



MODERNIZATION

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# INDUSTRY ROADMAP & HIGH-LEVEL PLAN

December 8, 2016

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## EXECUTIVE SUMMARY

Payments Canada is leading a multi-year, multi-phase initiative to modernize Canada's payments ecosystem.

The first phase of Modernization was the delivery of *Modernizing Canadian Payments: A Vision for the Canadian Payments Ecosystem* (the Vision), an industry-wide consultation exercise that identified the needs of the marketplace and the key features required of a modern Canadian payments ecosystem.

Using the Vision as a guide, Payments Canada moved into the planning and analysis phase, examining international modernization initiatives, the capabilities of in-market solution providers, approaches to funding, new global regulatory standards and related requirements (including regulatory requirements, public policy objectives, participant and stakeholder considerations and Payments Canada operational requirements). These insights fed into the Modernization Roadmap & High Level Plan.

Where the Vision tells us what needs to exist in the marketplace, the Roadmap & High Level Plan focuses on how Payments Canada and the industry can start delivering on those needs through five major changes:

- 1. A new core clearing & settlement system – to replace both the Large Value Transfer System (LVTS) and the Automated Clearing Settlement System (ACSS)**

In order to provide a foundation for future changes, Canada needs a new core clearing and settlement infrastructure, one that meets international standards for managing risk in both high value and retail payments and that has modern technical and risk management architecture. The new system will employ the most recent liquidity savings mechanisms and will be based on the ISO 20022 data standard. As the first priority, Payments Canada – as the operator of the system - will facilitate a process over the coming year to identify a service provider for the new core clearing & settlement system.

- 2. A faster payment capability in the form of a real-time payment rail**

A similar approach to replacing core clearing and settlement infrastructure will be applied to real-time payments: As an operator, Payments Canada will set the rules and parameters for this real time rail (clearing and settlement capability) and rely on a service provider to deliver the system and underlying technology. Over the coming months, we will develop the requirements for this system and the accompanying assessment criteria, which will be used to evaluate the capabilities in the market.

The real time rail will serve as a platform for innovation. The selected capabilities will need to satisfy the key elements of the Vision – including near real-time clearing, rich remittance

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information through ISO 20022 as well as enhanced functionality to support overlay services that serve consumers, small and medium sized businesses.

### 3. Enhancements to the batch Automated Funds Transfer (AFT) stream, including ISO 20022 and additional exchange windows

AFT batch payments – like payroll - will continue to operate along with any new real time rail. These will be ISO 20022-enabled and we will add additional clearing exchange windows to better serve Canadians across the country.

### 4. Changes to the ACSS over the near-term to meet new regulatory requirements (prominent designation)

The designation of the ACSS as a prominent payment system by the Bank of Canada means it must adhere to global regulatory standards and more stringent risk guidelines. As a result, changes will be required for this system over the near-term. Over time, payment products cleared through the ACSS are expected to migrate to new systems or be replaced with other service offerings.

### 5. Modernization of the Rules framework

The development of a modern rule set for wholesale and retail payments will enable Payments Canada's rules to remain relevant, reflect current market practices, achieve the appropriate balance between flexibility and compliance and facilitate innovation.

## Delivering on the Vision

Together, this package of change represents a bold first step towards a modernized Canadian payments system. The expected outcomes will enable the industry to deliver better services to Canadians and close the gaps identified in the Vision:

- **Faster** - real time payments in all cases where it is beneficial
- **Data rich** - expanded and standardized information to accompany payments
- **Transaction transparency** - notifications to payor and payee on payment status
- **Easier** - payments made possible with a simple identifier, such as a phone number
- **Cross-border convenience** – practical ways to pay those in other countries
- **Activity-based oversight** – rules and regulations that focus on services provided, instead of the type of institution that provides them
- **More open, risk-based access** - foster competition and innovation with clearly defined requirements for access, without compromising security
- **Platform for innovation** – an efficient, flexible and adaptable payments system

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## Next Steps

A detailed multi-year plan for various initiatives will be developed following additional research, industry consultation, requirements gathering, and assessment. Payments Canada looks forward to ongoing industry dialogue as we transform Canada's core clearing and settlement system, drive innovation in the competitive space, and position Canada well for the future.

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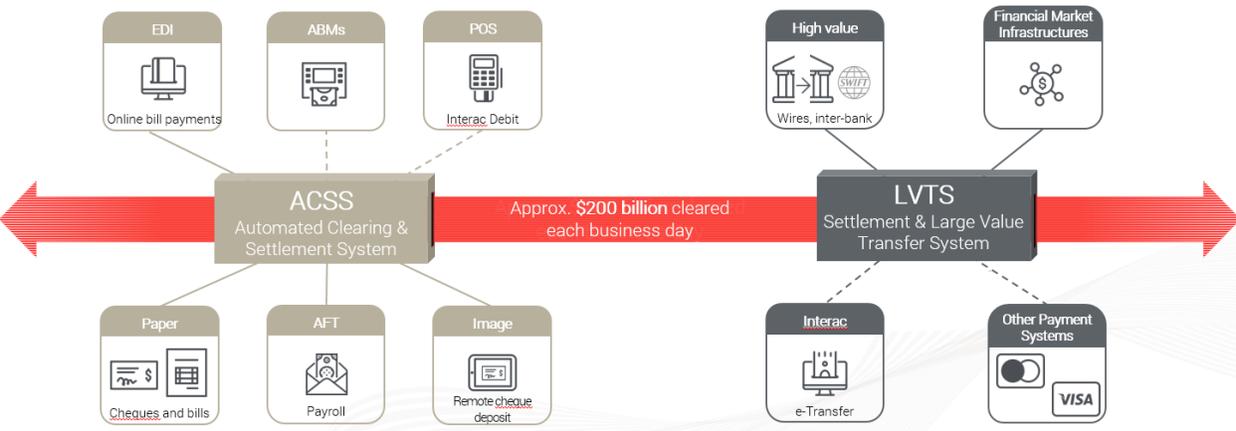
# 1. INTRODUCTION AND CONTEXT

Payments Canada is leading a multi-year, multi-phase initiative to modernize Canada’s payments ecosystem. External forces are reshaping the global payments ecosystem. To maintain Canada’s competitive position, we must better meet the needs of payment system users and participants and reflect changes to the evolving environment.

The first phase of the Modernization initiative was the development of *Modernizing Canadian Payments: A Vision for the Canadian Payments Ecosystem* (the Vision), which identifies the needs of the Canadian marketplace at the highest level and the key features required in a modern Canadian payments ecosystem. The next (and current) phase is to outline the changes required to progress towards the Vision and address related requirements (including regulatory requirements, public policy objectives, participant and stakeholder considerations and Payments Canada operational requirements) in an industry roadmap and define how Payments Canada will contribute to and enable the Vision. Payments Canada outlines these changes in this report (the Roadmap).

