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BANK OF CANADA FMI OVERSIGHT ACTIVITIES

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Executive Summary

Financial markets and the infrastructures that support them are the centre of the financial system. When they work safely and efficiently, these financial market infrastructures (FMIs) help to support economic growth by providing a platform to transfer funds, raise capital and manage risks. Through its oversight function, the Bank of Canada (the Bank) plays a crucial role in promoting resilient and well-functioning FMIs.

The *FMI Oversight Activities Annual Report* outlines how the Bank fulfills its oversight mandate for designated FMIs. This mandate is derived from the *Payment Clearing and Settlement Act* (PCSA) and forms part of the Bank's broader role to promote the safety and efficiency of the Canadian financial system. The Bank oversees FMIs that are designated by the Governor of the Bank of Canada as having the potential to pose systemic or payments system risks to the Canadian financial system. Accordingly, the Bank's main oversight activities focus on monitoring and evaluating risk in the designated FMIs to ensure that risk is being adequately controlled.

The environment in which FMIs operate is rapidly changing, driven by new regulation, increasingly interconnected markets and the evolution of financial technologies, such as distributed ledgers and digital currencies. With these developments, new and emerging risks, such as those related to cyber security, are commanding increasing importance. As an overseer, the Bank maintains a broad perspective on this environment and monitors developments to ensure that the designated FMIs remain safe systems to process payments and to record, settle and clear financial transactions.

The *FMI Oversight Activities Annual Report* outlines key issues with regard to the safety and soundness of designated FMIs, including both the Bank's own oversight priorities and the risk-management enhancements pursued by designated FMIs.

Overall, the Bank made significant progress in its oversight priorities for 2015, enhancing the frameworks that govern the Bank's oversight activities and moving forward with important policy developments, including proposals for the development of a resolution regime for designated FMIs in Canada and implementing the Bank's expanded role with regard to prominent payment systems. Many of these priorities are multi-year initiatives and will continue in 2016.

The designated FMIs made substantial enhancements to their risk-management practices throughout 2015 as they worked toward full observance of the Bank's Risk-Management Standards for Systemic FMIs—standards that fully incorporate the Principles and Key Considerations articulated in the CPMI-IOSCO *Principles for financial market infrastructures* (PFMIs). Further enhancements to strengthen observance of the Bank's standards will be a focus of the designated FMIs in 2016, including enhancements to observe the Bank's new Risk-Management Standards for Prominent Payment Systems for applicable systems.

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1. The Bank of Canada's Approach to Oversight of Financial Market Infrastructures

Financial market infrastructures (FMIs) are the backbone of the financial system through their provision of critical payment, clearing and settlement services. FMIs play an important role in enhancing financial stability by enabling individuals and firms to safely and efficiently purchase goods and services, invest in financial assets, manage risks and raise capital.

The stability and efficiency that FMIs bring is driving their expanding reach in the financial system, supporting a growing number of markets, especially in the areas of over-the-counter (OTC) derivatives and repurchase (repo) agreements. With their increasing systemic importance, there is a push to build and maintain sound risk-management frameworks to uphold the financial stability and to support the continuity of services that these FMIs offer.

Under the *Payment Clearing and Settlement Act* (PCSA), the Bank of Canada (the Bank) is responsible for the designation and oversight of FMIs that have the potential to pose systemic or payments system risks in Canada.[1] Oversight of these designated FMIs (designated systems) ensures that they operate in a manner where risk is being adequately controlled, while continuing to promote efficiency and stability in the Canadian financial system.

A Risk-Based Approach to Oversight

The designated FMIs, listed in **Table 1** (below) and described in further detail in Appendix 1, include both domestic and foreign-domiciled systems that have the potential to pose systemic or payments system risk to the Canadian financial system.[2]

[1] See the glossary in Appendix 2 for a full definition of systemic and payments system risk.

[2] Under the *Payment Clearing and Settlement Act*, the Governor of the Bank, with agreement from the federal Minister of Finance, has the power to designate FMIs for oversight by the Bank.

Table 1: FMIs Designated for Bank of Canada Oversight

LVTS	The Large Value Transfer System (LVTS) is a Canadian electronic funds-transfer system operated by the Canadian Payments Association (CPA) that settles large-value and time-critical payments.
ACSS[1]	The Automated Clearing Settlement System (ACSS) is a retail payment system operated by the CPA that clears cheques and electronic items such as pre-authorized debits, direct deposits and Interac debit payments.
CDCS	The Canadian Derivatives Clearing Service (CDCS) is a Canadian central counterparty operated by the Canadian Derivatives Clearing Corporation (CDCC) that clears transactions in certain fixed-income securities, repurchase agreements (repos), over-the-counter (OTC) equity derivatives and all derivatives traded on the Montréal Exchange.
CDSX	CDSX is a Canadian system operated by the Canadian Depository for Securities Limited (CDS) that consists of a securities settlement system, a central securities depository, and a central counterparty service for eligible Canadian exchange-traded and OTC equities.
CLS Bank[2]	CLS Bank is a global payment system for the settlement of foreign exchange transactions, including those involving the Canadian dollar.
SwapClear[2]	SwapClear is an LCH.Clearnet clearing platform for interest rate swaps and other OTC interest rate derivatives denominated in multiple currencies, including the Canadian dollar.

[1] Newly designated prominent payment system, designated in May 2016
[2] Foreign-domiciled designated systems

The Bank's primary FMI oversight activities relate to monitoring and evaluating risk in the designated FMIs to ensure that risk is being adequately controlled. These activities focus on assessing the risk-management practices of the designated systems through the review of proposed changes to their operations, rules and procedures, as well as periodic audits and inspections.[3]

The Bank's oversight of FMIs is conducted in close collaboration with FMI operators and relevant authorities, such as Finance Canada, provincial regulators and, in the case of the foreign-domiciled designated FMIs, the Bank of England and the Federal Reserve Board.[4]

The Bank applies a risk-based approach to its oversight of designated FMIs, including an annual cycle of setting risk-management priorities for these FMIs to pursue. This strategic approach allows for focused efforts by the Bank and the FMIs in areas that the Bank sees as most relevant to the safety and soundness of the FMIs and the broader financial system.

