

PlanWise - Catalyzing the Community & Tools focused on Optimizing Healthcare Delivery & Planning

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Last revised by Web Producer on June 21, 2018 - 3:09pm.

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Proposal Status: Review Complete

Executive Summary

Planwise emerged from a pioneering collaboration between InSTEDD, Concern Worldwide, and Kelly Roberson, who had a vision to productize and make it simple to use powerful geospatial service optimization techniques anywhere in the world. As the tool began to take form, it quickly became apparent that there was a broad ecosystem and demand for calculating facility catchment and improving the coverage and capacity of a health system or distribution network.

PlanWise has a simple but powerful design philosophy. You and millions of people use lots of “big data” and complex optimization algorithms every day, by just looking up driving directions in an app. Good design and fast algorithms make an otherwise daunting task intuitive, transparent and accessible. It’s so easy there’s no reason not to use it. Analogously, PlanWise makes it just as easy to analyze and generate health resource coverage plans. It does it without needing GIS consultants, forcing users to have access to massive or exclusive datasets, or understanding of algorithms, or doing expensive yet disposable one-time planning efforts. There is no good reason why province-level health official anywhere - India, Ethiopia, Niger, Laos - shouldn’t have user-friendly tools for informed decision making.

Vision

Leaders and Decision makers improve health impact by making resourcing decisions based on data

Mission

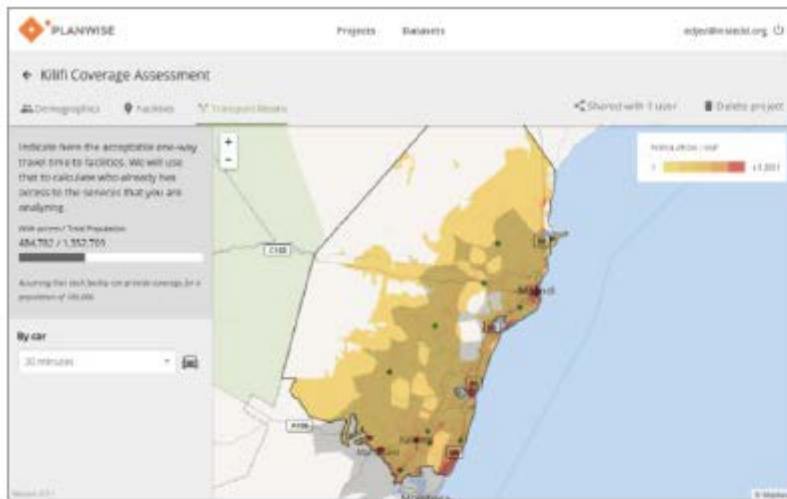
PlanWise will provide leaders and decision makers at every level with self-service tools that enables them to use proven data and algorithms to optimize investments in health resources.

Values

Collaboration – Openness - Simplicity

PlanWise has rapidly coalesced a rich ecosystem of country implementers, private sector and open-source data providers, algorithmic experts, design and technology experts that share this goal to democratize data-based plans, and have -or aspire to- contribute to a ‘commons’ that everyone in the world can access.

PlanWise makes it so easy for non-experts to generate and validate plans to improve health coverage that it has inspired NGOs and private sector members to extend its uses and contribute data.



Because bringing together all these disparate datasets, calculating plans, and implementing the results in-country required rigorous such cross-sector collaboration and careful design for diverse audiences, PlanWise emerged as a classic example of a commons where even the smallest contribution to the community, software and implementation model “floats all boats”.

Many NGOs, funders and health working groups have been adding use of Planwise into their projects, in planned implementations, or proposals, and a well-planned seed investment can be amortized and multiplied by the network.



See a brief video here: https://youtu.be/eRbo7xTx_Xw

More information here: <http://instedd.org/project/planwise/>

We propose to use resources as seed investment to catalyze the community with shared planning activities, help it grow with efficient communications, invest in the technology in minor ways that open up new user bases or help build significant partnerships, and merge the experience of global experts into a common codebase.

Description

Planwise works by taking 3 categories of data and bringing them together. The tool starts with population and demand density data, overlaying road networks and walking time calculations, and lastly mapping the health system itself. Together these data sets combined with industry leading best practice algorithms and optimization techniques allow an average ministry of health or NGO staff member to see several critical pieces of information:

1. To observe the actual coverage of the health system and quantify its current capacity.
2. To identify areas where coverage is missing
3. To explore and identify how best to enhance the health system for maximum impact.

