

# 2006 - 2007 JINR networking results

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The 2006 - 2007 results of the networking activities in JINR provided and coordinated by the LIT specialists are presented by the following:

- modernization of the JINR LAN central telecommunication node;
- creation of the channel between CERN and JINR Central Information and Computing Center in LIT;
- Dubna-City Internet eXchange;
- the external JINR-MSK-IX data communication channel;
- network Status Monitoring and Accounting;
- development of the network authorization system in JINR LAN;
- building up of the new access networks in the JINR small divisions.

## 1 Modernization of JINR LAN central telecommunication node

During the last two years we have made some essential improvements of the central telecommunication node of the JINR LAN:

- 1) the old edge router Cisco 7505 was replaced by new Cisco 7606 with Gigabit Ethernet interfaces;
- 2) the second central switch Cisco Catalyst 6509 was installed in the core of the telecommunication facility;
- 3) Cisco 7513 took the role of the DBN-IX (Dubna Internet eXchange) engine;
- 4) Cisco 7505 took the role of the VPN engine;
- 5) Cisco 3640 began to serve the JINR modem pool.

Major hardware modernization of the JINR LAN central telecommunication node was finally accomplished in 2007.

The JINR researchers take parts in many international scientific projects. Their demands to the network features have become much higher in the last few years. To increase the throughput of the JINR LAN, a new Cisco 7606 router to use on three gigabit directions was installed in October, 2005. A second central switch Cisco Catalyst 6509 was obtained in 2006 to increase the reliability of the network structure. These new most advanced pieces of Cisco equipment were put in the top of the network control structure, while the older routers went to the lower level to support less critical tasks. Another routing veteran Cisco 7513 is used as an external router for non-JINR related services, and former main router Cisco 7505 is used as a routing engine for the remote JINR VPN service.

In the figure (Fig.1) one can see the main elements of the JINR LAN telecommunication node.



## 4 External JINR-Moscow data communication channel

The external JINR-Moscow data communication channel physically comes into the Moscow Internet Exchange telecommunication node (fig.2), and here in MSK-IX it goes to the different networks: to Internet through RBNet – the network for science and education provides the Internet access for JINR, to RUHEP through RadioMSU – the network of Moscow State University provides access to the network for high energy physics (done in 2006), and to GEANT2 through RASNet – network of the Russian Academy of Science provides access to the European Educational and Scientific Network.

This year the LIT specialists have been estimating the overall situation with the project of the future “10-Gigabit”. This data link will connect the JINR LAN and Moscow Internet Exchange facility. Finally, the ideology of the 10 Gbps external data channel made on the Nortel equipment was cleared out. The preliminary negotiations with RSCC – Russian Satellite Communication Company (as the optical transport provider) authorities took place. The main issues discussed are the renting of the optical single mode fiber and placement of the 10-Gbps optical equipment in the provider’s premises along the way and in the Moscow-IX.

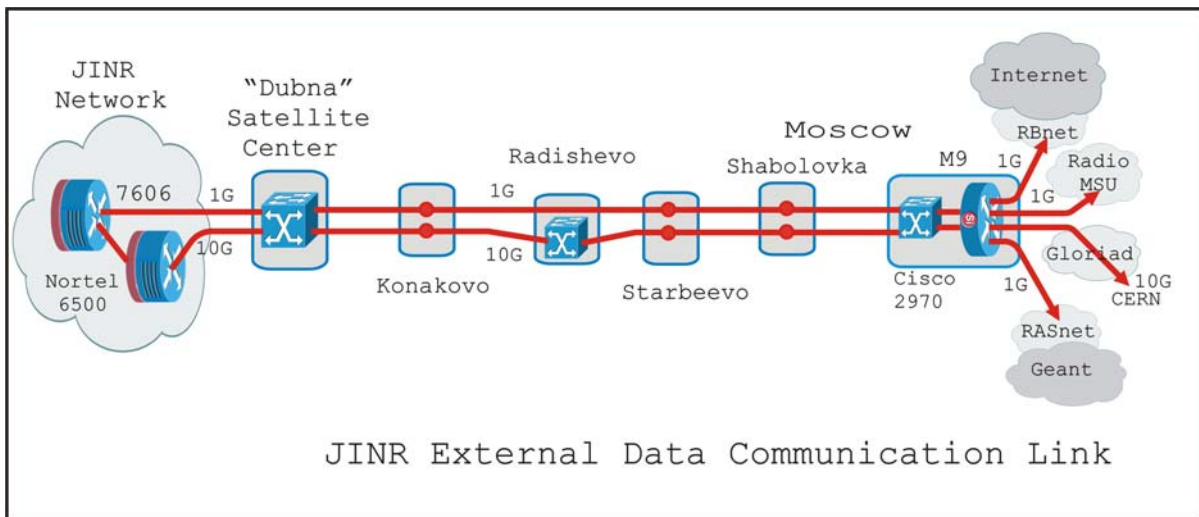


Fig. 2: JINR External Data Communication Channel

## 5 Network status monitoring and accounting

The network infrastructure elements of the JINR LAN are under permanent monitoring by specialized software tool NMIS – Network Management Information System, aimed for to know the health of the entire network and its elements. This system periodically polls to critical network elements and emails the results to the list of the network administrators. Thus, network specialists would know both the overall status of the network and the state of the needed network device.

Besides this, all work with JINR users is conducted through a specialized IPDB data base. The early version of the IPDB data base was originally developed in LIT almost 10 years ago, and it is the subject of permanent modernization, reflecting the demands of the time and needs of the staff to better organize network users’ activities. Thus, the last

add-ons to the set of IPDB features are Kerberos, Andrew File system (AFS), and User GUI.

## 6 Development of the network authorization system

The main task of the general network authorization system is to increase the level of security of the JINR LAN, to defend all computational clusters, standalone servers and separate workstations of an unauthorized access to the resources and services. The general authorization system should involve many services, such as AFS, batch systems, Grid, JINR LAN remote access, etc.

The general authorization system consists of four independent servers, which are spread over the JINR territory. One main server is located in the main telecommunication node in JINR, the rest – in three Laboratories: LIT, DLNP, LPP.

Heimdal Kerberos5 is the core of the general network authorization service. All Kerberos Data bases reside in the LDAP servers, which are physically located on the same computers as Kerberos packages.

Currently, the control of the authorized bases is accomplished by Unix Shell script. There are plans to transfer the control into the JINR global accounting system IPDB.

## 7 Building up of new access networks

The support of the existing users' access networks and building-up of the new small installations are held on the permanent basis by the LIT specialists.

Here are some examples. In 2006, a new structured cable system was installed in the building №1 of the JINR Administration. As a result, practically the whole year (2007) round LIT specialists were supporting to organize the work of the staff in this building when employers were moving from one room to another during the process of refurbishment of the premises. Then, the whole ASU division moved into the LIT building №134, where a new access network with 24 employees' working places was prepared.

There are much more examples of the work done by the LIT "cable" team in the JINR small divisions which have no their own IT stuff.

## References

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