

University of Salzburg

Department of Computer Sciences

Planned Master thesis

Student: Rainer Widmann

Supervisor: Univ.-Prof. Dr. Wolfgang Pree

Title: Migration towards a scalable web-based passenger information system

Abstract

This thesis addresses the migration of a passenger information system for low-density railway lines towards a scalable web-based system. The described system is a non-safety-relevant additional service to a specific train control system. It imports time tables of scheduled trains from the database of the train control system and has a communication interface to receive and process arrival and departure messages from running trains entering or leaving stations along the track. For each running train, arrival and departure time forecasts for upcoming stations are calculated. The available information about scheduled and running trains with potentially forecasted delay information can be sent to dynamic passenger information displays along the track. Moreover statistical data about running trains is stored in a database to allow for statistical analytics of historical data. The available data can be used to optimize the time tables for instance. The system has a graphical user interface (GUI) to analyze statistical data, to supervise running trains and current forecasts as well as to manage and configure the system. For example the GUI can be used to configure text messages that should be displayed at specific stations or displays.

The system is in operation for two separated tracks controlled by one railway company. For both tracks separated servers are run to host the train control system and the dynamic passenger information system. In future it is planned to host the passenger information system on one centralized server. The system should be capable of processing and storing data of both tracks and potentially also further tracks. This requires access from the train control centers of the different tracks and from central administrative offices of the company to the system. Therefore it is planned to migrate the system to a web-based solution allowing for access from various sites and offices.

Apache Tomcat will be used as web server and servlet container to host the developed web application. The web interface will be realized with the Google Web Toolkit (GWT). It is an open source development toolkit to build complex browser-based applications. Using GWT, asynchronous remote procedure calls to server methods can be executed and return value objects are serialized and transmitted over the network. As a consequence, data can be comfortably transferred on user or client requests. If the server-side state of the application changes, data needs to be pushed to the client to promptly represent the change in the GUI. Especially when the state of a train and current forecasts are displayed, the user interface needs to be refreshed on changes to be up to date. Therefore appropriate server push technologies are described in detail and are applied to overcome the limitations of the common http request-reply communication pattern.

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