

# Interactive Messaging and Real-time Comparison

## Introduction

In a white paper distributed to all members in early 1997, GSCC outlined its long-range plans to provide straight-through processing and a point-of-trade guarantee to its members, primarily through the implementation of real-time, interactive services designed to meet the demands of an increasingly fast-paced and dynamic marketplace. Since that time, GSCC has been working steadily towards achieving this objective.

GSCC's ultimate goal for straight-through processing remains the same – to accurately capture, compare, guarantee, reconcile, settle (when appropriate) and provide for the risk management of trades on the same day they are executed. As a first step, in 1998 we completed the reengineering of our existing systems platform to support the business requirements of real-time, interactive processing, which then became our production system in mid 1999. We further began to establish the foundation for real-time processing by implementing the participant Access Network, developing an automated clearing bank link (functioning currently in a test environment) and by reviewing and selecting standardized formats (i.e., SWIFT) to adapt for our interactive messaging specifications.

In our continued effort to deliver these critical services to the marketplace as expeditiously as possible, GSCC is adopting the following phased approach to implementation:

Phase 1: Interactive Messaging to Support Real-time Comparison

Phase 2: Interactive Messaging to Support Netting

Phase 3: Support of Same-Day Settlement of Repo Start Legs

Current plans are to implement interactive messaging to support real-time comparison early in the second quarter of 2000. This service description delineates those processing features that will be a part of this initial phase. Further Service Descriptions will be issued detailing subsequent phases closer to their implementation.

## Project Definition and Scope

GSCC's current processing environment is essentially batch. Participants submit data to, and receive data from, GSCC using our proprietary, fixed-format, fixed-

length batch input and output messages. In addition, most members submit a single batch to GSCC at the end of the day containing data for all of their trades, the bulk of which settle the next business date (excluding forward settling trades, repo close legs and failed transactions).

Upon the implementation of Real-time Comparison services, members will have the ability to submit trade input to GSCC intra-day as trades are executed using the SWIFT MT515 message format. Submitters will immediately receive trade status information (i.e., notification of whether the trade has been accepted or rejected) via the SWIFT MT509 message format. This format will also be used to provide up-to-the-minute trade status information to members as transactions are processed by GSCC (for example, a message will be sent when a trade compares, is cancelled or is modified). Trade counterparties will also be notified immediately when a trade has been submitted against them using the SWIFT MT518 message containing full trade details. In addition, the MT518 will communicate to the participant those changes that GSCC may have made to trade records submitted.

GSCC will continue to support our existing batch input and output facilities, although plans are to discontinue supporting these outdated formats once the majority of our members make the shift to processing SWIFT formats. To provide the most flexible input and output options, members may elect to receive interactive or batch output, regardless of their mode of input. That means that a member could choose to submit interactive messages in real-time but receive end-of-day batch output. To further increase flexibility, batch output will also be available in SWIFT formats.

GSCC's Comparison process will continue to run in real-time, enabling members to compare trades as close as possible to their execution. This will become critical when interactive services are expanded to include intra-day settlement of same-day settling trades. Members will have the ability to submit trade data to GSCC, review output, and identify and correct any errors, all within minutes of execution.

The comparison of dealer-to-dealer and brokered trades will continue to be performed based upon the matching of bilateral input – that is, both parties to the transaction will need to submit matching trade details to GSCC to effect a comparison. Realtime Comparison services will also include the acceptance of unilateral input from approved Electronic Trading Systems (ETS). The trades of an authorized ETS will be considered compared based solely on the data submitted by the ETS; the trade contra-party will not need to submit corresponding trade details to GSCC.

Concurrent with the implementation of Real-time Comparison services, **GSCC will move up the submission deadline for trade input from 10:00 p.m. to 8:00 p.m. EST.** In the 1997 white paper, GSCC announced that we would begin

requiring earlier submission prior to the full implementation of interactive services to facilitate members' transition to an earlier processing timetable. This is not only important to ensure there is ample time to reconcile all activity by the end of the processing day, but it also supports GSCC's cross-margining initiatives. Real-time risk management will be essential once interactive netting and settlement services are provided, and cross-margining with other clearing corporations will enhance our member's liquidity and trading capabilities. Further, GSCC's plans for cross-margining with clearing corporations in Europe will require a close coordination of data transfer. Ultimately, the submission deadline may be moved up even further in the processing day (for example, 6:00 p.m. EST).

