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MOBILITY, LOCATION MANAGEMENT AND HANDOVER TECHNIQUES FOR WIRELESS MOBILE NETWORKS

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Abstract

Capable mobility organization technique is critical to the accomplishment of next-generation wireless systems. Efficient location management design implies minimized signaling transparency for location modernizesin accumulation to paging as well as minimized update and paging delay. Similarly, professional handoff managing sustain implies minimum latency and packet slaughter throughout handoff. In careful, handoff latency is critical designed for real-time applications such as voice, real-time video, as well as streaming services and packet loss during handoff is significant for both real-time and non real-time applications. On behalf of this reason, handoff management has become more influential in fourth generation (4G) wireless networks which support multi-media services. Location Management (LM) has become a miscellaneous and broad playing field for research, and Location Based Services (LBS) are the Application Layer of LM. This investigation document tends to begin the bookworm to the latest investigate on LM in Wireless Data Networks as well as discover the various technologies underneath investigate and assembly.

Keywords: Location Management (LM), Location Based Services (LBS), Internet Protocol (IP),Global System for Mobile Communications (GSM), Mobile Application Part (MAP), Home Location Register (HLR), Visitor Location Register (VLR), Base Station Controllers (BSCs), Mobile Switching Center (MSC), Registration Areas (RAs), Temporary Local Directory Number (TLDN), Boundary Location Register (BLR).

1. INTRODUCTION

The facility to alter locations whilst related to the network creates a dynamic situation. This means with the aim of information, which is stagnant for immobile computing, becomes dynamic for mobile computing. Millions of Terminals are associated through Internet diagonally the globe with a familiar goal of being connected 24 by 7, irrespective of the location and time. This has escort to expansion in the entire fields, money-making, educational, haulage etc. Because the Network Technologies are swiftly poignant on the augmentation track, unusual access management techniques are being proposed to meet the challenges of seamless connectivity. The organization of these networks is most important aspect as theses networks involve high source sharing. Convenient and influential computers with wireless relation to the lay down of associated will transform the way inhabitants consider as about as well as use computing. These wireless computers can converse among other computers even despite the fact that the user is mobile. People haulage a mobile computer will therefore be able to admission in rank regardless of time and current position. For illustration this project will be able to take delivery of and send electronic mail from any location or receive current information about local traffic, bus and train services. Another advantage in the midst of mobile computing is that people container computes whilst these are traveling as well as in that office.

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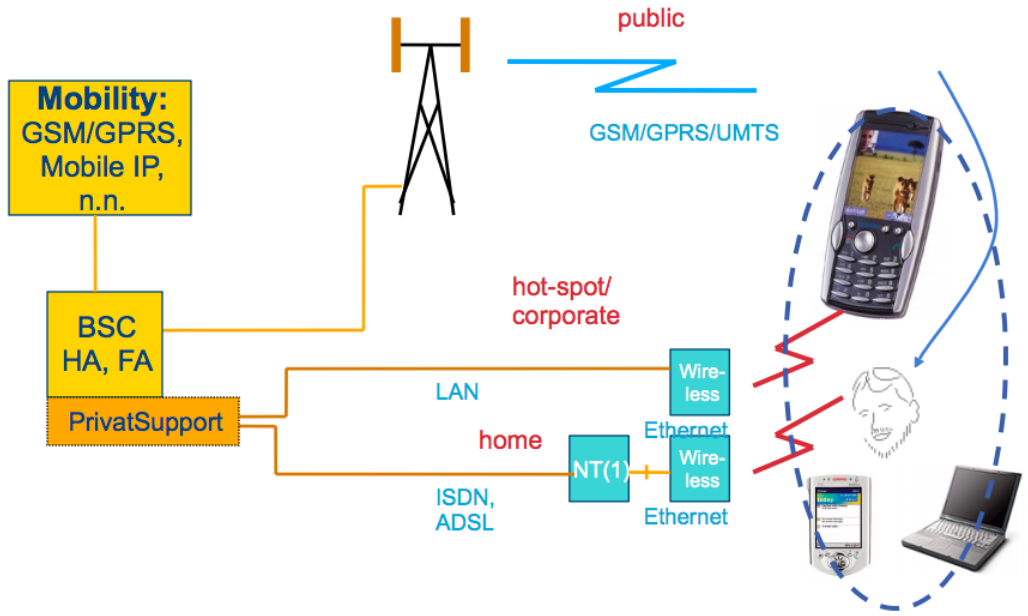

Fig.1. Mobility in Heterogeneous Network

Location management is a significant predicament in mobile computing from the time when wireless mobile computers are able to adjust setting whilst connected to the network. New strategies must be introduced to deal with the dynamic changes of a mobile computer`s network address. The minority difficulty associated throughout mobility resolve is discussed in this editorial.

