



Sprint Proposal Response

Location Based Services

Issued by

BigTribe Corporation

Issued on

May 7, 2002

Version 1.0

TABLE OF CONTENTS

1.	<i>Scope</i>	5
2.	<i>Executive Summary</i>	5
3.	<i>Current Annual Report</i>	5
4.	<i>Proposal</i>	10
4.1	Application Platform	10
4.2	Buddy Finder	10
4.3	Point of Interest Finder	23
5.	<i>Engineering Methodologies</i>	24
5.1	Development	25
5.1.1	MRD (example needed?)	25
5.1.2	Design Specification	25
5.1.3	Functional Specification.....	26
5.1.4	Implementation Plan	26
5.2	Engineering	26
5.3	Implementation	27
5.3.1	Meetings	27
5.3.2	Groupware.....	27
5.3.3	Backup.....	27
5.4	Testing	27
5.5	Support	28
6.	<i>Architecture</i>	28
5.1	Hardware Platforms	28
5.1.1	Servers (make and model).....	28
5.1.2	Switches and routers.....	29
5.1.3	Load balancers.....	29
5.1.4	Interface cards	29
5.1.5	Cabinet space.....	29
5.1.6	Bandwidth	30
5.1.7	Power requirements	30
5.1.8	Backup requirements.....	30
5.2	Software Platforms	30
5.2.1	Operating systems	30
5.2.2	Web servers	30
5.2.3	Application servers.....	30
5.2.4	Image servers.....	30
5.2.5	Database servers.....	30

5.3 Software Applications 31

5.3.1 Types 31

5.3.2 Versions **Error! Bookmark not defined.**

5.3.3 Capabilities **Error! Bookmark not defined.**

5.3.4 Interactions, etc 31

7. Network Topology 31

8. Business Information 34

7.1 Products and Employees 34

7.1.1 Product History 34

7.1.2 Customers 34

7.1.3 Product Deployment 34

7.1.4 Product Subscribers 34

7.1.5 References 34

7.1.6 Business Employees 34

7.1.7 Engineering/IT Employees 34

7.1.8 Delivery Employees 35

7.1.9 Third Party Suppliers 35

7.1.10 Total Employees 35

7.2 Diversity 35

7.2.1 Sprint's Supplier Diversity Policy 35

7.2.2 MBE, WBE and DVBE Subcontracts 36

7.2.3 MBE/WBE/DVBE Reporting 36

7.2.4 MBE/WBE/DVBE Subcontractor Reporting 36

7.2.5 DVBE Reporting 36

7.3 Reciprocal Business Opportunities 36

9. Certifications and Awards 37

10. Pricing 37

9.1 Hardware Costs 37

9.2 Software Costs 37

9.3 Training Costs 38

9.4 Miscellaneous Costs 38

9.4.1 Documentation 38

9.4.2 Deployment 38

11. RFP Matrix Requirements 40

12. Project Proposal 41

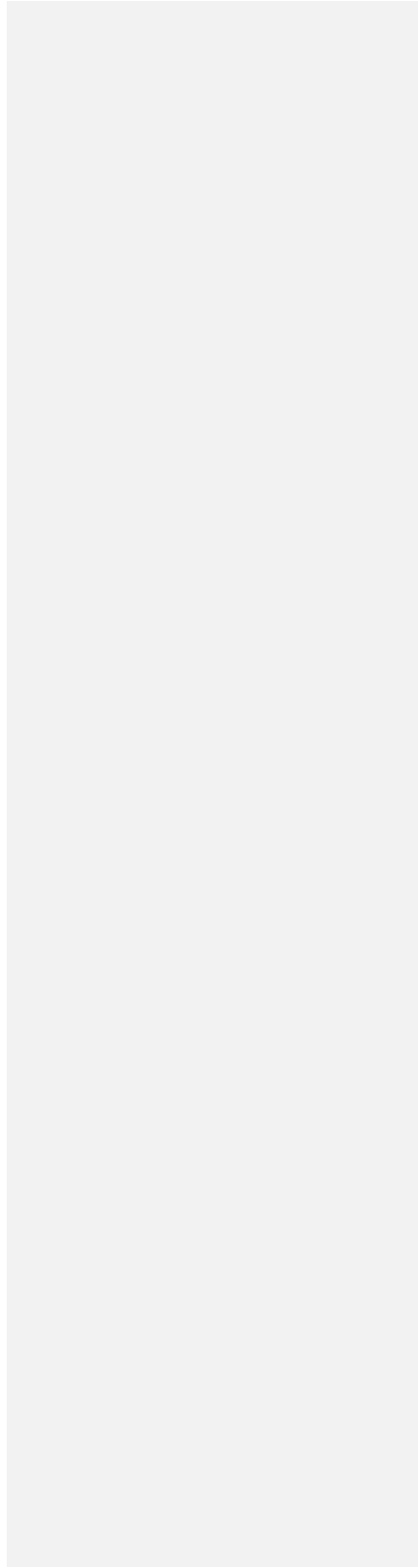
13. RFP Pricing Summary 41

12.1 Pricing Models 41

12.1.1 Direct Purchase with Unlimited Licensing 41

12.1.2 Up Front Costs for Revenue Share model 41

14. *RFP Requirements Response* 41



1. Scope

BigTribe is responding to the Sprint CFP with regard to the Application Platform (#3) and the Buddy Finder application (#4a). BigTribe has components which can be made available which satisfy many aspects of the Points of Interest application (#4b).

2. Executive Summary

BigTribe is building a location-based personalization platform that helps wireless carriers and portals increase revenues and reduce subscriber attrition through the delivery of personalized, location-centric services to their mobile subscribers. Mobile phone users are often on-the-move, leveraging their phones to accomplish goals in limited time. They need to complete tasks quickly and easily while doing other things. But existing wireless portals provide difficult interfaces, sometimes requiring navigating 10 or more WAP menus just to find a nearby restaurant. Using BigTribe's personalization platform, users can find and interact with location-based wireless web sites in as few as 2 clicks, and then go on to accomplish more goals in the same neighborhood with greater efficiency.

Carriers and portals benefit from purchasing BigTribe software. It reduces subscriber churn and increases usage. As subscribers interact with a BigTribe-enabled portal, the BigTribe platform builds a greater understanding of the user, increasingly streamlining the interface and helping a user save time. If subscribers switch to a different carrier or portal, they lose the advantages gained by past interactions. Because users gain daily utility from BigTribe software, carriers using BigTribe will experience higher demand for wireless data and location services.

Analysts estimate the wireless location services market will exceed \$6 billion in the US and \$18 billion worldwide by 2007 (Yankee, Analysis, Ovum). The market is being driven by pent-up demand, rapidly dropping cost, improved technology, and governmental regulation.

BigTribe's products focus on maximizing the value of users' relationships with locations. BigTribe's personalization platform improves the utility of almost all location services. Therefore, BigTribe has an opportunity to play a central role in much of this market. Its products are protected by US patent filings.

BigTribe was founded in May 2001 by successful software entrepreneurs. It has since gained leadership status in the location services industry, with BigTribe CEO Dan Greening leading the Location Interoperability Forum's standards committee, and with its development of a location-based friend finder for the Open GIS Consortium.

BigTribe's software has recently attracted the interest of wireless carriers. BigTribe is now responding to industry RFPs. BigTribe is currently in partnership discussions with network infrastructure providers and geospatial software providers.

BigTribe is seeking its first institutional funding round to increase carrier sales, deepen its relationships with key partners, and further develop its user-centric location platform. The company was built on a seed round of \$500,000. This initial funding is being used to validate the market concept, build prototypes, and file patents. Since research is a key foundation of BigTribe, and since BigTribe includes four computer science Ph.D.s, it is also pursuing grants to supplement traditional financing.

In 2004, we expect to raise an additional \$10 million to reach break-even at the end of 2006 with revenues of \$96 million dollars.

2.1 Products

There are five components to the BigTribe Personalization Platform: Context Manager, Operation Manager, Places, People, and Directory. All leverage the highly personal relationship between users and locations, to make wireless location services truly valuable additions to our lives. Because personalization involves revealing preferences to gain value, privacy is a concern. BigTribe software supports the Wireless Location Industry Association's Draft Privacy Policy Standard, which provides for complete opt-in subscriber control of their personal and location data.

BigTribe Context Manager helps users select venues to interact with. For example, at different venues they can buy movie tickets, reserve a car, refill a prescription or order a pizza. But selecting the venue can take many clicks in a typical portal. Using BigTribe Context Manager, users can select a venue near their current location (using GPS enabled mobile phones), from their favorites list, from recent history, or by typing in an address. In most cases, the venue can be selected in 1 or 2 clicks.

BigTribe Operation Manager introduces the idea that a wireless portal should help a mobile user accomplish as much as possible near a single location. People want to get somewhere, and then accomplish as many tasks as possible near that location. BigTribe Operation Manager chains tasks: first helping users accomplish their primary goal, then suggesting other personally-relevant tasks that can be accomplished nearby.

BigTribe Places provides highly personalized "what's nearby" results for specified categories—such as restaurants, ATMs, movie theaters, and gas stations—based on historic and implied user preferences. BigTribe Search uses artificial intelligence techniques to determine whether a user prefers a particular venue. For example, if a user visits low-cost gas stations, the BigTribe Search can identify that trend and provide those gas stations first in a search result. BigTribe Search quickly identifies brand preference and activity preferences, helping users find locations and accomplish goals faster.

BigTribe People provides services related to co-workers, friends or mobile services, such as taxis. Similar to Places, BigTribe People allows you to quickly identify people near you or near an important location, allowing you to more easily coordinate meetings, dispatch workers, or request mobile services.

