THE ANALYSIS OF BASNET NETWORKING INFRASTRUCTURE

M. Makhaniok, G. Valchewskaia, A. Valchewski,
A. Makhaniok, E. Nikitin,
National Center of Informational Resources and Technologies

The computer network of the National Academy of Sciences (BASNET) is the first research network in the Republic of Belarus. It was created to exchange data between different researching organizations and scientific groups. BASNET has been administrated by the Computing Center of The Academy of Sciences of Belarus that was reorganized in 2002 into the National Center of Informational Resources and Technologies. Currently it is the most advanced and dynamically developing research computer network in the Republic of Belarus.

Since 1997 BASNET is in partnership with the Belarusian State University network "BSU" and Ministry of Education network UNIBEL formed the Unified Research and Informational Computer Network (URICON) of the Republic of Belarus.

Since 2003 BASNET is recognized by Trans-European Association of Scientific Educational Networks (TERENA) as a National Research Educational Network (NREN) of the Republic of Belarus. The network has official co-operational agreements with many national and international research and networking institutions and associations including NATO SC, CEENet, Pionier.

BASNET scientific segment joins over 100 major scientific organizations of Belarus, including more than 50 institutes of the National Academy of Sciences of Belarus.

BASNET is widely used as a backbone to create virtual corporative networks for many ministries for instance State Committee of Science and Technologies under the Council of Ministries of the Republic of Belarus, Highest Belarusian Attestation Committee, Fund of Fundamental Research of the Republic of Belarus, Fund of Informatization of the Republic of Belarus, Ministry of Agriculture, Ministry of Industry, State Committee of Chernobyl, State Committee of Military Industry, Ministry of Health, National Library of Belarus, Central Scientific Library, Presidential Library, Republican Scientific and Technical Library.

This allows providing high-speed access to the regional libraries, distributed geo-informational databases, informational funds, as well as remote access to supercomputer resources, etc.

In the Fig. 1, the core of the infrastructure is FDDI-ring of 100 Mbps bandwidth is shown. Some institutes are located at the ring and others (so called periphery-institutions) are linked by radial fiber optics segments utilizing Fast Ethernet and Ethernet protocols, that provide high speed data exchange (100 Mbps) between local networks of the National Academy organizations.

In order to provide high speed connection for organizations located in Academy Campuses (at Kuprevich St. and "Sosny" settlement) the technologies of wireless connection including Radio-Ethernet and microwave channels are used (Fig. 2, 3).

To organize the traffic exchange between LANs of the institutions of the National Academy of Sciences of Belarus the Cisco 7204 router is used. Besides that, interaction between BASNET, Belarusian State University network BSU and network of the Ministry of Education UNIBEL is organized by direct FO links. To provide traffic exchange between these and other corporative networks (not associated with the Academy), the router Cisco 7505 is used, completed with four modules:

– 4 port serial module;
– Module FDDI;
– 2 Fast Ethernet modules.

This excludes nearly the whole traffic with above two major national networks from routing on Cisco 7505 and, therefore, considerably simplifies the processes of administration and monitoring.

Note that xDSL-technologies as well as and dial-up access through the V-90/92 protocol are also widely used for connection of BASNET customers. BASNET regional nodes operate in Gomel, Brest, Vitebsk, Grodno, and Mogilev.

Due to the technical solutions proposed in the analysis BASNET architecture is fully correspond to the current state-of-the-art networking systems. It allows BASNET to offer different services for individuals. Access to the Internet via dial-up with internet cards, dedicated lines, ADSL, site-hosting, web-design and DNS-services are among them.

