NETWORKING FOR SCIENCE AND EDUCATION IN BYELORUSSIA

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Abstract

The current state of research and academic networking in Byelorussia is considered. The UNIBEL project of creating the network for science and education is presented.

I. INTRODUCTION

At present there is considerable educational and scientific potential in Byelorussia. The greater part of it is concentrated in universities, institutions of higher education and several research institutes governed by Ministry of Education of the Republic of Belarus. In addition, there are a number of branch and industrial organizations supporting research and education, as well as libraries, cultural centres, public foundations, etc. Most of them are under the strict control of Byelorussian Academy of Science, Ministry of Public Health and other government bodies.

Actual exploitation and development of intellectual resources are hampered owing to the following circumstances:

- strict centralization and state control in education and science;
- destructive influence of conversion of military enterprises which is being implemented bureaucratically, without adequate planning, without replacement of technology;
- dissociation of universities, institutes and laboratories as well as private students, researchers and professorate;
- difficulties in publication and dissemination of scientific studies and ideas in the sphere of education; unreliability of the traditional means of communications (post, telephone) in the former USSR countries;
- inaccessibility and/or high cost of the up-to-date means of communication (fax and telex service, computer networks);
- almost total lack of working relationships with foreign research centres and scholars.

Most of these problems are an inheritance of "communist society"; the others are a result of current economic crisis.

Overcoming the difficulties mentioned above is possible only on the basis of wide spread use of computer telecommunications. This can support and facilitate further development of the intellectual potential of Byelorussia and provide for sufficient independence of science and education. Developed computer networks and means of telecommunications will give students, researchers and professors information independence, meet their requirements in free information exchange, and provide an entrance into the world information space.

II. CURRENT STATUS

Several public and commercial computer networks are presently working on the territory of the former USSR. However, most of them either demand payment for their services in hard currency or are limited in their potential. Most international computer networks do not have representations in Byelorussia, and this impedes their activity.

The most advanced networks operating in the territory of Byelorussia are following:

II.A. BelPAK

At present the Ministry of Communication and Informatics of Republic Belarus (Minsviaz) is developing national data network based on so called "PIEnet technology" - BelPAK. This network, however, presupposes intensive centralization and governmental control. Such centralization is a consequence of a policy of strict monopoly by Minsviaz. The gist this policy is quite simple: all international connections must be done only through BelPAK.

To date some network nodes of BelPAK have been installed in Minsk and regional centres Vitebsk and Gomel. The central node in Minsk is connected to Moscow via one 9.6 Kb dedicated line intended to provide international connection to all of Byelorussia. The services of this network will be quite expensive but will not be aimed to meet the requirements of science, culture and education. BelPAK is first of all intended to meet the needs of large commercial, industrial and governmental institutions.

The BelPAK network services are not realistically accssesible for academic and research institutions.

II.B. Sprint

Powerful commercial network SprintNet operates in the countries of the former Soviet Union more or less actively, but unfortunately not in Byelorussia. To date there is only one SprintNet node in Minsk that has four telephone entries and provides users with various services. The Minsk node is the only organization in Byelorussia leasing a dedicated line to Moscow under the strict conditions of Minsviaz. Therefore the services of the SprintNet are very expensive and are not currently available for Byelorussian science and education.

II.C. GlasNet

GlasNet is a public international network created during Gorbachov's times of "Perestroyka" and "Glasnost". It provides users with quite limited but low-cost services (basically e-mail). There are about 15 users of GlasNet at present. It has the only network node in Minsk connected to Moscow Glasnet node via dial-up line by means of special communication software.

II.D. EUnet/Relcom

EUnet/Relcom is the most active international commercial network operating in the former USSR countries. There are some network nodes in Minsk, Gomel and Vitebsk. The node in Minsk provides a connection to Internet via dial-up line to Moscow EUnet/Relcom network node. To date UUCP protocols are used. The EUnet/Relcom node in Minsk is the most active one and provides about 100 users (institutional as well as private) with e-mail, access to USENET, and some information services etc. Due to its reasonable prices EUnet/Relcom is quite popular with "middle-range" commercial and industrial companies and private businessmen as well as state and government bodies. The greater part of Byelorussian EUnet/Relcom users are universities, institutes and other academic and reseach institutions. Currently EUnet/Relcom is the only network which is more or less appropriate for purposes of science and education in Byelorussia.

