



# Finest – **F**uture **I**nternet enabled optimisation of **t**ransport and logistics networks



D7.4

## Prototypical Implementation of the Transport Planning Component

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## Abstract

*This report from Finest work package 7, "Transport Planning and Replanning" contains the description of the prototypical implementation of the Transport Planning Module. It is the fourth deliverable from this work package.*

*This report completes the task T7.4 – "Prototypical Implementation of the Transport Planning Component" together with the provided prototype implementation.*

*The intention of the prototype is to show some of the main ideas for the "Transport Planning and Replanning" work, and demonstrate how the proposed Transport Planning Module is intended to work together with the other parts of the Finest project. Together with the prototypes from other work packages in Finest, the prototype has been used in a demonstrator showing how planning, execution and replanning of a fish transport can be done in a Future Internet environment.*

*The report contains a description of the prototype and its main functionality. The report also includes the technical specifications for the system needed to run the prototype, and a description of the demonstrator setup.*

**Document History**

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V0.1	14.02.2013	Initial version
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## Acronyms

Acronym	Explanation
BCM	Business Collaboration Module
CRUD	Create, Read, Update, Delete (basic operations on data e.g. in a database)
ECM	E-Contracting Module
EPM	Event Processing Module
GE	Generic Enabler
GII	Goods Item Itinerary
LSC	Logistic Service Client
LSP	Logistic Service Provider
TBD	To Be Defined
TCP	Transport Chain Plan
TEP	Transport Execution Plan
TP	Transport Plans
TPM	Transport Planning Module
TSD	Transport Service Description
UBL	Universal Business Language containing a library of standard electronic XML business documents such as purchase orders and invoices. It is developed by OASIS.

## 1. Introduction

This deliverable contains a description of the prototypical implementation of the transport planning module (TPM) in Finest. The work was conducted during M19-M24 of the project and has been based on the TPM design reported in [1], [2], and [3]. This deliverable is of type Prototype, and thus, the main deliverable is the prototype itself. Access to the prototype and technical details on this are described in Section 3.

### 1.1. Brief description of the Transport Planning Module

The Transport Planning Module (TPM) is a Future Internet module offering services for planning transport chains and services, including finding transportation services matching the demand, making use of existing contract details, and setting up bookings. Its functionality is roughly divided into three parts:

First, the module offers functionality for describing transport demands as well as transport services, so that they can be used in the later planning process. This also includes functionality to publish transport demands and services on other systems, e.g. marketplaces and information sites.

Second, the module offers functionality to keep track of transport services matching a demand. In a standard Finest setup, the module will cooperate with the E-Contracting Module (ECM) in order to find services from long-term contracts and spot market that can be used to fulfil the demand.

Third, the module offers functionality to generate and configure a Transport Chain Plan (TCP) consisting of several Transport Execution Plans, based on the service and demand descriptions, as well as the functionality for negotiation on the services between the logistics service provider (LSP) and the logistics service client (LSC) and booking of the services. When a plan changes status from "under development" to "ready for execution", it will be transferred to the Business Collaboration Module (BCM).

The main outputs of the TPM are the Transport Chain Plan (TCP) describing the whole planned transport chain and the Transport Execution Plans (TEP) containing details on the individual parts of the chain. There will also be options for using the TPM for publishing transport demands (in the form of Transport Service Description Requests (TSD-requests) and Transport Service Descriptions (TSDs) on external systems. The messages used will conform to the Common Framework model [4]. The Common Framework messages are also used in other EU transport projects, e.g. e-Freight [5], FreightWise [6], iCargo [7], DiSCwise [8] and others.

Some of the functionalities from the design of the TPM are demonstrated in the prototypical implementation, as described in this deliverable.



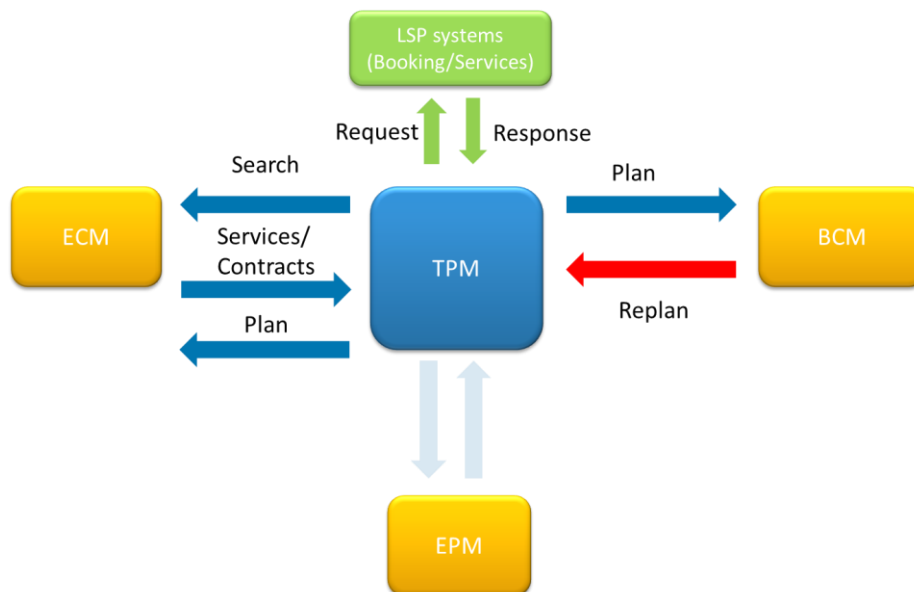
## 1.2. Structure of this Deliverable

The rest of the deliverable is structured as follows:

- Section 2 gives a brief overview of the TPM prototype
- Section 3 summarizes the Finest story line and the notion of roles and user access that is relevant for the TPM prototype.
- Section 4 lists the technical requirements to run the prototype
- Section 5 walks through the main parts of the demonstrator to show its core functionalities.
- Section 6 describes the supporting functionality that is needed to simulate the interaction with the EPM, ECM, and BCM.

## 2. TPM Prototypical Implementation: Overview

The purpose of the TPM prototype is to show some of the features described in the TPM design and to show how the transport planning module can interact with the other Finest modules. Figure 1 shows a simplified picture of the TPM interaction with the other modules.



**Figure 1 TPM Interaction with other Finest Modules**

The first step in the interaction is to search for services and contracts in the ECM that matches the transport demand. The TPM sets up the search request to the ECM, receives the answer from the ECM, and present the result to the user, based on the transport demand given by the user. As a result of the search, a list of possible services based on contracts and available services are listed. This is shown in the prototype by the possibility to plan a transport after a transport demand has been entered, Figure 11.

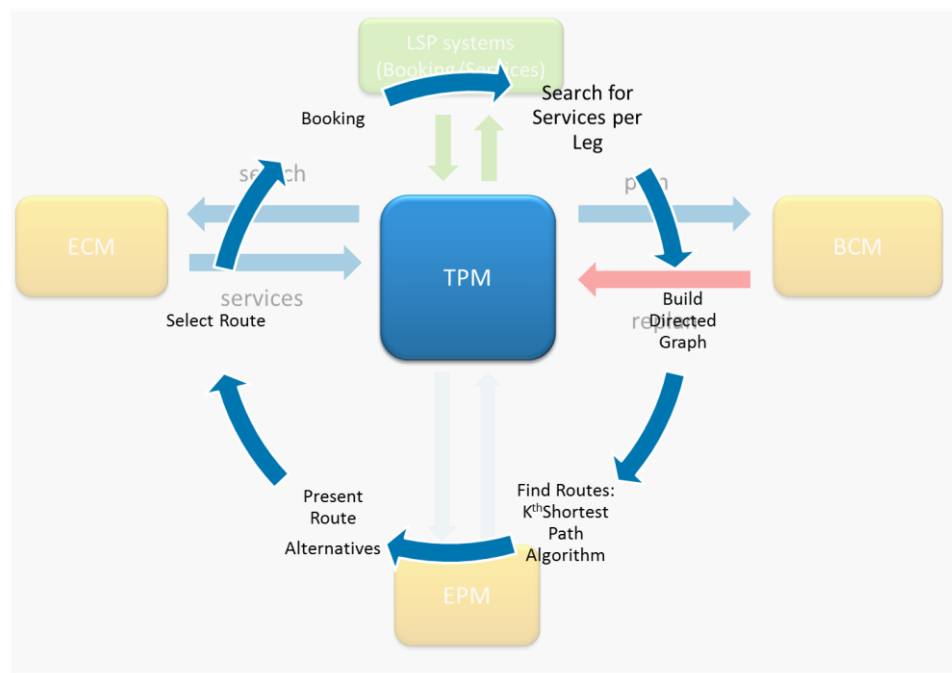
The booking part from Figure 1 is shown in the prototype as the possibility to select a certain route that is found by the TPM, Figure 13 and Figure 14. All bookings related to a TCP are handled by the TPM, and the result is presented to the user. During the booking, some interaction with the user may be needed, dependent on the actual contract or dependent on the response received from the LSPs. After the finished Transport Chain Plan (TCP) together with all referenced Transport Execution Plans (TEP) is built, the set of documents is sent to BCM for execution and to the ECM for them to update service usages. This is not shown in the prototype, but is something to be done in the background.

The interaction with the EPM is simulated by letting the user send an event to a transport plan, as described in Section 6.4.

Figure 2 shows an overview of the TPM internal tasks during the building of the transport plan consisting of the following tasks:

- 1) Search for Services per Leg
- 2) Build Directed Graph
- 3) Find Routes using  $K^{\text{th}}$  Shortest Path Algorithm
- 4) Present Route Alternatives
- 5) Select Routes
- 6) Do Booking

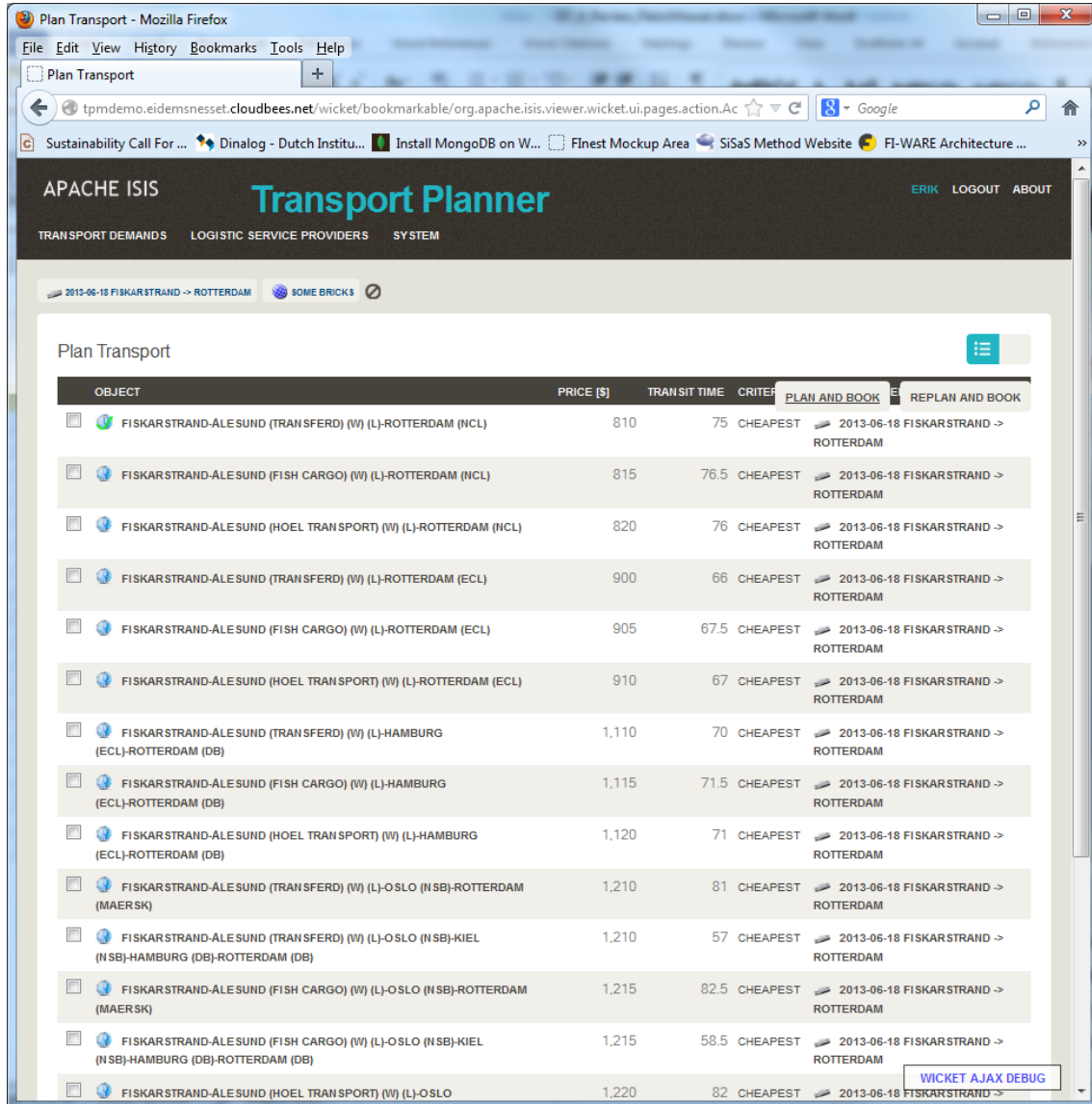
As stated in [2], integration of service and contract search during transport planning is more important than the optimization of the transport plan. However, in the prototype, the K<sup>th</sup> Shortest Path Algorithm is used to find the K numbers of shortest paths in a directed graph based on the algorithm described in [9].



### Figure 2 TPM Prototype Internals

The next step is to present the actual services in the TPM prototype to let the user choose among the possible transport routes, Figure 3. The actual services are presented automatically based on the transport demand given by the LSC, and based on the services and contracts fetched from the ECM.

Then, the LSC must select the actual services he wants, and then he starts the booking process by pressing the "Plan and Book"-button.



The screenshot shows the Apache Isis Transport Planner web application. The browser window title is "Plan Transport - Mozilla Firefox". The address bar shows the URL: [tpmdemo.eidemsnetet.cloudbees.net/wicket/bookmarkable/org.apache.isis.viewer.wicket.ui.pages.action.Ac](http://tpmdemo.eidemsnetet.cloudbees.net/wicket/bookmarkable/org.apache.isis.viewer.wicket.ui.pages.action.Ac). The page header includes the Apache Isis logo, the title "Transport Planner", and navigation links: TRANSPORT DEMANDS, LOGISTIC SERVICE PROVIDERS, SYSTEM, ERIK, LOGOUT, ABOUT. The main content area is titled "Plan Transport" and displays a table of transport alternatives. The table has columns: OBJECT, PRICE [\$], TRANSIT TIME, CRITERIA, and buttons for PLAN AND BOOK and REPLAN AND BOOK. The table lists 14 transport alternatives, each with a checkbox, a globe icon, a description, price, transit time, criteria, and a button to plan and book.

OBJECT	PRICE [\$]	TRANSIT TIME	CRITERIA	PLAN AND BOOK	REPLAN AND BOOK
<input type="checkbox"/> FISKARSTRAND-ALESUND (TRANSPORT) (W) (L)-ROTTERDAM (NCL)	810	75	CHEAPEST	2013-06-18 FISKARSTRAND -> ROTTERDAM	
<input type="checkbox"/> FISKARSTRAND-ALESUND (FISH CARGO) (W) (L)-ROTTERDAM (NCL)	815	76.5	CHEAPEST	2013-06-18 FISKARSTRAND -> ROTTERDAM	
<input type="checkbox"/> FISKARSTRAND-ALESUND (HOEL TRANSPORT) (W) (L)-ROTTERDAM (NCL)	820	76	CHEAPEST	2013-06-18 FISKARSTRAND -> ROTTERDAM	
<input type="checkbox"/> FISKARSTRAND-ALESUND (TRANSPORT) (W) (L)-ROTTERDAM (ECL)	900	66	CHEAPEST	2013-06-18 FISKARSTRAND -> ROTTERDAM	
<input type="checkbox"/> FISKARSTRAND-ALESUND (FISH CARGO) (W) (L)-ROTTERDAM (ECL)	905	67.5	CHEAPEST	2013-06-18 FISKARSTRAND -> ROTTERDAM	
<input type="checkbox"/> FISKARSTRAND-ALESUND (HOEL TRANSPORT) (W) (L)-ROTTERDAM (ECL)	910	67	CHEAPEST	2013-06-18 FISKARSTRAND -> ROTTERDAM	
<input type="checkbox"/> FISKARSTRAND-ALESUND (TRANSPORT) (W) (L)-HAMBURG (ECL)-ROTTERDAM (DB)	1,110	70	CHEAPEST	2013-06-18 FISKARSTRAND -> ROTTERDAM	
<input type="checkbox"/> FISKARSTRAND-ALESUND (FISH CARGO) (W) (L)-HAMBURG (ECL)-ROTTERDAM (DB)	1,115	71.5	CHEAPEST	2013-06-18 FISKARSTRAND -> ROTTERDAM	
<input type="checkbox"/> FISKARSTRAND-ALESUND (HOEL TRANSPORT) (W) (L)-HAMBURG (ECL)-ROTTERDAM (DB)	1,120	71	CHEAPEST	2013-06-18 FISKARSTRAND -> ROTTERDAM	
<input type="checkbox"/> FISKARSTRAND-ALESUND (TRANSPORT) (W) (L)-OSLO (NSB)-ROTTERDAM (MAERSK)	1,210	81	CHEAPEST	2013-06-18 FISKARSTRAND -> ROTTERDAM	
<input type="checkbox"/> FISKARSTRAND-ALESUND (TRANSPORT) (W) (L)-OSLO (NSB)-KIEL (NSB)-HAMBURG (DB)-ROTTERDAM (DB)	1,210	57	CHEAPEST	2013-06-18 FISKARSTRAND -> ROTTERDAM	
<input type="checkbox"/> FISKARSTRAND-ALESUND (FISH CARGO) (W) (L)-OSLO (NSB)-ROTTERDAM (MAERSK)	1,215	82.5	CHEAPEST	2013-06-18 FISKARSTRAND -> ROTTERDAM	
<input type="checkbox"/> FISKARSTRAND-ALESUND (FISH CARGO) (W) (L)-OSLO (NSB)-KIEL (NSB)-HAMBURG (DB)-ROTTERDAM (DB)	1,215	58.5	CHEAPEST	2013-06-18 FISKARSTRAND -> ROTTERDAM	
<input type="checkbox"/> FISKARSTRAND-ALESUND (HOEL TRANSPORT) (W) (L)-OSLO	1,220	82	CHEAPEST	2013-06-18 FISKARSTRAND -> ROTTERDAM	

Figure 3 View and Select Transport Plan Alternatives

### 3. Finest Story Line and TPM Prototype Roles

The demonstrator can be used to show different kinds of operational planning, and how the TPM relates to the other Finest modules. One example is the fish case, Figure 4, describing a transport of dried fish from Fiskarstrand (close to Ålesund) to Rotterdam. This story line is further described in [10]. The fish is transported in two containers filled with pallets of dried fish. The transport from the fish producer in Fiskarstrand to the terminal in Ålesund is done by truck. This is planned by the fish producer or the fish exporter (shipper). The handling and transport of the fish from Ålesund to Rotterdam is done by a forwarder working as a cargo agent. The cargo agent plans a warehousing and a loading operation in Ålesund, and a feeder transport from Ålesund to Rotterdam.

