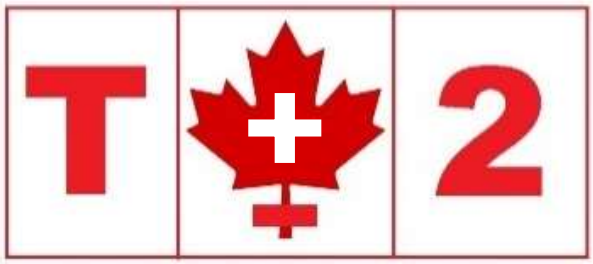
CCMA ACMC Canadian Capital Markets Association
Association canadienne des marchés des capitaux

T+2 Project: Post-Mortem Report

April 19, 2018



Authors:

Keith Evans, Executive Director, Canadian Capital Markets Association (CCMA)
Barb Amsden, Chair, Communications and Education Working Group, CCMA

Executive Summary

The Board of Directors of the CCMA, consistent with good governance practices, commissioned CCMA staff to prepare within six months of project completion this Report on Canada's efforts to shorten the debt, equity and investment fund trade-to-settlement-date cycle from three to two business days (T+3 to T+2). It includes input from a call to all CCMA committee members and industry stakeholders for feedback on the T+2 implementation process. It was reviewed by and reflects comments from the CCMA's Post-Mortem Review Group, the broader membership, and then the CCMA Board. It gives background on the T+2 initiative, project governance details, work streams, successes, lessons learned and considerations for the future. We thank all industry participants for their hard work and participation during the two-year project.

The move to settle trades on T+2 was an industry-led initiative, driven by the U.S. plan to reduce the settlement period as a way to reduce margin and liquidity needs, particularly during times of economic volatility; to lessen credit and counterparty exposure; and to align the North-American markets settlement cycle with that of Europe and other G-20 countries.

Quantifiable and qualitative evidence show that the T+2 Project was completed successfully in Canada in sync with U.S. (and certain other) capital markets. Canada moved to T+2 on September 5, 2017 for trades executed that day. September 7, 2017 was the date of the first two-day settlement. The project was delivered on time, on budget, and without market disruption or unexpected negative effects on those relying on capital markets.

This Report has been prepared for the information of CCMA members: dealers, custodians, asset managers; key securities infrastructure organizations, such as exchanges, CDS and Fundserv; back-office service providers and vendors; and others (e.g., regulators, SROs, etc.). So that the Report remains concise and usable, it assumes knowledge of capital markets operations and cross-references longer useful documents.

The Report's primary goal is to be a tool for industry members working alone or together to prepare for a settlement cycle that is shorter still. There already is pressure to move to a shorter cycle due to perceived benefits, competition, technology advances, transaction volume increases, and a continued focus on risk reduction. Canadian and U.S. regulatory authorities have asked for input on a further shortening of the settlement cycle. The second goal was identifying what worked well and possible improvements for any project crossing as diverse and dispersed a group of stakeholders as did T+2. Industry members cited the project's structure, industry engagement, regulatory participation, communications, project management protocols, and cross-border involvement as contributing to effective T+2 implementation. Given the additional complexity of a shorter-still settlement cycle, the Report identifies opportunities for additional efficiencies in each of these areas. Some measures already have been adopted for use in the new broadly-based TMX/CDS Post-Trade Modernization project.

While there are no *required* next steps, a shorter settlement cycle almost certainly will follow in the U.S.: Canada must be ready to adopt it at the same time. The T+2 project helped prepare the Canadian marketplace for a shorter settlement cycle still, but this Report is not a roadmap for a move to T+1 or less, due to considerable unknowns. Whereas the move to T+2 was about doing the same things faster, moving to a shorter cycle will require fundamental technology and process changes; take substantially more work, time, money, and co-ordination; and entail significantly greater transition risk than did moving to T+3 or T+2. At each step in the process – from stakeholder engagement; to infrastructure, service provider, and firm technology changes; to rule changes, to a go/no go decision – the need for timely certainty will be paramount. Misquoting Churchill, arguably this Report is 'not the end, but perhaps the end of the beginning'.

Table of Contents

I. Introduction

This Report has been prepared for CCMA members. It is a review of the industry-driven T+2 initiative and of what may be helpful for future projects. It is not a roadmap for future clearing and settlement changes – it cannot be, given the pace of change, particularly in the financial industry and in technology – but it will provide some useful starting guideposts.[1]

a. T+2: Definition and history

- ***Definition:*** T+2 (and T+0, T+1, and T+3) refer(s) to the number of business days between when a trade is executed (or T) and the related trade settlement – when the buyer's payment for securities is exchanged with the seller at the same time as the seller's securities are transferred to the buyer. While money market instruments and other investment products already settled on T+2 or less before the T+2 project was completed, most investments – equity, debt, most investment funds and some other products – settled in three days in North America.[2]

- ***History:*** After the 1974 failure of Germany's Herstatt Bank exposed huge settlement risk in international finance, the global Group of 30 (G-30), comprised of central bankers, regulators, academics and heads of major financial groups, was established in 1978. National G-30 working groups then were set up to co-ordinate steps to reduce this risk. In 1995, the Canadian G-30 Working Group worked jointly with American counterparts to shorten the securities settlement cycle from what was then T+5 to T+3. Almost immediately, cross-border efforts optimistically started to move the industry to a T+1 settlement cycle. From the SIFMA website:

  > "In 1999, after the successful conversion from T+5 to T+3 settlement for securities transactions and in anticipation of increasing trade volume, SIA [now SIFMA] convened a committee to explore the feasibility of further reducing the settlement cycle to T+1 by 2005..."

  On June 16, 2004, overshadowed by the events of 9/11, SIFMA wrote to the SEC saying that:

  > "After three years of evaluation, consensus-building, and intervening regulatory mandates, i.e., decimalization, business continuity planning, and compliance with the USA Patriot Act, SIA determined to shift the principal focus of the initiative from shortening the settlement cycle to achieving industry-wide STP."

  Shortly afterward, on July 12, 2004, Capco completed a CCMA-commissioned study titled *Assessment of Canada's STP/T+1 Readiness and a Comparison of Canada's vs. the United States' T+1 Readiness* (in summary and detailed form). It would be another 22 years at T+3 before the settlement cycle moved to T+2 in North America. From being an early T+3 adopter in the late 1990s, North American markets had been surpassed in the intervening decades by adoption of shorter settlement cycles in Europe and other countries.

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[1] To remain concise, this Report assumes knowledge of capital markets operations and provides the URLs of supporting documents that can be reviewed by those wanting more in-depth information. A list of acronyms used in the Report is included as an appendix.

[2] For brevity, the Report uses T+2 to refer to the transition of equities, long-term debt, etc., without each time specifying that some securities already settled on a same-day, T+1, T+2 or longer business-day basis.

b. CCMA: Broad industry group responsible for implementation

The CCMA is a federally incorporated, not-for-profit organization launched in 1999. Its mandate is "to communicate, educate and help co-ordinate the different segments of the investment industry on projects and initiatives spanning multiple parts of Canada's capital markets." The CCMA was the formalization of Canada's G-30 Working Group. When the U.S. began to work on achieving T+1 settlement in the late 1990s, a more formal structure for the Canadian group was needed due to the quantum difference in the time, cost and complexity associated with moving to a T+1, vs. the more-easily-achievable T+3, settlement cycle.

The CCMA was chosen to co-ordinate Canadian industry-driven efforts to shorten the settlement cycle to T+2 for several reasons:

1. **Time-sensitivity:** As the T+2 project would be subject to significant time pressures, there was a benefit to using the CCMA to co-ordinate the initiative as it already existed and had a mandate consistent with the T+2 work.

2. **Broadly-based:** The CCMA is a national organization that brings together all parts of the investment industry that would have to be part of the system-wide T+2 change. Participating under the CCMA's co-ordinating umbrella were dealers, custodians, asset managers and industry associations, etc.; key securities infrastructure, such as exchanges, CDS and Fundserv; back-office service providers and vendors; and other stakeholders (e.g., regulators, including SROs).

3. **Independence:** The CCMA is independent of any industry segment or regulator, and had relationships with both the industry and its regulators. While the T+2 initiative, and equivalents before it, were industry-driven, regulatory involvement was crucial. The regulators closely monitored developments and engaged in useful discussion, in addition to making regulatory amendments.

4. **Affordability:** A funding amount and cost recovery method were approved by the CCMA Board in 2015[3], with additional budgets approved annually, and the funds collected via the CDS billing system in December of each year of the project. In all, the CCMA collected approximately $950K. Of this amount, approximately $225K was still available at the end of the transition to T+2 in September 2017. The remaining funds are being used to pay for the Post-Mortem Report and any other initiatives approved by the CCMA Board. As well, by using the CCMA, members were able more easily to access industry efforts to move towards T+1 that had been completed from 1999-2004 by CCMA members: while technology and practice in some areas had moved on since then, the ability to tap into information and recollections from that period, and to repurpose some of the information and tools developed at that time, saved the industry time and money.

[3] While the costs of the CCMA at its 1999 inception to prepare for (then) T+1 were shared among different organization/organization types, with part paid from the then IDA's Restricted Fund of fines and settlements that could be used in limited circumstances for projects determined to be protecting investors and the integrity of the capital markets, the simpler T+2 project required less financing and there was less time to come to an agreement among parties on a broader funding model.

c. Post-mortem Report: Board-mandated

This Report was prepared by CCMA staff at the request of the CCMA Board to document the process and learn from the experience, so the investment industry could be well-prepared for any future industry-wide reduction in the security settlement cycle. This Report:

- Gives background on the T+2 initiative, with project organization details, work streams, successes, lessons learned, and future considerations.
- Includes input from a call to all CCMA committee[4] members and industry stakeholders[5] for feedback on the T+2 implementation process.
- Was reviewed by and reflects further comments from the broad-based CCMA Post-Mortem Review Group, which met to discuss and provide advice at various points.
- Was sent for input to the full CCMA membership and amended with their remarks.
- Was reviewed by the Board and includes a small number of suggested amendments.
- Includes a "look-forward" section incorporating an examination of what impediments would need to be overcome to shorten the settlement period further.
- Is not a roadmap for a move to T+1 or less, in light of considerable changes that continue in Canadian and global capital markets, and due to the need for the smaller Canadian marketplace to follow – and contribute appropriately to – a North-American settlement standard.
- Identifies recommendations to help the industry shorten the settlement cycle further.

II. Background

a. Why T+2?

- The **main benefits** for the Canadian marketplace and its stakeholders from the move to a shorter settlement cycle included:
  - Reduced collateral demand
  - Lowered risk
  - More closely aligned markets of North America with those of Europe and other countries already settling on a T+2 basis
  - Improved efficiency
  - Greater readiness for a further expected reduction in the settlement cycle
  - Enhanced client service.

- Under an ideal **cost scenario**, moving from T+3 to T+2 rather than to the T+1 cycle that had been sought in the late 1990s had a three-year payback period compared to one of five years (according to a 2010 DTCC-commissioned report prepared by the Boston Consulting Group and published by DTCC in 2012). Also, it would be materially less risky.

[4] Canadian efforts were structured through a steering committee, to which reported four working groups. This distinction was purely for clarity from a governance perspective. The word 'committee' is used here to reflect both committees and working groups under the CCMA and UST2 umbrella organizations.

