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High Performance Switches and Routers High Performance Schedulers for Network Switches and Routers Broadband Packet Switching Technologies Optimizing Network Performance with Content Switching High-speed Networks and Internets IEEE Workshop on High Performance Switching and Routing High-performance Packet Switching Architectures Implementation of IBM j-type Ethernet Switches and Routers Characterization of Surface Discharge Switches and High Performance Applications The All-New Switch Book High-performance Communication Networks HPSR2002 Switch/Router Architectures Ethernet Switches 2017 IEEE 18th International Conference on High Performance Switching and Routing Modeling, Design and Performance Analysis of Firewall Switch for High Speed ATM Networks High Performance Networks High-performance Packet Switching Architectures 2014 IEEE 15th International Conference on High Performance Switching and Routing (HPSR) Performance Evaluation of Buffered Switches in Packet Switching Networks with Mesh Topologies Performance Enhancement in Buffered Delta Networks Using Crossbar Switches and Multiple Links High-Speed Networking Enhance Features and Performance of Content Switches Performance Guarantees in Communication Networks 2005 Workshop on High Performance Switching and Routing High Performance RF MEMS Metal-Contact Switches and Capacitive Switches Architecture and Performance Analysis of Broad Packet Switches and ATM Multiplexers Computer Networks and Systems Special Issue Challenges in High Performance Switching and Routing in the Future Internet Radio Frequency Micromachined Switches, Switching Networks, and Phase Shifters Architecture Design and Performance Analysis of Practical Buffered-crossbar Packet Switches Performance Analysis of Telecommunications and Local Area Networks Interconnections for Computer Communications and Packet Networks Principles of Broadband Switching and Networking High Performance RF MEMS Metal-contact Switches and Switching Networks High Performance JavaScript Packet Guide to Routing and Switching Improved Performance Soft Switching Switch Mode Power Supply Intelligent Quality Assessment of Railway Switches and Crossings IBM b-type Gen 5 16 Gbps Switches and Network Advisor

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This book focuses on the latest scientific and technological advancements in the field of railway turnout engineering. It offers a holistic approach to the scientific investigation of the factors and mechanisms determining performance degradation of railway switches and crossings (S&Cs), and the consequent development of condition monitoring systems that will enable infrastructure managers to transition towards the implementation of predictive maintenance. The book is divided into three distinct parts. Part I discusses the modelling of railway infrastructure, including switch and crossing systems, while Part II focuses on metallurgical characterization. This includes the microstructure of in-field loaded railway steel and an analysis of rail screw failures. In turn, the third and final part discusses condition monitoring and asset management. Given its scope, the book is of interest to both academics and industrial practitioners, helping them learn about the various challenges characterizing this engineering domain and the latest solutions to properly address them. This much-needed update to the bestselling guide on the extensive changes to the local area networks (LAN) switching technologies explains why LAN switching technologies are critical to network design. This in-depth guide covers the capabilities, application, and design of LAN switches and switched internetworks and examines the significant changes that have taken place since the publication of the first edition seven years ago. You’re sure to appreciate the witty writing style and easy-to-follow format on such an often-complicated subject matter. Internet traffic is increasing by at least 200% per year and this is the first book to report on the current state-of-the-art of packet-switching architectures. The book to covers the subject in a comprehensive survey and presents contributions from the leading researchers in industry and universities. A mix of theoretical and practical material makes this book an essential reference for researchers in

academia as well as industrial engineers. Statistical performance evaluation has assumed an increasing amount of im portance as we seek to design more and more sophisticated communication and information processing systems. The ability to predict a proposed system's performance without actually having to construct it is an extremely cost effec tive design tool. This book is meant to be a first-year graduate level introduction to the field of statIstical performance evaluation. As such, it covers continuous time queueing theory (chapters 1-4), stochastic Petri networks (chapter 5), and discrete time queueing theory (chapter 6). There is a short appendix at the end of the book that reviews basic probability theory. At Stony Brook, this mate rial would be covered in the second half of a two course sequence (the first half is an applied computer networks course). Students seem to be encouraged to pursue the analytical material of this book if they first have some idea of the potential applications. 