The remainder of this document more fully describes the Real-time Comparison services. Information has been organized into the following sections:

- I. Use of SWIFT Messages
- II. Electronic Trading Systems
- III. Trade Input (screen-based, interactive, multi-batch and batch)
- IV. Real-time Comparison
- V. Trade Output (screen-based, interactive and batch)
- VI. Communications
- VII. Upcoming Document Releases
- VIII. Contacts

## **I. Use of SWIFT Messages**

One of the most significant features of the Real-time Comparison implementation will be the adoption of new SWIFT message formats for interactive and batch input and output. These new formats were developed by SWIFT in coordination with securities industry working groups to establish a viable and efficient industry standard. This standard defines messages composed of required and optional variable-length sequences of data tags and data fields, maximizing the flexibility and practical application of the messages. Various message types have been delineated by SWIFT, each providing a specific business functionality.

As noted in the previous section, to support Real-time Comparison, GSCC will use three SWIFT message types: 1) The MT515 format will be used by GSCC for trade input, cancellation and modification, 2) the MT509 will be used for providing trade status updates as trades move through GSCC's processing system, and 3) the MT518 will be used to provide contra-party notification and to provide trade output where full trade details are required.

By replacing GSCC's proprietary messages with SWIFT message formats, our members will incur substantial benefits. These include:

- Ability to use third Party software packages, which are readily available and can map to SWIFT format messages. This minimizes participant programming requirements.
- Reducing participant programming efforts in order to communicate with international securities service providers (for example, European Securities Clearing Corporation (ESCC) will utilize some of the formats GSCC is planning to use). Common records, sequences and data/field definitions will facilitate programming standardization by each participant.
- Facilitating future enhancements through the use of SWIFT's flexible formats that enable users to more easily add and delete fields to meet constantly changing business requirements.
- By adhering to the SWIFT standard, GSCC is positioned to give participant access to the SWIFT network, if this would benefit GSCC's membership.

## **II. Electronic Trading Systems**

Another key feature of the Realtime Comparison implementation will be the acceptance and processing of unilateral trade input from authorized electronic trading systems (ETS). This is being done to support the expanded use of electronic trading system intermediaries in the Government securities marketplace. These systems are owned and operated by many different types of entities, including registered broker-dealers, exchanges, and foreign companies.

Since its inception, GSCC has dealt with the "traditional" intermediaries in the Government securities marketplace – the inter-dealer brokers ("brokers") – by requiring them to be netting members and subjecting them to funds settlement obligations and limited margin and loss allocation requirements. The GSCC Board and management, after much consideration of this issue, believe that a different approach to the interaction between GSCC and ETS is appropriate; one that recognizes that ETS essentially are "black boxes" that match the long and short sides of a transaction on a simultaneous basis, exercise no discretion over the terms of the trade, and are not at any point in time in an unmatched or at-risk position.

In order to become an authorized ETS, the applicant must demonstrate that it has sufficient financial resources and operational status, as well as satisfy GSCC's stringent testing requirements. In order for trades to be accepted by GSCC, an ETS must obtain and execute a GSCC ETS Authorization form for each dealer contra-party.

An authorized ETS would execute the buy and sell sides or repo and reverse sides of a trade on a simultaneous basis. (This is an important requirement that assures that an ETS will never be in an at-risk position.) An ETS would immediately submit trade data to GSCC on a locked-in or pre-matched basis using any of the approved input media (see section III, "Trade Input"). Trades submitted by an ETS would not be subject to the \$50 million maximum transaction size; trades of up to \$2 billion would be accepted for processing.

The dealer contra-party would immediately receive compared trade notification from an ETS and would not be required to submit corresponding trade details to GSCC for matching. ETS will also notify GSCC of the trade. The dealer contra-party would then receive from GSCC an advisory (MT 518) of a locked-in trade submitted against them, and a status message (MT 509) confirming automatic comparison of the locked-in trade.

