval is concerned, RU6 is working on the construction of algorithms and mechanisms which aim at the focused data mining from communication channels which consist a part of Web 2.0. As far as text pre-processing is concerned, RU6 is developing pre-processing algorithms for keyword extraction in order to extract useful information from the web data. Concerning categorization and automatic summarization, RU6 has developed algorithms which target to the utilization of the two-way relationship between the aforementioned mechanisms and to the extraction of better quality results for both of them. Lastly, as far as the user interface is concerned, RU6 is developing dynamic web sites which focalize to the exploitation of information that is collected during the user's browsing. As a result of the aforementioned research fields of RU6, publications have been made in international journals and conferences and systems that implement the described procedures have been implemented.
- **Networking technologies (QoS provision, network resources management, IPv6, multicast, optical networks, third generation cellular networks).** The work of RU6 on this field focuses on the analytical and experimental evaluation and integration of mechanisms for service differentiation and quality in contemporary high-speed IP-based or MPLS based networks. The individual mechanisms available for these purposes are evaluated and extended in the networking level, accompanied by admission control and routing algorithms. Also, full management systems for QoS management are studied and developed. In addition, advanced networking capabilities available in IPv6 protocol are studied and integrated in synchronous networks. Moreover, multicast issues are studied in order to optimize the network's operation and also integrate them with QoS capabilities. Furthermore, RU6 works on the design of optical metropolitan networks as well as wireless networks based on state of the art technologies. UMTS (Universal Mobile Telecommunications System) is a family of third generation mobile networks designed to offer high bandwidth radio access. UMTS has been specified as an integrated solution for mobile voice and data with wide area coverage. High Speed Downlink Packet Access (HSDPA) and High Speed Uplink Packet Access (HSUPA) technologies will also play an instrumental role in positioning 3G/UMTS as a key enabler for true 'mobile broadband'. In UMTS, bandwidth is a limited resource, since the available radio resources can support only a handful high data-rate user simultaneously. Multicast is an efficient method of supporting group communication as it allows the transmission of packets to multiple destinations using fewer network resources. At this point, RU6 works on the analysis of multicast mechanisms and other one-to-many packet delivery methods in UMTS. Furthermore, we work on the field of evaluating the performance of UMTS in different traffic conditions.
- **Network simulations**. Simulation has always been a valuable tool for experimentation and validation of models, architectures and mechanisms in the field of networking. In order to study and validate Quality of Service and wireless architecture issues we have used the ns-2 simulator. Ns-2 is a powerful simulation tool that can simulate many kinds of networks, like mobile and satellite networks and

provide useful low-level insight in the operation of the networks. A user can define arbitrary network topologies consisting of nodes and links and attach applications and queues on each node. A researcher using ns-2 can design new protocols, test their functionality and performance and compare them. In the case of the DiffServ framework, simulation is valuable due to the fact that an analytical approach of mechanisms and services is infeasible because of the aggregation and multiplexing of flows. We extended the ns-2 functionality towards the direction of realistic traffic generation and a series of mechanisms defined by the DiffServ architecture. We have also extended ns-2 with the functionality of Bandwidth Brokers, which are entities for managing the resources and negotiating end to end resource reservations between domains. The implementation and deployment complexity of such solutions makes it useful to be able to inexpensively study related research issues in a simulation environment. Finally, we have extended ns-2 functionality by implementing modules for third generation cellular networks and in particular aspects of the Universal Mobile Telecommunications System (UMTS). These modules include functionality such as adaptive multimedia transmission, multicast routing, user mobility etc.

Selective list of projects undertaken by RU6

Sustainable Urban Mobility Management Information Technologies

The main goal of the project is to reduce the negative impacts of air pollutants through the deployment of an advanced mobility management information system base on ICT (Information & Communication Technologies). The application of these technologies in the mobility management system provides highly effective and relatively low cost solution and measures for the problem of urban traffic congestion: for example new intelligent systems that assist the driver to avoid accidents, provide drivers with real time information to avoid congestion, and optimise a journey or the engine performance to improve energy efficiency, Route optimization systems for local public transport

This project focus on the provision of information to citizens, the increase of mobility opportunities and the reduction of the environmental impact of private transport systems.

Techniques and mechanisms for user and text clustering aimed towards the personalized access of content in the world wide web.

The core of this project has to do with the development of a clustering mechanism both for texts and for users coming from the internet. We aim towards modeling the navigation paths that common users follow, the automatic evaluation of navigation behaviors with the obvious positive effect being the prediction of future user choices. Within the scope of this mechanism we will be studying classic clustering algorithms and we will be researching the modification and enhancement of those in order to improve their performance under the continuously altering user interests. Additionally, as far as text preprocessing is concerned, we will be researching towards improving it by incorporating query expansion, language thesauri and similar techniques in order to deal with the problems of polysemy and synonymy. User modeling will have a direct impact in our ability of personalizing information for the end user. Furthermore, we will be constructing a personalization algorithm that will be taking into consideration the plethora of parameters which reveal indirectly the user preferences. In the final state of information flow, the results will be returned either to the desktop application or via the Web Interface of our service. The above sub-processes after being evaluated autonomously, will be incorporated in a unified news articles indexing and personalization system.

Open Source software usage by European Public Administrations

Free and/or open source software (FOSS) represents a potential of significant competitiveness gains of its adopters, both for public administrations as well as citizens and companies. As a result, it is of vital importance to examine how and whether appropriate public policies can alleviate barriers and inhibitors rendering the potential benefits of FOSS actual ones and enhancing the competitiveness of European economies.

Public administrations can play a unique role as a catalyst force in demonstrating the value of FOSS and in removing legal and organisational obstacles and inhibitors by acting as early adopters. OSEPA aims to explore this potential through interregional cooperation and to cultivate a debate among public administrations in this direction with a view to:

- Analyse, promote knowledge and foster awareness on the main benefits and disadvantages, cost evidence and effectiveness resulting from FOSS adoption and use.
- Explore, identify, build consensus on the framework conditions enabling FOSS to become a technically, financially, legally viable alternative offering of IT solutions.
- Explore, identify, build consensus on and promote European, national and regional policies and approaches that may facilitate the emergence of FOSS as a mature and viable business model.
- Promote awareness, exchange and disseminate knowledge, good practice and case studies regarding technical, financial and legal aspects of FOSS adoption by European public administrations in order to reduce uncertainty, inertia and resistance-to-change that limit experimentation and adoption of FOSS software.
- Discuss and promote the adoption of internal policies, mission statements, methodologies and action plans facilitating European public administrations to experiment, exploit and benefit from FOSS solutions.

The project dissemination activities will promote awareness on FOSS and on OSEPA activities targeting

- relevant segments of the public opinion and
- Officers and elected representatives of local regional and national administrations.

Promotion of ICTs usage by SMEs as an enabler of Value Networks

All around Europe regions have implemented different strategies to promote Information Society in SME's convinced about the ICTs usage benefits to favor business sector. Those actions have contributed to the widely use of e-business as an opportunity for SME's growth.

ICT-VN want to go one step further and introduce a new challenge on information society promotion policies for SMEs. Today's business environment tend toward more networked forms of organization and ICT's development is one of the main drivers to facilitate interactions and value networks creation.

The project relies on the cooperation among 10 partners, from 9 countries willing to increase the impact of regional strategies for the Information Society and ICT promotion and development in SMEs in order to promote networking and contribute to the improvement of their regional economic competitiveness. New strategies will focus on three key sectors: agrifood, commerce/services and tourism.

