Location Based Services:

Considerations and Challenges

Introduction

- Location Based Services are already being launched. The trend is driven by both regulation and competition.
- Operators are currently key, but require cooperation with other players in order to be able to offer attractive LBS.
- In order to remain competitive and leverage their huge investments mobile operators should consider various aspects when offering LBS, including, network technology evolution, regulation, standardization, user acceptance, and the availability of attractive services.
- This white paper discusses current trends and lists the major areas for consideration to mobile operators, when launching Location Based Services.

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Location Based Services

The term Location Based Services (LBS) refers to mobile services in which the user location information is used in order to add value to the service as a whole. The user location information in that case consists of X-Y coordinates generated by any given Location Determination Technology (LDT), such as Cell-ID, A-GPS, EOTD, etc. These technologies usually require modifications in either the networks or the mobile phones, and in some case in both. Main service categories for LBS include Emergency and Safety, Communities and Entertainment, Information and Navigation, Tracking and Monitoring, and M-Commerce.

LBS has generated a lot of interest in recent years, as a new source for mobile operators to enhance their service offering, thus potentially increasing revenues and reducing churn. In some cases, i.e. in the US, it has been the regulator (FCC) that forced operators to be able to provide subscribers' location data for safety applications (the E-911 directive[1]).

Predictions of LBS usage have generated a lot of interest and attracted many new players developing and offering numerous applications and services. According to an Ovum report, for example, the LBS market in Western Europe is expected to reach USD 6.6 billion by 2006, with 44% of mobile users actually using some kind of LBS. Still, this represents a small proportion of the total operators' earning estimates for the same year (approx. 1%). Moreover, not all of these revenues will go to the operators alone. Revenues will be split between the various players in the value chain, as we discuss later in this document.

No matter how one interprets the above outlook, most mobile operators today are already offering, or at least considering offering LBS to their subscribers. Operators see it as an integral and inevitable part of their service offering, allowing them to better utilize some of their existing assets in order to be more competitive. However, since LBS is in an early stage no usage or revenue figures are currently available. It is yet to see how this market will develop and what future business will look like for the various players.

This document aims to give a better picture about what mobile operators are really doing or planning to do, and provide some ideas about the future outcome of these efforts.

Market Players

As mentioned before, mobile operators are not alone in the LBS arena. The future revenues from LBS will definitely have to feed a few more hungry mouths. Consequently, as seen in the last couple of years, more and more companies are joining the game. The lack of standards or preferred technologies opens opportunities for many alternative technologies. This is true for the Location Determination Technology (LDT), but also for the service platforms, the mobile terminals, graphical presentation, and more. Figure 1 below illustrates the current value web for LBS.

[1] http://www.fcc.gov/e911/

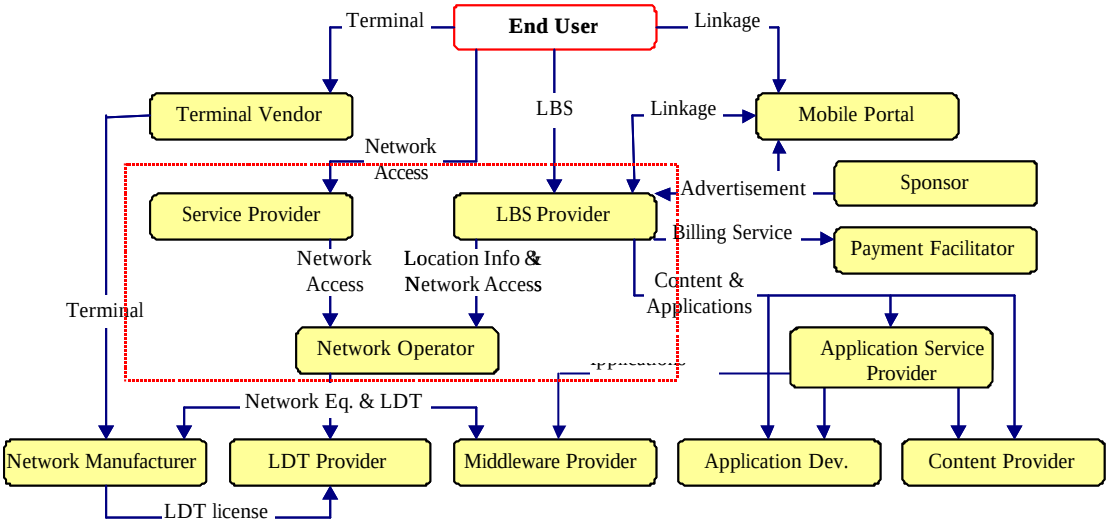

Figure 1: Today's LBS value web[2]. Source: Northstream, Jönsson & Karlsson.

