STP White Paper for the Securities Industry

by Tom Shaw, IBM Finance Sector – Securities Processing

Introduction to STP

Every industry undergoes an occasional major change in the methods it employs to satisfy customer and market demands. The financial services industry is presently in the throes of such a change known as straight through processing. When STP first became a popular topic, it was viewed as a back office securities processing issue. As the vision matured it added dimension. Today's vision of STP involves cross-border issues that embrace traditional front, middle, and back office processes and services.

STP encompasses a revised organisational, process, and technology model for financial industry organisations – all segments and all geographies. It can be viewed as a series of uninterrupted electronic processes across and throughout an enterprise, you:

- **S**ecure an initial transaction as an electronic message (a transaction encompasses any activity, not just orders, associated with currency and/or securities)

- **T**ransform and transport it to its initial execution/processing location

- **P**ass it through the processing cycle with little, if any, human intervention

Why Transform Securities Processing?

The financial industry's infrastructure has evolved for decades. As new markets, products and services proliferated, they were supported by modifying existing applications/systems, or by creating new ones that were disparate in nature. Systems and applications have become increasingly complex, costly, dangerous and time consuming to maintain and change. Redundant processing silos are commonplace. In many instances, it was quicker and easier to build new systems than to try to accommodate new structures in the old models. In most systems, post-trade processes were batch oriented, many remaining so to this day. The business process model for financial institutions – banks, broker/dealers, investment advisors/managers, mutual funds, custodians, clearing/settlement depositories (CSDs) and independent service vendors (ISVs) – needs to change.

Primary Marketplace Drivers

The principal driving forces behind STP are the implementation of a T+1 settlement cycle and increasing globalisation of the investment markets (irrevocable payment for a trade on the next business day is a global objective; STP solutions should incorporate the ability to settle on T+0).

In an effort to reduce settlement risk, financial markets anticipate shortening the time frame between trade and settlement dates. Today's trade processing cycles may take up to 72 hours or more to complete. In the anticipated next day settlement environment, the industry will have four hours or less to complete these processes. The emergence of new democracies and economies is expected to triple investor's participation in international investment/trading activities within two or three years.

Efficient access to these markets is an obvious imperative. Globalised portfolios will proliferate, and the ability to obtain offshore custodial and settlement information on a near real-time basis (NRT) will enable a firm to manage its risk, settlement and treasury functions on an enterprise-wide basis. These abilities will be key differentiators for service organisations. "Real-time" generally refers to the instantaneous simultaneous processing, posting, and notification of a transaction. NRT is more flexible in scope. Depending upon the criticality of the application it may be an instantaneous process or it may be a process in which several or more minutes elapse before all postings and notifications are made. It is a form of systems management determined on a

need-to-know basis to support just-in-time processing.

Secondary Marketplace and Operational Drivers

In addition to the primary drivers, there are others that mandate the implementation of an infrastructure to provide a systemic straight through process:

- new products
- new entrants
- Increasing competition
- decreasing margins of profit
- increasing need for "brand" differentiation
- alternate channels for direct communication (web, wireless)
- extended trading hours
- increasing volumes with spiking
- 24/7 processing requirements
- increasing regulatory scrutiny

Impact of Drivers

STP is a paradigm that is all encompassing. It is not just a technology change. An effective STP implementation will impact a firm's organisational structure, daily business processes, and its technical architecture significantly.

Organisational structure

The financial industry envisions a global homogeneous marketplace in which volume will triple, processing time will be compressed by at least 94%, and contracts will settle irrevocably within 18 hours or less! To ensure T+1 settlement of an order that was executed at the close of trading, execution notices, confirmations, and settlement instructions must be transmitted and acknowledged by principal parties within four hours of the close to ensure settlement (4/72=.05555, approximately 6% of today's timeframe). What magnitude of change will financial service organisations need to undergo to realise this vision?

Although systems will remain largely distributed, it is critical to provide centralised access and control of data. Regional, domestic and international branch offices will evolve into kiosk-type customer and operational service centres, electronically reporting their activities through centralised relational databases of information to operational control locations. For example, worldwide treasury services, worldwide credit services, worldwide clearing and settlement services need to be administered on an enterprise-wide basis. Comprehensive cross-border data sharing, NRT, will eliminate many of today's redundancies and enable STP.