2. RELATED WORK

Present are two principles for location management in stand-alone cellular networks: Electronic / Telecommunications Industry Associations (EIA/TIA) Interim Standard 41 (IS-41) and the Global System for Mobile Communications (GSM) mobile application part (MAP). Both standards are based on a centralized two-level management hierarchy. Two types of location databases, home location register (HLR) and visitor location register (VLR), are worn to store the location information of MTs. Every one customer is lastingly connected among an HLR in that subscribed network. A customer profile which includes the subscribed services, billing in progression, and location in progression is stored at the HLR for each user. Each VLR stores a reproduction of a customer sketch (downloaded from the HLR) for the MT visiting its associated area. Cells in cellular networks are partitioned into muster areas (RAs) in IS-41 (location area in GSM). All the base station controllers (BSCs) in an RA are connected to a mobile switching center (MSC), as shown in Picture2.1, which provides switching functions and coordinates location registration and call deliverance. Each MSC has a co-located VLR for location tracking. At what time initiating a call in cellular networks, the profession MT primary sends a call launch indicate to the allocation MSC throughout a close by foundation locality (pace 1 in Picture 2.2). The MSC sends a location demand communication to the HLR of the called MT (pace 2). The HLR determines the portion VLR of the called MT and sends a route stipulate memorandum to the VLR (pace 3). The MSC portion the called MT allocates a temporary identifier called temporary local register quantity (TLDN) to the MT and sends a reply to the HLR together with the TLDN (pace 4). The HLR forwards the TLDN to the MSC of the profession MT (pace 5).

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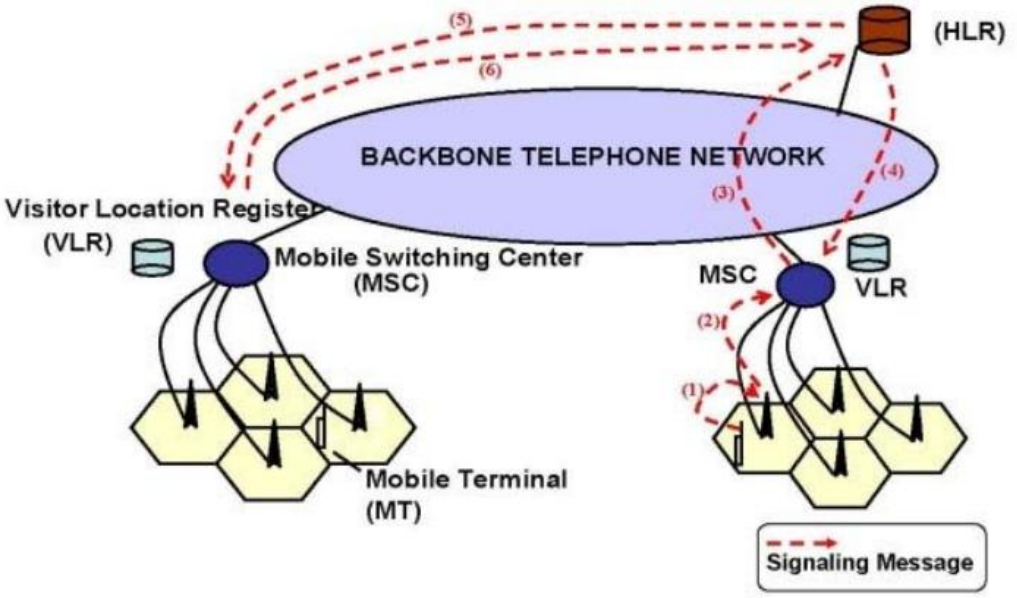

