

**Simple Binary Encoding**

**Version 1.0 Errata**

 **Technical Proposal**

**November 2020**

**v0.1**

**Proposal Status: Draft**

**For Global Technical Committee Governance Internal Use Only**

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# Document History

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| --- | --- | --- | --- |
| **Revision**  | **Date**  | **Author**  | **Revision Comments**  |
| V1.0  | Nov 17, 2020 | Hanno Klein, FIXdom | Initial draft  |
|   | Nov 20, 2020 |  Hanno Klein, FIXdom | Removed GitHub issue #120 that does not apply to SBE V1.0. |
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# Introduction

The High-Performance Working Group (HPWG) was formed with the goal of improving the fit-for-purposefulness of FIX for high performance message exchange. The working group has developed multiple standards for the presentation layer (message encoding), including Simple Binary Encoding (SBE). SBE is optimized for ultra-low latency encoding and decoding of messages, orders of magnitude better than typical tag value message processors, and with far more deterministic performance.

SBE is distinguished by these characteristics:

* A binary type system that maps FIX datatypes to native platform types, avoiding unnecessary and costly translation between character-based encodings and types directly usable by computers.
* Deterministic and narrowly targeted message layouts enforced by templates. They enable each use case of an overloaded FIX message type such as ExecutionReport to have its own layout. Each template contains just the required fields for its use case, such as immediate execution. The benefit is reduced message size and reduced optionality. In hardware terms, the result is reduced network bandwidth, reduced memory usage, reduction of cache misses, and less code branching in CPUs. All add up to deterministic performance and low latency. (In fact, “mechanical sympathy” enables hardware-based or accelerated solutions.)
* Just data on the wire. Metadata is exchanged out-of-band as a message schema. This enables pre-processing such as code generation of encoders and decoders rather on-the-fly interpretation.
* An explicit versioning mechanism that allows extension of templates over time without breaking older decoders.

Version 1.0 of SBE was the first FIX standard to complete the full cycle of technical standard process. Due its benefits, SBE v1.0 has gained users both within and beyond the financial industry for low latency applications. This proposal addresses a number of errata items and clarifications without making any changes to the standard itself.

## Authors

|  |  |  |  |
| --- | --- | --- | --- |
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|   |   |   |   |

# Requirements

Requirements added since version 1.0 Errata July 2018.

## Business Requirements

### Prepare for ISO Submission

The FIX Trading Community is a liaison “A” organization to the ISO TC 68 committee for financial services. FIX also is a liaison “A” organization to the ISO TC 68/SC 9 subcommittee on information exchange and ISO TC 68/SC 8 subcommittee on reference data. The ISO directives, the governance rules of ISO, permits national standards bodies and liaison organizations, such as FIX, to submit existing non-ISO developed standards for inclusion as international standards. The ISO directives provide for a “fast track” submission process. The “fast track” process only bypasses the working group phase of the process. The reasoning being that the standard is already developed and in use, what remains is to have the standard balloted by national standards body members of ISO for approval. The overall approval process includes document preparation and translation into the ISO supported languages, balloting by national standards bodies, then publication. This process is expected to take between six months to one year to complete.

SBE has now reached a level of maturity that it can be submitted to ISO for standardization. This requires following a pre-defined structure of the document. This proposal is not a submission to ISO but makes the necessary structural changes to the Technical Specification. These changes pertain to the existence and content of specific chapters, e.g., normative references and terms and definitions.

## Technical Requirements

### Mapping to ISO 11404 Datatypes

Each FIX datatype is already mapped to a field encoding in SBE. To aid mapping to other protocols, each SBE encoding should also be mapped to a semantic type as defined by ISO 11404 General Purpose Datatypes. That standard defines types by their value space, independent of platform and programming language. The purpose of the SBE standard is provide a lexical space for those types for high performance usage.

# Issues and Discussion Points

## Resolved Issues

Issues were tracked in GitHub. These issues were resolved and accepted for version 1.0 Errata Nov 2020. See [issues](https://github.com/FIXTradingCommunity/fix-simple-binary-encoding/issues) and [pull requests](https://github.com/FIXTradingCommunity/fix-simple-binary-encoding/pulls) in GitHub for details and changes.

|  |  |
| --- | --- |
| Issue | Description |
| 114 | The generated PDF a not valid for 2^64-1 |
| 121 | Section 4.4.4.3 described in 04MessageSchema.md does not exist in documentation |
| 125 | 2.4.2 Range attributes for integer fields |
| 126 | 2.10.4 Examples of date/time fields: Should 4047baa145fb17 be 004047baa145fb17 ? |
| 127 | 2.12.2 Page 31: The time unit is missing. |
| 128 | Chapter 4: <types> => '`. |
| 132 | Map field encodings to generic datatypes |

## Compatibility

Version 1.0 with Errata November 2020 is fully interoperable with SBE version 1.0 and SBE version 1.0 with Errata July 2018, in wire format and in XML schema.

# References

|  |  |  |  |
| --- | --- | --- | --- |
| **Reference**  | **Version**  | **Relevance**  | **Normative**  |
| FIX Simple Binary Encoding Technical Specification | V1.0,V1.0 Errata July 2018  | Previous specifications of SBE V1.0  | Yes  |
| GitHub project [FIXTradingCommunity](https://github.com/FIXTradingCommunity)[/fix-simple](https://github.com/FIXTradingCommunity/fix-simple-binary-encoding)-[binary-encoding](https://github.com/FIXTradingCommunity/fix-simple-binary-encoding)   |   | Final specifications as well as working drafts and issue tracking.  |   |
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# Relevant and Related Standards

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Related Standard**  | **Version**  | **Reference location**  | **Relationship**  | **Normative**  |
| None  |   |   |   |   |
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# Intellectual Property Disclosure

|  |  |  |  |
| --- | --- | --- | --- |
| **Related Intellection Property**  | **Type of IP** **(copyright, patent)**  | **IP Owner**  | **Relationship to proposed standard**  |
| None  |   |   |   |
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# Definitions

|  |  |
| --- | --- |
| **Term**  | **Definition**  |
|   |   |
|   |   |

# Simple Binary Encoding

## Specifications

Full specifications for the Simple Binary Encoding are available in separate document (*FIX Simple Binary Encoding Technical Specification v1.0 with Errata Nov 2020*). The standard defines wire format and message schema declaration. The document is a snapshot of drafts now being developed in GitHub project [FIXTradingCommunity](https://github.com/FIXTradingCommunity)[/fix](https://github.com/FIXTradingCommunity/fix-simple-binary-encoding)-[simple-binary-encoding.](https://github.com/FIXTradingCommunity/fix-simple-binary-encoding)

## Schema

An XML schema (XSD) is provided to standardize XML message schemas. The XSD file sbe.xsd is publicly available in GitHub project [FIXTradingCommunity](https://github.com/FIXTradingCommunity)[/fix-simple-binary-encoding.](https://github.com/FIXTradingCommunity/fix-simple-binary-encoding) The XML schema is also served by the address corresponding to its XML namespace, <http://fixprotocol.io/2016/sbe/>.

**Appendix A - Usage Examples**

Examples are provided in the specification document.

# Appendix B – Compliance Strategy

## XML Validation

Message schemas should be validated against the provided XML schema (XSD).

## Compliance Test Suite

The FIX technical standard process requires that to be promoted to final specification, a draft standard must have at least two interoperable implementations. A compliance test suite was published publicly in GitHub for SBE version 1.0.