BigTribe Directory allows users to help portals and carriers build more complete and accurate venue data. Today, it is difficult for consumers to report problems with "yellow pages" data, so venue data companies must spend millions to review and correct data using their own personnel. Using BigTribe Directory, by simply keeping their own personal "favorites" folder up-to-date, users can submit corrections and additions to data stored in a public directory. The primary customers for this data are yellow-pages providers and GIS data providers.

Users on the move are looking to accomplish as many things as possible around their present or future locations. The BigTribe Personalization Platform maximizes their opportunities to get things done, when they are looking for those opportunities.

2.2 Market Overview

Several forces are converging to build the estimated \$6 billion 2006 US market demand for location software. People organize their lives around location: working, shopping and playing require us to coordinate location; yet we have no simple network-based tools to help us. The cost of locating devices is dropping rapidly: GPS devices cost hundreds of dollars last year, while accurate GPS chips add less than \$10 to the cost of the phone. There are now 5 inexpensive GPS-equipped phones in the US market. Today's technologies to locate mobile phones have greatly improved: they can accurately position inside buildings, position in milliseconds vs. minutes, and consume far less power. The FCC E911 Phase II mandate requires that wireless carriers be able to locate mobile phones; the resulting

mass-market is partly responsible for driving down the cost of positioning, and prompting wireless carriers to exploit the upside of commercial location services.

FCC expects six of the largest US wireless carriers to deploy E911 Phase II throughout 2002. The largest mobile phone manufacturers expect a major marketing push for E911 enabled mobile phones in late 2002 and through 2003. Sprint projects that all their new Internet phones will be E911 capable starting Q2 of 2002.

BigTribe's strategy is to partner with wireless platform companies, and then develop direct relationships with the top six US carriers. This strategy is well underway; BigTribe has developed relationships with several platform companies, and is now in RFP discussions with carriers. A few international carriers are deploying accurate location capability. The BigTribe product suite is fully internationalized, allowing it to exploit these opportunities as the market opens up.

As the market matures, BigTribe will target location portal companies to provide plug-and-play personalization, along with highly detailed and accurate location data. We expect to partner with one or more existing location data providers in this process.

Competition in BigTribe's space can be viewed in several ways. There are about 300 companies world-wide in the location-based services sector. The majority provides infrastructure or applications for fleet management and driving directions that requires a location directory. Only a handful relate to BigTribe's market.

Competitors include Mobile Position, Nessicom and Followap that offer limited people-finder applications but provide limited or no personalization. Go2, Wcities, and Infospace provide wireless location search directories, but provide no personalization. NetPerceptions, Blaze, and Macromedia provide eCommerce personalization but neither wireless nor location-specific personalization. Vindigo offers offline location services for mobile devices but no online services or real-time personalization.

2.3 Shaping Standards

BigTribe is active in prominent location software standards groups: Location Inter-operability Forum (LIF) and Open GIS Consortium (OGC). BigTribe's involvement gives it an authoritative position with partners and customers, and allows BigTribe to shape standards to fit the needs of the BigTribe platform.

BigTribe's CEO, Dr. Dan Greening is chair of LIF's standards committee (which developed the widely adopted Mobile Location Protocol). LIF participants include carriers (Voicestream, Vodafone, NTT DoCoMo, Hutchison 3G), equipment manufacturers (Nokia, Motorola, Ericsson, Siemens, Samsung), and most location software providers. In LIF, Greening led the effort to harmonize LIF and OGC standards, to encourage more location applications.

BigTribe's CTO, Dr. Jack Hodges leads BigTribe's participation in the OGC's "Open Location Services" initiative. BigTribe's contribution to OGC OpenLS is a personalized people finder application that interoperates with infrastructure software from Webraska, Oracle, Vodafone, NavTech and others.

2.4 Team

BigTribe team members are experts in personalization technology, and have been involved in building successful startups. Together they bring a wealth of experience and knowledge to create and market products that involve personalization and privacy for the mobile-location market.

2.4.1 Dan Greening, Ph.D. Co-founder and CEO

Dr. Greening has twenty-five years of system software engineering and management experience. He participated actively in two successful startup acquisitions: LikeMinds/Andromedia acquired by Macromedia, and Software Transformation acquired by Novell.

At LikeMinds Greening designed the LikeMinds Personalization Server and championed it to financial success. The company was acquired first by Andromedia and then as part of Andromedia by Macromedia, where Dr. Greening became VP Engineering. The LikeMinds product is now licensed to IBM and sold with WebSphere, due to its superior scalability and fault-tolerance. LikeMinds displaced the leading alternative, NetPerceptions, in the IBM account.

Dr. Greening received his Ph.D. and M.S. in Computer Science from University of California, Los Angeles in 1995 and 1987 respectively, and has published and presented on topics such as personalization, data-mining, data warehousing, optimization and operating systems at numerous international conferences. He performed much of his graduate research at IBM T.J. Watson Research Center. He received his undergraduate B.S.E. in Computer Engineering from the University of Michigan, Ann Arbor.

2.4.2 Jack Hodges, Ph.D. Co-founder and CTO

Dr. Hodges has more than twenty-three years of engineering experience in corporations and academia. Prior to joining BigTribe, Dr. Hodges was acting Vice President of Engineering at NextMonet and prior to that led design and development efforts at Neuromedia.

He taught programming as a tenured professor of Computer Science at San Francisco State University and is an expert in Java, C++, knowledge-based systems, user interface design, and ecommerce server design and development. One of his books received a 5-star rating at Amazon.

Dr. Hodges received his Ph.D. from University of California, Los Angeles in 1993. He received his B.S.E. and M.S.E. in Aerospace Engineering from The University of Michigan, Ann Arbor.

2.4.3 Cynthia Mun, Co-founder and Vice President of Marketing

Ms. Mun has specialized in consumer marketing for the past twelve years in such industries as consumer electronics, digital media, and telecommunications. She has a successful track record for building marketing teams and launching new products into the marketplace.

Most recently, she was Sr. VP of Marketing and Operations at Savage Beast Technologies. She oversaw daily operations and led marketing strategies for the development and launch of personalized music recommendation software for customers such as barnesandnoble.com and Tower Records. Prior to Savage Beast, Ms. Mun was the Director of Product Marketing & Management at NuvoMedia. She has also launched MCI Worldcom and Cable&Wireless phone card products as the Director of Marketing at MVX Communications.

Ms. Mun graduated with a B.A. from Yale University, where she studied molecular biophysics & biochemistry and fine art. Ms. Mun is on the board of directors of the American Marketing Association (Silicon Valley).

2.4.4 Other Team Members

- Brian Yamanaka, Co-founder, Senior Engineer
- Curt Powley, Ph.D., Research Scientist
- Andy Fyfe, Ph.D., Senior Research Scientist
- Stanley Ho, Engineer
- Andrew Zimdars, Research Intern

2.3.5 Advisors

Dan Dickson (Board of Directors)

VP and Partner Brenner Group, CEO of Draper/Fischer portfolio companies.

Dr. Don Norman

Northwestern Professor of Computer Science, Usability

Dr. Ward Hanson

Stanford Business Professor, Ecommerce

Dr. John Canny

Published expert in personalization, human-centered computing. Presidential Young Investigator award recipient.

Dr. James Forcier

University of San Francisco Professor of Economics. Former director tech planning, AirTouch

Alan Brune

Former VP Marketing, Cellular One, Rangestar, Telephia

Greg Miller

Lawyer, Advisor to Senate Commerce Committee on privacy and infrastructure

Sam Lucente

Former Manager Strategic Design Group, IBM (Thinkpad), Director of User Experience, Netscape

Valerie Cook Carpenter

Former SVP Marketing, Scansoft, Broderbund. Stanford MBA

Jim Rossner

Former COO, VP Sales, VP Business Development. 25 yrs sales exp

3. Current Annual Report

4. Proposal

BigTribe is responding to the Application Platform and Buddy Finder application components in the Sprint RFP. The BigTribe PeopleFinder satisfies the Buddy Finder requirements, and is integrated into the BigTribe Application Platform. It should be noted that the second application, the one for Points of Interest, also falls within the purview of the BigTribe CCLD/CCD though it would be most appropriate working in concert with existing POI aggregators than alone.

The following sections describe these components individually and collectively. The introduction to each component will address the questions posed by Sprint:

- BigTribe's ability to meet the stated requirements.
- The extent to which BigTribe will meet the requirement.
- The date the product, application or services will be available.
- A product roadmap showing the evolution of your technology beyond initial deployment.
- How long this product be supported by BigTribe.

Within each section, the following topics will be presented:

- What the component does.
- What aspect of the Sprint Application Platform, Buddy Finder, or Point of Interest Finder it supports.
- How it interacts with other BigTribe components.
- How it interacts with other applications and vendors.
- Relevant technologies associated with the component.

4.1 Application Platform

4.1.1 Introduction

The BigTribe Application Platform provides a collaborative environment for personalization, contextualization, privacy, provisioning, event notification, traffic logging, and bandwidth metering for a variety of location-based (or non location based) applications. The primary functionality of this platform, the ability to provide a services foundation to a broad spectrum of applications, and to tie into the location services platform, is mediated through a combination of messaging and web services requests and responses. The services provided by the platform: collaboration, personalization, contextualization, and privacy, are defined and elaborated upon in the following sections.

The goals the development of this platform are intended to achieve relate mostly to the user experience and, hence, to increased usage of location-based services. The fact remains that using a wireless web interface is currently very slow, time-consuming, and awkward, even for wireless developers. To get people to not only use, but to embrace the potential of these applications, the interface must be fast, and the interaction must be only as time-consuming as it takes to decide what it is that the user wants to accomplish. If these problems can be resolved, then the awkwardness of working with a small screen will be less noticeable. The BigTribe Application Platform makes use of four innovations which directly address these limitations. First, the use of the BigTribe Context Manager builds relationships between what the user has done and what the user might wish to do, greatly reducing the need for the user to start over again between one application and another. For example, instead of having to navigate to get movie tickets and then to navigate to get dinner reservations, the user can select the location where the movie theater is and buy tickets, and immediately select from there restaurants in the local area to make reservations from. The variety of contexts the user can select from are limited only to what the user has saved in their action history or list of geomarks, or can imagine as useful in an organic fashion.

