5th week
5.03.2011

Power Management & Location Management

Power Management

- connect to a network when necessary
- interval for listenning network should be large - discontinious reception DRX
- two states → idle - low power cons.
  → active (connected) - high power cons.

Loc Management

schemes: what should be shape of tracking area (TA)

- overlapping / non overlapping

shapes static TA (fixed) dynamic TA. (depended upon where UE last did his TA update)

costs

paging cost: - cost from network side : # of cells where UE needs to be paged.

- paging channel capacity is also important: large # of pages, but limited paging capacity!
- to find UE! eNB, searches for UE -

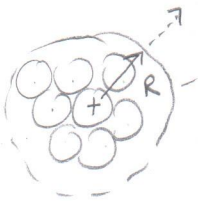
update cost tracking area update

- transmission power cost on UE for sending its TA updates.
- signalling cost in network.

Dynamic TA size

- Threshold Based
  - Time Based Th: UE starts timer when expired UPDATES!
  - Movement Based Th: whenever UE makes X transitions TA update
  - Distance Based Th
- Profile based: You are trying to look to profile of UE not just his last loc. ex// If he is moving fast, assign bigger radius.

Distance Based Deployment Scheme (used in CDMA)



this radius is TA, if he goes outside of circle, will do new TA.

~ papers from Sidhuda var.

Paging Schemes

- Simultaneous
- sequential paging
  - page last loc., he updated. If not found page entire area

delay becomes issue

- profile based paging (intelligent paging)
  - delay becomes issue.

WHAT IS IMPLEMENTED in LTE

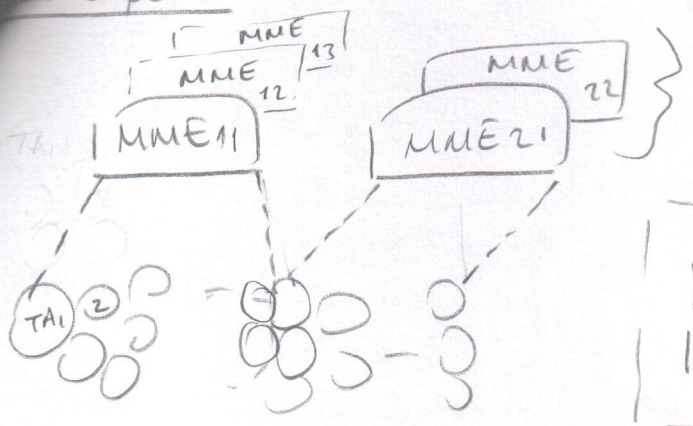
Location management in LTE:

- STATIC location/tracking areas.
- non overlapping TAs
- UE can be admitted to multiple TAs!

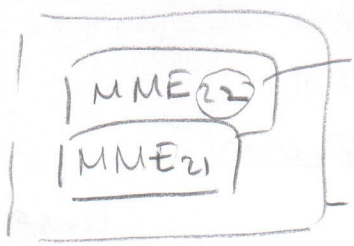
when UE comes to •, network can say, you belong to TA1 & TA2, then he does not need to update when he passes to TA2

- UE needs to be paged in all admitted TAs!

aspects



"MME group" is load sharing particular set of TA's.



color code of MME

MME group id #:2

∝ when UE moves to TA2, and does a TA update, this update has to be gone to MME who has his context!!

HOW? how does eNB find MME which has UE's context?

- sent to all MMES? X
- UE tells eNB which MME has his context! ✓

When UE does TAU, the MME provides UE with a temporal identity which contain the MME identity ⇒

GUTI: globally unique temporal identity

contains MME group id & color code.

S22

GUTI will say I am connected to MME11. when eNB in TA5 retrieves, he knows he is not connected to MME11 ⇒ context transfer & MME21 will update GUTI.

moving to new MME: MME updates GUTI to point new MME! (all done as part of TAU)

idle mode procedures

- check for pages
- selecting different (6s's) cell' actually

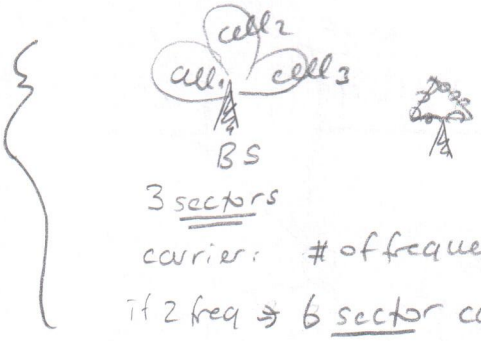
procedure is called

cell re-selection

listens to bcast message & learns

(PLMN, cell-id, TAI)

└ then will decide if TAU is needed)



3 sectors

carrier: # of frequencies.

If 2 freq ⇒ 6 sector carrier BS

for cell reselection

- Basestation's transmit power

≡ UE listens reference symbols → 533 tevar.

bate slot lor sadece ref. signal di!

- listens to transmit power of neighboring BS's

neighbr TP − your BS's TP > th ⇒ switch (select that cell)

UE "camps on" a cell" ; UE is listenning to the BCAST mes. from the cell

- discover new cells - lowest periodicty
- measure power of all discovered cells - highest period
- decide which cell to camp on - medium periodicty

Cell reselection : when to make measurements & reselection evaluation?

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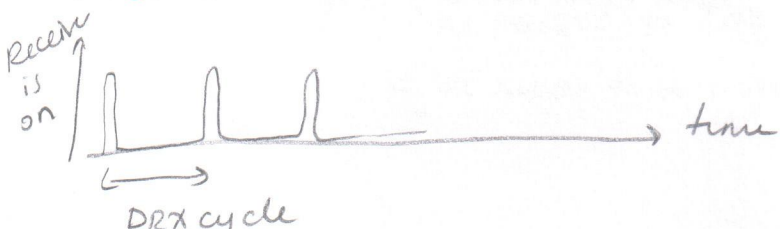
when UE decids to check for pages?

DRX cycle. discontinious reception -



radio frames {32, 64, 128, 256}
320 640 msec 1.28 sec.

Frame # 14 → 14 + 32 = 46
46 + 32 = 78
78 + 32 ; } at every 32 frames I listen.

which subframe to listen to?

PO: subframe that contains paging message — UE needs to monitor only 1 PO per DRX cycle.
(PF: radioframe " " 1 or more PO)

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active mode DRX handed over by network

Slide 45

Differences in WiMax?

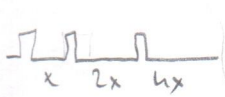
- paging group ≡ TA
- can have overlapping PG
- UE can belong to only 1 PG
- ASNGW can request another ASNGW to also page UE! (not in the case in LTE)
  (RU überindet!)
  (in LTE, only 1 MME is responsible for paging UE)

S48

LTE

- WiMAX
  sleep mode ≡ connected mode DRX
  short DRX cycle, long DRX cycle

class 1 class 2 class 3



increasing sleep cycle exponentially

fixed period

1 time sleep