Client Service System for SME Intermodal Operator

CLISME

Final report

Public version

European Community funded project by TEN ELECOM Trans European Telecommunications Networks

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1. INTRODUCTION

This is the final report of the CLISME[1] research project. The project was funded by the European Commission under the TEN-TELECOM TI-2.3, applications and services for small and medium sized enterprises (SMEs). CLISME is an acronym of Client Service System for a SME Intermodal Operator. The project was carried out between August 1999 and July 2001.

1.1 General

The interoperability between information systems is one of the key issues in the development of new telematic applications. Small operators experience significant problems with communication and information gaps.

Typically, the responsibility for the transported goods changes many times in the transport chain. In addition to the physical transfer of responsibility, all the related information must be changed fluently. For SME transport operators and also users, information technology is a barrier.

Smaller companies usually have isolated in-house information systems and often the information handling is done manually. Communication with others has to be done using more traditional technologies like the phone, mail and telefax. The problem of isolation in information flows has been noticed and these companies have planned to start communicating using EDI connections, terminal access or Internet solutions to connect with the information systems of the most important constituent groups. Establishing these connections is vital for SMEs in order to maintain their competitive position in the market.

In bigger companies the routine tasks are more often automated. They have already well-established EDI and other corresponding connections with their most important partners and for the most common information flows. The communication is mostly automated and the information is present when needed. Information technology is not a barrier for transport solutions.

SMEs have limited resources for increasing their information system capabilities. Instead of purchasing their own massive systems, it may be wiser to establish connections with their partners' systems and construct a simpler system where data is transferred from other systems.

[1] The homepage of the project: http://www.vtt.fi/rte/projects/clisme/

1.2 Background

Among logistics experts in the Nordic countries, the vision of logistics development in the future is widely based on the utilisation of modern information technology. In 1999, there were a few new successes in working applications. The approach had been theoretical although efforts had intensified in the last few years.

The applications in industrial companies were well developed and experts could find evidence of several success cases around the world. It was time to begin finding new application possibilities in the logistics field.

Very good evidence of the lack of commercial software applications was found in logistics exhibitions. There was no supply of software packages aimed at the logistics field between different companies.

The project's idea was found during the **Scandinet** (Promoting integrated transport in peripheral areas of the European Union) project (EU/DG7/Integrated Transport Chains), when piloting a new concept with the company, SeaRail, in Finland. The Scandinet project produced new ideas for developing SME intermodal operation by utilising modern information technology.

SeaRail EEIG is an SME intermodal[2] operator, whose business provides door-to-door transport services, mainly in the Nordic countries but also with some volume to continental Europe and Russia. SeaRail operates about 250 railway wagons, which are rented from other companies. The rail-ferry operations between Turku (Finland) and Stockholm (Sweden) are bought from SeaWind Line. The railway transport is bought from the national railway companies. The truck transport is bought from truck companies when needed. SeaRail has one departure office in Turku and another in Stockholm. Figure 1 shows SeaRail as an organiser.

[2] An official definition of intermodal transport is (CEN):

> *"The movement of goods in one and the same load unit or vehicle which uses successively several modes of transport without handling of the goods themselves when changing modes"*

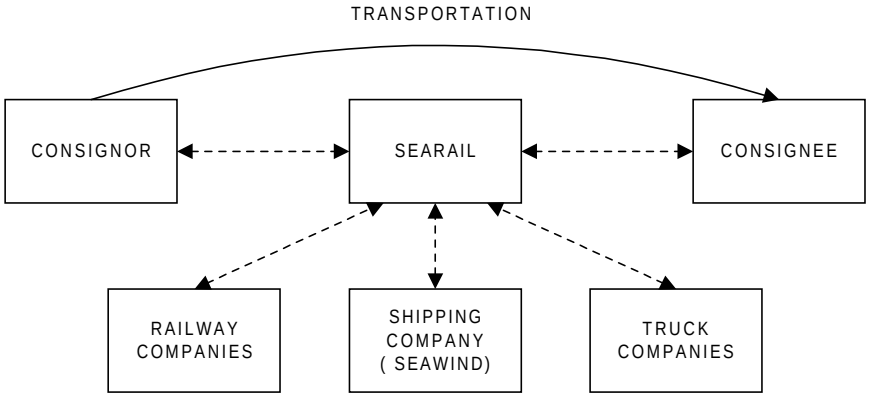

Figure 1. SeaRail as an organiser

SeaRail's operative planning and scheduling system was entirely manual. The sales processing system was computerised but with no detailed scheduling properties.

Increased pressure had been felt from customers to develop better client service systems. Demand was strongly focused on tracking and tracing service via Internet. This meant that SeaRail must first develop internal systems in order to produce information for their customers.

The operative systems of SeaRail were studied in the Scandinet project and it was found that the Internet-based tracking and tracing system requires development of a computerised operative scheduling system. There were two kinds of data-types that were handled in a tracking and tracing system: the planned transport schedule and the current status. These data allow the system to calculate deviations from the planned schedule.

1.3 Goals

The overall goal of the CLISME project was to improve the competitiveness of intermodal SME operators by utilising the modern Internet-based information technology. A new, lean and low-cost system concept would be developed for SMEs. The goal would be reached by constructing a pilot application for one intermodal SME operator. As a result the pilot company would get a partially functioning application and concept to utilise current information technology for further development.

Improving productivity and customer satisfaction, increasing the market share of intermodal transport and enhancing the co-operation with all the partners concerning intermodal chains were identified as further objectives.

1.4 Partners

The following partners took part in the project:

- **SeaRail EEIG**

  SeaRail is a member of the project consortium and provides the group with information of their operations and customer contacts. In return SeaRail will get a pilot application information system and a concept that utilises current information technology and can be further developed in to a full scale application for day-to-day transport operations later on.

- **Oy EDI Management Finland Ltd.**
- **Tieto Corporation Oyj, Services and Transportation**
- **VR Ltd, Finnish Railways**
- **Nordwaggon Ltd.**
- **Chalmers University of Technology**
- *The project co-ordinator* was **VTT (Technical Research Centre of Finland) Communities and Infrastructure**

1.5 Time table

The project was carried out in 24 months between August 1999 and July 2001. The duration of the different phases of the project is shown in the gantt chart in figure 2.

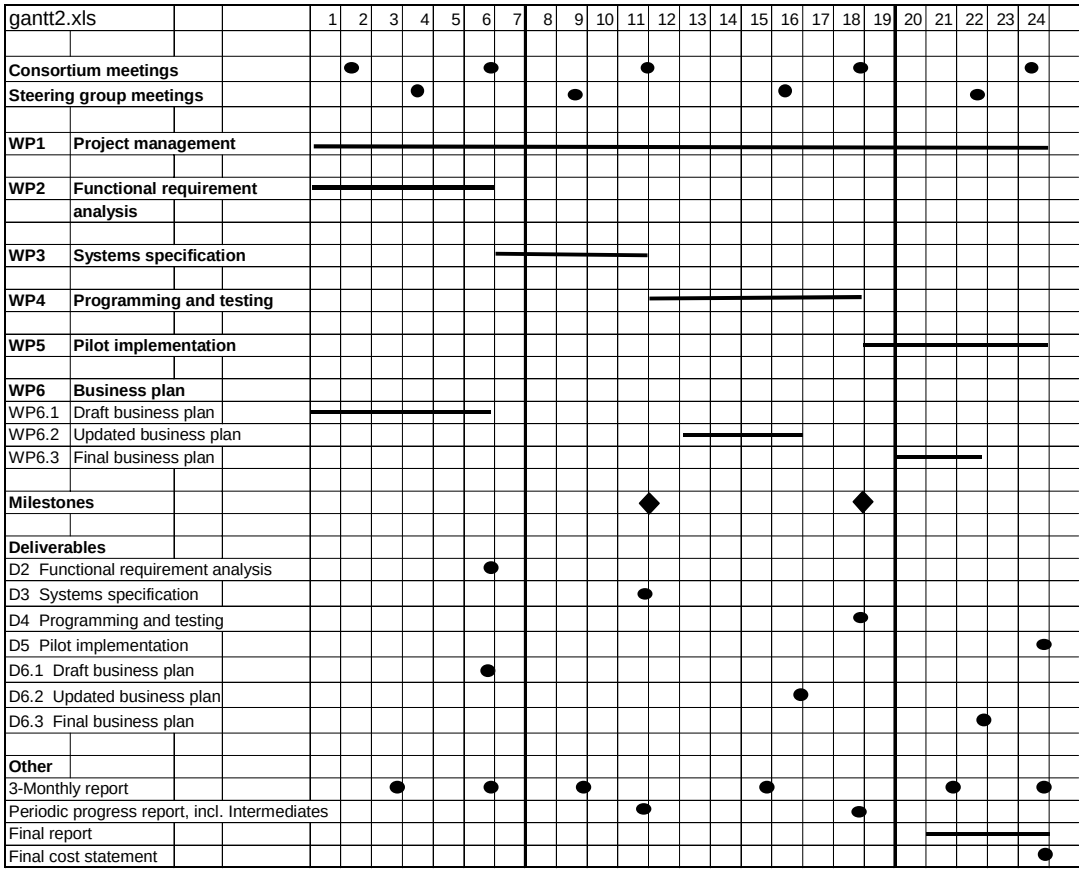

Figure 2. Schedule of the CLISME-project

1.6 Work Package Structure

The project was divided in eight work packages as follows. All work packages had a *work-package leader*, who was responsible for managing the work package, delivering *deliverables* and working papers, and monitoring the progress of the work.