Daily business processes

Traditionally, back office processing has been clearly defined. With the introduction of STP, the lines of demarcation become blurred or disappear as the back office processes become joined at the hip with traditional front office and middle office processes. The key concept underlying the STP paradigm is the capturing of a transaction at the point of origin, enabling continuous processing. For example, to fill an original order, a message will be routed electronically through a series of logical sequential steps. At each step in this logical path, the order will be enriched with information, obtained from a variety of internal and external sources, as required by the next recipient (system application) in the logical process chain. Inherent in this is a consolidation of the existing departmentalised operational services.

To accomplish STP, transactional information will have to be transmitted – NRT – universally. Success will depend upon the industry's determination to develop a financial industry super-structure that supports user-friendly intra-office, inter-office, inter-firm, and inter-country conversational communication. The Global Straight Through Processing Association (GSTPA) is addressing the latter.

Technical architecture

The technical architecture that will be required to support the next generation of securities processing will have to be significantly different than the infrastructure that is currently in place. The model supporting securities processing is currently segmented into front, middle and back office systems. Information is passed between and within these processing segments through channels including personnel re-keying data, file transfer, client/server and batch processing techniques. These techniques are rapidly reaching the limits of their ability to support existing processing demands, much less the demands of a rapidly accelerating securities industry.

Yet tomorrow's STP architecture must be constructed in a manner that leverages existing infrastructures, representing billions of dollars worth of technology investments. It must link disparate platforms internally and externally, domestically and globally. It must be reliable, easily and readily accessible, and scalable. It must also be flexible enough to respond to future changes with minimal software development effort. Message standards, message transformation, middleware and workflow software are the key components.

The emerging business model will demand reduction

or elimination of batch processing in favour of continuous near real-time processing and reduction of human involvement in favour of pervasive automation and just-in-time enrichment of transactions. Message-based architectures have proven effective in reducing batch windows by allowing processing to continue as soon as transactions arrive at a processing point, rather than allowing them to accumulate for later processing. Human interaction with systems can be minimised by loosely coupling systems via messaging, while workflow techniques can be used to assure efficient interaction between personnel and systems, when necessary, to resolve processing exceptions. Message brokers can be used to provide just-in-time enrichment of transactions.

Globally, diverse enterprises will be faced with providing an effective infrastructure across disparate computing platforms and locations to allow business applications to exchange the information needed to support their operations. Messaging middleware again provides the means to connect these platforms and locations. Message standards will play an increasingly critical role in bringing such systems together, but message brokers that provide for transforming proprietary formats into standard formats will be essential until existing systems can be modernised.

Global diversity introduces additional complexity, not only in processing support for multi-currency, multi-regulatory/tax environments, but also as it relates to supporting multiple execution, clearing and settlement venues. Both the ability to participate efficiently in a variety of markets and the ability to selectively take advantage of temporary anomalies that occur in a competitive global environment are design imperatives. These abilities will provide a clear competitive advantage to a firm that can demonstrate expertise in these arenas.

These global issues, along with the increased volume associated with the introduction of new financial products and a need to reduce time to market, places a demand for change to the traditional means of developing software to support them. In the past, these changes have meant lengthy software development processes. Such delays in delivering function are problematic. Architectures to support this processing must embrace approaches based on rules to reduce the amount of time it takes to deliver new functions.

Today's market is characterised by predictably increasing trade volumes over the long term and unpredictable variance in volumes in the short term. The evolving architecture must accommodate the ability to scale across platforms and hardware for predictable volume increases, and to dynamically detect instantaneous increases and schedule additional processing elements within existing platforms.

Increased competition among existing market participants, the entrance of new participants and access to securities services through alternate channels will demand that the architecture be flexible enough to embrace new technologies as they emerge.

A Straight Through Processing Solution

It is imperative that STP be viewed as an industry issue. Success is dependent upon a commitment to change by the entire securities industry, not just a segment of the industry and not just a few of the primary players in each segment. Nor will it succeed unless most existing front, middle, and back office processing applications are integrated with each other, creating a seamless end-to-end process. Implementing a gateway to GSTPA's TFM is a prerequisite. But alone, it will not provide a firm with an enterprise STP structure. Success is dependent upon the universal acceptance of relatively few but critical entities and industry infrastructure concepts. Numerous hardware, middleware, and software vendors will have STP proprietary offerings, each with unique nuances. In selecting the solution for your firm, the most important criteria is that the product/vendor selected can demonstrate proven capability to accept, transform and communicate messages in a user friendly mode to any internal or external system.