GSCC will not accept trade data from an ETS on behalf of a dealer contra-party unless the dealer contra-party has executed a written agreement authorizing such ETS.

### **III. Trade Input**

As noted in the introductory section of this service description, with the exception of authorized ETS (described in section II), bilateral trade input by dealer and broker members will be required for Real-time Comparison. **The submission deadline for all trade input will be moved forward from 10:00 p.m. to 8:00 p.m. EST.**

Members will have the ability to submit trades to GSCC using any of the following input options:

- Real-time Screen-based Input
- Real-time Machine-readable Input
- Multi-batch Intra-day Bulk Input
- Batch End-of- day Input

Each of these input options is described below.

#### **Screen-based Input**

GSCC will continue to support trade input using GSCC's existing screen facility, which will be expanded and simplified through the Access Network. GSCC plans to introduce a Web-based trade input facility in the near future.

Participants will submit data to GSCC using the screen facility in real-time as trades occur. Information entered in the fields will be instantly edit-checked and submitters will be informed immediately if a trade has been accepted or rejected. Trade data will be processed by GSCC upon receipt, and participants will have the ability to make inquiries regarding their trades immediately upon submission.

### **Interactive Message Input – SWIFT MT515**

The SWIFT MT515 message will be used by members and authorized Electronic Trading Systems (ETS) to submit trades to GSCC, to enter trade cancellations, and to modify the participant reference numbers on previously submitted trades. The MT515 format will support the following message types:

1. Instruct Message – The Instruct Message will be used to submit trade details to GSCC for regular buy/sell cash trades, repurchase agreements and trades executed by approved Electronic Trading Systems. This message will support: 1) all fields required to effect trade comparison; 2) collateral substitution stipulation fields for term repo trades; and 3) certain other SWIFT and GSCC mandatory and optional fields, such as audit trail information and data to satisfy disclosure requirements pursuant to Rule 10b-10.
2. Cancel Message – The Cancel Message will be used to initiate the cancellation of a previously submitted trade. A Cancel Message will be the mirror image of an Instruct Message, and as such will contain full trade details. (It should contain the last version of the trade on the GSCC system.) Once a trade has been cancelled, it may be resubmitted using an Instruct Message, and the same participant reference number used for the original Instruct Message may be assigned. A Cancel Message must be submitted by both parties if the trade has already compared based upon matching bilateral input. If the trade has not been compared or it is a locked-in trade, only the original submitter has to submit a Cancel.
3. Modification Message – The Modification Message will be used to submit a modification to a previously entered trade. Initially, the only field that may be modified using this message will be the participant reference number. In order to modify any other trade information, the trade must be cancelled and resubmitted (using a Cancel Message and a new Instruct Message). GSCC anticipates increased functionality of these messages to include other trade modifications, such as substitutions, rate changes and close-outs.

As is the case with screen-based input, participants using interactive input will submit data to GSCC in real-time as trades occur, and immediate notification regarding the trade's status will be generated.

## **Multi-Batch Input**

Members that are not initially capable of submitting trade data to GSCC interactively will have the option of submitting batch input to GSCC multiple times throughout the processing day. GSCC will support both the existing proprietary batch input format as well as batch input in the SWIFT MT515 format.

## **Batch Input**

GSCC will, at least initially, continue to accept and process bulk input submitted by participants for end-of-day processing. Both the existing proprietary batch input format and the SWIFT MT515 format will be supported for end-of-day processing. Members will be encouraged to migrate to real-time transaction submission as soon as they are able. The goal is to eventually eliminate overnight batch input, as this input type does not support the business requirements of straight-through processing.

## **IV. Real-time Comparison**

Trade data submitted bilaterally by trade counterparties will be matched upon receipt to effect a comparison. Trades submitted unilaterally by an authorized ETS are considered pre-matched and result in an immediate comparison. All compared trades constitute a binding, electronic contract between trade counterparties.