[5] For conciseness, and unless otherwise specified, the term 'service provider' refers to infrastructure (CDS, Fundserv, exchanges, ATSs, etc.), service bureaus/back-office service providers (e.g., Broadridge, IBM, IFDS, Paramax, etc.), correspondent clearers (e.g., NBCN/NBIN, etc.), and vendors.

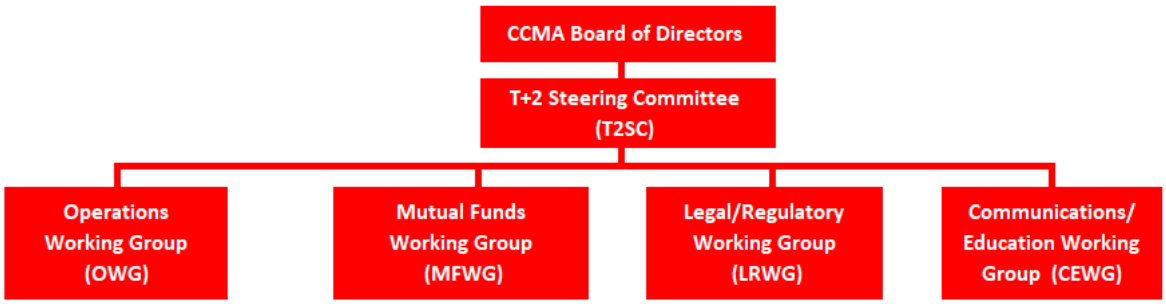
- It was the **competitive necessity of a move to T+2**, however, that was the most compelling reason for all practical purposes in Canada, whatever the direct benefits and costs of T+2. With the increasing globalization and integration of capital markets, standards between markets were becoming increasingly harmonized. Major markets in Asia/Pacific and European Union countries had shortened or were shortening the settlement cycle to T+2, and Singapore, Australia and New Zealand were actively looking to reduce their settlement cycle. However, T+2 only became imperative in Canada once the U.S. announced, and had regulatory interest in, the move to a shorter settlement cycle.

b. Impact of the U.S. on Canada

Charles River Associates (CRA) was commissioned to complete a study (November 1999) that determined that the Canadian capital markets should change the settlement cycle at the same time as the U.S. – neither before, nor after. At that time, about 40% of trades on Canadian stock exchanges were in inter-listed securities (that is, a single security listed on both Canadian and American exchanges) and Canada-U.S. cross-border transactions made up nearly 25% of the millions of trades processed annually through CDS. Different settlement dates in Canada and the U.S. would: increase risk, add to the cost of errors and manual corrections, cause Canadian firms to lose business, be confusing for investors, and potentially reduce client investment options.

c. Project structure[6]

The biggest challenge in any project and for any association is two-way communication. As with most associations spanning multiple segments, the CCMA relied on committee members both to provide input to decision-making and to disseminate information. Each committee was chaired or co-chaired by recognized industry experts who were essential to the overall success of the project. Each committee had a posted mandate, with composition, reporting lines, responsibilities, and governance requirements. Each committee's chair(s), issue log, and meeting minutes were located on its CCMA webpage.



As well, the CCMA is, in effect, an association of associations – the associations representing individual segments of the investment industry use their member networks to obtain feedback and distribute information further. Similarly, service providers and infrastructure operators shared information with – and raised issues that would affect – their members, participants, etc. The CCMA's direct membership grew substantially

[6] The CCMA Board engaged an Executive Director and two part-time contract employees to manage the project from the Canadian side. The U.S. relied on DTCC, SIFMA, and ICI staff, and engaged Deloitte for a 10-week period to help advance the U.S.'s planning.

during the two-year initiative via committee (see below) and indirect contacts through associations, service providers and infrastructure that reached a wider audience.

Committee	Members
T2SC	110
OWG	231
MFWG	185
LRWG	74
CEWG	43

i. Steering Committee

The T+2 Steering Committee (T2SC) was mandated to co-ordinate the industry-wide effort to shorten the securities settlement cycle to T+2. It had overall responsibility for the project, and provided direction to, and took feedback, from four working groups, resolving any issues raised for resolution.

The T2SC:

- Had a core of Board-approved decision-makers, including representation from all segments of the industry, and their major associations (e.g., CLHIA, IFIC, IIAC, PMAC, etc.)
- Included representatives from the UST2 project team
- Made all material decisions relative to T+2 after receiving working group input
- Was responsible for monitoring progress towards achieving T+2 on the same date as the U.S. and determining action should it appear that delays would compromise achieving the transition simultaneously.

ii. Working Groups

There were four working groups reporting to the T2SC:

- The Operations Working Group (OWG) – mandated to identify all operational issues/obstacles related to Canada's move from a securities settlement period of T+3 to T+2 and to identify the necessary cross-industry systems, process, procedural and administrative changes needed
- The Mutual Fund Working Group (MFWG) – managed by Fundserv with input from IFIC, had the same mandate as the OWG, with a focus on investment funds and other related products
- The Legal and Regulatory Working Group (LRWG) – mandated to identify and address all legal and regulatory issues
- The Communications and Education Working Group (CEWG) – mandated to manage all communications to stakeholders, including developing the structure and content of the CCMA website to deliver information; raising awareness of T+2; engaging stakeholders to act; co-ordinating communications with the U.S.; and managing/being prepared to manage industry reputational issues.

The T2SC and its working groups:

- Included all interested individuals
- Were designed to ensure they were broadly representative, that is, included small, medium and large firms, from all industry segments and parts of the

country, with meetings set to accommodate regional time differences (in a small number of cases, CCMA staff sought members from a particular industry, firm size, etc. to ensure full representation) and ensure that their industry association (e.g., the
Credit Union Central of Canada, etc.) received newsletters to better inform firms in the particular industry

- Met as required by their tasks – below are the number of times each committee met.

T2SC	OWG	MFWG	LRWG	CEWG
23	19	8*	23	22

***** Appears low as it excludes meetings organized as part of Fundserv's annual version system development process that also extended to discussion of T+2-related issues in addition to other enhancements that were part of the annual June version implementation.

iii. Decision-making

Within each committee and working group, decision-making and issue resolution were achieved on a consensus basis.

- Working groups researched and recommended solutions to all matters within their mandates.
- Material matters, and issues requiring resolution, were referred to the T2SC for confirmation or final decisions.
- Working group Chairs reported at each T2SC meeting on their progress against objectives, usually reflected in review of an issue log or report.
- T2SC approved action or decisions based on working group recommendations or resolved undecided issues if asked to do so.

iv. Two-way link to the U.S.

A critical success factor for Canada was ensuring effective communication channels with the U.S.

- The CCMA Executive Director sat formally on the U.S. T+2 Industry Steering Committee (ISC) and the final implementation Command Centre.
- There was DTCC/SIFMA member representation on the T2SC (as well as some working groups), which proved to be very helpful.
- There was also a close informal relationship between CCMA and DTCC staff, as well as an indirect relationship through close CCMA ties with CDS that had excellent DTCC connections too.
- Some firms/members sat on both U.S. and Canadian T+2 committees, providing additional avenues for information-sharing.

v. Kick-off/Launch

Below are key dates in the launch of the T+2 project:

- July 2015: CCMA re-activated after a seven-year hiatus
- October 2015: T2SC met for the first time
- November 2015: Working groups met for the first time
- Winter 2016: CCMA website relaunched

- March 2016: CCMA T+2 newsletter launched to facilitate consistent communication of messages
- April 2016: Industry event held to build awareness more broadly.

vi. Timeline

Settling on a particular implementation date was critical as typical project management protocols assume a work-back from a transition date with provision for contingencies. Key parts of the Canadian T+2 timeline were determined largely by the U.S.: the CRA report – and logic – made it clear that Canada needed to remain in lockstep with the U.S. While the Canadian marketplace could prepare to move to a shorter cycle, it was unlikely ever to make financial sense for Canada to move to T+2 *ahead* of the U.S. As the smaller market, lacking many of the U.S.'s scale efficiencies, Canada proceeding in advance of the U.S., when the U.S. might change direction and there would be an interim mismatched settlement period, would only add to Canadian participants' costs and risk. It would make even less sense for Canada *not* to move to T+2 with its southern neighbours for similar reasons.

Given the U.S. had initiated a study and was working on a T+2 Playbook as the CCMA was launching Canada's efforts, there was concern in some quarters in the Fall of the project's start in 2015 about Canadian readiness. However:

- Considerable groundwork had been done in Canada since the 1995 settlement period change. The possibility of a move to T+1 early in the second millennium, coupled with a regulatory decision to proceed with a rule to require institutional trade matching of a high percentage of trades by volume and value (NI 24-101), had led to improved STP. Firms had converted many manual trade-to-settlement securities-handling steps to automated electronic processing to reduce manual errors and risk, and to increase speed.

- The Canadian industry, while smaller, is also a more concentrated marketplace[7]. There are believed to be proportionally fewer physical certificates and a lower reliance on cheques – while neither of the latter were considered show-stoppers, it meant less disruption to interactions with retail investors.

- A project plan/schedule/key dates quickly was developed that tied into the U.S. schedule, with key dates as follows:

Summer 2016	Late Summer 2016	Fall 2016	Year-end 2016	Winter/Spring 2017	Sept. 5, 2017	Sept. 7, 2017
Detailed industry test plans released by CDS/CDCC, Fundserv, DTCC (U.S.)	Requests for comments released by SEC, IIROC, CSA	Responses to regulatory consultations due	Target industry development completion date	Industry utility test environments open; industry testing	Trade execution moves to T+2	Double settlement date; settlement moves to T+2

[7] The Canadian market is considerably more concentrated than that of the U.S. Instead of the usual 10:1 U.S.-to-Canada ratio, FINRA regulates 3,700 broker/dealers to IIROC's 168 – a relationship of 22:1.

vii. Trust but verify

The final requirement for meeting the transition deadline was a mechanism to test progress along the way. The CCMA determined early on – and publicized – that the best way to do this was to use surveys. The surveys served two main purposes:

i. They were, particularly early on, ***informational:*** they informed recipients of the T+2 timeline, provided guidance on steps to take, and offered a way to extend the CCMA's reach to a broader audience.

ii. As the project progressed, they were important for ***planning and contingency preparation***, allowing the CCMA to:
- Measure progress towards, and any concerns regarding, effectively transitioning to T+2 with U.S. markets on September 5, 2017.
- Compare developments with benchmarks provided by earlier surveys.
- Prepare industry participants for surveys as a decision tool to design the CCMA's final T+2 co-ordination efforts, including identifying if there were any substantive concerns that a material number of Canadian marketplace participants would be unable to implement successfully the shorter settlement cycle.

The three CCMA surveys received solid response numbers from large national and regional medium firms and small boutiques, as well as from investment managers, broker/dealers, custodians, infrastructure and service providers. The surveys were of particular importance to the Canadian industry as it was important to know general industry readiness *enough* in advance of the implementation period in case it were necessary to ask for an implementation date extension. There are two obvious reasons Canada's firms would not want to pursue this: reputational and due to the significant manual workarounds with the attendant costs for a period of any mismatch in settlement dates.

d. Conclusion

By early 2016, there was considerable comfort that the Canadian marketplace would be ready to transition to T+2 at the same time as the U.S. Certain Canadian initiatives progressed so far as possibly to have assisted in the U.S. For example, the Canadian asset list and FAQs were issued earlier in Canada than in the US.

