

Secretariat

Treasury Board of Canada Secrétariat du Conseil du Trésor du Canada



TELL US ONCE/SINGLE WINDOW PROTOTYPE: RESEARCH THROUGH DESIGN FINAL SUMMARY REPORT

Prepared by:

- Office of the Chief Information Officer of Canada
- Treasury Board of Canada Secretariat
- 2020 •

TELL US ONCE OVERVIEW





- The world has **undergone disruptive changes**, and Canadians expect **government to respond accordingly**.
- Fewer delays, real-time updates and access to the services they need, when and where they want.





- What if government could **re-imagine its service relationship with citizens**.
- "Tell Us Once" is a key pillar of our digital future, this approach means citizens only need to tell government their information once.



PROJECT BACKGROUND





- Today, there are 56 different places to log in to a government account.
- That's pretty frustrating for a population that's used to having everything from the latest meme to a full grocery order available in just a few clicks.
- With this initiative, we've been exploring ways to reduce those 56 login screens to a single place that seamlessly connects Canadians to their government services.

THE HIERARCHY

ONEGC

Any time, any where, any device

TELL US ONCE

Sign In Canada, CDXP, Legislative Review

TELL US ONCE PROTOTYPE

User experience and integration of specific use cases

THE JOURNEY



- Experiment with four use cases
- Determine a happy path for users
 - Land on a preferred technology
 - Collect and analyze data to help inform future direction
- Publish findings and develop list of recommendations



AUG

2020

PHASE 3: RUN

- Onboard additional GC services, encouraging dept. to make their services available through APIs

- Continue refining user experience based on usability testing
- Incorporate new common services such as notifications, forms, and wallets etc.
 - Tackle necessary policy and legislative changes as required
 - Launch beta version in production



production

WE WANTED TO BETTER UNDERSTAND





USER EXPERIENCE (UX)

What does Tell Us Once **look like to the end user**?

TECHNOLOGY

How do we best support integrated and interoperable service delivery across GC through Tell Us Once?

OUR SIX MONTH EXPLORATION



- Researched common user patterns and existing UX work (e.g., through Canada.ca)
- **3. Designed wireframes** (interactive visuals) to test user expectations for each use case
- Conducted usability testing on the wireframes to test user behavior (not their opinions)

- 2. Conducted an environmental scan to determine who's doing what and how
- **3.** Partnered with vendors to experiment with various modern, API-based client hub/portal solutions
- 4. Explored system integration with legacy systems
- Examine solution alignment with the current Pan Canadian Trust Framework (PCTF) 12

ASSUMPTIONS WE MADE



USER EXPERIENCE

- Consent must be given prior to sharing info
- Not constrained by existing policies or legislation
- When a service is selected on the non-authenticated side this information will be passed through to the authenticated side
- Web channel only
- User triggered changes and updates
- Users consist of both individuals and businesses
- Scope is limited to Canadian residents



TECHNOLOGY

- Leveraging APIs & messaging
- Open interop standards
- Non-production data for testing
- Cloud hosting possible
- Connectivity enabled through test services

WHO WAS INVOLVED

PROJECT LEAD

• TBS OCIO Interoperability

PROJECT TEAM

- TBS OCIO
 - Identity
 - Cyber Security
 - Enterprise Architecture
 - Privacy
 - Policy
 - Talent Cloud
- OneGC Partners
 - ISED
 - CRA
 - ESDC
- TBS
 - Legal
 - Canada.ca (SCMA)

CAPABILITIES EXAMINED

Find information		Manage account		Manage services			
Discovery external to GC	Site navigation inside GC	Account creation / sign in	Account maintenance	Service enrolment	Service request processing	Receive service output	
		Canada.ca	Profile information maintenance	Submit a request/apply for a service			
		Portal solution	Assign representatives/ Verified relationships	Submit a request/apply for a service bundle			
		Digital wallet solution		Credential mapping			
		Sign in and mapping credentials		Information sharing and consent			
		Identity proofing					
		Create or connect basic profile information					
		Verifiable proofs					





VERIFIED INDIVIDUAL Authenticate and prove identity of an individual



USE CASE 2

INFORMATION SHARING

Self serve client profile management*



USE CASE 3

VERIFIED ORGANIZATION AND RELATIONSHIP

Verify the existence of an organization and link it to an individual



BUSINESS INFORMATION SHARING

Enrol in two business facing services leveraging the business number and other common data elements*