The cargo agent itself changes role from being a LSP to be a LSC, and in the service client role, they plan for three different services: Storage in Ålesund, loading on board the ship in Ålesund, and feeder transportation using a container vessel from Ålesund to Rotterdam. A more general description of TPM roles is found in [11].

The following specific roles are used in the story line for the TPM:

- Shipper
- Forwarder
- Carrier

A possible usage of these roles in the TPM prototype is as follows:

- 1) The shipper is the fish producer Tranvåg creating the transport demand related to TCP1 in the TPM having the Owner role with full access to the transport demand, Figure 6.
- 2) The fish producer transfers the owner rights of the transport demand to the fish exporter West Norway AS. The fish producer gets contributor rights to the transport demand. West Norway AS does the planning of truck transport from Fiskarstrand to Ålesund (TEP1.1), and they enter the transport demand covering transportation from Ålesund to Rotterdam. However, they leave it to the forwarder to do the actual planning from Ålesund to Rotterdam (TEP1.2). West Norway AS gets owner rights to TCP1, TEP1.1 and TEP1.2. The carrier Transferd AS has owner rights to TSD1.1, and forwarder Tyrholm and Farstad has owner rights to TEP1.2 and TSD1.2.
- 3) When the forwarder Tyrholm and Farstad creates the transport plan for the transportation from Ålesund to Rotterdam, they get owner rights for TCP2, TEP2.1, TEP2.2 and TEP2.3
- 4) Tyrholm and Farstad Terminal gets owner rights to TEP2.1 and TEP2.2
- 5) The carrier NCL gets owner access to TEP2.3 and TSD2.3 making it possible to do the booking negotiation.

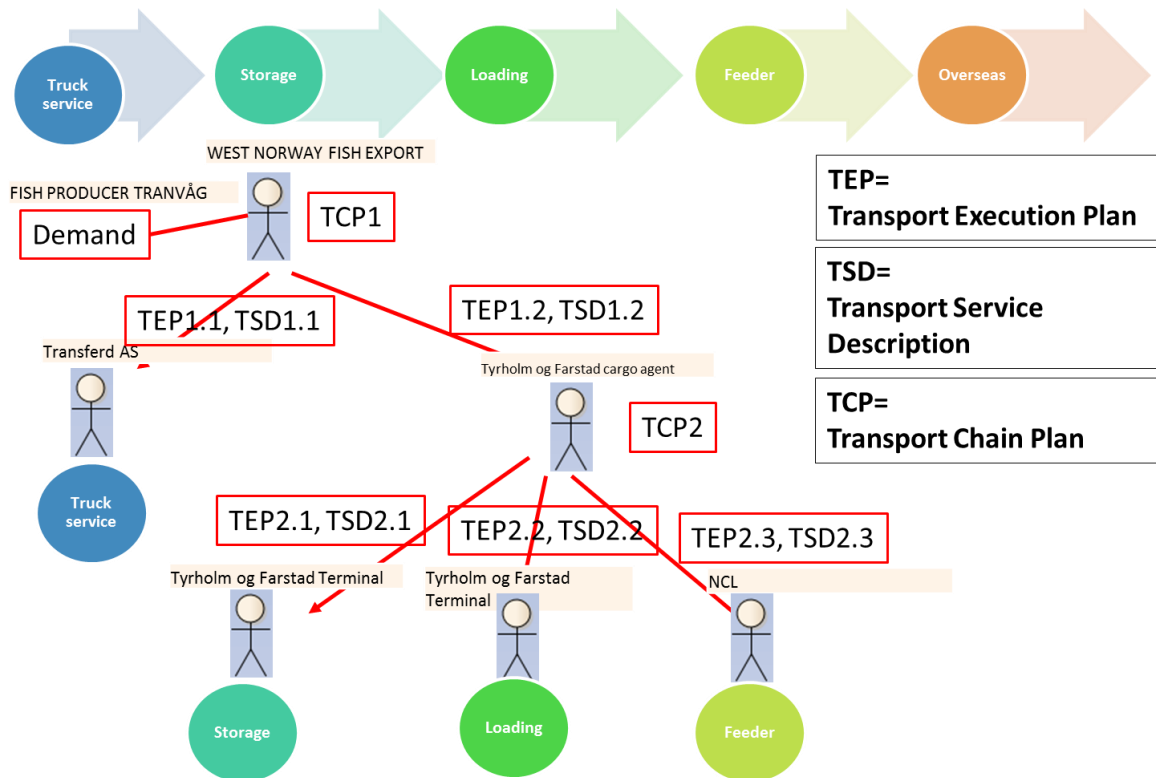


Figure 4 Fish Case and TPM Roles

## 4. TPM Prototype Technical Fact Sheet

Fact	Description
Key Features	<ul style="list-style-type: none"> <li>Enable LSCs to define a Transport Service Demand <ul style="list-style-type: none"> <li>Specify cargo details</li> <li>Specify pick-up and destination locations</li> <li>Define a time window for pick-up and delivery</li> </ul> </li> <li>Allow Logistics Service Providers/Forwarders to plan and re-plan transports. <ul style="list-style-type: none"> <li>Select possible transport paths using either <i>maximum price</i>, <i>maximum transit time</i> and/or one of the following strategies: <ul style="list-style-type: none"> <li>Cheapest</li> <li>Fastest</li> <li>Cheap and fast</li> </ul> </li> </ul> </li> <li>Enable both clients and providers to follow the transportation status based on simulated events received from the ECM module</li> </ul>
Implementation Technologies	Frontend

	<ul style="list-style-type: none"> <li>• <i>ISIS (<a href="http://isis.apache.org/">http://isis.apache.org/</a>)</i></li> </ul> <p><i>Backend</i></p> <ul style="list-style-type: none"> <li>• <i>Java EE 6</i></li> </ul> <p><i>Others</i></p> <ul style="list-style-type: none"> <li>• <i>Dependency Management: Maven</i></li> <li>• <i>Application Server: Apache Tomcat 7</i></li> </ul>
<i>Hosting &amp; Access</i>	<p>Prototype is deployed on cloudbees and directly available through:</p> <p><a href="http://tpmdemo.eidemsnesset.cloudbees.net/">http://tpmdemo.eidemsnesset.cloudbees.net/</a></p> <p><b>Example Users:</b></p> <ul style="list-style-type: none"> <li>• <b>Arne Rost (Shipper)</b> user = erik ; password = pass</li> <li>• <b>Erik Farstad (Forwarder T&amp;F)</b> user = erik ; password = pass</li> </ul> <p>Both users have different roles.</p>
<i>Requirements</i>	<p><b>Use of modern and standard compliant browser:</b></p> <ul style="list-style-type: none"> <li>• Mozilla Firefox (recommended)</li> <li>• Google Chrome (not tested)</li> <li>• Safari (not tested)</li> </ul>

## 5. Main TPM Prototype Functionality

The main functionality of the TPM prototype is found in the "Transport Demands" main menu item, Figure 5. A new transport demand can be added, a new cargo item can be added, and all demands can be viewed, updated, and planned.

Different users will have different (possibly several) roles as described in Section 3. As described in Section 4, the prototype has two different users: "Arne", representing the shipper, which can enter the transport demand, and "Erik", representing the forwarder, which can do the planning in addition to entering a transport demand.

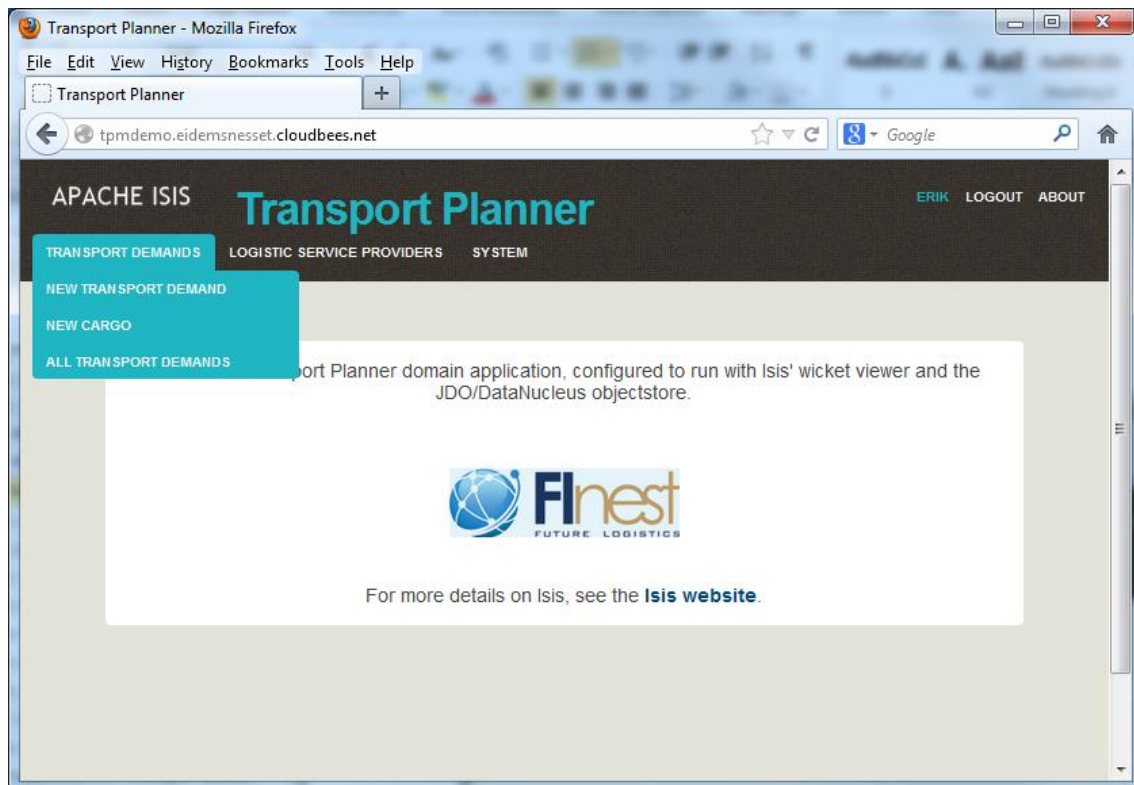
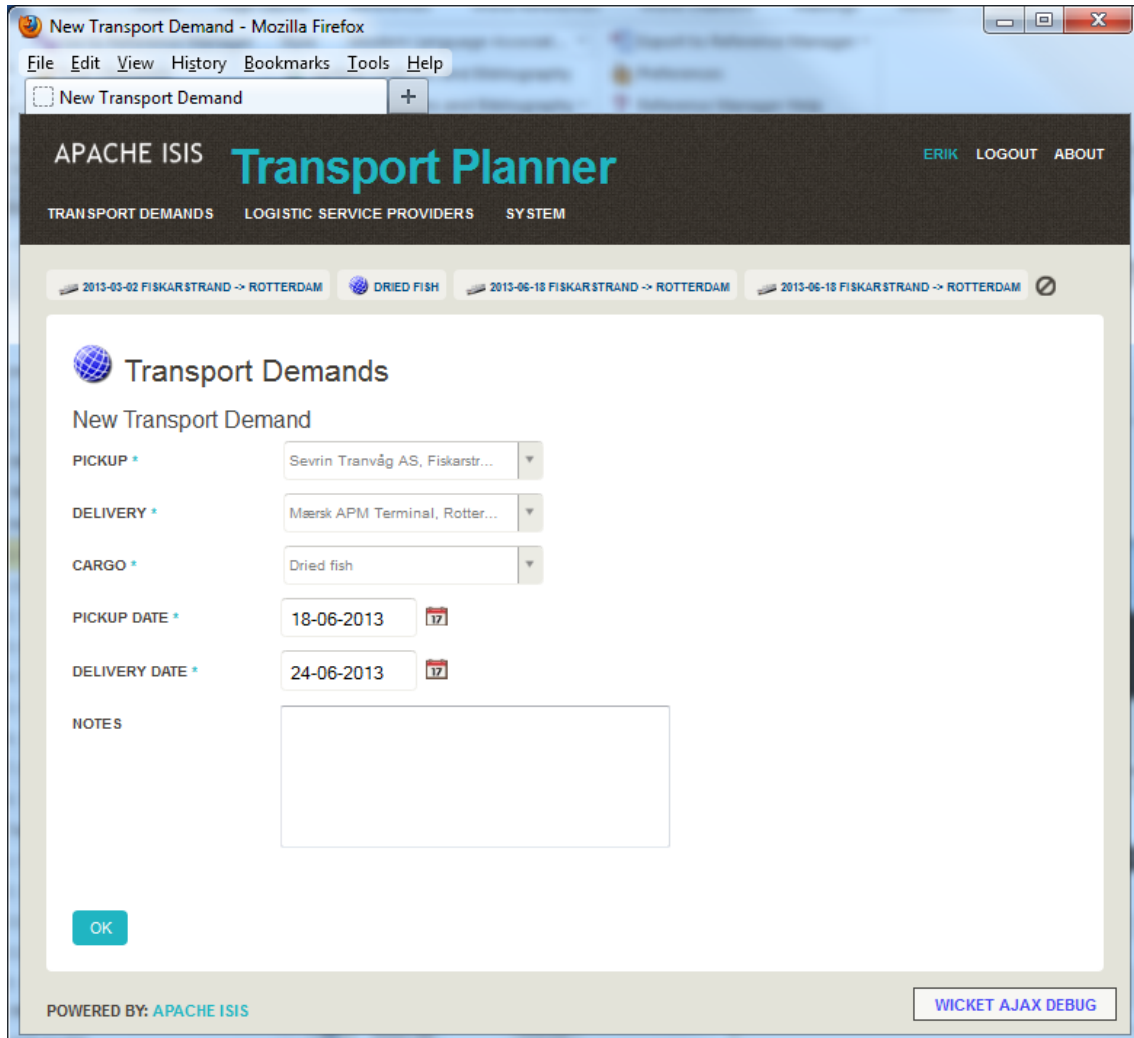


Figure 5 TPM Prototype Main Functionalities

## 5.1. Enter and Update Transport Demand

The initial details of a transport demand are entered through the screen shown in Figure 6. Here, the pickup and delivery locations and time intervals are added, and also the actual cargo to be transported. This screen can be used by shippers who have owner access rights to the transport demand, and the right to pass the access rights on to other users, Section 3, and [11]. In the fish case, it is the Fish Exporter or the Fish Producer that enters the demand, having the shipper role.

After the shipper has entered the demand, the demand will be ready for the cargo agent to do the planning part.



