

PulseTile: Transforming Usability in Healthcare: <http://www.pulsetile.com>

Submitted by Tony Shannon (Ripple Foundation) on January 18, 2018 - 2:03pm

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Proposal Status: [Review Complete](#)

Executive Summary

Healthcare IT at present is simply not good enough and poor usability is one of the key issues facing the sector, adversely impacting clinicians at the frontline and impacting the care process.

PulseTile is an open source user experience (UX) and user interface (UI) framework developed by the non profit Ripple Foundation, grown from the NHS in England, that is promoting and supporting the adoption of an open health and care platform to transform 21st Century health care. Designed with the complexity of healthcare in mind, it leverages key patterns in healthcare to deliver a modular User Experience and User Interface framework that is intuitive and simple to use.

The Ripple Foundation wish to offer the open source PulseTile UX/UI framework to the Global Goods Digital Health Initiative on the basis that it offers a uniquely useful usability framework for healthcare that could support clinicians around the globe, and has specifically been developed to be

- Easy to implement and scale- using leading standard web based technologies
- Adaptable to different countries and contexts - on the basis of core Tiles and plugin Tiles
- Interoperable with other digital health technologies via an open set of restful APIs
- Open sourced, publicly and freely available online, under the leading Apache 2.0 license

While we understand and expect the Global Goods initiative could/should will offer a broad range of tools, given the critical role that usability plays at the frontline of healthcare, we advocate that a simple, helpful, clinically led, user experience/user interface framework for staff and patients, such as PulseTile, is needed to transform the global digital health sector, so we now wish to share PulseTile with the wider world as a Global Good. The primary outcome we seek is a user centred framework in healthcare that patients and staff want to use.

Consortium Team

The team behind the PulseTile UX/UI framework is based with the Ripple Foundation, London, England. The [Ripple Foundation](#) was born in Leeds, England in 2015 out of lessons from the multi-billion £ NHS National Programme for IT as well as lessons from the frontline in the busy Leeds Teaching Hospitals NHS Trust & Leeds City area. The Ripple Foundation was established as a non profit foundation Community Interest Company (C.I.C.) in 2016 to further the mission towards an open platform in healthcare. The PulseTile UX/UI framework is one of 3 key open source tools that the Ripple Foundation is supporting as part of its mission towards an open platform in healthcare. bit.ly/openplf

The makeup of the team that is behind PulseTile and would lead on this project is as follows.

- Dr Tony Shannon, Director/Architect, Ripple Foundation
 - Emergency physician by background and Clinical Lead behind the PulseTile UX/UI framework, with an interest in healthcare reform, improvement and usability at the frontline. Main point of contact.
- Phil Barrett, Head of Development, Ripple Foundation
 - Co Director of the Ripple Foundation and passionate advocate for change in the health IT market. Oversees those projects that Ripple Foundation support.
- Simon Gamester, Head of UX Design
 - User Experience Architect and Head of Design for the PulseTile UX framework
- Kirill Beloborodko, Head of UI Development
 - Head of Technical Development for the PulseTile framework, oversees the agile development methodology and quality assurance process that delivers the PulseTile codebase.

As the development of an open platform to transform 21st Century Healthcare is key to the Ripple Foundations mission, we are actively seeking collaborators with us during this project.

Project Description

The PulseTile UX/UI framework has been developed as a generic UX/UI framework for multiple purposes , such as a Person Held Record app, an Electronic Patient Record application or a broad and deep Electronic Health Record that can span a city/region/country. The background, rationale and the design and development of the framework are explained on the website & comprehensive documentation site.

<http://www.pulsetile.com/>

<http://docs.pulsetile.com/>

The core PulseTile Tiles aim to support the core aspects of any clinical application in an easy to navigate approach, which include analytics (reporting), patient group/cohort management (waiting list, ward list, operating theatre list etc) and single patient management (Diagnosis, Medications, Allergies etc) functionality.

The plugin PulseTile Tiles aim to support a wide range of diverse clinical needs in the same framework, from patient imaging (DICOM/PACS viewer) to vital signs to telehealth sessions (via WebRTC etc), though there are a wide range of further modules that could be added.

While the following videos should help set the context for the background and some of the work done on the PulseTile framework since 2015 to date..