'The world of information processing is going through a major phase of its evolution. Networking has been associated with computers since the 1960's. Communicating machines, exchanging information or cooperating to solve complex problems, were the dream of many scientists and engineers. Rudi mentary networks and protocols were invented. Local area networks capable of carrying a few megabits per second became basic components of corporate computing installations in the 1980's. At the same time, advances in optical transmission and switching technologies made it possible to transfer billions of bits per second. 'The availability of this huge bandwidth is making people wonder about the seemingly unlimited possibilities of these "fat information pipes" A new world where all interesting up-to-date information becomes instantaneously available to everyone everywhere is often portrayed to be around the comer. New applications are envisioned and their requirements are defined. 'The new field of High Performance Networking is burgeoning with activities at various levels. Several frontiers are being explored simultaneously. In order to achieve more bandwidth and better performance, work is progressing in optical transmission, high speed switching and network resource manage ment. Some researchers have started to investigate all-optical networking as a promising approach to remove the relatively slow electronics from the network infrastructure. This will also introduce a new environment with unique characteristics that will have a definite impact on network architec tures, topologies, addressing schemes, and protocols. Leading authorities deliver the commandments for designing high-speed networks There are no end of books touting the virtues of one or another high-speed networking technology, but until now, there were none offering networking professionals a framework for choosing and integrating the best ones for their organization's networking needs. Written by two world-renowned experts in the field of high-speed network design, this book outlines a total strategy for designing high-bandwidth, low-latency systems. Using real-world implementation examples to illustrate their points, the authors cover all aspects of network design, including network components, network architectures, topologies, protocols, application interactions, and more. A modified version of new fully soft-switched boost converter suitable for active power factor correction has been developed in t This modified converter uses an auxiliary circuit consisting of less number of components than the earlier version. Both the switches of this converter turn on with ZCS and turn off with ZVS. Provides coverage of the state-of-the-art in packet-switching technology by presenting contributions from the leading researchers in industry and universities. A mix of theoretical and practical material makes this book a useful reference for researchers in academia as well as industrial engineers. This dissertation presents designs, fabrication processes and measurements of a series of high performance RF MEMS switches. Chapter 2 presents a miniature RF MEMS metal contact switch based on a tethered-cantilever structure. The miniature size and the use of tethers result in an excellent biaxial residual stress and stress gradient tolerance. The switch is built using thin metal process with a large biaxial stress and a high stress gradient (50 MPa and -105 MPa/um), and works well under these conditions. In the up-state, the switch

capacitance is 9.4 fF and results in an isolation of 20 dB at 20 GHz. In the down-state, the switch resistance is 3.6 ohm for a gold-gold contact under 30 V actuation voltage. The switch is compatible with CMOS back-end processing. With its miniature size, the switch could be placed in arrays to achieve lower contact resistance and higher power handling. Chapter 3 presents a multi-contact mN-force RF MEMS metal-contact switch with a pull-down voltage (Vp) of 45 V-50 V and an operation voltage of 60V-65V. The switch gets a contact force of s 2.0 mN under 65 V actuation voltage and a release force of s 1.2 mN (simulated). The switch gets an on-state resistance of s 1.8 with Ru-Au contact and an off-state capacitance of 13.5 fF, which results in a figure of merit of 24 fs. In the temperature stability measurement, the switch shows a change of 4V in pull-down voltage and a change of 2V in release voltage from 25 C to 125 C. In the high power handling measurement, the switch demonstrates a reliability of > 10 million cold switching cycles with 5 W RF power. Chapter 4 first presents a high capacitance ratio (Cr) capacitive switch with continuous tuning capability after pull-down. The measured up-state capacitance is 74 fF. The pull-down voltage of the switch is 30V -32V and there is an 8.4% linear tuning range from 33V to 40V actuation voltage. The measured down-state capacitance is 1296 fF under 40V actuation voltage, resulting in a Cr of 17.5. Next, a back-to-back switch using the high Cr switch is designed to improve IP2 without extra power supply. The back-to-back switch shows an up-state capacitance of 31fF, a Cr of 19.7 and a 6.8% continuous tuning range from 34V to 40V. The back-to-back switch shows a 14 dB higher OIP2 than the single switch does. Radio Frequency Micromachined Switches, Switching Networks, and Phase Shifters discusses radio frequency microelectromechanical systems (RF MEMS)-based control components and will be useful for researchers and R&D engineers. It offers an in-depth study, performance analysis, and extensive characterization