OUR UX APPROACH

- Designed experimental prototypes that focused on the "happy path" for the four use cases
- Based designs on common UX patterns and leveraged existing research on Canadians' expectations
- **Recruited diverse research participants** from traditionally underserved groups including Indigenous communities, people from lower income and lower education groups, and seniors
- **Tested prototypes** during in-person sessions and through remote, online testing tools.
- Tests for UC1 and UC2 included **78 participants** (28 in person, 50 unmoderated remote). Tests for UC3 and UC4 included **25** business owners (10 in person, 15 unmoderated remote)
- Conducted **statistical analysis** to formulate findings and recommendations for next steps



UX FINDINGS – SUMMARY

- Providing multiple unfamiliar sign-in options results in
 confusion
- 2. Most users **do not read** even extremely brief and simple **statements of consent**, but assume data is shared by default
 - Participants reacted positively to the convenience of having
 data shared across departments especially for businesses
 - Successful task completion was largely driven by participant
 age, their digital literacy, and their emotional state
 - Participants were eager for the experimental prototypes to
 become available, demonstrating enthusiasm for simplified digital services from the Government of Canada

Providing multiple unfamiliar sign-in options results in confusion

- The target success rate for signing into an account was 95%
- Experimental prototypes that **presented multiple sign-in options fell short of this goal**, with success rates **no higher than 89%**, and as low as 30% in one experiment
- Sign-in options included: provincial sign-in, GC Key, CRA key, banking sign-in partners, and digital wallet
- Participants expressed confusion about:
 - Why they were being asked for banking information
 - What a digital wallet was
 - Why they were being asked to sign-in in the first place
- A prototype which presented only **one single option for signing in had a 100% success** rate. The option provided was provincial sign-in in this experiment



- Most users do not read even extremely brief and simple
 statements of consent, but assume data is shared by default
 - 89% of users did not read the statement of consent (use case 2: change of address)
 - However, 88% of them assumed that data sharing across departments was the default



Based on 56 data points Confidence interval: ± 9 Confidence level: 95%

i.e. we are 95% sure that
the "real" value is:
between 80% and 98%
did not read consent
between 79% and 87%
assumed data sharing





Participants reacted positively to the convenience of having data shared across departments – especially for businesses

- The prototypes demonstrated how processes could be streamlined for Canadians when data is shared across departments
- In individual scenarios (use case 2)
 - Although most comments were positive, there was greater variation in responses, ranging from very positive to very negative
- In business scenarios (use cases 3 and 4)
 - The resulting time savings were unanimously appreciated
 - There were **no concerns expressed** about data being shared across departments

Successful task completion was largely driven by participant
 age, their digital literacy, and their emotional state

- The test population was recruited to represent a wide range of **age, digital literacy**, **ethnic background, and socio-economic status**
- Age and digital literacy were highly statistically significant factors that determined task completion success rates
- These results emphasize the importance of **intentionally recruiting senior citizens and people with lower digital literacy** to participate in user testing of digital services
- The **emotional and mental state** of the participant also played a role in success rates

For example, several participants expressed anxiety about the session, stress about some recent life event, or were distracted with incoming calls or their small children

 These results are a timely reminder that many government services are accessed during a time of personal stress (such as a global pandemic). A smooth and seamless user experience is especially important in this context

5.

Many participants were eager for the experimental prototypes to become available, demonstrating enthusiasm for simplified digital services

- A standardized System Usability Scale (SUS) questionnaire was administered at the end of some testing sessions. A SUS score is recognized as a standardized measure of perceived usability
- The rated prototypes received an **overall rating of 77 across three experiments**. This is considered an "average" rating, or a "B" grade
- However, **participants often expressed enthusiasm** that was unusually disproportionate to an "average" rating. For example:
 - One participant thought he had done something wrong, because "it was just too easy"
 - Several participants asked when the prototype would be available to use
 - Several participants expressed surprise at how quickly they were able to complete tasks
- These enthusiastic remarks demonstrate an eagerness for **digital services that simplify** interactions with the Government of Canada



OUR TECH APPROACH



- Tested three **API-based single window solutions** in a sandbox
 - Vivvo CitizenOne
 - Salesforce
 - ServiceNow
- Reviewed integration with identity providers
- Explored the use of **digital credentials** held in digital wallets to prove identity and to exchange verifiable information
- Set up mock services and authoritative data sources
- Explored the ability to integrate with legacy systems using stubbed versions of real interfaces
- Ran traffic through with dummy data



TECH INSIGHTS – SUMMARY

- An API-based platform is a common technical approach for
 delivering a single online window
- 2. Data doesn't need to be stored repeatedly everything can be mapped in the back end

Solutions advertised as low-code still require significant tech
investment for integration and testing

4.

