

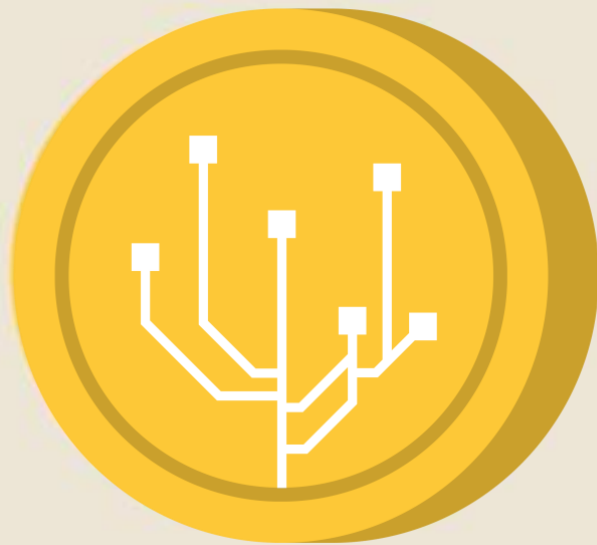


CommonwealthBank
of Australia



Making Money Smart

Empowering NDIS participants with Blockchain technologies



Executive Summary

Full report available at: www.commbank.com.au/makingmoneysmart

Full report

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Citation

Daniel Royal[†], Paul Rimba^{*}, Mark Staples^{*}, Sophie Gilder[†], An Binh Tran^{*}, Ethan Williams[†], Alex Ponomarev^{*}, Ingo Weber^{*}, Chris Connor[†], Nicole Lim[†]

October 2018

[†] Commonwealth Bank of Australia

^{*} CSIRO

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Acknowledgements

CSIRO's Data61 (Data61) and the Commonwealth Bank of Australia (the Commonwealth Bank) would like to acknowledge our partners and collaborators in developing, testing and evaluating the proof of concept, and producing this report.

Most importantly, we thank the people who have helped test the proof of concept based on their lived experience with disability and/or supporting people with disability. You are the reason why we built the proof of concept. We hope the learnings lead to meaningful improvements in your lives and the lives of the people you support. In particular, we thank:

- Diane and Bob Robinson, whose in-depth input and passion to improve outcomes for people with disability informed our participant persona and user stories for the proof of concept testing;
- volunteers from the Commonwealth Bank Friends of the Lab network, who are participants, carers and family members of NDIS participants, and who helped us to iteratively test the proof of concept throughout the project;
- the participants and carers who undertook formal testing of the final prototype, including: Donna Purcell, Greg Killeen, Jodie F, Joy Straw, Lischke Coleman, Malcolm Turnbull, Nick Pleadin, Nick Taylor and Tony Jones;
- the wide range of service providers, plan managers and disability sector experts who provided feedback on the proof of concept at key stages of the project.

We thank the member organisations of our Reference Group, who provided invaluable feedback and advice throughout the project:

- Ability First Australia
- Australian Digital Commerce Association
- Department of Human Services
- Department of Social Services
- Digital Transformation Agency
- Disability Advocacy Network Australia
- FinTech Australia
- National Disability Insurance Agency
- National Disability Services
- New Payments Platform Australia
- Reserve Bank of Australia
- The Treasury

We thank the Design Thinking and Open Innovation team and DXC Technology for helping to design, test and iterate the early stages of user interface for the participant app, and Objective Experience for helping to facilitate some of our user testing sessions. We thank Production Studios for helping to create the infographic and video used to communicate the outcomes of this project.

