



Securities Industry Association



T+1 Business Case Final Report

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THE
CAPITAL
MARKETS
COMPANY

SIA T+1 Business Case – Final Report

Final Report

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1.0 Executive Summary

Case for Change

The case for moving to T+1 settlement for the U.S. financial services industry is strong and is based upon several factors. First, the move from T+3 to T+1 will dramatically reduce the settlement risk exposure of the U.S. securities industry. Second, it will enable the U.S. market to continue to maintain its global competitiveness by serving as the catalyst for enhancing the current post-trade processing and settlement process. The changes will result in a significant economic benefit to the industry. Third, the move to T+1 serves the interest of the U.S. investor by synchronizing the clearance and settlement process across asset classes, and enabling more fungible, flexible trading and investing. Finally, improving current trade process activities will make it possible for the U.S. market to support increased volumes.

T+1 can be realized in three and one-half years of elapsed time. Assuming a start in the fourth quarter of 2000, T+1 could be realized by June 2004. While all industry participants must take action to start implementation of the building blocks there are three steps that the industry must take immediately: assure the participation of asset managers and other buy-side firms, enable development of new matching utilities and begin the rewrite of the DTCC's continuous net settlement process.

T+1 Vision

T+1 aligns the efficiency of the clearing and settlement process with the efficiency and effectiveness customers have come to expect from the front-end of the trade process. T+1 delivers this efficiency while preserving the benefits of netting. Four key features characterize the T+1 environment:

Seamless communication among parties. T+1 will enable trade participants, exchanges, DTCC and industry infrastructure providers to communicate electronically. Multiple service providers will be linked in a seamless and cost effective manner. The industry will adopt interoperability guidelines that will direct the commercial, operational and legal relationships between service providers. These guidelines will include standard codes of practice and standard communication protocols.

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Significant real-time processing, less batch processing. T+1 requires all parties to streamline and implement significant real-time or near-real-time processing to meet the compressed settlement timeframe. Industry utilities will create a “one-stop shop” for matching and transaction consolidation. Firms will reduce their reliance on manual processes. The utilities will offer value-added services that firms can leverage.

Virtual, not physical, processing. For retail firms, the use of checks and physical securities will be greatly reduced.

Concurrent, not sequential, exchange of information. Many of the steps in the transaction processing cycle will occur simultaneously rather than sequentially.

T+1 Building Blocks

The T+1 National Committee believes that the following ten building blocks must be built and operating effectively in a T+3 environment **prior** to the move to T+1. This will ensure that the transition to T+1 is accomplished in an orderly and risk-effective manner, thereby preserving the safety and soundness of the U.S. securities industry’s operating infrastructure.

1. Modify internal processes to ensure compliance with compressed settlement deadlines
2. Identify and comply with accelerated deadlines for submission of trades to the clearing and settlement systems
3. Amend DTCC’s trade guarantee process to provide guarantee on trade date
4. Report trades to the clearing corporations in locked-in format and revise clearing corporations’ output
5. Rewrite the Continuous Net Settlement system (“CNS”) to enhance speed and efficiency
6. Reduce reliance on checks and use alternative means of payment
7. Immobilize shares prior to conducting transactions
8. Revise the prospectus delivery rules and procedures for IPOs

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9. Develop industry matching utilities and linkages for all asset classes
10. Standardize reference data and move to standardized industry protocols

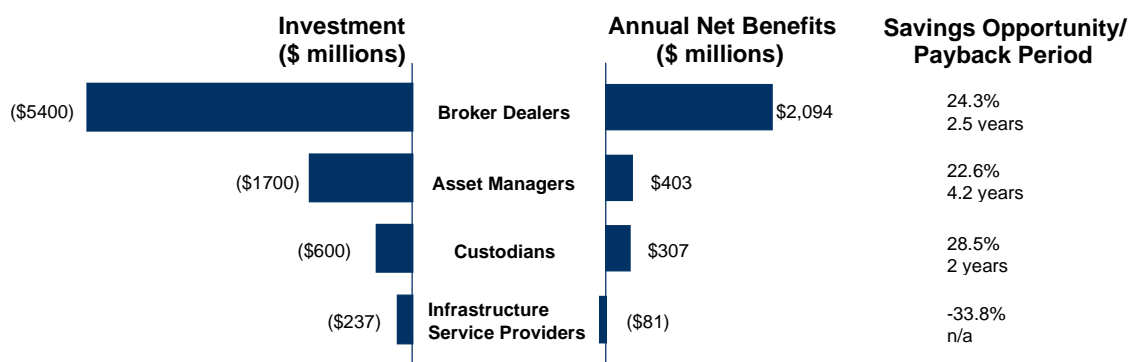
Business Case Analysis

Economic Value

Moving to T+1 will produce substantial benefits for the U.S. securities industry. It is estimated that the increased efficiency, effectiveness and automation that comes with T+1 will generate approximately \$2.7 billion in pre-tax, annual net benefits, distributed among the different participants as shown in Exhibit 1-1. This is a conservative estimate based on a comparison of costs attributed to the post-trade processing cycle in the current T+3 environment and the projected T+1 environment. From a process standpoint, more than half the benefits are realized in the back-end of the clearing and settlement cycle, as a result of improvements in settlement activities.

Exhibit 1-1:

**Net, Annual Benefits (\$ Millions) Total: \$2.7 billion;
Total Investments: \$8 billion**



1.0 Executive Summary

The U.S. financial services industry will invest \$8 billion to meet the new T+1 processing requirements. Ninety-nine percent of the total investment will be “within the four walls.” This investment will be used for internal changes such as process, IT infrastructure and application investment, as well as training, development and delivery. The remaining industry-wide investment will be to build new, centralized institutional trade matching utilities.

The “within the four walls” investment varies based on the participant type, size, and degree of challenge for each to implement the required building blocks for T+1.

The large firms (based on equity capital) will constitute a substantial portion of the overall T+1 investment, as they are expected to be the leaders in implementing new technologies and industry solutions. The medium and small firms will spend less, as many will outsource to vendors or utilize correspondent clearers and service providers to meet the new requirements. Although size is a key factor in determining the required investment, the existing technology environment, T+1 readiness level, responsiveness to change, and deployment complexities, will all impact the investment. For example, a large firm that has made significant progress in re-architecting may require less investment than a smaller firm that has not begun to prepare for T+1.

Risk Impact

The impact of moving to a shorter settlement cycle will materially reduce the value of outstanding settlement exposure for the U.S. financial services industry. Reducing the time period between trade date and settlement date by two-thirds, for those products settling on a T+3 basis, will result in a reduction in settlement risk exposure of approximately \$250 billion outstanding on a daily basis.

Implementation and Timeframes for T+1

T+1 implementation and conversion will require three and one-half years and is dependent on industry cooperation, agreement on common solutions, and active support and encouragement from regulators. Assuming the implementation commences in October 2000, T+1 could go live by June 2004.

The movement toward T+1 has already begun. Many of the building blocks are underway and firms are making investments that will enable T+1. Movement toward T+1 will become more structured as the T+1 National Committee, and the boards of various industry players, such as DTCC, the AMF/BMA, and

1.0 Executive Summary

ISITC, continue to lead the effort. Subsequently, implementation of the individual building blocks and T+1 as a whole will be dependent on the timely publication of industry standards, specifications, and testing plans.

Realization of T+1 will occur in two phases. In the first phase, the Implementation Phase, industry participants and service providers will prepare themselves and ensure that they are “T+1 Ready.” In the second phase, the Industry Testing and Settle-In Phase, the industry will migrate to the new industry processes, architectures, and utilities. During this phase, the industry will stabilize new technologies and infrastructure while maintaining the current T+3 settlement timeframes. A twelve to fifteen month period of operation within the Industry Testing and Settle-In Phase is expected before the industry will make the conversion to T+1 settlement timeframes.

Critical Success Factors

As the driver of T+1, the SIA T+1 National Committee (the “Committee” or “T+1 National Committee”) should monitor and address certain institutional, regulatory and behavioral issues that will be critical to the success of the initiative. Focusing on the following success factors will enable the industry to successfully implement and fully realize the benefits of the T+1 vision:

Disciplined governance process. The establishment and enforcement of a disciplined governance process by the SIA in partnership with key regulators, and participants will drive the industry’s movement to T+1 in accordance with an agreed timeline. This will include the establishment of appropriate monitoring and reporting procedures to manage the progress of participants and industry service providers, industry wide tests of T+1 components prior to the launch of T+1, and the adoption of codes of practice that will maximize the effectiveness of the shared utilities.

A clear and common vision. The U.S. Financial Services industry must have a clear and common vision of the impact, timeline, cost, and benefits of T+1, prior to launching the implementation effort. The Committee should help build industry consensus by syndicating the findings of the SIA T+1 Subcommittees’ whitepapers and this business case.

1.0 Executive Summary

Regulatory modifications. Achieving the T+1 vision will require some modifications to existing regulations. The Committee should encourage and monitor the progress of these modifications, which should be addressed prior to launching the T+1 environment.

Customer education. Customers need to be educated about the changing nature of their relationships with industry participants. This will ensure that customers are prepared to comply with new industry standards.

2.0 Case for Change

2.0 Case for Change

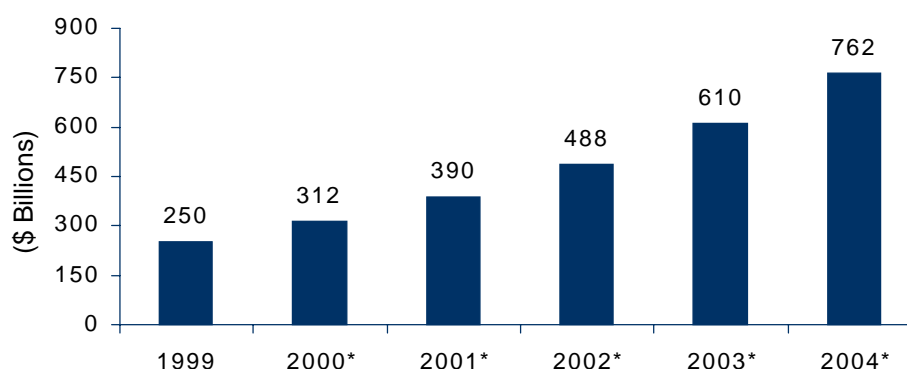
Overview

The rationale for moving to a shortened settlement cycle is based upon several factors. First and foremost, the move from T+3 to T+1 represents a dramatic reduction in the settlement risk profile of the U.S. securities industry. Second, the move to T+1 will serve as the catalyst for changing the current post-trade processing and settlement process, thereby enabling the U.S. market to function effectively and maintain its global competitive position. Last, the move to T+1 serves the interest of the U.S. investor, by synchronizing the clearance and settlement process across asset classes. This enables more fungible and flexible trading and investing.

2.1 T+1 will reduce settlement exposure

Currently the U.S. markets are efficient and the risk issues are mitigated due to appropriate checks and balances. However, rapidly increasing volumes and volatility have raised the risk profile of the market. These factors have resulted in larger dollar values of outstanding settlements, as well as greater opportunity for counterparty failure.

Volumes and dollar increases have been growing at a rapid pace—exceeding a thirty-three percent compounded annual growth rate. The total dollar value of T+3 settling trades awaiting settlement on a daily average basis exceeds \$125 billion. Moving to T+1 settlement will, therefore, reduce daily outstanding settlement exposure by \$250 billion. Based on current growth rates, this reduction in settlement exposure is projected to exceed \$750 billion in 2004, as depicted in Exhibit 2-1.

Exhibit 2-1**Projected Reduction in Settlement Exposure
from T+1 Settlement
(billions)**

Source (1999): DTCC

* indicates projected values

2.2 T+1 will enhance U.S. markets' global competitive position

The lower risk, lower cost, and greater liquidity brought about by a shortened settlement period will enhance the position of the U.S. market as the premier source of global trading and investment.

2.2.1 T+1 will strengthen the U.S. market against international competition

The U.S. markets must continue to improve efficiencies and reduce costs in the face of changing European markets. On May 3, 2000, the London Stock Exchange and Deutsche Borse announced plans for a merger creating the new iX exchange. This merger is expected to capture fifty-three percent of European trade volume. Deutsche Borse also holds a fifty percent stake in Clearstream, one of the major equities settlement organizations in Europe. The plan currently calls for a very efficient, all-electronic trading platform (Xetra), which could likely feed Clearstream for settlement.

2.0 Case for Change

Further consolidation of exchanges is evidenced by Euronext. The vision behind Euronext, a combination of Paris, Brussels and Amsterdam markets, is one of single membership, a single order book, a single rule book (the listing rules of the three members are to be harmonized), and single clearing and settlement solutions. This structure promises to offer an efficient trading environment and economies of scale to users, because the new market is built around a central counterparty.

In addition, investors are pressing Europe's myriad of clearing and settlement agencies to join forces and create one centralized company. Clearstream, the product of a merger between Cedel in Luxembourg and Deutsche Borse Clearing in Frankfurt, has a competitive advantage in the settlement of equities. Euroclear, in Brussels, has an advantage in the settlement of fixed-income securities. The feeling is that the European market will move towards consolidation soon; a merger of the two would provide the equivalent coverage to continental Europe that is afforded the U.S. market by DTCC.

The net result of the above changes will be the development of a seamless, efficient and cost-efficient alternative to the U.S. marketplace. The move to T+1 in the U.S. is a response to this development—it will result in process efficiencies that will enable the U.S. markets to maintain their preeminent global position.

2.2.2 T+1 will serve as a catalyst for industry change

The U.S. securities market enjoys a competitive edge over the other markets. This has fueled increasing cross-border investments into the U.S. market from foreign investors, and has established the U.S. capital market as the world leader in trading and investing.

The attractiveness of the U.S. market has to be maintained so that it can enjoy continuous growth. Specifically the following must be ensured:

- The maintenance and improvement of a lower cost structure
- The maintenance and improvement of efficient market processes and infrastructure
- Improved liquidity for the investor
- Continued acknowledgement as the low risk center of trading and investment

2.0 Case for Change

Recent trends in processing efficiency and capacity utilization have called into question the ability of the U.S. clearance and settlement system to maintain its pre-eminence, particularly in an increasingly competitive global atmosphere.

The move to T+1 will serve as the **catalyst** for coordinated industry action in the U.S., directed toward ameliorating the processing inefficiencies and unnecessary risk described below.

2.3 The move to T+1 will require the industry to address shortcomings in the current process

Implementing T+1 will require the industry to address shortcomings in the current process, to begin to move the industry towards greater levels of straight-through processing, and to synchronize the settlement cycles across U.S. markets.

2.3.1 The industry requires a solution that supports increasing volumes and volatility

At the present time, internal and industry-wide systems are straining to manage the rapidly growing volumes resulting from an explosion of self-directed investment for defined contribution plans, growth in cross-border activity, and the advent of electronic communication networks (ECNs) and electronic trading. This strain will intensify with the planned expansion of trading hours and the projected volume implications of decimalization.

Asset managers and broker/dealers have, in some instances, indicated that capacity is a critical issue. Significant investment in new systems will be required to manage anticipated trade volume.

The current institutional trade process consists of a series of sequential and repetitive steps and interactions among trade participants, and is hampered by manual processes, a lack of cross-industry messaging standards, and difficulties of obtaining and properly utilizing customer, security and settlement data. Consequently, there are many potential break points along the transaction cycle, which create multiple opportunities for failure.

The industry is already experiencing a marked reduction in processing efficiency, as reflected in the increase in the number of both trades awaiting confirmation on trade date and trades that are not affirmed prior to settlement. Unless proactive, cross-industry action is taken now, there will be negative implications to the industry, resulting in limited growth and lost revenue.

2.0 Case for Change

Measure	1995	1999
Average daily transactions	150M	350M
Average daily number of trades awaiting confirmation	36,036	70,015
Average daily number of trades not affirmed prior to settlement	12,000	41,000

2.3.2 T+1 will synchronize the settlement cycles across major U.S. markets

Currently, different settlement cycles are in place for different products in the U.S. markets. For example, U.S. Treasuries settle on a T+1 basis, while equities settle on a T+3 basis. The move to T+1 synchronizes the clearance and settlement practices of the major types of investment. Given the rapid rise in self-directed retirement investing and the rise in day trading, T+1 settlement for equities results in a positive benefit for retail investors, that is, the ability to better manage their portfolios without consideration of the funding implications of moving between asset categories.

Summary

In order for the U.S. markets to achieve radical process and technological enhancements, it is essential that all participants move in a cohesive way to achieve internal automation. In addition, it is essential that the participants actively commit to industry solutions that will promote efficiencies and automation between counter parties at various points of the trade cycle. All this cannot be achieved without a rallying cry that provides a motivation for all participants to move cohesively and concurrently to a targeted environment. Moving to T+1 can be that rallying cry for the industry.

3.0 T+1 Vision

Overview

The subcommittees of the T+1 National Committee have produced white papers that describe portions of the current T+3 settlement cycle that must be modified to move to T+1. Together, these white papers comprise the industry's vision of the T+1 world.

T+1 will align the efficiency of the clearing and settlement process with the efficiency and effectiveness customers have come to expect from the front-end of the trade process, while preserving the benefits of netting. Both retail and institutional customers demand faster service and turnaround times. Both groups have, or will soon have, direct access to the markets through online retail brokerage applications, ECNs, electronic trading platforms, and sponsored access to the exchanges. The speed and immediacy of trade execution needs to be matched by faster, more efficient settlement.

The vision for future trade processing is based on virtual interoperability, efficiency, codes of practice, and standards. The vision features the following guiding principles:

- Seamless communication among parties
- Concurrent, not sequential, exchange of information
- Significant real-time processing, less batch processing
- Virtual processing, not physical processing

3.1 T+1 vision components drive changes to the trade process

3.1.1 T+1 requires seamless communication among parties

Electronic communications will exist between trade participants, exchanges, the depository, and the newly created institutional trade-matching utilities.

Multiple service providers will be linked in a seamless and cost effective manner. This will be particularly true in the case of matching services (covered in detail in Section 3.2). Convergence among commercial providers will exist so that participants have a single process, regardless of the nature of the transaction.

3.0 T+1 Vision

Interoperability guidelines will be adopted to provide direction for commercial, operational, and legal coexistence among matching vendors. Any vendor intending to provide a matching service will have to conform to these “interoperability” guidelines.

Codes of practice and standardized communication protocols will be adopted. These will define interactions and behaviors between participants, and their roles and responsibilities within the transaction process.

3.1.2 T+1 requires synchronous exchange of information

Virtually simultaneous processes will comprise the various “steps” of the transaction cycle. This is explored in greater detail in Section 3.2. In essence, the new vision of transaction processing calls for the elimination of the sequential and reactive nature of the current process.

Centralized trade matching will be implemented. This is the cornerstone of revised institutional trade processing, and will replace the current confirmation and affirmation process. This will result in earlier identification of issues, resulting in more timely resolutions. Matching will be performed in three stages, depending on the needs and profiles of the participants, further described in Section 3.2.

3.1.3 T+1 requires significant real-time processing, less batch processing

Straight through processing (STP) will be enabled. Actions by all parties to become more straight-through in their processing activities are a necessary foundation for an effective T+1 settlement process. Additionally, industry utilities will create a single point for transaction consolidation.

Firms will reduce their reliance on manual processes. The ability of the securities industry to move to shortened settlement and greater efficiency will be predicated on the ability to institute an exception-based trade process. Manual intervention will be minimized, and the focus of operations will be on providing more value-added client services.

Value-added services will be offered by the utilities, which the participants can choose to leverage. These include generation of allocations, storage of account profile information, figuration rules storage and calculation capabilities, end-to-end monitoring of transactions, the ability to link to other solutions that provide enrichment service, and the ability to set up participant profiles to store processing parameters customizable by each participant.

