AQORD: An Adaptive QOS Routing Demonstrator for Wireless Ad-hoc Networks

White Paper

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Plamen L. Simeonov
TU Ilmenau, Faculty of Informatics & Automation
Dept. of Telematics

This paper proposes a concept for the realization of an integrated application-based case study on network-aware wireless multimedia which can develop into a showcase, a demonstrator, and later into a distributed testbed platform for adaptive QoS management in ad-hoc mobile networks.

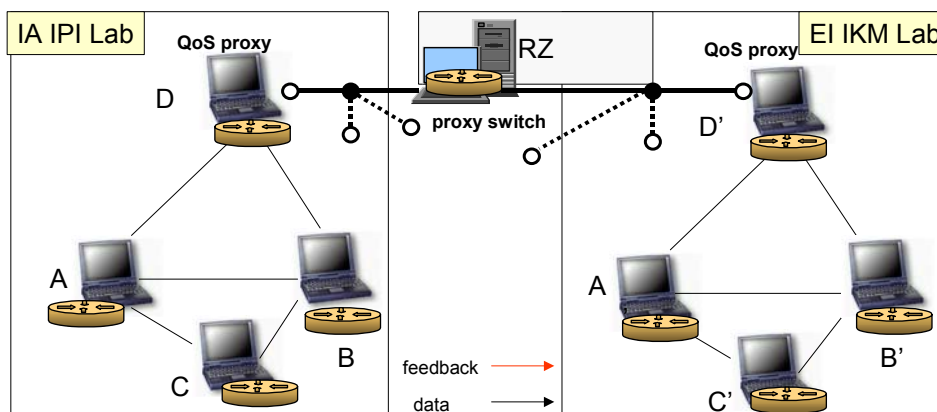## AQORD: Adaptive QOS Routing Demonstrator

Figure 1: The overall AQORD testbed architecture

The ultimate goal of this work is to develop, test and evaluate a representative set of application-specific software components for the adaptive support of wireless mobile multimedia joint colaboration in future teleworking environments on a per-user, per-session, per-application and per-flow base. Its add-on value in comparison with current research in this area is the incorporation of novel approaches for QoS regulation upon user feedback [cf. Hai] and QoS-based routing in ad-hoc networks [cf. Plamen] as a result of node state and network traffic monitoring along with a mechanism for the transportation, installation and activation of "QoSlets", the QoS algorithm components, "on-demand" between the the nodes as a QoS proxy delegation strategy in a distributed environment. The last item is a challenging research issue and should be considered in the broader context of active networking. An integration of this solution within the ABone testbed is also possible.

The application scenario described below is independent from the underlying wireless communications technology which can be either WLAN IEEE 802.11, Bluetooth, GPRS, UMTS or a combination of them.

Application Scenario

The proposed project scenario considers two service components of a real-time distributed multimedia collaboration service, e.g. "shared vision" and "remote ear", within an ad-hoc wireless network environment which can be also realized as a single application, e.g. MPEG-4 videoconferencing.

This application is a representative for such practical networking scenarios as multiple workshop or multiple classroom attendance where people can easily join and communicate through a wireless ad-hoc network of fellows by having access to their network resources and thus be able to remotely see and hear a desired content on an event-and-agreement base through their partners who are attending these sessions in person and directing that content to their peers.

Architecture

Figure 1 illustrates the overall testbed architecture in the IA and EI laboratories of TU Ilmenau. An appropriate selection and allocation of resources for the test cases described in the appendix of this paper is required.

Multicast and interoperability with available "fixed" network infrastructure are other two interesting issues which can be investigated in a straightforward manner within this architecture.

IA Contribution

1. Implementation and test of a QoS management software component upon user feedback for three dedicated service scenarios of live streaming: audio, video, auio + video.

2. Enhancement of the QoS management component by a route selection component to improve the desired level of QoS upon incidental changes of the environment threshold values (simulation of access point disturbances, narrowed bandwidth, latency, etc.): simulation of QoS-dependent routing.

3. Encapsulation and partitioning of the QoS management component for transportation, installation and activation as a remote servlet/QoSlet on a dedicated proxy node in the network for delegation of the ACORD QoS proxy function "on-demand".

4. Implementation and test of selected parts of the WARAAN adaptive ad-hoc routing algorithm in combination with the QoS management strategy.

5. Implementation & test of session management procedure of the entire set of testbed scenarios.

Miscelaneous

The implementation of widely used source code components, tools and standards is strongly desired.