II.E. Sovam Teleport

Commercial data network Sovam-Teleport is powerful one, providing more or less wide set of services. The Minsk node gives an access to X.25 networks as well as Internet through the BelPAK line. The services of this network are rather expensive and are not appropriate for science and education.

II.F. SITEK

SITEK is more of a commercial information system than a network in the strict sense of the word. It is a kind of extended BBS providing e-mail service through EUnet/Relcom network as an additional function.

II.G. FIDONET

There are about 50 voluntary nodes of FIDONET in Byelorussia, most of them in Minsk.

II.H. BASNET

The network of Byelorussian Academy of Science - BASNET - is intended to meet requirements of it's own research institutes. The Academy of Science is a very special organization, a closed system of strictly specialized research institutes and some other organizations. They are not involved in education. The BASNET network provides the Academy's institutions with services of e-mail and access to international networks through BelPAK network using X.25 protocol. The only BASNET network node is situated at the Computer Center of the Byelorussian Academy of Science.

Currently the Ministry of Education is developing a Republican computer network for administrative purposes - EDUCOM network. It is intended to unite central and regional bodies of the Ministry of Education as well as administrative staff of education institutions. The EDUCOM network is a basis of telecommunication infrastructure for the Ministry's computer- aided management system. It will be a rather closed system oriented toward governmental authorities rather than scientists or professors.

Besides these networks there are some companies that can provide any type of information and/or communication services, such as RIKO, the system giving a possibility of using its own commercial data bases and services of BBS, etc. Generally such systems are available by means of standard communication software.

The most advanced universities, educational and research institutes have their own local area networks, sometimes sufficiently powerful ones. But these networks are intended primarily for solving "local area problems" and do not have any external connectivity. These LANs are generally based on Ethernet or ARCNet network architectures. Different and sometimes even incompatible protocols and software are used. Such contradictions are often presented in the frame of the same institute or even laboratory. Non-coordinated technical policies creates serious obstacles to network integration.

Some of these institutes have attempted to get an international connection independently. But it is not very easy because of the monopoly of Minsviaz. An example of a successful attempt is an international EARN node established at the Research Institute of Heat and Mass Transfer of Academy of Sciense. This node provides Academy's research institutes with services based on NJE protocol. It is connected to Moscow EARN node (FREENET) via dial-up line and limited by its potential.

The situation with networking in Byelorussia is quite critical. The problem lies not only with the difficult economic situation and lack of funds but also in the lack of agreement in networking efforts of different universities, research and educational institutions. But the main obstacle is the monopoly of Byelorussian PTT Minsviaz.

III. UNIBEL PROJECT: CREATING AN ACADEMIC AND RESEARCH NETWORK OF REPUBLIC BELARUS

The main goal of the presented project is the creation of a Byelorussian University Computer Network (UNIBEL) and a coordination of various networking efforts in the sphere of science and education of the Republic of Belarus. The UNIBEL Network is intended to unite universities, educational and research institutions of Byelorusssia and give their students, professors and researchers the possibility of free information exchange with countries of the former USSR as well as the world community. The main feature of the UNIBEL Network will be wide accessibility of its services for students, researchers and educators. In addition, privileged connection will be provided for libraries, institutions of the Byelorussian Academy of Science, cultural centres, and government bodies (central and local) dealing with science and education. Additional goals include training of university and institute staff and dissemination and popularization of computer communications.

The UNIBEL project is a result of mutual efforts by organizations dealing with science and education. Currently it is partially supported by the Ministry of Education.

The configuration of the UNIBEL network will be based on regional approach. This presupposes creating a flexible but firm infrastructure of Republican computer telecommunications. The most important feature of such an infrastructure will be several backbone network nodes connected to each other.

