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REVIEW OF: Bernhard Albert and Anura P. Jayasumana. FDDI and FDDI-II: Architecture, Protocols, and Performance. Boston: Artech House, 1994.

REVIEW OF: Ken-ichi Sato. Advances in Transport Network Technologies: Photonic Networks, ATM, and SDH. Norwood, MA: Artech House, 1996.

by Thomas Dowling

One of the many corollaries to Murphy's Law states that networking demands expand to fill the available bandwidth. Surely someone, sometime, voiced a corresponding rule for network administrators--that you must always be working on the next plan to increase bandwidth. Home users are moving from 14.4K (in this parlance, Kilobits per second) modems to 28.8K and 33.6K, with an eye toward upcoming 56K modem standards and 64K/128K ISDN (Integrated Services Digital Network) connections. Small businesses are pulling out 56K lines and putting in T1s, multiple T1s, or T3s. Office LANs (Local Area Networks) have already used up the gain they received by moving from 2 Mbps (Megabits per second) networks to 10 Mbps networks, and are embracing still faster technology.

Regional and wide area networks face the same push for faster and faster connections, but from thousands of users. At different levels in this hierarchy, both FDDI (Fiber Distributed Data Interface) and ATM (Asynchronous Transfer Mode) have been on the horizon for a number of years, offering performance gains over competing technologies, but not without cost or without writing off an installed base of other platforms.

FDDI is a 100 Mbps networking technology that traces its roots back to the early 1980s and the first large-scale push by telephone companies to switch to fiber optical cables. Albert and Jayasumana cover FDDI in masterly technical detail. In fact, the greatest problem with the book is something entirely out of their hands: they should have written it either two years earlier or two years later. In 1994, they could only comment, prophetically:

Two proposals were under consideration for a standard for a LAN operating at 100 Mbps under the name Fast Ethernet--Ethernet has the largest installed base of LANs, and therefore the name Fast Ethernet will appeal to a large segment of the users who will upgrade. (p. 379)

The authors go on to predict the popularity of networking cards that can run either 10 Mbps Ethernet or 100 Mbps Ethernet. They were certainly right in predicting the popularity of Fast Ethernet, especially the eventual 100baseT specification, and they were right in predicting that dual-speed network cards would ease the transition for many sites. Given that, it is fair to ask whether a book on FDDI is still needed. Many readers will be excused if they answer no, but FDDI offers a few features that make it more than just an also-ran to 100baseT.

First, an FDDI network can cover enough physical area to operate as a Metropolitan Area Network; this makes it an interesting option for businesses that maintain, for example, a downtown office suite and a warehouse on the edge of town, or similarly an urban college campus with connections to branch campuses in the suburbs. These institutions might well run 100 Mbps Ethernet LANs within each of their buildings, but route traffic between them via a T1 line at 1.5 Mbps or even a 56K line. A FDDI network, on the other hand, would carry the traffic between buildings at the same 100 Mbps speed.

Second, FDDI paves the way for the FDDI-II specification. The basic FDDI mode is a packet-switched network, well suited to bursty data traffic not seriously affected by changes in network latency. FDDI-II, however, is able to integrate packet-type traffic with circuit-type traffic such as real time audio and video. As sites experiment with conferencing and collaboration tools over T1 lines and 64K ISDN connections, they may well find it worthwhile to retool their network to use FDDI-II.

The title of Ken-ichi Sato's book may mislead some readers. In North America, "Photonic Networks, ATM, and SDH" would more commonly be "Optical Networks, ATM, and SONET"; many readers would expect SONET (Synchronous Optical Network), as the current technology, to be covered in detail, but the second

paragraph of the preface dismisses that expectation:

In particular, in a comparison to SDH technologies, the inherent advantages of ATM, and the key technologies needed to fully utilize these advantages, are explored. (p. xi)

In fact, after a brief introduction to optical networking, there is an equally brief chapter on SDH (Synchronous Digital Hierarchy), and the book is all ATM from that point on. If the Albert and Jayasumana book suffers slightly from being behind the times, Sato suffers from being too far out in front: ATM just has not progressed far enough out of testing for most sites to do more than pencil it in on their very long range agendas. The problems involved in tying ATM into existing IP (Internet Protocol) or IPX (Internet Packet Exchange) networks are enough to keep many ATM plans on the drawing board.

