miniSEED 3 specification, resources, and outlook

FDSN WG 2

IUGG 2023

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Proposal status

Adopted as a standard July 2023.

The specification:
https://docs.fdsn.org/projects/miniseed3

Specification definition, drafts, and issue tracking:
https://github.com/FDSN/miniseed3

Library implementation in C language

Pre-release of libmseed 3.x available (API is frozen):
https://github.com/EarthScope/libmseed/releases

- Full read and write support for miniSEED 2 and 3
- Mapping from quality code to data publication version:
    - R -> 1, D -> 2, Q -> 3, M -> 4

Not a drop-in replacement, but ease of porting was a focus.

Internal data model is miniSEED 3 for full capability.

Format converter

mseedconvert

https://github.com/EarthScope/mseedconvert

By default converts version 2 -> 3, can also convert 3 -> 2 when possible

Designed for efficient and flexible use, avoiding re-encoding data samples when possible.

Format validator

mseed3-validator

https://github.com/EarthScope/mseed3-utils

Includes extra header validation using JSON Schema

Project also includes **mseed2json** and **mseed2text**, used to build reference data set. Note: these formats are *not* standards and are not recommended for adoption at this point.

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EarthScope plans

EarthScope anticipatea a data ecosystem where miniSEED versions 2 and 3 co-exist for a long time, with our data facility accepting both versions for the foreseeable future.

EarthScope strategy: make our miniSEED data handling systems agnostic to the version of format, i.e. able to handle both versions transparently. We anticipate offering upscaling to version 3 to normalize the format on-demand for clients.

EarthScope may convert stored miniSEED to version 3 for operational advantages (CRCs, reduced volume, simplicity, potential new encodings with improved compression. etc.)

Suggestions for FDSN members

Given the prevalence of miniSEED 2 in archives and data capture systems, and the high likelihood that both will coexist for a long time:

Data facilities, and software systems, that handle miniSEED should prepare for miniSEED 3 and a strategy of version-agnostic handling is recommended.

Important – **Prepare for expanded codes in <u>FDSN Source Identifiers</u> too!**

The *network, station,* and *location* codes can be up to 8 characters. The *channel* is structured differently (containing underscores) and also larger. See: https://docs.fdsn.org/projects/source-identifiers/en/v1.0/definition.html

Potential next steps for outreach

- A publication detailing the new format

- Presentation at upcoming seismological meetings?

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