
Automation of the Clearings

The State of the Clearing Process in the Early 1980s

By the spring of 1983, five of the non-bank deposit-taking institutions that had joined the CPA had determined that they each accounted for the necessary one-half per cent of the national volume of payment items passing through the clearings, and had decided to become direct clearers. The five had established or modified data centres to be in a position to read and sort cheques, and they were operationally ready to participate in the daily procedures. The CPA's Clearing By-law had been given Order-in-Council approval and was in force.

Despite these changes, the nature of the clearing process was fundamentally the same as it had been for decades. Clerks from each of the direct clearers still met each morning at clearing houses located in eight regions of the country to compare their summary statements about the volume, and particularly the value, of the payment items that had been delivered to, and received from, every other direct clearer in the physical exchanges of cheques, etc., during the preceding evening. Once the value statistics had been found accurate by the pairs of institutions involved (i.e., had been reconciled after the detection and correction of errors) the clearing house staff could manually calculate the bilateral net gains or losses associated with the day's clearing flows, and from these they could calculate the value of the multilateral (all-institution) net gains or losses. These positions were then promptly delivered to the nearest Agency of the Bank of Canada, forwarded by telex to the Bank's head office in Ottawa, and fed into the calculations of the overall national clearing result for each institution. That afternoon, the settlement accounts maintained at the central bank for this purpose would be adjusted—up for those direct clearers with multilateral net gains and down for net losses. All in all, the payment clearing process in Canada was overdue for a dose of contemporary computer and communications technology. The Board of the CPA had, in fact, approved such a development project at a meeting in early 1982, barely one year after the creation of the Association.

Design Objectives of the ACSS

The CPA's Automated Clearing Settlement System (ACSS) had three broad objectives: First, the Association wished to reduce the cost and increase the efficiency of the record-keeping, reconciliation, balance calculation, and settlement procedures within the national clearing and settlement system. Second, there was a desire to provide more timely and accurate information to the direct clearers about the dollar amounts gained or lost by them during the evening exchanges of payment items. Third, the CPA wanted to establish a settlement mechanism that was sufficiently flexible to accommodate future developments within the national payments system.

The design of the ACSS included a number of attractive elements that addressed these objectives. Workstation terminals would be used to facilitate the daily activities of personnel in several departments of each direct clearer, including the central bank. In the cheque-processing data centres, for example, the ACSS terminals would allow a person to prepare the summary statement for a particular package of deposited cheques about to be sent by courier to another direct clearer upon which the items had been drawn. (This statement, known as a clearing log, would give the total value and volume of the items contained in the delivery.) As soon as the statement was finalized, it would become part of that evening's flow of clearing information, and it could be immediately read by the personnel of the receiving institution—even before the courier arrived. This early availability of information would allow the process of reconciliation and correction to proceed quickly once the package was actually delivered.

The ACSS terminals would also link to a central computer that would add the value of each delivery of items to the calculations of bilateral net positions and, ultimately, the national multilateral net positions, of each direct clearer. Cash-management personnel in the treasury departments of each institution could read their continually updated positions by calling for the display of a particular ACSS statement. This facility would prove particularly useful to the cash managers early each morning, when the regional activities approached their final status, and after certain entries by the central bank (described on page 23) had been made. Information from the ACSS would thus be a crucial part of the data needed before the money market decisions of the day could be addressed. For example, a direct clearer learning about a larger-than-expected clearing gain could begin to decide about the appropriate investment of the funds later that morning.

The central bank would be able to call up the clearing positions of each direct clearer at any time. Of particular interest would be the *national* clearing gains or losses calculated by the ACSS for each institution. These data would be used by the Bank of Canada to make the corresponding credits or debits in the direct clearers' settlement accounts. Thus, the ACSS

would be an integral part of the daily process of settlement following the clearing of payment items.

Lastly, the ACSS would be an important building block for the more automated payments system that was beginning to emerge in Canada. For example, the clearing information would be processed and maintained in “streams” such as small-value cheques, large-value cheques, non-standard paper items, and debits or credits exchanged on magnetic tape. Over time, the ACSS data archives would compile information on the volume and value of (cleared) payments that had these particular physical forms. It would thus be possible to quantify with considerable accuracy the degree to which the Canadian payments system was evolving away from paper and in the direction of electronic media. The CPA could then pursue its planning mandate with better perspective and be able to monitor the effects of its efforts to promote such developments.

