

Success Story

**RDW**

# Modernisation: Securing the Value of Existing Applications

*“Cherish your investment and  
dare to row against the Stream.  
It will make and keep you successful.”*

GERARD DOLL, DIRECTOR ICT,  
RDW, THE NETHERLANDS

# EXECUTIVE SUMMARY OF THE SOLUTION

## CUSTOMER

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.

## TASK

Modernisation of the mainframe applications in order to reduce platform costs, gain platform independence and modernise the application architecture to prepare future development

- Preparing about 6,000 programs with 11,000 software components for the transition from Unisys OS 2200 with the DBMS RSA RDMS to Microsoft Windows with SQL Server and to this end replacing all platform dependencies with neutral solutions.
- Architecture transformation to provide data services.

## SOLUTIONS FROM DELTA SOFTWARE TECHNOLOGY

RDW decided against outsourcing and re-development. RDW decided for a solution with full automation using tools from Delta Software Technology.

- AMELIO® Modernization Platform™
- SCORE® Data Architecture Integration™  
for Unisys RSA RDMS and Microsoft SQL Server
- SCORE® Adaptive Bridges™
- SCOUT2™ Development Platform
- p<sup>2</sup>Flow

## ESSENTIAL RESULTS FOR RDW

- 1.3 million changes:  
100% fully automatically implemented in 14 million LoCs of COBOL.
- Defect injection rate of only 0.0004%
- Significant reduction of testing efforts
- High flexibility for platform change
- Provision of 3,200 platform-neutral data services

## **RDW ICT – THE ENTERPRISE**

RDW ICT is the IT service provider of the national vehicle authority of The Netherlands, privatised since 1996. Their main tasks include the inspection and registration of vehicles, market authorisation of vehicles, administration of driving licenses, information services for the police summing up to more than 300 million transactions annually.

Furthermore, the external partners of RDW like insurances, garages etc., are directly connected to RDW's central system. Because of these requirements system stability and reliability have top priority for RDW ICT.

The motto is: *"Cherish your investment and dare to row against the stream. It will make and keep you successful."* (G. Doll, Director RDW ICT). RDW repeatedly has been awarded as the best public organization, for best management and best annual results.

## **THE GOAL – PLATFORM INDEPENDENCY TO PREPARE THE PLATFORM CHANGE AND MODERNISATION**

RDW uses 2 UNISYS 2200 mainframes and (in total) 700 Intel servers. Because of uncertainties regarding the continuity of the Unisys OS 2200 computers and later for financial reasons, RDW decided to migrate the mission-critical applications from UNISYS to a Microsoft Windows-based platform.

Almost 6,000 programs with more than 11,000 software components and about 14 million lines of COBOL code were affected. RDW decided against a new development of the applications because of the value of the applications, their stability and the expected enormous costs. In the preparation phase of the migration project, 20 migration obstacles (so called Points of Interest – PoI) were identified hindering RDW ICT to achieve the desired independence from the proprietary OS 2200 platform. For some of the difficult to remove PoIs, very extensive program changes were expected.

These PoIs were characterized by the UNISYS 9-bit architecture, the used database RSA RDMS with its specific SQL dialect, UNISYS specific screen format and transaction system and other operating system specific particularities.

The magnitude of the necessary mass changes made to programs and other modules that would be nearly similar to a new development, and the associated risks (quality and amount of the necessary changes, long blocking times, big bang platform change) brought RDW to look for alternatives to manual changes.

## **PROCEEDING**

Delta Software proposed a fully automated mass change of RDW's applications based on the AMELIO Modernization Platform. AMELIO includes sophisticated tools which can be precisely configured to the project requirements and completed by case-specific transformation rules.

In addition to removing the identified PoIs without manual changes to RDW's program components, the AMELIO transformation solution provided the opportunity to modernise the existing application architecture as a further valuable benefit:

- Extracting the data accesses from the applications and encapsulating them in a persistency layer, allowing the most flexible distribution policies,
- Replacing the classical block mode screens by browser-based front-ends.

The abilities of the AMELIO's transformation factory were proven in a pilot project. For exemplary programs, SCORE Data Architecture Integration was used to provide data services instead of the data accesses formerly embedded in the programs. These data accesses allowed verifying the distributed architecture: the transformed and now platform-independent application continued to run on UNISYS 2200, data accesses via SCORE service components were executed on Microsoft Windows to an Oracle database.