Fig.2. Location register in stand-alone cellular networks

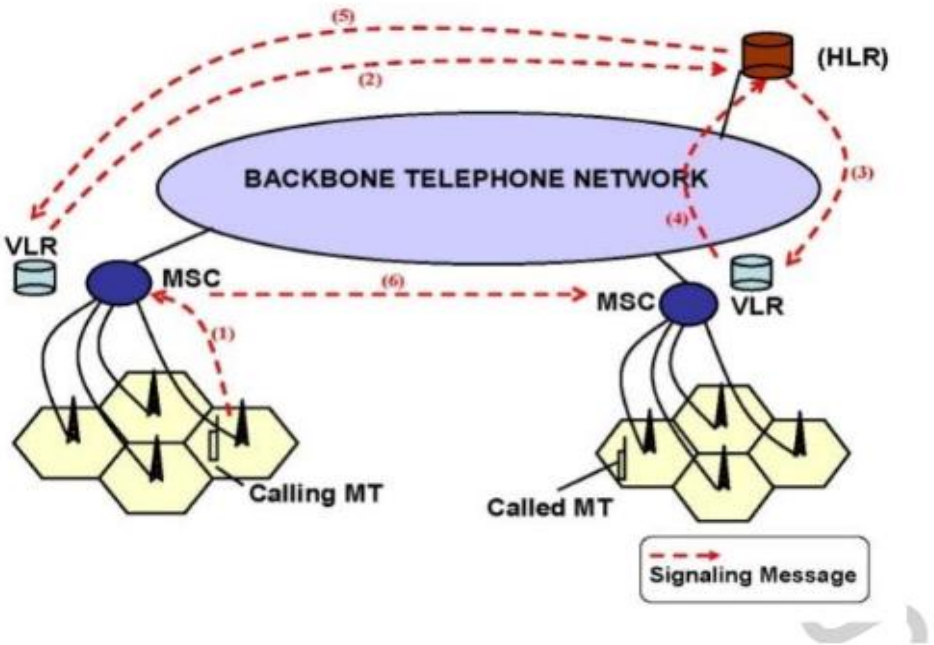

Fig.3. Call deliverance in stand-alone cellular networks

The network then set up an association from the portion MSC of the profession MT to the allocation MSC of the called MT (pace 6). Following getting the call, the serving MSC of the called MT broadcasts polling signals to all cells restricted by earnings of the coupled RA. The called MT sends a respond to the polling signal which allows the MSC to make your mind up its fashionable residing cell. This system is called paging.

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3. EXISTING SYSTEM

This segment describes existing regular of location management followed by means of the approaches evolved to surmount drawbacks of existing standard. The two popular standards at present worn are GSM as well as IS-41. Anarrangeutilize of two types of Registers, home location register (HLR) and visitor location register (VLR), to accumulate the location information of the mobile terminals. Picture 3.1 shows the basic structural design underneath this two concentration pecking order.

