Traffic Management of IPTV and Mobile Over Emerging 4G to Optical Networking

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Résumé du projet de recherche (Langue 1)

IPTV is gaining recognition as a viable alternative for the delivery of video by telecommunications and cable companies. It features bandwidth efficiencies, and management, it is ideally suited for broadcast, multicast, unicast interactive and multimedia services. Core networks are packet-based, however, access networks are not always packet-based. Furthermore, they are wired as either fiber-coax or fiber-twisted pair topologies. WiMAX Integrated Optical Networking (WION) and emerging 4G technologies connected to the fiber will offer a best solution in the access networks that can support Future IPTV services for both fixe and mobile users and provides very high data rates with longer coverage. Taking advantage of these features, IPTV services can be designed, delivered, and managed cost effectively without compromising the video and audio quality. In this study, IPTV over WION implementation will be presented. The majority of this study focuses on describing IPTV and WION key technology platforms. We are more precisely interested in analysing the traffic management coming from IPTV users (fixe:Mobile) over the wireless link (WiMax, LTE, ...etc) toward the optical network which is gaining more and more the access network. With WION offering high data rates to both mobile and fixed users, and the desire of users to watch real-time TV or VoD services make the implementation of IPTV over WION an exciting application. Realization of IPTV will enable users to have VoD services as well as to subscribe to which ever channel of their choice giving them the great deal of flexibility. In this context, first the study will conclude with an analysis of the WION primary core networking technologies and a brief overview of IPTV over WION network factors that affect the deployment of IPTV service. We will evaluate the performance of IPTV services and applications to Next Generation Access Networks which use a 4G and WiMAX Integrated Optical Network (WION) approach. The approach takes advantage of the optical wireless integration to achieve a high throughput and good resilience for IPTV distribution. It will also maintain the coexistence of both fixe and mobile IPTV traffic. In this context, the PhD student will prepare, first of all, the state of art on QoS based IPTV and on its evolution to WION. He will focus particularly on the modelling of the IPTV traffic (Fixe/mobile) over WION. We will propose a new architecture of IPTV over WION which efficiently integrates wireless to optical network by offering service continuity and QoS insurance over these heterogeneous networks. We will also analyse impact of this diffusion on the other existing traffic. To insure QoS requirements of this new traffic and of other all traffic, we will develop new algorithms such as Bandwidth Allocation Algorithms (static or dynamic) under some hypothesis and validate their performance using the simulation and numerical methods eventually.

Résumé du projet de recherche (Langue 2)

Future Internet applications need more bandwidth in access network area and also need quality; to overcome such demands, service providers always research new access technologies. Most of the service providers and network infrastructure designers study Fiber-to-the-Home (FTTH) architectures. The most popular FTTH architecture is Passive Optical Network (PON) architecture which has the best cost-effectiveness among fiber access architectures. PON technology is emerging as a viable solution for next-generation broadband access networks. New network architectures must have a flexible wavelength resources allocation considering the reduction of system cost. Particularly, Wavelength Division Multiplexing (WDM) PON has been received much attention as a solution since it can provision the high bandwidth with a low cost. Wireless Access techniques are also continuously expanding their transmission bandwidth, coverage, and quality of service support. They have low deployment costs and support mobility; and the new generation of wireless technique WiMAX has been standardized and deployed. The technological advancements are expected to force Mission-Critical service Providers to migrate from simple data services to triple-play or quadruple-play services on a single infrastructure. A combination of PON networks and WiMAX may be an attractive solution to broadband network access.