



Testing Environment for Location Based Services and Technology, “Nav-It”

Contents

1. Summary	3
2. Background	4
3. The Testing Environment and Functions	5
3.1 The Opportunity.....	5
3.2 Activities.....	5
3.3 Facilities.....	5
4. The Nav-It Company Model	7
4.1 The Limited Liability Company	7
4.2 Location Testbed Project	8
4.3 Organization	8
4.4 Principles of Operation	9
5. Implementation of the Testing Environment	10
6. Financing Model	11
6.1 Cost Estimates	11
6.2 Revenue Estimates.....	11
7. Present Status and Next Steps	13
8. Appendixes	14

1. Summary

Project for evaluating the feasibility of setting up a testing environment for location based services and technology was carried out by Locus Portal Corporation during 26.2 – 6.4.2001.

Purpose of the work was to specify how and under what conditions end-to-end testing of the location based applications and network component interoperability could be carried out.

The study was made by discussing with the parties that have indicated their interest in this kind of testing environment. The feedback was analyzed and proposals prepared according to the synthesis of the discussions. Four meetings with the Steering Group of the project were held.

Following parties were indicated, as essential facilitators in the interoperability and applications testing that would provide added value compared to testing arrangements available already today:

- Two or more network operators
- Two or more network equipment suppliers
- Middleware, application and content providers

As an organizational model we propose a limited liability company to be set up to coordinate and run the testing activities. The company (called Nav-It) would:

- Set up a project (called Location Testbed Project) for the testing environment
- Arrange the private and public financing
- Employ the resources
- Set up the software/hardware environment
- Carry out the coordination and testing

At this point, preliminary plans with a draft of Memorandum of Understanding document are made. More preparation work need to be carried out, before the final decision for the testing environment can be made. This work should include:

- Preparation of the outlines for company and testing environment project documents
- Preparations for public financing availability
- Finding the coordinator with necessary background and commitment
- Plans for testing environment hardware/software and integration work
- Detailed schedules for signing the documents, setting up the company, building up the organization, starting the testing activity
- Financial plans

This planning work is intended to be financed by companies that are prospective stakeholders of the Nav-It Company. No decisions of continuation is yet made.

2. Background

Navi program agreed to investigate the possibility to build a location testbed that would comply with LIF location testing recommendations, in Finland in Navi program management board on Feb 13 2001. The target was to make a proposal, which could be used to approach LIF. The work was later decided to be purchased from Locus Portal as a consultation work. Feb 22 2001 an agreement with Locus Portal was made to conduct the work.

Project for evaluating the feasibility of setting up a testing environment for location based services and technology was carried out by Locus Portal Corporation. The work was ordered and coordinated by Navinova Oy and financed by NAVI Network and Nokia Networks. The Steering Group for the project included representatives from 15 companies and institutions (see the appendix 1.).

The project was first introduced to Navi-network on 26.2.2001. The steering group first met at Nokia House 1.3.2001. Subsequent follow up meeting with intermediate report was held at Siemens on 9.3. A workshop day was held at hotel Matinlahti 30.3 to go through the testing environment implementation concepts. The final meeting was held at Tekes on Friday 6.4.2001.

The scope of work was 34 man days. The work was carried out by Tero Heinonen, Samuel Salmenlinna and Juuso Himanen of Locus Portal Corporation.

The study was carried out by discussing with parties involved and analyzing the feedback. Most of the work was concentrated on mobile operators and network vendors, participation of these companies being the essential prerequisite for realization of the testing environment.

Selected content providers and application vendors were interviewed to include their opinions and targets. Technical discussions were held with research institutions (VTT, University of Jyväskylä) and consulting about public financing was provided by Tekes.

The following pages include a synthesis of the information received during the project. It is written in a form of a proposal. Nav-It refers to the organization that contracts with network operators, network equipment suppliers and by other parties required to establish the testing environment. Location Testbed Project refers to the activities run by Nav-It during the period until the end of year 2003.

3. The Testing Environment and Functions

3.1 The Opportunity

Network interoperability testing is regarded as a major challenge both in network operation as well as in infrastructure development.

