The Mobile DLS Content Format

A White Paper for 3GPP
(MMA/AMEI)

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1. INTRODUCTION

The Mobile DLS (Downloadable Sounds) instrument content format [7] can be used with the SP-MIDI music content format to provide a flexible representation for high quality MIDI music content (synthetic audio) with custom instruments, for a wide range of playback devices, applications and services. 3GPP previously adopted SP-MIDI for PSS, MMS and EMS services [9] [10] [11] in Release 5.

The Mobile DLS instrument specification and a companion specification for compound SP-MIDI + Mobile DLS documents are currently under review and discussion within the MIDI Manufacturers Association (MMA) and the Association of the Musical Electronics Industry (AMEI), who jointly are responsible for development and publication of the official, royalty-free MIDI specifications worldwide. The proposals were drafted by the MMA's Scalable MIDI Working Group, which is chaired by Nokia and includes 3GPP member companies Ericsson, Motorola, and Beatnik.

For mobile applications, MIDI content is used in a networked environment where MIDI content may be accessed from various sources and distributed between different types of terminals. Therefore, the new content format is aimed at mobile terminals, PDAs, palm-top computers and other resource-constrained devices that require interoperability between terminals that may have different MIDI rendering capabilities.

Where the existing SP-MIDI format provides for the scalable interchange of MIDI music limited to the note level, the Mobile DLS format additionally provides for the interchange of wavetable MIDI instruments, defining the exact sound of each instrument delivered with the content.

Mobile DLS instrument content may be interchanged either with or without associated SP-MIDI note content. When they are distributed together and dependent on each other, it is in many cases necessary to bundle them together at the authoring stage, so the specifications define a compound document format for this purpose.

1.1 Motivation For Delivering Instrument Definitions

Instrument sounds are one of the most critical aspects of creating a musical arrangement, and Mobile DLS improves upon SP-MIDI in this regard.

Like its ancestors General MIDI and General MIDI 2, SP-MIDI alone can only select instruments from a generic pre-defined set, by number. For a given instrument number, there may be significant timbre differences in implementation from terminal to terminal, resulting in some cases in unintended, lower-quality musical impressions. With Mobile DLS, by contrast, the exact audio sample(s) and rendering parameters for the instruments are transmitted to the terminal. This makes possible much more consistent playback across terminals, and gives the author much greater freedom of timbre. Because the instruments are sample-based, this also makes it possible to use highly specific natural audio (including branded content) within the synthetic audio context, such as singing, or sound effects, or recorded music.

This opens new possibilities for application developers and service providers needing a compact and flexible content format for mobile music applications.

2. PURPOSE OF MOBILE DLS

2.1 For the Content Creator

Sound design and customized instruments play an important role in the composition of original music and audio content. The introduction of a flexible format for instrument sound representation and exchange brings new possibilities for content creators and makes higher quality MIDI music possible. These new possibilities can be utilized in many different ways. Content creators may want to imitate some recognizable ‘signature’ instrument sounds to improve the fidelity to the original songs. Mobile DLS can be used to create new custom instruments to add vocal samples, sound effects, or speech clips to the music. The support of arbitrary instrument sounds utilizes the *flexibility* of the Mobile DLS wavetable instrument format. The companion Mobile DLS compound document format is also very *compact* since the instrument representation is stored only once, but can be used many times through compact MIDI messages.

2.2 For the End-User

Mobile DLS adds value to the consumer's music experience by supporting the interchange of rich, high quality MIDI music. It enables improved sound design for high quality MIDI music content, advanced audio for games, music and sound design for mobile advertising etc. The use of SP-MIDI prevents the need for server-side content adaptation.

2.3 For the Device Manufacturer

For the mobile terminal manufacturer Mobile DLS provides an advanced and flexible music format suitable for many types of applications and services. In addition, the same technology can be scaled for different product implementations. Memory consumption is efficient since only the instruments that are used by the MIDI content need to be stored. Mobile DLS is based on the well-known DLS standards [4] [5] that are technically proven and have been successfully applied on the market.

2.4 For the Service Provider

Mobile DLS offers considerable benefits in the distribution of rich musical content to the customer. The compound SP-MIDI + Mobile DLS document format is very compact, and usable in many applications where ordinary sampled audio formats would require too much memory or transmission bandwidth. Compound content contains all the necessary information about its rendering/playback requirements, so a properly authored song can be automatically categorized according to rendering requirements without any additional (meta-data) information. Also the need to maintain multiple versions of a single piece of music for different terminal models can often be avoided through SP-MIDI content scalability.

