BOOK REVIEWS/EDITED BY ANDRZEJ JAJSZCZYK

IS-IS DEPLOYMENT IN IP NETWORKS

BY RUSS WHITE AND ALVARO RETANA, ADDISON-WESLEY, 2002, ISBN 0-201-65772-4, HARDCOVER, 305 PAGES

REVIEWER: PIOTR PACYNA

Intermediate System to Intermediate System (IS-IS) is a powerful and flexible routing protocol often considered now as a prospective one for moderate and large IP networks. *IS-IS Deployment in IP Networks* provides a comprehensive set of concepts related to the design and operation of this modern protocol in the IP environment. Written with an overall intention to demystify the protocol for the networking engineers, the book begins with an introductory historical perspective to allow a reader to understand the very specific features of the protocol, and its foundations and terminology.

The book is organized in six chapters. As already stated, Chapter 1 provides IS-IS fundamentals. Chapter 2 focuses on essentials of IS-IS operation. Chapter 3 deals with dividing the routing domain. Chapter 4 is devoted to deployment considerations. Traffic engineering issues are subject of Chapter 5, and Chapter 6 reports on numerous IS-IS enhancements that have recently been added or are being considered for inclusion in the protocol.

The introductory chapters present essential mechanisms, including neighbor discovery, neighbor adjacency maintenance, and flooding, and delve into the operation of the protocol on point-to-point links and broadcast networks. Advanced topics that follow in subsequent chapters include domain partitioning, deployment considerations, and a case study. Next, interworking with multiprotocol label switching (MPLS), including general tunneling issues, setup of virtual private networks, and constrained SPF techniques aimed to help to engineer traffic flows are discussed. IS-IS enhancements are covered in detail in a separate chapter. Among the few things that could enrich the book would be always welcome case study sections on approaching and resolving problems related to managing IS-IS networks, as well as information on interworking with other legacy routing protocols. Nevertheless, the book is a valuable source of information, able to give a comprehensive understanding of the protocol. It can satisfy a range of users, including routing beginners and experienced networking engineers. A demanding reader may benefit from sections on interworking of IS-IS with MPLS and protocol enhancements where new features such as IP over redundant packet rings, non-stop forwarding, fast rerouting, multi-topology routing, and incremental SPF are introduced. Review questions augment individual chapters and make the book a good choice for both personal use and in courses on the topic.

RELIABILITY, SURVIVABILITY, AND QUALITY OF LARGE SCALE TELECOMMUNICATIONS SYSTEMS

EDITED BY PETER STAVROULAKIS, JOHN WILEY & SONS, LTD., ISBN 0-470-84770-0, HARDCOVER, 353 PAGES

REVIEWER: PIOTR CHOLDA

We may see a growing interest in quality and reliability problems related to telecommunications networks. The authors of *Reliability, Survivability, and Quality of Large Scale Telecommunications Systems* also followed this trend. The book, which is a collection of texts written by 26 specialists and edited by Professor Peter Stavroulakis from the Technical University of Crete, Greece, consists of five main parts. Three of them are devoted to issues strictly connected with quality and reliability. The fourth part provides an overview of application matters, and the last one presents a case study. Each part is a separate chapter, with an introduction to the theme written by the editor.

Chapter 1 is a very short introduction to the whole book, after which the reader goes to Chapter 2, "Reliability." It is composed of two texts. The first ("Reliability of Emerging Internet-Based Services" by H. Eslambolchi and M. Daneshmand) focuses on Internet-based services. It describes the main components of the Internet and access techniques, and classifies services and applications that are available thanks to the Internet. Then it addresses certain reliability issues — mainly the methodology of calculating one of the reliability measures (defects per million, DPM) in the Internet environment. There are also examples of practical calculations for typical Internet services (email and Web applications, e.g., Web hosting or intelligent content distribution service). The following article ("Reliability Issues in IP over Photonic Networks" by S. Arakawa and M. Murata) presents some reliability aspects of modern optical networks. The authors briefly introduce IP over photonic network as well as generalized (G)MPLS and basic recovery approaches used within (dedicated/shared protection, restoration). Next, we have an explanation of their own proposals of wavelength assignment algorithms in such networks. Finally, some implementation issues of such algorithms are discussed.

