**CC PUB #242**

**April 1998**

# Multi-Path Routing Combined with Resource Reservation

**Israel Cidon, Raphael Rom and Yuval Shavitt**

**Department of Electrical Engineering**
**Technion - Israel Institute of Technology**
**Haifa 32000, Israel**

## Abstract

In high-speed networks it is desirable to interleave routing and resource (such as bandwidth) reservation. The PNNI standard for private ATM networks is a recent example for an algorithm that does this using a sequential crank-back mechanism. In this work, we suggest to do resource reservation along several routes in parallel. We present an analytical model that demonstrates that when there are several routes to the destination it pays to attempt reservation along more than a single route. Following this analytic observation, we present a family of algorithms that route and reserve resources along parallel subroutes. The algorithms of the family represent different trade-offs between the speed of the routing and the quality of the established route. The presented algorithms are simulated against several legacy algorithm, including PNNI crank-back, and exhibit higher network utilization and faster connection set-up time.