

Books

SNA and TCP/IP Enterprise Networking, Daniel Lynch, James P. Gray, and Edward Rabinovitch, Editors, Manning Publications Co., Greenwich, CT (1998). 560 pp. (ISBN 1-884777-11-2).

Computer networks have passed from their early infancy as proprietary systems to become mature components of a worldwide communications infrastructure. The synergy that we take for granted today traces its roots to the work of individuals and corporations along an evolutionary path that spans over three decades. *SNA and TCP/IP Enterprise Networking* is a composite of material from many of the leading authorities in the field of computer networking. The editors, Daniel Lynch, James Gray, and Edward Rabinovitch have compiled a collection of tutorials and technical perspectives from over 20 authors to form an authoritative reference guide for anyone who is involved in the planning, development, deployment, or management of complex enterprise or wide-area computer networks.

The book is comprised of three major sections: Part I—Tutorials, Part II—SNA interoperability today, and Part III—Emerging solutions. Most of the chapters are self-contained, with sufficient background and introductory material to enable the casual reader to focus on particular topics of interest. Over 50 percent of the book is devoted to the tutorials, with the next major portion of the book devoted to SNA interoperability.

The introductory chapter, written by Eddie Rabinovitch (Chapter 1, "SNA in the multinetworking era"), clearly positions SNA (Systems Network Architecture) as a network architecture that will continue to coexist with TCP/IP (Transmission Control Protocol/Internet Protocol) for several years into the next millennium. Many network administrators prefer to implement one wide area network (WAN) to transport both their host-based SNA traffic and their local area network (LAN)-based TCP/IP traffic. For some, TCP/IP-based WANs offer more flexibility for the heterogeneous LAN applications. These users can utilize

multiprotocol routers with support for SNA-over-IP via data-link switching (DLSw) or integrate their SNA and non-SNA traffic over frame relay. For others, the inherent reliability of SNA networking is the major factor for consideration. These users are more likely to utilize a traditional SNA WAN infrastructure that transports non-SNA traffic. IBM's family of AnyNet* products, for example, provides multiprotocol transport for TCP/IP, IPX (Internetwork Protocol Exchange), and NetBIOS, in addition to SNA, over SNA/APPN wide area backbones.

In Chapter 2, the reader gains an appreciation for the historical evolution of IBM's Systems Network Architecture from IBM Fellow Dr. James Gray, one of the original architects of SNA. Experienced SNA network users and administrators, in particular, will appreciate the behind-the-scenes perspective provided by Dr. Gray. A series of tutorials, written at a level of detail and technical clarity for the moderate-to-advanced practitioner, begins in Chapter 3 with the data-link layer of the architecture reference model and continues through the more advanced concepts of SNA's Advanced Peer-to-Peer Networking (APPN). The data-link layer tutorial, written by Radia Perlman, begins with the fundamental concepts of packet-error detection, packet delineation, and reliable transfer protocols. This chapter also includes an overview of LAN access schemes and topologies, as well as basic level-2 bridging concepts. SNA was initially based on a centralized control scheme, with the host node being the location of the Systems Service Control Point (SSCP). Subarea networks composed of physical and logical units formed the basis of a hierarchical communications structure that relied upon the centralized control point. APPN marked a major evolution in SNA with the introduction of peer-to-peer networking, dynamic network reconfiguration, and integrated support for LAN-attached devices. Donald Czubek's tutorial (Chapter 4, "SNA and APPN tutorial") provides a well-illustrated comparison of the two schemes. The tutorial by Thomas Routt en-

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titled "SNA, APPN & TCP/IP: Comparisons and Contrasts" (Chapter 8) provides a clear, well-written and illustrated, side-by-side comparison of the salient elements of these network architectures, with particular focus on basic APPN and TCP/IP layered architectures, resource identification conventions for addressing and naming, routing algorithms and topology protocols, and transport schemes. This one chapter comprises 50 percent of the book's tutorial material.

The proprietary networks of the 1960s and '70s have yielded to networks based on international standards that are now embraced by scores of vendors in the '90s. The modern Internet and the deployment of multiprotocol routers have created new challenges for large multinational corporations that must now migrate their network infrastructure to incorporate the bandwidth-hungry applications that are emerging. Part II of the book addresses these interoperability issues, particularly at the data-link and transport layers of the architectures. As TCP/IP becomes the predominant standard for internetworking, SNA applications and interfaces are able to also migrate, allowing network administrators the best of both worlds. Several authors with firsthand experience with these issues explain the problems that must be overcome, and offer solutions that can be readily implemented with *today's* networking products. Kevin Tolly's discussion (Chapter 9, "SNA across the data link") provides a perspective of the wide-area network SNA interconnection issues that a network administrator must understand. Key concepts, such as data-link switching, SNA-over-frame-relay, SNA-over-TCP/IP, and APPN high-performance routing are all described and compared in Chapter 10 ("Transporting SNA across TCP/IP"), Chapter 11 ("Interconnecting LAN networks with SNA"), and Chapter 14 ("Multiprotocol routers bring it together: IP to APPN/HPR").

With an eye toward the future of computer networking, Part III of the book addresses the transformations that have already begun as software applications become more dependent upon and maximize the potential of computer networks in a distributed computing environment. These include the Common User Address (CUA) standard, client/server computing models, and the Java language. The concluding chapter by John Pickens (Chapter 21, "Transport protocol revolution") looks at some of the transformations that have occurred in network protocols in the past, with a forward-looking discussion of protocol requirements for future distributed computing applications.

In summary, it is clear that both SNA and TCP/IP networks will thrive well into the next millennium. Both have continued to evolve during the past 20 years and are well positioned to meet the challenges that lie ahead as the next generation of software applications and computer technologies emerge. Much of the material and information contained in *SNA and TCP/IP Enterprise Networking* will remain viable and useful for several more years.

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