Chapter 3, "Survivability," also contains two texts. The first ("Key Issues in Survivable Cellular Systems" by H. G. Sandalidis and P. Stavroulakis) aims at providing a description of problems arising during the design of cellular systems. Main steps, problems, and objectives of network planning are outlined. There are also certain reliability issues reviewed here (first of all the method of outage index estimation and basic survivability strategies). The next paper ("Survivability in Wireless Mobile Networks" by T. Dahlberg, D. Tipper, B. Cao, and C. Charnsripinyo) concerns wireless mobile network architecture (2G, 2,5G, UMTS) and classifies failures typical of related network elements. The design that serves to prevent such failures is overviewed, too. Finally, analysis of survivability parameters (wireless outage index, performance index functions) is discussed.

Chapter 4 contains five texts. The initial one ("Quality of Service Adaptive Control in Multimedia Telecommunication Services" by G. Rovithakis, A. G. Malamos, T. Varvarigou, and M. A. Christodoulou) describes (also by means of complex mathematics) the application of recurrent high-order neural networks to model quality of service (QoS) application adaptation. Such a method is to estimate how users perceive the quality of network operation: it depends on so many parameters that it is impossible to strictly determine the satisfaction; therefore, the use of neural networks is highly suitable. Practical problems (bandwidth changes) are analyzed by means of the introduced model. The following part ("QoS Metrics for Performance Assessment in Integrated Terrestrial-Satellite Multimedia Systems" by A. Iera and A. Molinaro) covers problems well described by its title. First, the architecture that enables satellite access to the Internet is described; then QoS measurement issues for such systems based on the IP protocol are considered. The main idea is called QoS mapping, which means that network quality parameters (e.g., packet transfer delay, packet loss ratio) are transformed into service quality parameters perceived by the end user (e.g., video fluidity and audio quality levels). Methods of converting these metrics are given. At the end of the text adequate examples are presented. There is also a brief discussion of the characteristics of MPEG coding standards utilized in satellite multimedia transmissions. The consecutive text ("TCP/IP-Based Protocols over Satellite Systems: A Telecommunication Issue"

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by M. Marchese) looks through the TCP/IP protocol stack used over an atypical (for itself) system environment. The architecture of such a satellite system and applied protocols are specified. Then the methods and results of improving quality according to TCP congestion control (slow start, congestion avoidance, fast retransmit/recovery) are given. There are also additional examples of realization of such an architecture. The authors (G. K. Karagiannidis and S. A. Kotsopoulos) of the following text, "Outage Performance, Considerations in Cellular Mobile Radio Networks," describe in detail outage assessment in cellular mobile radio networks. The analysis is based on a Rician co-channel interference model. Of similar character is the next text ("Signal to Interference and Noise Ratio in Communication Systems as a Quality Measure" by A. Sampath and D. R. Jeske), which is devoted to signal-to-interference and -noise ratios in communication systems analysis. The last two texts are very mathematically advanced.

The last chapter, "Applications," consists of three parts. The starting one ("Quality Wireless Broadband Home Networking" by H. Zhang) deals with broadband home network realizations based on IEEE 1394 or its extension, Wireless 1384. The text contains an exceptionally accurate description of the last protocol. The successive text ("A Reliable ATM Switch Design" by Z. El-Saghir and A. Grzech) focuses on reliable ATM switch design. The methods of fundamental switch architecture designs together with their drawbacks are introduced. Switch reliability's dependence on an architecture is determined. The final part of the chapter ("Quality of Service via an Optimal Routing Model" by E. Aboelela and C. Douligeris) details a novel method of routing optimization by means of fuzzy logic. The fuzzy approach enables introduction of more complicated dependencies between QoS and bandwidth than those available in traditionally used methods. The authors concentrate on the optimization model, but experimental results are also provided.

