

## MOBILE CANBERRA (PILOT) – CASE STUDY REPORT

version: 4.0 (Final) – 13/05/13

### 1. PURPOSE

The report details the history, status, and lessons involved in the Mobile Canberra (pilot) project.

It constitutes the final (hand-over) report to the ‘customer’ – the ACT Government.

It also serves as a reference document for the other parties involved including Imagine Team P/L; the eGov Cluster; and NICTA.

Finally, it should also be useful for any other government agency or jurisdiction considering a similar area of development.

### 2. BACKGROUND

#### eGov Cluster

The eGov Cluster (the ‘Cluster’ for short) is sponsored by NICTA; it fosters the uptake of Australian ICT innovation by the public sector.

It does this to both advance the Australian ICT industry and to improve public administration.

One mechanism the Cluster uses to achieve its goals is by establishing and running collaborative projects that bring together government; industry and research.

The aim of such projects is to explore and develop new technology ideas to the point of proven feasibility / non-feasibility; this approach in effect fast-tracks what can be a lengthy and fraught process so that the potential of new Australian IP is realised and not lost or exported.

The Mobile Canberra (pilot) was one such collaborative project.

#### Project Genesis

The project was initiated at the request of the ACT Government via its Executive Director of the Government Information Office (GIO).

The ACT Government has two drivers that prompted the request: 1. Strong commitment to being an open Government and in particular promoting the use of government data provided to the community through its open data portal, dataACT; and 2. A desire to participate in and encourage Canberra as a connected and digital city. Hence ICT is a specific focus area for the ACT Government.

The ACT Government had made a public commitment to providing new services over the mobile / smart-phone platforms. Simultaneously the ACT GIO had become aware of a local ICT start-up with proven capabilities in app development.

The ACT GIO formally sought Cluster's consideration of establishing a collaborative project on app development. The design criteria and scope were defined. In due course the Cluster's Steering Committee approved the establishment of the project.

The project team comprised: the ACT Government through its GIO and senior Shared Services representative (the customer); Imagine Team P/L (the developers); NICTA Engineering and Technology Development (general oversight of development and user experience design); and the Cluster (project managers). The first meeting of the project management team was held mid-October 2012.

### Project Objectives

In summary the project sought to test two areas of innovative government service delivery: 1. A device-independent mobile / smart-phone service; and 2. Services that draw on the Open Data platform of the ACT.

The critical design criterion was that the app be developed in HTML5 rather than the native or device specific (Apple and / or Android) app environments.

HTML5 is effectively a web-browser toolset. Its appeal to the ACT Government if successful was twofold: 1. Support for the app was expected to be far simpler than alternative options; and 2. It would deliver an enhanced user experience by avoiding the complications of the upgrade process for device-dependent apps.

### Project Operation

In summary the planned duration was approximately 6 months.

The project team met approximately every 2 weeks.

All major milestones, as revised from time-to-time due to unforeseen circumstances were met.