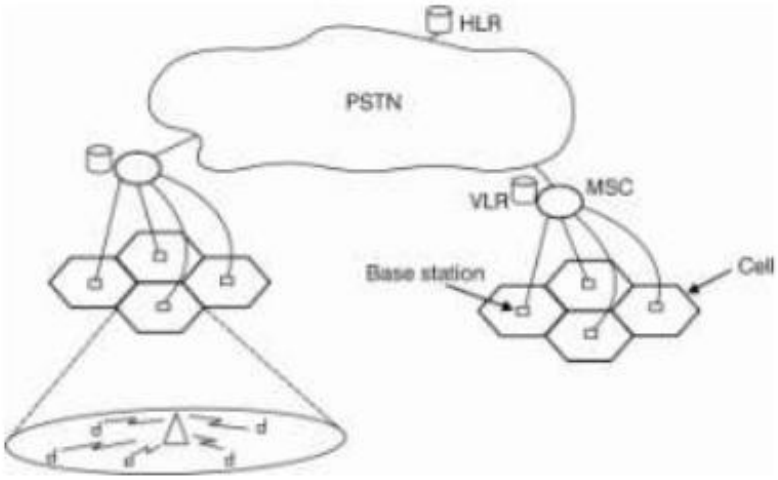

Fig.4. The Standard PCN architecture

Every one VLR: stores replications of the user profiles of the subscribers currently residing in its associated RA. In order to effectively locate a mobile terminal when a call arrives, each mobile terminal is required to report its location whenever it enters a new RA. We call this reporting process location update. On getting a location update message, the MSC updates its associated VLR and transmits the innovative location information to the HLR. We call this Register update process as location registration. The HLR will acknowledge the MSC for the successful registration and it will also deregister the mobile terminal at the VLR of old RA. In regulate to establish a mobile terminal for call delivery, the HLR is queried to resolve the serving MSC of the intention mobile terminal.

Draw Backs

- Given that every location apply for as well as position register are serviced throughout an HLR, it becomes swarming
- The centralized approaches do endure amid an extra quandary.

4. PROPOSED SYSTEM

Investigate behavior are conducted to devise broad-spectrum location management mechanisms for inter-system roaming of heterogeneous networks. The investigate behavior able to be grouped into two categories: location management for adjacent dissimilar systems with partially overlapping coverage at the boundaries and location management in multitier systems where service areas of heterogeneous networks are fully overlapped. The entire these solutions propose additional entities that take care of interworking issues between different wireless access networks.

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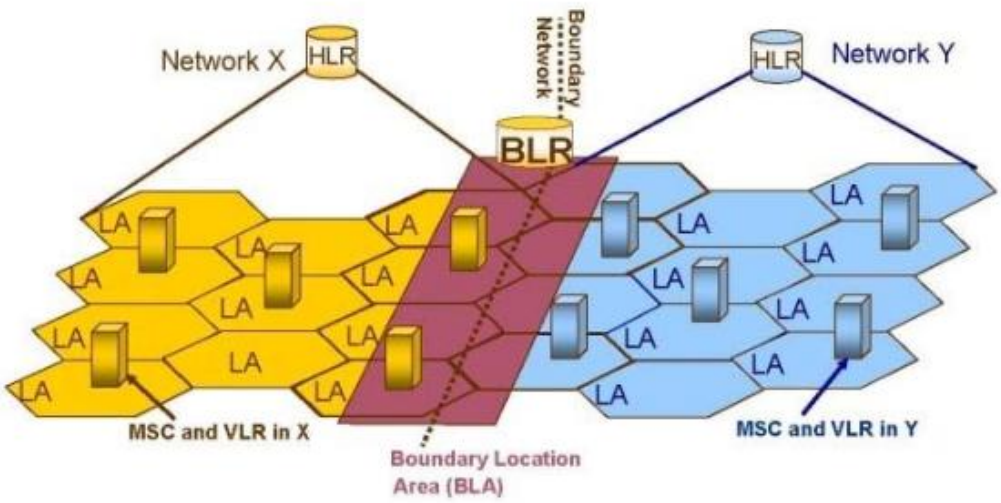

Fig.5. Boundary Location Register Proposed For Inter-System Roaming

A Boundary Location Register (BLR) is anticipated in to smooth the progress of location supervision for inter-system wandering involving two neighboring wireless systems with moderately overlapping area, as exposed in Picture 3. Anenergetic inter-systemlocation update policy is developed. An MT intelligence its location whilst its reserve from the boundary is less than a modernize distance. The update reserve is variable in excess of time depending on the network consignment and the mobility patterns of apiece MT.

Rewards

- Terminal mobility: The ability for a consumer terminal to maintain to right of entry the network when the terminal moves
- User mobility: The ability for a user to continue to access network services from different terminals under the same useridentity when the user moves
- Service mobility: The ability for a user to access the same services regardless of where the user is.