There are a variety of players in the Canadian payments ecosystem (Figure 1) including Payments Canada, which provides the core national clearing and settlement functions (including a legal framework, rules and standards, processes and technical infrastructure); financial institutions (FIs) that connect to those systems through their back office structures in order to provide payment services to end users; other financial institutions that connect indirectly; and a variety of new and existing payment service providers (PSPs).

Figure 1 - *The Canadian Payments Ecosystem (current state)* (Note: USBE is out of scope for this diagram)



Payments Canada has a unique role within the ecosystem, based on its legislated mandate to:

1. **Establish and operate** national systems for the clearing and settlement of payments and other arrangements for the making or exchange of payments.
2. **Facilitate the interaction** of its clearing and settlement systems and related arrangements with other systems or arrangements involving the exchange, clearing or settlement of payments.
3. **Facilitate the development** of new payment methods and technologies.

In pursuing this mandate, Payments Canada is to promote the public policy objectives of efficiency, safety and soundness of its clearing and settlement systems and take into account the interests of users.

Payments Canada's current role includes operating its clearing and settlement systems (Large Value Transfer System (LVTS), Automated Clearing Settlement System (ACSS) and US Dollar Bulk Exchange (USBE)); being a rule-maker for those and related systems and payment instruments; and providing services to payment system participants, such as the connecting physical network (CSN) and shared directory services (FIF and CCIN). Payments Canada is funded by participants and operates as a not-for-profit utility.

Payments Canada is also a facilitator within the wider payments ecosystem. Given its position at the core of the ecosystem (Figure 2), and its established relationships with financial institutions, stakeholders and regulators, Payments Canada is uniquely positioned to incorporate and reflect various inputs within a Roadmap that is system-wide and holistic. It can also use this unique position to influence ecosystem-wide outcomes to deliver on the Vision. Payments Canada is mindful of this and, in defining its own role and activities, will foster and support a competitive and dynamic marketplace, while also seeking to achieve safety, soundness and efficiency.

## Basic Definitions

**Operator** – setting rules and legal framework for a payment product, defining roadmap as part of product development. An Operator selects and manages Service Providers and controls pricing.

**Service Provider** – running the system and underlying technology. This includes Applications (including Business Applications), Infrastructure (including Data Centre) and Network (Connectivity) (including SWIFT & CSN).

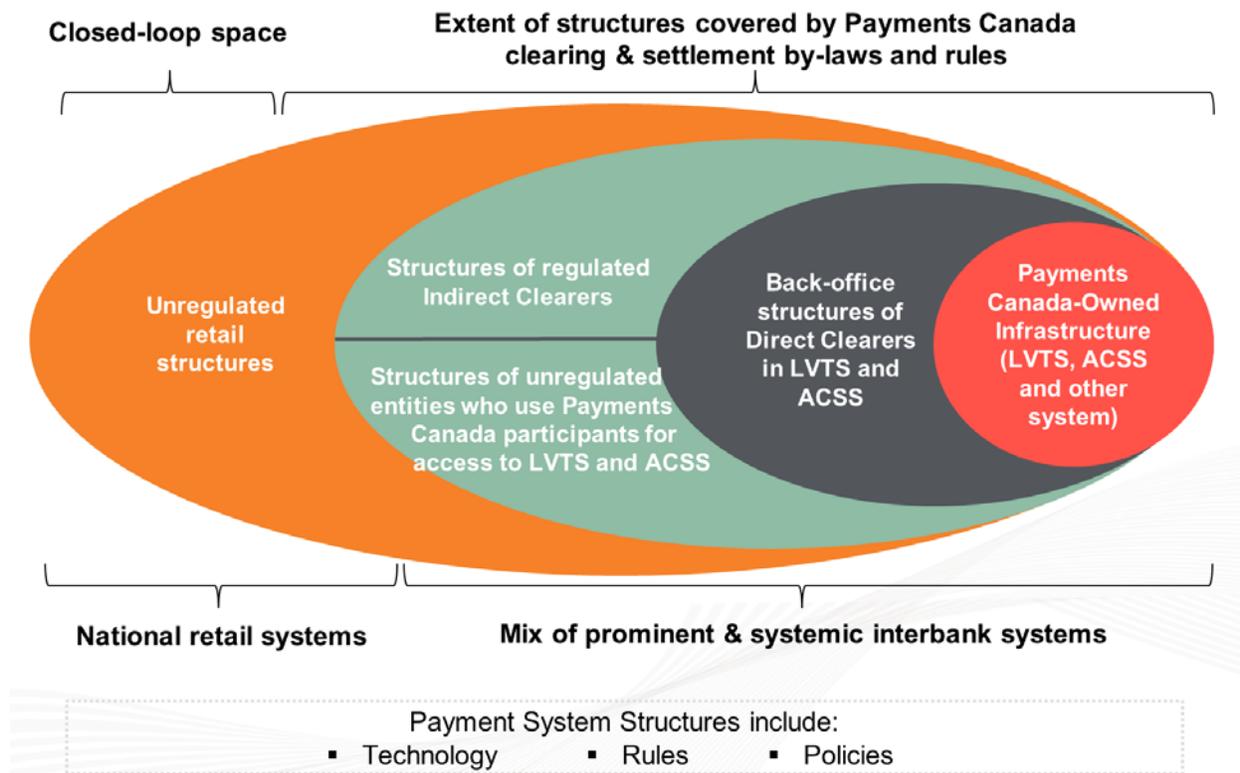
**Payment System** – combination of the legal framework (rules) and underlying technology, including settlement risk model, processes and network.

**Payments** – Canadian dollar-denominated transfer of value and data between parties.

**Exchange** - delivery and receipt of payment instructions/items.

**Clearing** - reconciliation of payment items that were exchanged and the calculation of balances.

Figure 2 - Payments Canada's reach across the ecosystem



Given the importance of payments systems to the economy, the Department of Finance oversees the payments ecosystem through stated policy objectives of safety and soundness, efficiency and consideration of user interests. Through these objectives, the Federal Government seeks to have a payments ecosystem that responds to the needs of Canadian consumers and businesses in support of a vibrant economy. Any major changes in the payments ecosystem must ideally support or, at a minimum, not impede achieving these objectives.

The Bank of Canada also has oversight responsibilities for designated payment systems. In particular, it sets risk management standards which must be observed for designated systems. These standards are based on international standards, the CPMI-IOSCO<sup>1</sup> Principles for Financial Market Infrastructures (PFMIs),<sup>2</sup> which apply to the LVTS and Standards for Prominent Payment Systems, which apply to the ACSS.

### The Vision

Payments ecosystems are complex networks, with traditional and non-traditional service providers serving users with diverse needs. Delivering value to payment system users is a key

<sup>1</sup> Committee on Payments and Market Infrastructures (CPMI) and the International Organization of Securities Commissions (IOSCO).

<sup>2</sup> Available at: <http://www.bis.org/cpmi/publ/d101a.pdf>

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driver of the Payments Canada Modernization initiative, recognizing that users rely on the speed, flexibility and security of those systems for their economic well-being and advancement. In order to better understand the requirements for Modernization, Payments Canada facilitated ecosystem-wide engagement with more than 100 stakeholder organizations<sup>3</sup> from across the country and conducted research to define a Vision for the modern Canadian payments ecosystem.