Important note

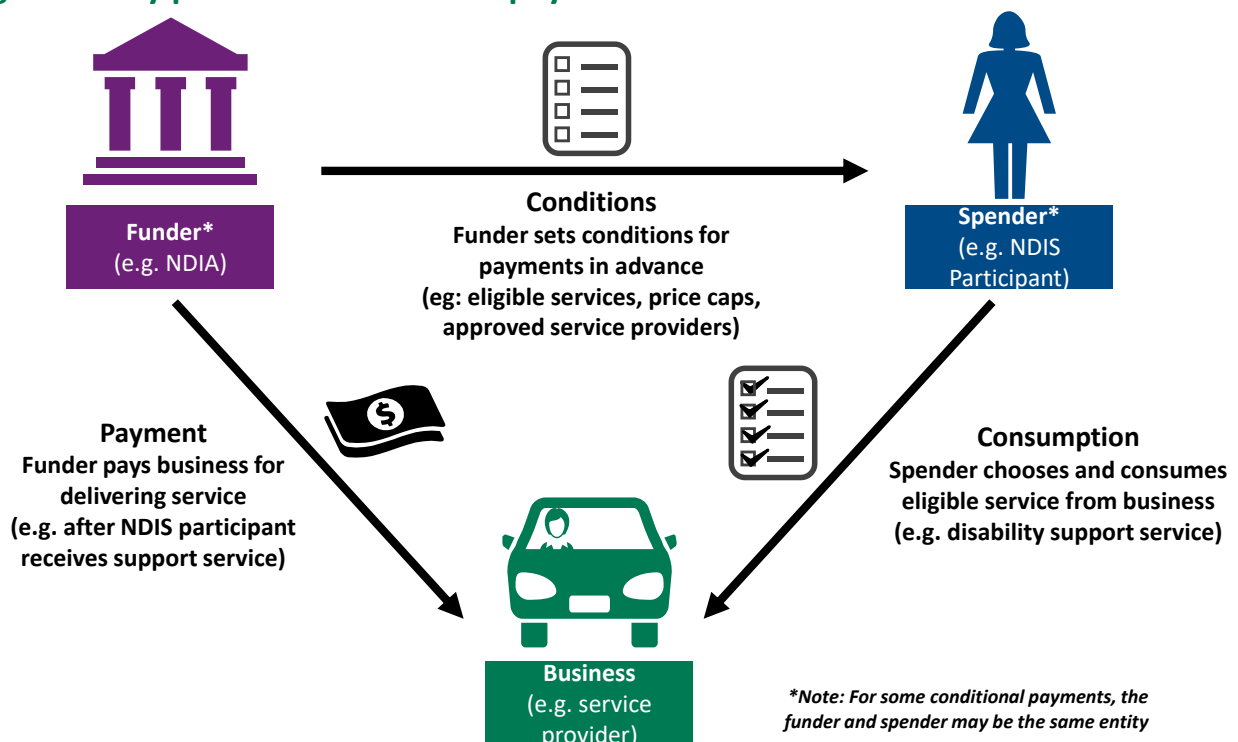
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Executive summary

How can ‘smart money’ better enable conditional payments? This project has sought to answer this question, motivated by the progression of blockchain technologies in recent years.

What are conditional payments? Conditional payment environments are all around us. They occur whenever one party wishes to fund a payment, but only after certain conditions are met. Conditional payment environments can range from public policy programs, to insurance payouts, to corporate and organisation delegations, to the management of trusts and charities, and even to the spending conditions individuals place on themselves, such as savings plans. The National Disability Insurance Scheme (NDIS) is a conditional payment environment; the National Disability Insurance Agency (NDIA) provides funding to people with disability, called participants, to spend on disability support services. Funds are spent in accordance with the rules set for each participant’s plan (see Figure 1).

Figure 1: Key parties in conditional payment environments



Most payments in the economy are conditional on something, if only being made in return for some good or service. This report focuses on conditional payment environments where the conditions can be set in advance and where such conditions can be automatically assessed at the moment of purchase.

What is smart money? Smart money, or programmable money, is money that can be programmed to be spent only when certain conditions are met and remember how it has been spent. This project created programmable money by attaching smart contracts to blockchain tokens that can be redeemed for payment in Australian Dollars (rather than through a programmable currency).

