

Illuminate Data with a DHIS2-Power BI Connector

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Proposal Status: **Awarded--Fully Funded**

Executive Summary

Population Services International (PSI) would like to partner with technology firm BAO Systems and the University of Oslo (UiO) to develop a connector between Power BI, Microsoft's suite of business analytic tools, and DHIS2. The connector will enable non-technical users to easily share data between DHIS2 and Power BI in order to visualize and compare vital information from multiple data sources. Power BI allows health program managers to affordably and quickly generate dynamic infographics that better communicate data, thereby informing health program strategy and improving health outcomes.

Currently, a user must manually import DHIS2 data into Power BI (e.g., through a data dump into an Excel spreadsheet). This barrier to use has not, however, stopped non-profits from turning to Power BI as a business intelligence (BI) solution. According to a 2017 NGO Software Tool Survey from Humentum, in which 70 organizations participated, Power BI was used by 31 organizations, compared to just 4 organizations in 2015 ("2017 Software Tool Survey for the Non-Profit Community," Humentum, December 2017, Page 6.). Power BI is used by 200,000+ organizations and 5+ million unique users worldwide.

Power BI's main competitor, Tableau, already offers a connector to DHIS2. BAO Systems was the developer of this initial Tableau connector. It is a disservice to the DHIS2 community that there is still not connector for Power BI because Power BI is free (non-profit E1 license). Without charge, a non-profit can have the entire suite of Office 365 tools, including Power BI. As a comparison, even with Tableau's non-profit discounts, the cost per user is between \$35/user/month and \$70/user/month (<https://www.tableau.com/pricing>). Health organizations and ministries of health should not have to pay Tableau hundreds of dollars more for their service just because Tableau has a DHIS2 connector and Power BI does not.

The most important reason for an organization to use a BI tool is to compare different data sources. DHIS2 has already demonstrated, in over 60 countries and over 40 organizations, what impact accessible health data can have. With Power BI, organizations can overlay this wealth of data in DHIS2 with hundreds of other data sources. Power BI already connects to platforms like Salesforce and QuickBooks. In addition, Power BI users can also choose to upload other comparative data sources that could be useful to see against DHIS2 data, including enterprise resource planning (ERP) software, World Bank Open Data, climate information, and social media. The ability to easily compare different data sets to DHIS2 creates the possibility to see new connections that would otherwise not be apparent. A tool like Power BI enables health organizations to gain a more in-depth, holistic understanding of their programs, better equipping practitioners to target resources and save lives.

PSI and BAO Systems are committed to data accessibility beyond platform silos. Per the Global Goods Maturity Model, this Power BI connector promotes interoperability and data accessibility. This Power BI connector would join other similar connectors to DHIS2 that BAO Systems has built. Those connectors include the aforementioned Tableau connector and also a connector to the data collection platform KoBo Toolbox. This suite of collectors together promote data accessibility and push the DHIS2 community towards software objectives set by the Global Goods Maturity Model.

Project Team

Population Service International

Role: Project Manager

Population Services International (PSI) operates in over 60 countries and is dedicated to improving the health of people in the developing world. PSI focuses on a lack of family planning, HIV/AIDS, barriers to maternal health, and the greatest threats to children under five. In addition to project management, PSI will contribute development support, staff time, and quality assurance (QA) testing services.

PSI will lead and coordinate this project.

BAO Systems

Role: Developer

BAO Systems is a DHIS 2 development, hosting, and support provider that has developed DHIS 2 apps, command line utilities, and connectors. BAO is the largest DHIS 2 hosting provider globally and the largest DHIS 2 based consultancy in North America. BAO has built connectors to DHIS 2 for Tableau, CommCare, Kobo/Ona/ODK, and a generic "Bulk Import Foundry" (BIF) app to load metadata quickly into DHIS 2. BAO's team consists of developers, data scientists, system administrators, and DHIS 2 experts.

University of Oslo

Role: DHIS2 Developer

The University of Oslo (UiO) is a leading European university and Norway's largest. UiO is the developer of DHIS2, an open-sourced management information system (MIS). PSI does not anticipate this project will demand a significant portion of UiO's time. PSI and BAO will lead all development and implementation of the Power BI connector, while PSI will only work with UiO to develop minor DHIS2 back-end application program interface (API) amendments.

Project Description

What: This proposal aims to build a DHIS2 connector for Power BI.

