

Computer-Mediated Communications
Multimedia Applications

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This book is dedicated to the memory of Dr. Hugh Daglish,
mentor, advisor, and much-missed friend.

Preface

When I was first asked to write this book the publisher latched onto the fact that the word *applications* appeared in the title. I think sometimes that many writers in the technology field have a tendency to write about technology but not how it is applied. This is not entirely surprising. Ask a TV technologist to define a TV application, and you will get a short reply: “watching it.” That is what people do; they watch TV. That, as far the technologist is concerned, is the application. They might watch it in the lounge, the bedroom, and even the kitchen; they might watch standing up, sitting down, or stretched out—but they are still watching it. The technologist’s concern ends at about the point where picture quality stops and content quality begins. This fixation can be demonstrated by recalling something that a voice mail evangelist said at a public conference. He solemnly announced that he thought the “killer application” for the voice network was voice mail. I can only presume that he had forgotten about telephony! Technologists can become very focused; it is their strength and their failing.

By background I am a technologist. I have designed hardware and systems, and have even written software—so how can I possibly write about applications in the communicating multimedia world? Simply because my true joy is in explaining something technical to people who are not technical, to see their mouths form an “oh” and their eyes open wide just before they say something like “Is that how it works?” or “Is it really as simple as that?” or “I always wondered why it does that.” My fear is to return to the days when I did presentations and people were so impressed that they quickly mumbled something like “Very interesting, Rob,” and then scurried away, just in case I might ask them something that proved that they had not understood a word I had said!

Sometimes I succeed in getting ideas across and sometimes I do not—but at least I try. This book is not written to impress you with my knowledge; it is written to communicate to you what is happening in the world of communications. To that end, I have scattered throughout the text a number of stories relevant to the task (though some will just lighten the load). I hope you like them. But the book is not just about applications, although there are plenty of those in

here, especially toward the end; it also talks about technology. After all, that is what drives the world of communications forward. Naturally, if a technology does not satisfy a need, it dies or waits for an application to come along. I do not think the technology described in this book will die. Computer-mediated communications are in fact an extension of existing technologies, riding the wave of advancement fueled by two powerful drivers—communications and computing.

This book is the last in a trilogy. I cannot pretend to have planned such a long-term project, but that is the way it has turned out. My first book was entitled *Voice Information Systems* and concentrated on voice processing systems. There I introduced the concepts of computer telephone integration (CTI) and integrated messaging. The latter extended voice messaging into the world of e-mail and explored various methods of integration at the desktop. There are now a number of products that provide this level of functionality and include the medium of image via fax as well. In extending voice messaging along the text and image path, it became clear to me that the move toward multimedia messaging had begun, but this was not a major consideration at the time. It was in this first book that I discussed the barriers to the successful use of systems, particularly from the user's point of view. Things have moved on since I wrote that book; some barriers have been breached and others remain. Some of those that remain are breached by the developments discussed in these pages.

In my second book, *Computer Telephone Integration*, the roles were reversed: voice processing took a backseat and the main subject became that of linking the computer and telephone systems in order to provide more effective applications. One of the interesting points made throughout this second book is that the telephone system is rapidly evolving from analog to digital capability. This move was motivated primarily by the need to improve voice quality across the telephone network; but as soon as the network becomes digital, it can then be used to carry any digital signals. In this way, the computer in CTI begins to control not only telephone calls, but any digital call, including voice, video, image, or data. In short, CTI is naturally becoming a key part of multimedia communications.

On completion of the second book, I began to take more interest in groupware and work flow as productivity tools. I also became a skeptical Internet user. The voice processing world, multimedia messaging, CTI, groupware, and information networks all began to whirl around in my mind. I knew that all of these things were connected and I had a clear view of how some of the elements were integrated and how they converged. I also knew that where they converged was not at the telephone, the fax machine, or the computer terminal, but at the PC or perhaps the PC server. I also knew that the important level of integration was not concerned with the networks themselves, or even with the information carried over them. Integration was all about the control or mediation of communication, not the communication itself.

By this time it was apparent that video was moving out of the "How wonderful!" to the "I want to use it when the price and quality are right" stage. It was also apparent that image processing had come of age and that the transfer of images without the intervention of fax machines was becoming commonplace. Meanwhile, there was a general antipathy toward the term *multimedia*. It was thought to be overhyped, oversold, and really all about the use of CD-ROMs to store video information. Communicating multimedia hardly had a mention. Thus it became apparent that the time was ripe for this third book, which took the strands of voice processing, multimedia messaging, and CTI and followed through their convergence with e-mail, image processing, groupware, work flow, and information networking. The logical outcome of that convergence needed a name, and one of Apple's evangelists suggested a suitable one to me: *computer-mediated communication* (CMC). As explained in the pages that follow, this is not a new term. What I have done is extended it from its conventional use in the non-real-time world to the world of real-time interaction, and I have also tried to hasten its move from a text base to a multimedia base.