3.1.4 T+1 requires electronic processing, not physical processing

Achieving a shorter settlement cycle requires a reduction in the physical and paper components of today's trade processing environment. For example, the T+1 vision relies on electronic payment forms and reduces the need for mandated physical components (e.g., prospectuses) prior to settlement date.

From a retail perspective, the use of checks and physical securities will be greatly reduced. The new vision of retail processing includes expanding the current use of the Direct Registration System, allowing for the electronic tracking and movement of ownership of physical securities. In addition, the reduction of checks as a payment mechanism for securities transactions will facilitate a shorter settlement period and reduce settlement risk in the marketplace.

3.2 The new T+1 trade process depends upon “virtual” trade matching utilities

The new T+1 trade process as proposed in the Institutional Process Model is based on the premise of a flexible, adaptable infrastructure, which eliminates systems and process redundancies and thereby reduces the number of manual steps required for transaction processing. The model proposes the concept of “virtual” matching utilities that allows for the seamless, real-time matching of trade data throughout a trade's lifecycle.

The matching utilities treat the trade cycle as a unit from post-execution to settlement, rather than as a group of loosely related messages and processes. The matching utilities and process are designed to deliver automated enrichment of trade information, with standing data elements throughout the cycle at points where they are required – a concept known as “just-in-time” or “continuous” trade enrichment. In addition to eliminating redundancies in data ownership by providing a repository, the matching utilities will enable real-time transaction status monitoring by all involved parties, providing for proactive risk management and the reduction of potential fails.

In addition to greatly reducing the systemic risks inherent in today's trade process, the proposed model will significantly reduce cycle times – a critical success factor for moving to T+1 – and dramatically increase capacity through automation, standards, and the streamlining of processes. In short, the new model will provide the type of infrastructure necessary to maintain the health of the U.S. securities industry for years to come.

T+1 improves all three phases of settlement processing: Trade Agreement, Settlement Agreement and Settlement.

3.0 T+1 Vision

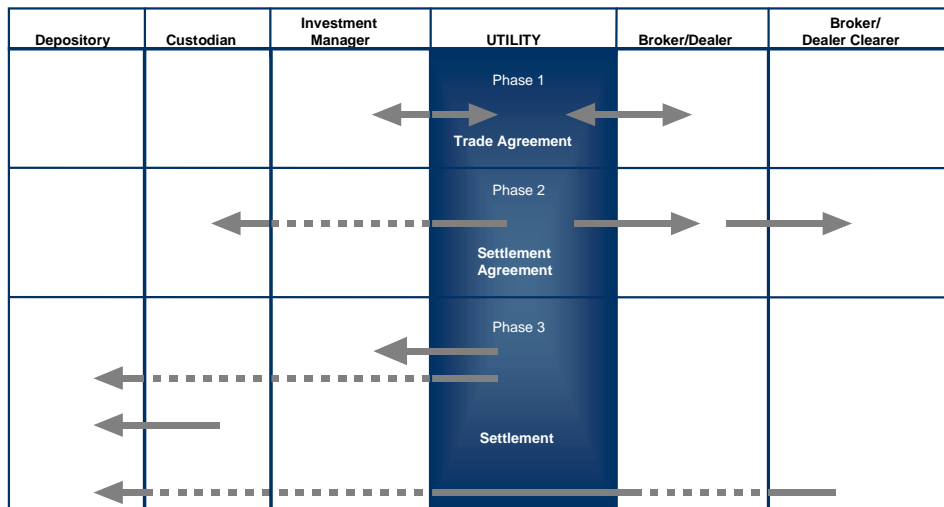
The **Trade Agreement Phase** includes the Notice of Execution (NOE), allocation, matching of trade details, and status reporting. The result of the Trade Agreement Phase is a fully agreed trade on a gross price basis. This phase requires active involvement by the trading parties, i.e., the investment manager and broker/dealers. This allows for any issues or errors to be caught early in the process, which will help minimize fails.

The **Settlement Agreement Phase** covers the calculation of commissions and other fees to arrive at a net amount, determination of settlement means, and the creation and distribution by the matching utilities of instructions-to-settle on behalf of the investment manager and executing broker. This phase requires the active involvement of executing brokers, clearing brokers, and custodian banks. The matching utilities will provide the interface between those parties.

The **Settlement Phase** includes the production of client confirmations and pending settlement instructions by the matching utilities, and the transmission of settlement approval by all involved parties.

Details of the T+1 trade process model and supporting industry initiatives are described in a series of whitepapers. ~~These whitepapers are available at~~ www.SIA.com/tradedateplusone/.

**Exhibit 3-1
The Role of Matching Utilities in T+1 Settlement**



3.3 T+1 could facilitate a potential future move to T+0

The process and infrastructure established by the implementation of the T+1 process vision is a prerequisite for the industry to move to T+0. The other prerequisites of moving to T+0 at this time would result in fundamental changes above and beyond the radical redesign of the transaction process required for T+1 settlement. These T+0 requirements are:

- A fundamental change in behavior and practices of the participants would be required. For example, orders could be kept open for extended periods of time, and every execution would require an allocation, as transactions would be processed and settled when they are executed. In addition, the practice of average pricing and final NOEs (which consists of multiple fills executed at various points of the day) will have to be eliminated. These changes are fundamental, and will impact the investors.
- All trades will need to settle on a real time, gross settlement – trade-by-trade – basis, thereby eliminating the processing efficiencies of netting which is being preserved in the proposed T+1 environment. As more processing is moved intra-day, a dramatic increase in volumes will result. In today's T+3 cycle, over ninety-five percent of street side trades are netted, reducing daily trade deliveries by over 5 million. These street side trades will need to be settled separately in a gross settlement environment.
- Further increases in volume would result from an inability to group executions and allocations by NOE in a T+0 environment will result in a dramatic increase in trade processing volumes. In today's environment the final NOE triggers the post trade process: the asset manager provides allocations to the broker/dealer. In a T+0 environment, each allocation will result in a settlement, resulting in a multiple of today's settlement volume. For example, if one order generates five executions for ten customer accounts, fifty settlements would result in T+0, versus 10 in T+1.

The increase in processing volume means that the DTCC will need to expand capacity significantly and all links with participants converted to real time, to enable settlement to occur real time.

- Aggregation and institutional netting may be required in a T+0 environment. This would increase the implementation timeframe and risk of shortening the settlement cycle.

3.0 T+1 Vision

- T+0 will require simultaneous movement of cash and securities—true real time gross settlement. This requires a real time payment and securities process that updates all relevant records on a real time basis. This will, in turn, require real time collateral management systems. All the business logic and functions performed at the end of the day and through nightly batch cycles will have to be transitioned to real-time. This will have to be done by all the participants in the transaction cycle.

It is anticipated that the investment that the industry will make to move to T+1 will provide the foundation and could be leveraged for the move to T+0. Given the substantial behavioral, technology and processing requirements of T+0, the business case must be proved.

4.0 T+1 Building Blocks

Overview

The actions that the industry needs to take to achieve T+1 are called “building blocks.” There are ten building blocks that are the minimum set of initiatives that need to be implemented to move from T+3 processing to T+1 processing. They include changes to regulation, information technology, organizations, and behaviors. Actions that are not strictly required to achieve T+1 have been excluded from the list of building blocks.

4.1 Ten building blocks will move the industry to T+1

Ten specific building blocks will move the industry to T+1. Their impact on market participants is shown in Exhibit 4-1. The descriptions of the specific building blocks that follow highlight some of the key barriers and impediments to successful implementation. An understanding of the barriers that must be overcome is critical to appreciating the challenge to the industry of moving to T+1, and forms the basis of the Implementation Roadmap as described in Section 7.

The SIA T+1 National Committee believes that all building blocks must be built and operating effectively in a T+3 environment prior to the move to T+1. This will ensure that the transition to T+1 is accomplished in an orderly and risk-effective manner, and thereby preserve the safety and soundness of the U.S. financial services industry’s operating infrastructure.

1. Modify internal processes to ensure compliance with compressed settlement deadlines

Shortening the settlement cycle will require that all market participants modify their applications, procedures, and behaviors. For example, broker/dealers will need to develop seamless interfaces between front-office order execution and back-office processing and settlement systems. Asset managers and custodians will need to automate the allocation and settlement authorization processes, respectively.

Many market participants process a significant portion of their transactions in batches. To enable a T+1 settlement cycle, participants will have to process transactions real-time, or near real-time, to ensure timely delivery of output to downstream portions of the trade cycle. This is particularly important for the institutional trade process. This requires participants to achieve some level of straight-through processing to enable an exception-based process, which embodies early identification of errors for timely resolution.

4.0 T+1 Building Blocks

2. Identify and comply with accelerated deadlines for submission of trades to the clearing and settlement systems

Clearing corporations must quickly communicate transaction cycle deadline changes to their memberships and change their systems and processes to accept input from market participants in a real or near real-time manner. Shortening the settlement cycle will require making clearing corporations' submission deadlines earlier than in the T+3 process. This will allow clearing corporations to complete their net settlement and trade guarantee processes earlier in the trade cycle.

Exchanges will need to submit trades to DTCC on a real-time or near real-time basis. While this has occurred for some exchanges, the elimination of overnight batch processing of trade information is critical for DTCC to complete its processing on trade date for T+1 settlement.

Institutional broker/dealers and custodians must modify the timing and substance of intra-day submissions to DTCC, and be positioned to accept revised output from DTCC as well.

3. Amend DTCC's trade guarantee process to provide guarantee on trade date

Shortening the settlement cycle requires DTCC to advance its trade guarantee to midnight of trade date (T+0). To do this, DTCC will need to change systems and processes by which it conducts intra-day risk monitoring.

For example, separate clearing corporations should be able to cross-collateralize a given participant. Participants will need to automate collateral provision processes and, possibly, extend after hours staffing to accommodate the accelerated schedule. In addition, the Fed window for cash and collateral may need to be expanded to facilitate the new timing requirements of the guarantee.

4. Report trades to clearing corporations in locked-in format and revise clearing corporations' output

In T+1, trades must be provided to the clearing corporations in a "locked-in" format. Locking-in trades ensures that the continuous net settlement process can complete in the shortened processing window. T+1 cannot be supported with extensive manual intervention in processing.

This building block is largely complete for equity trades. Currently, ninety-nine percent of equity trades are locked-in at the point of execution. Substantial work is required to lock in fixed income trades prior to submission to DTCC. DTCC, the exchanges, and the fixed income community need to resolve this issue quickly to complete implementation of this building block.

4.0 T+1 Building Blocks

5. Rewrite Continuous Net Settlement (“CNS”) to enhance speed and efficiency

DTCC will need to modify the current continuous net settlement (“CNS”) functionality to process both real-time transaction updates and multiple intra-day batch updates.

To meet earlier processing deadlines, the industry will rely more heavily on the CNS system. Street side trade participants will be required to submit their trades to CNS earlier and more frequently. To do this, they will need to modify their own trading systems, processes and behaviors.

6. Reduce reliance on checks and use alternative means of payment

In a T+1 processing environment, purchasers must fund their transactions earlier to meet the shorter clearing and settlement cycle. In today’s T+3 processing environment, approximately fifteen percent of retail securities payments are made by check. Many of these payments are mailed to broker/dealers that have three days to collect and apply these funds.

In a T+1 processing environment, retail broker/dealers need to reduce their customers’ use of checks by moving their customers to alternative automated payment methods. For example, one solution is to enhance the use of ACH by market participants. ACH offers a risk-free and expeditious means by which to transfer funds. Over seventy-five percent of broker/dealers currently have the capability to offer ACH to their customers; however, only three percent of securities payments are accomplished via ACH.

To use ACH as a payment mechanism, NACHA will need to revise its rules, which allow rescission of payments up to 60 days after settlement. The T+1 National Committee is working with the NACHA Rules Committee to modify the treatment of payments for securities transactions, thereby enabling a broader use of ACH as a payment mechanism. Studies are also underway as to other payment alternatives.

Another approach for reducing retail customers’ dependency on checks is to continue the ongoing asset gathering strategy by retail broker/dealers. By consolidating a customer’s balances and payment services in a single account, funds to cover a purchase are much more likely to be on hand.

7. Immobilize shares prior to conducting transactions

To enable the processing of trades in a shortened time frame retail broker/dealers or their clients must immobilize physical certificates prior to conducting sales transactions. In a T+1 settlement cycle, there will be insufficient time for certificates to be obtained, converted to street name, and settled. Broker/dealers may require shares to be on deposit prior to taking a sale order. Alternatively, clients may have their physical shares registered with the Direct Registration System (DRS).

4.0 T+1 Building Blocks

Expanding the use of DRS requires enhancing its communications infrastructure and connectivity at each transfer agent's installation. This will obviate the need for retail broker/dealers to build links with multiple transfer agents. It is assumed that DTCC will provide these communications interconnections.

In addition, transfer agents will need to increase the capacity of their DRS installations to handle increases in volume.

8. Revise the prospectus delivery rules and procedures for IPOs

In order to shorten the clearing and settlement cycle, the SEC must revise rules that require broker/dealers to deliver prospectuses forty-eight hours prior to trade confirmation. This will require them to develop alternate means of communicating the terms of a new issue before the customer pays for the security.

These alternative means could include electronic delivery of prospectuses and publication in major financial industry publications of a term sheet that describes the salient details of a new security. Both institutional and retail broker/dealers will need to amend their systems and internal processes to implement this building block.

9. Develop industry matching utilities and linkages for all asset classes

The demands of institutional trade processing require that today's sequential processing cycle be replaced by central utilities that make most activities concurrent. Shortening the clearing and settlement cycle by two days increases this need for concurrence. Information to complete each step of the shorter process will need to be more accurate and available earlier.

Virtual matching utilities will fill this need. They will route information, enrich data, and match transaction information on behalf of counter parties. The utilities will provide standard settlement instruction databases and automatic trade figuration. If configured in accordance with the proposed T+1 institutional vision, the utilities will provide significant processing efficiencies for all players, and will facilitate the needs of the clearing corporations for enhanced speed in trade submission.

10. Standardize reference data and move to standardized industry protocols

In order to achieve the processing and settlement of executed trades in a T+1 environment, the industry will need to develop consistent and timely instrument and counterparty reference data, to enable matching of trades. In addition, a transition to industry accepted messaging guidelines and standards will need to be accomplished to ensure the most effective processes and standards exist within the industry.

4.0 T+1 Building Blocks

Exhibit 4-1

Where is the Impact?

Building Block	Who Drives solution?	Where is the Impact?				
		Broker/ Dealer Institutional	Broker/ Dealer Retail	Asset Managers	Custodians	Infrastructure Service Providers
1. Modify internal processes to ensure compliance with compressed settlement deadlines	Participants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Identify and comply with accelerated deadlines for submission of trades to the clearing and settlement systems	<ul style="list-style-type: none"> ■ Exchanges ■ Broker/dealers 	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
3. Amend DTCC's trade guarantee process so that guarantee is provided on trade date	<ul style="list-style-type: none"> ■ DTCC 	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
4. Report trades to clearing corporations in locked-in format and revise clearing corporations' output	<ul style="list-style-type: none"> ■ DTCC ■ Exchanges 					<input type="checkbox"/>
5. Rewrite Continuous Net Settlement ("CNS") processes to enhance speed and efficiency	<ul style="list-style-type: none"> ■ DTCC 	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
6. Reduce reliance on checks and use alternative means of payment	<ul style="list-style-type: none"> ■ NACHA ■ Industry Associations 		<input type="checkbox"/>			
7. Immobilize shares prior to conducting transactions	<ul style="list-style-type: none"> ■ Regulators ■ DTCC ■ Transfer agents ■ Participants 		<input type="checkbox"/>			<input type="checkbox"/>
8. Revise the prospectus delivery rules and procedures for IPOs	<ul style="list-style-type: none"> ■ Regulators 	<input type="checkbox"/>	<input type="checkbox"/>			
9. Develop an industry matching utilities and linkages for all asset classes	<ul style="list-style-type: none"> ■ Regulators ■ Matching utilities ■ Clearing corporations ■ Participants 	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Standardize reference data and move to standardized industry protocols	<ul style="list-style-type: none"> ■ Standards committees ■ Matching utilities ■ Participants 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4.2 The impact of each building block will vary by market participant type

In the proposed T+1 vision, the responsibilities of all participants will change. These changes will significantly improve the efficiency and effectiveness of the entire trade process. This efficiency and effectiveness will allow for all parties to reduce processing times and move to a shorter settlement cycle.

4.2.1 Asset managers will seamlessly integrate trade information on a real-time or near-real-time basis

Processing Changes

In the proposed environment, asset manager systems will need to seamlessly integrate trade information on a real-time or near-real-time basis. Portfolio management, compliance, trading and operations will have to operate in unison. Besides internal interoperability, asset managers will now require real time interoperability with the matching utilities. In particular, asset managers will need to be able to monitor the impact of all their activities in real-time and provide the results to the utilities, enabling instantaneous resolution of unmatched or error messages. To accomplish this, information from a wide variety of applications will have to be accessible (e.g., the resolution of allocation to NOE match differences will require seamless access to allocation information, execution information, and booking information).

Interaction with utilities will need to occur on a real-time basis to ensure all risk and settlement issues are addressed immediately. As credit and risk monitoring will likely happen late on trade date and on the morning of T+1, asset managers will need to quickly react to errors caused by their transactions.

Forty percent of all asset managers responding to the survey indicate that real-time management of data represents one of the largest issues currently facing the asset management industry. To achieve this internally, over the next two years, asset managers will largely focus on the following activities (based on survey responses):

- Seventy-three percent will seek to improve automation of the allocation process
- Fifty percent will focus on migrating to a single order management system
- Forty-three percent will automate the net amount calculation process, and
- Twenty-nine percent will move to a single portfolio management system

In today's environment, a large number of asset managers still maintain separate internal portfolio, trading/order management and booking systems, making it difficult to provide an integrated view across all investment activities. Organizations have difficulty reacting quickly to decisions made by one part of the organization (e.g., trading) on other parts of the organization (e.g., portfolio management).

4.0 T+1 Building Blocks

Specifically, when notices of execution (NOEs) are received from broker/dealers, they frequently are not booked against the books and record until the night of trade date or the morning of T+1. Fifty-nine percent of respondents process NOEs through overnight batch systems, and sixty-six percent require the running of a batch cycle prior to starting the affirmation process.

Once internal interoperability and integration of trade information on a real-time or near-real-time basis is achieved, asset managers will realize improved decision-making and faster resolution of issues.

Codes of Practice Changes

Asset managers will need to adopt communication and messaging standards that enable seamless interoperability within and outside their organizational boundaries.

Standards are a key concern, as asset managers use a wide variety of methods and standards to communicate with both broker/dealers and custodians. The lack of consistent standards forces a significant amount of human intervention and rework, and introduces errors in the process. Methods of communication to custodians can vary widely: twenty-seven percent of trade notices are submitted via SWIFT, twenty-six percent via proprietary direct connections, twenty-eight percent via paper/fax, and the remainder via other methods. Allocations are communicated via a number of different means, using different standards, some more automated than others (e.g., Oasys). Twenty percent of allocations are communicated verbally, and twenty-six percent are still submitted via fax or other paper means.

Industry utilities will set the messaging standards, leverage existing standards to communicate, and reduce operational communication links by requiring only a single connection to the utilities. Currently, asset managers maintain a significant number of connections to external parties, via a variety of methods. Some large asset managers maintain links with over thirty to fifty custodians, each link frequently requiring its own type of connectivity and method of interaction. Forty-seven percent of asset managers indicated that connectivity and interaction with both custodians and broker/dealers will require improvement. To address this issue, over seventy-nine percent will focus, over the next two years, on establishing improved links, requiring fewer proprietary communication methods.

For example, submitting allocation information to the broker/dealer requires significant time. Even though fifty percent of allocations are generated within thirty minutes of receiving NOEs, the remaining fifty percent take up to five hours to generate. According to the responses received in the survey, ninety-nine percent of asset managers indicated that allocations are usually known the morning of trade date. In addition, ninety-six percent indicated that standard allocation algorithms are used in generating allocations.

