

## Chapter XXXII

# Movement Prediction Oriented Adaptive Location Management

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### ABSTRACT

*Movement prediction oriented adaptive location management provides a major role in personal communication service (PCS) system. Generally the GSM system supports two level architecture. Because it supports two kinds of databases-Home Location register and Visitor Location Register. Every time when the user crosses the location area it has to register with the HLR. This creates high cost for registration and location tracking as it involves the use of costly bandwidth between the Mobile Switching Center (MSC) and the HLR. In this paper the technique for reducing the costs during the location tracking and location update is proposed. Taking the movement prediction of the users it creates the block and the user registers with the HLR only after crossing the block instead of crossing the single cell. This movement prediction is generated using one neural network model for all the users. The block register (BR) is introduced between the block and the HLR in two level systems, thus introduces three level architecture. In this architecture some signaling cost values between the MSC-BR, BR-HLR and BR-BR are maintained to get the better performance. In this proposed system the aim is to set the value between the MSC and BR and the two BR as small as possible and the value between the BR and the HLR must be higher to get the better performance.*

## INTRODUCTION

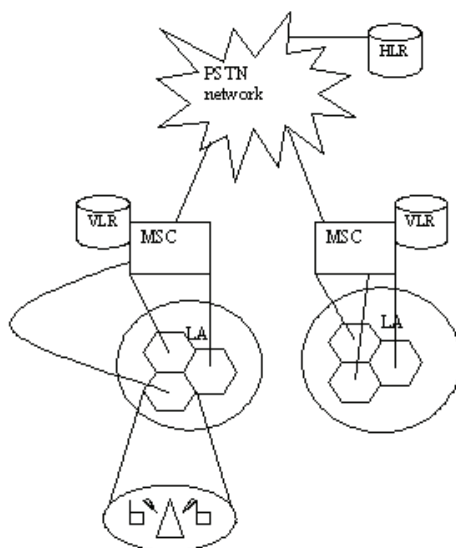
The enhanced population of mobile users of mobile network needs a reliable and uninterrupted communication. Due to increasing capacity of mobile users the signaling traffic is expanding day by day. In this situation personal communication service (PCS) network provides the efficient and uninterrupted communication to the mobile subscribers. PCS users are carrying mobile stations can communicate with the remote mobile regardless of their current location. There are two commonly used standards for mobility management. In North America IS-41 is used and in Europe Global System for Mobile Communication (GSM) is commonly used. We have used the GSM standard for the overall discussion and we will discuss the performance analysis of our proposed system with the standard GSM system.

Generally PCS network supports cellular architecture. Each cell consists a base station. When a mobile station (MS) resides in a cell it always communicates with the nearest base station. The coverage of the cell varies from few hundred meters to several km. Each cellular base station

is allocated a group of radio channels to be used within a cell. The network sends the message to the mobile station through the Mobile Switching Center (MSC). MSC acts as a bridge between the wired network and the wireless network. Mainly the base stations are connected with the MSC. Several cells constitute the location area (LA). One location area is controlled by one MSC. And each cell contains one base station. The wire line network carries user information and signaling among the MSCs and the location databases. In Figure 1, Public Switched Telephone Network (PSTN) is used as wired network. GSM standard is a two level database architecture because there are two kinds of databases in GSM architecture – Home Location Register (HLR) and Visitor Location Register (VLR). Generally the VLRs are coupled with the MSCs. It stores the location information of the users in its service area. HLR contains the permanent information of the users and pointing to the current serving VLR. HLR acts as a centralized database for storing all the user's profile. The VLRs are distributed throughout the PCS network. When the MS moves to the new MSC, signaling messages are exchanged among the HLR and the new and old VLR to record the current location of the mobile user. In the same way during the call tracking procedure when the call is going from the calling MS to the called MS the signaling messages are exchanged among the VLRs of calling MS and the VLRs of called MS. We will be discussed the registration and call tracking procedure in the following sections because the registration and the call tracking procedures are the major part of location management.

When we are discussing about the location management, first we have to define the concept of mobility management. Mobility management is the technology that supports roaming users with mobile stations to enjoy their services through wireless networks when they are moving into a new service area and location management means locating that station to deliver the calls

*Figure 1. PCS signaling network architecture*



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