

Invited paper

**Impairment Aware Networking and relevant Resiliency
issues in All-Optical Networks**

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Abstract

The issues and challenges associated with network planning and engineering of a dynamically reconfigurable all-optical network will be discussed. Possible solutions will be outlined and the effectiveness of some proposed solutions will be demonstrated.

Extended Abstract

Providing ultra high-speed end-to-end connectivity in core optical networks while satisfying the requirements for quality of service and network resiliency is a topic of intense research. In ultra-long-haul all-optical networks, the analog nature of the signal transmission through the network links and nodes introduces a number of issues (e.g. signal quality degradation due to impairment accumulation, difficulty in failure localization) that the system vendors and network operators have to somehow overcome or simply deal with them. In the past few years, it has been proposed that physical layer impairments or/and the overall optical signal performance should be monitored and considered in the network planning and operation processes. To support this network functionality evolution fast physical layer modeling techniques were developed, new optical performance and impairment monitoring schemes were proposed, novel impairment aware routing and wavelength assignment algorithms were introduced, failure localization algorithms for all-optical networks were discussed and associated control plane extensions were presented. These developments may be now integrated into the next generation optical networks that will accommodate dynamic traffic characteristics, rapid reconfigurability of the optical layer, and varying physical impairment/component characteristics. In this presentation, we will provide an overview of the related literature on the topic of impairment constraint optical networking and we will describe how the existing network planning and operation procedures could be extended to support a dynamically reconfigurable all-optical network environment.



Ioannis Tomkos

Dr. Ioannis Tomkos, has the rank of Full Professor at Athens Information Technology Center, serves as its Associate Dean and is an Adjunct Faculty at the Information Networking Institute of Carnegie-Mellon University, USA. At AIT he founded and serves as the Head of the "High Speed Networks and Optical Communication (NOC)" Research Group that participates in many EU funded research projects in which Dr. Tomkos has a consortium-wide leading role (e.g. Project Leader of the EU ICT STREP project DICONET, Technical Manager of the EU IST STREP project TRIUMPH, Chairman of the EU COST 291 project). Dr. Tomkos has received the prestigious title of "Distinguished Lecturer" of IEEE Communications Society for the topic of transparent optical networking. Together with his colleagues and students he

has authored more than 200 peer-reviewed articles. Dr. Tomkos has served as the Chairman of the International Optical Networking Technical Committee of IEEE Communications Society and a member of the IEEE ComSoc's Technical Activities Council. He is the Chairman of the IFIP working group on "Photonic Networking". He has been General Chair, Technical Program Committee Chair and member of the organizing committees for the major conferences (e.g. OFC, ECOC, IEEE GlobeCom, IEEE ICC, etc.) in the area of telecommunications/networking (more than 50 conferences/workshops). In addition he is a member of the Editorial Boards of the IEEE/OSA Journal of Lightwave Technology, the OSA Journal of Optical Networking, the IET Journal on Optoelectronics, the International Journal on Communications and the International Journal on Telecommunications Management.