Technical Trend of Location- Based Service

& RFID/USN

(S. H. Lee)   LBS
(K. W. Min)   LBS
(J. C. Kim)   LBS
(J. W. Kim)   LBS
(J. H. Park)

....

.
.
. LBS
. LBS
.   LBS
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I.

.   LBS
                                                                                      .

          .   ,
GPS   ,   ·
                                          .   (LDT)
                              ,
                          ,   (network-based)
                                                                GPS
          .   ,   (LBS)   (handset-based)   ,
                                                                        (hybrid)
                        .   [1]-[3].

LBS   ,
                                                      500
      . LBS   GPS
      GPS, GIS, ITS   ,

                                ,   ,   ,
                                            GPS
    .   ,   , DMB, RFID/USN   .

                                                                                  A-GPS
                                                    DGPS   .
    .   2003   LBS
              , 2005   1   '
            ,   LBS
                                                          .
        .   • Cell ID
            LBS   Cell-ID
, LBS   , LBS
                    ,   ETRI   ,
      LBS   .   ID   3
LBS   ,   .
                      ,   ((1)
                                    ,   ,
    ,   LBS   ).
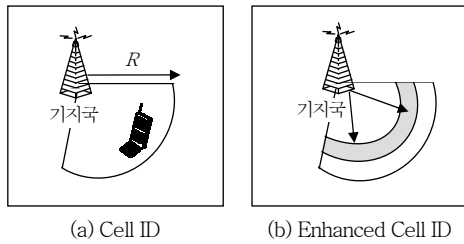
(a) Cell ID   (b) Enhanced Cell ID

(1) Cell ID   Enhanced Cell ID

• Enhanced Cell ID

Enhanced Cell ID   GSM
, Cell ID

.

,   RTT(3GPP FDD
Only)   .   RTT

.

• AOA

AOA(Angle of Arrival)
3

,
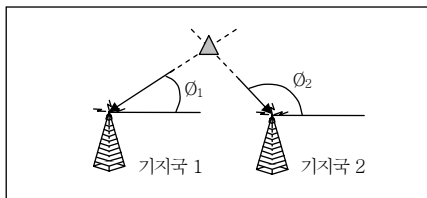
AOA

VOR
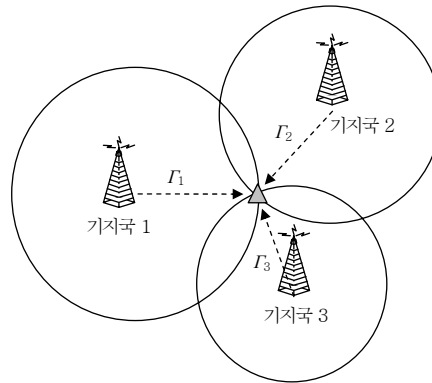.   50~150m
,   150~200m
((2)   ).

(2) AOA

• TOA

TOA(Time of Arrival)
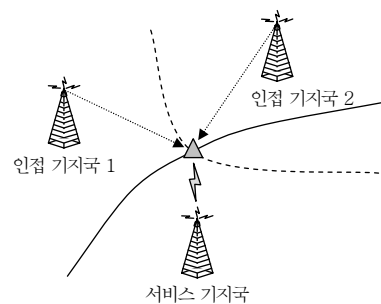
2

/

. ,

,

,

125m   ((3)   ).

(3) TOA

• TDOA

TDOA(Time Difference of Arrival)

.

,

.

50~200m
((4)   ).

(4) TDOA

• A-GPS

A-GPS(Assisted-GPS)

•

. GPS

, RFID,

,　　　　　　　　　[4],[5]　　　　　　　　　　　.

· ,　　　　　　　　·　　　　　　　　　(indoor

positioning technology)

.

PDE　　　　PDE

.

. LBS

• DGPS

LBS　　　　　LBS

DGPS(Differential GPS)　　　　　GPS

,　　　　,　　　　　　,

.

,

•

(location server)

.

• E-OTD

,

,

E-OTD(Enhanced Observed Time Difference)

.　,

2

,　　　　　　　,

,　　　　,

. GPS

,　　　　　　　　　LBS

75~150m

.

.

•

• Galileo

. LBS

DB　　　　　　　DB　　GIS DB

GPS

DB

.

DB　　　　　.

2008　　　　30

, Galileo　　　　　　　　GPS

GPS

. GPS　　　　　　　　　　　　　　.

55%　　　　,

96%

.

.　　　　　　　　　　　　　　　　　.

,

/

. 100 Tracking, Commerce .

• Information

DB .

'Chorochronos'[6]
" / ", " ", " !
"

ETRI .
DBMS . • Entertainment

•

LBS
, LBS .

. " ", " ", "LBS ", "
X, Y ", " ", " "
(geocoding) (reverse-geocoding) .

, • Safe & Security
, , GPS

, .

. . " ", "i-Kids", "GPS "
.