Once programmed, smart money can know who it can be spent by, what it can be spent on, when it can be spent, how much of it can be spent and any other conditions that may be set by the party funding the payment. As smart money is designed not to be misspent, it can reduce friction and enable funders to empower spenders in conditional payment environments. For example, it can reduce the need for funders to assess payments after-the-fact when checking for compliance with spending rules. In addition, as smart money remembers how it has been spent, this can assist with budget management for spenders, and payments reconciliation for businesses.

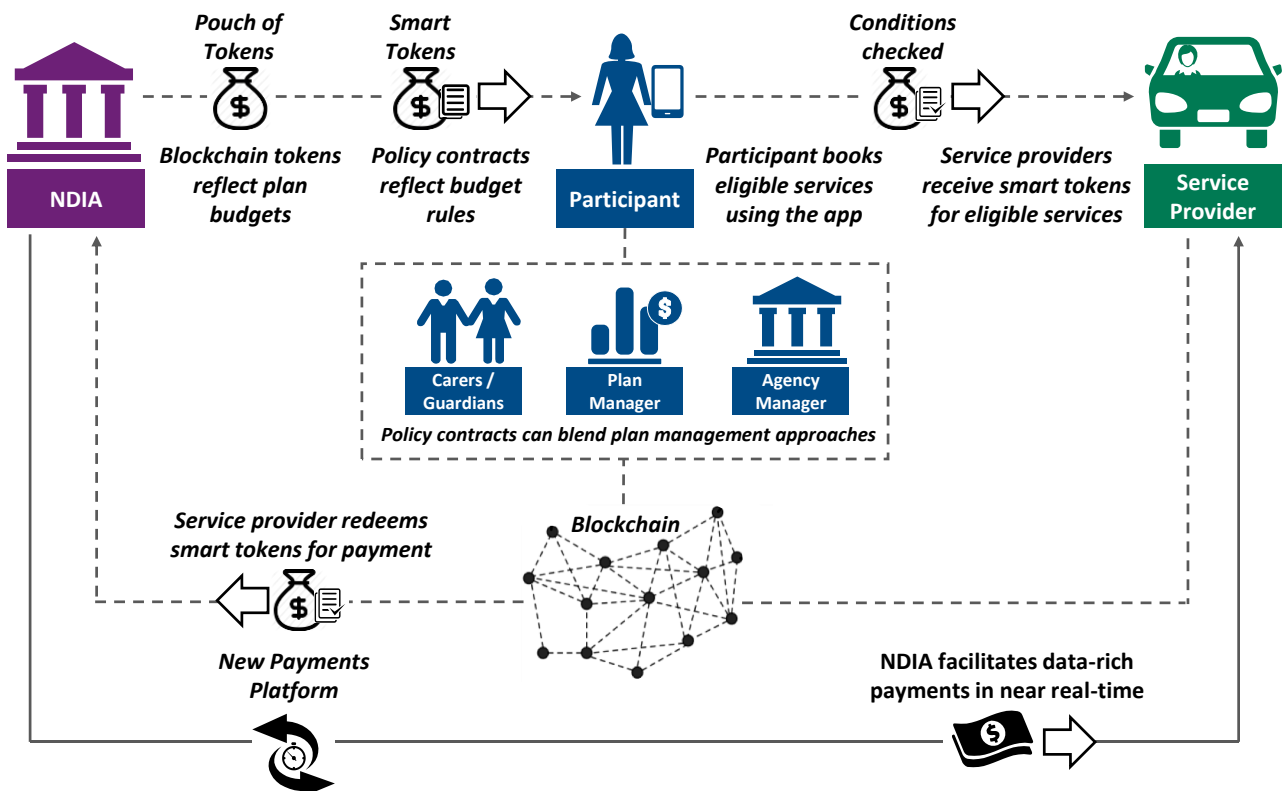
This project developed a smart money proof of concept and applied it to a use case of the NDIS.