I hope you find the organization of the book logical. It is not necessary to read every section of every chapter; indeed, you may wish to rush straight to the penultimate chapter, where I have assembled a number of CMC applications. This would be a pity, though, as there are applications sprinkled throughout the book, particularly in the second chapter, which covers group working, and the sixth chapter, which describes some of the products available at the time of writing. CTI is covered early in the book, before the introduction of the networks across which it provides functionally integrated applications. The two chapters following it are the most technical in the book. But do not be deterred—I try to lighten the load by including a number of asides and illustrative stories. The first of these chapters is on media processing. It is therefore central to this book and to CMC and covers the nature and needs of voice, video, image, and text media. The following chapter deals with the networks that are used to pass these media around. There is a chapter on CMC systems (I hold any detailed discussion of the Internet until then), which also includes other network services, together with an extensive coverage of CMC implementation, including some relevant tools from Microsoft and IBM. It may become apparent as you read this book that I am an Internet user rather than an Internet fanatic. I am not so overawed by its scope, size, and growth that I forget to question its performance and the quality of data it holds.

Finally, I take a peek at the future of CMC. Of course, the future is rosy—why else would I write the book? You will, I am sure, detect that I think CMC technology is a force for good in respect to environmental concerns and might even be considered an element of our "pursuit of happiness." But in my enthusiasm I have not forgotten or neglected the "couch potato." So if some of my readers are couch potatoes, there is news for you in the last chapter.

This book is ambitious; it is meant to be comprehensive. But the field that multimedia real-time CMC covers is too vast to achieve that at all levels. Hence, I have tried to touch on many topics while not delving too much into detail. One reviewer of this book thought that too much emphasis was given to the telephone network's technology and services. If that is so, then I am unrepentant, since the telephone network has now become, or is well on the way to becoming, a truly global digital network, and as such it is enabling applications that were virtually impossible 10 years ago. On the other hand, I have to ask myself whether the non-real-time world—the worlds of the Internet, messaging, computer conferencing, and packet-based systems in general—have had sufficient coverage. On the whole I think they have. One of the themes of the book is the convergence not only of computing with telecommunications, but also of the messaging and interactive worlds. That convergence is itself ambitious and is bringing together people who strongly believe that the best way to make progress on their project is via the one or the other. There are people who spend most of their working lives manipulating data and messaging, and there are others who spend most of their time interacting, in real time, with other people via telecommunications. There are yet others who spend the whole of their working time in face-to-face meetings—and enjoy it thoroughly.

This book is about making it easier to make the transition from the messaging world to the real-time world, and vice versa. If I had to pick one simple example of the former, then I would choose the following. You are sitting in your office reviewing your e-mail messages. One message contains some really interesting market figures from a company called Fabrication Surveys, but you do not understand some of the terms used. You click on the "Fabrication Surveys" name—just as you would on a hypertext field—and after a short wait, the image of a representative of that little-known company appears on your screen. You show her the market figures that you are interested in, and she explains the terms used and also tries to sell you the original report. You say that you will think about it, and she puts a summary of contents on your screen together with her electronic business card, which you save. You then continue processing your messages.

By its very nature this book brings together a number of different themes related primarily through their association with the computer and with communications. This results in some strange bedfellows: video-on-demand and e-mail, voice conferencing and remote access, voice mail and fax mail—to name but a few—all of which, of course, are the natural outcomes of the convergence of so many different technologies and services. It is the wide scope of the topic that makes CMC so very interesting, lively, and relevant in so many areas of application.

Acknowledgments

Getting enough information together to create a book of this size is a daunting task. Having established the outline and begun the task of writing, you are constantly on the lookout for suitable input material to flesh out your own concepts, and in doing so you often discover some significant black holes. I simply want to thank everyone who has wittingly or unwittingly supplied the information I have used here. I have tried very hard to ensure that any source material is referenced. If I have missed anyone, I am sorry.