WP 1, Project management

The objective of the WP1 was to manage the project during its lifetime. The work package leader was Mr. Kai Häkkinen from VTT (Technical Research Centre of Finland). This report is a deliverable of the WP1.

WP 2, Functional requirement analysis

Work package 2 was carried out by interviewing participants' organisations. Multiple meetings were arranged with all the organisations in which the management and operative issues were carefully discussed. The information and material flows were described. The user-needs were determined and analysed. The emphasis was on the analy-

sis of the decision-making during the information flow. The main challenge was to achieve a system concept that is really functional as an every-day tool in traffic management operations. The work was an iterative process, in which the plan was reviewed and corrections were made until the plan was accepted.

The work package leader was Mrs. Eija Aspelin from EDI Management Finland Ltd.

WP 3, System specification

This work-package was carried out by systems specialists within the project. The system structure was planned. The structure was strongly dependent on the technology that would be used as the constructing tool. The system structure was to be mentally tested by a group of users and specialists. The programming began after acceptance.

The whole system was planned roughly according to the functional requirement analysis. The system was divided into modules in order to reduce complexity. The next step was to determine the pilot system. The pilot system was designed to contain partially functioning modules and could be operated within SeaRail's organisation.

The pilot system database (files and fields) was carefully planned and took into account the complexity of intermodal transport. Technical architecture, including hardware, software and programming languages was chosen.

The system planning process was carried out according to Tieto Corporation's quality plan.

The work package leader was Mr. Sulevi Turkki from Tieto Corporation Oyj.

WP 4, Programming and testing

The programming and testing phase was implemented after the systems specification. The pilot application was divided into smaller modules that were programmed and tested. During this work package, the technical design of the pilot system was done including the database, modules, programs, architecture, etc. Internet-based software was programmed using standard HTML and JAVA. The software, which would be used inside the company and needs client software, would be made using DELPHI.

Each of the system modules was first tested individually. The latest phase was to test the whole pilot system. The most critical tests were the user-oriented validations, where the user interface was tested in practical situations. The database operations and tests of the program logic were the next phase.

The pilot test guide was made. This contained the procedure for the users and the customers, what features and properties were tested and what criteria used. The programming and testing process was carried out according to Tieto Corporation's quality plan.

The work package leader was Mr. Sulevi Turkki.

WP 5, Pilot implementation

The first implementation was carried out in SeaRail's organisation. The next phase was to implement the client information system. Finally, the interface to VR's RailTrack system was made. The software was installed into a portable computer, by which the pilot testing with different participants and others was locally achieved. On the other hand, the software was installed in Tieto Corporation's web-server, by which the Internet interfaces could be tested externally. One of the most crucial cornerstones of the system, the user interface was carefully tested. The opinions of the users were reported. The user help and guidelines were developed and written in co-operation with the users. During the testing, potential development proposals and observed deviation from planning were reported.

One target of the piloting phase was to produce information and input for the business plan work package by interviewing the users and the customers.

The work package leader was Mrs. Eija Aspelin, EDM.

WP 6, Business plan

This work package was carried out in following phases:

1. Approximately 6 months from the start: draft deliverables of all three main components of the final plan, including first findings of the market evaluation (demand), competition (supply) and preliminary ideas for deployment mainly based on desk studies. The outcome of this phase was deliverable 6.1.
2. After 15 months: an updated business plan including a more detailed demand and supply analysis, results from benchmarking the concept with the pilot and specialist group and updated deployment plan (alternatives). The outcome of this phase was deliverable 6.2.
3. At the end of the project: final business plan including the market potential requirements, the product and services concept to address this potential, marketing and technical activities (after the pilot phase) to make the concept commercially viable, and a concrete implementation and dissemination plan. The outcome of this phase was deliverable 6.3.

The main components of the business plan were:

- Market evaluation
- Competitive analysis
- Deployment plan

The work package leader was Mr. Seppo Auvinen, EDM.

Dependencies between the work packages

Dependencies of the deliverables (and work packages) are shown in figure 3.

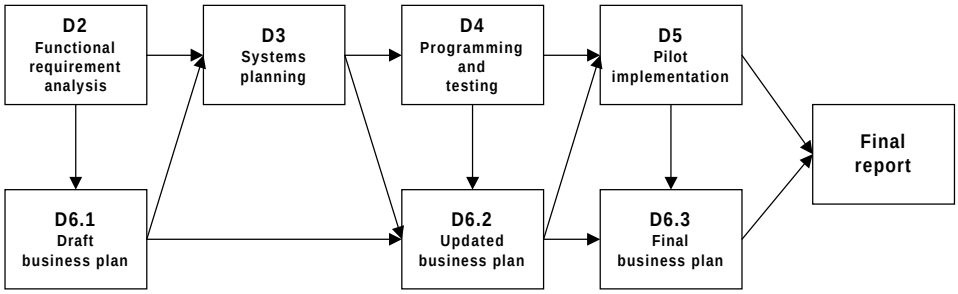

Figure 3. The dependencies between the deliverables

2. WP 2, FUNCTIONAL REQUIREMENT ANALYSIS

This chapter is based on deliverable 2 - *functional requirement analysis*, where the first results of the project were presented.

2.1 Objectives

A key characteristic of intermodal transportation is that the responsibility of the transported units is exchanged between many different parties during the time the transportation takes place. To make the movement of intermodal transport units through specific distribution channel as smooth as possible, the interoperability between different information systems, operated by different parties, is one of the key issues. This is where the SMEs have difficulties, especially the small ones. There are no information systems on the market as off-the-shelf products.

The overall objective of this work package was *to produce the user requirements of an information system designed for an SME intermodal operator*. The result was the *functional requirement analysis* of an information system for a SME operator including many necessary functions to deal with various day-to-day operations, especially resource planning operation tasks.

2.2 Work done

The results presented in 2.3 had been based on using three different methods; literature study, interviews and object-oriented modelling. The literature study covered the state-of-the-art technologies and a thorough analysis of the intermodal transport chain as well as the role of the logistics providers in the supply chain. The interviews concentrated on SeaRail and its interest groups such as customers, shipping lines, port operators, road haulage companies and wagon operators. In regard to the quality of the case study design, different measures were taken. To construct validity, a draft case study report was done after completing each case study and send to the respondent. The respondent judgement was then taken into consideration and a final conformity settled in regard to the contents before the final report was prepared. The outcome of the interviews was the process description between the different players in the logistics chain including the information flows exchanged. From SeaRail's point of view their current working procedures were presented and the future processes were suggested. The object-oriented modelling method was used for describing the suggested software modules.

SeaRail provided the project group with information of operations and customer contacts. In return SeaRail would get a pilot application information system and a concept that util-

ises current information technology. A real transport operation case was studied. From this case study a functional requirement description was made. One particular part of the functional requirement description was then chosen to be included in a detailed system specification. After that, programming of the pilot information system could be started

The architecture of the information system was designed and developed within guidelines such as:

- The system can be operated via Internet
- The system can be operated as in-house system by local area network
- The system can be constructed further to be operated by external service operator
- The interoperability of the system
- The interconnectivity of the system
- The scalability of the system
- The ease of maintenance

The main architecture was based on a *client-server* technique that entails a *database server*.

2.3 Results

Based on the literature study and the analysis of the interviews the conclusion was that the SME intermodal transport operator's IT system should besides the basic operative systems focus on the following areas:

- Transport planning and scheduling as well as the booking processing towards the interest groups including the allocation of transport units and the processing of booking confirmations and manifests as well as managing the time schedules
- Transport monitoring and control enabling the intermodal transport operator to follow up the unit locations as well as monitor and update their status
- Management reporting giving the intermodal transport operator the possibility to obtain information on customers, number of bookings, costs incurred, incomes, transport lead times, transport utilisation degrees etc.
- Client service enabling the client to enter bookings and waybill information on line using the Internet and to retrieve client specific reports as well as to track and trace shipments and/or transport units

These modules formed the basis for the selection of the actual pilot module to be developed. The outcome of the work package 2 was the input for the next work package 3, the system specifications.

The basic prerequisites of the information system were:

- Data is entered only once
- Accurate information (and data)
- Data is quickly available to all parties

The basic system architecture is shown in figure 4.

