

TECHNICAL NOTE

Subject: MusicXML–note timing–proposed protocol

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To: File

1. INTRODUCTION

This note defines a protocol, recommended by the author, for the timing aspects of the encoding of notes in the MusicXML language.

2. BACKGROUND

The MusicXML language includes provisions for describing both the notation of a note (its symbol and staff placement) and the details of the timing of its “performance” when the score is played by a notation program.

Although what I will refer to as “The MusicXML Documentation” defines each of the syntactic ingredients involved in this matter, it fails to elucidate the underlying intent of the overall protocol, especially with regard to the significance of the element `<duration>`. As a result, different implementers of the MusicXML language have adopted different interpretations of the meaning of that element, and in the wake of that have developed different, and incompatible, overall protocols in the area of note timing.

3. THE AUTHOR’S ANALYSIS

The author has studied this conundrum at length, extensively reviewing not only the MusicXML Documentation but as well clarifying utterances made in various forums by Michael Good, the original developer of the MusicXML language and today its *de facto* “keeper”.

The author has then crafted an overall protocol for this area he believes is consistent with the underlying intent. That protocol is described herein.

The rationale for this recommendation is discussed at tedious length in the Technical Report “MusicXML—the duration element”, by the same author.

4. CAVEAT

The author does not suggest that the adoption of this protocol for use in a given notation program or such will assure successful interchange (with respect to the timing issues) with another program of score via MusicXML. From some surveys done by the author, it looks unlikely that other programs have in fact adopted this protocol, or a significant fraction of it (nor, consistently, any alternative protocol).

It is believed, however, that should another such program also adopt the recommended protocol, successful interchange (with respect to timing issues) via MusicXML should be attained.

5. NOTATION

In this document, MusicXML elements will be referred to thus: `<note>`, which is evocative of the pure form of the opening XML tag for the element.

MusicXML attributes will be identified by being shown underlined, thus: attack.

6. THE SYNTACTIC INGREDIENTS

The MusicXML syntactic ingredients that are relevant to this issue are (with an interpretation of their official definitions):

- Element: `<divisions>`. Defines the unit of numerical musical time definitions, the *division*, in terms of the number of those in the musical time of a quarter note.
- Element: `<note>`. This defines a note (and, as a subcase, a rest).
- Subelement of `<note>`: `<type>`. This is optional, and may or may not appear (once) in any given `<note>` element. This tells in an enumerative text value (e.g., “quarter”) the symbol for the note, and thus the *time value* of the note.
- Subelement of `<note>`: `<duration>`. This is mandatory, and must appear (once) in any given `<note>` element. Its intended significance is a bit unclear.
- Attribute of `<note>`: attack. This is optional, and may or may not appear (once) in the opening tag of a given `<note>` element. It tells in (musical time units of *divisions*, signed) how the actual play starting time of the note is to be displaced from its nominal time (it not always being clear what that nominal time is).
- Attribute of `<note>`: release. This is optional, and may or may not appear (once) in the opening tag of a given `<note>` element. It tells in (musical time units of *divisions*, signed) how the actual play ending time of the note is to be displaced from its nominal time (it not always being clear what that nominal time is).

7. THE RECOMMENDED PROTOCOL

7.1 Introduction

This protocol covers only aspects of the MusicXML encoding that pertain to note timing, in various senses. There are of course many other aspects of MusicXML encoding that are beyond the scope of this protocol.

7.2 Encoding into MusicXML

- a. The value of `<divisions>` shall be chosen large enough to accommodate the needed precision of the element `<duration>` and the attributes attack and release, if used.
- b. The `<note>` element shall be provided with the subelements `<type>` and `<duration>`.
- c. The `<type>` element shall describe the symbol of the note (as an enumerative text variable, such as “quarter” or “whole”). This also, in accordance with accepted musical practice, defines the *time value* of the note.
- d. The `<duration>` element shall (interpreted in connection with the value of `<divisions>`) define the time value of the note (and thus its symbol).

Comment: Yes, this seems redundant. This situation is a result of the convoluted evolution of this aspect of MusicXML encoding.

- e. If it is the intent that the play duration of the note is different than that implied by the time value of the note, and/or that the start of the sounding of the note is displaced from the time instant implied by the location of the note in the measure, then the attributes (of the `<note>` element) attack and or release shall be included.
- f. If the intent is that the starting play time differs from the “nominal”, then the attribute attack shall be provided. It specifies the offset of the starting play time from nominal as a signed value in units of divisions.
- g. If the intent is that the ending play time differs from the “nominal”, then the attribute attack shall be provided. It specifies the offset of the ending play time from nominal as a signed value in units of divisions.

Note that if the situation is a simple departure of the play duration from nominal, that is treated here as a displacement of the ending play time.

7.3 Response to an imported MusicXML file

- a. If the optional element `<type>` is provided in a `<note>` element. It indicates (as, for example, “quarter”) the symbol of the note and thus its time value.
- b. If the optional element `<type>` is provided, the mandatory element `<duration>` is ignored.

Comment: This oddity is a result of the convoluted evolution of this aspect of MusicXML encoding.

- c. If the optional element `<type>` is not provided, the mandatory element `<duration>` is to be taken as giving (in numerical form, interpreted in connection with the value of `<divisions>`) the time value of the note and thus its symbol.
- d. The “nominal” play duration is to be as implied by the time value of the note. The nominal starting play time is at the instant implied by the position of the note in the measure.
- e. If the optional attribute `attack` is provided, it defines, in units of *division*, the displacement (in either direction—its value is signed) of the starting play time from its nominal value.
- f. If the optional attribute `release` is provided, it defines, in units of *division*, the displacement (in either direction—its value is signed) of the ending play time from its nominal value.

8. ISSUE RECORD

Issue 1, May 15, 2021 (this issue). Initial issue.

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