CNG (Community Network Game)

The Community Network Game (CNG) project is focused on applying new network technologies to support community activities over highly interactive centrally managed

massively multiplayer online games (MMOG). CNG intends to research and develop in-game community activities using in-game graphical insertion technology (IGIT) and a Combined CDN (Content Delivery Network)-P2P architecture for the distribution of game and User Generated Content (UGC). The InGame Graphics Insertion Technology (IGIT) is an innovative technology of replacing or inserting content to the game in real time without the need to change the game's code in the client or server. The User Generated Content (UGC) proposed by the Community Network Game Project includes 3D objects and Video to be streamed from one user to another user or from one user to many users. This UGC traffic represents a real challenge to the network already occupied by the MMOG client server data. The project intends to research and develop new techniques for P2P 3D/Video streaming that are "friendly" to the MMOG client server traffic.

Services for the promotion of broadband culture

The main objective of the project is to promote the growth of demand for broadband services. As part of the project, CTI will install two wireless Wi-Fi hot spots, will develop services to promote the growth of broadband demand and will hold an open event / workshop for the development of broadband demand.

Specifically, the following tasks will be performed:

1) Set up of two wireless Wi-Fi hot spots, in places with public access for use by researchers, students, visitors, etc. within the research and educational activities as well as during their spare/leisure time.

2) Development of services to promote the growth of broadband demand (mash-up with information for the broadband fiber optic networks to be implemented throughout the country, best practices-strategies-policies for development of broadband, newsletter, and news/announcements), and

3) Organization of an open event / workshop for the development of broadband demand.

Design, development and production of educational material – Topic B' / PETA S.A.

This project includes the creation of educational material for training in the area of Information and Communication technologies in the context of the course: Design and Administration of Telecommunication Networks in a Municipality (LANs, Intranet, SYXEYXIS, Municipal Networks, Broadband Networks and Services, Telephony and relative applications). The project includes the following sub-courses:

- Introduction in Computer Networks
- Local Area Networks
- Broadband Networks and Services
- Design of Metropolitan Area Networks and Wide Area Networks
- Intranets / SYXEYXIS
- Wireless Networks
- Design / implementation strategies for development/exploitation of networks and ICT
- Administration of telecommunication networks
- Videoconference application and Voice over Internet
- Business Models for Municipal broadband networks
- Network expansion.

Each sub-courses includes: Reference material, Main body of digital objects, Suggested activities and relative applications, Self-evaluation material, Teacher guide.

GN3

The GN3 programme creates an innovative, multi-domain hybrid networking infrastructure that enables R&E end-users and their organisations by providing flexible and scalable, production-quality services via constituent NRENs.

GEANT's great achievement has been to provide quality services to a vast, demanding and diverse user base. Through its 36 NRENs serving 4000 campus networks, GEANT has a potential user base of more than 40,000,000 end-users, thereby forming the world's largest and most advanced and diverse R&E networking system. Such a service can only be managed efficiently by using the current multi-domain hierarchy: Campus, NREN and Pan-European interconnect.

To progress even further, GN3 must enable the scalable expansion of its user base, and offer diverse robust services within a confederated architectural model. GEANT2 and the NRENs developed advanced hybrid switching infrastructures that are able to reach advanced R&E users and support e-Science initiatives. After the roll-out of these hybrid facilities, deployment of high-performance Virtual/Optical Private Networks (VPN/OPN) swiftly followed. These acted as a catalyst for the development of related end-to-end services. It is vital that the GN3 community further develops robust multi-domain services in order to fulfil the requirements of the growing number of high-end R&E users.

ARCHEOTOUR - Applied research in the cultural heritage and environmental opportunities for the tourism

Research Unit 6 of RACTI is a subcontractor of the "ARCHEOTOUR - Applied research in the cultural heritage and environmental opportunities for the tourism" project, which has been placed within INTERREG IIIA GREECE ITALY, Meter 3.2: "Promotion, Restoration and Exploitation of the Historical and Cultural Heritage of Common Interest". This program rose from a triple regard:

- The presence of rich cultural heritage, which is common both from a historical point of view as well as from a side of characteristics in the two regions of Puglia (Italy) and Achaia (Greece), and is not effectively exploited
- The opportunities provided by the innovative applications of ICT in the use of cultural heritage are numerous.
- The collaboration between neighboring regions is an important factor for the growth.

Project "ARCHEOTOUR- Applied research in the cultural heritage and environmental opportunities for the tourism" is based on the following axes of interventions:

- Creation of a network of infrastructures for the reception, the recovery, the promotion and the exploitation of cultural heritage.
- Promoting and Informational campaigns in common cultural issues with the use of new technologies.
- The creation of structures for the connection, the promotion and the growth of traditional cultural elements of the two countries.

The main objectives of the project are the appointment and exploitation of secondary forgotten cultural heritage beginning from the Byzantine period, via means of common tourist cross-border tour. The starting point is the recovery of the cultural heritage of Byzantine origin that is found in the regions of Puglia (Italy) and Achaia (Greece). In the region of Achaia the selected monuments are the Byzantine church of Saint Nikolaos in the region of Platani, Rio and the castle of Patras.

Uniform Networked Environment of Local Authorities for Citizen and Enterprise Services' Provision

Research Unit 6 of RACTI is a subcontractor of the KEDKE project "Uniform Networked Environment of Local Authorities for Citizen and Enterprise Services' Provision".

The main objective of the project is the implementation of advanced online services to the citizens and business of the local municipalities and communities of Greece. Additionally, a main scope of the project is the offering of Quality Services and Automation of services to the citizens and enterprises from the Local Municipalities. It

includes online and phone services to the citizens and enterprises in every aspect of the first degree local authorities.

The scope of the project will be fulfilled through a Uniform Networked Environment for the supporting of services to end users (citizens and business).

The platforms that will be used and implemented in the scope of the project are going to be open source and the tools that are going to be used will be based on open standards and protocols. The outcome of the project is a system that can be adopted by every municipality in order to provide services to its citizens and enterprises. The system will be based on open source tools with full adaptation of content and services to each municipality's needs. The whole project relies on the Greek interoperability framework in order to support all the rules and guidance for acceptable and interoperable web services.

Basic modules of the project will include a personalized(for every municipality) platform to offer services, tools for designing the business logic of the internal services of a municipality, tools for security and user authentication as well as websites for the project advertisement and for code repository.

INTERREG IIIA/GREECE-ITALY 2000-2006 – Broadband: Promotion, Demonstration, Strategies, Best Practices

The objective of the project is the exchange of experiences and know-how on broadband issues. Furthermore the transition of relative know-how, specially to small and medium enterprises and the promotion of broadband via the installation of public Wi-Fi hot spots, for the creation of demonstrative wireless network around the areas of installation and the broadband interconnection of this wireless network with the Internet, as well as via the development of a portal about broadband, which will aim at the promotion of broadband but also the provision of broadband content. In addition, among the objectives of this project is the investigation of models and strategies that can be adopted for the further promotion of broadband in the collaborating countries. To this direction, the project will investigate international and interregional elements by comparing concrete indicators that are related to broadband so as to conclude on the factors and the indicators that influence considerably the penetration of broadband for the households and enterprises, as well as the evaluation of international experience in regard to the strategies, the basic factors and the best practices that are related to the expand of broadband services. Finally, the project will investigate models for the growth and exploitation of broadband infrastructures.

PAVET-NE 2004 - Design and Implementation of a Platform for the Optimization of Services provided by Vending Machines with Remote Management

Goal of this project is the design and implementation of a System for the optimization of services provided by vending machines with remote management. The system will be able to manage propagated geographically vending machines that provide specific services. These vending machines (via their equipment) fulfil specific services to the citizens. Goal of this project is the design and implementation of the completed system (hardware and software) that will provide these services. From the activity the company (E-CODES) will acquire the essential know-how for future implementation and exploitation of such system. The system will ensure:

- Provision of the forecasted services.
- Remote access of terminals to central servers. The way of connection depends on the provided services and the needs for central briefing.
- Functional environment for the final user.
- Completed system of management that includes the following: Remote

- Management and control of terminals' operation, remote connection for pumping data and reprogramming of terminals, Central system that will manage the whole system and will check all the parameters of safety and avoidance from damage.