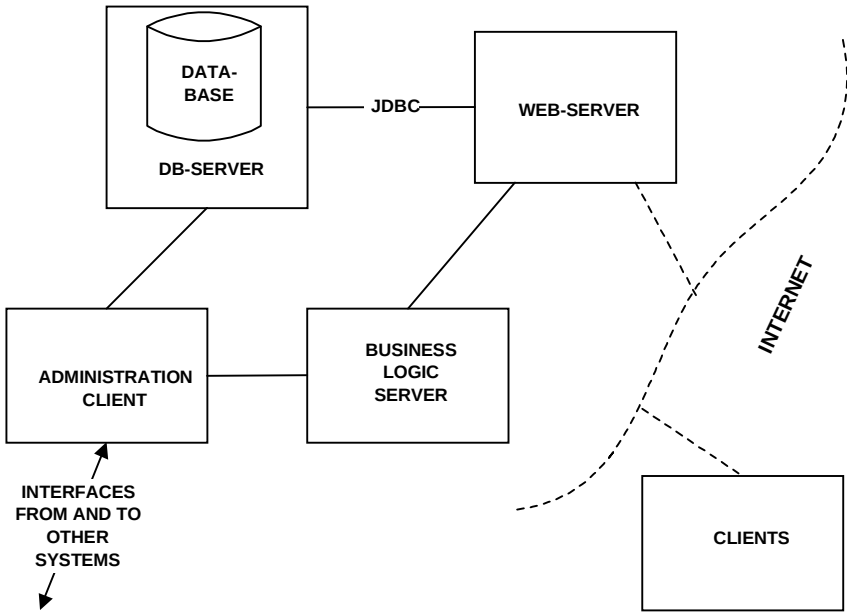

Figure 4. Basic system architecture

3. WP 6.1, DRAFT BUSINESS PLAN

The original tasks for WP6 were described to be:

- Evaluate European market place for a new Internet based software and services product for SME transportation companies
- Make an inventory of existing similar systems or projects and to benchmark CLISME-concept against some of the main systems
- Prepare alternative options to enter the European market and do a concrete business and deployment plan for one selected option

3.1 Objectives

The first part of WP6 can be illustrated according to the following figure 5:

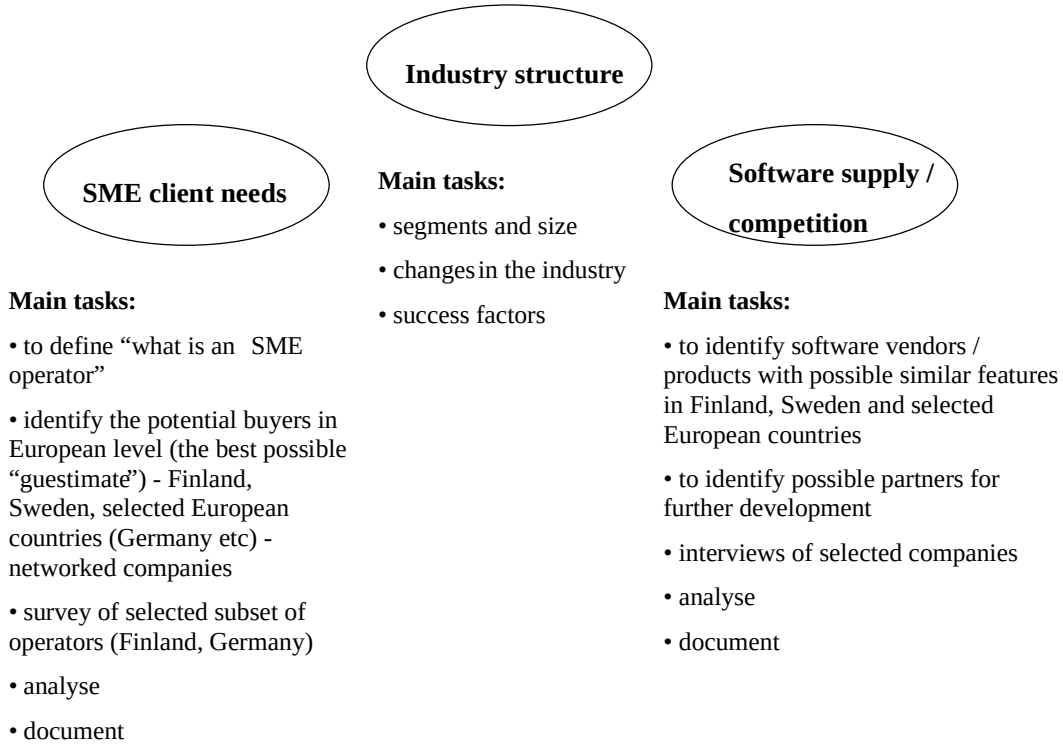

Figure 5. Tasks of WP 6.1

3.2 Work done and results

The following tasks were completed in this work package:

- Evaluation of the European market potential was started

- Market structure was defined
- The first survey of the European markets was done
- The first survey of existing software products and vendors was done based on existing literature
- The content of the final business plan report was planned
- Early findings and analysis were done both in group works and by the main author

Important issues for further work

Both logistics and IT industries were in a similar track of restructuring (polarisation meaning fewer and larger global and smaller specialised niche players). This meant a challenge to CLISME consortium in defining "who is the client" and "what is the product" as the structure is changing.

Concerning IT, it became obvious that the large logistics companies mostly had IT departments of their own to develop and maintain applications and that the investments to IT are high. The applications were communication intensive. Thus the market for CLISME type of solution is aimed at niche players or networked companies

Adopted software concept (at least in this phase of the project) was object based programming of logistics modules. A term of "Logistics Component Shop" was defined in which a few European specialised software companies will produce components. For the next stage in WP6, the markets would be studied further by trying to identify segments in which CLISME product concept is feasible.

In conclusion, it was impossible to define "an SME intermodal operator". The market was very fragmented. Thus it was impossible to develop a comprehensive CLISME package to this market segment. The current software providers in Europe consisted of a lot of SME specialised vendors and a few large players. The environment (business, technology) had changed from the initial entrance of CLISME.

4. WP 3, SYSTEMS SPECIFICATION

This chapter is based on deliverable 3 – *systems specification*.

4.1 Objectives

The main task was to design and structure the CLISME pilot system as well as planning the system development and implementation. Input into this work package came mainly from two sources:

- Deliverable D2 of WP2
- Deliverable D6.1 of WP6

The functional requirement analysis from D2 was the base of WP3 and the business model from D6 was used as a support to the evaluation of potential market for the CLISME system.

4.2 Work done

The pilot systems database was planned carefully taken into account the complexity of intermodal transport. Technical architecture including hardware, software and programming languages was chosen and described in deliverable 3. During the design phase, the extensibility of the system in different future environments was taken into account by using standard technologies, modular design methods and layered interfaces. Widely used software and hardware products that have good scalability were chosen.

The pilot interfaces to other systems were planned. Administration plan described how to maintain the system, update system parameters, update new software versions, how to make backups, etc. The data security was taken into account as well.

In deliverable 3:

- Database files of the whole CLISME system were introduced
- Modules of the whole system were described
- Definition of the pilot system was stated
- Catalogue of programs and modules with short description of functions included in the pilot system were described
- Technical description of pilot system interfaces to other systems was given
- Technical system architecture was introduced, including hardware, software and programming languages of the whole CLISME system
- Some administration and supporting parts of the system were described

4.3 Results

The functions of the CLISME modules are:

- Transport planning and scheduling module:

  managing time schedules, processing of bookings, allocating the transport unit, booking of road haulage, booking of ferry space, processing booking confirmations, processing of manifests

- Transport monitoring and control module:

  cost calculation and follow up, updating unit location, managing and updating unit status

- Management reporting module
- Client service module

The Client Service Module (CSM) was selected to be the pilot system.

The CSM of the CLISME system is based on a web-site that enables the clients to access different information of the co-operation organization, SeaRail, and its services and to enter online bookings, dispatch advise, arrival notices and reports. It also contains a link collection to other relevant web-based services such as the RailTrace[3] for tracking and tracing of shipments and wagons. Figure 6 describes the modules included in the CSM system.

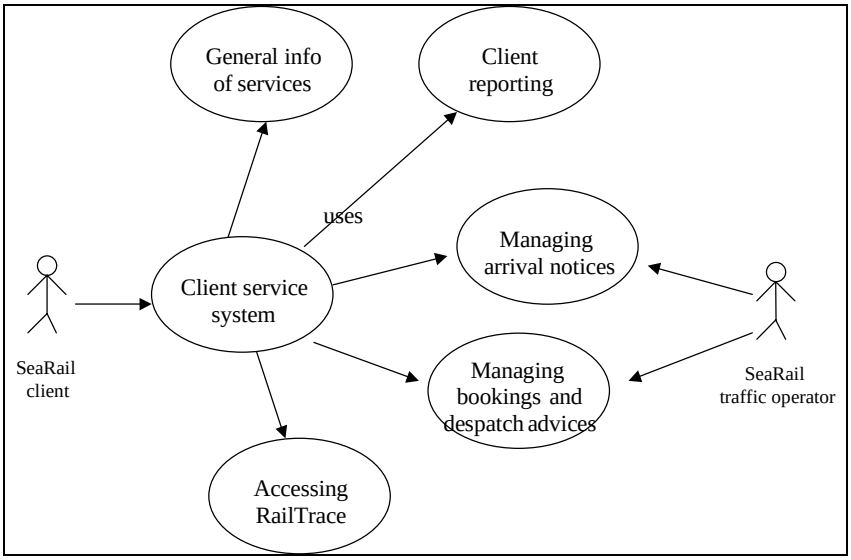

Figure 6. The modules of the CSM system

[3] VR's RailTrace system gives the client several options for tracking and tracing

In figure 7 a scheme of the interfaces between the CLISME CSM system and SeaRail's initial system, the Innovo information system, is shown.

