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REVIEW OF: Charles E. Perkins. Mobile IP: Design Principles and Practices. Reading, MA: Addison Wesley, 1998.

by Ray Olszewski

Historically, the Internet--and for that matter, computer networks generally--developed as a way to interconnect computers that remained in one place, if not permanently, at least for a long time. Computers (and even terminals) were big, heavy, and needed external power connections. Increasingly, all of this is changing. Laptops, notebooks, and computer-like devices such as PDAs (Personal Digital Assistant) are becoming increasingly important as nodes on the Internet. Software supports the networking of these devices, and several wireless LAN technologies make it easy for them to connect to the Internet without having to establish any physical connection to a LAN.

Until recently, though, Internet protocols did little to facilitate the easy movement of these portable devices around the Internet. The standard for Internet addressing--IPv4, or Internet Protocol version 4--specified that each machine connected to the Internet would have a fixed address. These addresses, familiar to most anyone who has ever configured a computer for Internet access, consist of four numbers, each ranging from 0 to 255, written in what has come to be called "dotted-quad" format. (My computer, for example, has IP address 205.149.169.184.)

IPv4 addresses are organized in a hierarchical fashion. All the individual nodes with addresses of the form 205.149.169.xxx, for example, need to be on the same physical network (the same Ethernet, for example). So if my computer were a laptop, and I took it from Palo Alto to, say, a client's office in New York, I would be unable to connect to the Internet through the client's LAN (without reconfiguring my computer to work with a new address appropriate to that LAN).

Mobile IP is a relatively new Internet protocol designed to facilitate mobility. It does so by introducing the concept of a "care-of" address, a second IPv4 address that is temporarily assigned to a mobile computer when it attaches to a "foreign" LAN. The computer retains its "real" IP address, but other computers, called "home agents" and "foreign agents," assign a temporary address that can be used to encapsulate IP datagrams for forwarding from the home LAN to the temporary LAN.

As usual, though, the devil is in the details. Making this simple idea work requires careful engineering and programming; consideration of security, authentication, and other technical issues; and consideration of how to overcome specific barriers such as the current design of firewalls. Mobile IP: Design Principles and Practices is a highly technical review of these issues and how the current design specifications for the Mobile IP protocol address the necessary complexities.

Written by the engineer who currently acts as document editor for the IETF (Internet Engineering Task Force) working group responsible for the Mobile IP specification, the book combines rigor and clarity in a way that makes it a model for technical documentation. The presentation is sometimes difficult to follow; to readers unfamiliar with the basic technical details of how the Internet works and with such things as the differences among Ethernet frames, IP datagrams, and TCP packets, it will read as though written in a foreign language. But throughout the presentation, the difficulties come from the true technical complexities of the topic, not from reliance on obscuring jargon or mental laziness by the author--two sources of "complexity" that are all too common in technical publications.

The reader with the needed technical background will be rewarded with a clear and deep understanding of how the Mobile IP protocol is designed to operate. The presentation regularly and smoothly moves between high-level descriptions of overall operation and detailed, datagram-by-datagram descriptions of the actual messages sent between the various pairs of nodes involved in implementing the protocol. Examples are plentiful as well.

Implemented property, mobile IP could, in principle, allow one to be continuously connected to the Internet while moving about, being handed off from one actual LAN to another, much in the way the cellular phones are handed from cell to cell as one moves about. To other hosts on the Internet--Web servers and the like--one would appear to be on one's "home" LAN. The agents--a "home agent" located on the computer's home LAN and a "foreign agent" located on the LAN that the computer is connected to at the moment--coordinate the process of rerouting datagrams sent to the computer's home IP address to its temporary, "care-of" IP address.

The specification allows for a computer to have multiple "care-of" addresses active simultaneously, a feature that facilitates smooth hand-offs when moving from LAN to LAN and anticipates the problem of being located in areas where multiple LANs are active. It includes an encryption standard for "signing" datagrams to authenticate them. An optional feature allows hosts or routers to learn "care-of" addresses and route directly to them, thereby reducing congestion and delays. The book discusses these and other features of the protocol with an excellent attention to detail.

