OpenTransit Grant Application for SF Brigade

Proposal Summary
The Proposal Summary should be about one paragraph and should include the amount of funding requested and give a general description of the use that will be made of the funds.

OpenTransit is pursuing its roadmap, which involves aggregating metrics from potentially terabytes of GPS data. Visualizations relating to mobility, speed, and reliability will make use of these metrics. This requires having multiple dedicated compute instances along with a mix of SSD and disk storage, which will require funding as to make our vision come to life and have an impact on transit riders everywhere.

Project History

OpenTransit started in October 2017 when Eddy first pitched his idea of using Muni's GPS data to visualize the speed and reliability of their routes. Since then we've on-boarded about 20 hack night attendees and presented at Demo Day and Open Data SF Day. Our goal is to use these open metrics and visualizations to increase public engagement with transit planning.

Problem you are solving
How big is this problem? How many people does it affect?

As congestion and transportation demand continue to increase, the mobility afforded by Muni has continued to decrease. That's why many people take unsustainable alternatives such as Uber or Lyft, which increase congestion, are unaffordable for many residents, and decrease the quality of life for everyone.

Public support is essential to initiating, planning, and implementing transit improvements, which is why we're focusing on increasing community engagement with transit planning.

Major Accomplishments so far

October 2017 – Tryn Maps becomes an official SF Brigade project and starts conducting user research and design specifications.

January 2018 – Tryn Maps renames to OpenTransit as to clarify our goal of using open-data to increase public engagement in transit planning.

Demo Day 2018: On February 7 we presented our mission and roadmap, and gave an early demo of our web-app. Our slide deck is on our homepage at http://opentransit.city.

Open Data Day SF 2018: On March 3, we attended Open Data Day as to present our roadmap and give a demo of our API in an unconference session.

On March 16, we deployed our web-app, which allows users to see the locations of all Muni vehicles for any moment of time starting December 2017.

On March 28, we wrote a guide on using our API and linked it to our homepage. Now anyone can access Muni's vehicle GPS data starting December 2017.

Other Info

Additionally, you should strive to answer how your project will address these factors: Scalability to other cities, ability to address identified civic needs, clear plan for sustainability, incorporation of open data, user research that has been conducted, roadmap includes accessibility or inclusivity, community / user engagement.

Last Fall we conducted user research by talking with planners at the SFMTA and Grand River Transit (in Waterloo, Canada), transit advocacy members at SF Transit Riders, and with planning and operations staff during our tour of the SFMTA operations centre in December.

We found that a major barrier to making any type of service or transit improvement was in the difficulty of achieving the necessary community support. Additionally, we learned that there are many insightful metrics relating to Muni service that was delivered along with projections for transit improvements that are not made publically available unless requested by management.

As we make progress in our goals, we plan on reaching out to other cities as to include them in our web-app. While our web-app currently only includes Muni, our API already works for multiple transit agencies, and is designed to use standard formats such as GTFS.

Project Goals

A useful structure is to break the project down into component goals. Under each goal, list and describe the activities that will be funded to achieve that goal, how achievement of that goal will be measured or defined, and when each goal will be started/completed.

We want to increase community engagement by:

1. Making Muni's GPS data open, providing and visualizing flexible mobility, speed, and reliability metrics derived from any segment of any route for any period of time.
    - Started December 2017, planned completion in late-July.
        1.1 Can access GPS coordinates of transit vehicles during any time interval and see them on a map (completed)
        1.2 Can access speed and reliability information of route segments during any time interval and visualize them on a map (in-progress)
        1.3 Can determine travel-times between two points at any given past point in time
        1.4 Can generate isochrones shapes that demonstrate mobility from a particular place at any given past point in time and draw them on a map (in-progress)
        1.5 Can generate links for sharing visualizations on a map

1.6 Users can track the reliability of their commute and of their mobility from their neighborhood using Muni
1.7 Call-to-action – can share on Twitter, being able to tag the SFMTA, transit advocacy groups, and their local political representation

2 Creating a visualization framework that will allow planners to clearly communicate the impacts of a transit improvement on our web-app to residents. Planned start date of late-July.
2.1 Can see proposed and ongoing projects on a map along with which routes they affect
3 Allowing users on our web-app to see how certain transit improvements will affect them and to send support or feedback.
3.1 Can see how various projects could impact your public-transit trips
3.2 Can ask questions or comment on projects on the map as well as directly send feedback to the transit agency

Budget

Component 1:

1.1: Existing OpenTransit Cloud Hosting - $160 / month
- Cassandra one-node cluster, running on one compute instance
- 4 Kubernetes containers, running on two compute instances
- Already set up

1.2: Increasing Cassandra cluster to 3 nodes - $120/month
- Two additional compute instances plus storage

1.2: Graph Database - $50/month
- One compute instance running Apache JanusGraph

1.2+1.3: Running data processing, AVL data upload batches, and travel time computation - $100/month
- Temporary compute instances for running batch jobs
- One compute instance

1.3+1.4: Isochrone Generation (IsoTransit - https://github.com/EddyIonescu/isotransit) backend + frontend + Valhalla backend hosting - $50/month
- One compute instances

1.6: Postgres database for storing user data (name, email, commute, neighborhood) and additional user API - $50/month
- One compute instance plus storage

Component 2:

Service to load and store configurations of transit improvements, and to communicate with IsoTransit (1.3) - $50/month
- One compute instance

Anticipated total monthly spend: $580

Our monthly spend will be less than this as not all components will have been completed at the start of the grant period – so we estimate that $2000 will be our total spending over May – August. This is the amount that we are requesting.