

# SHARING CONTENT AMONG MUSIC-ORIENTED MEDIATEQUES AND ARCHIVES

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**Abstract:** Archives of mediateques, theatres, music schools, conservatories, universities, etc. are the most important sources of cultural heritage. They are interested in digitising content to (i) improve the service towards their attendees, (ii) add new functionalities at the service provided, (iii) save the material that is going to deteriorate such as tapes, disks, documents, etc. Publishers are interested in digitising only content that guarantee a certain return of investment, at the same time they limit the distribution of their content which is located in the archives, to control its exploitation and to remain the content ownership. WEDELMUSIC has been defined to allow content providers to share and distribute interactive music. To this end, solutions, models and tools have been defined and developed, including adequate protection and monitoring solutions.

## INTRODUCTION

Multimedia and music publishers have in their archives audio files, music scores, documents, and images. Presently, some of music publishers are converting their archives of music scores from paper to images to survive on the market. Typically, they also have differently organised archives in which several other related digital objects are collected: posters, letters, pictures, lyric, videos, etc. This material is an important cultural heritage, and it is typically not organised and quite rarely managed by an integrated Digital Asset Management databases and tools for their integrated inspection. This amount of data has a strong potential if organised and distributed in multimedia products. The simple exploitation of that material to produce CDs and DVDs with authoring systems is only a small part of its potential since synchronisations and music score integration with other elements, sliding shows, navigation in the content, animations, multimedia biographies, etc., are only few examples.

Very important sources of cultural heritage are the archives: independent mediateques or archives associated to theatres, orchestras, music schools, conservatories, museum, foundations, universities, etc. Most of them present non digital music objects such as audio (disks, cassettes, tapes, etc.), video tapes, documents and pictures. These mediateques have accumulated their content with donations, years of work of music lovers, etc., and only marginally contacting and acquiring content from publishers. Most of the collected material comes from live performances and it is only partially covered by copyrights. Their content is for a large part non commercialised by publishers, for the lack of a real market. On the other hand, this material has a great cultural value for music lovers, students and experts: which are the typical users of the archives. The mixture of protected and non-protected material in the archive and the difficulty of its distinction constraints the archives to adopt restrictive policies for the usage of its material. Usually, the archives can be freely consulted on-site, while the attendees are not enabled to take excerpts, to make copies, to record, etc. This limits the valorisation and the visibility of very important archives and contents and the diffusion of non commercial content such as: music produced in regional folkloristic activities, original manuscripts, historical documentation, modern music of young composers, etc.

The publishers are not interested in digitising all the above mentioned content since they do not see the direct return of investment. In most cases, the archives are the only content owners

to be interested in digitising that content to (i) improve the service towards their attendees, (ii) add new functionalities at the service provided, (iii) save the material that is going to deteriorate such as tapes, disks, documents, etc. Their activity is very important to save the cultural heritage in this field. The digitisation of historical music archives can be a way to share via Internet the content among archives, instating a virtuous mechanism. This activity has been understood and solicited in the past with several national and international projects such as: MOODS [1], PARAGON, CANTATE, MUSIC Library online, Delos Network Libraries, etc. All these projects and prototypes have only linked the archives at level of cataloguing information. This is the first step for the start up of mechanism of content sharing. Copyright owners, such as publishers, allow the content sharing since the archive guarantees to keep under control the content prohibiting the copying and the uncontrolled duplications.

In this paper, the adoption of WEDELMUSIC to support the modelling and digital content sharing is illustrated. WEDELMUSIC has been defined to allow content providers to share and distribute interactive music. Music distribution and sharing is not viable without adequate protection and monitoring solutions. WEDELMUSIC proposes mechanisms for music protection, that include: protecting digital objects by using encryption techniques; allowing definition of Digital Rights Management policies; watermarking audio files, images of music score, and music sheets while they are printed [3]. Today, WEDELMUSIC solution has been adopted by Arcipelago Musica and Active Music Mediateques according to the sharing and distribution schema depicted in this paper. WEDELMUSIC is an IST project with partners: DSI, University of Florence, Italy; ARTEC Group, Belgium; Casa Ricordi, Italy; FNB, The Netherlands; Scuola di Musica di Fiesole, Italy; IRCAM, France; FHG-IGD, Germany; ILSP, Greece; CESVIT, Italy; SUGARMUSIC Edizioni Suvini Zerboni, Italy.