The know-how that will be acquired through this project will be the main exploitable result which is expected to constitute the base for products and services of the company.

Demand analysis and study for the implementation of e-government services for the Agrinio municipality (Sub-project 1 / P148 – Agrinio Municipality)

Subject of this project is a study for the implementation of a web portal for the Agrinio municipality through which the Agrinio municipality will offer e-government services to citizens and businesses. More specifically, the study includes the following:

- Methodology used
- Current situation in Agrinio municipality regarding available the e-government services
- National and International experience in the field of e-government services
- Categorization of e-government services
- Interviews with key personnel in Agrinio municipality and main conclusions of the interviews
- Criteria for selection of e-government services
- Analysis of selected e-government services for the Agrinio Municipality
- Methodology for the implementation of e-government services
- Basic characteristics of the system which will be implemented

SIGN – Learning partnership for sign language education

The SIGN Learning partnership would improve the present sign language and deaf education/training system in Europe. The project partners will form a common platform for discussion and exchange of information on present and new methods of sign language training and educating deaf adults. The platform targets at sign language interpreters and people with hearing difficulties. Specific goals are the following:

- Conduct an intensive research and assess the current schemes to train sign language interpreters, comparing the training of foreign language interpreters and to the training of sign language interpreters, examine the barriers of training opportunities of deaf people and sign language interpreters and the vocational training provisions
- Develop a new training method for sign language interpreter's training together with a curriculum ready for accreditation
- Create an information portal that will enable to exchange information between all stakeholders, and provide a basis for future e-mentoring and e-learning solutions
- Collect and spread the best practices available in Europe
- Assist the communication between the deaf and people at public administration (local governments, ministries, etc) so that deaf people would be able to arrange their official affairs without any problem

URL: http://www.eusign.eu

GRNET III/ VNOC 3 "Development / Administration of Service of Virtual Network Operation Center for Greek Research and Education network (GRNET – VNOC3)" Contract No 5 "Administration of Advanced Network Services: Development of Inrastructure and services: QoS, VPNs and Bandwidth-on-demand"

The goal of this project is the study and development of advanced network services for GRNET's network. In particular, the Quality of Service, Managed bandwidth Service and Administration of MPLS Virtual Private Network services will be implemented and extended for GRNET's network. In particular, the dimensioning of the network and the current advanced services will be upgraded. Additionally, new services such as IPv6 QoS, L2 QoS, L2 multipoint VPNs & CSC VPNs will be tested and implemented. Next, the administration tool for the advaced services (ANStool) will be extended, adding Web Services functionality, interoperability with Geant's administration tool and the administration of all the new implemented services (IPv6 QoS, L2 QoS, L2 multipoint VPNs). Also, scope of this project will be the study and implementation of Bandwidth-on-demand service that aims to provide Layer1 or Layer2 paths with guaranteed bandwidth. This service can be implemented either by provision of new optical lambdas (λ), either by the creation of TDM virtual paths or using traffic engineering tunnel (with RSVP-TE) in conjunction with QoS techniques and L2 MPLS VPNs. The implementation of the service will also include the relevant provisioning through the administration tool of the advaced services (ANStool).

Games at Large (Games@Large)

Games at Large (Games@Large) being an Integrated Project (IP) intends to research, develop and implement a new architecture to provide users with a richer variety of entertainment experience in their entire house, hotel room, cruise ships and Internet Cafe incorporating unprecedented ubiquitous game-play. The project evolved from the home environment to other local Focus Areas (FA) in consideration of the benefit such FA may gain based on Games@Large unique technology approach. The Integrated Project includes activities of TV Multimedia and Gaming using Enhanced Media Extender, Local Processing and Storage Server(s), Handheld Devices and Local Wireless Network. Games@Large intends to enhance the existing DLNA (Digital Living Network Alliance) and the UPnP Forum standards with the unique set of features required for running games over a local network, like all other media and content types (video, audio). The increase in number of home computers is old news as well as home computers connection to the Internet. Market interest is now revolving around capitalizing on the rapid increase of alwayson broadband connectivity, which becomes ubiquitous. Broadband connection drives to a new, digital, "Future Home" as part of a communications revolution, which will affect every aspect of consumers' lives, not the least of which is the change it brings in terms of options for enjoying entertainment. Taking into account that Movies and Music provided by outside sources were at home long before the Internet and Broadband, the challenge is to invent new content consumption patterns of existing and new types of content and services. Games offer a leisure time activity for every member of the household - from avid gamers to kids, as well as allowing whole families to play together. Games offer also leisure time activity for guests in hotels and visitors in Internet Cafes. Games@Large offers ubiquitous accessibility for all members of the household on all desired entertainment devices. The project integrates games-ondemand delivery and new innovative ideas such as multiple games execution on the Games Gateway and delivery of graphic rendering meta-data over the home network via low latency, low bandwidth Pre-Rendering Protocol to achieve low-cost implementation of ubiquitous game play throughout the house, while taking advantage of existing hardware and providing multiple members of the family the ability to play simultaneously. The proposed project intends to investigate research and develop the Games@Large infrastructure in order to enable the Games to diversify from dedicated appliances and a single corner of the house, to any place at home such as the TV in the living room, the hand-held device or any other device with a relevant screen, controls and connectivity.

The project will also provide the required infrastructure for running games on the hotel's guest room TV or on small screens for people sitting in the Internet Cafe, cruse ships, trains or airplanes. The principle of Games@Large environment is focused around a centralized local gaming server (s), responsible for the storage and execution of the game software, interfacing with multiple, distributed gaming displays and control units, including the TV, hand-held devices and other elements. Creating a new paradigm in the delivery of games over broadband connectivity needs to be balanced well to cater for the needs and goals of all parties involved. The project will be exposed to the main Telecom Market in Europe by T-Online & Portugal Telecom in Brazil and Latin America by Portugal Telecom through its subsidiary located in San Paulo and in North America and Asia by Exent. Promoting the Games@Large solutions in a different cultural context will foster new market opportunities to the European industry. The project will also get exposed to the hotel industry, Internet cafe operators and Cruise Ship Operators.

"Technical Consultant of Wireless Local Area Networks"

The objective of the project is the provision of specialized technical support for the implementation of wireless local area networks in several municipalities mainly in the Region of Western Greece. The technical support is provided to the Local Authorities that are the contractors of the Call 105 of the Measure 4.3 of the Info-society Operational Program. RU6 will provide technical support for the development of wireless local area networks in the following municipalities: Ancient Olympia, Kalavruta, Efpalio, Anaktorio, Skillounta, Gastouni, Vartholomio and Messatida. In particular, RU6 will work on conducting the studies of network's design and architecture and supervising the technical part of the construction of the wireless local area networks. The major target of the mentioned networks is to interconnect the buildings of the public sector in each municipality in advantage of the citizens of the above municipalities.

URL: http://ru6.cti.gr/broadband/

Design and Development of a platform for synchronous and asynchronous tele-training

Fundamental objective of the project is the development of a teletraining platform for Open and Distant Learning that will be directed to meeting the needs of Vocational Training Centres as well as of all service providers of adult training and life-long learning.

