

Capitalizing On The Location-Based Services Opportunity

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Change History

February 14, 2005	V1.0	Initial document release
March 14, 2005	V1.1	Update

1 Introduction

Location-Based Services (LBS) are applications that leverage a user's current physical location to provide an enhanced service or experience. The support for this technical capability in mobile devices represents a great opportunity for application developers to create compelling services that are widely used and highly valued. Location information can be used for a variety of purposes — from providing directions to the nearest restaurant to monitoring the locations of snow-plowing vehicles — and the wide-open nature of the market means there is plenty of room for entrepreneurial innovation.

Although there has been talk of LBS in the mobile domain for some time, it is only recently that support has been widespread enough to truly capitalize on this opportunity. Growth in LBS is largely a result of government mandates that have required mobile operators to provide location information for emergency services (such as the Enhanced 911 [E911] rules in the United States and E112 initiative in Europe, as well as 3G licensing terms), and the introduction of attractive map and navigation applications. Additionally, mobile devices — and the Nokia Developer Platforms in particular — are offering key APIs and features to accelerate innovation.

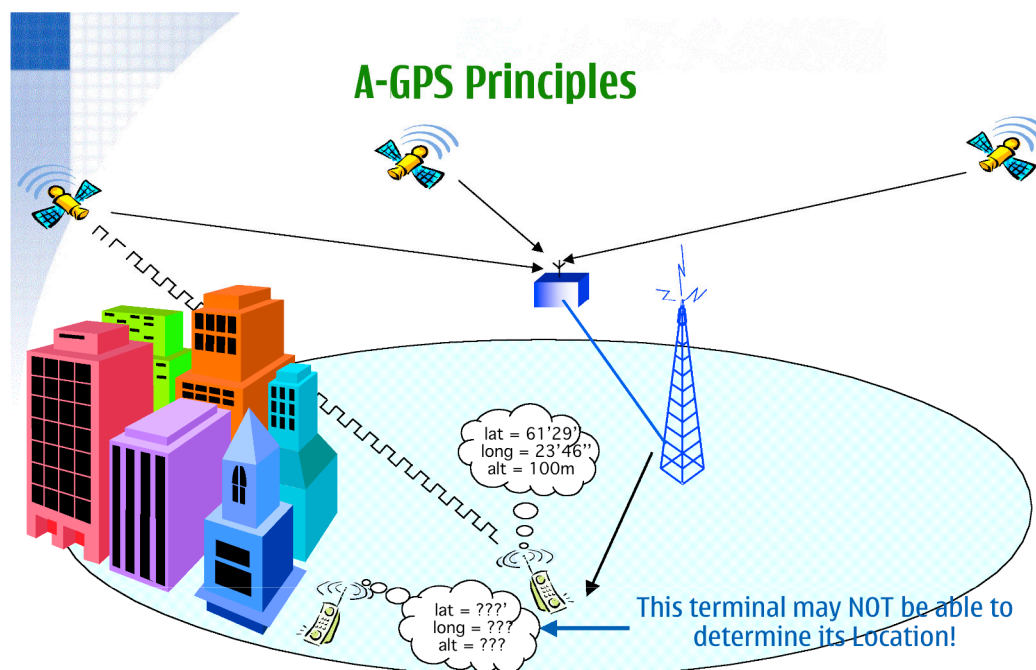
1.1 Market Outlook

Location based services and products are a 10 billion Euro market today, with double-digit projected growth potential by 2008. Nokia's view is that location-aware applications are about to take-off due to the availability of LBS on mass-market mobile devices. Thanks to growth barriers being overcome by changing markets, technologies, government regulations, and growing awareness among consumers.

2 LBS-Enabling Technologies

LBS are powered by several different methods for acquiring user location data:

- ◆ **Cell ID** — Predominantly used on GSM networks, this system identifies the cell site to which a user is currently connected, mapping it to coordinates for an estimate of the user's location. 3G networks use smaller cell sizes, so positioning information from these networks offers greater precision. Cell ID works even when the user is indoors (and cannot use satellite-based GPS).
- ◆ **Global Positioning System (GPS)** — GPS uses a network of 24 satellites to triangulate a receiver's position and provide latitude and longitude coordinates. Such positioning can be implemented either via GPS accessories, or as an integrated solution in a mobile device. Although GPS provides excellent position accuracy, position fixes require lines of sight to the satellites. GPS is integrated in some CDMA networks.
- ◆ **Assisted GPS (A-GPS)** — This solution is rapidly becoming more common because of its ability to provide location information indoors and in other harsh environments such as urban canyons and areas with heavy tree cover. A-GPS also offers faster positioning — the time it takes initially to fix a user's position — than does standard GPS, but it is sometimes less accurate.



