IUIS

Immunodeficiency Diseases Search Web App Proposal

Prepared for: Mimi Tang, Bobby Gasper, Jose Franco and Kate Sullivan, IUIS

Prepared by: George Charalambous, Director, Curve Tomorrow

7 September 2015
Proposal number: IUIS-001
Version: 2.0

Table of Contents

Introduction

This proposal is Curve Tomorrow's (CT) response to the "Request for Proposal - Immunodeficiency Diseases Search Web App" ("the Product"). Curve Tomorrow propose that the creation of the IUIS is staged, refer to Scope of Work and Work package sections. The approach breaks the project into three major phases. *Phase 1* focuses on analysis and design to enable the development of the most elegant product for the target users and reduce downstream errors. This will be expanded under the 'Our Approach To The Project' section. *Phase 2* is focused around developing the the web portal. The final phase, *Phase 3* surrounds post-deployment support.

The proposal will go through key deliverables, a breakdown of work packages, the quotation and a background of Curve Tomorrow.

Current Situation

We have reviewed current available systems that utilise a dataset of immunodeficiency diseases. We identified two currently available products; a product from the *Kazusa DNA Research Institute* (Japan - web16.kazusa.or.jp/OAS/OAS.html) and *Immunology* (USA - www.immunodeficiencysearch.com/).

The Immunology website has a major technology flaw. The website was developed using Adobe Flash that the industry has begun to stop support, including large internet technology organisations such as Google, Apple and Firefox. Adobe Flash was historically used for video and animations on the Internet. Unfortunately, it has become notorious for its security flaws that allow malicious attacks to unsuspecting users. Furthermore, Flash is not supported by Apple's iPhone and iPad.

The Kazusa website is based on older CGI technology. Historically, CGI (Common Gateway Interface) was used in the 1990's to develop for more complex websites. It is no longer industry best practice for new web development. Further, it is not a recommended for sites that require user authentication and regular updating of content.

Scope of Work

Curve Tomorrow's proposed solution will provide the client the following deliverables to ensure that *Section 2.2 Product Goals* are satisfied.

The Web 2.0 based application that will have:

- a **search** mechanism for the growing list of PIDs using different inputs, e.g clinical symptoms, type of infection, immunophenotype, gene defect

- an **intuitive** user interface that makes the live database of PIDs **easy** and **quick** to search over and navigate

- administration functionality allowing for **regular updates** as the list of PIDs change

- an interface to be usable on **mobile** and **tablet** devices (responsive to screen size)

Figure 1 - Proposed System Architecture below is a proposed architecture based on the deliverables.
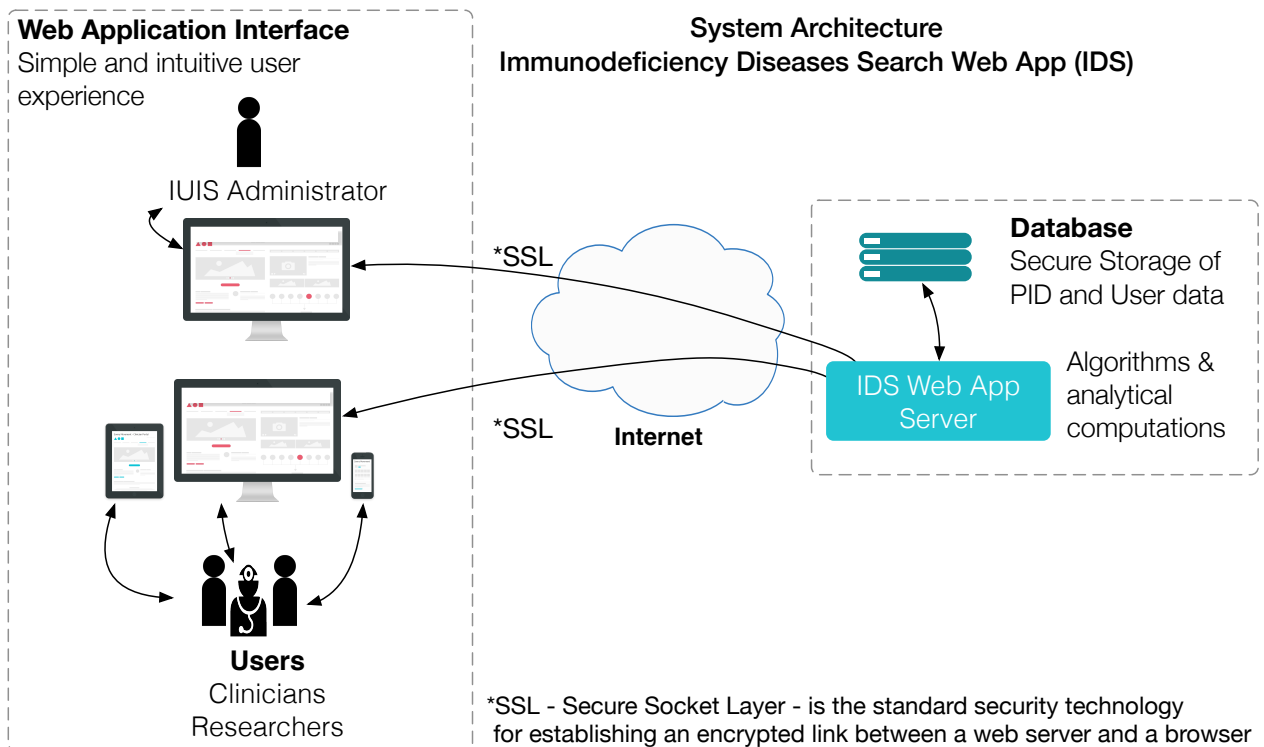
Figure 1 - Proposed System Architecture

