Straight Through Processing for Financial Services

Complete Technology Guides for Financial Services Series

Series Editors

Ayesha Khanna

Jürgen Kaljuvee

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Industry pressures to shorten trading cycles and provide information-on-demand are forcing firms to re-evaluate and re-engineer all operations. Shortened trading cycles will put additional emphasis on improving risk management through front-, middle-, and back-office operations. Both business and IT managers need to effectively translate these requirements into systems using the latest technologies and the best frameworks.

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Straight Through Processing for Financial Services

The Complete Guide

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For My Parents, Javed and Farida Malik

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Preface

Straight through processing (STP) is a concept that has matured over the last few years from a hyped buzzword to a fundamental goal of the securities industry. It originally entered the limelight as the name given to initiatives that would result in a shortened settlement cycle of securities—from T+3 to T+1 (where T stands for trade date). A shorter time to settlement would lower counterparty and liquidity risks significantly, a benefit that the Securities Industry Association (SIA) cited when it pushed the industry to meet a deadline for achieving T+1.

The industry's inability to meet the 2004 deadline highlighted the many roadblocks—inefficiencies due to manual processes, data inconsistencies, lack of connectivity, and mismatched records—that lay in the way of achieving this goal. The SIA dropped its insistence on T+1, advocating instead a focus on incremental steps, such as matching and confirmation of trades, as necessary milestones on the way to achieving a faster settlement cycle.[1] STP began to be associated with a far bigger goal, which was the automation of all processes related to the trade lifecycle of financial securities, including equities, fixed income, and derivatives.

Today, STP stands for complete automation of trade-related processes in the securities industry. It constitutes an end-to-end streamlining of operations within and across firms, from trade initiation to settlement, and inclusive of auxiliary processes, such as risk management and accounting. STP is therefore the set of operations and technology solutions that entirely replaces manual processes with system communication of transaction details between the parties involved in processing a trade. It requires all market participants, such as exchanges, clearinghouses, vendors, and broker-dealers, that play a role in the trade lifecycle to improve their IT systems within their firms and to standardize their communication with each other. Thus, STP must be understood as a two-pronged strategy, involving system improvements for both internal and external transaction processing.

The Drive Toward STP

The pressure to achieve STP has never been greater. In the current market environment, participants retain their competitive edge only by enhancing their ability to

[1] "Industry Drops Push for T+1 Settlement," *On Wall Street*, September 2004.

partake in industrywide STP. Business success is increasingly difficult without the benefits of IT systems that ensure accuracy, speed, and secure connectivity at all stages. This is as relevant to broker-dealers who are providing trade execution services, as to marketplaces that are creating electronic interfaces for clients, and to buy-side institutions that are searching for ways to improve returns on their portfolios: all players are affected one way or another by the drive toward increased automation and scalability in a global 24/7 trading environment.

Several factors are particularly motivating senior management to expand their efforts to improve their STP implementation. More people are trading securities than ever before, and they are also trading these securities more often. In other words, both trading volume and trading frequency have risen significantly in recent years. The ability to trade electronically and the commoditization of financial securities have contributed to this surge in volume. However, these very factors have also shrunk profit margins as the spread between bid and ask prices have become thinner as markets have become more liquid. Buy-side institutions are putting increasing pressure on their broker-dealers to provide them best execution prices for their orders, and are even beginning to access the market directly to trade (as is often the case with hedge funds that use prime brokerage facilities). Couple these changing market conditions with regulations, such as Reg NMS and MiFID, which call for more transparent and efficient markets, and the securities industry suddenly finds itself in a landscape that has changed drastically. The new mantra is to have faster access to market, quicker decisions on how to find the best price for a trade, and ability to store and analyze vast amounts of data for risk management. And all this must be done within the confines of a regulatory environment that is becoming stricter across the globe as governments strive to protect investor interests.

The only way to be competitive and succeed in such an environment is to have high-speed, scalable, and reliable systems that can communicate transaction information to each other securely. Operations and IT systems need to be set up in such a way that the trade lifecycle moves seamlessly and quickly from one phase to another—from pre-analytics to trade order, from trade execution to trade matching, from trade settlement to account allocation, and so on. Streamlining the trade lifecycle is not an easy undertaking. It requires a deep understanding of the financial processes involved, and a framework in which to make decisions on which technologies will be best suited to improve these processes.

The Need for a Framework

Market participants are faced with a plethora of technology options to choose from, each advocated by a different group of enthusiastic supporters in the industry. More often than not, senior management finds itself overwhelmed by questions on how to

move from their legacy environments, in which applications and data are stuck in silos and updated by processes that are manual and redundant, to a streamlined STP environment that will result in lower business risk and operational costs. There is no comprehensive guide in the market that gives answers to the question of how to automate the trade lifecycle and all its associated processes. This book was written to address precisely these needs by answering the questions: What are the current trends in the market and how is the trade lifecycle affected by these trends? What are the key technology solutions available to solve business requirements, and how can one choose the best solution given a particular problem? What are the laws and regulations that are relevant to implementing an STP environment for the securities industry?

