Aman Kumar
amankr1619@gmail.com
@amankrx:matrix.org / amankrx

Reworking Sync Options for Health

GENERAL DETAILS

Name: Aman Kumar
University: Indian Institute of Information Technology, Nagpur
Expected Graduation Date: July 1, 2023,
Primary Email: amankr1619@gmail.com
Secondary Email: bt19cse127@iiitn.ac.in
Matrix ID: @amankrx:matrix.org
IRC Nick: amankrx
GitHub: amankrx
GitLab: amankrx
Size of the Project: Large (350 Hours)
Blog Address: https://amankrx.com

DESCRIPTION

Health is a Health and Fitness Tracking application. It helps the user to track and visualize their health indicators better. That means a user can track down their activities and weight progressions.
However, the data has to be stored somehow. Currently, most users have to enter data manually. Google Fit is the only sync provider present in the Health at this moment. The way sync works for an activity in the Health application are:

1. Steps are pulled out of the sync provider.
2. Steps are converted into a walking activity.

There are some major drawbacks while using this approach.

1. Actual activities are missing in the data that is fetched from the sync provider.

2. Sometimes, Google Fit sync is not detecting steps from all sources. It displays the correct steps in the Google Fit application. However, the data received in the Health application has a lesser no. of steps than the actual steps. Issue 32

We can't sync activity from our Health application to the sync provider. So, these issues create a necessity to improve the sync options to a great extent.
So, the ultimate goal of this proposal is described below:

Primary Goals:

1. Support for syncing actual activities from Google Fit. Ultimately, we should take care of the model for the activities so that it can fit well with the other sync providers. Issue 42
2. Allow two-way sync as well. Issue 37
3. Support for different sync providers, including Apple Health and NextCloud Health. Issue 35
4. Setting up a schema so that activities and other data can be pulled out from multiple sync providers and there is a scope to add other health tracking models as well. E.g. Water drink tracker, Blood Count, etc.
5. Creating a User Interface for handling different sync providers.

Secondary Goals:

If time permits and there are enough resources, I would also like to work on the support for PineTime Companion apps. This way Health data can be accessed directly to the cloud services on Health and PineTime companion apps can focus on firmware updates. Issue 142

Mentor

1. Rasmus Thomsen (@Cogitri)

What city and country will you reside in during the summer?

I will stay in my hometown in **Ramgarh, India** until the 17th of July because of my Semester break. I will move to **Nagpur, India** on the 18th of July for my usual classes at my university. Regardless of where I stay, I will have a fast internet connection.

What applications/libraries of GNOME will the proposed work modify or create?

The proposal aims to modify the **Health (previously gnome-health)** application's sync options. First, I will change the sync part of the code to include various Google Fit scopes to store actual activities.
Besides the present Google Fit integration, I will also have to add some more files to support different sync providers and manage it in a way that each health data can be linked to a certain sync provider.
Along the way, I will also write tests to test the various new implementations of the different sync providers.

What benefits does your proposed work have for GNOME and its community?

The sync issue was first reported in 2020. Since then, multiple users have presented their interest in an improved sync functionality. Also, a lot of users have demanded the support of different sync providers as well.
With the improvements in sync functionality:

1. The usability and utility of the Health application will improve significantly.
2. Users will be able to track a large number of activities and other Health data as well.

With the addition of different sync providers:

1. The number of the user base for Health will increase since different sync providers mean the Health application can gather data from a large number of devices.
2. Users can have multiple sync providers to choose from for individual data and each data can be linked to a specific sync provider.

Thus, the addition of such improvements implies that GNOME and its community would benefit a lot from the improved Health application experience and an increased user base for the platform.

Why are you the right person to work on this project?

This project has taught me a lot about open-source, the use of Git, Rust, and GNOME frameworks. So, when the project idea was released for the Health Sync options, it immediately caught my mind.

I have been contributing to Health for quite some time. Therefore, I have understood the repository, file structure, and where to ask for help.

Apart from that, I have great experience working with NodeJS and building useful APIs. I have used several Google APIs including Google Fit APIs for a project and have a fairly good understanding of these APIs.

From the languages point of view, C++ and TypeScript have been my go-to languages for any programming project. I learned Rust a while ago and immediately loved it since the error messages were quite clear compared to the other languages that I used previously. And wherever I was stuck with Rust and GTK, I simply put a question in the respective GNOME channels and got my answer within minutes.

Being a student of an institute of national importance, I have learned to solve challenging problems, including algorithmic problems, and give my best to everything. When offered a chance to work on this project under the GNOME organization, I will surely give my best to make this project more usable.

How do you plan to achieve the completion of your project?

The plan is to include a bunch of useful scopes from Google Fit API to be added to the current Health model. Also, the current Health model has to be updated such that we can support different sync providers. The most important change will be to fetch actual activities from the sync providers. With this inclusion, we can store and track individual activities and weight changes. We should also support two-way sync with Google Fit so that the sync providers can be updated with the data stored in the Health database.
For the second half of the project, we should work on including different sync providers, such as Apple Health, and NextCloud Health as well. These sync providers will work similarly to Google Fit. And if the time permits and there are enough resources, we should work on the support of the different PineTime companion apps as well, so we can track live data from the PineTime watch via a companion application.

Please provide a sequence of tasks and subtasks and how long (days) you estimate it will take you to complete each of them. Highlight important milestones/deliverables.