Another aspect of this platform is the BigTribe Operations Manager, which allows vendors to register operations, such as 'reserve table' or 'purchase movie tickets' with respect to venues. Then, when a venue is selected by a user, the applicable operations are presented to the user, along with related operations appropriate to the location.

A third aspect of this platform is the BigTribe Adaptive Personalization Engine, which watches user actions and orders contexts and operations presented to the user in a way that is suited to their interests, thereby improving their experience with the system while providing valuable marketing information to the vendors.

Finally, the BigTribe Geomarking utility, allows a user to geomark a venue or event, route directions and maps, and to share that information with friends or the general public. For example, a user could agree to purchase movie tickets for a group of friends and, once the purchase is made, a confirmation could be sent to each friend along with a route to the theater from their current location. Shared geomarks become part of the BigTribe Community-Contributed Location Directory which is a collaborative tool that augments POI information with up-to-date and personalized information about venues and events, some of which might provide information that exceeds the scope of what POI vendors would normally host, such as information about places that aren't businesses, whether a shop is crowded, right now, or whether a Rave is happening: information that is important and essential to people on the go and, in particular, to youth, but might not be associated with a direct revenue source.

The aggregated effect of these components in an application framework is a complete, seamless, personalized, and user-friendly experience that brings great value to the consumer, vendors, and Sprint.

4.1.1.1 *Sprint's Application Platform Requirements*

Version 1 of the BigTribe Application Platform's components presented will not meet all of Sprint's stated requirements in full. The Application Platform will be deployed in a form that supports the two primary applications, and will continue to augment the platform until it meets and exceeds all of the Sprint stated requirements in full.

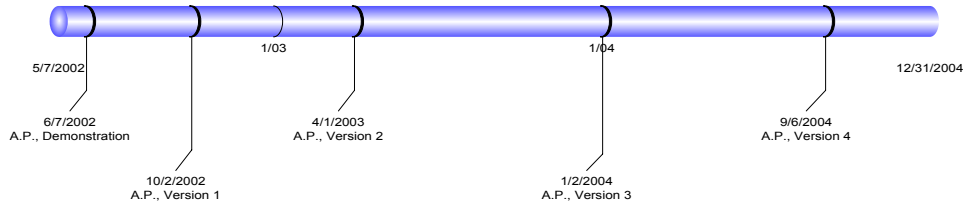
4.1.1.2 *Platform Availability and Support*

BigTribe will have all non-personalization components deployed by the end of Q3, 2002, and will have the first version of the BigTribe Adaptive Personalization Engine deployed before the end of Q1, 2003. The products stated in this proposal make up BigTribe's entire current product line, and so it is expected that BigTribe will support these applications for an indefinite period of time.

4.1.1.2 Application Platform Product Roadmap

The following diagrams show the BigTribe Application Program product development evolution from present until all applicable components and services have been tested and deployed. The diagram labeled Years 2002 – 2004’ shows the deployment path by version. presents two views. The first view illustrates the Application Platform components being developed, along with their demonstration and deployment dates.

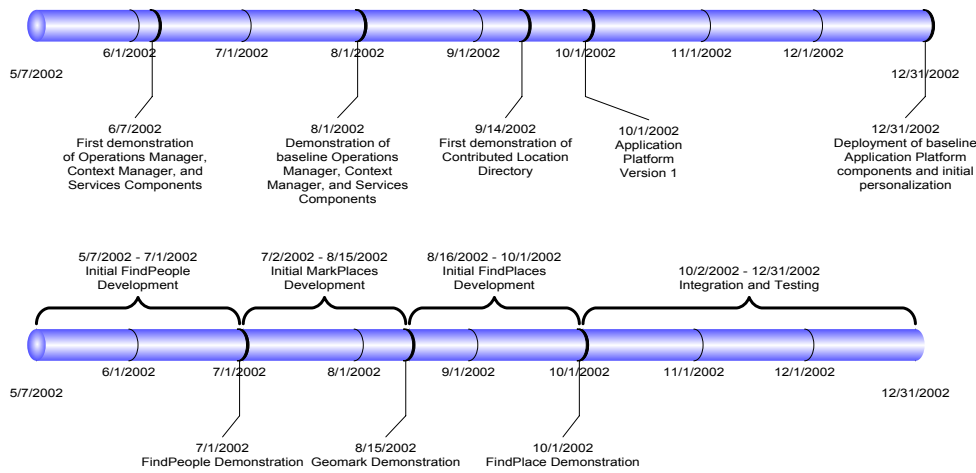
Application Platform Product Development Roadmap - Years 2002 - 2004



Version 1

The roadmap for Version 1 of the Application Platform is shown below.

BigTribe Product Development Roadmap - 2002



Version 1 of the Application Platform is predated by a demonstration of the core components: the OperationsManager and the ContextManager, in the BigTribe Find People application. The deployment of Version 1 follows the demonstrations of two other applications, Mark Places and Find Places, which implement the remaining baseline Application Platform components. The Version 1 implementation will thus provide the following component and application functionalities:

Category	Product	Feature and API
Platform Components	Context Manager	Operation applied to handset location
Platform Components	Context Manager	Operation applied to address location
Platform Components	Context Manager	Operation applied to recent action location
Platform Components	Context Manager	Operation applied to placemark location
Platform Components	Context Manager	Get applicable contexts
Platform Components	Operations Manager	Find operations
Platform Components	Operations Manager	Vendor registers operation
Platform Components	Operations Manager	Vendor unregisters operation
Platform Components	Operations Manager	Execute selected operation
Platform Components	Operations Manager	Register operation/venue in user's action history
Platform Components	Services	Get position from Geospatial Platform
Platform Components	Services	Get geocoded position from Geospatial Platform
Platform Components	Services	Get route from Geospatial Platform
Platform Components	Services	Get map from Geospatial Platform
Platform Components	Services	Get Point of Interest from Geospatial Platform
Platform Components	CCD	Create user
Platform Components	CCD	Add friend
Platform Components	CCD	Remove friend
Platform Components	CCD	Remove user
Platform Components	CCLD	Create invitation
Platform Components	CCLD	Accept invitation
Platform Components	CCLD	Reject invitation
Platform Components	CCLD	View invitation
Platform Components	CCLD	View route
Platform Components	CCLD	View map
Platform Components	CCLD	Select category
Application	Mark Places	Mark existing Point of Interest (venue)
Application	Mark Places	Delete mark
Application	Mark Places	Find mark
Application	Find People	Context based friend finder
Application	Find People	Locate friends
Application	Find People	Friend list
Application	Find People	Friend proximity
Application	Find People	Invite friends
Application	Find People	Manage friends
Application	Find People	Manage invitations
Application	Find Places	Select category
Management Console	User provisioning/Configuration	API
Management Console	View, logs, activities, metering	API

Management Console	Online user support	API
Documentation	API	
Documentation	Installation/Configuration	

Version 1 will provide the ability to perform simple marking of POIs supplied by application #2, but will not provide support for marking or sharing maps, routes, or user created locations. Version 1 of the Find People application will support finding anyone in the user's friends list (who has approved them), and routing to them, routing them to the user, or routing the user or them to a third location. The context manager will support all location-based contexts but not people-based contexts in Version 1. Histories will be saved for actions performed.

Version 1 will support both applications #1 (Buddy Finder) and #2 (Point of Interest), as well as any vendor supported operations (such as purchase movie tickets or reserve restaurant table) through a registration process.

Version 1 will not support any adaptive personalization or customization.

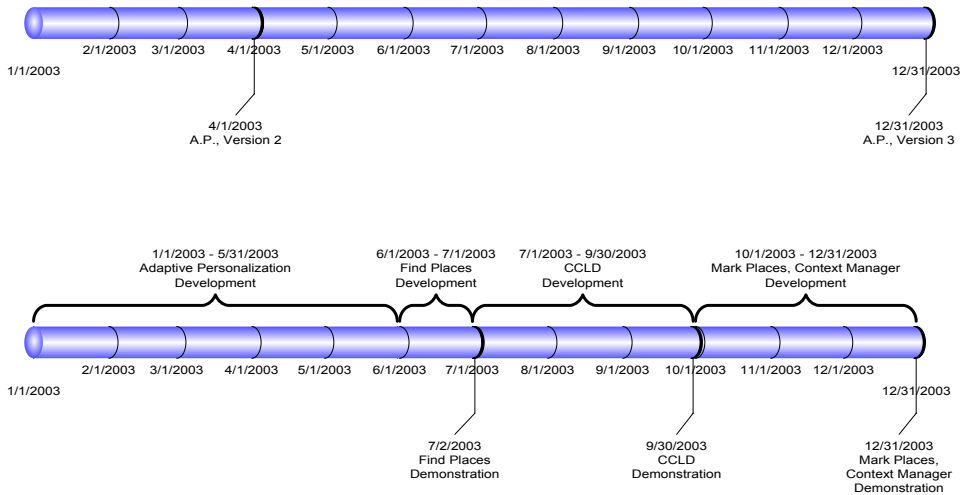
Version 1 will provide documentation for the APIs so that third-party developers and vendors can access the components. Version 1 will provide an SDK for developing applications such as the Find People, Find Places, and Mark Places applications.

Version 1 will not provide a console user interface or online user support. BigTribe will provide Tier 3 support to Sprint PCS.

Version 2

Version 2 of the Application Platform will become available in the first quarter of 2003, as shown in the roadmap below.

Application Platform Product Development Roadmap - 2003



Version 2 extends the platform functionality most profoundly by adding the first version of the Adaptive Personalization Engine, though it will only support user preferences, user profiles, and simple adaptation in this version.