Use cases we have identified to date include analyzing and planning for:

- **Primary healthcare delivery**, particularly for maternal and child health programs seeking to deploy new facilities, upgrade facilities, add ambulances, deploy mobile clinics
- **Laboratory or referral networks**, where facilities collect a sample or interact with a patient prior to further testing or treatment being performed at a second location.
- **Village or site-level interventions**, where a team sets up for a period of time to offer emergency services, or to support a public health campaign such as immunizations.
- **Radio tower placement** and capacity for international development projects that provide educational programming and behavior change content.
- **Water well placement** to maximize impact for investments in access to clean water.
- **School placement** and community analysis to identify gaps in communities where access to education is difficult.

For a demo video see here: [[Demo video](#)]

PlanWise made it feasible to quickly optimize health clinic placement in low-resource settings by combining healthcare demand statistics, data about access and reachability, and catchment data - with a simple to use interface that doesn't require GIS specialists or technical knowledge.

Together, InSTEDD and Concern Worldwide led the initial design and development of Planwise, and out of this experience an initial group of interested partners and organizations was formed. The project optimized health clinic placement modeling in Africa by combining healthcare demand statistics, data about access and reachability, and catchment data - with a simple to use interface that doesn't require GIS specialists or technical knowledge. Millions of people use "big data" and complex optimization algorithms every day by just looking up driving directions, and PlanWise has a mission to make it just as easy to analyze or even generate health resource coverage plans.

Planwise supports users, such as health system planners, analysts, and geospatial experts, to easily leverage the complex data and algorithms for articulating the true catchment of a network of facilities or sites providing a service. It then goes a step further by guiding a user through how they can best increase either the geographic coverage or the capacity of the network.

Planwise User Stories Include:

- As a program manager, I am preparing to deploy an intervention, and I would like to know where to select my intervention site(s), to reduce walking times for those who are most vulnerable.
- As a public health manager, I want to understand the true catchment of who can access a service my program is providing - via both driving and walking times.
- As a laboratory manager, I want to understand the gaps and bottlenecks in sample or patient referrals, so I can increase capacity or adapt referral patterns to maximize impact.
- As an analyst, I want to identify communities that have limited or no access to a service, to better articulate risk for poor health outcomes, outbreaks of disease, etc.

- As a program manager, I want to compare different scenarios for how best to increase the scope or capacity of the health system, so that I can make an informed decision about the approach we will take - such as to add more ambulances, build new facilities, increase capacity at existing facilities, send mobile clinics, etc...
- As a GIS analyst, I want to pull the base layers of demand and capacity data into another GIS or data visualization platform, to easily create custom reports and create compelling stories of impact and continuing need.
- As a funder/fundraiser, I want to know how much our network or system needs to grow to support X% of the population, so I can pursue the right amount of funding or advocate for universal access to care.

Digital Health Technologies

Planwise is the primary technology associated with this submission to Digital Square. It is licensed as an open source technology (GPL_v3) and is hosted and free to use as part of InSTEDD's platform of technologies. Planwise is built on top of a number of innovative and open data platforms, delivering additional impact and value through these diverse collaborations.

- For general details on Planwise, see here - [InSTEDD Planwise project page](#).
- For technical details on the platform, see the [Planwise github repository](#).



Supporting Technologies and Partnerships:

- [WorldPop](#), provides an open access archive of spatial demographic datasets for Central and South America, Africa and Asia to support development, disaster response and health applications.
- [Open Street Maps \(OSM\)](#) provides open road network data - while incomplete in many places, it represents the best scalable service for this data.
- [Google Earth Engine](#) and the collaboration with [University of South Hampton](#) have recently made friction surface data accessible, to allow for better walking time calculations.
- [Resource Map](#), the OpenHIE reference facility registry technology, is our default tool to manage service location data. We are also expanding to allow for csv uploads and are open to integrating with other platforms.

Community Feedback & Ecosystem

PlanWise organically attracted a living ecosystem of public and private sector data providers, algorithm experts, and country implementers, connected by a common interest rather than by MOUs and competitive contracts.

PlanWise commits to acts as a truly open initiative allowing for a multitude of partners and collaborators and not will not be driven by a single consortium or set of partners. ,

To grow the community in an organic fashion, we plan to focus on empowering groups and providing value, that aligns with the community by supports their goals. Specifically, we will:

- Hold routine (monthly) web-based community meetings where participants can share best practices, case studies, challenges, explore collaborations, and share updates.
- Conduct surveys and polls to gather feedback on community meetings, Planwise enhancements, guidance needs, and support material requirements, etc.
- Create and maintain an open digital repository of guidance, likely a wiki or simple website, to share information and details.
- Provide a simple mechanism to share and review concepts or proposals, and find collaborators.
- Depending on community preferences, we may also create a chatroom environment (e.g., slack) or google groups for asynchronous communication.