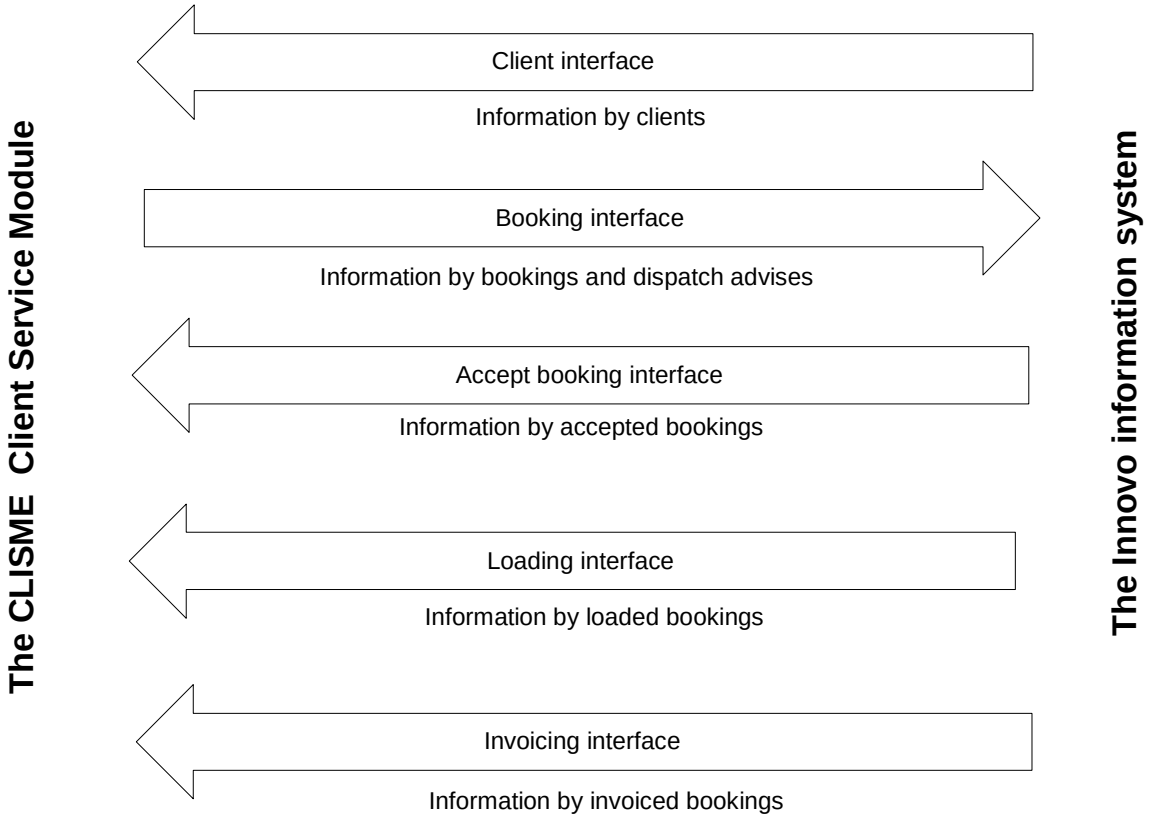

Figure 7.The interfaces

The CSM architecture

The client service system resides on the web server enabling access to SeaRail's own information system that run in an AS400 environment as well as the possibility for SeaRail's clients to transfer data in XML format. A scheme of the system architecture is shown in figure 8.

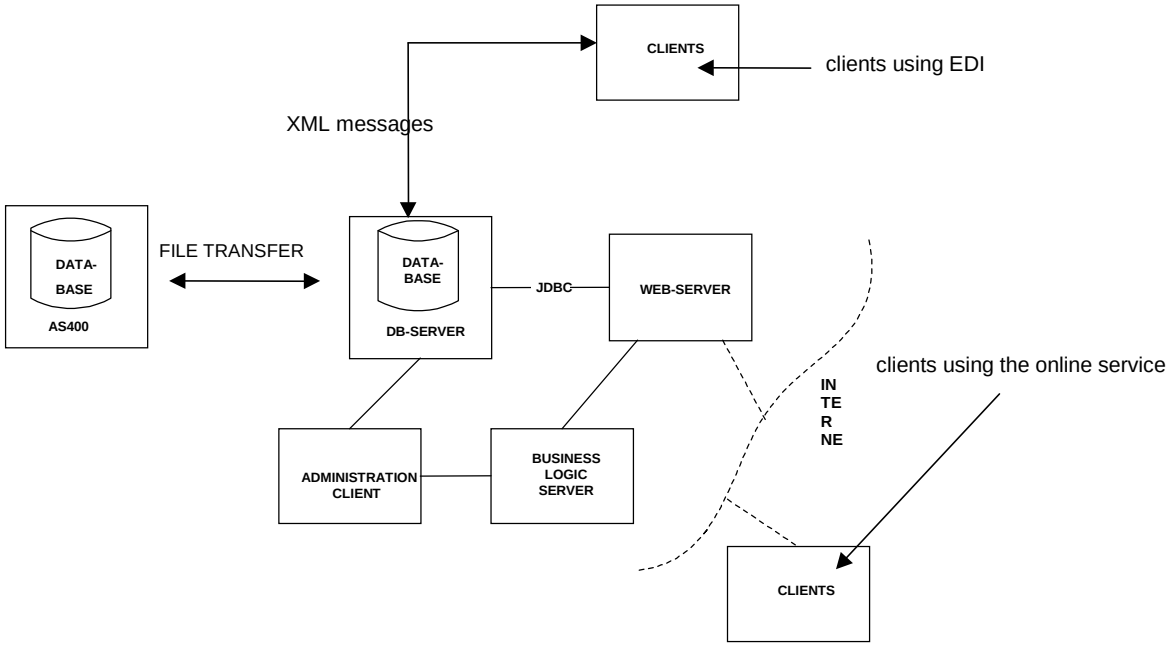

Figure 8. The system architecture

The bookings are whether entered on the web site online or transferred as XML files by the clients. The data will be stored in the database server of the Client Service Module. After validating the incoming information by SeaRail traffic operator the data will be transferred to SeaRail's operative IT systems or retrieved from there. In any case, the web server including the logical database server is the interface towards clients meaning that the clients are not allowed to access the AS400 directly. The web site is an Extranet application requiring username and password from the clients. The web site has to support multiple languages; at least Finnish, Swedish and English.

The main database files (as examples) of the overall CLISME system are:

- *Customer file* contains information about customers.
- *Order file* contains some of the production data that are necessary to carry out a work that has been ordered.
- *Technical specification file* contains information about the transport units available in the company.
- *Manifest file* contains all the information that is necessary for documentation of each consignment.

An example of order generation and the relations between respective files is shown in figure 9.

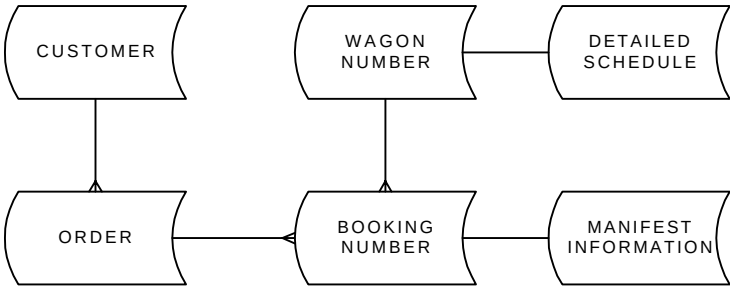

Figure 9. Order generation and related database files

The technical environment of the CLISME system consists of three levels:

- Workstation (www browser and administrator's application)
- Application/web server
- Database server

5. WP 4, PROGRAMMING AND TESTING

This chapter is based on deliverable 4 – *programming and testing*.

5.1 Objectives

In this work package, the specifications of the CLISME system were described within the framework of the pilot system. The focus was on programming and testing of the actual CLISME pilot system. The system comprised of two different modules: the Internet-based application designed for the clients of the intermodal transport operator, and the Delphi-based application for the system administrator of the transport company.

5.2 Work done and results

Application/web server

The Internet server software was the IBM's WebSphere Application Server version 1.0. The applications that are executed on the Internet server, access the database on the database server. The CLISME system servlets were implemented using IBM Visual Age for Java and database connections are developed using Borland InterBase driver.

Database server

The database server level is used by:

- CLISME's servlets and the database management system
- CLISME's administrators application
- Clime's interface batch jobs from/to AS/400

The Internet server level and the database server level physically reside on the same machine but for security reasons the database could also be on a different machine. The database is Borland InterBase and it is used with InterBase JDBC-driver and BDE 5.1.

Interface programs

Interface programs update the databases of either the Innovo or CLISME system. The interface program will send the booking information that is inserted via the web-interface. The input and output files for the interface programs are transferred using FTP.

Batch jobs

Batch jobs are programs, which export or import the information from or to the database of the AS/400, for example booking information from the CLISME system to AS/400 and booking confirmations from AS/400 to the CLISME system.

Technical overview

The CLISME database is described in figure 10.