Following the successful pilot project, Delta Software was entrusted to provide a specialized AMELIO transformation factory to meet RDW's requirements.

To reduce the risk associated with manual changes as far as possible, an **automation degree of at least 98%** was stipulated in the project's requirement specification.

*"AMELIO's technology and the close co-operation with Delta guaranteed a transformation quality that meets our high quality and security standards."*

**Gerard Doll,  
Director ICT,  
RDW, The Netherlands**

# THE AMELIO TRANSFORMATION FACTORY AND ITS OPERATION

## PROCESS STEPS OF THE TRANSFORMATION WITH AMELIO

The functionality of the transformation factory consists of 3 parts:

(1) **Discovery**

Import of all software components and storage as abstracted representation in the AMELIO Knowledge Base. Identifying all relevant parts for the changes.

(2) **Analysis**

Detailed analysis and connecting of the results of (1). Deriving conclusions, impacts and dependencies of possible changes. Code that is not affected by the transformation is ignored (e.g. business logic).

A model-based description of the applications and the necessary changes is the result of the first two steps.

(3) **Transformation** and production of the required mass changes using a dedicated rule base.

If advisable, the Delta generator technique is used for production. This tried-and-trusted technology has a proven track-record for more than 30 years.

*"A decisive factor in selecting AMELIO was its new meta-level test concept: It allows us to save 90% and more of the test effort and costs. The flexible In-place Migration ensures minimal blocking times as we can combine in production already transformed and not yet transformed components without any problem."*

**Auke van der Meulen,**  
Programme Manager Platform Independency ,  
RDW, The Netherlands

## CONFIGURATION OF THE AMELIO TRANSFORMATION FACTORY

AMELIO Modernization Platform provides a comprehensive collection of sophisticated tools for migrations and modernisations – configured for the respective project tasks. This technology foundation is supplemented by task-related, individually implemented rules for the project-specific tasks during analysis and transformation.

The transformation rules and standards were defined together with RDW ICT and were then implemented using the AMELIO Modernization Platform. There was a broad range of fabrication rules: There were small, simple rules that only had to replace a name's prefix. But there were also very complex transformation rules that had to gather information about data accesses at different program locations and as a result had to replace several hundred lines of code.

## PROJECT PHASE "FIRST RUNNING"

The first version of the transformation factory was used to perform the so-called "first running". Without affecting the ongoing productive operations and without depending on simultaneously executed maintenance projects, adjustments and optimizations of the transformation factory were implemented using a copy of the entire application portfolio. Analysis and transformation rules were tightened and corrected if needed.

Desired optimisations or necessary modifications of the implemented code transformations were applied to the rule base of the factory, not to the transformation results. Only in this way consistency and error-free transformations could be guaranteed. Every manual change or rectification applied later on would have resulted in unacceptable risks and increased test expenditures.

As the provision of the factory was independent of on-going other projects, the start for the productive factory's usage was solely governed by achieving the quality goals. Test runs of the factory and subsequent fine adjustments were repeated until the transformation quality provided by the factory fulfilled all requirements.



## **PRODUCTIVE OPERATION OF THE AMELIO TRANSFORMATION FACTORY**

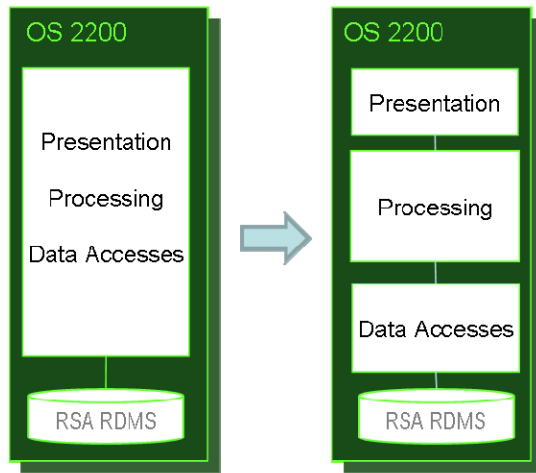
After this preparatory work, RDW's applications were transformed cluster-wise with the AMELIO factory. The clusters were determined by their availability. The programs of the clusters were blocked during the transformation and the following tests until their release into production. Due to the very fast AMELIO processing and the short testing time, only very short blocking times were necessary. After the transformed programs were released, further maintenance was implemented on the transformed "new" applications.