Individual objectives of the project are:

- Exploitation of previous work and results from the application of distant learning for the creation of a platform directed to the needs of Vocational Training Centres and service providers of adult training and life-long learning
- Application of modern pedagogic models and learning theories of learning (e.g. collaborative learning) in systems of distant learning
- Exploitation of open source software for the implementation of the platform
- Compatibility with educational standards
- Investigation of new technologies and development of a framework for the optimal application and use of open and distant learning

Broadband in Greece: Current Situation and Prospects

The objective of this project is the development of a complete study-research focused on the imprinting of the current dynamics and the specification of the actions of strategy for the growth of broadband in Greece and the elimination of the danger for the creation of a digital gap.

In particular, an analytic imprinting of the existing situation in Greece, the appointment of the most optimal practices from the international experience that can be applied in the country, and the composition of a complete frame of strategy and actions for the growth of broadband until 2013, will be realized.

In this frame the following will be realized: a) review of the International Environment, b) localization of the basic factors that affected the growth of broadband in the studied countries and analysis of the most optimal policies that were applied and led to the increment of broadband penetration, c) review of existing situation in regard to broadband in Greece and localization of the root causes for the low penetration rate, d) evaluation of the actions that have been completed, or are still under development or they have been decided and will be developed in Greece, e) analysis of the competition in the Greek market for broadband connections, f) mapping out of a Strategy for the growth of broadband in Greece and the improvement of relative indicators eEurope 2005 and iEurope 2010, g) definition of a Plan of Action for 2007-2013 for the growth of broadband in Greece with a region-leveled analysis.

Study of usage and impact of GRNET-2's network

During this project, a full record of the usage of GRNET's network by the Academic and Research community will be done. Also, the impact of the network to the final users will be investigated. For the latter, the development of the network during 2000-2005, the network services, the usage statistics and the model of the Virtual Network Operation Center (VNOC) will be taken into account. Additionally, the project will make an advisability study for further development of GRNET's network, taking into account the special characteristics of Educational and Research Networks, the technological tendencies, the needs of Greek's academic community and the characteristics of local telecommunication market. Finally, the project will conclude to the design, technological and operational parameters of GRNET's next generation's network that will be based on optical technologies.

GN2: Multi-Gigabit European Academic Network

The GN2 project sets out a programme of work to further extend the GN1 project, which has created the GEANT pan-European network. The project will improve the current network with emphasis on developing an "end-to-end" approach to the provision of service across multiple interconnected networks. Gaining an improved understanding of user needs, as well as measures to provide direct support to deal with performance issues, are major elements of the project. In parallel with the development of the network, carried out via Service Activities (SAs), a comprehensive set of Joint Research Activities (JRAs) are defined, which are designed to provide future network enhancements. These JRAs will involve technical experts from the NRENs community, DANTE and TERENA. The project will be carried out by the consortium of European National Research and Educational Networks (NRENs), together with TERENA, and with DANTE as the coordinating partner. CTI will participate as third party contractor to GRNET (Greek NREN). CTI's involvement is focused in GN2-JRA3 that deals with the investigation and development of a mainly connection-oriented, end-to-end (therefore multi-domain) "Bandwidth Allocation and Reservation Service" – in other words a "Bandwidth on Demand" (BoD) service. The service's scope includes technologies such as MPLS LSPs (preferably augmented with some sort of packet-based QoS - although this may only come later in many cases), native (and emulated) layer-2 channels (particularly Ethernet), TDM channels (based on SONET/SDH), native layer one wavelengths on fibre ("lambdas") and even dedicated dark fibre.

URL: http://www.dante.net

"Technical Consulting in Constructing Metropolitan Area Fiber Optical Networks in the Region of Western Greece"

The objective of the project is the provision of specialized technical support for the implementation of Metropolitan Broadband Fiber Optical Networks in the Region of Western Greece. The technical support is provided to the Local Authorities of the Region that are the contractors of the Invitation 93 of Meter 4.2 of the Info-society Operational Program.

More specifically, the work aims in the benefit of technical support via the following energies:

- The development of Studies of Application and Routing of Optical Fibres and the adaptation of Copies of Auctioning, on all financed Local Authorities of the Region of Western Greece.
- The supervision of technical work of manufacture of networks and the certification of equitable implementation of installation of infrastructures as well as their equitable operation.
- The development of enterprising schema of exploitation of infrastructures that will be installed in the Region. It Concerns the adoption, use and benefit of broadband services and the proposal of the Enterprising Form for the administration, growth, maintenance, operation and exploitation of the infrastructures.

The expected results of the project are the implementation of Metropolitan Broadband Infrastructures of Optical Fibers in a technically equitable way in the Region of Western Greece and their enterprising viable exploitation.

URL: http://ru6.cti.gr/broadband

GRNET II/ VNOC 2 "Development / Administration Advanced Service of Virtual Network Operation Center for GRNET's network (VNOC-2)" Contract No 5 "Advanced Network Services"

The goal of this project is the study and development of advanced network services for GRNET's network. In particular, the Quality of Service, Managed bandwidth Service and Administration of MPLS Virtual Private Network services will be studied and designed for GRNET's network. Next, a new tool, for the administration of these services, will be developed that will accept requests for the users of the services and will decide if the requests can be supported (implemented) depending on the network resources each time. Also, scope of this project will be the investigation and implementation of the interconnection between CCC-AtoM as well as the implementation of L2TP tunnels over MPLS. Finally, this project includes 4 more research studies that are IPv6 Quality of Service, IPv6 over MPLS, multicast over MPLS and Layer 2 optimizations of MAN networks respectively.

URL: http://vnoc.grnet.gr

Promotion of broadband culture in the Region of Western Greece

The main objective of the project is the promotion of request and use of broadband services in the region of Western Greece. This promotion will be achieved through an informing campaign, discussion with interested groups and the general public and with the demonstration of the capabilities of broadband access in the Internet.

In particular, the main aim of the project is the promotion of the request of broadband access through the following actions:

- Estimation of the request of broadband services and study about the ability of developing a broadband infrastructure in the region of Western Greece. Furthermore

there must be an informing campaign to the region authorities and telecommunication companies about the capabilities and opportunities of broadband services.

- Organization of informing campaigns and promotion through advertisements and TV conversations.
- Setup and operation of two showrooms (one with wired broadband access - ADSL and one with wireless broadband access – Wi-Fi) for the demonstration of broadband capabilities and services.
- Provide technical advises and support to the local authorities in order they to develop showrooms (such them that described above) for presentation of the capabilities of broadband access.

The combination of the above actions is expected to increase the public interest at first level and the request of broadband services in the region of Western Greece at second level. A further aim is the creation of an infrastructure that will cover all the region of Western Greece.

SIG-GLUE: A Special Interest Group for the Game-based Learning in Universities and lifElong learning (eLearning Initiative, eLearning Call for Proposals DG EAC/61/03 'Preparatory and Innovative Actions 2003')

Digital games are a significant element in the digital media and information society. They influence the development of the media technologies as well as the interface design, social interaction and new evaluation approaches. The development of the game industry is not only product for the leisure time, but also for work and learning with many dimensions in the area of the social life, knowledge acquisition and application, soft skills and gaining experiences.

Digital games are a large area for researchers in the different science fields e.g. social, political, cultural, pedagogical, computer science, etc. Within "SIG-GLUE" project direction of the educational games allots from wide spectrum of the digital games.

The main goals of the proposed network are: establishment of structured collaboration and research in the game-based learning area, creating tools that support propagating of knowledge, skills, experience in the game-based learning, monitoring the quality and establishing a quality stamp for game-based learning resources, contributing to innovation of the European institution and Universities.

G1: SIG-GLUE community will provide a Europeanwide communication and exchange platform for game-based learning in the field of universities and lifelong learning. The community could be seen as "knowledge pool" i.e. a resource of guidelines and practical examples that can be taken over thus facilitating the application of game-based learning.