Location based services involve several interoperability and roaming issues:

- Location based applications in multi vendor networks
- Locations based services in national roaming
- Location based services in international roaming

Location based applications are implemented now. Few ideas of potential “killer applications” are evident. Several ideas have to be tested and proven in practice.

Location based services especially in roaming situations involve important legal and privacy issues. These issues are connected to network security procedures and handling of confidential data. Also billing models and procedures are expected to generate high interest in testing.

Currently application vendors lack the ability to test their products in a live environment unless they have made a contract with an operator. However, making such contract requires a lot of resources and commitments, thus eliminating the opportunity to test wide range of services. Application vendors would seek to test

- Technical functionality
- Market feasibility

of their applications. On the other hand operators want to adopt such services, which are tested from both mentioned perspectives.

3.2 Activities

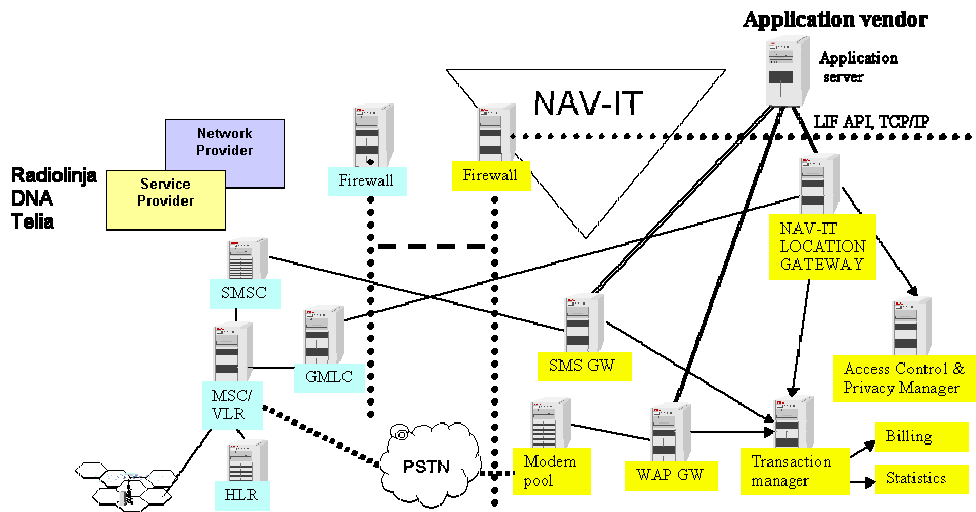
Location Testbed Project provides a unique opportunity for operators, technology vendors and application/content providers to ensure the interoperability as well as business and technical concept feasibility of their business offerings.

Location Testbed Project combines operators, technology providers and application developers in a neutral forum to concentrate on technical development and testing that none of the participating organizations – however strong - could alone perform. For smaller companies it provides a simple and easy channel to verify the operation and promote their services and products.

Nav-It organization and Location Testbed Project welcomes international players to participate in its activity and shares the views with international organizations like LIF and WAP Forum. It promotes Finland as a major development location for wireless technologies.

3.3 Facilities

In a proposed form under discussion, Nav-It provides a testing facility that allows connection to operator networks. The facility includes firewalls, authentication, access to positioning information, SMS- and WAP-gateway, provisioning, billing interface, databases and other necessary functions to ensure controlled and non-disturbing testing in a real environment.



Activity is not limited to any specific technology. All positioning methods, terminal types or network technologies are supported of course with the limitation of reasonable availability.

Nav-It can provide some general content such as map for testing. City of Helsinki and Finish Road Authority (digiroad) have shown interest in providing such maps.

A set of contract templates would be available for setting up the testing program and specifying the responsibilities of each party. Based on pre-negotiated conditions and previous testing project experiences, Nav-It prepares contracts, procedures and test plans. These agreements are drawn to include important inter-operator issues and are therefore easily processed by operators and other participants.

Nav-It maintains the neutrality of the testing environment and benefits of all participants. It eases the workload and maintains as well as promotes the interests of network operators involved in testing.

Nav-It knows the main players and their operating environments. Only reasonable and beneficial projects are proposed to the operators, of course, after careful and neutral consideration.

