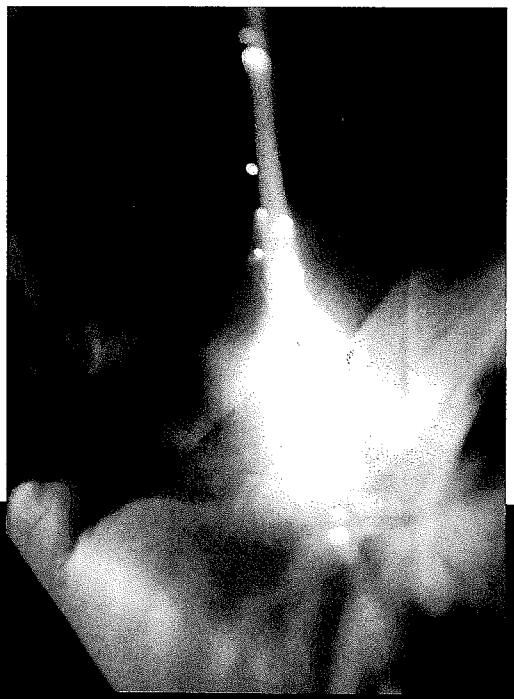
WILEY

Professional Developer's Guide Series

Creating Location Services for the Wireless Web



Johan Hjelm

Publisher: Robert Ipsen
Editor: Carol A. Long
Developmental Editor: Adaobi Obi
Managing Editor: Angela Smith
New Media Editor: Brian Snapp
Text Design & Composition: D&G Limited, LLC

Published by John Wiley & Sons, Inc., New York

Published simultaneously in Canada.

Library of Congress Cataloging-in-Publication Data:

Hjelm, Johan.
Creating location services for the wireless web : professional developer's guide / Johan Hjelm.
p. cm.
ISBN 0-471-40261-3
1. Wireless Application Protocol (Computer network protocol) 2. Web site development. 3. Geographic information systems. 4. Cellular telephone systems. I. Title.
TK5105.5865.H554 2002
005.2'76--dc21

2001006512

Printed in the United States of America.

10 9 8 7 6 5 4 3 2 1

CHAPTER 11

Location-Based Services in Terminals

The handset—the mobile telephone, PDA, or special-purpose receiver—is not a very good place to deploy services. The Internet end-to-end model did not take into account that you might want to present a highly interactive, vividly graphical service in a device that has a smaller processor than a Furby and less memory than the average technical calculator.

As of this writing, the mobile terminals on the market do not have any implementations of hardware or software to support any of the terminal-based positioning solutions, for example, GPS or E-OTD. However, in order to fulfill the accuracy requirements defined by FCC, if UL-TOA is not to be implemented, software and hardware to support one of the terminal-based solutions (or both) have to be added to the mobile terminals.

The better accuracy of the position information obtainable, the more applications for location-dependent services are conceivable, and the more useful they get. Therefore, some users may not find E-OTD sufficient with respect to obtainable accuracy for the services they are interested in. For these users, support for Assisted GPS in the terminal should satisfy their need for accuracy, which is the most accurate positioning solution for mobile terminal application. A terminal with a GPS receiver will, however, cost a bit more, and some users may not want to pay that extra amount for the accuracy enhancement compared to E-OTD.

Nor is the software required for the more interesting applications implemented. Web phones—at least, in the foreseeable future—will receive a ready-made presentation from the server. While they will probably have some limited capability to execute Java code, 128KB of memory is not something that

enables you to build particularly impressive services, although SVG viewers are available that will work in a mobile phone. Still, there is a programming environment for them that executes on their even punier companion processor, the SIM card. There is also one pioneering device that has more programmability: The Benefon Esc.

Combined Mobile Phones and GPS Receivers

Many GPS receivers have map services built in, but very few can communicate the position that they receive to another service to receive a response that is adapted to the request. An example of a device that can perform this task is the Benefon ESC, which is a combined GSM mobile telephone and GPS receiver. This device has a large enough window to present a position-dependent application—for instance, with a map interface. That is an exception, however, and will most likely remain that way for as long as the price of mobile phones is a primary buying argument.

GPS receivers can be made small enough to be integrated into a handset, and several manufacturers have demonstrated prototypes. Just having the GPS receiver in the handset, however, means that you have to perform a cold start every time you want to retrieve a position. You need a way of getting additional data about the satellites to the GPS receiver. From a cold start with the almanac, it typically takes two minutes to determine its position. A warm start takes about one minute; a hot start (with the last fix less than one minute old) takes about 15 seconds. Without the almanac, however, the time it takes to acquire the satellites is approximately 12 minutes.

There is also another concern. When you are using a protocol like the WAP Application Framework of LIF API, you send the position request along with the identity for the terminal that is to be positioned to the application server or MPC. All of the traffic concerning the positioning, including the execution of triggered requests, can be done in the fixed network connecting the base stations to the MPC (because you are asking for information that the network has collected anyway). But when you have the positioning in the handset, you have to transmit the position over the radio channel.

That might not seem so problematic, but consider the numbers. If 720 users in a cell on a GSM network are sending position information messages of 256KB every three seconds, that means they are using 400 kbit/s. The capacity of the cell is 2160 kbit/s. So, they will be using some 18 percent of the capacity of the cell for signaling.

Traffic modeling is more complicated, of course. Because the traffic tends to be bursty, there are fixed allocations of capacity that are required for certain traffic types and so on. But that simple calculation shows that just signaling would

use up a significant portion of the traffic, assuming that the return messages with the personalized information are the same, independent of the technology used. Another matter is pricing. Nobody knows how the tariffs will be set in the end, but given the charges of some European operators for the GPRS traffic (the packet data traffic on the GSM network), it would become extremely expensive to keep sending your position.

Benefon Esc

One of the first mobile phones that has a built-in GPS receiver is the Benefon Esc, built by the other Finnish mobile phone company, which in a sense combines the best of two worlds (Benefon is actually based in Finland, the same as market leader Nokia, but it has never reached their market volumes and remains specialized in niche applications). It is shown in Figure 11.1. While it uses GPS and has all the mobile communications possibilities of a mobile phone, it actually loses out because the GPS function cannot handle assisted GPS.

Strictly speaking, with the Benefon Esc you are not developing for the mobile phone; instead, you are developing for the system. The adaptation of the data is done in the service center (in other words, the application server), and the phone is providing coordinates that are used to adapt the data. The service center is a specialized application server (although it should not be too hard for application server developers to provide this kind of functionality if it becomes popular). The phone has a built-in GPS receiver, but it can also

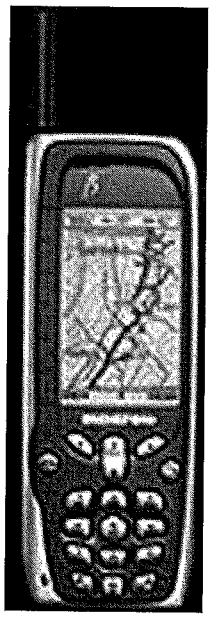


Figure 11.1 The Benefon Esc.

DOCKET ALARM

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts

Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research

With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips

Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS
Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS
Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS
Sync your system to PACER to automate legal marketing.