Attractive Mobile DLS content will encourage the development of mobile multimedia services by providing a new level of musical quality for mobile ringing tone, multimedia message, and music downloading services.

3. MOBILE DLS IMPLEMENTATION

The proposed content format consist of three elements: the musical score (note information) is represented in SP-MIDI format data, the custom instrument data is represented in Mobile DLS format data, and when required by the content, these two data are bundled in a compound document format. Mobile DLS format instrument data without associated SP-MIDI content may be distributed without using the compound document format.

3.1 SP-MIDI

SP-MIDI content is already supported in Release 5, and no technical changes have been made.

3.2 Mobile DLS

Mobile DLS instrument content [7] is based on the existing MMA/AMEI DLS 2 specification [5]. This standard has been adjusted for mobile devices and applications by reducing the minimum device requirements and harmonizing certain technical aspects of the SP-MIDI and DLS 2 specifications. Harmonization required modifying or removing DLS definitions that conflicted with SP-MIDI definitions, and introducing a common map for instrument numbers and banks. This was necessary to simplify the content creation process. Device requirements were significantly relaxed to limit player implementation complexity requirements.

The Mobile DLS instrument content specification does not mandate a particular synthesizer design. Mobile DLS content can be supported by any wavetable synthesizer implementation meeting a set of minimum requirements provided in the specification. For smaller files and more efficient transmission, the Mobile DLS specification can be extended to allow support for compressed wavetable instrument samples.

3.3 Compound Document Format

The SP-MIDI + Mobile DLS compound document format [8] is based on MMA/AMEI's previously standardized XMF technology [6], but with considerably reduced functionality to simplify implementation for mobile terminals. The compound document includes all necessary information for rendering and content management, both in content creation and in the network/device.

4. STANDARDS PROCESS

The 3GPP standardization of Mobile DLS will be based on specifications to be approved by MMA/AMEI. The proposals are scheduled for MMA voting & submission for AMEI approval this autumn.

Application for a new MIME type will be needed for 3GPP services.

ANNEX: ABOUT MMA AND AMEI

Since 1985 MMA and AMEI have provided the forums for their members to cooperate to develop and promote numerous standards related to MIDI, including Standard MIDI Files, General MIDI, Downloadable Sounds, XMF and more. MMA and AMEI members include leading companies in electronic musical instruments, PC computing, pro audio, and theatrical and themed event control. MMA/AMEI standards are also incorporated by reference into other worldwide standards, such as VRML, MPEG (both ISO standards), IEEE-1394 (an IEEE and IEC standard), and 3GPP.

References

[1] Scalable Polyphony MIDI specification (SP-MIDI), Version 1.0, RP-034. The MIDI Manufacturers Association, Los Angeles, CA, USA, 2002.

[2] Scalable Polyphony MIDI Device 5-24 Note Profile for 3GPP, Version 1.0, RP-035. The MIDI Manufacturers Association, Los Angeles, CA, USA, 2002.

[3] The Complete MIDI 1.0 Detailed Specification, Incorporating all Recommended Practices, MIDI Manufacturers Association, Document version 96.1, 1996.

[4] Downloadable Sounds Level 1, Version 1.1a. The MIDI Manufacturers Association, Los Angeles, CA, USA, 1999.

[5] Downloadable Sounds Level 2.1, Version 1.0. The MIDI Manufacturers Association, Los Angeles, CA, USA, 2000.

[6] Specification for XMF Meta File Format, Version 1.00b. The MIDI Manufacturers Association, Los Angeles, CA, USA, 2001.

[7] Mobile DLS Specification, unpublished draft specification. The MIDI Manufacturers Association, Los Angeles, CA, USA, 2003.

[8] [Title TBD] compound document format for SP-MIDI + Mobile DLS content, unpublished draft specification. The MIDI Manufacturers Association, Los Angeles, CA, USA, 2003.

[9] 3GPP TS 26.234: "End-to-end transparent streaming Service (PSS); Protocols and Codecs".

[10] 3GPP TS 26.140: "Multimedia Messaging Service (MMS); Media formats and codecs".

[11] 3GPP TS 23.040 "Technical realization of the Short Message Service (SMS)".