

## Special Issue:

# The New Standard IEEE 1599 - Interacting with Music Contents by XML Symbols

# Editorial

### 1. Introduction: Originality of Standard IEEE 1599

Proposed and de-facto standards that deal with some aspects of music have been around for several decades, ever since the need was felt to apply computer techniques to music and musicology [1]. Some deal with audio, some with the graphical representation, or score, of music, some with performance, special ones with choreography, and so on.

Since music has been annotated for at least the past forty centuries with *symbols* that represent musical events – such as *notes*, *rests*, *clefs*, *performance indications* – attempts have been made to capitalize on this experience and create music standards based on symbols. SMDL, MEI, Hy Time, SMIL, MusicXML, MusiXML, MusiCat & MDL, WEDELMUSIC, MNML, MML, MuTaTeD, MusicML, ChordML are a few recommendations and standards of that kind.

However, it is not that IEEE 1599 represents simply an addition to that long lost of specialized formats. It is, instead, global methodology for music representation, since it contains some features not found elsewhere, such as:

- Musical events and other indications are represented with *symbols* – just by itself, this is not new, even though the format is new
- The symbols are expressed in language *XML*, thus inheriting the features of XML such as: *natural extensibility*, *flexibility*, *durability*, which may allow the standard to evolve, beyond Common (Western) Music Notation and toward notational formats not yet established – as used by the music avant-garde [2]
- The concept of *layers*, that allow integrated representation of several aspects of music, such as its *graphic notation*, *texts* (as in songs and opera), *audio* (from a recording), *performance indications*, and everything that is related to the piece such as title, composer, interpreter, dates, posters, discographical and bibliographical data
- Applications that *synchronize* all layers and events, as with a running indicator on the score or the libretto during and audition, and that allow music fruition *independently of the version or the rendition*, and *independently of the audio or video format*
- As a consequence, all representations of a piece of music made with pre-existing methods can be *recuperated* as needed and desired, since they are both maintained in their original formats (e.g., WAV, MP3, MIDI, acoustical recording) and put under a single *comprehensive meta-language* in which every media file is related to all the others with links, thus creating an all-encompassing *music information system* that can be *navigated* in all its aspects.

The idea of *music navigation* is akin to entering the virtual world of a great poem or novel, such as the Iliad or Dante's Divine Comedy. This extends the enjoyment of music beyond that of *simple listening*, and provides information about what is happening, who is doing what – as in a jazz piece or an opera – how the piece is built – both at structural and at the detailed level – and about how the piece is built even from a musicological analysis – which can be supplied by *semantics webs* and appropriate *ontologies*.

### 2. Brief History of Standard IEEE 1599, and Acknowledgements

The initial *Project Authorisation Request* was accepted by the IEEE SA (<http://standards.ieee.org>) in 2001, and the *Standards Activity Board* of the Computer Society, CS SAB, became the *project sponsor*. It created a site describing the project (<http://www.computer.org/portal/pages/ieeecs/communities/standards/1599/par.html>) in 2004 (see also <http://www.lim.dico.unimi.it>).

An *IEEE CS Conference* dedicated to the project and its proposals took place in Milan in September 2002, which produced the *Proceedings of the First International Conference MAX 2002: Musical Applications Using XML*, IEEE CS, 0-7695-1864-8/02, Milan, Italy, September 19-20, 2002).

The *Abstract for a project proposal* was accepted by the global fund *Intelligent Manufacturing Systems* ([www.ims.org](http://www.ims.org)) in 2002 and a preliminary project was accepted for financing by the Swiss *Commission for Innovative Technology* (<http://www.bbt.admin.ch/kti/index.html?lang=en>) in 2004.

A first *article dedicated to the standard* was published in IEEE COMPUTER in 2005 [3], and since then several publications, lectures and invited lectures at conferences followed.

A formal *project proposal* was accepted by IMS in 2005 and by the Swiss CTI in 2006 to realize standard and applications, together with the *Radiotelevisione della Svizzera italiana* (<http://www.rtsi.ch>) and the festival *Jazz Ascona – New Orleans and Classics* (<http://www.jazzascona.com>). The Swiss government financed among others an Italian university, laboratory and its doctoral candidates.

The draft of the standard was *accepted in a vote* by the IEEE SA experts on April 13 with 96% in favor, and was *approved by the New Standards Committee* of the IEEE SA on June 12 with no objection. It reached its final form in October 2008, and the DTD has been posted at [http://standards.ieee.org/standardswire/archives/sw\\_nov08\\_email.html](http://standards.ieee.org/standardswire/archives/sw_nov08_email.html).

