HIRO

# codem-isoboxer

a light-weight, browser-based MPEG-4 parser


# Codem “family” of Open Source tools

| | |
|---|---|
| codem-transcode | Offline video transcoding (NodeJS, FFmpeg) |
| codem-schedule | Job scheduling, preset management (Ruby on Rails) |
| codem-isoboxer | ISOBMFF (MPEG-4 part 12) parsing in JavaScript |

# JavaScript?

- A lot of environments are JavaScript-enabled (from small devices to big servers)

- Examine the possible use cases for these environments

- Clients may require more logic than browsers supply:
  - EBU-TT-D / TTML captions in ISOBMFF (DVB-DASH)
  - Event Message Box 'emsg' (MPEG-DASH 2nd edition)
- Server-side processing/analyzing of uploaded content (NodeJS)


# Project origin

- First commit about 4 months ago
- Learning / debugging process (understanding what's going on in my files)
- Existing tools were too complex or didn't give me what I want
- Wanting something that's small, efficient and portable


# Features

- Parsing a regular ArrayBuffer (currently 16 parsers for 32 box types)
- Accessing individual boxes or sets of boxes
- Accessing raw data without copying (DataView)
- Basic conversion utilities (TextEncoder/Decoder)


# Features (2)

- Lightweight with no external dependencies (15.1KB regular, 10.2KB minified, 2.2KB gzip)
- Modular build to further decrease file size ***(NEW)***
- Low code complexity
- Simple API
- Test suite (can use some improvement)


# Code complexity

- Assume we're in a modern environment
- Support new APIs when they become available: DataView, ArrayBuffer, TextEncoder
- More parsers can be added easily using tiny source files


# Simple API

```
// Parse ArrayBuffer from any source, e.g. FileReader, XMLHttpRequest, WebSocket
var parsedFile = ISOBoxer.parseBuffer(arrayBuffer);
var boxes = parsedFile.boxes;

// Get the moov box
var moov = parsedFile.fetch('moov');

// Get all emsg boxes
var emsgList = parsedFile.fetchAll('emsg');

// Accessing properties (named as per the spec)
var scheme_id_uri = emsgList[0].scheme_id_uri;

// Boxes in boxes
var children = moov.boxes

// Parents of boxes
var root = moov._parent

// Accessing raw data (DataView)
var moovData = moov._raw
```


# Included in Dash.js as of v1.5.0.

- ftyp, moov, sidx, tfhd, tfdt, trun, moof, mdhd, emsg
- Extracting fragmented text (EBU-TT-D captions)
- Extracting segment indices from ‘sidx’ box
- Extracting in-band events from ‘emsg’ boxes


# Improvements & features

- Better 64-bit integer support (Hello ECMAScript!)
- More test fixtures: small sample files more than welcome!
- Stream support for NodeJS
- Box manipulation


# Summary

- Small, efficient parser with low overhead for project size
- Good match for segmented content (i.e. MPEG-DASH)
- Low complexity, easy to use and extendable
- Available under a permissive MIT license


# Information, questions, etc.

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