
Preface

The objective of this book is to provide timely and comprehensive coverage of the principles, technology, practice, and future of traffic grooming in optical networks. Traffic grooming considerations are already shaping new switch designs and standards, including next generation Synchronous Optical Network/Synchronous Digital Hierarchy (SONET/SDH) and Generic Framing Procedure (GFP), are affecting future optical network technologies, and are creating new business opportunities. Yet information on the topic is scattered and there is a shortage of technical sources where relevant material can be accessed in a single location. The motivation for this book was to bridge this gap by providing a single authoritative point of reference to the traffic grooming state-of-the-art.

Traffic grooming is a complex subject, involving a number of interrelated concepts, standards, and technologies. It is also a rapidly growing field of study, making it difficult for a single book to cover all aspects in detail. To cope with this scope and complexity, this book provides appropriate background information, followed by an in-depth study of a few key issues and challenges. It has been our intention to bring together a broad range of perspectives from preeminent researchers in both academia and industry. We believe that these multiple, diverse points of view add considerable value and make the contents more interesting to the reader.

This book is intended for practicing engineers as well as industry and academic researchers. The potential audience includes: new entrants to the field, including industry practitioners and graduate students in computer science, telecommunications, and related disciplines interested in practical information on traffic grooming; network designers and planners and engineering managers involved in cross-connect design, optical network design, and standardization efforts who are interested in traffic grooming technologies and techniques; and researchers who wish to explore the subject matter further. The book is also suitable as textbook for graduate-level courses on optical networks or network design, as well as for industry short courses on traffic grooming, and as a comprehensive reference for those conducting original research in the field.

Book Organization

The Introduction provides an easy entry to the field of traffic grooming, even for readers unfamiliar with optical networking. The remainder of the book is divided into three parts. The first part provides essential background material and the corresponding chapters are more tutorial in nature, whereas the last two parts examine several key research issues in depth.

Part I, *Foundations*, presents enabling technology and standards, and provides a formal introduction to traffic grooming theory. It contains five chapters covering grooming switch architectures, related control plane standards, the grooming capabilities of SONET and next-generation SONET technologies, the computational complexity of the problem, and a scalable hierarchical grooming framework.

Part II, *Techniques*, consists of eight chapters which present specific traffic grooming techniques addressing corresponding fundamental issues including: grooming in SONET and next generation SONET; survivability; mathematical programming approaches for static grooming; grooming under scheduled service and dynamic traffic; performance modeling; and multipoint grooming.

Finally, Part III, *Frontiers*, examines topics of emerging importance, including multidomain considerations, waveband grooming and switching, and all-optical grooming.

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