

FOREWORD

It is now over 15 years since the first, tentative efforts were made to assemble theories and tools that could help with the development of communications protocols – the rules and procedures that control and manage the flow of information within computer networks.

During the intervening years, a significant body of knowledge has been accumulated that can be successfully applied to the various phases of protocol development. There are now international standards for languages designed for the formal specification of the protocols upon which we will build our future computer networks. We have learned that even the most carefully developed protocol specifications contain subtle errors unless they are subjected to a thorough error analysis. Much progress has been made in the development of automated tools to support this. There have also been significant advances in testing techniques that make it possible to build reliable heterogeneous networks using hardware and software from a wide spectrum of manufacturers and development organizations.

We are fortunate that Gerard Holzmann has made the effort to write this book that summarizes much of what we know about designing protocols and documents his own considerable experience in the field. His book has four major sections. The first gives an introduction to the problems that are encountered during the development of protocols and discusses the principles of protocol design. The historical examples used to introduce the subject are a delight. The second section discusses ways in which a protocol can be modeled and specified. The third explains how protocol models can be analyzed to determine their properties and evaluate their correctness. The final section presents protocol design tools which complement the material in the earlier sections of the book. This is an important section. Protocols have proved to be extremely difficult to understand without automated analysis tools. The serious student of the field will learn a great deal by using the tools presented here to build and analyze his own protocols.

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