If necessary fabrication corrections were detected, the amendments were applied to AMELIO's rule base. These corrections never were implemented into the transformation results. Precluding any manual rectification ensured that all subsequent additions and corrections became effective consistently and universally.

The factory was operated by only one "operator". The factory performance was scaled by the number of used factory PC's, not by engaging further employees. Two additional persons to the "operator" were working on building transformation clusters, transferring the transformation results into RDW's development street and subsequent provision for the test.

## SMOOTH MULTI-STEP MIGRATION

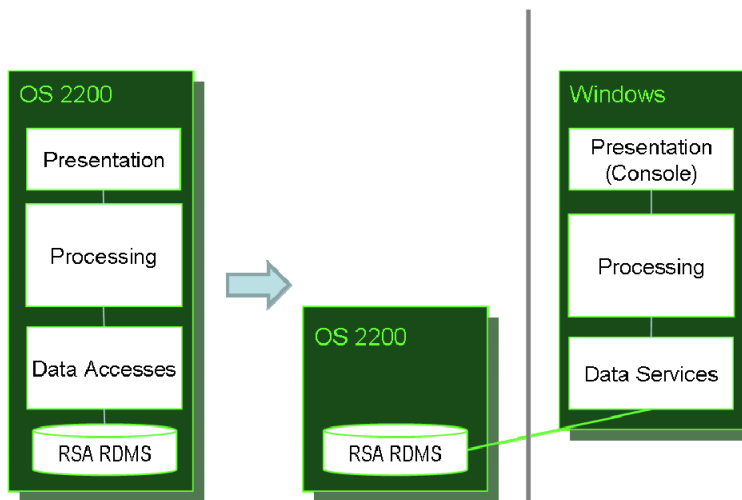
The used Delta tools made it possible to perform an "in-place" migration for the applications in the first step:



**Step 1: In-place migration**

In the first step, the programs that got platform-independent and PoI-cleaned by the transformation were executed with the new data service architecture in the existing OS 2200 environment, i.e. with accesses to the RSA RDMS database and with classic OS 2200 screens.

Thus, the transformed and not transformed programs were executed together in production on OS 2200. To ensure that this mix of transformed and not transformed programs (and therefore transformed and not transformed interfaces as well) could work, the AMELIO transformation factory created interface facades mapping "new world" and "old world".

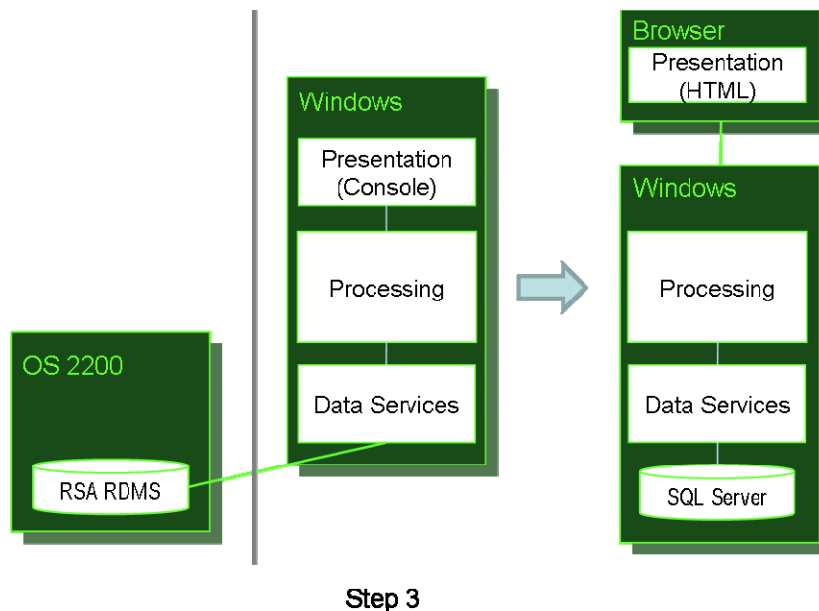


**Step 2**

In the second migration step the application clients were migrated to Microsoft Windows and Fujitsu NetCOBOL for .NET, the database was not yet migrated, thus data remains on the UNISYS.

