Music Notation and W3C: Framing the Future

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Who am I?

- I compose and play music

- My company builds web-based notation software: Noteflight

- Noteflight is owned by a music publisher: Hal Leonard

- I work on Web standards

Where is notation useful?

- Music education

- Notation editor import/export

- Music Publishing

- Reading/performance systems, both desktop & mobile

Where is notation useful?

- Scholarly and specialist publications

- In-house publishing
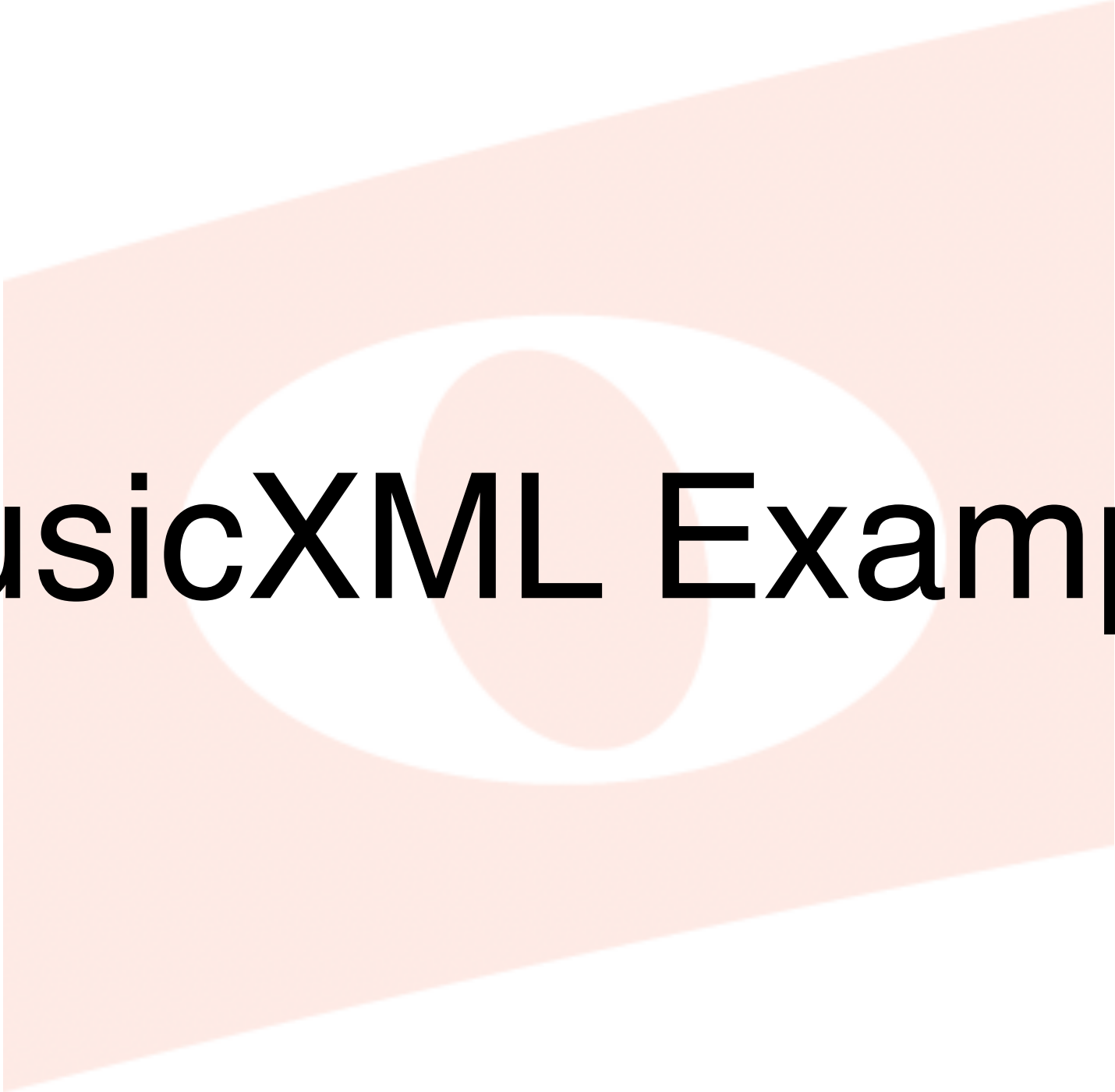
- Libraries and archival services

Noteflight Demo

Some Digital Music Notation Document Types

- MuseData (1980s)

- Humdrum (1990s)

- MusicXML (2000-, commercial)

- Music Encoding Initiative (2010-, academic)

A Brief History of MusicXML

- Original use cases: exchange, archive, document

- Created by notation software vendors, for vendors

- Non-PDF digital music publishing initially a sideline, now growing rapidly

- Needed to create conditions for success of a viable standard

MusicXML Example

Present-day Publishing with MusicXML (wishful version)

- Get hold of some MusicXML files from any source

- Feed them into some compatible application

- Everything looks great

- Drink a beer, glass of wine, shot of amaro (perhaps several) in celebration

Reality Check!