4.0 T+1 Building Blocks

In the T+1 environment, asset managers will be required to:

- Ensure that virtually all communications are carried out via standardized electronic communication message standards (e.g., SWIFT, FIX, ISITC)
- Ensure that real time communication links are established using standard communication protocols (e.g., MQ series), based on methods supported by the utilities
- Synchronize with and leverage standardized databases (e.g., for allocations, standard settlement instructions, figuration) whenever possible—asset managers will have to ensure all standing instructions are accurately reflected on the databases managed by industry utilities. Placing greater reliance on these will ensure reduced errors for all parties involved in the trade, thus reducing processing costs
- Support and adapt to new messaging sets—ensuring that consistent messaging standards exist internally will enable rapid adoption of current external message standards
- Comply with codes of practice regarding timely transmission of transactions, resolution of errors, etc.

Activity Changes

Asset managers will need to generate allocations on a more real-time basis. They will be able to leverage the utilities to eliminate or reduce current internal processes such as:

- NOE to allocation matching
- Enrichment of trade information (e.g., figuration, standard settlement, allocation)
- Communicating non-error situations to custodians and broker/dealers.

Activities currently occurring during “normal” business hours (e.g., 8 a.m. – 6 p.m.) in a T+3 cycle can occur during “off” hours in a T+1 cycle. Asset managers will need to assign resource to resolve off-hours error conditions (e.g., unmatched information) to enable timely resolution of errors.

In summary, placing greater reliance on industry infrastructure providers (e.g., providers of standard counterparty databases) will ensure timely and more cost effective reduction of unmatched trade information.

4.0 T+1 Building Blocks

4.2.2 In T+1 broker/dealers will move to exception-based processing

Processing Changes

In the proposed environment, broker/dealers will move to an exceptions-based operation. The broker/dealer community covers several segments of the market, including retail, institutional, correspondent clearers, and prime broker organizations. In T+1, all of these broker/dealers will need to achieve a substantial amount of straight through processing.

In the T+1 environment, NOE generation, allocation processing, and the generation of settlement instructions will need to be completed in near real time to accommodate the demands of a significantly reduced trade cycle. Broker/dealers will need to prepare for this by further automating their current environments. In addition, timely and effective error resolution will require real-time capture of all critical trade information.

In today's operating environment, a significant number of broker/dealers still function in a batch environment. This can be seen by the fact that on trade day, twelve percent of NOEs generated, and sixty-one percent of allocations processed, are performed via batch processes. In addition, sixty-six percent require the running of a batch cycle to notify clearing agents/depositories of trade instructions. In order to generate settlement instructions, sixty percent of firms require the generation of a batch cycle. The vast majority of small and medium sized firms will likely place a great reliance on the clearing firms in the industry in order to prepare for T+1. This will require the clearing brokers to ensure real-time or near real-time access to their systems, and ensure compliance with codes of practice.

In addition, clear and timely implementation plans will have to be devised, ensuring that clients clearly understand interface and processing requirements, as well as service level expectations. Institutional broker/dealers, street side firms, correspondent clearers, and prime brokers will need to comply with new DTCC systems and processes. The changes to be undertaken by DTCC will require broker/dealers to build more real-time or near-real-time interfaces to leverage the enhanced functionality that DTCC will provide. This enhanced functionality includes real-time updates, improved access to CNS and depository information, the ability to add new trades and corrections to the netting process in real time, and enhancements to the CNS stock borrow program.

DTCC will also require all broker/dealers to ensure that exchange trades are automatically captured and locked-in prior to submission to NSCC's trade guarantee process. This already occurs for a significant portion of equity-related transactions, as executions of these trades are already captured by electronic exchanges such as NASDAQ (including ECNs), or via hand-held floor devices on the NYSE (complete

4.0 T+1 Building Blocks

electronic capture will be required by the summer of 2000 as outlined by the NYSE). A solution must be determined to address fixed income trades.

Codes of Practice Changes

Broker/dealers will need to standardize processing and communications protocols and enhance their external connectivity. To enable the seamless, exception-based process described in the T+1 vision, firms will need to migrate to industry-prescribed standards and make greater use of real-time links. A number of industry standards are starting to evolve (FIX, ISITC, and SWIFT) and significant effort is being made to further improve these standards.

At present, many standards and methods exist for participants to interact with each other. No consistency or enforcement exists. This has led many broker/dealers to maintain proprietary communication links (forty-eight percent for institutional firms, and ninety-seven percent for retail firms) and pass information via manual communication channels (phone, fax or paper based). This is confirmed by thirty-eight percent of the survey respondents who indicated that the top barrier for institutional broker/dealers to achieving T+1 is the current lack of real-time connectivity and lack of standards in the industry.

For example, asset managers and broker/dealers often verbally negotiate commission percentages or amounts on an account-by-account basis. This has resulted in fifty-three percent of trades requiring an override in the calculation of figuration information due to the manual method of communication, manual entry, and errors. To effectively reap the benefits of the revised trade process envisioned in T+1, significant process and behavioral changes will also need to be made. In today's environment, more than fifty percent of NOEs are not communicated until after 2 p.m. on trade day. The adoption and enforcement of codes of practice will greatly reduce such processing bottlenecks and the potential for errors that they create.

Other changes to retail practices involve a need to reduce the use of checks and physical certificates. In today's environment, a retail customer has approximately three days to fund a trade if monies are not in the customer's account. Currently, only fifty-six percent of accounts have funds available at the time of trade execution. In a T+1 environment, it will not be feasible for retail customers to use checks to pay for their securities transactions, particularly if these payments are mailed. To ensure that payments arrive in time alternative methods of payment will be required. ACH has been identified as one alternative payment mechanism that will enable timely payment for securities. However, there are still several hurdles to overcome, including the need to modify the NACHA rescission period of sixty days for securities transactions.

The use of physical certificates impedes receipt of shares prior to settlement. In the current environment, it takes several days for securities to be on hand at the executing

4.0 T+1 Building Blocks

broker. In addition, corporate actions (e.g., dividends) often have to be processed prior to settlement, since many of the dividend payments are not processed within the normal dividend cycle (frequently overlooked by the holder). This process of delivering shares will not work effectively in a T+1 cycle.

To ensure that securities are available for settlement on T+1, physical shares must be immobilized prior to execution. This can be achieved either by requiring securities to be on hand at the broker/dealer, or by expanded use of the Direct Registration System (DRS). Brokers will have to ensure that they can interact effectively with the ultimate provider of the linkage to DRS, and conduct client education programs to effectively transition from the use of physical securities. The move toward immobilizing shares prior to transacting sales will greatly improve the cost effectiveness and efficiency of the retail process.

The practice of prospectus delivery will also need to change in the future for initial public offerings. In the current environment, new issues require the delivery of the preliminary prospectus, to anyone expecting to purchase the offering, forty-eight hours prior to sending a confirmation. The new T+1 settlement cycle will make this process unworkable. Therefore, consideration is being given to publishing preliminary prospectuses in major financial publications (non-restricted securities) or providing them electronically via a website or electronic utility provider.

Retail firms should consider providing consumers with an electronic means to view web-based copies of prospectus documents, or should anticipate building connectivity with a provider of electronic prospectus services. User identification and password control could be utilized to ensure the general public cannot view restricted (144a) issues. Additionally, client education is required to ensure the retail consumer understands alternatives to prospectuses.

Activity Changes

Institutional and retail broker/dealers, correspondent clearers, and prime brokers will need to eliminate some activities and shift their operational focus to exception-based processing. Settlement optimization and client service will differentiate operational performance of different firms. Skill and staff seniority will increase and retaining key employees will become even more important.

In the current environment, approximately sixty percent of broker/dealer operational resources are focused on trade capture, allocation, figuration, and trade matching (including error resolution). In the T+1 environment, a significant number of these activities are likely to shift from the broker/dealer/clearer to new utilities, including:

- The receipt of allocation information from asset managers

4.0 T+1 Building Blocks

- Matching of NOEs to allocations
- Receipt and comparison of settlement instructions
- The receipt of DTCC confirmations and production of corresponding confirmations

In addition, resources dedicated to other activities will be significantly reduced, depending on the extent to which a firm utilizes the optional features of the matching utilities. These include net figuration, and enrichment of the trade with settlement instructions.

Settlement processes conducted at the end of the trading day will likely necessitate twenty-four-hour staffing. This is due to the fact that the trade guarantee will now be performed on midnight of trade date, requiring some functions to be performed after the guarantee, (e.g., settlement exemption, settlement optimization and collateralization will occur during the early morning hours of T+1). It is likely that, in the long term, these functions will either be significantly automated or provided by a new market offering.

4.2.3 In T+1 custodians will need to change to real-time or near-real-time processing, with a focus on risk management

Processing Changes

Reduced time frames will have one of the most dramatic effects on the operating environment of custodians, despite their considerable progress toward straight-through processing.

To ensure successful operation in the T+1 settlement environment, custodians will have to ensure real-time or near-real-time processing of all trade instructions, and develop the ability to link seamlessly with the new utilities. This will require reengineering the current workflow, and eliminating batch processing cycles.

Risk management functionality will need to be enhanced, since the impact on account positions is frequently not known until late in the trade cycle (T+1 or T+2). The ability to measure risk on a real-time basis will be critical, as the time between current processing (involving trade capture and matching) and settlement is significantly reduced. Intra-day notification to clients will be required as collateral positions or risk profiles are affected, in order to allow sufficient time for clients to respond. Custodians will also have to utilize real time position/collateral management solutions for activities such as stock borrow and lending activities.

The modifications that DTCC envisions (involving the rewrite of CNS and changes to the trade guarantee process) will require custodians to adapt to new processing time frames and near-real-time processing. In addition to reduced time frames and

4.0 T+1 Building Blocks

standards, DTCC has indicated that reporting formats and standards will change, as it makes available a real time DTCC reporting database to all applicable participants.

While aggregation is not a pre-requisite to moving to T+1, it will improve the overall settlement process. Custodians will need to be able to process aggregated settlement transactions, as well as apply the settlements to the appropriate underlying accounts.

Changes to Codes of Practice

Historically, custodians have relied greatly on standard messaging and communication protocols. For this reason, custodians will likely require fewer changes in this area. Expansion and improvement of message sets will further enhance processing capabilities. New message sets will likely be required by the new utilities. DTCC has indicated that it will move to enhance messaging standards. Communications protocols supported by DTCC will ensure more timely and accurate transmission of data. International messaging formats will also have to be considered, since DTCC will support several existing standards such as the ISO 15022 data dictionary, ISITC and FIX.

Activity Changes

The reduction of the processing time frames in the transaction cycle will significantly impact the operational schedules of custodians. As indicated before, asset managers or utilities will have to present fully figured trade instructions to custodians on an almost real-time basis. In addition, custodians could receive instructions, delayed by resolution of trade differences, as late as 11 p.m. Custodians will then have to perform credit checks, notify the appropriate parties of credit issues and match settlement instructions. Resolution of credit issues or settlement issues will have to be resolved in time for settlement the next morning. This could mean that a significant number of resources will be required to process transactions between 6 p.m. on trade date and 6 a.m. on T+1.

The decrease in available processing time will be offset by a reduction in the number of settlement errors and a concomitant reduction in resources. As an example, settlement instruction errors will be significantly reduced because centralized utilities will offer standardized standing instruction databases that all can use.

4.3 Changes will also be required of service providers

The new processing model will also change the processes and practices of major service providers, including DTCC and vendors.

4.0 T+1 Building Blocks

4.3.1 In T+1, DTCC will have increased capacity and real-time clearing and settlement processing

As capacity is still a significant concern, DTCC is looking to reduce its processing burden by effectively eliminating its street side matching activities. With ninety-nine percent of equity trades submitted as locked-in trades, NSCC has been able to reduce the number of equity street side trades that require matching.

Efforts are underway to allow for real-time or intra-day multi-batch connectivity from all the exchanges. NASDAQ already provides intra-day, multi-batch feeds to DTCC. The NYSE is testing a real-time data link for OCS trades and will provide multi-batch submissions for other trades. The regional exchanges are working with DTCC to increase the frequency of their daily transmissions. How the OTC fixed income market will be handled remains an issue. Discussions are underway to provide a solution for this market.

CNS provides netting of most broker-to-broker transactions, effectively reducing the volume of settlements by ninety-five percent. The CNS application is twenty-five years old. T+1 settlement will require a significant rewrite of CNS to implement real-time functionality and expanded capacity. CNS changes include the ability for real-time updates and reporting, improved access to CNS and depository information, the real-time ability to add new trades and corrections to the netting process, enhancements to the CNS stock borrow program, and foreign currency capabilities. These enhancements will provide all participants and utilities with the ability to manage participant obligations, position and risk management and borrowings real-time.

DTCC has recommended that its guarantee be effective midnight of trade day. This will require systems and process changes to DTCC's risk management function. In addition, new procedures will be required to permit NSCC to obtain additional clearing fund deposits more quickly.

As the trade cycle is reduced from three days to one day, there will be a critical need for real-time information and updates from DTCC. Real-time access to current trade settlement, position, and netting information will need to be provided. This will require the development of a central information database that can be accessed by all relevant participants, via a number of access mechanisms. Message standardization will be critical to ensure correct interpretation of data and external connectivity.

4.0 T+1 Building Blocks

4.3.2 In T+1 vendors will be the beneficiaries of interoperability and open standards

Currently, a large number of vendors supply market participants with a variety of solutions and solution components that are vital to their operations. Solutions can include in-house software processing solutions, communication networks, market data, middleware, hardware, outsourcing solutions, consulting solutions and many more. In many instances these components only provide part of a larger solution. Without interoperability and open standards, participants frequently have to provide the “glue” to enable interoperability, requiring either customization or a middleware solution. Some participants shy away from “best of breed” solution components and look for a compromise solution that is already integrated.

The changing environment can provide vendors with opportunities to enable changes required in the industry. In order for vendors to succeed in the proposed environment, they will need to:

- Clearly understand the changes that participants, as well as utilities, will be required to make
- Provide value-added services that support the proposed environment
- Provide solutions that can seamlessly integrate with those of other solution providers, operate on open standards, as well as providing real-time data communication, processing and update capabilities

4.4 The U.S. securities industry understands the challenges of moving to T+1, and is beginning to address the building blocks

U.S. securities industry participants grasp the challenges of moving to T+1. Exhibit 4-2 describes the challenges participants see at their own firms.

4.0 T+1 Building Blocks

Exhibit 4-2

Response frequency to question “What are the top five impediments to achieving T+1 at your firm?” *

Impediments to Achieving T+1	Broker-Dealer Institutional	Broker-Dealer Retail	Asset Manager
Lack of real time connectivity, communication protocols and standards	38%		47%
Inability to undertake front to back STP including real-time automation	25%	43%	40%
Lack of clear and formalized industry plans regarding aspects and functions of the T+1 process, including Utility functions and implementation timeframes	19%	29%	
Competing industry initiatives such as decimalization and extended trading hours	31%	21%	
Lack of qualified technology resources	31%		27%
Lack of vendor preparedness			27%
Inability to economically provide alternative payment methods such as ACH		21%	
Inability to process physical certificates in a time manner		21%	
Inability to educate clients on changes the impact of T+1, including education around payments and physicals		21%	

Source: Open-ended survey question

* Custodians did not provide a response to this question; DTCC was not surveyed for this question

Summary

The ten building blocks are the critical set of initiatives that need to be implemented to move from T+3 to T+1 processing. They include changes to regulation, information technology, organizations and behaviors. The SIA T+1 National Committee believes that all building blocks must be built and operating effectively in a T+3 environment prior to the move to T+1. This will ensure that the transition to T+1 is accomplished in an orderly and risk-effective manner, thereby preserving the safety and soundness of the U.S. financial services industry’s operating infrastructure. While the industry understands the challenges the move to T+1 poses, participants have already taken steps to implement the ten building blocks.

5.0 Benefits Analysis

Overview

Moving to T+1 will yield substantial benefits for the U.S. securities industry. The increased efficiency, effectiveness and automation that flow from implementing all of the T+1 building blocks will generate approximately \$2.7 billion in pre-tax, annual net benefits. On an \$8 billion investment, the industry will realize a twenty-eight percent internal rate of return. Furthermore, the \$2.7 billion annual net benefit reflects a three-year payback. From a process standpoint, more than half of these benefits will be realized in the back-end of the clearing and settlement cycle, as a result of improvements in settlement activities.

Additionally, a significant decrease in credit risk will result from shortening the settlement cycle. And, the enhanced processing environment in which T+1 operates will result in significant operational risk benefits to the industry.

5.1 T+1 results in substantial cost savings opportunities for the industry

Implementing the ten building blocks will streamline securities processing throughout the industry and result in substantially reduced error processing, reconciliation, and rework. There are many different sources of these benefits. It is important to remember that, in the end, it is the asset owners (both institutional and retail investors) that will benefit from reduced processing costs in T+1.

5.1.1 Each phase of the clearing and settlement cycle yields a different level of benefit

Settlement Agreement Phase

The efficiencies created in the Settlement Agreement Phase will result from a reduction in time and effort associated with reconciliation and error processing, reflecting three major process changes in T+1:

- Match reports that eliminate the need to produce and match confirmations
- Increased automation that improves the efficiency of the figuration process and reduces the effort spent reconciling and resolving mismatches
- Standing settlement instructions that significantly reduce incidents of conflicting instructions.

5.0 Benefits Analysis

Settlement Phase

The efficiencies to be realized in the Settlement Phase are as follows:

- Early notification of trades, which will expedite resolution of credit and risk issues
- Use of alternative payment systems by retail customers, which will eliminate the expense of processing physical checks for many securities purchases
- Immobilization of shares, which will result in virtual processing of information, rather than the more costly physical processing of certificates

Some portion of these benefits will be offset by the application of increased resources to settlement optimization and to other activities that comply with the shortened settlement cycle.

Trade Agreement Phase

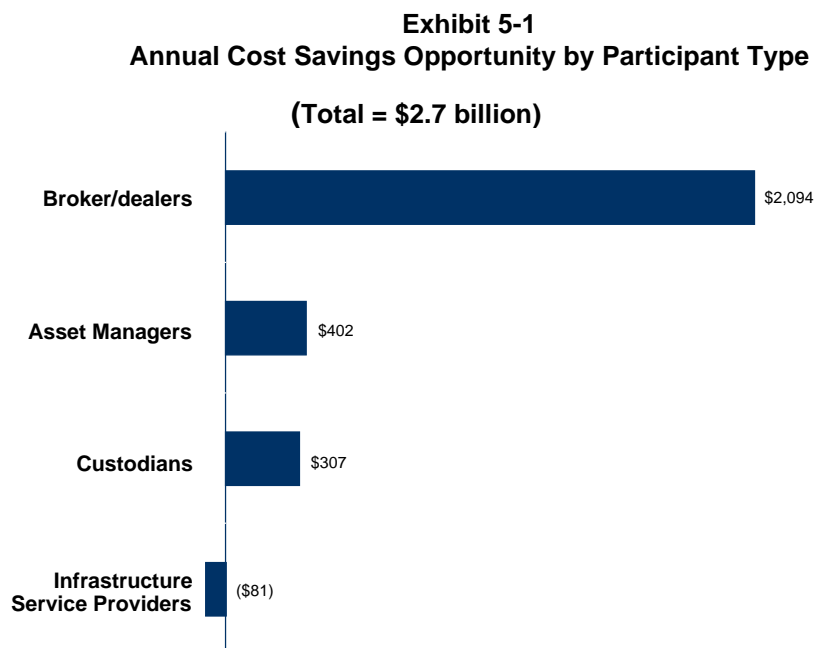
Savings opportunities in the Trade Agreement Phase will be a result of reduced reconciliation and resolution activities, resulting from:

- More efficient matching of NOEs to allocations at the utilities
- Reduced effort to create allocation sets at the asset manager
- Improved error resolution processes for broker/dealers and asset managers

5.0 Benefits Analysis

5.1.2 The level of benefit varies by participant

There is a variance in the degree to which different participants benefit from T+1. It is anticipated that in order to win a bigger share of the market, participants will pass their savings on to the retail and institutional investors, making them the ultimate beneficiaries of the lower cost T+1 processing environment. Exhibit 5-1 illustrates the distribution of benefits across participant types.



