

Spectrum defragmentation algorithms in elastic optical networks

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Abstract

Fragmentation in Elastic Optical Networks is an issue caused by isolated, non-aligned, and non-contiguous frequency slots that cannot be used to allocate new connection requests to the network, due to the optical layer restrictions imposed to the Routing and Spectrum Assignment (RSA) algorithms. To deal with this issue, several studies on Spectrum Defragmentation have already been presented. In this work we present an analysis of the different Defragmentation Algorithms in the literature, at the same time we compare the performance of those based on sequential approaches in terms of Blocking Probability, Entropy and Fragmentation Ratio. We also propose a Defragmentation Algorithm based on a Proactive-Reactive approach. Experimental results have shown the conditions under which a Proactive approach can outperform the Reactive ones, and when the Reactive approaches are a better option. Results also showed that our proposed Algorithm is a promissory solution to deal with the Fragmentation problem, because it outperforms the rest of the Sequential Defragmentation Algorithms considered in this study.