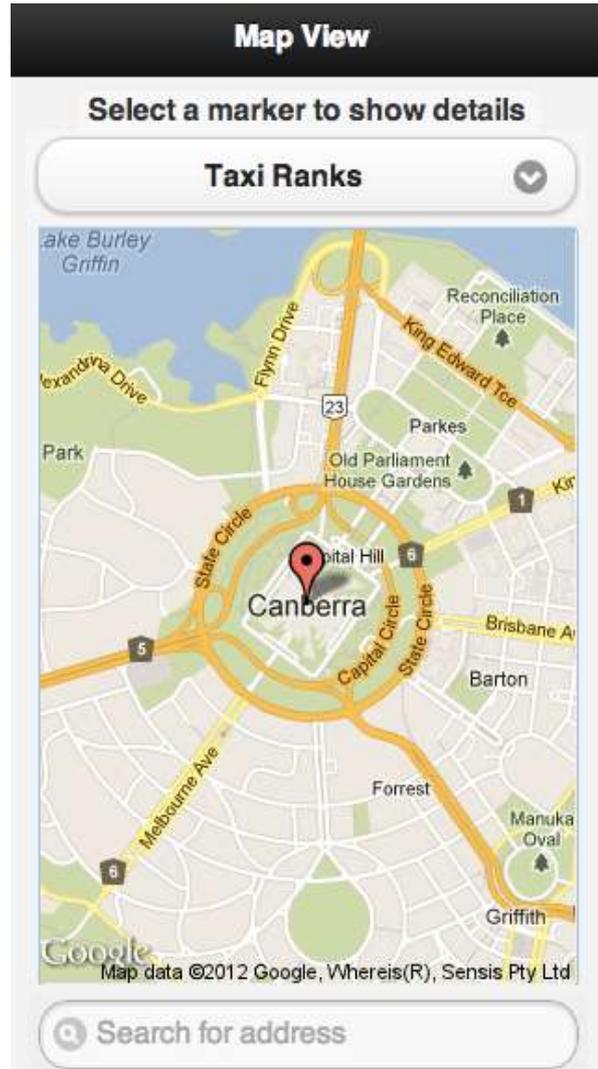
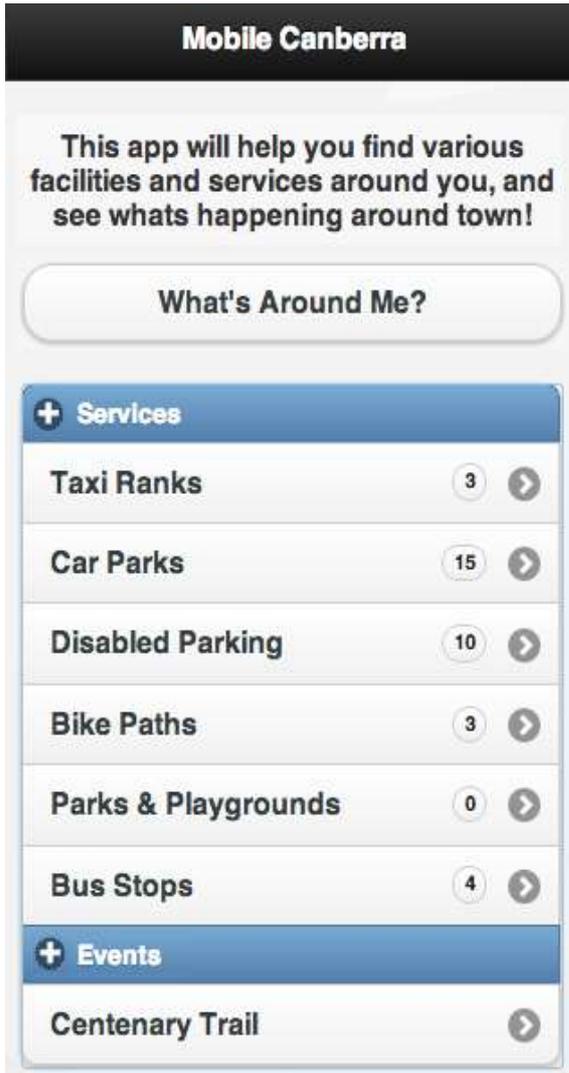
System development and testing was formally completed mid-April; the project itself is deemed completed with the publishing of this report.

## **3. STATUS**

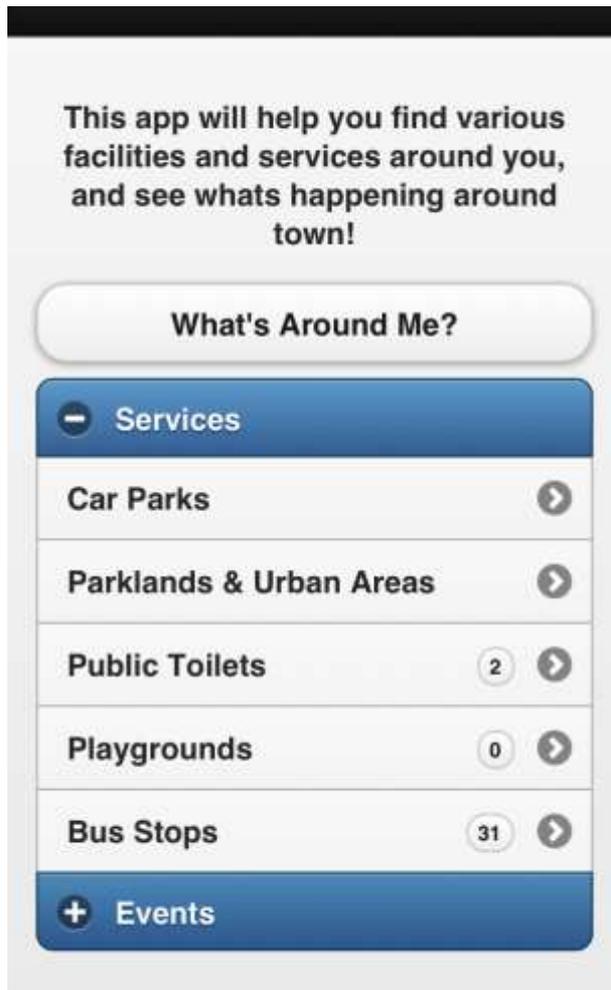
### Project Status

The project has delivered a working HTML5 app capable of being run on both Apple and Android devices.

