A Guide to the TCP/IP Protocol Suite

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Rodica Clocea received the Engineer degree in Electronics and Telecommunications from the Polytechnical Institute of Bucharest in 1979. Since then she has worked at the Research Institute for Informatics as system engineer and programmer. She has been on the team designing and implementing software products dedicated to a pass-through access service for asynchronous terminals in a heterogeneous network environment, EDP on a data switching equipment based on a multimicroprocessor architecture. She has also worked on a VIDEOTEX network value added service (VIDEOTEX terminal emulator on IBM PC like, access point for VIDEOTEX pages acquisition, multiaccess to VIDEOTEX databases). In 1993 she joined the team maintaining the national EuropaNET node.

The author makes it clear from the very beginning the book intention as "*to provide the reader with a meaty, yet concise, description of all the major protocols of a TCP/IP-based network*", its co-ordinates: "*to provide a single, handy technical guide to all the major Internet protocols at a level required by students and data communication analysts*"; "*to provide an organized description of the TCP/IP protocol suite, with many illustrations, which is suitable for training*", and its intended readership . He accounts for why understanding the TCP/IP protocol is necessary (it "**is the most widely used in the world of internetworking LANs and will remain popular through at least the end of this decade**").

The book is structured in 7 chapters; several valuable appendices and an index to subject reference are attached .

Chapter 1 ("**Overview of TCP/IP Internet**"), addressing "anyone having a desire to learn the fundamentals of the TCP/IP protocol suite", identifies the Internet, the structure and the protocols of each layer.

Chapter 2 ("**Physical and Data Link Layer Protocols**"), while remarking that Internet does not exactly specify the physical and link layer protocols, but how the layers will be interfaced, deals with physical networks interfacing via Internet, focussing on the Ethernet interface and its off-spring, the IEEE 802.3 interface.

Chapter 3 ("**TCP/IP Network Layer Protocols**") discusses the Internet protocol (IP) which receives data directly from the Ethernet and operates on an architectural level equivalent to the network layer of the OSI reference model. An explanation of the IP datagram and the IP protocol is first given. The IP datagrams addressing is covered next, being determined by the source and destination address fields in the IP header. The chapter concludes with a description of various routing techniques and an introduction to dynamic routing table update process.

Chapter 4 ("**TCP/IP Transport Layer Protocols**")is protocol- oriented. The transport layer protocols, user datagram protocol (UDP) and transmission control protocol (TCP) are in turn presented. One main criterion in making the applied software use either UDP or TCP is one's or another's reliability level (some application layer protocols being designed to operate with either UDP or TCP). The IP selection of either UDP or TCP is considers the protocol number in the IP header.

Chapter 5 ("**TCP/IP Utility Protocols**") gives a full description of the Internet utilities. Some of these utilities are essential as they assist the normal user traffic on the Internet (for example, ARP and RARP provide a routing function and the interface with the physical and link layer directly; ICMP and IGMP provide error notification to the user, a communication between gateways and hosts used to co-ordinate routing and status of group membership in multicast groups). The other utility protocols are not involved in a per-connection basis as the essential utilities are.

The EGP/BGP and IGP protocols enable a communication between gateways that automate routing-table information update.

Chapter 6 ("TCP/IP Application Layer Utility Protocols") investigates the application layer utility protocols, normally used to aid the application layer protocols or, otherwise, behind the scenes of the typical user session. BOOTP describes the initial load process and DNS helps a domain name conversion to the IP address. SNMP dedicates to network management of the Internet. The echo protocol completes a diagnostic service of returning messages and the Internet time protocols (time server, daytime server and network time protocol) offer synchronized time services.

Chapter 7 ("TCP/IP User Application Layer Protocols") presents the application layer programs that provide a direct service to users. Some of the programs use a lower layer protocol to be used by other programs as well. For example, NFS uses RPC, which is a stand-alone protocol and may be used by other programs. TELNET provides a remote log-in capability. FTP uses TCP for a secure file transfer facility, while TFTP uses UDP for the same (but less secure) file transfer facility. NFS shows remote file management capability and the SMTP is an electronic mail service. An independent graphics interface between a user and multiple applications will be possible by a X Window System.

The following will make the appendices to the book:

- a presentation of the Internet history and its comparing with CCITT and ISO standards;
- a list of Internet protocols, with the status and latest RFC number (and standard number) of each;
- lists of type codes, protocol numbers, well-known port numbers and other hard-to-find reserved numbers within the Internet community;
- a list of contacts within the Internet community and a list of all requests for comments (RFCs);
- identification of and the source of other standards used in the Internet;
- a list of Newsletters and Reports that describe current events within the Internet community;
- a list of acronyms.

The book succeeds in approaching the proposed subject. A special care is taken of the accuracy and relevance of the subject discussed. The information flow never stops (through text, figures, tables, examples, it is always at hand). An expedient way of introducing graphical and lexical conventions, augments the author's ability of having the protocol sequence and the standards' requirements well-understood.

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