Why: A Power BI connector makes it possible for organizations to compare and visualize DHIS2 data alongside other key data sources. The ability to visualize data in Power BI is significant because it offers:

- A range of visualization tools and 'complex' data reporting options
- Interactive reports pulling on DHIS2 live data for improving user experience and data analysis
- Data from hundreds of other sources (e.g., Salesforce) can be compared alongside each other.
- An affordable app for non-profits included with Office 365 and integrated with other Office 365 apps like SharePoint.

How: BAO will leverage the Microsoft Data Connector SDK for Power BI to create a "Get data" connection to Power BI that enables users to access DHIS 2 data in the Power BI Desktop application. By integrating seamlessly into the Get Data experience in Power BI Desktop, data connectors make it easy for users to query, shape and mashup data from DHIS 2 to build reports and dashboards that meet the needs of their organizations. The Power BI data connector would leverage Microsoft's Power Query M language to enable connectivity to DHIS 2. Please read more under "Digital Technologies."

Security: Data loaded will be filtered by DHIS2. Permissions used in Power BI will be the same as DHIS2 permissions.

Use Cases

The ability to import DHIS2 data into Power BI tool would give PSI, other NGOs, and ministries of health a significant advantage to democratize data and inform high-level decision making. A Power BI connector will empower institutions to combine different data sources from fit-for-purpose systems without having to create a data warehouse.

There are different use cases, across disease areas, countries, and data sources that demonstrate the potential impact of this Power BI connector. Here are a few potential use cases.

Example 1: Understanding Health Impact of Product Sales in Mozambique

PSI Mozambique's HIV program is one of the largest in the country. The program focuses on HIV testing and treatment alongside the sales and distribution of condoms in the private market. HIV testing and treatment data is collected and visualized in DHIS2 while condom sales and distribution is collected and visualized in Salesforce. Today, if a program manager wants to compare condom sales with HIV testing and treatment data, she must manually extract data from DHIS2 and Salesforce, then import the two sets of data into Excel to compare results.

With a Power BI connector, the program manager can navigate to Power BI, already offered by PSI's Office 365 account. With a logon and four mouse clicks, the Program Manager can choose which DHIS2 and Salesforce data to view. For example, areas where the HIV rate is high but the condom distribution is low. With the ability to easily visualize and overlay these two complimentary sets of data, PSI Madagascar would be more effectively able to combat HIV.

Example 2: Managing a Community Health Workforce in Uganda

PSI Uganda employs hundreds of community health workers that service a range of health areas, that include maternal health and HIV. Health program data is collected in DHIS2. Community health workforce data is collected in PSI Uganda's ERP software.

