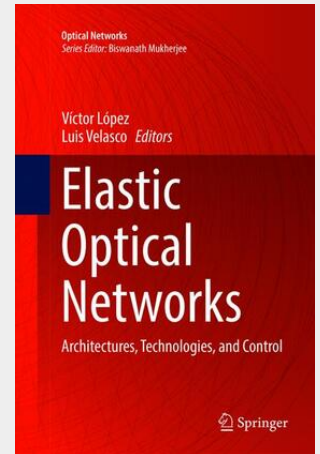


Elastic Optical Networks

Architectures, Technologies, and Control

This book presents advances in the field of optical networks - specifically on research and applications in elastic optical networks (EON). The material reflects the authors' extensive research and industrial activities and includes contributions from preeminent researchers and practitioners in optical networking. The authors discuss the new research and applications that address the issue of increased bandwidth demand due to disruptive, high bandwidth applications, e.g., video and cloud applications. The book also discusses issues with traffic not only increasing but becoming much more dynamic, both in time and direction, and posits immediate, medium, and long-term solutions throughout the text. The book is intended to provide a reference for network architecture and planning, communication systems, and control and management approaches that are expected to steer the evolution of EONs.

This book addresses challenges and potential solutions surrounding the dramatic yearly increases in bandwidth demand. The editors discuss the predicament surrounding current growth, which is predicted to continue because of the proliferation of disruptive, high bandwidth applications like video and cloud applications. They also discuss that in addition to growth, traffic will become much more dynamic, both in time and direction. The contributors show how large changes in traffic magnitude during a 24-hour period can be observed, as day-time business users have very different demands to evening-time residential customers, and how this plays into addressing future challenges. In addition, they discuss potential solutions for the issues surrounding situations where multiple content and cloud service providers offer competing services, causing the traffic direction to become more dynamic. The contributors discuss that although the WDM transponder technology can be upgraded to 100Gb/s in the short to medium term, and to 1Tb/s in the longer term, bandwidth-variable transponders that can adjust their bandwidth quickly and under software control are needed. In addition, they posit that by using a flexible grid the optical spectrum can be used in a more flexible way. The book comprehensively addresses all these topics and aims at providing a reference for the coming years for researchers, engineers, and practitioners working in the field. Planning and algorithms for elastic optical networks (EONs) are presented, including mathematical models and algorithms. - Discusses the evolution from WDM to flexible and the new applications that EONs can support - Shows how in the data plane, transmission in EON will cover the next generation of bandwidth variable transponders, novel modulation formats, mitigation of impairments, and node architectures - Presents extensions to GMPLS and OpenFlow for EONS in the control plane, extensions to GMPLS and OpenFlow for EONs, and the concept of in-operation planning



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