

# DHIS2 and CommCare Interoperability

Submitted by Clayton Sims (Dimagi) on January 19, 2018 - 1:23pm

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**Proposal Status:** In Review

## Executive Summary

In more than 15 countries, development projects and Ministries of Health employ CommCare as a core frontline worker patient tracking and data management tool, while also utilizing DHIS2 core information backbone, data warehouse, and analytics platform. Historically, the transfer of data between these two software platforms has required case-by-case support and customization from core development teams. This has proven to be costly to the user, inefficient to the developers, and a hindrance to information system sustainability and impact. With a commitment to the Principles for Digital Development, Dimagi and the University of Oslo request funding to further develop and provide supporting documentation to enable more users and programs to leverage DHIS2 / Commcare through the MOTECH integration platform. This integration platform will adhere to relevant IHE, ADX, and FHIR standards. It is the aim of this consortium that the MOTECH integration platform will provide users with a simple, plug-and-play, interface and comprehensive user guide and use-case descriptions that are publicly available.

We propose a one year project period to complete, i) technical modifications to MOTECH DHIS2 / CommCare integration platform, ii) development of user guide, iii) system testing, iv) a public demo site and iv) rich use-case description examples.

## Consortium Members

- University of Oslo (UiO) hosts the core DHIS2 software development team, contributes to in-country capacity building and implementation support, and promotes DHIS2 as a global public good. UiO brings the technical know-how of DHIS2 as well as the steering direction of enhancements of DHIS2 to better serve the needs of DHIS2 implementers and users. See <http://hispi.uio.no> and <http://www.dhis2.org> for further information.
- Dimagi is an award-winning, socially conscious technology company that helps organizations deliver quality health care to urban and rural communities around the world. Dimagi designs mobile technologies to perform patient-level disease management, clinical decision support, logistics and supply chain management, and health system monitoring. Dimagi takes a product platform approach to our ICT projects that ensures longevity, and support models that are sustainable over the long-term.

## Existing Experience

This proposal stems from existing experience using MOTECH to connect CommCare and DHIS2. In previous projects, Dimagi has attempted to send individual-level data into DHIS2 and further aggregating and processing the data in DHIS2. Many DHIS2 projects only deal with aggregated data, requiring them to update their configuration and new indicators to support data from CommCare. This is a complicated configuration to initially setup and maintain as the CommCare application changes. Additionally, many DHIS2 instances don't already track community level indicators - new indicators need to be added to the configuration. If they do exist, data review and approval workflows need to be updated. This experience has highlighted the need for both technical tools and implementation guidance for projects to integrate CommCare and DHIS2.

## Technical Proposal

Dimagi has developed a user-configurable beta version of a DHIS2 / CommCare integration tool using the MOTECH platform. That has been used in a number of countries including Burkina Faso, Senegal, Madagascar and Mozambique. This tool currently relies on DHIS2-specific APIs. Dimagi and the University of Oslo will work together to update the existing integration tool to utilize IHE standards such as FHIR and Aggregate Data Exchange (ADX). DHIS2 will expose an ADX data structure definition and MOTECH will consume that definition to generate



and send a corresponding ADX message from CommCare to DHIS2. The integration will also be updated to leverage the FHIR location standards to share administrative location information between CommCare and DHIS2.

Building a standards-based integration will enable existing integration workflows while allowing both DHIS2 and CommCare to interact with standards-compliant systems in the future. This lays the groundwork for any country or project to more easily connect DHIS2 and CommCare via interoperability standards instead of directly with each other.

We will also invest in improving the user interface and user experience enabling the integration business-user configurable (configurable as a product rather than in software). A point and click interface will be available to establish the interoperability, as well as reports and logs for made available for troubleshooting issues. Based on our experience, many CommCare / DHIS2 integration projects do not have software engineers available to configure or support the integrations. Developing a business-user configurable integration will enable organizations to easily share their community-level data with national and government HIS, and potentially other managed DHIS2 instances (i.e. a donor database).

