

INTRODUCTION TO SBE (simple binary encoding)

Scope and audience: This technical note intends to provide general technical information about SBE, not specifically to the SBE implementation on Optiq® – for the SBE integration and specificities of the SBE messages within Euronext Optiq platform please consult the Optiq specifications [here](#).

This document is meant to familiarize developers who will work with SBE for the first time.

SBE stands for Simple Binary Encoding and it is a OSI layer 6 presentation for encoding and decoding binary application messages with the main purpose of supporting low-latency financial applications.

SBE is a FIX standard for binary message encoding: [FIX Simple Binary Encoding](#).

SBE provides a language independent type system supporting integers, floating point numbers, characters, arrays, constants, enums, bitsets, composites, grouped structures that repeat, and variable length strings and blobs.

SBE has been chosen for the Optiq platform for the enumerated advantages mentioned in the following section.

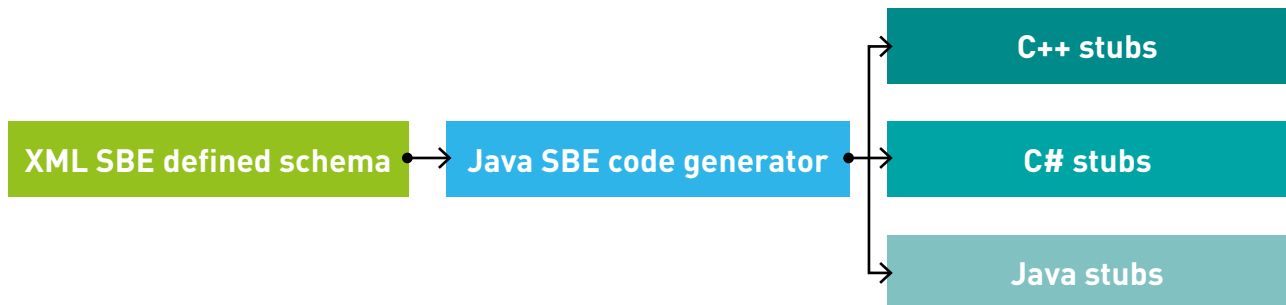
1. ADVANTAGES OF USING SBE

- Standard: FIX SBE has been developed by the FIX trading community, under the “High Performance FIX” initiative
- Performance: Fast and compact encoding / decoding of FIX messages
- Simplicity: Well documented and easy to use, with an open source implementation available
- Technology adoption: Major exchanges already use SBE.
- Efficiency: Focus on reducing bandwidth utilization for the market data
- SBE offers the possibility to have backward and forward compatibility. It means that clients are not required to be on the last version of Schema Version (message structure version) to be able to read the message. This is only possible if changes to SBE messages that are being introduced are:
 - not mandatory
 - done at the end of the block and / or the repeating section.
- Using the version of the schema system will parse the known fields and skip anything unknown. Please review the “Compatibility Strategy” within the official SBE spec for more details on this mechanism.

2. SBE USAGE IN PRACTICE

Messages to be encoded and decoded with SBE are described in a schema in XML format. The XML schema is a machine readable version of the order-entry and market data message specifications.

The XML message schema can be used for automated code generation. An SBE-compatible code generator can use the XML definition as an input and generate encoding/decoding methods in a high level language like Java, C++ or C#.

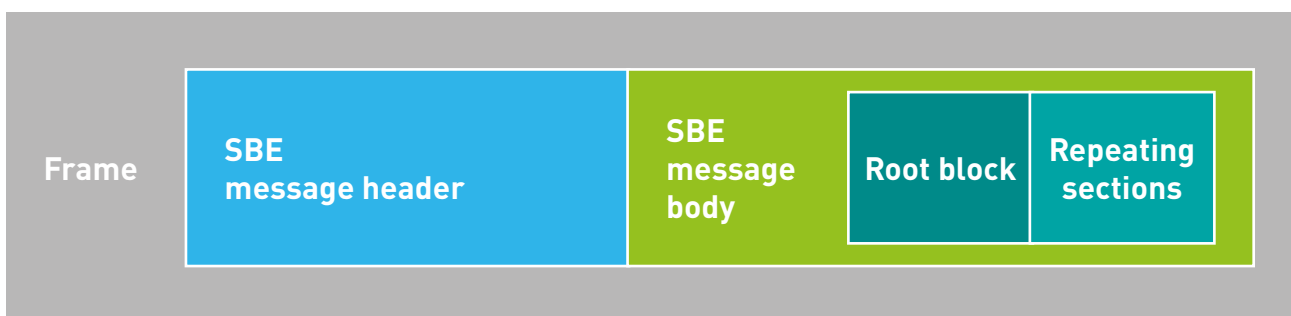


While using such automated code generation is not mandatory to use FIX SBE, it is expected to significantly reduce development effort on the long run:

- elimination of human errors introduced by manual coding.
- changes to message definition can be directly fed into a continuous integration process to test for impact and regressions.
- An example of such code generation tool-chain has been developed as an open sourced project by [Real Logic] (<http://real-logic.co.uk/>)¹. It is available [HERE](#). Real Logic open sourced code generator is a Java TM tool and currently supports Java, C++, and C# as target language's.

