

# "Enhancing the Interoperability of the Leading Open-Source Laboratory Information Management System (LIMS) Platform" - Digital Square Notice B

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**Proposal Status:** Postponing for Future Calls for Proposals

## Executive Summary

Laboratory Information Management System (LIMS) is software used in a laboratory for the management of samples, laboratory users, instruments, standards, and other laboratory functions such as invoicing, plate management, and workflow automation. At its core, LIMS software serves to automate the labor-intensive clerical activities associated with the processing of laboratory results to improve the accuracy and the turnaround time of results. Automation of laboratory activities removes the element of manual reporting, increases productivity, and allows access to retrospective data for analysis.

The global market for LIMS is expanding. According to one estimate, <sup>1</sup> this market is expected to reach \$2.12 billion by 2021 from \$1.37 billion in 2016, at an annual growth rate of 9.1%. The growth in the LIMS market is driven by the increasing demand for quality laboratory diagnosis, government initiatives to support health surveillance for effective disease prevention, and reliable case confirmation during pandemic outbreaks.

To increase the resilience, reuse, and sustainability of open-source LIMS software, we propose enhancing the interoperability, security, and quality control of SENAITE (formerly known as Bika LIMS), <sup>2</sup> the leading open-source LIMS platform. This proposal is designed to provide support to an existing global good to ensure that it is properly resourced for sustained development.

## Consortium Team

Our team is made up of the following organizations:

- **RTI International** (<https://www.rti.org/>) works with governments and nongovernmental organizations in 92 countries. RTI possesses an array of subject-matter expertise, among them: health information systems (HIS), information and communications technologies (ICT), health informatics, epidemiology, and disease surveillance. RTI has in-depth experience in HIS strengthening. Recently, in Tanzania and Zimbabwe, RTI provided technical assistance to the ministries of health in areas that included strategy, capacity building, ICT, and data demand and information use. In both countries, RTI led the national rollout of the District Health Information System 2 (DHIS2). In Zimbabwe, for the CDC-funded Zimbabwe Health Information and Support Project (ZimHISP), RTI led the LIMS deployment. RTI will serve as the organizational management lead and point of contact for this proposal.
- **Naralabs** (<https://naralabs.com/>) is an implementer and founding member of the Bika Open-Source LIMS project. Based in Barcelona, Spain, Naralabs is a company specializing in LIMS and offers professional technology services and engineering, such as consulting, implementation, training, system maintenance, and technical support. BikaLIMS is currently being used in Argentina, Australia, Canada, Colombia, Costa Rica, France, Germany, Guatemala, India, Liberia, Namibia, Nigeria, Portugal, Puerto Rico, South Africa, Spain, Trinidad and Tobago, United States, and Zimbabwe.

<https://www.marketsandmarkets.com/Market-Reports/laboratory-information-system-market-232312738.html>

[1] <https://naralabs.com/blog/20180104>

## Project Description

Our team aims to enhance the interoperability of SENAITE through the integration of DHIS2, tooling to support LIMS-to-LIMS synchronization (aka Collaborator Labs), and enhanced instrument interfacing. We believe that together these enhancements will have a



dramatic effect on the viability and reach of this open-source project.

## 1.1 Integration of DHIS2

SENAITE is an open-source LIMS for enterprise environments and is available on GitHub. It currently ships with an integrated JSON API and has a modular design and clean user interface. It is a derivative work of Bika LIMS software, uses Plone CMS, and is built with Python.

Across Africa, national reference laboratories conduct tests to confirm epidemic-prone diseases. This laboratory-diagnosis confirmation is critical to an appropriate and timely response to disease outbreaks. The challenge is how to ensure that disease confirmation information is available to all stakeholders who need this information in a timely manner. Many countries have or are planning on adopting a system like DHIS2 for disease surveillance.<sup>[1]</sup> This means that both aggregate weekly disease case counts and individual case notifications can be managed and analyzed using DHIS2.

To ensure that laboratory results information is available in a timely manner to all concerned parties, we propose designing and implementing the integration between the SENAITe and DHIS2. We aim to achieve this through the interoperability layer (IL) of the OpenHIE architecture (see **Exhibit 1**). Interoperability between these two systems would reduce the burden on laboratory and other staff tasked with tracking down this information and entering it into multiple systems, and it would speed up the availability of laboratory results for response efforts. The disease surveillance functionality of DHIS2 is improving and given this more countries will likely look to use DHIS 2 for their disease surveillance data, reinforcing the importance of interoperability between DHIS 2 and laboratory information systems.

## 1.2 Synchronization Tool (aka Collaborator Labs)

The LIMS synchronization tool keeps two or more instances of SENAITe synchronized. This would allow running different instances but sharing, for example, samples or patient-level data. For example, a patient created in system “A” can be seen, used, and modified by system “B” or “C.” As a turnkey feature, this will target SENAITe deployments where laboratories are geographically dispersed.

## 1.3 Decoupled Instrument Interfacing System

SENAITE can read files containing results and data exported from a laboratory instrument. The decoupled instrument interfacing system would consist of an integration software that will obtain data directly from instruments by making use of custom adapters and convert that information in a standard format understandable by SENAITe, regardless of the instrument type. This would allow the user to manage the interfaces, auto-imports, progress, monitoring, and other settings, exclusively related with instrument interfacing completely independent from the LIMS software.

## Exhibit 1. Interoperability Layer of OpenHIE Architecture



[1] According to a presentation by the University of Oslo at the Dakar, Senegal, July 2017 DHIS2 for Disease Surveillance Academy, the following countries are piloting or using DHIS2 for disease surveillance: Cameroon, Guinea, India, Mali, Rwanda, Sierra Leone, South Africa, and Tanzania.

### Supporting Documents:

- [digital\\_square\\_global\\_goods\\_call\\_for\\_proposals\\_notice\\_b\\_-\\_rti\\_offer\\_letter\\_proposal\\_0281800.596\\_-\\_exe.pdf](#)
- [digital\\_square\\_global\\_goods\\_call\\_for\\_proposals\\_notice\\_b\\_-\\_rti\\_proposal\\_0281800.596.pdf](#)