PAYMENTS CANADA

[PUBLIC]

Lynx Disclosure

Bank of Canada Risk Management Standards

payments.ca

Responding financial market infrastructure (FMI) operator:	Payments Canada
Date of this disclosure:	December 2021
Jurisdiction in which the FMI operates:	Canada
Regulating, supervising, or overseeing authority:	Bank of Canada Minister of Finance

This disclosure can also be found at www.payments.ca
For further information, please email info@payments.ca

Table of contents

Executive summary

The Canadian Payments Association was created by the *Canadian Payments Association Act* in 1980.[1] The Canadian Payments Association operates under the brand name of Payments Canada.

Payments Canada owns and operates Canada's main financial market infrastructures (FMIs) for payments. We underpin the Canadian financial system and economy by providing safe, efficient and effective clearing and settlement of payments.

On April 2012, the Bank for International Settlements' Committee on Payments and Market Infrastructures (CPMI)[2] and the Technical Committee of the International Organization of Securities Commissions (IOSCO) published the Principles for Financial Market Infrastructures[3] (PFMIs) to establish a uniform set of international risk management standards applicable to all systemically important FMIs. The Bank of Canada adopted the PFMIs as part of its risk management standards (the standards) for designated FMIs. The standards apply to the management and operation of Lynx, which is owned and operated by Payments Canada.

This disclosure document is prepared in accordance with the internationally recognized Principles for Financial Market Infrastructures: Disclosure Framework and Assessment Methodology[4] published by CPMI and IOSCO in December 2012 to assist FMIs in their application of the PFMIs and to facilitate consistent disclosure of information by FMIs. The disclosure aims at offering to Payments Canada members, Lynx participants, and the public a high-level understanding of Payments Canada's governance, operation, risk management framework and approach to observing the applicable standards to Lynx.

[1] In 2001, the *Canadian Payments Association Act* was amended by the *Financial Consumer Agency of Canada Act*, SC 2001, c 9, s 217 - 247.1. These amendments changed the title of the Act to the "Canadian Payments Act", updated the Canadian Payments Association's mandate, expanded its membership, and added new governance features among other things.

[2] Previously the Committee on Payment and Settlement Systems (CPSS). In September 2013, in the light of the Committee's standard-setting activities and the associated greater public scrutiny, the CPSS reviewed its mandate. The new mandate was approved as well as the renaming of the CPSS as the Committee on Payments and Market Infrastructures.

[3] Principles for Financial Market Infrastructures are available at: http://www.bis.org/cpmi/publ/d101.htm

[4] The assessment methodology is available at: https://www.bis.org/cpmi/publ/d106.pdf

Summary of major changes since last disclosure update

In 2015, Payments Canada embarked on a program to modernize Canada's payment systems. On August 30, 2021, Lynx replaced the Large Value Transfer System (LVTS) and became Canada's real-time gross settlement (RTGS) system.[5]

Lynx's risk model complies with Canadian and international risk standards. Lynx will support the use of the global ISO 20022 messaging standard.

Lynx was designated by the Bank of Canada as systemically important under the *Payment Clearing and Settlement Act* (PCSA). Lynx has been designed to comply with all the relevant risk management standards outlined in the Bank of Canada's standards that are based on the PFMIs.

General background of Payments Canada

Payments Canada owns and operates the national payment infrastructures used by its members to clear and settle payments. Along with operating the systems, Payments Canada develops, implements and updates the by-laws, rules and standards that govern the clearing and settlement of payments between its members.

Payments Canada's mandate is to:

- Establish and operate national systems for the clearing and settlement of payments and other arrangements for the making or exchange of payments.
- Facilitate the interaction of its clearing and settlement systems and related arrangements with other systems or arrangements involved in the exchange, clearing or settlement of payments.
- Facilitate the development of new payment methods and technologies.

[5] The previous version of Payments Canada's disclosure was for LVTS and dated June 30th, 2019. This disclosure document focuses solely on Lynx.

In fulfilling its mandate, Payments Canada has the public policy objective of promoting the efficiency, safety and soundness of its clearing and settlement systems and to take into account the interests of users.

Payments Canada operates two primary clearing and settlement systems: Lynx and the Automated Clearing Settlement System (ACSS). In addition, the US Dollar Bulk Exchange (USBE) system is used for clearing payments in U.S. dollars. Settlement of USBE balances is done through banks in New York.

Payments Canada members

The Bank of Canada and all chartered banks operating in Canada are required to be members of Payments Canada. Trust and loan companies, credit union centrals, federations of caisses populaires and other deposit-taking institutions, life insurance companies, as well as securities dealers and money market mutual funds that meet certain requirements are also eligible to be members.

As of December 2021, Payments Canada had 111 active members. The *Canadian Payments Act* (CP Act) sets out the requirements for Payments Canada's Member Advisory Council (MAC), which consists of a maximum of 20 members appointed by the Payments Canada Board of Directors. MAC serves as a consultative and engagement forum for the Payments Canada membership. It is broadly representative of the diversity of Payments Canada's membership and its mandate is to provide the board of directors with advice on Payments Canada's clearing and settlement systems, the interaction of those systems with others involved in the exchange, clearing and settlement of payments and the development of new technologies.

Payments Canada stakeholders

Payments Canada develops and implements by-laws, rules, standards and procedures that apply to Payments Canada members who use its systems for the exchange, clearing and settlement of payments. Although the rules are binding only on members, they do affect the way consumers, government and businesses make payments.

Certain other payment systems interact with or leverage Payments Canada's systems for clearing and settlement. For example, many private offerings or schemes (e.g. credit cards and e-wallets), choose to rely on Lynx to effect settlement.

The Payments Canada's Stakeholder Advisory Council (SAC) has a maximum of 20 interested parties representing the views of Payments Canada's broad stakeholder base, including consumers, businesses, retailers, and governments, as well as related service providers. SAC provides advice and counsel to the Payments Canada Board of Directors. It assists the decision making process by identifying issues of concern to payment system users and providers, suggesting how they might be addressed, and participates in a number of Payments Canada's working groups and committees.

Payments Canada legal and regulatory framework

The CP Act sets out the legal framework for Payments Canada, including its mandate, the types of organizations eligible for membership, the role of the board of directors and oversight responsibilities of the Minister of Finance.