III. Major work streams

a. Industry-wide: critical tools

In addition to the T+2 timeline, there were other critical documents that were the focus of considerable work and discussion in the early part of the T+2 project: the asset list and the issue logs. These items required attention both on an inter- and intra-segment basis.

i. Asset list

Everyone quickly realized that T+2 was affecting securities that were settling on a T+3 basis, and that these were, in general terms, equities, longer-term debt and funds. However, agreeing on a single list took more time than expected.

i. The first issue was **identifying a Canadian list of all securities** that settled on a T+3 basis. There was no such list, apart from an unofficial list found on the internet, nor is CCMA staff aware of an equivalent accessible list in other countries. The CCMA adopted the IIAC's list of all security categories, which had the benefit of having been vetted extensively by IIAC members and shared with IFIC, the CBA, CUCC, CDS and CLHIA in 2012. Members were comfortable that this provided a complete list of potentially-affected securities (although there was one type identified later that was referred to the IIAC for a future list update).

ii. The second issue was **reviewing each sub-class** of the main securities categories impacted that loosely defined were: all stocks (equities), all corporate bonds, long-term government bonds with a remaining term to maturity of more than three years, certain notes, investment funds (including conventional investment funds, ETFs and hedge funds), as well as certain non-security equivalents, such as segregated funds and certain federally-regulated products. Then CCMA members agreed on which were **'in scope'** (would entirely or almost entirely move to T+2) and what was **'out of scope'** (were not or were largely not changing their standard settlement cycle). The decision was taken early on *not* to list every subdivision of a security category, but only to break out sub-categories if needed for clarity.

Later feedback indicated that, while originally some believed a list simply identifying securities that would change to T+2 would be sufficient, the complete list was preferred so that appropriate in-house consultation could take place to ensure that nothing had been missed.

iii. The draft list including member input was circulated broadly for an extended **period of review and comment**.

iv. A final step was to **compare the CCMA's list with the U.S. Asset List** (and clarifications) when it was published to determine if there had been any omissions from the Canadian list.

The CCMA's **Canadian Asset List** was:

- Updated twice to provide some clarifications, and to address a small number of additional issues raised (CMHC MBS, options, and other derivatives).
- Issued in pdf format and, on request, an Excel spreadsheet version was made available that allowed multiple data-sorting alternatives and offered a high-level cross-referencing of the Canadian with the U.S. asset list.

ii. Issue logs

Issue lists are typical project tools to ensure all real and potential obstacles to an end goal are addressed. They also provided focus and structure for CCMA meetings. After a series of discussions, two important decisions were made:

- **To be included** on the issue list, an issue must have:
  - Been identified by a committee or working group, and approved for inclusion by the T2SC and
  - Had the possibility of impeding a *material* portion of Canadian firms' migration to T+2 on the same day as the U.S. and/or
  - Caused *regular* problems for a *meaningful number* of firms' ability to settle on T+2 *and* not have work-around solutions (physical certificates, holiday processing).

- **For an issue to be 'closed',** it must:
  - Have been documented by a working group: the issue logs included a description of the problem, the main discussion points, the proposed solution, and the date on which the final resolution was approved.
  - Have been recommended for closure by a working group and approved by the T2SC.
  - Have been 'assigned' to another committee or entity that had the appropriate expertise to address a point – often among the operations working groups (OWG and MFWG) and the LRWG, but also to other parties, such as CDS, Fundserv or an association.

Some issues were initially closed, but later re-opened due to the emergence of new information. The 'trickier' items in the issue logs are highlighted under the respective work streams below. A few items were not issues under T+2, but would be so under a shorter settlement cycle (such as foreign currency exchange, which currently settles on a T+2 basis).

b. Operations – Non-fund securities

A major issue was what would be the target date for transition to T+2. Originally, it was referred to as Q3 2017. The U.S. Industry Steering Committee announced on March 7, 2016 that the target implementation date was to be September 5, 2017 (there was a provisional back-up date, although never seriously considered, in November of 2017).

The OWG issue log included 34 issues. As well, the CCMA sought to learn from other countries that had successfully transitioned to T+2. These proved to be a bit of a challenge to connect with in most cases, however, a small number of committee members had good connections in multiple markets, which helped, and the CCMA was able to connect with Australia, which confirmed that two 'lessons learned' were not ones that were unknown – just regular project problems, e.g., communications and reaching all firms.

Below are the Canadian operational issues that elicited the greatest discussion, and therefore are ones that firms may want to keep in mind as they update systems for other purposes, so that when the settlement cycle shortens further – as expected – certain items (e.g., considerably higher rates of same-day affirmation) may have been addressed:

- Challenges associated with ***holiday processing***, that is, when there is a holiday in one country that is not in another, i.e., markets are closed in one and not the other – ultimately, CDS and the exchanges/marketplaces put in place procedural changes to help, and firms interested in doing anything further were encouraged to engage with an appropriate service provider.

- Changes in ***other countries moving to T+2*** provided some slight challenges. While most firms relied on their international custodians to keep on top of issues of this nature, it appeared to some surprising that announcements of what countries and securities were moving to a T+2 basis were unusually difficult to find.

- Some challenges were simply matters of ***delays in confirming answers***, for example, (1) the settlement cycle of derivatives already existing at September 5, 2017 (awaiting outcome of U.S. discussion of settlement date) and (2) the processing of securities with ex dates during the transition week.

c. Operations – Investment funds

The MFWG issue log included nine issues (additional technical ones were tracked by Fundserv and some can be discerned from the Fundserv FAQs). Below are the ones that had the greatest discussion and therefore the ones, as said in III.b. above, that firms may want to keep in mind as they update systems for other purposes. As mentioned above, it may help firms, when the settlement cycle shortens further as expected, to have addressed what may be impediments to a shorter cycle.

- ***Whether conventional investment funds were moving to T+2:*** At the start of the T+2 project, and based on the approach adopted in the U.S., it was expected that conventional investment funds would move to T+2. While the intention of the U.S. to move investment funds to a T+2 basis was known very early on, it was not apparent to the marketplace that the European reference to UCITS funds moving to T+2 did not cover all of what the North-American market knew of as investment funds. A related issue was that a greater than expected number of jurisdictions governing some of the foreign securities underlying ETFs remained on a T+3 or longer settlement basis. This led to a greater funding issue than originally anticipated.

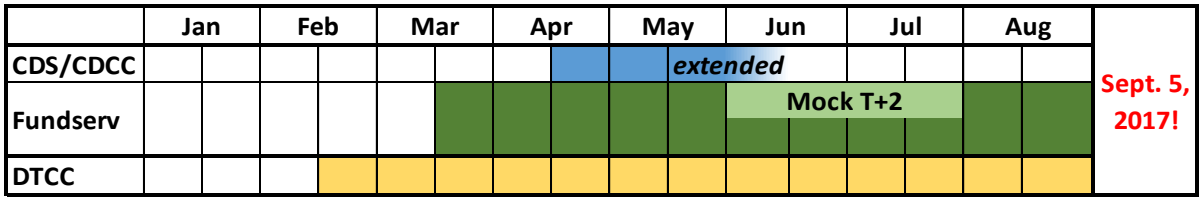
- ***Date switch methodology:*** Whether (a) all T+3 funds should automatically be moved to T+2 settlement (with any that needed to remain at T+3 left to be manually switched back by the issuer/manufacturer), as done in the U.S. or (b) if issuers/manufacturers should initiate the change of T+3 funds to T+2. Fundserv's longstanding practice is to make changes if mandated by regulation, and as this was not the case, option (b) was adopted. Fundserv showed industry participants how to check online whether a particular fund was to move to a shorter cycle or not. Fundserv also spent considerable time following up with issuers to ensure that there were no funds inadvertently listed with the wrong settlement date. In the end, a vast majority were moved to T+2 (~98%).

- ***Timeline:*** Fundserv has a long-established practice of implementing system updates (known as versions) annually, and usually in June. Fundserv used this proven process for T+2. Systems changes to accommodate T+2 formed part of the 2017 version change implemented in June 2017. This meant that the final part of Fundserv participant T+2 testing could only start later in June.

d. Testing and implementation: Non-fund and investment-fund securities

As the overwhelming majority of transactions cleared and settled through the combination of CDS, Fundserv and CDCC, these organizations were responsible for co-ordinating testing and implementation within the Canadian marketplace. DTCC co-ordinated the U.S. market and the CDS-DTCC link facilitated cross-border testing. The key points to note in this critical part of the T+2 initiative are as follows:

- ***Need for close adherence to U.S. schedule:*** Due to the need to synchronize implementation with the U.S., the Canadian marketplace had an overall testing timeline that was essentially in line with the U.S., although with some differences dictated by unique processes. The Canadian goal was to work as closely as possible to the U.S. timetable to ensure readiness without rebuilds.



- ***'Go'/'No Go':*** There was considerable discussion of a 'Go'/'No Go' decision, that is, what was meant by a market being "ready" and how to determine if the September 5, 2017 implementation would go ahead or whether, if it appeared there was a critical mass not ready, implementation should be deferred. "Ready" for a firm would mean able to transition, but this could be – for a time – by relying on manual work-arounds.

  Early informal discussions between CCMA and DTCC/SIFMA staff suggested that a decision would need to be made in the summer of 2017, at least six weeks before the implementation date, to allow sufficient time for communications throughout the industry of a new date should there appear to be a substantive problem on either side of the border. The CCMA adopted an early summer decision date of June 30, 2017: when the majority of firms would have finished testing and, while there was no expectation that Canada would *not* be ready, there was recognition that, should the Canadian marketplace need more time, there would have to be a period between June 30 and a mid-summer go/no-go date during which Canadian parties could escalate a request for a delay through to the U.S. at the very highest levels. The matter was later driven by the SEC, which specified within their Rules only the September 5, 2017 implementation date. This never became an issue, although Canadian regulatory authorities had provided for a potential delay in their final rules. However, the CCMA worked to the discipline of the June 30 date.

- ***Voluntary vs mandatory sign-off:*** Initially, there was interest in a mandatory sign-off by industry participants on readiness both north and south of the border. The requirement for some form of signature tends to focus the appropriate level of management attention. In the U.S., concerns regarding legal liability meant that mandatory sign-off was ultimately not a viable option. The Canadian marketplace adopted a middle ground that proved to be achievable, which was to focus on confirming readiness of the "links" in the overall very interconnected system (e.g., CDS, Fundserv, major service providers). It was supported by a series of surveys, and informal one-on-one discussions by the CCMA's Executive Director with parties

with large market shares in the industry. In Canada, CDS, and later IIROC, also required readiness reporting by direct CDS participants.

- ***Nature of certification/attestation if mandatory:*** Well in advance of transition, 37 major service and infrastructure providers were asked to agree on wording that they could sign off on, that to the best of their knowledge at the time, confirmed they were ready, their clients/participants were aware of and preparing for T+2, and they knew of no reason why adoption of T+2 could/should not proceed in Canada. Given liability concerns, it was referred to as the "T+2 Project Acknowledgement Form". Thirty-six signed the form (one ATS had ceased business in Canada), a 100% form return rate.

- ***Testing results:*** Fundserv, CDS/CDCC and DTCC were flexible in trying to address their participants' needs throughout the testing process. Anonymous data from these infrastructure organizations were helpful in assessing whether progress was being made or alarms should be raised.

  They also shared two common problems in the testing period:

  - Participants needed to make sure that they were set up and had completed connectivity testing before starting the T+2 testing.
  - A significant number of enquiries were not specific to T+2, but rather to testing people trying to understand basic clearing and settlement concepts or regular processing details unchanged for T+2.

