



The European Project **MEMORIES**: Management, Description, Retrieval of Audio Archives

Jean-François Cosandier (Radio Suisse Romande, Switzerland)

Guy Maréchal et Philippe Scohy (MEMNON)

Per Dahl (NIRS / University of Stavanger, Norway)



The Partners

Users:

- **Radio Suisse Romande (RSR)**
Lausanne, Switzerland
- **Norwegian Institute of Recorded Sound (NIRS)**, Stavanger, Norway
- **UNESCO**, Paris, France

Sound Services:

- **MEMNON (*Project coordinator*)**
Brussels, Belgium

IT suppliers

- **Audionamics / MIST Technologies**, Paris
- **Israel Institute of Technology (Technion)**
Haifa, Israel
- **PubGene**, Oslo, Norway

EU R&D project, June, 1st 2006 – May 31st 2009



The Objectives

The project intends to face the challenges of the exploitation of audio archives with following objectives:

1. Improvement of the **acquisition processes** namely by using a “Single Sensor Source Separation” approach
2. Improvement of the **retrieval processes** namely by using a “Advance search base on semantic annotations”
3. Definition of an “**Open Exchange Format**” based on standards by using an approach based on standards, mainly the OAIS (ISO 14 721)
4. Evaluation and validation by using a **demonstrator** fed with a large spectrum of domain of applications.



The Audio Material

- Radio Interviews** (Radio Suisse Romande) with mixed spoken and music contents (ca 150 hours)
- Radio News** (Radio Suisse Romande)
- Music Recordings (NIRS)**
 - 78 rpm classical music discs
 - Analogue Audio Tapes

- Ethnographic Recordings (UNESCO)**
(→ Not realized)



