Imagine Team Pty Ltd
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Case study for a ACT Digital Licence System application

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In starting the challenge, our understanding was that the objective of the challenge was that the ACT government required a system that uses a physical identifier to uniquely identify people in Canberra. This physical identifier had to be able to be used as a key point of interaction with government (and potentially private) services. Specifically, we understood that a key part of the challenge will be providing a solution which lends itself to easy consolidation and integration of existing government workflows into the software/hardware.

Our proposed solution was the utilisation of the ACTION MyWay card (which allows users to commute on the Canberran public transport service) as the basis for the physical identifier. The MyWay card contained a variety of validated information, such as a user's name, their date of birth, and their concession status. Using the MyWay card as the basis for a universal identifier, the Imagine Team wanted to leverage the existing infrastructure, and extend the capabilities to third-party services. Services identified included using the MyWay card for identification at ACT Libraries, and as a mechanism to pay for parking.

In hindsight, the proposed solution was very ambitious, and did not address concerns government agencies typically have. In hindsight, the Imagine Team's solution only addressed the technical considerations of a consolidated ID system, but did not address things such as business cases for the various additions (i.e. why would it be cheaper). The Imagine Team also lacked experience in the implementation of the system which failed to address risk-averse government departments. In the short timeframes of the project, the Imagine Team could not find a department that would be able to take full advantage of a cross-departmental identification system as a case study.

The Imagine Team realised these deficiencies shortly after we started on the challenge, and changed the approach such that the focus back was scaled back from an approach which was based on the MyWay card, and focused on providing end-user benefit by providing a "digital wallet". The solution was a mobile app dubbed "Cardly". This solution would provide benefit where end-users could replace their physical cards with digital versions in an iPhone or Android app.

The Imagine Team worked closely with the Road Transport Authority and with existing MyWay data streams, and procured a proof-of-concept iPhone and Android app that is extendible, and with the right support, deployment ready to coincide with the roll-out of strategies highlighted in the Digital City Action Plan and the Strategic Plan for ICT 2011-2015.

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The Imagine Team's methodology comprised of a simple approach of exploring possible solutions and exploring the requirements of various involved departments. The Imagine Team understood that a strict exploration of requirements provided by the departments would not leverage the entirety of the value proposition, and because of the recency of the technology, might also not be completely aware of the full capability of smartphone devices. In this regard, the Imagine Team had to kick-start discussions by providing a list of possible extensions with no basis on existing requirements. From there, the relevant departments would get a better understanding of the value proposition, and the possibilities of the technologies on mobile platforms. The government departments would then able to make informed decisions on what the mobile wallet solution would entail, and make decisions that have a basis on existing departmental requirements.

Once the exploration was complete, the Imagine Team moved to build the proof of concept based on the outcomes of the exploration. The point of this particular component was not to develop a fully-featured solution, but rather enough so that the solution was demonstratable, and viscerally understood.

The last component was to demonstrate the solution, and gather feedback on the nuances, and gather a better understanding of any impediments to the solution's wider roll-out. From there, it would be an iterative approach of exploration, building, and further feedback until the solution was deployment ready.
Aligning with the methodology outlined, the Imagine Team had a joint-discussion with the Parking authority, the Transport and Municipal Services, and a number of other agencies (with NICTA in attendance) to get a better understanding of how the consolidation of identification services might benefit the various departments. To provide suggestions to kick-start the discussions, the Imagine Team provided examples of an upgraded Park-N-Ride system.

The Park-N-Ride system is a government initiative that aims to promote commuters to park their cars at car-parks near interchanges, and subsequently catch the bus. The existing Park-N-Ride system was a manual process, whereby a user had to have a $200 balance on their MyWay transport card to be considered for discounted parking. Considering the average bus fare is less than $5.00, a $200 balance is a high amount to commit. This system also assumed commuters would park their cars at an interchange to catch the bus, but had nothing in place to actually check if this happened. The Imagine Team proposed a solution whereby a consolidated identification system would not only provide a mechanism to check if a commuter had caught a bus after parking their car at a nearby car-park, but because of the high-accuracy, would also negate the need to load $200 onto the MyWay card. The solution would entail the usage of the MyWay card data to gain access to the recent trips of an individual, and use the geo-locational capabilities of the mobile-device to ascertain whether the individual had parked their car in a nearby car-park, and subsequently caught a bus. Extensions such as using the MyWay card balance as a mechanism to pay for parking were also discussed.

