

Improving the Automated Testing, Interoperability, and Privacy of the Open Smart Register Platform (OpenSRP)

I. Two Sentence Overview

The goal of this project is to improve the automated testing, interoperability, and privacy of the Open Smart Register Platform (OpenSRP) as a point-of-service application in alignment with the OpenHIE architecture. We propose a series of individual work packages that will improve test automation, support mobile Care Services Discovery (mCSD), and mask personally identifiable information.

II. Executive Summary

The Open Smart Register Platform (OpenSRP) was recognized as a global good in 2018 and has progressively improved in maturity through support of consortium members, implementing partners, and donors. OpenSRP is a person-centered digital register and point-of-care software system for frontline workers that offers a suite of customizable features for countries wanting to digitize their legacy paper registers, which complements and integrates with common national-level digital systems (HMIS, EMR, LMIS). A committed collective of technology, research, and implementation partners have evolved the software to a point of maturity characterized by multiple national deployments, high performing technology at scale, and emerging documentation around specific use cases for RMNCAH, TB, HIV, Malaria and Early Childhood Development. OpenSRP is seeking investment to improve the shelf readiness as a feature-rich service used by health workers at the point-of-service so it can be more easily deployed and supported in our current and future deployments. Funding would help OpenSRP overcome identified constraints associated with more broad adoption and interoperability aligned with the OpenHIE architecture.

We propose three work packages which can be independently funded:

Work Package 1: Improving QA by Adding an automated testing framework and improving modular test coverage to 80%.

Work Package 2: Establishing OpenHIE interoperability by improving mobile Care Services Discovery (mCSD) support.

Work Package 3: Add Personally Identifiable Information masking across all OpenSRP APIs.

III. Consortium

Ona is a technical social enterprise focused on global health and data solutions, based in the United States & Nairobi, Kenya. The company has 60 employees. Approximately 40 of whom are software developers, architects, data and machine learning experts. Ona has extensive experience designing, developing and implementing health information systems that are used at national scale and integrate with existing government health information systems and open standards. Ona has developed numerous open source standard tools and libraries in the space that are used by mobile teams to add functionality to their existing technologies. Ona serves as the technical lead for OpenSRP, having co-created the platform with the World Health Organization. For these proposed 3 work-packages, Ona does not foresee the need to work with

external developer teams, but should the need for that arise, we do have a set of core contributors in the OpensRP developer network, that we will approach to collaborate with.

IV. Project Description

The goal of this project is to improve the shelf readiness of OpenSRP by improving the quality assurance and testing, interoperability, and privacy as a point-of-service application in alignment with the OpenHIE architecture. We propose a series of individual work packages that will improve test automation, integration with health worker and facility registries, and mask personally identifiable information. These work packages will allow implementing partners to ensure a higher level of platform resiliency and interoperability in current and future deployments.

Work Package 1: Improving QA by Adding an automated testing framework and improving modular test coverage to 80%. OpenSRP is a modular platform that allows implementing partners to pick and choose features that they wish to deploy in their context. More than a dozen modules are available across the OpenSRP server, Android client, and web interface. The target of this work package is to implement a unified automated testing framework across these multiple technical components so that we can build standardized unit, functional, and integration tests.

At present, test coverage varies widely across the platform between 0% and 85%. With this funding we will implement the testing framework and improve test coverage across the platform with a target of reaching 80% as measured on our Coveralls test coverage platform. Improved test coverage is critical to ensure that the platform functions in production environments.

Schedule/Activities/Outputs:

- 1 Month: Adding the automated test framework to the Android client, data warehouse, and server libraries
- 3 Months: Updating test coverage across 12 modules to reach 80%

Risks and Mitigation:

- Schedule is a risk because we will need to dedicate the engineers to work on this full time. We will aim to balance this over a longer time period so they make steady progress at less than an FTE while being able to adapt to other project needs.

Work Package 2: Establishing OpenHIE interoperability by improving mobile Care Services Discovery (mCSD) support. OpenSRP supports FHIR Organizations, Locations, Practitioners, and PractitionerRoles modeled off of the mCSD profile. We use these data elements to manage where work is being performed and linking teams to the appropriate information. We believe these data elements are foundational for information exchange. This work package focuses on improving the OpenSRP REST API for Locations, Organizations, Practitioners, and PractitionerRoles so that we fully support the FHIR API patterns for searching, creating and updating each resource in accordance with the [IHE supplement](#). Additionally, we will add support for HealthcareService, OperationOutcome and Bundle in order to achieve full compliance. Ultimately, this will allow OpenSRP to pull in master lists from OpenHIE infrastructure systems that manage locations and the health workforce.

Schedule/Activities/Outputs:

- 3 weeks: Improve and demonstrate that the OpenSRP REST API offers a FHIR compliant pattern for Locations, Organizations, Practitioners, and PractitionerRoles
- 1 month: Build and demonstrate that the OpenSRP REST API can support HealthcareService, OperationOutcome, and Bundle
- 2 weeks: Perform integration testing with Instant OpenHIE

Risks and Mitigation:

- Full demonstration of this work is dependent on full support for the mCSD in Instant OpenHIE. The online roadmap suggests that work will be completed by July 2020, which would allow us to begin after the Notice E0 awards are announced. To mitigate, we can begin development and adjust our timelines for demonstration based on this dependency.

Work Package 3: Add Personally Identifiable Information masking across all OpenSRP APIs. OpenSRP stores personally identifiable information (PII) so frontline health workers are able to identify individuals in their communities / health facilities, which helps them to better perform their job duties. PII information is centrally stored with access managed by OpenSRP's role based access control. However, our REST APIs do not mask personally identifiable information. This becomes problematic when moving information from the transactional database to third party applications and the data warehouse because our APIs return all information regardless of the sensitivity of the underlying information. This exposes PII to any middleware or software systems that have access to the REST APIs when it isn't necessarily needed. For example, a customer may need access to the APIs to store information in powerBI. The middleware that performs the ETL will have access to PII, even though information, like patient names, don't need to be extracted to fully perform the ETL process.

The target of this work package is to build a templated pattern in the application to identify which fields should be considered sensitive at varying levels. Once we identify which fields should be masked, the team will implement masking across all REST APIs by default and implement role based access controls to unmask PII only for frontline health workers and those users who need access to the PII.

Schedule/Activities/Outputs:

- 1 Month: Build and demonstrate the process for identifying which fields should be masked from the moment data is collected.
- 2 Months: Build and demonstrate that all APIs that include PII are masked by default unless the user accessing the API has the appropriate permissions

Risks and Mitigation:

- PII masking will need to be rolled out to production environments to be fully successful. This is dependent on approval from implementation partners. If funded, we will work immediately to engage project partners and identify that the improved handling of sensitive information is beneficial for each project with a minimal amount of effort to implement in their system.