

Using DHIS2 as a Business Intelligence Platform for a Health Insurance Provider

Michael Wario, National Hospital Insurance Fund, Kenya

Uwe Wahser, Deutsche Gesellschaft für Technische Zusammenarbeit (GIZ), Germany

Karingo Njoka, National Hospital Insurance Fund, Kenya

The National Hospital Insurance Fund (NHIF)

The NHIF is a State corporation that was established in 1966 with a core mandate to provide medical insurance cover to all its members and their declared dependants (spouse and children). The NHIF membership is at present 15 million members (principal and dependents) in 3.6 million principle members from the formal sector and 1.9 million principle members from the informal sector.

NHIF has 125 service points, with 46 of them being autonomous branches. NHIF has a vast provider network working with over 2000 hospitals in Kenya. The NHIF is composed of about 1700 employees.

In the past months, the NHIF has fundamentally re-oriented her organizational structures while at the same time extending the offered services from pure inpatient coverage to include outpatient coverage. These efforts are supported by the German Development Co-operation in terms of financial co-operation by Kreditanstalt für Wiederaufbau (KfW) and technical co-operation by Deutsche Gesellschaft für Technische Zusammenarbeit (GIZ).

Reporting Needs of the NHIF

As any organization, the NHIF has various reporting needs from the operational levels up to senior management. Current areas of reporting include:

- membership registration and management
- claims processing and analysis
- financial reporting (income and expenditure)
- revenue collection and debt management
- budget and utilization of funds
- balanced score cards

Due to the recent organizational changes it can be expected that the reporting needs are subject of frequent changes.

Existing IT Infrastructure

Currently the NHIF uses an internally developed and maintained Enterprise Resource Planning (ERP) System for the majority of the business processes in the branches and at the headquarters. The ERP contains thus most of the enterprise data. The existing reporting infrastructure feeds directly from the ERP. New reporting needs have to be implemented by IT developers. Several issues are compromising the performance, usability and quality of the existing reports, making it difficult for

the NHIF to produce timely and consistent reports for managerial processes and external communications.

Envisioned Business Intelligence Architecture

The NHIF is looking for a typical BI-Stack with a data-warehouse and a presentation layer. The data-warehouse is to be implemented and run by the NHIF-ICT department, optionally with external support.

The data-warehouse architecture should ideally be a layered Enterprise Data Warehouse (EDW), comprising a persistent staging area, an operational data-store and a data-mart layer. The data-stores in each layer should be populated in nightly loads with the changes from the previous day, thus providing up-to date reports before the next working day.

Implementation of a DHIS2 Prototype

DHIS2 was picked as a tool for a prototype solution until a strategic decision for a more comprehensive solution is taken, as most of the needed tools are already build in. This enables an early hands-on experience of NHIF staff with self-service BI-tools thus allowing the end users to enter into the strategic discussion with a more profound background. At the same time, low hanging fruits for addressing pressing reporting needs can already be addressed shortly after an extensive business analysis.

So far a software stack has been implemented exclusively from the Open Source market. The most recent DHIS2 release is installed on a standard Ubuntu Server. The nightly ETL processes were modelled with the Pentaho Data Integration Tool (aka Kettle). The decision for the tools was supported by the fact that they were already in use by the Kenyan Ministry of Health. Therefor a number of developers can be found on the local market, who could further support the NHIF later on.

Business analysis was done in the area of membership registration and claims processing. The resulting key figures were implemented as data elements into DHIS2 data sets, allowing disaggregation along various attributes like age, gender, sector or insurance scheme in to addition to the inbuilt dimensions time and organisation hierarchy. The data are being updated every night from the ERP.

Lessons Learned and Outlook

Setting up simple data cubes using DHIS2 data sets already solves a substantial number of reporting problems. We estimate that we are able to cover clearly more than half of the expressed reporting needs in the analysed areas.

But limits of the chosen architecture become quickly obvious on several levels of the DHIS2 BI-stack. The most obvious is the lack of configurable ETL mechanisms for propagating data within DHIS2, demanding for a third party ETL solution. Another issue is the inconsistent support of dimensional data throughout the presentation layer, e.g. preventing filtering of data according to age-group.

However, given the very dynamic developer community around the core team at the University of Oslo, there is reasonable hope that quite a number of these obstacles can be overcome in the near future. The decision to substitute the prototypical DHIS2 solution will have to balance the benefits of a more sophisticated BI-stack with the involved costs in terms of software licenses and required expertise.