The Minister of Finance has oversight powers with respect to Payments Canada and payment systems under the CP Act. These include general directive powers, as well as responsibilities and powers in relation to by-laws, rules and standards made by the Payments Canada Board of Directors, along with other powers regarding non-Payments Canada payment systems designated under Part 2 of the CP Act.

The PCSA assigns the Bank of Canada responsibility for overseeing clearing and settlement systems for the purpose of controlling systemic risk or payment system risk. Lynx has been designated as systemically important under this Act, so Payments Canada is also subject to oversight from the Governor of the Bank of Canada for Lynx.

Canadian real-time gross settlement system

Payments Canada's RTGS is an electronic wire system that facilitates the irrevocable transfer of payments in Canadian dollars between participating financial institutions. Lynx also facilitates settlement for Canadian and Foreign financial market infrastructures and payment systems. Virtually all interbank Canadian dollar financial market transactions are ultimately settled via Lynx

AIn 2021 an average of 46,215 payments per day were settled through LVTS until August 30, 2021 and then through Lynx.

Key metrics	2019	2020	2021
Total volume (items)	9.99 million	10.4 million	11.6 million
Daily average volume (items)	39,658	41,429	46,215
Total value	$47.6 trillion	$100.7 trillion	$126.7 trillion
Daily average value	$189 billion	$398 billion[6]	$505 billion[6]

Lynx is operated by Payments Canada and regulated by the Bank of Canada. Payments Canada administers the daily operations of Lynx, including the rules that support it. The legal foundation for the system is provided in Payments Canada's Lynx By-law and Lynx Rules, and supported by the PCSA.

Direct participants in Lynx must establish and maintain a Lynx settlement account at the Bank of Canada. Certain financial institutions participate directly in the system, while others arrange Lynx payments for their customers through Lynx direct participants. Lynx operating costs are primarily funded by our system participants.

Lynx design and operations

Lynx is an RTGS system whereby payments are settled on an individual gross basis in real-time. In order for payments to settle in real-time, the participant sending the payment must have a sufficient amount of intraday liquidity for the full value of the payment.

Participants have three sources of intraday liquidity in Lynx: (1) intraday loans obtained by pledging eligible collateral to the Bank of Canada, (2) deposits held overnight at the Bank of Canada, and (3) payments received from other Lynx participants, including the Bank of Canada.

[6] Each day the Bank of Canada makes a payment to each participant to return overnight deposits plus interest. Overnight deposits have increased significantly year over year as a result of the Bank of Canada's policies related to the global pandemic. The increase in overnight deposits has a corresponding increase to average daily payment values.

Lynx uses a combination of queuing, intraday liquidity recycling, and payment offsetting to reduce the amount of intraday liquidity participants required to settle payments.

Settlement mechanisms

Lynx participants can settle payments using four different settlement mechanisms. Each settlement mechanism has a unique purpose and is designed to settle payments in a way that meets specific business needs.

Each participant has an intraday liquidity account in each of the four settlement mechanisms. Participants can transfer liquidity between settlement mechanisms, but payments must remain in the settlement mechanism to which they were sent. When a payment settles, the sending participant's intraday account in the settlement mechanism is debited and the receiving participant's intraday account in the same settlement mechanism is credited. All participants must be active in all four settlement mechanisms—regardless of whether they plan on using all mechanisms—in order to facilitate the receipt of payments.

Real time mechanism (RTM)

The RTM is used to track a participant's credit limit, to manage their intraday loan and excess liquidity, and to settle payments related to interbank lending.

Liquidity saving mechanism (LSM)

The LSM is configured to provide liquidity efficiency through enhanced liquidity recycling and payment offsetting. If a participant does not have sufficient liquidity to settle a payment immediately, the payment is queued until sufficient liquidity becomes available, either via incoming payments (liquidity recycling) or through transfers of additional funds into the LSM.

Liquidity recycling in the LSM is enhanced via the use of a settlement sequence that bypasses a strict First In, First Out (FIFO) ordering of queued payments. In addition, the LSM employs a payment offsetting algorithm, called the Gridlock Buster, that runs periodically attempting to identify queued payments that can be simultaneously offset.

Urgent payment mechanism

The UPM is configured to settle payments immediately. While a queue does exist in the UPM, it is intended to prevent payments from being discarded due to timing differences between the registering of a payment and the transfer of intraday liquidity. Unlike the LSM, the UPM does not have a payment offsetting algorithm.

Reserved collateral mechanism

This settlement mechanism is used for the sole purpose of making payments to the Canadian Depository of Securities (CDS) account with the Bank of Canada for the settlement of CDSX related obligations.

The use of this mechanism enables participants to pledge securities to the Bank of Canada that have not yet settled in CDSX. The intraday liquidity generated through this pledge can only be used to settle the participant's CDSX settlement obligation. Participants are not required to settle these obligations in the RCM and may choose to settle them in the LSM or the UPM.

Financial risks in Lynx

An RTGS risk model does not give rise to credit risk exposures between participants. Therefore, there can be no financial default in Lynx. However, liquidity risk still needs to be managed by participants and Payments Canada using a variety of tools within Lynx and through the Lynx By-law and Rules.

Intraday liquidity risk has two components:

- First, the risk that a participant does not have sufficient intraday liquidity to settle all of their payment obligations.
- Second, the risk that a participant does not have sufficient intraday liquidity at a certain point in time to settle a time sensitive payment when it is due.

Liquidity management tools

The table below summarizes the various tools available in Lynx to monitor and manage intraday liquidity risk.

Liquidity management tools	Legal framework	Automated in Lynx	Participants
Throughput targets	✔		
Minimum liquidity requirements	✔	✔	
Queueing		✔	
Liquidity recycling		✔	
Offsetting algorithm		✔	
Queue management tools			✔
Intraday liquidity buffer			✔
Payment settlement priorities			✔
Net send limits			✔

Payment throughput targets

Lynx Rules establish both volume and value throughput targets for participants. Throughput targets help reduce intraday liquidity requirements at the system level by promoting synchronization in the flow of payments. When throughput targets are met, participants receive a significant proportion of payments in a timely fashion, enabling them to recycle incoming liquidity to make their own payments.