Nav-It provides standardized feedback to involved parties. Operators will get a feedback sheet that may be customized for each operator. Nav-It maintains the operational statistics.

The testing fees are charged according to pre-defined guidelines. The purpose of the fee is to filter out non-serious approaches and to collect revenue. It shall not prevent small companies from being able to test their products and services.

The fee structure shall be flexible to include issues like: resources need for the test, workload situation of Nav-It and special requests for participants (for example operators).

4. The Nav-It Organizational Model

4.1 The Limited Liability Company

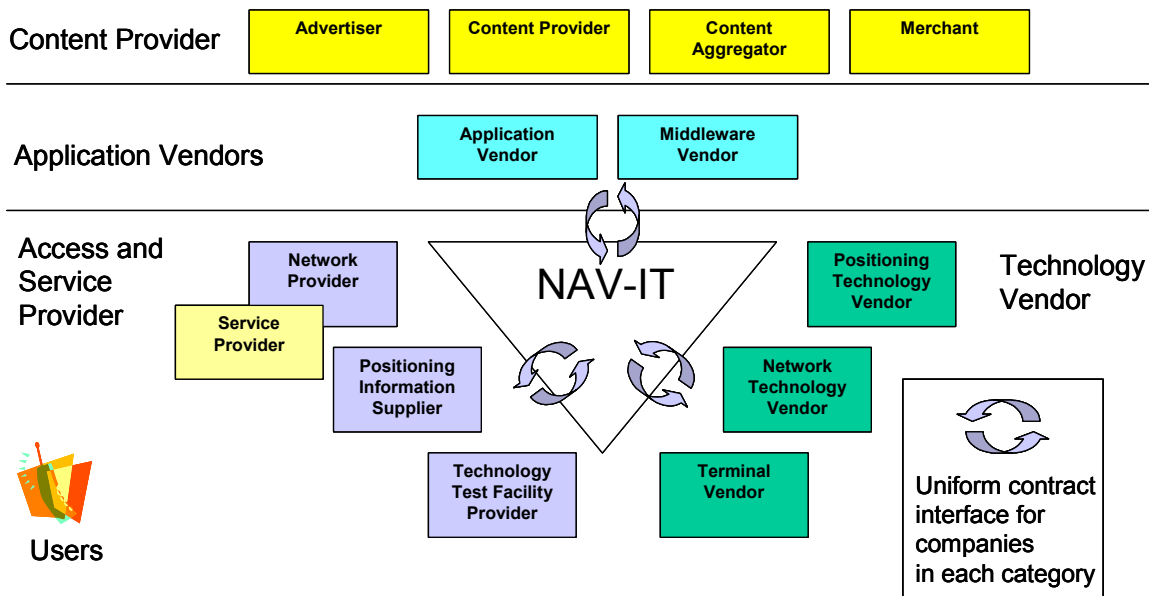
Nav-It organization is a limited liability company (Nav-It Company) that builds and operates Nav-It testing environment. The company contracts with operators, major network technology providers and a set of related companies active in location based services development.

The company model was selected over other alternatives because of:

- An easy and clear model of organization
- Setting up the facilities and recruitment of resources is likely to be easier
- The PR value

Purpose of the company is to promote technical and commercial development and run the testing environment.