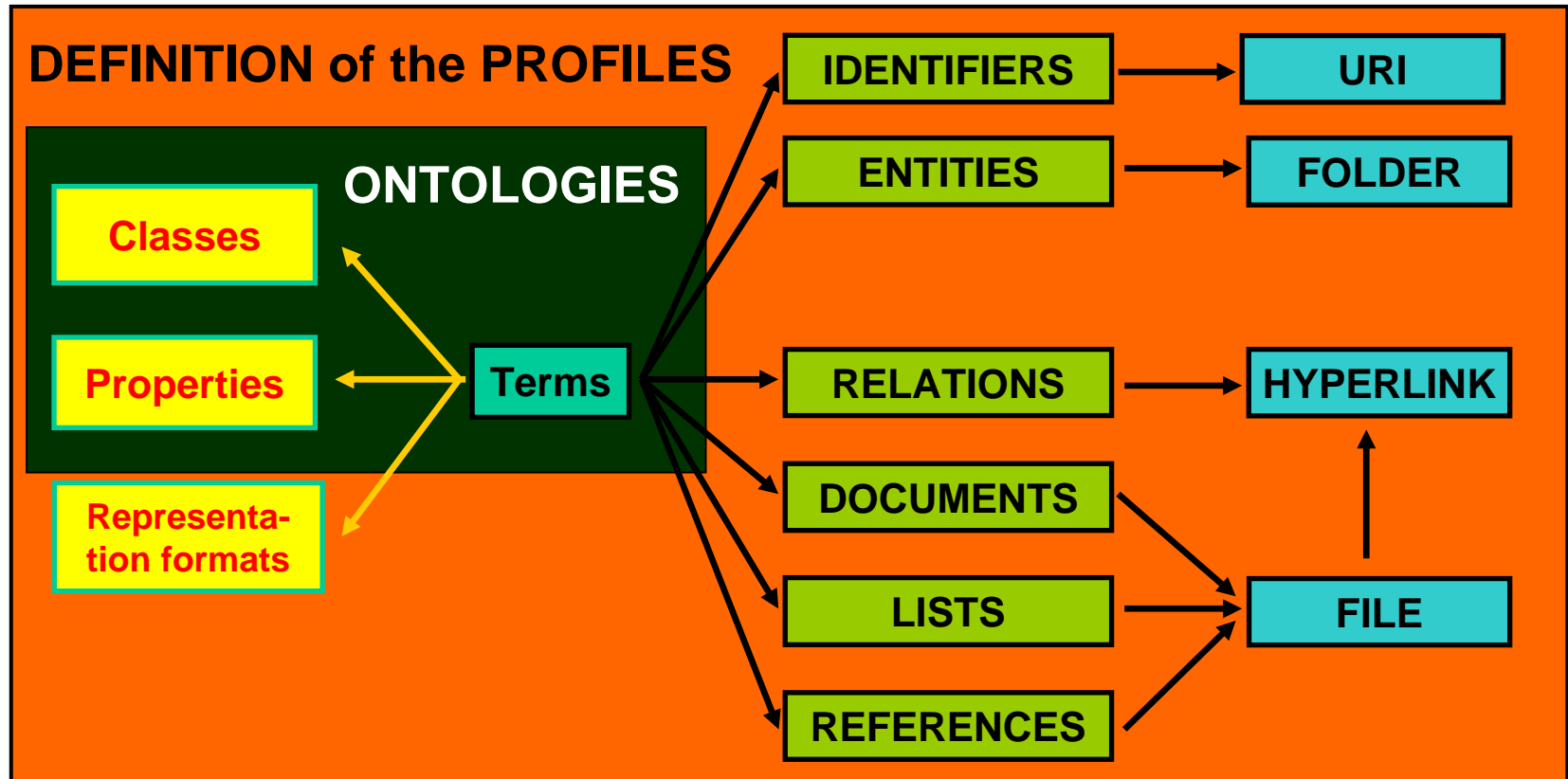


Acquisition process : metadata and indexation

- ❑ The improvement of the acquisition processes means that a lot of **semantic elements** can be gathered during this process and inserted into an information structure fitting to every type of audio document: the **PROFILE**
 - ❑ Profiles are linked like “plug-ins” to a so-called “**bootstrap architecture**” managing the central aspects of the storage and of the access: clips, documents, labels...
 - ❑ The specific profiles are defined in an **ontologic approach** including classes, subclasses, properties, terms and relations
- ❑ **Ontology** : “A formal representation of a domain of knowledge, with its existing entities, their relationships, their hierarchy, their attributes”