Minimum liquidity requirements

In order to be active in the LSM, participants must transfer a minimum amount of intraday liquidity from their intraday loan account to the LSM. The minimum liquidity requirement in the LSM is set to 1% of the average daily value sent by each participant over the most recent 12 months and is updated quarterly. This requirement serves the following purposes:

- Ensures all participants contribute liquidity to the system to ensure settlement can begin.
- Provides a means for participants to show other participants that they are ready to participate in the settlement mechanism.
- Encourages participants to use the LSM to settle payments.

Other settlement mechanisms in Lynx do not have a minimum liquidity requirement.

Queueing

Payment queueing is fundamental to liquidity savings and enables the enhanced liquidity recycling and payment offsetting available in the LSM. Queues also prevent UPM and RCM payments from being discarded due to timing differences between the registering of a payment and the transfer of intraday liquidity.

Liquidity recycling

Liquidity recycling refers to the use of payments received by participants as a source of intraday liquidity to settle their own payments. In the LSM, liquidity recycling is enhanced via the use of a settlement sequence that bypasses a strict FIFO ordering of queued payments.

Offsetting algorithm

Lynx uses a multi-stage algorithm that attempts to simultaneously offset two or more queued payments on a multilateral and/or bilateral basis. This algorithm, called the Gridlock Buster, reduces the amount of time payments spend in the queue and further increases the liquidity efficiency of the system. The only settlement mechanism that uses the Gridlock Buster is the LSM.

Queue management tools

Lynx allows participants to view and manage their payments in each settlement mechanism's queue. Participants are also able to view the gross amount of queued payments they are due to receive. This allows for real-time monitoring of these payments. Lynx provides the following capabilities to allow participants to manually manage their queued payments.

- Alter the sequential ordering of queued payments.
- Change the priority level assigned to a payment.
- Cancel a payment.
- Remove a payment from the queue by moving it to the Conditional Release Mechanism.[7]

Intraday liquidity buffer (RTM)

Participants have the flexibility to reserve excess intraday liquidity by either not fully borrowing against their credit limit or by leaving intraday liquidity in the RTM.

Payment settlement priorities

Lynx allows participants to assign a level of priority to each payment sent to the LSM. Payment priority levels provide participants with additional control over their intraday liquidity by allowing participants to rank their payments according to settlement importance..

Net send limits

Participants have the ability to set net send limits in the LSM against other participants. A net send limit effectively limits the value of payments that a participant is willing to send to another participant without receiving payments in return. The use of net send limits provides the following benefits:

- Participants are able to manage liquidity by avoiding one-sided outflows.
- Payments are more synchronized.
- Payment behaviour is influenced by encouraging participants to submit payments as early as possible.

Operating hours

Lynx is open during regular business days and closed on weekends and Federal statutory holidays. The payment processing cycle in Lynx starts at 12:30 a.m. and ends at 7:00 p.m. The

[7] The Conditional Release Mechanism is a mechanism in Lynx in which settlement instructions are temporarily held before being sent to a settlement mechanism or being rejected.

cycle is intended to cover the majority of a day to accommodate payment activity from different time zones across Canada and facilitate the settlement of high-priority FMI payments throughout the day, including overnight.

Standards narrative disclosure

Standard 1: Legal basis

An FMI should have a well-founded, clear, transparent and enforceable legal basis for each material aspect of its activities in all relevant jurisdictions.

Payments Canada owns and operates Lynx pursuant to the CP Act.

Payments Canada's activities in the operation of Lynx come from statutory authority and federal legislation, which provide a high level of legal certainty, transparency and enforceability. Key legislation includes:

- CP Act, under which Payments Canada is incorporated and which sets out the objects and powers of Payments Canada.
- PCSA, which outlines the oversight of designated payment systems, such as Lynx, by the Bank of Canada, provides legal certainty regarding settlement of payment obligations and provides a legal framework for FMI resolution.
- *Bank of Canada Act*, which addresses the provisioning and operation of settlement accounts.

Canadian common law also provides further legal certainty in respect of the interpretation of these statutes and related legal concepts.

The Lynx By-law and Rules support the operation of Lynx, and are made by the Payments Canada Board of Directors under the authority conferred by the CP Act.

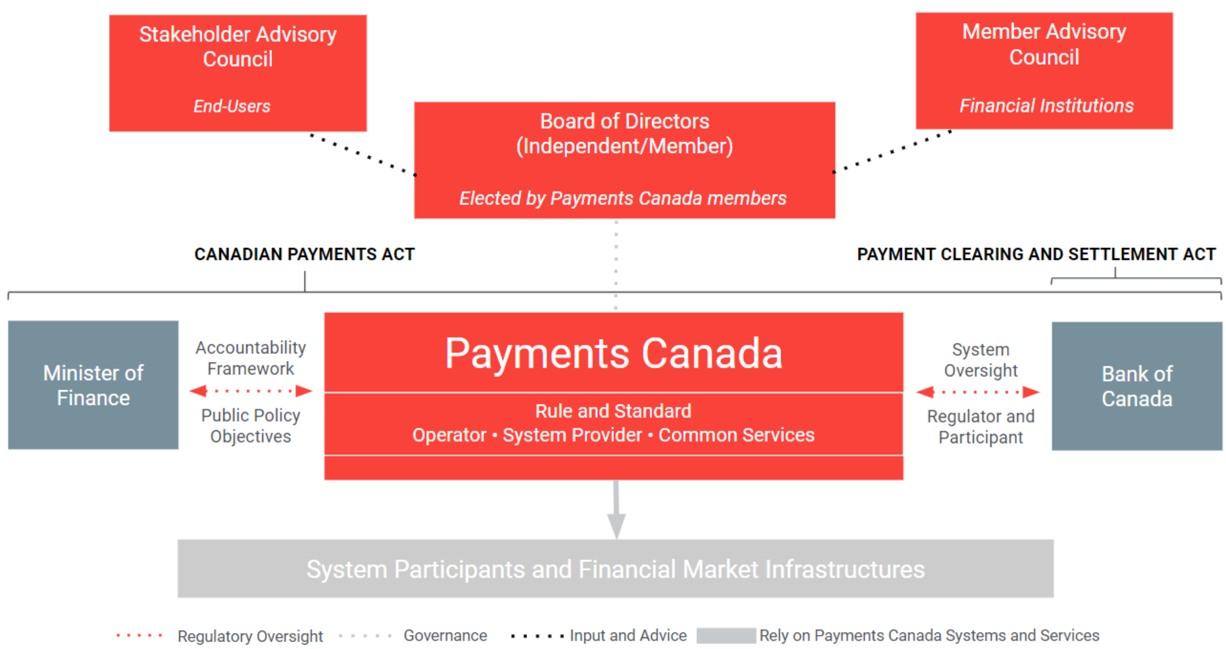
- The Lynx By-law is a regulation under the federal *Statutory Instruments Act* and subject to the requirements and scrutiny contemplated under that legislation. Except for Payments Canada's by-laws that relate to the internal administration of Payments Canada, all by-laws (and by-law amendments) must be approved by Canada's Minister of Finance.
- The Lynx Rules, which include Technical Specifications and Procedures supporting the operation of Lynx, are made under the authority conferred by the CP Act. Amendments to