Features & Technologies

Below is CT's response to satisfy *Section 3.1 Features & Technologies*. As technologies, tools and techniques evolve rapidly in the development of web applications, specific identification of versions.

Maintainability and Updatability

To ensure maintainability and updatability as part of our development and future support we will implement:-

- continuous monitoring software tools to notify of any unplanned anomalies to the web portal to prevent unexpected breakdowns we would implement New Relic or similar

- implementation of automated testing frameworks to ensure a high level of quality. Automated testing revolves around ensuring that as iterations of development occur with the updating of the application including future maintenance, previously developed features do not stop functioning. We will use products such as Protractor or similar

Scalability and Availability

To ensure scalability, we will utilise existing highly scalable web-based infrastructure and software platforms. This will entail the deployment of the application to the gold standard in Cloud Computing Services(Amazon Web Services) that have highly compliant and secure platforms. Amazon services are well known for the reliability and availability with a service level agreement indicating an 99.99% uptime (availability).

Extensibility and Industry standard open-source development software

The extensibility of the solution is highly dependant on the chosen development software. We strive to use industry leading standard open-source development software that comply with the HTML5, CSS3 and Javascript standards. We propose to use an integrated model that will include:-

- Ruby is a flexible and expressive general-purpose language which is reliable at runtime, and productive to use at development and test time. The library support is mature and extensive and the tooling is excellent.

- Rails is a web-framework for Ruby that is designed to be productive to work within, and uses sensible defaults to make otherwise complex choices and tasks simpler (such as managing security, database changes and application deployments).

- AngularJS for the user interaction. AngularJS is a toolset for building the framework most suited to your application development. It is fully extensible and works well with other libraries.

Security

Security is an essential component of a web application. We will ensure security by applying best practice and industry standards that are required based on the risk appetite of the IUIS sub-committee and the result of a security risk assessment that will be conducted at the beginning of the project. As a minimum requirement, we will ensure data is transmitted securely between all components of the system, as indicated on Figure 1 - System Architecture.

Accessibility

The proposed solution will have the capability of internationalisation (localisation) of language and units. It is proposed that we will develop the Product in English in the first instance. If the IUIS sub-committee decides to adds this feature the Product.

The product we propose will be developed to be of responsive design. This will ensure the Product will inherently be accessible from mobile and tablet devices.

