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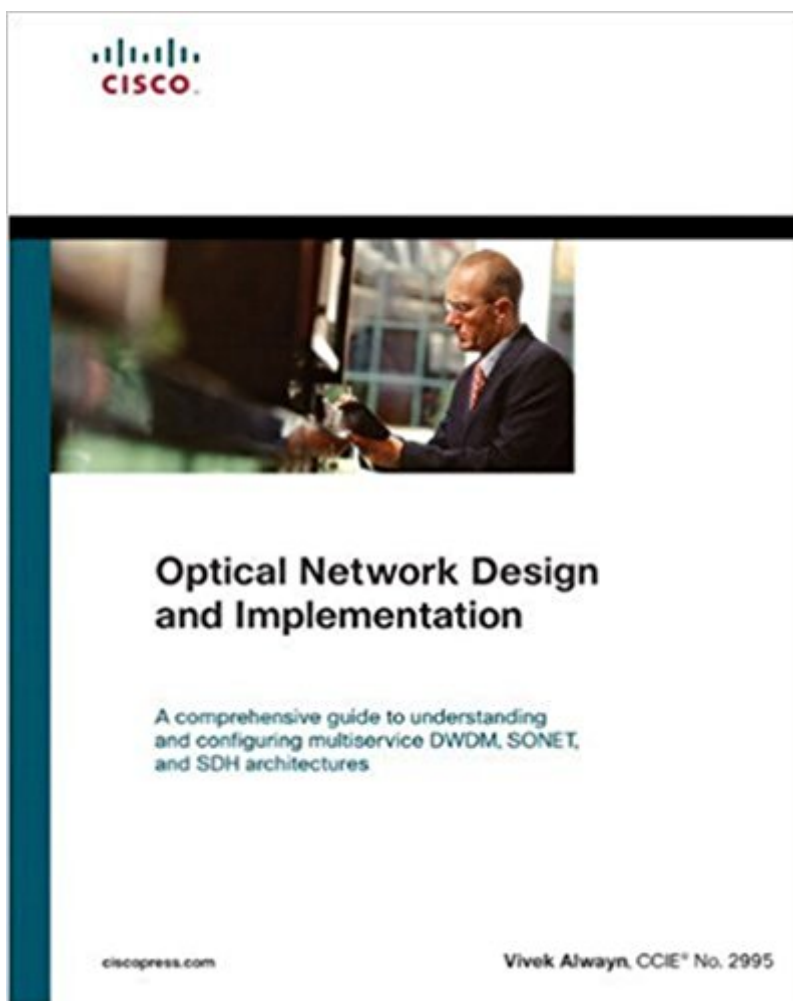
Optical Network Design and Implementation

A comprehensive guide to understanding and configuring multiservice DWDM, SONET, and SDH architectures

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Synopsis

A comprehensive guide to understanding and configuring multiservice DWDM, SONET, and SDH architectures Optical Network Design and Implementation provides in-depth coverage of the following: DS1/DS3/E1/E3 over SONET/SDH IEEE 802.17 Resilient Packet Ring (RPR) Fast/Gigabit Ethernet over SONET/SDH VRF virtual private networks Double-tagged 802.1Q VPNs SAN transport, FICON, and Fibre Channel over SONET/SDH DWDM infrastructures Analysis of DWDM, SONET, and SDH architectures Multiservice optical networking has multiple applications in service provider and enterprise environments. To help you make the most of these applications, Optical Network Design and Implementation provides a complete reference of technology solutions for next-generation optical networks. The book explains the differences among various MAN technologies, getting you up to speed on the solutions you need to use. Optical Network Design and Implementation contains a broad range of technical details on multiservice optical networking and covers optical networking theory, design, and configuration by providing informative text, illustrations, and examples. It can be used as a reference for anyone designing, implementing, or supporting an optical network. Even if you're not using Cisco ONS equipment, this book can increase your awareness and understanding of optical technologies and provide you with detailed design concepts and rules for building highly scalable multiservice optical networks. This book covers the entire spectrum of optical networking technologies from the physical layer to the network layer. If you are a network architect, network manager, or a consultant who designs, deploys, operates, or troubleshoots multiservice optical and DWDM networks, Optical Network Design and Implementation is your comprehensive guide to optical networking. "This represents the first book that offers a comprehensive and technical guide to unique IP+Optical innovations with Cisco COMET." -Jayshree V. Ullal, Senior Vice President, Optical Networking Group Cisco Systems, Inc. This book is part of the Networking Technology Series from Cisco Press, which offers networking professionals valuable information for constructing efficient networks, understanding new technologies, and building successful careers. 1587051052103152004

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Customer Reviews

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new technologies, and building successful careers. --This text refers to the Paperback edition.