- ***Contingency planning:*** Firms were encouraged to have contingency plans for problems or sudden changes in T+2 implementation protocols, including internal plans and participating in plans with their service providers/infrastructure. On an industry-wide basis, the CCMA co-ordinated a Transitional Back-up Support Plan over a two-week period. Prior to, during, and immediately following the Labour Day implementation weekend (September 2-4), daily conference calls following those in the U.S. were held, with notes posted as soon after each call as possible.

e. Legal and regulatory review

The LRWG undertook a rigorous legal issue review and identification process, and the Chair followed up rigorously with industry participants and regulators to monitor progress. The LRWG issue log included 62 issues. These were almost entirely made up of regulations or infrastructure rules.

In many cases, two levels of regulatory change approval were required, for example, by an SRO and then by a provincial authority. The serial rule approval process did not impede the move to T+2, and indeed the CSA moved quickly when it became evident in one case that a rule change was needed. Similarly, two levels of rule approval were required for rule changes by infrastructure entities.

- The CSA was very supportive of the initiative from the project's start in 2015; the OSC had taken the initiative to raise awareness even earlier, on April 2, 2015.
- Representatives of some or all of the AMF, BCSC, and two sections of the OSC, as well as the Bank of Canada, attended most meetings.
- In addition, the CCMA Executive Director met regularly with the AMF, BCSC, OSC and Bank of Canada, and presented once in person to the full CSA.

The CCMA made five submissions to regulators pertaining to T+2[8].

- October 26, 2016: Letter to IIROC on Notice 16-0177 re Amendments to Facilitate T+2 Move
- November 1, 2016: CCMA Letter to CSA on NI 24-101 T+2 Amendments
- November 1, 2016: CCMA Letter to SEC on Proposed T+2 Amendments
- February 3, 2017: CCMA Letter to CSA re Investment Funds and T+2
- July 6, 2017: CCMA Letter to CSA on T+2-related NI 81-102 *Investment Funds* Amendments

i. Regulatory Impact/Changes

a. NI 24-101 Institutional Trade Matching and NI 24-102 Clearing Agency Requirements

- NI 24-101 was identified for possible change at the outset of the project. Relatively quickly, there was agreement on the desirability (although not the necessity) of a rule amendment. The change was removing the one-day matching extension exception for out-of-North-American trade-matching parties. Rule changes did not include a requirement for same-day affirmation – matching trades on trade date – although it was recognized that firms able to affirm same-day were well-positioned to meet T+2.

- The CSA was supportive of amendments and advance notice of amendments was published on April 27, 2017.

- While not specific to T+2 readiness, the CSA issued Consultation Paper (CP) 24-402[9] *Policy Considerations for Enhancing Settlement Discipline in a T+2 Settlement Cycle Environment*, which asked for additional feedback on ways to improve clearing and settlement operationally. It ran on a different timeline and included matters that might prove useful should there be a further reduction in the settlement timeframe. This was followed by CSA Staff Notice 24-316 *Feedback on CSA Consultation Paper 24-402 Policy Considerations for Enhancing Settlement Discipline in a T+2 Settlement Cycle Environment*.

b. NI 81-102 Investment Funds and NI 81-104 Commodity Pools

In late 2015, the LRWG identified the potential for changes to various National Instruments to accommodate a shortened settlement period for investment funds. IFIC worked closely with the regulators to discuss the need to amend rules for a move to T+2 and reported in November 2016 that IFIC and the regulators did not see a need to do so immediately, although certain provisions would require change.

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[8] Also, IFIC submitted a letter on February 14, 2017 to the CSA on T+2's implications for NI 81-102 investment funds.

[9] Refer Annex E.

Some industry members interpreted IFIC's feedback to mean that investment funds did not *have* to move to T+2, which led to industry uncertainty for a period. The issue was re-opened by the LRWG, and there was additional discussion over a series of meetings, both at IFIC and the CCMA.

i. The CCMA requested that, at a minimum, a formal CSA clarification, if not a rule change, be announced given clear evidence of marketplace confusion.

ii. The CSA announced that a regulatory change would be made and provided final rule wording with interim guidance, which was sufficiently clear. Investment funds moved to T+2 at the same time as equities and debt (although the coming-into-force date, due to time needed for government ministerial approvals, was post-implementation).

ii. SRO Rules

- IIROC identified necessary changes early in the project, issued a request for comment and received feedback, and waited for the CSA's review of, comment on and approval of the final rule changes, after the CSA approved NI 24-101 changes.

- The MFDA ultimately did not require rule changes. It determined that some change to examination procedures would be sufficient.

iii. Exchange/marketplace trading rules

- Suggested amendments to these rules were identified and shared with the industry in a timely manner; the reviews by the exchanges and marketplaces were completed after the CSA finalized NI 24-101 amendments. Changes were needed to:
  i. ATS Subscriber Agreements
  ii. SRO Rules
  iii. Exchange/ATS Listing Policies.

- The rule changes were finalized and approved after the CSA approved the NI 24-101 changes.

iv. Clearing agency procedures

As in the case of trading rules:
- Required changes were identified and shared with the industry in a timely manner for feedback
- Approvals were received on time
- The procedures were finalized after the CSA had approved the NI 24-101 changes.

v. U.S. rule changes

The LRWG issue list included relevant U.S. rules (the U.S. also has a number of instruments without direct Canadian equivalent, such as a Prime Broker No-Action letter, Reg SHO prospectus delivery rule, etc.). There were some challenges in obtaining responses to the LRWG chair's request for clarity on various potential

U.S. rule changes. However, this does not seem to have ultimately had a negative effect on implementation. In the U.S., CCMA staff provided help to staff of the ICI that was pursuing rule changes by the FDIC and OCC, where rules permitted settlement on "T+3 or less". This meant potential mismatches between the settlement/redemption period of investment funds and other similar products with securities that underlay them. This issue was resolved.

vi. Transitional/administrative relief for NI 24-101, NI 82-101 and IIROC Rule

- The CCMA's letter, responding to the CSA's request for comments on NI 24-101, asked that firms be permitted to implement trade-matching exception reporting effective the first full quarter that all trades would have to be matched by noon on T+1, that is, for the fourth quarter of 2017, with the third quarter being reported as if the current rule applied through September 30, 2017. This request was granted.

- The CCMA's letter to IIROC asked that those IIROC dealers, which already were permitted to suppress institutional trade confirmations due to these firms' high institutional trade-matching rates, be allowed to continue to suppress confirms for the third and fourth calendar quarters of 2017 even should their trades matched might drop temporarily below the 90% threshold due to T+2 transitional issues. This request was granted.

- Later, a small number of funds were identified that wanted relief from the mandatory settlement on T+2 in NI 81-101 *Investment Funds* due to a variation in settlement cycles within the securities underlying the funds; managers of a small number of ETFs later sought individual exemptions.

In a perfect world, CCMA members would have preferred to receive confirmation of these approvals earlier in the project, to help in planning and providing certainty in system-building decisions. However, members understand the administrative constraints under which the commissions, and hence the SROs, are currently working. The CCMA appreciated the attention of, and access to regulators, during the T+2 project.

f. Communications

Preparing for communications was an early priority in the T+2 project, as is the case of any project involving multiple dispersed and disparate parties. Though many see the financial services sector as a single industry, it not only has many differences among segments, but also the interconnectedness of the many different parts makes implementation more challenging than in most, if not all, other industry sectors.

The CEWG's issue list was short – five items: awareness-building, followed by developing engagement; re-launching a website to support communication channels; linking with the communications team for the U.S. T+2 initiative; and addressing, if needed, reputational risks. Specific tasks included:

- Re-designing the CCMA ***website***, incorporating a ***T+2 countdown clock*** (featured in every newsletter to maintain a sense of momentum) and providing a link to material developed in the 1999-2004 efforts to move to T+1

- Building a ***contact database*** through outreach to associations, service providers, regulators and others; the website; newsletters; and other means – the number of committee members and newsletter recipients grew substantially throughout the project

CCMA Outreach Contacts	Members	Companies
Members November 23, 2015	**167**	**70**
Members November 29, 2016	350	121
Newsletter recipients November 29, 2016	239	133
Total November 29, 2016	**589**	**224**
Members September 5, 2017	433	154
Newsletter recipients September 5, 2017	190	70
Total September 5, 2017	**623**	**224**
Total Contact Increase 2015-2017	**373%**	**320%**

- Organizing an attention-driving ***kick-off event*** (April 21, 2016) to build credibility, put faces to the process, and demonstrate the breadth of the impact across all segments in the entire industry

- Calling for ***speaking opportunities*** for the Executive Director: the Executive Director spoke at many industry events to different audiences at association, regulatory and other venues

- Making efforts to engage with ***U.S. communications counterparts***; the CCMA linked to key U.S. documents and advertised the U.S. website, www.UST2.com

- Creating ***tools*** to help industry participants prepare, for example, links to matching data, publications, etc.: The CCMA website Publications page included links to Canadian documents, followed by links to key American documents and information about other T+2 transitions in global markets, summarized as follows:
  - Results of three CCMA (August 6, 2017, February 22, 2017, July 22, 2016) surveys and one Fundserv survey
  - Eight CSA, IIROC and MFDA releases
  - Seven industry testing documents
  - Nine other tools, including the asset list, CCMA transition weeks plan, Buyside Checklist, T+2 generic presentation, CCMA T+2 Readiness Preparation Checklist, and retail T+2 messaging – the latter discussing the best form and timing of customer T+2 communications for institutional and retail clients, etc.
  - Other items, such as the CDS and Fundserv T+2 white papers.

- Drafting ***surveys,*** and reviewing and discussing survey results, to support the readiness assessment

- Developing ***key messages*** to prepare for expected and possible questions from the industry, government/regulators, and media

- Ensuring CCMA staff were media-ready through a ***media training*** session and on-request consultation with industry experts as potential media issues arose

- Issuing five ***media releases***; additionally, all newsletters with highlights were circulated to industry media:

- July 15, 2015: CCMA appoints Keith Evans as Executive Director
- September 11, 2015: CCMA announces T+2 Steering Committee (T2SC)
- April 30, 2016: CCMA seeks industry comment on T+2 Asset List
- May 29, 2017: CCMA declares fewer than 100 days to go until T+2 settlement helps bring faster, safer exchange of securities for cash
- September 8, 2017: Canadian Capital Markets Association declares transition to shorter securities settlement cycle a success, credits Canadian capital markets participants

- Obtaining ***media coverage*** to expand the CCMA's reach: This was an area of disappointment for the CCMA: despite – or perhaps because of – the exponential increase and speed in information transmission as compared to at the time of the CCMA's 1999-2004 efforts, the CCMA was unable to get standard Canadian industry media coverage (all early coverage after an article in September of 2015 was limited to CSA, IIROC, and SEC T+2 releases, until an article on February 23, 2017). Through a CEWG member's and CCMA staff contacts, the CCMA achieved article placement or mention in pension publications and U.S. industry media:
  - The ACPM's *The Observer*
  - *Asset Servicing Times*
  - Pension Investment Association of Canada newsletter
  - www.UST2.com
  - U.S. FinOps

- Preparing 11 short ***newsletters*** (issued every six to eight weeks) with news, status updates, links to other documents for those needing more information in certain areas and regular sections of To Dos, Tips, Tools, and To Come; the newsletters always included the T+2 Countdown Clock to heighten awareness and urgency

- Preparing 11 batches, totaling 65 ***FAQs*****,** and a set of client-facing FAQs, addressing questions as implementation approached.; Fundserv also published T+2-related FAQs.

