

Preface

What should still be something pretty amazing seems just like a part of everyday life to a lot of people today. In recent decades, the old dream driving human development toward a mobility spanning time and space has become unprecedented reality. And this without a single physical law being broken. Instead we have learned to handle a surprising number of things in life in dematerialized, digitalized form. Dematerialized in the sense that instead of dealing with the things themselves directly we deal with their digital “shadows” - essentially their images - coded into a series of zeros and ones and then transported at the speed of light via electromagnetic signals to be processed at any computer. Two technological developments have made this possible. First, *computers* in all their forms provide the cosmos to give these so-called digital shadows complete expression. Here, they can be formed anew, processed, linked and stored. Second, the *Internet* offers the possibility of transporting “digital shadows” to another computer almost anywhere in the world in an instant, where they can take effect.

The computer and Internet rank among those very few technological developments in human history that have intrinsically changed people’s lives and actions. The industrial revolution of the 19th and 20th centuries expanded our physical mobility in ways that had been unparalleled up to that time. Just as cars, airplanes and spaceships have dramatically increased the radius of human physical activity, the drivers of the *digital revolution* - computers and Internet technology - have expanded our intellectual mobility to an extent that had been previously unimaginable. Our range of mental activity has been freed from (almost) every physical limitation. While it is likely that even the most modern physical transportation medium will continue to need several hours to bring a person from one continent to another, it is possible for him or her to bridge this distance almost immediately with the help of the Internet. Feelings, thoughts and instructions can be sent within seconds as we respond to the wishes and needs of those far away. And, in contrast to physical transportation, this can be done without significant costs.

The Internet has now turned forty and the WWW only just come of age. Because of this young history and the continuously rapid development of the computer and network technologies, the changes triggered by the digital revolution affecting society, business and private life can now only be foreseen in their vaguest manifestation. This makes it all the more interesting to look behind the scenes and gain an understanding of the technical basics of how the Internet and the WWW really work. This book entitled “Digital Communication” seeks to do just that. Along with the two other volumes of the trilogy: “Internetworking” and “Web Technologies,” we aim to offer

the reader an understandable, comprehensive, trustworthy, informative and detailed guide.

This present volume is devoted to the foundations of digital communication and offers an extensive look back at the history of communication and its technical resources. It covers the fundamentals of communication in computer networks, presents the diversity of digital media and its characteristics and coding and gives an overview of the security issues in the new digital world. The multi-dimensional organization of the material follows a format of accessible descriptions, complemented by numerous technically detailed excursus and glossaries, which offer chapter-related indexed commentaries, as well as bibliographic references providing an invitation for further research and reading. The reader is thus assisted in gaining the easiest entry into the fullness of the available material and also guided in making an interest or topic-based selection.

Based on this book, the Internet and web technologies are introduced comprehensively and in detail in the two volumes that follow: “Internetworking“ and “Web Technologies.“ We get to know the current computer network technologies, the different layers of the Internet, the TCP/IP protocol suite, the WWW, as well as various web technologies, such as URL, HTTP, HTML, CSS, XML, web programming, search engines, Web2.0 and the Semantic Web.

We have made every effort in the hope of inspiring you who are interested laypeople with a fascination for the new digital world. We also aim to provide students - who don't shy away from a bit of hard work and effort - with a useful and comprehensive textbook. Furthermore, we hope to present readers who are seasoned professionals with a dependable, handy reference book that serves to classify areas of specialization easily and reliably within the context of the huge complex of digital communication.

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