GSCC plans to introduce additional enhancement features in subsequent implementation phases to more efficiently support intra-day, same-day settlement. Because comparison delays caused by requiring the matching of data submitted by trade counterparties could interfere with timely trade settlement, alternative processing methods are being explored. These methods will allow deliveries associated with same-day settling trades to settle through GSCC intra-day based on information provided by brokers or delivering dealers.

## **V. Trade Output**

GSCC will provide three output options to its members:

- Screen-based Output
- Interactive Output
- Batch Output

Providing these three output options allows participants to select a processing alternative that best meets their needs and systems capabilities. As noted earlier, a participant may opt to receive any type of output, regardless of the method of trade input.

Each of the three output options is described below:

### **Screen-based Output and Advisories**

Participants will have the ability to view trade information through the GSCC screen facility. This includes the ability to monitor the trade status and to make inquiries using GSCC's list query and other screen-based functionality as more fully described in the communications section. (*See page 11.*) For example, among other things, participants could request a list of all uncomparing trades with a particular broker or for a particular security issue.

### **Interactive Message Output – Trade Status & Advisory Messages**

The SWIFT MT509 Message will be used to convey the status of each input message that has been submitted to GSCC for processing by a broker, a dealer or an authorized Electronic Trading System (ETS). The MT509 message does not contain full trade details, but rather provides the trade status along with the full set of reference numbers to identify the trade (i.e., participant reference number, secondary reference number, contra-external reference number, broker reference number and the GSCC-assigned Transaction Identification (TID) number). Certain status messages also include additional fields, such as reason codes for reject messages, etc.

A SWIFT MT509 message will be generated for each of the following trade statuses:

1. Trade Input Accepted – This status message will be sent to the trade submitter to acknowledge that its trade has been validated and is awaiting further processing within GSCC's systems.
2. Trade Input Rejected – This status message will be sent to the trade submitter to indicate that its trade has been rejected as part of the validation process. The reason for the rejection will also be indicated on the message.
3. Trade Compared – This status message will be sent to all trade parties when a submitted trade has been compared, either as a result of matched bilateral input or unilateral input by a valid ETS.

4. Trade Compared Through Par Summarization – This status message will be sent to all trade parties when a submitted trade has been compared during the enhanced comparison process based on a presumed match of data using par summarization. (Note: Par summarization presumes a match of trades if the total par amount and final money of one or multiple buy sides equals the total par amount and final money of one or multiple sell sides, currently limited to four trades in total).
5. Cancel Record Accepted – This status message will be sent to the submitter of a Trade Cancel to acknowledge that the message has been validated and is awaiting further processing within GSCC's systems. If the trade was previously compared, the cancel request will be pending until such time as a cancel message is sent by the trade contra-party.
6. Cancel Record Rejected – This status message will be sent to the submitter of a Trade Cancel to indicate that the message has been rejected as part of the validation process. The reason for the rejection will also be indicated on the message.
7. Trade Cancelled – This status message will be sent to all trade parties when a trade is successfully cancelled within GSCC's processing system. Where this message has not been received, the cancel has not been effected in the GSCC system for a given trade.
8. Repo Substitution Processed – This status message will be sent to all parties, indicating substitution has occurred and that GSCC has changed the terms of the repo in its system to reflect the new details. All parties will then receive an MT518 indicating the changed trade details.
9. Trade Modification Accepted – This status message will be sent to the submitter of a Trade Modification to acknowledge that the modification message has been validated and is awaiting further processing within GSCC's systems.
10. Trade Modification Rejected – This status message will be sent to the submitter of a Trade Modification to indicate that the modification message has been rejected as part of the validation process. The reason for the rejection will also be indicated on the message.
11. Trade Modification Processed – This status message will be sent to the submitting party when a trade modification has been successfully performed within GSCC's processing system. The counterparty will receive an MT518 indicating the changed trade details.
12. Deleted Uncompared Transaction – This status message will be sent to the submitting party indicating that an uncompared trade has been deleted in GSCC's processing system. (Currently, trades are deleted if they remain uncompared in the system for three days or, in the case of When Issued trades on auction date + 3, or for forward start repo trades on start date + 3). The counterparty will receive an MT518 indicating that the trade has been deleted.