the Lynx Rules are approved by the Payments Canada Board of Directors. New rules and amendments must be sent to the Minister of Finance and may not come into effect before the completion of the Ministerial review period (during the course of which the Minister may disallow all or part of a rule) or the Minister declares them to be in force earlier. As such, the activities of Payments Canada in the operation of Lynx flow from statutory authority, which provides a high level of certainty, transparency and enforceability.

Standard 2: Governance

An FMI should have governance arrangements that are clear and transparent, promote the safety and efficiency of the FMI and support the stability of the broader financial system, other relevant public interest considerations and the objectives of relevant stakeholders.

The governance arrangements that apply to Lynx are those that apply more broadly to Payments Canada as an organization.



These arrangements are prescribed and outlined in the CP Act, regulations made under the CP Act, and Payments Canada by-laws and rules. These instruments are publicly available and provide a high level of clarity and transparency around Payments Canada's objects, lines of responsibility within the board of directors and management, accountability and oversight; and the interaction with stakeholders and the public. The CP Act also gives Payments Canada the responsibility to "promote the efficiency, safety and soundness of its clearing and settlement systems and take into account the interest of users" in pursuing its statutory objects. In addition, the PCSA contemplates that the regulation of clearing and settlement systems (as an essential element of the financial system in Canada) is predicated on the need to control risk and promote the efficiency and stability of the financial system in Canada.

The Payments Canada Board of Directors consists of an independent chair, the president and CEO, seven independent directors (including the chair) and five member directors. Domestic systemically important banks are represented by at least two and a maximum of three directors. The board of directors has standing committees to assist it in fulfilling its responsibilities. The Risk Committee oversees the performance of risk management at Payments Canada and makes recommendations to the board of directors.

Payments Canada also employs strong practices that ensure accountability to its users and the public, through its engagement with SAC and MAC both of which are strong and engaged in their duties and responsibilities to the board of directors.

Under the CP Act, the Payments Canada Board of Directors may make any by-laws that it considers advisable for the attainment of Payments Canada's objects. Except for by-laws that relate to the internal administration of Payments Canada, all by-laws require approval by the Minister of Finance, also has the authority to review newly made Payments Canada rules or amendments to existing rules and, if appropriate, disallow the whole or part of a rule. The Minister also has the power to issue a directive including a directive to make, amend or repeal a by-law, rule or standard.

The PCSA gives the Bank of Canada responsibility for overseeing clearing and settlement systems for the purpose of controlling systemic risk or payments system risk. Lynx has been designated as a systemically important payment system under this Act, so Payments Canada is also subject to oversight from the Governor of the Bank of Canada for Lynx.

Payments Canada employs industry best practices in governance through various policies to increase efficient and effective decision making within its legislative framework. Roles and responsibilities around risk management and reporting of risk are clearly defined in Payments Canada's Enterprise Risk Management (ERM) Policy and Framework.

Standard 3: Framework for the comprehensive management of risks

An FMI should have a sound risk management framework for comprehensively managing legal, credit, liquidity, operational and other risks.

Risk is the uncertainty that surrounds future events and outcomes. As such, it is inherent in all we do and, therefore, risk management is critical to Payments Canada fulfilling its core purpose, vision and strategic plan.

Payments Canada has a formal risk management process that is overseen by the board of directors, implemented by management and executed by all in Payments Canada. The board-approved ERM Policy sets out the roles and responsibilities for risk management and governance. Payments Canada follows a three lines of defence approach, which distinguishes among three groups or lines required to support effective risk management. The first line of defence is the business units that perform day-to-day risk management – the functions that own and manage risks of relevance to their area of responsibility. The second line establishes enterprise-wide expectations for risk management and oversees the implementation of those expectations. The third line consists of internal audit and provides independent assurance on governance, risk management, and controls.

The objective of Payments Canada's ERM program is to support decision-making in achieving Payments Canada's core purpose, vision and strategic plan by managing all key risks across the organization in a comprehensive and integrated way. In doing this:

- All staff have a framework to confidently identify and manage risks in their day-to-day activities.
- Payments Canada Executive Leadership Team can confidently and effectively identify, understand and manage risk across Payments Canada and is able to provide assurance of this to the board of directors.
- The board of directors can confidently provide oversight of risk management.

This ERM Policy sets the overall intent and expectations for risk management at Payments Canada in accordance with a risk appetite approved by the board of directors and set out in the Risk Appetite Policy. A complementary ERM Framework describes how Payments Canada addresses ERM Policy requirements in alignment with the risk appetite. The Framework provides further detail on how to meet the expectations established through the ERM Policy.

Comprehensive reporting is regularly provided to management and the board of directors that includes the enterprise risk profile, which consists of enterprise top and emerging risks, risk appetite metrics, and key themes.

Risks to business planning and budgeting processes are also managed through the Investment Committee. Payments Canada also maintains a Financial Recovery Plan built to address severe financial stress scenarios; financial resources are available to ensure operational strength and financial viability in severe stress scenarios.

With respect to Lynx, risk management is implicit in the system; payments must pass risk controls before they are approved. Additionally, to manage risk, the Lynx By-law and Lynx Rules impose requirements on participants, provide suspension rules and procedures and establish a Lynx emergency committee to manage operational events.