on micromachined switches and phase shifters. The reader will learn about basic design methodology and techniques to carry out extensive measurements on MEMS switches and phase shifters which include electrical, mechanical, power handling, linearity, temperature stability, reliability, and radio frequency performance. Practical examples included in the book will help readers to build high performance systems/subsystems using micromachined circuits. Key Features Provides simple design methodology of MEMS switches and switching networks including SPST to SP16T switches Gives an in-depth performance study of micromachined phase shifters. Detailed study on reliability and power handling capability of RF MEMS switches and phase shifters presented Proposes reconfigurable micromachined phase shifters Verifies a variety of MEMS switches and phase shifters experimentally The effective design of high-speed, reliable switching systems is essential for moving the huge volumes of traffic and multimedia over modern communications networks. This book explains all the main packet-switching architectures, including all theoretical and practical topics relevant to the design and management of high-speed networks. Delivering the most systematic coverage available of the subject, the authors interweave fundamental concepts with real-world applications and include engineering case studies from wireless and fiber-optic communications. Market: Hardware and Software Engineers in the telecommunication industry, System Engineers, and Technicians. William Stallings offers the most comprehensive technical book to address a wide range of design issues of high-speed TCP/IP and ATM networks in print to date. "High-Speed Networks and Internets" presents both the professional and advanced student an up-to-date survey of key issues. The Companion Website and the author's Web page offer unmatched support for students and instructors. The book features the prominent use of figures and tables and an up-to-date bibliography. In this second edition, this award-winning and best-selling author steps up to the leading edge of integrated coverage of key issues in the design of high-speed TCP/IP and ATM networks to include the following topics: Unified coverage of integrated and differentiated services. Up-to-date and comprehensive coverage of TCP performance.

Thorough coverage of next-generation Internet protocols including (RSVP), (MPLS), (RTP), and the use of Ipv6. Unified treatment of congestion in data networks; packet-switching, frame relay, ATM networks, and IP-based internets. Broad and detailed coverage of routing, unicast, and multicast. Comprehensive coverage of ATM; basic technology and the newest traffic control standards. Solid, easy-to-absorb mathematical background enabling understanding of the issues related to high-speed network performance and design. Up-to-date treatment of gigabit Ethernet. The first treatment of self-similar traffic for performance assessment in a textbook on networks (Explains the mathematics behind self-similar traffic and shows the performance implications and how to estimate performance parameters.) Up-to-date coverage of compression. (A comprehensive survey.) Coverage of gigabit networks. Gigabit design issues permeate the book. As Internet traffic grows and demands for quality of service become stringent, researchers and engineers can turn to this go-to guide for tested and proven solutions. This text presents the latest developments in high performance switches and routers, coupled with step-by-step design guidance and more than 550 figures and examples to enable readers to grasp all the theories and algorithms used for design and implementation. Combined input crosspoint buffered (CICB) packet switches were introduced to relax inputoutput arbitration timing and provide high throughput under admissible traffic. However, the amount of memory required in the crossbar of an N x N switch is N2x k x L, where k is the crosspoint buffer size and needs to be of size RTT in cells, L is the packet size. RTT is the round-trip time which is defined by the distance between line cards and switch fabric. When the switch size is large or RTT is not negligible, the memory amount required makes the implementation costly or infeasible for buffered crossbar switches. To reduce the required memory amount, a family of shared memory combined-input crosspoint-buffered (SMCB) packet switches, where the crosspoint buffers are shared among inputs, are introduced in this thesis. One of the proposed switches uses a memory speedup of in and dynamic memory allocation, and the other switch avoids speedup by arbitrating the access of inputs to the crosspoint buffers. These two switches reduce the required memory of the buffered crossbar by 50% or more and achieve equivalent throughput under independent and identical traffic with uniform distributions when using random selections. The proposed mSMCB switch is extended to support differentiated services and long RTT. To support P traffic classes with different priorities, CICB switches have been reported to use N2x k x L x P amount of memory to avoid blocking of high priority cells.The proposed SMCB switch with support for differentiated services requires 1/mP of the memory amount in the buffered crossbar and achieves similar throughput performance to that of a CICB switch with similar priority management, while using no speedup in the shared memory. The throughput performance