Design of Survivable IP-over-Optical Networks

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Abstract

In the past years, telecommunication networks have seen an important evolution wih the advances in optical technologies and the explosive growth of the Internet. Several optical systems allow a very large transport capacity, and data traffic has dramatically increased. Telecommunication networks are now moving toward a model of high-speed routers interconnected by intelligent optical core networks. Moreover, there is a general consensus that the control plan of the optical networks should utilize IP-based protocols for dynamic provisioning and restoration of lightpaths. The interaction of the IP routers with the optical core networks permits to achieve end-to-end connections. And the lightpaths of the optical networks provide the topology of the virtual network interconnecting the IP routers. This new infrastructure has to be sufficiently survivable, so that network services can be restored in the event of a catastrophic failure. This paper addresses survivability issues that may be of practical interest for IP-over-optical neworks. We consider some optimization problems concerning the topology of these networks. We give integer programming formulation of the problem and discuss some extensions.