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REVIEW OF: Brian Kahin and James H. Keller, eds. Coordinating The Internet. Cambridge, MA: MIT Press, 1997.

by Clifford Lynch

Coordinating the Internet is the most recent in the very useful series of books that Brian Kahin and his colleagues at the Harvard University Kennedy School of Government's Information Infrastructure Project have published with MIT press on topics dealing with the Internet, national and international telecommunications, and information infrastructure policy issues.

This volume is particularly timely and welcome because the policy issues surrounding Internet governance are very much in the news with the proposals from the Clinton administration about the future management of the domain name system and the February 1998 release of Ira Magaziner's green paper summarizing these proposals (see http://www.ntia.gov (http://www.ntia.gov)). While Coordinating the Internet was evidently completed in early 1997 (the introduction is dated January 1997) and was published in October 1997, it is based in large part on papers from a conference held at Harvard in late 1996. Despite its age, this book provides an excellent summary of the historical, legal, policy, and technical issues that one needs to understand in order really to follow the current policy debate.

As with all of the books in this series, this work serves as a very important point of connection for the research and policy community. It organizes and synthesizes a great deal of material scattered across Internet RFCs (Requests for Comments) and drafts, policy papers, corporate and government documents, legal briefs, discussions within the Internet community (sometimes carried out through conferences and electronic mailing lists), and other fugitive sources into a series of papers that are broadly accessible.

Many of the authors have been actively involved in the events and issues that they describe through their participation in groups such as the Internet Activities Board, the Internet Engineering Steering Group, the Internet Engineering Task Force, the International Telecommunications Union, the National Science Foundation, the National Laboratory for Applied Network Research, and major commercial networking companies. These authors write authoritatively and insightfully and provide a window into the issues for readers who weren't in on the debates, as well as placing current events into larger contexts of economic, technical, legal, and policy analysis. As with all such collections of papers, there is a certain amount of repetition between papers, which allows individual papers to stand alone but also leaves the reader a little frustrated when reading the papers as a collection.

The central theme of the book is to explore how the evolution and operation of the Internet is governed, managed, and coordinated. The Internet is a largely extralegal, transnational enterprise that has been in large measure self-governing over the last decade; yet it also exists as an overlay upon local and national governments and international treaties and laws. While the Internet was initially created through the funding and oversight of the U.S. government, it has now become global and largely commercial, yet the U.S. government still retains control of and funds (at a very low level, compared with the overall scope of the Internet enterprise) certain key operational functions. Papers in Coordinating the Internet explore these issues both at a general level and as they apply to specific cases.

The first group of papers looks at general issues of Internet governance and how the Internet relates to international and national government; to international treaty, diplomacy, and law; and to standards-making organizations. A particularly welcome paper here is Mark Gould's "Governance of the Internet: A U.K. Perspective." In the U.S. one hears a great deal of discussion about the interplays among Internet governance, the U.S. government role, and the broad international scene, while Gould's paper shows us a view from another nation about not only the Internet's relationship to a different set of national laws and policies in the United Kingdom, but also a non-U.S. view of the unique U.S. role in Internet governance. More papers of this type would help to balance the sometimes U.S.-centric nature of the debate.

The second set of papers deal specifically with the operation, management, and future of the Domain Name System (DNS). These papers offer an exposition of the policy and legal issues involved in the assignment and registry of domain names as well as an overview of the technical mechanics of the system. In this debate we see the collision between the nongeographic nature of the Internet and trademark and

jurisdictional issues that are very strongly shaped by national boundaries. In this section, I found the paper by Andeen and King reviewing how a series of related issues were worked out in telephony particularly interesting.

The third group of papers deals with the assignment and management of network numbers both in the current Internet and under the new IP V6 protocol. This controversial area received a great deal of attention a couple of years ago when a broad recognition emerged that the Internet was running out of network numbers and new policies were put in place to manage the number space more effectively. The papers here do a good job of showing the variety of issues that come together in the administration of network numbering--not just conservation of the number space, but route aggregation, routing efficiency issues, and network number portability and ownership which has implications for the ability of customers to switch Internet Service Providers (ISP) readily and to multihome through connection to multiple service providers. The choices made here play important policy roles in shaping the structure of the ISP marketplace.

The fourth major section of the book covers interconnections and settlements. The focus here is both on the technical routing architecture of the Internet and the economic and business models which allow competing commercial service providers, both large and small, to cooperate within the framework of the Internet. The papers in this section offer considerable insight into the changing structure of the ISP industry and the formation of tiers of service providers; they illuminate the economic and technical relationships between backbone providers and second and third tier ISPs that provide more local or regional service.

Today, most ISPs simply carry traffic from other peer ISPs on a reciprocal basis without charge (as opposed to "customer" ISPs who purchase backbone carriage service from a larger ISP). In some cases the balance of traffic between these ISPs is quite uneven, and financial settlement systems have been proposed to compensate for these imbalances and presumably to rationalize the economics of inter-ISP traffic routing to eliminate exploitation of these imbalances. There are similar systems used in the telephony world. The papers also include discussion of how new Quality-of- Service-based network service offerings may change the business agreements among ISPs.

The final two papers deal with the measurement of service quality. The first of these, by Guy Almes, looks at the very difficult theoretical and practical problem of defining meaningful and useable performance measures. The second, by Monk and Claffy, describes experimental measurement systems that are being deployed through the Internet. These papers deal with an important issue--certainly a critical one for any organization purchasing Internet service or wanting to monitor quality of service, but they seem a bit out of place in relation to the other issues in the book. They probably deserve a book-length treatment in their own right. Certainly effective performance measurement requires coordination and is related to governance issues, but I believe that the hardest problems here are still technical rather than policy-related.