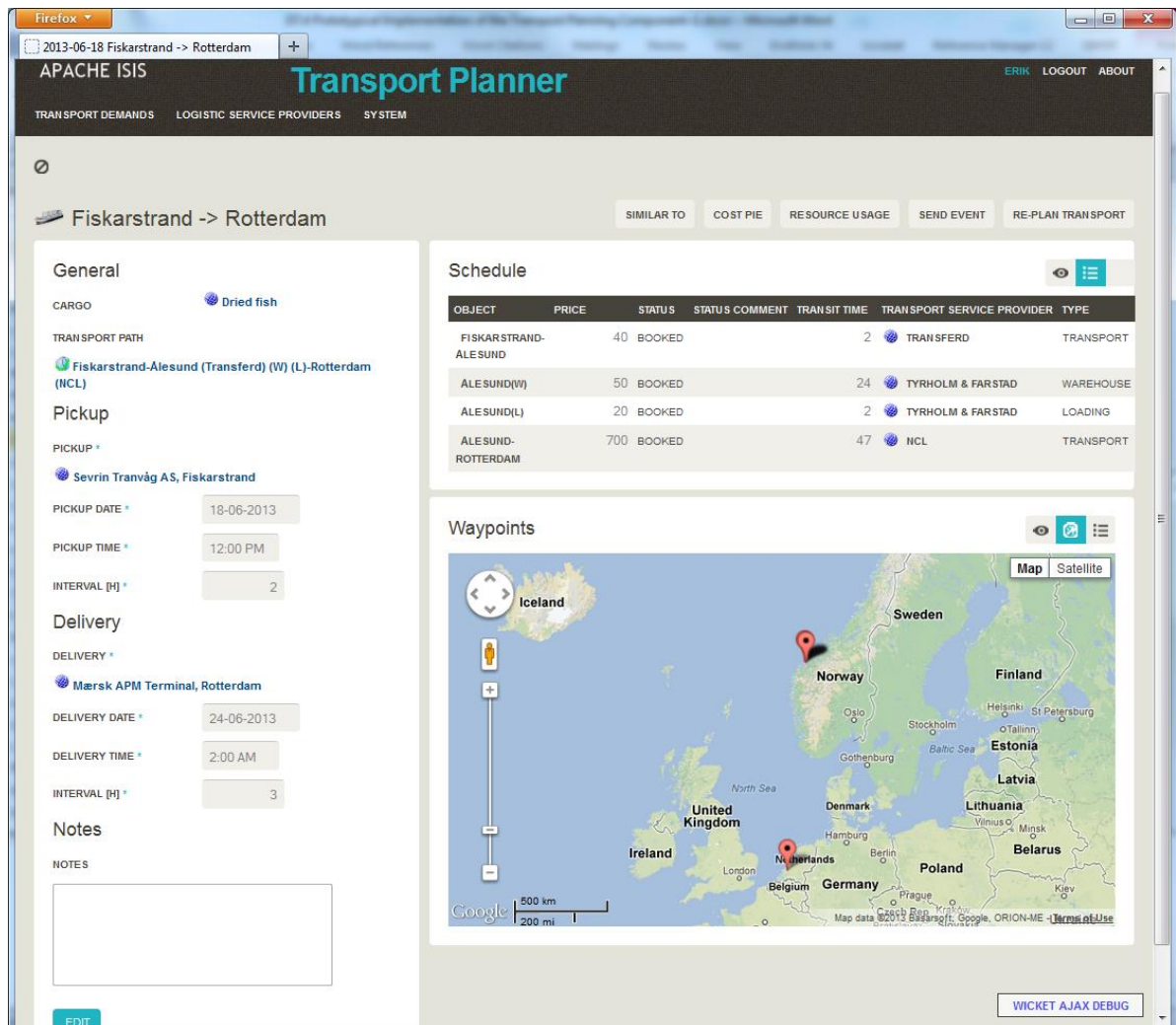
**Figure 6 Enter Transport Demand**

Figure 7 shows the main screen where the transport demand can be updated, and where the planning and replanning is done. The actual demand definition is shown in the left part of the screen. In the upper, right part the transport path (the actual schedule) for the transport plan fulfilling this transport demand is shown. Each leg or service of the transport plan is shown in one line. The price, status (booked, cancelled, completed), transit time, service provider and type of service is shown for each leg. This information is statuses that are relevant for the planning process. It is either generated by the TPM or fetched from the BCM (from the replanning trigger).

In the lower, right part of the screen a map showing the actual waypoints are given. This screen is also where information related to the bookings is shown, since it shows the booking status of the transport leg. The booking statuses are related to the different third party systems that the bookings are done in, and they are shown in a single view. The BCM has to be used to get the execution status of the transport.

The screen also includes the possibility to do replanning of a transport plan. The "Send Event" functionality is used to simulate events received from the EPM, Section 6.





**Figure 7 Main Transport Plan Screen**

The cost distribution for this transport plan can be shown as a "cost pie", Figure 8, or by using the "Resource Usage" functionality to show the time usage and costs in a bar graph, Figure 9. This gives a clear and direct view on how much of the transport that is spent on each leg, being the time usage or the money spending. This will give an indication of which leg it is most useful to have a closer look at, if you want to improve the overall picture.

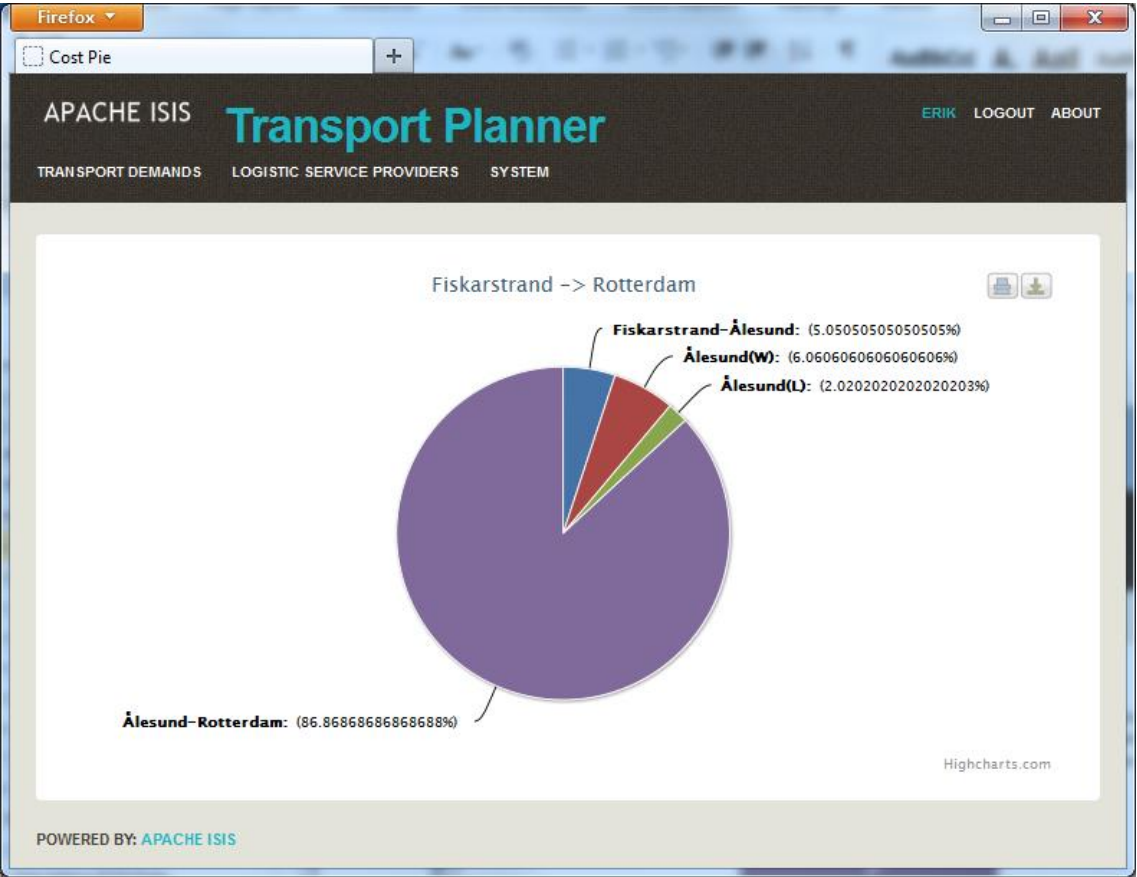
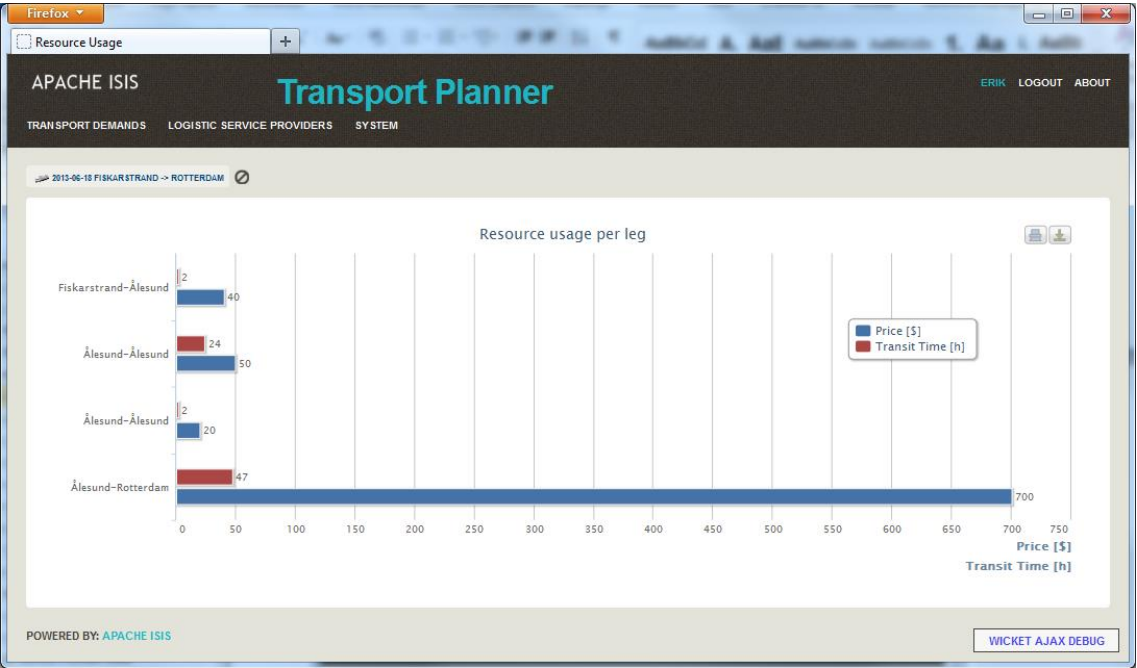
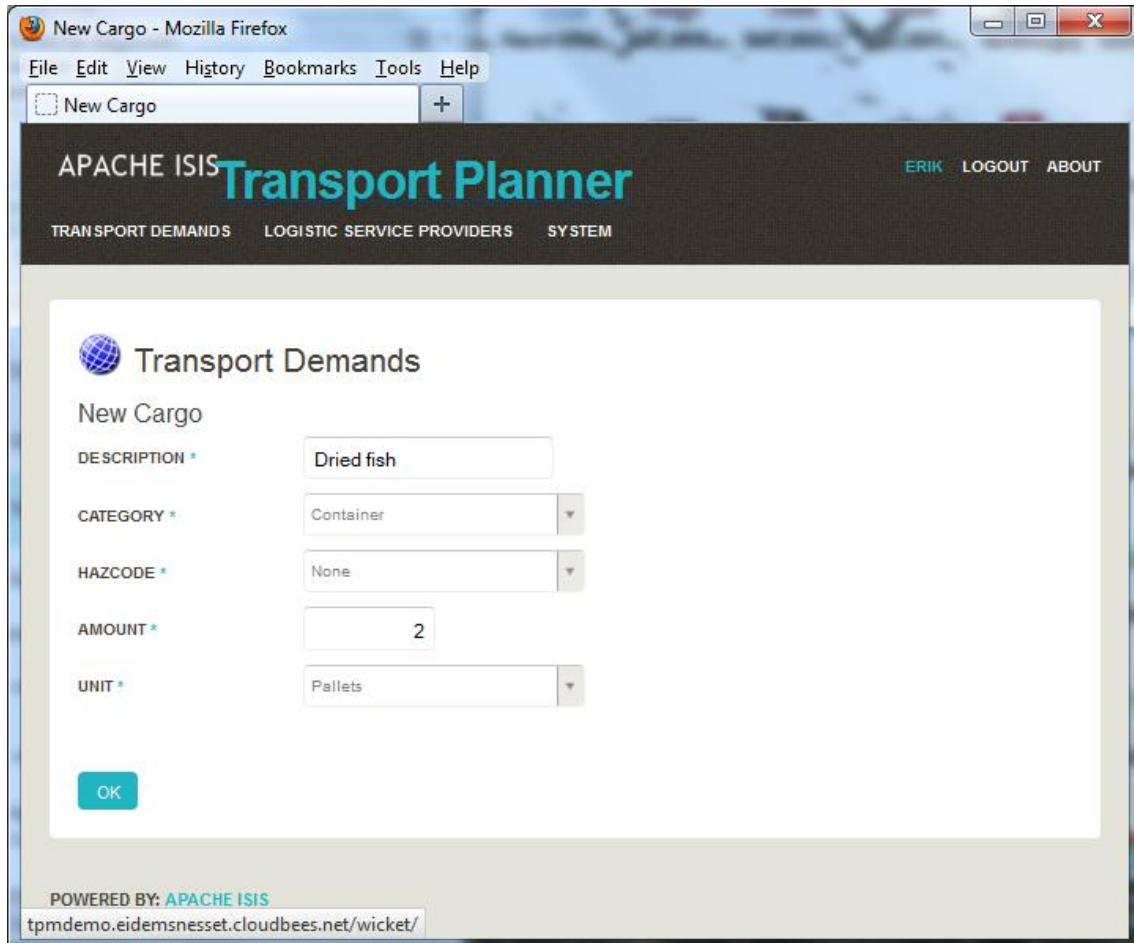


Figure 8 Cost Pie



**Figure 9 Resource Usage for Transport Plan**

New Cargo details can be entered as shown in Figure 10.



The screenshot shows a web browser window titled "New Cargo - Mozilla Firefox". The address bar shows "New Cargo" and a plus sign. The page header for "APACHE ISIS Transport Planner" includes links for "ERIK", "LOGOUT", and "ABOUT". Below the header are navigation links: "TRANSPORT DEMANDS", "LOGISTIC SERVICE PROVIDERS", and "SYSTEM". The main content area is titled "Transport Demands" and contains a "New Cargo" form. The form has the following fields:

- DESCRIPTION \*: "Dried fish"
- CATEGORY \*: "Container" (dropdown menu)
- HAZCODE \*: "None" (dropdown menu)
- AMOUNT \*: "2"
- UNIT \*: "Pallets" (dropdown menu)

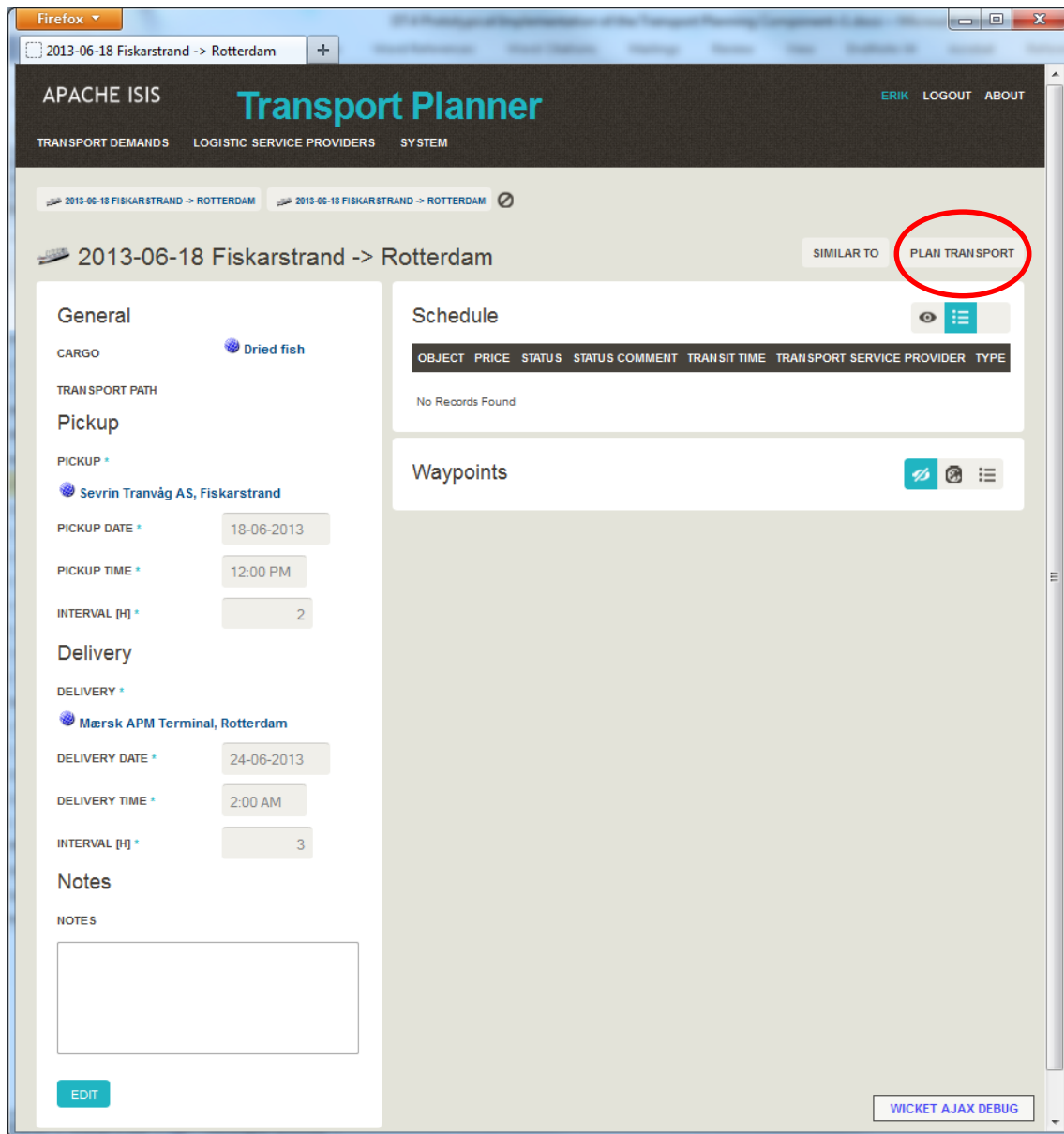
An "OK" button is located at the bottom left of the form. At the bottom of the page, it says "POWERED BY: APACHE ISIS" and provides a URL: "tpmdemo.eidemsnesset.cloudbees.net/wicket/".

**Figure 10 Enter Cargo Details**

This screen also has the possibility to add a new transport demand for this cargo directly.

## 5.2. Search for Services

The search for services and contracts matching the transport demand is done from the main transport demand screen, Figure 11. In a real world implementation of the TPM, the search is covering all services and contracts stored in the ECM or a similar tool. It will therefore present available services based on up to date information from the service providers, and it will also modify the information based on contracts between the LSC and the LSP.



**Figure 11 Search for Services and Contracts**

Figure 12 shows that the searching of services and contracts can be prioritized based on various criteria, for instance fastest routes or cheapest routes. The choice made here decides how the alternative routes are presented in the screen in Figure 13 and Figure 14. A maximum price and a maximum time can also be set to limit the search result.