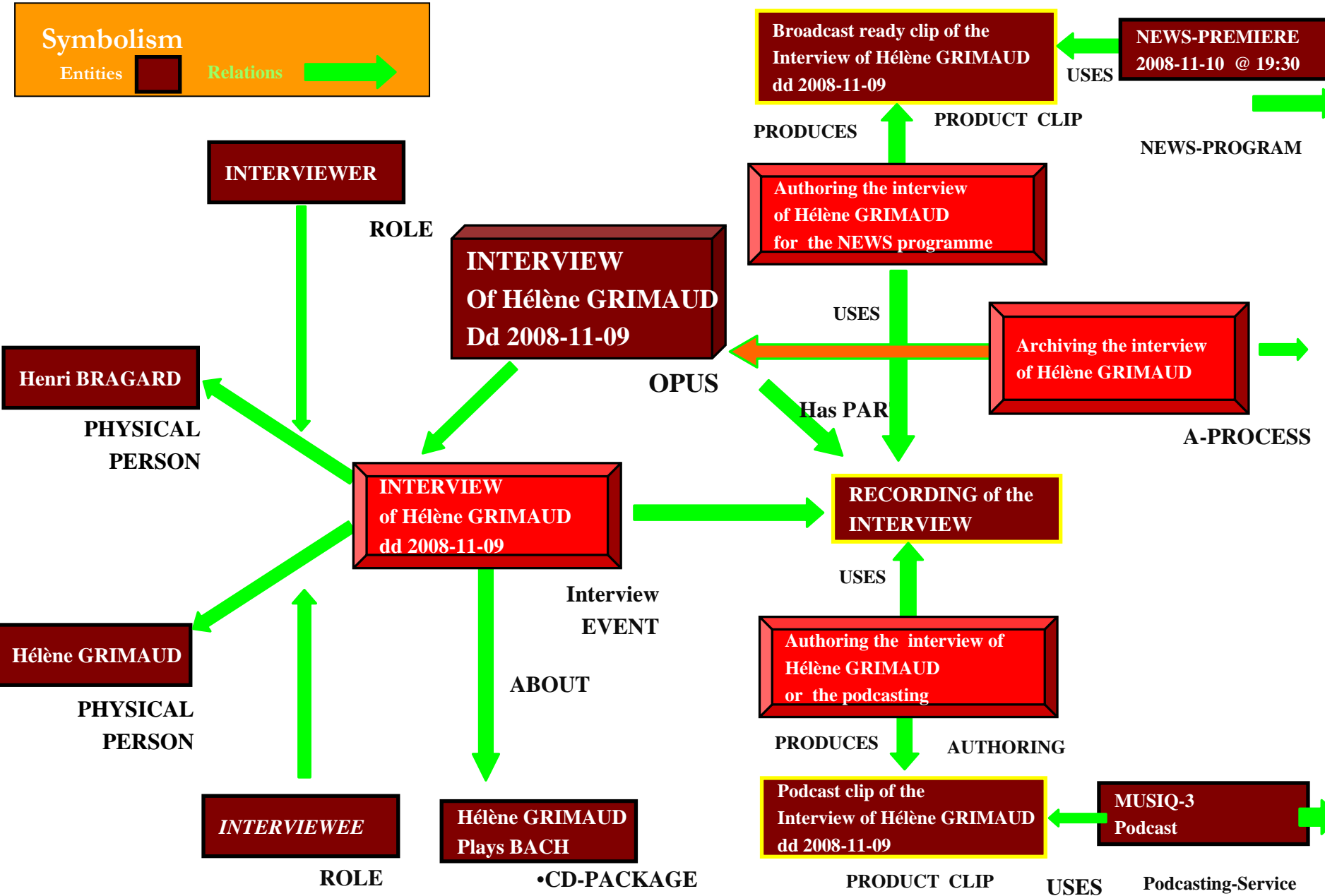


Profile based on ONTOLOGIES



Example of a derived AXIS model for the INTERVIEWS (Entity level)

Symbolism
 Entities Relations





Acquisition: the users' needs

In addition to the general identification metadata, the users expect:

- Segmentation** of the audio recording (music, speech, etc.)
- Speakers recognition**
- Musicians, instruments recognition**
- Spoken text transcription** (“Speech to text”)



In practice...

The audio documents are pre-processed in order to generate:

- The segmentation
- The speakers recognition,
- The instrument recognition
- The speech to text

Tools :

- Single sensor source separation (SSSS)
- Speech to Text and speakers recognition tool
- Ontology definition tool (Protégé, Stanford University)

→ the audio documents are ready for annotation in the “Clip Manager”



Annotation with the Clip Manager

- ❑ A tool, developed by Memnon, giving the user facilities for **editing the metadata, verifying the segmentation, the speakers recognition, etc.**
- ❑ Once these operations performed, the audio document with all metadata and semantic annotations is stored in an the Asset Management facility under the form of an **AXE (Autonomous eXchange Entity)**,