## CONTENT INTEGRATION

For music archives is very important to adopt music models presenting new functionalities with a particular attention to the aspects related to the interactivity in the respect of the owner rights. WEDELMUSIC solution proposes techniques for storing, retrieval, distributing and sharing multimedia musical objects. WEDELMUSIC XML format [2] includes symbolic music notation, images of music sheets, audio files, video, documents, identification, classification, lyrics, videos, images and audio etc., and a set of protection mechanisms. In each WEDELMUSIC object, several relationships among its components can be established. These allow the definition and exploitation of new functionalities. For example, it is possible to: define hypermedia links to pass from a music notation symbol to a document, video, image, audio file; listen real audio performance synchronously with the visualisation of images of the music score or the symbolic music notation; modify music notation symbols: formatting, arranging, fingering, adding/deleting notes, transposition, editing multilingual lyric, managing versioning, etc., in the respect of copyrights; print music score or other components; analyse music score, comparing and searching into the database, performing a piano reduction; extract excerpts of the music score, audio, and images of the music score; execute music notation generating MIDI file or audio; edit music for visually impaired people, print music in Braille, get a verbal description of music score; acquire music from other formats FINALE, SCORE, SIBELIUS, IGOR, MIDI; searching music into the

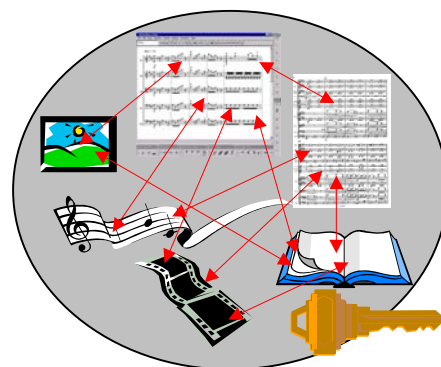


Fig. 1 - WEDELMUSIC object schema

database on the basis of content (music melody, lyric, documents, etc.), searching music components and objects on the basis of classification and identification aspects.

In the next example, a WEDELMUSIC object presenting the spring of Vivaldi is reported. It can be observed the symbolic representation of music scores, the audio player, a video player, an image viewer (the author's portrait) and the WEDELMUSIC editor presenting the Image Score of the original score sheet of Casa Ricordi, some symbol menus. Please note on the left side of the figure, the WEDEL Editor presents the structure of the WEDELMUSIC object. The example on the left presents a piece of Uccellini in which it can be seen the original music score sheet on the rights, the original dedication to "Serenissimo Principe", the cover of the Basso Continuo, the page sheet ready to print produced in WEDELMUSIC format with the music editor, and the audio player. Most of the above listed features are innovative and only possible on WEDELMUSIC model. Others available classical features have to be considered innovative since in WEDELMUSIC they are allowed in respect of the owner rights. To make possible the availability of these functionalities have

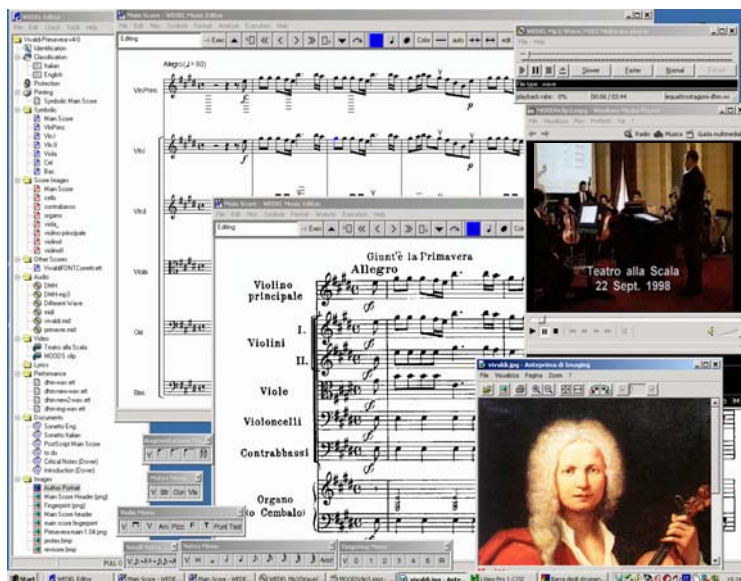


Fig. 2 - An example of WEDELMUSIC object



Fig. 3 - An Example of WEDELMUSIC object

constrained to design a sophisticated set of tools to protect WEDELMUSIC objects and at the same time to permit and control the exploitation of the new functionalities.