Category	Product	Feature and API
Platform Components	Operations Manager	Subscribe for event notification
Platform Components	Operations Manager	Notify subscriber of event
Platform Components	Operations Manager	Vendor response to operation
Platform Components	Personalization	Adaptive - popularity ranking
Platform Components	Personalization	Adaptive - simple history ranking
Platform Components	Personalization	NonAdaptive – preferences and profiles
Applications	Mark Places	Share marks with others
Applications	Mark Places	Mark routes
Applications	Mark Places	Mark maps
Applications	Find People	Last known handset location
Monitoring	Metering	Quantify all transactions, reset on billing date
Monitoring	Logging	Recording all transactions
Management Console	User provisioning/Configuration	Console
Management Console	View, logs, activities, metering	Console
Management Console	Online user support	Console
Management Console	Lost and Found	Console
Documentation	Management Guide	
Documentation	Programmer Guide/Tutorial	

Documentation Sample Apps

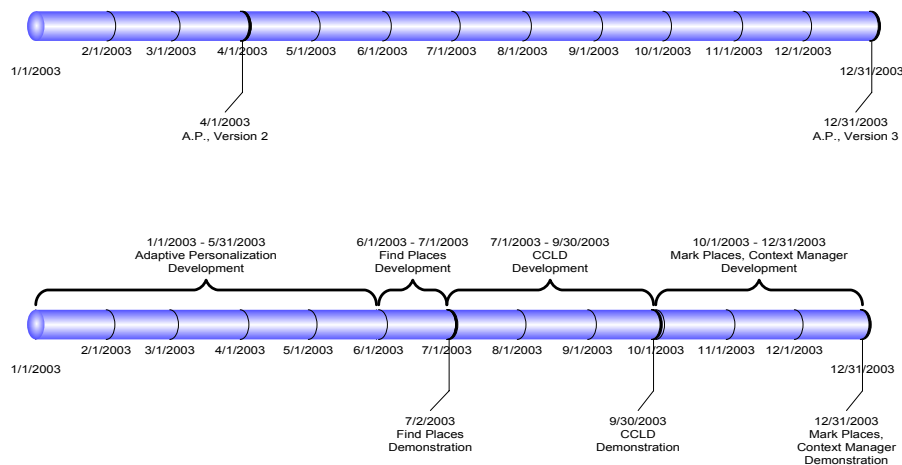
Version 2 will also add a visual console for monitoring the platform and assisting users with problems. Also supported will be the Buddy Finder last known handset location (as a web interface), marking and sharing of maps and routes, and APIs for both subscription to and notification of events, by outside vendors, for the purposes of performing usage analysis. Histories will be updated to accommodate the new operations (map and route).

Version 2 will not provide directory sharing or hierarchical folders for marks or histories. There will be no venue or event creation support in Version 2. There will be no provision of IM in Version 2. There will be no management of friend groups in Version 2.

Version 3

Version 3 of the Application Platform is deployed in the last quarter of 2003, as shown in the roadmap below.

Application Platform Product Development Roadmap - 2003



Full support for contributed Points of Interest and Event information is provided in this version, along with directory support for marks and histories. The Context Manager is upgraded to support event contexts and people contexts. The personalization component is upgraded to support induction of behavior based on user histories, and support for events in the user's calendar within the system.

Category	Product	Feature and API
Platform Components	Context Manager	Operations applied to event contexts
Platform Components	Context Manager	Operations applied to people contexts
Platform Components	CCLD	Event support (same operations as venues)
Platform Components	CCLD	Correct item
Platform Components	CCLD	Reputation system

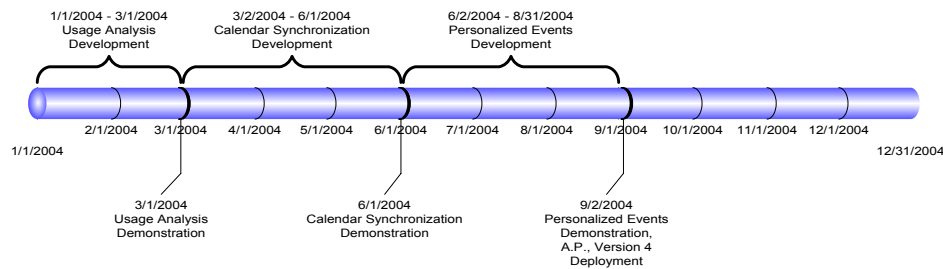
Platform Components	CCLD	Insert item
Platform Components	CCLD	Remove item
Platform Components	CCLD	Select category
Platform Components	CCD	Shared directories
Platform Components	Personalization	Inferential - global
Platform Components	Personalization	Calendar
Applications	Find Places	Route operation
Applications	Mark Places	Global
Applications	Mark Places	Corrections
Applications	Mark Places	Hierarchical folders
Documentation	Management Guide	
Documentation	Programmer Guide/Tutorial	
Documentation	Sample Apps	

Version 3 will not support synchronization of the user's calendar in the Application Platform with their calendar outside of the platform.

Version 4

Version 4 of the Application Platform will be deployed in the third quarter of 2004, as shown in the roadmap below.

Application Platform Product Development Roadmap - 2004

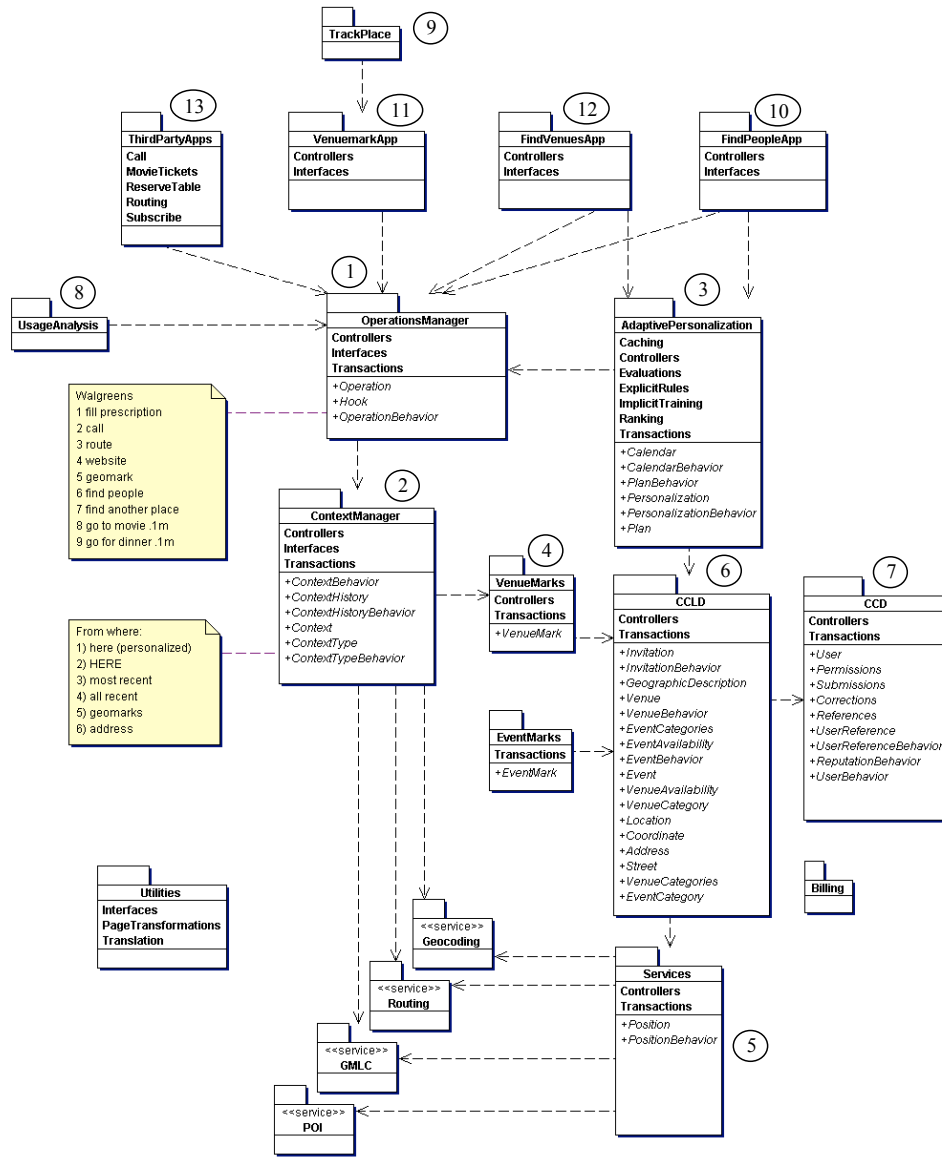


In this version synchronization of the internal calendar with an external calendar will be supported. A new addition in Version 4 is an extension to the Find People application that allows users to collaborate in an event planning context. Also supported in Version 4 will be complex usage analysis.

Category	Product	Feature and API
Platform Components	Synchronization	Event to calendar
Platform Components	Synchronization	Event to people
Applications	Find People	Personalized events
Management Console	Complex usage analysis	
Documentation	Management Guide	
Documentation	Programmer Guide/Tutorial	
Documentation	Sample Apps	

4.1.2 Application Platform Architecture and Components

The BigTribe Application Platform comprises five major components, as depicted in the package diagram below:



This diagram provides guidance regarding all components of BigTribe's Application Platform, along with three

applications BigTribe has developed as generic operations in the OperationManager.

The OperationsManager (at 1) is the entry point into the Application Platform and its role is to manage operations that can be performed at a Point of Interest and to provide integration of related operations in the vicinity. A list of applicable operations is displayed on the handset (e.g., Buddy Finder, Point of Interest Finder) and the user selects from among that list. If a Point of Interest has been selected, the OperationsManager identifies those operations that are applicable for the venue and displays them. The OperationsManager enables third party Point of Interest vendors to register operations with a known Point of Interest whereupon a user can select that operation when any of those Points of Interest are selected. When an operation is selected, control is dispatched to the vendor's site. When the transaction between the user and the vendor is completed, the vendor returns the user to the OperationsManager, whereupon the operation performed is persisted to the user's context history. The OperationsManager uses hooks to notify registered monitors of when operations are performed, though support for this capability will not be made available until Version 2. The OperationsManager has a full web services API for developing applications.

