Location Based Service

The Design & Implementation of Location Based Services for Mobile Carriers In Taiwan

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Alex Huang
huang@olemap.com
OleMap Inc.
Agenda

- The Data Service & LBS Market in Taiwan
- Service Model (Consumer & Corporate Services)
- Major LBS Issues in Taiwan
- Lessons Learnt
- Appendix – OleMap’s LBS offerings
Data Service & LBS Market in Taiwan
The Taiwan Miracle

Growth of Cellular Phone Subscribers in Taiwan

Unit: 1,000

Source: The Directorate General of Telecommunications
Ministry of Transportation & Communications
Gauging the Real Potential for Mobile Data Service

Number of Cellular Phone Subscribers Using WAP & GPRS

Unit: 1,000

Source: The Directorate General of Telecommunications
Ministry of Transportation & Communications
Taiwan LBS Industry at a Glance

Circumstance

CDMA2000  WAP 2.0  XHTML Basic  GPRS  WCDMA  MMS  3G Licenses  BREW

LBS progression

Concept Platform Developing Development Service (first stage) Service (second stage) Service (third stage)
Initial stage Platform-based Application-based Omni bearing

2001 2 3 4 5 6 7 8 9 10 11 12 2002 2 3 4 5 6 7 8 9 10

Carriers

1/3 contact with KGT  5/17 contact with TCC  6/29 contact with Mobitai  2002.3 3G Licence  2002.4 Mobitai Mobee  KGT i-mode
2/16 contact with FET  5/24 contact with TAT  2001.7 contact with FITEL  3/18 contact with PSAP  2002.5 NOKIA 9210c Java Handset  FET i-Style
3/12 contact with CHT  6/8 contact with FITEL  2002.1 CHT emome  4/9 contact with 3G Mobile  6/20 TCC MMS  BREW Release2.0

LBS Services


生活總檢索  氣象小精靈  戀戀美食  台灣走透透  玩樂一把罩  任我遊
娛樂總檢索  氣象播報台  我的樂透  玩樂指教授  晴雨娘娘  捷運玩樂通
交通總檢索  台灣玩得瘋  明牌大追擊  美食新鮮嚐  活就救急站  火公車自在行
道路救援  有巢氏租屋  氣象鮮收報  購物智慧王  行動金融家  超級美食家
金融理財家  打工家教族  銀行兌獎點  生活一指通  寶島追隨者  無線閱讀

Location 交友  TaipeiWalker  追蹤大明星  交際大明星
# OleMap - Service Bureau and Wireless Products

**Discover the Power of Location**

<table>
<thead>
<tr>
<th>Carrier</th>
<th>System</th>
<th>Users (Million)</th>
<th>Portal</th>
<th>MMS</th>
<th>Data VAS Subscriber</th>
<th>Wide-Band</th>
<th>CP/SP</th>
<th>MPS/ LBS</th>
<th>Positioning Accuracy</th>
<th>SDK</th>
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<tbody>
<tr>
<td>TCC</td>
<td>GSM (3G)</td>
<td>6.8</td>
<td>E-WAP (WAP)</td>
<td>TCC MMSC</td>
<td>&lt;1,000</td>
<td>Not Available</td>
<td>CID</td>
<td>About 1~2 km</td>
<td>×</td>
<td></td>
</tr>
<tr>
<td>CHT</td>
<td>GSM/ GPRS (3G)</td>
<td>7</td>
<td>Emome (WAP)</td>
<td>TBD</td>
<td>&lt;60,000</td>
<td>GPRS 20-30K</td>
<td>&lt;30</td>
<td>Enhanced CID (CHT)</td>
<td>About 250~350 m</td>
<td>×</td>
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<tr>
<td>FET</td>
<td>GSM/ GPRS (3G)</td>
<td>3.9</td>
<td>Super I-Style (WAP)</td>
<td>Ericsson MMSC</td>
<td>&lt;30,000</td>
<td>GPRS 20-40K</td>
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<td>Enhanced CID (Ericsson)</td>
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<td>KGT</td>
<td>GSM/ GPRS</td>
<td>4.1</td>
<td>n-mode like (n-mode)</td>
<td>i-mode</td>
<td>&lt;2,500</td>
<td>GPRS 30-40K</td>
<td>&lt;120</td>
<td>×</td>
<td>×</td>
<td>✔</td>
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<tr>
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<td>Depends</td>
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<tr>
<td>FIT</td>
<td>PHS</td>
<td>0.32</td>
<td>Mimi (PHS)</td>
<td>PHS</td>
<td>&gt;200,000</td>
<td>PHS 64K</td>
<td>&gt;400</td>
<td>CID+ Multi-path (UTStarcom)</td>
<td>About 80~100m</td>
<td>✔</td>
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</table>

- Data source from public information
- 3G License, APBW(CDMA2000) and 3G Mobile(WCDMA) not included.

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Service Model
Participants in the LBS Value Chain

Before anyone can make an earnest money in the LBS food chain, the overall LBS pie needs to be big enough to sustain itself.
Current LBS Delivery Model

Working with different carriers, content providers, and application developers, OleMap created policies, procedures and templates integrating multiple requirements from devices, and content formats.