### **Vision for Canada's Payments Ecosystem**

*A modern payments system is fast, flexible and secure, promotes innovation and strengthens Canada's competitive position.*

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<sup>3</sup> Including large corporations, consumers and small/midsize businesses, government organizations, financial institutions and non-bank payment service providers.

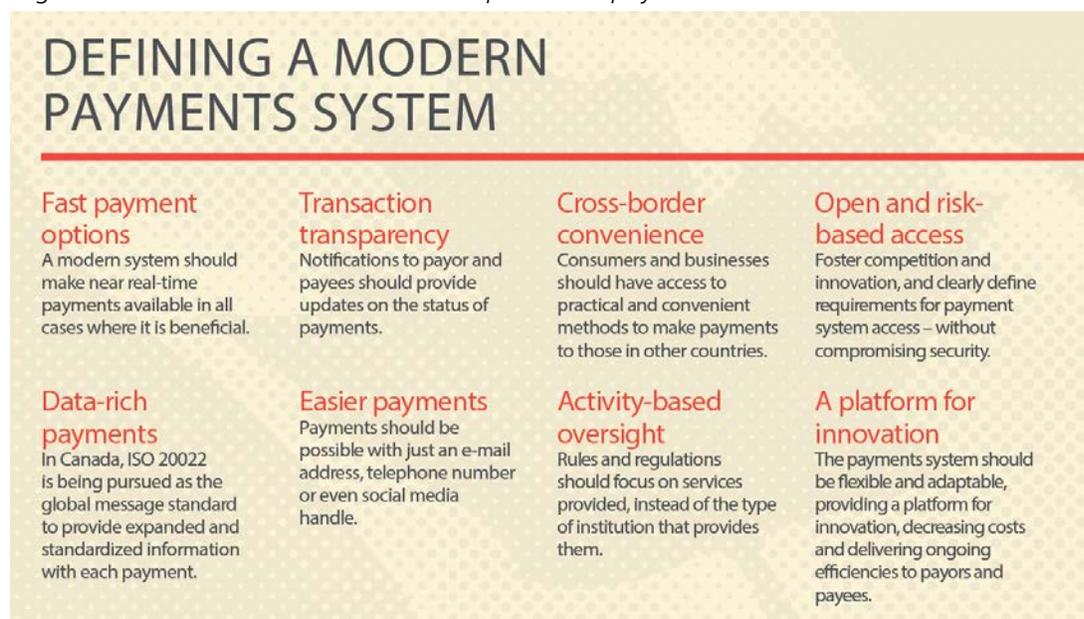
## 2. REQUIREMENTS FOR MODERNIZATION

The Canadian payments ecosystem is complex. Used by Canadians each and every day, it must be responsive to evolving user needs and recognize the impact of new technology, new entrants and the demands of the future economy. As critical infrastructure that underpins the Canadian financial system and economy, it also warrants close attention of regulators. As a network, it requires participants that regularly compete with each other and, from time-to-time, to engage collaboratively. However, the ecosystem is supported by aging technology infrastructure including Payments Canada's systems. Modernization must take all of these factors into account in determining the best way forward. This section outlines the requirements Payments Canada has considered in developing the Roadmap.<sup>4</sup>

### a. Needs identified in *Modernizing Canadian Payments: A Vision for the Canadian Payments Ecosystem*

Unmet needs, primarily in the retail payments marketplace, have ignited the Modernization initiative. Projects centred on upgrades to systems and underlying technology require consideration of future functional requirements in a broad business sense. Payments Canada facilitated a consultation process that identified eight needs of users in the payments ecosystem, listed in Figure 3. One key objective of the proposed Roadmap is to identify and prioritize the necessary changes required to better serve these needs and close the existing gaps.

Figure 3 - *What Canadians need and expect from payments*



<sup>4</sup> The process of developing the Roadmap is described in Appendix 1.

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The following five features were also identified as an outcome of the Vision, and, if provided, would better serve the needs of users in the payments ecosystem:

- **Fast:** Transactions can be processed in near real-time
- **Efficient:** Posting to accounts can occur quickly, making funds available sooner
- **Easy:** Transferring funds is made easier through use of common identifiers like an email address
- **Convenient:** Individual transactions provide status notifications and standardized payment information
- **Interoperable:** Domestic and cross-border commerce is seamless due to standardized protocols

### b. Canada within the international context

Canada is subject to the same high-level drivers for modernization as other developed economies, including technology, changing participant and user needs and regulation. Recognizing this, Payments Canada and the Bank of Canada analyzed payment systems in 27 jurisdictions.<sup>5</sup> While changes in Canada should be informed by the international experience and the realm of the possible, there is no “one best way” to address the challenges and drivers, and the Canadian context must be taken into account. Still, the research identifies important implications for Canada (Figure 4), including:

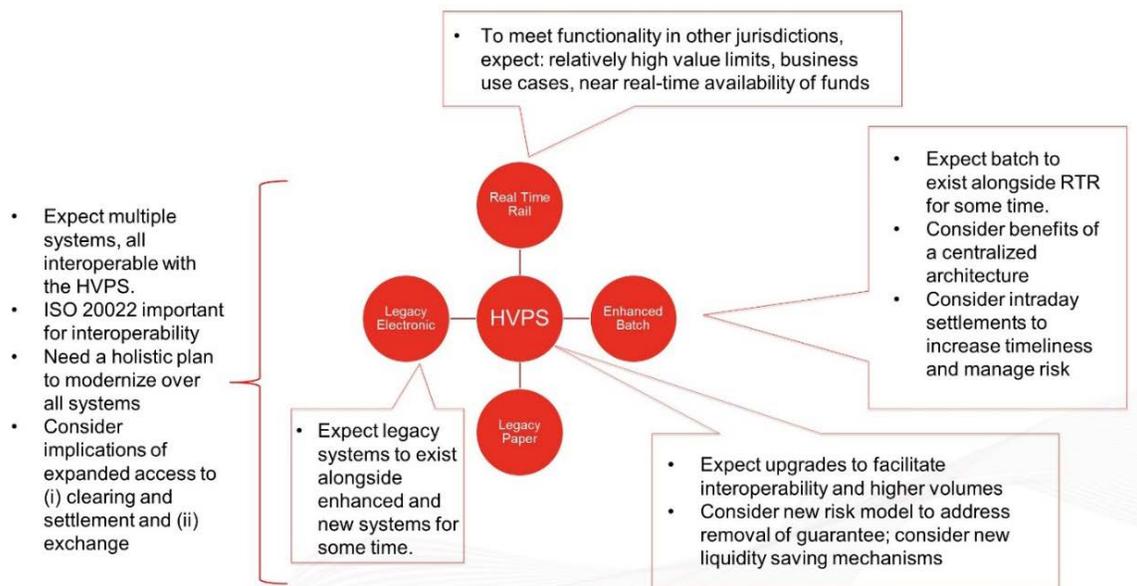
- Most jurisdictions have added a national “expedited” retail (credit push) payments system (ERPS), to provide capabilities for near real-time availability of funds for higher value retail transactions, which support use cases involving businesses transactions. In Canada, Interac’s e-Transfer solution is the nearest example of such a system. However, its configuration does not currently provide all of the capabilities found in ERPS in other jurisdictions.
- Retail systems are clearing and settling more often to better address liquidity and credit risk.
- Most countries have batch systems with intraday settlement finality, which operate along with newly-introduced ERPS and continue to see transaction volume growth. This suggests Canada could expect to operate its batch Automated Funds Transfer (AFT) stream in the ACSS, possibly with intraday settlement, for some time alongside any new offerings.
- Many jurisdictions have multiple retail systems that are interoperable with their large value system. This permits automated connections and eliminates manual interventions between systems. Multiple systems are expected to continue in Canada and the ISO 20022 message standard will facilitate interoperability both domestically and internationally.