<https://www.youtube.com/watch?v=JAudRFpexCo&index=1&list=PLNxHSK29ViKLrhdPTqbYr6XGTya4uGBv>

https://www.youtube.com/watch?v=jpfIZ_HWr3w&index=2&list=PLNxHSK29ViKLrhdPTqbYr6XGTya4uGBv

Our proposal is focused on improvements we can make to the PulseTile framework to ensure its value to the global community as a Global Good is increased. Some of those improvements and outcomes include;

- User Experience at the Frontline- Improvement/Refinement for a Global Audience
 - The PulseTile framework has been designed based on years of experience at the frontline of healthcare, primarily from healthcare systems in the UK/EU/US. We believe that the patterns in the UX framework will allow it to be reusable anywhere in the world. In the first instance we propose using an online based prototyping approach to expose the breadth and depth of the current PulseTile framework to a global audience. We welcome views from a very diverse global audience as to how to improve the User Experience (UX) of the framework and any key gaps that need to be addressed.
 - Once these improvements have been identified we are keen to work with Digital Square to grow the open source community and market of suppliers who are willing and able to address those improvements and gaps and thereby grow the capacity/capability in this area
- Integration with existing/other Global Goods -
 - In line with the Implementable & Interchangeable principles of the leading openHIE initiative and related architecture.. <https://ohie.org/architecture/> , we suggest the addition of a modern responsive UX/UI framework for healthcare i.e. PulseTile as a key component.
- Adding Multilingual Support - for languages other than English
 - As PulseTile has been developed primarily in the English language we propose adding multilingual support to the framework
- Improving Accessibility Support - for users with a disability
 - As PulseTile has been developed for both clinical staff and patients, it is mobile ready , though we feel there is room for improvement with accessibility.

We welcome your support on our proposal and look forward to sharing PulseTile with the wider world as a Global Good.

Proposal in Detail

Introduction

Ripple Foundation is a clinically led not for profit organisation working towards and supporting the move to an open platform fit for 21st century health and care. Supporting open source, open standards and an open architecture that can be used worldwide. Born out of the National Health Service in England and building upon 10+ years expertise (both clinical, business and technical) the team have broad experience with both national, regional and local based healthcare IT implementations.

We are supporting those people who are working to change 21st century health and care. They include clinical, business and technical leaders who have a need and/ or want to service that need.

We are supporting the process of building the community who want to collaborate around this open platform mission. We want to challenge the limitations of the current limited health and care IT market, positively disrupt and move health and care towards a services oriented marketplace.

We are supporting those key technologies that we believe should be open sourced to benefit the health and care world. Ripple Foundation is actively supporting key open platform projects in order to further this mission.

We operate on a free code, free knowledge but paid for support model to help healthcare systems with their move towards implementing an open platform approach. As a non profit foundation, aligned to Digital Square, we recognise the need to encourage and foster organisations (both for and non profit) to provide quality, cost effective services based on an open platform. Our services include:

- Leadership, Strategy & Design
- PMO support
- Education & Training
- Quality Assurance
- Contractual & Communication

We are fully signed up to the Digital Square principles of the need for Global Goods that will transform internationally. We have enjoyed and benefited from this open proposal approach and learned a lot about the current state of healthcare IT across the globe.

With due respect to all those other leaders in this field and their important work, we strongly believe that our carefully considered technologies are ideally placed to enhance this Global Goods mission and are already align well with the thought leading openHIE architectural principles.

We feel there is a real need to mature and further the health IT market, with a set of improvements to existing technologies in the LMIC setting, as well as improvements to those technologies such as our own that have emerged within an HIC setting. Therefore it is our considered opinion that a focused and action orientated set of proposals that aims to compare, contrast, combine and showcase these approaches is in the best short, medium and long term best interests of this Global Goods initiative from Digital Square.

We therefore offer one of three interrelated proposals that would each add value individually and of course when combined would be most beneficial. The specific outcome of this piece of work is a demonstrable showcase of an open platform, that combines the best of LMIC derived and HIC open source technologies. In doing so we believe this can help set solid foundations to which further investment to the global good initiative should be pursued to improve care healthcare across the globe.

In advance of the detail of this application we wish to address one particular point head-on, which is; why invest in new and unproven technology rather than invest in a set of tried and tested set of technologies proven in the LMIC setting? To this important point we politely

point out that though we have been advocating open source as a route to healthcare transformation in an HIC setting over the last 10+ years, we have been unable to get support for some of those existing LMIC based technologies in a HIC setting to due to one of three key reasons

1. Usability
2. Integration and interoperability
3. Robust records architecture

All challenges compounded by the vendor lock-in mentality that pervades the HIC health IT landscape.

Therefore, it is our view that any global goods initiative should openly and directly focus on addressing these issues to ensure existing LMIC technologies are continuously improved as well as ensuring a bridge is build between LMIC and HIC innovation in this field towards realising one truly excellent and compelling set of global goods.

This proposal aims towards helping Digital Square realise its Global Goods ambition.