Project Breakdown

Based on the list provided in Section 2.3 Preliminary Features, we have developed the breakdown into functional stories. These may change depending on the results from Phase 1 - Analysis & Design to include or exclude features that the IUIS team deem essential and non-essential features. We have also included post-deployment cost estimations to enable the cost of the Product over its usable life. It is recommended that the post-deployment costs are included in budgeting for the Product. Refer to Appendix 1 on how we propose to run the project.

Personas

We have added fictional personas to identify the key users of the Product. We have identified two key personas who will use the Product. These personas enable the development of great user experience. These personas will be extended during Phase 1 - Analysis & Design.

Harry Klein (Harry) is an IUIS sub-committee administrator. Harry is a primary immunodeficiency expert. Harry will be responsible to the system and will administer the users and the PID data.

Jane Gandalfo (Jane) is a clinician/researcher that will interface with the Product on regular basis. Jane will use the platform to obtain the latest PID updates.

Product Development

Table 1-1

ID	Analysis & Design	Essential
A1	Observation and Research of Users	Yes
A2	Interviews/Storyboard	Yes
A3	Gather input and analyse feedback	Yes
A4	Brainstorm solutions/approaches to design	Yes
A5	Select the best designs/options	Yes
A6	Validate with clinicians and experts	Yes
A7	Build and validate wireframes/prototypes to test best options with users and carers	Yes
A8	Create User Experience design and confirm system architecture of chosen solution	Yes
	Analysis & Design Duration	**4 weeks**

ID	Build & Validation	Essential
B1	Project Setup and Infrastructure	Yes
B2	As Jane, I can login/logout of the IUIS portal	Yes
B3	As Jane, I can do a Google type search across the diseases	Yes
B4	As Jane, I can do an advanced search across specific fields within the disease	Yes
B5	As Jane, I can sign up to the IUIS portal	Yes
B6	As Jane, I can validate my email when I sign up	Yes
B7	As Jane, I can forget my reset my password	Yes
B8	As Jane, I can manage my account details once logged in	Yes
B9	As Jane, I login and have my details remembered for next time	Yes
B10	As Jane, I can delete (soft) my account	Yes
B11	As Harry, I can manage a list of users (admin)	Yes
B12	As Harry, I can manage the list of diseases (admin)	Yes
B13	As Harry, I can have the IUIS portal pre-loaded with existing data	Yes
B14	As Jane, I can view/interact with the IUIS portal in my native language (single language)	No
	Build & Validation Duration (excluding non-essential components)	**14 weeks**
	Project Total Duration (excluding non-essential components)	**18 weeks**
	Project Total Duration (essential and non-essential components)	**20 weeks**

Post-deployment

ID	Post-deployment	Essential	Cost
B15	On-going platform infrastructure and tool costs - estimated annual cost	Yes	$2,000 USD
B16	Product Support - Maintenance and Monitoring - estimated annual cost	No	$5,000 USD
	Total (excluding non-essential components)		$2,000 USD

Assumptions and Dependencies

1. Access to relevant information and project representatives, will be available for Curve Tomorrow consultants.

2. Any travel required as part of the project will be at the expense of the client.

3. Curve Tomorrow is responsible for the deployment of each phase of the project.

4. Browser support will be finalised after project start and depend on the user requirements.

Project Timeline

The Project Timeline is broken down in the Project Development phases. These timelines are highly dependant on the availability of the project representatives. The estimated overall engagement could range from three to six months.

Phase 1 - **Analysis & Design**   Completed within 4-6 weeks of receiving project approval

Phase 2 - **Build & Validation**   Completed within 18-22 weeks of receiving project approval

Proposed Team
From our team, we propose utilise:

Mohinder Jaimangal, Director - https://au.linkedin.com/in/mohinderjaimangal

Julian Kelabora, Software Developer - https://au.linkedin.com/in/jkelabora

Case Study

PEERS - Murdoch Childrens Research Institute
PEERS (Paediatric Evaluation of Emotions, Relationships and Socialisation) will be the first digital, objective assessment tool available to health professionals to detect social problems in children leading to critical early intervention and treatment for these common disorders.

