Kobo Toolbox - DHIS2 Connector app
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Background

Kobo Toolbox is a suite of tools for field data collection that can be used in challenging environments. Kobo Toolbox Connector App integration driver is a user-friendly tool that pulls metadata and data from Kobo Toolbox into DHIS2 with minimal user interaction, allowing Kobo Toolbox data to be analyzed with the powerful analytic tools from DHIS2.

The connector gets objects from Kobo Toolbox and transforms them into objects that are intelligible to DHIS2. As a result, the connector process converts the Kobo Toolbox form into DHIS2 objects. This includes a DHIS2 event program (single event without registration), program stage, option sets and data elements; one Kobo Toolbox form to one DHIS2 program.

During the creation of metadata, Kobo Toolbox Connector app introduces a naming convention by appending “KB” and the relevant code to the metadata ‘Name’ and ‘Short name’ created on DHIS2. Once the metadata has been successfully created on DHIS2, the organization units on Kobo Toolbox forms are mapped with the organization units on DHIS2 and the program assigned accordingly. Thereafter, data from Kobo Toolbox is imported into the framework of DHIS2 metadata created by the driver.

During the process, the Kobo Toolbox Connector App allows for the selection of data elements that are to be created on DHIS2. This feature helps to select the most relevant data elements on Kobo Toolbox to sync with DHIS2.
Chapter 1. Getting started with the Kobo Toolbox Connector App

1.1. Installing Kobo Toolbox Connector App

The first thing to do before installing the app is to ensure that the additional DHIS2-server-side configurations for the Kobo app are made. The app will only work on a designated server for specified Kobo URLs. KoBo has not opened up their Same-Origin-Policy, blocking access to other domains. To handle this “Same Origin Policy” used by the KoBO API, you will need to proxy outbound requests at the server-level. This is a one-time setup and you should contact your DHIS2 server administrator for support. If your organization doesn't have a hosting plan with BAO, the example below will guide you through the configuration.

Configuration Example:
BAO servers route requests through proxy, so the following needs to be placed into nginx.conf. It is not dynamic. Once configured properly the KoBo API can directly be accessed via a BAO-Systems-hosted URL thusly: https://host.client.domain/kobo/

The location block below should be inserted into /etc/nginx/nginx.conf just after BAO's standard location blocks:

```bash
location /external-static/ {
  root /opt/dhis2;
  expires max;
}

# insert kobo location block here
```

```bash
}
```
Depending on which Kobo endpoint your project is using, you may need to change the `kc.humanitarianresponse.info` hostname in all four places it is used in the block:

```bash
# insert kobo location block here
# change kc.humanitarianresponse.info to correct URL
location /kobo/ {
  proxy_pass https://kc.humanitarianresponse.info/;

  # Additional request headers we're sending
  proxy_set_header Host kc.humanitarianresponse.info;
  proxy_set_header X-Real-IP $remote_addr;
  proxy_set_header X-Forwarded-For $proxy_add_x_forwarded_for;
  proxy_set_header X-Forwarded-Proto $scheme;

  # Response headers we're removing
  proxy_hide_header Set-Cookie;
  proxy_hide_header WWW-Authenticate;

  # Find and replace in the Response Body
  sub_filter_types ";";
  sub_filter_once off;
  sub_filter 'host/epi/' 'host/kobo/epi/';
  sub_filter 'kc.humanitarianresponse.info/' 'host/kobo/';
  sub_filter '/api/' '/kobo/api/';
  sub_filter '/api/' '/kobo/api/';
  sub_filter '/static/' '$scheme://kc.humanitarianresponse.info/static/';
}
```

Once you have edited and saved `/etc/nginx/nginx.conf`, you’ll need to test and reload the nginx config:

```
nginx -t & & nginx -s reload
```

Please also note that for the connector, the use of only one Kobo account is recommended.
Following this, in order to use the Kobo Integration App, the application must be installed as it does not come as a default App within DHIS2 itself. To install the Kobo Toolbox Connector, the system administrator must have the “Kobo Toolbox Connector” zip file. Installation itself is very easy.