The discussions were positive, but they stalled when it was realised that while there may be a clear use-case with the MyWay/parking solution, there weren't that many other use-cases that clearly highlighted the advantage of using several disparate identification systems in conjunction where the sum of the parts were more than the individual components. Discussions included suggestions of using the MyWay card as a library card, or the MyWay card as a concession card. While these discussions were interesting, they did not align with the objective of the competition.

After the realisation, the Imagine Team went back to the drawing board to discuss alternative solutions that still fell under the larger umbrella of a digital identification system, but had wider use-cases than the specific objective of the consolidation of disparate ID systems.
The Imagine Team took a step back to try and come up with an objective that aligned with the challenge goals, and with an objective that was achievable in the timeframes of the competition. A meeting was held between various departments to see if the digital wallet could find value in being a digital version of existing card-based identification systems. The proposed value would be that an end-user would be able to use their phone as an ID system rather than carry a multitude of different cards. Furthermore, as the cards would be digital, various improvements such as updateability, fraud prevention, and cost savings could be explored.

With this new approach, it was found in subsequent discussions that the Road Transport Authority (RTA) would be interested in exploring the option of having a digital driver’s licence. The high penetration rate of people who own driver’s licences made this a highly attractive option to explore for a case-study to explore the validity of a digital wallet, and so the direction of the digital wallet challenge was agreed upon.

The Imagine Team had several meetings with the relevant people at the RTA, and it was found that there were several considerations in order to explore such a solution:

- A digital driver’s licence solution had to be as secure (if not more) than the current card-based solution
- In order for the required uptake by relevant stakeholders, the digital driver’s licence had to demonstrate financial benefit such that it was cheaper to maintain than the existing card-based solution
- The solution had to be platform-agnostic to ensure wide uptake

With this understanding, the Imagine Team decided that the new direction would entail the inclusion of a sample driver’s licence, and a MyWay card. In this way, the proof-of-concept built would have more than one card included (making it more akin to a “wallet”), and would demonstrate the extendability of the solution.
A key component of any digital wallet must be the security of the solution, and the extendability of the solution. In this understanding, the Imagine Team started the design of the solution with a generic mindsight, and use the practical examples of the MyWay card and Driver’s licence as components within the generic solution.

The Imagine Team works with a user-experience driven development methodology, whereby the various user-flows are first explored and mapped out. From that understanding, the technical architectural diagrams are derived.

Find following the user flow diagrams, the architectural diagrams, and the user interface designs.
Using the user flows as the basis, the architecture was designed with security and extendability as a core component of the design. To that end, the following architectural considerations were addressed:

- A separate component was created which has no other functionality other than to be an interface between the Cardly server and external third-party servers, such as the RTA or the Transport and Municipal Services servers, for the validation of the end-user provided card information.

- Because of the separation of the core functionality and the interface, new interfaces can be created on the fly, and once the interface is tested and approved by the relevant department, it can be made available to all end-users without having to update the app.

- All the communication between the app is handled over an HTTPS connection, and all stored data is encrypted using a 2048-bit public/private key bank-grade encryption.

- Wherever possible, all sensitive data such as passwords, identification numbers are stored on the app, and are only stored temporarily on the server.

- A core component of the security was providing mechanisms for the client-side app to provide extra methods of verification. These include:
  -- Geolocation-based registration (e.g. if you're Canberran, you have to be in Canberra to register your digital driver's licence)
    - It makes it difficult for an attacker to fake a registration if they aren't in Canberra
    - Analogous example: You can't get an ACT Driver's licence if you live in Queensland
  
  -- Two-sided authentication (e.g. if a police officer pulls you over, they pull out a custom version of the app built for police officers, tap the phones together, and get all the information about that person)
    - If someone builds a fake version of the app, the licence number/information displayed would not be the same as what the officer sees in their version of the app
    - Analogous example: If a police officer suspects you have a fake licence, the police officer would check the details back in their car to verify the information
  
  -- Associating a device ID with a digital driver's licence (e.g. the WiFi MAC Address and NFC Broadcast ID)
    - There can only be one copy of a digital licence per person/phone
    - Analogous example: You can only have one physical drivers licence card at a time
**Design Considerations**

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**Every time your licence is used, you get a text message/email**
- You will be alerted whenever your licence is being used, so you can be aware if anyone stole your phone and is using your licence
- Analogous example: None

