



Canada's Major Payment Systems

Learn **what a payment system is** and **how payments are processed** through Canada's **Large Value Transfer System (LVTS)** and the **Automated Clearing Settlement System (ACSS)**. Both of these systems are owned and operated by **Payments Canada**. Read about **the Bank's functions in payment systems**.

Payment systems explained

Canadians use various “payment instruments” to purchase goods and services, to make financial investments, and to transfer funds from one person to another. These instruments include cash, cheques, debit and credit cards, and e-money. Except for cash, payment instruments involve a claim on a financial institution, such as a bank, credit union or caisse populaire. Financial institutions therefore need arrangements to transfer funds among themselves, either on their own behalf or on behalf of their customers. A payment system is the set of instruments, technical arrangements, procedures and rules used to transfer these funds.

How payments are processed

Payments go through two steps:

1. **Clearing**—the process of transmitting, reconciling and, in some cases, confirming payment orders prior to settlement. This process can include netting of payments and the establishment of final positions for settlement.
2. **Settlement**—the release of payment obligations between two or more parties by transferring funds between them.

There are two payment systems in Canada:

- **Large Value Transfer System (LVTS)**
- **Automated Clearing Settlement System (ACSS)**

Payment systems also play a role in clearing and settlement transactions involving assets such as securities, derivatives and foreign exchange. For example, CDSX, operated by the Canadian Depository for Securities Limited, clears and settles trades in Canadian-dollar-denominated debt and equity securities. The LVTS is used to settle end-of-day net payment obligations among CDSX participants.

The Large Value Transfer System (LVTS)

The LVTS is a real-time, electronic wire transfer system that processes large-value, time-critical payments quickly and continuously throughout the day. Owned and operated by Payments Canada, the LVTS was launched on February 4, 1999. The system provides participants and their customers with the certainty that, once a payment message has passed the system's risk-control tests, it is final and irrevocable in real time. These transactions will settle on the books of the Bank of Canada at the end of the day.

Payments Canada sets the requirements that financial institutions must meet to be **direct participants** in the LVTS. An institution must:

- be a member of Payments Canada
- use the SWIFT telecommunications network
- have adequate backup capability for its LVTS operations
- have a settlement account at the Bank of Canada
- enter into agreements relating to taking loans from the central bank and to pledging eligible collateral

LVTS participants provide their customers, which include other financial institutions as well as commercial and government entities, with indirect access to the system.

Risk-control mechanisms

The LVTS forms the core of Canada's national payment system. Because the LVTS is designated as systemically important, it is expected to meet the Principles for Financial Market Infrastructures (PFMIs). The smooth functioning of the LVTS substantially reduces systemic risk and allows Canada to meet best international practices for processing large-value payments. The risk-control structure of the LVTS is composed of the following elements:

- Individual payment messages are subject to risk-control tests in real time.
- The net amount that each participating financial institution is permitted to owe is subject to bilateral and multilateral limits.
- Participants pledge to the Bank of Canada eligible collateral with a value that is sufficient to cover, at a minimum, the largest permitted net debit position of a single participant. This provides sufficient collateral to make available the necessary funds to settle the system even if one of the participants defaults.
- The Bank of Canada guarantees settlement of the system in the extremely unlikely circumstance of more than one participant defaulting on the same day. The guarantee will be called on only in the event of a failure of more than one participant on the same day during LVTS operating hours, with the failing participants in a net owing position vis-à-vis the system, and if the amount owed by the defaulters exceeds the value of the collateral pledged to the Bank of Canada.

These four elements provide the participants with certainty of settlement. In turn, this certainty permits institutions to offer their customers intraday finality of payment.

Two types of payments—Tranche 1 and Tranche 2

When sending an LVTS payment, the sending participant can choose between two types of payment: Tranche 1 and Tranche 2. Each tranche has a corresponding risk-control limit and collateral requirements.