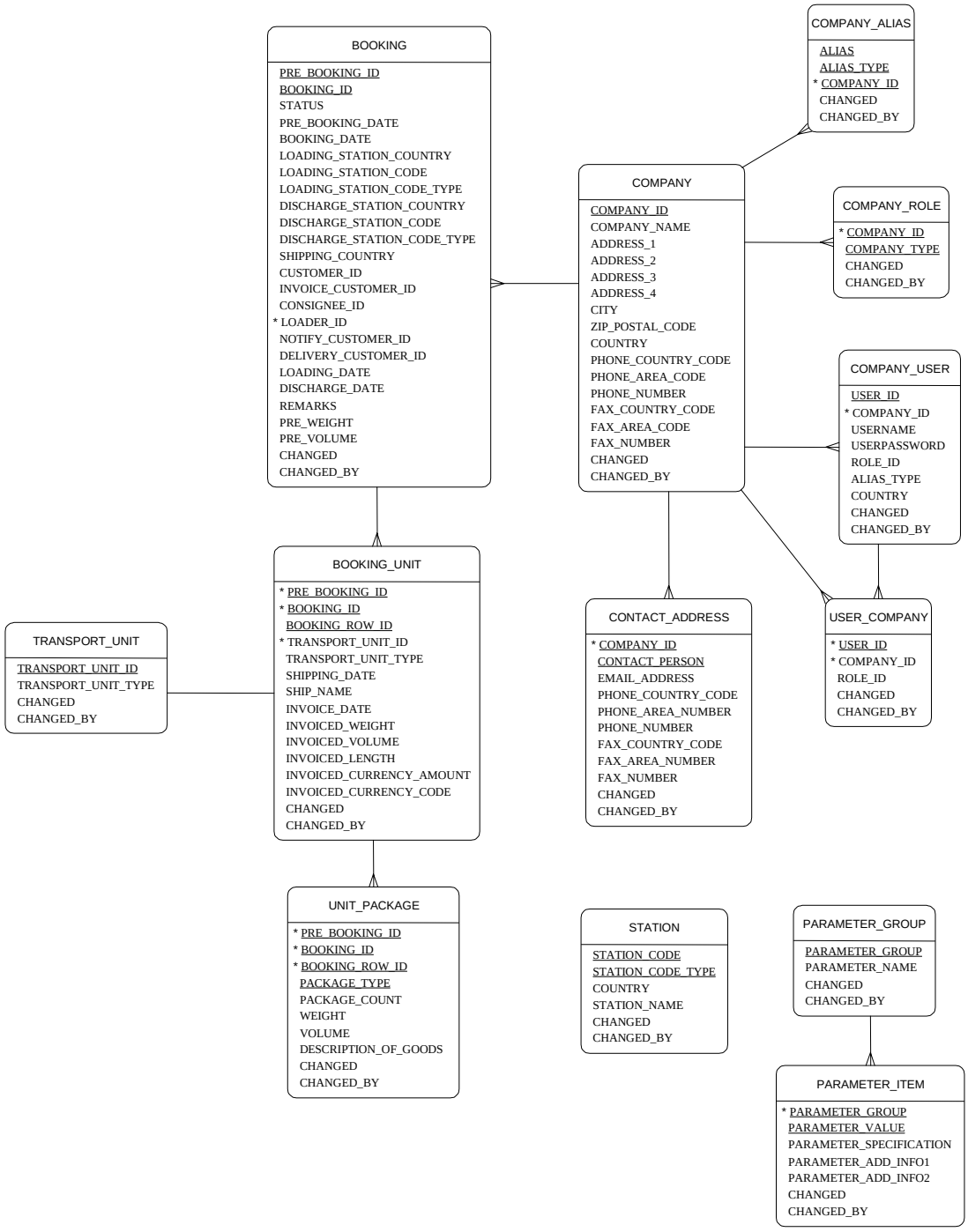

Figure 10. The CLISME database

Main modules (figure 11) of the pilot system are the Internet-based application for the clients, the administrative application for the traffic operator and the interface programs.

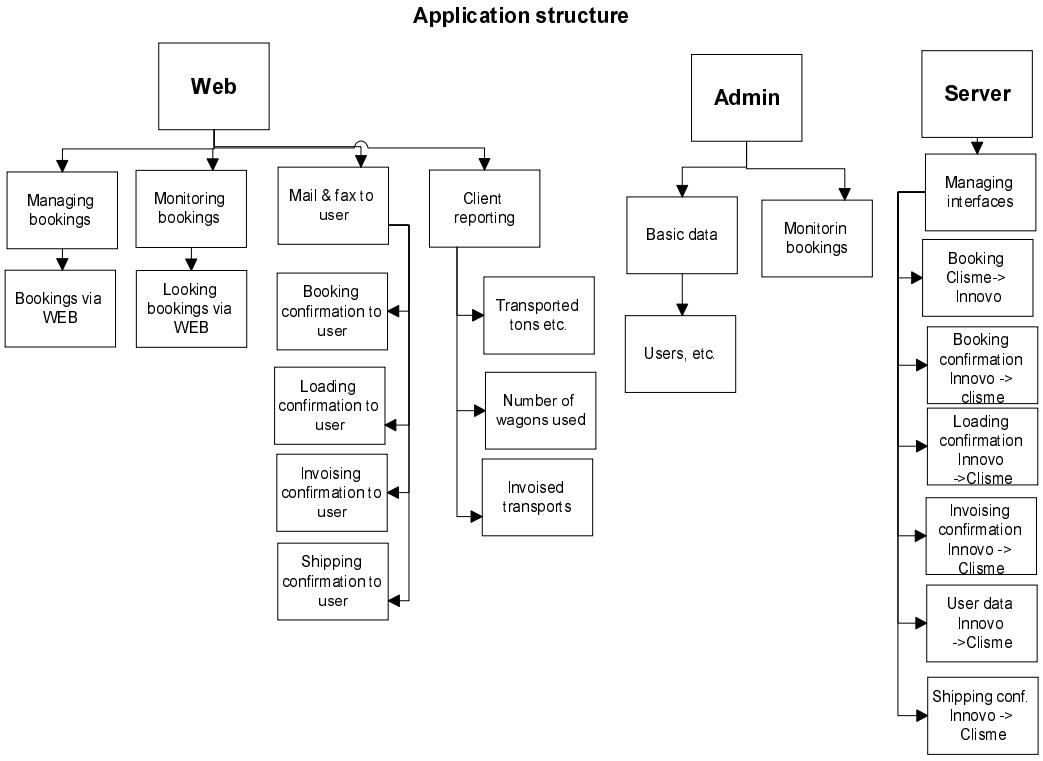

Figure 11. Main modules of the pilot system

The following screen dumps (figures 12-13) are examples of the user interface regarding the Internet-based the client service application.

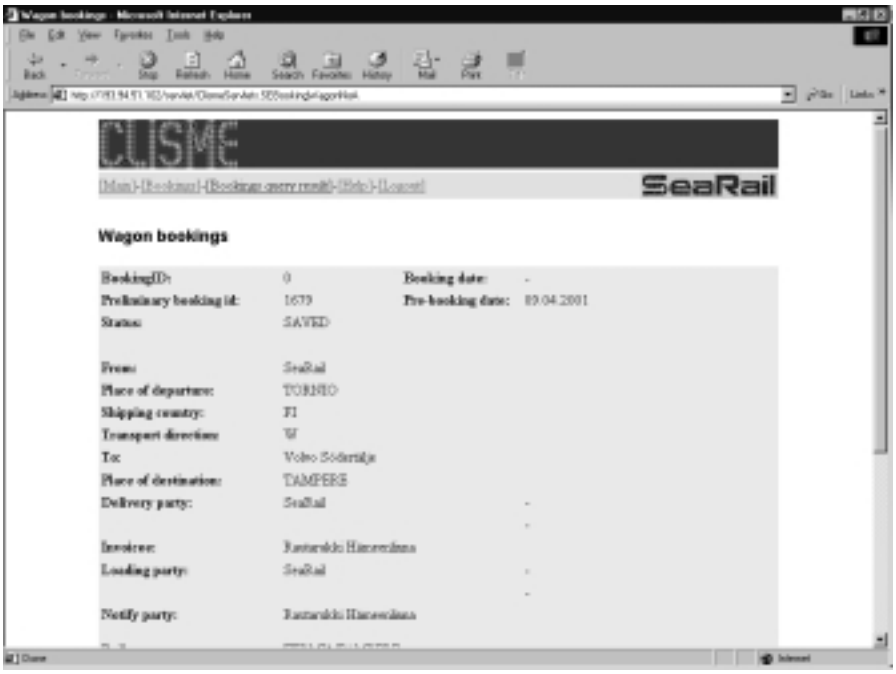

Figure 12. Detailed data of a booking

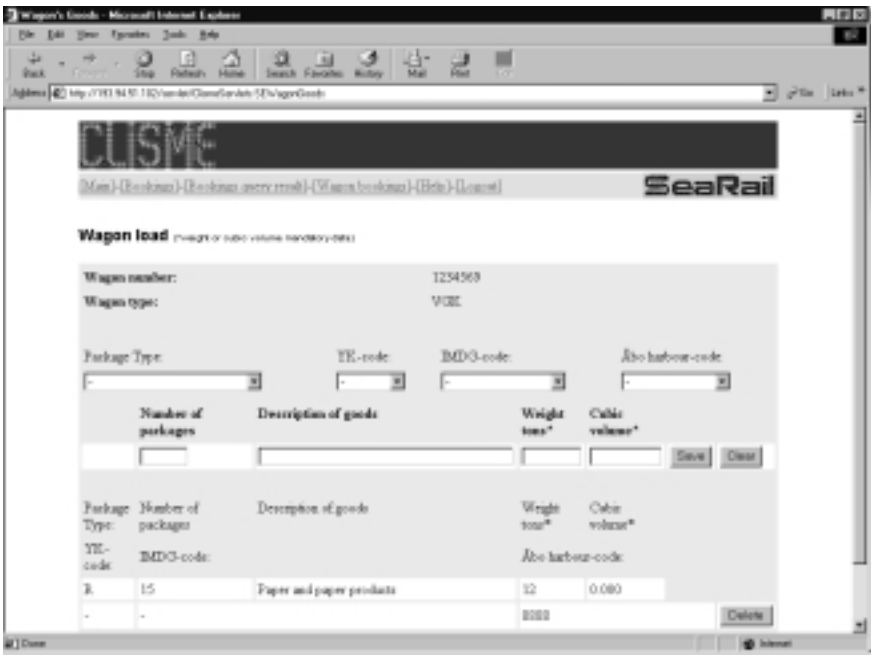

Figure 13. Inserting wagon load data

System administrator's application

The system administrator application's functionalities allow the administrator to:

- Accept, modify and reject bookings entered on the web-based application used by clients
- Insert and maintain contract information of the clients
- Insert and maintain company information
- Insert and maintain user information
- Insert and maintain railway station code lists, transport unit code list and parameters
- Change passwords

Figure 14 shows a screen layout example of system administrator's application.

