GUIDE TO CLEARANCE & SETTLEMENT

is an overview of The Depository Trust & Clearing Corporation (DTCC), whose sophisticated infrastructure and risk management systems provide critical services to US and global capital markets. The guide explains clearing, netting, and settling—the essential elements of post-trade processing—and the role of a central counterparty in ensuring completion of equity and fixed-income transactions. It looks, as well, at the increasing number of solutions DTCC provides for financial firms at home and around the world and its leadership role in driving innovation.

GUIDE TO CLEARANCE & SETTLEMENT

An Introduction to DTCC

VIRGINIA B. MORRIS

With a foreword from Michael C. Bodson, DTCC President & CEO
Welcome to *A Guide to Clearance & Settlement*. We’re excited to take you behind the scenes to learn more about the critical infrastructure that underpins the global financial markets.

While investors are very familiar with the mechanics of buying and selling stocks or bonds, the world of post-trade processing remains a mystery to most people—if they think about it at all. But what happens after a transaction is executed on an exchange or electronic platform is essential to safeguarding your investments and, more broadly, protecting the integrity of the global capital markets.

The moment you or your broker buys or sells a security, your trade joins millions of others on a journey to clearance and settlement. During that time, data streams through powerful digital networks and interconnected systems that seamlessly orchestrate the complex processes that support the flow of billions of transactions valued at more than $2 quadrillion each year. At the center of all this activity is The Depository Trust & Clearing Corporation, or DTCC.

Founded nearly 50 years ago as a market-neutral industry utility, today DTCC is the premier post-trade infrastructure for the global financial services industry. From 21 locations around the world, we automate, centralize, and standardize the processing of financial transactions. As part of that work, we simplify the complexities of clearing, settlement, asset servicing, data management, data reporting and information services across asset classes. Our mission is to mitigate risk, increase transparency, lower costs and drive efficiencies for our clients, including banks, broker-dealers, custodians, asset managers, transfer agents and other market participants. Most important is our responsibility to protect investors.

As financial inclusion efforts expand globally and digital innovation brings financial products and services to all corners of the world, we hope *A Guide to Clearance & Settlement* provides deeper insight into how the financial markets operate, reinforces the important role of market infrastructures in providing safety and soundness and supports better financial decision-making among investors. On behalf of all our DTCC employees around the world who help to ensure the flawless execution of transactions and the stability of the financial markets every day, we hope you enjoy the book.

Regards,

Michael C. Bodson
DTCC President & CEO
INTRODUCING DTCC

The Depository Trust & Clearing Corporation plays a central role in the capital markets.

Every business day in the United States, investors execute hundreds of millions of securities transactions—exchanging money for shares of stock, bonds, mutual funds, and other financial instruments. These transactions generate pools of capital that fund many kinds of business and government activities, including expansion of existing companies and creation of new ones.

One organization plays a leading role in keeping this transaction pipeline flowing smoothly and efficiently. It does so by processing all the transfers of money and securities between buyers and sellers.

Because this company, The Depository Trust & Clearing Corporation (DTCC), through its subsidiaries, processes enormous volumes of transactions, its costs per transaction are the lowest in the world. And, because DTCC guarantees the completion of the vast majority of stock and bond transactions it processes, it reduces risks for investors and for the entire US financial system.

In short, DTCC’s post-trade processing services help make the US markets the safest and most resilient in the world, attracting capital flows from investors at home and abroad.

MARKET SCOPE

Trading volumes of stocks and fixed-income instruments, including US government securities, mortgage-backed securities, and corporate and municipal bonds in US markets dwarf those in other markets around the world. For example, in a single day more than 19.3 billion shares of stock can be traded across equity markets in the United States, in contrast to 1.5 billion shares traded across European markets.

In 2020, DTCC settled transactions in stocks, exchange traded funds, mutual funds, corporate and municipal bonds, and US Treasury issues valued at $2.3 quadrillion. To put that number in perspective, about every three days DTCC processes the equivalent of the US annual gross domestic product.

DTCC also provides various services, including custody, to owners of 3.5 million securities issues registered in the US and 170 other countries and territories valued at US $73.5 trillion.

LOWEST COSTS

As the centralized infrastructure for the US capital markets, DTCC leverages economies of scale and a critical mass of trading volume to reduce trading costs. In addition, DTCC typically returns most volume-related excess revenues to clients through rebates or fee reductions consistent with its structure as a market neutral utility. This has helped, in part, establish the United States as the deepest, lowest cost, and most efficient and liquid market in the world, and so the most attractive to investors.

In addition—and perhaps even more important—DTCC minimizes risk and frees up trillions of dollars of capital each year that their clients can use for other investment purposes through a process called netting, which reduces the total number of trading obligations that require exchange of money for settlement.

BUILDING FINANCIAL STRENGTH

In recent years, DTCC has strengthened its financial position to fortify its balance sheet and create capacity to make critical investments in risk management, technology infrastructure and innovation. This included a successful two-part capital raise that began in 2015, which sourced $800 million in equity, and the issuing of medium-term notes to increase and diversify its default liquidity—both firsts in DTCC’s history. DTCC and its three clearing agency subsidiaries (NSCC, FICC, and DTC) are assigned high investment grade credit ratings by S&P Global and Moody’s Investor Service, reflecting the company’s financial strength, risk management resources and unique position in the US financial markets.

IT’S A GLOBAL MARKET

Capital flows to the markets where price is most competitive, risk is most efficiently managed, and resilience is greatest.

International investment in US securities reflects, in part, the perception that the US economy is stable and that the dollar, despite its ups and downs, is sound. But there’s ample evidence that overseas investors are drawn to US markets because the US financial system is more efficient, more liquid, and operates at a lower cost than other markets worldwide.

Subject to regulatory requirements, certain non-US financial companies can apply for and become full members of DTCC subsidiaries, enabling them to directly clear and settle trades executed in both US and non-US markets. What they seek in becoming members is the same high-quality risk management, balance-sheet netting, and cost savings that are available to US members.

SERVING THE INDUSTRY

DTCC is a utility for the financial services industry.

- As central counterparties, NSCC and FICC interpose themselves as the seller to every buyer and the buyer to every seller to guarantee that a trade will settle, even if the original buyer or seller defaults.
- DTCC is owned by its users—broker/dealers, banks, investment managers, and other third parties who market financial products and services.
- DTCC users are known as participants, clients, or members. Each full participant or member is also an owner. Participants or members who use a limited number of DTCC services are considered limited members but not owners.
- DTCC is market-neutral, which means it accepts transactions from multiple exchanges and trading platforms on a nondiscriminatory basis. It currently supports more than 50 exchanges and trading platforms, including the New York Stock Exchange (NYSE) and Nasdaq.

DEFINING THE TERMS

Central counterparty (CCP) is an entity that interposes itself as the buyer to every seller and the seller to every buyer to guarantee a trade will complete even if an original party to the trade—either the buyer or the seller—goes bankrupt or otherwise defaults.

Clearing and settlement is a process that finalizes a trade by transferring ownership of the traded asset and the cash to pay for it.

Custody is having possession of certificates that represent ownership, whether they are in physical or electronic form.
EQUITIES CLEARANCE AND SETTLEMENT

Post-trade processing wasn’t always the efficient process it is today.

Before the era of high-speed digital networks and electronic recordkeeping, virtually all securities transfers were conducted using paper certificates and paper checks. The end of the trading day involved a mass migration of papers, as hundreds of Wall Street messengers raced on foot throughout the financial district hand-delivering the certificates to the brokers who had bought stocks and bonds and returning with the checks to pay for them.

Meanwhile, back-office clerks at brokerage companies processed the extensive paperwork and manually filled out the multiple forms required to settle each transaction and transfer ownership on the firms’ books. In fact, a single securities transfer could involve as many as 33 different forms. The result was an increasing backlog of undelivered certificates and accounting discrepancies, totaling hundreds of millions of dollars at some firms.