Broker/dealers

Broker/dealers will realize almost \$2.1 billion in annual, net benefits from T+1. While many of these benefits are associated with the Settlement Agreement Phase of the clearing and settlement cycle, broker/dealers will realize benefits throughout the process, as follows:

- Savings will result from improved matching and allocation processing at the front-end
- Reduced error processing and reconciliations will occur throughout the trade cycle (e.g. for settlement instruction and figuration differences)

5.0 Benefits Analysis

- By reducing their reliance on checks as a payment mechanism for securities transactions, retail broker/dealers will be able to eliminate approximately \$125 million in expenses annually. Immobilization of shares will result in another \$725 million in annual benefits

Asset Managers

Asset managers will realize approximately \$403 million in annual benefits from T+1. Many of these benefits result from changes in the Trade Agreement Phase of the institutional trade processing cycle. Specifically, asset managers will benefit from the following:

- Many matching and reconciliation activities now executed by asset managers (e.g. matching of NOEs to allocations) will instead be executed by the industry utilities
- The industry utilities will be a more efficient processor, and their ability to consolidate information will dramatically reduce the cost of reconciliation
- Some of the effort associated with figuration, comparison of net proceeds amounts, and the resolution of mismatches will also shift to the utilities, increasing the overall benefits asset managers can expect to see.

Custodians

Custodians will realize approximately \$307 million in cost savings from T+1, in large part reflecting the many improvements to the Settlement Phase of the clearing and settlement cycle. Custodians benefit from many new efficiencies, as follows:

- Early notification of trades will accelerate processing routines
- Earlier processing of credit and risk checks will expedite the process of resolving issues with client and asset managers
- Receiving transactions from a single source in an electronic way that can be processed electronically will reduce the inefficiencies in the current process

Industry Infrastructure Service Providers

A shift of \$81 million of expenses will occur from the participants to the matching utility providers. One would expect this because:

- Existing infrastructure service providers will be doing more, e.g., DTCC is likely to provide DRS related communications services

5.0 Benefits Analysis

- New utilities will be performing consolidated processing on behalf of the industry (e.g., matching utility vendors will process trades formerly processed by broker/dealers and asset managers)

Industry infrastructure service providers will expend less effort generating settlement instructions and reconciling settlement instruction differences. Already highly automated, these providers plan to achieve an even higher level of efficiency and cost-effectiveness.

5.1.3 T+1 will reduce turnaround times and error processing dramatically

The changes to current processes and systems which T+1 will foster, will result in a significant reduction in the duration of the average trade's life cycle, greatly reducing turnaround times. This will result from the elimination of non-value-added activities, and the compression of others via automation. The concept of "just in time enrichment," embodied in the new vision for institutional trade processing, and the reduced manual processing planned for retail transactions, will reduce the time it takes to complete a transaction, resulting in a reduction of operational risk and cost, and the timely resolution of issues.

In addition to cycle time, a significant reduction in errors will accrue to the enhanced automation required for successful conversion to T+1 settlement. Less manual intervention in the trade enrichment process (e.g. with regard to figuration, average price calculations, settlement instruction processing, etc.) will result in a more error-free process. In addition, the enhanced process of exchanging information in T+1 will eliminate errors caused by incomplete or misinterpreted information. Lastly, the integration of centralized trade and counterparty information with the clearance and settlement process, and adherence to codes of practice, will further enhance the quality of trade processing.

5.2 T+1 will substantially reduce overall risk in the system

T+1 will not only result in substantial cost savings opportunities; it will also reduce the aggregate credit risk and operational risk in the U.S. securities industry. Since market risk is incurred at the time a trade is done, the move to T+1 will not impact industry aggregate market risk.

5.0 Benefits Analysis

5.2.1 Shortening the settlement cycle will reduce credit exposure by sixty-seven percent

Credit risk is the potential for counter-party default prior to completing settlement. An institution's principal exposure is directly related to the gross dollar amount of unsettled trades at any given time. It follows that in moving to a T+1 environment, the gross amount of unsettled trades settling on a T+3 basis will reduce from three days worth of outstanding value to one day. Therefore, credit exposures for these trades will be reduced by sixty-seven percent.

Since T+1 reduces the timeframe within which failed trades and potential non-settlement problems can be identified, participants will be better able to mitigate the economic impact of a default event.

Acceleration of clearinghouse guarantees will further reduce credit risk. Currently, DTCC provides delivery guarantee at midnight between T+1 and T+2. Under T+1, delivery will be guaranteed at midnight of T. This will effectively reduce the settlement duration from the present average time horizon of about thirty-six hours, to about ten or eleven hours. The settlement time horizon for OTC settled trades will be reduced from approximately eighty-one hours, to about twenty-four hours.

5.2.2 T+1 will reduce operational risk

Operational risk represents the potential for an unexpected systems or process problem that prevent an institution from settling its transactions in a normal routine way. The changes that firms will make to their systems and processes to enable T+1 will result in a significant **decrease** in operational risk. This assessment is based on an analysis of risk levels along the transaction cycle from low to high, based upon the potential frequency and magnitude of transaction failure, and its possible economic impact. Additionally, the decrease in the number of pending settlements as a result of shortening the settlement cycle, and the greater accuracy in determining entitlements for corporate actions, income processing and proxies will dramatically reduce operational risk for custodians.

The overall risk impact by process phase is depicted in the chart below and described in the following sections.

5.0 Benefits Analysis

Analysis of T+3 vs. T+1 Operational Risk by Clearing and Settlement Phase

	Trade Agreement	Settlement Agreement	Settlement
T+3 Risk	Medium	Medium	High
T+1 Risk	Medium	Low	Medium

5.2.3 The nature of operational risk will shift in the Trade Agreement Phase

Several features of the T+1 environment, such as automated matching and standardized communications, will contribute to a decrease in operational risk in the Trade Agreement Phase.

- In T+3, current systems across the industry suffer from limited capacity to handle increasing trade volumes, whereas in T+1, it is expected that scalable solutions will enable increasing volumes to be handled effortlessly and in a timely fashion
- In T+3, manual matching procedures often exist in smaller organizations. In T+1, the introduction of the matching utilities will automate and streamline this process
- In T+3, communication is often dependent on phone and fax. These forms of communication will be standardized to meet shortened processing timetables

Somewhat offsetting this decrease in risk, in the short run, is the inability to adequately modify trading practices to mitigate the risk of late or erroneous trade capture. This will result in a deterioration in error handling and resolution. Over time, it is expected that trade capture standards will be enhanced, leading to a lower overall level of risk in this phase of settlement.

5.2.4 Substantial reduction in operational risk will be realized in the Settlement Agreement Phase

The settlement agreement process in the proposed T+1 environment represents considerably **lower** risk than exists in the current T+3 process. Break points are largely removed and the risk of data transfer error is considerably reduced.

5.0 Benefits Analysis

For example, in the current T+3 environment, figuration routines are not standardized, limiting processing capacity. Furthermore, figuration discrepancies are often resolved by phone. With the advent of central matching utilities, automated figuration (although not mandatory in the current design) will increasingly be adopted, resulting in fewer errors and more timely resolution of differences. In addition, the use of a standing settlement database in the T+1 environment will result in higher levels of efficiency and reductions in errors, because of the reduced reliance on manual processes.

5.2.5 Moderate reduction in operational risk will be realized in the Settlement Phase

The current T+3 Settlement Phase represents a high level of risk. While the settlement process within T+1 will still be dependent upon the issuance of settlement approval to the depository by broker/dealers and custodians (as in T+3), the benefits of trade matching will reduce this level of risk to a medium level.

In the current environment, significant differences in automation levels exist between the participants of the trade, with smaller players often dependent on manual settlement generation and authorization. It is expected that the demands of central matching will result in increased automation levels, which will reduce error rates. Somewhat offsetting these benefits is the continued reliance upon institutional communication systems and a shorter time frame in which to resolve settlement errors.

Summary

There is a very strong economic case to move the U.S. securities industry to a T+1 clearing and settlement cycle. Analysis indicates that the increased efficiency, effectiveness and automation effected by T+1 will generate approximately \$2.7 billion in pre-tax, annual net benefits, on an investment of approximately \$8 billion. While these benefits may vary by participant, and by the phase during which they occur, they represent a very respectable twenty-eight percent internal rate of return for the industry.

T+1 will not only result in substantial cost savings opportunities; it will also reduce the aggregate credit risk and operational risk in the U.S. securities industry. Since market risk is incurred at the time a trade is done, the move to T+1 will not impact industry aggregate market risk.

6.0 Investment Analysis

6.0 Investment Analysis

Overview

The U.S. securities industry will spend \$8 billion to meet the new T+1 processing requirements, as defined by the ten T+1 building blocks described in Section 4 – T+1 Building Blocks. The level of investment will vary by participant type, size of firm, and level of T+1 readiness.

Ninety-nine percent of the total investment will be “within the four walls.” The level of this investment will vary by participant type. It will be directed to internal changes, such as IT infrastructure and application investment, and training development and delivery. The remaining investment will be used, industry-wide, to build new matching utilities.

Exhibit 6-1 presents the breakdown of investment by participant type for each building block.

Exhibit 6-1

Total Investment by Building Block and Participant Type (Total = \$8 billion)

	Instl. B/D	Retail B/D	Asset Manager	Custodian	Corr. Clearers	Depository	Exchange	Matching Utility	Total Investment
1. Modify internal processes to ensure compliance with compressed settlement deadlines	\$1510M	\$440M	\$790M	\$390M	\$140M	\$25M			\$3295M
2. Identify and comply with accelerated deadlines for submission of trades to the clearing and settlement systems	\$105M	\$75M			\$25M	\$5M	\$5M		\$215M
3. Amend DTCC's trade guarantee process that guarantee is provided on trade						\$25M			\$25M
4. Report trades to clearing corporation in locked-in format and revise clearing corporation output						\$5M	\$6M		\$11M
5. Rewrite current real-time CNS to enhance speed and efficiency						\$35M			\$35M
6. Reduce reliance on checks and use alternative means of payment		\$385M			\$180M				\$565M
7. Immobilize shares prior to conducting transactions		\$155M			\$25M	\$10M			\$190M
8. Revise the prospectus rules and procedures for IPOs	\$80M	\$160M			\$35M				\$275M
9. Develop an industry matching utilities and linkages for all asset classes	\$90M		\$195M	\$25M	\$25M	\$2M		\$100M	\$437M
10. Standardize reference data and to standardized industry protocols	\$1580M		\$675M	\$180M	\$390M	\$30M			\$2855M
TOTALS	\$3.4B	\$1.2B	\$1.7B	\$0.6B	\$0.8B	\$0.1B	\$0.01B	\$0.1B	\$7.9B

Source: T+1 Business Case Investment Model

6.0 Investment Analysis

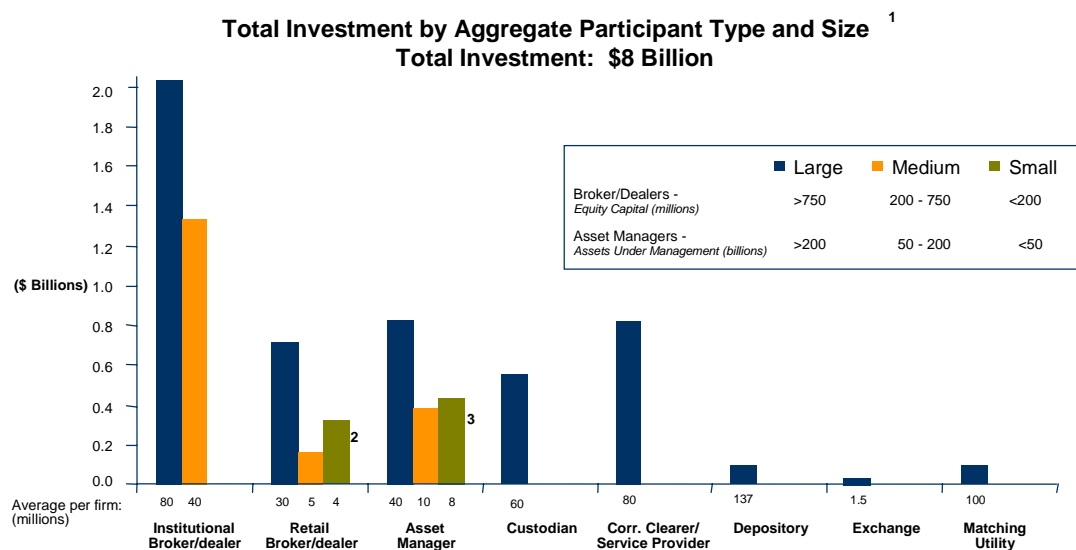
6.1 The level of investment varies by participant type and size

The T+1 building blocks will impact each of the participant types in a different way, and will consequently require different levels of investment. For example, institutional broker/dealers will be impacted by five of the building blocks and will need to invest more heavily than other participants to achieve compliance with shorter settlement cycles and standardized reference data. In contrast, asset managers and custodians will be impacted by only three building blocks each and will not need to invest to the same extent as broker/dealers.

In addition to participant type, the size of the firm impacts the investment. The large firms (based on equity capital) will constitute a substantial portion of the overall T+1 investment, since they are expected to be the leaders in implementing new technologies and industry solutions. The medium and small firms will spend less in aggregate, as many will outsource to vendors or utilize correspondent clearing firms and service providers to meet the new requirements. Although size of the firm is a key factor in determining required investment, the existing technology environment, T+1 readiness level, responsiveness to change, and deployment complexities, will also impact the investment. For example, a large firm that has made significant progress in re-architecting may require less investment than a smaller firm that has not begun to prepare for T+1.

Exhibit 6-2 presents the breakdown of total investment by participant type and size.

Exhibit 6-2



¹ These estimates assume all large and medium firms will make investments to address the 10 T+1 Building Blocks

² It is expected that 20% of small broker/dealers will need to make investments; the remaining 80% will rely on existing or new outsourcing arrangements

³ It is expected that 30% of small asset managers will need to make investments; the remaining 70% are expected to seek alternative solutions

6.0 Investment Analysis

6.1.1 Institutional broker/dealers will incur forty-four percent of the \$8 billion overall T+1 investment

The majority of the institutional broker/dealers' investment is associated with the move to the new institutional trade processing model (building blocks 1, 9, and 10). Institutional broker/dealers will invest \$1.5 billion to meet new requirements associated with compressed settlement timeframes, such as the ability to provide the appropriate information to new matching utilities in the specified time (see Exhibit 6-1). Most of this cost is associated with enhancing or replacing existing systems to enable real-time generation and processing of NOEs, allocations and figurations, and to automate and streamline the flow of transactions between front, middle, and back office systems. Broker/dealers will spend significantly less to improve the speed and reliability of information flow between participants since the service provider will incur the cost of actually developing the new matching utilities. However, broker/dealers will still need to spend \$90 million to implement the appropriate access modules and establish connectivity with new matching utilities (building block 9). Standardizing reference data will require a substantial investment on the part of the institutional broker/dealers (\$1.6 billion). Complying with industry-wide standards will require the majority of firms to completely reorganize enterprise reference data and ownership and to rationalize existing systems.

In addition to the investment associated with the new trade processing model, institutional broker/dealers will make investments to comply with street side requirements. Firms will spend \$105 million to modify existing batch processes to move to real-time or intra-day submission.

The remaining investment (\$80 million) will be made to revise prospectus delivery processes for initial public offerings (IPOs). This cost will be minimal for many broker/dealers, since they will leverage vendors' prospectus delivery capabilities. In particular, many of the smaller firms with limited IPO issuances will not need to make investments in this area.

6.1.2 Retail broker/dealers will spend \$1.2 billion, with the largest firms incurring sixty percent of this investment

Although the overall investment for small broker/dealers is larger than that of the medium category, the average investment per firm is actually lower for the small players. The sheer number of small retail broker/dealers is the key factor driving up the aggregate investment numbers for the small category. For example, the average investment for retail broker/dealers is \$30 million for large firms, \$5 million for medium, and \$4 million for small.

6.0 Investment Analysis

The highest cost for the retail broker/dealers is associated with compliance to compressed settlement timeframes (building block 1). Firms will spend \$440 million to enhance or replace existing systems to comply with new trade guarantee and CNS processes and revised clearing corporation outputs. Retail broker/dealers will also make a significant investment (\$385 million) to reduce reliance on checks (building block 6). The majority of firms will implement new functionality and systems to meet the new requirements (e.g., ACH links). However, there are also a large number of firms, particularly in the medium and small segment, requiring minimal investments, due to their existing ACH infrastructure or low volumes.

Retail broker/dealers will spend \$155 million to immobilize shares prior to conducting transactions (building block 7). This investment is not as substantial as the cost to achieve other building blocks, since many firms will look to DTCC and industry transfer agents to provide this capability. However, some investment will still be required to establish the appropriate links and provide for exception handling. Expanding the use of DRS requires enhancing its communications infrastructure and connectivity at each transfer agent's installation. This will obviate the need for retail broker/dealers to build links with multiple transfer agents. These connection capabilities will be provided by DTCC.

Retail broker/dealers will spend another \$160 million to revise prospectus delivery procedures for IPOs. Finally, retail broker/dealers will spend \$75 million to modify existing batch processes and systems to achieve more timely submission of trades to clearing and settlement systems.

6.1.3 The majority of the asset managers' \$1.7 billion investment is needed to meet the requirements of the new institutional trade matching model

Like the institutional broker/dealers, asset managers will make investments to meet the requirements of the new institutional trade processing model. Asset managers will spend \$790 million to comply with compressed settlement cycles, ensuring that appropriate information is provided to new matching utilities in the specified timeframes (building block 1). Most of this cost is associated with enhancing or replacing existing systems to enable real-time generation and processing of allocations, and figurations, and to automate and streamline the flow of transactions between front/middle and back office systems. They will spend an additional \$195 million to establish the appropriate interfaces with the new utilities (building block 9). Finally, they will make an investment of \$675 million to standardize reference data.

6.0 Investment Analysis

6.1.4 On average, each custodian will spend \$60 million to move to a T+1 processing environment

Unlike broker/dealers and asset managers, there are only a small number of custodians that serve the majority of the U.S. market. Therefore, custodians' overall investment constitutes only five percent of the overall T+1 investment. However, each individual Custodian will spend between \$30 million and \$90 million to implement the T+1 building blocks.

The move to the new institutional transaction processing model will require custodians to spend \$390 million to comply with compressed settlement timeframes (building block 1), \$180 million to standardize reference data, and \$25 million to establish the appropriate interfaces with the utilities (building block 9).

6.1.5 Correspondent clearing firms and other service providers will make investments comparable to those made by broker/dealers

The correspondent clearers and service providers (e.g., ADP) are impacted by the majority of the T+1 building blocks, since they provide services for both Institutional and retail broker/dealers. In particular, many of the small broker/dealers will not make T+1 investments; they will rely on the correspondent clearers/service providers. The average investment for an individual correspondent clearing firm is \$82 million, which is very similar to the average investment for a large broker/dealer (\$80 million).

Although several correspondent clearers have already achieved high levels of straight through processing, the majority will require significant changes to their existing infrastructures. The most significant costs for the correspondent clearers are associated with standardizing reference data (\$390 million), reducing reliance on checks (\$180 million), and complying with compressed settlement timeframes (\$140 million). Investments of \$35 million or less will be made to implement the remaining building blocks.

