

openMIS Shelf Readiness

Two-Sentence Overview

The goal of this project is to improve the open-source Insurance Management Information System (openMIS¹) interoperability layer for easy and efficient integration with other health-related systems within OpenHIE architecture, and to allow an efficient installation procedure through enhanced packaging and documentation, and, thus to align the solution with the Instant OpenHIE project and initiative. Being a project that requires total rearchitecting and redevelopment using new open source technologies and frameworks, the team composed by Swiss Tropical and Public Health Institute (Swiss TPH), the designer and developer of the legacy openMIS version, implemented in five countries, Bluesquare, the designer and developer of the new modular openMIS version, and SolDevelo, the developer of the FHIR module with experience in integrating health systems, will join their expertise to respond to both Instant OpenHIE project requirements and openMIS Initiative's expectations.

Executive Summary

This project aims to improve implementers, administrators and developers' experience working with openMIS. Digital Square's investment will allow us to undertake the following activities:

- The **openMIS FHIR module**, currently based on FHIR STU3 version, will be enhanced by integrating FHIR R4 version, allowing openMIS to support new workflows and integrations, by adding missing FHIR resources allowing external systems to synchronise metadata satisfying dependencies, by improving authentication and authorisation mechanisms, by proposing extensions based on OpenHIE interoperability workflows, and, finally, by improving FHIR module's documentation and quality.
- The **packaging and installation** mechanisms will be enhanced based on Instant OpenHIE project's requirements to allow a smooth installation procedure of both legacy and modular openMIS versions.
- **Quality assurance** will be substantially improved allowing for integration and system testing mechanisms.
- The technical **documentation** will be revised and redeveloped, allowing implementers and developers to install and customize openMIS based on their implementation needs.

Consortium Team

Swiss TPH (prime organisation)

Swiss TPH is a leading institute in global health with a particular focus on low and middle-income countries with a staff strength of over 850 from 80 different nations, currently active in 300 projects across 100 countries. Swiss TPH will be responsible for technical project management, the expertise on health financing, openMIS, drafting of business and technical specifications, supporting the system and architecture design.

Swiss TPH's relevant experience includes involvement in the design and implementation of the Insurance Management Information System (which is the genesis of the openMIS Initiative) since its inception in Tanzania. Swiss TPH is currently implementing two projects at scale for the deployment of insurance schemes through openMIS, in Tanzania and Cameroon, and two openMIS pilots in Chad and Democratic Republic of Congo. Additionally, Swiss TPH is actively involved in the development of openMIS as part of the Implementers and Developers Committees of the openMIS Initiative.

SolDevelo

SolDevelo is a dynamic Polish IT company (+80 staff) focused on delivering high-quality software and innovative solutions. SolDevelo is currently involved in several openMIS projects, including the

¹ <https://openimis.org/>

'maintenance and support project', HL7 FHIR module development, openIMIS integration with OpenMRS and enhancing the security of the legacy system. SolDevelo has been involved in many opportunities that required skill sets relevant to this particular project, for example OpenMRS (core contributors), HL7 FHIR (OpenMRS Sync 2.0 module), nationwide micro-service based implementations (OpenLMIS), nationwide OpenHIE architecture based implementations (National Health Infrastructure project with such components like OpenELIS, DHIS2, OpenMRS and many other HIE compatible applications, health standards-based workflows for the Client Registry, Facility Registry, Health Management Information System, Shared Health Record, and Interoperability Layer).

Bluesquare

Bluesquare specializes in data systems and technologies in the health sector. They have gathered a unique blend of expertise in the fields of information technology, software development, data science and modelling, and public health with a team 40-strong working from their headquarters in Belgium. They work in over 30 countries developing tools and data systems for program M&E, health financing and logistics. Their central focus is to support health program teams to develop and adopt innovative solutions that support improved performance of the health systems they serve.

Bluesquare has supported the openIMIS community since late 2018 as the partner managing the "Modular Transformation of Source Code". They bring to this project their rich experience in digital health financing tools in support of Result Based Financing (RBF) - they manage the data systems for several of the largest RBF programs in sub-saharan Africa - including the DRC and Nigeria and a senior team of software developers.