## Implementation and Testing

We will use a set of existing and new DHIS2 integration projects to iterate on the guidelines and technical design of the integration. We will validate that the tools developed enable organizations to implement integrations with minimal interaction with our organizations. These projects are currently in Madagascar, Mozambique, Senegal, Burkina Faso, and Benin -- with a new project potentially launching in The Gambia.

## Knowledge and Best Practices

Dimagi and the University of Oslo will leverage our experience implementing integrations to develop best practices and implementation guidelines for integrating community level data into health management information systems. This will include case studies, example use cases and corresponding recommended approaches and technical systems, videos and guidelines on configuring the technical systems, monitoring and error reporting, and how to define, validate and utilize community-level data indicators. These guidelines should enable organizations to more easily implement and share health data.

One exciting aspect of this proposal is the opportunity to build a stronger collaborative relationship between University of Oslo and Dimagi. Both groups have been gaining momentum, and leveraging each other's work indirectly over recent years, but rarely worked together. With this proposal, we expect to demonstrate the many benefits of closer collaboration to create better software, more awareness, and to generate many more opportunities to combine the power of both groups' work.

## Use Cases, User Stories, and Activities

### Example 1: Stock Availability of Family Planning Products in Senegal

An active integration of stock availability data for 40 family planning commodities collected from the Yeksi Na (formerly the Informed Push Model program) was completed by Dimagi in partnership with HISP, Intrahealth, PNA, DSIS and funding provided by the UN Commission on Life-Saving Commodities. The last mile stock data is collected in CommCare by approximately 40 third party logistics providers to all 1400 health centers in Senegal. Since the integration in 2016, the Yeksi Na program has scaled nationally to include 180 essential health commodities and new third party logistics operators using the CommCare application to distribute medicines across the country. The program is assessing the need to expand the DHIS2 integration to include the expanded list of commodities.

### Example 2: IMCI Protocol Adherence in Health Clinics in Burkina Faso

An active integration of 60 IMCI indicators collected by 1200 nurses in Burkina Faso at 400 CSPPS in the IeDA application called the REC, which is built on the CommCare platform. Dimagi carried out a training in 2017 with 4 Ministry of Health focal points in the country to train them how to maintain the integration over time. The REC application is scaling nationally in Burkina Faso and will require full integration with DHIS2 in a way that is configurable and maintainable by the Ministry of Health.



### Example 3: Maternal and Child Health Programs in Madagascar

An active integration of 134 Maternal and Child Health indicators including IMCI, family planning or stock management. Currently collected by ~300 community health workers (600 by the end of Q1 2018) using CommCare, the data is automatically flowing on a monthly basis in the Madagascar Ministry of Health DHIS2 server. Dimagi has collaborated with the Information System Department of the Ministry of Health to define and build the integration of the two systems. The collaboration will continue in the near future to support scale, and build the capacity of the MoH to support and maintain the CommCare/DHIS2 interface independently.

### Example 4: Community Health Worker Support in Benin

A proof of concept integration for 2 IMCI indicators in Benin. In the past 4 years Dimagi has worked with different partners in Benin to build an IMCI application used today by more than 200 users. The data provided by these community health workers will ultimately be aggregated in CommCare and collected in DHIS2. The proof of concept demonstrates that in the future with a full integration, the reporting workload of the different actors in the health system can be reduced by integrating DHIS2 with CommCare or the other tools deployed at the community level.

In all of these examples, the user stories leverage strong existing users of CommCare and DHIS2 to create even more value. The Frontline Workers leverage CommCare continue to use their service delivery applications as designed. The integration is performed by technically trained staff from Dimagi, HISP, or a 3rd party. The data is viewed in DHIS2 by key stakeholders within MOH who already have familiarity with viewed data and reports in DHIS2.