ARE Explorer

+http://www.rsr.ch/2008/04/14/interviews#SpeechProgram

View by SpeechProgram

- Speech Program: Micheline Calmy-Rey a été élue à la présidence de
- Speech Program: Entretien avec Serge Gainsbourg
- Speech Program: Entretien avec Didier Lockwood, violoniste, musici
- Speech Program: Spécial bi-centenaire de la Révolution française (2
- Speech Program: Direct de New-York (1/2) : 1. A la veille de l'investi
- Speech Program: Interview de Michel Corboz, chef d'orchestre, Marc
- Speech Program: Entretien avec Patrick Juvet, chanteur : A propos d
- Speech Program: Qu'avez-vous fait de votre vie ? : Entretien avec G
- Speech Program: Entretien avec Jean-Pascal Delamuraz, conseiller f
- Speech Program: Nathalie Baye : Portrait à travers des sons de films
- Speech Program: Election du Conseil fédéral du 10 décembre 2003.
- Speech Program: Qu'est-ce que le reportage radiophonique? A l'occa
- Speech Program: 1. Interview de René Allio, réalisateur français : A p
- Speech Program: 1. Interview de René Jeanne, historien et critique c
- Speech Program: 1. Introduction de Benjamin Romieux sur la sélectio
- Speech Program: 1. Interview de Freddy Buache : A propos du film :
- Speech Program: 1. Mort de Harpo Marx, comédien membre des Mar
- Speech Program: 1. Interview d'Otto Preminger, réalisateur : A propos
- Speech Program: Reportage sur la presse et les jeunes : Interviews c
- Speech Program: Interview de Jean-Pierre Mocky, acteur, réalisateur
- Speech Program: Interview de Maurice Béjart, chorégraphe
- InterviewEvent: Interview de Maurice Béjart, chorégraphe
- BroadcastEvent: En questions
- Media Sources
- Acoustical class segmentation
- Speaker change detection
- Sentence transcription
- CueLine_rstest1
- Speech Program: Interview de France Clidat, pianiste, surnommée "M
- Speech Program: Interview de Denis de Rougemont, écrivain, essayi
- Speech Program: Interview de Coluche, humoriste et acteur français
- Speech Program: Interview d'Ella Maillart, écrivain, journaliste
- Speech Program: Interview de Michel Corboz, chef de chœur de l'Er
- Speech Program: Interview d'Alice Rivaz et Michel Tournier, écrivain
- Speech Program: Interview de Daniel Balavoine, auteur, compositeur

Project explorer

speech Program: Interview de M...

Position: 00:00:00.000 Cursor Position: 0:0:0.0 Duration: 00:57:05.123

Zoomed WaveForm

00:00:10

Type:	Semantic
Segment Count:	1
Appendable:	True
Deletable:	False
Label Count:	label10

Acoustical class segmentation	Music	Speech	Music	Speech
Speaker change detection	Locutor_01			
Sentence transcription	en_question			
CueLine_rstest1				