User Stories

1# Medical Officer in LMIC setting

Medical Officer (MO) in a small district hospital in Africa who is responsible for a series of clinics, wards and an operating list, with minimal resources. He/She has an existing internet connection some of the time and is keen to run a more efficient service with an easy to use electronic patient record solution. Most of his/her needs are generic and can be summarised in three areas:

- Running basic business analysis on the patients involved and their outcomes
- The essential running of the clinics, wards and operating lists where groups of patients need to be managed on a daily basis to ensure the smooth running of the service
- Easy to use and navigate patient record system including on mobile devices

While the needs of the service are mostly generic, in order to stay in touch with good medical practice as it evolves at a regional/ national/ international level, the MO involved is keen to ensure the health system application is continually improved and stays in touch with this good medical practice.

There may be insufficient time to develop pathway design at a district hospital level, the MO is keen to obtain weekly/monthly updates and avail of modules of new or improved modules as they become available, from an open platform via their internet connection.

2# Chief Medical Information Officer in HIC setting

A Chief Medical Information Officer (CMIO) based in a medium sized city/region in Europe who is responsible for supporting a wide range of city wide clinics and hospital based wards and surgical operating environments, with reasonable resources, in their publicly funded healthcare system. He/She has a variety of existing health IT suppliers, yet is frustrated by the level of service support and clinical colleagues are frustrated by the poor usability of the systems He/She has been tasked with supporting a much more efficient, patient centred, service with an move towards an easy to use electronic patient record open platform approach in the region. Despite the complexity of the size and scale of the healthcare setting and associated integration challenges, most of the city/regional health IT needs are generic and can be summarised in three areas:

- Running clinical/business analysis on the patients involved and their outcomes
- The essential running of the clinics, wards and operating lists where groups of patients need to be managed on a daily basis to ensure the smooth running of the service
- Easy to use and navigate patient record system including on mobile devices

While the needs of the service are mostly generic, in order to stay in touch with good medical practice as it evolves at a regional/ national/ international level, the CMIO involved is responsible for ensuring that the health system application is continually improved and stays in touch with this good medical practice and makes best use of the public funding.

It is understood that there are a wide variety of disconnected patient pathways across primary, secondary, tertiary care across the city/region, the CMIO officer is keen to work towards an open platform that can be improved with weekly/monthly updates and avail of modules of new or improved modules as they become available, from a global open platform commons via chosen solution.

Use case

These contrasting user stories are outlined to highlight the pressing need for better IT tools across the planet, regardless of the LMIC and HIC setting. Most healthcare systems seek an easy to use platform, integrated and robust data for global reporting

While we appreciate the roots of the Digital Square initiative may be LMIC based, this call is after all, a call for Global Goods, so we are pursuing a goal of an open platform that can be used by all.

- Primary use case of this proposal is to work towards supporting both the health worker in the LMIC setting who has insufficient healthcare IT to meet their needs as well as the health worker in the HIC setting who is frustrated with the poor state of their healthcare IT. In both cases there is a clear and present need for global goods, based on an open platform across the world, leveraging smart principles such as the standards based, interchangeable components approach outlined by OHIE.
- The focus of this related proposal is to progress one of three open source tools that has emerged from a HIC setting and work towards their integration into an LMIC setting so they are aligned with the OHIE effort and leveraged as Global Goods. The tools are based on three key needs at the frontline:
 - Great usability: healthIT that frontline health workers and patients want to use.

- Easy integration: with existing systems as well as future applications
- Robust clinical records architecture: to unite clinical efforts around the world

Digital Health Technologies

PulseTile

PulseTile has been developed to support the busy clinical front-line as well as patients who wish to take greater involvement in their own care. This is based on 10+ years of research and development into usability at the front-line and leverages the leading edge technologies from the user interface development scene (React.js and Angular.js) to ensure they are mobile ready and responsive out of the box. We have crafted a core set of functionality (known as tiles) as well as a plugins approach to a wide range of modular components (tiles) that balances reusability and flexibility.

The PulseTile framework is building upon a generic set of UI oriented RESTful APIs and has been developed with data exchange and interchange in mind. In addition, through the development of our care record maturity model (<http://ripple.foundation/2016/02/integrated-care-digital-records-maturity-model/>), it has been designed to cater for existing systems as well as those applications that are working towards a semantically sound records architecture.

To our knowledge PulseTile is at the forefront of healthcare user experience (UX) and user interface design and development that is; Clinically led, User centred design, Patterns based Development, Modular approach, Open Source code.

The underpinning rationale for the PulseTile framework is explained as part of the overarching Ripple Foundation website (<http://ripple.foundation/pulsetile>) and continues to be comprehensively documented (including a User Interface kit) to the highest standards that developers can make use of. <http://docs.pulsetile.com/>

PulseTile development, issues and project management and roadmap are all managed in the open on GitHub with all code released on an Apache 2.0 licence with all related documentation freely available.

Community Feedback

PulseTile

Theresa Cullen

Increasing the efficiency and safety of clinical care is critical as we move towards POC HIT solutions in LMIC. The concept of 'tiles' for data display is gaining increased attention and traction as one way to help the health care team digest, consume and act upon massive amounts of information. I think that 'creatin' new ways to look at data in the UI is a critical next step. Is there a community that is helping inform this work and the subsequent roadmap?