[3] See the Bank's Guideline Related to Bank of Canada Oversight Activities under the Payment Clearing and Settlement Act for an overview of the Bank's oversight activities.
[4] In 2014, the Bank entered into a memorandum of understanding with the Autorité des marchés financiers (AMF) (Québec), the British Columbia Securities Commission (BCSC) and the Ontario Securities Commission (OSC) to facilitate co-operation in carrying out their respective oversight responsibilities for FMIs, with particular regard to CDSX and CDCS.

Box 1: Defining Designated FMIs

	Designated FMIs	
	Prominent Payment Systems	Systemic FMIs
Domestic Designated FMIs	• ACSS	• LVTS • CDCS • CDSX
Foreign-Domiciled Designated FMIs	–	• CLS Bank • SwapClear
Risk-Management Standard	Risk-Management Standards for Prominent Payment Systems	Risk-Management Standards for Systemic FMIs[1]

[1] Formerly the Risk-Management Standards for Designated FMIs.

The Bank's Risk-Management Standards

To ensure that risks are being adequately controlled, the Bank maintains its own Risk-Management Standards for Systemic FMIs and Risk-Management Standards for Prominent Payment Systems (PPSs).[5] Of note, the title of the former Risk-Management Standards for Designated FMIs will be changed in 2016 to the Risk-Management Standards for Systemic FMIs in order to remove ambiguity and to clarify that both PPSs and systemic FMIs are designated FMIs, with different standards developed by the Bank for each of these types of systems.

The Risk-Management Standards for Systemic FMIs fully incorporate the Principles and Key Considerations of the CPMI-IOSCO *Principles for financial market infrastructures* (PFMIs), which provide guidance on risk management for systemically important FMIs to preserve and strengthen financial stability.[6,7] These standards apply to FMIs that have the potential to pose systemic risk to the Canadian financial system. See **Box 1** (above) for a description of the designated FMIs and the risk-management standards that apply to them.

[5] For more detail, see the Bank's Risk Management Standards for Systemic (Designated) FMIs and the Risk Management Standards for Prominent Payment Systems.
[6] CPMI-IOSCO is the Bank for International Settlements' Committee on Payments and Market Infrastructures (CPMI) and the International Organization of Securities Commissions (IOSCO).
[7] For more detail, see the CPMI-IOSCO's webpage on the Principles for financial market infrastructures.

The Bank's Risk-Management Standards for PPSs, finalized in February 2016, are intended for designated FMIs that are not systemically important, but are nonetheless important to the Canadian economy—i.e., those that pose only payments system risk.[8] The Risk-Management Standards for PPSs incorporate elements of the PFMIs, but are proportional to the level of risk present in a PPS, which is relatively less than the level found in systemic FMIs.

Monitoring Trends in the FMI Landscape

As overseers, there is a strong need for the Bank to stay current and understand the evolution of the environment in which FMIs operate. As such, the Bank monitors the FMI landscape to keep pace with the latest market developments. For example, technologies such as distributed ledgers, while still in their infancy, have the potential to transform financial systems, including FMIs; accordingly, the Bank is monitoring emerging trends in this area.

The Bank is also exploring greater access to market data to provide further insight into FMI operations, including improved data on OTC derivatives being reported through trade repositories and new sources of data for Canadian repo markets being reported through MTRS 2.0.[9]

Oversight Activities Annual Report

As part of this risk-based approach, the Bank uses the *FMI Oversight Activities Annual Report* (the *Annual Report*) to disclose its oversight priorities, as well as the risk-management priorities for designated FMIs.

The following chapters examine the progress made by the Bank and the designated FMIs on their priorities for 2015, and outline new priorities for both the Bank and the FMIs to pursue in 2016.

[8] ACSS is currently the only designated FMI that is a prominent payment system.
[9] MTRS 2.0 is the Market Trade Reporting System 2.0 operated by the Investment Industry Regulatory Organization of Canada (IIROC).

2. Bank of Canada 2015 Oversight Activities and 2016 Priorities

Every year, the Bank, in consultation with the operators of the designated FMIs, identifies priority areas on which to focus its oversight activities. These areas may represent timely risk-management issues that the Bank wishes to examine in depth, new areas for policy development or enhancements to the Bank's FMI oversight practices.

Chapter 2 of this report focuses on the outcomes of the Bank's oversight activities for 2015 and outlines priority areas for the Bank's oversight throughout 2016.

Enhancing the Bank's Oversight Framework

Oversight of the designated FMIs has become increasingly complex in recent years: the implementation of domestic and international standards for FMI risk management, a growing number of designated systems to oversee, and an ever-changing risk environment in which these systems operate create new and evolving demands on the Bank's FMI oversight framework and its resources.

To address these complexities and ensure that the framework remains timely and relevant, the Bank implemented a number of changes throughout 2015. As part of these changes, the Bank formalized its risk-based approach to FMI oversight, allowing for the systematic and consistent evaluation of risks in the designated FMIs to determine if risks are being adequately controlled.

In particular, starting in 2015, the Bank instituted an annual cycle of risk-management activities to inform the priorities that the Bank sets for both itself and the designated FMIs. This annual cycle includes environmental scans and structured risk assessments, leveraging the Bank's expertise in FMI oversight, financial markets, risk management, and payment and settlement operations to enhance the Bank's FMI oversight framework.

Expanding Oversight to Prominent Payment Systems

In 2014, the Government of Canada expanded the Bank's oversight mandate to include systems that, while not systemically important, have the potential to cause adverse effects on economic activity and to affect general confidence in the Canadian payments system, should they incur a disruption or failure. These prominent payment systems (PPSs), which form a subset of the FMIs overseen by the Bank, have been designated for their potential to pose payments system risk to the Canadian economy and the Canadian payments system.

To implement its expanded oversight role, the Bank launched a public consultation in June 2015 on the proposed criteria for designating a payment system as a PPS, as well as on the new Risk-Management Standards for PPSs that are different from the Bank's Risk-Management Standards for Systemic FMIs. The Bank also undertook a review of payment systems eligible under the PCSA to determine if they have the potential to pose payments system risk and whether these systems should be designated under the new PPS framework.