Straight Through Processing for Financial Services provides a foundation for thinking about how the trade lifecycle can be automated in the light of current trends in the industry. It starts with a description of how the market is evolving today, explaining the main business drivers for STP in the industry. Readers are given a detailed overview of the trade lifecycle as it pertains to broker-to-broker and institutional investor-to-broker transactions for equities, fixed income, and derivatives products. The automation of the stages of the trade lifecycle explained in this overview constitutes the business goal of an STP system.

After having laid out the business foundations of the STP environment, the book proceeds to build a framework and strategy for choosing particular technology solutions. At every stage, readers are given a basic introduction to the kind of technologies that address a fundamental part of STP, such as connectivity or machine-to-machine communication. Each chapter addresses one important pillar of achieving automation in the industry, and directs the reader to solutions that are cutting-edge and have been received positively by leading market players.

For instance, there are many software architectures that can be employed when designing a large-scale complex system. In this book, Service-Oriented Architecture (SOA) is recommended because it is increasingly the most highly valued software architecture for financial systems. There are many ways to connect systems internally and between market partners. The book recommends using a high-speed message bus for internal communication and advocates choosing an external connection—direct, an extranet, or industry messaging provider—depending on the particular needs of the business. For example, if the need is lightning-speed connectivity and the company can afford it, then connecting directly to an exchange or marketplace is a very expensive but viable option; if the need is high-speed connectivity but the allocated budget is medium, using an extranet such as Radianz is recommended. One other common problem that technologists often face is how to deal with databases that are stuck in silos and carry inconsistent information about the same reference entities. This book recommends creating data warehouses for read-only reference data, such as historical prices, and then propagating this data

through a high-speed message bus across the enterprise. For quick access to data stored in local databases, using virtualization in the form of an enterprise data fabric is presented as a solution that has recently been met with considerable success.

These are just a few examples showing the complexity of problems and variety of choices facing technologists today. The needs of the financial services industry are particular, and the demands of the business are aggressive; in order to successfully compete, a holistic understanding of how to automate transaction-related processes as they occur within the firm and in partnership with other firms is required. This book provides the strategy that can be used to effectively leverage technology to give an organization the competitive edge it needs to be successful in today's market environment.

Constructing a Strategy

The first step to creating a strategy is to understand the business requirements in detail. The book, therefore, begins with two chapters that discuss the trends in the securities industry today, and the key phases of the trade lifecycle that will be automated. The remainder of the book devotes each chapter to a technology solution for a particular business need of implementing STP. Together, these chapters form a comprehensive guide on how to achieve STP of securities processing.

CHAPTER 1: THE BUSINESS CASE FOR STP

Any technology initiative must be undertaken based on a thorough analysis that shows there are significant advantages to investing in a particular IT project. Although it is difficult to put a precise dollar value on the increases in profits due to expanded and improved IT systems, it is possible to make a case for an implementation based on a review of the business requirements of today's markets. The financial landscape is changing rapidly with the ability to trade electronically, manage risk effectively, and comply with stringent laws becoming the most prominent drivers of automating trade processing and settlement.

CHAPTER 2: THE TRADE LIFECYCLE

STP revolves around the efficient and timely processing of trade-related activities, from trade initiation to settlement and then on to position monitoring and risk management. The trade lifecycle for all security types can be divided into four main phases: pre-trade (analytics and price discovery), trade (order creation and

execution), post-trade (clearing, allocation, and settlement), and post-settlement (risk management, profit and loss accounting, and position monitoring). During the course of one lifecycle, many different systems are used within a firm, and data is exchanged with multiple systems outside the firm. The ability to transmit and confirm accurate and complete transaction-related information results in lower risk and operational costs.

CHAPTER 3: SERVICE-ORIENTED ARCHITECTURE

Deciding on a sound architecture is the first foundational step to building and extending software systems. Service-Oriented Architecture (SOA) is advocated by this book as the technology architecture of choice to use for implementing an STP infrastructure. Most of the solutions in this book are presented under the SOA paradigm—a framework for representing software modules as loosely-coupled services that can be invoked individually or together to execute a business process. SOA enables a flexible and scalable architecture in which even legacy components can be seamlessly reused by wrapping them as services.

