

The Role and Status of Croatian Academic and Research Network – CARNet

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Uloga i stanje Hrvatske akademske i istraživačke mreže – CARNet

Ovaj izvješta opisuje djelovanje Hrvatske akademske i istraživačke mreže – CARNet u akademskoj i znanstvenoj zajednici, te u društvu općenito. Objasnjeni su ciljevi i pristupi, predočeni su trenutno stanje i planovi za budućnost.

This report describes the role of CARNet in academic and scientific community and the society as a whole. The goals and concepts are explained. The current status and future plans are presented.

Introduction

A huge step towards changing an intolerable low level of computerisation of academic and scientific community in Croatia was made in 1990, when a substantial financing was provided by the government for purchase of data processing (and other scientific) equipment. It was immediately realized that the benefit of that equipment would be much higher if it would be interconnected in a nationwide network. Therefore, a coordinating committee was nominated with the task to analyze the present status, overall needs and to suggest measures and steps to undertake. During the year 1992, the Ministry of Science provided funds for the first phase of development of the Croatian Academic and Research Network, CARNet.

Goals

The CARNet Coordinating Committee (CC) has set high goals from the very beginning. The ul-

timate goal is to connect every computer in academic and scientific community in a nationwide network. This network, in turn, should be integrated in world networks. Thus, every computer would have access to every other computer in Croatia and worldwide. It was proposed that every computer should support three basic services: E-mail, remote login and remote file transfer.

Such a network should be available to all scientists, researchers and students but also to all citizens and organizations involved in the research and education. This access should be provided in an affordable and stimulating way thus motivating the use of network and services.

In addition to facilitating access to the world wealth of information and its acquisition, from the very beginning the intention was to use network for the development of Croatian databases and information services. It would facilitate exchange of information, improve cooperation and yield with more effective activity.

The technical concept

A decision was made to build the network on private, leased lines instead of public data networks. The reasons were several. First of all the price: public network charges are based on traffic. To achieve the goal of motivating people to freely use the network the best solution is to have fixed communication expenses. Other reasons include

the need to implement new protocols, to experiment and to have higher communication speeds before others. Those requirements could only be achieved through the establishment of a private network.

The second choice to make was the protocol. After a thorough analysis of the state and trends in Croatia, Europe and the world, the decision was made that a multiprotocol network should be designed. However, in order to meet other goals as soon as possible, it was decided that for the time being a mandatory protocol that every computer should support would be TCP/IP.

Major network nodes, large institutions, governmental organisations and all other users will be encouraged to support OSI services and establish gateways between them and TCP/IP.

The third decision and proposal was to put accent on open systems, i.e. to insist on UNIX operating system in purchase and installation of new computers.

The organizational concepts

Due to the difficult economical situation in Croatia scientific and academic institutions are not expected to have substantial financial sources other than governmental at least for several years. Therefore, it was decided that financing of the development and operation of CARNet should be centralized, by the government. The Ministry will not only pay the communication and international expenses but has also purchased UNIX workstations for the institutions not having appropriate equipment and will pay the maintenance for all purchased equipment.

In order to run such a network, a suitable technical organization is required. The computing centre of the University of Zagreb (SRCE) was chosen to perform this task. It has been transformed into a support organisation for all Croatian universities with three prime tasks: to support CARNet network, to support users and to help in establishing information services.

It was proposed that CARNet project should be transformed into an organization. This organization should only provide a framework for users to articulate their needs, for the government to coordinate and harmonize the development and

for technical working groups to get necessary support to lead the future development.

The current status

CARNet project is now finalizing its first phase. Till the end of the first half of 1993, it is expected to have almost 100 (40%) institutions covering 7000 researchers (70%), connected into the network.

The national backbone is star shaped due to the topology of Croatia, technical possibilities of national PTT (HPT) and political and military situation. The major network node (MNN) in Zagreb, which is also the only international node connected to Austria and Slovenia, is in the centre of the star. The remaining three university cities (Rijeka, Split and Osijek) are connected to Zagreb. Individual institutions and neighbouring cities are connected to the nearest MNN.

