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PORTBASE

Conversion Factory

AN INFORMATION SYSTEM BLUEPRINT FOR A WEB-BASED LOGISTIC SERVICE PLATFORM FOR FREIGHT RAIL TRANSPORT.

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Introduction

This report describes the approach taken in the design of an information system blueprint for a web-based logistic service platform for freight rail transport.

The report gives possible logistic services and their relationships for the freight rail business around a port, in this case the port of Rotterdam. The approach assumes standard technologies and protocols for information exchange, and aims at a high level blueprint, with the main objective to provide the internal structure of a logistic service platform. It includes the complete list of logistic rail services, an overview of business processes in freight rail transportation, the parties involved in these processes, the information exchanges between these parties, and a visualization of the intended rail logistic platform.
The approach taken in this report was based on the results of two PhD theses performed at the IS group at Eindhoven University of Technology. The design project was commissioned by Dinalog and Portbase.

Scope

In scope of this report are all aspects that are relevant for the effective and efficient design of web based logistics service platforms, with focus on freight rail transportation around a port. The report provides detailed sub-reports on the results of the various phases in the specific design for Portbase, preceded by an account of the systematic approach taken to achieve effectiveness and efficiency.

Description of the approach

In most cases logistic service systems, logistic tools, and logistic platforms have to be developed with a number of elements and aspects of the existing situation as given. Neglecting these givens in the design process may results in tedious repair processes and in overrunning of time and cost budgets. In the project, an approach has been used which allows the design team to systematically explore the available design space and to systematically specify the elements and aspects of the system such that implementation of the designed system in the given context is possible.

The approach distinguishes five aspects for the description of freight rail logistic platform reference architecture design, and four dimensions for different levels of detail at which elements and aspects of the system can be specified.

The five aspects are:

1) The data aspect, describing the organization of the data in the information system;
2) The process aspect, describing the business processes supported by the information system;
3) The software & services aspect, describing the structure of the software in the information system;
4) The platform aspect, describing the hardware platform in which the information system is implemented;
5) The organisation aspect, describing the different organizational positions serving and being served by the information system.

These aspects are tightly connected to each other, which means that choices made on one aspect can constrain or influence effectiveness of choice options on other aspects. Thus, design space is complex and the search through design space must be based on a process of careful investigating all choices per aspect and careful checking the consequences of a specific choice on one aspect on other aspects, allowing for some iterations, but not too many since this would lead to time and cost overrun.

The four dimensions are:

1) The abstraction dimension.
2) The realization dimension.
3) The aggregation dimension.
4) 4) Aspect dimension

The abstraction dimension

On the abstraction dimension, it is specified how abstract or concrete an architecture description needs to be for the intended purpose and the intended target group of people. Under-specification on this dimension may lead to uncertainty on the receiving side and interpretations that do not match with the intentions of the design team. Over-specification on this dimension may lead to time and money spent on unnecessary activities and missed opportunities to realize the intended goals by mobilizing valuable of knowledge at the receiving side.
The approach distinguishes five levels of abstraction:

1) Business independent model,
2) Business specific model (for example freight rail)
3) Business specific model for specific type of software system
4) Business specific model for specific type of software system in specific companies
5) Business specific model for specific type of software in specific companies, bought from specific vendors.

The realization dimension

On the realization dimension, it is specified at what implementation level the system should be specified. The approach distinguishes four levels:

1) At the business level, the goals to be achieved with the system are specified,
2) At the organizational level, it is specified how the organisational units are structured and interconnected to achieve the business goals,
3) At the architectural level, the architecture of the information system is specified,
4) At the technology level, the realization of the system in hardware and software is described.

The aggregation dimension

On the aggregation dimension, it is specified in what detail the components of the systems should be specified. Typically, description at various aggregation levels is needed for a useful description of the system to be designed. The aggregation dimension values should provide information about model details from business goals to services and means by which they can be performed. For the freight rail logistic service reference architecture, six aggregation levels are distinguished where the first two levels provide very aggregated information about customers and their business goals, then two levels that provide information about services and activities that enable realizing these goals, and finally two levels that provide information about how the services and activities are performed in terms of software.

1) Level one describes the parties which use the freight rail logistic platform;
2) Level two describes the complete set of services used by a party;
3) Level three describes the separate business services;
4) Level four describes the separate operations in a business service;
5) Level five describes the software functions needed for a service operation;
6) Level six describes the software operation needed for a software function needed for a service operation.