THE PAPER CRUNCH

In the early 1960s, so much paper was changing hands that the Securities and Exchange Commission (SEC) increased the time permitted between the execution of a trade and the settlement date to five days from four. It had been two before 1946. And, to give firms a chance to catch up with paperwork, the New York Stock Exchange (NYSE) began shutting its doors every Wednesday and closing early on other days of the week.

Even more problematic, this manually intensive process was not only rife with errors but strained the US capital markets to their breaking point and threatened their ability to raise capital.

Though less infamous than the crash of 1929, the dot.com bubble, or the credit crisis that began in 2008, the paperwork crisis of the 1960’s and 1970’s presented one of the biggest challenges the US securities markets ever faced.

In response, Congress charged the SEC with investigating and addressing the underlying causes. The laws that emerged profoundly shaped the clearance and settlement process that’s in use today.

A NEW ERA OF SETTLEMENT

The Securities Act Amendment of 1975 eliminated fixed brokerage commissions and ushered in the National Market System (NMS) to foster greater transparency, efficiency, and competition in US capital markets, including the process of clearance and settlement.

To rally support in the financial community for streamlining and automating securities transfers, a group consisting of New York’s clearinghouse banks, the NYSE, the American Stock Exchange (AMEX), and the National Association of Securities Dealers (NASD)—at that time the self-regulatory organization of the over-the-counter market—formed the Banking and Securities Industry Committee (BASIC). The collaboration ultimately resulted in the creation of The Depository Trust Company (DTC) in 1973.

Jointly owned by key industry players, DTC’s mission was to help eliminate the reliance on paper stock certificates, which was a major obstacle to efficient trade settlement. At DTC, stock certificates were immobilized, or held at a central location, with changes of ownership recorded electronically using a computerized book-entry system. In doing so, DTC created the first electronic security.

CONSOLIDATING FORCES

While eliminating the industry’s reliance on the physical delivery of thousands of paper stock certificates was critical to solving the paperwork crisis, the US capital markets also needed a more efficient process for clearing and settling transactions executed on the stock exchanges and over-the-counter market.

On the floor of an exchange, brokers on each side of a trade wrote paper tickets and runners literally ran the tickets to the back room where data entry clerks entered information into computers. This process was highly inefficient and fraught with errors. Most important, there was no certainty that the trading parties would settle the trade in a timely fashion.

A REGULATORY NOTE

In July 2012, the US Financial Security Oversight Council designated DTCC subsidiaries NSCC, DTC, and FICC as Systemically Important Financial Market Utilities (SIFMUs) under Title VIII of the Dodd-Frank Act. The reasoning was that a failure or disruption to any one of these subsidiaries could increase the risk of significant liquidity problems spreading among financial institutions or markets, threatening the stability of the global financial system. This designation requires the company to meet prescribed risk management standards and subjects it to heightened oversight by US regulatory authorities.
BUILDING A SYSTEM

The structure of equities clearance and settlement rests on the foundation that was established in 1973.

Today, NSCC and DTC—now wholly owned subsidiaries of DTCC—clear and settle virtually all broker-to-broker equity, corporate bond, municipal bond, and UIT transactions in the United States. Their work begins on the day a trade is executed, called T for trade date, and ends two days later on T+2, when the buyer officially becomes the owner and the seller has received payment. To understand how the system works, it helps to start with three key features considered essential to efficient trade completion:

- **Role of the central counterparty**
- **Immobilization of paper certificates**
- **Trades handled and recorded electronically through book-entry system**

**FUNGIBLE SECURITIES**
Investors can buy and sell securities, such as shares of stock or corporate bonds, because the securities are fungible, or interchangeable, in the same way one $20 bill has exactly the same value as any other $20 bill.

NSCC offers as a central counterparty (CCP). NSCC receives trades in near-real-time and, after validation, guarantees them. As the CCP, NSCC becomes the buyer for every seller and the seller for every buyer. At that point, regardless of what happens to either of the trading parties, NSCC guarantees trade completion.

DTCC has recently proposed settlement be accelerated even further, to T+1, and is developing an alternative system, known as Project Ion, that digitizes securities and can settle on T+0. The earlier that trades are guaranteed by NSCC and settled by DTC, the less risk there is in the system.

**TAKING RESPONSIBILITY**
One of the major questions in any financial transaction is whether the person or organization on the other side of the deal—the buyer if you’re selling or the seller if you’re buying—will live up to the terms of the bargain. This potential default, known as counterparty risk, is serious enough when the agreement is between individuals.

But it can be even more problematic if the agreement depends on a financial institution, such as a brokerage firm, which may be the counterparty to millions of trades that occur in various marketplaces each day. If the financial firm fails to pay for the securities its clients bought, or to deliver those its clients sold, the entire system could falter.

These counterparty risks are greatly reduced by the trade guarantee that

**CONTROLLING THE FLOW**
In the same legislation that established the National Market System, Congress recommended immobilization, which essentially streamlined the multi-step process during which (1) the seller endorsed and delivered the certificate to a broker, (2) the selling broker delivered the certificate to DTCC, (3) DTCC delivered the certificate to the transfer agent, (4) the transfer agent issued a new certificate in the name of the new owner, and (5) the buying broker provided that certificate to the new owner.

With immobilization, transfers are handled electronically through a book-entry accounting system. The immobilized securities are all held by DTCC and registered in its nominee name, Cede & Co. The certificates themselves never leave DTCC and the name of the registered owner never changes either. Instead, every trade is handled electronically as the record on DTCC’s book entry system is updated to show that a security sold by a client of one broker/dealer has been debited from that firm’s account with DTCC and credited to the account of a firm whose client has purchased the security.

Simultaneously, if payment for delivery is elected, the account of the broker/dealer whose client has bought the security is debited for the amount that’s due and the account of the broker/dealer whose client sold is credited.

As a final step, the brokerage firms update their clients’ records and send a confirmation of the trade.

**DTCC GOVERNANCE MODE**
DTCC is owned and governed by the users of its SIFMU subsidiaries, all of whom commit capital as owners, pay fees for services, and ultimately benefit from the safeguards, risk mitigation, and operational efficiencies that DTCC provides. But to become a full member and be able to clear and settle transactions through any of DTCC’s three subsidiaries—NSCC, FICC or DTC—prospective participants must satisfy stringent membership requirements.

Among other things, this includes having an established business history or personnel with extensive experience, sufficient technology, and adequate financial resources. Each firm has a minimum net capital requirement, which is based on the organization’s business, its credit profile, the services it wants to access and, in the case of a broker/dealer, whether it clears for other firms. Members are also subject to an ongoing surveillance program designed to detect anything out of the ordinary that may suggest an increased risk to the clearing corporation.

This ownership structure ensures that:

- DTCC is not unduly distracted by short-term considerations that might discourage taking a long-term view of proper risk management.
- DTCC’s primary focus is addressing industry needs and preserving market stability, which is especially critical during times of crisis.

DTC, as a central securities depository, holds custody of 85% to 90% of all securities in the United States and services those assets for financial firms on behalf of investors.
MATCHING AND NETTING

The principle behind matching and netting is that less money means less risk.

Matching and netting are key elements in clearing and settling securities transactions. NSCC uses a fully automated accounting system called Continuous Net Settlement (CNS), which plays a central role in helping to reduce the total number of trade obligations that require financial settlement. Currently, on an average day, 98% of all trade obligations that occur in US equity markets don’t require the exchange of money.

MATCHING THE DETAILS

Matching, or comparing the details of a transaction, is the first, essential step in ensuring that securities and the money to pay for them will be exchanged within the required timeframe. In an equity trade, for example, the brokerage firm that places a buy or sell order and the contra firm that fills it must agree on the name of the stock, the price per share, and the number of shares that have been exchanged.

Here’s how it works: If you give your broker at Firm A an order to buy 100 shares of NRQ stock, your broker will enter an order to buy 100 shares. Another firm—say Firm B—fills the order in its trading system in response to a client’s instruction to sell NRQ. Its books will show a reciprocal order to sell 100 shares of NRQ stock. You should note, though, that the process of filling orders is handled differently on the various trading platforms and that firms can satisfy a trade from their own inventory of securities. But however the transaction is handled, the broker managing it must ensure the investor gets the best price available.