Kobo Toolbox Connector App is installed through the App Management module of DHIS2.

1. Hover over (or click) the Apps button in the upper right corner on the header bar, click the App Management icon:
2. In the Standard Apps section, click the **Upload** icon:

![Installed Standard Apps](image1)

3. After clicking upload, navigate on your local system to the folder where the Kobo Integration App install zip file is and select it. Be sure that you are uploading the original entire zip download and not the individual files within. After being uploaded it will look as shown:

![Installed Standard Apps](image2)
1.2 Access control

To allow access of the app to users, a User Role Authority is created in DHIS2 when the Kobo app is installed. Simply add the User Role Authority to a desired DHIS2 User Role, and all users with that authority will then be able to access the app. Alternatively, you could also create a new User Role containing only the Kobo App authority and assign it to selected users.

Access to the Kobo App should only be allowed for people that should (and are able to, e.g. Superusers) create DHIS2 Metadata for Programs and Events.

1.3 Accessing Kobo Toolbox Connector App

Kobo is accessed like every other in-built DHIS2 app - through the App menu. To access Kobo:

1. Hover (or click) the Apps button in the upper right corner on the header bar.
2. Scroll down (or search by typing “Kobo”) and select Kobo-DHIS2 Integration from the menu.
Chapter 2. Kobo Toolbox Connector integrations

2.1 Add new integration

3. Once Kobo-DHIS2 Integration app is open, it appears as shown below.

4. Click on the ‘add’ or ‘+’ icon in the lower right corner to create a new integration.

5. A Username and Password are required when connecting to Kobo Toolbox from DHIS2 for the first time. These are the Kobo login credentials for the account you wish to access surveys.

6. Upon successful login, all the forms that the user has in Kobo will be pulled into DHIS2. The forms will be listed under “All forms” with the Form title and Form ID shown. The image below is an example.
*Note that if you close the tab, you will need to re-enter the username and password (it is stored in your session).

2.2 Integrate Kobo Toolbox to DHIS2

When integrating a form with DHIS2 for the first time, there will be no metadata found in DHIS2 to correspond with the Kobo form. The following message will be displayed and the user prompted with the option to automatically create the metadata in DHIS2 (a necessary step). The user can always opt to add metadata to the Kobo form first and start the integration process later, but this is the only opportunity that will exist for any changes on the Kobo form to be automatically pulled into DHIS2. Post metadata creation, all changes in Kobo will need manually reflecting/replicating in DHIS2.
Every survey in Kobo is scanned for the presence of the “OU question”. This is a question which needs to exist in the Kobo form that maps the Organisation Unit (OU) (location dimension) from Kobo to DHIS2. In the Kobo form, the question is created with the name prepended with the convention “ou_”. For example “ou_location”. Additionally, the choices for this OU question will have the list_name ou_ with each choice name corresponding to a valid OU UID in the destination server. **This configuration must happen before metadata creation within the Kobo-DHIS2 app.** (More details can be found in [Section 7 - Design, org unit mapping](#) of the Kobo-DHIS2 technical specification.)

If this “OU question” is missing from the survey, a warning message will show telling you to “include the question in the survey”, and also terminate the configuration-sync process until it is rectified.

In cases where the OU question does exist, the user will be prompted with the message below.
At this point there is a choice to make. By clicking:

- ‘OK’ will create the entire Kobo form - every single question - as metadata on DHIS2. This process will create an exact replica of the Kobo form in its DHIS2 equivalent.
- ‘Cancel’ will take you to a selection page where you can manually choose which parts of the Kobo form to create metadata for in DHIS2. Subsequently, only data for the selected questions will sync to DHIS2.

2.3 Selector

If selecting ‘Cancel’, you will arrive on a page where you will be required to select which data elements to be created in DHIS2. Put another way: to select which Kobo form questions to include in DHIS2.

The Selector allows users to either choose a few questions of interest or all questions to be created in DHIS2.

Options:
1. To select some Data Elements, click on the checkbox just before the name of the data element of interest.
2. To select all Data Elements, click on the “Data Element Name” checkbox at the top of the list.

