

Preface

Location-based Services (LBSs) are IT services for providing information that has been created, compiled, selected, or filtered taking into consideration the current locations of the users or those of other persons or mobile objects. They can also appear in conjunction with conventional services like telephony and related added value features, for example, to realize location-based routing of calls or location-based charging. The attractiveness of LBSs results from the fact that their participants do not have to enter location information manually, but that they are automatically pinpointed and tracked. Therefore, the key technology is positioning, for which various methods exist differing from each other in a number of quality parameters and other circumstances. Once location information is derived, it needs to be processed in several ways, including its transformation into the format of another spatial reference system, its correlation with other location information or geographic content, the generation of maps, or the calculation of navigation instructions, to name only a few. Usually, these tasks are not carried out on a single mobile device or PC but are adopted by many actors involved in the operation of the respective LBS. Thus, the operation of LBSs is an interorganizational matter for which various actors like network operators, service and content providers have to cooperate on a distributed infrastructure. This imposes a number of challenges like the real-time exchange of location information between these actors or the saving of privacy interests of individuals the location information refers to.

This book explains the fundamentals and operation of LBSs and gives a thorough introduction to the key technologies and organizational procedures mentioned earlier. It is dedicated to all those who want to obtain an understanding of the complex systems, methods, and standards LBSs rely on. For professionals in the areas of network operators, providers, and vendors, the book provides a compact and comprehensive overview of positioning methods, location protocols, and service platforms, which otherwise so far have only been covered in a jungle of many interrelated standardization documents and recommendations. Nevertheless, it has not failed to name these documents and reference them at the appropriate text passages for further study. The book also focuses on lecturers and students of computer science, business and media information systems, and electrical engineering. For this target group, it covers the fundamentals of spatial reference systems, spatial databases and GISs, wireless communications and cellular networks, as well as positioning, and shows how these topics are utilized for and contribute to the operation of LBSs. Furthermore, application developers may profit from the overview of location protocols, interfaces, languages, and service platforms as well as from related examples demonstrating their usage.

The motivation for the “LBS book project” originated from the lectures on “Mobile Communications” and “Location-based Services” I gave at the Institute for Informatics of the Ludwig Maximilian University Munich (Elev 515 m N 48° 08' 58" E 11° 35' 40")

and from research in this area. I received massive support from superiors and colleagues, without which it would not have been possible to write this book. I especially thank Prof. Dr. Claudia Linnhoff-Popien and her Mobile and Distributed Systems Group. Claudia always inspired and encouraged me in writing this book, gave me helpful hints for organizing the preparation and compilation of the manuscript, and provided valuable comments on many parts of it. I also wish to acknowledge my colleagues for the many rich discussions in the areas of location-based and context-aware services, which significantly contributed to the topics selected for this book, and, in the last phase of writing the manuscript, for taking up tasks that I did not manage in due time. I am especially very grateful to Georg Treu. Georg not only managed the proofreading of the manuscript and gave me valuable input for improvement, but also inspired many fruitful discussions for LBS research, which we often had after a long working day in the bar “Leib und Seele” (Elev 533 m N 48° 08’ 43” E 11° 35’ 36”). Furthermore, I wish to thank the Munich Network Management (MNM) team guided by Prof. Dr. Heinz-Gerd Hegering for its support and cooperation and for providing an inspiring working environment. I am also grateful for the comments on the manuscript I received from our students, who are dealing with LBSs in practical courses and master theses. Last but not the least, I would like to stress that writing a book is a long and cumbersome process that needs some guidance. I am very grateful to the publishing team of John Wiley & Sons, Ltd for providing me this guidance, their support during the entire writing process, and for their patience.

The book is accompanied by a dedicated web page that provides the reader with links, comments, and latest news in the area of LBSs as well as with an errata. It can be accessed at the following URLs:

<http://www.location-based-services.org/>
<http://www.mobile.ifi.lmu.de/lbs/>

Finally, I appreciate any comments, suggestions, and feedback about the book. Please use the email address given below to contact me.

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