As the final step in the trade, the buy order is automatically matched electronically against the sell order at the marketplace or exchange. If the details agree, the order is complete, or locked in, and sent from the trading venue to NSCC. NSCC then confirms receipt of the details of the transaction by sending a communication electronically to the trading firms. This communication legally commits the firms to complete the deal.

EXCEPTIONS TO THE RULE

In today’s highly automated trading environment, all equity trades are matched before they arrive at NSCC. Where there is an unmatched trade, because the buying firm’s information doesn’t match the selling firm’s, the firms must resolve the discrepancies before the trade can be sent to NSCC for clearing. Misunderstandings may occur for a number of reasons. For example, the firms may not agree on the price or the size of the order.

Once the differences are resolved, the matched order goes on to NSCC for clearing and settlement following the standard procedure.

NETTING

Clients place orders

98% of trading obligations are eliminated through netting

All equity trades arrive at NSCC already locked in

DISTILLING THE NUMBERS

Twice on the night of the trade date (T) and once the late morning of the following day, NSCC provides each participating broker/dealer with a summary of all of its securities transactions to be settled on T+2. The report also shows the firm’s position either as net seller—when that firm’s clients have sold more shares of a particular security than they purchased—or as net buyer—when the firm’s clients bought more shares of a security than they sold.

These positions of net seller and net buyer are determined through netting, or automatically offsetting the firm’s buy orders on an individual security against its corresponding sell orders for that security. The net buys and sells are determined by matching settlement dates of each security’s CUSIP.

The goal of netting is to minimize the number and value of the transactions that must take place between firms to settle their trades. For example, suppose that Firm A had 100 clients buying and selling shares of stock NRQ. Through netting, the vast majority of these trades may cancel each other out by offsetting shares bought against shares sold.

Though it’s conceivable for a firm’s trades in a particular security to net out perfectly, it isn’t very likely. So, at several times on T and T+1, NSCC may alert Firm A that it is a net seller of 500 shares of NRQ and must deliver those shares to settle its obligation.

What makes netting of trades possible is that NSCC legally becomes the counterparty to all trades. So no matter how many different firms Firm A traded with on a particular security, all of those buys and sells can be netted together. This process is known as multilateral netting.

Netting financial obligations—the money that must change hands—is even easier. NSCC nets all money owed to or from each firm for its trading activity to a single dollar amount each day.

What that means is that any firm that ends the day with a net debit needs to have only enough money on hand to cover its net financial obligation. That is always less than the actual value of its transactions.

NETTING

At the end of each trading day, netting consolidates the amounts due from and owed to a firm across all the securities it has traded to a single net debit or credit position. On a record day on January 27, 2021, $3.51 trillion was reduced by over 98%, to $80.3 billion requiring final money settlement.

Netting also significantly reduces industry risk and helps DTCC clients optimize capital by freeing up trillions of dollars that they can use for other investment purposes. That increased liquidity is a significant advantage of the centralized clearance and settlement system that’s a feature of US capital markets.
Every day is T+2 for a new group of transactions. The pieces all come together on the settlement date (T+2) when a securities transaction is finalized. It’s the day when the money is exchanged and the ownership changes.

**BEHIND THE SCENES**
Settlement doesn’t just happen. But NSCC and DTC have established a process to ensure that it does.

NSCC communicates in advance to financial firms what their final cash and securities obligations are. It also sends an electronic report of trade details to DTC, including brokerage accounts that need to be updated to reflect ownership changes.

When securities are due from a brokerage firm as the net seller, DTC can see what’s available in the firm’s account at DTC in order to transfer ownership.

**LATE DELIVERY**
If a firm doesn’t provide securities that are due on the settlement date, it is still obligated to make delivery.

Through a process called marking to market, the settlement price of the undelivered security is updated to match the current market price, which could be higher or lower, and is passed on to the party that is owed the difference. NSCC collects additional collateral to cover that increase in price, if necessary. That’s done to minimize the increased risk of non-delivery. For example, the firm may purchase the securities, borrow them, or securities that have been on loan may be returned. The firm uses these securities to settle existing obligations first.

Under current SEC rules (Rule 204), all equities that fail to deliver (FTD) must be closed by the morning of the day following the settlement day.

**SETTLEMENT DATE**
The final stage of settlement is moving the money from buyer to seller, a process that occurs in parallel with transferring ownership of the securities. It is initiated when DTC posts the final net amount due from participants late in the afternoon of T+2.

The obligations don’t come as a surprise. NSCC and DTC jointly provide all participants and their settling banks with reports and user interfaces throughout the day listing net debit and net credit amounts for individual participants, as well as a net-net figure for each settling bank.

Each participant firm is required to select a settling bank from among several banks that provide this service to handle the electronic payment or receipt of payment through the Federal Reserve Bank’s Fedwire system. This process automates and streamlines what used to involve the delivery of physical checks to complete settlement. When multiple financial firms use the same settling bank, the balances of each firm are netted to one net-net balance for the settling bank, which further streamlines the settlement process.

As technological capabilities improved, the industry shortened the settlement process, from T+5 to T+3 in 2005 and to T+2 in 2017.

But NSCC and DTC are actually able to clear and settle transactions on T+0, or more quickly than the current two-day cycle requires. NSCC processes same day transactions it receives before 11:30 am and sends them, in hourly batches, to DTC for near-instantaneous settlement.

**PAYING THE BILL**
The broker/dealers who are among the more than 300 participants in transactions handled through the NSCC system are called self-clearing firms. In this role, they may clear and settle transactions for their own firms. A participant that is a clearing firm can clear and settle for its own firm and for other brokerage firms that are not NSCC members.

Some clearing firms also provide record-keeping and custody services for the client accounts of other broker/dealers, known as introducing firms, that don’t do their own clearing. All client assets, most of which exist as electronic records, must be kept segregated from the clearing firm’s own assets.

**PARTICIPANT FIRMS**
In 2020, DTCC, in partnership with industry organizations, began assessing shortening the settlement cycle to T+1 to further mitigate risk and reduce the amount of margin that Members are required to post with the clearinghouse. Following collaboration, a formal roadmap detailing the necessary operational and regulatory changes was developed, which calls for moving to T+1.
The National Securities Clearing Corporation (NSCC) and The Depository Trust Company (DTC) facilitate orderly transfer of more than 100 million equity transactions, on average, every trading day.

MAKING A TRADE
Investor places an order to buy or sell with a broker/dealer.

FIRMS
Broker/dealer firm sends the order to an exchange or market for execution.

EXCHANGES & MARKETS
Upon trade execution NSCC receives the transaction in near-real-time and, after validation, steps in as central counterparty (CCP) to the trade. At this point, NSCC assumes responsibility to complete the trade should either the buying or selling firm be unable to fulfill its end of the obligation.

NSCC issues a trade summary to the buying and selling firms, indicating net money and net securities owed for settlement.

DTC transfers securities electronically from the selling firm’s account to NSCC’s account at DTC, and then from NSCC’s account to the buying firm’s account.

Firms instruct their settling banks to send funds to, or receive funds from, DTC to complete the transaction.

SETTLEMENT DATE
DTC transfers securities electronically from the selling firm’s account to NSCC’s account at DTC, and then from NSCC’s account to the buying firm’s account.

More than 99.9% of all equity, municipal, and corporate bond transactions in the US are settled within two business days—the timetable set by the Securities and Exchange Commission (SEC) to ensure the stability and efficiency of the financial markets. This settlement cycle begins the first business day after the trade is executed. So, if you bought a stock on Friday morning, T+1 would occur the following Monday, and the settlement date would be Tuesday.

There’s a lot more to settling a trade than meets the eye. More than 99.9% of all equity, municipal, and corporate bond transactions in the US are settled within two business days—the timetable set by the Securities and Exchange Commission (SEC) to ensure the stability and efficiency of the financial markets. This settlement cycle begins the first business day after the trade is executed. So, if you bought a stock on Friday morning, T+1 would occur the following Monday, and the settlement date would be Tuesday.
SETTLEMENT AND BEYOND

DTC plays a part at every stage of a security’s life cycle.

