THE PROCESS OF AN INTEGRATION OF PETERSBURG NUCLEAR PHYSICS INSTITUTE INTO THE WORLD WIDE INFORMATION SPACE

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This paper is intended to summerize main results in PNPI networking.

The problem of restructuring the computer resources and importance of the networking was recognized at the Institute in 1990 [1].

In January of 1993 we finished with a closing of a range of the old fashion mainframes (ES-1046, ES-1060, BESM-6, etc.).

In May of 1993 we put into operation a first segment of TCP/IP on the base of thin Ethernet (10 Mbit/sec). Total number of all type computers in that network was in limit of 10. At that time we had only way to communicate with the colleagues: e-mail over dial-up telephone line and UUCP.

In March of 1994 we have realized the first Institute IP channel to ITEP (Moscow) and later to NPI MSU (Radio/MSU - Moscow) over switched telephone line ISKRA-2 with channel capacity about 12 Kbit/sec. The network traffic by month over that line is shown in the Table.

Table

The External PNPI Network Traffic by Month

Year	Month	Traffic in bytes
1994	March	22,824
	April	51,136,349
	May	127,018,780
	November	250,045,736
	December	506,406,294
1995	April	1,079,912,090
	September	2,684,354,138
1996	January	10,243,529,900

In second half of 1994 we began to build internal institute network structure. First reasonable result came with putting into operation first Institute fiber optic line between two large buildings. Many people obtained the possibility to receive an information from the Internet and many people became interested for the same.

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In September of 1995 we installed the satellite IP channel to DESY (Hamburg, Germany) in according to the project INTAS-93-56. That channel gives us 64 Kbit/sec. On the first stage of our network development it was important the support we obtained from DESY in according to the experimental program HERMES [2] where Institute was involved.

Meanwhile internal Institute network structure was developed as well. Already several Institute buildings are connected to the Institute network centre by the fibre optic cables. In total Institute has about 3 Km FO lines. Everyday Institute IP external traffic exceeds 300 MB (about 1 GB for three days). Approximately 40% of total external network traffic is outgoing from the Institute and 60% of total external network traffic is ingoing to the Institute. Our network is part of Russia High Energy Physics network (RUHEP-Radio-MSU) [3]. More than 300 scientists have an access to the Internet. The Institute LAN consists of more than hundred computers.

PNPI has now several www and ftp servers: main server - "http://www.pnpi.spb.ru/", main ftp server - "ftp.pnpi.spb.ru" and news-server.

We think that an information interchange is the driving wheel for intellectual work of any type. To participate in the information exchange anybody should follow one of the known scenario. There are several scenarios which are supported by appropriate technical tools. We mean the following: e-mail, ftp, www, netnews, telnet, irc, talk, white-board (the component of MBONE [4]), etc. All of them are available in PNPI.

Last time we undertook several experiments with a realization of an audio graphic channel over the Internet. In particular we used satellite 64 Kbit/sec channel PNPI-DESY. It was found out that audio was of acceptable quality. The quality of the video images were less acceptable with low frame rate (about 0.2-0.5 frame/sec).

The obvious Institute requirements in the information area are as followed:

- to increase the IP channel banwidth at least to 128 Kbit/sec;
- to disseminate the consistent information about the Institute scientific works;
- to give the physicists intellectual tools to search the required information in the Internet;
- to build (to adopt) a distributed computing model to analyse the experimental data in remote research centres from PNPI terminals.

Some useful information on PNPI networking can be found in our www-page [5].

REFERENCES

1. *Shevel A.E.* The organization of a computing at Leningrad Nuclear Physics Institute in 1990 and in nearest future. LNPI Preprint-1647, L., 1990. 12 pp.
2. HERMES Home Page *"http://dxhra1.desy.de/"*.
3. Radio-MSU home page *"http://www.radio-msu.net/"*.
4. MBONE Information Web *"http://www.best.com/~prince/techinfo/mbone.html"*.
5. PNPI Computing and Networking page *"http://www.pnpi.spb.ru/comp_home.html"*.