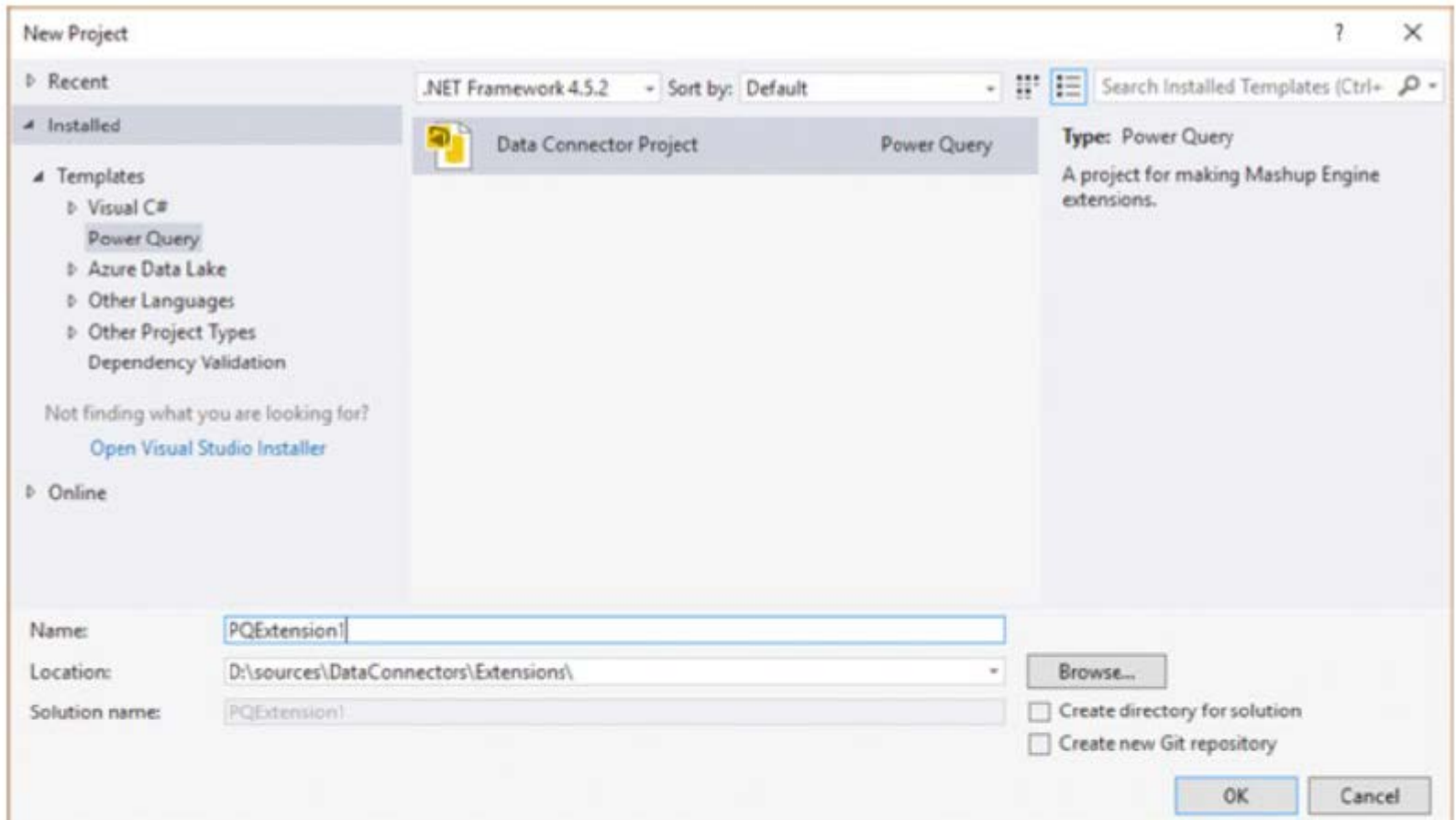
With a Power BI connector, managers at PSI Uganda could easily use Power BI to compare health program data in DHIS2 with community health workforce data in the ERP. With this information, patterns emerge that would not be apparent otherwise. "How does the influx in the number of new health workers impact health outcomes in a particular area?" "What are best human resource practices that demonstrably drive certain health indicators?"

Example 3: Seeing the Bigger Picture in Laos (MOH)

The Ministry of Health in Laos currently collects health data in DHIS2. In order to more accurately measure the impact of non-health socio-economic factors on health outcomes, MoH would like to compare data in DHIS2 to data provided by the World Bank. Currently, this would require manually downloading data from each source and comparing the data in DHIS2. However, with a Power BI connector, MoH would instead connect to DHIS2 data in Power BI and upload to Power BI an excel spreadsheet downloaded from <https://data.worldbank.org/>. Power BI could compare health outcomes with key education or gender statistics, for example.