The STP Enterprise

The characteristics of securities processing historically demand high performance and high availability messaging systems, particularly for order processing and trade execution. The need for robust messaging systems is expanding, caused by business dynamics anticipated over the next two to five years in this industry. For example, shortened settlement cycles will significantly increase the demand for near real-time continuous processing of value bearing messages. This will cause the most significant IT impact expected in the industry, i.e., the transformation of item processing currently performed by batch job streams, to a message based continuous workflow environment.

A key area required to support that environment is an open framework we call a Managed Message Service. These services provide a foundation for business integration of existing and new application solutions. These services can be functionally and structurally designed as logical Message Hubs, built largely on the messaging infrastructure provided by IBM's MQSeries product family. Such hubs can be placed at

appropriate nodes within an enterprise network providing a backbone, a bus, by which business transaction requests can find their way from investors to clearing agents and back to investors.

The Managed Message Service plays two critical roles in securities processing. It provides a managed, secure environment that enables connectivity between end-users and application processes within or across enterprises. It establishes an application productivity and enrichment environment by providing managed access to services such as rules-based message routing, data transformation and workflow directed processing of business logic.

The Managed Message Service is structured as a selectable set of integrated services using strategic components as shown in Figure 1 – The STP Enterprise. It provides an open framework for integration of proprietary, packaged and customer developed infrastructure products.

Figure 1 shows how the infrastructure is accessible from the perspective of business application components depicted in the centre. Individual subsystems such as transaction, messaging and database managers are directly available to the application processes. Applications may also gain the benefit of the portable infrastructure from the use of higher level services such as workflow or message broker support. Note that these higher level services are themselves portable and supportive of distributed architecture. It is the intent of the Managed Message Service to deliver high-level business interfaces that abstract the underlying infrastructure and platforms.

From the vantage point of business analysts and I/T operations staff, the Managed Message Service supports two major requirements for securities processing:

- connectivity between end users and business applications is achieved through adapters which support the communications methods and message formats and protocols deployed by end-users connected to the Message Hub via intranets, the Internet, remote dial access or