The new Risk-Management Standards for PPSs are based on the PFMIs, but are designed to be proportional to the level of risk present in a PPS, which is relatively less than the level found in systemic FMIs.[10]

With both the criteria for designation and the new risk-management standards finalized, the Bank designated the Automated Clearing Settlement System (ACSS), operated by the Canadian Payments Association (CPA), as a PPS in May 2016. Under the ACSS's own risk-management priorities for 2016 (found in Chapter 3) the system will work toward full observance of the Bank's new Risk-Management Standards for PPSs.

Contributing to the Modernization of Core Payments Systems

As part of a multiyear project to modernize Canada's core payments infrastructure, the CPA initiated a process with stakeholders, including the Bank, to develop a shared vision for the next generation of core payments systems.[11]

The Bank will work with the CPA throughout 2016 and beyond to ensure that this vision (and the eventual design and implementation of new systems) takes into account the Bank's considerations for the next generation of payments systems in Canada, including the Bank's risk-management standards for systemic

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[10] For more information, see the finalized Bank's Criteria and Risk-Management Standards for Prominent Payment Systems.

[11] See the CPA Strategic Plan, including its strategy *Modernizing Canada's payment system*, at: https://www.cdnpay.ca/imis15/eng/Our_Strategy/Modernization/eng/strategy/modernization.aspx?hkey=33f38308-600b-4e98-93cd-b46c7d38ef43

FMIs and PPSs, which these systems will be expected to observe, given the likelihood that they will be designated for oversight by the Bank of Canada.

The Bank will also play an active role in encouraging broad stakeholder input to the CPA's modernization initiative by leveraging its own participation at industry venues and collaborating on research with the CPA and other stakeholders. See **Box 2** (below) for more information on the Bank's recent research activities with regard to payment systems.

Canadian FMI Resolution Regime

In 2014, the Financial Stability Board (FSB) enhanced its *Key Attributes of Effective Resolution Regimes for Financial Institutions* (the Key Attributes) to include core elements for the effective resolution of systemically important FMIs. These elements aim to reduce the impact of an FMI failure on the financial system and the broader economy, limit taxpayer losses in the event of a failure, and ensure the continuity of an FMI's critical functions, including the critical payment, clearing and settlement services they offer to markets.

The Bank is leading Canada's international engagement on FMI resolution while federal authorities are examining a Canadian resolution regime for designated FMIs. This work will continue over the course of 2016.

Ongoing Bank research will assist this work by, for example, examining the linkages between FMIs, with particular regard to credit-risk exposures, as well as the effects of loss-allocation tools used by FMIs during their recovery from significant financial losses caused by participant default.

Contributing to International Efforts

The Bank participates on a number of international committees that seek to develop, promote and uphold risk-management standards for systemically important FMIs.

In 2015, the FSB, the Basel Committee on Banking Supervision (BCBS), CPMI and IOSCO produced a coordinated work plan to examine central counterparties (CCPs).[12] The Bank is playing an active role in this examination, which focuses on understanding the various aspects of the resilience, recovery and resolvability of CCPs—for example, through its participation on an FSB cross-border crisis-management group to address challenges related to the orderly resolution of CCPs.

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[12] The joint CCP Workplan developed by the FSB, BCBS, CPMI and IOSCO is available on the FSB's website at http://www.fsb.org/2015/09/2015-ccp-workplan/.

Box 2: Highlighting Bank Research in Payment Systems

Over the course of 2015, the Bank undertook a number of research initiatives related to FMIs, with a particular focus on payment systems. Notable achievements include the publication of research on the implications of fully collateralizing payments in the Canadian Payments Association's (CPA's) Large Value Transfer System (LVTS), similar to what would be done in a real-time gross settlement system (RTGS).[1] Results from this research demonstrated that collateral requirements would vary by participant, and that some participants would require less collateral under the investigated model as compared to what is currently required under the LVTS' system design.

In light of the CPA's work to develop a vision for their next generation of core payment systems, the Bank conducted joint research with the CPA on how to achieve the public policy objectives in the development of these systems.[2] In addition, the Bank coordinated a joint research workshop with the CPA in October 2015, entitled Payments System Modernization: Opportunities & Challenges. The topics of this workshop ranged from risk-management and system interoperability issues to innovation and emerging themes in payment systems' modernization. The results of this research will assist both the CPA and the Bank in the CPA's initiative to modernize payment systems in Canada.

1 See Bank of Canada Working Paper No, 2015-29, Examining Full Collateral Coverage in Canada's Large Value Transfer System.
2 See Bank of Canada Discussion Paper 2015-6, Public Policy Objectives and the Next Generation of CPA Systems: An Analytical Framework.

In connection with the CCP work plan, the CPMI-IOSCO conducted a stock-taking of CCP practices in 2015 that covered key risk-management areas, including stress testing, margin requirements, coverage, skin-in-the-game contributions and recovery planning.[13] The Bank is an active participant in these efforts, which will continue throughout 2016 and are intended to identify potential areas for additional clarity and guidance under the PFMIs.

The Bank is also a member of the CPMI-IOSCO Implementation Monitoring Standing Group (IMSG), which monitors the implementation of the PFMIs across member jurisdictions. Included in these assessments was the IMSG's examination of certain aspects of Canada's implementation measures, which, in early 2015 found that Canadian authorities had broadly implemented the PFMIs.

Subsequently, the Bank detailed the dates by which the designated FMIs were expected to observe the Bank's Risk-Management Standards for Systemic FMIs, addressing a key finding from the assessments.[14] Continued participation on the IMSG will be a priority for the Bank in 2016 and beyond as the Standing Group carries out further assessments of PFMI implementation across member jurisdictions.

13 Skin-in-the-game contributions refer to a CCP's capital-at-risk that the FMI provides as part of its risk-management framework to address financial losses, generally as part of a CCP's *default waterfall*.
14 The Bank's 2014 *Oversight Activities Annual Report* highlighted the Bank's expectation that systemically important FMIs observe the Risk-Management Standards for Systemic FMIs by the end of 2015, with the exception of standards related to tiered participation and recovery plans, where FMIs are expected to be in observance with these standards by the end of 2016.

Over the course of 2015, the Bank also participated in the development of a consultative report with the CPMI-IOSCO, which proposes guidance on the cyber resilience of FMIs that reflects emerging practices and trends.[15] The Bank will be involved in the completion of this guidance in 2016, based on stakeholder input.