This book represents a very valuable survey of the issues around Internet governance and is well focused. There are, of course, many other areas where the global nature of the Internet interacts in complex ways with national laws and national culture: regulation of gambling, censorship, obscenity, cultural content, intellectual property, privacy, regulation of cryptography, and financial and tax regulations, to name only a few. But the theme here is how activities directly related to the operation of the Internet, such as the DNS, relate to existing national and international structures, rather than how the Internet brings varying national practices into collision with each other.

In the near term, this is a very valuable sourcebook for anyone who wants an informed understanding of the current policy debates and commercial and legal issues involved in Internet governance. In the longer term, I believe it will be an important resource for researchers in history, economics, public policy, and technology

evolution. With a few exceptions, the papers are easily accessible by readers with only a modest technical understanding of how the Internet functions. The book also offers a very useful source of material for teachers; while it isn't a textbook, many of the papers could serve well as class reading assignments.

A postscript--in late 1997 Brian Kahin left the Directorship of the Information Infrastructure Project at Harvard to join the White House Office of Science and Technology Policy, where he is now involved in formulating policy for many of the very difficult and controversial areas that are described so well in Coordinating The Internet and the other books in this series.

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REVIEW OF: Louis Rosenfeld and Peter Morville. Information Architecture for the World Wide Web. Sebastopol, CA: O'Reilly and Associates, 1998.

by Ray Olszewski

The technologies that define the World Wide Web provide for great flexibility in organizing Web sites. Hypertext Markup Language (HTML) in particular was designed to support a high degree of integration across the documents that make up a site and even across many sites. Elaborations of HTML (e.g., tables, frames, CGI (Common Gateway Interface)-based forms, embedded programs in Java and JavaScript) have increased the variety of ways one can organize both individual Web pages and entire sites.

While this increased freedom has helped make the Web a hotbed of creativity, it has not been entirely beneficial. Many sites have suffered from bloated graphics, incomprehensible search engines, and a variety of other defects that cause them to fail in their intended purposes. While these defects are trivial--even sometimes entertaining--when they appear on personal home pages and other small sites, they can be major problems for large sites that seek to attract business.

In Information Architecture for the World Wide Web, Rosenfeld and Morville attempt to introduce readers to the techniques and skills needed to organize a good Web site. The authors are principals in a consulting firm that provides Web design services, so they have considerable experience to draw on. Their background is in information management, not programming or graphic design (both are librarians by training), so they deliver a sharp focus on the logical design of a site, saying little about the tools one would use or the design of actual pages.

The authors see the three key design elements of a Web site to be its overall navigation structure, its browsing (they call it labeling) structure, and its searching structure. The three chapters devoted to these areas are the best in the book. They combine information drawn from research on how people search (both generally and on the Web) with a good understanding of the realistic limitations of Web technology. The fact that it considers both components is crucial to the success of this discussion.

For example, in considering the relative merits of text-based and icon-based lists, the performance loss that comes from adding more graphics to a page has to be traded off against the visual benefits. At the same time, text has its own real merits, as the authors indicate when they go through a list of "inventive" icons and how actual Web users interpreted them--often very differently from the intended meaning. For example, an icon of the world with some lines superimposed (an abstract image of a network), intended to mean "World Wide Web," was seen by viewers as meaning such things as "global," "map," "location," and (my personal favorite) "dimensions of the planet." (p. 86)

Another three chapters take readers through the process of designing a site's architecture, covering predesign issues, working with a team to produce a workable design, and managing implementation. Here as elsewhere, the advice always seems to come out of real experience. While some of the approaches offered seemed in the abstract to be fuzzy or illogical, in the end their practical merits outweighed any initial skepticism.

A striking absence from this design process is computers and the Web itself. The emphasis on use of whiteboards, flipcharts, paper-based design sketches, and text-based blueprints seemed at first odd to me--I tend to favor prototyping sample pages and links earlier in the process than they suggest. But my experience is in smaller sites, where the members of the development teams were mostly programmers and graphic designers. Their approach is geared more to larger projects, where many members of the team will not have hands-on expertise in HTML design and the related programming issues. In these contexts, the paper-focused approach they describe seemed to make more sense.

The authors emphasize from the start that this is "not the typical O'Reilly book that tells you how to build a Unix firewall machine from a box of toothpicks and an old coffee maker. There are no code listings, no listings of function parameters, and no workarounds on little-known bugs in SunOS 4.2." (p. xv) While this difference is important to emphasize from a truth-in- advertising perspective, giving it too much weight distracts from the book's general excellence. There are only a few software references (such as a list of freeware search engines), but they all are sensible choices needed to support the main points of the text. In other respects, the bulk of the book does follow the O'Reilly tradition of providing real, usable advice. After reading several books on Web design that spend a lot of pages listing the skills and knowledge you need to know, but very few pages actually teaching you any of those things, this one is a welcome relief.

The one real disappointment in the book is its final chapter, a discussion of an example drawn from one of the authors' actual projects. I suppose it is impolitic to criticize in print one's own work for a client, but the example in this chapter demonstrated many of the design faults that the book warns against in earlier chapters. The example Web pages they show here do look good on a printed page, but a look at the same pages on the Web revealed some serious problems. The page tops are dominated by huge graphics, both slow to load and greedy for space. To present the Web pages in the book, the authors cheat by enlarging the Web-browser window to a size much larger than the size of a standard (14 inch, 640 x 480) computer screen. In the end, this chapter serves to illustrate the difficulties that even design professionals face when attempting to develop a well-designed site.

Aside from this problem, the book is an excellent guide to the process of planning the structure of a Web site. Anyone responsible for designing a medium to large Web site, rejuvenating a tired or ill-designed one, managing a Web-design project, or dealing with a Web-design consultant will benefit from reading Information Architecture for the World Wide Web.

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