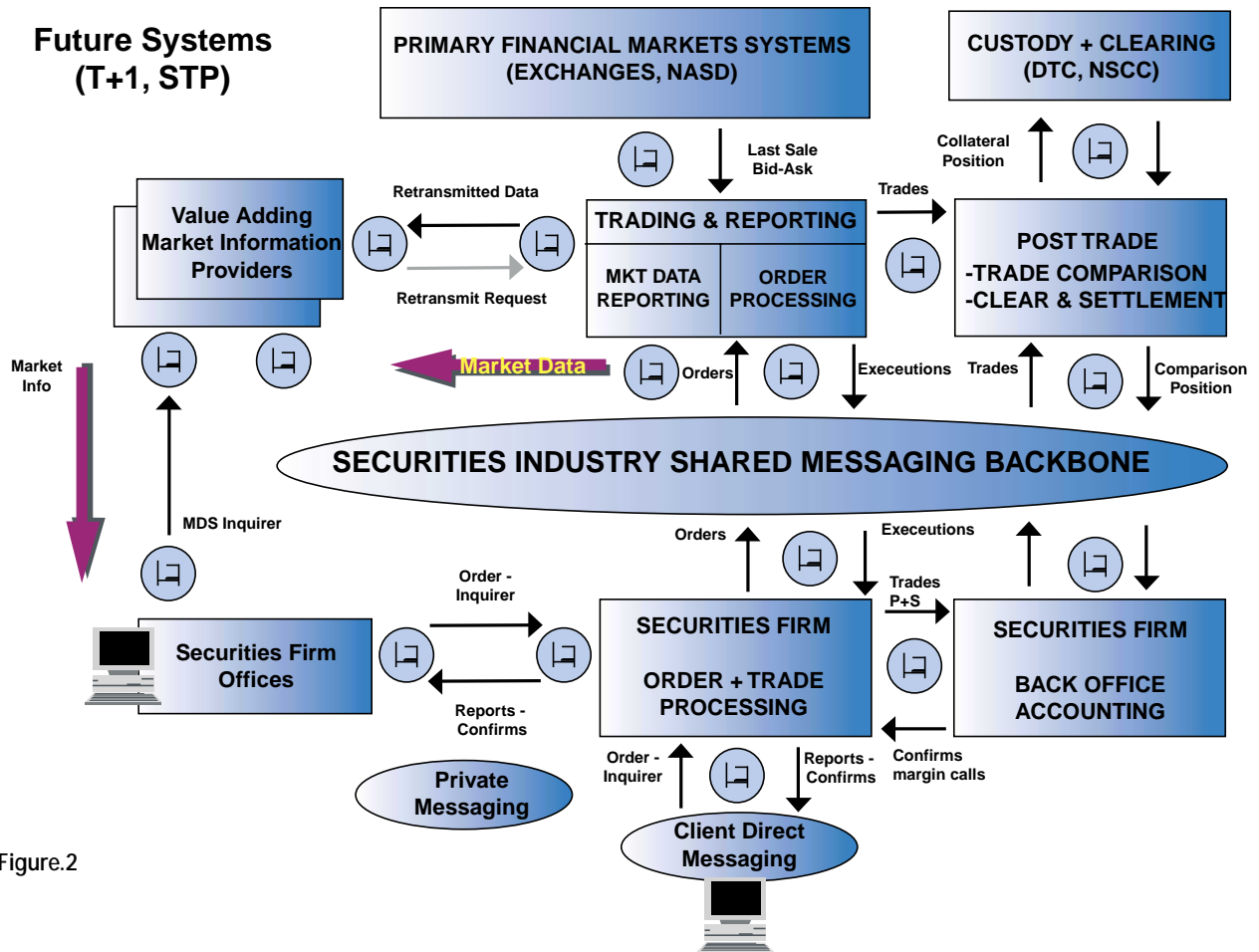Figure.1

**Future Systems
(T+1, STP)**
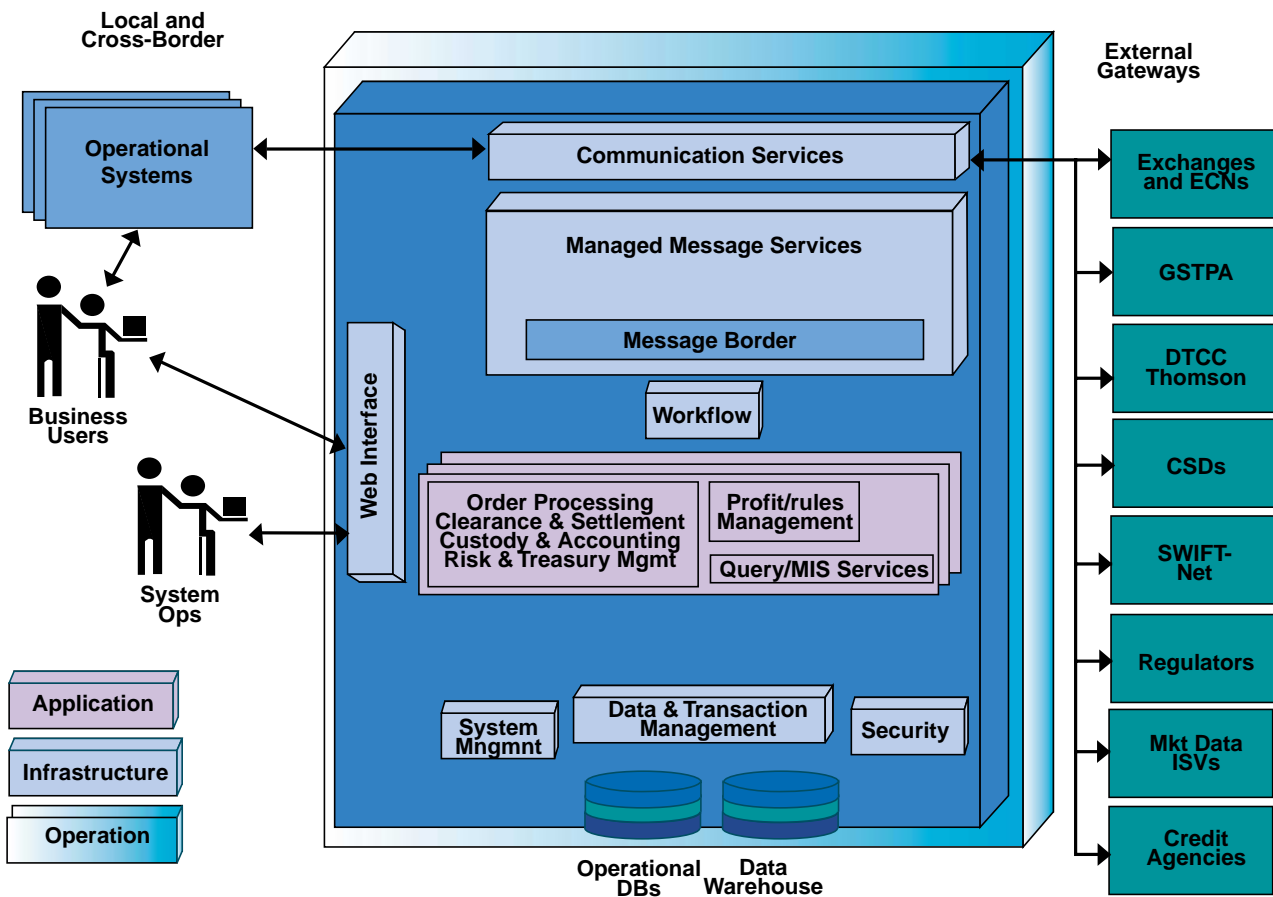
Figure.2

industry extranets. The Message Hub supports analysis, transformation and routing of the messages that flow between the users and the applications connected to or residing within the hub

• event-driven business logic and message-based interprocess communication is supported by reliable messaging services which assure the delivery of message objects. The basic messaging services may be augmented by a set of message broker services and by a configurable workflow management component. The use of workflows to execute business processes provides continuity and consistency with business process models that implement business policy

The STP Industry

STP represents the embodiment of message hub concepts to effect continuous securities processing across a variety of securities industry enterprises. It is a model that supports the industry direction for global STP and shortened settlement cycles. Message hubs have traditionally existed in the industry,

particularly for linking the securities firm's network and routing orders to securities exchanges and dealer networks (which were also supported by their own message hub configurations). The future direction will place message hubs at the heart of securities clearance and settlement systems. These new hubs within the securities firms will be linked with hubs at clearing, depository and custodial entities to eventually form a federated global network for securities processing.

Summary of Technology Solutions Relative to the STP Drivers

The preceding paragraphs have addressed market issues and technological tools. The following table re-examines the STP drivers from a systems architecture perspective to produce a snapshot that correlates the STP drivers to both organisational/infrastructure changes and the technologies that will facilitate the realisation of the STP vision as expressed in this white paper.

Business Drivers	Organisational and Infrastructure Changes	Enabling Technologies
Increasing **globalisation** of the investment markets **Alternate channels** for direct communication Implementation of a **T+1** settlement cycle Increasing **regulatory scrutiny**	Enterprise-wide coordination • system interoperation, intra & extra-firm, local & cross-border, • support for more complex data structures • support for more complex process logic • maintenance of consistent data throughout the enterprise Consolidate information from all time zones • centralised control of decentralised assets • centralised data bases with local distribution Consolidate business processes • front and middle office consolidation with NRT oversight • integration of cash accounting and SMAC accounting systems • merger of departmental functions Support of integrated processes • across internal entities • across industry participants • operating in near real-time	Data consolidation • normalisation • cleansing Standards based delivery • internet and wireless technologies for communications and servers • industry-based standard for messages i.e., FIXML, ISITC, SWIFT Intersystem message brokering • message transformation • enrichment • content based routing-workflow High availability systems High performance parallel processing Resource reuse • object technology for new development • messaging for existing systems
Increasing **volumes** with spiking Increasing **competition** Decreasing profit **margins** Increasing need for **brand** differentiation **New products** **24/7** processing **Extended trading hours**	Enable rapid support implementation for new, competitive products utilising skeletal information formats to facilitate "just-in-time" processing Support low cost transaction execution through implementation of intelligent order routing Support process insourcing and outsourcing Support secure electronic communications with all internal and external entities Support continuous client access	Security Architecture • capable of maintaining transaction security and state across organizations • protecting one institution form security problems as another institution Message based communication • replacing current file based batch communication between processes Automated process flow • supporting STP • requiring reduction in exception transaction to support increased volumes

Business Drivers	Organizational and Infrastructure Changes	Enabling Technologies
		Object based development • component reuse • potentinal component purchase Rules based process logic • process adaptability • specification by business user Message based process interaction • high performance low cost access to existing systems • message transformation and enrichment for interaction with new or unplanned systems Security architecture • support multiple entities • exploiting standard technologies • compatible with the component development

In forthcoming articles, IBM will discuss each major component of the STP solution, providing specific insights into the methodologies it employs to architect a STP enabled enterprise.