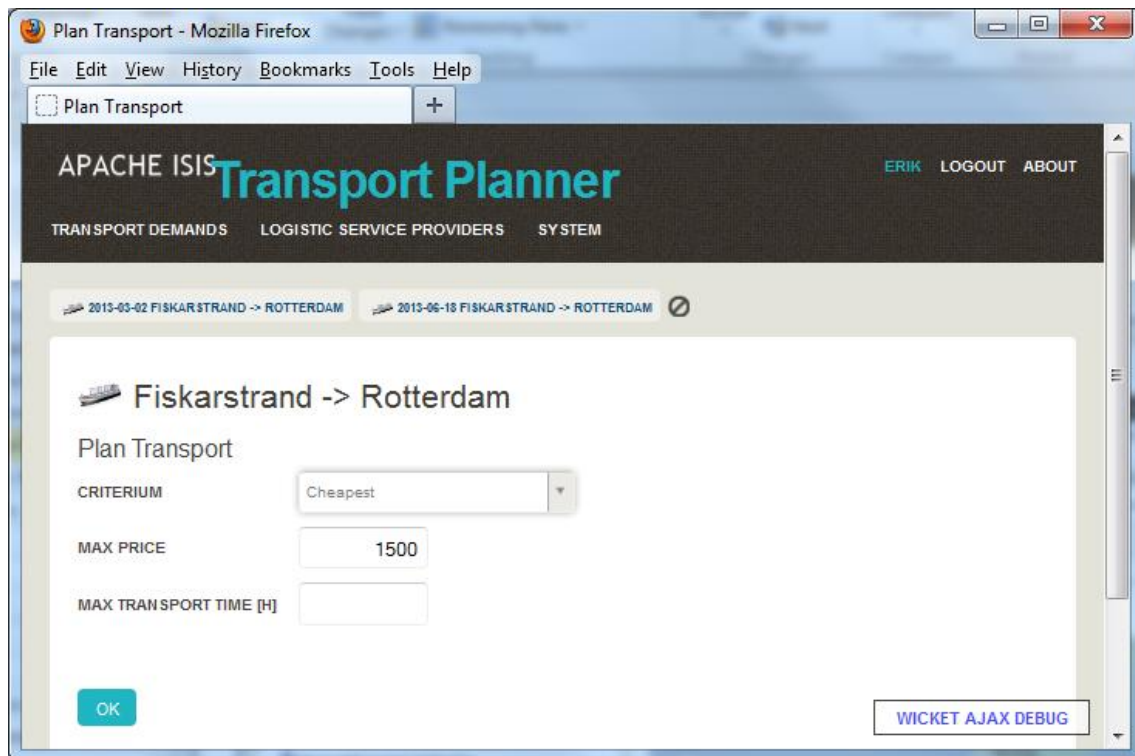


Figure 12 Select Priority for Service and Contract Search

### 5.3. Build Graph

When building a directed graph forming possible routes from the pickup location to the destination location, the route information given in Figure 29 is used. In a real world implementation of the TPM, this information will be fetched from the ECM or a similar module, and the values will be up to date. From this information, we know where we can possibly head from each location. Each arc in the graph has costs associated with it, both time and price. Additionally, each arc consists of one provided service between two locations, or at one location. If the user enters a maximum price, a maximum time usage or a maximum number of legs, the building of a certain route can stop when at least one of these requirements are no longer fulfilled. In [11] more details on the two different route building algorithms used in the TPM are described.

### 5.4. Find Routes

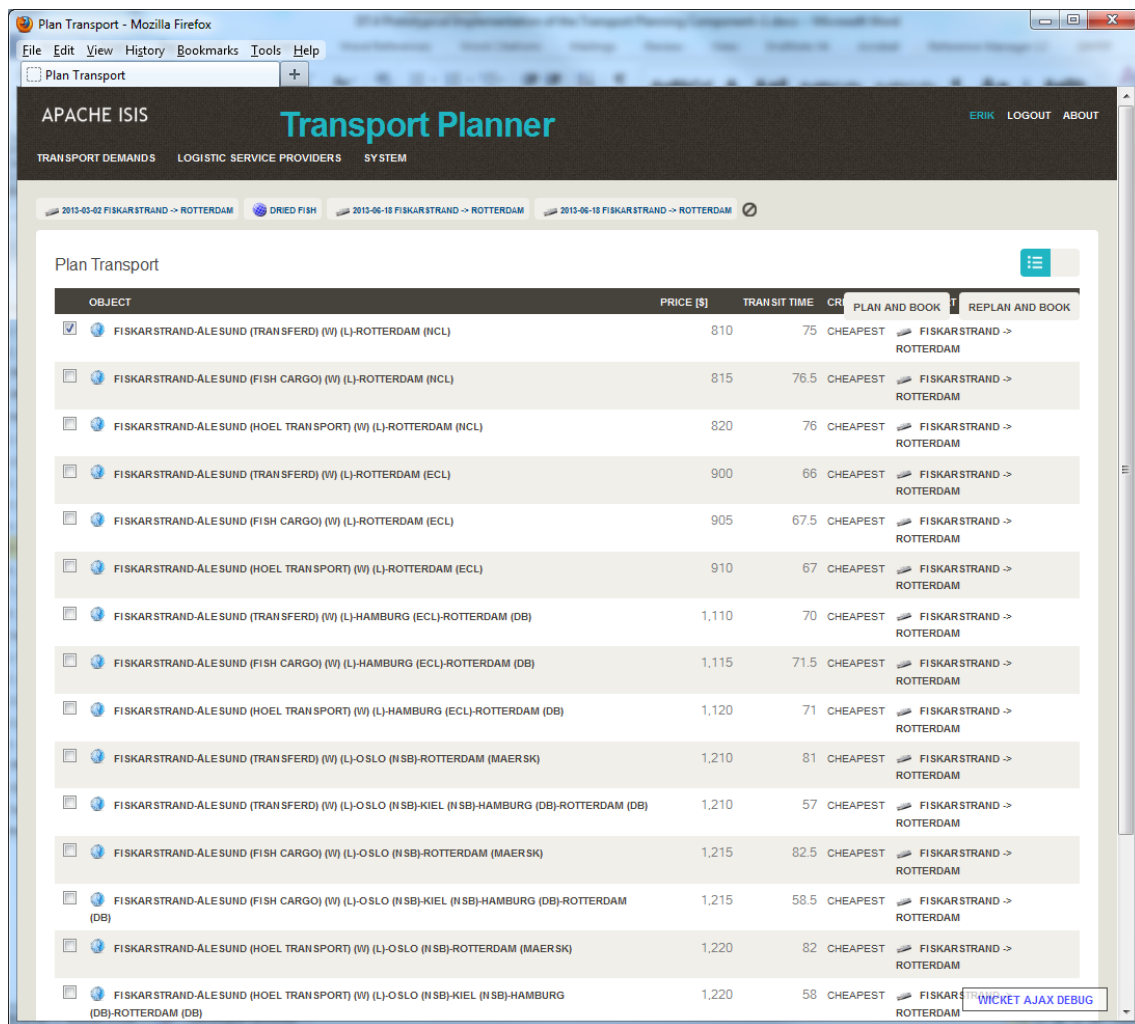
All possible routes from the pickup to the destination location in the directed graph are sorted using the  $K^{\text{th}}$  shortest path routing algorithm. Not only the single cheapest or fastest route must be found, but rather a list of routes that are prioritized according to end user specification (typically price, time, number of legs etc.). The  $K^{\text{th}}$  shortest path routing algorithm first finds the



shortest path through the directed graph. Then this route is removed from the search, and the algorithm is run once more until all possible paths are found.

## 5.5. Present Routes

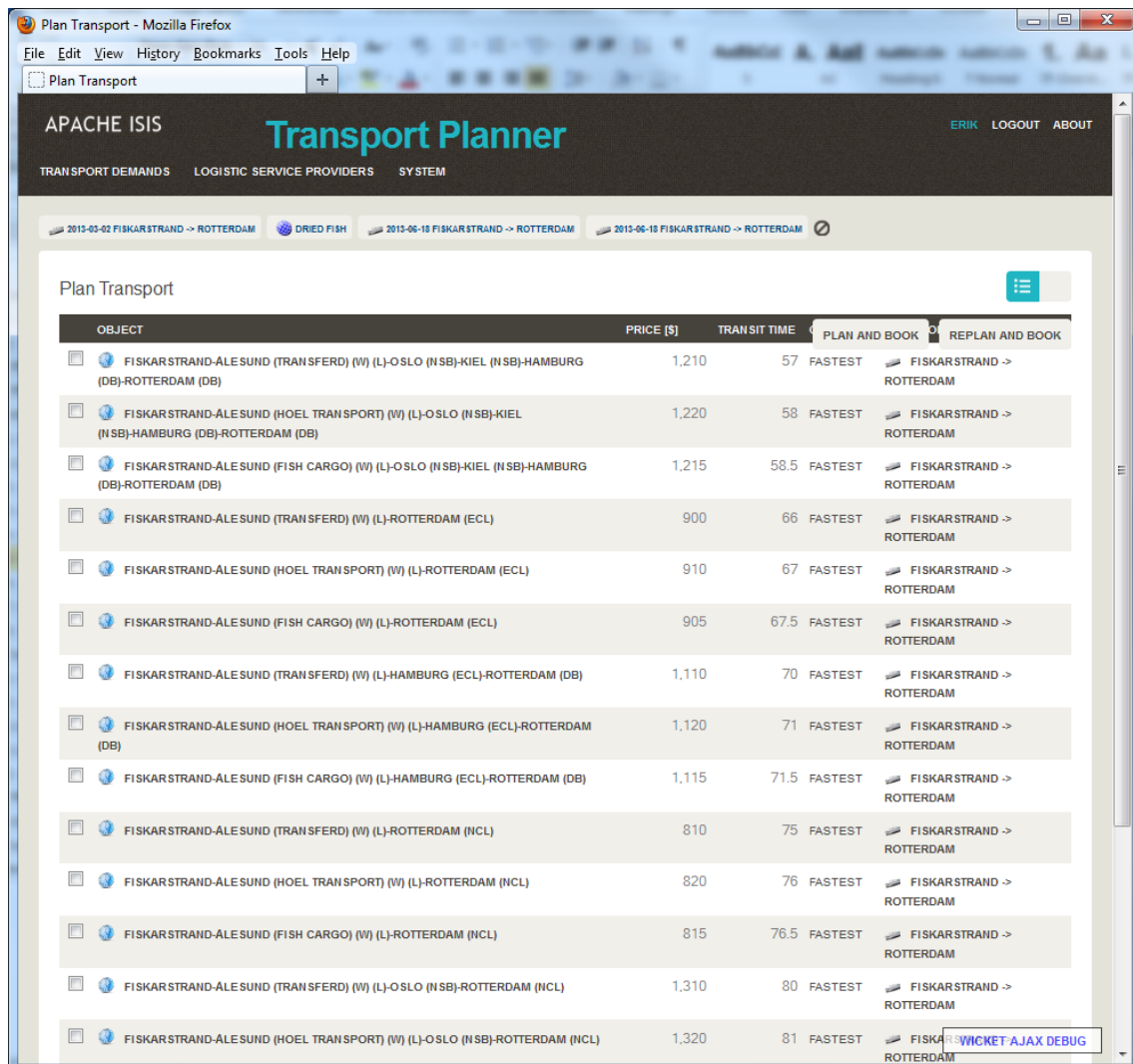
The actual routes are sorted according to the criteria selected in Figure 12, and they are presented as shown in Figure 13 (sorted on price) and Figure 14 (sorted on time).



The screenshot shows the 'Transport Planner' interface with a table of route alternatives. The table is sorted by price in ascending order. The first route is selected with a checked checkbox.

OBJECT	PRICE [€]	TRANSIT TIME	CHEAPEST	PLAN AND BOOK	REPLAN AND BOOK
<input checked="" type="checkbox"/> FISKARSTRAND-ÅLESUND (TRANSFER) (W) (L)-ROTTERDAM (NCL)	810	75	CHEAPEST	FISKARSTRAND -> ROTTERDAM	
<input type="checkbox"/> FISKARSTRAND-ÅLESUND (FISH CARGO) (W) (L)-ROTTERDAM (NCL)	815	76.5	CHEAPEST	FISKARSTRAND -> ROTTERDAM	
<input type="checkbox"/> FISKARSTRAND-ÅLESUND (HOEL TRANSPORT) (W) (L)-ROTTERDAM (NCL)	820	76	CHEAPEST	FISKARSTRAND -> ROTTERDAM	
<input type="checkbox"/> FISKARSTRAND-ÅLESUND (TRANSFER) (W) (L)-ROTTERDAM (ECL)	900	66	CHEAPEST	FISKARSTRAND -> ROTTERDAM	
<input type="checkbox"/> FISKARSTRAND-ÅLESUND (FISH CARGO) (W) (L)-ROTTERDAM (ECL)	905	67.5	CHEAPEST	FISKARSTRAND -> ROTTERDAM	
<input type="checkbox"/> FISKARSTRAND-ÅLESUND (HOEL TRANSPORT) (W) (L)-ROTTERDAM (ECL)	910	67	CHEAPEST	FISKARSTRAND -> ROTTERDAM	
<input type="checkbox"/> FISKARSTRAND-ÅLESUND (TRANSFER) (W) (L)-HAMBURG (ECL)-ROTTERDAM (DB)	1,110	70	CHEAPEST	FISKARSTRAND -> ROTTERDAM	
<input type="checkbox"/> FISKARSTRAND-ÅLESUND (FISH CARGO) (W) (L)-HAMBURG (ECL)-ROTTERDAM (DB)	1,115	71.5	CHEAPEST	FISKARSTRAND -> ROTTERDAM	
<input type="checkbox"/> FISKARSTRAND-ÅLESUND (HOEL TRANSPORT) (W) (L)-HAMBURG (ECL)-ROTTERDAM (DB)	1,120	71	CHEAPEST	FISKARSTRAND -> ROTTERDAM	
<input type="checkbox"/> FISKARSTRAND-ÅLESUND (TRANSFER) (W) (L)-OSLO (N SB)-ROTTERDAM (MAERSK)	1,210	81	CHEAPEST	FISKARSTRAND -> ROTTERDAM	
<input type="checkbox"/> FISKARSTRAND-ÅLESUND (TRANSFER) (W) (L)-OSLO (N SB)-KIEL (N SB)-HAMBURG (DB)-ROTTERDAM (DB)	1,210	57	CHEAPEST	FISKARSTRAND -> ROTTERDAM	
<input type="checkbox"/> FISKARSTRAND-ÅLESUND (FISH CARGO) (W) (L)-OSLO (N SB)-ROTTERDAM (MAERSK)	1,215	82.5	CHEAPEST	FISKARSTRAND -> ROTTERDAM	
<input type="checkbox"/> FISKARSTRAND-ÅLESUND (FISH CARGO) (W) (L)-OSLO (N SB)-KIEL (N SB)-HAMBURG (DB)-ROTTERDAM (DB)	1,215	58.5	CHEAPEST	FISKARSTRAND -> ROTTERDAM	
<input type="checkbox"/> FISKARSTRAND-ÅLESUND (HOEL TRANSPORT) (W) (L)-OSLO (N SB)-ROTTERDAM (MAERSK)	1,220	82	CHEAPEST	FISKARSTRAND -> ROTTERDAM	
<input type="checkbox"/> FISKARSTRAND-ÅLESUND (HOEL TRANSPORT) (W) (L)-OSLO (N SB)-KIEL (N SB)-HAMBURG (DB)-ROTTERDAM (DB)	1,220	58	CHEAPEST	FISKARSTRAND -> ROTTERDAM	

Figure 13 List of Route Alternatives sorted by Price



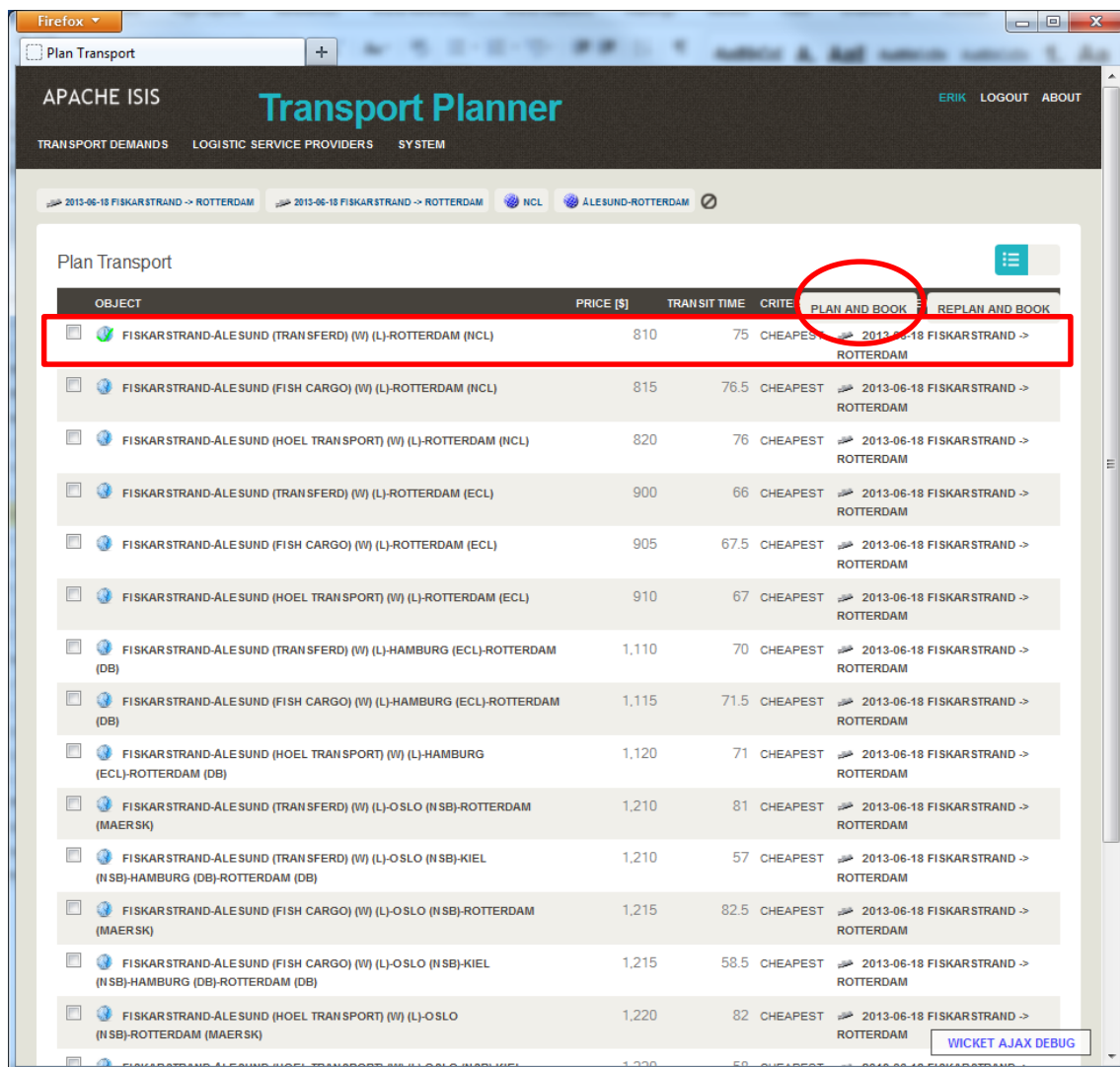
The screenshot shows a web browser window titled "Plan Transport - Mozilla Firefox". The application is "APACHE ISIS Transport Planner". The main content area is titled "Plan Transport" and displays a table of route alternatives. The table has columns for "OBJECT", "PRICE (\$)", "TRANSIT TIME", "PLAN AND BOOK", and "REPLAN AND BOOK". The routes are sorted by transit time, with the fastest route at the top.