The ContextManager (at 2) is used to identify the starting location for an operation when a specific Point of Interest (venue) hasn't yet been selected. In such cases, the ContextManager draws upon the current handset location, a user provided address, the users list of placemarks, or the users context history, to select a starting point. In Versions 1 and 2, the ContextManager will support among location-based contexts. In Version 2, the ContextManager will additionally support people contexts.

Both the OperationsManager and ContextManager make use of the Adaptive Personalization component (at 3) to rank results. The role of the personalization component is to learn what the user likes, to relate actions, and to make the environment more fun and useful as time goes on. The personalization component will be developed to support a variety of personalization techniques, all of which will be transparent to developers and users. As better models are developed, they will be swapped into active service. The personalization component registers with the OperationsManager to be notified of operations the user invokes. In addition, the personalization component has access to the context history, the user's personal marks, and other data sources from which to draw behavioral inferences. In Version 1 there will be no personalization, but in Version 2 there will be popularity-based personalization. In Version 3 there will be induction-based personalization, along with support for user preferences (such as ordering of directories and deemphasis of item types).

A key component of the Application Platform is the functionality associated with marking a Point of Interest (e.g., the venue itself, a map, route, or event) in a hierarchically-organized personal list of placemarks. This is accomplished using a MarkPlaces application (at 11) and a Venuemarks (at 4) component. Version 1 will enable a user to mark a known Point of Interest and to locate it in their context history for future operations. In Version 2 the user will be able to mark maps and routes, and in Version 3 directory/folder and events support will be available. Any item that is markable will be sharable with other users, and published to the contributed Point of Interest directory.

The Application Platform makes extensive use of location-based operations such as geopositioning, geocoding, reverse geocoding, routing, and mapping. This data is acquired through a Services component (at 5) which registers GIS services and then communicates with them to obtain the desired information. The preferred transport is HTTP/SOAP, but other transports can be used. The Services component will be fully deployed in Version 1, along with its API.

Collaboration is achieved with the addition of the BigTribe Community-Contributed Location Directory (CCLD, at 6), and Community-Contributed Directory (CCD, at 7). These components enable users to identify new venues and events, or to augment information about existing venues and events with up-to-date information, and in ways that may not be supported by commercial Point of Interest vendors. The CCLD/CCD combination will be supported in Version 3 of the Application Platform, along with marking, sharing, and their respective APIs.

BigTribe provides an internal Usage Analysis component (at 8) which subscribes to receive history notifications from the OperationsManager and then performs marketing analysis. An API is provided for external parties to gain access to this information. The Usage Analysis component will be available in Version 4.

Although it may be costly (power, time), BigTribe has a TrackPlace (at 9) component that occasionally pings the handset and performs various definable tasks. This component will not be available until Version 4 and will initially be used to define the last known handset location (in addition to the last operational location).

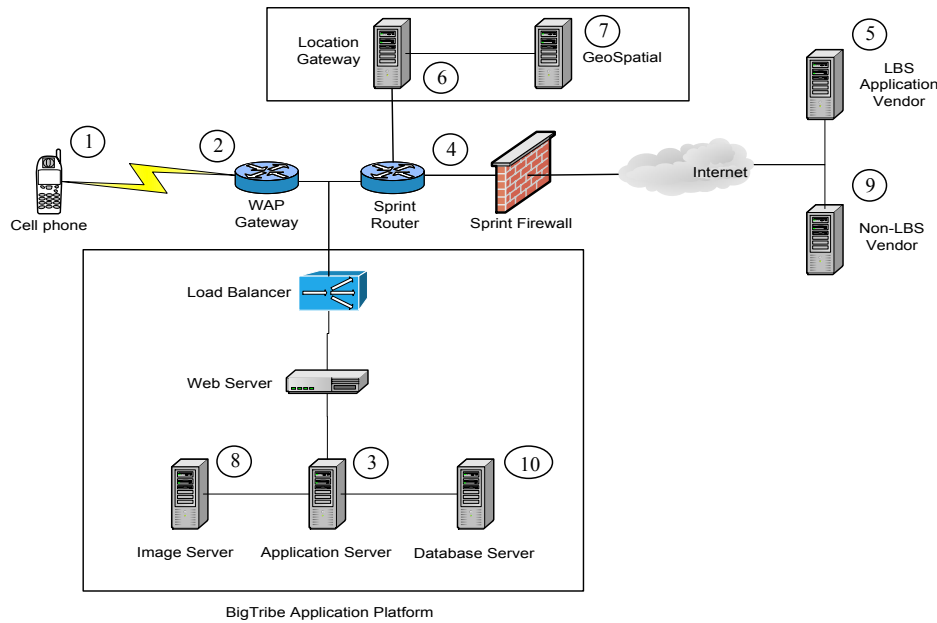
Items 10-13 represent operations that can be performed and would appear on an OperationsManager screen. Some are provided as part of the Application Platform, such as IM, Call, Route, Map, Find People, Find Places, and Mark. Others, as mentioned previously, will be registered by vendors. Operation registration provides a URL to forward to when the operation is selected by a user, along with the information from the venue data required to enable the operation. Any number of operations and vendors can be supported using this mechanism.

Performance

The Application Platform is designed using scalable and secure components based on the J2EE architecture and a true Model 2 MVC architecture. BigTribe is targeting a response time of less than a ½ second on all user-initiated operations, excluding response times for external operations. Such operations are: WAP Gateway, GIS services response (particularly routing), vendor-specific operations, and Point of Interest calculations.

Architectural Interactions

The BigTribe Application Platform is integrated into the Sprint Location Middleware with the Location Gateway and the GeoSpatial Platform. The figure below depicts the types of interactions that can take place in this environment. Three flow sequences will be described: (1) Sprint applications, (2) vendor applications, and (3) using the Application Platform APIs.



Sprint Applications

The Sprint Buddy Finder and Point of Interest locator illustrate the type of interaction that will be used for location based services vendors. Such vendors’ applications (at 5) could reside outside of the Sprint firewall, with access to the Sprint Location Middleware (Application Platform) through the internet. Users interacting with the Sprint location platform (at 1) would have their packets passed to the Location Middleware through a WAP Gateway (at 2). These packets would be interpreted by the Application Platform (at 3), and the result would be displayed on the handset (at 1). In the case where the user has just arrived at the Location screen, selecting a provided application, such as ‘Find Place,’ would result in the Application Platform Operation Manager invoking the LBS POI Application (5) through the Sprint router and firewall (at 4). The POI application would then communicate with the Location Gateway through the Sprint router and firewall, and with the user through the WAP Gateway. When the interaction was completed, the POI application would return the result to the Application Platform, where it would be integrated into the user’s context history and the user would be provided with ways to use that information toward some other end. Alternatively, if the user entered the Wireless Web and then went to the BigTribe menu item, the request would still go through the WAP Gateway (at 2), then to the Application Platform (at 3), but a different screen, one showing all the operation possibilities at their current location, would be displayed, two of which would be ‘Find Buddies’ and ‘Find Place.’ From there the interaction would be identical to the first case.

Vendor Operations

Many operations are invoked on a place that has been located using a Point of Interest locator or through some other means, but are not, themselves, location-based applications. One simple example is the purchase of movie tickets with a service such as Fandango, or reserving a restaurant table using OpenTable. In these cases, the same user (at 1)

finds themselves at the end of the examples above, but now the OperationManager has displayed the operations available at that particular POI. These are the operations that have been registered by third party vendors. If the user selects one of these operations, control is redirected back out the router/firewall to the vendor's site. When the interaction has been completed between the user and the vendor, control is returned to the Application Platform, whereupon the action taken with the vendor is integrated into the user's context history and the user is provided new options for what to do.

API

Another manner in which the Application Platform can be accessed is through the programming APIs and HTTP/SOAP access. In this case, the user visiting third-party vendor interacts with the Sprint Location Middleware through the internet and through the API calls to the various Application Platform components.

Call Flow Sequences

I may have just done this, I am not sure what this means right this moment.

User Interaction Sequences

This is what Curt is working on.

4.2 Buddy Finder

4.2.1 Introduction

The BigTribe FindPeople application provides the ability to locate a user-configurable list of people, such as friends, peers, or any organizational unit, within a radius of interest, or to invite one or more people in a group to a venue or an event and provide routing instructions. The people list is configurable to enable the user to select individuals by group membership, by the times their location is viewable, by the type of event they are engaging in, or any combination, that are applicable to their schedule and interests. The application polls the user's location, and that of the individuals who have given permission to see their location, so the last known position for the handset is always maintained in the event that a handset is misplaced or stolen, or if the user becomes incapacitated. The FindPeople application can be accessed using any supported wireless user interface and the world-wide-web.

4.2.1.1 Sprint's Buddy Finder Requirements

The BigTribe FindPeople application presented will meet all of Sprint's stated requirements in full, though not in Version 1.

4.2.1.2 Buddy Finder Availability and Support

BigTribe will have the FindPeople application deployed by the end of Q2, 2002. The product stated in this proposal makes up a significant BigTribe component, and so it is expected that BigTribe will support this application for an indefinite period of time.

4.2.1.3 Product Roadmap

The following diagram shows the BigTribe Buddy Finder product development evolution from present until all designed functionality has been tested and deployed. The FindPeople application is expected to be integrated into a larger, personalized Concierge system that can be used for collaborative planning. This functionality will not be available until Version 4.