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<sup>5</sup> See *Clearing and Settlement Systems from Around the World: A Qualitative Analysis*, Payments Canada Discussion Paper No.5, June 2016, <https://www.payments.ca/sites/default/files/2016-qualitative-analysis.pdf>.

- Many large value systems examined required upgrades to integrate with new ERPS or higher frequency batch settlements. Canada should expect that upgrades will be required to facilitate timely interoperability with its batch system and any new systems.
- Large value systems are adding stronger controls and new liquidity savings mechanisms to increase transaction speed while decreasing risk and collateral costs. Such features could be used in Canada to improve efficiency, reduce risk and meet the Principals for Financial Market Infrastructures (PFMIs) without reliance on the central bank guarantee.<sup>7</sup>
- Many jurisdictions operate under explicit public policy objectives to increase direct access (for regulated deposit-taking institutions) to exchange, clearing and/or settlement. Although there is no such explicit regulatory objective in Canada, modernization efforts present an opportunity to consider the implications of widening access to clearing and settlement.
- New features and services are enabled largely through centralized architectures, which provide advantages with respect to efficiency (e.g., straight-through-processing, and fraud and error detection), innovation, access, risk management and interoperability, which would be useful in the Canadian context.<sup>6</sup>

Figure 4 - Summary of international research implications for Canada



<sup>6</sup> Although Canada’s ACSS has a decentralized architecture, it is expected that any ERPS would use a centralized architecture.

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### c. Bank of Canada requirements

Payments Canada has engaged closely with the Bank of Canada to understand its requirements as they relate to the Modernization initiative. The Bank plays an important role as both the Regulator and as a direct participant / direct clearer in the LVTS and the ACSS.

The Bank of Canada strongly supports the recommendation for a new modernized wholesale payments system as opposed to a continuation of required investments in the existing infrastructure. A new system must observe the Bank's minimum risk management standards (based on the PFMI) and the Bank expects to see a system design that meet the PFMI without reliance on the central bank guarantee.<sup>7</sup> This would likely require participants to pledge an increased amount of collateral to the Bank of Canada which may have ancillary impacts in terms of changing participant behaviour in the system. Liquidity savings mechanisms (LSMs) available in modern high-value payment systems can help offset increased collateral needs.

Core clearing and settlement systems should support enhanced risk-based access to address the risks associated with a highly tiered structure and the clearing of different payment instruments and settlement arrangements (e.g. end-of-day, multiple intra-day or individual payments, bilateral or multilateral net). Interoperability to provide more automated exchange, clearing and settlement is a key priority, along with the adoption of ISO 20022 to support straight-through processing and automated reconciliation between businesses. In addition, a fast payment option including immediate access to funds on a 24/7/365 basis should be a key feature of a newly designed system. Replacement, rather than incremental improvements, of both core clearing and settlement systems is supported by the Bank of Canada.

The *Payment Clearing and Settlement Act* was amended in 2014 to give the Bank of Canada responsibility to identify, designate and oversee systems that have the potential to pose payments system risk<sup>8</sup> to the Canadian economy. In May 2016, the ACSS was designated as a Prominent Payment System (PPS) and must comply with the Bank's *Criteria and Risk-Management Standards for Prominent Payment Systems*.<sup>9</sup>

An initial review of the ACSS against the standards indicates that significant changes are required to meet the standards. The Bank has provided preliminary guidance regarding the gaps

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<sup>7</sup> The Bank of Canada's residual guarantee provides that, in the unlikely event of multiple defaults on a single day, if survivors' and defaulters' pre-pledged collateral does not cover the defaulters' losses, the Bank will cover the difference.

<sup>8</sup> The *Payment Clearing and Settlement Act* defines payments system risk as the risk that "a disruption to or a failure of a clearing and settlement system could cause a significant adverse effect on economic activity in Canada by (a) impairing the ability of individuals, businesses or government entities to make payments, or (b) producing a general loss of confidence in the overall Canadian payments system, which includes payment instruments, infrastructure, organizations, market arrangements and legal frameworks that allow for the transfer of monetary value."

<sup>9</sup> Available at: <http://www.bankofcanada.ca/wp-content/uploads/2016/02/criteria-risk-management-standards.pdf>

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that need to be addressed in the near future (e.g. new collateral requirements for ACSS) and those which could be addressed as part of Modernization (see Appendix 2). Currently, the ACSS settles next-day, has limited features by which to collect data to monitor risk and performance, lacks tools to manage credit exposures and liquidity risks and does not require ISO 20022 messaging standards. Meeting these requirements will mean changes to Payments Canada systems.

#### **d. Current state assessment of the Large Value Transfer System**

As part of the overall Modernization project, Payments Canada undertook a review of the LVTS. The LVTS was designed in the mid-1990s leveraging technology standards of that time. Implemented in 1999, the system, while systemically important to the Canadian economy, is based on end-of-life technology, with a dated monolithic architecture underpinned by an inflexible non-database data storage structure. This makes it extremely challenging to introduce changes and isolate the impact of a change to one part of the system from others. The single-threaded architecture limits the throughput to 2-3 payments per second, which causes regular morning backlogs with limited functionality available to participants to manage their queues. With this technology it is not possible to maintain and improve availability, extend hours of operation or support increasing processing volumes without peak period delays.

There are a number of changes to the functionality of LVTS that will be required in the future. The most significant is driven by the Bank of Canada's requirement to have a system that meets the PFMI without reliance on the central bank guarantee. In addition, as the United States and other jurisdictions move to the ISO 20022 message standard, the Canadian high-value system will have to adopt this global standard as well. The LVTS currently supports the settlement of various payments systems and products. In the future, more payments will require settlement through this system which require enhancements around hours of operation, liquidity management, reporting capabilities and new system interfaces to support automatic settlement and connections. These changes will be difficult to enable without making significant changes to the architecture of the LVTS, to the point that effort to do so would exceed the cost of replacement. Finally, there are emerging operational concerns based on the current design of the LVTS, which have been managed so far, but will become more problematic as expectations and requirements for this systemically important system continue to evolve.