OBJECT	PRICE (\$)	TRANSIT TIME	PLAN AND BOOK	REPLAN AND BOOK
<input type="checkbox"/> FISKARSTRAND-ALESUND (TRANSFERD) (W) (L)-O-SLO (N SB)-KIEL (N SB)-HAMBURG (DB)-ROTTERDAM (DB)	1,210	57	FASTEST	FISKARSTRAND -> ROTTERDAM
<input type="checkbox"/> FISKARSTRAND-ALESUND (HOEL TRANSPORT) (W) (L)-O-SLO (N SB)-KIEL (N SB)-HAMBURG (DB)-ROTTERDAM (DB)	1,220	58	FASTEST	FISKARSTRAND -> ROTTERDAM
<input type="checkbox"/> FISKARSTRAND-ALESUND (FISH CARGO) (W) (L)-O-SLO (N SB)-KIEL (N SB)-HAMBURG (DB)-ROTTERDAM (DB)	1,215	58.5	FASTEST	FISKARSTRAND -> ROTTERDAM
<input type="checkbox"/> FISKARSTRAND-ALESUND (TRANSFERD) (W) (L)-ROTTERDAM (ECL)	900	66	FASTEST	FISKARSTRAND -> ROTTERDAM
<input type="checkbox"/> FISKARSTRAND-ALESUND (HOEL TRANSPORT) (W) (L)-ROTTERDAM (ECL)	910	67	FASTEST	FISKARSTRAND -> ROTTERDAM
<input type="checkbox"/> FISKARSTRAND-ALESUND (FISH CARGO) (W) (L)-ROTTERDAM (ECL)	905	67.5	FASTEST	FISKARSTRAND -> ROTTERDAM
<input type="checkbox"/> FISKARSTRAND-ALESUND (TRANSFERD) (W) (L)-HAMBURG (ECL)-ROTTERDAM (DB)	1,110	70	FASTEST	FISKARSTRAND -> ROTTERDAM
<input type="checkbox"/> FISKARSTRAND-ALESUND (HOEL TRANSPORT) (W) (L)-HAMBURG (ECL)-ROTTERDAM (DB)	1,120	71	FASTEST	FISKARSTRAND -> ROTTERDAM
<input type="checkbox"/> FISKARSTRAND-ALESUND (FISH CARGO) (W) (L)-HAMBURG (ECL)-ROTTERDAM (DB)	1,115	71.5	FASTEST	FISKARSTRAND -> ROTTERDAM
<input type="checkbox"/> FISKARSTRAND-ALESUND (TRANSFERD) (W) (L)-ROTTERDAM (NCL)	810	75	FASTEST	FISKARSTRAND -> ROTTERDAM
<input type="checkbox"/> FISKARSTRAND-ALESUND (HOEL TRANSPORT) (W) (L)-ROTTERDAM (NCL)	820	76	FASTEST	FISKARSTRAND -> ROTTERDAM
<input type="checkbox"/> FISKARSTRAND-ALESUND (FISH CARGO) (W) (L)-ROTTERDAM (NCL)	815	76.5	FASTEST	FISKARSTRAND -> ROTTERDAM
<input type="checkbox"/> FISKARSTRAND-ALESUND (TRANSFERD) (W) (L)-O-SLO (N SB)-ROTTERDAM (NCL)	1,310	80	FASTEST	FISKARSTRAND -> ROTTERDAM
<input type="checkbox"/> FISKARSTRAND-ALESUND (HOEL TRANSPORT) (W) (L)-O-SLO (N SB)-ROTTERDAM (NCL)	1,320	81	FASTEST	FISKARSTRAND -> ROTTERDAM

Figure 14 List of Route Alternatives sorted by Time Usage

## 5.6. Select Route

The wanted route is selected as shown in Figure 15 and "Plan and Book" is done.



OBJECT	PRICE (\$)	TRANSIT TIME	CRITERIA	ACTION
<input checked="" type="checkbox"/> FISKARSTRAND-ALESUND (TRANSFER) (W) (L)-ROTTERDAM (NCL)	810	75	CHEAPEST	2013-06-18 FISKARSTRAND -> ROTTERDAM
<input type="checkbox"/> FISKARSTRAND-ALESUND (FISH CARGO) (W) (L)-ROTTERDAM (NCL)	815	76.5	CHEAPEST	2013-06-18 FISKARSTRAND -> ROTTERDAM
<input type="checkbox"/> FISKARSTRAND-ALESUND (HOEL TRANSPORT) (W) (L)-ROTTERDAM (NCL)	820	76	CHEAPEST	2013-06-18 FISKARSTRAND -> ROTTERDAM
<input type="checkbox"/> FISKARSTRAND-ALESUND (TRANSFER) (W) (L)-ROTTERDAM (ECL)	900	66	CHEAPEST	2013-06-18 FISKARSTRAND -> ROTTERDAM
<input type="checkbox"/> FISKARSTRAND-ALESUND (FISH CARGO) (W) (L)-ROTTERDAM (ECL)	905	67.5	CHEAPEST	2013-06-18 FISKARSTRAND -> ROTTERDAM
<input type="checkbox"/> FISKARSTRAND-ALESUND (HOEL TRANSPORT) (W) (L)-ROTTERDAM (ECL)	910	67	CHEAPEST	2013-06-18 FISKARSTRAND -> ROTTERDAM
<input type="checkbox"/> FISKARSTRAND-ALESUND (TRANSFER) (W) (L)-HAMBURG (ECL)-ROTTERDAM (DB)	1,110	70	CHEAPEST	2013-06-18 FISKARSTRAND -> ROTTERDAM
<input type="checkbox"/> FISKARSTRAND-ALESUND (FISH CARGO) (W) (L)-HAMBURG (ECL)-ROTTERDAM (DB)	1,115	71.5	CHEAPEST	2013-06-18 FISKARSTRAND -> ROTTERDAM
<input type="checkbox"/> FISKARSTRAND-ALESUND (HOEL TRANSPORT) (W) (L)-HAMBURG (ECL)-ROTTERDAM (DB)	1,120	71	CHEAPEST	2013-06-18 FISKARSTRAND -> ROTTERDAM
<input type="checkbox"/> FISKARSTRAND-ALESUND (TRANSFER) (W) (L)-OSLO (NSB)-ROTTERDAM (MAERSK)	1,210	81	CHEAPEST	2013-06-18 FISKARSTRAND -> ROTTERDAM
<input type="checkbox"/> FISKARSTRAND-ALESUND (TRANSFER) (W) (L)-OSLO (NSB)-KIEL (NSB)-HAMBURG (DB)-ROTTERDAM (DB)	1,210	57	CHEAPEST	2013-06-18 FISKARSTRAND -> ROTTERDAM
<input type="checkbox"/> FISKARSTRAND-ALESUND (FISH CARGO) (W) (L)-OSLO (NSB)-ROTTERDAM (MAERSK)	1,215	82.5	CHEAPEST	2013-06-18 FISKARSTRAND -> ROTTERDAM
<input type="checkbox"/> FISKARSTRAND-ALESUND (FISH CARGO) (W) (L)-OSLO (NSB)-KIEL (NSB)-HAMBURG (DB)-ROTTERDAM (DB)	1,215	58.5	CHEAPEST	2013-06-18 FISKARSTRAND -> ROTTERDAM
<input type="checkbox"/> FISKARSTRAND-ALESUND (HOEL TRANSPORT) (W) (L)-OSLO (NSB)-ROTTERDAM (MAERSK)	1,220	82	CHEAPEST	2013-06-18 FISKARSTRAND -> ROTTERDAM

**Figure 15 Presentation and Selection of Transportation Routes**

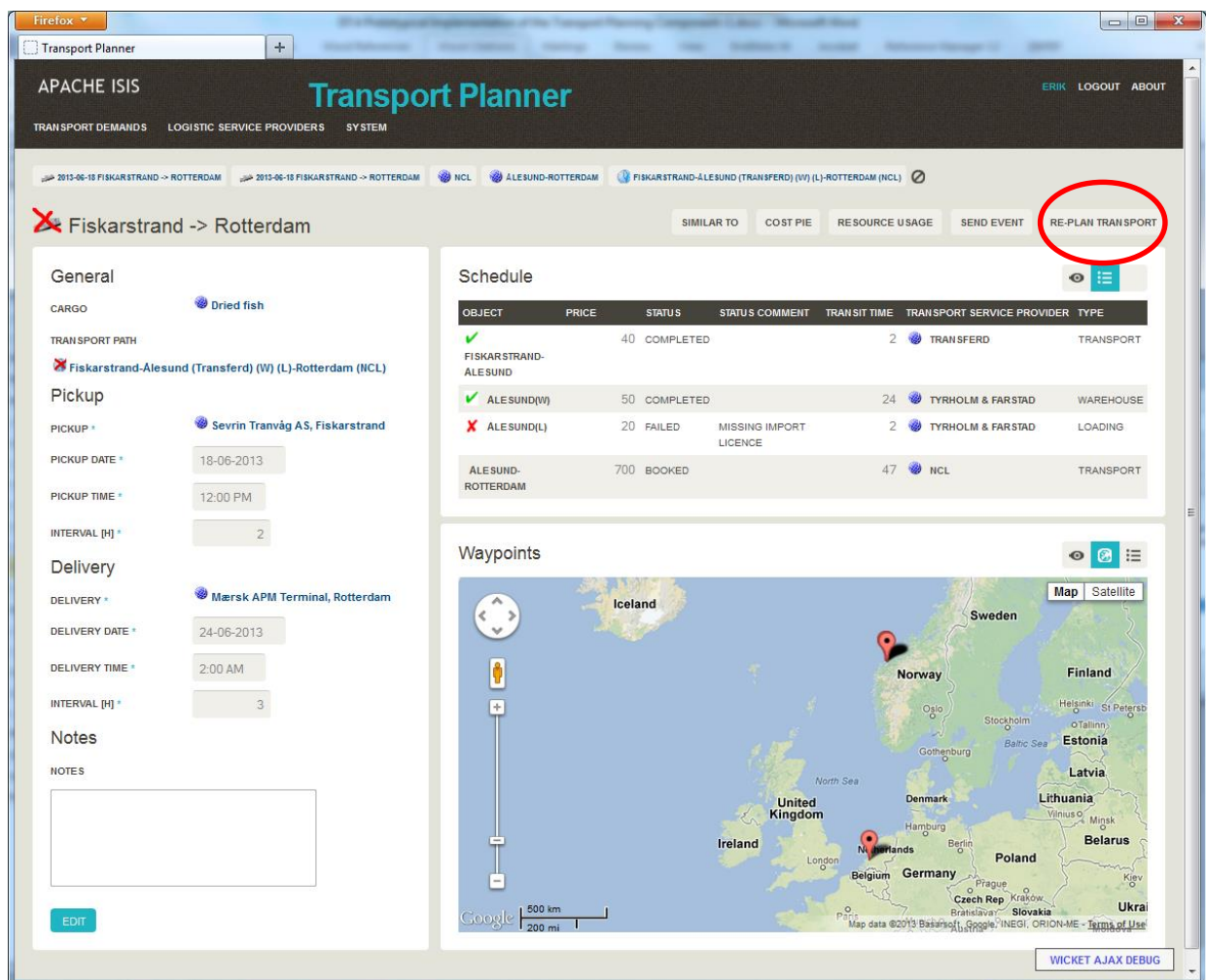
Then, booking of the actual services towards LSPs booking systems should be done, and the service is listed as "Booked" in Figure 7. In the prototype, the finalized booking is marked with a green hook at the beginning of the selected route, Figure 15. The TPM will handle bookings against all involved LSP booking systems and present the result uniformly to the LSC in onw single screen, Figure 7. In a real world implementation of the TPM, booking negotiations between the LSC and the LSPs also must be added.

The updated plan is presented as shown in Figure 7.



## 5.7. Replanning

Events are simulated as described in Section 6.4. If a "Missing Import Licence" event is simulated on the loading service for the transportation of containerized dried fish from Fiskarstrand to Rotterdam, the front end user will get a picture of the transport plan as shown in Figure 16 and an overview in Figure 18. This means that actual events related to a transport plan are shown directly in the transport planning tool. The TPM notifies the planner about the event, states which legs have completed OK, and which have failed, and it leaves it to the planner to do replanning covering the remaining transport legs.

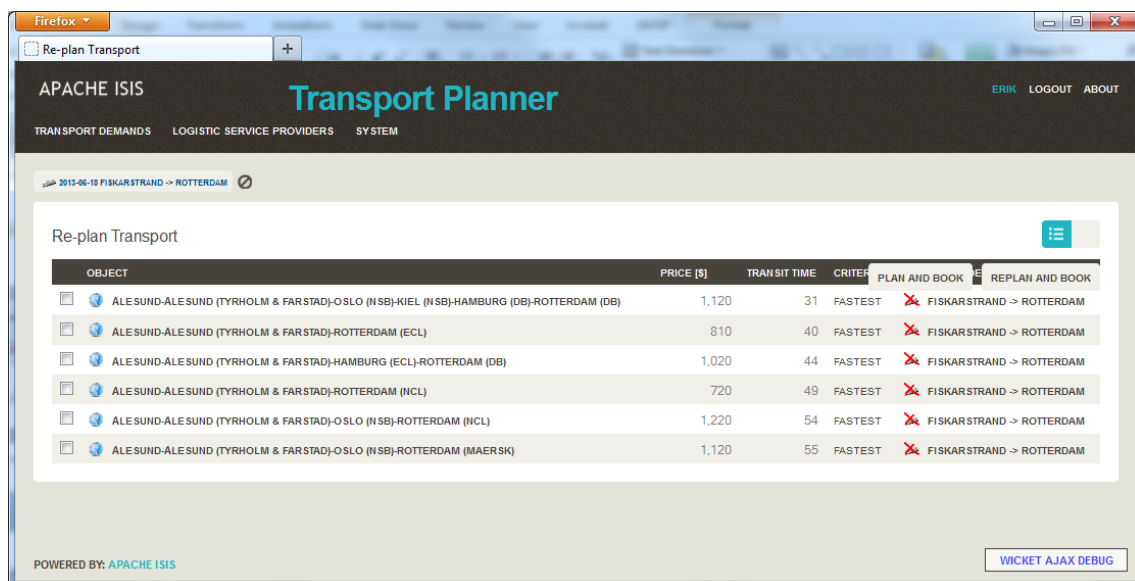


**Figure 16 Transport Plan Updated with Run time Information**

Figure 16 shows that the truck transport from Fiskarstrand to Ålesund has been completed OK, and also that the warehousing in Ålesund is completed. It states that the loading in Ålesund has failed due to a missing import licence. The execution status is automatically received from the BCM, and it is automatically shown in the plan, meaning that the user/planner gets a good overview of what the current situation is, and what has to be done. It leaves the end user with

the possibility to do replanning. By selecting the "Replan Transport" button, the screen in Figure 17 is shown.

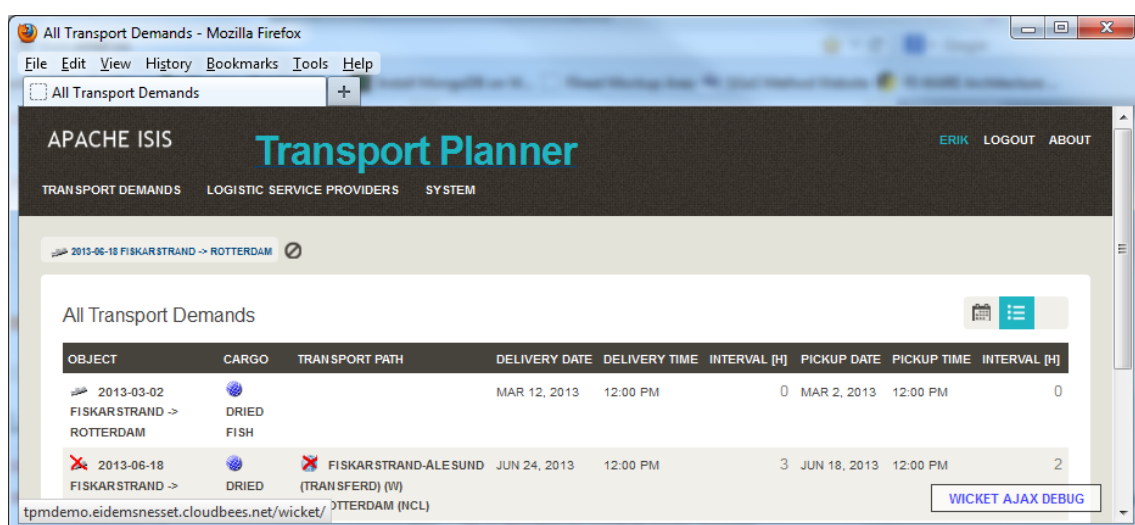
When the "Re-plan transport" button in Figure 16 is selected, a list of routes is presented as shown in Figure 17. The transport demand is automatically updated to reflect the fact that the first part of the transport has been completed successfully. In our example, the presented routes cover alternatives from Ålesund to Rotterdam only, not from Fiskarstrand, since the first leg already has been completed, and therefore not need to be replanned. The routes are based on up to date information from the ECM regarding available services and contracts, meaning that a different list than in the initial planning may be given here. The list of available services is updated automatically based on the results received from the ECM.