One item was discussed but rejected due to staffing limitations – namely, whether there should be an online ***"you've got questions/we've got answers"*** for quick replies. Such a facility may be more important in the case of a further shortening of the trade-to-settlement cycle.

g. Similarities and differences between Canadian and American approaches

There were considerable similarities and some variations (beyond the known market divergences in U.S. and Canadian practices and systems) between Canadian and U.S. T+2 preparations. While a number have been mentioned already, they also are included in the table below.

Parameter	U.S.	Canada
Cost-benefit analysis	BCG cost-benefit analysis	Determined not to be required as interconnectedness of Canadian and U.S. markets required simultaneous move with the U.S., confirmed by 1999 CRA study
Detailed implementation breakdown	U.S. *T+2 Playbook* provided a useful dissection of all aspects	No equivalent issued in Canada as Canadian marketplace is considerably more concentrated, with significantly fewer

Parameter	U.S.	Canada
	of U.S. change requirements	participants and greater use of large service providers; however, many Canadian firms used the *U.S. T+2 Playbook* for reference
Asset list	Listed securities moving to T+2	Listed all securities that were in scope and those *not* moving to T+2
Issue logs	Not publicly available	Public via website, as well as meeting minutes
Testing	More months and test cycles	Shorter period; more concentrated market mitigated risk; also, testing of Canadian changes could not fully start before U.S. changes were in place
Readiness	Surveys; importance of DTCC in assessing readiness	Three surveys and T+2 Project Acknowledgement Form; importance of CDS and Fundserv in assessing readiness; direct CDS participants reported to IIROC
Communications	Through www.UST2.com, DTCC, and service providers	Through www.ccma-acmc.ca, newsletter, and service providers
Regulatory participation	Regular reports to U.S. regulators	• Observers on CCMA committees and regular reports to CCMA regulators • CSA jurisdictions wrote to registrants about T+2, issued CSA Staff Notices in preparation for the transition (24-312 and 24-314), and a number of regulatory authorities included T+2 readiness in registrant outreach work

h. Evidence of success

During the two-week transition period, no Canadian (or U.S.) impediments to a general move to T+2 were identified in daily meetings[10]. All sides reported that weekend implementations had been successful and communications within and among members had gone well. CDS said the change to T+2 and double settlement payment exchange had proceeded "as if it were business as usual." Fundserv reported that the 67,000 or so funds recording T+3 settlement had moved successfully to T+2. No transition issues caused a delay in trading or settling on a T+2 basis. In a final U.S. transition meeting call, U.S. leads said that the transition process had worked so well that it should serve as a great blueprint for future endeavours. In the final Canadian industry transition meeting, participants described the changeover as having gone "perfectly". As one industry participant reported "There were plenty of happy people [after payment exchange] on Thursday afternoon!"

[10] Some members had been affected by very small issues (Bloomberg reportedly had not switched CUSIPs of foreign preferred securities settling at DTCC to T+2, a Canadian custodian had caught and corrected a small percentage of client transactions submitted on September 5 with a T+3 settlement date); some three-day settlement calculations for ex dates on dividend payments were identified in the period following transition, however, some were correct and others were corrected without impact.

i. Costs

In 2012, data in the U.S. suggested that the T+2 implementation process would cost American participants USD 400 million (CAD 500 million). This figure was updated in 2017 to USD 615 million (CAD 770 million). Using the estimated average 10:1 ratio for the size of the Canadian to U.S. equity, debt and fund markets, this would mean an estimated cost to the Canadian industry of CAD $50-$77 million.

The CCMA surveyed organizations participating in the T+2 transition in the following categories: buyside; sellside; custodians/transfer agents; exchanges, marketplaces, and clearing agencies; service providers/vendors; and other (associations and regulators). Recognizing that the inconsistency in the costing methodologies and using the 38 entities that responded to estimate the complete marketplace, the CCMA assesses a T+2 project cost of CAD 35-50 million. It should be noted that these numbers likely did not include some of the indirect costs incurred, such as senior management.

j. Conclusion

The result of the committee members managing the work streams was that the Canadian industry was well-prepared from an operational, regulatory and communications perspective for T+2, as evidenced by the smooth transition. With Canada's back-office clearing and settlement system sometimes referred to as the investment industry's 'plumbing', unlike plumbers those participating in the T+2 effort cannot really take the system offline. The smooth functioning of the system throughout, while neither appreciated by the general public, nor given the public acknowledgement it arguably deserves, is a testimony to the dedication of those in the industry. There was generally excellent involvement by clearing agencies, service bureaus as well as other service providers, DTCC, and regulators throughout the process.

IV. Successes/Lessons Learned

The CCMA requested feedback on the T+2 project from committee and working group members and stakeholders during meetings in late August and in September 2017. As well, the CCMA approached a representative cross-section of members from different industry segments and from across the country, to participate in a CCMA Post-Mortem Committee to review feedback and add additional views. The following are all comments received, grouped in five topic areas for better comprehension. In most cases, the wording is verbatim, with edits made to remove information that might reveal a respondent; where there were multiple comments on the same theme, the comments were blended to maintain brevity.

a. What went well?

i. Project structure/CCMA

1. No industry politics were present from the outset, as Canada had to follow the U.S. lead to transition to T+2.
2. Use of the CCMA for overall industry co-ordination and education.
3. Cooperation amongst industry members with a sense of fellowship and camaraderie – a sense that we were all in this together working towards a common goal. Meetings were often light-hearted, and members had a sense of humour (although meetings rarely extended beyond one hour maximum and implementation weekend calls were less than half an hour).

4. Key service providers were participating.
5. Trust with knowledge, connections, independence of CCMA "staff".
6. Industry participants learned more about the broader industry.

ii. Regulatory

1. Regulatory involvement from the beginning: AMF, OSC, BCSC, BOC, IIROC and MFDA attended most meetings and adequately met the timelines of the project in terms of the industry request for changes to regulatory instruments, etc.
2. CCMA provided a common voice for all participants by drafting various letters to regulatory agencies, and ensuring key regulatory questions were clarified by follow-up phone calls.

iii. Project management

1. Formulation of CCMA working groups allowing members to ensure that the right people attended the right meeting related to their area of interest and/or focus.
2. Strong leadership from the working group chairs, who all had substantial industry experience.
3. CCMA periodic readiness surveys providing insight to industry members of overall member comfort level and status of member transition activities.
4. Regular CCMA meetings and status updates, and a high level of engagement and attendance by industry participants.
5. Regular participation at CCMA meetings by CDS and Fundserv.
6. Tracking of all issues within issue logs with status updates on progress relayed at each meeting.
7. Defined what "ready" meant.
8. Agreed on Project Acknowledgement Form.
9. Executive Director visits to membership for "soft sounding" of real preparedness of firm and industry.
10. Within CCMA Board-approved project budget allocation.
11. Able to access and repurpose some historical CCMA materials.
12. Website re-built on open platform and staff managed uploads to keep costs down and ensure new information was quickly made available; will make pass-on/transition simpler for any future CCMA projects.

iv. Communications

1. Communication was exceptional throughout the entire project, with industry members offering feedback and insight to challenges that could impact other participants within the industry.
2. CCMA newsletters providing helpful information to industry members throughout the lifecycle of the project.
3. CCMA FAQs providing helpful information to industry members.
4. Considerable importance of associations, custodians, vendors and their connections in getting word out to clients/members and media.
5. CCMA website as a source for information throughout the entire project – minimal false news/rumours.

v. Testing and implementation

1. Industry participants willingly working together to conduct end-to-end trade lifecycle testing to ensure that we all were successful in the transition.
2. Industry testing allowing participants to test their systems for T+2 readiness and to identify any overlooked system impacts because of T+2.

3. Industry test plans and calendars outlining test focus on each day throughout the lifecycle of the test.
4. Key service providers were participating, and had crafted integrated testing plans.
5. Status update meetings held throughout the transition weekend were helpful to industry participants to ensure that we were all aware of any potential issues and updated on status of key participant implementation activities.
6. CCMA meeting minutes published during transition period to support member firms updating key senior executives on industry status as a whole.
7. CCMA September 1-8, 2017 migration activities were in line with our expectations and there were no significant issues to resolve. However, we would want a similar process/schedule in place for any future migrations.

vi. Cross-border/global issues

1. Sync'd the Canadian marketplace with Europe and other important trading partners, in addition to the U.S.
2. Generally, we appreciated the oversight and co-ordination provided by CCMA, including CCMA's inclusion of the key U.S. participants in the Canadian meetings.
3. Involvement by the U.S., SIFMA and, in particular, DTCC was instrumental in giving us the U.S. perspective and overall project timelines that were important to our planning; DTCC participating on the T2SC was important for us.
4. Usefulness of U.S. work coupled with Canadian expertise to understand where Canada differs.
5. The U.S. has a better appreciation of the Canadian marketplace's importance within the U.S. settlement requirements, as well as our ability to manage large cross-border projects.

b. Areas to consider for future securities settlement changes

i. Project structure/CCMA

1. Perception that Canada was behind at the start; this was quickly remedied but any similar perception in the future would need to be addressed fast.
2. The Mutual Fund Working Group did not meet for a number of months, and some members felt that there were conversations/actions occurring at Fundserv's regular member meetings, which were not being raised at the CCMA level. The Fundserv Town Hall in March [2017] was helpful getting members in sync; the involvement of Fundserv staff throughout was invaluable and will be critical to future efforts.
3. Recognize member staff turnover will be a fact of life, so it will mean some repetition for committee members who have been involved from the start (Executive Director sent recent minutes, newsletters and information to new members).
4. Good idea to get/confirm point person and project manager (if not the same person) at each firm from the start.

ii. Regulatory/statutory

1. Understanding CSA as well as the CSA/SRO structure and approval timelines is essential to ensuring a timely completion of regulatory changes.
2. Earlier regulatory feedback/certainty on administrative/transitional relief would have given greater comfort to the industry when deciding on systems development work to be undertaken.

