A Future Mobile Packet Core Network Based on IP-IN-IP Protocol

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The current Evolved Packet Core (EPC) 4th generation (4G) mobile network architecture features complicated control plane protocols and requires expensive equipment. Data delivery in the mobile packet core is performed based on a centralized mobility anchor between eNode B (eNB) elements and the network gateways. The mobility anchor is performed based on General Packet Radio Service tunnelling protocol (GTP), which has numerous drawbacks, including high tunnelling overhead and suboptimal routing between mobile devices on the same network. To address these challenges, here we describe new mobile core architecture for future mobile networks. The proposed scheme is based on IP encapsulated within IP (IP-in-IP) for mobility management and data delivery. In this scheme, the core network functions via layer 3 switching (L3S), and data delivery is implemented based on IP-in-IP routing, thus eliminating the GTP tunnelling protocol. For handover between eNB elements located near to one another, we propose the creation of a tunnel that maintains data delivery to mobile devices until the new eNB element updates the route with the gateway, which prevents data packet loss during handover. For this, we propose Generic Routing Encapsulation (GRE) tunnelling protocol. We describe the results of numerical analyses and simulation results showing that the proposed network core architecture provides superior performance compared with the current 4G architecture in terms of handover delay, tunnelling overhead and total transmission delay.