3. SBE MESSAGE STRUCTURE

A general representation of a SBE message structure is provided below.



- Frame – contains the total length of the message, including length of the Frame and SBE Header fields
- SBE Message Header - contains general information about the SBE template used, specifically about Block length, Template ID, Schema ID, Schema version
- SBE Message Body – contains the static mandatory and optional fields of the root block and the optional and conditional fields of the repeating sections. An SBE Message body may have none, one or multiple repeating sections depending on the specificities of the message.

Please check the standard [FIX SBE](#) for a general overview of the SBE Message Structure – please note, access to this page requires registration.

Use the Optiq MDG and OEG specifications [HERE](#), for more specific information about OPTIQ SBE message structure.

4. SBE XML SCHEMA AND OPTIQ INTEGRATION

The SBE XML schema is the template XML file used by the SBE encoder / decoder to encode or decode SBE messages. The SBE XML schema, matching the specification, as well as an XML schema sample, will be available for download on the Optiq website.

There are several elements which build an SBE XML schema:

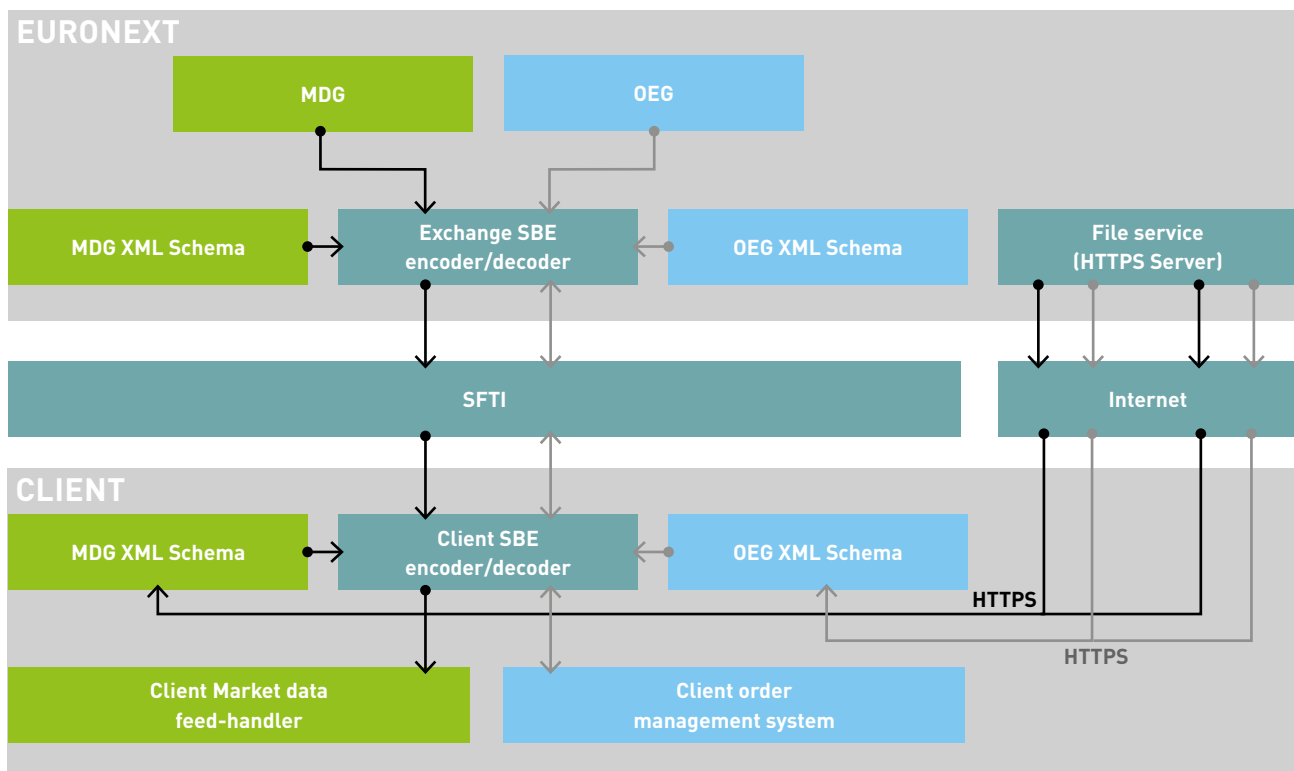
- Message schema, Types (type, set, enum, composite), Message, Field, Group, Data.

Each of the above mentioned elements are being described [HERE](#).

An example of such general SBE schema can be found [HERE](#).

Below, specific to Euronext and its clients, is a diagram of the usage and integration of the SBE Encoder and SBE XML template (schema) within MDG (Market Data Gateway) and OEG (Order Entry Gateway).

This diagram applies to the Optiq Production Environment.



Notes to the diagram:

- Exchange and Client SBE Encoder / Decoder are different.
- MDG and OEG XML schema are the same.

Optiq SBE XML template files for both MDG and OEG will be made available for download on the Optiq File Service.

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