6.1.6 DTCC is expected to spend greater than \$100 million to implement the building blocks necessary to move to T+1

DTCC will make investments that enhance its internal capabilities, and provide key components of the industry infrastructure. While the specifications of these enhancements are not yet finalized, it is expected that one of the major internal investments DTCC will make is to rewrite the existing Continuous Net Settlement (CNS) system (\$25 million). CNS will be substantially rewritten to accommodate real-time processing and other enhanced capabilities that will bring greater efficiency to the settlement of streetside trades. Another major investment (\$25 million) will be made to modify internal processes to enable more streamlined processing and ensure compliance with shortened settlement timeframes.

6.0 Investment Analysis

The compressed timeframes resulting from T+1 settlement will also require DTCC to modify its existing trade guarantee, and its reporting systems and processes. DTCC will spend approximately \$35 million to amend its trade guarantee process and modify risk management processes and procedures for obtaining additional margin from participants. DTCC will spend \$10 million to provide linkages to DRS to support immobilization of shares and another \$5 million to enhance or replace reporting systems and processes, so as to achieve the greater reporting efficiencies required in a T+1 environment.

In addition, the move to the new transaction processing model will require DTCC to make investments to provide connectivity between internal systems and new matching utilities (\$2 million), and to standardize reference data (\$30 million).

6.1.7 Exchanges will spend \$11 million to implement the required T+1 building blocks, representing an insignificant portion of the overall T+1 investment

The exchanges will make the investment required to report trades “locked-in” to the clearing corporation (\$6 million). Enhancements to existing systems will be required to enable submission of all equity street side trades in locked-in format. For some exchanges (i.e., NYSE), this investment will be minimal, since the majority of trades are already submitted locked-in. For fixed income trades, additional investments will be required by the exchanges to integrate with the “industry defined” solution. In addition, the exchanges will spend \$5 million to modify existing batch processes and systems to achieve more timely submission of trades to clearing and settlement systems.

6.1.8 The \$100 million investment cost of new matching utilities compares to the \$335 million investment required by institutional players to establish the appropriate links and interfaces

This \$100 million investment covers the functional scope of building block 9, as described in Section 4—T+1 Building Blocks (e.g., information routing, data enrichment and matching for domestic trades).

Summary

The U.S. financial services industry will invest \$8 billion to meet the new T+1 processing requirements. Ninety-nine percent of the total investment will be “within the four walls.” This will vary based on the participant type, size and state of T+1 readiness.

This investment will be used for internal changes such as process, IT infrastructure and application investment, as well as training, development and delivery. The remaining industry-wide investment will be to build new, centralized institutional trade matching utilities.

7.0 Implementation Roadmap

Overview

T+1 implementation and conversion will require 3 ½ years and is dependent on industry cooperation and agreement, as well as regulatory support and encouragement. Assuming the implementation commences in October 2000, T+1 could go live by June 2004.

7.1 Implementation and conversion of T+1 will require three and one-half years

Achieving industry-wide implementation of T+1 will require coordination across participant types. Without coordination, the pace toward implementing T+1 building blocks could vary across the industry. Some participants might move more quickly, driven by business cases, internal needs, strategic relationships, or executive vision. These firms, service providers, and organizations will implement and deploy capabilities that increase their readiness for T+1. Other industry participants might not perceive benefits in an independent move toward T+1. Action on the part of these entities to move to T+1 settlement will require industry leadership and marketplace influence.

The movement toward T+1 has already begun. Many of the building blocks are underway and firms are making investments that will enable T+1. As the leaders of the T+1 effort, the SIA T+1 National Committee, partnering with other industry boards and associations, such as DTCC, GSTPA, the newly formed DTCC/Thomson joint venture, the AMF, BMA, ISITC and ICI, will introduce more structure and coordination so that an industry-wide implementation plan can be achieved. Efforts are already underway to coordinate the common efforts across these bodies (e.g. with regard to codes of practice, market standards, etc.). Subsequently, implementation of the individual building blocks and T+1 as a whole will be dependent on the timely publication of industry standards, specifications, and testing plans.

T+1 will occur in two phases. During the first phase, the Implementation Phase, industry participants and service providers will prepare themselves and ensure that they are “T+1 Ready.” During the second phase, the Industry Testing and Settle-In Phase, the industry will migrate to the new industry processes, architectures, and utilities, converting to the new industry infrastructure while maintaining the current T+3 settlement timeframes. The Industry Testing and Settle-In period is expected to last for twelve to fifteen months of operation, before the industry would make the conversion to T+1 settlement timeframes.

7.0 Implementation Roadmap

The implementation roadmap does not define the specific testing approach for T+1. An important early activity for the industry to take is to define the migration and approaches that will be used for each industry building block. Once specific migration approaches are defined, the business cases and implementation roadmap will need to be revisited and adjusted based on the more specific approach. The SIA has established a Testing Committee to address these areas in greater detail.

7.2 Achieving T+1 requires an implementation roadmap that addresses each of the ten building blocks

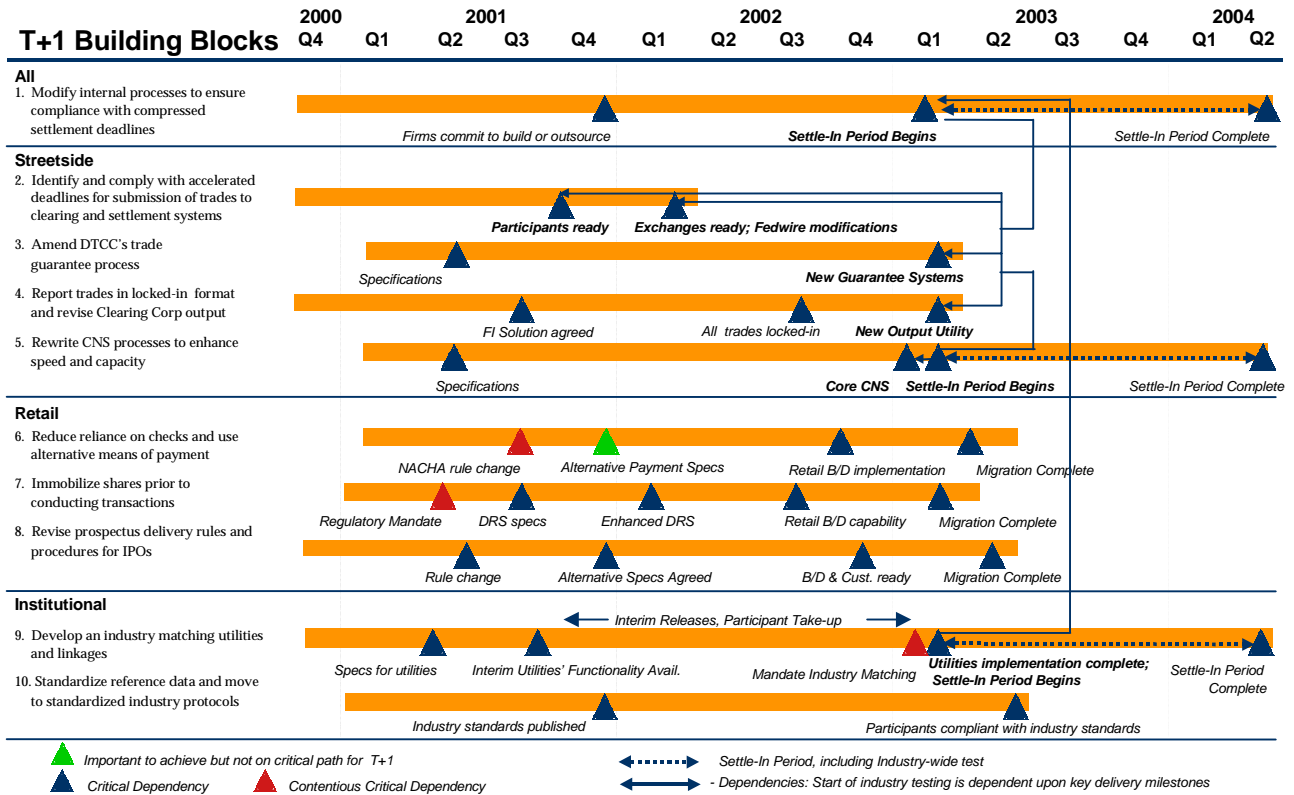
The industry will implement T+1 by addressing the ten building blocks as largely distinct initiatives. Implementation of each initiative follows a similar approach. Each initiative relies on the industry agreeing and publishing relevant standards, processes, and interface specifications. Participants will then need to make changes to meet requirements, by building or outsourcing in a timely fashion. In parallel, a shared industry infrastructure (e.g., matching utilities, DRS links) will be implemented according to specifications made available to the industry participants. A period of individual testing and stabilization will be conducted before the individual building block initiative goes live. A period of industry T+1 testing and settling-in will occur to integrate the building blocks that have interdependencies before the industry moves to T+1 settlement.

Exhibit 7-1 depicts the implementation timeframes by building block. Interim milestones, including critical path dependencies, are identified for each building block. It should be noted that there is some disagreement between industry participants about the necessity of some interim milestones. Milestones deemed critical to T+1 implementation that are the subject of such disagreements are highlighted in red in Exhibit 7-1.

7.0 Implementation Roadmap

Exhibit 7-1

T+1 Implementation Roadmap



7.0 Implementation Roadmap

7.2.1 Implementation roadmap by building block

The interim milestones associated with each building block are **indicative**, and need to be confirmed by the SIA committees responsible for their accomplishment.

1. Modify internal processes to ensure compliance with compressed settlement deadlines (Responsibility: All participants)

Within one year at the latest, firms should have made a decision to build or to outsource. Those firms that have not committed to a strategy by this point risk missing the transition to T+1. They may find that the resources—including external consultants and employees—required to implement the change may not be available, or that the capacity of service providers to outsource their processing is exhausted by firms that have acted more quickly.

Within two years, participants will have modified or outsourced internal processes, applications, and infrastructure, in order to be able to comply with new timeframes applicable to streetside submission and/or interaction with the new Institutional Trade Processing model. After another six months, coinciding with the completion of DTCC and matching utility dependencies, the industry will engage in industry testing followed by a settle-in period to pilot the usage of the new links and timings with the DTCC.

Milestone	Milestone Date
Firms Commit to Build or Outsource: Participants commit to build or outsource internal processing that meets the timing requirements imposed by new street side schedules and Institutional Trade Processing model	Q4 2001
Participants have completed testing of internal processing	Q3 2002
Settle-In Period Begins (includes industry-wide integration test)	Q1 2003
Settle-In Period Complete: Industry tests and settle-in period completed among industry participants and streetside utilities	June 2004

7.0 Implementation Roadmap

2. Identify and comply with accelerated deadlines for submission of streetside trades to clearing and settlement systems (Responsibility: exchanges, broker/dealers)

Most exchanges and marketplaces are in the process of working with DTCC to enable transmission of trades more frequently. Large-volume marketplaces are working to achieve real-time (or message-based) transmission of trades. Moderate to low-volume marketplaces are working to achieve multiple intra-day transmissions of trades. While final volume-based guidelines are not yet defined, most marketplaces are expected to have moved to an appropriate transmission model for their volume by end of calendar year 2001. March 2002 will mark the movement of any remaining marketplaces to the new transmission guidelines.

Retail and institutional broker/dealers will implement capabilities to more quickly transmit trade-related information, in just over one year of elapsed time. Most firms will not start immediately but will wait to gain further understanding of the new DTCC transmission timeframes. Once these are known, some firms will require a moderate amount of time to modify existing technology to allow for the more frequent generation of the required trade-related information.

Modifications may be required to Fedwire functionality to support requirements in the collateralization process or other streetside processes for T+1. The SIA T+1 National Committee should coordinate communication of the necessary modifications.

Milestone	Milestone Date
Participants Ready: Institutional and retail broker/dealers have reengineered systems to allow for real-time or multiple intra-day batch transmissions (to DTCC)	Q3 2001
Exchanges Ready: Exchanges and marketplaces moved to real-time or multiple intra-day batch transmission (to DTCC)	Q1 2002
Fedwire Modifications: Modifications to Fedwire functionality will be completed to support any relevant requirements in the collateralization process or other street side processes for T+1	Q1 2002
DTCC systems modified to receive real-time submissions	Q3 2001

7.0 Implementation Roadmap

3. Amend DTCC's trade guarantee process so that guarantee is provided on trade date (Responsibility: DTCC)

During a twenty-seven month implementation period, DTCC should complete modifications to its trade guarantee process, and the industry should migrate to the amended process before the shift to the new Institutional Trade Processing model. This timeframe is based on the assumption that the new risk management logic and processes are defined, communicated to the industry, and approved twelve months before implementation. The building block would then be completed in time for industry testing of new streetside processes and submissions. Industry testing for all four streetside building blocks could then begin in Q1 2003.

Milestone	Milestone Date
DTCC establishes new risk management logic and procedures	Q2 2001
Specifications: Determine and communicate new requirements to participants	Q2 2001
New Guarantee Systems: DTCC completes modifications to trade guarantee systems and processes	Q1 2003

4. Report trades to clearing corporations in locked-in format and revise clearing corporations' output (Responsibility: Exchanges, DTCC)

Locked-in trades and clearing corporation output are treated as related initiatives within this building block. Milestones for locked-in trades are described first, followed by clearing corporation output.

Submission of all equity streetside trades in locked-in format from the marketplace is well underway with a target completion date of Q4 2001. A solution for matching fixed income trades is under discussion within the industry, and an approach will be defined. Implementation of the fixed income matching approach will be completed within a year of the solutions definition. Following a six-month stabilization period, all trades, both equity and fixed income, will be submitted to DTCC in a locked-in format.

Earlier implementation and migration could be possible by accelerating the definition of the approach to fixed income streetside trade matching. Submission of locked-in trades will proceed in the industry independent of the industry testing and settling-in period.

7.0 Implementation Roadmap

Milestone	Milestone Date
All equity streetside trades are submitted to DTCC locked-in from the marketplace (i.e., NYSE)	Q4 2001
Fixed Income Solution Agreed: The industry agrees fixed income streetside trade matching	Q3 2001
Fixed income solution implemented for subset of fixed income trades	Q1 2002
All trades locked-in: All fixed income streetside trades are submitted as locked-in to DTCC	Q3 2002

Rationalization of DTCC output and elimination of redundant output will be implemented within thirty months. Participants' modification of internal processing, and updates to DTCC interfaces will also be implemented by March 2003, if appropriate participants are educated about the new reporting procedures five months in advance. This building block will be completed in time for industry testing of new streetside processes and submissions. Industry testing for all four streetside building blocks could begin in Q1 2003.

Milestone	Milestone Date
DTCC completes analysis of T+1 trade reporting requirements (e.g., timing and content requirements gathered using internal DTCC analysis and input from users)	Q1 2001
DTCC creates and communicates project plan, including target conversion dates	Q2 2001
DTCC educates participants on new reporting procedures	Q3 2002
New Output Utility: DTCC designs, builds, and tests new reporting solution (e.g., data model, data distribution strategy, archive/purge mechanisms, report distribution mechanism, etc.)	Q1 2003
Participants modify internal processing and update interfaces based on new reporting procedures and outputs (see Identify/comply with accelerated deadlines (i.e., building block 2) milestones	Q1 2003

7.0 Implementation Roadmap

5. Rewrite Continuous Net Settlement (CNS) processes to enhance speed and efficiency (Responsibility: DTCC)

Required modifications and rewrites to DTCC's Continuous Net Settlement facilities will require twenty-seven months, followed by the Industry Test and Settle-In Phase. This duration reflects an expectation that significant work is required to modify the core systems and to adjust the in-bound and out-bound architectures to support new CNS processing.

The implementation date is dependent on timely industry input and participation in requirements definition. Requirements gathering and project planning are expected to take four months, once an appropriate CNS Rewrite Advisory Committee is established. The CNS rewrite will be completed in time for the industry test of all streetside building blocks.

Milestone	Milestone Date
DTCC establishes a CNS Rewrite Advisory Committee comprised of a cross-section of users of the system to counsel DTCC during the rewrite	Q1 2001
Specifications: DTCC gathers and confirms requirements (with advisory committee) of the CNS rewrite	Q2 2001
DTCC creates and communicates project plan	Q2 2001
Core CNS: DTCC designs, builds and tests core CNS functionality (e.g., netting)	Q1 2003
DTCC educates participants on new CNS functionality	Q4 2002
Settle-In Period Begins (includes industry-wide integration test)	Q1 2003
Settle-In Period Complete: Migration to new CNS system and processes	June 2004

7.0 Implementation Roadmap

6. Reduce reliance on checks and use alternative means of payment (Responsibility: NACHA)

Within twenty-one months, all retail broker/dealers will have the capability to reduce the number of security settlements effected by checks. Retail broker/dealers will respond to this requirement by increasing their capabilities to deal with alternative payment methods that allow for immediate movement of funds into accounts. Enhancements to each firm's ability to use alternative payment methods (e.g., ATMs, alternative payment networks) will be part of the implementation window. Changes to ACH rescission rules must be made by the NACHA prior to migration, to protect retail broker/dealers, custodians, and clearing corporations from risks that currently arise from the possibility of rescissions being made after settlement.

An additional six months is allocated to allow retail broker/dealers to communicate and educate their customers and to migrate the new payment capability into production.

Milestone	Milestone Date
NACHA Rule Change: NACHA change to rescission rules made	Q3 2001
Alternative Payment Specs: Specifications describing new payment models are published	Q4 2001
Retail B/D Implementation: retail broker/dealers implement payment infrastructure support and procedures and payment controls, reports and exception processes	Q3 2002
Retail broker/dealers communicate new payment approaches to customers	Q4 2002
Migration Complete: Migration to new payment approach complete	Q1 2003

7. Immobilize shares prior to conducting transactions (Responsibility: Regulators, DTCC, Transfer Agents, Broker/dealers)

The elapsed time to migrate to immobilized shares is twenty-seven months.

Prior to the T+1 implementation date, retail broker/dealers will have the ability to trade shares immobilized either through increased holdings of shares in street name, or by expanded use of enhanced DRS functionality offered by the Transfer Agents and made available with common industry links (e.g., DTCC). This is provided that the specification for the links and the enhanced DRS functionality will be available one year in advance, and will be delivered six months in advance. Additional time is built into

7.0 Implementation Roadmap

the implementation plan to enhance the functionality for supporting immobilized shares, such as expanding capacity, streamlining processes, and simplifying interfaces. Functionality will also be built to record restricted share legends, access them, and automate rule processing for trading restricted shares.

Milestone	Milestone Date
Regulatory Mandate: Regulatory changes (e.g., NYSE Rule 226, NYSE Rule 227) to rules regarding physical certificates and book-entry settlement are made	Q2 2001
DRS Specs: DTCC publishes DRS interfaces and specs for direct connection – creates web and IP interfaces	Q3 2001
Enhanced DRS: DTCC enhances DRS capability, making less manually intensive (e.g., full realization of Profile system)	Q1 2002
DTCC expands IPO system	Q1 2002
Retail broker/dealers educate customers on the movement of the industry to immobilized securities	Q1 2002
Retail B/D Capability: retail broker/dealers develop capability to link to enhanced DRS	Q3 2002
Migration Complete: retail broker/dealers complete migration	Q1 2003

8. Modify the prospectus delivery rules and procedures for IPOs (Responsibility: Regulators, Broker/dealers)

It will take two years for the industry to meet the requirement to make prospectus information available electronically, as well as through alternative means. Many Retail and institutional broker/dealers will look to vendors to meet the requirements of prospectus delivery. Those with large businesses in initial offerings may develop or redevelop their own capabilities in this area.