**Verified Accounts (MyWay card, Facebook, Twitter, Credit Card, home address, etc)**
- The more verified information you have associated with your digital drivers licence, the more likely it is that you are who you say you are
- Analogous example: 100-point ID system

**Hologram parallax**
- Mimic the security features available on the physical card, so you can't just take a screenshot of the digital licence
- Analogous example: Card has several layers of hologram security

It was important to note that the Imagine Team tried to come up with a list that was device-agnostic in technological approach (i.e. all smartphone devices have gyrometers for hologram security), and tried to keep each map each suggestion to current security objectives to make the suggestions easier to understand.
The User Interface was designed such that it mimics a wallet by making it clear that an end-user can add several cards. It also took a minimalist approach, so that varying branding requirements of different departments could still be added without redesigning the app.

**Card Information**

- **Licence Type**: Full
- **Demerit Points Threshold**: 12 - 18
- **Status**: Suspended

**Card Information | Quick Usage**
To make the information associated with each card more accessible, as a user scrolls through the cards, the information is updated to reflect the card that has center focus, reducing the amount of taps required.

**Which card do you want to add?**

- **MyWay**

**Wizard | User-led**
When the user first opens the app, the app explicitly gives directions on what action is required with little opportunity for ambiguity.

**Skeuomorphism | Viceral Design**
When a user taps a card, the screen is filled by the card, and by moving the phone, the hologram moves in response, providing tactile feedback, making the transition to a digital wallet less jarring.
Software is eating the world. The Digital Wallet is a shining example of software that will bring together Government Services, Law enforcement, private industry, and the ACT community. The move from paper to digital is highly applicable to an ID system and promises to provide several direct and indirect benefits. With respect to the Digital Canberra Action Plan:

1. Digital City
   A streamlined ID system will go hand in hand with the image of a Digital City. The feasibility of the Streamlined ID system depends in part on the Plan's Actions, providing positive pressure and demand on the ACT's digital infrastructure.

2. Digital Economy
   An extendible Digital Wallet is in prime position to facilitate and encourage digital transactions. Reducing friction in making government payments (Alongside Identification) can only be a positive outcome for the Digital Economy.

3. Connected Community
   While the Digital Wallet initially contains two examples (MyWay Card, Digital Driver’s License), interconnecting further services in future will enable sharing, more openness, and more interconnectivity between government, educational, and community services.

4. Open Government
   The Digital Wallet system can only provide more visibility of government services, and accountability, potentially gathering feedback from users to better inform government decision making. As a further example, the Digital Wallet could provide data to dataACT, to enable further innovation as part of GovHack

5. Digital Services
   Including an initial set of broadly necessary services in the Digital Wallet will encourage an appetite for government services in a mobile and online medium. An ideal example from the Digital Action Plan is the digital parking action. Imagine Team aims to digitally integrate many services into the Streamlined ID system.
Undertaking the establishment of a relationship between an SME and a government participant is a difficult endeavour under normal circumstances, but with the government participant as undetermined, the Digital Canberra Challenge managed to bring together an enthusiastic, progressive government department representative and our team in the best way that could have been expected. Creating buy-in and support from the entirety / remainder of the department was expected to be met with resistance, but learning to manage this is likely one of the learning outcomes of the DCC, for the team. Our team will continue to enthusiastically pursue providing the Digital Wallet Streamlined ID solution post-challenge, and aim to take full advantage of the availability of the procurement vehicle provided by the DCC terms, to bring our innovative solution to the public.
The Imagine Team's experience in the competition has been both refreshing and familiar. The same level of positive encouragement and understanding of progressive innovation that was experienced with the eGovernment cluster in the past was very much present in the involvement with the competition. The competition was refreshing in its dynamic nature, not tied to a single outcome set in stone, rather, a goal. The broad outcome of a Streamlined ID system felt too all-encompassing at times in the early stages, but in hindsight, was absolutely the right direction for the challenge. The reason being, the goal allowed both the team and potential government clients to take advantage of the exploratory nature inherent in finding an innovative solution. Without the ability to change direction within the broader goal, the Imagine Team would have come across barriers and blocks that would definitely have limited the Imagine Team's demonstrable progress.

The Imagine Team looks forward to enthusiastically pursue providing the Streamlined ID solution post-challenge, and aims to take full advantage of the availability of the procurement vehicle provided by the DCC terms, to bring our innovative solution to the public.

The Imagine Team wants to thank the E-Government Cluster, and the various representatives from the government departments involved and who provided feedback input.

The Imagine Team