This open ecosystem includes so far:

- Concern Worldwide: the first implementer of Planwise for Maternal Child Health, and their collaborators and funders (including the Xerox foundation, and with special acknowledgment of Kelly Roberson who first pioneered with InSTEDD the work on productizing at scale the mathematical models validated in Kilifi, Kenya).
- ASLM (ASLM African Society for Laboratory Medicine) : Working on a funded program that is implementing PlanWise in 2018 for diagnostic device placement and sample referral optimization in 2 countries this year and enabling use across african countries in 2019.
- WorldPop, the open population and movement dataset effort that provides open access archive of spatial demographic datasets as a data 'commons', maintained by the University of Southampton. Additional Southampton researchers and grantwriters are exploring further implementations of PlanWise.
- OpenStreetMaps as a provider of road networks and in some cases drive time data.
- Google Earth Engine as a source of elevation data, and as a close ally of PlanWise that has worked with the University of Oxford to create unique data derivatives and friction surfaces corresponding to walking times, which PlanWise can help operationalize in the field.
- Steeve Ebener (AEHIN GIS expert) and Nicolas Ray (UN Environment / Science Division, Geneva Univ) who are authors and maintainers of AccessMod - possibly the most broadly disseminated toolkit used for catchment calculation. PlanWise can become a channel to capture channel their experience and expertise to a global audience.
- Equal Access is exploring the applicability of PlanWise to measure the impact of health programs transmitted via FM & AM, and optimize their reach by calculating and optimizing locations and characteristics of transmitters.
- InSTEDD, the largest architecture, design and engineering contributor to date, and facilitator of many of the conversations that have fostered the growth of the Planwise ecosystem as part of our commitment to open source technology development and open community stewardship..Ministries of health, NGOs, and members of open source communities & working groups related to facility registries and master facility lists that have given ideas & suggestions and are exploring possible use cases.

Case Study of a Specific Need: CRS

The Catholic Relief Services (“CRS”) case study below illustrates how incremental investments into a commons can have huge impact on the applicability and reach of a tool that has demonstrated value. It also shows that we can leverage these investments by amortizing them across a number of implementers and use cases, thereby maximizing the overall value of the investments. The following text is by Catholic Relief Services (CRS):

“...CRS and InSTEDD have been working together to collaborate around the use of PlanWise to support their programmatic operations by reducing walk times to program services and activities.

PlanWise is a cloud-based platform developed by InSTEDD, that enables wide access to algorithms and modeling that have already been used to plan facilities by Concern Worldwide, and is being planned for use in pan-african optimization of diagnostic equipment.

CRS works to save, protect, and transform lives in more than 100 countries, without regard to race, religion or nationality. In 2016, 94 percent of expenditure went to programming that benefits the poor overseas, our programming reaches 120 million lives. CRS has been helping people in need for nearly 75 years. The relief and development work is accomplished through programs of emergency response, HIV, health, agriculture, education, microfinance and peacebuilding. CRS manages multiple types of facilities and services, including: wells, clinics, trainings, distribution of cash and assets, as well as project monitoring and evaluation. In Madagascar where we used spatial analysis to reduce walk times, we increased our food distribution rates by 30% for pregnant women and children under 5. Reducing walk times gave valuable time back to women and allowed them to engage in farming and other livelihood activities. Re-distributing program outreach can cost CRS however it accomplishes our mission of serving the poorest of the poor.

Many of our programs do not have the capacity to run this spatial analysis, as a result we are reaching out to InSTEDD to build an easy to use web application.

- Hoping to optimize their services for walking times to wells, clinics, project training, cas and asset distribution activities, and program monitoring activities.
- If a change in tools and resources for outreach could be funded, to change how walking access times are computed in PlanWise, CRS would be able to share this new operational functionality with our programming globally to improve the lives of the people we serve. Based on evidence from our pilot, we believe this tool will increase attendance rates in our programmatic activity and give valuable time back to the poorest of the poor, who often live in the hardest to reach places.

...”

Planwise Global Good Maturity Model

The self assessment of the global good maturity model for Planwise, can be found here:

- [Link](#)

Some notes from our team: We believe that the main gaps identified in our maturity model, can be resolved and we are committed and excited to do so in a transparent and community-driven approach.