of SMCB switch with crosspoint buffers shared by inputs (I-SMCB) is studied under multicast traffic. An output-based shared-memory crosspoint buffered (O-SMCB) packet switch is proposed where the crosspoint buffers are shared by two outputs and use no speedup. The proposed O-SMCB switch provides high performance under admissible uniform and nonuniform multicast traffic models while using 50% of the memory used in CICB switches. Furthermore, the O-SMCB switch provides higher throughput than the I-SMCB switch. As SMCB switches can efficiently support an RTT twice as long as that supported by CICB switches and as the performance of SMCB switches is bounded by a matching between inputs and crosspoint buffers, a new family of CICB switches with flexible access to crosspoint buffers are proposed to support longer RTTs than SMCB switches and to provide higher throughput under a wide variety of admissible traffic models. The CICB switches with flexible access allow an input to use any available crosspoint buffer at a given output. The proposed switches reduce the required crosspoint buffer size by a factor of N , keep the service of cells in sequence, and use no speedup. This new class of switches achieve higher throughput performance than CICB switches under a large variety of traffic models, while supporting long RTTs. Crosspoint

buffered switches that are implemented in single chips have limited scalability. To support a large number of ports in crosspoint buffered switches, memory-memory-memory (MMM) Clos-network switches are an alternative. The MMM switches that use minimum memory amount at the central module is studied. Although, this switch can provide a moderate throughput, MMM switch may serve cells out of sequence. As keeping cells in sequence in an MMM switch may require buffers be distributed per flow, an MMM with extended memory in the switch modules is studied. To solve the out of sequence problem in MMM switches, a queuing architecture is proposed for an MMM switch. The service of cells in sequence is analyzed. Novel switching and routing techniques will be addressed that provide higher scalability and quality of service, including IP lookup, schedulingImprovements of routers and switches to provide better network security and lower power consumption will be analyzedImplication of emerging applications on switching and routing will be considered IBM® j-type data center solutions running Junos software (from Juniper Networks) provide operational agility and efficiency, dramatically simplifying the network and delivering savings. With this solution, a network design has fewer devices, interconnections, and network tiers. Beyond the cost advantages, the design offers the following key benefits: Reduces latency Simplifies device management Delivers significant power, cooling, and space savings Eliminates multiple system failure points Performs pervasive security The high-performance data center is built around IBM j-type e-series Ethernet switches, m-series routers, and s-series firewalls. This new family of powerful products helps to shape the next generation of dynamic infrastructure. IBM j-type e-series Ethernet switches meet escalating demands while controlling costs. IBM j-type m-series Ethernet routers are high-performance routers with powerful switching and security capabilities. This IBM Redbooks® publication targets IT professionals who sell, design, or administer IBM j-type networking solutions. It provides information about IBM j-type Ethernet switches and routers and includes the following topics: Introduction to Ethernet fundamentals and IBM j-type Ethernet switches and routers Initial hardware planning and configuration Other configuration topics including Virtual Chassis configuration, Layer 1, Layer 2, and Layer 3 configurations, and security features Network management features of Junos software and maintenance of the IBM j-type series hardware Performance Analysis of Telecommunications and Local Area Networks presents information on teletraffic engineering, with emphasis on modeling techniques, queuing theory, and performance analysis for the public-switched telephone network and computer communication networks. Coverage includes twisted pair cables and coaxial cables, subscriber loops, multistage network switching, modeling techniques for traffic flow and service time, random access networks, and much more. End-of-chapter problems with solutions are also included. Performance Analysis of Telecommunications and Local Area Networks is also a useful reference for practicing engineers but is intended as a textbook in advanced- level courses. A practicing engineer's inclusive review of communication systems based on shared-bus and shared-memory switch/router architectures This book delves into the inner workings of router and switch design in a comprehensive manner that is accessible to a broad audience. It begins by describing the role of switch/routers in a network, then moves on to the functional composition of a switch/router. A comparison of centralized versus distributed design of the architecture is also presented. The author discusses use of bus versus shared-memory for communication within a design, and also covers Quality of Service (QoS) mechanisms and configuration tools. Written in a simple style and language to allow readers to easily understand and appreciate the material presented, Switch/Router Architectures: Shared-Bus and Shared-Memory Based Systems discusses the design of multilayer switches—starting with the basic concepts and on to the basic architectures. It describes the evolution of multilayer switch designs and highlights the major performance issues affecting each design. It addresses the need to build faster multilayer switches and examines

