Providing End-to-End QoS for Multimedia Applications in Converged Wired/Wireless Networks

Abstract

Telecommunications industry is facing two dominant trends. First, broadband access in the form of cable, fiber to home and WiMAX (IEEE 802.16) is providing a high-bandwidth pipe to people's home and to small-medium businesses. Second, there is a fundamental shift from circuit-switched networks to packet-switched networks. The implication of broadband access is an opportunity for providing richer multimedia applications and services. Applications such as multimedia streaming require high bandwidth; whereas applications such as Voice over IP (VoIP), Push-to-Talk (PTT), online gaming require low delay/jitter; yet applications like video conferencing require both high bandwidth and low delay/jitter. QoS, therefore, means low latency, low delay/jitter, low loss, adequate bandwidth and above all, good end-user experience. However, all the metrics do not necessarily apply to all applications and hence it's a challenge for the service provider to build an infra-structure that can provide end-to-end QoS for applications with variety of QoS needs. The second trend towards converged networks and services implies the need for a unified service architecture that is independent of the access network. The unified service architecture needs a SIP-based signaling and control infra-structure to support QoS-control on a per-user (or per-class-of-users) and per-application or (per-class-of-applications) basis. While basic mechanisms are provided by IETF protocols, a carrier grade implementation of such QoS control requires a more robust and systematic design of the service infra-structure. Unified signaling plane for QoS control is not enough to guarantee QoS of multimedia services. There needs to be equivalent carrier-grade support for the bearer plane as well. DiffServ-aware MPLS Traffic Engineering is fulfilling that need.

The talk will address the above issues and describe how Service Providers are building carrier-grade networks to support Quality of Service in Converged access-agnostic networks. There will be a special focus on 3G Wireless Access.

Biography

Dr. Sanjoy Paul is currently the Director of Wireless Networking Research at Bell Laboratories. Before that he was the Chief Technology Officer at Edgix. He has over fifteen years of technology expertise, specifically in the areas of multicasting, media streaming, intelligent caching, mobile networking, and secure commerce. Prior to joining Edgix, Sanjoy was a Distinguished Member of Technical Staff at the Bell Laboratories Research, where he was the chief architect and visionary of Lucent's IPWorX (later called Imminet) caching and content distribution product line. Sanjoy is well regarded in the technical community for his contributions to the field of Internetworking: designing the Reliable Multicast Transport Protocol (RMTP), holding twenty U.S patents, publishing a book on Multicasting and numerous papers, and receiving the 1997 William R. Bennett award from IEEE Communications Society for the best original paper published in IEEE/ACM Transactions on Networking. Sanjoy is a Fellow of the IEEE, an editor of IEEE/ACM Transactions on Networking, and an adjunct faculty of WINLAB at Rutgers University. He holds a Bachelor of Technology degree from Indian Institute of Technology, Kharagpur, India and both an M.S and a Ph.D. degree from the University of Maryland, College Park.