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Portions of this software were originally based on the work from the nightscout-librelink-up repository by Timo Schlüter, available at <https://github.com/timoschlueter/nightscout-librelink-up>

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LibreLink Up (real-time) with FHIR

This script written in TypeScript facilitates the upload of CGM (Continuous Glucose Monitoring) readings from LibreLink Up to a server that uses FHIR(Fa). It is designed to work with at least Freestyle Libre 2 (FGM) and Libre 3 CGM sensors. The original idea and initial code structure are derived from the nightscout-librelink-up repository within the DIY communities.

Official documentation regarding data sharing can be found at LibreLinkUp Getting Started.

Configuration

The table below lists the environment variables used in the application:

Environment		Example	
Variable	Description	Value	Required
LINK_UP_USERNAME	LibreLinkUp (LibreView) username/email address		Yes

Environment Variable	Description	Example Value	Required
LINK_UP_PASSWORD	Our LibreLinkUp (LibreView) password		Yes
LINK_UP_CONNECTION	Our LibreLinkUp (LibreView) Patient-ID. Can be received from the console output if multiple connections are available.		No
LINK_UP_TIME_INTERVAL	Time interval (in minutes) in which the values should be retrieved from LibreLinkUp	5	Yes
LINK_UP_REGION	Your region. Used to determine the correct LibreLinkUp service (Possible values: US, EU, DE, FR, JP, AP, AU, AE)	EU	No
LOG_LEVEL	The log-level to use	info	No
SINGLE_SHOT	Disables the scheduler and runs the script just once		No
DEMO_ENABLED	Enable the DEMO and runs the script just once		No
FHIR_ID	FHIR ID for a patient		Yes
FHIR_URL	URL of the FHIR server		Yes
TOKEN_ENDPOINT	Endpoint URL for obtaining authentication tokens		Yes
CLIENT_ID	Client ID for authenticating with Keycloak		Yes
CLIENT_SECRET	Client secret for authenticating with Keycloak		Yes
SCOPE	Client Scope for FHIR server Keycloak		Yes

Usage

This script provides different options for usage.

Variant 1: Local (Reading the file)

Run the demo script by executing the following command from the root folder after downloading the .zip file or cloning the repository.

For Linux/macOS:

```
# Make the script executable
chmod +x start-demo.sh

# Execute the script
./start-demo.sh
```



FreeStyle Libre apps

The person wearing the FreeStyle Libre Sensor uses a FreeStyle Libre app on their mobile phone to send a sharing invitation email to their family member or friend.



LibreLinkUp (and this script)

To fetch data in real time, you need to insert the Libre-LinkUp credentials



The LibreLinkUp app is not compatible with the FreeStyle LibreLink special edition app or FreeStyle Libre 2 special edition app.

Figure 1: Data Sharing
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To execute this script in Windows:

1. Open Command Prompt (cmd).
2. Navigate to the directory where the script is saved.
3. Run the script by typing its name `start-demo.bat` and pressing Enter.

This will:

1. Initiate the process and observe the output in the console.
2. The FHIR bundle files will be available in the following folder: `Demo/Data`
3. Execute the script (`./start-demo.sh`) to initiate the process and observe the output in the console.
4. You will find the files that represent the FHIR bundle at the following folder: `Demo/Data`

Variant 2: Local with real time data and Libre link Up

Running the Real-time Script. **It's very important** that you replace the following variable:

- `LINK_UP_USERNAME="your_librelinkup_username"`
- `LINK_UP_PASSWORD="your_librelinkup_password"`

To run the real-time script, follow these steps:

- Clone the repository to your local machine:

```
git clone https://pra016@dev.azure.com/pra016/Continua/_git/libre-link-up-fhir
```

- Navigate to the project directory:

```
cd libre-link-up-fhir
```

- Run the following code, for Linux/macOS:

```
export DEMO_ENABLED="false"
export LOG_LEVEL="info"
export LINK_UP_USERNAME="your_librelinkup_username"
export LINK_UP_PASSWORD="your_librelinkup_password"
export LINK_UP_TIME_INTERVAL="5"
export FHIR_ID="your_fhir_id"
export FHIR_URL="your_fhir_server_url"
```

```
export TOKEN_ENDPOINT="your_token_endpoint"
export CLIENT_ID="your_client_id"
export CLIENT_SECRET="your_client_secret"
npm install
npm start dev
```

Remember to replace also `your_fhir_id`, `your_fhir_server_url`, `your_token_endpoint`, `your_client_id`, and `your_client_secret` with your actual values.

- Run the following code, for Windows:

```
REM Required environment variables for the demo
set "DEMO_ENABLED=false"
set "LOG_LEVEL=info"
set "LINK_UP_USERNAME=your_librelinkup_username"
set "LINK_UP_PASSWORD=your_librelinkup_password"
set "LINK_UP_TIME_INTERVAL=5"
set "FHIR_ID=your_fhir_id"
set "FHIR_URL=your_fhir_server_url"
set "TOKEN_ENDPOINT=your_token_endpoint"
set "CLIENT_ID=your_client_id"
set "CLIENT_SECRET=your_client_secret"

npm install
npm start demo
```

As alternative Create a `.env` file in the root directory of the project.

This file will contain the required environment variables. Here's an example of the `.env` file:

```
LOG_LEVEL=info
DEMO_ENABLED=true
FHIR_ID=your_fhir_id
FHIR_URL=your_fhir_server_url
TOKEN_ENDPOINT=your_token_endpoint
CLIENT_ID=your_client_id
CLIENT_SECRET=your_client_secret
```

Add other variables as needed, and replace `your_fhir_id`, `your_fhir_server_url`, `your_token_endpoint`, `your_client_id`, and `your_client_secret` with your actual values.

- Run the demo script by executing the following command:

```
npm install
```

and then run:

```
npm start dev
```

This will start the demo version of the script using the configured environment variables in the `.env` file.

Remember to set the necessary environment variables according to your setup before running the script. You can modify the `.env` file with your specific values for the environment variables required by the script.