OBJECT	PRICE [€]	TRANSIT TIME	CRITERION	PLAN AND BOOK	REPLAN AND BOOK
<input type="checkbox"/> ÅLESUND-ÅLESUND (TYRHOLM & FARSTAD)-OSLO (N SB)-KIEL (N SB)-HAMBURG (DB)-ROTTERDAM (DB)	1,120	31	FASTEST	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> ÅLESUND-ÅLESUND (TYRHOLM & FARSTAD)-ROTTERDAM (ECL)	810	40	FASTEST	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> ÅLESUND-ÅLESUND (TYRHOLM & FARSTAD)-HAMBURG (ECL)-ROTTERDAM (DB)	1,020	44	FASTEST	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> ÅLESUND-ÅLESUND (TYRHOLM & FARSTAD)-ROTTERDAM (NCL)	720	49	FASTEST	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> ÅLESUND-ÅLESUND (TYRHOLM & FARSTAD)-OSLO (N SB)-ROTTERDAM (NCL)	1,220	54	FASTEST	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> ÅLESUND-ÅLESUND (TYRHOLM & FARSTAD)-OSLO (N SB)-ROTTERDAM (MAERSK)	1,120	55	FASTEST	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

POWERED BY: APACHE ISIS [WICKET AJAX DEBUG](#)

Figure 17 Updated route alternatives for the Replanning



OBJECT	CARGO	TRANSPORT PATH	DELIVERY DATE	DELIVERY TIME	INTERVAL [H]	PICKUP DATE	PICKUP TIME	INTERVAL [H]
2013-03-02 FISKARSTRAND -> ROTTERDAM	DRIED FISH		MAR 12, 2013	12:00 PM	0	MAR 2, 2013	12:00 PM	0
<input checked="" type="checkbox"/> 2013-06-18 FISKARSTRAND -> ROTTERDAM (NCL)	<input checked="" type="checkbox"/> DRIED <input checked="" type="checkbox"/> FISH	<input checked="" type="checkbox"/> FISKARSTRAND-ÅLESUND (TRANSFER) (V)	JUN 24, 2013	12:00 PM	3	JUN 18, 2013	12:00 PM	2

tpdemo.eidemsnet.net/cloudbees.net/wicket/ [WICKET AJAX DEBUG](#)

Figure 18 Overview of Updated Transport Plans

When the end user has selected "Re-plan and Book", the replanned transport in our example looks as shown in Figure 19. During this step, the booking process is repeated for the services that need rebooking. It is optional whether the existing bookings are cancelled automatically or not. The user has to choose whether he wants to cancel the booking and then make new reservations, or whether he wants to change the existing reservations. This interaction is not shown in the current prototype.

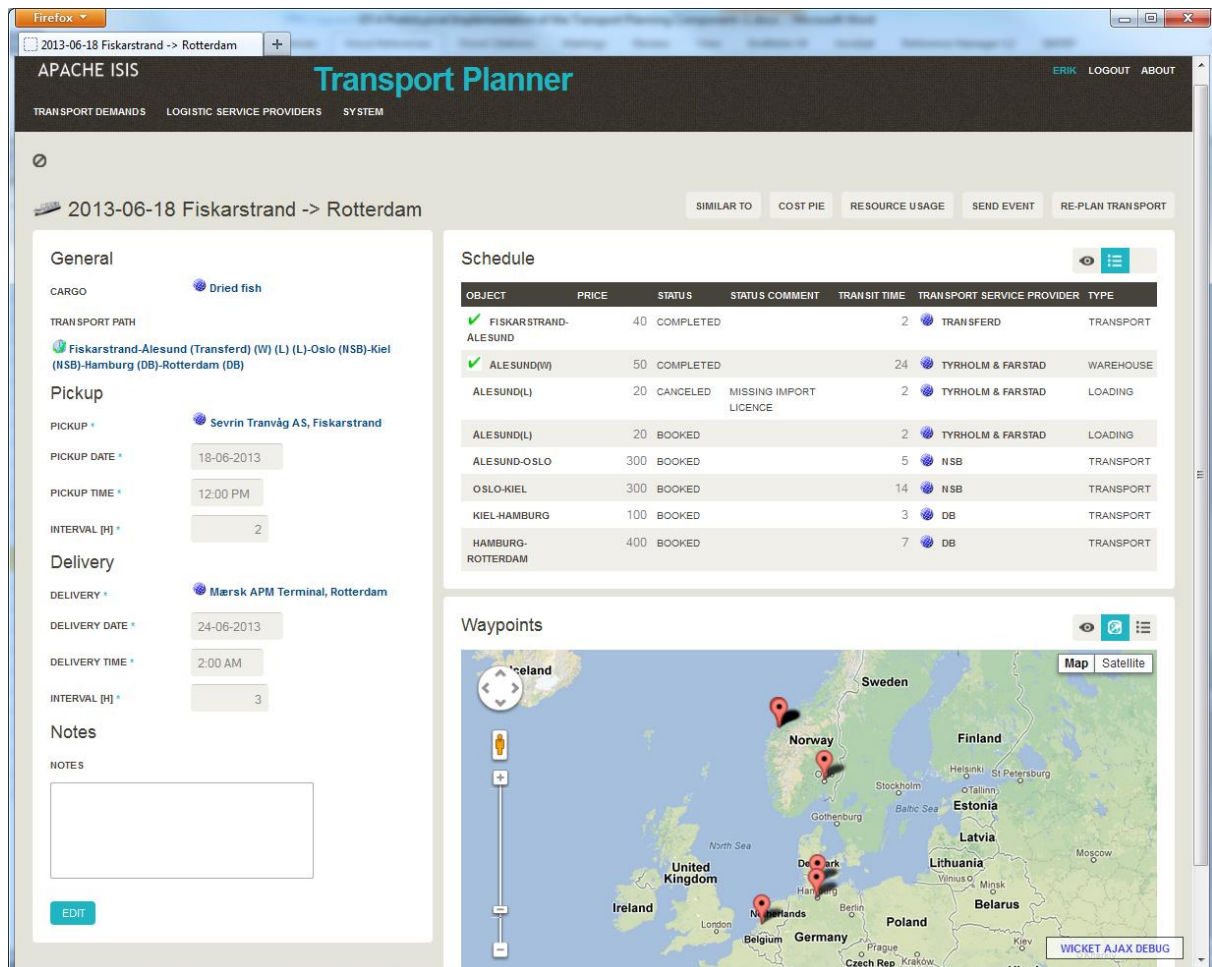


Figure 19 Completed Replanning of Transport

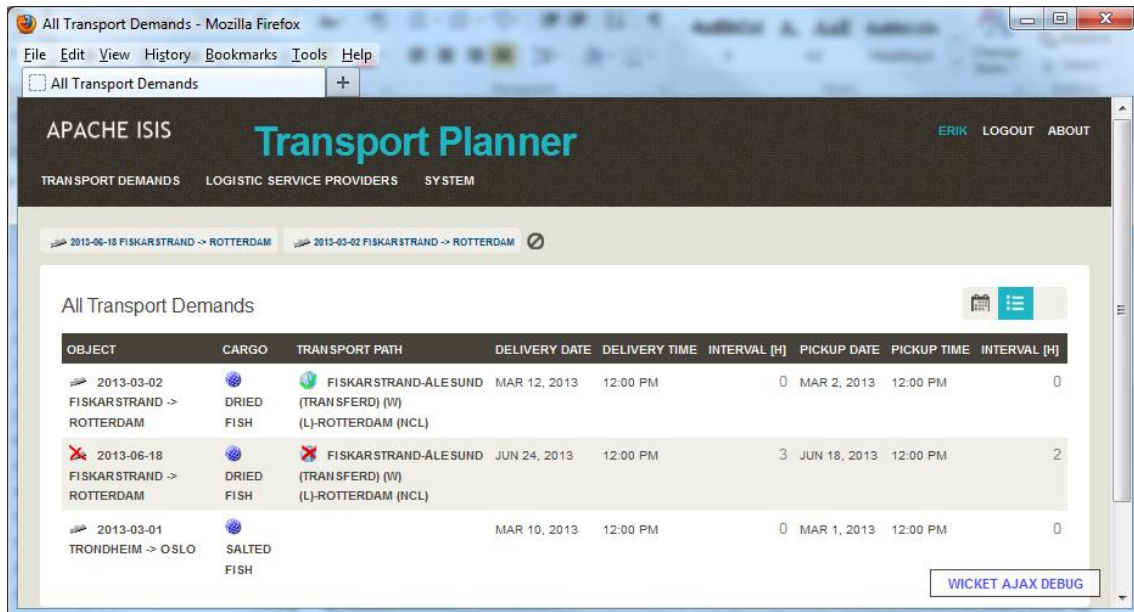
## 5.8. Transport Demand and Plan Overview

Figure 20 shows the screen giving an overview of actual transport demands and transport plans. According to the various user roles, only those demands and plans accessible to a user should be visible here.

A red mark on a plan means that some failure has occurred and that an event has been sent from the EPM to the BCM, and that the BCM has sent a replanning trigger to the TPM.

A green mark on a plan means that the plan has been successfully booked, and also that the execution so far is completed correctly.

A missing transport path means that this demand is added to the TPM, but that the planning has not yet been done.



The screenshot shows the 'All Transport Demands' page in the Apache Isis Transport Planner. The page has a dark header with the title 'Transport Planner' and navigation links for 'TRANSPORT DEMANDS', 'LOGISTIC SERVICE PROVIDERS', and 'SYSTEM'. There are also links for 'ERIK', 'LOGOUT', and 'ABOUT'. Below the header, there are two tabs for '2013-06-18 FISKARSTRAND -> ROTTERDAM' and '2013-03-02 FISKARSTRAND -> ROTTERDAM'. The main content area displays a table of transport demands.

OBJECT	CARGO	TRANSPORT PATH	DELIVERY DATE	DELIVERY TIME	INTERVAL [h]	PICKUP DATE	PICKUP TIME	INTERVAL [h]
2013-03-02 FISKARSTRAND -> ROTTERDAM	DRIED FISH	FISKARSTRAND-ALESUND (TRANSFER) (W) (L)-ROTTERDAM (NCL)	MAR 12, 2013	12:00 PM	0	MAR 2, 2013	12:00 PM	0
2013-06-18 FISKARSTRAND -> ROTTERDAM	DRIED FISH	FISKARSTRAND-ALESUND (TRANSFER) (W) (L)-ROTTERDAM (NCL)	JUN 24, 2013	12:00 PM	3	JUN 18, 2013	12:00 PM	2
2013-03-01 TRONDHEIM -> OSLO	SALTED FISH		MAR 10, 2013	12:00 PM	0	MAR 1, 2013	12:00 PM	0

At the bottom right of the table, there is a button labeled 'WICKET AJAX DEBUG'.

Figure 20 Transport Demand and Plan Overview

## 6. Supportive TPM Prototype Functionality

Some functionality provided in the prototype is not part of the TPM itself, but it is still needed to be able to show the core of the TPM.

### 6.1. Prototype Initializing

Figure 21 shows the "Install" menu item which is used to set up some useful, predefined data in the TPM prototype. This can be run before starting the actual transport planning demonstration in the prototype.

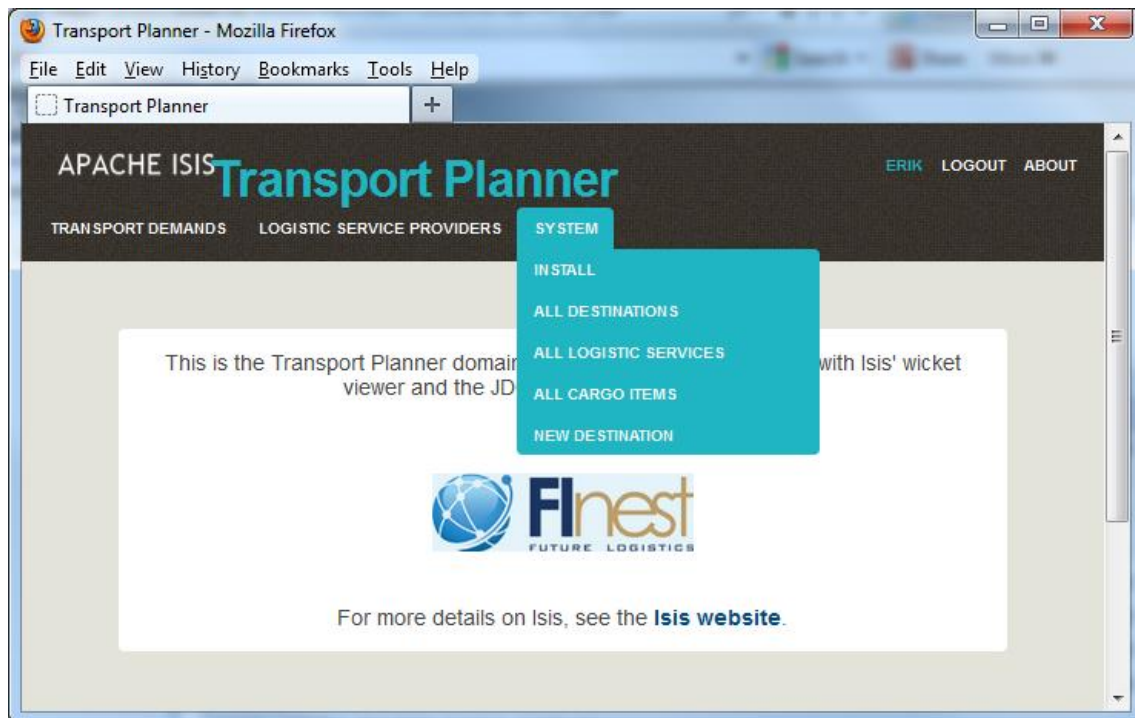
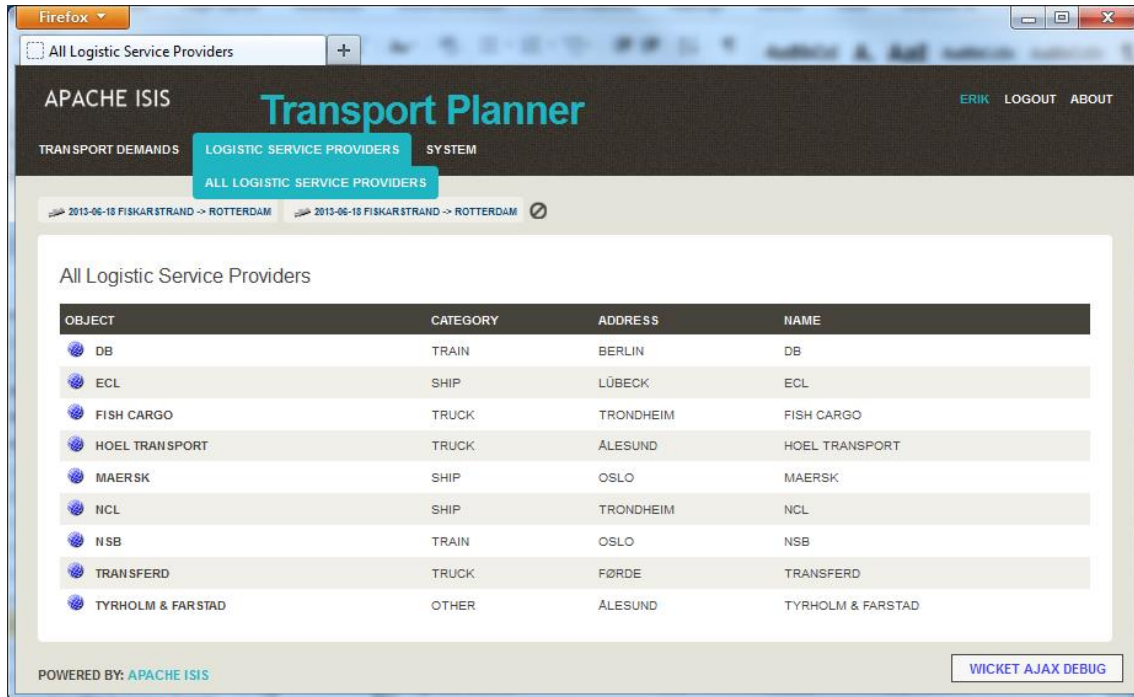


Figure 21 TPM Prototype Initialization

## 6.2. Simulating Service Provider Data

Figure 22 shows which service providers are added as background data in the TPM. This is done to simulate the functionality provided by the ECM and backend systems.



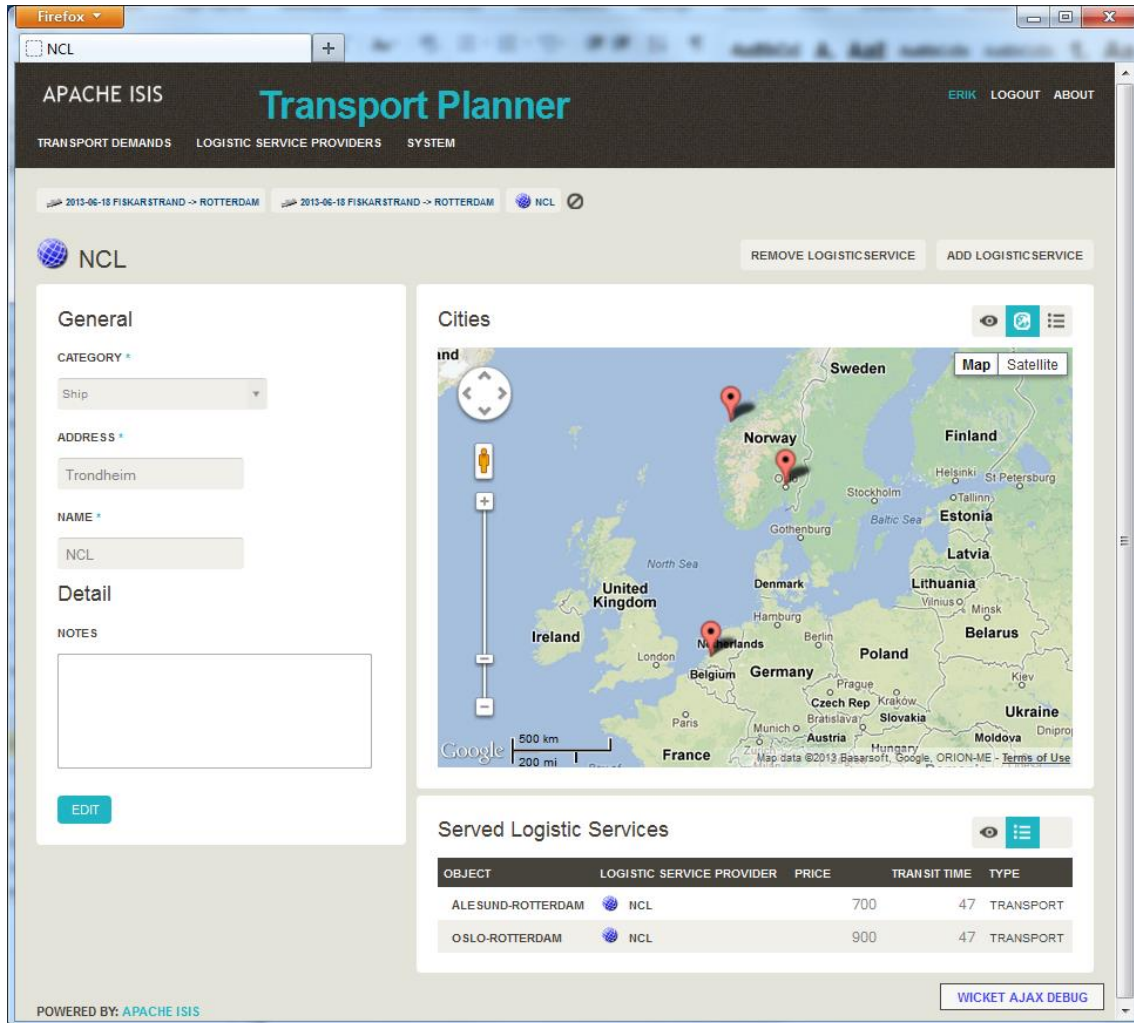


The screenshot shows a web browser window with the Apache ISIS Transport Planner interface. The browser's address bar shows the URL 'http://localhost:8080/transport-planner/'. The application has a dark header with 'APACHE ISIS' and 'Transport Planner' in large letters. Below the header, there are tabs for 'TRANSPORT DEMANDS', 'LOGISTIC SERVICE PROVIDERS' (which is active), and 'SYSTEM'. Under the 'LOGISTIC SERVICE PROVIDERS' tab, there is a sub-tab 'ALL LOGISTIC SERVICE PROVIDERS'. The main content area displays a table titled 'All Logistic Service Providers'. The table has four columns: 'OBJECT', 'CATEGORY', 'ADDRESS', and 'NAME'. It lists eight service providers: DB (TRAIN, BERLIN), ECL (SHIP, LÜBECK), FISH CARGO (TRUCK, TRONDHEIM), HOEL TRANSPORT (TRUCK, ALESUND), MAERSK (SHIP, OSLO), NCL (SHIP, TRONDHEIM), NSB (TRAIN, OSLO), and TRANSFERD (TRUCK, FØRDE). At the bottom of the page, it says 'POWERED BY: APACHE ISIS' and there is a 'WICKET AJAX DEBUG' button.

OBJECT	CATEGORY	ADDRESS	NAME
DB	TRAIN	BERLIN	DB
ECL	SHIP	LÜBECK	ECL
FISH CARGO	TRUCK	TRONDHEIM	FISH CARGO
HOEL TRANSPORT	TRUCK	ALESUND	HOEL TRANSPORT
MAERSK	SHIP	OSLO	MAERSK
NCL	SHIP	TRONDHEIM	NCL
NSB	TRAIN	OSLO	NSB
TRANSFERD	TRUCK	FØRDE	TRANSFERD
TYRHOLM & FARSTAD	OTHER	ALESUND	TYRHOLM & FARSTAD

**Figure 22 Showing Logistics Service Providers**

By selecting one line in Figure 22, the information about one service provider can be viewed and updated, Figure 23.



The screenshot shows the Apache Isis Transport Planner interface. The top navigation bar includes 'APACHE ISIS', 'Transport Planner', and links for 'ERIK', 'LOGOUT', and 'ABOUT'. Below this, there are tabs for 'TRANSPORT DEMANDS', 'LOGISTIC SERVICE PROVIDERS', and 'SYSTEM'. The main content area is divided into three sections:

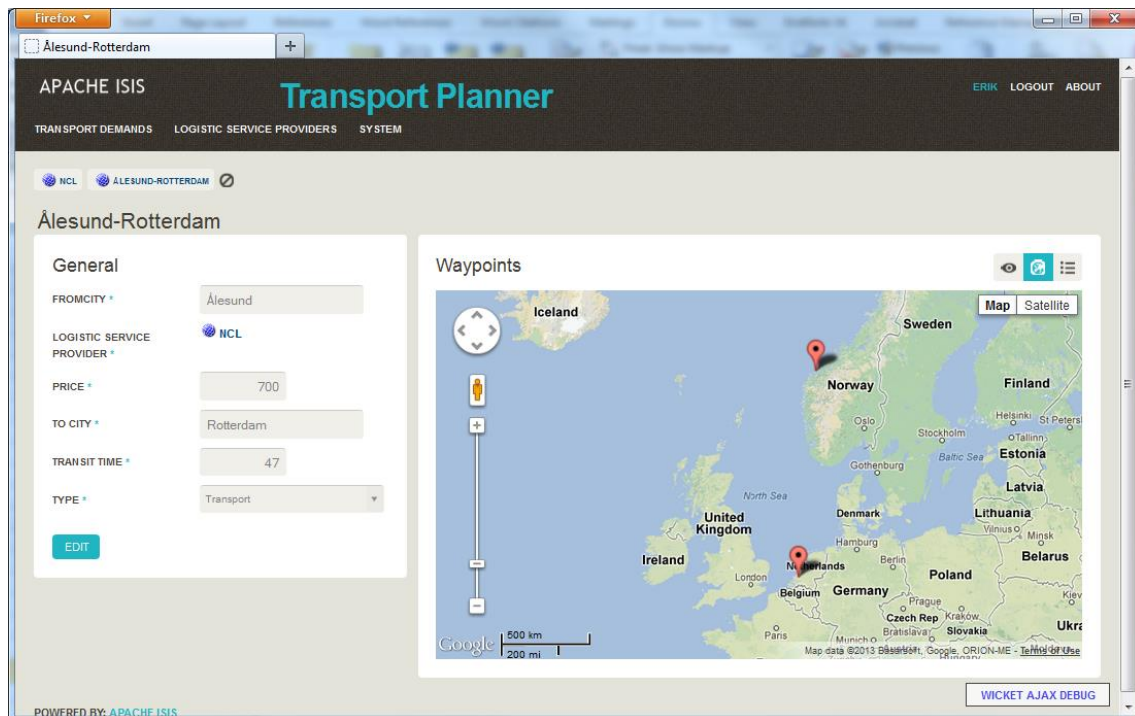
- General:** Contains a 'CATEGORY' dropdown set to 'Ship', an 'ADDRESS' field with 'Trondheim', a 'NAME' field with 'NCL', and a 'Detail' section with a 'NOTES' text area and an 'EDIT' button.
- Cities:** A map of Europe showing various countries and cities. Red pins are placed on Norway, Sweden, and the Netherlands. A scale bar indicates 500 km and 200 miles.
- Served Logistic Services:** A table listing services provided by NCL.

OBJECT	LOGISTIC SERVICE PROVIDER	PRICE	TRANSIT TIME	TYPE
ALESUND-ROTTERDAM	NCL	700	47	TRANSPORT
OSLO-ROTTERDAM	NCL	900	47	TRANSPORT

At the bottom of the screen, it says 'POWERED BY: APACHE ISIS' and there is a 'WICKET AJAX DEBUG' button.

**Figure 23 Information about one Service Provider**

The screen shows details about the service provider, which cities it serves and also which routes it operates. Details on the services provided for a certain route are found by selecting the actual route in the lower, right part of the screen, Figure 24.



**Figure 24 Logistics Service Overview**

The services offered by a logistics service provider, together with the price and time usage, can be added as shown in Figure 25. Likewise, a route can be removed from a service provider, Figure 26.



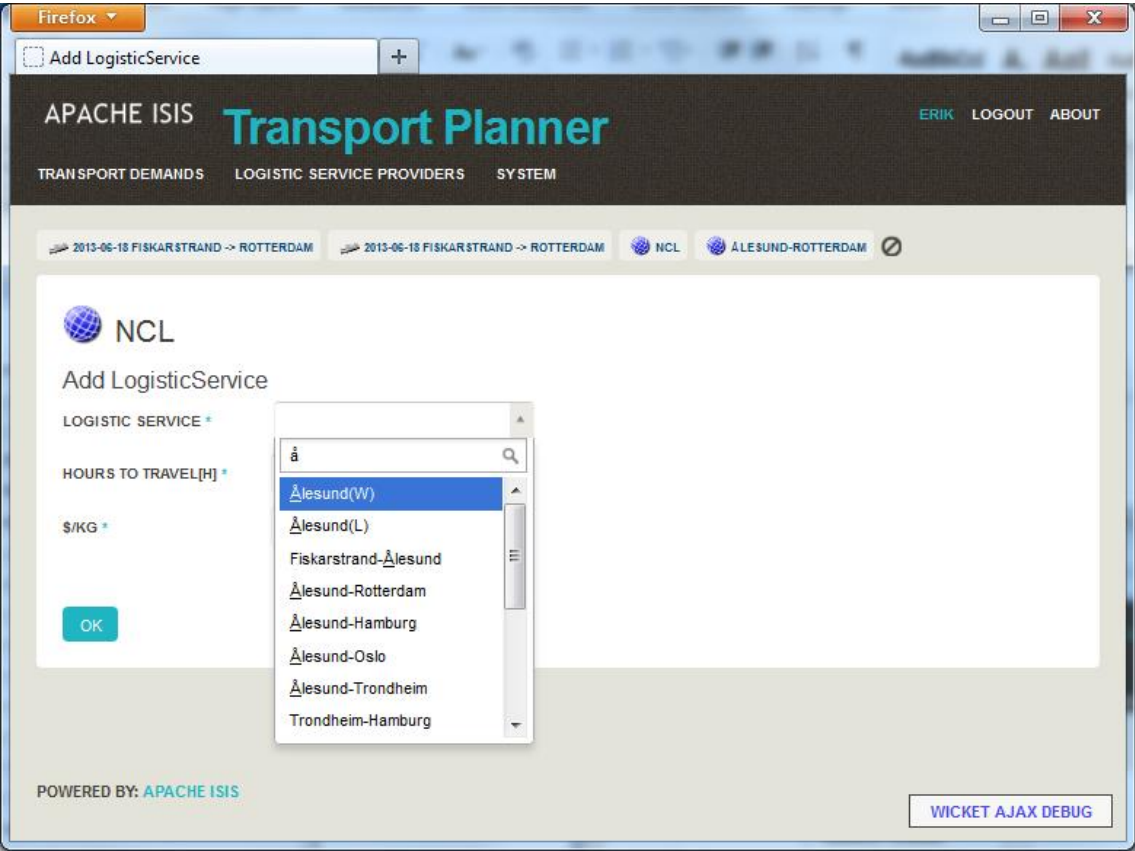


Figure 25 Adding Service to Service Provider

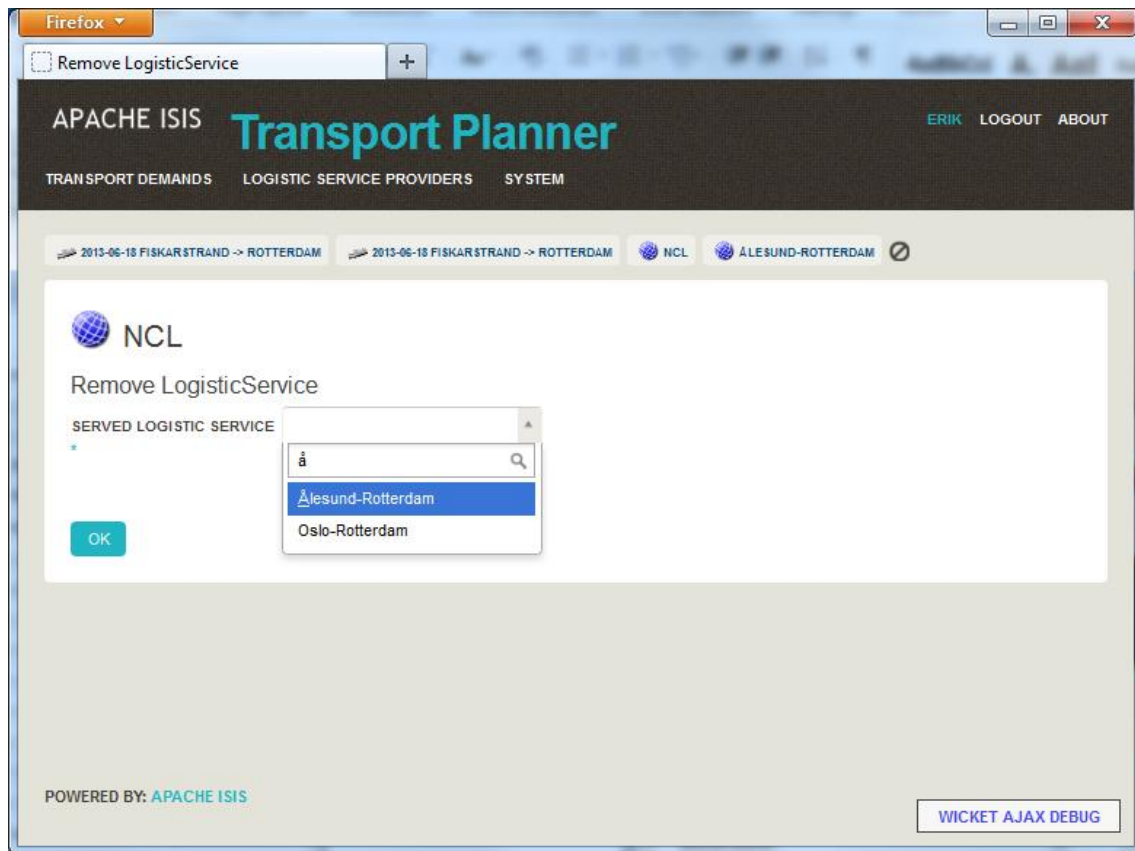
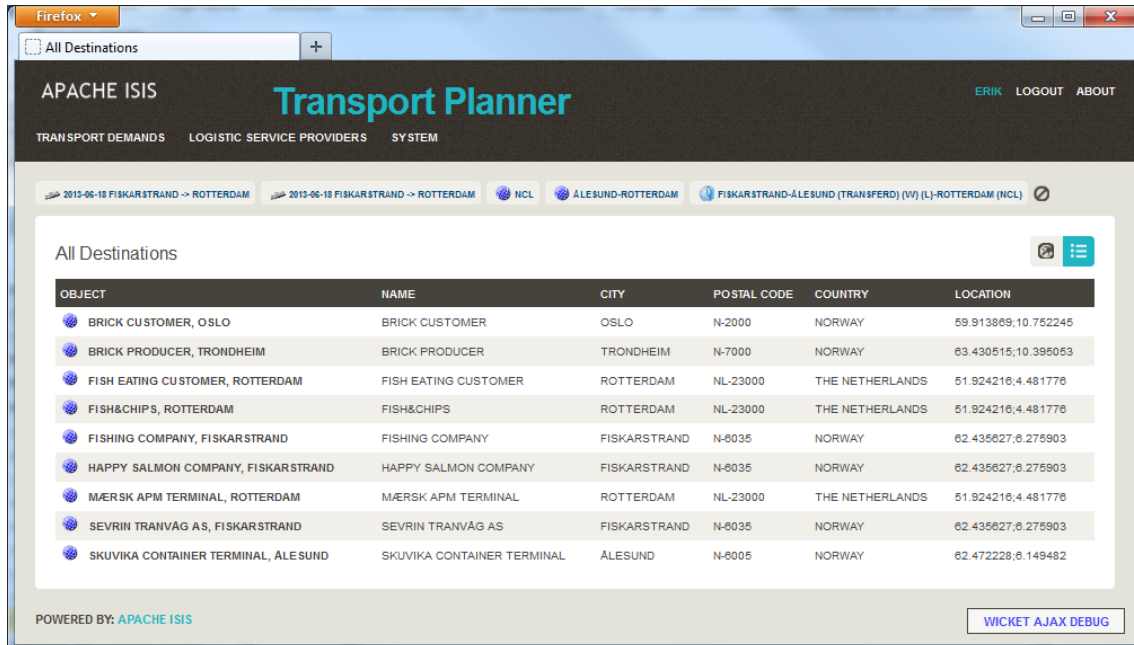


Figure 26 Removing Service from Service Provider

### 6.3. Simulating Other Systems Data

The "System" menu item in Figure 21 shows background information that is used by the TPM to be able to build up graphs of services and routes, and to select and sort routes. This information would normally come from the ECM or third party booking systems.

Figure 27 shows a list of all destinations that can be used as pickup and delivery locations.