LBS Applications

- SoftStar
- OleMap

OleSpot

- Taipei Walker
- MyJob.com
- e-Card
- OleMap
- Twhouses.com

Mobile Content
Mobile carriers may deploy any LBS services via OleSpot today and the average service turnaround time is a matter of days.

Benefits to Mobile Carriers:

- All of these location services may be delivered via a Common LBS platform in OleSpot.
- In addition, OleSpot may be viewed/used as a location Service deployment repository where 3rd party vendors wishing to provide LBS services to the mobile carrier may *easily carry out their services*.

Therefore, the benefits of making OleSpot as part of the LBS Infrastructure are:

1. As a service platform to consolidate all Content Providers for ease of management of content, **better control of vendors**
2. Single point of control for **privacy and security**
3. Mobile Carriers’ One-Stop-Shop for addressing both **Consumer and Enterprise** sides needs
Characteristics:

- **Carrier does not lease or buy LBS platform**
- **Carrier is open to LBS Service Providers**
**Characteristics:**

- Carrier leases or buys LBS platform
- Carrier develops its own LBS service
**Characteristics:**

- Carrier leases or buys LBS platform
- Carrier does not develop LBS service, but is open to LBS Service Providers
<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
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<tbody>
<tr>
<td>Platform</td>
<td>SP</td>
<td>SP</td>
<td>SP</td>
</tr>
<tr>
<td>No</td>
<td>open</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Advantage**

- Quick time to market
- W/o upfront cash outflow
- Revenue inflow

- No Privacy concern
- Better control of LBS
- Capable of developing corporate solution
- Data mining
- Scalable, robust, flexible

- No Privacy concern
- A variety of applications
- Capable of developing corporate solution
- Data mining
- Scalable, robust, flexible

**Disadvantage**

- Privacy issue
- Limited options for corporate solution
- Quality of service not guaranteed

- Upfront investment
- No immediate ROI
- Difficult to develop applications in-house

- Upfront investment
- No immediate ROI
- Effort to integrate SPs

**Market Feasibility**

- Immediate term
- Medium term
- Medium-long term

**Arrangement**

- Revenue sharing 15:85 (carrier : CP/SP)
- Lease or Buy
- Lease or Buy

**Example**

- CHT, FITEL, FET, KGT
- Libertel Vodafone, Orange Switzerland, AT&T wireless
Major LBS Issues in Taiwan
Issues of Next Generation LBS

- Permission-based Tracking
  - Privacy & Security for corporate and consumer solutions
- Continuous and Zone Tracking
  - Location FriendFinder & M-coupon Download (continuous)
  - Push-mode Advertising, Regional Announcement (zone)
- Co-work System (network-based vs. handset-based)
  - Telematics and Fleet Management
- J2ME and BREW Handset
  - Pre-install Applications & LBS Game
- Service Bureau & MVNO
  - Roaming, Standards, Common Service Platform
- Quality of Content & Data
Discover the Power of Location

Business Model Issues for Operator

- Data Value-added Service vs. Churn Reduction
- Active(Push) vs. Passive(Pull) LBS Provider?
- Market Segmentation
- What will be the killer applications?
  - Pull/Push Advertisement
  - Tracking for Safety
  - Telematics and Fleet Management
  - Local guide, map & direction
- Revenue Model?
  - Monthly fee, Flat Rate, Per Use/Volume
- Privacy & Security
- Cross Carrier Services
Technology Issues for Operator

- Positioning System Accuracy & Capacity
- Positioning Availability
  - Zone tracking
  - Continuous Tracking
- Friendly User Interface
- Billing System
- Encryption
  - Privacy & Security
- Not N-to-N capable
- Economy of Scale
- Fast Growing User Base
  - Traditional GIS Box Solution Can’t Fulfill the Need
Standards Issues

- OGC Consortium – OpenLS Forum Standard
  - GML for Location Services and LBS Topology
- LIF - Location Interoperability Forum
  - Mobile Location Protocol
- 3GPP Recommendation (Release 99, 4 and 5)
- HTTP Based Services & XML APIs
- J2ME CLDC/MIDP and BREW Location API and Development
- OSA/Parlay Standard - System/ Bottom Layer API for 3G
- OMNI (Open Mobile Network Interconnection ) in Taiwan
  - Provide Multiple and Common Use Platform for CP
  - Open Development & Testing environment
Lessons Learnt
Challenges

- The market size is limited (23 millions subscriber)
- Incongruous systems (GSM/GPRS/Imode/PHS/WCDMA/CDMA2000)
- Poor document quality, SDK & APIs for CP/SP
- Legal Issues (Privacy & Security)
- Poor map quality & inconsistent data information
- Few strategic partnership, and the role of Content Aggregator is ambiguous and seldom
- Yet to see a LBS “killer application”
- Today’s MPS can’t meet the features of next generation LBS
Location-Based Service Profiles

