DELTA software technology

RDW

A Washing Machine for Software

Automated Clean-up of Technical Debts

RDW has been developing and maintaining its core business applications for over 30 years. The applications work reliably, but over time technical debts have accumulated that make maintenance and further development difficult. The daily business as well as the size and criticality of the application do not allow a manual clean-up of the software. The solution for the problem: a washing machine that performs an automated cleaning of the software from its technical debts.

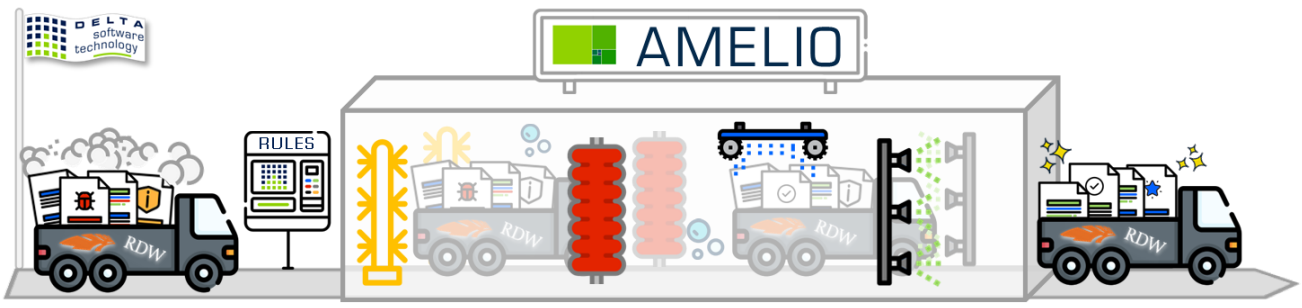
The applications are running, but...

RDW ICT is the IT service provider of the Netherlands Vehicle Authority. The main tasks include the licensing of vehicles and vehicle parts, the registration of vehicles, the issuing of driving licences, information services for the police - in total more than 300 million transactions per year and insurance companies.

The applications required for the tasks have been developed by RDW since the 1980s. Over the decades, the applications have been maintained and continuously developed, adapted to new requirements, new technologies introduced, platforms replaced and much more. To this day, they run stably and work reliably, but: the changes and adjustments made over the decades, as well as generations of developers, have left their mark. Technical debts have accumulated that

- hinder an efficient maintenance,
- make it difficult to interact with components in "modern" languages and with new technologies,
- do not allow an agile development and
- make an integration into newer development processes difficult.

In short: they endanger the future viability of the application and thus the business processes. However, the size, complexity and criticality of the application do not allow a rewrite according to current paradigms and with modern languages; the effort and risk would be too high.



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Automated clean-up

Instead of doing everything from scratch, RDW and Delta Software Technology developed a concept for cleaning the productive applications in manageable steps in such a way that the regular maintenance, further development and the ongoing operations, were not affected. As with many (modernisation) projects, not all requirements were known at the start. Instead of performing lengthy analyses in advance, it was decided to start the project and gradually incorporate new findings.

A washing machine for software

In an iterative process, a factory was built that performs an automated cleaning of the sources from technical debts, for this reason it is also called washing machine. The washing machine works rule-based and according to a strict clean room concept, i.e. with strict processes that cannot be interfered with from the outside. This means that it can be extended at any time to include new rules for analysis and transformation. In addition, the changes implemented by the washing machine are always reproducible.

Clean software step-by-step

As a first step, a version of the washing machine was generated that can process the RDW sources and implement a set of cleaning rules. A meta-level test was used to check the correctness of the rules on the basis of a sub-application. While the tests for the first set of rules were still running, the next clean-up measures were defined and implemented in another set of rules and checked again according to the meta-level test concept.

Each individual rule set forms a washing programme for the washing machine. As soon as a new washing programme was available, the application developers at RDW could decide whether they wanted to have their sub-application already cleaned with one or more of the existing washing programmes or wait for further washing programmes that were in the making. Due to the reproducibility of the clean-ups, sub-applications that have passed first washing cycles at an early stage, could pass further relevant washing cycles at a later stage.

The meta-level test

The criticality of the application required a very in-depth review of the clean-up. However, the size of the application and the number of the performed changes prevented an individual testing of each performed change. For this reason, RDW decided to perform tests according to the concept of meta-level testing. Meta-level testing takes advantage of the fact that the washing machine works rule-based and that the performed clean-ups can be reproduced over and over again. The assumption is that if the washing machine applies a rule correctly once, it will do so again and again. For this reason, it is not necessary to test every change made, but only all implemented rules. In addition to the cleaned programs, the washing machine also provided RDW with an overview of which rules exist and

in which programs they were applied. This made it easy for RDW to detect suitable test sets.

Going productive in packets

Instead of cleaning up the entire applications in one big bang, partial packets were formed. These were processed by the washing machine according to the regular maintenance cycles.

While the individual washing programmes were implemented in the factory at Delta, the maintenance and development continued undisturbed at RDW. After a successful meta-level test for the respective washing programme, RDW delivered the current source status of the desired partial packets to Delta. These sources were then cleaned from their technical debts by the washing machine and returned to RDW. This only required a very short freeze of the sources for a few hours or a weekend. The cleaned-up sources could be integrated at RDW and put into production. Further tests were not necessary thanks to the meta-level test. For the same reason, there were no additional costs for RDW when sources were cleaned up several times by the washing machine.

The washing machine has processed 16,470 artefacts (Delta ADS programs, COBOL programs and copybooks, as well as Delta ADS macros) of the application.

To date, 4,236 artefacts have been cleaned up, resulting in a total of 53,740 changes. The clean-up measures envisaged at the beginning of the project have now all been implemented. However, further possibilities have emerged in the meantime. For example, it is currently being examined how the principle of the washing machine can also be used for refactoring the applications or cleaning up data models, including the necessary changes in the sources.

Fit for the future

It is in the nature of things that technical debt accumulates in applications which are developed and maintained over many years. RDW decided to have these technical debts removed in an automated way. As not all requirements were known at first, a tailor-made washing machine was set up in an iterative process. The application was cleaned up packet by packet, whereby it was possible to decide which cleaning measures were to be performed during each washing cycle. The clean-up was performed in such a way that the changed sources could be implemented into the regular maintenance cycles and no additional work was caused by the changes. This is a step towards future-proofing the application; further measures are planned and should ensure that RDW can continue the Vehicle Registration tasks reliably 24/7.

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About RDW

RDW

RDW ICT is the IT service provider of the national vehicle authority of The Netherlands. Their main tasks include the inspection and registration of vehicles, market authorisation of vehicles, administration of driving licenses, information services for the police – in total more than 300 million transactions annually.

RDW repeatedly has been awarded as the best and most innovative government organization, for best management and best annual results.

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Further information about the event can be found here:
https://delta-software.com/link.php?de=7305

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Delta Software Technology

Delta Software Technology is a specialist for generative development tools that automate the modernisation, integration, development and maintenance of individual IT applications. Our solutions help you to quickly and safely adapt your applications to new business requirements, architectures, technologies and technical infrastructures.

Delta has a more than 40-year track record of successfully delivering advanced software technology to Europe's leading organisations, including AMB Generali, ArcelorMittal, Deutsche Telekom, Hüttenwerke Krupp Mannesmann, Gothaer Versicherungen, La Poste, RDW, Suva and UBS.

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