

## Preface

The demand for mobile access to data no matter where the data is stored and where the user happens to be, in addition to the explosive growth of the Internet and the rising popularity of mobile devices, are among the factors that have created a dynamic business environment, where companies are competing to provide customers access to information resources and services any time, any where.

Advances in wireless networking, specifically the development of the IEEE 802.11 protocol family and the rapid deployment and growth of GSM (and GPRS), have enabled a broad spectrum of novel and out breaking solutions for new applications and services. Voice services are no longer sufficient to satisfy customers' business and personal requirements. More and more people and companies are demanding for mobile access to multimedia services.

Mobile multimedia seems to be the next mass market in mobile communications following the success of GSM and SMS. It enables the industry to create products and services to better meet the consumer needs. However, an innovation in itself does not guarantee a success; it is necessary to be able to predict the new technology adaptation behaviour and to try to fulfil customer needs rather than to wait for a demand pattern to surface.

It is beyond all expectations that mobile multimedia will create significant added values for customers by providing mobile access to Internet-based, multimedia services, video conferencing, and streaming. Mobile multimedia is one of the mainstream systems for the next generation mobile communications, featuring large voice capacity, multimedia applications, and high-speed mobile data services. As for the technology, the trend in the radio frequency area is to shift from narrowband to wideband with a family of standards tailored to a variety of application needs. Many enabling technologies including WCDMA, software-defined radio, intelligent antennas, and digital processing devices are greatly improving the spectral efficiency of third generation systems. In the mobile network area, the trend is to move from traditional circuit-switched systems to packet-switched programmable networks that integrate both voice and packet services, and eventually evolve towards an all-IP network.

While for the information explosion, the addition of mobility to data communications systems has enabled new generation of services not meaningful in a fixed network (that is, positioning-based services. However, the development of mobile multimedia services has only started, and, in the future, we will see new application areas opening up.

Research in mobile multimedia is typically focused on bridging the gap between the high resource demands of multimedia applications and the limited bandwidth and capabilities offered by state-of-the art networking technologies and mobile devices.

## OVERVIEW OF MOBILE MULTIMEDIA

Mobile multimedia can be defined as a set of protocols and standards for multimedia information exchange over wireless networks. It enables information systems to process and transmit multimedia data to provide

end users with services from various areas, such as mobile working place, mobile entertainment, mobile information retrieval and context-based services.

Multimedia information as combined information presented by more than one media type (text [+pictures] [+graphics] [+sounds] [+animations] [+videos]) enriches the quality of the information and is a way to represent reality as adequately as possible. Multimedia allows users to enhance their understanding of the provided information and increases the potential of person to person and person to system communication.

Mobility as one of the key drivers of mobile multimedia can be decomposed into:

- **User mobility:** The user is forced to move from one location to location during fulfilling his activities. For the user, the access to information and computing resources is necessary regardless of his actual position (e.g., terminal services, VPNs to company-intern information systems).
- **Device mobility:** User activities require a device to fulfill his needs regardless of the location in a mobile environment (e.g., PDAs, notebooks, cell phones, etc.).
- **Service mobility:** The service itself is mobile and can be used in different systems and can be moved seamlessly among those systems (e.g., mobile agents).

The special requirements coming along with the mobility of users, devices, and services, and, specifically the requirements of multimedia as traffic type bring the need of new paradigms in software-engineering and system-development but also in non-technical issues such as the emergence of new business models and concerns about privacy, security, or digital inclusion to name a few.

The key feature of mobile multimedia is around the idea of reaching customers and partners, regardless of their location and delivering multimedia content to the right place at the right time. Key drivers of this technology are, on the one hand technical, and on the other, business drivers.

Evolutions in technology pushed the penetration of the mobile multimedia market and made services in this field feasible. The miniaturization of devices and the coverage of radio networks are the key technical drivers in the field of mobile multimedia.