## DISTRIBUTION AND SHARING ARCHITECTURE

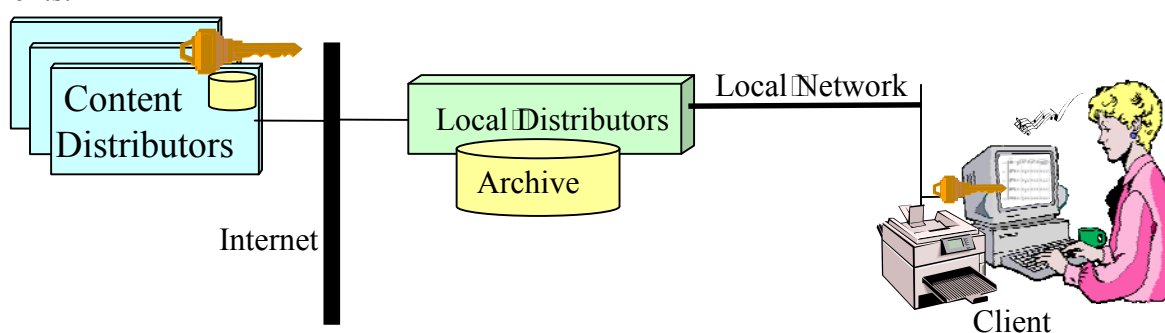
The WEDELMUSIC solution is based on several tools, among them:

- ◆ WEDELMUSIC editor and generator of music in WEDELMUSIC format.
- ◆ WEDELMUSIC Server/Content-Distributor for the distribution of WEDELMUSIC objects on the Internet in protected or no protected manners. It integrates tools for watermarking, reading watermarks, encrypting, decrypting, managing the identification keys, managing the transaction, Digital Right Management, digital asset management, etc.
- ◆ WEDELMUSIC Local Distributor, LD, for interfacing the corporate music consumers (libraries, music schools, theatres, etc.) with the general servers and for providing music objects to the internal computers in the plant of the corporate consumer.
- ◆ Music Viewers and Listeners to visualise music in WEDELMUSIC format for clients.

E-commerce for music is only acceptable for publishers if supported by adequate protection mechanisms. WEDELMUSIC enables publishers, distributors, content providers, to protect their music/content and at the same time to allow the users exploiting the above-mentioned functionalities for distributing/sharing content and its fruition in innovative manners.

## WEDELMUSIC Object Distribution

The LD manager may navigate on the WEB pages of the Publisher WEDELMUSIC Servers in order to select the WEDELMUSIC objects that would like to have on the LD database. The Clients/Attendees of the LD are allowed to make queries to the LD database on the basis of cataloguing, identification and content aspects via WEB. The Clients uses the WEDELMUSIC viewers and listeners for visualising and editing WEDELMUSIC objects. WEDELMUSIC objects are built and encrypted on the publisher site (on the Server) by using a specific key for each LD. Protected files can only be opened by registered WEDELMUSIC Clients.



The differences between protected and protected WEDELMUSIC objects are totally transparent for the Client users that receive the objects from the LD. The differences are obviously on the usage of the object.