the architectural constraints imposed by the various multilayer switch designs. The book also discusses design issues including performance, implementation complexity, and scalability to higher speeds. This resource also: Summarizes principles of operation and explores the most common installed routers Covers the design of example architectures (shared bus and memory based architectures), starting from early software based designs Provides case studies to enhance reader comprehension Switch/Router Architectures: Shared-Bus and Shared-Memory Based Systems is an excellent guide for advanced undergraduate and graduate level students, as well for engineers and researchers working in the field. Retaining the first edition's technology-centred perspective, this book gives readers a sound understanding of packed-switched, circuit-switched and ATM networks, and techniques for controlling them. If you're like most developers, you rely heavily on JavaScript to build interactive and quick-responding web applications. The problem is that all of those lines of JavaScript code can slow down your apps. This book reveals techniques and strategies to help you eliminate performance bottlenecks during development. You'll learn how to improve execution time, downloading, interaction with the DOM, page life cycle, and more. Yahoo! frontend engineer Nicholas C. Zakas and five other JavaScript experts—Ross Harmes, Julien Lecomte, Steven Levithan, Stoyan Stefanov, and Matt Sweeney—demonstrate optimal ways to load code onto a page, and offer programming tips to help your JavaScript run as efficiently and quickly as possible. You'll learn the best practices to build and deploy your files to a production environment, and tools that can help you find problems once your site goes live. Identify problem code and use faster alternatives to accomplish the same task Improve scripts by learning how JavaScript stores and accesses data Implement JavaScript code so that it doesn't slow down interaction with the DOM Use optimization techniques to improve runtime performance Learn ways to ensure the UI is responsive at all times Achieve faster client-server communication Use a build system to minify files, and HTTP compression to deliver them to the browser Go beyond layer 2 broadcast domains with this in-depth tour of advanced link and internetwork layer protocols, and learn how they enable you to expand to larger topologies. An ideal follow-up to Packet Guide to Core Network Protocols, this concise guide dissects several of these protocols to explain their structure and operation. This isn’t a book on packet theory. Author Bruce Hartpence built topologies in a lab as he wrote this guide, and each chapter includes several packet captures. You’ll learn about protocol classification, static vs. dynamic topologies, and reasons for installing a particular route. This guide covers: Host routing—Process a routing table and learn how traffic starts out across a network Static routing—Build router routing tables and understand how forwarding decisions are made and processed Spanning Tree Protocol—Learn how this protocol is an integral part of every network containing switches Virtual Local Area Networks—Use VLANs to address the limitations of layer 2 networks Trunking—Get an indepth look at VLAN tagging and the 802.1Q protocol Routing Information Protocol—Understand how this distance vector protocol works in small, modern communication networks Open Shortest Path First—Discover why convergence times of OSPF and other link state protocols are improved over distance vectors This dissertation presents the design and measurement of high performance RF MEMS metal contact switches capable of achieving mN-level contact and release forces. The switches are designed and demonstrated to be tolerant to a wide range stress effect and temperature. Chapter 2 presents an electrostatic RF MEMS metal contact switch based on a tethered cantilever topology. The use of tethers results in a design that has low sensitivity to stress gradients, biaxial stresses, and temperature. A switch with a footprint of 160x190 [mu]m2 and based on a surface-micromachined 8-[mu]m thick gold cantilever with a Au/Ru contact is implemented on a high-resistivity silicon substrate and results in a total contact force of 0.8-1.2 mN at 80-90 V, a restoring force of 0.5 mN, a pull-in voltage of 61 V, an up-state capacitance of 24 fF, and an actuation time of 6.4 [mu]s. The device

