



GDIFF/SpatDIF Workshop, Ircam 20.5.2010



**ircam**  
Centre  
Pompidou

# SDIFF

## Past, Present, and Future

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**<http://sdif.sourceforge.net>**

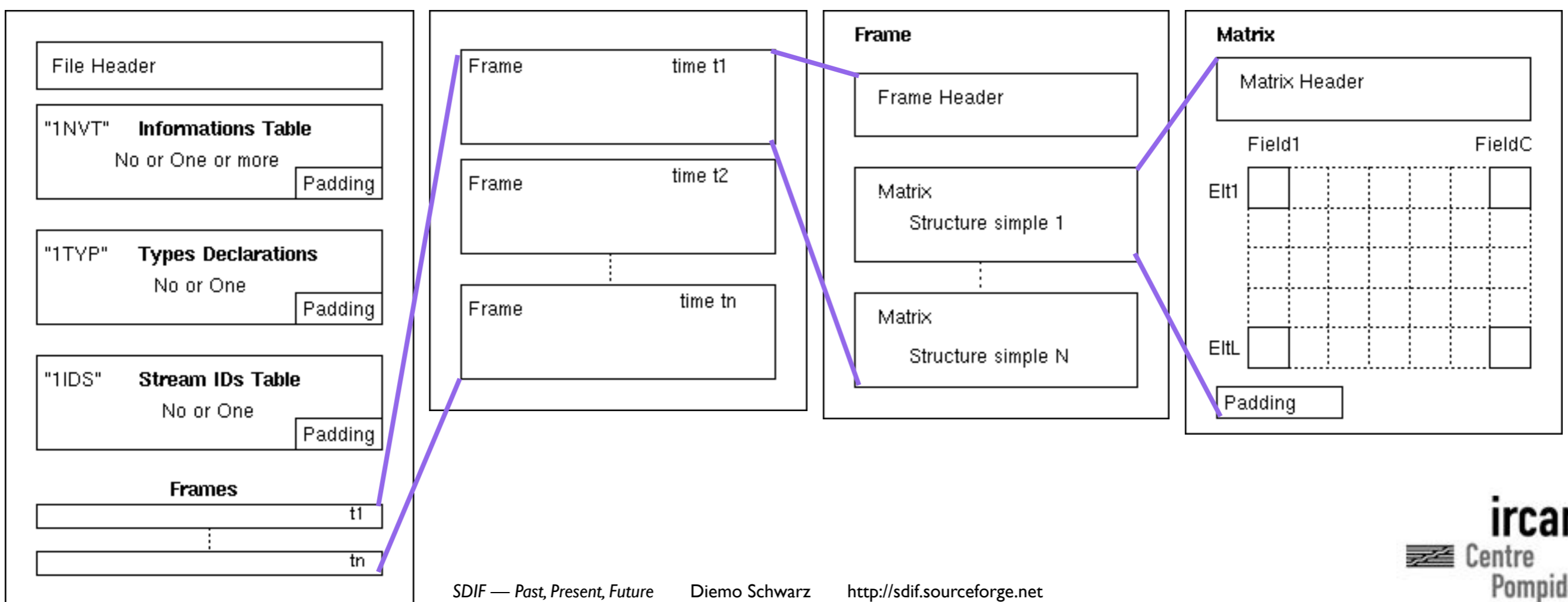
# SDIF History and Principle

- suggested by Xavier Rodet 1995, “SDIF Dinner” with Ircam, CNMAT, and IUA-UPF (now MTG)
- first presentation 1997, first articles 1998
- by now an established standard for the *well-defined and extensible interchange* of a variety of sound descriptions
  - e.g. spectral, sinusoidal, time-domain, descriptors, markers
- *Metaformat:*
  - basic data format framework + an extensible set of standard sound (or signal?) descriptions



# SDIF Structure

- *Header + Streams of Frames of Matrices* of numbers or text or arbitrary byte data (BLOBs)
- *Header* has dictionaries of metadata
  - NVT = Name–Value lookup-table for any context information (date, user, source sound file name, etc.)
  - TYP = Type declarations for privately defined types or extended standard types (frame signature, matrix and column names):  
*obligatory definition, well-defined semantics*