3 Application Opportunities

Applications that use LBS are limited only by developers' imagination, but there are some categories where needs and opportunities have been clearly identified:

- ◆ Mapping, navigation, and directions applications are the obvious targets for LBS, but developers who combine this capability with directory services and other offerings will be the long-term winners.
- ◆ Workforce-tracking and management applications may end up being the most lucrative applications because they will help enterprises optimize utilization of their people, supplies, and capital equipment in the field. Industry segments include security, delivery, and service businesses.
- ◆ Entertainment and gaming applications can take the baton from the pioneering geo-cache enthusiasts and create interactive gaming experiences and services that complement sporting events, concerts, and more.
- ◆ “Finder” applications can apply users' locations to helping them locate anything from the closest restroom to friends in a crowd.
- ◆ Location-enhanced imaging applications can label captured multimedia with information about the location where the user recorded the file.
- ◆ Weather applications can provide local forecasts and warnings about inclement weather.
- ◆ Location-based reminder applications can prompt users when they reach particular locations, displaying, for example, a shopping list when a user gets close to a certain store.

Several different billing models are available, depending on the positioning method and the operator. Some positioning methods (such as GPS) are free of charge, and others are available for request- or subscription-based fees.

4 LBS Support On Nokia Developer Platforms

Understanding of a few key terms will help those who delve into Nokia's LBS offering:

- ◆ **Coordinates** — Data that provide the latitude, longitude, and (sometimes) altitude of the user can be used for calculations within LBS applications.
- ◆ **Landmarks** — Sets of information tied to the coordinates of any given location (for example, those of a restaurant or a bus station). Because landmarks also provide coordinates for applications without requiring any actual positioning technology, users can merely indicate where they are — for example, at Parliament in London — and the corresponding coordinates can be fed into the LBS application. Landmarks can also be downloaded from Web sites and shared among users.

LBS applications are supported across Nokia Developer Platforms via JSR-179, the Location API for Java™ 2 Platform, Micro Edition (J2ME™). JSR-179 enables the application to request and receive a user's coordinates (regardless of the location method being used) along with a time stamp and (if available) course and speed information. Landmark storage is also supported, and the security framework of Mobile Information Device Profile (MIDP) 2.0 is used to ensure that the application has rights to this information.

Integrated GPS can be Assisted GPS (A-GPS), which offers better performance than stand-alone GPS because of superior accuracy, quicker time-to-first-fix, and heightened sensitivity, which leads to better performance in challenging or blocked environments. Integrated A-GPS will be available on the Nokia 6155i, which is a Series 40 CDMA device. CDMA terminals will support cell/sector ID along with the A-GPS modes. This will let operators offer location services even if they have not upgraded their network for A-GPS. Stand-alone move and cell/sector ID methods do not offer the performance of A-GPS but offer the ability to enable applications for location services without network upgrade.

For Series 60 and Series 80 devices and the Nokia 7710 widescreen multimedia smartphone, developers can utilize several APIs for native C++ applications. The Location Acquisition API lets applications create a session with the Location Server to request and receive coordinates and other relevant and available location information (regardless of the location method). The Landmarks API and Landmarks Search API let applications access and manage landmarks, as well as search for landmarks and landmark categories on the basis of specified criteria.

Privacy is a key issue when dealing with user location and several safeguards are in place. For C++ applications, a privacy check is performed to verify that the requesting party has permission to access that information. On Series 60 devices and the Nokia 7710 smartphone, the privacy for mobile terminated location requests (MT-LR) feature gives users control: A simple-to-set UI determines whether or not network-resident location applications have access to a user's current location. For Series 40 devices, privacy management features address both terminal-resident and network-resident applications.

The following table shows LBS support on Nokia devices.

		Series 40 2.0 6155i	Developer Platforms		Nokia 7710 smartphone
			Series 60	Series 80	
Available Features	JSR-179 Support	Yes	3rd Edition	-	-
	Location Acquisition API	Yes	2nd Edition Feature Pack 2	2.0	Yes
	Landmarks API	Yes	3rd Edition	-	Yes
	Landmarks Search API	Yes	3rd Edition	-	Yes
	Landmarks UI Selector API	No	3rd Edition	-	-
	Privacy for MT-LR	Yes -outside of application layer - not an API	2nd Edition Feature Pack 1	-	Yes

5 Tools For LBS Development

For development of C++ applications that use LBS on Nokia Developer Platforms, there are several SDKs available:

- ◆ Series 60 2nd Edition SDK for Symbian OS, Supporting Feature Pack 2.
- ◆ Series 80 Developer Platform 2.0 SDK for Symbian OS.
- ◆ Nokia 7710 SDK for Symbian OS, for C++.

For testing Java applications using JSR-179, the Nokia Prototype SDK 2.0 for J2ME™ should be used.

Additionally, the Nokia Mobile Server Services SDK 1.5 can be used for developing network-resident LBS applications.

Tools are available for free download at <http://forum.nokia.com/tools>.