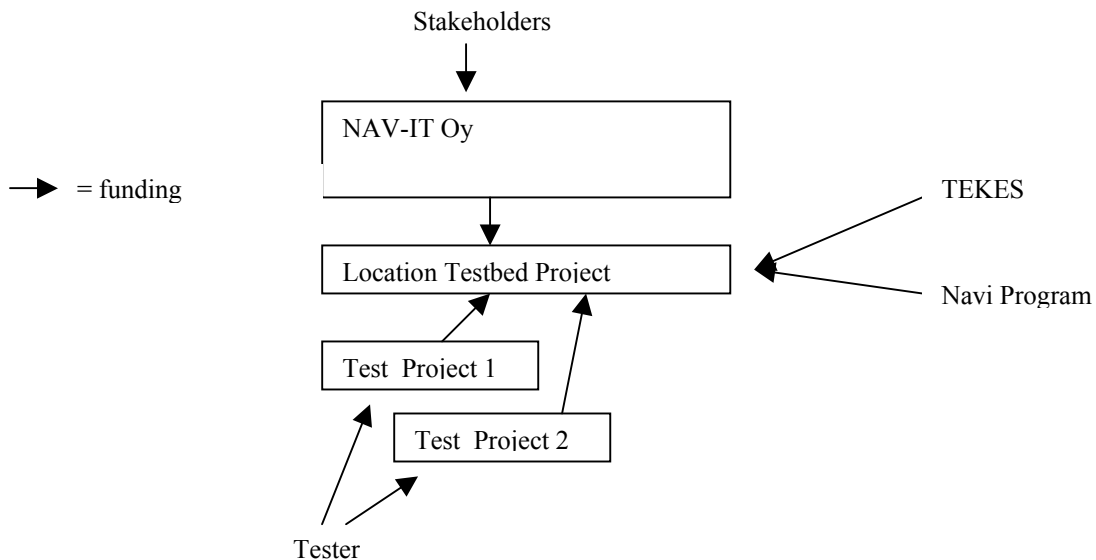
The organization publishes information to Associate Members. Associate Members refer to companies that participate in Location Testbed Project by testing their products or otherwise contribute to the testing. In principle, any company having related activity may become an associate member also during the Location Testbed Project period. Information about tests is statistical. Detailed information about individual tests is published based on permissions by the actual testers only.



Nav-It organization does not imply any obligations for contracted companies to support, or to participate in, some particular tests requested by some party. Neither does imply any obligations to support particular technology or technologies, that may be required to implement those tests. However, contracted companies are expected to provide Nav-It with appropriate resources and support needed to build Nav-It organization and facilities, and for successful execution of agreed tests.

A fee is charged for testing in order to compensate the operating costs of the company and to filter in only serious applications.

Under no conditions is Nav-It planning to do business with applications or provide any commercial services through its facilities. The function of Nav-It Company is only testing and any commercial launch of applications and services to the public is to be done outside of Nav-It activities.



4.2 Location Testbed Project

Nav-It Company sets up a Location Testbed Project to carry out the testing activity. The project period is planned to the end of year 2003. The Location Testbed Project includes:

- Setting up the testing facilities with resources
- Running the testing activity with other parties involved
- Promoting the testing environment and co-operating with industrial forums like LIF
- Providing information to the parties involved
- Promoting the technical and commercial development of mobile services and applications

After the Location Testbed Project the Nav-It Company and testing environment is expected to be continued on self funding basis.

4.3 Organization

The Nav-It Company employs coordinator (Managing Director) who manages the test environment operations and agreements between testing participants. One to two engineers and project managers are recruited to maintain the facility and run the testing.

The coordinator is a senior manager who:

- Manages the Nav-It Company
- Keeps constant contact with parties involved including industrial forums like LIF
- Coordinates the agreements between participants
- Coordinates the resourcing
- Manages the development of the testing environment

The testing engineers and project managers are specialists who are:

- Able to maintain and develop the testing facility
- Participate in testing
- Consult in specifying and running the tests

4.4 Principles of Operation

A set of contracts will be prepared as a basis of testing environment operation. For the Nav-It company following contracts are to be prepared:

- Contracts for key resource suppliers

Definitions of company resources and principles for utilizing them

- Detailed procedures for utilizing the testing facility
- Procedures for maintaining the neutrality and independency
- Principles for specifying the testing fees and charges

Intellectual Property Rights

- Guidelines on publicity (or confidentiality) of testing and results

Relations of the Nav-It Company towards other companies and organizations:

- Participation to the work of the industry forums
- Agreement for associate members

5. Implementation of the Testing Environment

The principle to implement the test environment is as follows:

- Build the test environment
- Run the tests
- Collect results

The roadmap for setting up the operations shall be prepared before founding the Nav-It Company. The plan should include:

- Definition of the resources and facilities: “service provider” or coordination only?
- Functionalities of the “service provider” environment
- Estimates on hardware, software and integration work
- Estimates of extent of the operations (amount of tests..)
- Availability of the coordinator

6. Financing Model

The Location Testbed Project and financing is planned for 2.5 years period until the end of year 2003. After that the operations will continue if the testing demand justifies new financing or adequate testing fee revenue.