7.0 Implementation Roadmap

Milestone	Milestone Date
Rule Change: Regulatory changes are made regarding existing prospectus rules (e.g., separation of final prospectus delivery and payment delivery)	Q2 2001
Alternative Specs Agreed: Regulatory agreement is achieved to define alternative means for achieving the objectives of prospectus delivery	Q4 2001
B/D Ready: broker/dealers and vendors develop capability to deliver prospectuses electronically (e.g., develop website)	Q4 2002
Broker/dealers communicate new delivery method to customers	Q4 2002
Customers Ready: Customers consent in writing to electronic delivery of prospectuses	Q1 2003
Migration Complete: broker/dealers transition to new delivery method for “consenting” customers	Q2 2003

9. Develop industry matching utilities and linkages for all asset classes (Responsibility: Regulators, Matching Utilities, Clearing Corporations, Participants)

The new Institutional Trade Process will be realized with the implementation by vendors of shared matching utilities in two and one-half years, followed by a fifteen-month Industry Testing and Settle-In Phase, during which firms interact with the new utilities in a T+3 environment. Vendors will need to publish specifications describing interaction with the utilities within the first six months in order for participants, asset managers, institutional broker/dealers, custodians, and correspondent clearers, to implement required internal changes.

The implementation date will be dependent on timely industry communication and regulatory activity. It will also be contingent on the definition of standard codes of practice, which will outline the required performance guidelines for each participant in the institutional trade process.

Implementation of this building block may also be dependent on the definition of standard industry reference (building block 10). In particular, the specification of the utilities and their interfaces may be dependent on the standardization of industry data formats. This dependency might impact the implementation timeframe and delay it beyond the current elapsed timeframe.

7.0 Implementation Roadmap

Milestone	Milestone Date
Utility Specs: Vendors publish Institutional Trade Matching specifications	Q2 2001
Vendors deliver utility functionality through interim releases	Q4 2001 – Q1 2003
Utility Implementation Complete: Vendors deliver industry utilities for testing	Q1 2003
Matching mandated for clearing corporation settlement	Q1 2003
Settle-In Period Begins (includes industry-wide integration test)	Q1 2003
Settle-In Period Complete: All participants migrated to new trade processing model	June 2004

10. Standardize reference data and move to standardized industry protocols (Responsibility: Standards Committees, Matching Utilities, Participants)

As stated in the overview, the implementation plan is premised on the assumption that the appropriate response to industry reference data will be completed by the June 2004 implementation date. This assumption should be revisited once the T+1 requirements for standardized industry reference data (building block 10) are more fully developed. The industry will address standardization of formats, values, and sources related to a variety of trade-related data—for example, trade elements, commission standards, and FIX standards. This scope should be confirmed and potentially corrected through further discussion in the industry.

In the current implementation plan, firms will standardize their use of industry reference data within three years, given that agreed industry standards are established a year into the program. Addressing internal issues of standard reference data can be complex for many firms, especially large institutional broker/dealers, custodians, and correspondent clearers. Effective migration requires adopting the standards across the enterprise and then rationalizing existing systems, modifying or wrapping those systems, and potentially converting data.

The implementation plan does not include standardizing values or sourcing of reference data across firms, only within firms. Again, this assumption may need to be revisited.

7.0 Implementation Roadmap

Milestone	Milestone Date
Industry standards data are established	Q4 2001
Participants modify internal processing and systems to rely on a common source of standardized reference data	Q2 2003

7.3 Critical path

Certain key milestones must be achieved on target to ensure the successful attainment of the June 2004 implementation date. Implementation of a new institutional trade matching process is expected to take the greatest amount of time. The June 2004 implementation target is based on an assumption of vendors' publishing utility specifications by Q1 2000, and an implementation elapsed time for the utilities by vendors within a twenty-four to thirty month timeframe. A fifteen-month Industry Testing and Settle-In Phase allows the industry to operate using the new Institutional Trade Processing model in the current T+3 environment before switching fully to T+1 settlement.

The rewrite of CNS will also require substantial time, enough to implement matching utilities. The steps involved will include the formation of an advisory committee, the finalization of requirements and implementation, and a considerable testing and settling-in period for the new CNS system and corresponding streetside model.

The final element of the critical path is the successful accomplishment of industry participants' efforts to modify internal systems to prepare for compressed settlement deadlines. This is expected to take approximately twenty-seven months and will include a fifteen-month period of street testing and settling-in.

A set of T+1 requirements can be implemented in a shorter timeframe. These include modifications to payment processing, physical certificates, and submission of trades to clearing and to settlement in a locked-in format. The industry will adopt some of these practices in advance of the broader T+1 Industry Testing and Settle-In Phase.

It is assumed that the implementation of Standardized Reference Data, as described in building block 10, can be accomplished within the timeframes outlined for the new Institutional Trade Process. However, more elaboration of the requirements is necessary.

8.0 Critical Success Factors

Overview

Successful implementation of T+1 requires addressing institutional, regulatory and behavioral issues. Such a broad-based, industry-wide initiative also requires a single industry body to play a central, coordinating role. As the driver of T+1 for the industry, the SIA T+1 National Committee should monitor and address the critical success factors for T+1, set forth below. Focusing on these critical success factors will enable the industry to successfully implement and fully realize the benefits of the T+1 vision.

8.1 The SIA must establish a disciplined governance process

To achieve this goal, the National Committee must establish a governance process, in partnership with industry regulators, to monitor and motivate the progress of all participants toward achieving the changes required for T+1 success. This governance process, including defining governing bodies and areas of responsibilities, should be established at the onset of the T+1 initiative. The governance process should define the overall project plan for T+1, as well as the industry-wide approaches for regular progress evaluations, communications, and issue tracking and resolution. Additionally, the governing bodies should urge regulators to encourage participants to establish budgets and implement the program.

8.2 The industry must have a common understanding of the vision and priority of T+1

Participants in the U.S. securities industry must have a shared understanding of what will be required to achieve T+1, in terms of functional capabilities, investment, timing and effort. In order to adequately plan for the implementation, participants must understand the priority of T+1 over other industry and firm initiatives.

8.0 Critical Success Factors

Participants in the U.S. securities industry must have a clear and common vision of the impact, timeline, cost, and benefits of T+1 prior to launching the implementation effort. The SIA should coordinate this consensus building through industry-wide syndication of the business case findings. Specific institutions which are critical ensure the success of the effort include:

- DTCC
- Matching Providers such as the DTCC/Thomson joint venture and GSTPA
- Buy side organizations (AMF, ISITC, ICI)
- Exchanges
- SEC and other regulatory bodies (e.g., NYSE Regulation, NASD Regulation)

In turn, the SIA, Bond Market Association (BMA), ISITC and other industry organizations must communicate to their memberships the impact of the business case findings and respective member requirements. These activities should take place as soon as possible, and could take the form of industry conferences, discussion forums, and public notices to enable the memberships to begin the necessary preparation.

8.3 Regulatory changes are critical to enable the T+1 vision

Achieving the T+1 vision will require addressing specific issues and modifying existing regulations. The Committee should encourage and monitor the progress of these changes, which must be addressed prior to launching the T+1 environment.

8.3.1 Regulatory actions are required to enable the virtual matching component of the vision

Shortening the settlement cycle to T+1 is dependent on enabling virtual matching. Virtual matching cannot be fully realized without specific regulatory changes:

- **Modify Rule 10b-10 to allow the utilities to match trades at the block level.** This change will obviate the need to produce individual customer confirmations prior to settlement. For example, a matching report could substitute for the current confirmation and affirmation process. Confirmations could be provided to customers after settlement date
- **Establish end of day trade submissions for next day settlement.** This will enable industry infrastructure providers to establish guidelines for end of day submission of trades, the cycle for trade guarantee, the requirements of CNS, and the design of virtual matching utilities

8.0 Critical Success Factors

- **Issue necessary approvals** to ensure SROs can continue to monitor the actions of new industry utility providers, such as the new matching providers

8.3.2 Regulatory actions are required to implement the electronic nature of the vision

The following regulatory modifications are required to address share immobilization, prospectus delivery, and electronic payment alternatives:

- **Modify SRO rules regarding physical certificates and book-entry settlements.** SRO Rules 226 and 227 should be modified to mandate a return of physical securities to the system prior to sale. Under the vision, shares would either be placed with a broker/dealer or held in a customer name via the Direct Registration System (DRS). This change would effectively immobilize shares, resulting in efficiency improvement, risk reduction, and protection of the right of the investing public to hold shares in a physical form
- **Approve amendments eliminating prospectus delivery requirement prior to settlement.** New means of communicating salient trade details to customers will be necessary, including electronic means and the development of term sheets, which can be published in major financial industry publications
- **Modify NACHA Operating Rules to provide finality of ACH payments.** Presently, NACHA Operating Rules allow the immediate return of a customer debit for up to 60 days after the payment date. NACHA and the SIA have formed a working group to develop and propose a rule change to make ACH an acceptable form of payment for the securities industry

8.4 Industry-wide coordination is critical for successful implementation

The T+1 National Committee is uniquely positioned to coordinate industry-wide activities related to the implementation of T+1.

8.4.1 A coordinated, street-wide test of T+1 building blocks is critical to successful launch of T+1

The implementation plan allows sufficient time for participants to migrate to the components of T+1 prior to launching the T+1 settlement cycle. Critical to the success of the launch is a street-wide test across market participants. This will ensure that integration between the utilities and participants is thoroughly tested in a “production-like” environment. The SIA should coordinate the planning, scheduling and execution of this street-wide test, similar to the role it played during the Y2K initiative.

8.0 Critical Success Factors

8.4.2 The T+1 Building Blocks must be in place and operating in a T+3 environment prior to launching T+1

To ensure a smooth migration to T+1, the major building blocks should operate together in the T+3 environment for a minimum period of nine to twelve months. This will provide sufficient time to address integration, communication and performance issues, prior to actually shortening the settlement cycle.

8.4.3 The industry should adopt codes of practice to maximize effectiveness of the shared utilities

To maximize the effectiveness of virtual matching utilities, codes of practice should be established to guide interactions between participants. For example, firms will need to agree the timing standards for submission of trade information for by broker/dealers and Investment Managers, as well as adhere to standards involving communication formats and protocols. In addition, the industry will likely need to establish a conformance authority to monitor compliance with these guidelines. SIA should champion this critical success factor until such an authority is established.

8.5 Organizational and customer considerations are critical for successful operation in a T+1 environment

Technology implementation alone will not enable the industry to fully realize the benefits of T+1. Within the four walls of a firm, firms should adjust staffing and organizational aspects to better address the new processing environment. From a customer or investor perspective, behavioral changes are required to maximize the benefits of T+1 and to maintain customer satisfaction. The SIA should continue regular T+1 communication to provide firms the information they need to address these critical success factors.

8.5.1 Participants must consider and address the staffing and organizational impacts of T+1

In addition to planning for the implementation of T+1, participants must plan for the organizational impact of the eventual T+1 settlement cycle. Participants should develop organizational plans to enhance or replace the skills required by support staff in the future T+1 environment. Some considerations include:

- Re-tooling operational resources, with a focus on settlement optimization as opposed to processing
- Re-deploying resources from those functions that will be supported by virtual matching utilities

8.0 Critical Success Factors

- Securing necessary night shift employees to effect settlement authorization prior to the overnight cycle after the trade day guarantee (midnight)
- Re-tooling and addressing staffing levels of client service staff to effectively support increased customer education and service needs during transition period.

8.5.2. Firms must address internal mind-set and behavioral changes required to operate successfully in a T+1 environment

In addition to adjusting staffing levels and functions, firms must address their own internal training and change management needs to operate successfully in a T+1 environment. For example, participants may need to launch education and training sessions on new processing requirements and on the use of new systems and interfaces.

8.5.3 Customer education regarding the impact of T+1 is critical to realize T+1 benefits and maintain customer satisfaction

The changing nature of the relationship between industry participants and their customers must be clearly communicated to the investing public to ensure that they are prepared to amend their practices to new industry standards. This could take the form of industry-wide education, or individual firm communications. In particular, the changes that should be addressed include:

- Transition to more automated means of payment, or greater use of in-house accounts versus current reliance on checks
- Acceptance of new requirements for share immobilization, including the return of shares to the system prior to sale or the use of DRS
- Adjustment to new means of receiving IPO prospectuses, either via electronic means, or via modified disclosures in major financial publications.

8.6 Major industry service providers must increase their leadership efforts

8.6.1 The DTCC must provide guidance to participants as to revised settlement guidelines

DTCC must establish submission deadlines for institutional and street-side trades, to enable proper preparation by member firms and providers of matching services. In addition, messaging standards, formats, and output revisions need to be communicated to the membership as soon as possible. These will be dependent on the specifications to be developed for the revised CNS system and revised guarantee process.

8.0 Critical Success Factors

In addition, DTCC needs to consider the implications of accelerating its guarantee process to the size and skill of its risk team, since the challenge of moving the guarantee to trade date must be met with both technological and process changes.

DTCC must also issue procedures and timelines for firms' settlement optimization process to take place. These will depend upon the proposed timing for the night cycle.

8.6.2 Matching service providers must inform the membership as to the requirements for proper linkage with the utilities

Before effective planning for T+1 conversion can begin, the providers of matching services must provide, within the next six months, specifications to all industry participants. This will enable participant automation efforts to be conducted in parallel with those of matching utilities. It is recommended that these specifications address the following minimum functionality:

- Provision of NOE/Order and NOE/allocation matching
- Provision of standard settlement instruction database
- Comparison of settlement instruction among participants and the depository
- Provision of figuration capabilities where desired by the participants

As part of this specification process, it is recommended that guidelines for interoperability among eventual providers be agreed between the providers and the membership.

Appendices

- Appendix A: Project Plan and Schedule**
- Appendix B: Data Collection Sources and Methodology**
- Appendix C: Economic Model Approach**
- Appendix D: Investment Model Approach**
- Appendix E: Glossary of Terms**
- Appendix F: Business Case Assumptions**

Appendix A: Project Plan and Schedule

Project Scope

Andersen Consulting and The Capital Markets Company teamed together to perform the analysis and production of the SIA T+1 Business Case. The project team was jointly staffed from the two firms and totaled approximately ten FTEs. The five-month project involved fact-finding, analysis, and formulation of recommendations regarding the feasibility of shortening trade processing cycles to “trade date plus one” settlement (T+1) in the United States. The project scope was focused on U.S. traded equities, corporate and municipal bonds, and mutual funds. The objectives of the project were to:

- Develop impact analysis on firms of varying sizes
- Determine level of industry readiness
- Determine T+1 investment required in the context of known impact
- Develop realistic implementation time frame and identify impediments to progress
- Understand impact of T+1 on volumes and turnaround times
- Summarize overall costs and benefits of T+1 to industry

The project commenced February 7, 2000 and the Business Case document was presented to the SIA on July 7, 2000. A timeline depicting the major project activities is included in Exhibit A-4.

Project Approach

The primary project activities can be categorized as follows:

- Collect Data
- Define T+1 Vision, Building Blocks and Impacts on Participants
- Perform Analysis and Modeling
- Prepare Deliverables and Reports

Collect Data

Member data collection was supported by an on-line survey on the SIA web page. There was a separate survey for each participant type (e.g., broker/dealer, asset manager, etc.). The data collected pertains to current processing volumes and performance, and general STP readiness. Appendix B – Data Collection Sources and Methodology - contains a detailed description of the data collection techniques and results.

Additionally, industry-level and trend data was collected through interviews with industry utilities and exchanges and secondary research.

Define T+1 Vision, Building Blocks and Impacts on Participants

The vision for institutional and retail processing in a T+1 environment was articulated in partnership with the SIA T+1 Subcommittees tasked with addressing the key challenges (“building blocks”) to achieving a shortened settlement timeframe. The project team prioritized the key challenges, analyzed the key impacts on industry participants, and suggested a timeline within which each building block could be achieved. In addition, the dependencies among these building blocks were defined in an effort to highlight the critical path for T+1 implementation.

Perform Analysis and Modeling

The analysis supporting the business case was constructed using several models and analysis frameworks. These models and frameworks were driven by the responses to the member survey, interviews and other data gathering results.

Economic Model

A primary component of the project approach is the development of a securities processing industry economic model. This utilizes the Industry Simulation model, which processed trade volume, FTE factors, cost units and failure rates, in both the T+3 and T+1 environments, to determine cost savings and other processing implications of T+1.

Risk Impact Analysis

The project team evaluated the risk impact associated with moving to T+1 against the key processes associated with settlement. Three key process stages were evaluated:

Trade Agreement

- Execution of the trade
- Notification and allocation of the trade
- Matching of the trade

Settlement Agreement

- Figuration of the trade
- Processing of settlement instructions
- Enrichment of the trade's details

Settlement

- Confirmation of the executed trade
- Settlement authorization

Investment Analysis

The Investment Analysis was based on a targeted interview/survey approach. A sample size of twenty firms, including industry utilities, was targeted as representative of industry participant types and sizes. The survey assessed readiness against the T+1 Building Blocks defined earlier in the project. Responses were analyzed to estimate investment to implement these building blocks.

Prepare Deliverables and Reports

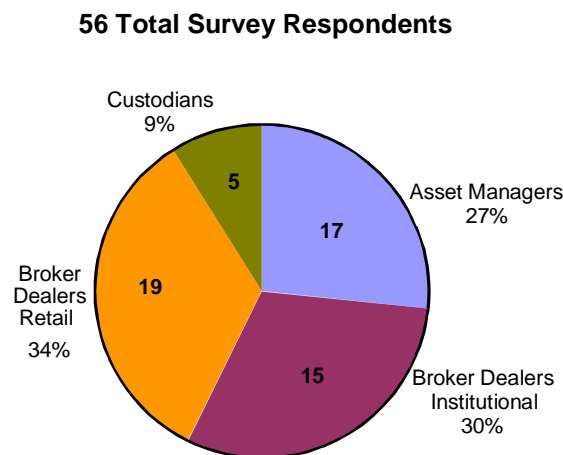
The project team produced regular, interim deliverables for review and approval by the T+1 Business Case Subcommittee. These approved analyses and findings were incorporated into the Business Case report. The project team syndicated the final findings of the analysis with the committee members and solicited and incorporated committee feedback. The Business Case was delivered on July 7, 2000.

SIA and Industry Participation

Member Participation

The business case analysis reflects input from fifty-six firms, across participant type, as well as industry infrastructure providers (e.g., exchanges, depositories, etc.). Respondents reflected a cross-section of industry participant types, as depicted in Exhibit A-1. Appendix B – Data Collection Sources and Methodology - contains detailed information and statistics on the survey techniques and responses.

Exhibit A-1



Committee Involvement

The project team interacted regularly with the subcommittees formed by SIA to address the primary aspects of T+1. The Business Case Subcommittee, chaired by Diane Frimmel, included the chairs of each of the other T+1 Subcommittees (refer to Exhibit A-2 below). The project team conducted formal monthly meetings with the Business Case Subcommittee. The purpose of these meetings was to provide regular status updates, as well as seek input on issues and points of analysis. This subcommittee provided input, reviewed and approved the project interim deliverables, each of which contributed to the final Business Case report.

The T+1 subcommittee white papers provided another important source of information for the Business Case. Each of the subcommittees, with the exception of Legal and

Appendix A

Project Plan and Schedule

Regulatory, completed a final or draft white paper during the course of the project. The findings and recommendations of these white papers formed a basis for the industry vision and the implementation approach described in the business case.