G2: Aim of the SIG-GLUE community is to support end users by the application of game-based learning in the first place. Hovewer, it is also important to involve actively the educational game producers and content designers. The intention is to initiate and support development and application of joint game-based learning lectures and courses supporting studen e-teamwork among distributed learning institutions. Joint lectures will be formally acknowledged by several partners.

G3: Establishing a Quality stamp for game-based learning resources and permanent monitoring the quality.

G4: Workshops & events will be organised and carried out to educate the educators in the terms of design and application of the game-based learning and to disseminate innovative learning approaches. Issues such as current research and design of educational games will be also tuckled at those events.

G5: Establishment of several different Task Forces to work on interesting subject (these are to be identified and defined by the participating members based on the common interests, user analysis and the developments in the area). Main target is to identify the future trends and try to influence them as early as possible in order to ensure more educational (as well as recreational) value of innovative learning approaches.

UniGame (Game-based Learning in Universities and Lifelong Learning, 101288-CP-1-2002-1-AT-MINERVA-M, MINERVA, SOCRATES Programme, EU)

UniGame addresses the concepts of game based learning with a focus on the higher education sector. Game-based learning has been adopted widely for children's learning. Only recently has it been discussed for learning of adults. Within UniGame this field should be opened to European Universities for student learning but also for continuous education concepts. The games to be adapted, used, and trailed within UniGame will focus in their educational, rather than recreational, value. The game selection will focus on social game forms, which are based on current theories of collaborative and community learning. It will be based on research on game-based learning, but also on best practice of using games in group learning. The game forms will mostly be communication oriented, taking in account also user behaviour of mobile technologies and chat environments.

URL: http://www.unigame.net/

ASP-NG (ASP – New Game, IST-2001-35354, Key Action V.1.12., EU)

The objective of ASP-New Game is to research, develop and implement a new middleware for ASP/ISPs. The new platform will integrate all the required functionality for running an ASP operation, including new methods, such as Streaming Application (application is partially run on the client' s PC while the ASP server streams additional blocks of software to the client when it is needed), to deliver productivity tools and rich content, secure keying of IP and Digital Rights Management. The proposed ASP-NG project is aimed at providing ASP/ISPs, small, medium, or large enterprises (SMEs and Telecos), with a complete set of features required to run an ASP. The new platform will enable integration of some of the existing technologies, such as Thin Client. Streaming Application enhances the usage of rich media and games through ASP/ISPs it is protected by a unique security key, and makes use of distributed servers, such as those found in Content Delivery/Distribution Networks (CDNs). The project' s objectives include to run 3 successful pilots and complete, based on the pilots results, the definition of the ASP-NG product. CTI/RU6 is responsible for the design and the implementation of web-based front end and the authentication mechanisms.

URL: http://www.asp-ng.eu.org

EDCOMNET (A Humanistic Urban Communal-Educational Net, IST Programme, Action Line III.2.2 The learning citizen, EU)

EDCOMNET is an educational communal net, a virtual learning community platform for adult citizens to be set up in many regions of the European Union and associated countries like Israel. The net will act as a portal stimulating the active learning of social skills by the citizen, thus enhancing the social integration of individuals within urban communities. It will empower the individual citizen to be a self-reliant part of society, fostering creativity and autonomous opinion forming as well as decision-making. The EDCOMNET system will be a network based information system consisting of a number of local servers. The different servers communicate through the Internet but will operate in the local language and will be embedded in the regional cultural context. In the underlying RTD project a novel multi-agent infrastructure will be developed enabling information retrieval relevant to the needs of average citizens as users.

URL: http://www.edcomnet.net

INVITE (Intelligent Distributed Virtual Training Environment, IST Programme, Key Action III.3.3, Advanced Training Systems, EU)

The main aim of the project is to build an innovative support system for collaborative learning over distance through distributed and shared virtual environments. INVITE will be a platform for synchronous tele-learning, providing users with functionality that supports social learning process through distributed virtual environments and all those features needed to create a collaborative learning experience. The INVITE environment will be an integrated system, which is able to educate its users in carrying out tasks within the environment in an efficient and intelligent way, with the use of intelligent agents. The INVITE environment will be designed as an open system, which can be interfaced with standard instructional management systems and data-representation schemes.

URL: http://invite.fh-joanneum.at/

VirRAD: The Virtual Radiopharmacy - a Mindful Learning Environment (IST Programme, Key Action III.2.1 Self learning for work, EU)

The main objectives of VirRAD are the development of i) an instructional design from Mindful-Learning theory; ii) a multi-layered meta-cognitive learner model within the context of an intelligent, virtual reality enhanced, distance learning environment for vocational training; iii) the embedding of this environment within an enriched learning structure that gathers together learners, practitioners and specialists in a knowledge community, using Radiopharmacy as the target learning and knowledge exchange area. VirRAD aims to create a readily-accessible virtual-environment where the Nuclear Medicine community can meet to learn, exchange views, and discuss best practice. This intelligent learning environment incorporates a number of multimedia resources, including a dedicated simulation-based virtual environment in which trainees may gain experience of operating equipment with potentially hazardous radioactive materials.

URL: http://www.virrad.eu.org

Also: http://www.virrad.com, http://www.virrad.net, http://www.virrad.org

TODAY'S STORIES (Long Time Research, ESPRIT Programme, Task 4.4, Intelligent Information Interfaces (i3), Experimental School Environments, EU)

Today's Stories develops an approach to learning for young children (4 to 8) that is aimed at the development of social, communicative and emotional skills in the context of their everyday activities. The underlying idea is, first, that children may learn from reflecting on their actions and, second, that children may learn from other children's perspectives on their own actions. The results of Today's Stories are developed and applied within two school environments, in Denmark and in Israel. Exploiting the significant differences between both settings, the project pays attention to social, cultural and ethical implications, as well as to the conditions for acceptance and success. CTI is responsible for the development of the Multimedia Editing Environment. This will serve as the medium for the presentation of the children's stories and material.

URL: http://www.stories.i3net.org/

Training seminar for teachers of secondary schools (Operational Program for Education and Initial Professional Training (O.P.E.I.P.T), Ministry of Education)

The main objective of the seminar was to offer training to teachers of secondary schools in the thematic area of networks, operating and distributed systems. The seminar's duration was 210 hours. CTI was responsible for the scientific co-ordination and the training courses in the thematic area of networks. This thematic area included courses about general aspects of networks, the OSI/ISO model, basic concepts about the TCP/IP protocol, introduction to Internet and its applications. CTI was also responsible for the execution of the exercise scheduled.

VES (Virtual European School, Joint Call for Educational Multimedia Programme, EU)

Virtual European School (VES) aims to develop a comprehensive on-line resource of teaching material for secondary school education. The system is fed by a group of smaller publishing houses from different European countries (Austria, Italy, Greece, Great Britain) specialised in educational material and contains multimedia material, CBT products, and also additional background materials. The technical structure is based on Internet technologies, with interconnected VES servers in each participating region. The multimedia material is stored in a database, with multi-lingual annotations for each project. Three user groups exist within the VES project: publishers, teachers and pupils. The main innovation is that pupils access the system through a specifically designed interface to work with selected learning material through 3D Distributed Virtual Environments (DVEs).

URL: http://www.ves.eu.org

PLATON, Program for the Training of Executives and Trainers of special social groups (EMPLOYMENT – INTEGRA Initiative, EU)

The project aimed in producing and distributing training material for tutors of special social groups. CTI was responsible for the development of an asynchronous ODL tool to support the above activities and for the design and implementation of a database to include organisations that offer continuous training for special user groups' tutors. The ODL tool offers library support, glossary and an evaluation schema and the database is accessible from the Internet. Both applications are user protected (authentication mechanism) and allow easy administration.