achieves a switch resistance of 2.4±1.4 Ohms to 1.8±0.6 Ohms at 90-100 V in open laboratory environments (unpackaged). Chapter 3 presents a temperature stable metal-contact RF MEMS switch capable of handling>5W of RF power (a second generation of the tethered cantilever topology). The device achieves 0.7 - 1.5 mN of contact force for actuation voltages of 80 - 90 V, with a restoring force of 0.63 mN. Furthermore, the device is insensitive to stress effects and temperature. Temperature measurements showed excellent thermal stability - no deflection in the beam, and a change in pull-in voltage of only 4 V from 25-125°C. The switch was tested under prolonged (>24 hrs) high-power RF conditions with excellent reliability. Chapter 4 presents a compact RF MEMS metal-contact switch based on a tethered cantilever topology and orthogonal anchors. The switch is a "medium-force" design capable of achieving 0.38-0.72 mN of contact force for actuation voltages of 90-100 V and a restoring force of 0.46 mN (simulated) in a 120160 um^2 area. The pull-in and release voltages are 75 V and 70 V, respectively. In the down-state, the switch resistance is 1-2 with a Au/Ru hybrid contact. In the up-state, the capacitance is 16 fF, resulting in an isolation of 20 dB at 10 GHz and 9 dB at 40 GHz for an SPST configuration. Furthermore, the switch demonstrated a reliability of>10 million cycles (1 W, cold switching) and a power handling of>5 W. For a series/shunt configuration, the switch achieves an isolation of 55 dB at 10 GHz and 35 dB at 40 GHz. Compact SP4T and SP6T switching networks are also implemented. The SP4T is 850x530 [mu]m2 (850x650 [mu]m2 with bias pads); the SP6T is 850x730 [mu]m2 (850x855 [mu]m2 with bias pads). Both designs achieve an isolation ~36 dB and insertion loss 0.3 dB at 3 GHz. Chapter 5 presents a mN-level contact and restoring force RF MEMS metal-contact switch exhibiting high reliability, high linearity, and high power handing for DC-40 GHz applications. The device, which is insensitive to stress and temperature effects, achieves 1.2-1.5 mN of contact force (per contact) from 80-90 V and 1.0 mN of restoring force (per contact). The up-state capacitance is 8 fF, resulting in an isolation of -46, -31, and -14 dB at 1, 6, and 40 GHz, respectively. Measured results show switch resistances of 1-2 Ohms and a reliability of100 million cycles at 2-5Wunder cold-switching at 100 mW under hot-switching conditions, in an unpackaged and standard laboratory environment. Furthermore, the device was tested under prolonged hold-down conditions and demonstrated excellent RF power handling (>10 W) and DC current handling (>1 A) capability. Finally, SP4T and SP6T switching networks implemented with the metal-contact switch are demonstrated. An authoritative introduction to the roles of switching and transmission in broadband integrated services networks Principles of Broadband Switching and Networking explains the design and analysis of switch architectures suitable for broadband integrated services networks, emphasizing packet-switched interconnection networks with distributed routing algorithms. The text examines the mathematical properties of these networks, rather than specific implementation technologies. Although the pedagogical explanations in this book are in the context of switches, many of the fundamental principles are relevant to other communication networks with regular topologies. After explaining the concept of the modern broadband integrated services network and why it is necessary in today’s society, the book moves on to basic switch design principles, discussing two types of circuit switch design—space domain and time domain—and packet switch design. Throughput improvements are illustrated by some switch design variations such as Speedup principle, Channel-Grouping principle, Knockout principle, and Dilation principle. Moving seamlessly into advanced switch design principles, the book covers switch scalability, switch design for multicasting, and path switching. Then the focus moves to broadband communications networks that make use of such switches. Readers receive a detailed introduction on how to allocate network resources and control traffic to satisfy the quality of service requirements of network users and to maximize network usage. As an epilogue, the text shows how transmission noise and packet contention have similar characteristics and can be tamed by

comparable means to achieve reliable communication. Principles of Broadband Switching and Networking is written for senior undergraduate and first-year postgraduate students with a solid background in probability theory. Providing performance guarantees is one of the most important issues for future telecommunication networks. This book describes theoretical developments in performance guarantees for telecommunication networks from the last decade. Written for the benefit of graduate students and scientists interested in telecommunications-network performance this book consists of two parts. The first introduces the recently-developed filtering theory for providing deterministic (hard) guarantees, such as bounded delay and queue length. The filtering theory is developed under the min-plus algebra, where one replaces the usual addition with the min operator and the usual multiplication with the addition operator. As in the classical linear system theory, the filtering theory treats an arrival process (or a departure process) as a signal and a network element as a system. Network elements, including traffic regulators and servers, can be modelled as linear filters under the min-plus algebra, and they can be joined by concatenation, "filter bank summation", and feedback to form a composite network element. The problem of providing deterministic guarantees is equivalent to finding the impulse response of composite network elements. This section contains material on: - (s, r)-calculus - Filtering theory for deterministic traffic regulation, service guarantees and networks with variable-length packets - Traffic specification - Networks with multiple inputs and outputs - Constrained traffic regulation The second part of the book addresses stochastic (soft) guarantees, focusing