- Get hold of some MusicXML files from any source

- Discover that they use different subsets of MusicXML in different ways

- Discover that engravers used different features to mean the same thing, or the same features to mean different things

- Discover that your renderer requires certain features to be present that are not in your files, or can't use the features that are there

- Discover that you have no way to specify how your scores should look in diverse end-user environments (paper, desktop, mobile, …)

- Drink something stronger (perhaps several) in despair

Looking Forward

- Successful digital publishing with MusicXML is possible, yet challenging

- Building interactive experiences on MusicXML is pretty much impossible

- What is the best way to move ahead?

Likely areas for evolution

- Flexible Styling and Layout

- Syntactic validation of semantics

- Metadata vocabularies

- Manipulation, interactivity and selection

- Playback

- Graphics and hypertext inclusion

- Anchors and Pointers

- Annotations

- Accessibility

One likely area: Cascading Style Sheets (CSS)

- Stylesheets allow definition of "how it looks" to be cleanly separated from "what it is".

- Many documents can share the same set of stylesheets.

- To customize the look of a document, change the stylesheet you are using.

- Style "attributes" can reflect high-level concerns of engravers (e.g. density or placement conventions) not low-level details (X/Y positions of many individual objects)

- Stylesheet queries support responsive design

Cascading Style Sheets (CSS)

print.css: (print-oriented stylesheet)

```
credit.title {    /* manner in which title-type credit should be shown */
  position: absolute:
  top: 120px;
  horizontal-align: center;
}


part {    /* inherited attributes applying to all <part> children */
  staff-line-spacing: 6px;         /* 6 pixels between staff lines */
}
part#P1 {  /* override for violin part shown at smaller size */
  staff-line-spacing: 4px;
}


measure {
  duration-spacings: 5L 3L 2L 1L 0.71L;    /* standard spacings for durations */
}


direction.tempo {  /* How should a tempo direction look? */
  font-weight: bold;
  font-size: 15px;
  default-offset: +2L;   /* 2 lines above staff */
}


note.alternateReading { /* special style class for alternate readings */
  note-size: 0.5;    /* relative size of note heads */
}
```

Example: Styling and CSS

Excerpt of score.xml: (note independence from CSS stylesheet)

```
   . . .
 <credit class="title">Sinfonia XLVII</credit>
   . . .
 <part id="P1">
     <measure number="1">
        <direction class="tempo">Grandly</direction>
        <note>
           . . .
        </note>
        <note class="alternateReading">
           . . .
        </note>
     . . .
  </part>
   . . .
```

Example: Styling and CSS

<u>mobile.css:</u>

```css
credit.title {
  display: none;  /* in mobile app, title is not part of score rendering */
}

part {    /* inherited attributes applying to all <part> children */
  staff-line-spacing: 8px;
}

note.alternateReading { /* special style class for alternate readings */
  color: rgb(127,127,127);    /* on mobile, gray out rather than make smaller */
}
```