#### **e. Marketplace capabilities**

Payments Canada strengthened its understanding of potential payments solutions and services available in the market through a structured Request for Information (RFI) process, which generated 17 high quality responses. A number of these vendors presented at the *Modernization Showcase* at the *Payments Panorama* conference in June 2016, and six were invited to provide further details to Payments Canada in individual meetings. The responses and presentations confirmed the availability of full-feature, end-to-end solutions, as well as innovative approaches

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that could fulfill the identified needs and requirements (see section 4b for further details). Insight was also gained into the feasibility of adopting a roadmap strategy that could, over time, result in a common foundation for both high-value and lower value / high volume payment processing.

Interac Association and Acxsys Corporation (Interac) plays a role in the Canadian payments ecosystem as a utility provider, with a national payments infrastructure supporting the person-to-person (P2P) e-Transfer service and other offerings such as Bulk Transfer. Interac offers these services, via existing integrations with financial institutions, to nearly every bank account in Canada. Payments Canada has been in discussions with Interac to better understand its core utility platform and whether it has the potential to address the needs identified in the Vision and other requirements detailed in this report. If so, it could bring efficiencies by enhancing existing systems, and benefit from an already broad adoption.

#### **f. Distributed ledger technology**

Distributed ledger technology (DLT) has significant potential as a disruptive force in any system design, including the payments ecosystem. Many parties around the world, including Payments Canada and its participants, are examining the potential for DLT to catalyze frictionless, secure, and efficient payment processing. This technology has the potential to, over time, revolutionize the existing approaches to settlement. While the mitigation and control of the counterparty and systemic risks can be improved, any additional risks DLT could introduce are not yet well defined or understood and, as a result, this technology will not be market ready for the critical payments systems for several years. Payments Canada is actively working to understand the mechanics, limits and uncertainties (e.g. technical scalability, cyber security risks, data privacy, governance, legal and regulatory frameworks) and potential opportunities DLT could provide in the core clearing and settlement system. While the next generation replacement of the LVTS will not incorporate DLT, the future use of DLT will continue to be researched and prototyped with an eye to subsequent generations of technical infrastructure. Payments Canada understands that new system designs have to be flexible and evolve rapidly. Current system architecture does not expect technology solutions to operate unchanged for decades, but rather recognizes the need for continuous change and more significant overhauls when the technology landscape changes dramatically.

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### 3. MEETING THE REQUIREMENTS - THE PROPOSED INDUSTRY ROADMAP

The significant changes recommended in this Roadmap reflect the need to consider the interconnections between the wholesale and retail core clearing and settlement infrastructure (i.e. systems, including all rules, standards and technology standards) along with the capabilities of participants, the needs of stakeholders and regulatory requirements.

While being a foundational component of the Canadian economy, the wholesale system - LVTS - is based on legacy technology that makes it extremely challenging to introduce changes without a significant risk. Yet, changes will be required to address regulatory requirements and support evolution in other payments systems. As the foundation for settlement of existing (and future) payment systems and other financial market infrastructures, and to address operational, risk and regulatory concerns, **LVTS must be replaced as a first priority**. A new Core Clearing and Settlement System (CCSS) will provide a modern platform to support enhancements to retail payment systems.

Canada's retail system, **the ACSS, also requires enhancements** to meet the new regulatory requirements and deliver new features and functionality like richer remittance data identified in the Vision. **Changes to the "batch" Automated Funds Transfer (AFT) stream** and moving to same-day settlement will deliver enhancements in the form of more frequent exchanges, faster delivery of funds and ISO 20022 rich remittance capabilities for AFT batch payments. It is expected that a new CCSS and its components will incorporate the central clearing functions of the current ACSS, effectively replacing ACSS.

The Vision identified a need to **enable real-time payments capability for retail payments** and there are choices on how to proceed between enhancing existing systems or acquiring new capabilities.

**Renewal of Payments Canada's rules, standards and legal framework** is required to support these changes and provide flexibility to accommodate innovation and change in the payments ecosystem over time.

Building a strong foundation for Canada's core clearing and settlement as a priority and careful sequencing to address retail system change<sup>10</sup> has two advantages:

1. It sets the core settlement platform on which all existing and future payments systems can settle in the central bank funds, without a necessary modification to the legacy LVTS

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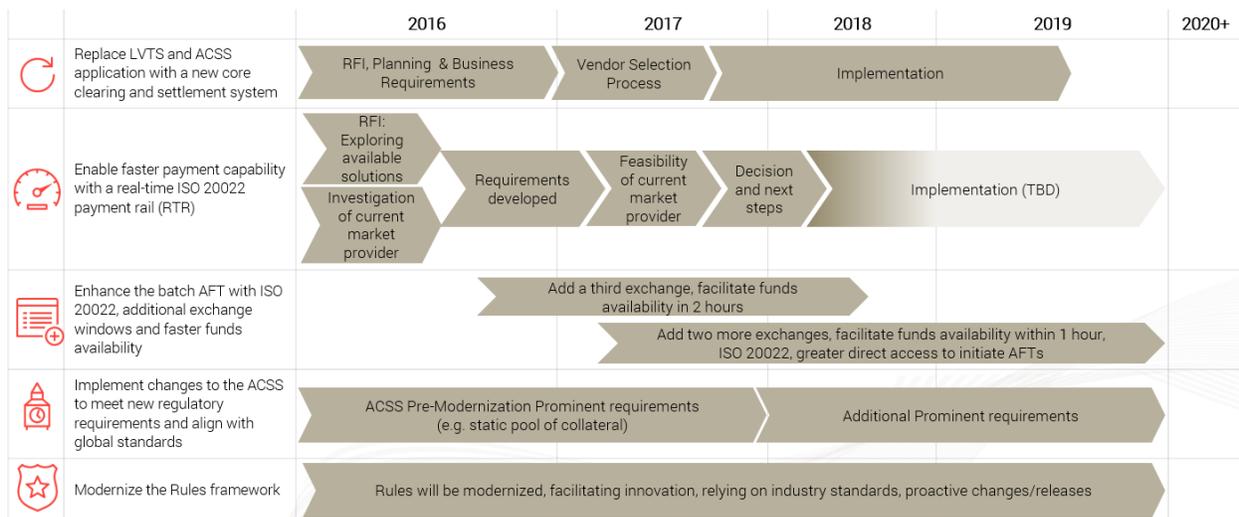
<sup>10</sup> A later phase of the Roadmap will address changes in other payments cleared and settled in the ACSS (such as cheques, bill payments, Point of Sale, Electronic Data Interchange) and US Dollar Bulk Exchange (USBE). Such changes will also address whether payment transaction limits should be modified to better address risk considerations and influence desired outcomes.

first and then potentially again to all the connected payments systems when the LVTS is replaced.

2. Changing the high-value system is a significant effort on its own. Changing it and acquiring a new real-time retail system concurrently introduces challenges in managing change at the industry level, particularly given the inter-dependencies of the initiatives.