Project-Management Challenges Posed by the ACSS

The process by which an association of financial institutions moved from a design concept, through a systems-development sequence, and on to the operation of a structure such as the ACSS involved some novel aspects. The applications of information technology in the Canadian financial sector up until the early 1980s had been, with a very few exceptions, internal to particular firms, addressing back-office operations such as deposit accounting and the maintenance of the general ledger. Now a cluster of 14 direct clearers of contrasting character, location, and size, wished to establish a common cross-country system. It would have to work for all 14, regardless of their particular internal systems.

The Board of the CPA established a steering committee of direct-clearer representatives to assemble the desired ACSS specifications, obtain the services of a systems-development company, and oversee the assembly of the hardware and software. This committee, chaired by Larry Moncrieff of the Bank of Canada, was called the ACSS Working Party. Three CPA staff members were dedicated full-time to the project. (At this early stage in the history of the Association, the total staff numbered only 20 people, all in Ottawa.) The development company, Ducros, Meilleur, Roy and Associates Ltd., was headquartered in Montreal, and most of the committee members were in Toronto. The somewhat complicated working arrangement that emerged was one in which there could easily be failures in communication. But in the end, the ACSS project was completed in under two years at a cost of about \$750,000—an accomplishment for all involved.

The Technology Used for the ACSS

The ACSS-related hardware used by each of the 14 direct clearers consisted of the newly marketed “personal computers” of the early 1980s, one hundred in all, each linked by a modem to the national telephone system and from there to the IBM Computer Centre in Toronto. Linked in this way, the terminals comprised an on-line, interactive, computer/communications network. Each terminal could send and receive clearing information to and from the host computer, where the information was held and consolidated to provide a database for inquiries as to the direct clearers’ positions throughout the clearing cycle. The host system at the service bureau in Toronto was available for ACSS transactions from 7 a.m. on one day to 6:30 a.m. on the following day.

The various ACSS programs for the terminals were grouped together by type of user. There were five sets of programs; namely, those for the cheque-clearing staff in the various regions, for the treasury department officers managing the cash and money market positions in each institution, for security personnel in each direct clearer, for the Bank of Canada as the settlement institution, and finally for the Canadian Payments Association as the system manager. This separation of ACSS program sets according to particular user requirements was an essential security feature of the system. No one could use the system without access to a recognized terminal, possession of the appropriate set of program diskettes, and proper authority.

The ACSS in Production

The ACSS began operations on 19 November 1984. In the subsequent year, it facilitated and accounted for the clearing of 6.6 million payment items on a daily average basis. The daily average value of these payments cleared was \$33.4 billion.

The database associated with the ACSS quickly produced a picture of the Canadian payments system that showed just how far it still had to evolve. For example, the volume of items cleared through the “stream” in the ACSS labelled “magnetic tape credits” accounted for only 160,000 of the 6.6 million items per day recorded in all streams. (There were no other streams at that time that could be considered to involve “electronic” payments.) A second example stresses the value, rather than the item count, of the payments being cleared through the ACSS. In 1985, the “large cheque” stream (i.e., all cheques individually worth at least \$50,000) accounted for fully \$30 billion of the \$33.4 billion total flow of items cleared on an average day. The evolution to electronic media, particularly in the case of these large-value transfers, would be the major development of the next 15 years.

The ACSS was soon modified to facilitate the daily implementation of the monetary policy of the Bank of Canada. In these early years of the 1980s (and indeed until the opening of the CPA's Large Value Transfer System in 1999, described in Chapter 7), the regularly used daily technique of adjusting the liquidity of the financial system in order to manage interest rates was the drawdown or redeposit of government funds placed with the direct clearers.¹ In 1985, the ACSS became the channel through which the direction and dollar amounts of the day's drawdown or redeposit transactions were both communicated to all the direct clearers and simultaneously effected for each of these institutions at 8:30 each morning.

The ACSS operated in a satisfactory manner in the subsequent years—so much so that, in 1986, the software was cloned for use in a similar context; namely, the bulk exchanges of U.S.-dollar-denominated payment items occurring once a day among the majority of the private direct clearers. The shared cost of this broadening of the scope of the ACSS was under \$60,000. While some portion of the contrast between the original and the cloned cost is explained by the fact that no settlement arrangements at the Bank of Canada were needed in the latter case, the main explanation lay in the substantial economies of scope. (Once an investment in an automated system has been made to achieve one operational purpose, it often proves economical to apply a slightly modified version of the system in similar operating contexts.)

If the automation of the clearings and the building of the ACSS proved to be a success story for the CPA during the mid-1980s, the economic environment in which the new system was functioning produced a story of very different character. The CPA was about to be drawn into the turbulence caused by a sharp cyclical downturn and the failure of two small Canadian banks.

1. See K. Clinton, "Bank of Canada cash management: The main technique for implementing monetary policy," *Bank of Canada Review* (January 1991): 3–25.