The funding is to be provided by:

- Primary testers, based on agreements
- Tekes, the National Technology Agency of Finland
- Testing fees
- Other organizations and industrial forums

The plan below represents one possible alternative in setting up the testing environment including “service provider” type of facilities in a form of hardware, software and resources.

Simpler models could include less resources and functionalities and subsequently less cost. The minimal setup would be two persons (Coordinator and engineer) and only coordinating functionality.

However, the “full functional” model like below was usually regarded as best value for money with comment “if something is done, it has to be done well and with adequate resources”.

6.1 Cost Estimates

Following estimates are made as basis for discussion (in FIM)

½ year period to the end of 2001:

- Test facility: Initial hardware and software 500.000:-
- Planning for the testing facility: 300 h, 200.000:-
- Building the system, developing and integrating the software: 1000 h, 600.000:-
- Nav-It own organization 5 pers.1.300.000:-
- Operation expenses 200.000:-

First year to the end of 2002:

- Test facility maintenance and updates 400.000:-
- Nav-It own organization 5 persons 2.000.000:-
- Operation expenses 400.000:-

Second year to the end of 2003:

- Test facility maintenance and updates 300.000:-
- Nav-It own organization 5 pers.2.000.000:-
- Operation expenses 400.000:-

Total cost for operations until the end of 2003 in FIM: 8.300.000:-

Sources of financing

- Financing from the initial contracts: 2.750.000:-
- Public financing: 2.800.000:-
- Testing fees: 2.500.000:-
- Financing from other organizations: 250.000:- (by NAVI)

Total: 8.300.000:-

6.2 Revenue Estimates



Financing by the founders is estimated based on dividing expenses between operators and network suppliers as 1/3 (for a 400 needed, operator pays 100 and network company 300).

As an example: if there are 3 operators and 3 network suppliers and 2.500.000 need for financing, the cost would be 84.000:- per year for an operator and 250.000:- per network supplier per year basis.

Public financing is estimated as 1/3 of the total cost.

Testing fees are estimated 20.000:- for a “small” test and 40 pcs of “small” tests or fewer amount of bigger, but relatively more expensive tests to be made per year. This is expected to be a conservative estimate, the initial estimate being 60 – 80 tests per year.

100.000:- per year contribution is estimated from NAVI Program

7. Present Status and Next Steps

This testing activity has been defined from an actual need in the market. In addition a government interest for promoting Finland as a high end location-technology region provides a business opportunity for a small or medium size company.

At least two individual companies have shown their interest for the challenge. Thus the chances that a functional testbed will be build looks good.

The next step will be decided by the acting companies. Possible approaches varies from seeking participants for a MoU to a Letter of Intent with participating companies.

Since the content of the MoU or LoI will vary based on the approach selected, those documents will not be part of this report.

In the next stage the following steps should be taken:

- Prepare Mou or LoI if seen necessary by the acting company
- Prepare and negotiate the public financing availability
- Find the coordinator with necessary commitment
- Make a plan for testing environment hardware and software including plans for equipment, functionalities, integration work, schedules and costs
- Prepare a detailed plan with schedules for signing the documents, setting up the company, building up the organization, starting the testing activity

8. Appendixes

1. List of companies that have been in Steering Group of this study
2. Power Point slide sets:
 - Nav-It Goals
 - Nav-It Business Model
 - Nav-It Technology and Services

Appendix 1.

List of companies that have been in Steering Group or otherwise involved in this study

Note, the name in the list do not any way indicate the company's commitment on participating to the planned activities.

Operators:

DNA Finland

Radiolinja

Telia Mobile

Sonera

Technology suppliers:

L. M. Ericsson

Nokia Networks

Siemens Osakeyhtiö

Motorola

Benefon

Hewlett Packard

Middleware, Application, Content:

MS Location

Intelliwhere

Research Institutions and other Organizations:

Information Technology Institute of University of Jyväskylä

Navinova

Tekes

VTT Information Technology

Locus Portal Corporation