The NDIS involves highly personalised payment conditions. Since the NDIS was first envisaged in 2011, and even during its ongoing rollout, payments technology has progressed considerably. This includes research into the application of blockchain technology and smart contracts as well as the introduction of Australia’s New Payments Platform.

Each NDIS participant has an individualised plan, which can contain multiple budget categories – each with different spending rules. This high degree of tailoring offers greater choice and control for participants, but also creates new challenges for accessing the right services, managing budgets and making payments. In addition, providers must ensure the services they deliver are eligible for payment. We explored whether smart money can assist with these challenges.

The proof of concept design combines blockchain token technology and Australia’s New Payments Platform. The blockchain component was developed as a system using tokens to represent promises to pay in Australian Dollars, smart contracts to create spending conditions based on NDIS plan rules, and registries to represent parts of the payment environment such as lists of eligible service providers for particular services (see Figure 2).

Figure 2: Overview of smart money proof of concept



The proof of concept translates budgets in NDIS plans into blockchain tokens. Each budget line is represented by a separate token for the budgeted amount, with policies dynamically attached to the token to implement the budget conditions. Participants can then use their tokens to book and purchase services through a smart phone app. Participants never see the tokens – only their budget balances – as the tokens operate in the background. The proof of concept was designed to support self-managed, plan-managed and agency-managed participants.

Our technical focus of inquiry was on payment functionality rather than privacy or confidentiality. Nonetheless, to support the confidentiality of information, each budget category in a participant's plan uses a unique private key (a confidential signature for authorising payments), which is automatically and securely accessed from the participant's app. In addition, to support privacy, all demographic and disability assessment information is housed in secure servers off the blockchain.

In our proof of concept, a provider receives blockchain tokens as they deliver eligible services. The service provider could then transfer their tokens to the NDIA to request payment to their bank account through the New Payments Platform. This payment could occur within seconds and include remittance information to enable automatic payment reconciliation for service providers.

The data from bookings and transactions could be viewed in real-time, with appropriate controls to protect confidentiality of data, such as access controls and the de-identification of data. For participants, the real-time data could support the management of budgets. For service providers, it could support business intelligence to deliver improved services. For government agencies, it could support the functions of plan development and oversight, market custodianship, regulation of quality and safeguards, scheme-wide budget planning, and policy review and analysis.

The blockchain system developed for the proof of concept operates on a permissioned Ethereum network, with three processing hubs: one for the NDIA; one for the financial institution enabling payments; and one for an observing regulator. An envisaged full-scale solution would operate on a fast distributed ledger architecture and could incorporate additional processing hubs, with rules determining which hubs process which transactions. For example, service providers might operate hubs only for transactions to which they are a party.

The proof of concept design was informed by engagements with participants, carers, service providers and a project Reference Group. The Reference Group consisted of leaders from disability, government, payments and fintech sectors. Through these engagements, we created user stories for an NDIS participant archetype/persona.

The user stories reflected a broad range of NDIS payment conditions to enable us to critically evaluate the proof of concept. The stories include the potential to blend aspects of plan financial management, including self-management, plan-management and agency-management – as well as potential integrations with systems for service providers, plan managers and eMarkets.

We built the system using an agile approach, with multiple rounds of user testing and iteration involving participants, carers and service providers. The final, formal round of testing involved ten participants and carers trialling the applicability of the participant app for the user stories.