In the meantime, however, to deliver the swiftest value to the market and address needs identified in the Vision, Payments Canada is recommending **functional enhancements to the existing AFT batch stream**, over and beyond the regulatory requirements, to add additional exchange windows, provide faster availability of funds, and expand capabilities to better serve businesses and financial institutions across all Canadian time zones to demonstrate value to stakeholders. International research confirmed that batch systems have not been displaced by new real-time rails in other countries and enhancements to them concurrently would be an important and complementary element of Modernization. Further, the adoption of ISO 20022 as a standard for all modernized Payments Canada’s systems recognizes the rising importance of data to both participants and users. This will put more emphasis on Payments Canada as an operator of the systems to grow its role in carefully managing the aspects related to richer remittance information being transferred.

Figure 5 - *The proposed industry roadmap*



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**a. Acquire a new high-value core clearing and settlement system (CCSS) as a first priority.**

The new Core Clearing and Settlement System (CCSS) will replace the current LVTS and function as the core settlement system for Canada and settle payments in central bank dollars at the Bank of Canada. It will be ISO 20022 enabled with “backwards compatibility” to support the MT message standard interface currently used, to manage change for existing LVTS Direct Participants. At this point, access criteria for direct participation is not anticipated to change.<sup>11</sup> Initial high-level design elements will observe the Bank of Canada’s minimum risk management standards (based on the PFMI) without relying on the central bank guarantee, identify options for exchanging, clearing and settling higher volumes, support interoperability (other domestic financial market infrastructures, Bank of Canada’s systems and other payment schemes), and support improvements arising from the Prominent designation of ACSS and the needs identified in the Vision. Replacing the LVTS with a new CCSS will ensure Canada’s high-value payment system remains a solid foundation for the Canadian economy.

**New CCSS characteristics**

- Settlement on the books of the Bank of Canada
- Clearing of wire payments
- Best-in-class resiliency
- ISO 20022 with backwards compatibility
- Settlement Optimization Engine replacing the ACSS settlement system
- Liquidity Saving Mechanisms
- Payments Canada as the Operator and Application Provider

Additional opportunities and synergies that may exist in relation with the Bank of Canada’s existing applications, such as collateral management and the High Availability Banking System (HABS), will be examined.

Importantly, the CCSS will enable the future decommissioning of the ACSS and the creation of a single core clearing and settlement platform. The Settlement Optimization Engine will enable the settlement of lower value items/payment schemes to be migrated to the new CCSS, maintaining, to the greatest degree possible, the high efficiency of multi-lateral net settlement currently delivered through the ACSS.

**b. ISO 20022-enabled real-time payments capability for Canada**

Canada urgently needs real-time payments capability (i.e. a Real-Time Rail – RTR) for consumer and business payments. Payments Canada will be the operator of the RTR, in that it will set the rules, legal framework and define the future roadmap for the RTR, although it may not necessarily be the service provider (i.e. run the system and underlying technology – applications, infrastructure and network).

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<sup>11</sup> Payments Canada members are eligible to become participants and there is no volume criteria like there is in ACSS so it is more ‘open’ in that sense.

Payments Canada’s investigations with a number of providers through the RFI process and discussions with a market incumbent, Interac, demonstrated new opportunities that could achieve the objective of implementing a real-time payments capability for Canada. To ensure that Payments Canada can deliver on its accountabilities to the market with respect to robustness, functionality and future enhancements as market needs evolve, an objective process to select the right service provider is required. As a next step, Payments Canada will identify more granular requirements for the Real-Time Rail as well as assessment criteria. Payments Canada is committed to an objective and transparent evaluation and assessment process and may issue, if required, a Request for Proposal (RFP) to assist in this process.

It is imperative that progress towards ISO-enabled real-time payments capability is delivered quickly. The Real-Time Rail will be the main platform for future innovation and Canadians will greatly benefit from having this functionality implemented.

One important feature of the Real-Time Rail is that it will support multiple overlay services. These will rely on the Real-Time Rail’s clearing and settlement functionality and provide end-user functionality, for example person-to-person money movement, bulk payments, bill payments or fraud detection. Payments Canada will establish and operate its own overlay services if supported by the membership as an efficient offering for the ecosystem within the collaborative space. As with the Real-Time Rail, Payments Canada does not have to be the service provider for these collaborative overlay services. As well, Payments Canada will not play in the competitive market for overlays i.e. offering services that directly compete with the same services offered by our members.

**c. Make functional enhancements to batch Automated Funds Transfer (AFT) payments**

AFT batch payments are expected to continue to operate along with any new systems that will be developed. Payments Canada will want to evolve AFT batch and continue to act as the operator, though not necessarily the service provider.

The AFT batch stream, as currently structured, does not exchange, clear or settle fast or frequently enough. The Roadmap recommends functional enhancements to better serve

**New Real-Time Rail (RTR) characteristics**

- Clearing of real-time “credit-push” payment items
- Deferred Net Settlement through the new CCSS
- ISO 20022 messaging
- Open access, run as “utility”
- Ubiquitous reachability of recipients
- Able to meet Prominent Standards
- Legal Framework - Rules, Standards, Interfaces
- Payments Canada as Operator but not necessarily the Service Provider
- Clear governance for Service Provider
- High throughput of payments
- 24/7 availability

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Canadians and unify their experience across all time zones, including Western Canada. These changes are proposed in the following phases:

- *Phase I* - add a third payment exchange, five days a week, with funds availability through posting to end-users within two hours).
- *Phase II* – expand to five payment exchanges a day, five days a week, with funds availability through posting to end-users within one hour, ISO 20022 enabled, consumers and businesses to have better access to originate AFT credits (e.g. through online banking) (current target: December 31, 2019).
- *Subsequent Phases* – further investigation moving to exchanges over seven days a week, expanded notification system to recipients and originators, and other enhancements (dates to be determined).

Legacy payment products will be managed such that volume and value will reduce over time so that they can be progressively decommissioned and replaced with other services (including through overlay services through the Real-Time Rail as outlined below).

#### **d. Changes to the ACSS and associated products in order to meet the regulatory requirements**

In order to comply with the standards for Prominent Payment Systems, there will be additional changes required to the ACSS, AFT, EDI and other payments products cleared and settled through the ACSS. For example:

- collateralization of credit exposures
- same-day settlement of products clearing and settling through the ACSS;
- revise access criteria to participate in the retail clearing and settlement system, to be fair, open and risk-based.

