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

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<tr>
<td>0.001</td>
<td>26/09/2022</td>
<td>John Greenan</td>
<td>Distribution</td>
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<td>0.006</td>
<td>07/11/2022</td>
<td>John Greenan</td>
<td>Enhanced draft&lt;br&gt;Added <em>Time-In-Force extension</em>&lt;br&gt;Added <em>Unsolicited cancel enforcement</em>&lt;br&gt;Updated <em>Working Group Members</em></td>
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<td>0.007</td>
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<td>John Greenan</td>
<td>Added <em>Unsolicited resend during sequence number reset</em></td>
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<td>22/12/2022</td>
<td>John Greenan</td>
<td>Cleaned-up and removed product references</td>
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<td>Added <em>FIX Version upgrade</em></td>
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<td>17/01/2023</td>
<td>Kamila Donald</td>
<td>Modified to FIX Trading Community format</td>
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<td>John Greenan</td>
<td>Added item 20 – “TCP/IP Sequence number wrap round”</td>
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<td>Renumbered&lt;br&gt;<em>FIX Session Infrastructure, Monitoring &amp; Support</em>&lt;br&gt;<em>Application Layer Functionality</em>&lt;br&gt;Added notes from 26/01/2023 meeting&lt;br&gt;Added Aquis proposal as S.01(6)&lt;br&gt;Added David Arnold proposal as S.09&lt;br&gt;26/01/2023 meeting == I.01 to I.05 all resolved&lt;br&gt;26/01/2023 meeting == S.02 to S.05 all resolved&lt;br&gt;26/01/2023 meeting == A.01 resolved</td>
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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 History

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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 is 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.