Managing Mobility

Presented by
Scott J. Swindell
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Introduction

\textbullet \ Two Views of Mobility Management:

\textbullet \ Mobility Management in Next Generation Wireless Systems
  \textbullet \ Written by Ian F. Akyildiz, Janise McNair, Joseph Ho, Huseyin Usyanlioglu, Wenye Wang (GIT)
  \textbullet \ Appeared in \textit{Proceedings of the IEEE}, Vol. 87, No. 8, pp. 1347-84, August 1999

\textbullet \ Application of Mobility in \textit{AirMeeting}
  \textbullet \ Developed by Jason Agee and Scott Swindell
**Mobility Management in Next Generation Wireless Systems**

- Future of wireless will include data transfer, video conferencing, image transfer, and video delivery, etc.
- Achieving mobile multimedia will require development of next generation wireless systems
- Components of Mobility Management:
  - Location Mgmt. And Handoff Mgmt.

**Mobility Management Components**

- Location Management
  - Location Registration
  - Call Delivery
- Handoff Management
  - Initiation
  - New Connection Generation
  - Data Flow Control
Location Management

- Location Registration
  - Authentication
  - Database Updates
- Call Delivery
  - Database Queries
  - Terminal Paging

Handoff Management

- Handoff Management
  - Initiation
    - User Movement
      - Network Conditions
      - Resource Allocation
      - Connection Routing
  - New Connection Generation
  - Data Flow Control
    - Buffering & Sequencing
    - Multicast
Future Wireless Network Architecture

Next Generation of wireless will provide basis for evolving networks to implement mobility of terminals, users, and services.

Proposed Third Generation Systems:
- International Mobile Telecom System (IMT 2000)
- Universal Mobile Telecom. System (UMTS)
- Future Public Land Mobile Telecom. System

IMT 2000 Specification

Developed by the International Telecommunication Union (ITU)

Three Key Features:
- Hierarchical Cell Structure
- Global Roaming
- Radio Spectrum
Hierarchical Cell Structure

- Global
- Satellite Cell
- Suburban
- Macro-Cell
- Urban
- Micro-Cell
- In-Building
- Pico-Cell

Global Roaming

- **Terminal Mobility**
  - Ability of a MT to receive data regardless of its point of attachment to the network

- **Personal Mobility**
  - Ability of a User to access services regardless of their MT

- **Service Provider Portability**
  - Allows User to receive services regardless of the current network
Radio Spectrum

- Current Spectrum segmented in limited amounts for specific services
  - paging, cellular, PCS, mobile data, satellite, microwave, etc.
- IMT 2000 includes all segments in a standard pool of frequencies
  - Segmented only between IMT and Satellite
Problems

- Will take time to standardize and implement Next Generation systems
- Current mobility services very protocol dependant
- Want Wireless & Mobile Multimedia applications now rather than waiting for future network changes!

Solution

- Manage Mobility at the Application Level rather than waiting for it to be implemented at a lower level...
**AirMeeting**

- Demonstrates Wireless and Mobile Multimedia Networking in the form of Videoconferencing and Reliable Data Transfer
- Client-Server Architecture
  - Fixed Server Manages Mobility
  - Client Informs Server of Location
- Written in Java, using IP/UDP

**Location Management in AirMeeting**

- Server tracks current location of all online clients
  - Client informs server of location at logon
  - Client informs server if location changes
  - All communication from one client to another is sent to server, then forwarded to the correct destination location
**Handoff Management in AirMeeting**

- Users can roam from BS to BS without being severed from their current VideoConferencing session.
- When MT switches BS's it informs AirMeeting Server of new IP.
- Video packets are dropped during switch.
- Reliable Data is buffered until location is re-registered.

**Conclusions**

- Next Generation Wireless Networks such as IMT 2000 will manage global mobility throughout heterogeneous networks, facilitating Multimedia.
- AirMeeting shows that Multimedia Mobility can be achieved now.