Further details on specific policies, procedures, and controls that are used to manage specific risks are captured in Standard 4 Credit Risk, Standard 7 Liquidity Risk, Standard 15 General Business Risk, Standard 16 Custody and Investment Risks, and Standard 17 Operational Risk.

Standard 4: Credit risk

An FMI should effectively measure, monitor and manage its credit exposures to participants and those arising from its payment, clearing and settlement processes. An FMI should maintain sufficient financial resources to cover its credit exposure to each participant fully with a high degree of confidence. In addition, a CCP that is involved in activities with a more complex risk profile or that is systemically important in multiple jurisdictions should maintain additional financial resources sufficient to cover a wide range of potential stress scenarios that should include, but not be limited to, the default of the two participants and their affiliates that would potentially cause the largest aggregate credit exposure to the CCP in extreme but plausible market conditions. All other CCPs should maintain additional financial resources sufficient to cover a wide range of potential stress scenarios that should include, but not be limited to, the default of the participant and its affiliates that would potentially cause the largest aggregate credit exposure to the CCP in extreme but plausible market conditions.

Payments Canada is not exposed to credit risk from the settlement of payments between participants in Lynx. Participants pledge collateral to the Bank of Canada to secure the credit limit in Lynx. The credit limit ensures that intraday loans provided by the Bank of Canada to participants are fully collateralized. Lynx provides for real-time gross settlement: settlement takes place in real-time, payment by payment, on a fully pre-funded basis, and therefore, does not involve credit risk exposures between participants.

The fully pre-funded mechanism provides for a cover-all risk model, fully mitigating for financial default risk with regard to settlement. That is, there can be no uncovered credit losses and therefore, there is no need to borrow from a liquidity provider. Lynx also does not give rise to credit risk regardless of any possible default(s) of participants outside of Lynx during any given business operating cycle. And the Lynx Rules and system functionalities will provide for automatic expiration of any payment instructions that remain queued before end-of-day procedures mitigating for future credit exposure between participants.

Payments Canada continuously monitors developments and trends in its payments systems. A formal Governance Framework has been developed for the Lynx Financial Risk Framework; it is designed to manage material changes, which are defined as changes to the Lynx Financial Risk Framework which could have credit, liquidity and settlement implications. When applicable, any changes to the Lynx Financial Risk Framework may result in the need for corresponding changes to the Lynx legal framework (e.g. potential amendments to the Lynx Rules).

Standard 5: Collateral

An FMI that requires collateral to manage its or its participants' credit exposure should accept collateral with low credit, liquidity and market risks. An FMI should also set and enforce appropriately conservative haircuts and concentration limits.

Payments Canada, as the operator of Lynx, does not accept collateral from participants. The Bank of Canada, through its Standing Liquidity Facility, provides access to liquidity to Lynx participants.

The Lynx collateral management framework is therefore managed by the Bank of Canada: the collateral is pledged to the Bank of Canada and Lynx participants are required to enter into the appropriate legal agreements with the Bank of Canada, granting security in the assets pledged as collateral.

The Bank of Canada determines the list of securities that are eligible to be pledged as collateral for Lynx operations. The list of eligible collateral consists primarily of securities that are issued or guaranteed by the Government of Canada or a provincial government. The list of eligible securities also includes other securities that meet minimum credit rating requirements as determined by the Bank of Canada.

The Bank of Canada High-Availability Banking System (HABS) provides a collateral management system which, combined with other related systems and process controls, ensures that only eligible collateral is accepted. The current framework used by the Bank of Canada to determine appropriate haircuts is a "bucketed" approach that focuses on broad classes of issuers and asset characteristics. This framework is relatively simple to implement and is aligned with market trading practices and, in general, with the practices of other central banks. A review of a cross-section of Lynx collateral haircuts is conducted annually and the results are reviewed by a panel of independent internal experts at the Bank of Canada. Many of the eligible securities under the policy are pre-approved by the Bank of Canada, including the appropriate pricing. Any securities that are not pre-approved are reviewed on a security-by-security basis against the eligibility criteria before they can be pledged to the Bank of Canada.

Collateral is valued each morning prior to the Lynx's payments cycle beginning and also when additional securities are pledged by a participant throughout the payments cycle. Collateral is valued by the Bank of Canada at market value less a discount (haircut), which depends on the type of asset, its maturity, and credit rating. The Bank of Canada imposes prudent haircuts to account for volatility of market pricing. Principally, haircuts are determined on a through-the-cycle approach, using a sample of historical data that account for periods of high volatility.

The Bank of Canada periodically reviews its Standing Liquidity Facility Collateral Policy and can make changes in response to market developments, new financial instruments or financial conditions.

Standard 7: Liquidity risk

An FMI should effectively measure, monitor and manage its liquidity risk. An FMI should maintain sufficient liquid resources in all relevant currencies to effect same-day and, where appropriate, intraday and multi day settlement of payment obligations with a high degree of confidence under a wide range of potential stress scenarios that should include, but not be limited to, the default of the participant and its affiliates that would generate the largest aggregate liquidity obligation for the FMI in extreme but plausible market conditions.

In light of Lynx financial risk framework, including the risk controls and liquidity requirements, the liquidity risks are not borne directly by the FMI: Payments Canada is not exposed to liquidity risk from the settlement of payments between participants in Lynx. Liquidity risks are borne solely by the participants (including the Bank of Canada). The Bank of Canada, as the liquidity provider, manages this risk outside of Lynx. (see Standard 5).

Liquidity needs take the form of the amount of intraday liquidity needed by each participant to settle their payments on time and mismatches between payments and intraday liquidity across several settlement mechanisms. The Lynx pre-funded mechanism provides for a cover-all risk model, fully mitigating for financial default risk with regard to settlement.

Lynx comprises individual settlement mechanisms, each with their own pool of liquidity for settling payments and each operating independently. While liquidity can be transferred between settlement mechanisms, payments must remain in the settlement mechanism to which they were sent.

Participants choose which settlement mechanism they would like to use to settle each payment by taking into consideration each mechanism's configuration. The settlement mechanism chosen by a participant to settle a payment is the same settlement mechanism and liquidity pool that the receiving participant will receive the payment.