The data services built with Delta's SCORE Data Architecture Integration still access the RDMS data. The connection between application clients and data services using RDW's own middleware is also guaranteed by SCORE.

Windows frontends replace the block mode screens on UNISYS as part of the migration to Microsoft Windows.



In the third step, as soon as all application clients are migrated to Microsoft Windows, the data will be migrated from UNISYS RDMS to Microsoft Windows SQL Server. A re-generation of the service components with SCORE Data Architecture Integration for the SQL Server platform will provide the appropriate SQL Server specific data servers.

*"SCORE Data Architecture Integration enabled us to free our application portfolio from its database dependence. Its comprehensive support of distributed applications and automated production of data services for the different mainframe (UNISYS RSA RDMS) and open systems (Microsoft SQL Server) allowed a smooth migration without risk."*

**Geert Pater,**  
**ICT Manager Architecture & Innovation,**  
**RDW, The Netherlands**

# RESULTS OF THE TRANSFORMATION PROJECT

In the process of the project, the AMELIO transformation factory edited more than 11,000 modules (programs, macros, copybooks, screens etc.) with more than 14 million lines of code.

All Points of Interest (PoI) were solved:

- All changes of the data declarations for bit and binary fields and structures, that were necessary because of the 9 bit architecture of Unisys OS 2200, were implemented.
- Data accesses to UNISYS RSA RDMS were replaced by calls of data services that allow RSA RDMS accesses and that are also used for the accesses to Microsoft SQL Server on Windows.
- UNISYS-specific screen handling was replaced by a platform neutral solution. Now it is possible to equally serve block mode screens on Unisys OS 2200 and Windows frontends.
- All UNISYS-specific language constructs were replaced by platform-neutral constructs.

Altogether, 1.3 million changes were implemented, each one of them affecting a single or multiple lines of code.

3,200 service components and 1,700 platform-neutral screen descriptions were newly created.

If all project efforts are summarized (building and operating the factory, testing, project management, etc.), the result is an effort of less than 1 minute per change – a result that is not achievable using manual changing procedures.

The stipulated objective - a degree of automation of 98% - was considerably surpassed: 98.66 % of all software components were 100% automatically transformed, i.e. the technical PoIs were replaced by platform-independent code without any manual interventions or rectification. All database accesses were consistently replaced by the use of data services.

By avoiding the "human factors", the susceptibility to errors and the dispersion of quality that generally are consequences of manual changes, could be drastically reduced: only 0.004% of the 1.3 million changes implemented by AMELIO transformation factory caused errors after being released into production. The resulting defect injection rate of 0.0004% was even lower.

*"AMELIO Modernization Platform is the reliable solution for the systematic modernisation of our complex applications – 100% automated, tailor-made and generative. Using AMELIO we were able to accomplish this demanding large project faster and with less resource."*

**Carine Jousse,  
ICT Manager Projects,  
RDW, The Netherlands**

# AMELIO MODERNIZATION PLATFORM

AMELIO Modernization Platform from Delta Software Technology is a safe, easy to manage and economic tool that implements the modernisation and transformation of applications 100% automatically.

AMELIO Modernization Platform

- analyses and changes the applications using a fully automated, rule-based process that is exactly tailored to the particular requirements,
- slashes testing efforts,
- implements changes without blocking other projects or the ongoing maintenance,
- guarantees the stability and integrity of the applications at any time,
- documents all changes according to audit rules,
- leaves free choice between stepwise implementation and "big bang".

## APPLICATION AREAS FOR AMELIO MODERNIZATION PLATFORM:

- **Mass changes:**  
Changing data formats, customer, account or insurance numbers, euro, swift, UTF-16 (Unicode) for EU harmonisation, ...
- **Application modernisation:** platform change, framework adaptation / replacement, ...
- **Architecture transformation:** service enablement, modularisation, platform neutralisation
- **Language transformations** (4GL, Delphi, C++ etc)
- **Quality assurance**

Users confirm: This is the way for large transformation projects to be completed in less time, with utmost reliability, with less resources and with the highest quality – by full automation.

**[WWW.D-S-T-G.COM/AMELIO](http://WWW.D-S-T-G.COM/AMELIO)**

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