

# Broadband Wireless Multimedia Networks

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## Abstract

With the significant advances of the broadband wireless technologies (including mobile WiMAX, 802.11WLAN, EVDO and HSDPA), the diverse bandwidth-intense real-time multimedia applications are rapidly becoming highly demanded with economical feasibility. This, of course, has been made possible by the significant progress of the both IP-based network and signaling protocols, such as SIP which is the core protocol of IMS, as well as the multimedia standards such as H264/MPEG-4 AVC to provide highly efficient video compression and delivery.

The project mainly explores using broadband wireless, IMS and other key technologies from wireless, multimedia and networking portfolio to establish the resource efficient networks with which operators can provide high-speed real time multimedia services with mobility and QoS support.

The provisioning of real-time audio and video based multimedia communications such as rich multimedia video conferencing, or interactive network entertainment like multiparty online gaming, is one of the most exciting but challenging aspects of next generation wireless networks. In this project we also explore the characteristic and the requirements of the real time multimedia services and how these services run over the presented underlying networks.

The networks presented in the project will take advantages to the various technologies mentioned above to provide real-time multimedia services with mobility and QoS as well as scalability, in a word, real time and mobile. Such networks with IP-based core such as IMS which is capable of the multiple access management, service management and subscriber management are targeted to the telecom network providers and wireless Internet service providers.

The project examines the most up-to-date packet-based broadband wireless and network technologies, and explores the efficient mechanism for allocating network resource dynamically to provide QoS on real-time multimedia communications.

The project first investigates video coding techniques and the primary requirements of the multimedia, such as video quality for different content and applications, and corresponding bit rate based on different video compression technologies.

The project will then explore the characteristic and capacity of the various broadband wireless technologies respectively, including WLAN, Mobile WiMAX, and 3G cellular (1xEVDO/HSDPA). For each examined technology, the project mainly addresses the standardized approaches, as well as proposed protocols or technologies, based on the MAC and physical layer.

The broadband wireless infrastructure to provision high performance real-time video-based communications should consider the mobility and interoperability as well as network resource utilization efficiency. The project then explores the network infrastructure of mobility realization, and handoff over heterogeneous radio access for IP-based networks, based on different layers.

The discussion of multimedia applications and services riding on the underlying networks is focused on multiparty online gaming and real-time video communications with the IP-based infrastructure.

The mobile networks are continuously evolving with heterogeneous radio access across all-IP core network to provide much higher bandwidth for rapidly growing multimedia applications in a seamless mobile manner with QoS support. The future research on cross-layer is recommended for the future works.