

## **Management system for integrated voice-data networks**

The system developed by the project supports the integration of the traditional data networks and VoIP networks providing management services for these heterogeneous networks.

This development requires research on three separate management planes:

- **Quality of Service Management:** The project investigates the QoS approaches related to the VoIP services. The main topics include: analysis and development of call admission control algorithms; working out dynamic traffic engineering procedures based on the quality of the VoIP sessions; protocols and algorithms to optimize the voice codec selection for a VoIP connection; and finally the investigation and optimization of VoIP traffic aggregation.
- **Network Resource Management:** The control and the optimal sharing of the network provider's network resources. This field requires research in the following topics: optimal arrangement of VoIP zones, VoIP gateway and VoIP Gatekeeper devices; network resource sharing in heterogeneous and homogenous VoIP networks; and within this research field we analyze the possibility to protect the VoIP sessions by providing alternative routes in case of network failure.
- **Error Management:** The project investigates VoIP network monitoring, analyzing and fault recovery solutions. Based on the results of the research we build a prototype of a high level, automated error management system.

Both the QoS management, and the error management may require network resource management as well. The network resource management will be based on parameters observable and controllable on VoIP and IP equipment available on the market.

The management of IP based telephone networks are supported by further developing the management tools of the IP based computer networks, e.g. HP OpenView, Cisco VoiceManager. These solutions support well the VoIP network operation. However, their services are well behind the services offered by the management tools of the familiar telephone networks.

The goal of the project established by the consortium is to considerably contribute to the basic research and applied research on the field of VoIP management systems based on our knowledge and experience achieved in the field of traditional telecommunication management. Further goal is to implement a prototype of the VoIP management system based on our researches.

One of the social advances of the project is that the basic VoIP service provides new perspectives to the telecom companies and subscribers. This way the widely deployed VoIP services enhance the personal and business communication by its high quality value added services, especially by its Multimedia over IP capability..

From the view of the economics the integrated VoIP and traditional data networks results cost savings and extra revenue for the service provider. The service provider is able to provide more and better quality services to the subscribers, its network utilization grows as well, but the maintenance costs are lower than it would operate two different networks. The project supports the development of the Information Society, and so it contributes to the reduction of the difference in development between Hungary and the EU countries.

To work out the above project, the Department of Telecommunication and Telematics of the Budapest University of Technology and Economics formed a consortium together with Ericsson Hungary Ltd. and Kovax Ltd. The university Department and the Ericsson Hungary Ltd. have been successfully co-operating for 10 years in infocommunication R&D activities, and they employ researchers and specialists both in telecommunication and informatics. Kovax Ltd. on the other hand is a small company ran by exclusively Hungarian owners, exhibiting considerable experience in designing and developing software tools for IP based telecommunication. The consortium intends to publish the results of the basic and applied researches and also to register patents and standards related to the research. The results are taken into the education of the university, support the IP based telecommunication related research and development activity within Ericsson Hungary Kft. and first of all are utilized by the Kovax Ltd. in its software products, operating on servers attached to VoIP and IP equipment available on the market.

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