IMMOBILIZATION

Dematerialization

A security transaction is settled when the buyer owns the asset and the seller has been paid. Ensuring that settlement happens, transaction after transaction, is the responsibility of The Depository Trust Company (DTC), a step that, in most cases, is completed as the settlement period ends.

DTC was created in 1973 to streamline the settlement process, which like the rest of the securities business was paper intensive, time consuming, and vulnerable to errors and delays. To get the job done, DTC took custody of and immobilized millions of paper certificates, re-registering the majority—between 85% and 90%—with the issuer’s transfer agent under the DTC’s nominee name of Cede & Co., better known as in street name.

To streamline the transfer of the immobilized securities as they were traded among investors, DTC developed an electronic book-entry system to record the names of the broker/dealers whose clients hold immobilized securities.

IN STREET NAME

The process for trading immobilized securities is as seamless as it is efficient and reliable. The physical certificate stays where it is, and it never has to be updated because it remains registered in street name.

When investors buy an immobilized security for their brokerage accounts, the investors are listed in their broker/dealers’ records as its actual, or beneficial, owners. At the same time, the broker/dealers are identified in DTC’s electronic records as holders of the security.

When the security is sold, DTC’s electronic records are updated at settlement to reflect that it has been debited from the seller’s broker/dealer’s account and credited to the buyer’s broker/dealer’s account. Those firms, in turn, update their own records to reflect the sale and purchase of shares.

DEMATERNALIZATION

Over the years, the industry has made significant progress eliminating paper certificates, a process known as dematerialization. However, existing inventory of physical securities still remains, primarily in the equity markets.

Today mutual funds, US Treasury securities, and most new equities are issued only in electronic form, but some equities still allow investors to receive physical certificates. While the majority of new corporate or municipal bond issues are in Book Entry Only form, the original issuance into Cede & Co. is represented by a physical global certificate.

The bottom line is that dematerialization reduces the risks and costs associated with manual processing and human touchpoints with paper certificates. It also increases efficiency and resilience across the industry at a time when automation is more important than ever.

ON THE BOOKS

Through its Direct Registration System (DRS), DTC serves registered owners of equities who prefer to hold stocks in book-entry form with the issuer or its transfer agent.

An immediate benefit of DRS is that it accommodates investor preferences while essentially eliminating the cost and risk of moving paper securities. Perhaps even more significant, DRS moves the industry one step closer toward the global goal of abolishing physical certificates.

DTC also handles the seamless settlement of retail and institutional trades and is directly involved in everything that occurs during the lifecycle of a security. This includes supporting the underwriting process that brings the new issue to market, facilitating dividends and interest that investors receive from their equity and debt securities on issues held in DTC’s nominee name of Cede & Co., providing tax-withholding information where applicable and disseminating news of corporate actions to broker/dealers whose clients are affected.

SECTIONS ISSUED FROM 170 COUNTRIES

The payment and transfer of securities ownership occurs at DTC, which provides custody and asset servicing for securities issues from more than 170 countries and territories valued at US$73.5 trillion as of 2020.

1.5 MILLION
SETTLEMENT TRANSACTIONS

In 2020, approximately 1.5 million settlement-related transactions with a value of approximately $359 billion were completed every day at DTC in an efficient and risk controlled process.
SETTLING DEBT INSTRUMENTS

A lot happens under the umbrella of the Fixed Income Clearing Corporation.

The Fixed Income Clearing Corporation (FICC) automates clearing and settling trades in US government and government agency securities in the primary and secondary market—the world’s largest and most liquid fixed-income market. Novation, or the process of a party stepping in and assuming either side of a contractual obligation between two parties involved in a transaction, is also automated.

SMOOTHING THE FLOW

Using its automated comparison and netting services, GSD determines a net credit or debit trading position for each participant in each government security after the fixed-income market closes on the trade date (T).

On settlement date, FICC’s clearing bank, The Bank of New York Mellon, transfers the securities from seller to buyer in a continuous book-entry process. As securities are received before the 3 pm deadline, they are immediately dispatched to a buyer who has paid for them, using what’s known as a delivery vs. payment (DVP) system.

Using multilateral netting, GSD calculates each participant’s daily cash settlement obligation, aggregating all net positions to a single dollar value.

GETTING A TRIM

When securities are used as collateral in margin accounts, their current values may be reduced by a certain percentage to protect against potential future loss. The discount is described as a haircut.

AUCTION TAKEDOWN

To finance the public debt, the US Treasury sells bills, notes, bonds, and other financial instruments to institutional and individual investors through public auctions. Through its Auction Takedown service, GSD is able to reduce the costs and risks of settling these transactions. It does so by automatically netting the purchases that its clients have made at the auctions with their other trading activity in the secondary market.

Because of the lag between auction and issue dates, net positions created by the auction are forward-settling transactions for which special margin requirements apply. On the issue date, net positions are replaced with settlement obligations and the securities are delivered to the purchasers as they arrive in the GSD accounts at the clearing bank from the Federal Reserve.

MANAGING RISK

As a frontline defense against risk, GSD acts as a central counterparty (CCP), serving as buyer to every seller and seller to every buyer, guaranteeing that all matched trades will be settled even if one party defaults. To manage the potential risk of a clearing member’s default, GSD requires all participants to contribute to a clearing fund, depositing either cash or eligible securities twice per day.

As trades reach GSD, they are matched and confirmed by its Real-Time Trade Matching (RTTM) system. Buyers and sellers receive immediate notification, making their obligation to complete the trade legal and binding.

In addition, RTTM helps to reduce the risk of failed trades by allowing participants to make immediate adjustments to a trade to address any discrepancies. The automated process that RTTM initiates ensures collection and payment of netted cash settlement obligations.

GSD also continuously monitors trading activity and adjusts margin requirements. Among other things, it looks at clients’ open positions in individual securities and collaborates with futures clearing organizations in a process called cross-margining to track participants’ credit exposure—and thus potential vulnerability to default—across fixed-income markets.

FINANCING SERVICES

Measured by dollar volume, repurchase agreements, called repos, are the largest component of the government fixed-income market. Repos are popular because they offer secured financing on favorable terms, providing vital market liquidity of about $3 trillion a day.

Using a repo, firms sell securities for immediate cash and simultaneously agree to repurchase the same or similar securities at a specific future date at an agreed-upon price. Through a reverse repo, firms that have a cash surplus can earn short-term interest by lending money and holding the security as collateral. The repurchase price includes the interest earned on the deal.

GSD novates and settles both the start and end legs, which increases efficiency and mitigates risk.

General Collateral Finance (GCF) Repo Service also creates additional liquidity in US Treasury and Agency debentures as well as Fannie Mae, Freddie Mac, and Ginnie Mae Fixed and Adjustable Rate Mortgage-Backed Securities. GCF Repos enable dealers to trade general collateral repos, based on rate, term, and underlying product, throughout the day without requiring intra-day, trade-for-trade settlement on a DVP basis.

SPONSORED MEMBERS

FICC has expanded its Sponsored Member program to increase the number of institutional investors. These investors can borrow and lend cash or eligible collateral overnight or through term repo in US Treasury and agency securities, buy and sell those securities, or transact generic CUSIP trades. In addition, GSD also provides the Sponsored GC Service, which offers eligible clients the ability to execute general collateral repo transactions with each other in the same asset classes currently eligible for Netting Members in the GCF Repo Service.

All eligible FICC/GSD members can act as sponsors for their clients, who become the Sponsored Members. The Sponsoring Members facilitate trading activity, act as processing agents for trade submissions and settlement with the CCP, and guarantee its Sponsored Members’ performance. A sponsor may also agree to its Sponsored Member trading with other counterparties.

Sponsored Members include US mutual funds and hedge funds as well as financial entities in certain countries.
CLEARING MBS

Settling mortgage-backed securities is big business.