3. Click “SAVE SELECTED DATAELEMENTS AND CONTINUE” to save your selected questions.

4. At the top of the page, a notification pops up that shows a summary of the data elements to be created on DHIS2. Click on “OK” to proceed.
5. Once the data elements are selected the user will be prompted to select the legacy Organization Unit. During data import, in the eventuality that a Kobo form has data that does not have reference to an OU question within the legacy data, it would not usually be possible to import data to DHIS2, since the OU is a required dimension. Therefore at this stage of the route setup process, you will be prompted to select a "Legacy Org Unit". This is the location within your DHIS2 org unit hierarchy where all legacy data that does not have an associated org unit from Kobo will be sent. Said another way, during data import, for forms that were set up with a legacy OU, whenever data is not assigned to a specific OU, it will be automatically assigned to the “Legacy OU” selected.

6. Click on the “SYNC AND SAVE INTEGRATION” button to start synchronizing. This one click will save your desired Kobo form route setup; create the equivalent metadata objects within DHIS2; and, begin the process of importing data to DHIS2. It should be noted that all subsequent syncs of this
route will draw upon the specified setup unless a change is made within DHIS2 directly. In other words, it is very difficult to roll back from here.

The status of the integration will be displayed against the action in the log, shown below.

7. Once successful, a message pops up to show that sync is successful and the details of the integration will be displayed.

8. The result provides a summary of the total amount of data imported, updated, ignored and deleted. The full details of the integration will be displayed in the “DHIS2 Import Log” pane. Click on imported, updated, ignored or delete to populate this log with further details of each result.
2.4 Re-sync

You can choose to perform a **resynchronization of the routes already created**, if further data has been submitted through Kobo since the previous sync. The Kobo App Home screen gives the user the option either to delete the Kobo Toolbox route (but note, metadata and data will be left in DHIS2) or to carry out the sync of data, as shown.

![DHIS Import Log](image)

**2.5 Visualising synced data in DHIS2**

Before data can be visualised in DHIS2 once a sync of a Kobo form has successfully run, two things must happen:
● The metadata created on DHIS2 is not specifically shared. Thus the metadata will need adequate sharing settings applied according to your DHIS2 system design (and in particular the program and program stage data sharing levels). This will allow data access to the relevant users or user groups.

● DHIS2 relies on the running of an analytics process for newly entered data to be accessible in the analytics apps. (Newly entered means, entered/imported since the previous process run.) Therefore you will either need to wait until the DHIS2 scheduled analytics process runs again (normally overnight), or request your system administrator, if appropriate, to manually run this for you.

2.6 Remove data in DHIS2

If you would like to remove the sync route and remove related data/metadata in DHIS2 for a particular Kobo form, please take the following steps:

1. Delete all events in DHIS2 imported for the program to be deleted
2. Remove Data Elements from the Program (which is the same as removing from the stage also)
3. Delete the Program then Data Elements and Option Sets in DHIS2

Refer to the Metadata Protocol to see how those objects are linked via names and codes.

2.7 Uninstall the app

Warning: Uninstalling the app deletes all integrations but keeps the data/metadata in DHIS 2!

Additionally, delete the app’s dataStore at: /api/dataStore/kobo-integration-forms
Chapter 3. Troubleshooting

Troubleshooting issues when using the Kobo DHIS2 integration app can be done through:

- DHIS2 import logs
- Browser console

3.1 DHIS2 Import logs

DHIS2 Import logs provide user-friendly pointers for resolving issues when using the DHIS2 Kobo integration tool. DHIS2 Import logs track the details of all metadata/data imported into DHIS2; the inspection of each module will provide guidance as to what is causing the errors during the import. The import logs functionality is located on the bottom of the screen during the import process, as shown:

![DHIS2 Import Log](image)

3.2. Troubleshooting via Browser console

There are instances where it is necessary to monitor or inspect the browser console. To inspect the browser console right click on the page and click on inspect as shown below.

![Inspect in Browser Console](image)
Inspections can be performed through use of either the console or network tab. The console error messages will be instructive on the type of error encountered and give clues as to how it could be resolved.

Example: