

Reducing Traffic Impacts of PCS Using Hierarchical User Location Databases

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Abstract

Emerging Personal Communications Services (PCS) are expected to make substantial use of Intelligent Network capabilities for locating users who move from place to place. Previous studies have shown that, with predicted levels of PCS users, there will be significant loads upon the signalling network and network databases, and that these loads are dependent upon the architecture and strategy used to manage user location data.

A common architecture currently adopted in several standards proposals for PCS uses a two-level arrangement of Home Location Register (HLR) and Visitor Location Register (VLR) databases. The VLR helps to offload from the HLR some of the database and signalling traffic resulting from the protocols required to locate the called user prior to setting up a PCS call. We consider the situation where the user location databases are arranged in a tree, which may have more than two levels, thus generalizing the two-level HLR-VLR database architecture. We define a protocol for locating users in such an hierarchical architecture, and compare the costs and benefits of using this architecture with the two-level architecture in terms of signalling traffic load, mean PCS call setup time and switch processing. We show that under certain assumptions about users' calling and mobility patterns the general hierarchical architecture, and associated protocols, can result in lowering traffic and mean PCS call setup times.

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