3. Statutory changes facilitating or even mandating the issuance of securities in uncertificated format would have made shortening of the settlement period much easier.

iii. Project management

1. CCMA meeting minutes for the previous meeting were only posted at the time of distribution of materials for the next meeting. It would have been beneficial had the minutes been posted (even if not approved) immediately following any given meeting when things were still fresh in participants' minds and to ensure that members who could not attend a particular meeting did not have to wait until the next meeting to receive updates or action items, which should be highlighted.
2. Fundserv distribution of information was generally through their secured site. It was a problem for some industry project managers and business analysts to readily get their hands on information in a timely fashion (although they should have been able to do so through internal means), as they did not have direct access to the secured site. Would have been helpful for all Fundserv communications to also be made available to the CCMA for distribution to avoid delays and potential risk of missing important information or updates.
3. What's in and out of asset list – some items added at the end; need to include CMHC in discussions.
4. Meeting bookings ideally on regular dates further in advance of the meetings via common work calendaring functions with dial-in numbers in invites as well as at top of agendas.

iv. Communications

1. Teleconference-only meetings would benefit from being supplemented by periodic in-person meetings, or at least have a central location that local members could come join in person; these were really helpful in the U.S. at DTC – great meeting people in person, adding to effectiveness of communication
2. Meetings held by conference call and attended by a large number of industry representatives were often disrupted by background conversations despite CCMA staff request to put calls on mute.
3. Senior champions – including from each industry association – could have helped get past some issues faster.

v. Testing and implementation

1. Even though the industry had approved the CDS proposal of two test cycles (in comparison to DTCC, which offered 14 test cycles), this put pressure on firms to get their internal system development completed quickly to ensure they were in a position to test during one or both of the CDS test cycles. In the end, CDS was able to accommodate the industry needs by extending their test region availability to ensure that all members were able to complete their internal testing successfully (the third cycle was not extensively used). For future initiatives, a more thorough review should be undertaken between the industry and the clearing agencies to ensure adequate testing is available.
2. Statistics from both CDS and Fundserv during the transitional period would have been beneficial to the industry in determining their progress (e.g., DTCC provided number of participants/number of transactions per test cycle/firms with no test activity to date, including by size of company).
3. Vendors must be part of testing and testing calls (not an issue in Canada; one ultimately non-serious, but persistent, implementation issue in the U.S. arose; the

vendor, by not joining implementation weekend or later calls, delayed getting answers).
4. Getting to the "official" sign-off person for the T+2 Project Acknowledgement Form.

vi. Cross-border/global issues

1. Learned late that Europe UCITS funds did not move to a shorter settlement cycle; should – MUST – connect earlier.
2. While involvement of other T+2 implementing countries proved to be a non-issue, there were questions, and the difficulty in getting answers as to the status of specific changes in countries moving to T+2 was surprising – suggest connecting with central securities depositories associations to obtain information.
3. Lack of accessible information on securities settlement cycles in countries *not* moving to T+2 – suggest approaching Association of Global Custodians.
4. Cross-border integration and testing – while the overall integration testing went well, there were some key gaps; a complete end-to-end test of NASDAQ trades had various challenges due to certain U.S. industry components not being connected (Canadian dealer trades were being sent to the NASDAQ Test Facility, which was not connected to NSCC); better coordination between CDS and DTCC/NSCC test cycles for more complete testing.
5. Some documentation was still being changed late in the project; engage directly with ISDA.

V. The Future

Due to the many uncertainties and quick progress of change in technology and financial services, this part of the Report is not a 'road map' to follow to reach a shorter settlement cycle. However, it provides market and regulatory signposts to keep an eye open for, and comments on the potential effect of technology changes.

a. Market landscape

The move to T+2 was market-driven by the industry and not by any regulatory body, although was supported by the regulators in Canada and the U.S. As was the case for the transition from T+3 to T+2, any further reduction in the trade-to-settlement cycle will, in all likelihood, be driven by the U.S. The question, therefore, is what would drive the U.S. markets?

i. There may be internal pressures caused by increasing collateral and liquidity needs. Under a heading "T+2: What's Next?", DTCC issued "Modernizing the U.S. Equity Markets Post-Trade Infrastructure: A White Paper to the Industry" on January 22, 2018. The preamble states:

> "Today, on average over $5 billion is still held in margin to manage counterparty default risk in the system. In addition, DTCC's subsidiary, National Securities Clearing Corporation (NSCC), requires additional liquidity resources for peak settlement days, further adding costs and risks to U.S. markets. We believe the opportunity exists to modernize the settlement system to achieve additional operational and capital efficiencies by further accelerating the settlement cycle and optimizing the settlement process."

The DTCC White Paper, referencing an "eventual move to T+1", includes two proposals:

- ***Settlement optimization***: Finding new ways to move and settle money intraday, while continuing to allow end-of-day processing
- ***Accelerated time to settlement:*** Moving the settlement of eligible trades to before market open on settlement day (T+2), to eliminate almost a day of settlement risk and cost without removing a calendar day.

The U.S.'s move to T+2 followed that of European and other G-20 countries by two to three years. The U.S. could again be impacted by changes in global markets. While some markets are already at T+1 or less, there are still a number of important markets (e.g., Japan and Brazil), as well as other developing markets (e.g., the Philippines and Indonesia) at T+3. While there is no formal agreement that all markets should clear and settle on the same basis, a one-day settlement difference between markets may be easier to manage than a two-day difference, which might slow a move to less than two-day settlement until other large markets catch up.

However, there are three developments that may exert pressure for shorter settlement.

A number of clearing-and-settlement-type organizations are beginning to experiment with new technology (see Blockchain below) that may facilitate achieving a shorter settlement cycle.

a. On October 17, 2017, **Payments Canada**, the **Bank of Canada** and **TMX Group Ltd.** announced a joint experiment integrating a securities and payment settlement platform using Blockchain technology as a proof of concept for the clearing and settlement of securities using central bank money (cash-on-ledger or Large Value Transfer System (LVTS)) as the settlement asset or token within a Distributed Ledger Technology (DLT) system.

b. In Australia, the **ASX** announced on December 7, 2017 that it would replace CHESS (Clearing House Electronic Sub-register System, the ASX system recording shareholdings and managing equity clearing and settlement) using Blockchain. The ASX advised that it "… will now work with stakeholders on finalizing the scope of Day 1 functionality for the new system, drawing on its extensive consultation that will continue in 2018. Day 1 functionality and the proposed timing for transition are expected to be released for market feedback at the end of March 2018 *[extended to April 2018]*."

c. On February 13, 2018, the **CSE** announced its platform for clearing and settling securities using Blockchain by enabling companies to issue conventional equity and debt through 'tokenized' rather than certificated or traditional book-entry securities, called security token offerings (STOs). Unlike Bitcoin or other DLT currencies, the CSE stated that the STOs will be subject to full regulation by applicable securities commissions.

b. Regulatory outlook

The regulatory requirements to achieve T+2 are described in Section III – Major Work Streams – above. There were three regulatory documents issued during the project timetable that took a forward-looking view, as follows:

i. SEC 17 CFR Part 240 [Release No. 34-80295; File No. S7-22-16] RIN 3235-AL86 – *Amendment to Securities Transaction Settlement Cycle*

Unlike in Canada, the U.S. explicitly sets out, in *Exchange Act Rule 15c6-1(a)*, the standard settlement cycle and this rule was amended to change the settlement cycle from T+3 (last set in 1993 for effect in 1995) to T+2. On March 22, 2017, SEC staff announced, as they released the final rule, that they would undertake further research, committing to:

> "… submit a report to the Commission no later than three years from the compliance date [September 5, 2017] of Rule 15c6-1(a) as amended herein. This report will include, but not be limited to an examination of:
> (i) the impact of today's amendment to Rule 15c6-1(a) to establish a T+2 standard settlement cycle on market participants, including investors;
> (ii) the potential impacts associated with movement to a shorter settlement cycle beyond T+2;
> (iii) the identification of technological and operational improvements that can be used to facilitate a movement to a shorter settlement cycle; and
> (iv) cross-market impacts (including international developments) related to the shortening of the settlement cycle to T+2."

With the SEC having set a timeline of no later than September 2020 for staff analysis of a move to an even shorter cycle, and the need for a period of comment to follow, at present there does not seem to be imminent U.S. regulator-driven pressure for a further shortening in the settlement period. That said, the SEC and other U.S. financial regulators are likely to be monitoring European and other developments (and listening to American capital market stakeholders, for example, as discussion of the DTCC White Paper proceeds).

ii. CSA Staff Notice 24-316 *Feedback on CSA Consultation Paper 24-402 Policy Considerations for Enhancing Settlement Discipline in a T+2 Settlement Cycle Environment*

The CSA said, in discussion of the future direction of clearing and settlement issued on August 3, 2017, that they would consider action on the following issues by early 2018. They intended to monitor and "… seek to understand (i) whether the lack of real-time or intra-day batch reporting might have a detrimental impact on timely settlement, and … (ii) what the costs might be to industry in moving to real-time or intra-day batch reporting of trades." Currently, the OSC is engaging with IIROC and its members on these matters.

While the CSA noted that commenters believe the existing settlement discipline regime was sufficient for timely settlement and market efficiency on a T+2 basis, the Notice added that: "A number of commenters expressed concern that the lack of real-time or intra-day batch reporting of trades poses challenges for trade reconciliation purposes in a T+2 environment, which may cause some settlement delays."

The CSA commented that "While increasing automation could lead to improved SDA efficiencies in trade confirmation-affirmation processes, those efficiencies would largely depend on market participants embracing such technology on an industry-wide scale." Barring mandated changes, the 1999 CRA study had noted that the free-rider effect – that is, where firms implementing improvements do not get all the benefits of their technology expenditures, while to those who do nothing accrue improvements they have not paid for – would hamper greater efficiency.

The CSA agreed that additional settlement discipline measures were not *needed* for T+2, and enquired about and/or received comments on a range of options in section VI – Recommendations below, supplemented by other considerations received during the CCMA post-mortem discussion process, that would be relevant to consider for any further shortening in the settlement cycle or to reduce risk.

The August 31, 2017 CSA release, "Adoption of a T+2 Settlement Cycle for Conventional Mutual Funds – Amendments to National Instrument 81-102 Investment Funds", did not specifically identify additional analysis underway of a further shortening of the settlement cycle as it affects investment funds.

iii. European Commission Public Consultation on post-trade in a Capital Market Union: dismantling barriers and strategy for the future

On August 23, 2017, the European Commission's Directorate General of Financial Stability, Financial Services and Capital Markets Union announced that it was continuing to study settlement issues after European markets moved to T+2, and launched public consultations. Closing November 15, 2017, the European Commission sought feedback on post-trade trends and challenges, and how to improve post-trade services, including clearing, settlement and collateral management. The consultation paper did not specifically ask about a shorter settlement cycle, nor has a summary of comments on the results yet been published.

c. Technology directions

There is full agreement among CCMA members that significant technology changes are needed to move from an overnight batch to an intraday batch or real-time system ('real-time' would need to be defined). Under any scenario, the challenges of co-ordinated implementation among multiple firms, exchanges, ATSs, infrastructure providers, service bureaus, correspondent clearers, the Bank of Canada and others are significant: this is not a single supplier struggling with huge implementation issues, but rather many organizations, with a large range of old mainframe to more modern technology, all having to move on the same day in a new direction or risk affecting the Canadian capital markets from a reputation, investor and potentially systemic perspective. Before going into some of the specifics, below is a bit about Blockchain that many hope or think may make at least some of this work redundant.

i. Blockchain

Many see Blockchain as a silver bullet. Developed as an accounting method for Bitcoin, Blockchain – or distributed ledger technology (DLT) – allows the creation of an unchangeable, undeletable record that can be tracked digitally without a central recordkeeping authority. Blockchain promises a single technology (rather than a

network of multiple interconnected systems), greater transparency, easier auditing, shorter settlement periods, earlier access to capital, reduced counterparty risk, lower collateral requirements to back unsettled outstanding trades, and an improved way to address time-zone issues. The fact that all parties must confirm payment processing is aimed at reducing fraud concerns. A Goldman Sachs report suggested that adopting Blockchain could save stock market operators up to $6 billion a year by removing the middleman.