ODL-UP (Open and Distance Learning program of University of Patras - Operational Program for Education and Initial Professional Training (O.P.E.I.P.T) / Action 3.1.d.2, Ministry of Education)

This project aims at the exploitation of the educational, technological and administrative experience and the high quality network and computer infrastructure of University of Patras for the implementation and operation of an Open and Distance Learning Centre. During the project, the implementation of the following modules took place:

- The curriculum for Open and Distance Learning
- The information system which supports the Open and Distance Learning Centre
- The Open and Distance Learning Centre that is responsible for the administration of Open and Distance Learning services.
- The Educational material, which is used during the Open and Distance Learning services.

CTI/EM6 was responsible for the design and the implementation of the Open and Distance Learning Information System (ODLIS). ODLIS offers both synchronous and asynchronous Open and Distance Learning services.

URL: http://odl.upatras.gr

OSYDD (Integrated system for broadband network management in the University of Patras – Operational Program for Education and Initial Professional Training (O.P.E.I.P.T) / Action 3.1.c, Ministry of Education)

This project aims to implement an integrated system for the administration of the University of Patras campus network. This integrated system is the base for:

- The evolution of Internet and Intranet applications into the University of Patras environment.
- The modernisation of educational and research activities with the use of multimedia, advance network services and telematic services (for example tele-training).
- The improvement and update of the services for the students, researchers, and administrative personnel of University of Patras.
- The update of the telecommunication infrastructure of the University of Patras, through the interconnection with national and international network with the use of high capacity links.

RU6 was responsible for the design and the implementation of advance telematic services. These telematic services were Synchronous Distance Learning, Asynchronous Distance Learning and Computer Support Collaborative Work for Learning.

URL: http://www.noc.upatras.gr

Pilot project for the implementation of the Distance Education Service (Hellenic Telecommunications Organisation)

The project aimed at the implementation and demonstration of a pilot distance education service, which, in the sequel, may evolve in a commercially available service. More specifically, during the project CTI/RU6 designed and implemented a tele-education application based on ISDN technology. The tele-education application supports both synchronous and asynchronous tele-education scenarios. The project was fully implemented by CTI/RU6. During the project the following actions took place:

- Study and evaluation of similar products
- Design of pilot application architecture
- Installation of necessary equipment
- Implementation of support services for tele-education application (like videoconference service, application service, etc)
- Implementation of tele-education application based on the support services

POWERNET (Innovative actions for training on the thematic section of Electricity Power Companies especially on issues of services for the citizens and employees security, ADAPT Initiative, EU)

The aim of the project was to set up an informational and training network under the WWW. The system offered asynchronous Open Distance Learning in the field of English Grammar. The ODL tool also facilitated the communication between the students and the tutor, offered access to a library service and a glossary and included an evaluation

mechanism to be used by the students. CTI also designed and developed a database on issues of work safety to be used by the employees of the Greek Power Company. The database gave access and retrieval of relevant material based on the description of each query item. The system also facilitated communication between authorised users and easy administration services.

TRENDS (Training Educators Through networks and Distributed systems, Telematics Programme, EU)

The project TRENDS aimed in developing and effectively offering education to teachers, in order to improve the quality of general purpose teaching services and to create new jobs in the area of education. The main concept was to focus on the improvement of existing Open Distance Learning (ODL) techniques, as far as multimedia and telematics issues are concerned, using the latest methods of Information Services. The project results aimed to cover the needs of people who provide education, such as education services providers, teachers, company administrators, educational material designers/producers, and users who receive knowledge, such as professionals who have direct educational needs and employees who work in distant working places.

URL: http://www.lrf.gr/english/trends/trendshome.html

ATMNet (Internetworking and Advance Services over Public ATM network, EPET II Programme, General Secretariat of Research and Technology)

This project is the first large-scale attempt for the introduction of ATM technology in Greece. This project aims to interconnect the local ATM networks of Greek Universities with the public ATM network of the Hellenic Telecommunication Organisation. The result of the above interconnection will act as a test-bed for study and research on the following areas:

- Interconnection of private ATM networks with the public ATM network
- Interoperability of alternative technologies (for example IP networks, Frame Relay)
- ATM standards for administration, control, and routing
- Quality of ATM services
- Quality of Advanced telematic services with multimedia characteristics

The ATMNet project will install telematic services (videoconference, CSCW - Computer Support Collaborative Work, teletraining, telemedicine) in order to evaluate the quality of those service to the end user. The above evaluation will be based on the design and the implementation of a number of experiments on the implemented test-bed. CTI/RU6 is responsible for the design and the realisation of the teletraining experiments.

IoS (Internet over Satellite, Hellenic Telecommunications Organisation)

The IoS project intends to utilise the available FAST Internet satellite technologies for the implementation of new types of services (e.g. Tele-Education, Tele-Medicine, Collaboration work). These services are mostly suitable for satellite transmissions. The utilisation of satellite channels for Internet traffic will be implemented through the IoS software provided by INTRACOM. The project aims to conduct research in the field of TCP/IP transmissions over satellite channels and propose improvements that will better suit the applications that are going to be implemented. The proposed improvements will be integrated into the IoS platform of INTRACOM. CTI participates in the project as a subcontractor of NTUA/NOC.

MBS: Managed Bandwidth Services (Greek Universities Network – GUnet), Network service management, (PENED Programme, General Secretariat of Research & Technology), Management of Advanced MBS Services, (Greek Research & Technology Network – GRnet)

RU6 has undertaken a number of projects in the filed of Management Bandwidth Services. The research in these projects is focused on techniques and algorithms for network Management Services with quality of service in Internet WANs. These services are becoming more and more important for the implementation of advanced services over large-scale heterogeneous networks. The projects will extend the proposed solutions for the management and constrain of resources from point to point and will propose uniform ways of efficient and rational administration putting emphasis on the exploitation of the underlying technologies of the engaged subnetworks. In addition, the projects investigate the capabilities offered by the MPLS technology (and especially MPLS VPNs), as well as solutions (e.g. MPLS/CCC) that allow transfer of layer 2 protocols over MPLS.

URL: http://www.grnet.gr/mbs.html

SEQUIN (Service Quality across Independently Managed Networks, IST Programme, Key Action 7.1.2., EU)

SEQUIN is a project involving eight partners in seven countries and co-funded by the European Commission under the Information Society Technologies (IST) Programme. SEQUIN became operational on November 1, 2000 and will run for 15 months. The objective of SEQUIN is to define and implement an end-to-end approach to Quality of Service (QoS) that will operate across multiple management domains and will exploit a combination of IP and ATM technology. An initial objective of the SEQUIN project is the creation of a definition of QoS which is based on a merging of user requirements and the capabilities of emerging technologies. This definition will then be tested in a pilot environment with the objective of achieving a stable production QoS offering differentiated QoS by the end of the project. CTI is representing GRNet in SEQUIN and is responsible for the SLA/SLS definition and realisation for the defined QoS.

URL: http://www.ten-155.net/sequin/

IPQoS (Design and implementation of a QoS architecture over GRNet)

Aim of this pilot project is to study, design and provide practical guidelines for the implementation of a QoS architecture of the GRNet backbone, in order to provide different Classes of Service (CoSs) to the customers of GRNet and utilisation and management of GRNet's resources. The project will also study and propose a framework for the application, monitoring and management of these CoSs within the spectrum of GRNet and towards GRNet's customers. CTI/RU6 is a full partner in the project working mainly on the network architecture of the proposed QoS framework.