5. SYSTEM MODEL

- Location Management
  - Seek out: Find a mobile user's existing location
  - Update (Register): Update a mobile user's location
  - Dynamic Location Updating Scheme: Maintained at a variety of granularities (cell vs. a collection of cells called a muster region)
  - Examine Issue: organization of location databases
    - Global Systems for Mobile (GSM) vs. Mobile IP

- Handoff Management
  - Ensuring that a mobile user remains connected while moving from one location (e.g., cell) to another
  - Packets or associated are routed to the new location
  - Decide when to handoff to a new access point (AP)
  - Select a new AP from among several APs
  - Acquire resources such as bandwidth channels (GSM), or a new IP address (Mobile IP)
  - Channel allocation is a research issue: goal may be to maximize channel usage or revenue generated
  - Inform the old AP to reroute packets and also to transfer state information to the new AP
  - Packets are routed to the new AP
- Seek Out
  - HLR -> VLR0 -> …. -> VLRi -> cell ->paging
- Update
  - When the length of forwarding pointers < K:
    Set up a pointer between the two involved VLRs
    - When the length of forwarding pointers = K:
  - Update information in the HLR
  - Location update algorithms can be static or dynamic
    - With static, an update is triggered because of crossing of RA boundaries, e.g., the basic HLR-VLR scheme
    - With dynamic, update or not depends on a user's call and mobility patterns
  - Dynamic Location update schemes:
    - Time-Based, Movement-Based, Distance-Based
- Dynamic Location Update Schemes
  - Time-Based: A mobile terminal updates in every T time units
  - Movement-Based: A mobile terminal counts the number of boundary crossings and performs the update when a threshold is exceeded (e.g. M=6)
    - Forwarding pointers can be considered as a variation of it.

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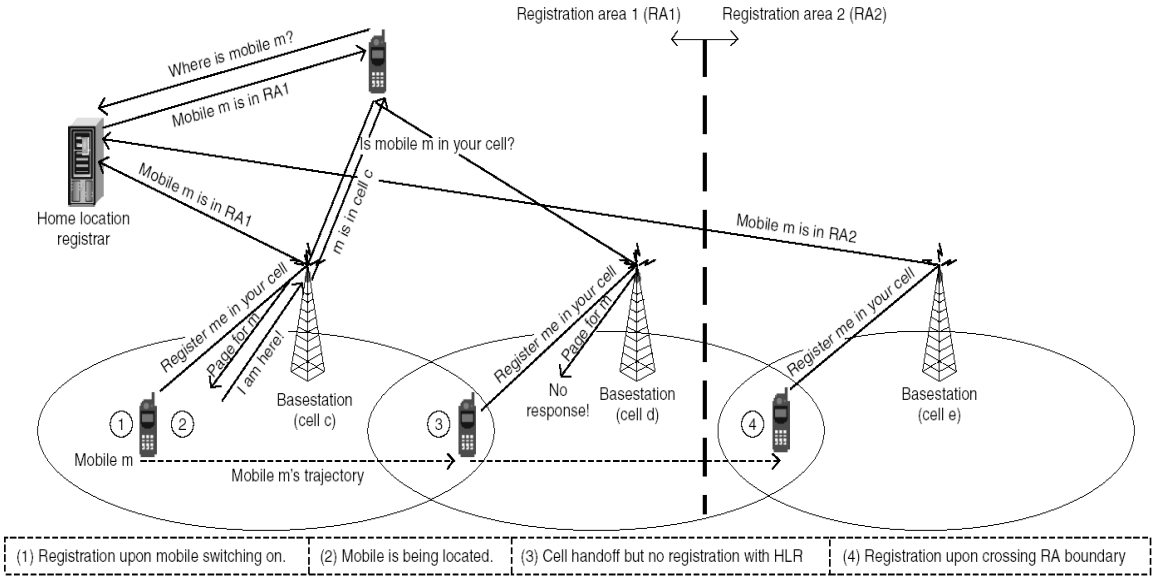