- **Miniaturization:** The first mobile phones had brick-like dimensions. Their limited battery capacity and transmission range restricted their usage in mobile environments. Actual mobile devices with multiple features fit into cases with minimal dimensions and can be (and are) carried by the user in every situation.
- **Radio networks:** Today's technology allows radio networks of every size for every application scenario. Nowadays, public wireless wide area networks cover the bulk of areas especially in congested areas. They enable (most of the time) adequate quality of service. They allow location-independent service provision and virtual private network access.
- **Market evolution:** The market for mobile devices changed in the last years. Ten years ago, the devices have not been really mobile (short-time battery operation, heavy and large devices), but therefore, they have been expensive and affordable just for high-class business people. Shrinking devices and falling operation- (network-) costs made mobile devices to a mass-consumer-good available and affordable for everyone. The result is a dramatically subscriber growth, and therefore, a new increasing market for mobile multimedia services.
- **Service evolution:** The permanent increasing market brought more and more sophisticated services, starting in the field of telecommunication from poor quality speech-communication to real-time video conferencing. Meanwhile, mobile multimedia services provide rich media content and intelligent context-based services.

The value chain of mobile multimedia services describes the players involved in the business with mobile multimedia. Every service in the field of mobile multimedia requires that their output and service fees must be divided to them considering interdependencies in the complete service life cycle.

- **Network operators:** They provide end-users with the infrastructure to access services mobile via wireless networks (e.g., via GSM/GPRS/UMTS).
- **Content provider:** Content provider and aggregators license content and prepare it for end-users. They collect information and services to provide customers with convenient service collection adapted for mobile use.
- **Fixed Internet Company:** Those companies create the multimedia content. Usually, they provide it already via the fixed Internet but are not specialized on mobile service provisioning. They handle the computing infrastructure and content creation.
- **App developers and device manufacturers:** They deliver hardware and software for mobile multimedia services and are not involved with any type of content creation and delivering.

## WHO SHOULD READ THIS HANDBOOK

This handbook provides:

- An insight into the field of mobile multimedia and associated technologies;
- The background for understanding those emerging applications and services;
- Major advantages and disadvantages of individual technologies and the problems that must be overcome;
- An outlook in the future of mobile multimedia.

The handbook is intended for people interested in mobile multimedia at all levels. The primary audience of this book includes students, developers, engineers, innovators, research strategists, and IT-managers who are looking for the big picture of how to integrate and deliver mobile multimedia products and services.

While the handbook can be used as a textbook, system developers and technology innovators can also use it, which gives the book a competitive advantage over existing publications.

## WHAT MAKES THIS HANDBOOK DIFFERENT?

Despite the fact that mobile multimedia is the next generation information revolution and the cash cow that presents an opportunity and a challenge for most people and businesses. This book is intended to clarify the hype, which surrounds the concept of mobile multimedia through introducing the idea in a clear and understandable way. This book has a strong focus on mobile solutions, addressing specific application areas. It gives an overview of the key future trends on mobile multimedia including UMTS focusing on mobile applications as well as on future technologies. It also serves as a forum for discussions on economic, political as well as strategic aspects of mobile communications and aims to bring together user groups with operators, manufacturers, service providers, content providers and developers from different sectors like business, health care, public administration and regional development agencies, as well as to developers, telecommunication, and infrastructure operators,...etc.

## ORGANIZATION OF THIS HANDBOOK

Mobile multimedia is defined as a set of protocols and standards for multimedia information exchange over wireless networks. Therefore, the book will be organized into four sections. The introduction section, which consists of nine chapters, introduces the readers to the basic ideas behind mobile multimedia and provides

the business and technical drivers, which initiated the mobile multimedia revolution. Section II, which consists of eight chapters, explains the enabling technologies for mobile multimedia with respect to communication networking protocols and standards. Section III contains 10 chapters and is dedicated to how information can be exchanged over wireless networks whether it is voice, text, or multimedia information. Section IV with its eleven chapters will clarify, in a simple a self-implemented way, how to implement basic applications for mobile multimedia services.

## **A CLOSING REMARK**

This handbook has been compiled from extensive work done by the contributing authors, who are researchers and industry professionals in this area and who particularly have expertise in the topic area addressed in their respective chapters. We hope readers will benefit from the works presented in this handbook.

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