I have a mentor who has carefully checked all of my books so far. He has found some ghastly grammatical errors, discussed with me the use and spelling of certain words, and, most importantly, commented on the way the information is presented and structured. Fortunately, he has been forthright in his criticism and I know that all of my books, including this one, have benefited enormously from his advice and observations. In this book he also prepared most of the illustrations from my rough input, so I wish to thank him for this and for his help with the text. Unfortunately, I can no longer do so—my mentor, Dr. Hugh Daglish, died soon after the completion of this manuscript. I have therefore dedicated this book to Hugh's memory.

Each time I commence a new book, my wife groans. She knows the effort involved and is perhaps more realistic about this than I am. For all that, she is a trooper. She has transcribed abysmally noisy tapes I recorded on airplanes, in cars, and on trains. Thank you, Margaret.

Finally, I am grateful to the publishing staff at Artech House, who encouraged me to write the book, cajoled me when I fell behind the original schedule (and the two revised ones), sympathized with my excuses for the delays, and yet maintained a sense of humor throughout the creative period. Thank you, Julie and Kate.

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What Is Computer-Mediated Communication?

1

Computer-mediated communication (CMC) is the use of an application computer to control multimedia interactive and message-based communication to provide more effective ways of doing things.

1.1 INTRODUCTION

In the late 1970s I attended a conference in London entitled "Office Automation." For some reason it was particularly futuristic and, in retrospect, very academic. The four things I particularly recall about the conference are the cocktail reception, a question about speech recognition, the use of laser helmets, and a film that provided a glimpse of the future.

The cocktails I remember simply because I worked at the time for a very large company, and, completely unbeknownst to me, my employer had sponsored the cocktail reception, which followed the first day of the conference. Because the company's name appeared on my badge, I was kept particularly well supplied with cocktails and was consistently thanked for my generosity by the other attendees. It was all very bemusing, but quite fun.

The question concerning speech recognition I recall because it caused such a wave of interest. Speech recognition had not been mentioned until about half way through the conference. The questioner wanted to know what the current state of the art in speech recognition was, and he then went on to describe his own experience of this technology. I think the question was a ploy. The questioner turned out to know far more about the state of the art than any of the attendees or the speakers, and the conference delegates, including myself, paid a lot of attention to him for the rest of the conference. This might seem odd now, but at the time we really thought that speech recognition was little more than a subject for long-term research and that its practical application within the office

was well over the horizon. Perhaps we were right—it is only now, in the mid-1990s, that this technology is truly out of the laboratory and in general use.

Though speech recognition has become a viable and practical input technology, I do not think that the laser helmet has. The idea, if I can recall it correctly, was that an automated office should be basically similar to a conventional physical one. To select an object of interest, you simply looked at it. An attachment on your head emitted laser light which was detected by the icon you were looking at, and the relevant data or application was introduced to the computer screen. I believe the author of this particular presentation was looking even farther into the future than the rest of us. Perhaps he had spotted the development of the virtual office?

However, the most relevant part of these recollections is a film that provided a glimpse of the future (yes, a film—videos were rare at that time). It was produced by a consulting company called Logica, and it created three views of the office of the future: 5 years, 10 years, and 15 years away. The method employed was to follow the activities of an office worker during a normal day in the office. Compared with many video constructions of this sort that I have seen since, it was quite good. It made a great deal of the evolving technologies of the office. I seem to recall that in the scene that depicted the office as it might be 15 years into the future, the office worker had only a thin slab of material on the desk. This thin slab provided access to all the necessary paraphernalia of an office, including the personal diary, filing cabinets, telephone, and video communications. Naturally, the whole thing was controlled by voice and was cordless and, as is usual for such views of the future, seemed to consume no power. The film ended by saying that all of the items of technology needed to create this scene were demonstrable right then—the creation of the office of the future only required that we bring them together! That film was prepared over 15 years ago and presented a view of what the office should look like now. I think that we can fairly say that all of the items of technology to create the scene envisaged in the late 1970s are available right now—all we need to do is bring them together!

Does this mean that 15 years have passed and nothing has happened? Not at all—it is just that “bringing things together” was not so easy as was imagined. But now things really are beginning to come together, and CMC, the subject of this book, shows how and where they are coming together and who is benefiting from it.

There is a denouement to the tale of the futuristic film. I was so impressed by the content that I contacted Logica and suggested that I hire the firm to show to a group of people with whom I worked at the time. We were developing digital private automatic branch exchanges (PABX) and were interested in what kinds of applications they might be used for in the future. Logica was unwilling to rent the film, but was willing to travel to our location to present it to us. As consultants they perceived an opportunity to present themselves and their company,