Fig.6. Process of Mobility and Location Management

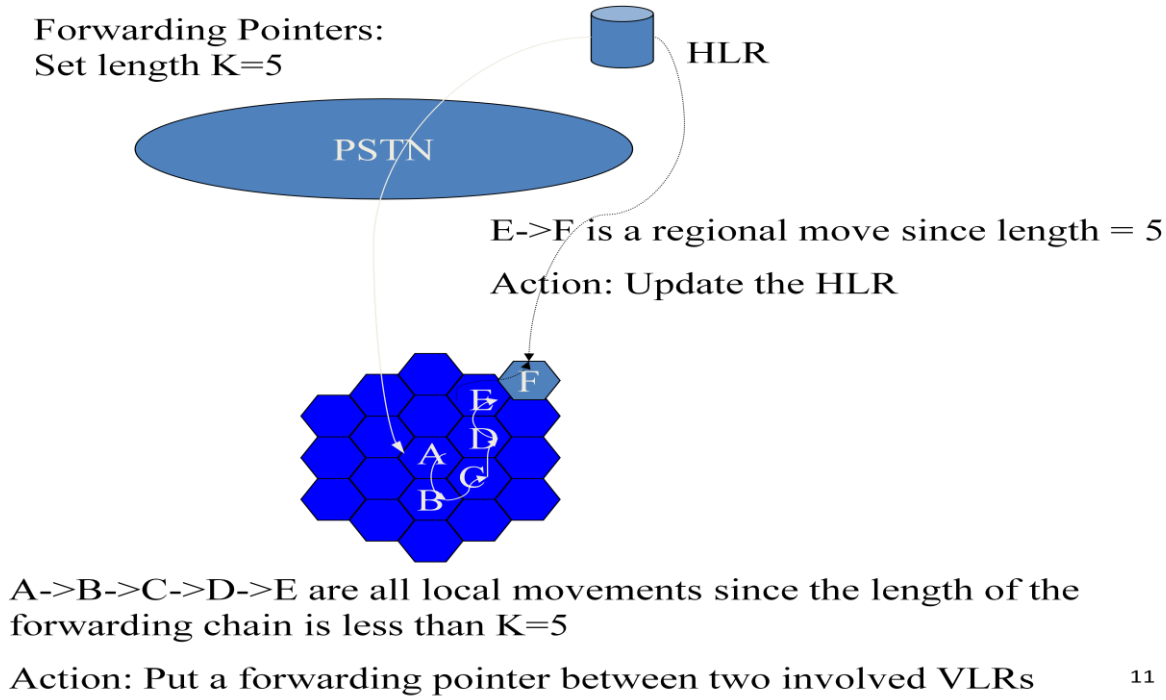

Fig.7.Forwading pointer process

- Examine Issue
  - Distance-Based: A mobile terminal tracks the distance D (in terms of RAs) it has moved since the last update
    - Update is performed when a distance threshold is exceeded

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- Mobile terminal needs some knowledge of the network topology
- Local Anchor can be considered as a variation of it.

Algorithm

- T is the time gap for the stage a location modernize
- Imagine a search procedure performs an expanding ring search
- Let l be the call arrival rate and s be the mobility rate. Then the maximum area to be searched is a circle of radius s * min(1/l, T) cells.
- Normalizing each update operation with a cost of 1 and each search operation with a cost of s * min(1/l, T) , the cost of time-based management per unit time is:

$$C = l * s * \min(1/l, T) + 1/T$$

- When 1/l > T, C = l * s * T + 1/T. Take dC/dT=0, Topt=1/sqrt(sl), implying that when either s or l increases, Topt decreases

LeZi Update

- Based on a compression algorithm by Ziv and Lempel
- LeZi is a path-based update algorithm by which the movement history, not just the current location, is sent in an update message
  - The history has a list of zone (LA or cell) ID's the mobile terminal has crossed
  - The location database keeps the history in compact form by means of a search tree structure
  - Can be part of the user's profile
  - On a call arrival, selective paging is performed

6. PROCESS

In order to satisfy the above requirements, next-generation wireless systems with mobility management should have two basic functional capabilities:

- Location management: A procedure to facilitate enables the system to establish a mobile device's current location, i.e., the current network attachment point where the mobile device can receive traffic from the system.
- Handoff management: a process that enables a mobile device to change its network attachment point while keeping its on-going traffic uninterrupted. If the network attachment point change involves the roaming into another network with a different operator, then network access control is also involved in the handoff process. Network access control includes authentication (verify the identity of a user), authorization (determine whether a user

should use the network service), and accounting (collect information on the resources worn by a user).

CONCLUSION

Location management is a key factor for mobile computing. Without a good strategy for location management, mobile computing cannot exist. In this article we have looked at different mechanisms to locate a mobile computer's current network address and discussed their advantages and disadvantages. What we aim for is a location management scheme that will provide efficient searches and updates transparent to the user.

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