

THE GROUP OF IP TELEPHONY IN CESNET2 NETWORK

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Abstract: The group of IP telephony came into being in the middle of the year 1999 and associate specialist of the academic community, which can apply their knowledge in the telecommunications area and IT technology. The group is financed by company CESNET. The aim of the work is to approve new technology in the area of voice transmission through the data network and to minimize expense of telephone connection between non-profit organisations connected to the network CESNET2. This paper explains the VoIP technology integration into CESNET2 network and experience with operation.

1 Introduction

The IP telephony is a set of methods which enables one to transmit a voice into IP area. After the initial first experiments it has been decided that the group of IP telephony will proceed by way the Voice over IP technology (VoIP). This technology is appropriate in the network CESNET2. The work of the group came in the second phase with the aim to connect of the selected telephone exchanges. In the first phase it was performed the experiments with the VoIP equipments with the aim to test all accessible interfaces of PBX suitability for the connection into data arrangement (VoIP gateways) which was proceeding in the telecommunication department of the laboratory VSB-TU Ostrava and CVUT Prague. The connection possibility was successive checked for analog and digital interfaces.

2 Evolution VoIP in CESNET2

In the end of the year 1999 there was connected telephone exchange of VSB-TU Ostrava and CVUT Prague by VoIP technology in a pilot project. There was checked the technical specification for adjustment interfaces of the exchanges and VoIP equipments for optimum operation during pilot traffic. The voice transfer possibility between network CESNET2 and Czech Telecom was verified too, which was important for decrease call charge of the connected members in the liberal telecommunications market. The aim of the work in this year is to connect the next PBXs (Private Branch Exchange) to the network CESNET2 and development of new application for VoIP technology area (above all improvement of the application for call charge and support of the IP telephony for OS LINUX in open source projects) and of course to publish any activities relating to VoIP technology and the result of

work to public not only in Czech Republic, but in foreign markets too. Four universities solved the connection PBX to the network CESNET2 in the end of the year 1999 :

- VSB – TECHNICAL UNIVERSITY OF OSTRAVA
- CZECH TECHNICAL UNIVERSITY IN PRAGUE
- MASARYK UNIVERSITY BRNO
- UNIVERSITY OF SOUTH BOHEMIA IN CESKE BUDEJOVICE

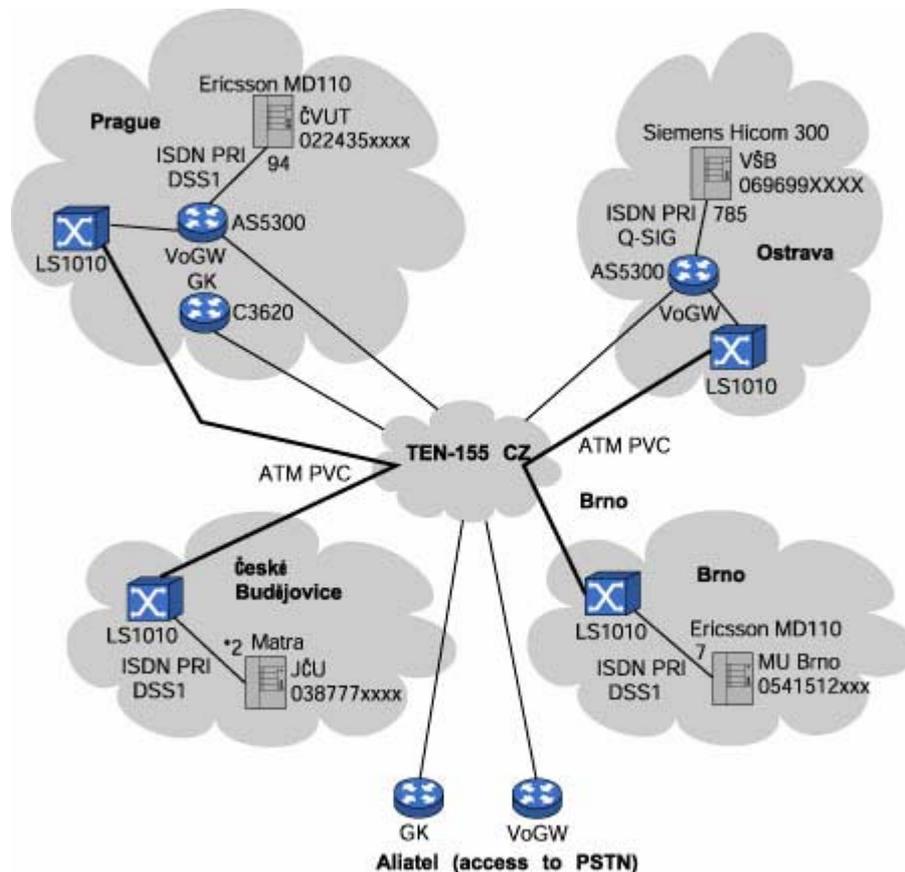


Fig. 1: Configuration in pilot project.

