This section of the book is devoted to service engineering. Service engineering has been defined as the art and science of building software for communication services. In this, it deals with methods, techniques, languages, tools, architectures, interfaces, and common components by which service software can be conceived, specified, designed, built, tested, deployed, run, maintained, improved, and retired. More abstractly, anything anywhere in the life cycle of service software that can be applied to more than one service can be considered within the domain of service engineering. Furthermore technological progress, such as the shift from function-orientation to object-object-orientation or the emergence of agent technology add additional diversity in this domain. Hence the spectrum of issues present in the service engineering domain is a big one.

This section of the book features ten papers, which are grouped in accordance with the hot topics of the telecom services environment into three major parts: Intelligent Networks, Object-oriented Middleware / Service Platforms and Mobile Agents.

Within the last decade, the Intelligent Network (IN) concept has coined the face of the telecommunications environment. Rather than just a network architecture, the IN represents a complete framework for the creation, provisioning and management of advanced communication services. The first IN architectures were introduced in the 80s in order to provide a network independent and service independent service platform. The basic goal was to provide more flexibility in service delivery than is possible in traditional service environments. Since the beginning the IN has been the subject of research and ongoing evolution in order to meet emerging market demands and take into account technological progress.

Three papers of this section are related to IN issues. The application of IN principles on top of broadband networks represents a major research issue. The paper of Hussmann “Intelligent ATM Networks: Services and Realisation Alternatives”, presenting the results of the ACTS project INSIGNIA, discusses several realisation alternatives for network intelligence in order to provide a broadband VPN and a broadband videoconference service in ATM networks. Another area of ongoing research in the IN world is the feature interaction problem as a consequence of combining multiple services which have been designed independently. The paper of Kimbler et.al. “Goal-based Filtering of Service Interactions”, presenting results of the EURESCOM project P509, introduces a concept of interaction filtering, which identifies interaction-prone combinations by analysing the relations between services and user’s goals. Finally, the introduction of an IN within a specific network environment requires careful analysis. The paper of Makhrovskiy et.al. “Intelligent Networks Planning Supported by Software Tools”, presents a complex tool for IN dimensioning and planning in order to maximise efficiency.

In the beginning of the 90s, research on object-orientated distributed service platforms, also referred to as “middleware”, has received increasing attention, since object-orientated software development has been considered to provide advantages in the context of software structuring and reuse of components. Therefore the integration of service control (i.e. IN) and management (i.e. TMN) platforms into a unified architecture taking into account emerging Open Distributed Processing concepts has represented and still represents a fundamental research issue for future telecommunications. In this domain the Telecommunications Information Networking
Architecture (TINA) and the underlying distributed processing environment (DPE) technology, such as OMG's Common Object Request Broker Architecture (CORBA), have evolved as de facto standards during the last three years. Therefore we will recognise these architectures within most of the five papers within the second part of this section. Object-oriented platforms require corresponding service development tools. The paper "Adopting Object-oriented Analysis for Telecommunications Systems Development" by Martin reports on initial experiences with the adoption of object-oriented analysis for the development of telecommunications systems. Dede et.al. introduce in their paper "OSAM Component Model - A key concept for the efficient design of future telecommunication systems" a basic modelling concept for the consistent and effective analysis, design, use and management of services, developed within the ACTS project DOLMEN. On the other hand effective techniques for the rapid integration of service and management systems over multiple organisational domains are required in face of increased competition, complex service provision chains and integrated service offerings. Furthermore, multimedia services are considered as the drivers for the new service platforms. Therefore appropriate mechanisms have to be provided by the platform. Qian and Campbell propose in their paper "Extending OMG Event Service for Integrating Distributed Multimedia Components" a timed event service, representing an extension of the standard OMG event service with temporal factors so that the system can deliver large volume events, like video frames, in real time. Finally, the paper by Newcomer et.al. "STDL as a High-Level Interoperability Concept for Distributed Transaction Processing Systems" describes how the concept of STDL is used in the ACTS ACTranS project for portability and interoperability of heterogeneous Distributed Transaction Processing Systems, including support of object-oriented TP systems.

In 1994 another new paradigm has gained momentum considered as an alternative to traditional Remote Procedure Calls in client/server systems: Mobile Agents. Mobile Agents enable the delegation and automation of specific tasks to autonomous software entities which could move between network nodes in order to perform their tasks. This enables on demand service provision and network computing. Dedicated "Agent execution environments" form the prerequisite for agent-based services taking care for the secure execution, communication and transfer of agents. Today scripting languages, such as Java, are considered most appropriate for implementing mobile agents. Rather than considering Mobile Agents and Remote Procedure Calls as exclusive approaches, maximum flexibility will be achieved by hybrid middleware platforms.

Two papers are present in this final part of the book section. The paper of Park et.al. "JAE - A Multi-Agent System with Internet Services Access" introduces a Java-based Agent Environment, a multi-agent system comprising mobile agents communicating with a fixed infrastructure of agent servers making services provided through the Internet accessible. JAE will be used within the ACTS project OnTheMove. In their paper "AgentSpace: A Framework for Developing Agent Programming Systems" Silva et.al. concentrate on the development of distributed applications based on agents and their support programming systems. The idea is to consider agent-based applications spanning through three levels: agent framework, programming system and application level itself. In summary it can be stated, that the outlined papers present a good snapshot of the current diversity of research issues within the service engineering domain.