Larry Tabb, consultant and formerly of Lehman Brothers, in a February 16, 2016 report, "Blockchain Clearing and Settlement: Crossing the Chasm", said:

> "Blockchain has substantial capabilities to help facilitate, trade, track, and automate the processing of many types of securities, however, in order for the public Blockchain to replace the core of our traditional central clearing solution for equities, sovereign debt, or any liquid product, many massive and, in some cases what seem to be insurmountable, challenges need to be overcome across banks, investors, custodians, and industry infrastructure. [Eight major issues will be] … ownership, securities lending, foreign exchange, allocations/confirmations, physical securities, fractional ownership, netting, and technology challenges across the sub-industries of investing, custody, the institutional sell-side, and retail brokerage."

While there is great interest in reducing the expense, errors and delays caused by traditional record reconciliation methods, the following concerns remain:

1. ***Fraud potential:*** With no evidence of a slowing in cyberattacks and continuing investor protection concerns, this will remain a concern despite confidence that Blockchain could be superior in terms of managing this risk.

2. ***Technical:*** Storage and synchronization will present issues given the perpetually growing size of Blockchain. On the assumption that there are multiple Blockchain developments performing the same functionality, interconnectivity will be paramount. Also, it has been suggested that a single digital identity passport authorizer is a critical next step.

3. ***Regulatory:*** The Federal Reserve, Bank of Canada and Bank of England are responsible for systemic risk in financial markets in their countries. A February 2015 Bank of England research report stated: "Further research would also be required to devise a system which could utilize distributed ledger technology without compromising a central bank's ability to control its currency and secure the system against systemic attack." Other questions typical of financial regulation of any new technology/system include:
   - Who is responsible for maintaining and managing the Blockchain?
   - Who admits new participants?
   - Who validates transactions?
   - Who determines who sees which transactions?

   While there is evidence of regulatory support for fintech – a word sometimes accompanied by the word 'disruptive'– it is not certain what might be the outcome or timing of regulatory reviews of any serious move to the use of Blockchain in systemically important clearing and settlement systems.

4. ***Cost and who pays:*** Significant losses were incurred in unsuccessful past single firm efforts to replace post-trade systems; if more firms undertake major changes simultaneously, such projects arguably become even more costly (and risky) due to competition for knowledgeable staff and contractors.

The Bank of Canada/TMX/CPA's, CSE's, and ASX's planned implementation of distributed ledger technology will prove a useful example of how the above four issues can be addressed and useful to those in Canadian capital markets. However, there is a much greater cost to be incurred and bigger policy issues to consider if there is a move to a wholesale switch to Blockchain: these are beyond the scope of the Report to consider.

ii. Improving discrete aspects of clearing and settlement

Interim steps could be taken, without changing the actual settlement date that would facilitate a later move to shorten the settlement date. These are reflected in the DTCC's 2018 White Paper, and will follow in the next stage of the ASX adoption of DLT. There are also made-in-Canada approaches discussed above and below. While leading to unnecessary costs if the overall direction changes after such steps are taken, the important benefits of this approach are that changes can proceed by agreement among fewer entities, often using established parties (e.g., CDS) and processes (e.g., Fundserv's annual version implementations).

In Canada, the CCMA is co-ordinating the Post-Trade Modernization Advisory Council working with participants of CDS and CDCC to co-ordinate, educate and communicate the work and efforts associated with the TSX/CDS modernization of its clearing, settlement, entitlement and corporate action systems, scheduled for implementation in 2019.

iii. Other

There are also questions about other potential technology advances and new regulatory changes along the way. Any scenario will have to take into account:

- Getting from "here" to "there" – the challenges of linking existing records in the back-, middle- and front-office networks to new Blockchain ledgers or other networks.
- The timeline for the project given considerably higher cost and complexity: the U.S. T+1 plan, initiated in the late 1990s, implied a six-or seven-year project, transitioning in 2005. It should be noted that most companies look for project payback in no more than at worst three years.
- Any mass cross-system change, due to materially greater risk, may need a back-out plan that was not a serious consideration in the move to T+2.

d. Minimum requirements for cross-industry move to T+1 or less

Sections III. and IV. above provide general information about the work streams, processes used and implicit strengths and improvement opportunities related to the T+2 project, with important project highlights below.

i. Project structure: The key requirement will be a central body and staffing that are: credible, independent, national and broadly-based, cost-effective, quickly

organizable, with transparent reporting and decision-making. More vendors will need to participate, and members will need to engage in bringing vendors to and keeping them at the table. Also, more large pension funds and government financing agencies (e.g., CMHC) may wish to participate. Regulatory involvement will be needed from the beginning from at least the AMF, OSC, BCSC, and BOC. More senior management should be involved due to the higher-risk profile of the project. Clearly, budget will be a major issue. See 'Costs' in "e." below.

Administratively, given the likelihood of a need for additional committees to address a broader range of issues in detail (securities lending, corporate actions, dematerialization, etc.), there will be a need for more administrative support, including the need for a shared central filing structure accessible by all project staff of any central co-ordinating body, as well as access to improved teleconference and IT (e.g., including e-mail) capability and, potentially, a meeting room – while discussions were almost exclusively teleconference only, in-person meetings may be appropriate in some of the planning stages. Administrative support for the CCMA could be made available through an existing association, such as the IIAC, or an organization such as CDS or Fundserv.

ii. Canadian regulatory and related requirements:

i. ***The CCMA legal issues list will need to be reviewed*** and any new rules that affect clearing and settlement will have to be identified, reviewed and potentially put through the regulatory consultation and approval process, specifically.
   a. NI 24-101 and NI 81-102 will need to be reviewed and modified.
   b. NI 62-104 will need to be reviewed again, even though it was not changed for T+2.
   c. Most if not all SRO, exchange and clearing agency rules will need to be reviewed and modified.

ii. ***Members should remain aware of other regulatory implementations*** (securities, tax, etc.) that could affect implementation, and plan around them or seek ways to address them. The European Commission consultation, for example, does take into consideration withholding tax issues, an interest not always apparent in North America.

iii. ***Canada should engage early with the U.S.*** – along with U.S. and Canadian regulators – during any "deadline-settling" discussions and there should be agreement if at all possible on provision for a deferral if there is any question about a material part of the industry in either country being ready. For T+2, the transition date of September 5, 2017 was one selected as the lowest risk date on which to migrate to a shorter settlement cycle, taking into account considerations such as, statutory holidays, high-volume events (e.g., index rebalancing), year-ends, option expirations, scheduled corporate action events, and employee vacation periods.

iv. ***The industry should remain engaged closely with the regulators.*** Members appreciated regulatory efforts to provide certainty through rule changes as quickly as possible during the T+2 project while respecting the rule-making administrative requirements under which the commissions and SROs operate. Confirming and disseminating details of regulatory changes as early as possible

will be even more important if the settlement cycle shortens further, due to the greater complexity, cost and – most of all – risk of such a move.

v. ***Automatic administrative and transitional exemptions should be considered early*** to reduce uncertainties; while there may be regulatory concerns that this would slow down engagement of some industry parties in the change, the cost and reputational implications are sufficient to ensure appropriate industry involvement. Recognizing the need for transitional relief early on would save unnecessary time and resources focused on 'what-ifs'.

vi. ***Industry best practices and standards*** (aspects of what had been developed may have become codified in, for example, CDS systems or rules), issued when the industry was looking to move to T+1, should be revisited as part of any review to enhance processes.

vii. ***Documentation*** will need to be reviewed and updated, and industry parties may want to consider including clauses in agreements that provide for amendment in clearing and settlement provisions without opening entire agreements. Trade-matching statements may also need updating.

iii. ***Technology and related requirements:***

The U.S. *T+2 Playbook* should be reviewed in detail for impact analysis of all parts of the integrated and inter-related trade-execution-to-settlement process, however, this much is clear: batch processing dependencies at present will be a large challenge to overcome as we shorten the settlement cycle further. Keeping a clear eye on what is transpiring in the U.S., the following issues will need to be addressed:

1. The first question is whether the move is to ***T+1 or T***, with considerably greater challenges if T is chosen. The current infrastructure is more overnight-batch-driven, and will need to evolve to a new real-time or near real-time processing in order to be successful. Same-day trade execution/reporting and reconciliation will be a must. If there is interest/comfort in moving to T+0, this must be defined: is it same-day? intraday batch? or true "real-time"? The development requirements would be substantially different in each case.

2. The move from T+2 to either T+1 or T will require a ***more intense technological change***. The area of biggest concern is the reporting, allocation, affirmation and confirmation of the trades to prepare them for settlement, and this might lead to a growth in matching utilities or adoption of Blockchain. The 1995 move from T+5 to T+3, and the more recent move from T+3 to T+2, were more about doing things faster and more efficiently within the existing infrastructure.

3. ***Small and medium-sized firms*** could be affected more due to their current lower automation, although they would likely rely on service providers to manage change for them. Also, ***firms in different segments of the industry*** will have more or less costly implementations.

4. ***Physical securities*** will still pose a problem and processing may remain on a longer cycle (meaning the sale of physical securities ordinarily will not be considered as payment for a trade executed on T).

5. The impact, if any, on ***domestic clients'*** needs will have to be assessed early on as more change in practice may be required than in the move to T+2.

6. The ***day-end fund pricing model*** will have to be reviewed. For years, investment funds have been able to settle money market funds on a T+1 basis, but these are fixed-priced funds. For all other funds, prices are currently not available until 6 p.m. or later on T. Manufacturer/issuer transaction contracts drive settlement calculations. These are currently required by Fundserv by 6:00 a.m. on T+1 in order to settle on T+2. Dealers today take trades from Fundserv in batch into their book of records on the evening of T+1. The funds industry will need to assess the impact of the shortened cycle and whether there will need to be a move to a different settlement cycle for funds as compared to other securities, which to date has been avoided.

7. Were the future move to a shorter cycle be set for July, August or even September of any given year, the long-held Fundserv tradition o*f **annual June ESG releases*** might need to be adjusted in a particular year or Fundserv might use its point implementation capability.

8. There may be an opportunity at implementation of a shorter cycle for the 2017 ***opt-in for funds*** (managers changed their funds' settlement date) to change to an opt-out (Fundserv would change all funds to the shorter cycle and fund managers would change the few not changing back to the longer date), as occurred during T+2 in the U.S. This automation would streamline work and reduce last-minute uncertainty.

9. There should be early consideration of what ***data to collect*** to help assess progress/readiness in the case of a shorter settlement cycle (CDS provides data based on trades entered and confirmed, but not on fails, and information on block settlements and allocations is not automated).

10. ***Costs*** will be substantial under any scenario.