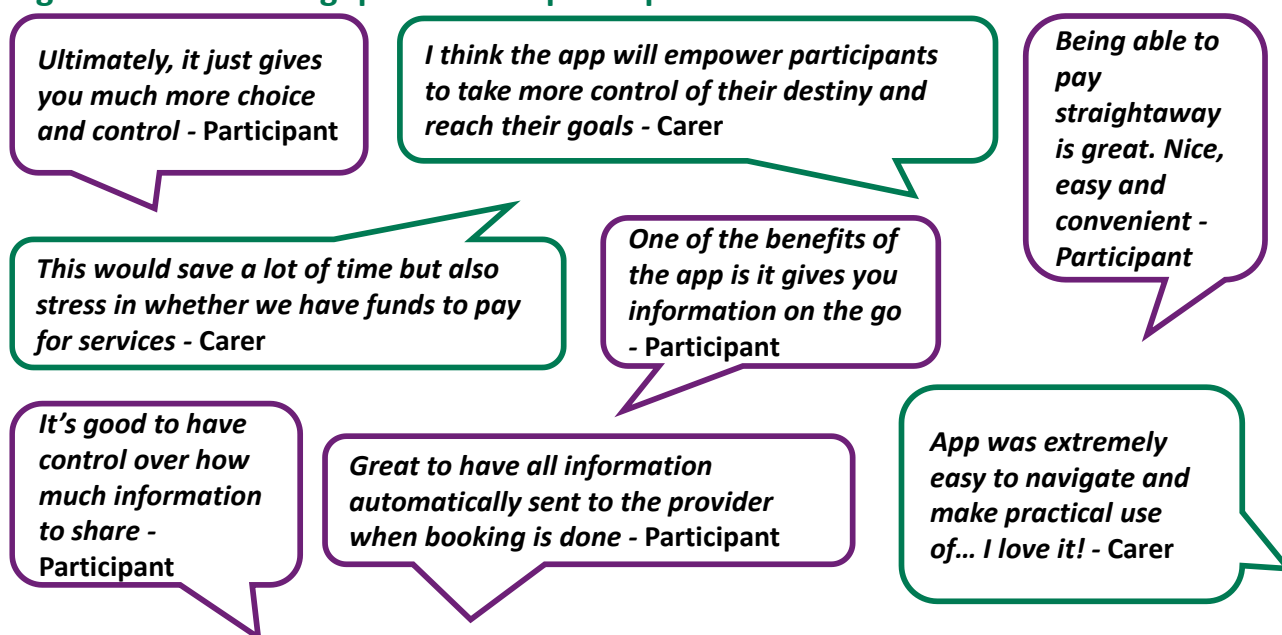
We evaluated the proof of concept using ten design criteria; choice, control, accessibility, simplicity, efficiency, confidentiality, integrity, performance, cost and modifiability. We compared the proof of concept system with the current systems and processes in the NDIS, as well as with two hypothetical alternative future designs: a centralised rules-based database; and a

currency-on-blockchain solution that would add to the project's proof of concept the capability to settle payments directly on the blockchain, rather than through the redemptions of blockchain tokens for bank transfers.

Overall, our results indicate that there is strong potential to better enable conditional payments in Australia. A new concept of smart money is possible using blockchain token technology, and could be integrated with the New Payments Platform (however, this integration was not tested as part of the proof of concept). The benefits could include greater empowerment for spenders, greater payment certainty for businesses, and greater spending integrity for funders.

User testing with participants and carers achieved an 89% net promoter score (NPS) of the prototype app.¹ Figure 3 and Figure 4 summarise some of benefits that could result if the proof of concept was scaled for the NDIS.

Figure 3: User testing quotes from participants and carers




Testing also demonstrated the potential to deliver substantial economic benefits. Participants and carers estimated that the prototype app could save them between 1 hour and 15 hours per week, while service providers estimated potential cost savings of between 0.3% and 0.8% each year. CBA modelling indicates that, even if these estimates were applied conservatively across the NDIS ecosystem, the economic benefits would equate to hundreds of millions of dollars annually, if the proof of concept was leveraged to develop and implement a full-scale solution.²

The benefits would be greater if the technology was applied to multiple conditional payment environments to expand the reach and flexibility of smart money and to better share technology infrastructure costs and payment environment data sources across the economy. This may require further research and development, particularly with respect to ensuring sufficient performance and confidentiality.

