

On the Spectrum-Efficiency of Transparent Optical Transport Network Design with Variable Forward Error Correction codes

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Abstract—We discuss the flexible rate optical transmission enabled by forward error correction (FEC) codes adjustment. The adaptation of FEC codes to given transmission condition gives rise to the trade-off between transmission rate and optical reach. In this paper, that compromise is addressed from network planning standpoint. A static transparent network planning taking into account that rate-reach trade-off is formulated. A case study is solved in realistic NSF network with a comparison between mixed line rate (MLR) (10/40/100 Gbps) and flexible rate (FlexRate) by FEC variation (10-100 Gbps with a step of 10 Gbps). The result shows that the maximum link load could be reduced up to ~60% in FlexRate compared with MLR and the reduction becomes evident at high traffic load. Moreover, thanks to finer rate adaptation, the FlexRate could support an amount of traffic around three times higher than MLR.

Keyword— Optical fibre networks, WDM networks, Integer linear programming, Forward error corrections



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