Optical Network Design and Modelling

IFIP – The International Federation for Information Processing

IFIP was founded in 1960 under the auspices of UNESCO, following the First World Computer Congress held in Paris the previous year. An umbrella organization for societies working in information processing, IFIP's aim is two-fold: to support information processing within its member countries and to encourage technology transfer to developing nations. As its mission statement clearly states,

> IFIP's mission is to be the leading, truly international, apolitical organization which encourages and assists in the development, exploitation and application of information technology for the benefit of all people.

IFIP is a non-profitmaking organization, run almost solely by 2500 volunteers. It operates through a number of technical committees, which organize events and publications. IFIP's events range from an international congress to local seminars, but the most important are:

- the IFIP World Computer Congress, held every second year;
- open conferences;
- working conferences.

The flagship event is the IFIP World Computer Congress, at which both invited and contributed papers are presented. Contributed papers are rigorously refereed and the rejection rate is high.

As with the Congress, participation in the open conferences is open to all and papers may be invited or submitted. Again, submitted papers are stringently refereed.

The working conferences are structured differently. They are usually run by a working group and attendance is small and by invitation only. Their purpose is to create an atmosphere conducive to innovation and development. Refereeing is less rigorous and papers are subjected to extensive group discussion.

Publications arising from IFIP events vary. The papers presented at the IFIP World Computer Congress and at open conferences are published as conference proceedings, while the results of the working conferences are often published as collections of selected and edited papers.

Any national society whose primary activity is in information may apply to become a full member of IFIP, although full membership is restricted to one society per country. Full members are entitled to vote at the annual General Assembly, National societies preferring a less committed involvement may apply for associate or corresponding membership. Associate members enjoy the same benefits as full members, but without voting rights. Corresponding members are not represented in IFIP bodies. Affiliated membership is open to non-national societies, and individual and honorary membership schemes are also offered.

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Part Four   Network availability and performance modelling

Significant technological progress, an increasing variety of communication services, growing demand for network flexibility and availability as well as a fast expanding traffic volume continuously drive telecommunication networks into new, fast evolving generations. With optical networks, a new, highly promising age of communication appears on the horizon. Affordable broadband communications for everybody might soon become reality.

Photonic or optical networks exhibit novel properties like optical transparency over global distances, nearly unlimited transmission capacity, transmissions with extremely low bit-error rates and a hitherto unmatched flexibility in operation. A powerful, universal communication structure is developing. Existing networks and the wealth of different communication services can be integrated naturally. In addition, the same optical infrastructure can for instance also be exploited for the terrestrial part of mobile communications, for highway and air-traffic control systems as well as for analog and digital TV-distribution networks.

We are now starting to face an era of world-wide use of advanced optical technologies being applied in optical networks. In this promising new environment, optical network design and modelling is an essential issue for planning and operating networks of the next century. Many research programs make enormous efforts substantiating new approaches for optical networking. The main issues are being widely investigated, not only for WDM networks based on wavelength division multiplexing but also for networks based on optical time division multiplexing (OTDM) and optical packet switching.

This book contains part of the contributions presented at the working-conference *'Optical Network Design and Modelling'* held in Vienna, February 24-25, 1997. This conference has been the first meeting of an annual event of Working Group WG10 *'Photonic Communication Networks'* of the Technical Committee TC6 of the International Federation for Information Processing IFIP. This working group is aimed at strengthening research and development of photonic networks; to explore their potentials; to accelerate early development of these networks; and to provide a platform for presenting and discussing research activities, major achievements, and trends involving these all-optical communication networks.

In order to stimulate progress in optical networking, the major scope of the working group is to foster exploration of architectures, system designs,

control mechanisms, and applications that exploit the abundant transmission capacity and flexibility of photonics; and to promote development of analytical and simulation tools as well as methods for analysing, operating, dimensioning, and planning such networks.

The contributions in this book reflect these activities to promote the widespread introduction of photonic communication networks that hold the promise of solving several problems in the current generation of networks, among them restricted transmission capacity and limited performance capability.

The papers have been ordered into the following sections:
- OAM functions and layered design of photonic networks
- Network planning and design
- Network modelling
- Network availability and performance modelling

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