Tranche 1 payment

A participant can send a Tranche 1 payment as long as its net owing position (as a result of all its Tranche 1 payments sent and received) is no greater than the collateral that the institution has pledged to the Bank of Canada for Tranche 1 activity. If the participant should default on its final LVTS settlement obligation, this collateral would be used to cover any net negative position in this tranche of payment. For this reason, Tranche 1 payments are known as “defaulter pays.”

Tranche 2 payment

Under Tranche 2, each participating institution begins the day by granting a bilateral line of credit to every other institution (which can be zero), i.e., the largest net exposure that it is prepared to accept vis-à-vis that institution on that day. In addition, each participant (as a sender) has a multilateral net debit cap, calculated as the sum of all bilateral lines extended to it, multiplied by a specified percentage set by Payments Canada. Each participating financial institution pledges to the Bank of Canada collateral equal to the largest bilateral line of credit it has extended to any other institution multiplied by the specified percentage. If a participant defaults on its final LVTS settlement obligation, in addition to seizing the collateral pledged to Tranche 1, the Bank of Canada seizes the defaulter’s Tranche 2 collateral. If the defaulter’s Tranche 2 collateral is not sufficient to cover their amount owing, the loss-allocation procedures pro-rate any remaining amounts to surviving participants on the basis of the bilateral lines of credit established by survivors vis-à-vis the defaulter. The collateral pledged by the participants will always be sufficient to cover the default of the institution with the largest possible amount owing to the system, i.e., the institution participant with the largest sender net debit cap. This part of the system has been described as “survivor pays,” since surviving financial institutions absorb any losses associated with a default (after the defaulter’s collateral is seized and used to meet its obligations). Tranche 2 payments make up the great majority of the volume and value of payment transfers in the LVTS, principally because of savings in collateral relative to Tranche 1 operations.

LVTS daily operating schedule—phases of the LVTS cycle

00:00 (ET)—Commencement and start of initialization period

Participants wishing to send payments will sign on, pledge collateral, apportion collateral, confirm participant profile information and set bilateral limits. The Bank of Canada will evaluate all participants’ collateral.

00:30-06:00 (ET)—Start of payment message exchange period

The LVTS is open for exchanging payments. During this period, participants exchange payments to settle CLS transactions. CLS is a foreign exchange settlement system, operated by the CLS Bank. All Canadian-dollar CLS transactions settle in the LVTS. There must be bilateral agreement between sending and receiving participants to send non-CLS-related payments prior to 06:00.

06:00-08:00 (ET)

The LVTS is open for payment exchange between active participants for all payments (MT 103 and MT 205), both customer and inter-participant.

07:00-08:00 (ET)

Participants not already active will sign on, pledge collateral, apportion collateral, confirm participant profile information and set bilateral limits.

08:00-18:00 (ET)

Payment exchange

18:00 (ET)—End of payment message exchange period/start of pre-settlement

(Start of Inter-participant payment message exchange period)

The LVTS is open for inter-participant payments (MT 205 only). This period is to be used by the participants to bring their multilateral net positions closer to zero.

18:30 (ET)—End of pre-settlement

No further payment messages may be exchanged through the LVTS.

By 19:30 (ET)—Settlement

The Bank of Canada will settle all participants' multilateral net positions simultaneously.

The LVTS—Canada's Large-Value Transfer System

James Dingle

November 12, 1998

The LVTS is an electronic network for sending and receiving large-value payments. It is expected to become operational in the first half of 1999. Major chartered banks and other large deposit-taking institutions will provide access to the system for their clients in the financial, corporate and government sectors. Canada's LVTS exceeds world standards for risk control in large-value systems. The author explains how this is achieved through the netting, bilateral and multilateral credit limits, collateral, and loss-sharing procedures used in the event of a default, and, as a last resort, a guarantee by the Bank of Canada. The LVTS gives participating institutions certainty of settlement for their LVTS positions every day, even if one or more participants default. This greatly reduces systemic risk in the financial system. Moreover, the LVTS supports finality of payment; that is, it makes funds unconditionally and irrevocably available to the receiver. Finality is highly desirable when the amount of the payment is substantial, or when exact timing is critical. Since the LVTS will carry the great majority of the value of all payments in Canada, it should be considered the core of the national payments system.