PEERS is an iPad App composed of 14 games that test a patient's social functions across a variety of domains. PEERS is interactive and incorporates elements of gamification to engage and capture the most accurate data from the patient. Upon completion of PEERS a social quotient or "social IQ score" is delivered that will guide professional interpretation and a

Curve Tomorrow, working with Prof. Vicki Anderson have successfully delivered a prototype of PEERS. The PEERS prototype has lead to a successful funding round from NHMRC Development Grant and was a top 20 finalist at the national ozApp awards this year. PEERS is now being developed using the Curve Tomorrow development process and scheduled for production release in 2016.

PEERS is being developed in collaboration with an international team of clinicians, researchers and key opinion leaders in child neuropsychology and development from Canada, UK and USA.

PEERS is being developed and will be marketed as a Class 1, non-measuring medical device making it a credible clinical assessment tool. Once developed, the product will comply with the ISO-13485:2003 for medical devices.

For an overview of Curve Tomorrow's health technology experience refer to 'Our Experience in Digital Health'.

Referees

Key Partners and referees include:

- Professor Vicki Anderson, Head of Psychology, The Royal Children's Hospital, Melbourne, Australia

- Dr James Dromey, General Manager – Business Development & Strategy, Murdoch Childrens Research Institute, Melbourne, Australia

Quotation

An overview of the proposed project schedule and cost breakdown provided below for essential components.

	Task (Essential)	Duration	Total
		weeks	USD
M01	Analysis & Design	4	$10,200.00
	Sub-total (ex GST)		$10,200.00
M02	Build & Validation (essential)	14	$35,700.00
	Sub-total (ex GST)		$35,700.00
	Total (ex GST)		$45,900.00
	Total (inc GST)		$50,490.00

	Task (Non Essential)	Duration	Total
M03	Internationalisation of language (non-essential)	2	$6,800.00
	Total (ex GST)		$6,800.00

Terms

- This project and any future projects the client engages Curve Tomorrow are bound by the terms and conditions contained in the Curve Tomorrow in this document.

- This quotation is valid for 30 days from the specified date.

- This project will be invoiced a third upfront, a third at halfway point and a third at completion.

- Payment terms are 7 days and deliverables can not be delivered and will remain the property of Curve Tomorrow until full payment is received.

Liability

Any application developed by Curve Tomorrow for the Client are produced as a work for hire; therefore the Client assumes full responsibility for each application's accuracy, completeness, and fitness and agrees to indemnify Curve Tomorrow from any and all claims of product, procedure, and operation liability including any and all costs incurred in defending any and all such claims. Curve Tomorrow's liability arising out of this Contract shall not exceed the total of the amounts which the Client has paid to Curve Tomorrow under this Contract.

In no event shall Curve Tomorrow be liable for any incidental, indirect, special, consequential losses or damages in connection with or arising out of this Agreement.

Curve Tomorrow reserves the right to change any warranty or service policy set forth in any product license or elsewhere, at any time, in a form of a written notification. Curve Tomorrow is not responsible for quality or completeness of data. The Client assumes full responsibility for the usability, safety, and operational integrity of any and all software, equipment and files provided by the Client for Curve Tomorrow's use on the Client's project.

Warranty

All development work, included in all Work Packages, comes with **60** day warranty from the date of project acceptance. All bugs raised will be defined by the severity levels in Appendix 1.

Notes

- Curve Tomorrow will only handle support requests once the issue has been diagnosed by IUIS and defined by IUIS using the above Severity definitions

- The Warranty (please refer to Appendix 1) indicated timeframe response times are to solve problems (update code).

- If Curve Tomorrow investigations find that the support request was **NOT** the responsibility of Curve Tomorrow then a charge of **$200** per hour (excluding GST) will be applicable for the time spent on the investigation.

Intellectual Property

The Product will the property of IUIS and/or collaborators. All Curve Tomorrow background IP utilised to produce the Product will remain property of Curve Tomorrow. Curve Tomorrow will grant a perpetual, worldwide and royalty-free licence to IUIS for all Curve Tomorrow background IP utilised for the development of the Product.

New IP created during the development of Product will become property of IUIS. IUIS will grant a perpetual, worldwide and royalty-free licence to Curve Tomorrow for all new IP created during the development of the Product.