Segmentation editor

SpeechProgram - urn:axiscap:memnon01-19440---(0)SpeechProgram

SpeechProgram Entity AXISCore

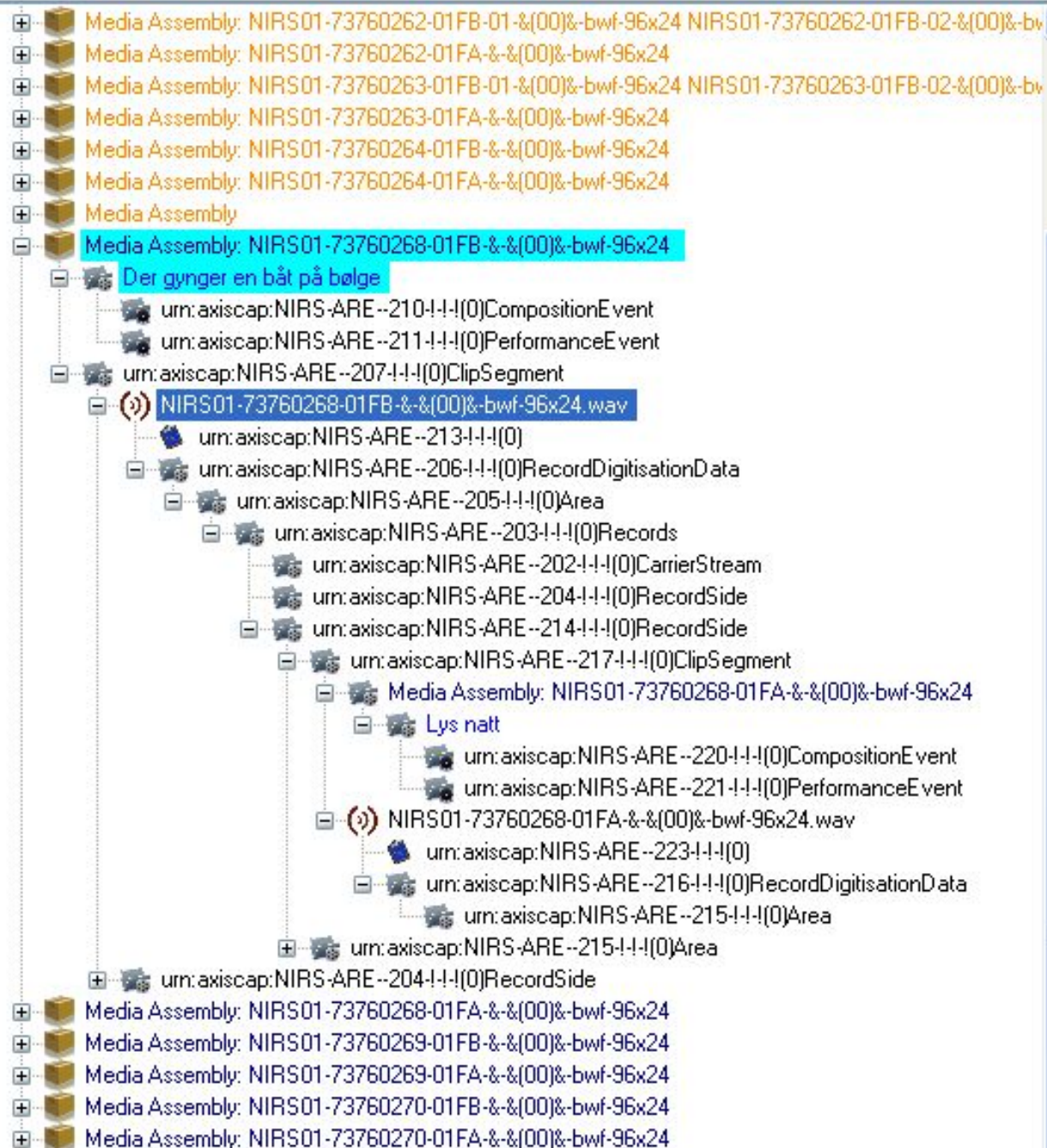
Attributes

Geographical descriptor	Suisse romande, Suisse
title	
Language	
Live	Non live
Notes	
Rights status	
Sub-domain	Interview
Summary	
Thematical descriptor	danse (art chorégraphique)
Years of creation	11/01/1974 - ##/##/####

Relations

hasPartSpeechProgramAudioComponent	
isARecordingOfSpeechProgramInterviewEvent	InterviewEvent: Interview de Maurice Béjart, chorégraphe
Is used by	BroadcastEvent: En questions