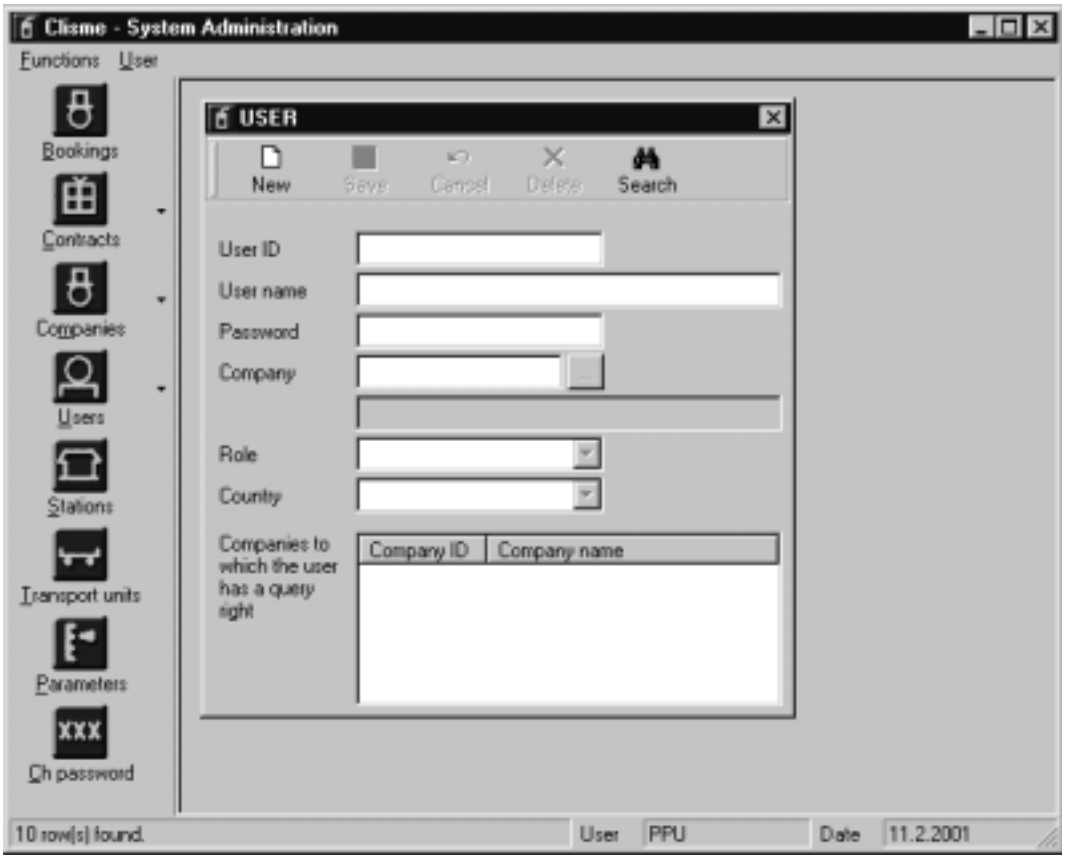

Figure 14. An example of system administrator's application, a CLISME user screen

Deviations of system specification

During the programming phase a very extensive iteration process was completed. This process involved the traffic operator SeaRail, TietoEnator and EDI Management personnel. Therefore some functions described in the earlier deliverable D3 were left out, and some functionalities not included in D3 are added during the programming phase. Table 1 shows the differences between WP3 and WP4

Table 1. The modules and programs of the CSM system and deviations

Module / sub-module	**System specification**	**Deviations**
Client reporting (via web-application)	CLISME's report generator	Solution: Three predefined reports
Managing bookings and despatch advice		
Web-application		
	booking entry	This is divided in four different functions Selecting the contract as the basis for the booking, Entering new bookings, Selecting bookings from list, Managing existing bookings
Traffic operator application		
	managing bookings	This is divided in two function: Selecting bookings from list, Managing bookings
		New feature: Contract list
		New feature: Contract maintenance
Managing basic data		
	transport unit type list	Included in parameter maintenance
	transport unit type maintenance	Included in parameter maintenance
	package unit type list	Included in parameter maintenance
	package unit type maintenance	Included in parameter maintenance
	commodity type list	Included in parameter maintenance
	commodity type maintenance	Included in parameter maintenance
		New feature: Transport unit list
		New feature: Transport unit maintenance
Managing arrival notices		
	entering arrival notices	not included in the pilot system
Database system		
	MySQl	Changed to InterBase (Borland)

Pilot testing

Once the overall programming and internal testing of the CLISME modules was completed, the pilot system was tested by real users. The users were divided into groups of two types; the other piloting users represented the clients of the SME transport and the other user group was the one that tested the operator's modules, which are developed in the Delphi environment.

6. WP 6.2, UPDATED BUSINESS PLAN

This chapter is based on deliverable 6.2 – *updated business plan.*

The project team made the following assumption for further studying the markets:

- SME intermodal operators form a fragmented market of different types of companies with different types of solution needs
- Any SME operator providing logistics services may be a potential user for CLISME

This change of strategic assumption meant that the original CLISME package approach had to be abandoned.

New strategic assumptions

- An SME intermodal operator can be any SME transport services operator having same types of IT needs for its operations
- Instead of having a package, a library of reusable components for different types of tasks in logistics are developed
- Instead of one SME software company, a network of vendors are established - called **LCS** (Logistics Component Shop) (figure 15)
- These vendors would use reusable components to develop solutions and/or develop **ASP** (Application Services provision) applications

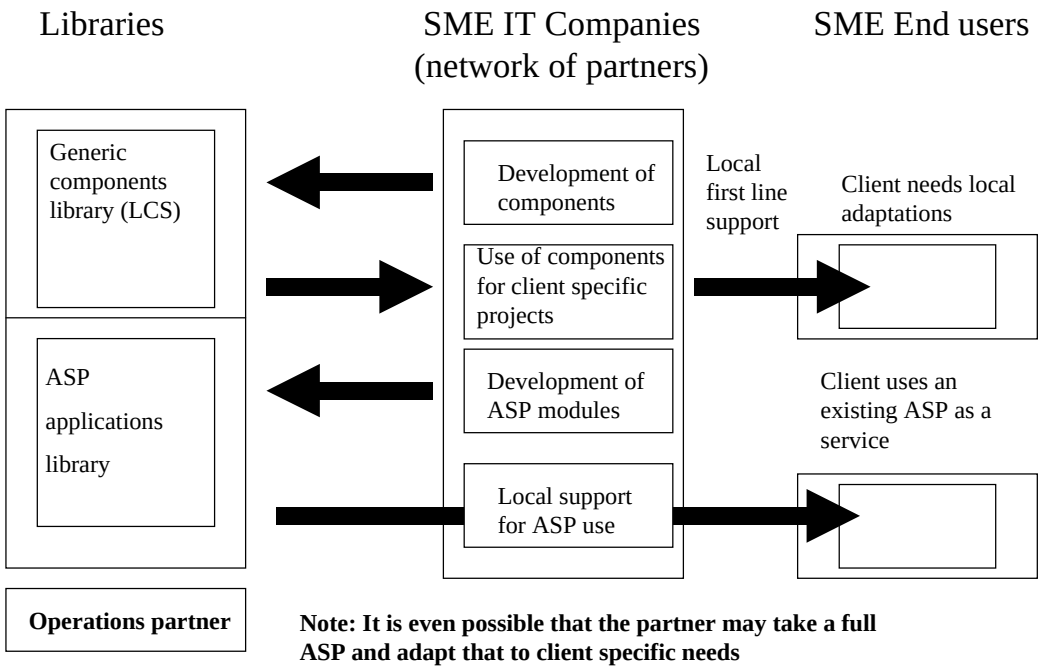

Figure 15. LCS network framework

Vision

A specialist international application services provider Logistics Component Shop (LCS) is the leading provider of software and application services to European SME Intermodal and transport operators. The goal of the services is to increase levels of logistics performance by means of modern information technology, which gives the companies new ways on which to build a competitive business. LCS is not targeting to serve large operators and will not compete with the top 5 IT companies.

The motivation for both IT vendors and their clients could be preliminarily listed as follows.

Benefits for IT vendors:

- Independence, creativeness maintained by the local partners
- International image through networking
- More effective product development by using mutually agreed methods and reusable components
- Decreased time and costs of client projects, better competitive edge
- Stronger image as a credible IT vendor through networking
- Opportunity to merge to a one of the largest logistics IT services providers in Europe

Benefits for SME operators:

- Opportunity for smaller operators to use state-of-the-art applications on ASP basis
- Overall cost-effectiveness vs. functionality
- Local SME partners giving local support
- Possibility to enhance internationally the usage
- Flexibility to move from ASP service option to in-house option
- Stepwise implementation of modules without major investments to software and hardware

Strategic phases

1. Entry – 1-2 years
2. Expansion – 3-4 years
3. Restructure – 5 years and ahead

Challenges and risks

- Identification of partners with a good start-up match
- Identification of users of these partners for phase I implementation

- Development of rules and procedures for LCS
- Timing of the entrance, risk of similar ventures
- Development of the first LCS applications based on e.g. CLISME specifications or existing products of the partner(s)
- Entry investments (marketing, ASP modules, basic co-operation procedures)

Next tasks

- Testing the scenario with a few software companies and a few potential users
- Finalising the business plan
- Writing the initial documents for partners
- Benchmark the findings against other EU programs
- Implementation

7. WP 5, PILOT IMPLEMENTATION

This chapter is based on deliverable 5 – *pilot implementation*.