4.2.2 FindPeople Architecture and Components

4.3 Point of Interest Finder

4.3.1 Introduction

The BigTribe Geomarking application, FindPlace application, and Community-Contributed Location Directory provide the ability to locate various Points of Interest or events at same, to insert new points of interest and events, to evaluate points of interest and events, and to mark and share this information with others. Any POI information can be used to aggregate with the BigTribe directories, adding value to the POI vendor and to the user. In time, the BigTribe Geomarking and Community-Contributed Directory could overtake an established POI in terms of depth and breadth of coverage.

4.3.1.1 Sprint's Point of Interest Finder Requirements

The BigTribe components presented above could conceivably, in time, meet all of Sprint's stated requirements in full, but would be best suited to augmenting existing POI vendor's data with temporally and spatially up-to-date information, along with

4.3.1.2 Point of Interest Finder Availability and Support

BigTribe will have all non-personalization components deployed by the end of Q3, 2002, and will have the first version of the BigTribe Adaptive Personalization Engine deployed by Q1, 2003. The products stated in this proposal make up BigTribe's entire current product line, and so it is expected that BigTribe will support these applications for an indefinite period of time.

4.3.1.3 Product Roadmap

The following diagram shows the BigTribe product development evolution from present until all designed products have been tested and deployed.

4.3.2 POI Architecture and Components

5 Engineering Methodologies

5.1 Development

BigTribe utilizes a staged development process originating with an MRD from the product development team and culminating with a release document and product that achieve the goals of the MRD or as modified and approved.

5.1.1 MRD (example needed?)

The BigTribe MRD includes a general description of the following:

- The application or enhancement and the market need it fulfills
- The market community the application or enhancement relates to
- The performance requirements the application or enhancement must meet
- The textual use cases the application or enhancement will implement
- The storyboards illustrating the interaction sequence an application user will see, along with explanations of what each component and term mean
- The timing required for delivery of the application or enhancement
- The points of contact information for the application or enhancement

After meeting to discuss the project, and its general feasibility, Engineering responds to an MRD with a Design Specification that will meet the technical requirements set forth in the MRD.

5.1.2 Design Specification

BigTribe Design Specifications detail the components that will interact to meet the MRD. It is constructed using UML tools and comprises the following elements:

- Package diagrams identify how application components will be organized and interact with each other
- Use case diagrams illustrate how actors will interact with components
- Sequence/Collaboration diagrams illustrate message passing between class object instances to implement use cases
- Entity relationship diagrams illustrate how relational entities will be developed and share information

The components of a Design Specification comprise the technical analysis and approach associated with developing an application or enhancement. They imply, since BigTribe uses a specific technological approach in implementing software, what approach will be applied in the implementation phase, though they do not imply specific algorithms that will be applied.

The Design Specification is returned to the product development team for review. Upon approval, a Functional Specification and Implementation Plan are developed.

5.1.3 Functional Specification

The BigTribe Functional Specification makes use of aspects of the MRD and Design Specification to develop each functional aspect of the implementation as follows:

- Marketing requirements from the MRD
- Use cases from the MRD
- Description of functional the component by mechanism
- Functional requirements for the component by mechanism
- Technical issues in meeting functional requirements for the component
- Interaction diagrams needed to develop the component
- Class diagrams specific to functional the component
- Data requirements for the component
- Algorithms required for the component
- Implementation steps for the component
- Expected problem areas or new technologies related to the component
- Test cases for each significant component and use case

From the Functional Specification, components are broken into specialty areas, along with interface requirements by specialty areas, and resources are divided up in an implementation plan.

5.1.4 Implementation Plan

The BigTribe Implementation Plan decomposes a project into use cases, and then by functional components and significant mechanisms. Each entry is assigned resources and engineering meets to discuss the implementation steps in developing each component and the timing required to develop the implementation. The first-cut Implementation Plan is returned, along with the Functional Specification, to the product development team, for approval.

Engineering implementation plans include entries for unit/component testing. When integrated, the use cases are tested. The plan also includes time for documentation, integration, and deployment.

5.2 Engineering

The BigTribe engineering team is comprised of experienced software engineers and technical staff in the specialty areas associated with eCommerce:

- Personalization strategies, including rule-based systems, collaborative filtering, and natural language processing.
- User interface design
- High-volume internet architectures
- Data modeling
- Java-based n-tier design and implementation
- Java EJB development
- Wireless protocols and interoperability standards (WML, HTTP, SOAP, LIF, OPENLS)

The team is divided into six groups:

- Design and management
- Data modeling and transactions (using EJBs)

- Control and translation
- Presentation and interface design
- Testing
- Documentation

Within these groups, different projects are assigned based on expertise and workload.

BigTribe has its own design, implementation, documentation, and style guides which are used to guarantee consistency, coherence, extendability, modularity, transparency between engineers, and performance of the products.

5.3 Implementation

Implementation of BigTribe components and applications follows the format presented in section 4.1: An MRD is discussed for every new product, a software/hardware design is returned, a functional specification and implementation plan are developed, the implementation is developed and tested, and the product is released.

5.3.1 Meetings

Engineering holds regular review meetings:

- Project kickoff
- Design review
- Code reviews
- Milestone tests

5.3.2 Groupware

BigTribe software is maintained using CVS on a machine not being used for software development. Software is maintained by application, component, and subcomponent. For example, EJB objects are maintained in their own project, as are the view and control objects.

5.3.3 Backup

Software archives are currently stored on CD-RW and CD-R media, and by the company ISP at their location.

The company has yet to establish a formal backup plan and strategy (not good for a proposal).

5.4 Testing

Due to the size of the company, BigTribe performs its software testing within the engineering team, according to test cases constructed at design time.

No formal testing personnel, software, or strategy has been implemented to date.

5.5 Support

BigTribe has no formal customer support staff at the time of writing, since no products have been commercially deployed.

As problems or enhancements are identified with the software, they are noted in a bug-tracking program by the following criterion:

- Hardware architecture
- Operating system
- User interface or browser affected
- Application
- Component
- Mechanism
- Severity
- Possible remedies

The bug is assigned to the appropriate engineer responsible for that component of the software at the time the problem is identified, along with possible remedies.

Engineering meets to review the bugs on a regular basis, to reassign severity and priority to their resolution, and to reassign personnel as appropriate.

6 Architecture

Each vendor responding to this RFP must provide a diagram that depicts the location architecture that will meet Sprint PCS's requirements and exceed growth projections. The architecture must show and describe the following:

Included with these descriptions should be an explanation of the functionality that each network system provides. This should be provided in the "Architecture" section of the response.

Also to be included in the "Architecture" section should be a set of call flows showing and describing how the different **data location messaging** would work.

5.1 Hardware Platforms

5.1.1 Servers (make and model)

5.1.1.1 Web servers

The web servers being used in 2002-2004 are 2 single-CPU's with 256MB RAM and 12 GB of disk space.

The number of web servers increases to 3 in 2005.

5.1.1.2 Application servers

The 2002-2004 architecture makes use of 2 dual-CPU application servers, 512 MB RAM per CPU, and 30 GB disk space.

The 2005 architecture increases the number of application servers to 3. Additionally, the amount of RAM per CPU is increased during this timeframe from 512 MB to 1 GB.

5.1.1.3 Image servers

The 2002-2004 architecture makes use of 1 dual-CPU image server, with 512 MB RAM per CPU, and 30 GB disk space.

The 2005 architecture increases the number of image servers to 2. The first and second year will host low-quality maps for occasional users and caches will be invalidated nightly. By 2005, when Sprint is fully supporting 1XRTT (3G), the number of image servers and the amount of RAM and disk they carry per CPU is increased from 512 MB to 1 GB. Disk space is increased accordingly.

5.1.1.4 Database servers

The 2002-2004 architecture makes use of 2 dual-CPU database servers, 512 MB RAM per CPU, and 30 GB disk space per board. This will accommodate redundant copies of the database instance, staging instance, and backup.

The 2005 architectures increase the number of database servers to 3. Additionally, the amount of RAM per CPU is increased in 2005 from 512 MB to 1 GB.

5.1.2 Switches and routers

BigTribe will use Sprint's routers, and has not yet selected a switch vendor.

5.1.3 Load balancers

BigTribe will use 2 Cisco Arrowpoint-like load balancers in 2002-2004, and 3 in 2005.

5.1.4 Interface cards

Extra NICs are required for each web server in the DMZ. The current proposal requires 2 extra cards from 2002-2004, and one additional NIC in 2005.

5.1.5 Cabinet space

The 2002-2004 proposal can be accommodated in 2 racks running at 20 amps per rack. Each rack will hold a switch, a load balancer, a web server, an application server, and a database server, with space and power to spare. One rack will hold the image server.

The 2005 proposal increases to 3 racks.

5.1.6 Bandwidth

Bandwidth requirements in 2002 will be one MB and will ramp to 2 GB in 2005.

5.1.7 Power requirements

20 amps per rack at 2 racks in 2002-2004, or 40 amps. In 2005 the power requirement will increase to 60 amps.

5.1.8 Backup requirements

Backup requirements are modest in 2002, at 150 GB per month. In 2003 they increase to 300 GB per month. In 2004 to 600 GB per month, and in 2005 to 1 TB per month.

5.2 Software Platforms

5.2.1 Operating systems

BigTribe currently uses Sun Solaris 8 on all production machines.

5.2.2 Web servers

BigTribe uses Apache Stronghold as the web server.

5.2.3 Application servers

BigTribe is currently using BEA WebLogic Server 6.1 but will be migrating to WebLogic Server 7 in the near future. BigTribe uses BEA Clustering Servers to control failover for the application servers, particularly session state, servlets, and EJBs.

5.2.4 Image servers

BigTribe hasn't identified an Image Server vendor to date.

5.2.5 Database servers

BigTribe is using Oracle 9i Spatial as the database server. The company intends to have the data store on separate drives than the server, for redundancy, and to have the data store in a disk array for performance. In the future, BigTribe is considering a clustering environment for the database servers, to provide failover capabilities for the database and improved control and scalability.