Lynx provides the ability for participants, Payments Canada and the Bank of Canada to monitor positions in real-time via the Lynx application. A formal reporting regime provides intraday liquidity monitoring on a daily basis for Payments Canada, with a periodic reporting regime which includes reporting to members and the Bank of Canada.

Throughput guidelines encourage participants to process a certain percentage of their daily payment message volume and value before specific times each day.

Standard 8: Settlement finality

An FMI should provide clear and certain final settlement, at a minimum by the end of the value date. Where necessary or preferable, an FMI should provide final settlement intraday or in real time.

Lynx provides for real-time gross settlement; finality between participants occurs at the point in time when each individual payment settles. There is no delay between when a payment clears the risk controls and when it settles. Finality is provided for in the Lynx By-law. A Lynx payment obligation will be settled provided:

- That settlement of a Lynx payment obligation would not result in a negative balance in the sending participant's Lynx account.
- The payment obligation would not result in violation of any limits placed on the participant pursuant to the rules on the value of payments the participant is willing to send to the other participant without receiving payments in return (liquidity management functionality).

Upon settlement of a Lynx payment obligation, the payment between the sending participant and the receiving participant is final and irrevocable, meaning the payment may not be adjusted, reversed, repaid, unwound or set aside.

Settlement provisions are supported by the federal PCSA, Lynx By-law and Lynx Rules made pursuant to the CP Act.

Standard 9: Money settlements

An FMI should conduct its money settlements in central bank money where practical and available. If central bank money is not used, an FMI should minimise and strictly control the credit and liquidity risk arising from the use of commercial bank money..

Lynx uses claims on central bank money for settlement of Canadian dollar obligations. Each Lynx participant is required to maintain an account on the books of the Bank of Canada specifically for the purpose of settling its Lynx position.

Standard 13: Participant default rules and procedures

An FMI should have effective and clearly defined rules and procedures to manage a participant default. These rules and procedures should be designed to ensure that the FMI can take timely action to contain losses and liquidity pressures and continue to meet its obligations.

Through the real-time gross settlement risk model, Lynx provides a design that mitigates credit risk in the settlement process as it ensures that no exposure to credit risk is generated between participants.

Therefore, there can be no settlement default in Lynx (i.e. financial losses through settlement default are not possible) because settlement of payment instructions will be effected on an immediate basis in the accounts of each participant on the books of the Bank of Canada as soon as they have been entered and have passed the risk control tests, which include the availability of funds in the account of the participant sending the payment.

In the context of the assessment of observance for the standard 13, an event of default is intended to cover a declaration of non-viability. Suspension of a participant's status upon a declaration of non-viability is addressed in the Lynx By-law and Rules. The management of a declaration of non-viability and resolution is supported by Payments Canada's Crisis Management Plan.

Standard 15: General business risk

An FMI should identify, monitor and manage its general business risk and hold sufficient liquid net assets funded by equity to cover potential general business losses so that it can continue operations and services as a going concern if those losses materialize. Further, liquid net assets should at all times be sufficient to ensure a recovery or orderly wind-down of critical operations and services.

Payments Canada identifies its general business risk by two primary means: (i) the risk appetite framework which enables business unit leaders to identify, manage and address risks within their specific lines of business and identify emerging risks, and (ii) ongoing review and discussion by the Enterprise Risk Management Committee of risks identified and listed on the enterprise top and emerging risks.

With respect to recovery, Payments Canada does not currently hold liquid net assets funded by equity to cover general business losses. Instead, Payments Canada holds reserved funds to cover six months' of Lynx operating expenses. The Finance by-law includes a provision for the building of reserves.

Payments Canada is a statutory public purpose corporation, created by an Act of Parliament. It operates on a not-for-profit basis and is fully funded by its membership. Reserves are funded through a charge that is levied against each payment item that is sent and received by participants through the Lynx system. Payments Canada's HVPS funds to support the operations of the Lynx system are held in Government of Canada Treasury Bills with a term to maturity of less than one year.

Payments Canada's Financial Recovery Plan outlines the steps necessary to achieve recovery. For the purpose of the Financial Recovery Plan and in line with Payments Canada's business model, a severe financial stress scenario is defined as a scenario that would significantly put a strain on Payments Canada's short-term cash-flow. The Financial Recovery Plan is reviewed and, if necessary, updated at least every year and is approved annually by the board of directors.

It should be noted that there is no formal plan in place to achieve an orderly wind-down as the affairs of Payments Canada may only be wound up by Parliament.

Standard 16: Custody and investment risks

An FMI should safeguard its own and its participants' assets and minimize the risk of loss on and delay in access to these assets. An FMI's investments should be in instruments with minimal credit, market and liquidity risks.

Payments Canada holds its cash in a Chartered Canadian bank that is regulated by the Office of the Superintendent of Financial Institutions (OSFI) and insured through the Canada Deposit Insurance Corporation (CDIC). Payments Canada uses 2 custodian banks which are members of the Investment Industry Regulatory Organization of Canada (IIROC) for its banking requirements, thus reducing the concentration risk it faces.

Payments Canada does not invest assets in participants' (i.e. members) securities. Payments Canada has adopted a very strict Investment Policy whereby the key criteria in selecting investments include safety of principal and ease of liquidity of the investment. Under its Investment Policy, Government of Canada Treasury Bills are the only investment Payments Canada is eligible to invest in. Government of Canada Treasury Bills are highly liquid assets which can be converted to cash and settled on the same day. Given the fact that Treasury Bills are secured by the Government of Canada, the risk that the quality and liquidity of the investments would be impacted by adverse market conditions is unlikely.

The Investment Policy is reviewed and approved by the Payment Canada Board of Directors on a regular basis.

Standard 17: Operational risk

An FMI should identify the plausible sources of operational risk – both internal and external – and mitigate their impact through the use of appropriate systems, policies, procedures and controls. Systems should be designed to ensure a high degree of security and operational reliability and should have adequate, scalable capacity. Business continuity management should aim for timely recovery of operations and fulfillment of the FMI's obligations, including in the event of a wide-scale or major disruption.