Exhibit A-2 Committee Members

Project Committee Member	Position
Diane Frimmel, Paine Webber	Chair, Business Case Subcommittee
Lee Cutrone, Thomson Financial	Business Case Committee Member
John Davidson, Morgan Stanley Dean Witter	Chair, Electronic Storage Subcommittee
Peter Johnston, Goldman, Sachs and Company	Chair, Institutional Trade Processing Subcommittee
Ron Kessler, A.G. Edwards	Chair, Dematerialization Subcommittee
Don Kittell, SIA	Business Case Committee Member
Tom McCarthy, DTCC	Chair, Streetside Processing Subcommittee
Tom Monahan, SIA	Business Case Committee Member
Larry Morillo, Pershing	Chair, Legal and Regulatory Subcommittee
John Panchery, SIA	Business Case Committee Member
Ernie Pittarelli, UBS Warburg	Chair, Payments Subcommittee
Tony Pellici, Instinet	Resigned
Denise Youngblood, Munder Capital	Business Case Committee Member

Appendix A

Project Plan and Schedule

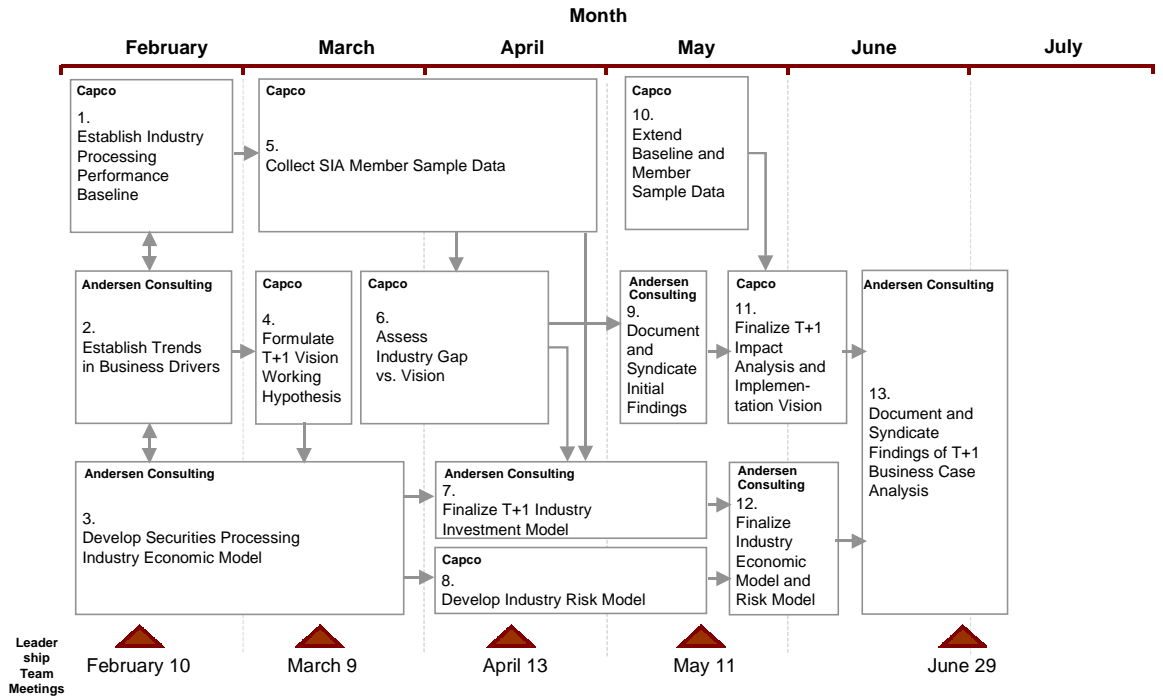
Project Team Members

The project team was jointly staffed and led by Andersen Consulting and The Capital Markets Company. The core team and Leadership Team members included:

Project Team Member	Firm
Joe Anastasio, Project Partner	The Capital Markets Company
James Honohan, Project Partner	Andersen Consulting
Luc Philippi, Partner	The Capital Markets Company
Patricia Tsien, Partner	Andersen Consulting
Thomas Klein, Project Manager	The Capital Markets Company
Peter Stockman, Project Manager	Andersen Consulting
Ann O'Connor, Program Management Office	Andersen Consulting
Harold van Berkel, Principal Consultant	The Capital Markets Company
Lynn Bishop, Senior Consultant	Andersen Consulting
Brian Dawson, Manager	Andersen Consulting
Mark Gilrain, Associate Partner	Andersen Consulting
Andrew Lathrop, Senior Consultant	Andersen Consulting
John Harvey, Managing Principal	The Capital Markets Company
Francisco Pulgar-Vidal, Manager	Andersen Consulting
Steven Schumacher, Senior Consultant	The Capital Markets Company
Craig Vaream, Principal Consultant	The Capital Markets Company
Sanjay Vatsa, Managing Principal	The Capital Markets Company

Project Timeline

Exhibit A-4
Project Timeline



Appendix B: Data Collection Sources and Methodology

Overview

The T+1 Business Case Project received a broad range of input from multiple industry constituents. A cross-section of firms and organizations participated in the T+1 Business Case survey and interview processes, such as broker/dealers, asset managers, custodians, vendors, industry regulatory bodies, clearing firms, depository organizations, exchanges and the Securities Industry Association. This participation provided the basis for our Business Case findings.

Data Collection Sources

The project team utilized several data collection methods, including web-based surveys, interviews, paper-based surveys, and research and review of existing industry data (committee white papers, SIA statistics, DTCC statistics).

Participant data was collected through a web-enabled survey launched from the SIA website. The web tool provided individual respondents with an overview of the T+1 Business Case project and approach, the T+1 Vision as defined by the SIA T+1 subcommittee white papers available at that time, and survey and project contacts. Surveys were tailored to participant type -- one each for retail broker/dealers, institutional broker/dealers, asset managers, and custodians. The surveys contained some sections that were consistent across participant type, as well as sections specifically designed to obtain an understanding of the current processing environments for each participant, and to identify readiness and provide inputs for the economic model. Individual registration identification numbers, as well as passwords, were used to ensure data integrity and security.

A sample set of 210 firms was identified based on statistical sampling techniques. Each firm in this sample set received direct e-mail notification of the survey, along with a unique registration identification number and password. In addition, all industry participants were invited to participate, via a CEO notification generated by the SIA. Their participation was effected by contacting the T+1 mailbox and requesting a registration number and password.

In addition, tailored interviews were conducted with a number of firms in the securities industry. These interviews focused on industry-wide bodies, such as exchanges, regulators and infrastructure providers, to obtain an industry perspective on key requirements for T+1. Additionally, the SIA T+1 Subcommittee Chairs were interviewed to gain an understanding of specific subcommittee findings, perspectives,

Appendix B

Data Collection Sources and Methodology

key requirements, and implementation and timeframe implications. Interviews were conducted with:

- DTCC – Both the NSCC and DTC organizations
- NYSE Regulation and NASD Regulation
- SIA Local Firms Committee (representing 300 firms)
- ADP SIS (representing more than 40 firms)
- SIAC
- SIA Dematerialization / Physicals subcommittee
- SIA Electronic Storage and Access subcommittee
- SIA Street-side subcommittee
- SIA Payments subcommittee
- SIA Legal and Regulatory subcommittee
- SIA Institutional Transaction Processing subcommittee

Paper-based surveys were also employed to obtain additional insight, industry-wide data points, collective participant data, and specific investment related data (see Appendix D - Investment Model Approach). The following organizations were surveyed via paper-based means:

- Correspondent Clearers
- Prime Brokers

Sampling methodology

A stratified random sampling method was utilized for participant data collection as follows:

- The population of U.S. securities industry firms was categorized by market segment (asset manager, institutional broker/dealer, retail broker/dealer, and custodian)
- Within each segment, a sampling frame was constructed of three evenly sized ranges (large, medium and small), based on equity capital or assets under management (for broker dealers and asset managers, respectively)
- A simple random sampling was conducted from each frame using Minitab (statistical software)

The response number of firms (n), not the overall existing number of firms (N), was used as the basis of the sample size.

A general rule for most population distributions is that, regardless of the shape, once the sample size is at least thirty, the sampling distribution of the mean will be approximately normally distributed. Therefore, assuming a conservative response rate of ten percent (average SIA response rate to very large audiences), and a minimum of twenty target firm responses, the survey was disseminated to an initial sampling frame of 210 firms (asset managers, broker/dealers and custodians).

Initially, 210 separate survey organizations were provided with a registration identification number and passwords to complete the web based surveys. The web-based data collection began on March 30, 2000 and was completed by May 30, 2000. Multiple notifications were provided to all SIA members via the SIA corporate communication group's weekly CEO notice. Notices or reminders were sent on the following dates:

- March 30, 2000 – Initial sampled group
- April 14 – SIA weekly CEO notice
- April 21 – Reminder to initial sampled group and all registered firms
- May 12 – SIA weekly CEO notice and reminder

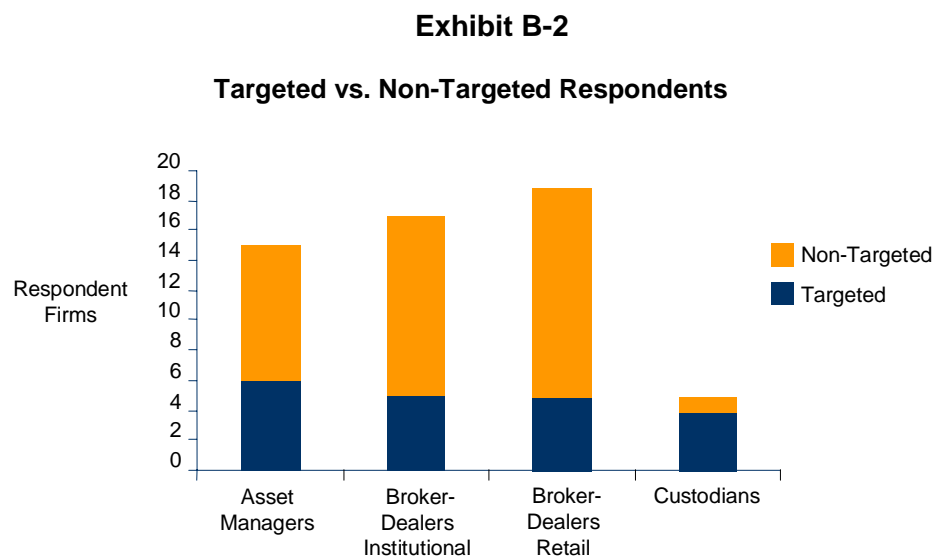
Additionally, twenty target firms, whose input was considered critical to ensure representative results across segments and firm size, were selected. The target firms all agreed to provide complete responses to the Business Case survey, to ensure response validity and completeness. The twenty target firms are listed in Exhibit B-1.

Appendix B**Data Collection Sources and Methodology****Exhibit B-1****Target Firms**

Participant Type	Target Firm
Asset Manager	Fidelity Investment
Asset Manager	Merrill Lynch Asset Management
Asset Manager	Alliance
Asset Manager	The Capital Group
Asset Manager	UBS Brinson
Asset Manager	Munder Capital
Broker/dealer	Goldman Sachs
Broker/dealer	JP Morgan
Broker/dealer	Lehman Brothers
Broker/dealer	Merrill Lynch
Broker/dealer	Morgan Stanley Dean Witter
Retail Broker/dealer	AG Edwards
Retail Broker/dealer	Edward Jones
Retail Broker/dealer	Paine Webber
Retail Broker/dealer	Schwab
Clearing Co.	Bear Stearns
Custodian	Bank of New York
Custodian	Chase Manhattan Bank
Custodian	Citibank
Custodian	State Street

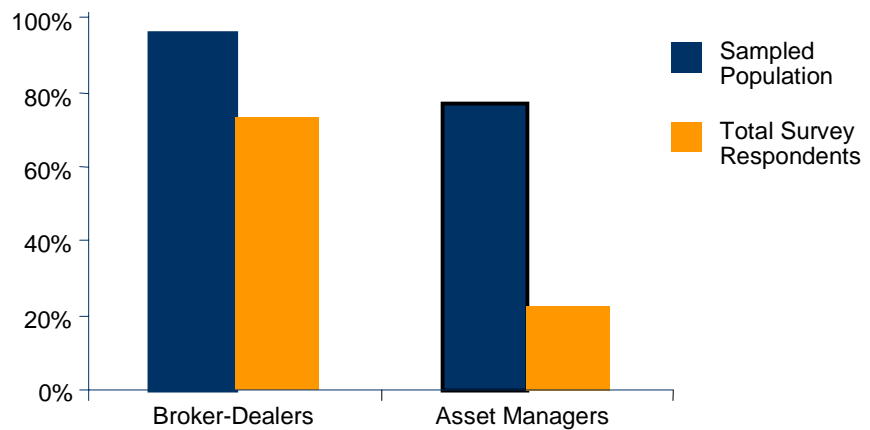
Survey Results

One hundred percent of target firms responded to the surveys. An additional thirty-six firms responded, bring the total number of respondents to fifty-six. This reflects a twenty-four percent response rate against the original sample population, including target firms. Exhibit B-2 depicts the target and other firm response rate by participant type.



Appendix B**Data Collection Sources and Methodology**

Overall survey responses represent over seventy-five percent of SIA member firm capital, and over twenty percent of assets under management industry-wide as depicted in Exhibit B-3.

Exhibit B-3**Industry Representation**

Based on equity capital and assets under management as of December 31, 1998 for Broker-Dealers and Asset Managers, respectively

Appendix C: Economic Model Approach

Simulation Model Assumptions

Scope

The scope of the simulation model starts after trade execution and ends immediately after trade settlement.

Types of Instruments

Two main types of instruments are simulated: equities (institutional and retail) and fixed income.

Process Flows

Two process flows have been modeled. The T+3 process flow describes the current trade settlement process for equities and fixed income instruments, at the industry level.

The T+1 process flow represents the industry-level vision of subject matter experts on future trade settlement processes.

Business Rules

Business rules describe the impact of transforming inputs into outputs over the settlement process. That is, they indicate which inputs are required for starting an activity, which outputs are produced as a result of performing the activity, the duration of the activity and the resources consumed during the transformation.

The business rules implemented in the simulation come from two main sources. First, the T+1 Business Case Survey, distributed to a representative group of industry participants, provides a snapshot of current operational practices and parameters. Second, the opinion of industry experts is used to supplement and help interpret survey data.

IT Infrastructure

Many automated tasks to be performed by the utilities are represented in T+1 as assigned to industry infrastructure providers.

As-of Trades

As-of trades are modeled as normal trades with an earlier execution date, and are not treated preferentially.

Cancel and Correct

Cancel and correct activities are represented in the process flows as reconciliation and resolution tasks with an extended duration. Additional trades generated by these activities are already accounted for in the survey data.

Simulation Input and Output

The main source of input data for the simulation model is the T+1 Business Case Survey. Industry participants' responses make up a sample data set that undergoes pre-processing prior to inclusion into the simulation model.

The pre-processing of input data includes tasks such as data scrubbing, some statistical treatment, expert interpretation, and scaling into industry-level magnitude.

T+3 Processing Parameters

The data and verification sources for the T+3 simulation processing parameters are listed in the Exhibit C-1.

Exhibit C-1
T+3 Processing Parameters: Sources and Verification

Parameter	Description of Business Logic	Source	Verification
Daily Trade Volume	<ul style="list-style-type: none"> ■ 2Q 1999 to 1Q 2000 average 	Exchange data, bond market data, survey data	DTCC Team
“As-Of” Trades and Cancel/Corrects	<ul style="list-style-type: none"> ■ Percentage of institutional trades receive 1 day delay; % that receive 2 days delay 	Survey & interviews	Capco SME AC SME
Generate NOE	<ul style="list-style-type: none"> ■ Percentage of daily orders enter system by 1PM ■ Percentage between 1:00PM and 4:00PM 	Survey	Capco SME
Match Order to NOE	<ul style="list-style-type: none"> ■ Percentage NOEs received manually 	Survey	Capco SME AC SMEs
Resolve NOE and Order Differences	<ul style="list-style-type: none"> ■ Time to resolve: minimum, mode, maximum in minutes 	Survey & industry interviews	AC SMEs Capco SMEs
Create Allocation Sets	<ul style="list-style-type: none"> ■ Time to create set: minimum, mode, maximum in minutes 	Interviews	AC SMEs Capco SMEs
Match NOE to Allocation	<ul style="list-style-type: none"> ■ Percentage received manually, all processed automatically ■ Percentage of time figuration is attached 	Survey Surveys, interviews	Capco SMEs, AC SMEs
Resolve NOE and Allocation Set Differences	<ul style="list-style-type: none"> ■ Time to resolve error: minimum, mode, maximum in minutes 	Survey & interviews	Capco SMEs
Create Net Proceeds	<ul style="list-style-type: none"> ■ Time to create proceeds: minimum, mode, maximum in minutes 	Survey & interviews	Capco SMEs
Match Net Proceeds	<ul style="list-style-type: none"> ■ Time to match: minimum, mode, maximum in minutes ■ Percentage of time settlement instructions and/or net proceeds are attached 	Survey & interviews Survey & interviews	Capco SME AC SME Capco SME
Resolve Figuration Differences	<ul style="list-style-type: none"> ■ Time to resolve error: minimum, mode, maximum in minutes 	Survey & interviews	Capco SMEs AC SME
Generate Settlement Instructions	<ul style="list-style-type: none"> ■ Time to generate instruction: minimum, mode, maximum in minutes 	AC SME	Capco SME
Create Confirm	<ul style="list-style-type: none"> ■ Time to generate instruction: minimum, mode, maximum in minutes 	AC SME	Capco SMEs

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Economic Model Approach

Compare Settlement Instructions	Time to generate instruction: minimum, mode, maximum in minutes	AC SME	Capco SMEs
Resolve Settlement Instruction Differences	<ul style="list-style-type: none"> ■ Day of presentment • Percentage resolved real-time • Percentage resolved by end of current day • Percentage held over to next day ■ Next day ■ Percentage resolved by 7 am ■ Percentage resolved by end of day ■ Percentage held over to next day 	Group interview at large custodian	AC SME
Generate and Send Affirmed Confirm	■ Time to generate and send affirmed confirm: minimum, mode, maximum in minutes	AC SME, surveys	Capco SMEs
Perform Account, Credit and Risk Checks	■ Time to perform check: minimum, mode, maximum in minutes	Interview; survey;	AC SME Capco SMEs
Perform Position Check Compliance	■ Time to check position: minimum, mode, maximum in minutes	Interview; survey;	AC SME
Prepare Preliminary Settlement Report	■ Time to generate and send report: minimum, mode, maximum in minutes	Interview; survey;	Capco SMEs
Optimize for Settlement	■ Time to optimize settlement: minimum, mode, maximum in minutes	Interview; AC SME	AC SMEs Capco SMEs
First Settlement Report	■ Time to generate and send first settlement report: minimum, mode, maximum in minutes	Interview and AC SMEs	Capco SMEs
	■ Percentage of time custodian auto-settles transaction	Capco SME	AC SMEs
Generate Settlement Authorization	■ Time to generate settlement authorization: minimum, mode, maximum in minutes	Interview and survey	AC SMEs Capco SMEs
	■ Percentage of transactions that need no settlement adjustment	Survey and interview	AC SMEs
Create Settlement Adjustments	■ Time to create settlement adjustments: minimum, mode, maximum in minutes	Interview; survey	AC SMEs Capco SMEs
Final Settlement Report	■ Time to generate and send final settlement report: minimum, mode, maximum in minutes	Interview; survey	Capco SMEs

T+1 Processing Parameters

The data and verification sources for the T+1 simulation processing parameters are listed in the Exhibit C-2.

