

TELEMETA, audio web Content Management System for ethnomusicological sound archives

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Abstract. *Telemeta* is an open-source audio web Content Management System (CMS) dedicated to digital sound archives secure storing, indexing and publishing. The demonstration aims at presenting the features offered by this platform in the context of *ethnomusicological* research. It focuses on the enhance and collaborative user-experience in accessing the audio items and associated metadata and on the possibility for the expert user to further enrich those metadata. *Telemeta* also provides integrated audio signal processing tools for automatic analysis of the sound items.

Keywords: Sound archives, Metadata, Ethnomusicology, Database, Audio labelling, Web platform

1 Introduction

In social sciences like anthropology or linguistic, researchers have to work on multiple type of multimedia documents like photos, videos, sound recordings or databases. The need to easily access, visualize and annotate such materials can be problematic given their diverse formats, sources and given their chronological nature. This particular concern gets together some laboratories¹ involved in research on Ethnomusicology from the french National Center on Scientific Research (CNRS).

Given those considerations, since 2007, the CREM laboratory and Parisson, a company specialized in the management of audio databases, have been developing *Telemeta*, an innovative, collaborative and interdisciplinary open web-based

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multimedia platform that fits the professional requirements from both sound archivists and researchers in ethnomusicology. Since 2008, a first prototype of this platform has been online².

2 Telemeta

2.1 Web audio content management features and architecture

Telemeta³ is a free and open source⁴ web audio content management system which introduces useful and secure methods to backup, index, transcode, analyse and publish any digitalized audio file with its metadata.

An overview of the Telemeta's web interface is illustrated in Figure 1

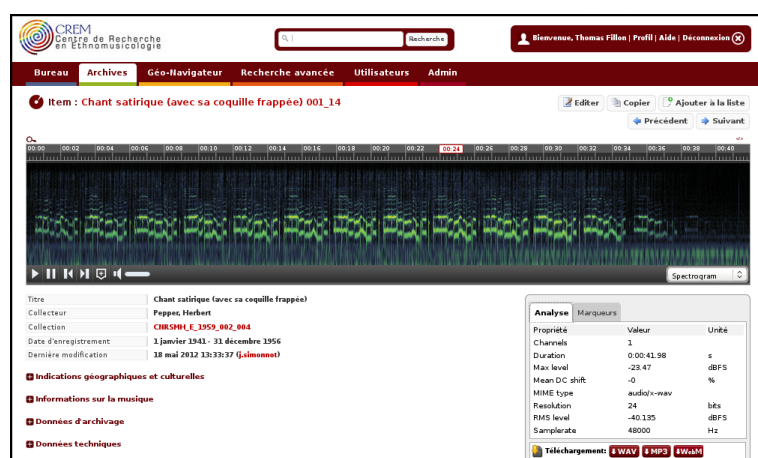


Fig. 1. Screenshot excerpt of the *Telemeta* web interface

Telemeta is dedicated to professionals who want to easily organize, backup, archive and publish documented sound collections of audio files, CDs, digitalized vinyls and magnetic tapes over a strong database, in accordance with open web standards. *Telemeta* architecture is flexible and can easily be adapted to particular database organization of a given sound archives.

Regarding web aspects, the main features of *Telemeta* are:

- *Pure HTML* web user interface including high level *search engine*
- Smart *workflow management* with contextual user lists, profiles and rights
- Strong Structured Query Language (SQL) or Oracle backend
- Model-View-Controller (MVC) architecture

Beside database management, the audio support is mainly provided through an external component, TimeSide, which is described in Section 3.

² Archives sonores du CNRS, Musée de l'Homme, <http://archives.crem-cnrs.fr>

³ <http://telemeta.org>

⁴ Telemeta code is available under the CeCILL Free Software License Agreement

2.2 Metadata

In addition to the audio data, an efficient and dynamic management of the associated metadata is also required. Dynamically handling metadata in a collaborative manner enable to optimize the continuous process of knowledge gathering and enrichment of the materials in the database. The compatibility with other systems is facilitated by the integration of the metadata standards protocols *Dublin Core* and *OAI-PMH* (Open Archives Initiative Protocol for Metadata Harvesting) [2,4].

Contextual Information Regarding ethnomusicology, contextual information could be geographic, cultural and musical. It could also store archives related information and include related materials in any multimedia format.

Annotation and segmentation Metadata also consist in temporal information such as *time-coded makers* with comments and *segmentation* according to ontology relevant for ethnomusicology (e.g. speech versus singing voice segment, chorus, ...). It should be notice that those annotations and segmentation can be done either by a human expert or by some audio processing automatic analysis (see Section 3).

3 TimeSide

One specificity of the Telemeta architecture is to rely on an external component, *TimeSide*, that offers audio player integration together with audio signal processing analysis capabilities. Figure 2 illustrates the overall architecture of *TimeSide*.

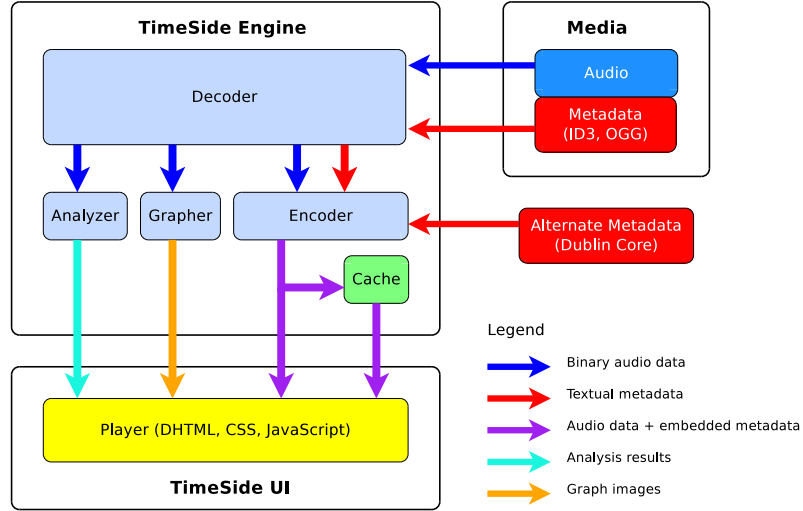


Fig. 2. TimeSide architecture (see <https://code.google.com/p/timeside/>)

3.1 Audio management

TimeSide provides the following main features:

- *Secure archiving, editing and publishing of audio files* over internet.
- *Smart audio player* with enhance visualization (waveform, spectrogram)
- *Multi-format support*: read all available audio and video formats through Gstreamer, transcoding with smart streaming and caching methods
- *"On the fly" audio analyzing, transcoding and metadata embedding* based on an easy plugin architecture

3.2 Audio features extraction

TimeSide incorporates some state-of-the-art audio feature extraction libraries such as Aubio, Yaafe and Vamp plugins [1,3,6]. This feature extraction capability enable to automatically analyzes every sound items in a given collection and display the results as a support to ethnomusicological studies. Further works on that subject driven by the DIADEMS project will incorporate advance Music Information Retrieval methods to provide automatic annotation, segmentation and similarity analysis.

4 Conclusion - Purpose of the demonstration

The demonstration aims at presenting the features offered by *Telemeta* as detailed in Section 2 in the context of ethnomusicological sound archives [5]. It focuses on the enhance and collaborative user-experience in accessing the audio items and associated metadata and on the possibility for the expert user to further enrich those metadata. Another goal of this demonstration is to present the integrated audio analysis tools described in Section 3.

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