7.1 Objectives

The main tasks of this work package were to implement the actual software modules developed during the work package 4 including the interfaces towards the legacy system of the transport operator as well as to train the users of SME intermodal operator and the clients. The goal was to evaluate whether the CLISME pilot system met the user requirements set and what were the deviations compared to the functional requirement analysis.

7.2 User experiences and practical functionality

The pilot phase started in April-May 2001 with marketing actions towards SeaRail's clients. In order to support the marketing of the pilot system different type of material was completed. This included the power point shows in Finnish, English and Swedish, the brochures in Finnish and English as well as the actual user manuals. The CLISME system was demonstrated extensively at SeaRail's stand during the Finnish Transportation Exhibition in May 2001.

After visiting several clients SeaRail was able to make a piloting agreement a paper exporting company. Additionally Finnish Railways personnel also piloted the client service system. SeaRail piloted the administrator's system.

The CLISME client service system from a user's point of view

The clients piloting the system were in general quite happy with the client service system. A number of bookings were entered as well as the accompanying despatch advice and the general opinion was that the system is very easy to use, especially since it provides a lot of basic data such as the contract information. The system technically worked properly, the application was stable and there were no major problems in the Internet connections.

The main benefits from the client point of view were the simplification of the booking procedures: no more phone calls or waiting to get in contact with the traffic operators. The client could do the bookings once she/he had the time suitable instead of sitting on the phone. The piloting clients welcomed also different reports and wished to obtain this type of new reports.

Clients wanted to have more basic data offered for them such as their commodity types and Customs codes keyed in already in the basic registers. Also the information of border crossing was seen necessary, since that is the trigger for invoicing the consignees.

All in all the pilots were satisfied in the way the client service system worked.

The CLISME administrator's system from a user's point of view

According to SeaRail's personnel the administrator's system worked as it was defined and specified, no major problems were encountered. In general the system was quite easy to use, but the users wished to have more functions like the "Copy and Paste" in the different modules of the system.

The main benefit for SeaRail was the fact that the incoming bookings and despatch advice already contained all the necessary information and therefore met the requirements of accurate and adequate data. Additionally, this type of Internet-based application frees the resources at the traffic operator side, since the number of phone calls can be reduced. This is especially true when the clients wish to check whether their wagons have loaded or shipped, i.e. the number of phone queries regarding the booking status can be minimised with the help of client service systems.

The interfaces between CLISME and the Innovo system were also completed during the piloting phase, which put the pilot system into real operational use.

7.3 Deviations to the functional requirement analysis

Functionality: client reporting

It was planned that the client has the possibility to get detailed information about his previous bookings. He is able to explore previous invoices and rates, delivery times, transported tons/cubic meters per wagon types, usage of wagons etc.

As result, the user (customer) is able to monitor the transport operations completed with SeaRail via web site.

Functionality: General info of services

In this case it was planned that the user (client) can have general information of SeaRail's services such as the transport equipment (wagon type, wagon capacity etc.), time schedules of ferries, possible routes, delivery times, basic rates etc.

As result, the client is able to retrieve general information of SeaRail's services and facilitate the daily working routines.

Functionality: Accessing RailTrace system

It was planned that the client is keen on tracking and tracing the shipments or wagons. Since the VR is already developing a very extensive tracking and tracing system that covers major countries in Europe, the tracking and tracing services are offered via a link to this RailTrace system.

Functionality: Managing bookings and despatch advice

It was planned that the client is able to enter the booking information via the SeaRail's web site. When the goods have been loaded into the transport units, the client can update the booking with the content of the despatch advice. Data content of the booking and the despatch advice are the same as described before.

As result, the client is able to complete on-line booking at a time suitable for him as well as add the despatch advice information.

In general, all developed functionalities above except the general information of services were completed. That was however achieved by setting up a link to SeaRail's own website that includes most of the data.

Otherwise the only major deviation compared to the functional requirement analysis was EDI/XML-based transfer of bookings, that most of the bigger clients wish to have in the future.

7.4 Summary

As a conclusion of the piloting phase, it can be said that these type of Internet-based client service applications form a win-win status for both the client and the transport operator. They both benefit a lot from using the system, which is proved by time savings and more efficient and rapid transportation chain control. For the SME companies the Internet-based application is adequate but for the more advanced companies the rational option is to base the connections towards the transport operators on EDI/XML transmissions, since the basic data already exists in their own legacy systems.

Technically, the pilots would like to use the SSL protocol to ensure the secure transmission over the Internet in the future. Additionally the website could include more user-support information, such as FAQ-pages. Also the selection of the client-specific reports should be expanded to cover different type of reporting needs. Also the web-based client service application should include more client data already keyed in by the traffic operator.

8. WP 6.3, FINAL BUSINESS PLAN

This chapter is based on deliverable 6.3 – *CLISME business plan.* The scope of WP 6.3 was to provide the results from CLISME-project as a business plan format. The key purpose was to describe the new LCS[4] (Logistics Component Shop) concept.

Background and the principles of the new LCS Ltd are:

- The logistics marketplace in Europe and information services and software product market are both very fragmented. There are numerous SME sized software companies providing limited solutions in small market areas.
- LCS Ltd's mission is to enter logistics information services market segment in Europe with the intent of influencing an industry rationalisation in a focused area.
- LCS Ltd will utilise modern process models and component based development methods to increase the productivity of application generation.
- LCS Ltd will create and maintain component-based libraries of different levels from technical components up to ASP applications.
- Sales and assembly of end-user systems will be implemented by a network of logistics software companies.
- There are two modes to associate with LCS Ltd: a) limited number of shareowners b) networked partners with a franchisee type of contract.
- LCS Ltd and the partner network will develop and use jointly agreed process models and object oriented programming methods (OOP) and tools.
- LCS Ltd and the partner network will grow to a major player in logistics within 3-5 years by having more than 1000 employees and more than 100 M Euro revenue.
- The revenue consists of on-going revenue from current customers and new revenue from LCS based systems. It is estimated that the share of LCS based revenue is close to 50 % in year 5.
- The first three years external funding need is 3,5 M Euro of which 40 % is expected to get from sources such as TEKES to facilitate the R&D.

The main goals of LCS are:

- LCS is well known in main market areas as the number one brand and trend setter in logistics IT.

[4] LCS: New network based approach to develop new types of integrated logistics solutions to transport operators utilising modern internet and object based processes and tools with the intention to increase considerably the productivity of customer application generation.

- All partners are profitable in their own market areas in all main countries in Europe.
- LCS and the partner network will become large enough to compete of larger clients in long term.
- LCS libraries of components and ASP's will cover all needs of transport operators.

LCS concept is derived from a combination of general trends in both IT and logistics. One key strategy is *Networking Model*. The intention is to form a working process model of networked IT companies working in genuine collaboration. Also in the logistics side the networking model is future and often in connection to IT development. In the technology side a clear trend is toward *reusable components* and this will be one cornerstone of LCS. LCS concept is also based on assumptions that *standardisation* will be enhanced in all necessary fields from process standardisation to technology standards in logistics. The main strategic principles are illustrated in table 2 below.

Table 2. Strategic principles

STRATEGY	**ENTRY**	**GROW**	**EXIT**
Marketing strategy	Plan the image and brand around the collaborative LCS concept	Introduce and market new networked (franchising type of model) – "Grow by doing things right with logistics components"	LCS is well-known and accepted as THE brand of logistics software development concept
Sales strategy	Sell existing clients or prospects (of the owners) the partnership to develop first LCS applications	Identify potential partners in selected countries, sell the new collaboration concept with benefits	Intra-country networking expansion by the existing partners' success stories
Products and services strategy	Build first generation libraries with pilot clients to be part of full LCS (CLISME) portfolio	Commercialise first generation library, involve more partners to component development First ASP's introduced	Fully integrated LCS library existing, clear proof of major impact to development costs and time
Technology strategy	Strictly adapt to standards and standard (de-facto or generic) development tools	Introduce new concepts – be in the lead role in OOP application progress	Others follow what LCS does!

Financing strategy	Use different financing tools to different purposes e.g. TEKES for product and process development and own resources (existing employees) and funding from pilot clients (avoid risk money in the entry phase)	When entry completed and proof-of-concept created use risk money to the strong international expansion	Financing from operations
Management strategy	Technology oriented, innovative management to facilitate the first generation development	Marketing oriented, networked and collaborative management to create the LCS network	Business oriented management team to look at the EXIT and next major step as well as the needs of owners and other interest groups (employees)
R&D strategy	Plan and execute a large R&D program to study and create new models for OOP processes in logistics Join an international organisation to follow-up and eventually lead the progress	Invest in educating all partners in the new processes and technologies Participate to new e.g. European R&D programs Maintain the models and follow development in the field	Prepare for the next major change in the field
Employee strategy	Best logistics and technology resources from the very beginning Bonus schemes to reward the results	Global scope in recruiting Bonus schemes to facilitate cross-country collaboration	Facilitation for LCS and partner network companies to exchange employees to transfer knowledge across the whole network

The main quantified prime goals and targets within 3-5 year timeframe are:

- LCS will become a more than 50 employee development and R&D group in logistics providing services to more than 20 networked companies with more than 1000 employees in 3-5 years.