Mortgage-backed securities (MBS) are created by bundling a group of similar mortgages into a package that can be divided into slices and sold to investors.

The Mortgage-Backed Securities Division (MBSD) of the Fixed Income Clearing Corporation (FICC) is the only centralized clearing facility for the $70 trillion market in MBS issued by US government corporations and agencies. These include Ginnie Mae and the government sponsored enterprises (GSEs) Fannie Mae (FNMA) and Freddie Mac (FHLMC). The division doesn’t clear MBS offered by non-government organizations.

Like FICC’s Government Securities Division (GSD), which clears and settles transactions in US Treasury issues, MBSD uses the automated Real-Time Trade Matching (RTTM) system to compare transactions that clearing members submit for settlement and to generate confirmations that establish the members’ contractual obligation to complete the trades.

MBSD operates as a central counterparty (CCP) and guarantees the settlement of all matched trades if one of the parties to the trade defaults.

SAVING TIME AND MONEY

One benefit of real-time clearing is reduced risk and increased efficiency, in part because RTTM provides tools that members use to detect and correct errors before they create a problem that would interfere with timely settlement.

The MBSD of FICC stepped in legally as a new CCP for MBS trades in 2012, and after several years of testing and regulatory approval procedures, it began to offer operational Novation in 2017. Now, when trades are submitted and matched in RTTM, firms receive a message making FICC the counterparty to their transactions. On settlement day (SD), the participating firms settle their net pool obligations through FICC’s clearing banks with FICC as the counterparty.

In its first month after operational Novation began, DTCC achieved 67% reduction in the volume of mortgage pools and payments involved in settling the trades as a result of its Do Not Allocate (DNA) service. Since all transactions are versus FICC, DNA allows firms to pair-off buy and sell trades and settle for cash instead of securities. This continues to provide a significant reduction in the costs and operational risks for clients active in this market.

THE MORTGAGE MARKET

Transactions in mortgage-backed securities and Treasury issues differ in a number of ways. MBS transactions settle over time periods as long as 90 days from the trade date, a much longer period than trade date plus one (T+1) that applies to most government securities cash transactions.

In addition, the majority of MBS transactions are done on a to-be-announced, or TBA, basis. Contracts do not specify which pools will be included in the trade until 48 hours prior to settlement—a concept that was introduced to bring more liquidity to the market. Until the final mortgage pool or security is assembled, the contract is identified by a generic CUSIP, or nine-digit identifying code, that identifies the terms—including the maturity date and coupon rate—of the hundreds of securities that are eligible for inclusion.

This approach works because mortgages of the same class are assumed to be fungible, or interchangeable, and to carry equivalent risk. The classes themselves are defined by SIFMA, the Securities Industry and Financial Markets Association.

TYING UP THE ENDS

Through its settlement balance order system, MBSD sets all eligible to-be-announced (TBA) contracts three days before their settlement date (SD-3). This process reduces the number of mortgage pools that must be delivered by more than 90%.

Two days before settlement (SD-2), sellers must begin submitting information on the pools they will deliver. They use MBSD’s real-time Electronic Pool Notification (EPN) service, which replaces their existing securities. FICC worked with the GSEs and the industry to implement this change for its clients.
DELIVERING INVESTMENT PRODUCTS

Automated systems smooth the bumps in the road that can slow down product delivery or hinder market growth.

Today investors have ready access to a competitive choice of mutual funds and variable annuities to meet their financial goals, plus enhanced customer service, thanks to the streamlined and flexible systems NSCC created to link trading parties and product providers.

TRADING MUTUAL FUNDS

As the mutual fund industry expanded rapidly in the 1980s, the process of trading funds remained largely manual, labor intensive, and very inefficient. This prevented fund companies from offering a wider range of choices and curtailed the ability of banks, broker/dealers, and financial planners to serve their clients.

These problems became even more pressing with the growing popularity of individual retirement accounts (IRAs) and defined contribution plans, especially 401(k)s, prompting investors to demand more fund alternatives for putting their increasingly sophisticated income products to use. This, in turn, has helped to provide virtually unlimited choice for investors among the thousands of funds sold within the country’s borders.

KEEPING INFORMATION FLOWING

Fund/SERV acts as a central hub for mutual fund transactions, linking all trading parties—mutual funds and the broker/dealers and banks who market their products—and automating key steps from initial order to final money settlement.

Say, for example, you tell your broker to buy shares of ABC Fund. Your broker relays your order to ABC Fund through Fund/SERV. ABC Fund then either confirms or rejects the order through Fund/SERV, which then relays that confirmation or rejection back to your broker almost immediately. Selling your shares of ABC Fund is handled the same way.

CREATION OF FUND/SERV

In 1986, the industry asked the NSCC to help find a solution based on its success in automating the processing of equity transactions. Working closely with industry partners, along with a consortium of mutual fund companies and broker/dealers, NSCC launched Fund/SERV, an acronym for Fund Settlement, Entry, Registration, and Verification.

This centralized processing system has become the industry standard for processing and settling mutual fund transactions in the United States. What’s more, it has helped to provide virtually unlimited choice for investors among the thousands of funds sold within the country’s borders.

INSURANCE AND RETIREMENT SERVICES

Eighty million retiring baby boomers created an opportunity and a challenge for two segments of the financial services industry: the insurance companies that provide variable annuities, and the firms that market those products to retail clients.

At stake is trillions of dollars invested in retirement accounts that must be refocused from asset accumulation to providing income. The continuing challenge is reaching these account holders with attractive retirement income products that compete with the same level of automated efficiency and transparency that characterizes stocks, bonds and mutual funds.

MEETING THE NEED

For more than 20 years DTCC has worked with the insurance industry to develop solutions that can automate, standardize, and centralize the multiple transactions, money settlements, and information exchanges that characterize these complex products throughout their lengthy lifecycle.

As one example, complete electronic processing has streamlined the sales process for agent and client by automating transactions prior to and after the sale of an annuity, from initial application to premium and commission settlement.

MONITORING AND REPORTING

To help the industry manage its responsibilities under a complex array of federal and individual state regulations that govern annuity sales and service, NSCC also provides asset value and transaction information.

The ability to immediately confirm transactions or underlying asset values in a contract gives financial firms and their clients the ability to make investment decisions based on timely data.

MINIMIZING RISK

By automating linkages between trading parties and providing services to support the full lifecycle of mutual funds and annuities, NSCC has helped the industry grow while reducing errors, improving processing efficiency, mitigating operational risk, lowering the cost of transaction processing, and easing regulatory compliance.

TAPPING INTO DATA

Within the insurance industry, there’s certainly no lack of data. More than 14.5 million insurance policy records are processed daily. But harnessing this information to make critical business decisions or respond to today’s rapidly changing regulatory and reporting requirements is challenging. With DTCC’s Insurance Information Exchange (IIEX), industry participants can exchange their raw data over a centralized platform to more easily pinpoint information, identify trends, and transform them into actionable insights.
INSTITUTIONAL TRADING

Institutional trades dominate investment markets.

While the number of retail investors has grown considerably over the past several years, institutional investors still account for as much as three-quarters of the overall market, according to recent studies. These two classes of investors share the same objective—to buy and sell financial assets to make a profit over time. But the similarities stop when it comes to processing their trading activity.

INSTITUTIONAL TRADING EXPLAINED

An institutional investor places an order with its investment manager, who contacts a broker to execute the trade. Unlike retail investing, most institutional trade orders consist of blocks of 10,000 shares at a minimum. To help maintain confidentiality and avoid triggering a market shock, the buying broker may break the block into several smaller trades and, in some cases, execute them over several days.

Once a trade is completed, a notice of execution is sent to the investment manager, who allocates the block across the accounts of the institutional investors for which it placed the order. These allocations are sent to the broker, who confirms them back to the investment manager.

CENTRAL MATCHING

A key step in the trade lifecycle is to match the details of the transaction. The most efficient way to do this is through automated central matching, which accelerates critical post-trade steps. In fact, trade date matching and confirmation has a significant positive impact on cost and risk because unconfirmed trades are more likely to fail than confirmed trades.