The following table illustrates the number of processors required to implement the architecture presented and illustrated in the topology presented in Section 7.

	Q4 2002	2003	2004	2005

Baseline Sprint Connections (Tier 3)	417,000	28,366,000	67,128,000	119,947,000
Daily Connections	4,633	78,794	186,467	333,186
Daily Connections (50% load factor)	6,950	118,191	279,701	499,779
Hourly Connections (16 hour day)	290	4,925	11,654	20,824
Hourly Connections (50% load factor)	435	7,388	17,481	31,236
Application Server Licenses (CPUs)	4	4	4	6
Image Server Licenses (CPUs)	2	2	2	4
Database Server Licenses (CPUs)	2	2	2	4

5.3 Software Applications

5.3.1 Types, Versions, and Capabilities

BigTribe uses a variety of software products to develop components and applications. These are enumerated below:

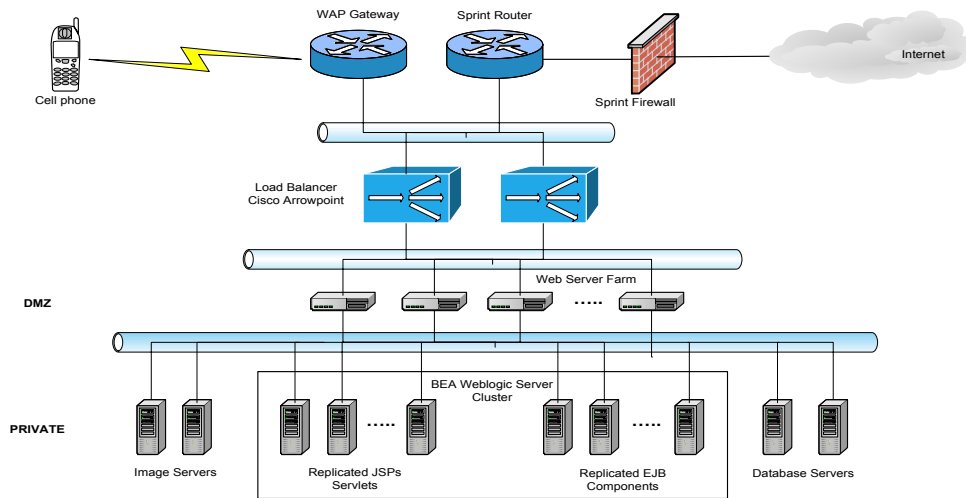
- Borland Software – Jbuilder Enterprise 6 software development environment, BAS application server
- Quest Software – TOAD database visualization tool
- Altova Software – XML Spy 4.1 XML/XSD/XSLT design and visualization tool
- TogetherSoft Corporation – Together Control Center 5.3 UML design tool
- OpenWave Corporation – OpenWave 5 development environment
- BEA Corporation – BEA WebLogic 6.1 development application server
- Oracle Corporation – Oracle 9i Spatial development database server
- Ericsson – Ericsson MPS 4 mobile positioning emulator
- Navigation Technologies – RTMS realtime maneuver system

5.3.2 Interactions

The BigTribe software development environment interacts with location based services for GMLC, geocoding, reverse geocoding, and routing. Currently the positioning needs are being met with the use of the Ericsson positioning emulator and NavTech's RTMS. Internally, we have our development environment using the Borland Application Server and the Topcat Web Server and an instance of Oracle 9i Spatial running on the development machines. We also have a deployment environment running on a Sun Blade, where we are running a development version of Apache Web Server, BEA WebLogic Server, and Oracle 9i Spatial. We use the OpenWave emulator and our out handsets to test the WAP interfaces and functional behavior.

7 Network Topology

BigTribe employs an n-tiered architecture based on web services and EJB technology. The basic architecture is illustrated below.



Traffic accesses BigTribe components using standard ports (80, 1572, 443, etc.) through the Sprint routers and WAP gateways. Traffic is load balanced externally to web servers which reside in the DMZ. For greatest security, these hosts should have dual NICs on the separate subnets represented by the network pipes in the diagram. Failover is accommodated by reallocating sessions across the viable webservers. Traffic from the webservers is also load balanced to the application servers, image servers using the application server clustering architecture. Hosts in the private area have proxies in the DMZ. Failover at the application server level is mediated by the application server clustering software, which maintains servlet and EJB state. In later releases, the database servers may also be clustered, ensuring failover at the data level. The topology/architecture presented is highly scalable, enabling volume/traffic changes to be accommodated with the addition/removal of hosts at any level in the topology. The variations supporting Sprint traffic requirements are presented in the table below:

	Q4 2002	2003	2004	2005
Baseline Sprint Connections (Tier 3)	417,000	28,366,000	67,128,000	119,947,000
Daily Connections	4,633	78,794	186,467	333,186
Hourly Connections (16 hour day)	290	4,925	11,654	20,824
Hourly Connections (50% load factor)	435	7,388	17,481	31,236
Load Balancers	2	2	2	2
Web Servers	2	2	2	3
Web Server NICs (extra, for DMZ)	1	1	1	2
Application Servers (dual CPU)	2	2	2	3
Image Servers (dual CPU)	1	1	1	2

Database Servers (dual CPU)	1	1	1	2
-----------------------------	---	---	---	---

The architecture (2 + 2 + 2 + 1 + 1) presented should be able to handle transient loads to 50,000 sessions per hour, which exceeds the 2005 predictions by 240%. The scaled up architecture will support 500,000 – 1,000,000 sessions per day with the addition of one web server, another application server, another image server, and another database server. Additional volume could be accommodated by increasing the number of servers in the farm. Supporting calculations are shown below:

$$50,000 \text{ connections per hour} = 833 \text{ connections per minute}$$

The maximum size a current GPS handset can load per page is 2.5 KB. Thus the required bandwidth to support a current handset using circuit-switched technology is:

$$\begin{aligned} \text{Bandwidth per day} &= 800,000 \text{ connections/day} * 2.5 \text{ KB/connection} \\ &= 2 \text{ GB/day} \end{aligned}$$

Assuming that a user can view at most one page every 5 seconds, a user could view 12 pages per minute. Thus the bandwidth required to support one user for a minute is:

$$\begin{aligned} \text{Bandwidth per minute per user} &= 12 \text{ pages} * 2.5 \text{ KB/page} \\ &= 30 \text{ KB} \end{aligned}$$

The average session is probably lasts between 2 and 5 minutes, so the average session bandwidth requirement, per user, is:

$$\begin{aligned} \text{Total user bandwidth per session} &= 30 \text{ KB/min/user} * 3.5 \text{ min} * 1 \text{ u/s} \\ &= 105 \text{ KB/session} \end{aligned}$$

Database performance will be limited by the need for proximity searches (i.e., spatial searches). Current benchmarks suggest that BigTribe can expect the following performance (provided by Oracle):

$$\begin{aligned} \text{Spatial Searches per CPU} &= 1,800 \text{ SS/sec} - 24 \text{ cpus} / 24 \text{ cpus} * 60 \text{ sec/min} \\ &= 4,500 \text{ SS/cpu/min} \\ &= 270,000 \text{ SS/cpu/hr} \end{aligned}$$

Using these rough calculations and some experience with websites delivering higher bandwidth using similar architectures, the first three years could be accommodated with two machines, one acting as failover for the other, and for staging. A conservative architecture would thus use two machines for redundancy and a third for failover, which is the architecture recommended for the 2005 traffic figures. Bandwidth requirements fall within current limits for a modest eCommerce site.

Due to the nature of the Application Platform architecture, as usage bandwidth increases (e.g., as 3G architectures are made available), the volume through the Application Platform may increase but the bandwidth should remain relatively constant.

Due to the clustering components proposed by BigTribe, this architecture and topology scale extremely well with no alterations to the topology, assuming that 32 IP addresses are made available at the onset.

8 Business Information

BigTribe Corporation was founded in May 2001. BigTribe is a startup software developer currently developing partner and customer relationships. BigTribe's products are currently not deployed in any implementation at the time of this RFP. BigTribe is self-funded by the founders including a cash investment of \$500,000.

BigTribe has steadily increased the number of employees in the past eight months. There are seven full time employees and one part-time employee. Four of the employees are currently compensated with stock only and the three of the employees receive a salary. One employee is an intern and does not receive compensation.

7.1 Products and Employees

7.1.1 Product History

Number of years that vendor has offered the products it is proposing in its response to this RFP

- BigTribe was founded in May 2001. The products are being developed specifically for Sprint. We currently do not have any customers deployed.

7.1.2 Customers

Number and type of customers using these proposed products: customers should be categorized as Wireline or Wireless and then within Wireless by CDMA, TDMA, GSM, or other.

- None

7.1.3 Product Deployment

Number of these proposed network systems that are in production today in a wireless IS-41 CDMA network.

- BigTribe currently does not have any product deployments.

7.1.4 Product Subscribers

Number of subscribers supported by the identified production systems today in a wireless IS-41 CDMA network.

- None

7.1.5 References

Three references of customers using the identified production systems today (contact name, phone number, and e-mail address)

7.1.6 Business Employees

Number of employees involved in the sales and marketing of these proposed products.

- Two full time employees and four advisory board members

7.1.7 Engineering/IT Employees

Number of employees involved in the development and testing of these proposed products.

- Six full time employees

7.1.8 Delivery Employees

Number of employees involved in the delivery and support of these proposed products.

- Six full time employees

7.1.9 Third Party Suppliers

Name and products of any 3rd party suppliers to the proposed products (indicate licenses and pricing for those licenses)

- BEA: Weblogic application server, version 6.1
- Oracle: Oracle Spatial 9i database server

7.1.10 Total Employees

Total number of employees including not only those involved in the sales, marketing, development, testing, delivery, and support of the proposed products but any others as well.