Payments Canada's operational risk approach is derived from risk principles articulated in its Operational Risk Management (ORM) Policy, including supporting the ERM Policy, ERM framework, and Risk Appetite Policy. The (ORM Policy sets out expectations to identify, monitor, and manage operational risk, namely: operational risk assessment, incident management process, business continuity and crisis management, payment systems and critical IT systems recovery, security program, human resources program, legal and compliance program, project management and vendor risk management programs.

As defined in Payments Canada's ORM Policy, Operational risk is the risk resulting from inadequate or failed processes, systems and IT, people or policies, or from external events, which can result in the reduction, deterioration, or breakdown of services. Operational failures can damage the organization's reputation or perceived reliability, lead to legal consequences, and result in financial losses. Through Payments Canada's Risk Taxonomy, 13 operational risk categories have been identified: business continuity, physical security, fraud, governance, people, information, legal and regulatory, model, process, change and delivery, technology, vendor, and external events.

Payments Canada manages security risk by clearly defining and achieving its cyber-resilience objectives that aim to maintain and promote Payments Canada's ability to anticipate, withstand, contain and recover from cyberattacks on its operations and reduce any impact to the broader financial ecosystem. The cyber-resilience objectives are published in our Cyber-Resilience Strategy and achieved through an Information Security Management Systems consisting of a framework, policies and standards that aligns with the Bank of Canada's Guidance on Cyber-Resilience for Financial Market Infrastructures and Expectations for Cyber-Resilience documents.

Payments Canada manages security risk by clearly defining and achieving its cyber-resilience objectives that aim to maintain and promote Payments Canada's ability to anticipate, withstand, contain and recover from cyberattacks on its operations and reduce any impact to the broader financial ecosystem. The cyber-resilience objectives are published in our Cyber-Resilience

Strategy and achieved through an Information Security Management Systems consisting of a framework, policies and standards that aligns with the Bank of Canada's Guidance on Cyber-Resilience for Financial Market Infrastructures and Expectations for Cyber-Resilience documents.

The Lynx system has been designed to be highly resilient and available. The system is hosted in two data centres; the data centres are configured to exchange service state, configuration, and transactional data using synchronous data replication capabilities offered at the storage layer and via database technologies. For select components that are not natively high availability, mitigations using technologies and processes have been implemented to significantly reduce any impact due to component failure. The service objectives for Payments Canada provided equipment and services in support of the Lynx are a recovery point objective of zero hours and a recovery time objective of one hour.

To further support the achievement of the resiliency objectives in abnormal operational conditions, emergency procedures are embedded in the Lynx rule framework. These are complemented by the Lynx Contingency Playbook, which supplement the rules by providing the procedures for operationalizing contingency plans.

Payments Canada maintains a performance capacity model which correlates the actual resource usage levels with the forecasted Lynx workload. Actual performance tests are incorporated in the ongoing maintenance lifecycle methodology.

Vendors are managed through a lifecycle approach to ensure proper risk management from the initial engagement through to contract renewal/termination. Payments Canada's Vendor Risk Management Framework outlines a standardized process for the consistent oversight of vendor risk.

Payments Canada's Business Continuity and Disaster Recovery testing policy outlines the business continuity, disaster recovery and contingency tests that need to take place on an annual basis. The policy outlines roles and responsibilities for the management, monitoring and reporting of these tests. Scope and objectives reports and after-action reports are required for all tests to ensure that objectives are clearly understood prior to the exercise and that lessons learned are identified following the test to enhance and improve resiliency strategies in the future. Business continuity, disaster recovery plans, and Lynx contingencies are reviewed and tested annually, at a minimum.

On an annual basis, an independent assessment of key controls surrounding Lynx and its operations is conducted by an external auditor. Key aspects of Payments Canada's ORM are covered within this audit such as business continuity management. External audits are also required from critical service providers.

Payments Canada also has an internal audit function that provides independent assurance on the effectiveness of governance, risk management, and controls. A three year risk based audit plan is in place and updated on an annual basis to reflect the key risks faced by Payments Canada. Key aspects of Payments Canada's ORM are covered each year. Payments Canada also has audit rights to examine controls of its critical service providers on a regular frequency.

Standard 18: Access and participation requirements

An FMI should have objective, risk based and publicly disclosed criteria for participation, which permit fair and open access.

The participation requirements are in place to reflect the objectives of safety, soundness and efficiency of Lynx by ensuring finality and irrevocability of settlement, and mitigating credit risk exposure between participants. Lynx By-law and Rules, which are publicly disclosed, clearly set out the criteria for becoming a participant in Lynx.

All Payments Canada members are eligible to become Lynx participants upon satisfying all requirements. There are no minimum payment value or volume requirements to be a participant. Payments Canada members that choose not to be participants can still make payments through Lynx on their own account and on behalf of their customers by using a Lynx participant.

Standard 19: Tiered participation arrangements

An FMI should identify, monitor and manage the material risks to the FMI arising from tiered participation arrangements.

Lynx By-law, Lynx Rules and procedures are based on direct participation. Any Payments Canada member that chooses not to be a Lynx participant may contract with a Lynx participant to process payments through Lynx. Participants that process Lynx payments on behalf of other members must provide Payments Canada with a listing of all of the members for which it acts in this capacity. Payments Canada relies on the participants' strong risk controls in place to manage and mitigate any risks for indirect participation. There are no formal tiering, rights, responsibilities or risk controls specifically assigned to indirect participants.

Payments Canada's approach to monitoring tiered participation in Lynx is defined in accordance with the regulatory requirements and underlying specificities of Lynx. Under this framework, specific Lynx participants report on a semi-annual basis on the payment values and volumes they originate and receive via Lynx on behalf of all unaffiliated, indirect participants for which they act as a Lynx agent.

Standard 21: Efficiency and effectiveness

An FMI should be efficient and effective in meeting the requirements of its participants and the markets it serves.

To fulfill its vision and deliver on its mandate, Payments Canada focuses on three strategic objectives that have anchored corporate planning and activities for several years: deliver, operate and enhance, and facilitate.

Lynx was developed by Payments Canada through a cooperative process involving the Bank of Canada and members with due regard for business requirements, risk management needs, system rules and legal implications. Lynx operating procedures and hours of operation are designed to reflect the specific needs of Canadian users, markets and geography. Lynx system and rule changes are reviewed in conjunction with participants and in consultation with stakeholders and the public when relevant. Lynx Rule amendments are reviewed by the Bank of Canada and are subject to the Minister of Finance's disallowance power.