- Passive Location Determining
- Active Location Tracking
- Pull
- Transition
- Push

- Emergency
- Coupon Download
- POI Finder
- Driving Direction Routing
- Fleet Management
- employee allocation management
- Location FindFriend
- Lover Matching
- Location Notes
- Parking Space
- Where am I?
- Local Guide Map
- Real Time Traffic Info.
- Hazard Alert
- LBS Game
- Push-mode Adv.
- Announcement
- Buddy List
- Travel/Leisure Info.
- Push

Killer Application – So Close Yet So Far

Discover the Power of Location
Stretch Your Imagination -
M-Commerce Adds Complexity

User Billed by Mobile Portal

- User
- Mobile Operator
- Mobile Network
- Mobile Portal
- Advertisers
- W-ASPs
- Content Providers
- Aggregators

User Could be Billed by Content Provider

- User
- ISPs and MVNOs
- W-ASPs
- Content Providers
- Aggregators

Drives Increased Traffic
Revenue Share
Revenue

Source: Telecompetition Inc., Feb 2001
LBS Service Development Trend

**Driving Force**
- **Business Expansion**
  - Permission-based Tracking: security & privacy concern
  - One-to-one continuous and Zone Tracking
  - Push/Pull Advertisement & Vector Marketing
  - Corporate solution

**To**
- To provide full and open XML/APIs document and spec..
- A robust business model and elastic tariff criteria
- To develop the next generation LBS, such as real-time info., LBS game, MMS, community, F.M. permission-based tracking (Friend Finder)
- To follow industrial standard, such as OGC GML, J2EE, EJB, XML, LIF, OSA/Parley, 3GPP Recommendation, OMNI.
- To improve the position accuracy into 100m, and raise capacity and availability

**From**
- Shortage of VAS and/or LBS system spec. or document and poor document and specification quality
- Also the service model, tariff criteria and service pricing strategy.
- Many of today’s consumer oriented LBS applications are ready off the shelf, but truly location centric ones are few. (Level I)
- Poorly follow industrial open standard
- Shortage of capacity, accuracy and availability, causes the limited development and usage.

**New Technology**
- Data rate: GPRS, PHS, 3G, UMTS, CMDA2000
- WAP 2.0, cHTML, PDX, SMIL, e-mail, WML
- J2ME and BREW Handset
- Positioning Technology
Summary

- In Taiwan, mobile carriers’ learning curve from 2001 proves critical in going forward. There has been better visibility and mobility in the mobile market place since Q1 of 2002.

- Learning curve indicates revenue extraction per subscriber (therefore ARPU) for voice is different as it is for data service. However revenue generated from data service will be able to cushion current ARPU’s sharp decreases.

- LBS market can be tested today with Cell-ID based systems.

- Can DoCoMo iMode Data Service be adopted and replicated?

- The LBS opportunity is significant but incremental thus business cases requires careful planning (marketing & technology issues).

- Making the data service pie bigger requires not only a wait-and-see attitude, but a robust long-term strategy.
Appendix
OleMap’s Value Proposition

There are two critical elements in the wireless LBS business that vendors in the LBS value chain must address in order to meet the minimum speed and the accuracy requirement expected from a “location service”:

- Being the ultimate provider of LBS services to mobile carriers, OleMap works with various partners in the LBS food chain.
- An affordable way to address the complex manipulation and computation within the geo-spatial requirements from any location related service request
- OleMap addresses the very needs of any LBS request via its LBS application platform, OleSpot

OleMap is deploying a workable and successful LBS business model via consolidation with various content/service providers to provide high quality LBS.
Current Structure of OleMap’s LBS applications

OleMenu

- Tracking/Safety
- Traffic/Travel
- DB/Information
- Community
- Pushing Marketing
- LBS Game

Disabler Tracking for Safety
- Mass Transportation Routing System
- Location Weather Forecasting
- LBS FriendFinder/Playmate Finder
- LBS Shopping List (by Credit-card Ctr)
- Monopoly

Emergency (911)
- Driving Direction Indexing
- House Rental Information Indexing
- Lover Matching
- Push-mode Advertisement
- Treasure Hunting

Employee Allocation Management
- Map & Local Guide
- Part-time Job & Tutor Opportunity Finder
- Movie Star Tracking
- Restaurant Reservation/On-line Booking
- Indian Game

Fleet Management System
- Where am I?
- Useful Information (POI Finder)
- Location Notes
- Direct Marketing
- City Simulation

Enterprise Mobile Database
- Travel Information
- Parking Space Indexing in Real Time
- Location Notes
- Location BBS/IM
- One-to-one Marketing
- City War

Consumer
Corporation
Either
Discover the Power of Location

OleMap

Stretch Your Imagination -

Employee Allocation Management

OleMap’s Offerings

OleMap’s Offerings

Wireless Carriers

Control Center

OleMap Web Server

Location-based Service Apps

OleSpot™

XY, ID Number

XY Request, ID Number

e-Map, Result of Routing, P.O.I.

Information…

Request, XY, ID Number

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LBS Platform (OleSpot) Levers the Market