DTCC’s Institutional Trade Processing (ITP) CTM platform supports central matching of cross-border and domestic transactions by automating the trade confirmation process across multiple asset classes, including equities, fixed income, repurchase agreements (repos), and equity options. The service enables users to take advantage of configurable matching rules, enrichment from ITP’s ALERT service—the industry’s largest and most compliant global database for maintaining and communicating over 11.5 million account and standing settlement instructions—SWIFT messaging, and, for US trades, direct integration with DTC settlement. Today, the same-day CTM matching rate for the industry is 95%.

AN OPTIMAL NO-TOUCH PROCESS

However, trade matching is just one piece of the puzzle provided by DTCC’s ITP business. Institutional traders, including buy-side, sell-side, and custodian firms, also have access to an integrated platform that provides end-to-end, straight-through-processing for their trading activity. In addition, these services allow for seamless integration into the DTCC’s clearance and settlement systems.

The critical steps of an optimal, no-touch post-trade process include:

- Centrally managing and enriching all necessary reference data, including legal entity identifiers (LEI) and settlement instructions (SSI)
- Centrally matching trade on trade date
- Instructing all parties to the trade with an authoritative trade record and settlement details

THE PLAYERS

The parties involved in an institutional trade include the:

- Institutional investor, such as a mutual fund, pension fund, hedge fund, bank trust department, or insurance company
- Investment managers who place orders based on investors’ trading decisions
- Buying and selling brokers, who act on behalf of the investment managers
- Custodian banks, which handle delivery of securities and payments for the trade

Providing the ability to monitor and manage settlement status, including any exceptions, to achieve settlement finality

This automation of post-trading activity increases efficiencies and reduces costs for all market participants and puts the industry on the path to true no-touch processing, with the goal of eliminating virtually all fails.

CONVERGENCE OF REGULATION

While new financial regulations have led to significant mandates on institutional traders, DTCC’s ITP helps simplify the complexity of compliance. For instance, DTCC’s ITP helps firms meet the requirements of Europe’s Central Securities Depositories Regulation (CSDR) by minimizing the risk of trade failure. Similarly, ITP’s Margin Transit Utility (MTU) addresses an expected increase in margin calls and the need for liquidity resulting from new uncleared margin rules (UMR). UMR requires firms using over-the-counter (OTC) derivatives to post margin daily to cover market and credit risk.

TRADING IS GLOBAL

ITP solutions currently enable 6,000+ clients across 52 markets to provide instant access to counterparties worldwide, driving best practices, promoting effective communications, and accelerating post-trade processes.
AN INFRASTRUCTURE FOR OTC DERIVATIVES

DTCC is transforming post-trade processing of over-the-counter (OTC) credit derivatives.

Derivatives are financial contracts whose value is linked to an underlying asset or market index, ranging from securities such as stocks or bonds to physical commodities like pork bellies or barrels of oil.

OTC derivatives serve a number of financial purposes. For example, large corporations, investment banks, institutional investors, sovereign wealth funds, and hedge funds may use them to diversify portfolios, protect against volatility, interest rate or currency movements, and create capital.

THE PAPER CHASE

Trading in OTC derivatives was historically paper intensive and manual, with the details of each contract usually worked out over the phone, by fax, or by email. Because these tailor-made contracts are often negotiated across national borders and regulatory jurisdictions, there was little standardization in the legal documentation for executing these transactions.

For example, a deal worked out between a US bank and a British dealer on an underlying asset traded in Japan might report the details of the transaction in an inconsistent manner. This lack of standardization resulted in frequent errors, delays, and significant operational risks.

A CENTRALIZED SOLUTION

DTCC pioneered ground-breaking derivatives services in 2003 when it launched the Deriv/SERV family of services to support payment reconciliation and provide automated matching and confirmation, asset servicing, and centralized settlement in multiple currencies for OTC credit default swaps (CDS).

As trading activity continued to increase, so did the risks of processing CDS trades manually. This, along with the large exposures represented by outstanding contracts and a lack of market transparency, led DTCC to create the Trade Information Warehouse (TIW) in November 2006 to serve as a central, automated registry to keep track of CDS contracts worldwide.

The TIW eliminates the risks, inefficiencies, and uncertainties that arise from incomplete documentation. This comprehensive database also serves as the repository for all legally binding OTC credit derivatives contracts.

The TIW services the contracts in its database, including processing amendments, assignments, and early terminations throughout their terms, which often last several years. It also provides payment services for these contracts, including calculation of payment amounts, netting of offsetting payment obligations to reduce the number of payments required, and, in partnership with CLS Bank International, central settlement of these obligations in multiple currencies.

Virtually all of the world’s credit derivative contracts, excluding wealth management, inter-affiliate contracts, and some prime brokerage, are now recorded in the Warehouse.

GLOBAL TRADE REPOSITORY SERVICE (GTR)

By 2008, an estimated 98% of all CDS contracts worldwide were being serviced by TIW using data and processing standards defined in collaboration with industry participants. TIW laid the foundation for DTCC’s creation of the Global Trade Repository (GTR) service in 2012, which, through locally registered or recognized trade repositories (TRs), now collects and reports data in all five asset classes across multiple jurisdictions.

In response to the financial crisis, various jurisdictions acted on commitments made by the Group of 20 to increase transparency and reduce risk in the OTC derivatives market. Among the responses were mandates authorizing the establishment of TRs for derivatives reporting across multiple asset classes. A TR is an entity that centrally collects and maintains the transaction records of derivatives or securities finance trades. TRs play a central role in enhancing the transparency and reducing risks in these markets.

GLOBAL COVERAGE

DTCC created the GTR to fulfill this charge, and in 2012 and 2013 received authorization for its first TRs—in the US, Japan, and the UK—by having met applicable regulatory agencies’ registration or recognition requirements. Over the next eight years, additional DTCC TRs were created in Asia-Pacific (APAC) jurisdictions as well as to support European reporting post-Brexit. In addition, the US trade repository expanded its services to support Canadian and SEC reporting.

GTR is the premier transaction reporting solution for clients and regulators worldwide. It is also the only industry-owned and governed global provider of trade reporting services.

GTR has established a successful track record in helping the industry address risks, automate processing, enhance transparency, and drive down costs arising from emerging regulatory requirements around trade reporting.

Today, GTR, through its locally registered or recognized TRs, provides reporting services for OTC derivatives transactions in the US, Canada, UK, EU, Switzerland, Singapore, Hong Kong, Japan, and Australia. It also provides trade-reporting services for exchange traded derivatives and Securities Financing Transactions Regulation (SFTR) reporting in the UK and EU.

EXPANDING CAPABILITIES

As new regulatory mandates continue to be implemented globally, DTCC launched the Report Hub service to provide comprehensive support for clients to manage pre- and post-trade reporting requirements for their derivatives, Markets in Financial Instruments II (MiFID II), and Securities Financing Transactions Regulation (SFTR) transactions. The service offers data normalization, exception management, and automated reconciliation, and facilitates trade submission to TRs or Approved Reporting Mechanisms (ARM) to help clients mitigate compliance risk and reduce costs.
MANAGING RISK

Running a tight ship depends on anticipating problems and having solutions at hand.

For DTCC, risk management means anticipating “unthinkable, unknowable, and unimaginable” threats. It’s at the heart of the company’s mission as it has been since inception more than 45 years ago. Risk management entails effective and timely identification, measurement, monitoring and mitigation of credit, market, liquidity, systemic, cyber, and operational risks for the DTCC enterprise, its users, and the marketplace.

An ever-changing risk landscape magnifies the importance of operational resilience, or an organization’s ability to safeguard and continue to provide its critical services regardless of the nature or origin of a disruptive event.

WHAT DANGERS LURK?
Among the known risks that DTCC faces, two especially demand constant vigilance:
- On the financial front, participant firms might be unable to meet their monetary obligations.
- On the technology front, the automated systems might be disrupted by natural disasters, a cyberattack, or other operational issues.