URL: http://ouranos.ceid.upatras.gr/diffserv/start.htm

6NET (Large-Scale International IPv6 Testbed, IST Programme, Key Action 7.1.2., EU)

The main objectives of the project are to build and operate a dedicated international pilot IPv6 network, and use this network to validate that the demands for the continuous growth of the global Internet can be met with the new IPv6 technology, by using state of the art IPv6 applications. The migration strategies for integrating IPv6 with the existing IPv4 infrastructure (core and access networks) will also be validated. A further aim is to evaluate the deployment and manageability of a large IPv6 network including physical infrastructure, address allocation, registries, routing and DNS operation. In this way, the project will help European research and industry play a leading role in defining the next

generation of networking and application technologies. CTI/RU6 is assistant contract to GRNET.

URL: http://www.sixnet.org

PAVET 2000 - Development of an autonomous intelligent agent for the implementation of a synergetic web navigation model on the Internet (in co-operation with MLS Firmware)

The basic goal of the project is to design and develop a reliable, sufficient and easy to use, Web navigation agent. The agent will be developed as an intelligent agent and will be able to provide clues, hints and advice to the users in order to improve their browsing habits according to their needs. Furthermore the intelligent agent will provide constant transparent web browsing/navigation surveillance, in order to assist the user, by executing network functions such as DNS pre-resolving, pre-fetching and others. The ultimate goal of the agent will be the reduction of web latency. The intelligent agent will be provided in the form of an integrated software package that can be installed on any web user's computer. CTI/RU6 will be involved in both the design and implementation phases of the project.

PAVET 2000 - A platform for the implementation of interactive Digital Television Services (in co-operation with INTRACOM)

The goal of the project is to design and implement interactive Television services for athletic events. With the use of these services the user will be able to: (a) Interact with the athletic event that he/ she is watching in the sense that the user will be able to foresee the result and play in a newly designed interactive game (b) Receive various information about the event. The information will be related to the history of the event, statistics and previous results. RACTI/RU6 is responsible for the design, implementation and integration of the systems database module.

SEGAS - ONLINE SERVICES FOR THE GREEK ATHLETICS FEDERATION

The project will develop the Web site of the Greek athletics federation and several online services, such as online news and game results. In its initial phase the project will record the historical archives of the federation. The archives will then be digitised and transformed into an online Web site.

URL: http://www.segas.gr/

URL: http://www.olympics.segas.gr/olympics/

The city of Patras on the Internet

The goal of the project was to design, implement and integrate a demanding Web site for the Municipality of Patras. The Web site contains a vast amount of information about the city of Patras and the Municipality of Patras. During the project, RU6 designed and implement several prototype, dynamically updated online services for the Municipality. The services designed were the Search engine of the site, the City Guide with all the information about points of interest in the Municipality, the Events and ticket reservation service, the News service, the online voting service and the Communication service. RU6 also designed and implemented an administration web site with the use of which, the Municipality can easily administer all the online services and communicate with the citizens of Patras through the Internet.

URL: http://www.patras.gr/

SYN-KERKYRA (SYN Programme, General Secretariat of Research and Technology)

The aim of the project was the design and the implementation of an Intranet and Internet based Information System, to provide efficient management of information. The system supported the distribution of information and the exchange of documents from, towards and within the Prefecture of Corfu. CTI was responsible for the design and implementation of the system. A user analysis study defined the main functionalities to be included in the system. These included the provision of Internet access to all the employees of the Prefecture, facilitate the exchange of information between the citizens and the Prefecture, the exchange of documents via Internet, to support flow management and to offer communication through teleconference tools (NetMeeting), on-line chat (Chat) and use of Bulletin Board.

ELECTRA (European Electronic Information Centre for Adult Education, ISPO Programme, EU)

Aim of the project ELECTRA was to satisfy the need for wide access to adult education and lifelong learning resources, by developing a European Electronic Information Centre for the citizens of the European Union, accessible through the Internet. The Centre collects the accumulated experience of European programmes, national and European policies and private initiatives, and information about organisations in the field of adult education. CTI was responsible for providing the technological experience and developing from technical and technological point of view the whole system.

URL: http://www.electra.eu.org

DARING (Disabled people in new Internet jobs, HORIZON – EMPLOYMENT Initiative, EU)

The objectives of the project were:

- The creation of a network for providing disabled people with information relative to existing job positions and employment opportunities and for supporting communication in social, labour and technological themes through the use of the WWW.
- Development of a system designed for informing disabled people and their tutors about teleworking issues.
- Training of a special group of disabled individuals (with kinetic problems) in the themes of personal evolution, new forms of jobs, Informatics and Telematics and specifically on issues about design and creation of electronic publishing.
- Development and adjustment of telematic centres to support the work of people with kinetic disabilities in new Internet jobs and electronic publishing

CTI was responsible for the development of the supportive telematic services namely: Searching and information retrieval about organisations and institutes for disabled people, law and decrees, personal data about disabled people and job positions and employment opportunities. Also CTI developed the infrastructure for e-mail and teleconferencing services restricted use by the program's group and relevant specialists.

Pilot project for the implementation of the Tele-working Service (Hellenic Telecommunications Organisation)

The project aims at the implementation and demonstration of a pilot Tele-working service, which, in the sequel, may evolve in a commercially available service. More specific, target of the project is the description of tele-working environments, the study and evaluation of architectures for the implementation of tele-working service, the

implementation of tele-working applications and the demonstration and evaluation of those tele-working applications. The project was fully implemented by CTI/RU6. During the project the following actions took place:

- Demonstration of the technologies, which are used for the implementation of tele-working applications.
- Study and evaluation of existing tele-working products
- Design and detailed description of tele-working applications
- Testing and evaluation of the services that support tele-working applications
- Testing and evaluation of proposed tele-working applications

Teleteaching Service for the Greek PTT

The project "Teleteaching Service for Greek PTT" aims to develop one commercialise Teleteaching application and constitutes the continuation of the Pilot Teleteaching project, which the CTI and the Greek PTT have completed.

More particularly the project "Teleteaching Service for Greek PTT" aims to the following:

- Implementation of an application for high quality synchronous Teleteaching over IP and ISDN networks (with the use of one BRI connection) with the use of special hardware.
- Implementation of an application for high quality synchronous Teleteaching over IP and ISDN networks (with the use of three BRI connection) with the use of special hardware.
- Implementation of an application for high quality synchronous Teleteaching over IP and ISDN networks (with the use one BRI connection) without the use of special hardware.

In this project participate the CTI and the Greek PTT and the role of the CTI is the design and the implementation of the above applications.

IPv6 Pilot Project

The main objectives of the project are the investigation of how the already implemented streaming and videoconference applications can benefit for the enhanced capabilities that IPv6 networks offer. An important factor of streaming and videoconference applications is the multicast transmission of data. In addition, the project will study the multicast transmission of data over IPv6 networks. Moreover the pilot IPv6 project will propose a methodology on how the end users can have access in an IPv6 network. The IPv6 pilot project is funded by the GRNET and is executed by the CTI/RU6.

URL: http://www.grnet.gr/ipv6

GUNet

The project aimed to design, implement and test the right function of nodes which connect the local area Academic networks, in order to provide advanced high-speed services of telematics. CTI participated in the pilot projects for the following applications RTS (Real Time Services), MBS (Management Bandwidth Services), VoD (Video on Demand) and IPv6 parts of the whole project. The aim of RTS was the study of all infrastructures at the network, system and user application layer for image and voice transfer in real time and application sharing. MBS resulted in a presentation of alternative solutions for the programming and resource allocation in heterogeneous networks. The aim was also to propose and develop the necessary infrastructure for efficient resource

administration ensuring quality of service. Finally, a study for the connection and operation of local VoD servers was presented.