Content Type(s): **Publications, Bank of Canada Review articles**

Topic(s): **Payment clearing and settlement systems**

A Primer on Canada's Large Value Transfer System

Darcey McVanel, Neville Arjani

March 1, 2006

This paper provides a comprehensive overview of Canada's Large Value Transfer System (LVTS). The LVTS is a real-time electronic system for handling large-value payments and is an integral component of the country's financial system. Each day, approximately Can\$140 billion in payments is sent through the LVTS, including payments used to settle other important clearing and settlement systems in Canada.

The Automated Clearing Settlement System (ACSS)

The Automated Clearing Settlement System (ACSS) is owned and operated by Payments Canada. The ACSS is a deferred net settlement system that clears retail payments, including paper-based payment items (mostly cheques), pre-authorized debits and credits, as well as small-value electronic payment items, such as point-of-sale debit card or automated banking machine transactions. Payment obligations cleared in the ACSS are settled in the LVTS.

In 2013, the ACSS handled an average of 26.8 million payment items per day, with an average daily value of \$24 billion. Paper items accounted for 11 per cent of the volume and 49 per cent of the value, while electronic items made up about 89 per cent of the volume and 51 per cent of the value.

Direct and indirect clearers

Members of Payments Canada may be either **direct or indirect clearers** in the ACSS. Eligibility criteria for being a direct clearer include being a Payments Canada member and maintaining a settlement account and loan facility at the Bank of Canada. The entity must also account for at least one-half of 1 per-cent of the total volume of ACSS clearings. An indirect clearer is a member of Payments Canada that does not maintain a settlement account or loan facility at the Bank of Canada and has a direct clearer acting as its agent in the ACSS clearing and settlement process.

ACSS clearing and settlement cycle

In the ACSS, payment items that are exchanged among ACSS direct and indirect participants throughout the day are cleared overnight and are settled with interest compensation on the next business day across the settlement accounts of the Bank of Canada. The specifics of the exchange and clearing of the items vary, depending on the item (e.g., whether the payment item is paper based or is sent as an electronic data transmission). But all items follow a similar path.

Clearing for paper transactions is handled through six regional settlement points across the country, and the specifics differ according to the type of payment item. Generally, items collected by Payments Canada members throughout the value day (T) are forwarded to a local data centre operated, or contracted, by a direct clearer. Payment items are sorted at the data centre by high-speed computerized readers/sorters, according to the institutions on which they are drawn. Items drawn on other institutions are then delivered to the data centres of the appropriate direct clearer in the same regional clearing area. The delivering direct clearer enters the information regarding the exchanged items, including the volume and value of various types of payment items, into its ACSS terminal. This information can be checked at the receiving direct clearer's data centre and adjusted if necessary. The next day, the cheques are returned to the branches of the institutions on which they are drawn.

This process of exchanging items, entering information into ACSS terminals and, potentially, adjusting entries continues on the value day until the final closing time, which is 11:00 ET on the settlement day (T + 1) for all regional settlement points. The ACSS calculates the net position across all types of payment items for each direct clearer. By 8:00 on T + 1, the financial institutions have typically finished making adjustments to their clients' accounts, debiting payors' accounts, and crediting payees' accounts. At approximately 9:30, initial net balances are available to all the direct clearers, and bilateral reopenings of the clearing may occur to correct errors, if both parties agree. By 11:00, the final multilateral positions of the direct clearers are calculated and made known to the Bank of Canada.