The Bank is also an active member of the CPMI Working Group on Retail Payments. In November 2015, the Working Group published its report, *Digital currencies*, which examines innovations in this field and the possible implications of interest to central banks.[16] In particular, the report examines risks for the use of digital currencies as a means of payment, as well as the development of distributed ledger technologies and the potential applications of this innovation.

FMI Aspects of Recovery and Resolution for Financial Institutions

A financial institution in recovery or resolution needs to maintain access to FMI services in order to carry out critical payment, clearing and settlement activities. At the same time, a financial institution under extreme stress has the ability to pose risks to the FMIs offering these services and to the FMIs' participants.

To ensure that these risks are adequately managed, the Bank, the Canada Deposit Insurance Corporation and the Office of the Superintendent of Financial Institutions formed a working group to examine the potential challenges related to FMIs that can impede the successful recovery or resolution of a financial institution. Among these challenges are actions taken by FMI operators against a financial institution undergoing a stress event, including suspension and termination, as well as actions taken by FMI participants.

Over the course of 2015, the working group met with the domestic designated FMIs to discuss how such challenges might be managed in the FMIs' rules and procedures. A series of recommendations for the designated FMIs were developed to address these concerns. The working group will continue to collaborate with the domestic designated FMIs throughout 2016 to implement these recommendations.

The working group is also examining linkages between the overseers, regulators and operators of the designated FMIs to ensure effective communication between them in time-sensitive situations. Progress on this work stream will be a priority of the working group in 2016.

[15] The CPMI-IOSCO consultative paper *Guidance on cyber resilience for financial market infrastructures* is available at http://www.bis.org/cpmi/publ/d138.htm.
[16] For more information, including the publication of the CPMI report *Digital currencies*, see: http://www.bis.org/press/p151123.htm.

3. Risk-Management Priorities for the Domestic Designated FMIs

The Bank works directly with the domestic designated FMIs and relevant authorities to ensure that these FMIs' risks are being adequately controlled and that they observe the Bank's risk-management standards for their respective systems.

Every year, as part of its ongoing cycle of oversight activities, the Bank identifies risk-management priorities for the domestic designated FMIs to pursue. These priorities are established following a rigorous process to determine gaps in the observance of the Bank's risk-management standards, or to identify emerging vulnerabilities or enhancements to an FMI's risk-management practices.

Chapter 3 discusses the performance of the domestic designated FMIs against the priorities set for them in 2015, as well as the risk-management priorities that the Bank has identified for these FMIs to pursue in 2016.

3.1 Common Risk-Management Priorities

Some of the risk-management priorities that the Bank sets pertain to all of the domestic designated FMIs. In 2015, these systems were asked to examine their cyber-security practices and to begin the development of recovery plans. Both of

Common Priorities 2015

- analyze cyber security self-assessments
- begin development of recovery plans

Common Priorities 2016

- implement cyber security action plans
- complete development of recovery plans
- develop tiered participation assessment frameworks

these areas remain common risk-management priorities for the FMIs in 2016, in addition to a new common priority related to understanding tiered participation in the designated systems.[17]

Enhancing Cyber Security

With digitally connected markets and a rapidly changing technological environment, the importance of cyber security is only increasing. Cyber attacks on FMIs have the potential to pose systemic and payments system risks to the Canadian financial system by disrupting the critical payment, clearing and settlement services that FMIs offer.

While the designated FMIs have extensive controls and processes in place to manage cyber risk, in an environment of escalating cyber threats, FMIs must continually advance their cyber-security capabilities. To this end, in 2015, the domestic systemic FMIs completed a self-assessment of their existing cyber-security practices against the National Institute for Standards and Technology (NIST) Cybersecurity Framework—a comprehensive tool for assessing cyber-security defences.

The Bank reviewed these self-assessments and made recommendations to the FMIs for enhancements to their cyber-security defences. In response, the FMIs developed action plans to address the Bank's recommendations. Making substantial progress on these action plans is a common priority for the domestic systemic FMIs in 2016, although the Bank recognizes that many of these cyber-security enhancements will be multi-year initiatives.

Developing Recovery Plans

The Bank's risk-management standards for systemic FMIs and PPSs both require that designated FMIs have recovery plans in place to ensure that they can offer their critical payment, clearing and settlement services as a going concern.

In 2015, the domestic systemic FMIs were asked to undertake preparatory work for the development of their recovery plans. This work included the identification of critical FMI services; extreme but plausible stress scenarios that could lead to recovery; and the communications and escalation protocols that the FMIs maintain internally with their operational and management frameworks, and externally with authorities, including the Bank.

A common priority for all the domestic systemic FMIs is to have a recovery plan in place by the end of 2016. To support this priority, the Bank is collaborating with the CSA to produce joint supplementary guidance related to recovery and orderly wind-down to facilitate the implementation of the Bank's Risk-

[17] Since the ACSS is a newly designated system, the common risk-management priorities for 2016 will not apply to it and are intended only for the domestic systemic FMIs.

Management Standards for Systemic FMIs. This supplementary guidance builds on the PFMI requirements for recovery plans found in the CPMI-IOSCO report, *Recovery of financial market infrastructures* (the Recovery Report).[18] The joint supplementary guidance is intended to assist the designated FMIs by interpreting the PFMIs and the Recovery Report in a Canadian context, and to communicate Canadian authorities' expectations on recovery and orderly wind-down. In 2015, the Bank and the CSA launched a joint public consultation on a draft of the supplementary guidance, which will be finalized in 2016.

Understanding Risks in Tiered Participation

In 2015, the Bank, in consultation with the CSA, clarified its expectations related to the monitoring and management of material risk to the FMIs as a result of tiered participation arrangements—arrangements where firms can indirectly participate in an FMI through an FMI's direct participants. This clarification, conducted bilaterally with the domestic systemic FMIs, asked them to build capacity to collect data on tiered participation and to develop a framework that uses these data to identify, assess and manage the risks of tiered participation in the FMIs' systems. Making progress on these activities is a common risk-management priority for all of the domestic systemic FMIs in 2016.

3.2 LVTS Priorities

As the operator of the Large Value Transfer System (LVTS), the CPA made substantial progress on its risk-management priorities identified in last year's *Annual Report*. This includes planning for the modernization of core payment infrastructure in Canada, contributions to which are a priority for the Bank to pursue in 2016, as discussed in Chapter 2.