Proposal

We propose to grow the PlanWise ecosystem whereseed capital will be strategically used to catalyze & mobilize many implementers simultaneously.

This investment would be split between carefully considered enhancements to tools so that bottlenecks to adoption are removed, improving communications so advocacy can foster scale, and building relationships so the network of data, algorithms, and implementers is extended with

champions, resulting in a positive feedback loop. We also are planning for a two phase approach, where the community will be launched during phase 1 and grown during phase 2. For a detailed breakout of the activities per phase, please see the project work plan.

We envision the following outcomes and activities:

1. Remove technical bottlenecks for wider adoption and collaboratively create a feature roadmap. As more and more users engage and use the platform, they have been stretching the generic planning use cases to the edge. We want to make enhancements to the tool to make it intuitive for health officials across diverse scenarios to make the types of decisions that are meaningful in their particular domain (e.g. MNCH, emergencies, diagnostics, AM/FM, shelter, etc).
2. Manage and facilitate the community - strengthening activities such as training, support, implementation guidance, and fundraising collaboration - and build an open roadmap that supporters can rally behind and can capture community priorities.
3. Simplify and encourage community fundraising and advocacy by having good communication materials. Additionally, we aim to simplify the implementation effort and offering menu/cost structure so implementing in a country can become "fixed cost". This would make it easy for NGOs to include use of PlanWise in proposals and have predictable access to GIS experts, supports, model calibration, etc as a 'package'.
4. Run the initial data loading and processing for 50 priority countries. Right now, it takes a couple of hours of manual effort and a few hours or/day of high-power compute time to pre-process road networks, population maps, and other baseline data for a country. By doing this up front for 50 target countries we can allow people to self-serve uses and expand the relevant demonstration and pilot scenarios.
5. Enable GIS experts to "open the hood" of PlanWise and tweak and calibrate models, algorithms, and data for specific uses and countries - effectively saving their work and offering it automatically to a much broader audience than they could reach directly.
6. Outreach efforts to build partnerships with additional public and private sector data providers.

The balance of how seed resources would be applied to the activities above would be a community discussion in of itself.

The creation of a commons global good is an effort in community building as much as having quality technology. With such a unique and diverse ecosystem, PlanWise is a great example of how catalyst funds to support early capex can strengthen and expand a network that has the vision of being self-sustainable in the long run.

Work Plan, Project Deliverables & Timeline

The work plan for the planwise concept can be found here: [Link to spreadsheet](#)

Budget Narrative

Personnel

- Eduardo Jezierski - CTO and key solution expert for Planwise - Responsibilities and activities include overarching role in guiding and rallying the community, engaging new partners (private and public) and growing overall collaboration. Further the CTO will provide leadership in the development of the solution roadmap.
- Scott Teesdale - Program Director - Responsibilities and activities include general project management for the solution development and coordination between the stakeholders and InSTEDD team (including leading and agenda setting around routine meetings, status updates, and community and tool enhancement). In addition the program director will be responsible for supporting engagement among implementation partners and ensuring Planwise requirements are effectively documented

and planned for in the product roadmap.

- Nicolas di Tada - Architect/Director of Engineering - Responsibilities include technical leadership in guiding Planwise software development, based on community-driven requirement gathering, for both Planwise as well as integrations with other tools. Further, responsibilities include directing and managing the team of software designers and developers - to support the community and enhancements prioritized for Planwise.
- Software Designer and Developer (TBD) - InSTEDD has a pool of over 20 developers that we engage based on project needs and availability. Between 3 and 4 developers at various levels of effort will be identified from the pool to support the community roadmap. Responsibilities and Activities include: 1) supporting integrations; 2) enhancing the software; 3) supporting design and technical explorations; 4) technical capacity building.
- Bridget Sperry - Admin & Project Support - Provides logistics support for onboarding partners, travel/workshop planning support, meeting scheduling, coordination and report completion.

Workshop / Travel

- Workshop - We also plan to help kickoff this community and global goods engagement by convening a small, focused workshop, at a yet to be determined location, to help further engage key actors, explore their implementation challenges, and prioritize specific work times for the community moving forward. We are estimating ~10-12 individuals, meeting for 3-4 days, at a cost effective location that minimizes travel costs and burden among the group. Total travel and logistics associated cost for this workshop are \$33,000 USD.

Total Budget

The project budget includes:

- Phase 1*: \$304,902
- Phase 2: \$170,278

*We are currently seeking funding for phase 1. We plan for phase 2 to happen at a later date, informed by the progress from phase 1.