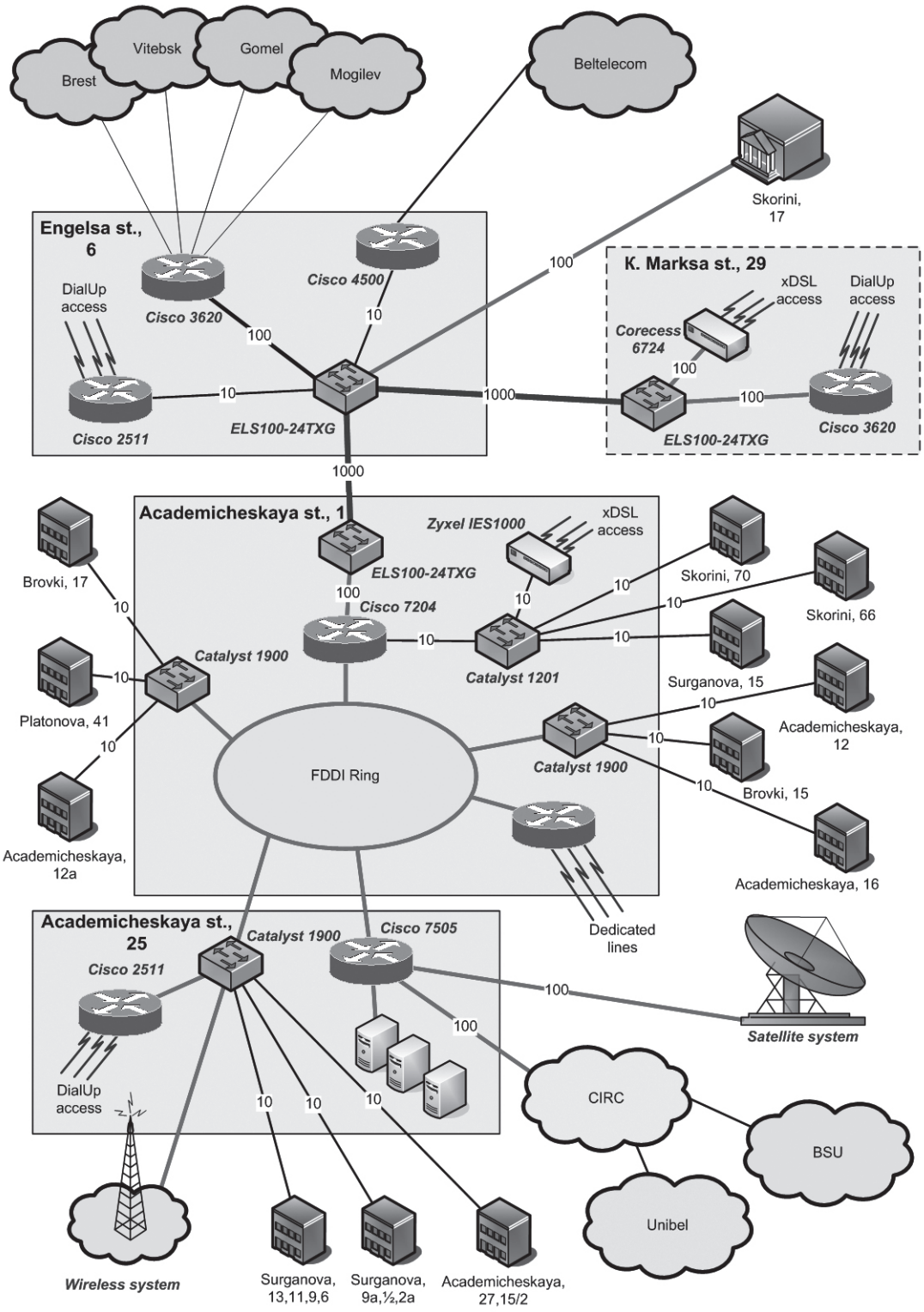

Fig. 1. Basic structure of Research and Informational Computer Network BASNET

Since August 2004 access to the global computer networks is organized by fiber optics link to the Pan European Research Network GEANT according to the agreements with the Polish Academy of Sciences. GEANT currently unites over 3500 research and educational organizations of 43 countries. The organization of the given channel considerably reduced the cost of the "international traffic".

Currently due to the support of the European Community the administration of BASNET is negotiating for full membership in DANTE and GEANT.