The *IEEE CS International Conference "The Use of Symbols To Represent Music and Multimedia Objects"* took place in Lugano, Switzerland, on October 8, 2008, and produced the *Proceedings*, ISBN 88-7595-010-5, with ten articles, seven of which have been dedicated to aspects of Standard IEEE 1599. This was part of the *Symposium on Music, Mathematics and Multimedia*, supported financially by the University of Applied Science of Southern Switzerland, SUPSI, by the State University of Milan, Italy, and by the City of Lugano, shown at <http://www.cm.supsi.ch>.

Several projects and applications to illustrate the power of the standard are planned for the next future.

### 3. This Special Issue

It contains seven articles that describe some of the features of standard IEEE 1599. They contain, among others, examples and detailed explanations of what is described in the bulleted paragraph in the introduction of this writing.

### References

- [1] Lejaren A. Hiller, Leonard M. Isaacson, *Experimental Music*, McGraw-Hill Book Company, 1959.
- [2] John Cage, *Notations*, Something Else Press, ISBN 0-87110-063-0, 1969.
- [3] Denis Baggi, "An IEEE Standard for Symbolic Music", *IEEE Computer*, November 2005, pp.100-102.

### Guest Editors:

**Denis L. Baggi, University of Applied Science of Southern Switzerland**  
**Goffredo M. Haus, State University of Milan, Italy**



**Denis L. Baggi** graduated in Electrical Engineering at the *Swiss Federal Institute of Technology* in Zurich (ETHZ) and obtained the Ph.D. Degree at the *University of California at Berkeley*, with a thesis on Artificial Intelligence and Music.

He was a Professor of Computer Science at the *Polytechnic Institute of New York* and at the *City University of New York*, a Research Scientist at the *AT&T Bell Laboratories* in Murray Hill, NJ, and at the *International Computer Science Institute* in Berkeley. He was a Research Manager in Swiss industry, specialising in operating systems (UNIX), Artificial Intelligence (expert systems, LISP programming), Music and Musicology (contributing an American patent, and playing tenor and soprano saxophone), and Systems for Financial Analysis. He is the author of several scientific and popular articles, editor of a book on Computer Generated Music, and author of one about the structures of jazz. He is the founder of the *Technical Committee on Computer Generated Music* of the IEEE CS, Chairman of the *IEEE SA Working Group for Standard IEEE 1599* to encode music symbolically with XML, and he has acted as journalist for the festival *Jazz Ascona - New Orleans and Classics*.

Presently Dr. Baggi is a Professor at *Scuola Universitaria professionale della Svizzera italiana*, SUPSI, near Lugano, where he is involved in research on computer applications to music and musicology, teaches computer science and jazz, and acts as director of the new *Laboratorio per sistemi semantici e multimediali*, LSMS. He is currently preparing a course on Musical Informatics.



**Goffredo M. Haus** is known for his research in computer models for music and multimedia. Prof. Haus's approach to music and multimedia description and processing was mainly based on Petri nets and DSP techniques. Until 1985 he has been a member of *Department of Information and Communication Technology* of the State University of Milan, in which year he became the director of the *Laboratorio di Informatica Musicale*, or LIM. He is currently the Dean of the Department.

Dr. Haus has supervised about 150 master and PhD theses, at his university and others. He is *full professor of Computer Science area* at the Faculty of *Mathematical, Physical, and Natural Sciences* of the State University of Milan. He teaches several courses, such as *Computer Science Applications in Music*, *Foundations of Computer Science*, and *Multimedia Digital Archives*. He has also directed computer music and multimedia projects of industrial interest, and carried out didactic as well as cultural activities, both inside and outside academia. Currently he is involved in a number projects for electronic publishing of music and multimedia, of which the one about *rescuing the Musical Archive at Teatro alla Scala* in Milan.

Prof. Haus published about a hundred scientific papers, dozens of other kinds of publications, and several books and CD-ROMs on concerning computer applications in music. In 1992, he co-initiated, with Dr. Denis Baggi, the *IEEE Computer Society Task Force on Computer Generated Music*, which in 1994 became the *Technical Committee on Computer Generated Music*, of which he is the vice-chair.

In 2001 he started the IEEE Standards Association *Working Group on Music Application of XML*, of which he is the Official Reporter to the IEEE CS Standards Activity Board.