

Preface

CASCOM started with a vision of what could be achieved in the future for mobile service environments. The challenge was to address how ubiquitous application services could be flexibly coordinated and pervasively provided to mobile users operating in highly dynamic environments. The CASCOM approach was sound and involved combining and significantly extending existing complementary technologies (agent capability, Peer-to-Peer systems, mobile computing, and semantic web services coordination) in order to develop an architecture capable of reaching its vision.

From its outset the work had ambitious objectives. In order for these to be fulfilled, many technical and scientific barriers would have to be met and overcome. Many questions had to be answered, not least: If there is an assumption of no fixed architecture what changes would be needed to deal with agent communication? How can service coordination be provided with agents and P2P environments in nomadic situations? What were the implications for service discovery architectures taking into account the dynamic topology of IP2P networks, the fluctuating QoS of wireless network connections, and the limited capacity of devices? What solutions could be found for service discovery, service composition planning, service execution monitoring, and failure recovery for open, secure IP2P environments taking into account resource-poor devices? Finally, how could the notions of context and situation awareness be made more precise for IP2P environments.

The overall CASCOM system has involved many innovative solutions for individual problems such as service discovery, matching algorithms and service composition planning, etc. Furthermore, the integration of these components, together with aspects dealing with privacy and context, etc. have resulted in a coherent and impressive system.

In order to demonstrate the power of the architecture and to see how it could truly support mobile users the group chose the challenging and fundamental service of health care. Providing emergency medical assistance to travellers epitomises the difficulties of integrating, coordinating and exchanging information between physically distributed and nomadic actors operating over a variety of networks. The team put a strong emphasis on user group input. This input has been essential throughout the work, not only for testing but also for influencing the development. It would have been easy to trial the system in simple and straightforward condi-

tions. However, the team chose a more difficult and realistic route trialling the system in some extreme conditions and demanding environments. This was coupled with quantitative performance testing of the system in the laboratory. The results are impressive and the system is simplistically easy to use masking the technological achievements of the work.

Technologically the CASCOS solution can be considered as being ahead of its time. The principles of the approach have been demonstrated and the benefits to the different actors involved in this arena (end users, network operators and service providers) are clear. The potential use of both the individual CASCOS components and of the complete architecture itself is large. The components dealing with service provision, discovery, composition and monitoring, etc. can be taken and used individually. The open-source nature of much of the software will greatly facilitate its adoption and use within the community. For the whole system a critical factor in its potential uptake is the adaptability of the system to other applications. Being domain independent the framework would require little modification if applied to another scenario.

CASCOS met and exceeded its objectives pushing ahead and producing advances in many domains. The CASCOS approach has demonstrated how it is possible to have ubiquitous application services for mobile users using constrained devices in dynamically changing open environments without any assumption of a fixed architecture. At a purely theoretical level the results would be impressive. However, the work is not merely blue-skies research but the demonstration of the system in action has shown the potential of the approach, thus forging the way for next-generation global, large-scale intelligent service environments.

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