A NEW DYNAMIC INTER-DOMAIN ROUTING AND GROOMING ALGORITHMS UNDER DEDICATED PROTECTION IN INTELLIGENT OPTICAL NETWORKS

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Abstract. Intelligent Optical Networks (ION) is predominantly used as the transport infrastructure to carry inter-domain traffic for client networks. Traffic grooming refers to the aggregation of low-speed client traffic flowing onto high-capacity optical connections, to achieve cost-effective traffic transport. In this paper, a novel dynamic inter-domain routing and grooming scheme with two algorithms LDFR-LLWG (Least-domain First Routing-List Load Wavelength Grooming) and LDFR-LCPG (Least-domain First Routing-List Congestion Path Grooming) for 1+1 dedicated protection in ION is proposed, which combines the advantages of both source routing and hop-by-hop routing, and selects preferred routes of least transit domains for 1+1 protection traffic. Extensive simulation results show that the average block probability can be reduced, the control overhead and signaling complexity can be alleviated in ION of the proposed algorithms compared with the traditional inter-domain routing and grooming algorithm, meanwhile, it guarantees that the performance descending of Label Switched Path (LSP) setup time is tolerable.

Keywords. ION, inter-domain routing, inter-domain traffic grooming, source routing, hop-by-hop routing, dedicated protection, fixed alternate routing.

1   Introduction

The advent of Intelligent Optical Networks (ION) will significantly change the way that the carriers sell bandwidth. In ION, to dynamically provide bandwidth to users, on one hand, the bandwidth requests need to be groomed into lightpaths for efficiently operating overall networks. This is because of the typically large differences in scale between the bandwidth of a wavelength channel and of individual connections. Traffic grooming, which can effectively use lightpaths to transmit traffic streams by multiplexing many low-rate traffic streams into one lightpath, is getting more and more research.