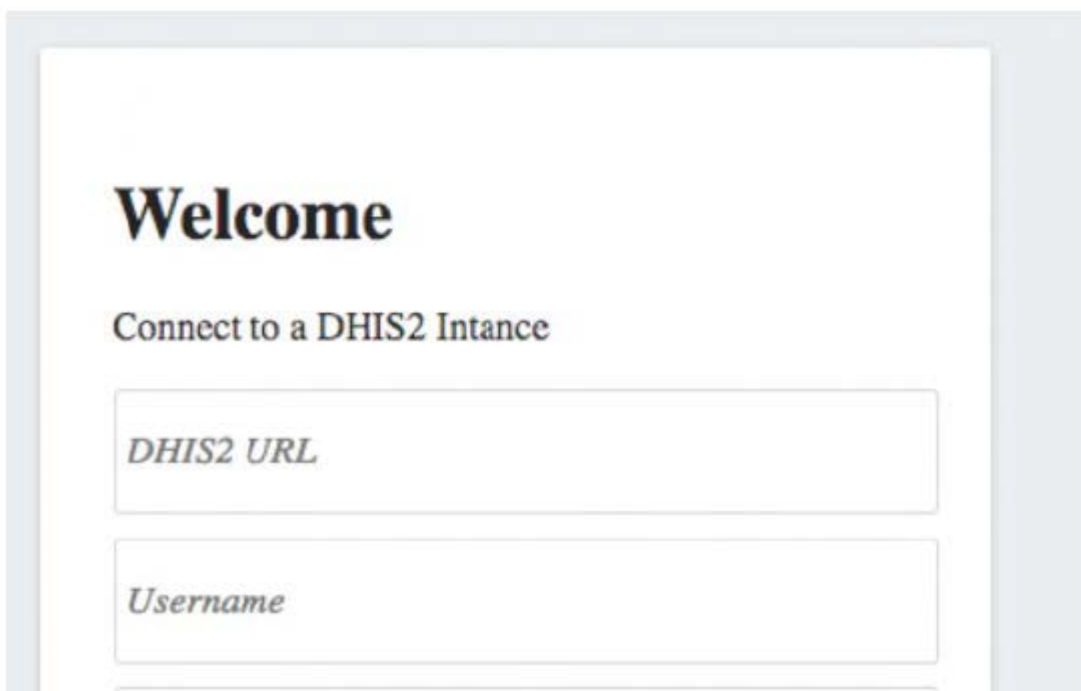
Digital Health Technologies

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Power Query SDK

The Power BI Connector supports OAuth v2 authentication, which is the same authentication scheme used in DHIS 2. With the rich REST API available in DHIS 2, and new features that allow direct access to analytic tables, creating a powerful view into DHIS 2 data to be imported and worked with in PowerBI is possible.



Password

Login

The custom PowerBI data connector will have a basic interface to login and then select query criteria from the DHIS 2 as shown below:

Choose Period

RELATIVE PERIOD

SELECT DATES

Last 3 months

Choose data element groups

Acute Flaccid Paralysis (AFP)
All Others
Anaemia
ANC
ARI treated with antibiotics (Pneumonia)
ARI Treated Without Antibiotics (Cough)
ART
ART enrollment
ART entry points
ART pediatric 1st line
ART staging
ART treatment
Bums
Cholera
Clinical Malnutrition

SELECT NONE

SELECT NONE

Choose Organisation Units

Selected organisation units will include sub-hierarchy

▸ Sierra Leone (1)

Once a user has selected the basic data they wish to work with in Power BI, the Data Connector will transfer selected data from DHIS 2 to Power BI where it can be worked with further to create visualizations, dashboards, and more.

Community Feedback

PSI will directly reach out to other NGOs to user-test the Power BI connector prior to official launch. The development timeline will include a period for user testing. Feedback from other NGOs will inform further development of the Power BI connector prior to launch. User feedback will also inform efforts to communicate and promote adoption of the Power BI connector after launch.

Once development of the Power BI connector is completed, PSI will announce to the larger DHIS2 community and other NGOs that this new Power BI connector exists and offer instruction and inspiration for how it can be used to illuminate data. This will be done through webinars, email blasts, and posting documentation through DHIS2 community channels. PSI will also leverage its relationships with local ministries of health to instruct on how this Power BI connector can be incorporated into these public-sector activities.

In addition, PSI already plans to collaborate with UiO on developing a web-based DHIS2 Community of Practice (CoP), which will serve as an online space for engagement, knowledge sharing, and learning amongst DHIS2 implementers and users. PSI plans to actively use the new CoP to share the Power BI connector, advise other DHIS2 users on how to best take advantage of the tool, and improve the Power BI connector based on any feedback from the DHIS2 community.

Lastly, PSI will also reach out to Microsoft to advocate for promotion of this new Power BI connector through Microsoft channels. This includes a connector for DHIS2 documentation page on [Microsoft's Power BI for Non Profits sub-site](#).

Workplan, Project Deliverables, Schedule

The proposed workplan for this project is over 3 months:

Month 1

- BAO to develop Power BI connector.

Month 2

- BAO to develop Power BI connector.
- PSI to test Power BI connector with select DHIS2 users.

Month 3

- BAO to make revisions and finalize the Power BI connector based on user testing.
- PSI to launch and promote Power BI connector to broader DHIS2 community.

Budget Narrative

Total Budget: \$ 66,000

PSI Program Manager (10% LOE)

- Provide global technical support and coordination for Power BI connector deployment.
- Promote Power BI connector to the DHIS2 community.

PSI DHIS2 Architect (10% LOE)

- Provide global technical support and coordination for Power BI connector deployment.

BAO Senior Developer (65% LOE)

- Develop of Power BI Connector.

BAO Project Manager (5% LOE)

- Provide support to developer and interface with PSI.

BAO Analyst (5% LOE)

- Technical documentation

UiO API Architect (5% LOE)

- Develop minor DHIS2 back-end API amendments.

Contact

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Appendix 1: Budget

See budget attached.

Appendix 2: Self-assessment on the Global Good Maturity Model

See assessment attached.

Supporting Documents:  [psi-power-bi-connector_global-goods-maturity-model-assessment_2018.03.26.xlsx](#)