CHAPTER 4: INDUSTRY STANDARDS

Machine-to-machine communication constitutes the core of STP; it eliminates the time delays and errors caused by manual processes. However, it cannot be achieved unless the securities industry chooses standards for exchanging financial data, both in terms of message format and message language. Currently, three languages dominate system communication—FIX, FpML, and SWIFT—and it is imperative for firms that want to connect electronically to industry partners to use one or more of these standards. The code delimited FIX is the most popular industry standard for electronic trading, particularly for equity trading in which it has been credited for revolutionizing the efficiency of the market.

CHAPTER 5: CONNECTIVITY

Systems connected over networks transmit transaction-related information both within the firm and to partners in the industry. Trade messages travel from broker-dealers to exchanges, from exchanges to clearinghouses, and from clearinghouses to custodians, to name just a few of the connections that must be made to ensure STP. Within the firm, the front, middle, and back offices continually send information back and forth for risk calculations, profit and loss accounting, and reporting

purposes. While an enterprise message bus is the SOA prescribed connectivity paradigm internally, firms have the option of direct connectivity, using an extranet, or an industry messaging provider such as SWIFT for external connectivity. The choice of network is determined by the speed, budget, and specific requirements of the business unit using the network.

CHAPTER 6: DATA MANAGEMENT

The need for effective data management has risen in the priority ladder of resource allocation with a C-level officer, the Chief Data Officer (CDO), joining the ranks of the top management of companies for the first time. Firms are inundated by high-frequency, high-volume data coming from multiple sources that must be funneled at tremendous speed to various applications across the enterprise. Having a centralized data management strategy that consists of data warehouses for reference data, and an SOA-based data architecture for accessing local databases through data access layers, is the most cost-effective way of accommodating the needs of modern enterprise data management.

CHAPTER 7: RECONCILIATION AND EXCEPTION HANDLING

Reconciliation and exception handling are usually considered second-tier topics of interest when discussing how STP makes the trade lifecycle more efficient. However, this book considers the checks and balances of continual reconciliation between systems throughout the trade lifecycle as a key enabler of STP. Without proper matching of transaction details, the trade will fail to settle or risk will be miscalculated post-settlement, both of which are costly and time-consuming errors. The ability to handle events that are not part of the normal functioning of a system, including those that occur when reconciliation errors occur, is known as exception handling. Firms should have a central exception-handling platform that uses a combination of system validations and operations personnel investigations to identify and resolve exceptions.

CHAPTER 8: REGULATORY COMPLIANCE

As market innovation increases the complexity and variety of financial services and products, governments are also increasing their surveillance of the securities industry. In a global economy, market players often operate in more than one country, and

they must constantly keep abreast of regulations if they are to avoid heavy fines and government lawsuits. Regulations primarily aim to improve market transparency and efficiency and to protect the interests of the small investor. Five major regulations are currently affecting firms in the US and the EU—Sarbanes-Oxley, Basel II, MiFID, Reg NMS, and the Patriot Act. All STP systems must be implemented in compliance with these regulations.

CHAPTER 9: BUSINESS CONTINUITY

The terrorist attacks of September 11, 2001 on New York City highlighted the vulnerabilities of the financial sector in coping with unexpected disasters. Business continuity or disaster recovery has since 2001 become a priority for firms that saw disruption in business operations and devastating loss of personnel, systems, and information. A business continuity plan is a cohesive set of procedures that will be carried out in case of an emergency event, such as an earthquake, a terrorist attack, or a pandemic. Business continuity is a concern for the entire industry; regulatory authorities across the globe are working in partnership with industry members to test the ability of the entire industry to recover from disaster scenarios.

CHAPTER 10: VIRTUALIZATION AND GRID COMPUTING

Virtualization extends the SOA approach by making even the physical infrastructure used by software services virtual, thereby allowing a grid of resources across the firm to be utilized on demand. This greatly enhances the computing power available to applications such as risk analytics and algorithmic trading applications, which require massive amounts of power to process high-volume high-frequency data. The twin technologies of virtualization and grid computing have therefore become some of the most highly coveted technologies on Wall Street.

APPENDIX: THE SECURITIES INDUSTRY

The securities industry is one of the most important contributors to the economy of developed countries. It provides a forum for bringing together investors and those looking for capital—businesses and governments—through the issuance and exchange of financial securities. This chapter provides an overview of major players and products in the market and serves as background material for the book, and a refresher course for those familiar with the industry.

Who Will Benefit?

This book will be useful to senior management responsible for trading, risk management, and technology operations, financial analysts, technology managers, strategy consultants, IT developers, and students interested in the industry. It provides a framework for choosing technology solutions for automating and streamlining operations when trading financial securities. Whether you are a technology manager looking for cost-effective solutions to implement STP in your firm, a trader or risk manager keen to improve profits and reduce risks, or an interested industry observer, I hope you find reading this book as educational and enjoyable as I found the process of writing it.

Ayesha Khanna
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