If left unchecked, either of these risks could interfere with, and, at its most extreme, prevent clearance and settlement of trades.

MARGIN: KEY TO MANAGING RISK
One specific challenge to managing risk and settlement is the possibility that a participant might fail to meet its financial and operational obligations. For example, what happens if a member firm declares bankruptcy in the middle of a settlement cycle, when several days’ worth of trades are in the system but before money and securities have changed hands? And what happens if not just one firm, but several firms, collapse within a short time?

To safeguard against this possibility, which could have a cascading, crippling effect on financial markets globally, all full-service clearing members must deposit collateral—generally a mix of cash and liquid securities—with the clearinghouse that could be used to complete settlement and protect the investing public as well as all remaining participating parties in the event of a firm’s failure. Under the SEC’s Covered Clearing Agency Standards, DTCC’s clearing agencies are required to have sufficient pre-funded default resources to cover the potential default of its largest member.

There’s a risk-based margin methodology that enables the clearinghouse to identify the risks posed by a participant’s unsettled portfolio and to quickly adjust and collect additional deposits as needed to cover those risks. Each participant’s requirement is calculated at least once daily, and back-testing is conducted to determine the sufficiency of requirements.

FOCUSBING ON SYSTEMIC RISK
When your business is managing risk, you look forward and backward. To be prepared for any unwelcome surprises, DTCC risk management teams use scenario-planning exercises to simulate financial meltdowns and other events they hope will never happen and test potential responses for managing the situation.

Recognizing the systemic importance of the SIFMU designation for its subsidiaries, DTCC created the Systemic Risk Office (SRO). The SRO is responsible for identifying and monitoring emerging risks that could impact DTCC, its members, and the financial services industry. The SRO works across the organization and with external stakeholders like clients and regulators to enhance preparedness to systemic events and to mitigate their impact where possible.

In addition, DTCC understands the importance of protecting the industry and clients from risks associated with the use of third parties. Its Third-Party Risk program strives to deliver industry best practices for identifying, assessing, monitoring, and mitigating third-party risk.

CYBERSECURITY
Large-scale cyberattacks on critical financial infrastructure are a major threat, potentially causing significant damage and disruption to the financial sector and the larger economy. The complexity of the financial services industry, the interconnectedness of financial firms and the markets in which they operate, and the introduction of new and innovative technologies further heighten the risk of a large-scale cyberattack.

When it comes to cybersecurity, DTCC follows core protocols that have proven effective—patch management, vulnerability management, effective monitoring of infrastructure, identity management, network segregation, separation of duties, and network access—to name a few.

In keeping with the commitment to reduce risk as well as provide certainty and reliability to the global financial system, DTCC’s Client Cybersecurity Program (CCSP) is a collaborative effort between DTCC and its clients to ensure firms have adopted proper frameworks to safeguard against cyber risks.

This is essential since an attack on one or more institutions or critical infrastructures could have a contagion effect across the financial system, especially as interconnectedness continues to grow. Raising the cyber resilience of individual firms makes the entire financial services ecosystem safer and more secure.

In addition, cyber-threat information sharing is a cornerstone of a resilient cyber defense program. What one firm learns from its peers can be used to strengthen its defenses before an attack hits or to limit its impact and recover more quickly. DTCC works with sector-specific and government agencies to enhance threat intelligence sharing and to build the resilience of the global financial ecosystem.

HOW THE MARGIN PROCESS WORKS
As part of DTCC’s daily responsibilities to protect the financial markets, each morning NSCC issues margin calls to those NSCC member firms who may need to post additional collateral to cover their risk. Margin calls are calculated at the start of the day and intraday using historical price moves to determine the value-at-risk and mark-to-market charges. Additional charges may be applied in situations where members take on more risk in their cleared portfolios than their capital levels can support.

To ensure transparency into margin calls amounts, NSCC provides reporting and calculation tools to its clearing members to help them anticipate their requirements for a particular portfolio.
It takes significant technology and innovation for DTCC to process more than $2.3 quadrillion in financial transactions each year. At the center of this complex array of networks and systems is the IT organization, which is responsible for providing a seamless client experience and ensuring operational and technical resilience.

Advances in technology have made that speed and volume possible. But the data generated must be instantly accessible and error free. And communications among the parties must be secure and uninterrupted.

Keeping these interlocking systems fully functional is an ongoing responsibility that requires regular stress testing of current capacity as well as constant innovation and upgrading.

**BOOSTING CAPACITY**

DTCC and its subsidiaries have responded to meet the demands of escalating trade volumes. Through automation, capacity is scaled as needed and excess capacity is always readily available. This ensures that unpredictable spikes in trading volume as a result of extreme but plausible events won’t overwhelm DTCC systems.

These automated capabilities keep clients and products running without interruption. In addition, the company continues to enhance its capabilities and fortify its systems for the future.

**SMART REDUNDANCY**

Extreme but possible events—like power outages, weather events, and cyber-attacks—pose a different threat from spikes in trading volume. Yet all put technological capacity and resilience to the test. To prepare, DTCC has established rigorous business continuity policies and procedures to keep its operations running at all times.

DTCC maintains offices around the globe to provide seamless 24/7 support to clients. In addition, certain sites can take primary control of critical operations in the event of an issue. DTCC and its clients work together on recovery and resumption, and these capabilities are periodically tested to ensure sound practices. IT also follows a set of resilience principles while building enterprise solutions that provide its modern applications with the tools needed to recover from outages while minimizing data loss and maximizing application availability.

**STAYING CONNECTED**

A secure, redundant communications network supporting data, voice, and internet is vital to keeping trade and settlement information flowing between DTCC and its clients. The company is continuously improving its robust network, which includes redesigning hardware to achieve more flexibility as it acquires new clients and expands its services, as well as automating processes where possible.

To eliminate the risk of a communications breakdown, DTCC has relationships with multiple vendors and maintains a highly redundant network. If communications are disrupted, the goal is for the network to seamlessly reroute to another provider, with no impact to clients.

During 2020, with heightened market volatility due to the COVID-19 global pandemic and other events, DTCC upgraded its bandwidth by 10 times to support business and corporate functions in a virtual workplace.

**LEVERAGING A MULTI-PLATFORM STRATEGY**

High-speed electronic transmission is essential to DTCC’s business continuity planning as it ensures proper data replication and storage across its data centers. DTCC has a multi-platform strategy, leveraging physical infrastructure, private cloud, and public cloud to best serve its clients and the industry.

Since 2012, IT has leveraged cloud computing for streamlining processes, rapid delivery, risk reduction, and cost avoidance. Components of distributed systems development and testing is in the cloud, as well as many data capabilities and corporate functions to drive operational savings.

IT is focused on enhancing its on-premises enterprise infrastructure, specifically maturing capabilities and feature sets of the private cloud as appropriate. With a multi-platform approach, the company right-sizes the best-fit cases for its business and corporate functions. This provides DTCC with greater flexibility and control over its infrastructure costs. Maintaining this blend of physical and virtual hardware additionally provides the ability to deliver client solutions to the market faster.

**RESILIENCE AT WORK**

One of the most important ways that DTCC provides stability to the financial system is by ensuring that no matter what happens, day in and day out, its clearing and settlement activities continue to operate without interruption during times of extreme volatility or market stress.

When many parts of the world shut down at the start of the COVID-19 pandemic in March 2020, DTCC continued to operate seamlessly. Relying on its well-tested business continuity plans and procedures, DTCC processed a record 363 million transactions on Thursday, March 12—more than 15% higher than the previous record of 315 million transactions in October 2008, at the height of the financial crisis. With more than 95% of its staff working remotely, the firm never missed a beat even as financial markets spiked up and down. Less than a year later, DTCC set a new processing record of more than 475 million transactions in January 2021.
INNOVATION

DTCC is leading the industry into the digitization era.

