

Book Review:***High-Speed Networks and Internet – Performance and Quality of Service
Second Edition*****Redes e Internet de Alta Velocidad - Rendimiento y Calidad de Servicio
Segunda Edición**

William Stallings

Pearson Educación (Prentice-Hall) – Madrid 2004

ISBN 84-205-3921-X

This book presents the treatment of advanced topics in computer networks - mainly in those of high speed - which the designer or the network manager necessarily needs to know. These topics relate to multimedia traffic support, real time traffic, and congestion control as well as the needs of providing different levels of quality of service (QoS) according to the applications and users.

Its use is intended for the professional and academic scope. For the academic environment, it is a book for an intermediate level (as second course of Computer Networks, for instance) or for activities of seminars dedicated to specific topics, due its organizational flexibility.

The book is divided into seven parts.

The first two parts present a summary of the basic concepts. Part I presents a review of the background and main principles of computer networks, protocol architectures in general, and TCP/IP in particular. Part II deals with high speed WAN and LAN networks based on *frame relay* and ATM, on one side, and Ethernet, fiber channel and wireless networks, on the other. These topics are dealt with in depth in a book of the same author, in which the main concepts of communications and computer networks are studied [1]; reason why, if the student has already done a basic course on communications and networks using this material or similar, these two part may be avoided without affecting the understanding of the rest of the book.

Parts III to VII refer to the main topics dealt with in the book. These parts are independent one of the other, which allows the professor to adapt the course – be it given during a complete semester or in some weeks – to his/her needs. In each part, it is even possible to give a smaller number of chapters than the whole, which is really useful for short term courses.

Part III deals with traffic modeling through networks and internetworks, a key point to design high performance networks. For it, an introduction to the probability and stochastic processes is made, which can be omitted if students have already received a course with this respect. Then it presents the analysis of queues and self-similar traffic. This last topic, of recent development, introduces the necessary tools for the study of the current traffic of networks, which, in most of the cases, do not present the random characteristics necessary to strictly apply the equations of queuing theories.

Part IV deals with the congestion and traffic management, reviewing the general techniques usually applied and then analyzing the specific case of *frame relay*. Next, there is a description of the problem at the level of link layer (with examples using HDLC), transport layer (specifically using TCP) and ATM networks. Part of the material which is studied in these chapters is described in the quoted book of the same author [1], though more generally.

Part V deals with routing in Internet, beginning with graph theory and classical algorithms, and then studying quite in depth the interior routing protocols (such as RIP and OSPF) and exterior routing protocols (such as BGP, IDRP, and those used in multicast). Special attention is paid to the problem of packet routing which carry information on voice, images or video, and to the fact that the most recent architectures do not thoroughly rely on point to point virtual channels but on routers management and their capacity to intelligently route packets, in order to avoid or properly act against congestion, using at the same time a data interchange scheme with other routers that avoids the overload of the network.

Part VI deals with the quality of service in IP-based networks. For it, the concepts of integrated and differentiated services are introduced and developed in order to address the new and constant demands of IP networks. Next, protocols designed for those services are studied, such as ESVP and MPLS. In order to support real time applications, the RTP protocol is later discussed.

Finally, Part VII deals with data compression, with an introduction to the theory of information that can be omitted, if its bases have been given in other courses. The main discussion focuses on the study of lossless compression and lossy compression, including the understanding of JPEG, and MPEG in audio and video.

The text concludes with two appendices. The first appendix refers to the standards and organizations in charge of establishing them. The second appendix makes an interesting study of *sockets*, analyzing the importance of their use and including a guide about them. At the end, some examples of *sockets* programming applications are given.

It is typical of this author to give us a website dedicated to his books (in this case <http://williamstallings.com/HsNet2e.html>, last update in February 2007), where both the professor and the student can find really useful material: figures and tables of the book in .pdf, slides in PowerPoint, related web sites, student resource site, etc.

[1] William Stallings, *Data and Computer Communications*, 8th Ed., Prentice Hall, 2006, ISBN 0132433109.

Alejandro Rosales
arosales.tw@gmail.com