As illustrated by the red dotted line, most mobile operators today are also operating as service providers and the practically sole providers of LBS. The latter stems from the fact that most of the services offered today are based on network-based and hybrid (network and terminal-based) LDTs, meaning that generation of the subscribers' location information is done and controlled by the mobile operators. Unless this changes - possible reasons for change include inter-alia regulation, and proliferation of terminal based LDTs – operators are likely to be able to keep a major part of the pie for themselves. Nevertheless, in order for the pie to exist in the first place, other players, such as content providers, LDT providers, middleware providers, etc., must exist, and more so, make profits. Operators alone, will not be able to create an attractive LBS offering.

Looking at the number of cooperation agreements, partnerships, and participation in relevant industry forums, it seems that what we describe above is well understood to all the major players in the industry. Still, it is not clear how these partnerships will materialize when revenues start to accumulate. Most of the smaller players, such as content providers, LDT providers, and application developers, are still operating on the money they have raised in the pre-telecom-crisis private equity market. Operators will have to be generous in sharing their revenues with the other players in order to keep the wheel moving. In any case, it is clear that many of the current players will not be able to survive on their own. This will lead to some consolidation, but also to numerous unfortunate bankruptcies.

One key player whose role is yet to be seen is the regulator. Whereas much of the progress in the field of LBS can be attributed to the E-911 directive in the US (requiring mobile operators to provide location information for safety applications), possible regulation in other areas such as user privacy and ownership and use of user location information, will have a major role in determining how LBS will evolve. It is worth mentioning, however, that the although regulation in the US is in more advanced stages, it is the competition-driven European operators that are launching LBS more heavily.

Key trends in operators LBS thinking

For the mobile operator, offering LBS is a tough challenge. Many different areas exist where thorough consideration is required, that might have a crucial effect on

[2] Legend: roles (rectangles), revenue streams (arrows) and revenue specifications (text on arrows).

the bottom line. Challenges include the choice of LDT, the use of a third party platform vs. the in-house design and implementation of an application platform , the selection of services to offer and selection of business models to use, to name a few. As with any new, and somewhat hype driven business field, operators are trying to be innovative, and yet keep an eye on the competition to make sure they are not left behind, nor running too fast ahead. It is interesting to note, for example, that marketing efforts for new LBS are usually quite low. Below we list some of the key trends we have identified, concerning what operators are doing and are planning to do.

Launch of LBS

The launch of LBS in the US market is mainly driven by the E-911 directive, with initial launch of services originally planned for October 2001. Much delays are expected though, as the FCC has given extensions to many operators. The European and Asian markets, on the other hand, are driven mainly by competition, leading to earlier deployment of LBS than in the US. Most "Tier 1" operators in these regions are already offering some related services and are planning to launch more services in the coming months on their GSM, as well as next generation networks.

The most common services for the consumer market at the moment include 'Yellow Pages' and 'Point of Interest'. These services allow users to locate the nearest hotel, cinema, etc., based on their current location. Other common services include navigation and traffic information. The next planned steps for consumer applications include improved functionality of the existing services, and offering new entertainment services. For the business segment, fleet management is seen as the leading application in the near future.

Generally speaking, operators do not see the need for higher accuracy LDT, although in some cases operators are looking into improving the location information accuracy. This is further discussed later in this document.

We believe that the next wave of applications deployed by operators is likely to include entertainment applications such as community applications and games. One of the main drivers of this trend is the often-quoted success of such services among i-mode users. Operators see great potential in this type of applications.

Interestingly enough, competition-driven European market is bringing about a wider range of services to the market that the regulation-driven US market. When regulation and legislation concerning LBS is finalized in Europe, including areas such as use of location information or the provision of location information for safety applications, there will already be an active market for LBS. It is interesting to see what the effect on the market will be at that stage.

Business models for LBS

As implied earlier, mobile operators seem to recognize the need to share the LBS revenues with other players, in order to enable the launch of attractive services. This, combined with the early stages the LBS market is in, calls for a wide range of business models for, some of them still considered as experimental. Common models used by application developers, for example, include a combination of one time set-up fees, revenue sharing and monthly payments for additional services such as technical support and upgrades, customer care, etc. On the subscriber side, operators are also experimenting various charging schemes, including charging per additional time/traffic, charging for premium services (e.g. per transaction) and a monthly subscription, to name a few.

Due to the relatively low use of LBS today, and the low revenues associated with it, it is impossible for the different players to rely only on revenue sharing with the operators. This trend is likely to change in the future if and when revenues from LBS actually increase as predicted.

Due to the sensitivity of the user location information, and the lack of relevant legislation, operators are eager to keep this information for themselves. Most of them view the ownership of location information as a key asset that they will not give away unless forced to. This implies that operators prefer to deploy and operate LBS within their own network, leaving less room for others players such as application service providers. In many cases though, operators still lack the expertise and are willing to accept outsourced solutions, using various means to hide the actual user information from the third party. In the long run, it is likely that LBS platforms will be integrated into operators service platforms. This will facilitate the implementation and launch of new LBS.