Interactivity plus styling with CSS, DOM, jQuery

```
// Highlight the most recently clicked note as green and play it

var highlightedNote = null;    // track last-clicked note

// Highlight a given note
function highlightNote(note) {
    if (highlightedNote) {
        highlightedNote.css("color", ""); // remove previous highlight
    }

    highlightedNote = note;
    highlightedNote.css("color", "rgb(0,255,0)");  // apply new highlight
}

// Process click events dispatched from note elements in MusicXML DOM
document.addEventListener("click", function(event) {
    var target = $(event.target);
    if (target.is("note")) {
        highlightNote(target);
    }
}
```
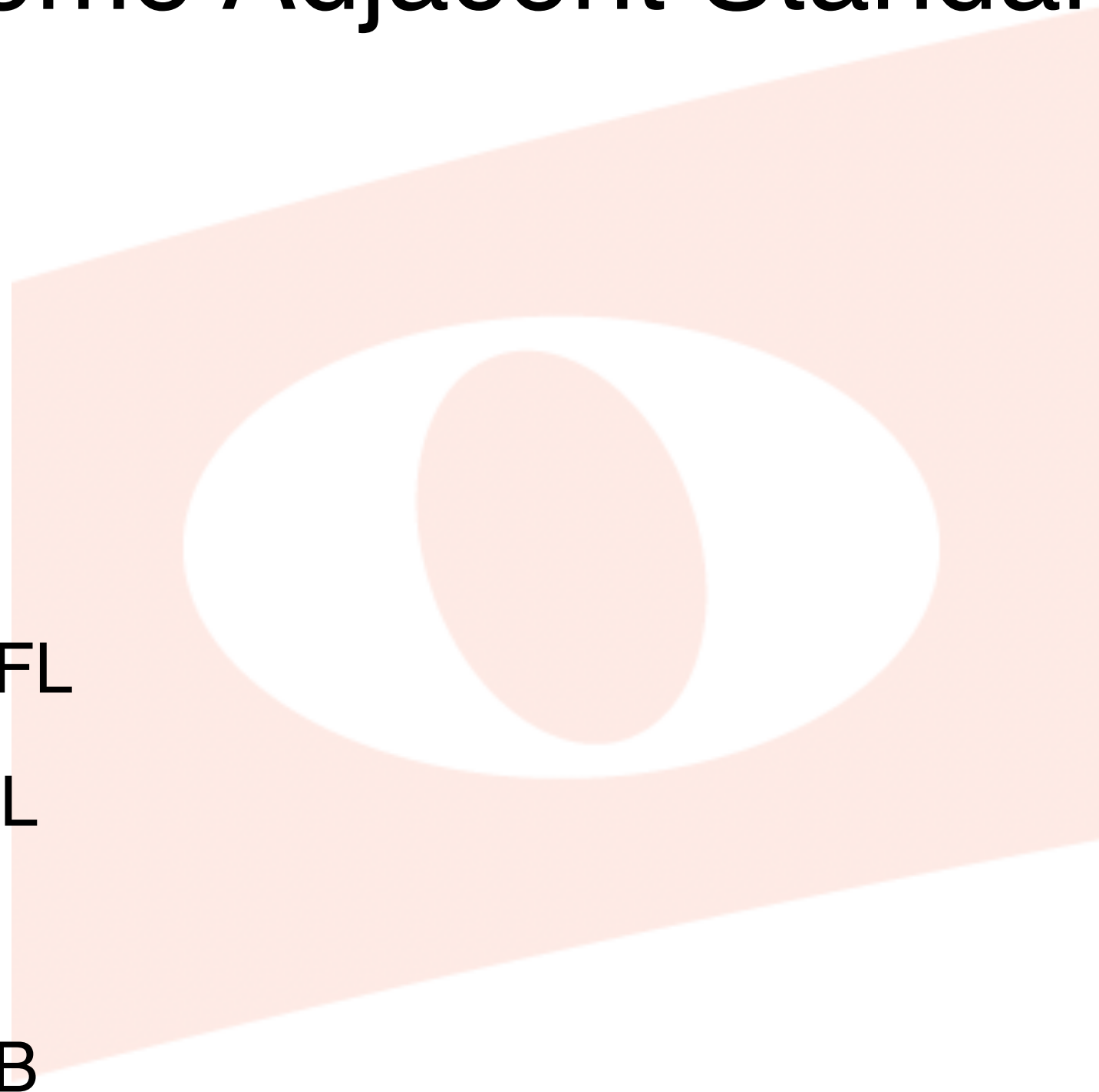
Some Adjacent Standards

- MEI

- CSS

- SVG

- SMuFL

- HTML

- MIDI

- EPUB

Consortium Choices

- W3C owns many adjacent specifications and provides access to their experts

- W3C has excellent technical support for developing specs and seeing them through

- W3C has proven its ability to adapt

- MMA is custodian of an important but singular and domain-specific spec

- EPUB still primarily targets text-oriented publications, moving towards Web, Arts, STM

Recent Developments

- A new W3C Community Group (CG) has been formed. CGs are the initial step on a track to W3C standard. No membership fees are required.

- CG is working on identifying use cases, needs, features

- We need to recruit best musical experts and experts in adjacent technologies (e.g. CSS, EPUB, MIDI)

- Eventual W3C Working Group and Recommendation status down the road