Interactive Message Output– Trade Advisory/Confirmation: SWIFT MT518

The SWIFT MT518 Message will be used to convey full trade information to the transaction contra-party associated with Instruct, Cancel and Modify input messages submitted against it. This message will also be used to provide collateral substitution details and yield-to-price information to affected trade parties.

SWIFT MT518 Messages will include the following types:

1. Comparison Request – This message will inform a member that an Instruct Message has been submitted against it. In order to effect comparison, the member must submit corresponding trade data to GSCC for matching, if they have not already done so.
2. Comparison Request Modify – This message will inform a member that a Modification Message has been submitted by its contra-party for a trade that is pending comparison. In order to effect comparison, the member must submit corresponding trade data to GSCC for matching, if they have not already done so.
3. Locked-in Trade Advice – This message will inform a member that an Instruct Message has been submitted against it by an authorized ETS. This is a compared trade; the member does not need to submit data for this trade to GSCC. (A comparison message (MT509) will also be sent).
4. Cancel Advice Pre-comparison – This message will inform a member that its contra-party or GSCC has cancelled an advice of a trade that has not yet compared. The trade has been cancelled; the member does not need to take any action.
5. Cancel Request – This message will inform a member that its contra-party has submitted a Cancel Message for a trade that has already compared. In order to cancel the trade, the member must submit a corresponding Cancel Message to GSCC.
6. Post-comparison Cancel Advice (of ETS/Locked in Trade) – This message will inform a member that a Cancel Message has been submitted against it by an authorized ETS. The trade has been cancelled; the member does not need to take any action.
7. Yield to Price Assumed Coupon Change – This message will inform all parties of a when-issued trade that the assumed coupon used to calculate the final money for the trade has changed.
8. Yield to Price Actual Coupon – This message will inform all parties of a when-issued trade of the actual coupon used to calculate the final money for the trade on the auction date for the underlying security.
9. Repo Substitution Details – This message will provide collateral substitution details to all parties to a repo substitution. It will reflect the new details of the repo transaction, such as the new quantity, security and final money.

10. Trade Compared with Modifications - This MT518 reflects new trade details based on changes GSCC may have made to a participant's trade during the comparison process. Changes include change of trade date, final monies, contraparty flip and executing broker.
11. Post Comparison Trade Modification - This message, where appropriate, will provide full trade details for all modifications that have been made to a participant's trade after comparison. (e.g., change in commission.)
12. Post Comparison Contraparty Trade Modification - During the initial phase, this message will reflect the new external reference number on a contraparty trade record that previously compared against a participant's trade.
13. Notification of Default Values Applied - This message will provide full trade details back to the participant where GSCC has completed trade records with default values (e.g., where the participant has not provided net monies or trade date, on the trade originally submitted to GSCC).
14. Screen Input Trade Replay - This message will provide full trade details to the participant where a trade has been added, modified, or cancelled via screen input, rather than an automated interface. Using this message, a participant can ensure that the same transaction events exist within their application.

It should be apparent to participants that, in order to fully utilize the interactive messaging capabilities that have been developed; it will be necessary for them to build functionality that can properly manage these messages in an automated manner.

### **Batch Output: SWIFT Formats and GSCC Proprietary Format**

GSCC will, at least initially, continue to produce bulk output based on both intra-day processing and the end of day processing cycle. Both the existing proprietary batch output formats and a batch file consisting of SWIFT MT509 and MT518 formats will be supported for batch output. Members will be encouraged to migrate to the new formats as soon as they are able. The goal is to eventually eliminate the proprietary format as the limitations and maintenance of those messages will delay deployment of new services.

## **VI. Communications**

As part of the Real-time processing implementation, GSCC has implemented MQ Series as a message exchange facility to support reliable submission of trade messages and delivery of status messages. GSCC also implemented the Access Network as a TCP/IP communications facility to support a reliable, secure connection to participant's systems. These facilities are explained in further detail below.