The following section highlights the CPA's performance against the 2015 LVTS risk-management priorities, as well as the system's priority areas for 2016, which are in addition to the common risk-management priorities for domestic FMIs.

LVTS Priorities 2015

- implement a new governance and accountability framework
- implement ERM framework
- enhance intra-day liquidity monitoring
- begin planning for system renewal

LVTS Priorities 2016

- continue implementation of the new governance and accountability framework
- enhance resilience and security
- continue implementation of the finalized ERM framework
- enhance intra-day liquidity monitoring (deferred from 2015)

[18] The CPMI-IOSCO report Recovery of financial market infrastructures is available at: http://www.bis.org/cpmi/publ/d121.pdf

Enhancing Governance and Accountability

In response to amendments made to the *Canadian Payments Act*, the CPA implemented changes to its governance and accountability structure throughout 2015. These statutory amendments and the changes that followed were made pursuant to a governance review of the Canadian payments sector by Finance Canada, conducted to ensure the continued safety and soundness of the payments system, spur innovation and promote considerations of user interests.[19,20]

Changes made to the CPA's governance and accountability structure in 2015 included the establishment of a smaller board of directors with more members who are independent of the CPA's membership, and new accountability measures. The CPA will continue to implement further changes in 2016, including new requirements for annual reporting and medium-term planning.

Enhancing Resilience and Security

Disaster recovery plans, back-up arrangements, escalation procedures and security should be reviewed periodically to ensure that these practices do not become outdated and that areas for improvement or enhancement can be identified, based on existing standards and best practices, and acted upon in a timely manner.

Last year, a review of current practices was conducted to ensure that they were aligned with the CPA's resilience and security objectives. As a result, the CPA developed a comprehensive plan that prioritizes the implementation of more-robust back-up arrangements in 2016 to ensure the ongoing resilience of the LVTS. Security tools and processes will also be enhanced, including incident management.

Implementing Enterprise Risk-Management Plans

Enterprise risk management (ERM) planning provides a comprehensive framework to identify, measure, and manage complex and interconnected risks. Following the approval of an ERM policy by its board in 2015, the CPA undertook a number of key initiatives to implement the framework, including developing a strategy to align operational policies and practices with the ERM framework and establishing an internal audit function.

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[19] The CPA's governance review was announced by the federal government pursuant to the 2011 findings of the Task Force for the Payments System Review. For more information, see the March 2012 Finance Canada news release on the findings of the Task Force for the Payments System Review.

[20] Legislative amendments to the Canadian Payments Act pursuant to the CPA's governance review were announced by the federal government in Budget 2014.

In 2016, the CPA will work toward full implementation of its ERM framework, including the finalization of risk appetite statements and ensuring that integrated risk reporting is in place.

Enhancing Intra-day Liquidity Monitoring

The LVTS is designed so that the system's participants, and not the CPA, are exposed to liquidity risk. Nonetheless, to ensure full observance of the Bank's Risk-Management Standards for Systemic FMIs, the CPA was asked to develop a plan to provide additional monitoring and evaluation of the liquidity risk of LVTS participants. While this gap was identified as an area of focus for the LVTS in 2015, due to competing priorities, work to develop additional tools for liquidity monitoring was delayed and will be addressed in 2016.

3.3 ACSS Priorities

In December 2014, the PCSA was amended to give the Bank responsibility to identify, designate and oversee systems that have the potential to pose payments system risk to the Canadian economy.

The Automated Clearing Settlement System (ACSS) is the retail payment system operated by the CPA that clears cheques and electronic items such as pre-authorized debits, direct deposits and Interac debit payments. As a result, the ACSS is the primary clearing and settlement system for retail payments in Canada.

Upon review of the system against the Bank's criteria for PPS designation, the ACSS was designated as a PPS by the Governor of the Bank in May 2016.

In early 2016, the Bank published its new Risk-Management Standards for PPSs, which these systems are expected to observe. As a newly designated system, the CPA will conduct a review of the ACSS against these new risk-management standards in 2016 and develop a plan to address the gaps identified from this review.

ACSS Priorities 2015	ACSS Priorities 2016
ACSS was not a designated prominent payment system in 2015.	• review existing risk-management frameworks against the Risk-Management Standards for PPSs and develop a plan to address gaps identified

3.4 CDCC Priorities

CDCC made progress on all the priorities identified for the system in last year's *Annual Report*, including the common risk-management priorities related to cyber security and recovery planning that will continue in 2016.

The following section highlights the performance of CDCC against its priorities for 2015, as well as the new priorities the FMI has been asked to address in 2016, which are in addition to the common risk-management priorities discussed earlier in this chapter.

Strengthening Observance of the Risk-Management Standards for Systemic FMIs

Over the course of 2015, CDCC was asked to address gaps in its observance of the Bank's Risk-Management Standards for Systemic FMIs related to operational-risk management and default management. In response, CDCC completed several projects working toward full observance of these standards, including the finalization of its ERM framework to ensure that policies are aligned with the management of risks on an enterprise-wide basis.

Establishing a Buy-Side Participation Model

In 2015, substantial progress was made in outlining the details of a limited-liability clearing model that would allow buy-side participants to join the CDCC's repo clearing service without compromising its risk-management standards. CDCC will continue to make progress on this priority in 2016.[21]

Enhancing CDCC's Risk System

In addition to strengthening its observance of the Bank's Risk-Management Standards for Systemic FMIs, CDCC's financial risk-management processes and procedures have the potential to be enhanced through the adoption of a more-robust and comprehensive risk-management platform.

CDCC Priorities 2015

- complete and implement an ERM framework
- establish a buy-side participation model

CDCC Priorities 2016

- complete a buy-side participation model
- develop an action plan for, and make substantial progress on a new risk system
- complete the design of a segregation and portability framework

[21] Buy-side participants are investing institutions, such as mutual funds and pension funds. Current efforts are focused on large pension funds active in the repo market.

In recent years, CDCC made significant enhancements to the management of credit and liquidity risks within the limitations of the current risk system. However, further improvements, including the introduction of new risk-management technology, are required to ensure resilience in CDCC's operations.