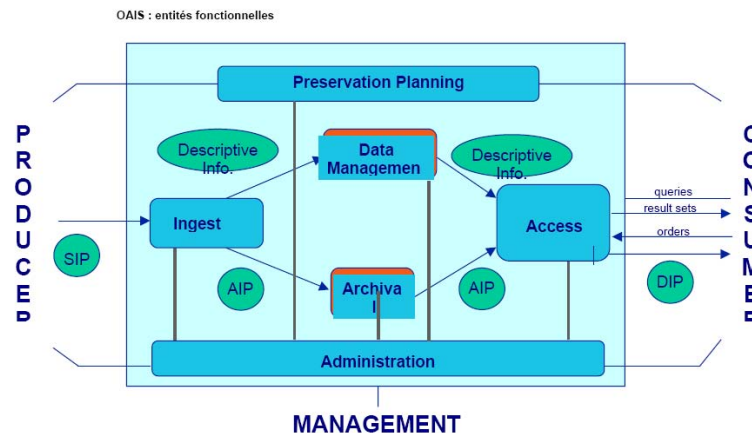
Metadata





Storage Architecture

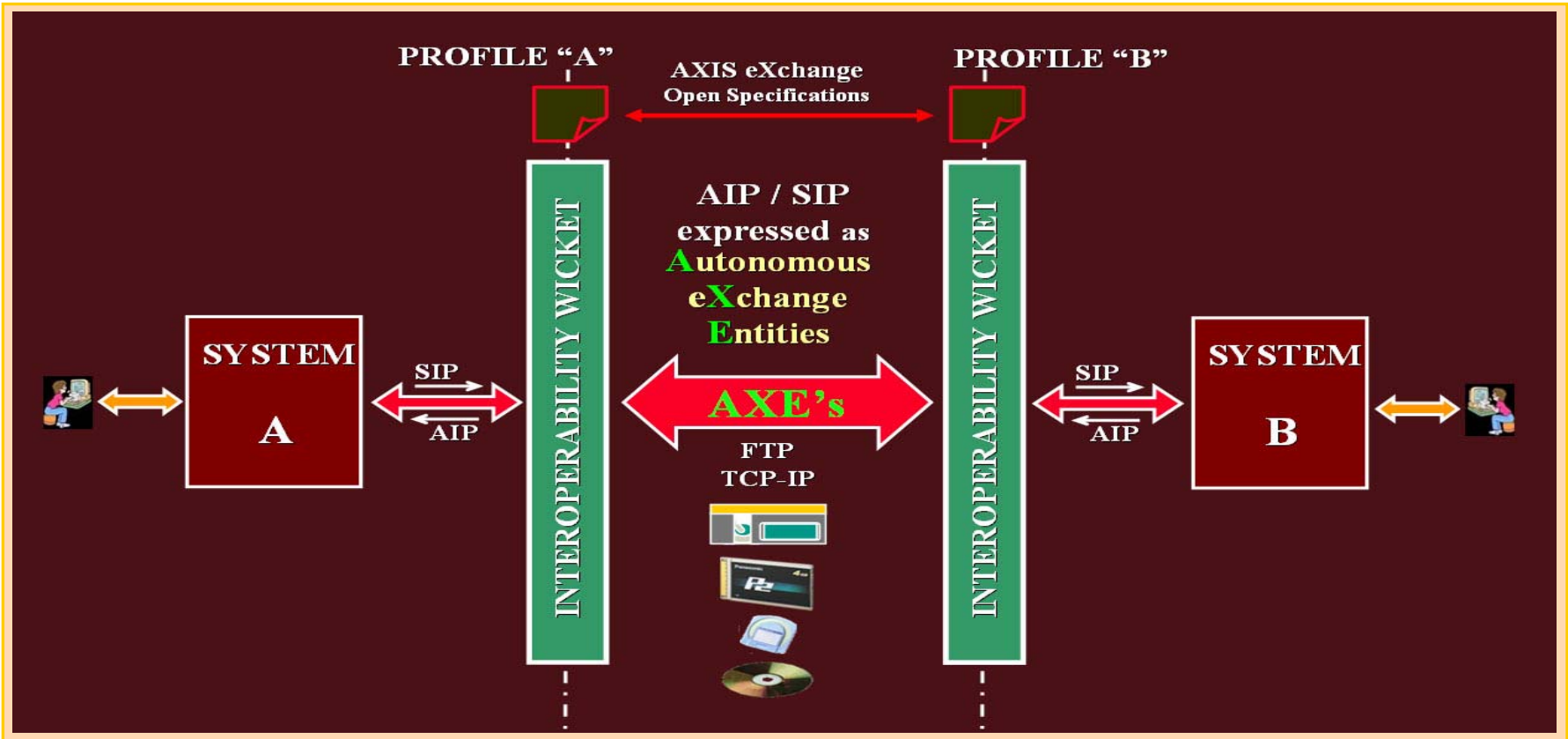
- ❑ The AXE's are based on open formats and standards. They integrate the rich semantic structure of the description.
- ❑ They can be sent to an asset management facility, fitting to the principles of OAIS (Open Archive Information System, ISO Standard 14721)



SIP = Submission Information Package
 AIP = Archival Information Package
 DIP = Dissemination Information Package



AXIS Architecture





Research tool

- ❑ The research tool, developed by Pubgene, is based on a **statistic network of semantic association** between terms.
- ❑ It has been developed from the experience gathered in **genetics and genomics**
- ❑ It offers the **pre-listening of the sound**, synchronized with the speech-to-text (if existing).