Most challenging part of the technology is the integration with
legacy systems – but it can be done

5.

Digital credentials and wallets are rapidly emerging approaches and technologies worth exploring

An API-based platform is a common technical approach
for delivering a single online window

- Of the three solutions explored (Vivvo CitizenOne, ServiceNow, and Salesforce) none were set up to be the single monolithic system of record*
- Data is retrieved (via Application Programming Interfaces (APIs)) for display to the user, **but not stored within the system**
- These platforms support multiple authoritative or non-authoritative sources of data
- The approach **minimizes** the need to retain multiple copies of the data
- We are not alone. Governments and NGOs are already leveraging API-based platforms to successfully delivery valuable services to citizens and stakeholders. For example:
 - Province of Saskatchewan
 - <u>State of Michigan</u>
 - CERN (Conseil européen pour la recherche nucléaire)



Data doesn't need to be stored – everything can be mapped in the back end

- The platforms could easily integrate with identity providers and data can be used from authoritative sources (e.g., provinces, territories or banks) without being stored centrally
- A single unique identifier isn't required everything can be mapped in the back end and anonymous identifiers can be used to maintain that mapping
- Common identifiers, such as the **business number**, can be used to make **linking to existing services** simpler
- Platform solutions can also manage consent for the sharing of data. The consent settings are stored centrally and are shared with the various programs depending on the user's preference
- Users have real-time, as needed, access to their data, regardless of which government program holds that data



Solutions advertised as low-code still require significant
 tech investment for integration and testing

- Low-code/no-code approaches provided by the platforms can work for some business users if all the integration points are built and the business users have some basic technical skills
- Developers and system integrators (SIs) will still be essential to enable modern integration methods with legacy systems
- Commercial solutions **don't have strong support for automated testing**, so the need for manual testing remains high
- Each solution had its own jargon and way of provisioning workflows and integrations, which are not directly transferable from other technologies. This requires **platform operators to go through training**



Most challenging part of the technology is the
 integration with legacy systems – but it can be done

- Getting data to/from the legacy systems becomes the most complex part of these solutions
- Legacy system data must be exposed to allow for real-time data access
- Various technical solutions and patterns can be employed **aside from modernizing the legacy** solution:
 - Adapters provide native connectors and capabilities for mapping and transformation (can be deployed on different infrastructure and network zones for security purposes)
 - Legacy wrapper services are written to serve as an interface between legacy and the single window solution (and other solutions requiring data in realtime)



Digital credentials and wallets are rapidly emerging
approaches and technologies worth exploring

- Some experimentation was conducted with the self-sovereign data model using **digital** credentials and wallets (which could complement a federated model using APIs)
- Standards exist and continue to evolve, but more investment in standardization is needed to ensure widespread interoperability
- Successful proofs of concept have been completed across numerous jurisdictions including British Columbia, Alberta, Canada (Innovation, Science and Economic Development Canada and Transport Canada), United States (USA), and the United Kingdom (UK)



NEXT STEPS & RECOMMENDATIONS

ADOPT A PRODUCT-BASED APPROACH

For future phases of this initiative, it is recommended to take a product approach that:

- Is outcomes-based
- Puts the **user's needs and behaviors** at the center to drive decisions
- Supports an incremental release, agile delivery methodology
- Ties together the product manager, program owners, legal, policy, privacy, accessibility, identity, security, data stewards, data science, visual design, usability testers, system integrators, and developers – and has them work in unison to create a shared vision for the solution
- Fund the product in incremental chunks, and releases new funds based on demonstrated value



GET A HANDLE ON DATA MANAGEMENT

- Confirm approach for **GC-wide data governance model**, aligned to organizational needs
- Articulate common data standards to support a consistent approach to common data across the GC. This includes reference and master data standards to help enable data interoperability



- Prioritize standardization of person and organization data elements to support service delivery to citizens and businesses
- Explore possible **data model approaches*** and determine which models would work best for the GC

