

Guest-editorial

QoS for multimedia on the Internet

The growth of multimedia on the Internet is evidently increasing. The advances in the video compression (e.g., H.263) and audio compression (e.g., G.729) that enables transmitting video and audio streams over low speed links, and the vast growth of palm and ubiquitous computing create a strong motivation and new challenges for wireless multimedia. On the other hand, providing high bandwidth high quality video compression such as MPEG7 increases the importance of interactive video on-demand applications on high-speed networks. Due to the lack of an optimal solution, new trends have been proposed such as employing active network to offer customized services for optimizing the multimedia networks resources for particular applications. After a decade or more of research and development in multimedia networking, the research community has learned a number of lessons. First, increasing the capacity of the ‘best effort’ networks and services does not provide an effective and permanent solution for offering a guaranteed quality of service (QoS). Second, the integration of service and network management is significant to play an active role in observing and reacting to the dynamic behavior in the application environment. Therefore, instead of employing just a passive control reaction to network congestion, end-to-end and per-hop management policies are emphasized to enforce specific service disciplines (e.g., priority scheduling and dropping) and maintain QoS. Third, end-to-end traffic monitoring is a key issue for providing a scalable feedback for reactive management and control in multimedia networking. Although management of multimedia networks spans a wide range of problem domains including signaling, routing, multicasting, buffer and bandwidth management, scalable monitoring, and customizable active services, this special issue focuses on some new trends on management of multimedia networking today.

The paper by Baochun Li, William Kalter and Klara Nahrstedt proposes a hierarchical middleware-based QoS architecture that enables applications to tune its parameters and steer the application towards the best attainable performance tradeoffs with different semantics. They also show experimentally the robustness of their approach for adapting multimedia services to fluctuating computing and communication. The paper by Bing Zheng and Mohammed Atiquzzaman presents a novel analytical framework that offers QoS for interactive video on demand over ATM networks. Both the mathematical and experimental work were presented and the results are quite promising. The paper by Kamil Saraç and Kevin Almeroth present a survey and evaluation of the existing management tools for the Internet multicast infrastructure. The survey identifies fundamental issues in scalable monitoring tools for multicast networks and it explores new methodology to evaluate multicast reachability. The paper by Marcus Brunner and Rolf Stadler proposes a framework for supporting a scalable management services for active network. The paper identifies the fundamental architectural issues that are necessary to deploy active services such as customized packet processing which can significantly support the QoS in multimedia networking. The last two papers focus on transport and resource management issues in wireless multimedia. The paper by Youssef Iraqi and Raouf Boutaba addresses the major challenges and critical issues for deploying future seamless wireless multimedia services. The paper discusses various techniques for the channel allocation, mobility management, and bandwidth distribution problems. The next wireless paper by Maan Kousa proposes a new hybrid ARQ/FEC scheme that maintains a high throughput efficiency over noisy wireless ATM links while introducing a minimal encoding and decoding overhead.

The papers selected in this special issue address curtail issues and technical challenges for enabling QoS for multimedia on the Internet. Although many problems still remain, we believe that these six papers in this special issue reflect the state-of-the-art in this area and advance our research effort toward the ultimate goal.

Enjoy!

Ehab Al-Shaer,
Multimedia Networking Research Lab
School of Computer Science, Telecommunications
& Information Systems
DePaul University
Chicago, IL 60604
USA
Tel.: +1 312 362 5137
Fax: +1 312 362 6116
E-mail: ehab@cs.depaul.edu

Anthony Chung
School of Computer Science, Telecommunications
& Information Systems
DePaul University
Chicago, IL 60604
USA
Tel.: +1 312 362 8724
Fax: +1 312 362 6116
E-mail: chung@cs.depaul.edu