Principles and Practices of Interconnection Networks, William James Dally, Brian Patrick Towles, Elsevier, 2004, 0080497802, 9780080497808, 550 pages. One of the greatest challenges faced by designers of digital systems is optimizing the communication and interconnection between system components. Interconnection networks offer an attractive and economical solution to this communication crisis and are fast becoming pervasive in digital systems. Current trends suggest that this communication bottleneck will be even more problematic when designing future generations of machines. Consequently, the anatomy of an interconnection network router and science of interconnection network design will only grow in importance in the coming years. This book offers a detailed and comprehensive presentation of the basic principles of interconnection network design, clearly illustrating them with numerous examples, chapter exercises, and case studies. It incorporates hardware-level descriptions of concepts, allowing a designer to see all the steps of the process from abstract design to concrete implementation.

Case studies throughout the book draw on extensive author experience in designing interconnection networks over a period of more than twenty years, providing real world examples of what works, and what doesn't. Tightly couples concepts with implementation costs to facilitate a deeper understanding of the tradeoffs in the design of a practical network. A set of examples and exercises in every chapter help the reader to fully understand all the implications of every design decision.

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