Sato is certainly aware of the market challenges facing ATM, its technological advantages aside: "Eventually, all telephone and narrowband data traffic will be transferred using ATM, but due to the large investment needed, it will take many years, maybe more than a decade, before this occurs." (p. 109) I have a lot of respect for any author in the networking world willing to stick his neck out and say such-and-such WILL happen, and also for anyone willing to make a public guess on any aspect of computing a decade down the road. Nevertheless, readers, gauging for themselves the rate at which their telephone companies might upgrade, may come up with different estimates, especially in markets where any widespread ATM deployment will compete with services running over POTS--Plain Old Telephone Service--and cable television.

In conclusion, these books will tell you everything you might want to know about the technical aspects of FDDI and ATM. They will not answer questions about whether now is the time you need to know about either technology.

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REVIEW OF: Patrick Niemeyer and Joshua Peck. Exploring Java. Sebastopol, CA: O'Reilly & Associates, 1996.

by James Powell

If only Javan rhinos were as common as Java books, then we could all breathe a sigh of relief over the state of the environment. Clearly, that's not the case. Java texts just drag more trees out of the forest. There are probably more books about Java than books about the assassinations of Kennedy and Lincoln combined. Still, most of us struggle to find the time to delve deeply into any one text. So we end up with several enticing texts collecting dust on a bookshelf, half read with dog-eared "sticky notes" marking our last visit.

Is it always our fault? I would argue that it is not. Computer book companies stake their reputations on being the first to publish books on new technologies, books that are guaranteed to teach the reader about a new programming language in 21 days, a week, or even 24 hours! They often fail to deliver on these promises.

So, now we are "Exploring Java." Sounds more like the title of a Lonely Planet guide to the Indonesian paradise. Instead, it is one of the first books on Java published by O'Reilly and Associates. This little book factory has quietly built a well-deserved reputation for exhaustive, readable texts on virtually any computing topic (including Perl, or Practical Extraction and Report Language, Python, and even Japanese information processing). Not only do they find the best authors, but they also have the best book covers of any computer publisher (Their JavaScript book has a rhinoceros on its cover.). Exploring Java marks a departure from the O'Reilly cover menagerie in that it bears simply a well-traveled suitcase. Luckily, the contents are not as disappointing as the cover, although the book is at times long-winded and dry.

Exploring Java is a complete and thorough examination of Java version 1.02. Once you get past the first two chapters, it is more often a succinct and highly usable tour of the components of the Java Development Kit (JDK). The focus of this book is on developing Java applets--small Java programs designed to be embedded in Web pages. It is a good text for Web authors and Webmasters.

The first chapter in particular provides an excellent overview of the role, function and potential uses of Java on the Web. If you still don't quite understand what an applet is, give this chapter a try. The second chapter, entitled "A First Applet," is long enough to tempt you to make this your last applet as well. Your first applet is a "Hello Web!" applet developed in several stages, each of which could nearly comprise a chapter of its own. The chapter is well written and answers all those little questions that pop up while you explore the source code, such as the nature of public methods like paint(), and how to use the <PARAM> tag to change that silly "Hello Web!" message to something less inane.

The next chapter seems out of place. "Tools of the Trade" gives you an overview of using the JDK to develop applets and applications. It serves to reinforce your knowledge of these tools since you've already had to use them in chapter two. Recommended detour: read chapter three before chapter two.

Chapter four is a chapter only a programmer could love. It covers all components of the Java language including data types, statements and expressions, reserved words, operator precedence, arrays, and exception handling. Most of the language components are somewhat similar to C and are easy to learn. The truly new ground covered here is the section on exceptions. This is a well-written tutorial on how to write robust Java applets that recover gracefully from errors. If you doze off during part of this chapter, make sure you are awake for this topic.

Chapter five is a discussion of Java objects. The authors devote a lot of space and effort to providing explanations and examples of the proper coding of classes and methods. They postpone a general discussion of object-oriented programming until mid-chapter under the section entitled "Subclassing and Inheritance." This section serves as an excellent introduction to object-oriented programming concepts. Recommended detour: read the Subclassing section first, then read the rest of chapter five.

Chapter six introduces threads. I found the analogy of players sharing a golf course particularly helpful when trying to visualize the behavior of threads. Java does make developing multi-threaded applications easy, and the authors demonstrate this with examples that illustrate how to create and control threads. The authors illuminate the concept of synchronization equally skillfully with their public restroom analogy. By the end of this chapter you will have sufficient background to determine when and how to implement threads in your applets.

