FIX Recommended Practices

24x7 Sessions

FINANCIAL INFORMATION EXCHANGE (FIX)

RECOMMENDED PRACTICES

Continuous Markets Working Group

24x7 Sessions

July 2023

Version 1.0 (Final)

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DOCUMENT HISTORY[1]

Revision	Date	Author	Revision Comments
0.001	26/09/2022	John Greenan	Distribution
0.006	07/11/2022	John Greenan	Enhanced draft Added Time-In-Force extension Added Unsolicited cancel enforcement Updated Working Group Members
0.007		John Greenan	Added Unsolicited resend during sequence number reset
0.008	22/12/2022	John Greenan	Cleaned-up and removed product references
0.009	05/01/2022	John Greenan	Added FIX Version upgrade
0.010	17/01/2023	Kamila Donald	Modified to FIX Trading Community format
0.011	25/01/2023	John Greenan	Added item 20 – "TCP/IP Sequence number wrap round"
0.012	27/01/2023	John Greenan	Renumbered FIX Session Infrastructure, Monitoring & Support Application Layer Functionality Added notes from 26/01/2023 meeting Added Aquis proposal as S.01(6) Added David Arnold proposal as S.09 26/01/2023 meeting == I.01 to I.05 all resolved 26/01/2023 meeting == S.02 to S.05 all resolved 26/01/2023 meeting == A.01 resolved
0.013	16/02/2023	John Greenan	Working group meeting feedback See sections marked Update 16/02/2023
0.014	03/03/2023	John Greenan	Working group meeting feedback See sections marked Update 03/03/2023 Proposal to use int64 for sequence number and LastMsgSeqNumProcessed for control-of-flow logic.
0.015	13/03/2023	John Greenan	Clarifications on datatypes
0.016	02/05/2023	John Greenan	Collation of feedback from April meeting See sections marked Update 02/05/2023

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[1] Previous versions of this document, as referenced in this list, contain details of discussions and other supporting material used within working group meetings. FIX members can access these documents in the working group page on the FIX website. Please contact the FIX programme office for details.

Revision	Date	Author	Revision Comments
0.017	05/05/2023	John Greenan	Collation of feedback from May meeting See sections marked Update 05/05/2023
0.018	05/05/2023	John Greenan	Clean-up
0.19	13/05/23	John Greenan, Jim Kaye	Initial draft
0.20	08/06/2023	John Greenan	Updated Message Resend Limits
1.0	14/06/2023	Hanno Klein	Prepared for GTC submission
	10/07/2023	FIX GTC	Final version after public review (no changes)

1 Executive Summary

This document sets out a series of topics that should be addressed in any project that intends to use FIX for a continuous workflow over an extended period of time, including indefinite length sessions.

This document is not an exhaustive "how-to", nor an exhaustive list of issues.

2 Objectives

This document is intended as a checklist and a starting point for;

a)   an existing implementation specific project to enhance and extend capabilities to include 24x7,

b)   a greenfield new-build project to run 24x7.

3 Scope

The FIX Continuous Markets Working Group was set up to allow trading venues and any FIX connected market participant to run their FIX connections without needing to go through a regular "start, stop, reset" process.

This document does not seek to resolve issues of temporary network outages or of hardware failures. The scope is only to look at the session layer logic that has to adapt to support continuous sessions.

4 Target Audience

This document is aimed at technologists and project planners/managers engaged in or investigating the use of continuous FIX sessions.

5 Recommendations for Continuous Sessions

5.1   Sequence Number Format

FIX sequence number management poses a challenge for long-running sessions. FIX does not specify an IEEE datatype for sequence numbers. As FIX sessions have historically been reset daily, it is common for 32-bit integers to be used. For long-running sessions, the addressable space of sequence numbers is likely insufficient.

We therefore recommend that implementations use unsigned 64-bit integers for sequence numbers. While one may be tempted to stick with 32-bit integers and use in-session resets, in-session resets can result in message loss unless they are accompanied with an inactivity period.

Using unsigned 64 bit integers should allow a firm to send and receive up to 1,000,000,000 messages per second for 584 years.

5.2   Message Resend Limits

FIX guarantees a complete ordered delivery of messages. For a long-running session, this guarantee comes with significant operational overhead to store the unending number of messages.

We therefore recommend placing an upper bound on the number of messages that can be recovered within an implementation's rules of engagement. Once that number has been exceeded, earlier messages will never be redelivered and can be purged by the sender. Resend requests that are out of range should result in a logoff as this can be considered to constitute a serious problem requiring manual intervention.

Further, we recommend the use of LastMsgSeqNumProcessed(369) on all messages so any potential problems can be recognized and addressed before the upper bound in reached.

Example

Two counterparties connect a FIX session. Counterparty A is a broker and Counterparty B is an asset manager. Counterparty B sends orders to A and receives execution reports. Each order may have thousands of execution reports and over time this may be viewed as too expensive for Counterparty A to have in immediately accessible storage to re-transmit to Counterparty B upon receipt of a resend request from B to A.

As part of the rules of engagement, Counterparty A may state that ResendRequest(35=2) messages will only be serviced if they ask for messages within a static range of the current sequence number and a certain number before. Such as "resend requests only available from current sequence number to current sequence number minus 10,000".

The use of LastMsgSeqNumProcessed(369) by both sides of the connection can allow both sides to see that the data transmitted has been persisted up to a certain point in time. Extending the above example, if Counterparty A is sending LastMsgSeqNumProcessed(369) with "current sequence number minus 5,000" then a ResendRequest(35=2) can successfully fill in the data from "current sequence number minus 5,000" to current sequence number. If Counterparty A is sending LastMsgSeqNumProcessed(369) with "current sequence number minus 18,000" then a ResendRequest(35=2) cannot successfully fill in the data from "current sequence number minus 18,000" to current sequence number. In this case it would make sense for both Counterparty A and B to monitor the data sent in LastMsgSeqNumProcessed(369) to check it is within safe bounds.

5.3   Changes of FIX Application Layer Versions and Functionality

The FIX Protocol (application layer) is extended periodically by the FIX Global Technical Committee to support new features as requested by FIX working groups. The need to introduce new versions of FIX was removed several years ago with the introduction of FIX Latest.

We recommended that changes to the application layer, noting their backwards compatibility, should not themselves require a restart of a FIX session. However should BeginString(8) change (noting this may constitute a major change to the behaviour of the application layer), a session restart is recommended and detection of a change to BeginString(8) should result in a session being terminated.

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