CDCC will be expected to develop an action plan for this new risk system by May 2016 and to make substantial progress on its implementation throughout the year, with the understanding that this will be a multi-year initiative.

Developing a Framework for Segregation and Portability

To reduce the effects of a participant default, the Bank's Risk-Management Standards for Systemic FMIs call for systemically important CCPs to have a segregation and portability regime that allows for the effective holding and transfer of client positions and collateral.

In 2015, CDCC distributed a white paper proposing a high-level framework for segregating client positions in exchange-traded futures and, in the event of a clearing member's default, for enabling the portability of its clients' positions to another clearing member. Both the Bank and the CSA have reviewed the white paper and are satisfied that the proposal is consistent with the Bank's Risk-Management Standards for Systemic FMIs, which fully incorporate the PFMIs. As a result, CDCC will now complete its framework and design the rules and system changes necessary for its implementation.

3.5 CDS Priorities

CDS, the operator of the CDSX system, made significant progress against its 2015 risk-management priorities identified in last year's *Annual Report*.

For 2016, in addition to the common risk-management priorities related to cyber security and recovery planning, CDS will have additional priorities to pursue related to enhancing event reporting and phasing in earlier novation in the system's equity CCP.

CDS Priorities 2015

- implement enhancements to CNS (CDS's equity CCP)
- adjust the recovery-time objective

CDS Priorities 2016

- enhance event reporting
- begin transition to earlier novation in CNS
- continuously achieve margin confidence levels in CNS

Strengthening Observance of the Risk-Management Standards for Systemic FMIs

Over the course of 2015, CDS achieved significant milestones in addressing gaps in its observance of the Bank's Risk-Management Standards for Systemic FMIs. In particular, it increased collateral requirements for Receivers of Credit, the last participant category that did not satisfy the PFMIs' requirement that exposures for each participant be covered fully and with a high degree of confidence.

CDS also transferred its only member from the Federated Participant category to the Extenders of Credit category. This reduces risk in CDSX because members of a participant credit ring guarantee the payment to CDS of the obligations of other participants in that credit ring.

In addition, CDS enhanced its policies and procedures to ensure that its critical information-technology systems can resume operations within two hours of a disruptive event.

Enhancing Event Reporting

CDS has the primary responsibility to ensure the safety and efficiency of the CDSX system. Given the systemic importance of CDSX to the Canadian financial system, CDS must also ensure that it provides clear and timely communication of relevant events to its stakeholders—for example, events that result in a material operational disruption to the services of CDSX.

The Bank believes that further enhancements can be made to CDS's current event-reporting practices. To this end, the Bank, in consultation with the CSA, requested that CDS refine its event escalation and communication policy in 2016, to ensure that event reporting consistently meets regulatory expectations in terms of timeliness and the appropriate level of detail at various stages of an incident, including post-mortem reports.

Implementing Enhancements to CDS's Equity CCP

In 2015, CDS's risk-management priorities identified three design improvements to the Continuous Net Settlement (CNS) service, the FMI's equity CCP. CDS addressed two of these improvements by shortening the final deadline for participants to deliver collateral from six hours to 3.5 hours after a margin call (thereby reducing the risk of a collateral shortfall should a participant default during this period); and introducing a skin-in-the-game contribution to the FMI's default-management procedures (thereby dedicating a portion of its own financial resources to absorb losses in the event of participant default).

The third improvement identified relates to earlier novation of trades, sooner than the current CNS settlement date of three days post-trade. However, due to competing priorities and the industry's work toward shortening the settlement cycle to T+2, implementation of this priority will now be phased-in and completed in 2017.

Continuously Achieving CNS Margin Confidence Levels

The Bank's Risk-Management Standards for Systemic FMIs require CCPs to collect and retain sufficient collateral to cover potential losses from a defaulting participant to a confidence level of at least 99 per cent. The CNS margin system is designed to target this coverage requirement to ensure that the system's margin methodology is in full observance of these standards.

To confirm that sufficient collateral has been collected to achieve this confidence level, CDS conducts back-testing of participant portfolios, comparing participant's collateral requirements against losses that would have occurred had they defaulted.

In 2015, CDS's back-testing showed that margin requirements in the CNS equity CCP did not consistently achieve the minimum 99 per cent confidence level set out in the Bank's standards. CDS is assessing this matter and will ensure it can continuously meet or exceed the 99 per cent confidence level in the CNS CCP.

4. Risk-Management Priorities for Foreign-Domiciled Designated FMIs

The Bank's oversight responsibilities include the designation and oversight of foreign-domiciled FMIs that have the potential to pose systemic risk to the Canadian financial system. As with the domestic systems, oversight of these FMIs focuses on efforts to ensure that they are adequately controlling risk in an efficient and effective manner.

To achieve this objective, the Bank relies on co-operative oversight arrangements, generally in the form of oversight colleges, which are led by an authority in the jurisdiction where the foreign FMI is domiciled—i.e., the lead FMI regulator in that jurisdiction. The Bank's main objectives in these colleges are to ensure that the foreign FMIs have risk controls in place that are equivalent to the Bank's Risk-Management Standards for Systemic FMIs and that the Bank is consulted on developments affecting these FMIs, such as material changes to FMI rules. In this context, the Bank maintains a particular focus on Canadian-dollar denominated activities and the risks that the FMIs bring to their Canadian participants.

Priorities for the foreign-domiciled FMIs are set by the regulators in their home jurisdictions, in consultation with the members of the co-operative oversight colleges. Through these colleges, the Bank works closely with the lead regulators and authorities from other jurisdictions that are participating in the co-operative oversight arrangements.

4.1 LCH.Clearnet SwapClear Priorities

SwapClear is a global system operated by LCH.Clearnet for the central clearing of over-the-counter (OTC) interest rate derivatives denominated in multiple currencies, including the Canadian dollar. The Bank is actively involved in the oversight of SwapClear through participation in the LCH Global College, organized and administered by LCH.Clearnet's lead regulator, the Bank of England, which supervises systemically important FMIs in the United Kingdom (U.K.). The Bank of Canada also participates in the LCH Crisis Management Group, which is led by the Bank of England to facilitate crisis coordination among authorities with respect to LCH.Clearnet.