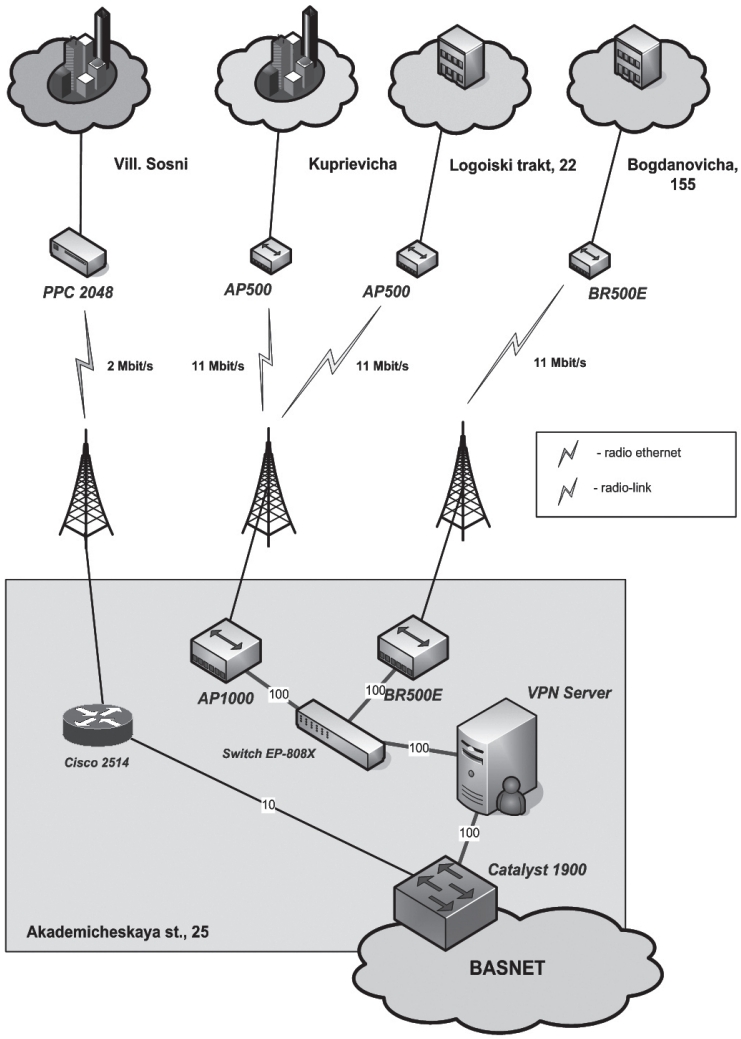

Fig. 2. Wireless components of BASNET

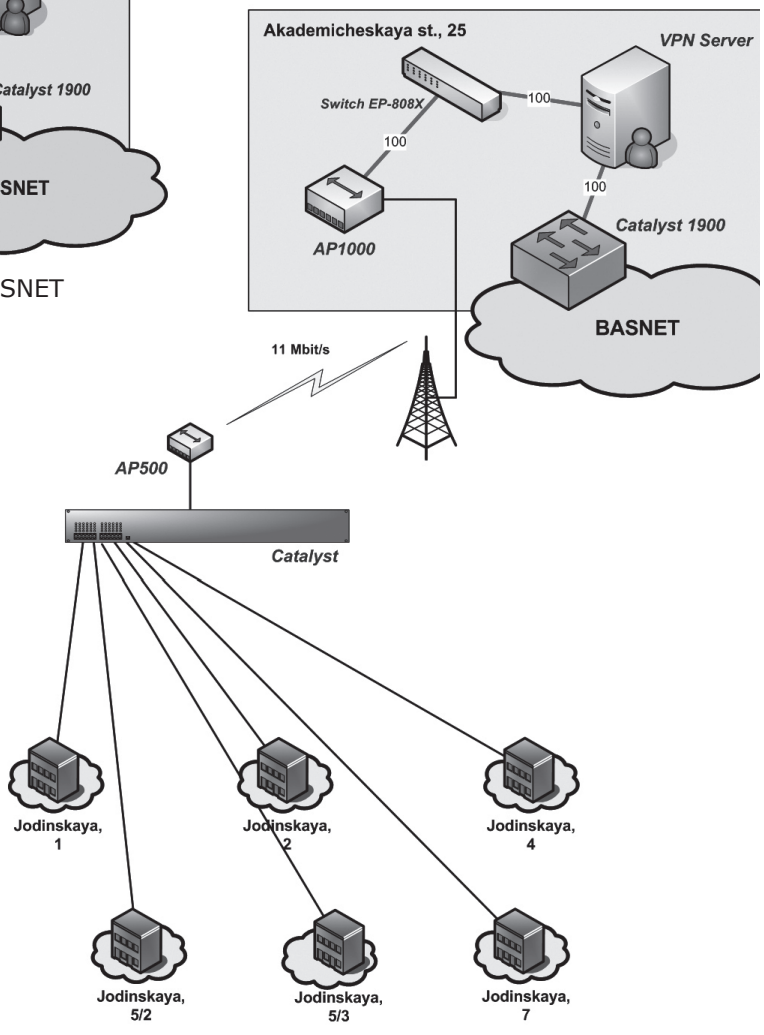

Fig. 3. Topology of users connection in Academy town at Kuprevich St.