Project Description

Background and problem statement

Developed from 2012, openIMIS was built by Swiss TPH as a monolithic system using Microsoft technologies (the legacy openIMIS version). Overtime, additional features were added, making it difficult to maintain and customize. Since 2018, the solution has been redesigned and redeveloped by Bluesquare using open source technologies (Python/Django and Javascript/ReactJS) to compose a modular architecture of the solution (the modular openIMIS version). Because the migration from the legacy to the modular version is a long process, openIMIS Initiative, the group behind openIMIS, has decided to migrate the solution module-by-module, requiring to install and use both versions simultaneously, making the installation cumbersome.

Nevertheless, the new modular architecture has permitted SolDevelo to develop the FHIR module, allowing the integration of three open source health systems (OpenMRS, Bahmni and DHIS2), a first step for shelf readiness and integration into the OpenHIE architecture. The development of the FHIR module focused on the claim submission process that limits the coverage of other health financing related workflows such as enrolment.

Further, openIMIS offers a good User Documentation Manual but is limited in technical documentation. Unit tests are part of the modular openIMIS developments and this, as part of quality assurance, is highly recommended to be enhanced with integration and systems testing.

Objectives

The technical activities will be grouped into four work packages (WP).

WP1. openIMIS FHIR Module

In this WP, we will further improve the FHIR module through the following activities:

- Integration of the FHIR R4 version with additional resources required by openIMIS (e.g. InsurancePlan). This integration has already been started as a university bachelor thesis and this activity will allow us to finalize and validate it as complete and fully functional.
- Identification and publishing of openIMIS registries (e.g. medical products data, diagnosis data) as FHIR resources for external systems' metadata synchronization, and proposal of FHIR extensions to cover openIMIS structure (e.g. family relations, patient-location link, claim attachments) to allow triggering of openIMIS workflows from external systems (e.g. claim submission, enrolment).

- Improvement of the authentication and authorisation mechanisms (application and user levels) by making the necessary links with openIMIS modules and, thus, reuse business rules and behavior.
- Identification and integration of extensions to openIMIS data structure (e.g. claim state) based on FHIR and OpenHIE interoperability workflows.
- Improvement of FHIR module's quality assurance.
- Improvement of FHIR module's documentation and definition of the FHIR openIMIS profile.

WP2. Packaging and Installation

This WP is divided into two activities.

- First, Docker packages for Legacy and Modular versions will be improved to simplify the containers, to integrate advanced health-check for all containers and to comply with Instant OpenHIE's packaging/deployment strategy and app owner responsibilities.
- Secondly, scripts will be developed to allow the modular openIMIS version to be installed and easily integrated into Windows environments, but also to facilitate the initialization of a ready to start openIMIS development environment.

WP3. Quality Assurance

The Unit Testing of the modular openIMIS version will be extended to Integration and System Testing. Automatic tests of openIMIS backend's role-based authorisation and business rules will be considered under this WP (via API call).

WP4. Documentation

openIMIS technical documentation will be addressed by producing developer, implementer and administrator documentations for the modular openIMIS version.

Deliverables and Schedule

Work Package	Deliverable	Schedule
1. FHIR module	FHIR R4 integration	March 2021
	FHIR new resources and extensions	April 2021
	Authentication and Authorisation	February 2021
	FHIR module documentation	May 2021
2. Packaging and installation	Docker package	February 2021
	Scripts	February 2021
3. Quality Assurance	Integration/System automatic testing	May 2021
4. Documentation	Developer documentation	February 2021
	Implementer documentation	March 2021
	Administrator documentation	June 2021

Risk and Mitigation

The proposed activities will allow openIMIS to be shelf ready, improving implementers and developers' experience. However, it might not be sufficient for the integration of openIMIS into the Instant OpenHIE platform. Additional required activities, identified during the project execution phase, will be documented in the appropriated platforms to be considered in future openIMIS related projects.