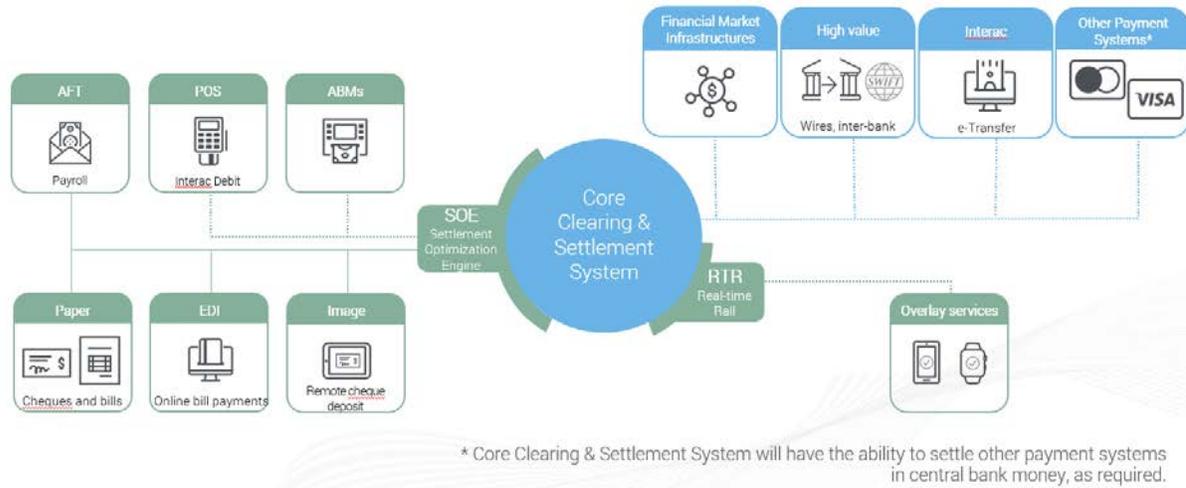
It is expected that these payments products will, over time, be migrated to other payments systems (like the Real-Time Rail or the new CCSS) and possibly be replaced with other service offerings. The AFT will remain as a batch payments stream operated by Payments Canada and the other legacy paper, including cheques, and electronic payment products will be progressively and carefully managed down over time.

#### **e. Modernization of rules, standards & legal framework**

The development of a modern rule set for wholesale and retail payments is required so that Payments Canada's rules remain relevant in a rapidly evolving ecosystem, reflect current market practices and achieve the appropriate balance between flexibility and compliance. This work will consist of a number of pillars: preparing a framework for modernized rules within Payments Canada; establishing a comprehensive information source and repository for rules, by-laws and procedures; documenting the rules review and amendment process; and establishing and managing the pipeline for forthcoming by-law and rules changes. The future innovation in the

payments ecosystem will be facilitated by Payments Canada and its modernized rules framework, which will be proactive, fast and flexible.

Figure 6 - The Canadian Payments Ecosystem (future state) (Note: USBE is out of scope for this diagram)



### Options considered, but not pursued

Delivering an ISO 20022 enabled, real-time system as a first priority was considered but not pursued due to the importance of the CCSS to the financial system. Additionally, new functionality in the CCSS could better support improvements to the retail system (e.g. interoperability). A number of alternate models for current ACSS payment streams other than AFT were considered, and will be important to address in the future if these are not replaced by other service offerings. These were not included as an immediate priority as the AFT payments stream was identified to have the greatest potential impact for improvements given its broad use. Finally, allowing the market to satisfy the identified needs, without encouragement or intervention, was considered, but not chosen as there is insignificant early indication that sufficient change would occur on its own.

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## 4. INDUSTRY CAPACITY

### a. Participant state of readiness and support

During our consultations with participant financial institutions, it was evident that many are currently involved in infrastructure renewal, building out their architecture to interface more easily with new technologies, players and adapt new processes. A primary objective of this effort is to insulate older internal infrastructure from change, by implementing a buffer layer or payments hub that is more adaptable. It also helps members address silo challenges, where systems were added over time to address specific business needs, and would benefit from being better integrated and aligned.

In some cases, these changes are underway and will soon deliver new flexibility and adaptability, which can be positively leveraged as the new CCSS is introduced and other systems acquired or enhanced. However, other members have not yet significantly advanced their implementation efforts and resources are heavily absorbed in that process, delaying other activity, or forcing reprioritization. Additionally, many FIs are still responding to cheque imaging and its associated impacts and opportunities, as well as continued enhancements to mobile and online offerings to better serve their client needs.

Of the changes proposed, by far the biggest impact to the FIs is the adoption of ISO 20022. In several instances, they are unable to begin to develop that capability until a new payments hub has been implemented. As a result, while some FIs could begin to send and receive full ISO messages within the year, others estimate that it could take up to five years. The development of the Roadmap will inform members around the prioritization of their investments and the need for a resourcing strategy.

### b. Vendor capabilities (RFI)

Payments Canada approached various payments solutions organizations and service providers through a Request for Information (RFI) to learn more about the products and services available in the market that could be relevant to our Modernization effort. The RFI process resulted in useful insights, uncovering potential options to achieve the Vision.

On the **retail side**, several faster payments solutions were presented, with features closely matching the desired feature set for Canada. Vendors described how solution components could be combined to deliver faster retail payments infrastructures and batch processing. There are many solutions available, as well as options for customizing to support financial institutions in connecting to payments infrastructures, however some level of customization to meet specific needs will be required.

On the **high-value side**, a smaller number of vendors offer real-time gross settlement (RTGS) solutions. There is a smaller market for the high-value payments systems usually only operated

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by central banks. For some, the offerings around risk and liquidity management and settlement functionality are standard and have largely been implemented in smaller economies, while others have rather complex liquidity optimization modules that could provide significant liquidity efficiencies for additional bilateral or multilateral netting. To meet Canada's needs, any of these solutions would likely need to be specifically configured and enhanced.

Some vendors presented components of retail solutions (message exchange, authentication/validation modules, risk and liquidity management, fraud monitoring, and business rule execution functionality), which could be used as the building blocks for developing a new high-value system.

Most of the solutions presented employ service-oriented architecture principles, enable Application Programming Interfaces (API), and support an "overlay services" model for approved payment services provided by third parties.

Overall, a new CCSS is likely to be a vendor-supplied solution while the next step on the new RTR will require finalization of the requirements and assessment criteria in order to choose the best path to deliver faster payment capabilities to Canadians and foster innovation.

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## 5. FUNDING APPROACH

Working with the Member Advisory Council Funding Group, Payments Canada assessed the options for funding a new system or systems, including the manner in which any upfront investment required should be funded, allocated and priced. Options investigated include debt financing (i.e. bonds or bank financing), equity financing and vendor financing.

Debt financing provides a mechanism for current and future participants, who are benefitting from the system, to pay to use the system (as they would be required to pay for the amortization of the loan's principle balance). While the choice between bond and debt financing are roughly equal in cost, debt financing provides greater flexibility, is more cost effective and easier to administer.

Vendor financing will be evaluated through the competitive process, with capitalization and recovery over time through transaction fees.