In the following years there has designed connection to next universities and it's realized. Connection to public telecommunication network is realized too and with very advantageous call charges. [1], [2], [3]

3 Current Situation

The management of company CESNET prefers research task of the IP telephony. VoIP will become a standard platform which will very quickly become part of the majority of networks, applications and services. Implementation VoIP will be enable by the non-commercial CESNET to their members decrease call charge, which be possible to concrete express in numbersoperating an economical study. If PBX had within its software

implemented this service LCR (Least Cost Routing), final effects can be completed by a automatic routing low cost effective way without the necessity of the poll special prefix for the network CESNET2.

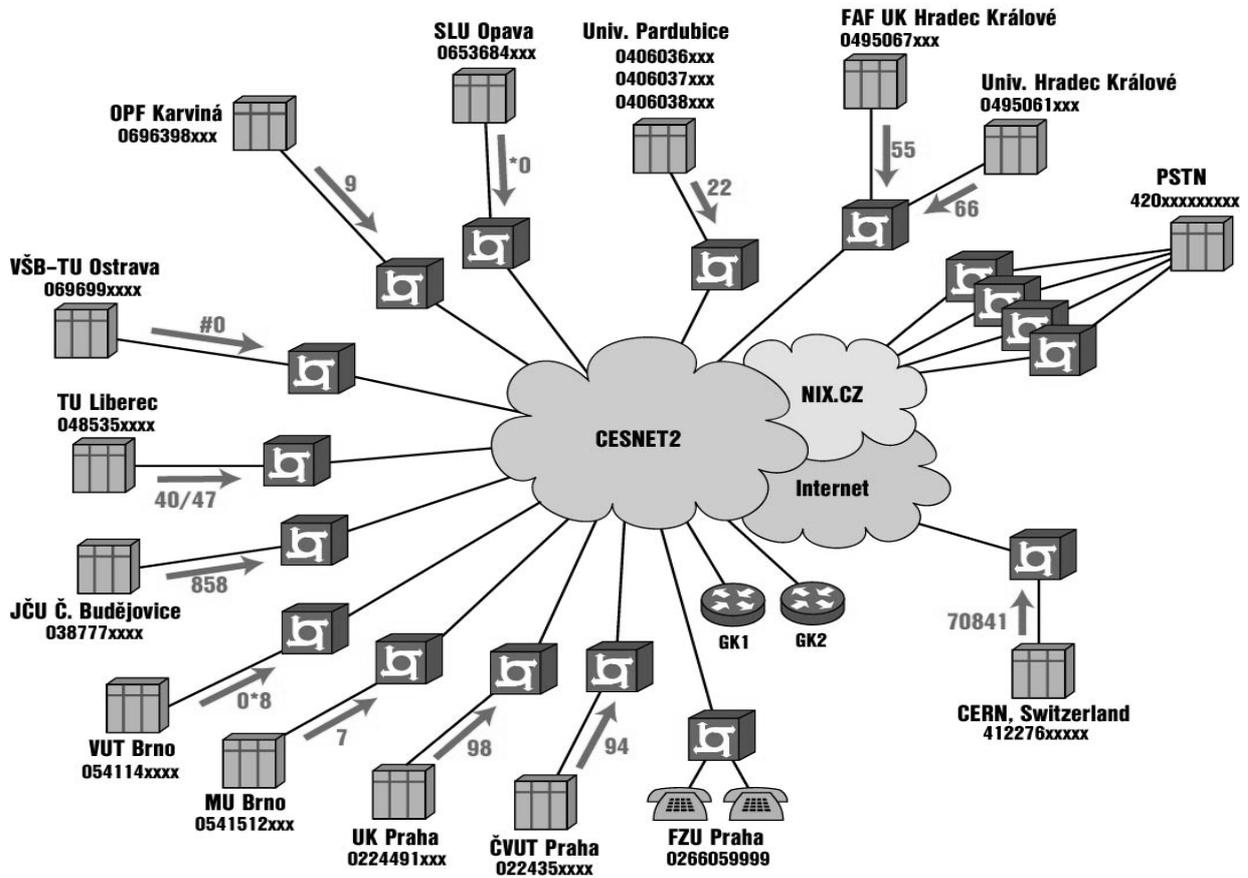


Fig. 2: Network configuration of the VoIP project.