Making Progress on Key Risk-Management Priorities

As discussed in the *Bank of England's supervision of financial market infrastructures 2016 Annual Report*, the Bank of England's supervision of U.K. FMIs included areas such as governance and financial risk mitigants, cyber resilience and international regulatory work to improve CCP resilience and resolvability.[22] Specifically with respect to LCH.Clearnet, a parallel default-management fire drill exercise for LCH.Clearnet and Eurex Clearing AG was developed by the Bank of England, jointly with BaFin and Bundesbank. In addition, the Bank of England established a crisis management group for LCH.Clearnet.

A key priority for the Bank of England's supervision of CCPs, including LCH.Clearnet, is to work toward ensuring that they fully observe the PFMIs. In this spirit, the Bank of England's annual report notes that its priorities for CCP supervision in 2016 include a continued focus on strengthening operational risk management, including cyber risk, further assessments of recovery plans, and CCPs' processes for managing clearing member default. In addition to these priorities, the Bank of Canada will also work over the course of 2016 to assess whether LCH.Clearnet has sufficient liquidity in all relevant currencies under stressed periods.

Monitoring New Products and Services

Through the LCH Global College process, the Bank will continue to focus its oversight efforts to ensure that the FMI's risk-management frameworks do not adversely affect the Canadian participants in the SwapClear CCP service. This includes assessing any significant changes arising from LCH.Clearnet's introduction of new products and services, including current initiatives to offer portfolio margining between OTC and listed interest-rate derivatives, and partnering with CLS Bank to deliver settlement for clearing foreign exchange options.

[22] For more information, including the publication of the *Bank of England's supervision of financial market infrastructures 2016 Annual Report*, published on 4 March 2016, see http://www.bankofengland.co.uk/publications/Pages/fmi/annualreport2016.aspx.

4.2 CLS Bank Priorities

CLS Bank is a global payment system for the settlement of foreign exchange transactions, including those involving the Canadian dollar. CLS Bank is supervised by the Federal Reserve Board and is overseen by the CLS Oversight Committee, which is composed of central banks whose currencies are included in the CLS arrangements, including the Bank of Canada.

Ensuring PFMI Observance

Since 2014, CLS Bank has been working toward observance with the PFMIs. In addition, CLS Bank is required by its lead overseer, the Federal Reserve Board, to meet the risk-management standards in Regulation HH (12 C.F.R. Part 234). These standards are based, on and generally consistent with, the PFMIs. While CLS Bank was required to meet most of the requirements in Regulation HH as of 31 December 2014, the compliance date for certain new and heightened requirements, such as establishing integrated plans for recovery and orderly wind-down, was extended to 31 December 2015. Throughout 2016, the CLS Oversight Committee will continue to monitor CLS Bank's compliance with the PFMIs.

Monitoring New Services and Other Developments

Over the course of 2015, CLS Bank introduced new services and expanded the scope of its operations—including the development of payment-versus-payment settlement services for the cross-currency swaps market and the introduction of the Hungarian forint to the list of currencies eligible for settlement. In addition, CLS Bank continues to work with LCH.Clearnet to develop a CLS settlement service for cleared foreign exchange products.

Throughout 2016, the Bank will continue to monitor developments within CLS Bank with regard to these new services and the expanded scope of operations to understand the effects these enhancements will have, particularly on Canadian-dollar denominated activities and their effects on the FMIs' Canadian participants.

Appendix 1 | Overview of Designated FMIs

LVTS (Payment System | Designated Systemic FMI 1999)

The Large Value Transfer System (LVTS) is a Canadian electronic funds-transfer system operated by the Canadian Payments Association (CPA) that settles large-value and time-critical Canadian-dollar payments.

Measure	2013	2014	2015
Daily average value settled	$150 billion	$154 billion	$171 billion
Daily average volume settled	30 thousand	31 thousand	32 thousand
Daily average collateral pledged	$37 billion	$37 billion	$38 billion
Number of direct participants	16	16	17

CDSX (Securities Settlement System, Central Securities Depository, Central Counterparty | Designated Systemic FMI 2003)

CDSX is a Canadian system operated by the Canadian Depository for Securities Limited (CDS) that consists of a securities settlement system, a central securities depository, and a central counterparty service for Canadian exchange-traded and over-the-counter (OTC) equities.

Measure	2013	2014	2015
Daily average value of equity and fixed-income securities cleared and settled	$452 billion	$475 billion	$478 billion
Daily average volume of equity and fixed-income securities cleared and settled	1,372 thousand	1,671 thousand	1,737 thousand
Average value of securities held at the central securities depository	$4.3 trillion	$4.6 trillion	$4.6 trillion
Number of direct participants	100	100	99

CDCS (Central Counterparty | Designated Systemic FMI 2012)

The Canadian Derivatives Clearing Service (CDCS) is a Canadian central counterparty operated by the Canadian Derivatives Clearing Corporation (CDCC) that clears transactions in certain fixed-income securities, repurchase agreements (repos), OTC equity derivatives and all derivatives traded on the Montréal Exchange.

Measure	2013	2014	2015
Daily average value of OTC repos cleared	$19.7 billion	$22 billion	$21.5 billion
Daily average notional value cleared (exchange-traded derivatives)	$101 billion	$109 billion	$100 billion
Daily average notional value cleared (OTC derivatives)	$15.1 million	$16.2 million	$7.9 million
Number of direct participants	36	37	36

ACSS (Payment System | Designated PPS 2016)

The Automated Clearing Settlement System (ACSS) is a retail payment system operated by the Canadian Payments Association that clears cheques and electronic items such as pre-authorized debits, direct deposits, and Interac debit payments.

Reporting of ACSS annual data will commence in the 2016 Annual Report.

CLS Bank (Payment System | Designated Systemic FMI 2002)

CLS Bank is a global payment system for the settlement of foreign exchange transactions, including those involving the Canadian dollar.

Measure	2013	2014	2015
Daily average foreign exchange settlement (total)	US$4,987 billion	US$5,093 billion	US$4,750 billion
Daily average Canadian-dollar foreign exchange settlement	Can$126 billion	Can$138 billion	Can$168 billion
Settlement members	63	63	66

LCH.Clearnet SwapClear (Central Counterparty | Designated Systemic FMI 2013)

SwapClear is an LCH.Clearnet clearing platform for interest rate swaps and other OTC interest rate derivatives denominated in multiple currencies, including the Canadian dollar.