Ⅲ. LBS
• Tracking

, LBS , ,

,
.

. 1999
, , " ", "
LBS , , / ", " ", "
. "

• Commerce
1. LBS LBS ,
LBS , m-
Information, Entertainment, Safe & Security, Commerce L-Commerce

,   .

                                    ,

                                                    . 2004

                                7   911

                            E911   . E911

                            Autodesk   "Friend connect",

.   LBS   Kivera   Voltdelta

                                        "Driving directions"

2.   LBS

                                            ,

•

                                        ,   ,   ATM

    LBS   2001   KDDI   "Find places"   .

gpsOne   GPS

        . 2001

    CP

NTT   KDDI   ## .   LBS

                            ETRI   LBS

            . , LBS   LBS

                , PC,   ,   .   LBS

,   , PDA   ,   ,

                .   ,   DBMS,

•

                                                                    .

    LBS   L-Commerce,   –

        ,   ,   ,   LBS

            2000   ((5)   ).

        .   LBS   ,

                            ## 1.   LBS

        ,

, LBS   •

                E112

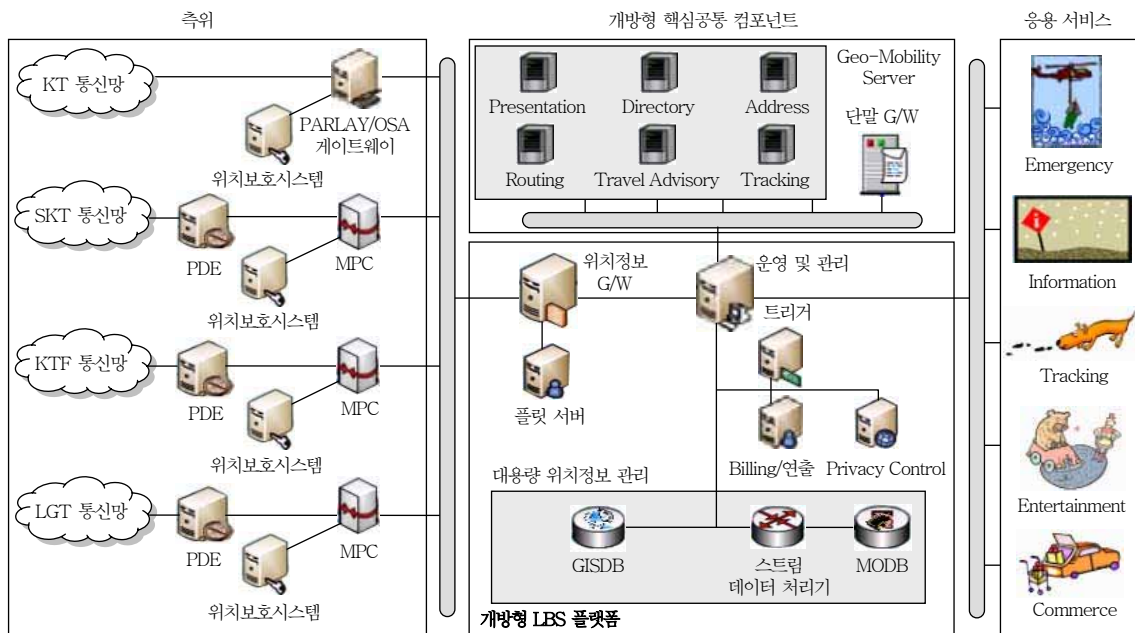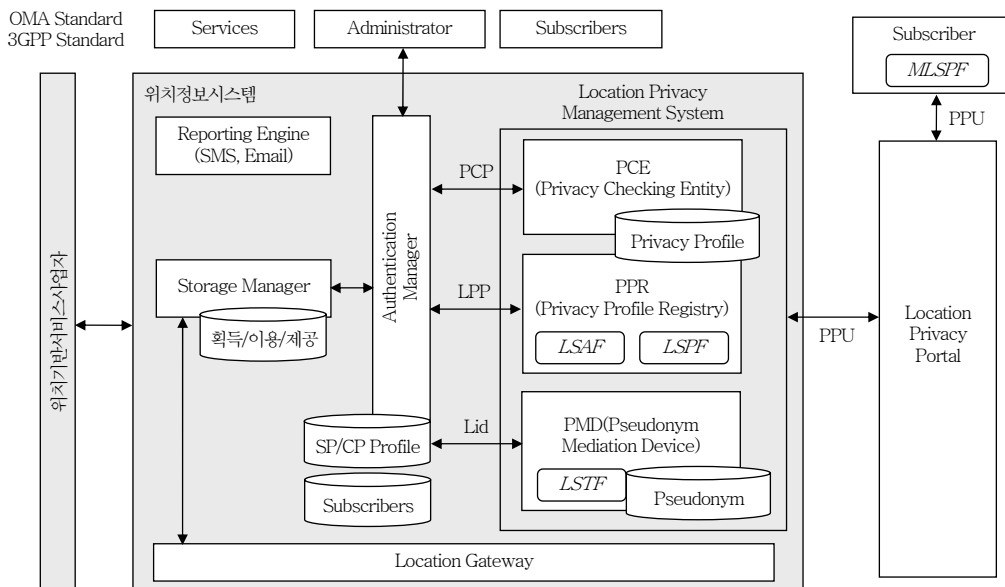   LBS   ,

                . Vodafone, Or-   ETRI   LBS   KLP

ange, T-mobile   . KLP   OMA

                                        MLP

    Vodafone   .