Payments Canada regularly gauges customer satisfaction in terms of effectiveness and efficiency by conducting member and stakeholder surveys, the results of which are shared with the board of directors. Payments Canada also completes a corporate scorecard, which provides a simple and effective evaluation of Payments Canada's operational efficiencies and organizational successes. The scorecard measures Payments Canada system availability rates, financial results, and progress on achieving strategic objectives. Operations reports and scorecard performance are reviewed quarterly by the Payments Canada Board of Directors, and the scorecard framework is reviewed annually.

Standard 22: Communication procedures and standards

An FMI should use, or at a minimum accommodate, relevant internationally accepted communication procedures and standards in order to facilitate efficient payment, clearing, settlement, and recording.

Lynx uses internationally accepted standards for communicating: Messages are sent to Lynx using message standards set by the Society for Worldwide Interbank Financial Telecommunication (SWIFT) and are sent over the SWIFT network. Payments Canada defines the usage of certain fields within the payment message specifically for Lynx based on SWIFT's message formats and other communication standards. A subset of these messages that meet certain criteria are sent to Lynx using SWIFT's FIN-Copy service and are subject to Lynx risk controls before being authorized. Lynx does not engage in cross-border operations.
Lynx Release 2 will include MX message (ISO 20022) capabilities that will also be aligned with SWIFT global communications standards.

Standard 23: Disclosure of rules, key procedures and market data

An FMI should have clear and comprehensive rules and procedures and should provide sufficient information to enable participants to have an accurate understanding of the risks, fees and other material costs they incur by participating in the FMI. All relevant rules and key procedures should be publicly disclosed.

Lynx is supported by a comprehensive framework of rules and procedures, supported by federal legislation, which are all publicly available on Payments Canada's website.

New participants to Lynx are provided with business and technical training by Payments Canada. Regularly scheduled Lynx committee meetings provide participants with the opportunity to discuss the operation of the system and address any questions related to the rules and procedures. Each year Payments Canada publishes an Annual Report on its public website; the structure of this report closely follows industry best practices.

Appendix I: Standards that do not apply to Lynx

Standard 6: Margin

A CCP should cover its credit exposures to its participants for all products through an effective margin system that is risk based and regularly reviewed.

This standard applies to central counterparties.

Standard 10: Physical deliveries

An FMI should clearly state its obligations with respect to the delivery of physical instruments or commodities and should identify, monitor and manage the risks associated with such physical deliveries.

This standard applies to central securities depositories.

Standard 11: Central security depositories

A CSD should have appropriate rules and procedures to help ensure the integrity of securities issues and minimize and manage the risks associated with the safekeeping and transfer of securities. A CSD should maintain securities in an immobilized or dematerialized form for their transfer by book entry.

This standard applies to central securities depositories.

Standard 12: Exchange-of-value settlement systems

If an FMI settles transactions that involve the settlement of two linked obligations (for example, securities or foreign exchange transactions), it should eliminate principal risk by conditioning the final settlement of one obligation upon the final settlement of the other.

Lynx does not settle transactions that involve the settlement of two linked obligations.

Standard 14: Segregation and portability

A CCP should have rules and procedures that enable the segregation and portability of positions of a participant's customers and the collateral provided to the CCP with respect to those positions.

This standard applies to central counterparties.

Standard 20: FMI links

An FMI that establishes a link with one or more FMIs should identify, monitor and manage link-related risks.

This standard does not apply to payments systems.

Appendix II: Acronyms

ACSS	Automated Clearing Settlement System
CDIC	Canada Deposit Insurance Corporation
CP Act	Canadian Payments Act
CPMI	Committee on Payments and Market Infrastructures
ERM	Enterprise Risk Management
FMI	Financial Market Infrastructure
HABS	High-Availability Banking System
HVPS	High-Value Payment System
IOSCO	International Organization of Securities Commissions
IIROC	Investment Industry Regulatory Organization of Canada
IT	Information technology
LVTS	Large Value Transfer System
MAC	Member Advisory Council
ORM	Operational Risk Management
OSFI	Office of the Superintendent of Financial Institutions
PCSA	Payment Clearing and Settlement Act
RTGS	Real-Time Gross Settlement
SAC	Stakeholder Advisory Council
SWIFT	Society for Worldwide Interbank Financial Telecommunication
USBE	US Dollar Bulk Exchange

Appendix III: Publicly available resources

Payments Canada general information

Governance:	https://www.payments.ca/about-us/governance-risk
Member Advisory Council:	https://www.payments.ca/about-us/how-we-collaborate/member-advisory-council
Stakeholder Advisory Council:	https://www.payments.ca/about-us/how-we-collaborate/stakeholder-advisory-council
Payments Canada systems:	https://www.payments.ca/our-systems-rules
Participant financial institutions:	https://www.payments.ca/our-directories/member-financial-institutions

Acts and by-laws

Canadian Payments Act	https://laws.justice.gc.ca/eng/acts/C-21/page-1.html
Rules Centre	https://www.payments.ca/rules-center
Payments Canada membership requirements regulations	https://laws.justice.gc.ca/eng/regulations/SOR-2001-476/index.html
CPA By-law No. 1 - General	https://laws.justice.gc.ca/eng/regulations/SOR-2017-1/index.html
CPA By-law No. 2 - Finance	https://laws.justice.gc.ca/eng/regulations/SOR-2016-283/

CPA By-law No. 3 - Payment items and ACSS	https://laws.justice.gc.ca/eng/regulations/SOR-2003-346/index.html
CPA By-law No. 6 - Compliance	https://laws.justice.gc.ca/eng/regulations/SOR-2003-347/index.html
CPA By-law No. 8 - Administration	https://www.payments.ca/sites/default/files/by-law-8-administration_0.pdf
CPA By-law No. 9 - Lynx	https://laws.justice.gc.ca/eng/regulations/SOR-2021-182/

Statistics

High Value Payment System (LVTS and Lynx)	https://www.payments.ca/about-us/our-systems-and-rules/large-value-transfer-system/statistics
High-value payment system - Lynx	https://www.payments.ca/high-value-payment-system-lynx-statistics