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## 6. CONDITIONS FOR SUCCESS

Based on our experiences with major industry-wide projects, as well as learnings gathered from the RFI and similar overseas' experiences, major conditions for success include:

- **Engaged members, stakeholders and regulators** - Modernization will require clear and consistent messages, on-going engagement at multiple levels with members, stakeholders and regulators, supported by strong communications.
- **Leadership / champions** - There will need to be clear leaders and champions for Modernization within Payments Canada, Bank of Canada and the broad industry. Ideally there will be multiple industry champions, including representatives from large financial institution, smaller financial institutions and the fintech sector.
- **Clear decision-making processes and accountabilities** - The participation of multiple members and stakeholders means that there will be areas of disagreement. It is important to maintain momentum, consider strategic objectives and avoid over-analysis or drawn-out processes. While working towards consensus is highly desirable, there must be clear and simple mechanisms to quickly and effectively resolve differences.
- **Secure funding** - Securing adequate funding for central work is necessary, with a need for financial discipline and, where possible, negotiation to secure a good price.
- **Sound legal basis** - Any significant arrangements between Payments Canada, the provider of real-time capability and the CCSS service providers must be on a sound legal basis.
- **Well-defined scope and objectives to minimize scope changes**
- **Disciplined program and risk management**
- **Industry Level Program Management Office** – Multiple parallel initiatives within Payments Canada and other institutions will require strong coordination and program management support at the industry level. This will require sufficient resources allocated by Payments Canada and financial institutions.

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## 7. GO FORWARD PLAN

### Program-wide

- Establish through RFP an Industry Program Management Office with a partner that specialises in the management of financial sector transformation.

### Acquire a new CCSS

- Define high-level business requirements that reflect members' needs and Bank of Canada functionality – establish cross-functional Working Groups.
- Develop a risk model.
- Identify collateral management options and liquidity saving mechanisms.
- Finalize proposed funding and project governance models.
- Preparation of acquisition strategy in late 2016/early 2017.
- Engage a consultancy firm to support creation of the procurement strategy.

### ISO 20022-enabled real-time payments capability

- Gather additional information from existing and potential providers on capabilities, planned service changes and timelines for implementation.
- Define desired capabilities required for ISO 20022-enabled, real-time payments capability.
- Develop a robust assessment model and transparent process to ensure a thorough and objective analysis is performed.
- Consider accountability and oversight models for various sourcing arrangements.
- Continued research and engagement with members and stakeholders.

### Changes to AFT batch

- Develop greater understanding of the impact of AFT changes to the ecosystem.
- Investigate overall sequencing and timing of changes.
- Develop requirements and plan for implementation.

### Changes to ACSS to meet regulatory requirements

- Complete assessment of ACSS against prominent payment system risk management standards.
- Identify gaps between Payments Canada current capabilities and those needed to ensure compliance.
- Develop a plan to address the gaps which must be resolved now and as part of Modernization.

### Modernize rules, standards & legal framework

- Prepare a framework for modernized rules within Payments Canada.
- Establish a comprehensive repository for rules, by-laws and procedures.
- Document the rules review and amendment process.
- Scan international payment bodies to gauge best practices for modern rules.

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## 8. APPENDIX

### 1. DEVELOPMENT OF THE INDUSTRY ROADMAP

#### a. Research

Using the Vision as a starting point, Payments Canada performed further research, engaged industry players and examined operational capabilities of its existing systems. All these inputs informed the development of the Roadmap.

Payments Canada published a series of research papers:

- [\*Clearing and Settlement Systems from Around the World: A Qualitative Analysis\*](#) (jointly published with the Bank of Canada);
- [\*Public Policy Objectives and the Next Generation of Payments Canada's Systems: An Analytical Framework\*](#) (jointly published with the Bank of Canada); and
- [\*The economic benefit of adopting the ISO 20022 payment message standard in Canada.\*](#)

In addition to the examination of existing domestic payment system capabilities, Payments Canada conducted an RFI process to develop a greater understanding of current and potential exchange, clearing, settlement and ancillary capabilities that exist in the global marketplace today. With regard to Payments Canada's capabilities, a current state assessment of the LVTS was completed and an assessment of the ACSS against new Bank of Canada oversight requirements<sup>12</sup> was conducted.

#### b. Participation

Payments Canada has an established and ongoing dialogue with its regulators. Both the Bank of Canada and Department of Finance are strong proponents of payment system modernization and are carefully monitoring global developments and domestic progress to ensure that Canada's payments ecosystem keeps pace. Similarly, the Office of the Superintendent of Financial Institutions (OSFI) and the Competition Bureau have been briefed. These agencies have provided guidance and, in some cases, requirements, for consideration in the development of the Roadmap.

Industry participants and stakeholders continue to inform the options and choices included in the Roadmap. The Member Advisory Council (MAC) and Stakeholder Advisory Council (SAC) each created working groups to provide input to the MAC<sup>13</sup> and the SAC and to share their knowledge with Payments Canada and provide input into the development of the Roadmap.

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<sup>12</sup> The ACSS was designated effective 2 May 2016 as a clearing and settlement system that has the potential to pose payments system risk. As such, the system must comply with the Bank's *Criteria and Risk-Management Standards for Prominent Payment Systems*.

<sup>13</sup> The MAC created two working groups: one to focus on funding issues and another on modernization issues more generally.

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These groups were engaged in a series of structured meetings over the summer of 2016. In addition to these working groups, frequent one-on-one meetings were held with members and stakeholders, the Canadian Bankers Association and senior executives from participant financial institutions.

### **c. Conceptual models**

A series of models that explored enhanced features within retail and wholesale payments and roadmap options envisioning different approaches, prioritization and timing of wholesale and retail system changes were used to generate input and understanding of the implications of different approaches. These were socialised through the MAC and SAC Working Groups, through one-on-ones with participants and with regulators.

## 2. ANTICIPATED PROMINENT PAYMENT SYSTEM GAPS TO ADDRESS

	Anticipated key gaps to address	Near-term	Modernization
Settlement finality	Same-day settlement		✓
Participant default rules and procedures	Perform periodic default simulations	✓	
General business risk	Potential increase in financial reserves	✓	
Credit risk	Collateral to cover credit exposure arising from the single largest default; and access to liquidity to settle same-day	✓	✓
Collateral			
Liquidity			
Operational risk	Improved testing of existing ACSS contingencies Improved contingency and back-up	✓	
Access and participation requirements	Review participant requirements		✓
Tiered participation arrangements	Automated tools to collect data to monitor risk		✓
Efficiency and effectiveness	Define and monitor performance metrics		✓
Communication procedures and standards	Required use of ISO 20022 messaging standard		✓

### 3. GLOSSARY

Clearing	Reconciliation of payment items that were exchanged and the calculation of balances.
Exchange	Delivery and receipt of payment instructions/items.
Operator	Entity that sets the rules and broader legal framework for a payments product, and defines roadmap as part of the product development. Also selects and retains control over the service provider, ensuring agreed service levels are met. Operator also controls pricing for the participants.
Payments	Canadian dollar-denominated transfers of value and data between parties. <i>(N.B. US Dollar Bulk Exchange remains a Payments Canada system, though it is currently out of scope for this Roadmap).</i>
Payments System	Combination of the legal framework (rules and standards) and underlying technology.
Participant	An entity that participates in a payment system and ordinarily offers payment products and services to users.
Service Provider	Entity running the system and underlying technology, often on behalf of the Operator.
Settlement	Payment of the clearing balances.
User	Individuals and organisations, including businesses, government and other organisations, that use the payment products and services offered by payment system participants to make payments to another party.