Chapter seven marks a return to fundamentals. In the "Basic Utility Classes" chapter, the authors cover various classes in the Java lang and util packages. Here you will learn how to use and compare strings, and discover that some of the pitfalls of using strings in C are no problem for the Java string class. Stick a "sticky note" on the page containing the list of string methods (Table 7-2). If you are like me, you will need to refer back to this list often to find the Java string class method equivalent to various C string functions. I was less thrilled by the math section, but perhaps that's because it covered the math class which contains high level math functions that I seldom use. The date and hashtable classes are also documented in this chapter, and each section merited another "sticky note" in my copy of the book.

Chapter eight is the last of what I consider the essential chapters of Exploring Java. Here the authors introduce Java "Input/Output Facilities." This chapter covers input and output streams. Streams are used for accepting input from, and sending data to, a terminal display, a Web browser, or even a file in some cases. Unfortunately, I found there were not enough concrete examples to illustrate all the concepts presented in this chapter. The best section deals with file input and output. There are many helpful tips for using the file class to interact with local filesystems, list files in a directory and present the contents of a file, as well as read and write files.

If you are feeling brave or adventurous, try out chapter nine. During the course of this chapter on network programming, you will write your own Web server in Java. "TinyHttpd" is exceedingly easy to understand, just by reading the source listing. It is obvious very early in this chapter that Java was written especially for the net. Network programming is significantly easier in Java than in any other language I've used. You may prefer to skip the sections on content handlers for now, and refer back to them when or if you decide you want to use Java to extend a Web browser to support some new data type (not the kind of thing one would do very often, actually).

Okay, perhaps I fudged a bit when I said there were no more essential chapters. But chapter ten covers a topic that really deserves a book of its own: the Abstract Windowing Toolkit (In fact, O'Reilly publishes a book entitled Java AWT Reference, but don't take this as an endorsement as I haven't read it yet!). The AWT is a set of classes for building user interfaces in Java. It includes classes for buttons, checkboxes, menus, lists, labels, scrollbars, text fields, windows and many other graphical user interface (GUI) components.

Components are what users interact with to use your applet. The authors present a very clear discussion of the functionality of components. The next section briefly discusses events. The authors discuss how components, such as buttons, receive and process events, e.g., mouse clicks. The remainder of the chapter discusses containers, building applet GUIs, and specific information and usage examples for some of the most common Java AWT components. This is a long chapter that covers a lot of ground. Luckily, it works well as a reference chapter so you can refer back to it as you get braver and use more components in your applets.

The final chapter of Exploring Java covers drawing and images. It also serves as a wrap-up chapter that covers methods for handling several different media types, including simple animations and audio (I guess this didn't fit anywhere else.). When the authors refer to drawing, they don't only mean Windows Paintbrush/mouse- based sketching. In fact, every Java program draws. The drawing section shows you how to use graphics class methods for drawing and filling rectangles, polygons and ovals. It also covers setting the drawing color, and choosing font styles and sizes for drawing text. The remainder of the chapter discusses loading images, displaying animations and generating images on the fly with Java. The chapter and book conclude on a quirky note with a single page discussion of Java audio support.

While the authors occasionally reach out to non-programmers and beginners, the bulk of Exploring Java is written for people who are already proficient in a programming language such as C. In fact, there are a few instances where the authors used C code to illustrate a point. If you are comfortable with C, Pascal, or Perl, then you will probably get a lot out of this book. If you are a genuine beginner looking for a gentle introduction to Java, then you should buy a different book now, and consider Exploring Java when you are ready to develop some applets. Exploring Java may not be a vacation planner, but it isn't a waste of a good tree.

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REVIEW OF: Mark Stefik. Internet Dreams: Archetypes, Myths, and Metaphors. Cambridge: MIT Press, 1996.

by Liz Rifken

Stefik explores the Internet by compiling and commenting on a prophetic and compelling collection of essays. Stefik, a scientist at the Information Sciences and Technology Laboratory, Xerox Palo Alto Research Center, contends that there are four main metaphors reflected in the way we act and interact with the Internet. Related myths and archetypes substantiate these.

Stefik's work also delves into the realm of the National Information Infrastructure (NII) and the Global Information Infrastructure (GII). Stefik's book looks at the following ideas about the Internet: the Digital Library Metaphor, the Electronic Mail Metaphor, the Electronic Marketplace Metaphor, and the Digital Worlds Metaphor.