The PBXs in academic area are of different brands and types (e.g. Ericsson, Siemens, Alcatel, Avaya and Matra) and they are equipped with different types of interfaces. The VoIP network is based mainly on Cisco routers, providing IP services. Group of IP telephony performed a series of experiments with various telephony equipment, particularly testing available PBX interfaces for the connection to a Cisco routers. Upon completing these tests, group finally decided to use only digital ISDN PRI/BRI interfaces.

CESNET connected IP telephony network to the public telephone network via Aliatel telecommunication operator in March 2001. Users in the IP telephony network can call all phone numbers in the public telephone network in Czech Republic and selected international numbers.

The subscribers dial access prefix of connected PBX to get into the IP telephony network and the phone number in according to ITU-T E.164 Czech numbers including the long distance code and the area code. Calls to institutions connected to the IP telephony network and calls to peering institutions are free of charge. Calls to the public telephony network in Czech Republic are paid.

Example:

- Call from VŠB-TU (VSB – Technical University) in Ostrava to ČVUT (Czech Technical University) in Prague, see figure 2.

#0 02 2435 xxxx (xxxx - PBX's extension number)

(Connection inside CESNET2 network is free of charge)

- Call from VŠB-TU (VSB – Technical University) in Ostrava to public telephone network (destination Prague, area code 2)

#0 02 xxxx xxxx (xxxx xxxx - customer's number in Prague)

Call is automatically routed outside CESNET2 network to public telephone network.
Call charge to Prague: 0,80 Kc/min., per second without minimal charge

The VoIP network is based on H.323 standards, two central gatekeepers situated in Prague and Ostrava provide the control of the VoIP network. Gatekeeper Kerio is in use to International peering with Switzerland, Australia and USA, see below figure 3.

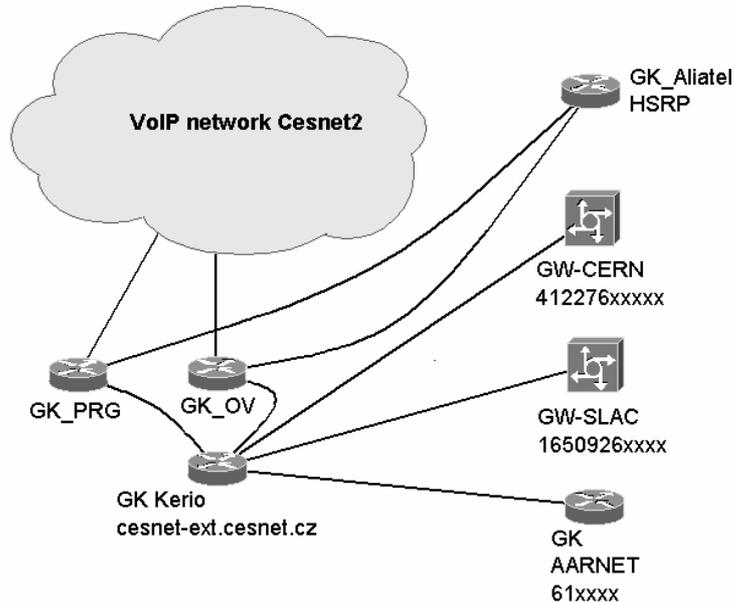


Fig. 3: Gatekeepers configuration..

4 Conclusion

The pilot project VoIP in the network CESNET2 showed possibility to carry on the voice traffic between universities through the academic data network. In total 12 voice H.323 gateways of various academic institutions are connected into VoIP network and several thousands subscribers can call each other over the IP telephony network free of charge. There is a plan to connect next universities for this year (UP Olomouc and OU Ostrava , currently designed). CESNET is prepared to peerings with others IP telephony networks, and there is possibility to provide central H.323 gatekeeper for Europe in Czech Republic. CESNET has substantial experience with IP telephony during four years operation.

References

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