Vivek Alwayn, CCIE No. 2995, is a senior manager with Accenture. He has more than 15 years of experience working with core transport technologies, MPLS, and optical networking. He has designed and implemented several large- scale WAN switched, MPLS, and optical networks for service provider and enterprise customers worldwide. He holds a bachelor's degree in electronics engineering and is currently working on his master's in telecommunications engineering. He authored the Advanced MPLS Design and Implementation title for Cisco Press and has published several technical papers. Vivek Alwayn is also an active member of the IEEE and IETF. He can be reached at vivek@alwayn.com.

I work for a switch fabric semiconductor company. I wanted to gain a better understanding of the types of systems that our components would be used in, specifically relating to IP-over-SONET traffic, MSPPs and ring protection mechanisms. This book fit the bill quite nicely. It covers the basics of fiber optic technology, including DWDM. The treatment of SONET and SDH is very thorough, with good illustrations included. The last part of the book deals specifically with the provisioning and applications of various Cisco ONSs. I found the Network Case Studies in the last chapter to be very informative, as it helps reinforce the material and demonstrate how it can be applied to a real-world network.I give the review 4 stars, for a couple reasons. First, having experience as a designer of fiber optic transponder modules, I felt that the treatment of fiber optic technologies and DWDM in chapters 3 and 4 was a little on the light side. Some of the important concepts, such as chromatic dispersion, are treated in somewhat vague terms and could be explained more fully, without getting too technical. For a better understanding of such concepts, I recommend "Understanding Fiber Optics" by Hecht.Also, there are numerous small errors in the book that may lead to misunderstanding of the material. Some errors look like simple typos, and others are technical errors. They are too numerous to list here, but hopefully an errata or second revision will be published to correct these. For example, in the unidirectional and bidirectional rings shown in figures 5-36 through 5-38, the east and west traffic directions are swapped. This may cause confusion when attempting to trace the traffic flow in the diagrams, as described in the text (which is correct).Figure 5-22 shows a diagram of an Add/Drop Mux, but the text describes it as a Terminal Mux. granted, these are small problems, but may cause confusion for some, nonetheless.All in all, this is a very good book and I highly recommend it.Roger MillerEnigma Semiconductor

This book is probably the most comprehensive and in-depth source of information about optical networking that I have ever read. The book opens with an introduction to optical networking, discusses SONET/SDH architectures, and briefly presents all the concepts and technologies, which are covered in detailed later chapters.The second chapter delves immediately into the details of Time Division Multiplexing (TDM) and analog signal processing. T-carrier and E-carrier hierarchies and their signaling and framing formats are examined, followed-up by a review of the ISDN BRI/PRI standard and ISDN frame formats.The next section of the book looks at the physical characteristics of fiber optics including the materials used, physical construction of the cable, and behavioral and performance characteristics of different optical materials under differing conditions. For those interested in calculating their own measurements, refraction, power measurement, and span loss formulas are presented along with a few case studies as examples. Splicing techniques and optical connectors are also covered here. Wavelength-Division Multiplexing (WDM) (both coarse and dense) and various dispersion compensation techniques finish up this section.Chapters 5 and 6 cover SONET and SDH architectures respectively. This is a fairly thorough examination of the two standards and includes a detailed look at the electrical and optical signals, SONET/SDH technology layers, framing, transmission overhead, multiplexing, error reporting, topologies and topology protection strategies, to name just a few! Packet ring technologies such as gigabyte Ethernet and Multi-service Provisioning Platform (MSPP) are also presented in this section for those applications where end-to-end Ethernet framing is desirable.The Cisco product lines for SONET and SDH platforms are presented next, with a fairly in-depth look at the Cisco ONS 15454 which is positioned as Cisco's most versatile and widely used multi-service add/drop multiplexer (ADM). Configuration options for control, alarm, electrical, optical, and Ethernet modules are examined along with an introduction to Cisco's Transport Controller (CTC), a graphical application for provisioning and managing optical networks.Chapters 9-11 provide detailed, over 300 pages worth, of explanations and examples for configuring the ONS 15454 for SONET MSSP, SDH MSPP, and Ethernet over SONET & SDH. Step by step directions for different configurations utilizing CTC, and accompanying screen shots, make for an easily understandable provisioning and configuration process.Overall, this book serves as a welcome addition to any technical bookshelf. Whether a seasoned technical expert looking for a good reference book, or a beginner looking to learn about optical networking technologies, this book is well written for both audiences. This book earns a place as one of my personal favorites. For those looking to test their knowledge on the material covered in this book, chapter 12 provides a selection of insightful and challenging case studies.

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