Mobility Management

Files & media	05-MobilityManagement.pdf
Name	Lecture 5
Review	☐

location management - set up connection for msg delivery, update location database, location

movement of user - uncertainty of device

handoff management - maintain connection as device continue move and change its access point

Mobility Management in Cellular Network

handoff management

- process of transferring ongoing call from one channel connected to core network to another channel
- old traffic release & new traffic channel assigned
- reason: move out of coverage of BS, signal strength deteriorate below threshold, traffic load management
- handoff complete before signal strength drop below minimum acceptable level, / disconnected & dropped

Process

- handoff initialization - identify need
- new connection generation - network find resource for handoff connection & perform additional routing operation for connection establishment
- data-flow control - control delivery of data-flow from former connection path to new connection path

- handoff completion - release unneeded resource

Dissociation - MS dissociated w/ old BS, traffic channel assigned to MS in old BS released

Re-association - MS associated with new BS, traffic channel in new BS assigned to MS

Handoff Decision Algorithm

received signal strength

RSS	choose BS(new) if P(new) > P(old)
RSS with threshold(Pt)	choose BS(new) if P(new) > P(old) & P(old) < P(t)
RSS with hysteresis(Ph)	choose BS(new) if P(new) > P(old) + P(H)
RSS with threshold & hysteresis	choose BS(new) if P(new) > P(old) + P(H) & P(ol) < P(T)

Hard Handoff - break before make

- stay connect to only one cell at a time
- break with old cell before establish connection with target cell
- momentary call disruption during handoff
- FDMA & TDMA

Soft Handoff - make before break

- MS connect multiple cell at same time, use combined multiple signal
- switch without call disruption
- CDMA

Types of Handoff Processes

Intra-cell handoff:

- inside cell but across sector / MS signal strength deterioration in the original traffic channel
- BS find new traffic channel with appropriate signal strength in same cell

- transfer to new channel
- dissociation & re-association, no handoff

Inter-cell handoff

- MS move into adjacent cell
- user call transfer to new traffic channel in target cell
- handoff, dissociation / re-association in traffic channel of BSs, link b/t BS and same MSC, coordination of MSC

Inter-MSC

- MS move cross boundary of 2 cell which managed by diff MSCs
- handoff & dissociation/re-association, both MSCs & BSs

location management

location management

locate & track MSs

discover current access point of the MS for call/message delivery

update location database

2 method for location management

Without location update

- no maintain current location info of MS
- when call arrive, network send searching msg over cover area, when receive, MS reply
- simplicity, no location update cost
- high searching cost for incoming calls, need response time for searching MS

location update w/ location areas(LA)

- LA: network divided into number of non-overlapping partition, each partition contain certain adjacent cells called LA

- MS reports its current LA info to system - location update
- maintain LA of MS: no precise cell, seach MS in LA
- ad: limit searching area to LA, save searching cost

Location Database

- home location register(HLR)
  - home DB of MS, locate at pre-specified zone, maintains user data and current LA of user in user profile, MS move, LA info update
- visitor location register(VLR)
  - dynamic DB contain temp info about MS
  - locate as MSC to serve visiting MS
  - when MS move into new area, VLR at MSC will request info about MS from HLR

Location management Operation

1. Subscription
2. location update Process
3. call delivery Process
4. paging Process

- Parallel Paging & Sequential Paging

Location Management Cost(Calculation)

Location Management Issue

Location Update Method

- static LA
- dynamic LA
  - time-based
  - distance based

    - movement based

Drawback of HLR/VLR

Routing Optimization

mini HLR query cost for call delivery

- per-user location caching
- user profile replication

mini HLR update cost for location update

- pointer forwarding
- local anchoring

Mobility Management in Wireless IP Network

Mobile IP

Mobile IP Architecture

Location Management

- Agent Discovery
- Registration
- Data Delivery

- Routing inefficiency
- Routing Optimization

Handoff Management in Mobile IP