Direct clearers' net positions are settled by adjustments to their settlement accounts at the Bank of Canada. This is typically completed by 12:00 ET on the settlement day (T + 1), with interest compensation calculated on positions at the Bank rate minus one-quarter of 1 per-cent (25 basis points), the Bank's target for the overnight interest rate. For settlement, direct clearers in a net debit position make an LVTS payment to their settlement account at the Bank to cover their ACSS position plus calculated interest compensation. Similarly, direct clearers in a net credit position have the funds plus interest compensation credited to their account, and value is returned to them through an LVTS payment. Note that although the exchange process begins on day T, settlement is completed the next business day for value T + 1; hence, the interest compensation component.

Payments Canada

Payments Canada is a not-for-profit organization created by an act of Parliament in 1980 under the *Canadian Payments Association Act*. The Act was replaced in 2001 by the *Canadian Payments Act* (the CP Act). The CP Act underwent significant amendments in 2014 to update the governance and accountability frameworks of Payments Canada.

The mandate of Payments Canada 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; and
- facilitate the development of new payment methods and technologies.

In fulfilling its mandate, Payments Canada has the public policy objective to “promote the efficiency, safety and soundness of its clearing and settlement systems and take into account the interests of users.” Payments Canada owns and operates the two national payments systems in Canada—the Automated Clearing Settlement System (ACSS) and the Large Value Transfer System (LVTS). Payments Canada sets bylaws, rules and standards that govern members’ participation in these systems and outlines operational procedures.

Membership and governance

Membership in Payments Canada includes the Bank of Canada, domestic banks and authorized foreign banks. Other deposit-taking institutions (credit union centrals, trust and loan companies, and provincial savings offices) have been eligible for membership since 1980. The amendments to the CP Act in 2001 opened membership to life insurance companies, securities dealers and money market mutual funds.

Following amendments in 2014, and taking effect in July 2015, Payments Canada will be governed by a 13-person Board of Directors, composed of 7 independent directors, 3 directors from Payments Canada members who are direct participants in Payments Canada systems, 2 directors from other Payments Canada members and the President of Payments Canada. The Chair of the Board is one of the independent directors. Also contributing to the work of Payments Canada is the Stakeholder Advisory Council (SAC) and the Member Advisory Council, which provide advice and expertise to the Board on payment, clearing and settlement issues.

All Payments Canada bylaws are approved by the Governor in Council, i.e., the federal government Cabinet.

The Bank’s functions in payment systems

Beyond its oversight and resolution responsibilities under the Payment Clearing and Settlement Act, the Bank of Canada has two other roles in Canada's payment systems:

- Settling the positions among the participants in the LVTS and the ACSS. There are about a dozen financial institutions in these systems that have “settlement accounts” with the Bank. At the daily settlement times, the systems calculate the net amounts owing among the institutions, and those amounts are settled via entries to the institutions' accounts at the Bank. In the case of the ACSS, participants that have net funds owing fund their ACSS settlement account with an LVTS payment.
- Lending funds overnight to any institution that is a direct participant in the LVTS and has net funds owing in the LVTS at settlement time. This is referred to as “providing liquidity.”

Unlike central banks in many other countries, the Bank of Canada neither owns nor operates any of Canada's major payment systems. However, the Bank of Canada has a keen interest and involvement in these systems, for several reasons:

- The safety and stability of payment systems contribute to the Bank's broader objective of promoting a safe and sound financial system in Canada.
- Unsafe or unsound payment systems could impair the Bank's ability to implement monetary policy effectively.
- As the ultimate source of liquidity to the financial system, the Bank is naturally concerned about the safety and soundness of Canada's systems. Poorly designed systems could generate significant liquidity and credit risks for their participants.
- Final settlement of payment obligations among the participants in the systems takes place through the transfer of funds held in their settlement accounts at the Bank.
- The Bank is a participant in the LVTS and the ACSS, settling amounts owing to or from itself and to or from the Government of Canada.
- The Bank has strong links to Payments Canada, which operates Canada's national payment systems.
- The Bank participates in international groups—particularly the Bank for International Settlements Committee on Payment and Market Infrastructures—that set risk-management principles for payment, clearing and settlement systems.