Copies of the designed and planned main 2 entry screens for the app are provided here.



Initially 7 service functions were designed and planned to be available through the app. At project completion, 5 have been delivered (some of which were not in the original design); those that ended up being unable to be delivered were because the data to support them could not be provided (or provided in a suitable format). The final main 2 screens follow.



Mobile Canberra is a web application that was developed using various web services. Such services include PhoneGap which is responsible for managing web functionality for the app (i.e. Google API's) and an Apache Tomcat server as a hosting solution to manage backend services for the app (i.e. pulling data from DataACT). Other environments used for development were Eclipse and xCode which are native Java and Objective C IDE's (Integrated Development Environments) for the Android and iPhone platforms. The code is stored on a secured repository and updated using SVN version control.

### User Feedback

The detailed analysis and findings are contained in the separate report at attachment 'C'. In summary:

- Concept:
  - The app was well received (however performance was a major issue, refer below)

- There was some confusion around icon usage but participants learned quickly and progressed from there
- Performance:
  - The majority of the issues result from the use of PhoneGap
  - Performance of the app would be considered a critical failure in the context of the time sensitive nature of use cases (e.g. needing to catch a bus)
- Data:
  - All the participants found the data accurate, but only 54% found it contained enough detail to make decisions
  - There are some limitations around the data (useful levels of detailed info).

### Overall Assessment

The Mobile Canberra Pilot has shown that productive collaborative development through the Cluster is both possible and worthwhile. (From an ACT Government perspective the experience of collaborating via the Cluster has been a very good one, and one to be repeated in the future.)

This particular collaboration has delivered a pilot app and technical learning associated with the current performance limitations of a pure HTML5 approach. To overcome these limitations it appears a hybrid (i.e. a combination of HTML5 and device or native code) would be required.

Equally important is a realisation of how dependent such a government services project is on having reliable access to relevant source data. To “go live” with a production version of this app, the ACT Government will need to ensure that a regularly updated source of published data is available from data custodians within government.

At the agreed completion of development; the project team’s collective assessment is that the app provides a useful and potentially attractive service, but in its current form has limited appeal for two reasons: 1. It is too slow; and 2. It doesn’t include the most useful functions that were part of the original specification, e.g. taxi ranks; bike-paths.

The ACT Government has clearly resolved the critical question about the viability of HTML5 apps and it now has full access to the app’s source code should further development be decided.

The ACT Government now has a good understanding of the limitations of its current Open Data offering - the collaboration participants would welcome the opportunity to provide further input to any planning about how to improve that situation.

The collaborative project approach of the Cluster has proven to be a very effective model for developing and/or refining new innovative ideas in a low-risk, low cost way that doesn’t breach government probity and equity requirements.

## 4. LESSONS

### Technical

The aim of the project was to explore the possibility of using web technologies to deploy an app, which could leverage a handset's geo-location capabilities in an accurate manner (i.e. not a simple IP address lookup, should provide accuracy of 20 meters at least), and could be deployed simultaneously across multiple devices.

If possible, the code was to be narrowed down to one source, such that there was only one code base to manage.

It was assumed that there would be a server side component which performs any computationally expensive tasks, and that the app will simply display content.

It was assumed that the primary smartphone OS's targeted were the Google Android and Apple iOS platforms, but with an auxiliary preference of also deploying to Windows Mobile 7, and Blackberry.

After some research, several solutions were found that met these requirements. These were narrowed to a choice of two - Titanium and PhoneGap.

Titanium is a technology that allows the deployment of an app across multiple mobile platforms with a singular code base. The code base is "converted" into native code binaries.