¹ Measures the willingness of customers to recommend a product to others. Maximum score is positive 100% and minimum score is negative 100%.

² See Appendix A.4 of Full Report for calculation details.

Figure 4: The potential of smart money, explained




Meet Fahima!

Fahima is a participant in the National Disability Insurance Scheme, who has chosen to manage her plan to maximise her choice and control.


Current technology

Fahima tracks her budget progress, sometimes across multiple categories and payment stages.




Checking budget

Fahima seeks NDIS funding for each service and pays from her own bank account.




Paying for services

Fahima files her payment receipts for her records and potential plan audits.

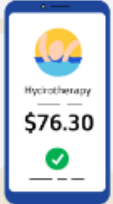


Keeping records


Possible future with Smart Money



The Smart Money system could automatically keep track of all budget information in one place.




The Smart Money system could enable automatic payments directly to the service provider.



The Smart Money system could automatically log Fahima's receipts

Service provider

Booking 1	✓	✗
Booking 2	✓	✗
Booking 3	✓	✗
Booking 4	✓	✗

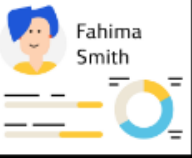



Payment received

The Smart Money system could confirm bookings and service eligibility in real-time.

The Smart Money system could enable payments within seconds and automatic reconciliation.

Government





The Smart Money system could help ensure Fahima's plan activities support her goals, with appropriate privacy controls.

The Smart Money system could automatically confirm spending integrity without manual audit processes.

The smart money concept offers particular promise in the following use cases:

1. **enhancing public policy programs to achieve better citizen outcomes**, particularly where person-centred funding, cross-jurisdictional funding, outcomes-based funding, or taxes, transfers and rebates are involved
2. **empowering individuals to optimise their spending**, including through smart savings plans, smart diets, smart pocket money, pre-commitment mechanisms to help manage addictions and values-based spending supports, such as ethical product registries
3. **reducing friction and costs for businesses, trustees and not-for-profits**, with respect to insurance payouts, managing corporate delegations and procurement, and providing transparency for funds managed by trusts, charities and membership organisations.

While the technology promises great potential, further work is required to deliver refined solutions. Before any implementation of the smart money proof of concept is commenced for any conditional payment environment, a business case and/or cost benefit analysis would need to be undertaken. Careful consideration would also need to be given to the proposed governance arrangements for the system, including which parties should be processing nodes, who has visibility of the blockchain and who is eligible to set and modify conditions. An agile build and test approach would be most appropriate to manage implementation risks.

If a decision was taken to leverage the proof of concept to develop and implement a full-scale solution for the NDIS specifically, further work would be required to: test a greater variety of use cases; ensure the app is accessible to all NDIS participants; develop integrations with NDIA, service provider, plan manager and participant system interfaces; and enable seamless payments to service providers who do not accept bank transfers.

If the proof of concept was leveraged to develop a solution that functioned across multiple conditional payment environments to unlock platform benefits, further research and development would be required to ensure that the required levels of performance and confidentiality could be achieved across the greater number of processing nodes and users across the platform.

If these areas for future work are progressed successfully, there is great potential for smart money to enable automated conditional payments across the economy, and through this improve the financial wellbeing of people, businesses and communities.

The full Making Money Smart report is available at: www.commbank.com.au/makingmoneysmart

CONTACT US

t 1300 363 400
+61 3 9545 2176
e csiroenquiries@csiro.au
w www.data61.csiro.au

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FOR FURTHER INFORMATION

Dr. Mark Staples
Senior Principal Research Scientist
Data61 (CSIRO)
t +61 2 9490 5646
e mark.staples@data61.csiro.au
w www.data61.csiro.au

Mr. Daniel Royal
Senior Manager
Payments Development and Strategy
Commonwealth Bank
t +61 4 3666 2424
e daniel.roya@cba.com.au
w www.commbank.com.au

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