## Digital Health Technologies

Dimagi has developed a user-configurable beta version of a DHIS2 / CommCare integration tool using the MOTECH platform. This has been used in a number of countries including Burkina Faso, Senegal, Madagascar and Mozambique. This tool currently relies on DHIS2 specific APIs. Dimagi and the University of Oslo will work together to update the existing integration tool to utilize IHE standards such as FHIR and Aggregate Data Exchange (ADX). DHIS2 will expose an ADX data structure definition and MOTECH will consume that definition to generate and send a corresponding ADX message from CommCare to DHIS2. MOTECH will be updated to leverage the FHIR location standards to share administrative location information between CommCare and DHIS2. The latest version of MOTECH is now integrated with CommCare and available as a multi-tenant environment.

Building a standards-based integration will enable existing integration workflows while allowing both DHIS2 and CommCare to interact with standards-compliant systems in the future. This lays the groundwork for any country or project to more easily connect DHIS2 and CommCare via interoperability standards instead of directly with each other.

We will also invest in improving the user interface and user experience enabling the integration business-user configurable (configurable as a product rather than in software). A point and click interface will be available to establish the interoperability, as well as reports and logs for made available for troubleshooting issues. Based on our experience, many CommCare / DHIS2 integration projects do not have software engineers available to configure or support the integrations. Developing a business-user configurable integration will enable organizations to easily share their community-level data with national and government HIS, and potentially other managed DHIS2 instances (i.e. a donor database).

## Community Feedback

Based on initial feedback during the Open Proposal process, DHIS2 has many integrations to consider that they will be submitting in a future round. For this specific partnership, the majority of the work is in documentation and ease-of-use of the MOTECH platform to enable the integration between CommCare and DHIS2 to be cheaper and easier. University of Oslo is supportive of this consortium and approach, as it does not require a substantial investment of time from their team and this point in time and leverage and pre-existing roadmap and strategic direction. Dimagi is also supportive of this consortium for the same reasons, and will be leading the majority of the work under this proposal.



Both Dimagi and University of Oslo recognize there will be multiple global public good approaches to connecting data systems with CommCare and DHIS2 generally, and even specifically, there are already multiple ways one could connect CommCare and DHIS2 (OpenFn, OpenHIM, MOTECH, Direct custom Code, Zapiet). We believe the approach in this proposal is a strong, cost-effective approach that will improve the ability to connect two of the most popular platforms used in Digital Health. But we also believe there should be more than one way to accomplish this important health system need.

We will solicit feedback on the approach from the implementation partners that this will be deployed with across the existing first 4 use cases. We will publicly post the documentation for using MOTECH to connect CommCare and DHIS2 to both the CommCare and DHIS2 communities to solicit feedback. The final documentation will also be made publicly available along with all of the MOTECH code publicly on Github.

## Self-Assessment of the Global Good Maturity Model

See attached file named "Dimagi - Digital Health Software Global Good Maturity Model v1.1".

## Workplan

The proposed work-plan for this project is over a 12-month period. We have divided it into to 4 quarters from the start date:

### Q1

- Dimagi will improve the User Experience for MOTECH to support CommCare and DHIS2 integration on the existing 4 projects
- Dimagi and University of Oslo will document upgrades to the existing APIs to modify MOTECH to leverage established IHE standards

### Q2

- Dimagi will update MOTECH to use the agreed upon APIs and roll out to 1 partner site
- Dimagi will add a README to the [core MOTECH repository](#) available on Github to publicly document how to use the integration.

### Q3

- Dimagi will update the remaining 3 partner sites to leverage the new standards based APIs with MOTECH.
- Dimagi will provide draft documentation that includes: Best Practices, Sample Environment, and How-To Guide. Dimagi will publish this documentation to both CommCare and DHIS2 communities for feedback

### Q4

- Dimagi and University of Oslo will finalize documentation based on feedback, and publish to the public documentation of both CommCare and DHIS2.
- Dimagi will produce a publicly available demo integration that shows how data from a CommCare app can be integrated into DHIS2

**Supporting Documents:**  [dimagi\\_digital\\_health\\_software\\_global\\_good\\_maturity\\_model\\_-\\_v1.1.xlsx](#)