EXPLORE POLICY & LEGISLATION

- Review existing policies and legislation against the four use cases, and determine changes required in order to implement a federated data model
- Unpack **privacy and consent** from a user's perspective
- Develop models for assuring **informed consent**
- Streamline information sharing agreements and processes



UNDERSTAND THE USER JOURNEY

- Map out the entire user journey, across all touchpoints (online, in person, phone etc.) understanding where the main points of friction exist for the users
- Invest in extensive UX research, design, and testing across the entire user journey
- Bake accessibility into the solution
- Significantly simplify text (e.g., consent statements) in order to reduce the interaction friction
- Reduce the sign-in options, where the choice of credential is remembered and reused across all GC Services



INVEST IN TECHNOLOGY

- Invest in a modern, cloud-enabled, API-based client hub
- **Prioritize API development** as follows:
 - Updating and retrieving information
 - Creating service requests
- Develop digital infrastructure and standards to further explore digital credentials and wallets
- Adopt an agile approach to establishing connectivity between the solution and existing departmental systems
- Support data exchange with legacy systems by creating translation layers



START SMALL

- Continue partnership with TBS, CRA, ESDC, and ISED to start
- Fully enable Digital Identity through Sign In Canada in accordance with the Pan-Canadian Trust Framework
- Identify flagship projects and release a Minimum Viable Product (MVP) with at least two services connected to Canada.ca, Sign-In Canada, account management, and program-specific systems and case management solutions
- Expand public-private sector initiatives on digital credentials and wallets working with federal, provincial, territorial, and municipal partners
- Provide simple services to verify information such as address, Business Number (BN), Social Insurance Number (SIN), banking information, etc.





DATA MODELS*

CENTRALIZED DATA AUTHORITY



A single central solution stores and manages core citizen profile data (legal name, gender, address, marital status, dependents, citizenship). A single organization is responsible for administering this data, including providing support services such as help desk, data verification, and data quality management.

FEDERATED DATA AUTHORITIES



A single data authority will be designated for each context portion of citizen data (life data, residency/citizenship data). Each data authority is responsible for administering their portion of the citizen data and mapping that data to records in other data authorities through some form of a record key (single or federated). This model has been used by Estonia.

DISTRIBUTED DATA MANAGEMENT



Each Department manages their own version of the citizen's data. A central service hub can still provide a common interface for the citizen and some mechanisms to broker data sharing between Departments. Each Department makes the determination on what to do with an update.

SELF-SOVEREIGN DATA AUTHORITY



The individual/businesses manages their own version of verifiable proofs for identity and associated information. They present their proof(s) to departments based on enrollment in services and level of assurance required, and the departments verify their claim.

Departments continue to operate as-is with data sharing as required (e.g. legal/public safety reasons).

ARCHITECTURE



CHANGE ADDRESS (USE CASE 2)

Sign in to Government of

Canada services

Sign in to easily view and manage your Government of Canada services and benefits.

Government account

If you already have an online account with the Government of Canada, a province, or a territory, you can use it to sign in.

Choose a government account:

Sign in

No selection

Online banking account

The Government of Canada partners with Canadian banks and credit unions to make it easier to access services online.

Choose a bank or credit union:

No selection Sign in

Digital wallet

A digital wallet or e-wallet is an app on your phone or computer that securely stores your online accounts and digital IDs.

Sign in with a digital wallet provider:

Sign in



If you do not have any of these accounts, or you aren't sure if you do, we can help you register for access to Government of Canada online services.

Register

Version 1 – Account Based:

Québec 🔡

credentials below

Username Password

Sign in using your province of Quebec

Sign In

User signs into a dashboard to change address (mobile prototype) •

	Welcome Adrian
· · · · · · · · · · · · · · · · · · ·	
fQuebec	News and Alerts
	Don't forget to file your taxes by April 30th
	Your passport expires soon. Find out how to renew <u>here</u>
sword:	My Contact Information
	Primary Address 123 Laurier Street, Ottawa, ON, K2P8H3 Canada
	Primary Phone 613-234-567
	Taxes
	Amount Owing\$1368
	Due On: April 30th 2020

Phone and email Primary Phone Number 613-123-4567 Primary Email canada2020@gmail.com Manage numbers and emails	
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Services that use this address	
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Services that use this address	
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+ Add New Address