A central support network node has been already established in Minsk during the initial stage of development of this project. This node supports the operation of several university and institute regional network nodes installed at the Byelorussian State University, the Byelorussian University of Informatics and Radioelectronics, the Polotsk Skoryna University, Grodno State University and some educational and research institutions such as Mogiliov Scientific Information Centre, Research Institute of Applied Physics, the Research Institute of Nuclear Problems, and some government bodies dealing with research and education, such as the Ministry of Education, the Ministry's Computer and Analytical Center, etc. In the very near future the nodes will be established in all large regional centres of Byelorussia (Brest, Gomel, Grodno, Mogiliov and Vitebsk) beginning with the most advanced academic and research institutions.

The kernel of UNIBEL network structure will be the powerful multiprotocol central node. The main task of the central node in Minsk is technical support and consultation with the regional network nodes and the provision to them with an international access through dedicated lines to Warsaw, Moscow and Lviv (Ukraine). In addition, the central node will be responsible for training domestic staff. At present the UNIBEL network is based on UUCP protocol and provides connection to Internet through EUnet/Relcom network. TCP/IP protocols will be used as soon as the IP-connection is obtained.

The regional network nodes are planned to be installed in the most advanced institutions and universities so that the end-users could connect to them. These institutions must have their own local area networks and reasonably qualified staff.

At the first stage the UNIBEL users will be provided with the following basic services:

- electronic mail;
- file tranfer protocol;
- TELNET functions and others TCP/IP services.

In the future more expanded services are intended to be provided:

- X.400 and X.500 services;
- connection to the national data network BelPAK;
- entrance into the EARN/BITNET, DECNET etc.

The UNIBEL network is currently implemented with the leading participation of Open Contact Ltd. This company develops the network in cooperation with the institutions mentioned above and maintains close contact with Ministry of Education of the Republic of Belarus and other organizations interested in the creation of the UNIBEL network. To date Ministry of Education authorized Open Contact Ltd. to act as the organization that would be responsible for developing and operating the UNIBEL network.

The Polish Academic and Research Network NASK renders the UNIBEL network greate technical and consultation assistance. The 64 Kb dedicated line Minsk (UNIBEL) - Warsaw (NASK) is planned to be established with NASK support. This line will probably be the only actual international link available to Byelorussian science and education for a quite long period.

Currently the dedicated 9.6 Kb line is planned to be establised to the FREENET (Russian Academic and Research Network). The line will be used according mutual agreement.

Presently the UNIBEL network is registered in the RIPE and IP-numbers were assigned in December 1993. The UNIBEL is a National Member of the EARN, the CEENet (Central and Eastern European Networking Association) and is invited to become a Member of RARE.

In spite of some progress the situation is still quite critical. UNIBEL permanently faces financial and organizing problems in its development efforts. A central node is required to provide further development of more complicated and up-to- date equipment. Such equipment is necessary to provide efficient use of the 64 Kb line to Warsaw. The central network node in Minsk must be sufficiently powerful to support an international connection for the entire Republic of Belarus in the spheres of science and education. Unfortunately, the Ministry of Education can not currently afford the expense of providing equipment for the central UNIBEL node.

The next stage of developing the UNIBEL network is a creating regional network nodes in the most advanced institutions in Minsk as well as the periphery. At least 5 well equiped nodes are needed to establish the backbone structure of the UNIBEL network. Currently Byelorussian universities and research institutes have the needed potential to start working in the UNIBEL network. The equipment installed at these institutions is rather outdated, however.

To provide further development of networking for science and education in Byelorussia at least modest assistance is required for other institutions which currently have no computer hook-ups at the present time. At least 15 central and peripherial institutions need such help in order to be connected to the UNIBEL.

IV. CONCLUSION

The situation with research and academic networking in Byelorussia is critical. Several efforts being pursued by different institutions and private persons, but they are facing financial problems and bureaucratic barriers. Additonally, there is also a problem with lack of agreement and coordination of such efforts. The UNIBEL project is designed to overcome these difficulties and provide Byelorussian science and education with a viable network.

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