

Traffic "Packing" Algorithms for Optical Networks

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A single optical fiber has diameter less than that of a human hair and has the capacity to transmit many gigabytes per second.

Thus, fiber optical networks are well-suited for high-bandwidth applications such as video-on-demand. However, even an HDTV (high definition television) stream will only consume a small fraction of the bandwidth of a single fiber! Therefore, a fiber's bandwidth is typically shared by numerous streams of data. This project examined the problem of optimally "packing" or "grooming" multiple traffic streams onto optical fibers subject to various physical constraints that arise in optical networks. We proved that such "grooming" problems were computationally "hard" (i.e. NP-complete or worse) but obtained algorithms that are fast and find solutions that are provably close to optimal.