## Sharing WEDELMUSIC Object for Mediateques

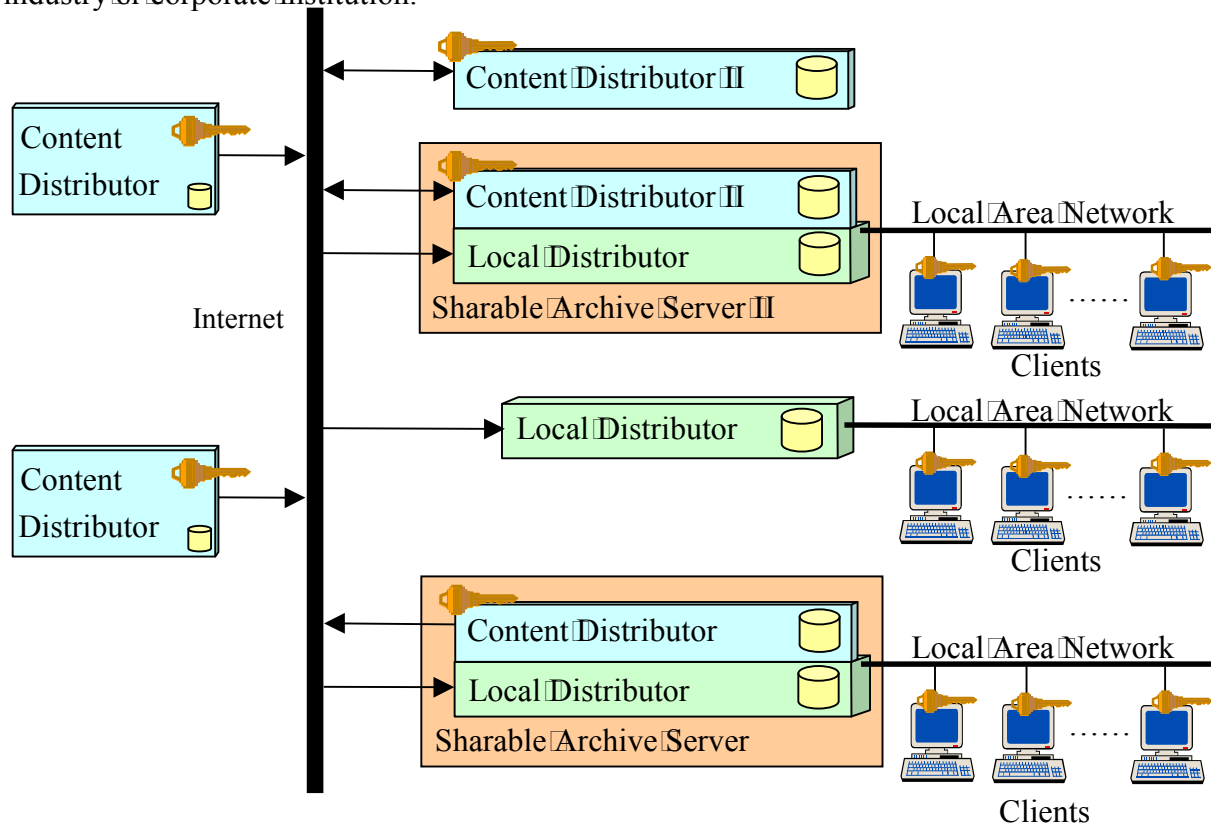
The above mechanisms can be used for building a large variety of solutions for multimedia and music content distribution. These solutions allow the content sharing among corporate institutions or in any case among content distributors. These can be archives, mediateques, second publishers, music shops, associations, etc. Content Distributors/providers that hold their WEDELMUSIC objects are capable of protecting them and distributing them to LDs. To perform their job, they need to have the WEDELMUSIC Content Distributor/Server and Editor for building WEDELMUSIC objects.

Content distributors are also interested in becoming second publishers or redistributors of content provided by other Content Distributors. They get WEDELMUSIC objects from other Content Distributors to distribute these and their objects to other LDs. In the figure, these are Content Distributor II. In some cases, corporations hosting a LD are also interested in building their WEDELMUSIC objects and in distributing these and those acquired from publishers to other LDs. In this case, they play the double role of Content and Local Distributors, building also WEDELMUSIC objects. This allows to build networks of archives that share each other their content. The same solution is obtained when Content Distributors or Content Distributors II are interested to play the role of LDs in their location/plant. In this case, they host in their plant the clients: Sharable Archive Server and Sharable Archive Server II. In this case, they build, acquire and redistribute to client and to other distributors.

Sharable archive server allows the implementation of the synergetic mechanism in which each archive may produce content that can be shared by the others to enlarge the catalogue of the archive. The above configurations, Content Distributor, Content Distributor II and Sharable



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## CONCLUSIONS

Mediateques, theatres, music schools, conservatories, universities, etc., are interested in digitising content to improve their collections, save cultural heritage, and provide new functionalities. As presented in this paper, WEDELMUSIC solutions and tools allow content providers to share and distribute interactive music. The structure of WEDELMUSIC objects is innovative and allows covering a wide range of needs of digital archives. According to the solution proposed, the sharing of content among archives via WEDELMUSIC solution can be accepted by the copyright owners for the presence of effective mechanisms of Digital Right Management and watermarking. WEDELMUSIC format allows exploiting new functionalities of digital music in the respect of the owner rights.

## References

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