mainly on tail distributions of queue lengths and packet loss probabilities and contains material on: - (s(q), r(q))-calculus and q-envelope rates - The large deviation principle - The theory of effective bandwidth The mathematical theory for stochastic guarantees is the theory of effective bandwidth. Based on the large deviation principle, the theory of effective bandwidth provides approximations for the bandwidths required to meet stochastic guarantees for both short-range dependent inputs and long-range dependent inputs. This book introduces different interconnection networks applied to different systems. Interconnection networks are used to communicate processing units in a multi-processor system, routers in communication networks, and servers in data centers. Queuing techniques are applied to interconnection networks to support a higher utilization of resources. There are different queuing strategies, and these determine not only the performance of the interconnection network, but also the set of requirements to make them work effectively and their cost. Routing algorithms are used to find routes to destinations and directions in what information travels. Additional properties, such as avoiding deadlocks and congestion, are sought. Effective routing algorithms need to be paired up with these networks. The book will introduce the most relevant interconnection networks, queuing strategies, and routing algorithm. It discusses their properties and how these leverage the performance of the whole interconnection system. In addition, the book covers additional topics for memory management and congestion avoidance, used to extract higher performance from the interconnection network. IBM® System Storage® Gen 5 fabric backbones are among the industry's most powerful Fibre Channel switching infrastructure offerings. They provide reliable, scalable, and high-performance foundations for mission-critical storage. These fabric backbones also deliver enterprise connectivity options to add support for IBM FICON® connectivity, offering a high-performing and reliable FICON infrastructure with fast and scalable IBM System z® servers. Designed to increase business agility while providing nonstop access to information and reducing infrastructure and administrative costs, Gen 5 Fibre Channel fabric backbones deliver a new level of scalability and advanced capabilities to this robust, reliable, and high-performance technology. Although every network type has unique management requirements, most organizations face similar challenges managing their network environments. These challenges can include minimizing network downtime, reducing

operational expenses, managing application service level agreements (SLAs), and providing robust security. Until now, no single tool could address these needs across different network types. To address this issue, the IBM Network Advisor management tool provides comprehensive management for data, storage, and converged networks. This single application can deliver end-to-end visibility and insight across different network types by integrating with Fabric Vision technology; it supports Fibre Channel SANs, including Gen 5 Fibre Channel platforms, IBM FICON, and IBM b-type SAN FCoE networks. In addition, this tool supports comprehensive lifecycle management capabilities across different networks through a simple, seamless user experience. This IBM Redbooks® publication introduces the concepts, architecture, and basic implementation of Gen 5 and IBM Network Advisor. It is aimed at system administrators, and pre- and post-sales support staff. A guide to the applications of content aware networking such as server load balancing, firewall load balancing, Web caching and Web cache redirection. This is growing to a $1 billion market. The authors are specialists from Nortel. If you’re ready to build a large network system, this handy excerpt from Ethernet: The Definitive Guide, Second Edition gets you up to speed on a basic building block: Ethernet switches. Whether you’re working on an enterprise or campus network, data center, or Internet service provider network, you’ll learn how Ethernet switches function and how they’re used in network designs. This brief tutorial also provides an overview of the most important features found in switches, from the basics to more advanced features found in higher-cost and specialized switches. Get an overview of basic switch operation, the spanning tree protocol, and switch performance issues Learn about switch management and some of the most widely used switch features Discover how a hierarchical design can help maintain stable network operations Delve into special-purpose switches, such as multi-layer, access, stacking, and wireless access-point switches Learn about advanced switch features designed for specific networking environments Dive deeper into switches, with a list of protocol and package documentation Results of experiments which were conducted to characterize the performance of a surface discharge as a high-performance, self-closing isolation switch for high energy applications are described. These experiments, conducted under both dc and pulsed conditions, lead to a model of switch operation which enables the design of such switches for multi-megajoule operation. The paper describes the successful implementation of a surface switch as an operational component in a multi-megampere pulse-power system.

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