Nevertheless, it is unclear what the outcome of regulation and LDT selection by operators will be. This will have a major effect on where most of the value will be generated, and which players are likely to keep most of it. Whereas operators believe and hope the ball is likely to land on their court, much lobbying is done to shift the ownership of the location information to the subscribers themselves. This will give them freedom to decide who they trust enough to be willing to provide them with LBS. Furthermore, GPS and other handset based LDTs might leave the operators out of the picture. This, however, is not a very likely scenario.

Implementation of LBS

On a more technical level, much uncertainty exists. Whereas in the US operators already had to make a decision and report to the FCC which LDT they will use (although some extensions where given), and have specific requirements in terms of accuracy they will provide, Europe and Asia are still driven mainly by competition. Since the required investments for all high accuracy technologies are quite high, and not enough services exist that justify this investment, most European and Asian operators are using the fairly inexpensive Cell-ID technology, in some cases in an enhanced form (e.g. Enhanced Cell-Id or Cell-ID + Time of Arrival). This is not likely to change in the near future, but will definitely happen in coming years as part of the competitive evolution. Unless specific regulation will be introduced, it is the competitive pressure and the availability of attractive services that will encourage operators to make the required investments.

The LDT choice of US operators might have an effect on the availability and price of various solutions. The key trend in the US at the moment is E-OTD for GSM operators and A-GPS for CDMA/TDMA operators. But since GSM is gaining momentum in the US, E-OTD has a chance of becoming a dominant technology. Once it is included and tested in most GSM equipment, the path into the European GSM market should be somewhat shorter.

The choice between network and terminal based LDT might have a big impact on operators LBS business. Not only it affects the required investment, but it might affect the future control of user data, and therefore the actual use of LBS. As already mentioned before, one of operators' key assets as regards LBS is their ownership of user data.

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Key areas for consideration

It is yet to be seen what the LBS market will look like in a few years. Northstream believes that the competitive pressure in general will increase, forcing operators to offer even more innovative services, including LBS. Operators who have started with simple informational services will gradually start to offer more attractive and a wider range of LBS. Current LDT will be replaced with more accurate technologies, enabling new services. In most cases LBS will not necessarily be a service category in itself, but rather an added feature to existing services, increasing their usability and value to the users.

Some areas need to be considered and will have a crucial effect on this development:

New network technologies

The availability of new network technologies including 2.5G and 3G technologies will increase the use of data services. The 'always-on' data connection, the higher data transfer rates, and the charging per volume and per user-value, will enable LBS to benefit from these technologies. The ability to push data to users based on their location and preferences, in a seamless and inexpensive manner, is likely to help LBS services to proliferate. Future releases of 2.5G and 3G technologies are likely to benefit from the fruits of the ongoing effort to standardize different aspects of LBS, as discussed below.

Standardization

Much effort is put in standardizing LBS, both on the network and application side. Main forces are the 3G Partnership Program (3GPP), defining mainly the addition of LBS capabilities to future releases of 3G networks, and the Location Interoperability Forum (LIF), formed by vendors and interested parties to developing and promote common and ubiquitous solutions for LBS which are network and LDT independent. The outcome of these efforts will have an enormous effect on the success of LBS, affecting the technology choice operators will make, the required investment to launch or upgrade existing LBS, as well as on the actual availability, usability, and cost of services.

Availability of attractive services

LBS will not take off unless there are attractive, easy to use services. Some of these future services are likely to benefit from higher accuracy LDTs. The ability to offer such services requires tight cooperation between mobile operators, application developers and equipment vendors. This requires the understanding of subscribers preferences and usage habits as well technology expertise. Standardization is likely to facilitate the development and launch of services, but the key is still in attracting the subscribers. Only a joint effort by the different players is likely to enable that.

User acceptance

A key question remains whether subscribers will be willing to pay additional fees to use these services. User acceptance surveys provide different answers, most of them debatable. General usage figures based on past experience with other services show that the answer lies in the usability and value services bring to users. This adds a further dimension to the attractive services mentioned before – services should be tailored and offered to specific user segments, maximizing their value from such services. Operators are in a key position to define and

package such services, and tailor them to the needs of their different subscriber segments.

Regulation and legislation

Regulation will play a major role in the shape and success LBS will take. Regulation is likely to have an impact on the accuracy operators will provide, as well as on the use and handling of user information. This will affect both the technology choice and the availability and usability of user location information for the different players, therefore affecting business models and participation in the total revenues. However, as we have already seen in Europe, LBS will be driven mainly by competition. Operators will do what is necessary to comply with regulation, but will also have to be innovative and offer attractive and competitive services, leveraging their existing investments.

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Northstream has studied all aspects of **Location Based Services**. Please contact us if you would like to find out more about this or about our company and the services we provide.

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