<http://memories.filmlibrary.tv>



July 8, 2009

Home | Advanced Information Retrieval


[Home](#)

Search for:

[? Help](#)

Title contains:

Item reference :

Keyword:

Support:

Person:

Place:

Event Date (1968) :

Extending research with Network concepts technology :

Our example website demo shared his XML database with Pubgene search engine.

[PLEASE CLICK HERE TO TRY ADVANCED INFORMATION RETRIEVAL](#)

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[Home](#)

Search parameters :

[Search text] = mountain

[Modify the search criteria](#)

8 result(s)

Page 1 of 2

Relevance	Title	Date	Length	Audio	Image
13 occurrence(s)	Sunday Supplement: Zermatt mountain guide		0s	✓	
11 occurrence(s)	Hedi Olden: A Gstaad legend		0s	✓	
10 occurrence(s)	Swiss Transport Museum		0s	✓	
10 occurrence(s)	Sunday Supplement: Interview with mountaineer Denis Bertholet		0s	✓	
10 occurrence(s)	Cinefilm Festival Gstaad		0s	✓	

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Description fields	Technical fields	Speech2Text
Item Title :	Cinefilm festival Gstaad	
Unique ID :	RSR-ARE_urn:axiscap:RSR01-ARE-931-!-!(0)SpeechProgram	
Time codes :	Segments: 31	
	001) 00:00:00	to 00:00:29.2700000
	<p>special festival hit lighting film music are getting hit from singer actress Julia has an film director Blake Edwards it was also cooked up in part by various spices edged out to starters which was not displeased to create a money generating event during festival are seizing cell with a well calculated collection of sponsors and film music means on its last and ninety festivalgoers rolling for the first time this March in her</p>	
	002) 00:00:29.2700000	to 00:00:53.2700000
	<p>more from if</p>	
	003) 00:00:53.2700000	to 00:01:17.8490000
	<p>there are a series Bernstein membranous team will be there with her office in a musical for Emma Bernstein is a very important composer of film music he made many squads for Scorsese visits are the on the other other hand if we have tore it up it in meets the Silver Japan Japan may be be one\one one\one of the most important are are composed important in Far for</p>	
	004) 00:01:17.8490000	to 00:02:19.4700000
	<p>its and music the director director handle already returns transformed when Dundee the means the festival festival guests which included composer David Wragg also also president of the Society for the preservation preservation of your music in a estate state Jinan '\apostrophe Cini wife wife of the late Henry mean menacingly anything in one\one of the most prolific film composers in in Hollywood Hollywood and i\india news was mean the the second prize was awarded at at the festival festival it the result was not so of been the Enlightenment one\one writer of more more songs songs were Elvis Elvis and than any any other other composer in appearance by film director Roman Roman Polanski he he was was there getting to introduce introduced the the screening screening of of his his new new film film death definitely and the maiden which which was built around a musical theme of composer Franz Schubert seniors events included a further cross-section of movie screenings from the nineteen twenties sci-fi epic metropolis to the popular children's film from mild to Mozart and Degas Last appearance by singer actress Liza Minnelli but much of the glitz and glamour of the festival was aimed at highlighting the issue of the diminishing attention is being given to film music nowadays</p>	



Conclusions

❑ Memories has developed a set of tools giving the archivist facilities to

- have a general view on the audio material
- annotate and complete the semantic elements
- store the digital information with a high degree of persistence
- meet the widely recognized opens standards

❑ The researcher can benefit of these facilities

- performing an intelligent search based on statistical associations
- having an easy access to the metadata and every part of the content of the audio document.



THANK YOU !

www.memories-project.eu