Measure	2013	2014	2015[1]
Notional outstanding OTC interest rate swaps in all currencies as of 31 December	US$426 trillion	US$362 trillion	US$251 trillion
Notional outstanding OTC interest rate swaps, denominated in Canadian dollars, as of 31 December [2]	Can$13.2 trillion	Can$12.2 trillion	Can$8.7 trillion
Number of direct participants[3]	86	98	100

[1] The decreasing trend in notional outstanding is largely driven by increased use of compression.
[2] SwapClear reported U.S. dollar equivalent, which has been converted into Canadian dollars based on the Bank of Canada's closing spot exchange rate for 31 December 2013, 31 December 2014, and 31 December 2015 respectively.
[3] Based on the list of Global Service Members on SwapClear's website, available at www.swapclear.com/service/our-members.html.

Appendix 2 | Glossary of Terms

Central counterparty	An entity that interposes itself between counterparties to contracts traded in one or more financial markets, becoming the buyer to every seller and the seller to every buyer and thereby ensuring the performance of open contracts.
Central securities depository	An entity that provides securities accounts, central safekeeping services and asset services, which may include the administration of corporate actions and redemptions, and plays an important role in helping to ensure the integrity of securities issues (that is, ensures that securities are not accidentally or fraudulently created or destroyed or their details changed).
Clearing	The process of transmitting, reconciling and, in some cases, confirming transactions prior to settlement, potentially including the netting of transactions and the establishment of final positions for settlement. On occasion, this term is also used (imprecisely) to cover settlement. For the clearing of futures and options, clearing also refers to the daily balancing of profits and losses and the daily calculation of collateral requirements.
Collateral	An asset or third-party commitment that is used by a collateral provider to secure an obligation vis-à-vis a collateral taker.
Core systems	The technology, networks and data that support the operations of financial entities.
Credit risk	The risk that a counterparty, whether a participant or other entity, will be unable to fully meet its financial obligations when due, or at any time in the future.
Cyber defences	The strategies, tools and technology deployed by an entity to prevent, detect, and recover from cyber attacks.
Default	An event stipulated in an agreement as constituting a default. Generally, such events relate to a failure to complete a transfer of funds or securities in accordance with the terms and rules of the system in question.
Default fund	A pre-funded default arrangement that is composed of assets contributed by a CCP's participants that may be used by the CCP in certain circumstances to cover losses or liquidity pressures resulting from participant defaults.
Designated system | Designated financial market infrastructure	A financial market infrastructure designated under the *Payment Clearing and Settlement Act* for oversight by the Bank of Canada.

Enterprise risk management	A process put in place by an entity's board of directors, management and personnel that is applied in setting strategy across the enterprise. ERM is also designed to identify potential events that may affect the entity and to manage risk so that it remains within the entity's risk appetite.
Financial market infrastructure	A multilateral system among participating institutions, including the operator of the system, used for the purposes of clearing, settling or recording payments, securities, derivatives or other financial transactions.
Initial margin	Collateral that is collected to cover potential changes in the value of each participant's position (that is, potential future exposures) over the appropriate close-out period in the event that the participant defaults.
Liquidity risk	The risk that a counterparty, whether a participant or other entity, will have insufficient funds to meet its financial obligations as and when expected, although it may be able to do so in the future.
Orderly wind-down	Orderly wind-down involves the set of actions and procedures to affect the wind-down of the functions of an FMI in an orderly manner.
Payment system	A set of instruments, procedures and rules for the transfer of funds between or among participants; the system includes the participants and the entity operating the arrangement.
Payments system risk	Payments system risk is the risk that a disruption to or a failure of an FMI could cause a significant adverse effect on economic activity in Canada by either impairing the ability of individuals, businesses or government entities to make payments, or producing a general loss of confidence in the Canadian payments system.
Procyclicality	The changes in risk-management requirements or practices that are positively correlated with business or credit cycle fluctuations and that may cause or exacerbate financial instability.
Recovery	Recovery concerns the ability of a financial institution, including an FMI, to recover from a threat to its viability and financial strength so that it can continue to provide its critical services without requiring the use of resolution powers by authorities. More specifically, in the context of an FMI, recovery is defined as the actions of the FMI that are consistent with its rules, procedures and other ex ante contractual arrangements to address any uncovered loss, liquidity shortfall or capital inadequacy, whether arising from participant default or other causes (such as business, operational or other structural weaknesses), including actions to replenish any depleted pre-funded financial resources and liquidity arrangements, as necessary, to maintain the FMI's viability as a going concern and the continued provision of critical services.

Resolution	Resolution is the set of actions that a resolution authority can take when recovery efforts have been unsuccessful, or when recovery measures are deemed by the authorities to be insufficient to return the financial institution or FMI to viability.
Securities settlement system	An entity that enables securities to be transferred and settled by book entry according to a set of predetermined multilateral rules. Such systems allow the transfer of securities either free of payment or against payment.
Systemic Risk	The risk that the inability of a participant to meet its obligations in an FMI as they become due, or that a disruption to or a failure of an FMI, could, by transmitting financial problems through the FMI, cause: • other participants in the FMI to be unable to meet their obligations as they become due; • financial institutions in other parts of the Canadian financial system to be unable to meet their obligations as they become due; • the FMI's clearing house or the clearing house of another FMI within the Canadian financial system to be unable to meet its obligations as they become due; or an adverse effect on the stability or integrity of the Canadian financial system.

Appendix 3 | Abbreviations

ACSS	Automated Clearing Settlement System
CCP	Central counterparty
CDCC	Canadian Derivatives Clearing Corporation
CDCS	Canadian Derivatives Clearing Service
CDIC	Canada Deposit Insurance Corporation
CDS	Canadian Depository for Securities Limited
CNS	Continuous Net Settlement Service
CPA	Canadian Payments Association
CPMI	Committee on Payments and Market Infrastructures
CSA	Canadian Securities Administrators
ERM	Enterprise risk management
FMI	Financial market infrastructure
FSB	Financial Stability Board
IOSCO	International Organization of Securities Commissions
LVTS	Large Value Transfer System
OTC	Over-the-counter
PCSA	Payment Clearing and Settlement Act
PPS	Prominent payment system