

Routing and Wavelength Dimensioning for Dynamic WDM Optical Networks

Dr. Reinaldo Vallejos^(1,2)

⁽¹⁾Universidad Técnica Federico Santa María; ⁽²⁾INRIA-Chile

Network operators faced with the routing and wavelength dimensioning (R&WD) problem seek to simultaneously minimize the cost to the network while ensuring that the network performs according to the standard established in the Service Level Agreement. Given the difficulty in finding an optimal solution to this problem, in practice, heuristics are used to achieve acceptable solutions with minimal computational complexity.

It is common practice to solve the R&WD problem by separating the routing problem from the dimensioning problem. Typically, the routing aspect is solved in two phases. First, the shortest path is used to route the information of every node pair. Second, from the path sets that balance the traffic across the network, the set of shortest paths is selected. Next, and according to the routing obtained, an appropriate method is used to dimension the number of wavelengths per link.

The approach presented in this work differs from the common practice described above in three key ways: 1) it solves the R&WD problems simultaneously, 2) it does not necessarily use the shortest path routing algorithm, and 3) the load balancing strategy is not used.

Despite the differences from the standard approach, the algorithm proposed here yields better quality and faster results.