## **Message Exchange**

GSCC has implemented a message exchange facility in order to support receipt of trade messages and delivery of status and advisory messages to/from participant systems. A message exchange facility requires support for the implementation of queues, which are typically time ordered lists of messages (trade messages, cancellation messages, status messages, etc.). This allows participant systems to generate trade messages as trades are executed, and these trade messages are "queued" onto the "To GSCC" queue. If the communications connection is enabled (including all the links, from the dial-up or leased line up to the messaging product itself), then the message is immediately sent to GSCC. Otherwise messages will accumulate on the queue until a connection is completely established.

The same procedure holds true on the return side - meaning as GSCC processes trades, from trade acceptance through comparison (and eventually through netting), status updates will be queued for delivery back to participant systems. Participants' systems must have a program (i.e., a process or thread) that is waiting for messages to appear on the "From GSCC" queue in order to process GSCC responses interactively.

**GSCC has implemented the MQ Series product from IBM to support the GSCC Interactive Message specification.** This product implements a reliable message exchange protocol, which deals completely with sequence numbers, connection recovery and other messaging-related issues. The use of this product precludes the traditional requirement of developing a custom message exchange protocol for each new clearing corporation interface. MQ Series is available for the majority, if not all, of the systems platforms in use at GSCC's participants' data-centers (including MVS, VMS, most common versions of Unix, and NT) and is the primary messaging facility now in place at GSCC's clearing banks. Many of GSCC's participants already use this product either in house or to connect with the clearing banks.

GSCC's messaging implementation will provide a "To GSCC" queue and a "From GSCC" queue for each participant. Additional details, including the full naming convention that will be utilized, will be distributed shortly in a separate document.

## **Communications Facility**

GSCC implemented the participant "Access Network" in early 1998 and provided high-level details of that network in a New Service Bulletin dated June 3, 1998. This document, which will be re-distributed as part of a series of documents describing GSCC's real-time initiative, is currently available at GSCC's Web Site

(www.gsccl.com) in the Important Documents section, under Other Important Documents).

The GSCC Access Network basically provides a financial industry "Extranet" operated by SIAC, and utilized by DTCC, formerly known as NSCC. Participants may connect using their own equipment through their choice of connection. Most alternatives are supported including: dial-up, 56KB, fractional and full T1, frame relay and ISDN. DSL is currently being researched.

The connection is a full, secure, TCP/IP connection to the Access Network which provides GSCC members with full access to the services of GSCC including:

- MQ Series connectivity between the MQ implementation at participant's data-centers and GSCC's MQ hub.
- Web browser access to GSCC's application screens from a number of users operating from different workstations within a member's organization using a single connection.
- Members' ability to conduct multiple screen sessions on a single workstation. Users may perform multiple functions simultaneously, such as viewing unmatched trades and advisories while monitoring GCF positions in real-time. The real-time interactive messaging system will have a comprehensive set of real-time displays, lists and reports to provide in-depth feedback on comparison results.
- Access to GSCC's new Web Archive Reporting Facility, giving members the ability to use a standard Web Browser to view and print reports on-line as soon as they are generated by GSCC's system. Members may also use this facility to view up to 6 years of historical print-image output.
- Use a single connection for sending and receiving both their regular cash DVP and GCF Repo systems batch input and output. (This is an alternative to the existing Broker Network for batch file communications.)

This same single connection that also provides access to NSCC systems will likely provide access to other clearing corporation systems down the road. About 50% of GSCC members currently have implemented a connection to the Access Network. The SNA protocol continues to be available through the Broker Network, and this will support a MQ connection.

## **VII. Upcoming Document Releases**

In the near future, GSCC intends to issue a series of releases, which recognizes the complexity of the interactive messaging process. Participants will receive the following information:

- In-depth documentation delineating the full message specifications for interactive messaging to support real-time comparison, which also includes transaction mapping and sample messages and new batch specifications.
- A document depicting message flows between GSCC and participants for various transaction scenarios.
- An implementation schedule announcing when real-time comparison, and phases two and three, will be released.
- A testing schedule for real-time comparison and future phases, in addition to procedures for using interactive messaging.
- Detailed documentation that defines the MQ configurations.

## **VIII. Contacts**

### Message Specifications

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