            .

                                •

•

    LBS   ,'   ' 2004

E911(Enhanced 911)   12   , LBS

                .   ,   .

측위　　　　　　　　　　　　개방형 핵심공통 컴포넌트　　　　응용 서비스

(　　5)　　　　LBS

(　　6)

, PPR, PCE

PMD , PCP, PPR PMD

, LPP Lid OMA 3GPP

PCE ((

, 6)).

• Assisted, MS-Based
((7)).

, • DBMS

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,

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, MS-

DBMS

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, , ,
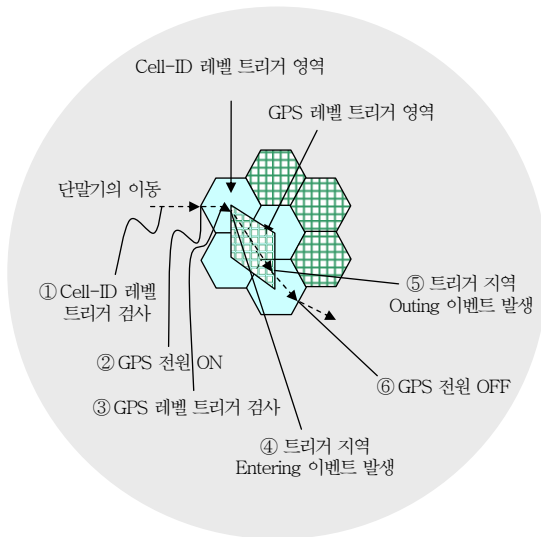
, ETRI

DBMS LBS

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•

LBS LBS

LBS

LBS .

LBS OGC OpenLS

'GeoMobility Server'

, XML

(7) Multi- Level Location Trigger

단말기의 이동

Cell-ID 레벨 트리거 영역

GPS 레벨 트리거 영역

① Cell-ID 레벨
트리거 검사

② GPS 전원 ON

③ GPS 레벨 트리거 검사

④ 트리거 지역
Entering 이벤트 발생

⑤ 트리거 지역
Outing 이벤트 발생

⑥ GPS 전원 OFF

Open LBS Geo-Mobility Server v3.0

Management Presentation Directory Address

Location Travel Advisory Tracking Routing

LBS 단말
게이트웨이

KTF
KTF MPC Open GW

SK Telecom
SKT MPC Open GW

LG Telecom
LGT MPC Open GW

Open API

Traffic Data
Service ASP

Weather Data
Service ASP

Road Construction
Data
Service ASP

OpenLS Interface

Internet

(8) GeoMobility Server

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. , LBS   WIPI, WinCE

   J2ME   LBS   .

,   ,   LBS   ,

((8)).   LBS

2.   LBS

,   DBMS   ,

                          IT

• L-Commerce   .

. Safe-Zone

   ,   ,   .

, LBS

                          .

•   –

  GPS

               ,

                 .

A-GPS	Assisted-GPS
AOA	Angle Of Arrival
DGPS	Differential GPS
DMB	Digital Multimedia Broadcasting
E-OTD	Enhanced Observed Time Difference
GIS	Geographic Information System
GPS	Global Positioning System
ITS	Intelligent Transportation System
KLP	Korea Location Protocol
LBS	Location-Based Service
LDT	Location Determination Technology
LPP	Interface between Platform and PPR
LSAF	Location Subscriber Authorization Function
LSPF	Location Subscriber Privacy Function
LSTF	Location Subscriber Translation Function
MLP	Mobile Location Protocol
MO	Moving Object
PCE	Privacy Checking Entity
PCP	Privacy Checking Protocol
PDE	Position Determination Entity
PMD	Pseudonym Mediation Device
PPR	Privacy Profile Registry
PPU	Privacy Profile Update
RFID	Radio Frequency Identification
RTT	Round Trip Time
TDOA	Time Difference Of Arrival
TOA	Time Of Arrival
USN	Ubiquitous Sensor Network
VOR	Very high frequency Omnidirectional Range

•   LBS

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              .   ,

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           .

LBS

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    nologies in Cellular Networks: An Evaluation of
    Their Performance Metrics," *MILCOM 2002 Proc.*,
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    Personal Positioning," Doctor of Technology Thesis

Work, Tampere University of Technology, Mar. 2001.

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    Sensing Using Active RFID," Wireless Networks,
    Vol.10, Nov. 2004.

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