Digital Square Notice E0: OpenMRS Quality Assurance for Interoperability

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Two Sentence Overview

OpenMRS aims to advance our shelf-readiness by producing high-quality interoperable software and increasing trust in our system through rigorous, comprehensive, systematic quality assurance. By bringing together experienced community members and collaborating with other global goods communities, this investment will be used to 1) extend OpenMRS automated test portfolio, 2) address QA for OpenMRS interoperability testing, and 3) strengthen the adoption of the improved QA for community-wide utilization and conduct dissemination of a QA model to the broader global goods community.

II.Executive Summary

Founded in 2004, OpenMRS is a high quality, open source, integrated electronic medical records platform (EMR) aimed at resource-constrained settings where structured patient record keeping systems can support improved care delivery and help achieve health equity. As OpenMRS continues its growth in over 5,500 health facilities in 60 countries to date, it increasingly is recognized as a de-facto EMR standard, supported by the OpenMRS community.

At OpenMRS, we contend that a critical factor of shelf-readiness is a user being able to trust the product. This trust is earned through rigorous, comprehensive, and systematic quality assurance testing and protocols; thus, quality assurance is an integral part of building shelf-ready, standalone, and interoperable OpenMRS technical products. With funding from Digital Square Notice C, the OpenMRS Quality Assurance (QA) Team was established to improve community quality assurance processes and tools. As a first step, our QA Team identified an initial set of priority test cases to automate with the OpenHIE testing framework. As a result, OpenMRS is the first global good trialing the adoption of the OpenHIE testing framework into a community QA process and tooling for OpenMRS products.

With additional funding, the OpenMRS QA team can a) expand the set of automated tests for full product release and system interoperability testing, b) participate in the generalizability of the OpenMRS test portfolio for standard EMR/EHR testing in the Instant OpenHIE ecosystem, and c) transition the QA process from emerging to established, community-owned and community-wide standard. Our consortium will achieve these objectives by fostering collaborative work between the OpenMRS QA Team and the larger OpenMRS community, including the FHIR Module Squad and OpenMRS implementers, OpenHIE subcommunities such as the LIS CoP and Client Registry CoP, and Instant OpenHIE representatives. The QA Team's current scope of work and relationships with these stakeholders serves as a foundation for future collaboration. The QA team recently explored an approach for integrating this process and tooling into the FHIR Squad project to support their work on EMR-LIS and EMR-SHR use cases. The OpenMRS QA team is well positioned to serve as an advocate and leader for how other global goods can adapt the model and tooling to their community and products, resulting in Shelf-Readiness improvements to the global goods domain as a whole.

III.Consortium Team

In 2019, UW CIRG and OpenMRS partnered to lead OpenMRS QA Team work as well as the OpenMRS FHIR Squad project. Our consortium team reflects our commitment to supporting the OpenMRS QA Team and FHIR Squad by continuing this partnership.

UW CIRG (University of Washington Clinical Informatics Research Group) is one of the premier global health informatics organizations, specifically working to advance digital health global goods and the communities supporting them. CIRG has contributed substantially to multiple digital health communities, and led numerous large-scale informatics grants and programs around the world in partnership with global health funders and Ministries of Health. CIRG faculty serves on the Board of Directors of OpenMRS, BoD of OpenELIS, and is the co-founder of the OpenHIE LIS CoP.

OpenMRS, Inc. OpenMRS is an open source EMR and community that functions as a consortium, with many organizations working in LMICs supporting the work of individual OpenMRS contributors. As such, the community seeks to engage and motivate both volunteers and supporting organizations to actively contribute to all aspects of the software development and implementation process.

IV.Project Description

i.Background or problem statement

OpenMRS is utilized globally as the de facto EMR for LMIC, implemented in more than 5,500 facilities across 64 countries, serving ~12.5 million patients. Although OpenMRS is a mature software, QA processes have been largely left to developers to manage; resulting in limited and non-systematic testing that didn't involve the acceptance by implementers, which leaves low levels of trust in the safe and effective use of the product. With the establishment of the QA Team from Notice C, there has been a community-wide initiative to move from reactive QA to proactive QA by including both developer and implementer participation in the software release lifecycle, and through the initial steps to adopt the OpenHIE testing framework and tooling. Although well-received by the community, this more robust and systematic QA is in its infancy in establishing a community-wide comprehensive testing portfolio, and implementer product acceptance. The QA team has begun to explore how this process and use of the OpenHIE tooling can be disseminated to the broader global goods community and utilized by the OpenHIE subcommunities to address interoperability test standards with OpenMRS and EMRs in general.

ii.Objectives

Expanding this work will allow us to progress towards our goal of providing a quality, shelf-ready product and result in a significant gain in Shelf-Readiness for the OpenMRS products. By addressing interoperability test cases, OpenMRS will be able to integrate with the Instant OpenHIE project, as well as, leverage its experience with the OpenHIE testing framework and process to serve as an advocate and leader for adapting this model and tooling for other global good communities and products, resulting in Shelf-Readiness improvements to the global goods domain as a whole.

Our consortium proposes two work packages. Work package 2 will expand collaboration to include the FHIR Module Squad and OpenMRS implementers, OpenHIE subcommunities such as the LIS CoP and Client Registry CoP, and Instant OpenHIE representatives.

iii.Deliverables & Schedule

Deliverable	**Timeframe**
Work Package 1: Assuring a quality, shelf-ready and standalone OpenMRS Reference Application**.** **Objective**: Automate priority Reference Application test cases using OpenHIE test framework.	
Reference Application test cases developed in Cucumber Studio-Selenium integration through OpenMRS University sessions and sprints	Month 1-12
Set of shelf-ready OpenMRS automated test cases integrated into the OpenMRS Release Cycle	Month 3-12
Automated testing documented on OpenMRS Wiki	Month 3-12
Webinars and working sessions conducted for training and adoption of OpenHIE automated testing framework by the OpenMRS community and global goods domain	Month 1-12
Work Package 2: Developing shelf-ready interoperability test cases to support priority EMR interoperability workflows. **Objective**: Automate interoperability test cases for the OpenMRS FHIR module and Instant OpenHIE.	
Identified and prioritized interoperability test cases in the OpenMRS QA roadmap with input from OpenMRS community squads, developers, and implementers; OpenHIE CoPs; and from Instant OpenHIE project members	Month 1-3
Automated interoperability test cases developed in Cucumber Studio-Selenium (OpenHIE test framework)	Month 3-9
OpenMRS automated interoperability testing conducted with Instant OpenHIE project	Month 9-12
Documented recommendations for how to generalize OpenMRS interoperability test cases to other EMRs, and use within the Instant OpenHIE project.	Month 9-12

iv.Risk Mitigation

- Low risk of community resistance to full adoption of the OpenHIE testing framework and tooling. This is mitigated by holding community webinars, trainings, and gaining early buy-in.
- Risk of inability to generalize the documented test cases in Cucumber to be used by other EMRs in their testing. Following OpenHIE published architecture standards for interoperability will mitigate some of this risk, but inherently, some OpenMRS test cases will not apply to other EMRs.
- Risk of the resulting test portfolio being unsustainable by the community due to resource constraints. Mitigated by resourcing a funded QA Lead to champion and manage the QA process overall, roadmap for prioritizing test cases, integrating QA into community squad projects to leverage those resources, and by continuously conducting outreach to implementers for active participation and ownership of the business-acceptance side of the testing process.