11. The ***time*** required to implement the project will be longer.

12. Due to cost and complexity, the ***decision-escalation process*** will be more critical.

iv. ***Communications:*** *See key points from Sections III. and IV. above*

v. ***Testing and implementation:*** *See key points from Sections III. and IV. above*

vi. ***Cross-border/global issues:*** *See key points from Sections III. and IV. above and:*

i. ***Foreign exchange conversion*** must also have a shortened settlement cycle – currently foreign exchange typically settles on a T+2 basis (although CLS, formerly the Continuous Linked Settlement Bank, can facilitate earlier settlement).

ii. Foreign clients in materially ***different time zones*** pose a significant risk to timely settlement and this will need to be addressed early on.

e. Costs

The BCG report estimated that T+2 would cost the U.S. marketplace approximately USD 400 million dollars, while the move to T+1 would cost USD 1.8 billion (and implicitly more if the move were to same-day settlement). In the end, BCG estimated that the cost of T+2 was closer to $650 million. This could mean that the cost of a U.S. move to T+1 is now estimated at $2.3 billion (CAD 2.9 billion). Much of the material that supported T+2 relied on theoretical models of risk reduction, so actual savings and reduction of risk have not yet been determined and may be more mixed, according to a Fitch Ratings report. The cost and benefits could be re-visited to determine the actual net outcome from T+2. Based on U.S. estimates and the results of the CCMA's T+2 cost survey, costs in Canada could run to almost CAD 300 million for a move to T+1. The cost of a move to T would be materially higher to implement, or errors would be corrected on an after-the-fact basis at greater cost rather than, as now, as much as possible before securities settlement.

f. Benefits

The benefits of a less than T+2 settlement cycle, cited by the SEC in its March 2017 report, were to:

> "…reduce credit, market, and liquidity risk, and as a result, reduce systemic risk [and financing costs] for U.S. market participants… promote technological innovation and changes in market infrastructures and operations that will incentivize market participants to further pursue more operationally and technologically efficient processes, which may lead to further shortening of the standard settlement cycle... also [to] reduced margin charges and other fees that clearing broker-dealers may pass down to other market participants, thereby reducing transaction costs generally and freeing up capital for deployment elsewhere in the markets by those entities... the move to T+2 was more cost-effective and consistent with current market preparedness than a move to T+1."

VI. Recommendations

Recommendations were not specifically requested by the CCMA Board, but can be found implicitly in many parts of the Report. That said, Canadian capital markets participants face many, sometimes competing, and often inter-related changes in securities and non-securities-related regulation, technology, and risk in an environment of intense cost pressures. Because of the Canadian marketplace dependency on directions taken in the U.S., the CCMA membership believes that recommendations regarding certain immediate next steps would be helpful, and some recommendations made earlier in the report are highlighted below.

a. Immediate recommendations

1. Formally assign following up on recommendations agreed to by the CCMA Board in "a.", "b." or "c". here to an association or other organization that should report regularly on developments to interested parties.
2. Participate in U.S. clearing-and-settlement-cycle improvements (in particular as arise from the DTCC White Paper) through CDS and Fundserv, and monitor European Union and Australian industry-driven and regulatory developments identified in Section V – The Future.

3. Agree on and then communicate additional data points to evidence progress towards earlier trade-data entry and matching, fails and other critical points (for example, possibly the high, low and median institutional trade matching rates).
4. Provide for the CCMA website to be maintained with additions to the site and with changes to the CCMA newsletter recipient list accepted to allow for communications to interested parties.
5. Keep the CCMA Asset List up to date annually.
6. Consider periodically engaging with the CSA/SEC to ensure the Canadian capital markets can provide input to decision-making from inception of discussions of a shorter trade-to-settlement cycle.
7. Propose a way to ensure information on standard settlement cycles by product category in different countries, and Canadian securities exempted from the standard, is available.

b. Possible steps to take *prior* to any decision to shorten the settlement cycle

As with any period of possibly large change and little certainty, Canadian marketplace participants could, as Canadian humourist Stephen Leacock said, ride "madly off in all directions." Or do nothing until a direction for the horse (capital markets) is certain. However, these 'opposite-end-of-the-spectrum options' can leave the Canadian marketplace, respectively, wasting resources on pointless work or ill-prepared. There are interim possibilities, and this is the approach the U.S., Europe and Australia appear to be adopting. The following are divided into possible rule changes, industry-driven adoption of improvements, and industry and regulatory disciplinary options.

1. ***Further amendments to NI 24-101, NI 81-102, NI 81-104, other regulations:*** Comments received did not recommend, at this time, changes to NI 24-101 beyond removing provision for longer matching by non-North-American counterparts. The regulators and industry could also consider ways to reduce the extent of last-minute regulatory changes, such as by having settlement requirements triggered off of settlement date minus a number of days rather than off of T. As well, transitional and/or administrative relief could ideally be discussed and addressed further in advance of the implementation date, with transparency through accessible disclosures as required.

2. ***Industry-driven adoption of unique NI 24-101 model for making progress:*** Without recommending changes to NI 24-101 at this time, NI 24-101 encouraged successive advances – through measurement and reporting – in clearing and settlement by using gradually more restrictive matching deadlines. This enabled institutional trade-matching parties to better plan for and manage the costs of changing. The Canadian marketplace similarly could voluntarily agree to take interim steps to improve the process, leaving the industry better prepared for market or regulatory moves in the U.S., for example:

    - Move to a 95% trade-matching-by-noon-on-T+1 (Note: It is recognized that even matched trades may not settle[11]).
    - Move to 90% matching earlier in the day, say, 8:00 a.m. on T+1, possibly followed by close of business on T.

[11] Institutional trade matching statistics are posted on the TMX website as 'ITPs stats'

- Mandate use of electronic communication to improve confirmation and affirmation rates, and reduce errors.
- Adopt the European markets' two-hour trade confirmation response maximum.
- Consider CDS adopting the NSCC rule requiring all locked-in trades from exchanges, ATSs and other such sources to be sent to it in real-time, without pre-netting or batching of trades.
- Where appropriate to the Canadian marketplace, review and adopt approaches being discussed in the DTCC White Paper referenced in Section V. above.
- "Test-drive" a shorter cycle on bilateral bases or for trades over a set amount.
- Consider having a business day-end, with the understanding that transactions following a cut-off time would be for the next day's value as with deposits in the banking industry.

3. ***Discourage bad behaviour or unhelpful market practices:***
   - Impose settlement-fail penalties of some kind or after a certain number of incidents (the U.S. does so for Treasury and Agency securities and the European Commission's Central Securities Depositories (CSD) – Regulation (CSDR) EU No 909/2014 provides for such penalties also).
   - Require close-outs or forced buy-ins[12].
   - Report publicly on names of organizations involved in, or repeatedly involved in, late settlements, fails, late security loan returns, etc.
   - Report on counterparties and custodians *not* confirming trades until clients have available position or cash in their account.

4. ***Focus more regulatory attention on those firms reporting lower trade-matching rates*** (e.g., lower than minimum requirement %) by noon on T+1.

5. ***Consider more formally assessing benefits of a move to T+1 or less***, including as compared to the costs of the above measures aimed at improving settlement discipline.

c. Project management in the event of a decision to shorten the settlement cycle

While many items in "b." above can be achieved by agreement among CCMA members or other capital markets subsectors, it is likely that at some point cross-industry efforts and industry-wide project management would be advisable.

The main aspects of T+2 project management have been covered in detail above and, at present, there is no indication that the project management approach for T+1 or less needs to be materially different, although a move to T may require more of a team outsourced solution. There were areas that worked well that could be re-established, and a number of areas where improvements are indicated that should be adopted. These can be found in section 'IV – Successes/Lessons Learned'. There are, however, a number of areas to highlight because there is greater reliance on technology and less of a margin of error as the settlement cycle shortens.

- There need to be ***senior industry champions*** involved at firms and associations across the country due to the quantum increase in complexity of a move to a shorter cycle than T+2 as there were in earlier efforts to move to T+1.

[12] The International Capital Markets Association has expressed views on penalizing fails (acceptable) and requiring buy-ins (have concerns) due to the potential cascading effects of trade failures.

- ***Early meetings with regulatory leaders*** would be useful to see if there is an opportunity for earlier completion of rule changes and transitional relief, due to the serial nature of rule completion and greater need for regulatory certainty given the magnitude and risk of changes to achieve a settlement cycle shorter than T+2.

- ***Editorial Board meetings*** and more direct interactions with industry media will be called for as there was some media confusion with the CSA's August 3, 2017 CP 24-402, where coverage led some to think that T+2 implementation was being delayed ("Real-time reporting by exchanges considered for T+2 transition").

- There should be greater ***Canadian/U.S. interaction among communications counterparts***.

- ***Budget development and a payment model*** between participants may be complex: with the emphasis on fintech, there may be new entrants to discussions who have not contributed to development of the clearing and settlement system, and others who benefit from the system, but who did not pay for project management – a cost assumed by CDS participants in the case of T+2 but unlikely to be acceptable in future.

- There should be provision for ***industry-standard IT administrative support*** (e.g., e-mail and calendaring; shared database for members; shared filing of documents; and cybersecurity risk detection and protection provisions).

- There will likely need to be ***funding allocated for translation*** as the next round of discussions will be more intensive.

d. Conclusion

A number of member suggestions for project management improvements already have been adopted as part of the Post-Trade Modernization Advisory Council's work with CDS and CDCC participants working on the TMX/CDS Post-Trade Modernization project. Other recommendations described here would bring benefits – some smaller and some more important – to Canadian capital markets and those who rely on them.

Should readers have questions or comments regarding the Report, please contact info@ccma-acmc.ca. Answers will be provided, or the matters will be referred to the appropriate industry association or other body for a response.

Once again, CCMA staff wish to recognize and thank community members for their hard work, and regulators for their support, during implementation of T+2 and in keeping Canada's capital markets strong.

Appendix: List of Acronyms

ACPM	Association of Canadian Pension Management
AMF	Autorité des marchés financiers
ASX	Australian Stock Exchange
ATS	Alternative Trading System
BCG	Boston Consulting Group
BCSC	B.C. Securities Commission
BOC	Bank of Canada
CBA	Canadian Bankers Association
CCMA	Canadian Capital Markets Association
CDCC	Canadian Derivatives Clearing Corporation
CDIC	Canada Deposit Insurance Corporation
CDS	The Canadian Depository for Securities Ltd.
CEWG	Communications and Education Working Group (CCMA)
CLHIA	Canadian Life and Health Insurance Association
CMHC	Canada Mortgage and Housing Corporation
CPA	Canadian Payments Association
CRA	Charles River Associates
CSA	Canadian Securities Administrators
CSE	Canadian Securities Exchange
CUCC	Credit Union Central of Canada
DLT	Distributed Ledger Technology
DTCC	Depository Trust and Clearing Corporation (CDS equivalent)
ETF	Exchange-traded fund
FDIC	Federal Deposit Insurance Corporation (U.S. CDIC equivalent)
FINRA	Financial Industry Regulatory Authority (U.S. IIROC equivalent)
Fundserv	Fundserv Clearing Corporation
G-30	Group of Thirty
ICI	Investment Company Institute (U.S. similar to IFIC)
IDA	Investment Dealers Association of Canada (later IIROC, an SRO)
IFIC	Investment Funds Institute of Canada
IIAC	Investment Industry Association of Canada (similar to SIFMA)
IIROC	Investment Industry Regulatory Organization of Canada (similar to FINRA)
ISC	Industry Steering Committee (U.S.; equivalent to T2SC)
ISDA	International Swaps and Derivatives Association
ITM	Institutional trade matching
LRWG	Legal and Regulatory Working Group (CCMA)
LVTS	Large Value Transfer System
MFDA	Mutual Fund Dealers Association (SRO)
MFWG	Mutual Fund Working Group (CCMA-Fundserv-IFIC)
NI	National Instrument
OCC	The Options Clearing Corporation (U.S.)
OSC	Ontario Securities Commission
OWG	Operations Working Group (CCMA)
PMAC	Portfolio Management Association of Canada
SDA	Same-day affirmation
SEC	Security and Exchange Commission (U.S.)
SIA	Securities Industry Association (forerunner to SIFMA)
SIFMA	Securities Industry and Financial Markets Association (U.S.; similar to IIAC)
SRO	Self-regulatory organization
STP	Straight-through processing
T2SC	T+2 Steering Committee (CCMA)
UCITS	Undertaking for Collective Investment in Transferable Securities (European)