

Title

How to Integrate Optimal Scheduling in Wireless Networks with Optimal Routing and Flow Control?

Speaker

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Abstract

In this talk, we first present a brief overview of the problems of Routing, Flow Control, and Scheduling and the existing approaches to formulating them as a single integrated problem. We then discuss a new approach to joint scheduling, flow control and routing in wireless networks, which is based on formulation as a convex optimization problem. This approach is novel in that it integrates optimal scheduling and flow control with a modified version of minimum delay routing, resulting in significant performance advantage over alternative approaches. We come up with a distributed algorithm for implementation of the proposed scheme and show, by analysis and simulation, that the algorithm achieves fairness and/or priorities among users in accordance with pre-assigned user parameters. In sharp contrast to alternative algorithms that perform scheduling and packet routing based on per-session queue differential between adjacent nodes, our algorithm uses a complete multi-hop view of network conditions for packet routing and retains the desirable properties of minimum delay routing. As the result, it achieves queue sizes and end-to-end delays that are many times smaller, without compromising the throughput.

Short Bio

Jamal Golestani received his PhD in Elec. Eng. from MIT, Cambridge, MA, in 1980. Besides 12 years of academic experience in Iran (1980-1988 and 2005 to present), he has spent 7 years (1988-1995) at Bell Communications Research, Morristown, NJ, and 10 years (1995-2005) at Bell Labs Research, Murray Hill, NJ. He is a fellow of the IEEE.

Jamal is currently with Sharif University of Technology, Tehran, Iran. His teaching and research interests are in the areas of computer networks, wireless communications, and network information theory and coding.