URL: http://www.gunet.gr

ODYSSEAS (Integrated network for Secondary Schools in Achaia, Thrace and the Aegean, Operational Program for Education and Initial Professional Training (O.P.E.I.P.T), Ministry of Education)

The objectives of the project were to install an integrated educational network in three geographically dispersed regions, to develop a set of services in order to support the educational process as well as to train the teachers in order to exploit the new means and capabilities. CTI undertook the management of the project, the development of the technological infrastructure, the training support and the installation/operation of the applications in 30 schools of the region of Achaia. Also a number of applications were developed to facilitate collaboration such as Discussion Groups and Bulletin Boards. Moreover, CTI participated actively in the diffusion of the results to a national and international level through publications, and conferences.

URL: http://odysseia.cti.gr/odysseas

Study and Technical assistance for the Information System of the Greek Ministry of Education and Religious Affairs, Greek Ministry of Education and Religious Affairs

The project objective was to present an analysis and design of the Information System and the network infrastructure of the Greek Ministry of Education and Religious Affairs. The study included the design of the local and national network infrastructure and the Information Centre. The study included the scheduling of the implementation phases, the evaluation of the technical and economical proposals, and installation of the equipment. The project system analysis and development was based on the application of widely used methodologies like SDM and SADT.

HELIOS (Hellenized Infrastructure of Upper Layer OS, STRIDE Programme, General Secretariat of Research and Technology)

The project aimed at producing a study for International Upper Layer OS, in order to set standards to support Greek and Latin character sets for private and public environments. The project developed a prototype for implementing, testing and optimising MHS issues on a WAN environment towards an integration of telematics and telecommunication services over private/public MHS environments.

DIANE (Development and installation of an advanced industrial network, STRIDE Programme, General Secretariat of Research and Technology)

The main objective of the project was to design and implement a network environment for research and development purposes for the Aluminium of Greece, HITEC and CTI. The network aimed at facilitating knowledge transfer between the research institutions and the companies participating in the project. CTI was responsible for the presentation of an analytical study of available network administration software products based on a requirements analysis, selection of the product based on the specifications produced, implementation and operation of the network administration environment in the Aluminium of Greece. CTI was also responsible for training the technical staff of the company in the administration of the relevant software.

BEAM (Biomedical Equipment Assessment and Management, AIM Programme, EU)

The objective of the project was the design and development of an acceptable framework for the administration of medical information. This approach also included a market survey of medical equipment in terms of cost, quality and usability. CTI participated in the design and development of FINE (Facility for Information Exchange). FINE aimed at becoming a standard for exchange of bio-medical information in Europe. FINE included a database where all relevant info was stored and a network infrastructure that facilitated the efficient retrieval from the database.

TELEMED (TeleMedicine, RACE II Programme, EU)

Main objective of the project was the demonstration of IBC capabilities for control and transmission of medical files to facilitate the co-operation between doctors and medical researchers in the area of diagnosis and treatment with the use of multimedia workstations. This project achieved not only the development of tele-medicine services but also defined the general requirements for the rendering of IBC services in Europe. CTI was responsible for the design and development of the RECPHONE application, an integrated environment (in Macintosh) to assist the communication between medical personnel and exchange of medical images to support consultant services.

DINES (Interconnection of Broadband Islands, Telematics Programme, General Secretariat of Research and Technology)

The project designed and developed a pilot broadband communication network for the transmission of video, voice, graphics and data. The network consists of two local broadband islands in Athens and Patras. The island of Athens is based on ATM while the Patras Island on FDDI technology. The connection between these two islands is based on a 2Mbps line. The project supported applications such as: teleworking, end-users collaboration in order to complete a common task, teletraining, support of training activities over the network and teleconference, support of conferencing activities.

BIOFORM (EUROFORM Programme, General Secretariat of Research and Technology)

The main aim of the project was to design and develop a network infrastructure to facilitate information exchange, to develop training material in the form to support on line communication and autonomous educational multimedia applications for Neurophysiology, Cellular Biology and Biomedical Technology and Medical Physics. A tool was developed to facilitate the Open Distance courses called HIPPOCRATES that also supported on line communication between doctors. HIPPOCRATES provided a platform to be used for the presentation of synchronous courses, exchange of medical material (images, text) and offering of consultant services.

TELESERVICE (Technical Chamber of Greece, Branch of Western Greece)

The aim of the project was the design and development of an information system to be used by the members (engineers) of the branch of Western Greece. CTI was responsible for the design and implementation of the information database and the network infrastructure to facilitate access through the Internet by the end users.

Technical Consulting for Government and Private Sector

- **Greek Open University.** CTI was responsible for providing technical assistance in the selection process of the contractor and the implementation of the mechanism to support the submission process for applicants to the Greek Open University.
- **Greek Pedagogical Institute.** CTI provides the Pedagogical Institute with technical assistance at the implementation of the project "Value added services for the Greek Schools Net".
- **Greek Parliament.** CTI provided technical consulting for the development of the Management Information System (MIS) and Network
- **ODYSSEIA/KALYPSW.** KALYPSW was the co-ordinating action of all ODYSSEIA's projects (for the introduction of Computer and Networking Services to secondary education in Greece). CTI participated in Kalypsw by providing technical consulting on the field of Educational Networks and Services.

CE^2 (Computer Experiments for Concurrent Engineering, BRITE/EURAM Programme, EU)

The main aim of project (CE^2) was the provision of solutions for improving designs which came up in some instances of industrial applications, using modern, specific algorithmic techniques. In detail, the project aimed towards the solution of a multiobjective optimisation problem, e.g., the finding of the best function, which satisfies the constraints of the user or/and the physical concept of the problem. The tool used fast emulators instead of slow simulators to speed up production time. Emulators are abstract mathematical models that realise the behaviour of the systems under study within acceptable ranges of accuracy. The system offered an advanced User Interface by the use of advanced graphics interpretation of the results. CTI was involved in the software development and integration of the different modules (algorithmic) of the system. CTI participated in the project as a subcontractor of INTRASOFT.

DELTA-CIME (Development of an Integrated Production Management System, ESPRIT III Programme - HELLENIC SPECIAL ACTIONS, EU)

The main objective of the project was the research and implementation of an integrated Production Management System for the DELTA dairy company and especially for the yoghurt production line. The development of the system was based on the extension of a classical MRP II system with the integration of simulation technology and real time expert systems. CTI was responsible for the development of the system. The simulation was used for the verification of the production plans and the Real time Expert System was used in order to obtain on-line data from the production line and to take the decisions needed in order to achieve the production plans. Each time a variation from the production plan is encountered or an abnormal situation occurs the system runs and produces alternative production schedules. The process is automatically triggered by the expert system and returns to the end user suggestions of how to keep the process under certain constraints.

TEXTILE (Introduction of new technologies in the textile and Apparel industry, STRIDE Programme, General Secretariat of Research and Technology)

The main objective of the project was the development of a Production Management System for the textile and apparel industry. CTI designed, implemented and installed an MRP II based Production Planning System at the participating companies of the project. The system was designed and implemented based on the specific user requirements of the participating companies to ensure high portability and ease in installation especially

for industries of the textile sector. The system was developed in a modular way ensuring adaptability to various job-shop environments with a reduced set of alternations. CTI also developed an Inventory control system and implemented a set of training courses in "Applications of Information technology in the Industry".

Contact Persons

Dr. Christos Bouras,
Professor
Scientific Co-ordinator
Email Address: bouras@cti.gr
Tel.: +30 610 960375, +30 610 996951
Fax: +30 610 969016

Dr. Vaggelis Kapoulas,
R&D Engineer
Managing Director
Email Address: kapoulas@cti.gr
Tel: +30 610 960355
Fax: +30 610 960358