Coverage in the area of the University of Zagreb (the largest one) is about 30% whereas other universities have been covered with almost 100%.

The current communication speed is low: 9600 bps on the backbone and international connections and 19200 bps towards individual institutions. MNNs are equipped with CISCO multiprotocol routers and UNIX computers while member institutions are provided with UNIX workstations communicating with MNNs via SLIP (serial line IP).

Each institution has nominated a person who will serve as a coordinator between CARNet and the institution. SRCE has organized courses for coordinators.

A quarterly bulletin "Glasnik SRCA" has been initiated.

All connected institutions have three basic network services available: E-mail, remote login and remote file transfer.

The network services

Simultaneously with the establishment of the core of CARNet, the development of information services began.

E-mail is the basic and simple service, but is extremely powerful one. First of all, a standard for the definition of personal addresses has been

agreed upon. Each and every individual user has his/her own address of the form:

first_name.last_name@institution.HR .

Besides personal addresses, group addresses have been defined, such as: professors, young_researchers, etc.

E-mail can be used to communicate with programs, too. Test installations are being operated serving as automated post office for receiving various data to be stored in databases, forwarded, or processed by other programs.

Many institutions have established FTP servers, containing not only public-domain programs but also data regarding their activity. A host (car-net.hr) provides the central FTP server for documents and programs useful for the whole community. Unfortunately, due to very limited external memory resources, it cannot contain all necessary data. An effort is being put to standardize FTP server structure and to organize data searching mechanism.

Tools are being prepared and data structures explored for the establishment of nationwide information service based on Gopher protocol. The intention is that every institution should provide at least one server offering at least basic information about the institution, its staff and projects. All those servers will be linked in a single system providing basic information on community organization, population and activities.

Further investigations will be performed on other protocols and systems, such as: WAIS, World Wide Web, Hyper-G etc.

Future plans

To fulfil the goals, it is necessary not only to connect the remaining institutions from the academic and research community but also to make demo connections to all other segments of the community.

In order to implement new multimedia technologies it is absolutely necessary to improve the communication speed by several orders of magnitude. Further investigations and implementations of information systems in all fields of human activity is the permanent orientation and the basic activity in the future. One of the largest tasks is the global library system of Croatia. The development and establishment of the information systems is not a goal per se. Its full meaning is to serve people. An important task of CARNet is to continuously educate potential users and promote new technology.

The policy

CARNet is the network for academic and research community. As such it can only support non-profit activities. However, CARNet must be the model for the development of other types of networks and must serve the global development of Croatia. Therefore, CARNet will provide access for individuals and even for commercial users providing that they use the network exclusively for non-profit activities. This will continue until commercial networks of necessary properties emerge.

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Predrag Pale was born on 7th May 1960 in Zagreb, where he finished primary and secondary school, and the Faculty of Electrical Engineering, from which he graduated in 1982, and won a M.Sc. degree in 1988. In the period from 1983 to 1986, he was engaged in research and development in several firms and he designed in that period a few microprocessor controlled measurement units. Since 1986 he has been working as a researcher in the Faculty of Electrical Engineering - University of Zagreb, in the area of the application of computer systems for the acquisition and processing of measurement data. He is one of the patentees of "IDT- Independent Data Transmission System." He is the author of several scientific and professional papers. Since 1991 he has been a coordinator of the Board of Croatian Academic and Research Network (CARNeT).

Ivan Marić (1965) studied electrical engineering in the Faculty of Electrical Engineering at the University of Zagreb (1985-1990) from which he graduated in 1990. Shortly after studies he started to work in the University Computing Center in Zagreb (SRCE) as a system manager. In 1992 he became the Head of the Network Department in SRCE. His main fields of competence are electronic mail, computer communications and network management.