- Titanium Advantages:
  - Code in HTML5/Javascript/CSS
  - Can access native UI elements (so does not replicate them via an HTML equivalent)
  - Can access native API's (which include geo-location)
  - Speed/"Feels Native"
- Titanium Disadvantages:
  - "Out-of-the-box-solution" (which means you get what you get - limited ability to make customisations)
  - Not open-source
  - Relative to PhoneGap it has a smaller development community
  - iPhone/Android/iPad/Android Tablet only

PhoneGap is similar to Titanium in that it allows deployment of an app across multiple mobile platforms with a singular code base. It is however different to Titanium in that it leverages the smartphone's browser capabilities to display the app. Rather than convert the code base into native code, PhoneGap merely "sandboxes" the environment in a web-view, with some specially built APIs and HTML5 technologies to access native phone technologies (like geo-location).

- PhoneGap Advantages:
  - Code in HTML5/Javascript/CSS

- Support is abundant (which includes a wide range of plugins for extra functionalities)
- Can access native API's (which include geo-location)
- Open source (can make customisations need be)
- 7 smartphone OS's supported (Android, Bada, Blackberry, iOS, webOS, Windows Phone 7, and Tinzen)
- PhoneGap Disadvantages:
  - Slow/"clunky feel"
  - Various web-engines have different capacities (akin to Microsoft IE vs. Firefox vs. Chrome. On this note, the best web-kit is Safari's, followed by Android and Blackberry. Windows Phone 7 is apparently abysmal)

After careful consideration, the recommendation was to go with PhoneGap. While using Titanium would allow for an app of a better quality, it ultimately fell short in its limited smartphone OS support, and its closed-source nature.

While the objectives were met at a high-level, there were several problems that manifested throughout the development phase. In practice, it was found that while PhoneGap allowed for a platform-agnostic approach to coding, there were many intricacies in the varying platforms and platform versions that required corresponding variations in the code. In fact, 4 versions of the same code were required to run the app on Android 2.3-4.0 and iOS 5-6! It is estimated that the time spent on debugging and finding the workarounds in the variations would've been the same amount time as developing two code-bases to develop the app natively for the iPhone and Android platforms.

It was also found that there were performance issues that couldn't be resolved due the slow nature of current mobile web technologies. Specifically, there were occasional memory leaks and poor garbage collection timings that caused the app to slow down. In addition to poor memory management, it was found that the rendering engines on handsets were not as fast as desktop web-browser counterparts. As a consequence, the app was not very responsive, especially when compared to natively written apps.

In developing the app, the availability of the data is just as critical as the functionality of the app. A lack of easily-available/consumed data renders any functionality pointless. As this project started as an exploration, concerns over the format of the data were raised. To counter in the uncertainty, our system was designed such that the app would communicate to a server that parsed data in a uniform format. This allowed for the app to have a consistent interface with any datasets, and the server catered for any data format discrepancies/differences.

### Procedural

The project itself operated successfully; it delivered on the planned outcome within time and within budget; all parties contributed as per their commitment including being active participants on the project team; at no time was there the need to reference the formal signed Agreement underpinning the project; all parties promptly paid any monies committed as per the Agreement.

As stated above, the Cluster's collaborative project model has proven to be a more flexible, yet dynamic approach to requirements definition. It presents as a blueprint for governments interested in embracing innovation as a means of transformational improvements.

The developers (Imagine P/L) were exemplary in their involvement; they delivered a very high quality system; they delivered what they said they would on time; they contributed actively in all planning and review sessions; they provided additional information requested promptly; the assessment is that they did work beyond what was planned to ensure the project was as successful as possible.

The level of expertise and professionalism displayed by such a young business is impressive. It is a credit to the team and to their educators. Considering the attractiveness of Imagine Team's charge-out rates compared to much larger and higher-profiled industry competitors; and their creativity and responsiveness, tapping into these sort of capabilities should be a very strong value proposition for government.

## 5. RECOMMENDATIONS

In summary, the participants recommend:

- The collaborative project model employed by the Cluster for a rapid and effective, yet low-risk, low-cost exploration of innovative ICT by government.
- At its current level of maturity, a purely HTML5 based app solution for this kind of service oriented app is not viable; accordingly the participants believe a hybrid approach is the answer (with this latter approach to possibly be the subject of a further collaborative project).
- Government Open Data initiatives are in part designed to promote innovation and entrepreneurship in the expectation that new wealth will be created through developments such as Mobile Canberra. To realise such benefits, government must ensure that their Open Data programs are first and foremost treated as a whole-of-government program and then directed, managed and resourced properly. To assume they will happen 'organically' overlooks the very real policy, cultural and technical challenges within government, and the engagement challenges externally. Both these areas have to be addressed to underpin success.