My proposed timeline for the tasks will be as follows:

Dates (2022)	Project Deliverables/ Milestones
Before May 20	I'll continue working on the existing issues to improve my understanding of the project.
Community Bonding Period Begins	

May 20 - June 12 (Community Bonding Period)	With the help of my mentor, I'll help to familiarize myself with the community and the codebase. Also, I'll be discussing the potential ideas to solve the issue and set up SCRUM in GitLab. I will also work on different issues and bugs related to syncing to better transition into this project. I will also research how Google Fit, NextCloud Health, and Apple Health model their data during this period.
Coding Period Begins	
June 13 - June 26 (Week 1 and Week 2)	Create a barebone for how different activities will show up and are stored in the database. Create a schema based on a common model for sync providers to fetch the data from these sync providers. Work on pushing activities back to sync providers as well.
June 27 - July 10 (Week 3 and Week 4)	Test the Google Fit API and start implementing the API calls from the application. Create functions to handle and manage the actual activities pulled out from the API. Also, make sure to set a certain interval for syncing the data from these APIs
July 11 - July 24 (Week 5 and Week 6)	Write tests to test the newly made changes for Google Fit and finalize the work for Google Fit activity sync. Create a Merge request and put the code on review and add up anything else required to be changed.
Phase 1 evaluation	
July 25 - Aug 07 (Week 7 and Week 8)	Work on implementing Apple Health and NextCloud Health as additional sync providers. Create a new file for each sync provider and write functions to handle data similarly to Google Fit API. Write tests for each sync provider and test these new sync providers individually on how they sync the Health data.
Aug 08 - Aug 21 (Week 9 and Week 10)	Finalize the sync part. Add frontend design and a way to switch each sync provider for different Health data like Activities, Weights, (and in future water tracker, etc.). Add these frontend designs to the Setup Window and Preferences Window. Finalize all the work done and create a Merge Request.
Aug 22 - Sep 05 (Week 11 and Week 12)	If there is enough time, start a discussion on the support of PineTime companion apps and work on the implementation during this period. Finalize the Merge request after a thorough discussion with the mentor and get the code merged for the next release.
Final Evaluation	

What are your past experiences with the open-source world as a user and as a contributor?

I've interacted with several people from the open-source community and had a great experience so far.

From a user's perspective, I'm an avid user of open-source products using these products whenever there is a possibility. I have used Fedora Desktop with a GNOME environment since my first year in college. At that time, I simply wondered how these products were still free, and not long after that, I decided to contribute to the open-source to pay my part.

From a contributor's perspective, wherever I have introduced myself as a newcomer, the community has welcomed me and answered my questions with full enthusiasm. EddieHub Community was where I began my open-source journey. I got my first PR merged for a bot they were working on and I learned a lot about how open-source works and the basics of contribution. Soon after that, I came to the GNOME community and had a tough time installing the GNOME SDK, but the community members came to the rescue.

Since then, for any queries, I head over to the Rust channel, the specific toolkit's channel, or ask my mentor. And they have all been supportive. To conclude, I think positively about the open-source ideology and that's why I chose to contribute to the GNOME Foundation.

Please include links to your code contributions which have already been merged, or to Gitlab merge requests for the issues you fixed for the project of your proposal or any other GNOME projects. This demonstrates your willingness to learn and familiarity with development workflow.

My contributions to Health so far are described below:

1. **BMI Level bar** and **Setup Window:** Added Current Weight input in the Setup Window and an option to include BMI Label in the BMI Level bar. MR 165
2. **Database:** Implemented TrackerStatement to bind query strings instead of querying strings with the format. MR 166
3. **Steps View:** Added a message when Step Goal reaches 100%. MR 167
4. **Home View:** Added Calories icon. MR 134
5. **Date Selector:** Disallowed future dates. MR 97
6. **Activity:** Fixed activity's unit tests. MR 93
7. **Meson:** Set project language. MR 68

Apart from these contributions, I'm also working on an issue to Support Multiple users. WIP

If available, please include links to any code you wrote for other open-source projects.

I started my Open-Source journey with the EddieHub Community. I learned the basics of contributing guidelines and git by working for their organization. My contribution to EddieHub:

- Updated Features list with Alex Features. PR 409

What other relevant projects have you worked on previously and what knowledge have you gained from working on them?

During our second year, I took part in a hackathon where our team built a Health application that took several tests from the users, analyzed the data with the trained models, and provided health risks for patients. This application helped us stand in the top 20 positions in the Streamr Data Challenge. Project
Apart from that, I started working on a NodeJS application for a company where I built several APIs to help them exchange the usernames from social media, without having a mediator.
In my third year of college, I learned Software Architecture and various software models. I built a decentralized chat application with the agile model and also learned about many software models, including Scrum, Waterfall, etc. Project
I have also worked on a project where I used Google Fit's API to alert users about their daily activities and Goals.

What other time commitments, such as school work, exams, research, another job, planned vacation, etc? What are the dates for these commitments and how many hours a week do these commitments take?

I will take GSoC as a full-time commitment. Until July 17, I will stay at my home because of the semester break and I will use most of my productive time working on this project itself. During this semester break, I will devote 35-45 hours a week to the project.

After July 17th, I will move to my college and I'll start with my 7th semester. But the workload will be lower compared to the semesters until now. Since it will be my penultimate semester and all the subjects will be electives and a final year project. Therefore, I can easily accommodate my schedule for the project accordingly. I will spend 30-40 hours a week on the project during this period.