As a sort of bonus, the book ends with fine overviews of two other important, emerging protocols. The first is the proposed new standard for Internet addressing--IPv6, which expands addresses from the present 32 bits (4 numbers, each between 0 and 255) to 128 bits (in effect, 16 such numbers). The second is Dynamic Host Configuration Protocol (DHCP), an emerging standard that provides for simplifying the process of adding new nodes to a LAN by providing for automatic distribution on a LAN of IP addresses and related information from a central host.

The book includes a (brief) mention of some Web sites with further information, the most important of which is some prototype software implementing portions of the Mobile IP protocol. One that I checked offered experimental client software for computers running Linux, a free Unix-like operating system. Such references are useful in a book like this one because, in the end, one needs to see an actual implementation of a protocol to understand its strengths and limitations.

While strong in many ways, the book does have its limitations. Its focus is on the technical complexities of the protocol, so it does not explore the economic and managerial issues associated with offering Mobile IP functionality. In practice, I expect the protocol to find two main uses: (1) within companies, as a way to facilitate movement between sites that have separate LANs but are part of a larger Intranet, and (2) by services that provide mobile access on a commercial basis to travellers (the book offers an example in which an airliner has an internal LAN that gets passed from one ground-based site to another using Mobile IP).

It is less clear whether the protocol will be an attractive solution to a coming problem that libraries will face--how to give patrons with their own laptops, notebooks, or PDAs temporary access to the Library LAN to access local services. Although not optimized for that purpose, it might emerge as one solution to that future need.

Because Mobile IP is technically demanding, its audience is limited. It is indispensable reading for anyone actually involved in implementing the Mobile IP protocol, and it is valuable reading for system administrators of networks that may be early adopters of Mobile IP. Others--managers, potential users of the service, and people with administrative but not technical responsibility for LANs and Internet access--would be better served by finding a less rigorous overview of the protocol, where it is going, and what its practical uses might be.

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REVIEW OF: Barbara Stewart. Neal-Schuman Directory of Library Technical Services Home Pages. New York: Neal-Schuman, 1997.

by Kuang-Hwei (Janet) Lee-Smeltzer

The development of the World Wide Web and the growing number of Web pages related to library technical services have changed the working life of technical services librarians. Web pages provide an easy venue for sharing institutional policies and procedures and bringing technical services functions out from behind the scenes. Easy access to online documentation and tools makes technical services work much more efficient.

The Neal-Schuman Directory of Library Technical Services Home Pages by Barbara Stewart is a printed list of Web home pages related to library technical services work. It was developed from the author's own searching as well as leads from virtual colleagues on the Autocat and PACS-L discussion lists. The author states in the preface that the directory "is much more than a mere printed and bound listing of useful Web pages for technical services work. It has been conceived and designed as a ready reference guide specifically for the working technical services librarians." (p. ix)

The directory is organized into three broad parts: Part I: "Web Pages of Special Use for Acquisitions Librarians," Part II: "Web Pages of Special Use for Catalogers," and Part III: "Web Pages of Special Interest for All Technical Services Librarians." Within each broad category, it is divided into subcategories and then, in some cases, more specific topics. For example, "Web Pages of Special Use for Catalogers" is subdivided into "Cataloging in General," "Authority Control," "Cataloging Special Formats and Subjects," and more. "Cataloging Special Formats and Subjects" is further divided into "Computer Files," "Internet Resources and Digital Documents," and "Music Materials."

Web pages are listed in alphabetical order under specific subcategories or topics. Over 1,000 Web pages were listed. Examples of the Web pages listed include: University of Washington Libraries Acquisitions Division (http://weber.u.washington.edu/~acqdiv (http://weber.u.washington.edu/~acqdiv/)), EBSCO Information Services (http://www.ebsco.com (http://www.ebsco.com/)), Princeton University Libraries Catalog Division Home Page (http://infoshare1.princeton.edu/katmandu/cathome.html (http://infoshare1.princeton.edu/katmandu/cathome.html)), and OCLC's InterCat--A Catalog of Internet Resources home page (http://www.oclc.org/oclc/man/catproj/overview.htm (http://www.oclc.org/oclc/man/catproj/overview.htm)). Most of the Web pages are from the United States, but pages from Canada and Australia are also included. Each entry includes the name of the Web page, the name(s) of the creator(s) or the associated institution and locality, and the Uniform Resource Locator (URL),

as well as a short description ranging from one or two lines to over twenty lines. Although some of the descriptions include evaluative comments, it is not clear if any evaluative process went into the selection of the pages to include. There are ample graphic representations of the home pages illustrated throughout the directory. Since Web resources are volatile in nature (i.e., URLs for Web pages change often), the author also shared her methods for finding pages that have moved.

This is the first printed directory of library technical services home pages. There are "virtual" directories on the Web. The author is also the creator of one of these virtual directories. Her "Top 200 Technical Services Benefits of Home Page Development" is accessible through the University of California at San Diego Technical Processing Online Tools (TPOT) (http://tpot.ucsd.edu/ (http://tpot.ucsd.edu/)) Cataloging/Misc/top200.html). Although titled "Top 200 ...," the page has more than 200 links to various technical services Web sites. The contents of the printed directory and the Top 200 page overlap to a great extent. However, some sites listed in the directory are not included in the Top 200 page and vice versa. The Top 200 home page is mentioned in "About the Author" on the last page of the directory.

Another similar site is the "Internet Library for Librarians" (http://www.itcompany.com/inforetriever (http://www.itcompany.com/inforetriever)) created by Vianne Tang Sha. This page contains rich resources and links which are highly relevant to technical services. The "Acquisitions/Serials/ Collection Development" section of the page has links to licensing electronic resources. Licensing is an important and timely topic for both acquisitions and serial librarians, but the topic is not covered in the printed directory, nor is the Internet Library for Librarians "Acquisitions/Serials/Collection Development" section listed in Part I of the directory which covers pages for acquisitions librarians. Only the "Cataloging" section of the Internet Library page is included in the directory. It is listed under the "Internet Resources and Digital Documents" in Part II, "Web Pages of Special Use for Catalogers," although the "Cataloging" section has links to resources useful for catalogers and cataloging in general as well.

For major Web sites such as OCLC (http://www.oclc.org/ (http://www.oclc.org/)) and Library of Congress (http://lcweb.loc.gov/ (http://lcweb.loc.gov/)) which have sections related to different areas in technical services, the section pages are listed under the corresponding subcategories or topics. Some of the sections are useful but not included. For example, one would expect to find the OCLC's Bibliographic Formats and Standards page (http://www.oclc.org/oclc/bib/about.htm (http://www.oclc.org/oclc/bib/about.htm)) listed under the "MARC, AUSMARC ..., etc." in Part I for catalogers, but it is not; however, the OCLC MARC-Codes List page (http://www.oclc.org/oclc/man/code/codetoc.htm (http://www.oclc.org/oclc/man/code/codetoc.htm)) is. OCLC's Passport for Windows page (http://www.oclc.org/oclc/passport/passport.htm (http://www.oclc.org/oclc/passport/passport.htm)) is listed under both "Cataloging in General" and "Cataloging Workstations," but OCLC CatME for Windows Quick Reference page (http://www.oclc.org/oclc/man/9934/frameset.htm (http://www.oclc.org/oclc/man/9934/frameset.htm)) and Micro Enhancer (DOS) and Windows 3.11 and 95 Users page (http://www.oclc.org/oclc/promo/9910inst/install.htm (http://www.oclc.org/oclc/promo/9910inst/install.htm)) are not.

The directory may be useful as a starting point for technical services librarians who are new to the Web or Web resources. Technical services librarians who are familiar with the Web would already have bookmarked the most often-used pages; many of these also lead to other related resources. Surfing in this fashion is a far more efficient way of getting to resources on the Web. The short description for each entry in the directory does not provide enough information; thus one has to visit the resource anyway before evaluating how good or useful the site is. In addition, the directory is by no means a complete list of Web pages related

to technical services. Web resources are a moving target; new pages are being created, old pages updated, and URLs are often changed. A printed directory such as this is likely to be out of date as soon as it is published. The author's time and effort may be better spent on updating and enhancing her Top 200 page instead of on creating a printed directory.

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REVIEW OF: Scott M. Ballew. Managing IP Networks with Cisco Routers. Sebastopol, CA: O'Reilly Publishing, 1997.

by William S. Williams

After reading Scott Ballew's Managing IP Networks with Cisco Routers, I could only think one thought: where was this book when I started my career as a network administrator and engineer? I have yet to find another book that so elegantly and simply defines many of the intricacies involved in creating and administering what has now become one of the most central entities in the business world today: an IP (Internet Protocol) network.

This book will seem particularly appropriate for and familiar to those folks who have spent time designing and maintaining networks on university campuses; it should, because Ballew is an integral member of the Purdue University Computing Center's network engineering group. His years of experience are apparent; his careful explanation of subnetting, his succinct chapters on trouble-shooting, and most importantly his chapters on the technical and nontechnical sides of network management will seem, at first, obvious, then at a second glance, refreshing.

His knowledge and discussion of the IP routing algorithm and the Cisco Internetwork Operating System are both valuable additions to the work. The beginning administrator will find Ballew's book a helpful guide to the snares and pitfalls involved in networking; while the experienced engineer will find his work to be a useful review of many of the aspects of networking that most folks seem to take for granted.

Ballew provides the network engineer and administrator with a fifty-thousand-foot aerial view of the nature of networking, first by ensuring an understanding of the IP routing algorithm. He then moves to network design principles, while taking into consideration cost, feasibility, topology, and media selection. There is so much information here that is valuable to both the individual who is given an opportunity to design and implement a network from the ground up and the individual (probably the majority of network technicians) who inherits a network that has already been designed.

His discussion of media selection seems particularly geared for university and campus networks; however, the information provided here is appropriate for anyone involved in joining multiple networks. Topology, as the essential component of any network, is given sufficient and high-quality discussion. The differences

between star, bus, ring, mesh, and point-to-point topologies are driven into the memory of many a networking student (almost as much as the seven layers of the Open Systems Interconnect model!). As a complement to the discussion of topology, Ballew conducts a review of the differences among and applications of bridges, hubs, switches, and routers: the building blocks of any network, complex or simple.

One of the complexities facing network implementations today is the issue of multi-protocol routing, whereby multiple network protocols are routed on the same network. Depending on the needs of your network, you may find it necessary to route IPX (Internet Packet Exchange) or some other type of protocol on your network. Ballew concludes that while multi-protocol routing is, in fact, a good thing, one needs to be quite aware of the overhead involved: additional routing tables, knowledge requirements, complexity, and difficult design issues considering differing address assignments and other issues. Ballew provides as an alternative the issue of tunneling whereby the foreign protocols are wrapped or encapsulated in the packets that you are already routing. Ballew concludes that tunneling may be the best solution for routing smaller numbers of foreign packets.

Ballew spends two chapters discussing the complicated nature of routing protocols and the advantages and disadvantages of static and dynamic routing. This is useful information for anyone involved in networking but particularly helpful for the fortunate folks building a network from the ground up who find themselves in a quandary over which protocol to select. Briefly, if you are building a small network, static routing provides the simplicity and predictability that you will probably require with little or no overhead involved in constantly updating large routing tables. With that said, if you are building a complex network with many changing pieces, you essentially have no choice between the two: dynamic may well be your only option. Ballew deftly provides the reader a thorough explanation of the differences between the two and the necessary requirements facing the implementation of each protocol.

Ballew also provides a clear discussion of the differences between the two main categories of dynamic routing protocols: distance-vector (Routing Information Protocol, Interior Gateway Routing Protocol, and Exterior Gateway Routing Protocol) and link-state protocols (Open Shortest Path First). Suffice it to say that an in-depth discussion of these common routing protocols would be beyond the breadth of this review, but Ballew's discussion of these protocols and their main features is clear and concise. This is a handy manual to consult when faced with understanding the differences among these protocols and configuring them on your networks.

In addition to the technical analyses and discussions that Ballew gives the reader, possibly the most valuable tools that he provides (and these are the ones that come only with years of experience) are his nontechnical ones. Possibly the most essential concept to have under your belt, as you face the sometimes immense task of supporting sprawling (or even usually sleepy) networks, is knowing your boundaries. Know your limitations. At first glance these are simple suggestions, yet how many of us have taken this advice to heart and followed it in our day-to-day work?