Exhibit C-2

T+1 Processing Parameters: Sources and Verification

Parameter	Description of Business Logic	Source	Verification
Daily trade volume	<ul style="list-style-type: none"> ■ 2Q 1999 to 1Q 2000 average 	Exchange data, bond market data, survey data	DTCC Team, Capco SME's
Generate NOE	<ul style="list-style-type: none"> ■ Percentage of total daily orders enter system by 1PM ■ Percentage executed randomly from 1-4 PM 	Capco SME, white papers	Survey, interviews
Match Order to NOE	<ul style="list-style-type: none"> ■ Percentage NOEs received manually 	Survey, white papers	AC SMEs & Capco SMEs
Resolve NOE and Order	<ul style="list-style-type: none"> ■ Time to resolve: minimum, mode, maximum in minutes 	AC SMEs, white papers	Capco SMEs
Create Allocation Sets	<ul style="list-style-type: none"> ■ Time to create set: minimum, mode, maximum in minutes ■ Percentage created by utility 	Capco SME, white papers	AC SMEs
Match NOE to Allocation	<ul style="list-style-type: none"> ■ Time to match: minimum, mode, maximum in minutes 	AC SMEs, white papers	Capco SMEs
	<ul style="list-style-type: none"> ■ Percentage with figuration attached 	Capco SME, white papers	AC SMEs
Match Net Proceeds	<ul style="list-style-type: none"> ■ Time to match net proceeds: minimum, mode, maximum in minutes 	AC SMEs, white papers	Capco SMEs
	<ul style="list-style-type: none"> ■ Percentage with settlement instructions attached 	Capco SME, white papers	AC SMEs
Generate Settlement Instructions	<ul style="list-style-type: none"> ■ Time to generate instruction: minimum, mode, maximum in minutes 	AC SMEs, white papers,	Capco SMEs

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Economic Model Approach

Compare Settlement Instruction	■ Time to compare: minimum, mode, maximum in minutes	AC SMEs, white papers	Capco SMEs
	■ Percentage aggregated	Capco SME, white papers, committee work	AC SME
Resolve Settlement Instruction Differences	■ Time to resolve differences: minimum, mode, maximum in minutes	AC SMEs, white papers	Capco SMEs
Generate Complete Trade Instruction	■ Time to generate instruction: minimum, mode, maximum in minutes duration noted on flow	AC SME, white papers	Capco SMEs
Create Prelim Settlement Report	■ Start time and end time of report preparation	Capco SME, white papers	AC SMEs
Optimize for Settlement	■ Time optimization starts	Capco SME, white papers	AC SMEs
Create First Settlement Report	■ Start time of report creation on T+1	Capco SME, white papers	AC SME
Generate Settlement Authorization	■ Start time of settlement authorization on T+1	Capco SME, white papers	AC SMEs
	■ Percentage of transaction bypass create settlement		
Create Settlement Adjustments	■ Start time of create settlement on T+1	Capco SME, white papers	AC SMEs
Final Settlement Report	■ Time settlement report is issued on T+1	White papers	Capco and AC SMEs

Appendix D: Investment Model Approach

Overview

The investment model estimates the investment required across the industry for T+1. It is a simple model based on extrapolating estimated investments for a representative sampling of firms, and applying them to the entire industry. The investment model is conservative in its analysis. Where the team was required to reconcile two source numbers or approaches, the team took the more conservative approach.

The investment estimates include costs associated with IT infrastructure and application investment, and training development and delivery. There are additional investments required for process redesign, policy procedure changes, and organizational changes which have not been incorporated into the \$8 billion overall T+1 investment.

The investment model data collection approach required a set of sample firms within each industry segment to approximate, as best as possible, the investment required to achieve T+1. Large, medium, and small firms were targeted within the institutional broker/dealer, retail broker/dealer, and asset manager segments, to ensure that the investment information gathered is representative of the industry. Each firm was asked to provide information regarding the investment, approach, and timeframes required to address each relevant T+1 building block.

In addition, the T+1 business case team developed a set of “investment ranges” for each of the building blocks by industry segment. The ranges were developed, first, by determining the various approaches firms might take to address each gap. The approaches typically ranged from “No Changes Necessary,” to “Minor Modifications Necessary,” to “New Processing Architecture Required.” Investment ranges were then created for each approach. To maintain the conservative nature of the business case, the higher end of the investment ranges were used in calculating the final \$8 billion estimate.

The investment figures were calculated using the “investment ranges” verified by the actual firm responses. Andersen Consulting and The Capital Markets Company then leveraged their experience to complete investment estimates for a sample of small, medium, and large firms within each industry segment. A firm’s current technology environment and its progress to date in addressing the building blocks were considered in the determining the investment estimate. Actual investment estimates provided by the firms were cross-checked against these ranges.

Range Assumptions

The T+1 business case team developed a set of ‘investment ranges’ for the building blocks pertaining to each industry segment. The investment ranges were determined by comparing actual results from project experiences that were similar in function and scope as described for each building block in Section 4, - T+1 Building Blocks.

The team evaluated fifteen projects or programs across the following categories to develop the investment ranges for the building blocks.

- Real-time global cash management project
- Standardized global reference data project
- Instruction management project
- Debt architecture blueprint project
- Equity architecture blueprint project
- Continuous net settlement implementation
- Settlement architecture blueprint project
- Enterprise application integration architecture implementation

The detailed investment ranges are shown in the table below (note: details for building blocks 3, 4 and 5 are not included, as they require investments from DTCC only):

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Building Block	Institutional B/D	Retail B/D	Asset Manager	Custodian	Corr. Clearer
1 - Modify internal processes to comply with compressed settlement deadlines					
A. No change necessary	\$0	\$0	\$0	\$0	\$0
B. Minor modifications required	\$1 - \$2M	\$.5 - \$1M	\$1 - \$2M	\$1 - \$2M	\$1 - \$3M
C. New interfaces/functionality required	\$5 - \$25M	\$2 - \$10M	\$2 - \$10M	\$5 - \$25M	\$5 - \$10M
D. New architecture/systems required	\$25 - \$50M	\$10 - \$25M	\$10 - \$25M	\$25 - \$50M	\$15 - \$25M
2 - Identify and comply with accelerated deadlines for submission of trades to clearing & settlement systems					
A. No change necessary	\$0	\$0	N/A	\$0	\$0
B. Minor modifications required	\$.5 - \$1M	\$.5 - \$1M	N/A	\$.5 - \$1M	\$.5 - \$1M
C. New interfaces/functionality required	\$1 - \$3M	\$1 - \$3M	N/A	\$1 - \$3M	\$1 - \$3M
D. New architecture/systems required	\$3 - \$10M	\$3 - \$10M	N/A	\$3 - \$10M	\$3 - \$10M
6 - Reduce reliance on checks and use alternative means of payment					
A. No change necessary	N/A	\$0	N/A	N/A	\$0
B. Minor modifications required	N/A	\$.5 - \$1M	N/A	N/A	\$.5 - \$1M
C. New interfaces/functionality required	N/A	\$1 - \$3M	N/A	N/A	\$1 - \$3M
D. New architecture/systems required	N/A	\$5 - \$25M	N/A	N/A	\$5 - \$25M
7 - Immobilize shares prior to conducting transactions					
A. No change necessary	N/A	\$0	N/A	N/A	\$0
B. Minor modifications required	N/A	\$.5 - \$1M	N/A	N/A	\$.5 - \$1M
C. New interfaces/functionality required	N/A	\$1 - \$3M	N/A	N/A	\$1 - \$3M
8 - Revise prospectus delivery rules and procedures for IPOs					
A. No change necessary	\$0	\$0	N/A	N/A	\$0
B. Minor modifications required	\$.25 - \$.75M	\$.5 - \$1M	N/A	N/A	\$.25 - \$.75M
C. New interfaces/functionality required	\$1 - \$5M	\$1 - \$3M	N/A	N/A	\$1 - \$5M
D. New architecture/systems required	\$5 - \$10M	\$3 - \$10M	N/A	N/A	\$5 - \$10M
9 - Develop an industry matching utility and linkages					
A. No change necessary	\$0	N/A	\$0	\$0	\$0
B. Minor modifications required	\$.5 - \$1M	N/A	\$.5 - \$1M	\$.5 - \$1M	\$.5 - \$1M
C. New interfaces/functionality required	\$1 - \$3M	N/A	\$1 - \$3M	\$1 - \$3M	\$1 - \$3M
D. New architecture/systems required	\$3 - \$10M	N/A	\$3 - \$10M	\$3 - \$10M	\$3 - \$10M
10 - Standardize reference data and move to standardized industry protocols					
A. No change necessary	\$0	N/A	\$0	\$0	\$0
B. Minor modifications required	\$.5 - \$2M	N/A	\$.5 - \$2M	\$.5 - \$2M	\$.5 - \$2M
C. New interfaces/functionality required	\$2 - \$10M	N/A	\$2 - \$10M	\$2 - \$10M	\$2 - \$10M
D. New architecture/systems required	\$20 - \$45M	N/A	\$20 - \$45M	\$20 - \$45M	\$20 - \$45M

Sample Set and Extrapolation Assumptions

For a particular firm, its current environment and target approach to implementing the T+1 building blocks will determine the level of investment required to achieve T+1 processing capability. For example, a firm that already has a high-level of intra-day processing and information sharing, requires less investment than a firm that relies on batch processing and file-sharing.

To determine the aggregate industry-level investment, the project team defined sample sets for each industry segment. The sample sets include a sample of small, medium, and large firms for most industry segments. Correspondent clearers, custodians, depository, and exchanges were not broken out by size. For each firm in the sample sets, an estimate of the investment required to implement the building blocks was made. These estimates were spot-checked against the results of investment questionnaires that were sent to a subset of the sample set. Estimates were modified based on the survey responses.

Results were extrapolated by multiplying the average investment for large, medium, and small firms (when broken out by size) within the sample set, by the number of firms in the industry segment. For example, for large asset managers, an average investment per firm was calculated for the large asset managers in the sample set. The total investment for all large asset managers was calculated by multiplying the firm average for large asset managers by the total number of large asset managers. This process was repeated for the large, medium, and small firms of each industry segment.

At times, a factor was applied to adjust the total number of large, medium, or small firms being used in calculating the overall investment for the industry segment. The factor accounts for situations where large numbers of firms may not make the average investment for some reason (e.g., will outsource, functionality is provided by a service provider).

Where firms were classified by size, it was done by equity capital. The cutoffs used are included in each industry segment section below.

Sample Firm Estimate Assumptions

Broker/dealers, Asset Managers, and Custodians

Estimates were completed by reviewing

- Raw survey data

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- Interview information related to firms' current environments (e.g., number of batch systems used to create confirms)
- Investment survey data for firms included in the 50% we surveyed
- Interview results related to firms' approaches to T+1.

Andersen Consulting and The Capital Markets Company have worked extensively with many industry participants. The business case team leveraged their firms' knowledge of industry participants' current architectures as a factor in estimating the required T+1 investment for sample firms. Estimates for sample firms were validated against the responses to survey questions pertaining to 'top-down' estimates of project T+1 investment.

In certain cases, the business case team's estimate differed from the actual survey response. In these situations, the team re-evaluated the bottom-up estimation approach, often seeking additional input or information specific to that firm. The bottom-up estimate may have been used instead of a firm's survey response in the following situations.

- The firm did not respond consistently to the two surveys (the base T+1 Survey and the follow-up T+1 Investment Survey)
- The firm did not demonstrate an understanding of the T+1 vision, as evidenced by written explanations in the survey response or follow-up interviews;
- The business case team's knowledge of the firm's current architecture, applications, and processes suggested an alternative estimate would be more appropriate.

For example, Institutional Broker Firm #3 estimated that achieving the capabilities described in building block 1 (streamline internal systems; make more real-time) would require a \$2.5 million investment. In response to the T+1 Business Case survey, this firm also reported a high number of batch systems currently used for a large volume of settlement activities. The \$2.5 million estimate is inconsistent with the level of effort required to change the large number of batch systems. The project team conservatively estimated an investment between one-half and one million dollars would be required to convert each batch application to intra-day processing. Using these estimates, the total investment required for this firm was between \$25M and \$50M.

This estimate was further validated based on project experience with this firm, and comparing the scope of change required for building block 1 with previous initiatives at Firm #3 to confirm that the selected range was a reasonable estimate.

Correspondent Clearers

The project team met with most of the firms in the Correspondent Clearers sample set. Estimates by building block were developed based on the results of these interviews.

Matching Utility Providers

The estimate for development of the utility (building block 9) was based on the detail estimating of the trade matching capability that was done for the GSTPA.

Extrapolation Assumptions

For purposes of extrapolation, it was assumed that large and medium broker/dealers have both institutional and retail operations. This ensured the industry investment for either the retail or institutional segment was not undercounted or double-counted. The Securities Industry Association (SIA) provided the total number of broker/dealer firms in the industry, along with their equity capital figures. The SIA also provided the total count of all small broker/dealers which represent small retail broker/dealers. The project team did not estimate a distinct group of small institutional broker/dealers.

Survey responses provided the basis for the percentage of small broker/dealers and small asset managers who are expected to make no investment for T+1 building blocks because of existing or new service provider contracts.

Retail Broker/dealers

Investment estimates were made for a sample set of five large, four medium, and two small firms. Questionnaires were mailed to three large, one medium, and one small firm. Responses were received from three of the five sampled firms.

Classification of firms was based on the following cutoffs (equity capital in millions):

Large: > \$750 <Total: 25 firms>

Medium: \$200 – \$750 <Total: 34 firms>

Small: < \$200 <Total: 387 firms>

One hundred percent of large and medium firms were used to calculate industry segment investment. Twenty percent of small firms were used (i.e. 77 of 387); it was assumed that the remaining eighty percent of the small firms would not need to make investments (e.g., due to outsourcing or use of external vendor services).

Institutional Broker/dealers

Investment estimates were made for a sample set of six large, three medium, and two small firms. Questionnaires were mailed to three large, one medium, and one small firm. Responses were received from three of the five sampled firms.

Classification of firms was based on the same cutoffs used to classify the retail broker/dealers (equity capital in millions):

Large: > \$750 <Total: 25 firms>

Medium: \$200 – \$750 <Total: 34 firms>

Small: < \$200

One hundred percent of large and medium firms were used to calculate industry segment investment. Small institutional broker/dealers were not estimated as part of this study. The impact of this small segment is not expected to exceed \$300 million due to the large number of broker/dealers who utilize correspondent clearers and/or service providers.

Asset Managers

Investment estimates were made for a sample set of six large, four medium, and three small firms. Questionnaires were mailed to three large, one medium, and one small firm. Responses were received from one of the five sampled firms.

Classification of firms was based on the following cutoffs (assets under management in billions)¹:

Large: > \$200 <Total: 21 firms>

Medium: \$50 – \$200 <Total: 42 firms>

Small: < \$50 <Total: 175 firms>

One hundred percent of large and medium firms were used to calculate industry segment investment. Thirty percent of small firms were used (i.e. 53 of 175); it was assumed that the remaining seventy percent of the small firms would not need to make investments (e.g., due to outsourcing or low volumes).

¹ Source for number of asset managers in industry along with their assets under management: *Pensions and Investments/Watson and Wyatt*.

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Custodians

Investment estimates were made for a sample set of three custodians. Questionnaires were mailed to all three. Responses were received from all three.

The three large custodians in our sample set represented 45% of the market share² (measured by custody assets) held by the top twenty firms.³ To maintain a conservative industry investment estimate, the analysis assumed the three large custodians represent 30% market share of all custodians, and that each of the three largest represents 10% of the market on average. The custodian segment was then extrapolated by multiplying by ten to cover all firms of all sizes.

The breakdown below is an example of how the custodian segment's investment might be broken down across different size firms:

	Average	Total
Largest Custodians (3):	\$60M	\$180M
Large Custodians (3):	\$20M	\$60M
Regional Custodians (24):	<u>\$15M</u>	<u>\$360M</u>
		\$600M

Extrapolations were performed based on the assumption that the ten large custodians represent the majority of the industry.

Correspondent Clearers and Service Providers

The same approach for estimating investment for custodians was used for correspondent clearers and service providers. Investment estimates were made for a sample set of three correspondent clearers. Extrapolations were performed based on the assumption that ten large correspondent clearers and service providers represent the majority of the industry. The investments required of the service providers were

² Measured as assets under custody

³ According to information published by Institutional Investor Magazine (www.iimagazine.com/research/99/gc/index.html)

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considered in the overall investment for this participant type but were not explicitly broken out in the investment breakdown.

Exchanges

Investment estimates were made for a sample set of four exchanges. Extrapolations were performed based on the assumption that eight exchanges represent the majority of the industry (i.e. NYSE, Nasdaq, five regional exchanges and one ECN/Exchange).

Depository

Investment estimates were made based on actual experiences with projects of comparable size, scope and complexity.

Appendix E: Glossary of Terms

Affirmation	<ol style="list-style-type: none"> 1. DTCC's matching of trade details submitted by both trading parties and its notification or affirmation of the match back to the trading parties. 2. The submission of trade details to DTC by one party to a trade, with the counterparty accepting or affirming the trade independently.
Aggregation	The additive accumulation of same-side, same-custodian, same-security trades for settlement.
Allocation	The decomposition of a block trade by the investment manager into its component parts by account.
Average	The simple average unless otherwise stated. For example, Average Daily Volume is equivalent to Total Month's Volume divided by Number of Business Days.
Automatic	Automated; processed through systems without manual intervention.
Batch	A computer term for events that are processed through systems as a group at a time later than the time each event was originated.
Block Trade	A single, same-security order executed as one or multiple fills on behalf of several accounts. A block trade requires allocation to its component accounts prior to settlement.
Bulk processing	The processing of instructions that are held in the order received, in a single run, with no priority given to transaction type, participant or time scale.
Confirmation (or Confirm)	<ol style="list-style-type: none"> 1. A report on affirmed trades sent to the trading parties by DTC. 2. A report or confirmation of a trade sent from one party of a trade to the counterparty.
Cross-Border Trade	A trade for which one of the trading parties is located in a country other than where settlement will occur.
CSD	Central Securities Depository

Appendix E

Glossary of Terms

Depository (Securities Depository)	Financial institutions, including banks and national clearing systems, that hold securities in safekeeping. Depending on the form of the securities, safekeeping may involve physical custody or maintenance of accounts; the receipt of incoming and delivery of outgoing securities; and the taking of any action required for custody operations. Such actions include collection and payment of income and redemption proceeds, assistance in tax reclaim, provision of information on corporate actions, and execution of custody operation instructions.
Duration	The length of time, in days, of a particular event.
Error (see also Fail)	A mistake in the trade process that causes a disruption to the "normal" process flow but is corrected prior to settlement.
Execution Venue (e.g. ECN, crossing network and exchange)	Any organization or infrastructure, e.g., ECNs, crossing networks and exchanges, that registers, monitors, matches and guarantees trades in a securities market, and carries out financial settlement of securities transactions in that market.
Fail (see also Error)	The failure to settle a trade by the close of business on the contractual settlement date.
Figuration (or Net Figuration)	The gross proceeds of a trade net of any commissions, fees, and taxes.
FIX (Financial Information eXchange) Protocol	A messaging standard developed specifically for the real-time electronic exchange of securities transactions. FIX is a public domain specification owned and maintained by FIX Protocol, Ltd.
FTE	Full-time Equivalent headcount
Instruction (see also Standard Settlement Instructions)	A communication or that part of a communication that contains the authorization and required details for a transfer.
Interface	A link either between two systems, within a single system, or between participants and a system.
Intra-day	Within the course of the business day, i.e., prior to the close of business.

Appendix E Glossary of Terms

Manual	Manually processed, i.e., with human action or intervention.
Matching	The comparison of a trading party's instruction to its counterparty's to ensure that the terms of a trade are identical on both the buy and sell side.
Mission Critical	A component of a process that, in and of itself, defines the success of the process.
NOE (Notice of Execution)	A statement sent from the exchange to a broker dealer and thereafter to an investment manager as notification of a partial or complete fill of an order.
OASYS	Thomson's real-time, on-line affirmation and allocation system for U.S. equity and fixed income (especially DTC-eligible) securities.
Resolve (of Fails)	Agreed-upon resolution of a failed trade, with each party's actions defined.
Straight-through Processing (STP)	The processing of a trade, who's data is compliant with internal and external requirements through systems from post execution though settlement without manual intervention.
Standard Settlement Instructions (SSIs)	Instructions that specify default values for processing, identify specific processing requirements, request the generation of specific account instructions when defined conditions occur, and provide reporting rules. SSIs include detailed account data, e.g., account name and number.
Trade	A transaction resulting in an execution on an exchange.
Trade Notification	The communication of transaction details by an investment manager to its custodian, usually with Standard Settlement Instructions (see Standard Settlement Instructions).
Write-offs	Discrepancies in proceeds that are considered unidentifiable or unresolved, and which are charged against the income statement of the firm.