There is an Appendix at the end of the book devoted to large telecommunications networks dedicated to operation for the last few Olympic Games (from 1994 in Lillehamer to a proposal for a network at Athens in 2004). The descriptions, more or less precise, contain the characteristics of applied techniques, served traffic, experienced problems, network architectures, and some conclusions. The Appendix is mainly a result of the Millenium IEEE Communications Quality and Reliability International Workshop on Quality and Reliability for World Class Events (Crete, Greece, April 2000).

Without a doubt a book analyzing quality and reliability problems for large telecommunications systems is greatly needed. The authors of the reviewed book tried to meet this need. They succeeded partially. The reader should remember that because some of the texts were written as papers for magazines, not for a book, they are of uneven quality, and there is some repetition (the text of the whole book is a little unsystematic, which is why it cannot be recommended as a regular handbook of reliability and quality engineering). Of course, the book does have its merits. It can be recommended to undergraduate and graduate students (they may learn from it much basic information concerning different telecommunications techniques (especially mobile communications). On the other hand, the book could be of some interest to professionals as it contains proposals of certain new approaches to old problems, especially QoS issues. Even practitioners may find in it something for themselves: the Olympic Games case study could be instructive for designers.

MANAGING IP NETWORKS: CHALLENGES AND OPPORTUNITIES

EDITED BY SALAH AIDAROUS AND THOMAS PLEVYAK, IEEE PRESS AND JOHN WILEY & SONS, INC. 2003, ISBN 0-471-39299-5, HARDCOVER, 360 PAGES

REVIEWER: ANDRZEJ JAJSZCZYK

The role of IP networking is growing. Along with carrying data traffic, IP-based networks also support other services, such as telephony, video, and e-commerce. This wide range of services is frequently subject to higher resource requirements for proper operation. Efforts are now underway to build communications networks combining IP, dense wavelength-division multiplexing (DWDM), and other technologies in order to support these services better. Planning, operating, and managing such networks become important challenges.

The book Managing *IP Networks: Challenges and Opportunities*, edited by two renowned experts in the area, the late Salah Aidarous of NEC America and Thomas Plevyak of Verizon, is an ambitious attempt to present a broad view of management issues in the current Internet.

An introduction written by Vint Cerf and Bob Kahn discusses current challenges facing IP networks, including scalability, traffic engineering, QoS, billing, and security. The authors also present some possibilities to extend management paradigms to digital objects representing accessed information. Chapter 1, "Current Practice and Evolution" by Salah Aidarous, briefly overviews the evolution of IP-based networks and lists related management challenges.

Chapter 2, by Paul Levine, is devoted to e-commerce. First, the author, using an ISO/IEC report, presents e-commerce requirements. Then relevant standardization activities, under a banner of "Open-edi," are overviewed, including the business operational view. Final sections of the chapter are devoted to defining the semantic content of information and standards related to interchanging commonly defined information among organizations.

Chapter 3, by Joberto S. B. Martins, "Quality of Service in IP Networks," is

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"So far as one can tell from their recent behavior, the recording companies believe that the survival of civilization depends on terrorizing twelve-year olds... Suing your own customers is not a sustainable business model."

Moglen, Pay Artists, not 'Owners'

A	Marc Andreesen
B	Octave
C	Guglielmo Marconi
D	Lee de Forest
E	Elvis
F	Noise
G	Polarization
H	Author
I	Yodel
J	Albert Einstein
K	Revs
L	Tub
M	Invar
N	Synthesizer
O	Tact
P	Sips
Q	Nosh
R	Oliver Heaviside
S	Thou
T	Occult
U	Web
V	Nono
W	Edwin Armstrong
X	Riff
Y	Subs