Amanda BenDor

What would be some potential adopters of PulseTile? How would integrations work with existing software?

Niamh Darcy

I am delighted to see this proposal as I think having a UX/UI layer within any eHealth architecture is extremely important, that supports different usability requirements in different LMIC. The tile or modular approach is really important - giving a lot of flexibility in terms of UI integration with consumable data and related security standards.

As users adapt and change their expectations of how information is displayed and how they interact with information it is important to have an adjustable framework that is easy to configure across HIT solutions to support user needs.

As this is an approach that impacts all the HIT proposals, it might be useful to consider having some more detailed in person collaboration to discuss how something like this could be added to for example the OHIE or other architectural approaches.

Self-Assessment of the Global Good Maturity Model

See attachment

Activities/ Action for this proposal:

The Ripple Foundation team delivering this work, operate on a user centred, Agile development, sprint based methodology. As part of this approach, the team will undertake more detailed preparatory work at the beginning of a project and ahead of each of the 2 week development sprints. Whilst the team are comfortable undertaking back to back development sprints, we have found when working with multiple partners and organisations, that undertaking 1 sprint per month ensures sufficient evaluation and preparatory work to maximise the time in development.

The detail of each of the items highlighted in the sprints below, would be further elaborated and agreed ahead of the commencement of the associated development to ensure user needs and outcomes are clearly defined. Whilst the team would undertake daily standups, sprint retrospectives etc. we would also look to align with broader reporting measures defined by Digital Square in an open and transparent manner.

Title	Activities
Project Startup	Project initiation User Experience framework review kickoff Connection with the oHIE team & technologies
Sprint 1	PulseTile Multilingual Support Integration with JEMBI
Sprint 2	PulseTile Accessibility Enhancements
Sprint 3	Online Demo of PulseTile & QEWD & EtherCIS connected to JEMBI With test data
Project closure / knowledge transfer	Online Training Materials Technical overviews of the tools used to aid knowledge share Project closure report

NB Dependency: On cooperation from openHIE (JEMBI) technical team to provide a test environment with access to their APIs

Workplan - Project deliverables

Upon completion of project, the team will have delivered the following:

- An online demonstrator of Global Goods in action, based on the oHIE model utilising PulseTile/QEWD/EtherCIS
- Showcase test environment integrations with the following existing Global Goods:
 - JEMBI
- Open Source code - released under an Apache 2.0 license
- Free and openly available documentation and learning materials

- Knowledge transfer to any interested within the Digital Square ecosystem
- Project report of work undertaken, lessons learned and proposed next steps

Workplan - Schedules of Milestones

#	Milestone	Example timings
Month 1	Project initiation	e.g. May 31st 2018
Month 2	Sprint 1 (as per Sprint plan above)	e.g. June 30th 2018
Month 3	Sprint 2 (as per Sprint plan above)	e.g. July 31st 2018
Month 4	Sprint 3 (as per Sprint plan above)	e.g. August 31st 2018
Month 5	Project close and knowledge transfer	e.g. September 30th 2018

NB This proposal is one of three related proposals , all related to the 3 key tiers of the Ripple showcase stack, towards an open platform.

Those 3 proposals are for;

PulseTile: Transforming Usability in Healthcare: <http://www.pulsetile.com>

QEWDjs: Quick/Quality Easy/Enterprise Development & Integration for Healthcare: <http://qewdjs.com/>

EtherCIS: Enterprise Clinical Data Repository - built to world leading openEHR standard <http://ethercis.org>

On its own this proposal offers a unique yet valuable asset to the Global Goods initiative.

When combined with another/all three, these offer a major contribution to the Global Goods initiative, in particular these offer a way to combine the efforts and expertise of the open source health IT community from both LMIC and HIC backgrounds towards truly groundbreaking global goods.

Budget Narrative for PulseTile proposal

Key support

Days

Strategy and Clinical leadership- Dr Tony Shannon -	20
Programme Management and oversight - Phil Barrett -	20
UX/UI Design - RootSol Ltd - Simon Gamester	13
PulseTile UI Development - SliceArt Ltd - Kyrlyo Biloborodko	70
QEWDjs Integration - M/Gateway Ltd -Rob Tweed	15

Total Budget

USD \$ 148,034

See attached budget narrative for more information, the detailed project budget has been submitted to Digital Square

NB This budget has been prepared as a standalone project , while 1 of 3 proposals. It can be expected that significant savings could be achieved across the 3 projects if these platform components could be funded together

Supporting Documents:

 [pulsetile_digital_health_software_global_good_maturity_model_-_selfassessment2018march_v1.xlsx](#)

 [PulseTile Budget Narrative](#)