Company Background

Curve Tomorrow is a digital health technology company that makes a positive impact on society with the use of pervasive technology. We are placed at the forefront of health technology, with offices embedded in a world leading Melbourne tertiary hospital and in Silicon Valley, USA.

We work side by side with medical researchers, clinicians and end-users to develop the most elegant and user friendly digital products. We have successfully done this in the fields of autism spectrum disorders, traumatic brain injury, allergy, cerebral palsy, speech therapy and genomics. Curve Tomorrow has successfully released clinical and consumer facing digital health products and experienced in developing medical device products.

Our unique culture, methods and approach mean that we always focus on the deeper meaning behind what our concepts require and ensure that they are always user centred innovations.

Our Experience in Digital Health

We have extensive experience in developing digital health products that align well with your application.

PEERS
A tool to assess a child's social disorder (i.e. Autism Spectrum Disorder (ASD) and ADHD).
Video: https://youtu.be/BzA6NL1IVaY

HeadCheck
An app that helps with the diagnosis of concussion.
Video and Info: www.curvetomorrow.com/#brief1

SONNY Movement
Laptop and Web App using a 3D camera to assess movement of TBI, CP and Stroke victims.
Video and Info: www.curvetomorrow.com/#brief7

CMT PedS
Web App Assessment tool for clinicians to assess a neurological genetic disease (CMT).
http://calculator.cmtpeds.org

ALT
A tool to assess language and speech delay

Vitality
An app to facilitate a medical research project into Allergy.

Fingertips
A wearable that allows a visually impaired user to interact with their smartphone

Appendix 1 - Our Approach To The Project

We propose breaking the development of the product into two major phases.

Phase 1 - Analysis & Design Sprint   **Phase 2 - Build & Validate Iterations**
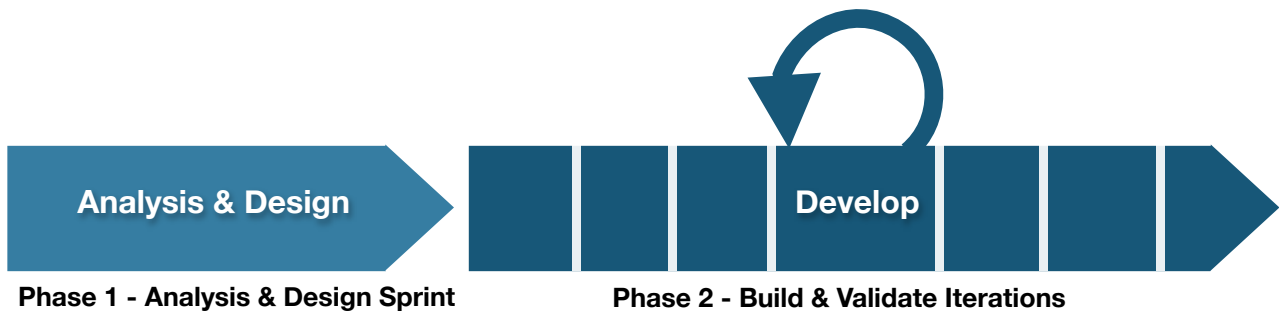
This phase is focused on ensuring we are building the best and most elegant product for the target user and reduce downstream mistakes.

1. Understanding Background and Users

2. Look at whats possible (Diverge)

3. Decide on direction (Converge)

4. Prototype (Minimum Viable Product)

5. Validation of the Prototype with Users

Using an Agile Development methodology we will start by building a fully functional slice of the product (i.e. feature/scenario) from end to end. The user will interact and experience each slice/feature to provide immediate feedback for the next iteration.

We are committed to delivering the highest quality products. Everything we develop will be thoroughly tested using best practice in unit, acceptance and system testing. If your product is classified as a medical device, we have additional processes and experience in developing TGA and FDA class 1 and 2 devices.

