

## Case Study – Business Rules Extraction - COBOL

### Business Scenario:

The Department of Health Care Services' (DHCS) of every State finances and administers a number of individual health care service delivery programs, including Medicaid, Children's Services program, Child Health and Disability Prevention program and Genetically Handicapped Persons Program.

These programs are run by very old legacy systems that are undocumented and hence no longer maintainable. Unfortunately, they need to remain current not only to deal with changing legislative requirements but also changing accessibility requirements. Hence it is imperative that these programs be modernized so that they can be maintained and scaled with changing requirements.

As a first step, the Federal Govt. has mandated that the State must extract and validate the embedded rules in these legacy systems against the policy manual of each program. The goal would be to transform these rules into modern code or exported into a business rules engine or a process management tool.

### Challenge:

Every State's Medicaid system contains several modules that support the filing, authorizations, adjudications and processing of Medicaid claims from all the residents and agencies within that State.

The first phase of modernizing this system was the extraction of embedded business rules. The State began this process by selecting the patient billing module of the system for BRE.

This module deals with patient validation, claims, billing calculations and adjudications. The billing module, comprising of multiple sub-modules, receives data files for processing from various counties, agencies and departments within the State. These files are processed nightly as batch processes by the billing module and its sub-modules, producing claim files that are passed as input to other modules within the Medicaid system.

This module was considered mission critical because it contained rules that validated claims data and performed adjudication of claims submitted by Medicaid beneficiaries. Unless these rules were extracted with a high degree of accuracy, the target system could not be developed to ensure proper payment to claimants.

## **Business Objective:**

The State had awarded the project to modernize and maintain its legacy Medicaid system to a large domestic outsourcing company. A fundamental requirement of the contract was the delivery of the business rules embedded in the existing system.

This would allow the State to compare the extracted rules with the most current policy manual, thereby allowing only relevant rules to be used in the proposed modernized system.

The modernization project was in its second year and the State was finding that there seemed to be many missing rules in the system modules which were deemed “complete” by the outsourcing company from a rules extraction standpoint. Without proper documentation of the current system it was impossible for the State to:

- (a) determine if the current system was meeting the State’s legislative laws and
- (b) validate any target system that the outsourcing company would produce.

Further, with subject matter experts of the current system retiring, the situation was becoming dire as in a few years it would become impossible for the State to ensure that they were getting a valid system to run their Medicaid program.

The State needed a solution that:

- (a) was highly automated
- (b) could accurately extract the system’s business logic
- (c) had features to derive business rules from business logic and
- (d) had the ability to export the derived rules in the desired format.



## Solution:

In keeping with the parameters required for the solution to be a success, the State selected a solution built around EvolveWare's Legacy Modernizer tool because this product:

- (a) automated the extraction of source meta-data
- (b) had features to facilitate derivation of business rules and
- (c) was flexible enough to accommodate the delivery of extracted rules in a format that met the State's requirements.

The solution included the services of subject matter experts (SMEs) that could review the extracted business logic; and with the aid of the tool's features deactivate unwanted rules, merge and split business logic to derive rules relevant to the policy manual and rename variables and rule names to reflect each rule's functionality.

Additionally, to describe each rule in plain English, each rule could be annotated in the tool, thereby providing an abstract explanation for the benefit of business analysts. Finally, the derived rules could be exported in Word or Excel format to facilitate validation with the State's policy manual.

The screenshot displays the Intellisys Legacy Modernizer tool interface. At the top, the Intellisys logo is visible on the left, and the user name 'Hello Mike' is on the right. Below the header, there are search and navigation controls, including a search bar with 'MSV\_04' entered and a 'Go' button. A table lists various program logic items, with one item selected for detailed view. The main area shows the 'Business Logic' for '1000-DISPLAY-CUSTOMER-DATA' in 'Vidp2x'. It includes a legend for color-coding (Dark Green for Process Name, Blue for Variable Name, Brown for Constant/Entity Name) and a list of logic rules with 'Merge' and 'Replace' buttons. A sidebar on the left contains navigation options like 'Annotate', 'Variable Dictionary', and 'Trace Code Flow'. The footer shows the copyright notice '© 2016 EvolveWare Inc. All rights reserved.' and the EvolveWare logo.

The combination of Legacy Modernizer and SMEs became a compelling solution in processing almost 860,000 lines of code to meet the State's requirements in terms of automation, accuracy and delivery of extracted rules; and all this in 6 months at a fixed cost.

From a time perspective, the solution was implemented in a time frame that allowed the State to not only retrieve business rules and create a working catalog for validating their deliverables from the prime contractor, but also a seamless way to document and manage their entire legacy system in a single product exposed as a single repository.

## Project Deliverables & Time Lines:

The project included the following deliverables:

- Documentation – Code Logistics, dead code, system level diagrams, program logic and business logic
- Business Rules derived from extracted business logic
- Single platform and central repository that kept the extracted documentation and rules updated with code changes and accessible to authorized users at anytime

The source code was received for processing and the complete set of business rules assembled in catalogs/sub-catalogs were delivered 6 months later. During the period of 6 months, an average of 8 personnel, including 2 SMEs, extracted and derived business rules from almost 860,000 lines of legacy code using EvolveWare's Legacy Modernizer. The following statistics provide the calendar time spent on each of the major project tasks performed in the course of the BRE project.

1. Extraction of embedded information - 4 weeks
2. Derivation of business rules, applying keywords/constant dictionary and adding annotations for business analysts – 18 weeks
3. Classifying rules into catalogs / sub-catalogs - 2 weeks
4. Exporting rules in RTF (Word) format – 2 weeks

## Business Benefit:

The State succeeded in identifying a solution that extracted business rules from their Medicaid system with a very high level of accuracy. The project was completed on time



and within budget. The success with the patients claims processing module was compelling enough for the State to move forward with extracting business rules from the remaining modules of the Medicaid system.

From a value-add standpoint, the solution, once completely implemented, not only provides the State with documentation and an understanding of their current system but also gives them a platform to keep the documentation updated on an on-going basis. This is a major step forward for the State, considering the large amounts of money being allocated for maintenance of their systems.

While the benefits will take some time to be quantified, the hurdle to modernization of the Medicaid system has been removed as the State can now match the extracted rules to their policy manual and determine which rules will feature in the target system, otherwise the target system would have had to be written from scratch based solely on the policy manual, and this effort would have been very risky and time-consuming considering the size and complexity of such a system.

## Customer Comments:

“Using EvolveWare’s Legacy Modernizer solution helped us in achieving our target of extracting business rules from the patient claims processing module of the State’s Medicaid system. The tool’s automated extraction abilities and feature set allowed subject matter experts to identify the embedded rules with a very high level of accuracy. The project met a very aggressive schedule and was completed in time on a fixed budget”

*BRE Project Manager*

## Environments:

### Source System:

- IBM 3090 MVS
- VSAM Flat Files / DB2
- COBOL, JCL/Procs



EvolveWare, Inc. has been awarded 5 U.S. Patents and 1 Australian Patent for the technology that is incorporated into Legacy Modernizer and its successor, Intellisys™. The U.S. Patent numbers are 7,769,704, 7,774,290, 7,917,457, 8,051,410 and 8,412,653 respectively. The Australian Patent number is 2007348312.

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