Since DTCC created the first electronic securities nearly a half-century ago, the firm has a proven track record of employing the newest technologies to develop innovative solutions. With the growing prominence of fintech, or the integration of technology in banking and financial services, in recent years, DTCC is now leading the industry into the digitization era by exploring ways to turn traditional and physical interactions, communications, business functions, and models into digital ones.

DTCC is a recognized global leader in experimenting with distributed ledger technology (DLT) to enhance post-trade processing. It is also developing prototypes and solutions that use cloud processing for distributed computing, Artificial Intelligence (AI) and Machine Learning (ML) for data insights and, most recently, Application Programming Interfaces (API) to give clients a seamless way to access its services and data.

ACCELERATING SETTLEMENT

While the US clearance and settlement system is recognized as the most efficient and lowest cost in the world, DTCC continues to advance innovative approaches to further reduce settlement times. In 2020, less than three years after it helped lead the implementation of a T+2 settlement cycle, DTCC completed significant enhancements to the settlement system by re-engineering night-cycle processing.

Using heuristic algorithms to create a more dynamic and intelligent processing environment, DTCC is now able to optimize a client’s available positions and control the order in which transactions are attempted for settlement—all within existing night cycle timeframes. The result is enhanced processing efficiency, reduced operational risk, and improved intraday settlement finality.

PLANNING FOR T+0

Despite advances in technology, accelerating settlement beyond T+1 is aspirational at this time due to market structure and convention. However, DTCC’s Project Ion envisions an alternative settlement process flow that digitalizes DTC-eligible securities on a DLT and offers optimized processes and the ability to settle on a T+0 cycle—all while retaining the core benefits of its centralized netting and risk management. Because the platform will be asset agnostic, it could potentially manage any form of asset transfer, ranging from registered securities and cash to private market securities, digital tokens, cryptocurrency, and central bank digital currency, among others.

ION NETWORK

DTCC PARTICIPANTS

REGULATORS

TRANSFORMATIONAL CHANGE

When it comes to digital innovation, DTCC is turning its focus inward and outward with a long-term vision to modernize its legacy technology, reimagine its existing solutions and develop new ones, establish next-generation resilience and elevate the client experience. This transformational work is being delivered to the industry in components. The focus is on creating enterprise solutions with the philosophy of “build it once, and use it again and again” to increase efficiencies, operational resilience, and flexibility in its technology architecture. A critical component is leveraging cloud computing for rapid development at minimal costs to test new products and spur innovation. This “succeed or fail fast” philosophy helps to focus resources on concepts that are most likely to provide value for clients.

FRAMEWORK FOR DLT ADOPTION

With most financial firms, including DTCC, continuing to invest in DLT, it is important to build a strong foundation, including governance and standards, for the technology’s future adoption.

DTCC, working with Accenture, has developed a proposed DLT governance framework to manage the risks and consequences of a distributed ledger landscape. It would create an orderly system for addressing adoption, security, and regulatory compliance, establishing three key groups to manage an accountable and transparent DLT community: governing entities, network operators, and members of the network community.

DTCC continues to work with industry stakeholders to encourage adoption of the framework and to establish clear guidelrils that will enable DLT to thrive. DTCC’s experience using the newest technologies to drive market innovation will help usher in the age of digital assets, platforms and markets while ensuring that investors remain protected.

INNOVATION IN PRIVATE MARKETS

With many US companies delaying the decision to go public in recent years, DTCC recognized an opportunity to bring greater efficiency to the private markets while also helping to democratize them by expanding investor access to these growth-stage companies.

The Digital Securities Management platform (DSM), first introduced in 2020 as Project Whitney, is a digital infrastructure to support private market securities throughout their lifecycle, from issuance to distribution and secondary transfer.

DSM will deliver efficiency, standardization, and automation to the private markets by supporting traditional uncertificated securities via APIs and facilitate asset tokenization through its integration with public and private blockchains. The platform has the potential to significantly increase investor access while bringing structure and compliance to this burgeoning market.
Beneficial owner is an investor who has purchased and owns a security, even though the title is held in nominee name (also known as street name) for safety and convenience. The beneficial owner receives the dividends or interest the security pays, has the right to sell it, and, in the case of stock, is entitled to vote on certain corporate matters.

Book-entry describes the automated accounting system that transfers ownership of securities electronically from the selling broker’s account at The Depository Trust Company (DTC) to the buying broker’s DTC account when the transaction is settled. With book-entry accounting, no physical certificates change hands.

Central counterparty (CCP) is an entity that interposes itself as the buyer to every selling brokerage firm and the seller to every buying brokerage firm to guarantee a trade will be completed even if the original buyer or seller defaults.

Clearing fund is a pool of collateral made up of cash and securities that brokerage firms, banks, and others that clear transactions through The Depository Trust & Clearing Corporation (DTCC) subsidiaries must deposit to participate. The resources can be used to close out a defaulting participant’s pending trades, reducing losses to its counterparties.

Continuous Net Settlement (CNS) is a fully automated netting system the National Securities Clearing Corporation (NSCC) uses to reduce the total number of trade obligations that require financial settlement.

Custody means having possession of certificates that represent ownership of securities, whether those certificates are in physical or electronic form.

Dematerialization is the process of eliminating paper certificates from the securities processing cycle and replacing them with electronic records.

Margin requirement is the minimum amount of collateral in cash and securities that a DTCC participant must have on deposit in a clearing fund at a particular moment. Margin requirements are calculated at least daily.

Market risk encompasses the factors that individually or in combination have the potential to drive a securities market lower, reducing the value of the issues trading in that market. Among these factors are falling profits, increasing interest rates, illiquidity, fraud, political unrest, and currency fluctuations.

Multilateral netting is a process through which buy and sell positions are offset within a brokerage firm, no matter who it traded with, to reduce the number of securities that must be delivered. Financial obligations are also netted within and among brokerage firms to reduce the size of settlement payments that must be made.

Mutualization of risk means that all parties who clear and settle trades through a DTCC subsidiary agree to share the potential losses that might result if the subsidiary had to tap the resources of its clearing fund in the event of one trading party’s default.

Nominee name, also known as street name, is the name in which immobilized securities are registered with the issuer’s transfer agent if they are not registered to the beneficial owner. Securities held at DTC are registered in its nominee name, Cede & Co., and recorded on its books in the name of the brokerage firm through which they were purchased. On the brokerage firm’s books, they are assigned to the accounts of their beneficial owners.

Operational risk includes the risks posed internally by an organization’s infrastructure or policies and externally by natural events, malfunctions, or deliberate attacks.

Repurchase agreement is a fixed-income product. One party to the agreement sells securities to another and simultaneously agrees to buy back the same or similar securities at a specific future date at an agreed-upon price.

Settling bank handles the electronic payment or receipt of funds associated with netted securities transactions for the financial firms that have selected the bank to act on their behalf. Payments move through the Federal Reserve’s Fedwire system.

Standing Settlement Instructions are a market participant’s default instructions for the payment and delivery of securities. They often differ depending on the type and denomination currency of the securities.

Systemic risk is the possibility that an entire inter-related system of institutions or structures could be crippled or even collapse if a component of that system failed.

Trade Information Warehouse is a centralized electronic infrastructure and database for retaining the terms, handling the post-trade processing, and serving as a repository for over-the-counter (OTC) credit derivatives contracts. The Trade Information Warehouse is a service offering of DTCC Deriv/SERV LLC, a wholly-owned subsidiary of DTCC.
GUIDE TO CLEARANCE & SETTLEMENT
is an overview of The Depository Trust & Clearing Corporation (DTCC), whose sophisticated infrastructure and risk management systems provide critical services to US and global capital markets. The guide explains clearing, netting, and settling—the essential elements of post-trade processing—and the role of a central counterparty in ensuring completion of equity and fixed-income transactions. It looks, as well, at the increasing number of solutions DTCC provides for financial firms at home and around the world and its leadership role in driving innovation.

GUIDE TO CLEARANCE & SETTLEMENT
An Introduction to DTCC

VIRGINIA B. MORRIS

With a forward from Michael C. Bodson, DTCC President & CEO