- Eight employees and ten advisory board members

7.2 Diversity

Vendor must complete the Sprint Supplier Registration Form located online at www.sprint.com/sprint/diverse/ as a condition to submitting the Proposal/Information. If Vendor has completed a Sprint Supplier Registration Form within the last 12 months, there is no need to re-register. If Vender is a Certified MBE, WBE or DVBE, this fact should be noted in the Proposal/Information along with any documentation to support Bidder's certified status.

7.2.1 Sprint's Supplier Diversity Policy

Sprint's Supplier Diversity policy requires that MBEs, WBEs and DVBEs should have the maximum practicable opportunity to participate in Sprint's Projects by providing products/services. Certified MBEs, WBEs or DVBEs who respond to this RFP will be viewed as providing added value to their Proposal. In addition, Vendors who are not an MBE, WBE or DVBE but joint venture or subcontract with Certified MBEs, WBEs or DVBEs or use such enterprises to provide products and services incidental to their business will be viewed as providing added value to their Proposal.

BigTribe is not an MBE, WBE, or DVBE. However, There are five co-founders of BigTribe with the following ethnic and gender diversity: 2 Caucasian American males, 1 Korean American female, 1 Japanese American male, and 1 Chinese American male.

Cynthia Mun 4/23/02 3:33 PM

Comment [1]: Need to add pricing information

7.2.2 MBE, WBE and DVBE Subcontracts

If Vendor is not an MBE, WBE or DVBE, Vendor agrees to use its best efforts to give Certified MBEs, WBEs and DVBEs the maximum practicable opportunity to participate in the subcontracts it awards, consistent with the efficient performance of any contract awarded by Sprint as a result of this RFP/RFI.

BigTribe agrees to use our best efforts to give Certified MBEs, WBEs and DVBEs the maximum practicable opportunity to participate in the subcontracts it awards, consistent with the efficient performance of any contract awarded by Sprint as a result of this RFP/RFI.

7.2.3 MBE/WBE/DVBE Reporting

If Vendor is awarded a contract as a Sprint Supplier as the result of this RFP/RFI, and Vendor is not an MBE, WBE or DVBE, it must report use of certified MBEs, WBEs and DVBEs on a quarterly basis.

If BigTribe is awarded a contract as a Sprint Supplier as the result of this RFP/RFI, and BigTribe is not an MBE, WBE or DVBE, we will report use of certified MBEs, WBEs and DVBEs on a quarterly basis.

7.2.4 MBE/WBE/DVBE Subcontractor Reporting

Vendor will require all subcontractors (except Small Business Concerns) who receive subcontracts in excess of \$500,000 (\$1,000,000 for construction services) to adopt an MBE/WBE/DVBE utilization plan.

BigTribe will require all subcontractors (except Small Business Concerns) who receive subcontracts in excess of \$500,000 (\$1,000,000 for construction services) to adopt an MBE/WBE/DVBE utilization plan.

7.2.5 DVBE Reporting

If the Project involves services performed in or products delivered to California, Sprint will require a Sprint Supplier to report its DVBE status.

BigTribe understands that if the Project involves services performed in or products delivered to California, Sprint will require a Sprint Supplier to report its DVBE status.

7.3 Reciprocal Business Opportunities

Sprint is a global communications company serving 23 million business and residential customers in more than 70 countries. With more than 80,000 employees worldwide and \$23 billion in annual revenues, Sprint is widely recognized for developing, engineering and deploying state of the art network technologies, including the United States' first nationwide all-digital, fiber-optic network. Sprint's award-winning Tier 1 Internet backbone is being extended to key global markets to provide customers with a broad portfolio of scaleable IP products. Sprint's high-capacity, high-speed network gives customers fast, dependable, non-stop access to the vast majority of the world's Internet content. Sprint also operates the largest 100-percent digital, nationwide PCS wireless network in the United States, already serving the majority of the nation's metropolitan areas including more than 4,000 cities and communities.

Will your company have any opportunities for Sprint to bid on your internal telecommunications or information technology services? Does your company have any planned joint marketing opportunities in which Sprint might team with you as either a prime or subcontractor? If such opportunities might be available, please respond to the following questions.

- BigTribe is currently a Sprint PCS customer for wireless phone services.

Does your company have any planned joint marketing opportunities in which Sprint might team with you as either a prime or subcontractor?

- Not at this time.

9 Certifications and Awards

Any Industry Recognized Certifications/Awards especially quality ones

10 Pricing

9.1 Hardware Costs

Hardware costs may be included in your pricing, but Sprint PCS reserves the right to leverage our purchase agreements with hardware vendors to purchase the equipment outright. Any hardware purchased by Sprint PCS will meet the Vendor's specifications.

If the Vendor includes hardware pricing, it must meet the following criteria:

- 9.1.1 Vendor must provide all recurring and non-recurring pricing that is associated with all hardware required for Location Services. List out all components, including all third party components.
- 9.1.2 Vendor must include pricing for planned upgrades for each year (2003 through EOY 2004.)
- 9.1.3 Vendor must provide warranties for all hardware and include maintenance costs of the system.

9.2 Software Costs

- 1.
2. Vendor must provide all recurring and non-recurring pricing that is associated with all software required for Location Services. List out all software, including all third party software.
3. All licensing fees must be based upon an unlimited use model.
4. Vendor must indicate any pricing associated with software upgrades and what constitutes a software upgrade that is not covered by annual maintenance fees.
5. Vendor must provide information regarding discounts to be applied towards future feature application packages.

6. Vendor must provide pricing associated with any customized software development.
7. Vendor must indicate the length of the warranty period and when annual maintenance fees start being incurred.

9.3 Training Costs

Vendor must supply pricing for any necessary training services associated with engineering, service troubleshooting and fault isolation, system administration, hardware and software upgrades, relevant training offered by third-party vendors, and other support training.

9.4 Miscellaneous Costs

9.4.1 Documentation

Vendor must provide pricing for documentation that would include user manuals, installation guides, operational and technical manuals, architecture diagrams, drawings, trouble shooting aids, etc.

9.4.2 Deployment

Vendor must supply pricing for Engineering, Furnish, and Install (EF&I) of proposed systems and software for a national application rollout (2002 through EOY 2003). All hardware and software must be deployed per negotiated schedule. Vendor’s equipment must be compatible with raised floor, concrete floor and overhead cabling environments.

1. Any other miscellaneous costs are to be included in this section and explained in the comments section.

Location Based Services Pricing Matrix						
	Direct Purchase (unlimited use) ⁽¹⁾	Up Front Costs for Revenue Share Model ⁽²⁾	Revenue Share Percentage for Vendor ⁽³⁾	Buyout of Revenue Share Model ⁽⁴⁾	Miscellaneous Costs ⁽⁵⁾	Comments
Location Gateway						
Software						
Professional Services						
Maintenance Fees						
Hardware						
Training						
Geospatial Platform						
Software						
Professional						

Location Based Services Pricing Matrix						
	Direct Purchase (unlimited use) ⁽¹⁾	Up Front Costs for Revenue Share Model ⁽²⁾	Revenue Share Percentage for Vendor ⁽³⁾	Buyout of Revenue Share Model ⁽⁴⁾	Miscellaneous Costs ⁽⁵⁾	Comments
Services						
Maintenance Fees						
Hardware						
Training						
Application Platform						
Software						
Professional Services						
Maintenance Fees						
Hardware						
Training						

Location Based Services Pricing Matrix						
	Direct Purchase (unlimited use) ⁽¹⁾	Up Front Costs for Revenue Share Model ⁽²⁾	Revenue Share Percentage for Vendor ⁽³⁾	Buyout of Revenue Share Model ⁽⁴⁾	Miscellaneous Costs ⁽⁵⁾	Comments
Application #1						
Software						
Professional Services						
Maintenance Fees						
Hardware						
Training						
Application #2						
Software						
Professional Services						
Maintenance Fees						
Hardware						
Training						
⁽¹⁾ Must include Software costs, Professional Services, Maintenance Fees, Hardware and Training.						
⁽²⁾ Include all up-front costs associated with a Revenue Share model.						
⁽³⁾ What percentage of the total fee charged for location services do you expect to receive? This fee could be based upon a MRC or per Event charge. Sprint PCS considers only (completed) successful billable events to be charged to our customers.						
⁽⁴⁾ Sprint PCS expects this fee to include credit for up-front costs and some percentage of the revenue shared.						
⁽⁵⁾ Vendor must supply pricing for Engineering, Furnish, and Install (EF&I) of proposed systems and software for a national application rollout (2002 through EOY 2003). Any "other" costs not covered are to be included here. Please provide necessary details.						

11 RFP Matrix Requirements

The system requirements matrix for each of the products requested is embedded into the attached "LBS RFP MATRIX.xls" file. The file is in an Microsoft Excel format.



12 Project Proposal

High-level project proposal for developing, engineering, installing, testing, and implementing the new network systems or applications. This should explain how vendor does/would perform network systems integration testing in their lab and supports Sprint PCS's FIT (Field Integration Testing). It should also explain how vendor would perform integration testing with other WIN and MSC vendor equipment in a laboratory environment.

Project plan proposal for developing, engineering, installing, testing, and implementing the new network systems

The ability of your company to meet these requirements.

The extent to which you will meet the requirement.

The date the product, application or services will be available.

A product roadmap showing the evolution of your technology beyond initial deployment.

How long will this product be supported by your organization (estimated obsolescence date)?

Provide enough capacity to meet the first two years growth projections.

13 RFP Pricing Summary

12.1 Pricing Models

12.1.1 *Direct Purchase with Unlimited Licensing.*

12.1.2 *Up Front Costs for Revenue Share model.*

12.1.2.1 *Percentage of Sprint PCS fee charged for Revenue Share model.*

12.1.2.2 *Costs to Buyout of Revenue Share model.*

14 RFP Requirements Response