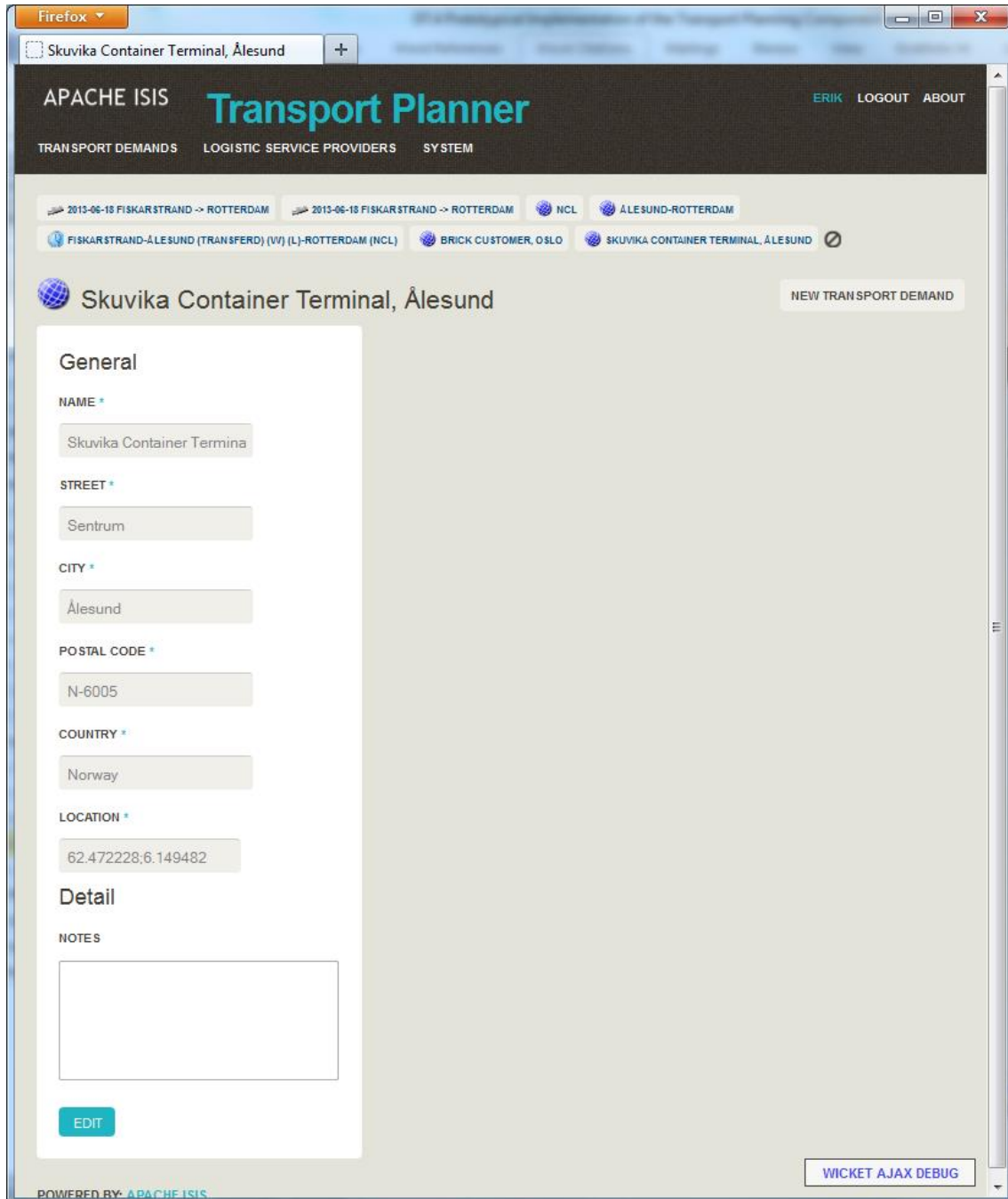


The screenshot shows a web browser window with the Apache Isis Transport Planner interface. The page title is 'All Destinations'. Below the header, there are several tabs for different routes: '2013-06-18 FISKARSTRAND -> ROTTERDAM', '2013-06-18 FISKARSTRAND -> ROTTERDAM', 'NCL', 'ÅLESUND-ROTTERDAM', and 'FISKARSTRAND-ÅLESUND (TRANSFER) (VV) (L)-ROTTERDAM (NCL)'. The main content area displays a table of destinations with the following columns: OBJECT, NAME, CITY, POSTAL CODE, COUNTRY, and LOCATION. The table lists ten destinations, including Brick Customer, Fish Eating Customer, Fish&Chips, Fishing Company, Happy Salmon Company, Mærsk APM Terminal, Sevrin Tranvåg AS, and Skuvika Container Terminal. The footer of the page indicates it is powered by Apache Isis and includes a 'WICKET AJAX DEBUG' button.

OBJECT	NAME	CITY	POSTAL CODE	COUNTRY	LOCATION
BRICK CUSTOMER, OSLO	BRICK CUSTOMER	OSLO	N-2000	NORWAY	59.913869;10.752245
BRICK PRODUCER, TRONDHEIM	BRICK PRODUCER	TRONDHEIM	N-7000	NORWAY	63.430515;10.395053
FISH EATING CUSTOMER, ROTTERDAM	FISH EATING CUSTOMER	ROTTERDAM	NL-23000	THE NETHERLANDS	51.924216;4.481776
FISH&CHIPS, ROTTERDAM	FISH&CHIPS	ROTTERDAM	NL-23000	THE NETHERLANDS	51.924216;4.481776
FISHING COMPANY, FISKARSTRAND	FISHING COMPANY	FISKARSTRAND	N-8035	NORWAY	62.435627;6.275903
HAPPY SALMON COMPANY, FISKARSTRAND	HAPPY SALMON COMPANY	FISKARSTRAND	N-8035	NORWAY	62.435627;6.275903
MÆRSK APM TERMINAL, ROTTERDAM	MÆRSK APM TERMINAL	ROTTERDAM	NL-23000	THE NETHERLANDS	51.924216;4.481776
SEVRIN TRANVÅG AS, FISKARSTRAND	SEVRIN TRANVÅG AS	FISKARSTRAND	N-8035	NORWAY	62.435627;6.275903
SKUVIKA CONTAINER TERMINAL, ÅLESUND	SKUVIKA CONTAINER TERMINAL	ÅLESUND	N-6005	NORWAY	62.472228;6.149482

Figure 27 All Destinations

The details of each destination is shown as in Figure 28.



The screenshot shows a web browser window with the Apache ISIS Transport Planner interface. The browser's address bar shows the URL 'Skuvika Container Terminal, Ålesund'. The application header includes the title 'Transport Planner' and navigation links for 'TRANSPORT DEMANDS', 'LOGISTIC SERVICE PROVIDERS', and 'SYSTEM'. A user menu shows 'ERIK', 'LOGOUT', and 'ABOUT'. Below the header, a list of transport demands is displayed, including routes like '2013-06-18 FISKARSTRAND -> ROTTERDAM' and 'FISKARSTRAND-ÅLESUND (TRANSFER) (VV) (L)-ROTTERDAM (NCL)'. The main content area is titled 'Skuvika Container Terminal, Ålesund' and features a 'NEW TRANSPORT DEMAND' button. A form for editing the destination is visible, with fields for 'NAME', 'STREET', 'CITY', 'POSTAL CODE', 'COUNTRY', and 'LOCATION'. The 'General' section contains the following data: NAME: Skuvika Container Termina, STREET: Sentrum, CITY: Ålesund, POSTAL CODE: N-6005, COUNTRY: Norway, and LOCATION: 62.472228;6.149482. The 'Detail' section has a 'NOTES' field and an 'EDIT' button. At the bottom, there is a 'WICKET AJAX DEBUG' button and a 'POWERED BY: APACHE ISIS' footer.

**Figure 28 Information on one Destination**

A list of all service routes are shown in Figure 29 and information about one route is shown as in Figure 30. Each of these routes can be related to a service provider together with a price and a time usage and forming a "Served Logistic Service" as shown in Figure 23 and Figure 24.

Firefox ▾

All Logistic Services +

APACHE ISIS **Transport Planner** ERIK LOGOUT ABOUT

TRANSPORT DEMANDS LOGISTIC SERVICE PROVIDERS SYSTEM

2013-06-18 FISKARSTRAND -> ROTTERDAM 2013-06-18 FISKARSTRAND -> ROTTERDAM NCL ÅLESUND-ROTTERDAM

FISKARSTRAND-ÅLESUND (TRANSFER) (VV) (L)-ROTTERDAM (NCL) BRICK CUSTOMER, OSLO SKUVIKA CONTAINER TERMINAL, ÅLESUND ÅLESUND(VV)

### All Logistic Services

OBJECT	FROMCITY	TO CITY	TYPE
ÅLESUND(VV)	ÅLESUND	ÅLESUND	WAREHOUSE
ÅLESUND(L)	ÅLESUND	ÅLESUND	LOADING
FISKARSTRAND-ÅLESUND	FISKARSTRAND	ÅLESUND	TRANSPORT
ÅLESUND-ROTTERDAM	ÅLESUND	ROTTERDAM	TRANSPORT
ÅLESUND-HAMBURG	ÅLESUND	HAMBURG	TRANSPORT
ÅLESUND-OSLO	ÅLESUND	OSLO	TRANSPORT
ÅLESUND-TRONDHEIM	ÅLESUND	TRONDHEIM	TRANSPORT
TRONDHEIM-HAMBURG	TRONDHEIM	HAMBURG	TRANSPORT
OSLO-ROTTERDAM	OSLO	ROTTERDAM	TRANSPORT
OSLO-KIEL	OSLO	KIEL	TRANSPORT
OSLO-TRONDHEIM	OSLO	TRONDHEIM	TRANSPORT
KIEL-HAMBURG	KIEL	HAMBURG	TRANSPORT
HAMBURG-ROTTERDAM	HAMBURG	ROTTERDAM	TRANSPORT
ROTTERDAM-ARNHEM	ROTTERDAM	ARNHEM	TRANSPORT

POWERED BY: APACHE ISIS

WICKET AJAX DEBUG

Figure 29 Information on all Logistics Services

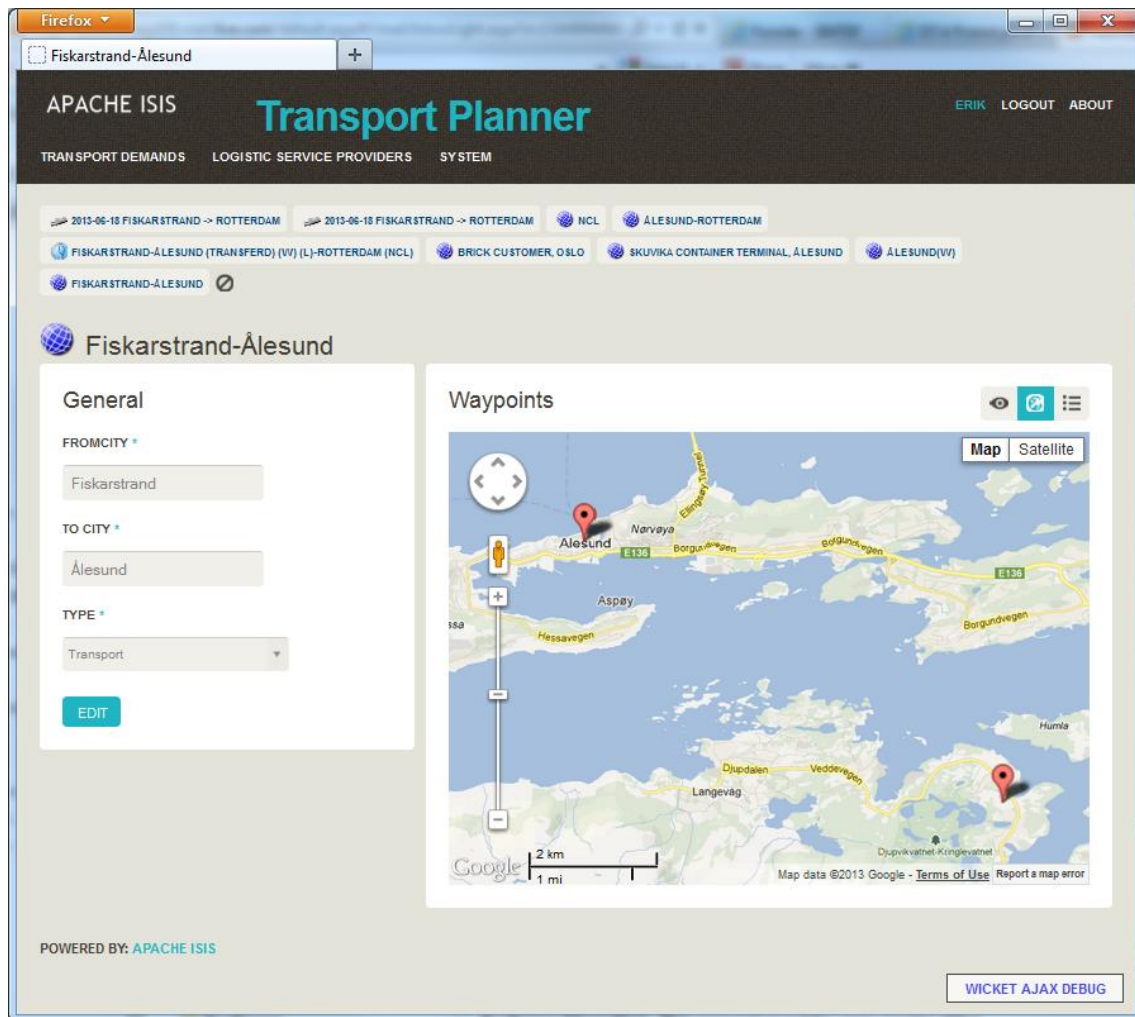


Figure 30 Information on one Route

## 6.4. Simulating EPM Events

Figure 31 shows how receiving a replanning trigger from BCM (and thus an event from EPM) can be simulated in the TPM. Events of various types (*Executing*, *Completed*, *Failure*) can be attached to a certain leg, and a comment can be added.



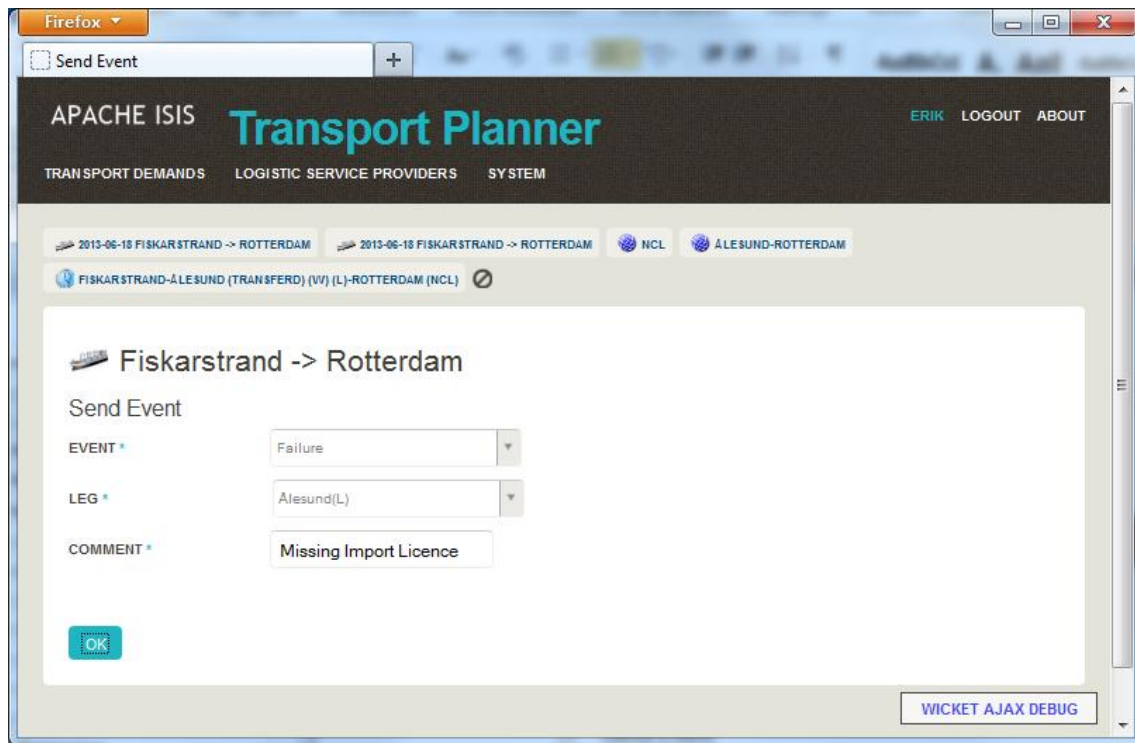


Figure 31 Simulating Event from EPM

## 7. Summary

The prototype delivered as D7.4 of the Finest project shows some of the functionality we believe that a Future Internet Transport Planning Module should have, and it also demonstrates how such a module can cooperate with other modules developed in the Finest project.

The prototype in its current state functions as a demonstrator of some of the ideas for a transport planner resulting from the work in WP7 (proof of concept), as well as its place in the Finest environment. It is, however, still far from a complete "production ready" system; there are still many parts of the TPM described in the other WP7 deliverables that are not in place, and that has to be implemented in follow-up projects. We do believe that the demonstrator can give an "end-user-friendly" impression of what the Module is intended to be, while the technical specifications described in D7.5 will work as a guide for how this can be realized.

The work from WP7 will be continued in the work on the Logistics Planning Application in the follow-up project cSpace, and it is believed that this work will result in a more complete version of the described system. Plans for development of the Logistics Planning Application can be found in D7.5.

This report is intended as a user guide to and description of the prototype of the Transport Planning Module that has been developed in WP7 of the Finest project. In addition to a walk-through of the prototype, it also describes the demonstrator setup where all prototypes from the project were demonstrated together using the "Fish export scenario" from the Use-Case work package. It also gives technical data of the prototype, including the URL to an instance of the prototype, so that the reader can "try out" the prototype functionality.

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