Appendix 2 - Issue Severity

Severity Level	Situation	Response Time	Curve Tomorrow	MCRI	Target Resolution
Severity 1 – Urgent Very High Business Impact	Major System or Component Failure Malfunction with critical impact on Client's ability to operate entire business processes & production. No work-around or manual process available. The problem must be resolved immediately.	● Initial Communication Call Back: Within 2 Hours ● Commence Service Call Work: Within 5 Hours	● Curve Tomorrow initiates & manages the Service Call to resolution. ● Curve Tomorrow troubleshoots the incident, engages appropriate expertise and releases new version when necessary.	● Client provides appropriate personnel & access to the premises to sustain continuous work effort & necessary communication. ● Without appropriate access or instructions, the incident will be downgraded to Severity 2. ● Client notifies Senior Executives on-site of the incident.	● For 8x5 Coverage: During Regular Business Hours: Next Business Day 85% of the Time. ● During Other Than Regular Business Hours: Day after Next Business Day 85% of the Time.
Severity 2 – High High Business Impact	Minor System or Component Failure Malfunction causing impact on Client's ability to operate significant business processes or production. No work-around or manual process available.	● Initial Communication Call Back: Within 3 Hours ● Commence Service Call Work: Within 6 Hours	● Curve Tomorrow initiates & manages the Service Call to resolution. ● Curve Tomorrow troubleshoots the incident, engages appropriate expertise and releases new version when necessary.	● Client provides appropriate personnel & access to the premises to sustain continuous work effort & necessary communication. ● Without appropriate access or instructions, the incident will be downgraded to Severity 3. ● Client notifies Management on- site of the incident.	● For 8x5 Coverage: During Regular Business Hours: Next Business Day 85% of the Time. ● During Other Than Regular Business Hours: Day after Next Business Day 85% of the Time.
Severity 3 – Moderate Moderate Business Impact	Component Failure Malfunction not causing impact on Client's ability to operate significant business processes or production. Work-around or manual processes are available.	● Initial Communication Call Back: Within 4 Hours ● Commence Service Call Work: Within Next Business Day	● Curve Tomorrow initiates & manages the Service Call to resolution. ● Curve Tomorrow troubleshoots the incident, engages appropriate expertise and releases new version when necessary.	● Client provides appropriate personnel & access to the premises as mutually arranged to support work effort & also liaises with Curve Tomorrow for necessary communication and support.	● For 8x5 Coverage: During Regular Business Hours: Within One Week 85% of the Time. ● During Other Than Regular Business Hours: Day after One Week 85% of the Time.
Severity 4 – Low Low Business Impact	Component Failure Malfunction not causing virtually any impact on Client's ability to operate significant business processes or production. Work-around or manual processes are available.	● Initial Communication Call Back: Within 8 Hours ● Commence Service Call Work: Within One Week	● Curve Tomorrow initiates & manages the Service Call to resolution. ● Curve Tomorrow troubleshoots the incident, engages appropriate expertise and releases new version when necessary.	● Client provides appropriate personnel & access to the premises as mutually arranged to support work effort & also liaises with Curve Tomorrow for necessary communication and support.	● For 8x5 Coverage: During Regular Business Hours: Within One Week 85% of the Time. ● During Other Than Regular Business Hours: Day after One Week 85% of the Time.

Appendix 3 - Insurance Details

CHUBB INSURANCE COMPANY OF AUSTRALIA LIMITED
A.B.N. 69 003 710 647 A.F.S. Licence No: 239778
Level 14, 330 Collins Street Melbourne, VIC 3000
Telephone: 9242 5111 • Fax: 9644 0909

Information and Network Technology
INT Liability

Certificate of Currency

27/07/2015

Insured: Curve Tomorrow Pty Ltd

Policy Number: 93552374

Covering: INT Liability

Limits of Liability:

Financial Injury (Professional Liability)	$5,000,000 each act and $10,000,000 in the aggregate
Public Liability	$20,000,000 each occurrence
Products Liability	$20,000,000 each occurrence and in the aggregate

Policy Period: From: 10/08/2015
                       To: 10/08/2016

This Certificate is furnished as a matter of information only and does not constitute an insurance contract upon which claims can be made.

Authorised Employee

Contact Information

For further information or any clarification sought, please contact:

George Charalambous
Director
M: + 61 400 221 279
E: george@curvetomorrow.com.au

Mohinder Jaimangal
Director
M: + 61 409 021 703
E: mohinder@curvetomorrow.com.au