

The increasing penetration of the mobile devices is generating a huge number of data traffic over mobile networks. Facing this challenge, from the mobile network operator point of view, IP multicast is expected to be a cost-effective solution to deal with a huge number of traffic demands (especially video traffic). As a part of an all-IP system, multicast should be considered with the IP mobility protocol which plays the crucial role in the future networks. However, it raises some issues as a result from the interaction of IP multicast and IP mobility protocols such as service interruption, packet loss, leave latency, non-optimal routing, and packet duplication. These issues may become the main obstacle for the deployment of the multicast service in the real world.

In this thesis, our main objective is to deal with the multicast mobility-related issues. The solutions are considered in the context of the evolution of the current IP mobility management: from the host-based to the network-based, and also from centralized to distributed mobility management. In more details, for a single PMIPv6 domain, we propose a method to reduce the service disruption and leave latency. We then propose a load balancing mechanism to improve the scalability of PMIPv6 networks. As DMM is still under discussion and has not been standardized, we propose an inter-domain mobility solution, which can be considered as a solution in the evolution path from to DMM. Finally, we converge to a final architecture in a DMM environment that can offer various benefits and address most of multicast listener mobility issues. Throughout our thesis, a near-to-real testbed will be used to achieve the realistic results.