



Master's Thesis:

Automation of generic functional testing on train for different projects

Background

In trains, the Train Control and Management System (TCMS) consists, among other, of an onboard communication network that has various hardware such as controller boards, I/O units and HMIs. TCMS handles the communications inside the train, using built-in intelligence and the application framework, via several common/generic functions such as the DOORS control function, the Passenger information function or the Pantograph up/Down function. These functions may be used on different types of trains such as high-speed trains, metros or trams. However, for each type of train, the TCMS has different software interfaces towards these functions. The objective of this thesis is to automatically connect the generic functions with the TCMS, across different (train) projects. By having this automated connection, the generic function would be able to be tested on the TCMS releases, before sending the releases for train testing as it is done today. By testing the functions before the train testing, the regression of the V model is reduced and hence the mitigation of founding defects in a later stage of the cycle. Furthermore, the train development process may be improved by merging the developed automation of the regression test specifications, to the continuous integration chain.

Objective

The main objective of the master's thesis is as following:

1. Conceptually introduce an abstract layer (e.g., middleware layer) that creates an independency between a function and the different TCMS interfaces used by each specific (train) project.
2. Develop the introduced layer and integrate it into the Bombardier Transportation (BT) specific simulation tools.
3. Integrate the extended simulation tool (or scripts) into the continuous integration process.

The project will consist in the following tasks:

1. Get familiar with the BT basic concepts such as control functions and their interfaces, and the simulation tool
2. Introduce the concept of the abstract layer
3. Implement and integrate the layer into Continuous integration
4. Develop a formal integration test specification document
5. Develop a user manual of the created layer

Application

Prerequisites: Master's in software engineering/embedded/computer science. Git/SVN or any source code versioning tool, programming experience. Python, C/C++ and basic concept of IP communication.

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