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123 Laurier Street						
Apartment, suite, unit, building (opti-						
Ottawa						
Ontario 🔹						
K2P 8H3						
following services. We will share this address with any service(s) that you leave checkmarked						
 Following services. We will share this address with any service(s) that you leave checkmarked Federal Income Tax Employment Insurance (EI) Canada Pension Plan (CPP) Fishing License 						

≡

Canada.ca account

Edit Address

CHANGE ADDRESS (USE CASE 2)

Version 2 – Service Based:

• User changes address in context of another task (filing a labour standards complaint)



	overnment Gouvernement				
MENU +	Canada du Canada		Senth Canada.ca	a.	
Labou	ur standards com	plaint			
File a labo	ur standards complaint by fil	ling out the form below			
Step 1 Personal info Address, phone	Step 2 Work History Job title,	Step 3 Employer Info Name, type, address,	Step 4 Complaint Details Details, supporting	Step 5 Review and Submit Summary view of	Edit Address
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519-654-3	321				
Johnmoora	e@gmail.com		Use this address		
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VERIFIED RELATIONSHIP (USE CASE 3)

Version 1 – Account Based:

• User signs into a dashboard to verify their relationship with a business

Greeksa Associ Jamie Blair	Add or switch profile		Add a business profile ×	Carelusa account Bob's Maple Syrup Factory	Add or Switch Profile $$
Area and Ariert A constraints of a sector of a se	nerror biss:	Add or switch profile Personal profile Personal profile Add new personal profile Lusiees profile Add new business profile Add new business profile	1 2 3 Do you have a business number? ○ Yes ○ No No No No No No No No No No	News and Alerts • Your quarterly 0574/07 filling is due Apdit 1. <u>[]it here</u> . • Your paraterly 0574/07 filling is due Apdit 1. <u>[]it here</u> . • Your paraterly 0574/07 filling is due Apdit 1. <u>[]it here</u> . • Your paraterly 0574/07 filling is due Apdit 1. <u>[]it here</u> . • Your paraterly 0574/07 filling is due Apdit 1. <u>[]it here</u> . • Your paraterly 0574/07 filling is due Apdit 1. <u>[]it here</u> . • Your paraterly 0574/07 filling is due Apdit 1. <u>[]it here</u> . • Your paraterly 0574/07 filling is due Apdit 1. <u>[]it here</u> . • Your paraterly 0574/07 filling is due Apdit 1. <u>[]it here</u> . • Paraterly 0574/07 filling is due Apdit 1. <u>[]it here</u> . • Paraterly 0574/07 filling is due Apdit 1. <u>[]it here</u> . • Paraterly 0574/07 filling is due Apdit 1. <u>[]it here</u> . • Paraterly 0574/07 filling is due Apdit 1. <u>[]it here</u> . • Paraterly 0574/07 filling is due Apdit 1. <u>[]it here</u> . • Paraterly 0574/07 filling is due Apdit 1. <u>[]it here</u> . • Paraterly 0574/07 filling is due Apdit 1. <u>[]it here</u> . • Paraterly 0574/07 filling is due Apdit 1. <u>[]it here</u> . • Paraterly 0574/07 filling is due Apdit 1. <u>[]it here</u> . • Paraterly 0574/07 filling is due Apdit 1. <u>[]it here</u> . • Paraterly 0574/07 filling is due Apdit 1. <u>[]it here</u> .	Tases Action required Main system of 31235 for Boltzmann for the system of the system of the system of the system of the system of the system of the system of the system of the system of the system of the system of the syst
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			Cancel Continue Add a business profile X 1 2 3 Here's what we found in our records. Bob's Maple Syrup Factory 50 Rideau Street Ottawa, ON KIN 97 Owner: Adrian Thompson		
			Is this the correct business?		

VERIFIED RELATIONSHIP (USE CASE 3)

Version 2 – Service Based:

• User verifies their relationship with a business in context of another task (filing HST return)



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ENROL IN MULTIPLE PROGRAMS (USE CASE 4)



ENROL IN MULTIPLE PROGRAMS (USE CASE 4)



2nd service: Export license (CFIA)

- Data entered in previous application is **pre-filled** in this one.
- There is no need to create a new profile with CFIA because single window makes business information accessible through the original sign in.



ENROL IN MULTIPLE PROGRAMS (USE CASE 4)



3rd service: Canada Brand (AAFC)

• Test participants were able to complete the three different applications in less than 15 minutes