Each of these metaphors plays an important role. In Part 1, "The Digital Library Metaphor: The I-Way as Publishing and Community Memory," Stefik examines deeply embedded assumptions about what libraries have traditionally meant to societies and how those ideals affect what we expect them to preserve and reflect in cyberspace.

The idea of libraries serving as "this keeper of knowledge archetype" provides the framework for what digital libraries can ultimately become. (p. 5) However, we also need to look at what is different on a digital landscape. The grass may not only be greener at the public library, but it has professional staff to select, purchase, and catalog material. Also, the accessibility of publishing on the Net eliminates the necessity of having editors and publishers filter out works they consider irrelevant, leaving the Internet clouded with materials that may not have been published otherwise.

The essays Stefik selects for this section are rich in complexity and will inspire the reader. The excerpt from Vannevar Bush's "As We May Think," written over 50 years ago, gives a descriptive glimpse at using the "memex" for what we now refer to as hypertext. J. C. R. Licklider's "Libraries of the Future," written almost

two decades later, looks at what may be in store for libraries beyond the capabilities and limitations of the printed book.

Other excerpts in this section include the following: "The Digital Library Project, volume 1: The World of Knowbots," "Communication as the Root of Scientific Progress," "What is the Role of Libraries in the Information Economy?" "Technological Revolutions and the Gutenberg Myth," "Libraries Are More than Information: Situational Aspects of Electronic Libraries," and "The Electronic Capture and Dissemination of the Cultural Practice of Tibetan Thangka Painting." The wide range of topics interwoven with Stefik's commentary and analysis should make this section invaluable to both information researchers and librarians.

Part 2 of this book deals with "The Electronic Mail Metaphor: The I-Way as a Communications Medium." The relationship inherent between the words "communicate" and "community" helps to explain how our usage of the Internet can create electronic discussion groups and chat rooms, and give birth to the netizen. Stefik showcases the following: "Some Consequences of Electronic Groups," "Netiquette 101," "The MPC Adventures: Experiences with the Generation of VLSI Design and Implementation Methodologies," and "Digital Communications and the Conduct of Science: The New Literacy."

In discussing the differences and similarities between regular mail and electronic mail, the author makes us think about how we view electronic mail based upon our past experiences and expectations of regular mail. Reading the excerpts in this section will enhance the reader's understanding of electronic mail and how the nature of it will evolve and grow over time. The last excerpt of this section, "Digital Communications and the Conduct of Science: The New Literacy," was written almost thirty years ago, after the ARPAnet, the precursor to the Internet, began. In this work, Lederberg identifies the EUGRAM as a method for not only sending electronic mail, but more importantly as a tool for increasing collaboration among scientific researchers.

The next section, "The Electronic Marketplace Metaphor: Selling Goods and Services on the I-Way," discusses the spirit of capitalism. The various myths and archetypes covered revolve around the evolution of the trader as a result of the growth of agriculture. We may not think about the image of the "shaman-hunter-trickster" when we place an order on the Internet, but all of these images reside within the marketplace. The excerpts in this section are entitled "Electronic Commerce on the Internet," "Electronic Markets and Electronic Hierarchies," "Slaves of a New Machine: Exploring the For-Free/For-Pay Conundrum," and "Letting Loose the Light: Igniting Commerce in Electronic Publication." The latter is written by the author and concentrates on copyright issues facing digital publishing. Stefik suggests different ways systems could obliterate most of the barriers and "let loose the light," to increase digital publishing without the fears of copying without permission.

"The Digital Worlds Metaphor: The I-Way As a Gateway to Experience" is the final section. The implications of the digital world are reflected in "Mudding: Social Phenomena in Text-Based Virtual Realities," "A Rape In Cyberspace: How an Evil Clown, a Haitian Trickster Spirit, Two Wizards, and a Cast of Dozens Turned a Database into a Society," "Interaction Without Society?: What Avatars Can't Do," "Toward Portable Ideas," "The National Collaboratory--A White Paper," and "Internet Dreams: First Encounters of an On-line Dream Group."

The final section focuses on the idea that we do not leave our real selves or our real world behind when we venture onto the Internet. We still have to adhere to the same kinds of social niceties, even though we find ourselves in virtual reality. It is only by marrying the two facets of our personalities, that of the "real" self and that of the "imaginary" self, that we can create a worthwhile digital world.

This is a book creative minds will embrace. Stefik leads us beyond what we know about the Internet through an insightful journey of images, cultures, and ideas.

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