This aspect of networking deals with the "eighth layer" of the OSI model--the political layer. Usually more frequently than is desired, every network manager must deal with the division of labor and knowledge of whose teams are responsible for which network segments. It is at this level, the discussion of the nontechnical aspects of networking, that Ballew seems exceptionally qualified to offer wisdom. Here is the true "Zen and the art of networking" that will aid everyone who deals with the management of technical people and technical problems. Included in this discussion are how to create a help desk and assessing staff skills. Ballew even includes a brief mention of the dreaded "ninth layer" of the OSI model: the financial layer-- determining cost and benefits when faced with decisions that affect your network, from purchasing hardware to maintenance and support contracts.

It is hardly possible to cover every aspect of this book which is sure to become a frequently visited occupant of any network guru's bookshelf. Ballew gives the beginner and the expert alike a trusted and established viewpoint that covers the many differing facets of networking. It is not just a technical handbook, but a career handbook which will aid in creating "right-thinking" and "right-vision" in your job and your future network projects.

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REVIEW OF: Ashley J. Meggitt and Timothy D. Ritchey. Windows NT User Administration. Sebastopol, CA: O'Reilly & Associates, 1997.

by John Wynstra

While many books have been written to explain the Windows NT Server operating system in detail, this book takes a focused look at just one fundamental aspect of Windows NT--managing users. Far from the typical approach to Microsoft NT, this book is not four inches thick, does not walk you step by step through simple procedures, does not have page after page of screen images, and does not promise to be the only book you will ever need to learn the NT operating system. On the other hand, this book is not for beginners and will probably be best suited for those who have spent time reading at least one of those thicker texts.

The following quote from the introduction is a good summary of what the reader should and should not expect from the book. "It is not about installing NT on a particular hardware platform, connecting NT to a network, figuring out TCP/IP, optimizing NT's performance, setting up a RAID platform--and a whole host of other topics that are better served by other books. Our primary goal here is the support of users on a system, and the resources and tools available for that task." (p. viii)

The authors are strong proponents of using Perl scripts for performing many administrative tasks on NT, and so it turns out that as much as this book is about Windows NT and user administration, it is also about using Perl scripts. This strong focus turns out to be both a strength and a weakness. The strength lies in the fact that these scripts will be practical and time saving for those administrators who take the time to use them. The weakness lies in the fact that there may not be a large audience out there for using Perl scripts and command line utilities to manage Windows NT--a system whose very name almost defines the term graphical user interface.

The first chapter lays out the authors' general views on user administration apart from any specific operating system. User administration is described as being concerned with three areas of responsibility: managing resources, controlling users, and auditing. This chapter also includes a considerable introduction to Perl scripting and why it is such a strong element in this book.

Chapter 2 covers the creation of user accounts. User account naming conventions, passwords, logon scripts, and the built-in NT user accounts are all discussed. As a pattern for the rest of the chapters of this book, the authors discuss how these tasks are performed using the Windows NT graphical user interface, and then how these tasks can be performed using command-line utilities and scripts.

Chapter 3 explains how groups play an important role in managing access to the resources on the network (i.e. printers, files, etc.). The groups are created according to logical categories of users and access to resources is assigned to the groups. User accounts are then placed into groups and the users inherit the rights of the groups. Permissions can also be granted to the individual users, but managing rights at the individual account level can become very complex with even a few users on a system.

Chapter 4 demonstrates a number of different situations where scripting can be useful. Among the scripts highlighted here are logon scripts, bulk user creation scripts, check file security scripts, and removing users scripts.

Chapters 5 through 7 get into the heart of Windows NT, providing one of the better overviews of the NT domain model that I have yet come across, and an explanation of the registry and user profiles--where the real workings of this operating system can be found. While whole books have been devoted to understanding and working with the registry, this book stays focused on only those sections that are specific to the task of user administration. The Perl interface to the registry is covered in depth here.

Chapters 8 and 9 bring the book to a close with a detailed section on auditing. Windows NT has some good auditing tools built right in the operating system, but even here the authors have something to offer in terms of Perl scripting to completely automate the process.

This book offers good advice and practical solutions to real problems that are faced by NT network managers. I would recommend this book to those administrators who are looking to increase their understanding of, and tools for, managing users in a Windows NT network.

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