- The LCS logistics network of companies will have more than 100 M Euro turnover and will operate in more than five countries in Europe. All networked companies will generate at least 10 % profits.
- LCS will be profitable after 3rd year and will generate more than 25 % profit for its owners.
- Customer satisfaction will be measured and rewarded.
- Innovative new scheme to reward successes across the network has been established from year 3 and ahead.

Product and service description

The basic functions of the current product of CLISME are illustrated in following figure 16.

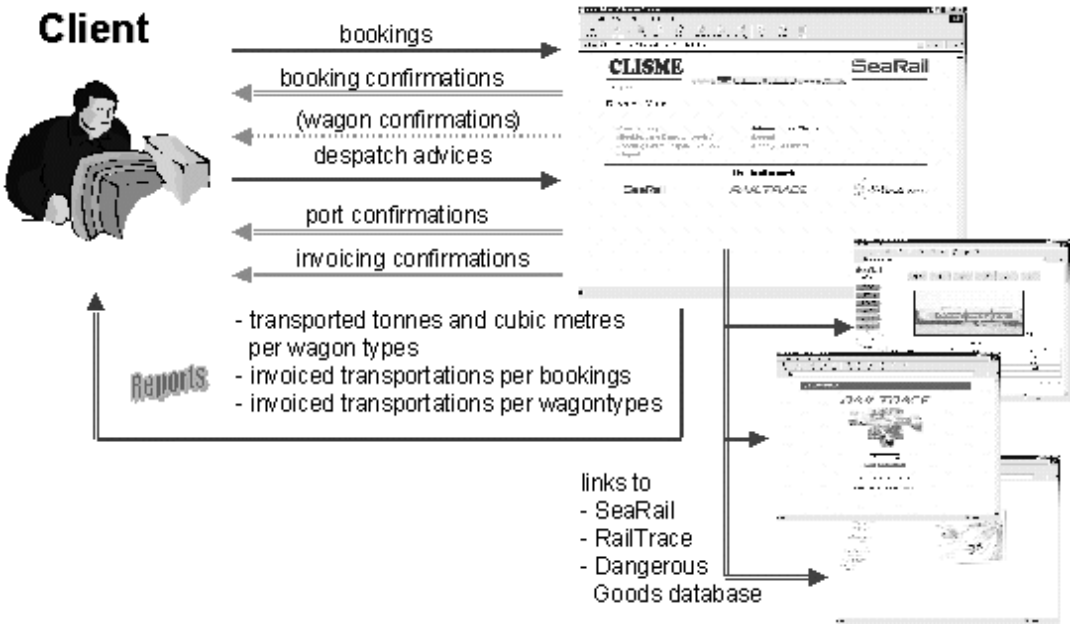

Figure 16. The basic functions of CLISME

Using the CLISME system requires from the client only to have a computer, browser software (Internet Explorer or Netscape Navigator) and access to Internet.

Target markets

The targeted market for CLISME applications is defined to include SME transport operators (logistics services providers) regardless of their role in the transport chain. However, large global operators and very small trucking and other companies are excluded.

It is assumed that in the entry phase between 100 and 200 SME companies are targeted accounts for IT partners. The number of users may expand in a later phase if LCS Ltd will launch e.g. ASP based services for smaller companies.

In Europe there are close to 800,000 transportation companies. As in Finland, most of the companies are really small in terms of employees and number of trucks. The targeted market amounts of 1-2 % of the number of companies. This rough estimate leads to a number of at least 8000 potential clients to LCS Ltd and its partners.

Marketing and sales strategy

The marketing and sales strategy is in a simplified form

- The sales channel to end-users is the partner network so that they will sell enhanced LCS based applications to their existing customers and new accounts
- LCS is responsible in the creation and strengthening the brand (image) of LCS as the main logistics IT network in Europe

Each IT-partner is responsible in making its own sales plans with the assistance from LCS. Their objective is to grow in its own market area by using LCS products and services to generate new revenue and possibly by acquisitions.

Product development plans

The development company LCS is responsible for the processes, methods, technologies, component libraries, development of new components and ASP, integration and quality assurance of components and ASP's coming from partners.

Partners are responsible of end-users implementations. They use existing components and partly develop new ones if needed. No applications and components will be developed without clients except for the generic infrastructure and technical platform

Persons from both LCS and partners will initiate and participate to external R&D programs by EU, Finnish TEKES and similar research institutes in other countries, standardisation development in selected organisations and communities. Via these programs new ideas, processes and technologies will be launched to LCS and its partners.

The levels in the future component libraries include:

- Full ASP's
- "Semi-assembled" components for generic larger functions
- Functional components for generic tasks
- Integration components and adapters for applications integration
- Security and administration components
- Technical components in building up the applications infrastructure

Other main parts of the LCS services will be documentation of processes, methods, workflows, technical guidelines, programming tools, project models, standardisation

documents and guidelines and in general all necessary information to co-operate efficiently in the network.

LCS will establish an intranet based Knowledgebase to disseminate information and share experiences of the partners.

Financial projections

According to the financial vision of this process:

- LCS will become a more than 50 employee development and R&D group in logistics providing services to more than 20 networked companies with more than 1000 employees in 3-5 years
- The LCS logistics network of companies will have more than 100 M Euro turnover and will operate in more than five countries in Europe[5]
- All networked companies will generate at least 10 % profits
- LCS will be profitable after 3rd year and will generate more than 25 % profit for its owners

Tables 3 and 4 give an initial estimate of the three first year investments, costs and sources of funding.

Table 3. Investments

INVESTMENT OBJECT	**1st year**	**2nd year**	**3rd year**
Personnel	1,2	1,9	2,5
Hardware, software	0,2	0,2	0,2
External consulting	0,4	0,3	0,3
TOTAL	**1,8**	**2,4**	**3,0**
CUMULATIVE	**1,8**	**4,2**	**7,2**

Table 4. Funding

SOURCE OF FUNDING	**1st year**	**2nd year**	**3rd year**
Premiums	0,4	1,5	1,8
From shareowners	0,2	0,1	0,3
From TEKES or similar	0,8	0,8	0,6
Investors	0,4		0,3
TOTAL FUNDING NEED	**1,8**	**2,4**	**3.0**
CUMULATIVE	**2,0**	**4,2**	**7,2**
TOTAL EXTERNAL FUNDING	**1,4**	**0,9**	**1,2**

[5] 100 M Euro and 1000 employee target is not new revenue but a combination existing base and LCS generated revenue

Risks and challenges

This LCS case is obviously a risk investment as there are many assumptions given in this plan.

The risks and challenges include:

- How to obtain initial first generation development results sound and solid to be the base for expansion
- How to commercialise and brand the LCS concept in due time
- How to build up the partner network as planned
- Are the assumptions correct
- Introducing the library concept
- Joint LCS development centre concept
- Utilisation of new object based methods and tools
- Networked and collaborative organisation approach

However, as the strategy is to build up gradually the new network, there is all the time space for adjustments in the plan.

The most critical period is the first year when the concept will be finalised in detail parallel to first 2-3 client implementations.

9. CONCLUSIONS

The basic idea to CLISME-project was found during the SCANDINET-project. The results of SCANDINET showed, that information change between companies was the basic problem in Intermodal transportation companies. On the other hand, Internet as a new communication technique had been discovered and the use of it was heavily growing all the time. SeaRail EEIG was one of the SCANDINET partners. Discussions with SeaRail and scientists created an idea to establish a new piloting project. The goal was to test if there could be possibilities to construct an Internet based transportation management and client service system. Additional goal was to investigate the business possibilities with such a created new kind of system.

The CLISME-project was divided to six work packages: 1) Management, 2) Functional Requirement Analysis, 3) Systems Specification, 4) Programming and Testing, 5) Pilot Implementation and 6) Business Plan.

The overall system concept for Intermodal operator was designed. Systems specification was made about SeaRail's operation covering a client service part of the whole system. The client service application was programmed in Programming and Testing phase. Finally the pilot application was tested in real every day operation with SeaRail's customers.

At same time the Business Plan was ongoing. The market evaluation was made – what is the demand of the transportation management and client service systems in Europe. Consequently the competition of such kind of systems was evaluated. The results showed, that there are a huge number of small transportation companies and only few bigger companies. On the other hand the supply of transportation related logistics applications is very fragmented. There is a lot of dedicated software packages on the market. These applications are directed to a certain type of companies solving very restricted type of problems. CLISME-type of Internet-based software packages was not found.

Additionally, there are not many SeaRail type of Intermodal operators in Europe.

Due to these findings, the conclusion was, that it is not possible to construct a package type of transportation management application for Intermodal SME operator.

The following part of Business Plan concentrated to find out a new way to enter the market. The focus was broadened. The LCS-concept was discovered (Logistics Component Shop). LCS means a network of software vendors who have been in logistics business and are experienced to the operation with related issues and problems. Technically the production of different kind of software is controlled by using mutual standards and rules.

The LCS-concept was introduced to several transportation and software companies. All of the companies were more or less interested in the concept. Companies found possibilities to get better quality applications with less money. Additionally the dependencies to a certain software vendors could be weaker increasing the freedom of choice between them. Software companies found benefits by getting more possibilities to enter to new markets with networked concept.