# Software supporting SDIF

## ■ Sound/Music apps

### ■ Max/MSP

- CNMAT SDIF-buffer

- FTM&Co (Jamoma interface by KN)

- Mubu

### ■ Analysis/Synthesis software:

*AudioSculpt, Loris, Spear*

- OpenMusic

## ■ Programming languages

- C/C++ (SDIF and EaSDIF libraries from Ircam (LGPL), sdif-lib from CNMAT)

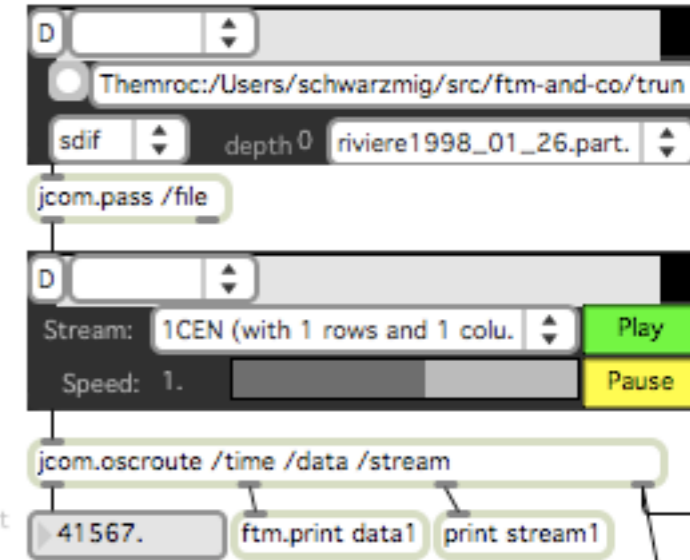
- Matlab

- Java, Python, Perl, Ruby, TCL, PHP, ... (via SWIG)

## ■ Tools

- command-line extractors and converters

- editors, visualisers, converters



setup info creator "me myself and I"  add nvt  
other info title "kilroy was here"  add nvt

Number of  
streams to  
record:

1

	ID	Variable names	Frame description
Stream 0	XAC3	"X[], Y[], Z"	3D_acceleration
Stream 1	XAC2	"X[], Y"	2D_acceleration
Stream 2	1MID	"status_b[], first_db[], second_db"	MIDI_data
Stream 3	XPOS	"X[], Y[], Z"	3D_position
Stream 4			
Stream 5			
Stream 6			
Stream 7			



# Applications at Ircam

## ■ Classic

- sound representation for analysis/resynthesis such as fundamental frequency, FFT frames, sinusoidal partials, transient markers, PSOLA waveforms, phase-vocoder frames

## ■ Extended

- Store audio features, a.k.a. sound descriptors, statistical models [Burred et al. ISMIR 2008]
- store motion capture and sensor data, together with audio data [<http://www.i-maestro.org>]



## ■ Non-Standard

- persistency: store program configuration and intermediate data in AudioSculpt

## ■ Musical

- corpus-based transcription by Aaron Einbond [Einbond et al. ICMC 2009]



# Aaron Einbond – *What the blind see*

1. snow melting on a metal roof
2. CataRT resynthesis with instrument sounds
3. manually edited transcription
4. live reading by ensemble

28

The musical score for page 28 of 'What the blind see' is divided into five staves:

- Alto:** Starts with a circled 'C10' and 'a tempo' marking. The first measure is marked '193' and contains a sixteenth-note triplet. Dynamics include *pp* and *ppp*. Later, it features an *arco* instruction, a *gliss. (main)* with a dashed line, and a *pp* dynamic.
- Cl.B. en Sib:** Includes the instruction 'bruit des clefs : doigtés ad lib.' above the staff. Dynamics range from *f* to *sfz*.
- Hp.:** Starts with 'SF neige to concatenation' and 'a tempo'. Includes the instruction 'étouffé avec papier sempre' with a dashed line. Dynamics include *p* and *pp*. Performance techniques 'paume' and 'ongles' are indicated below the staff.
- Pno.:** Features a *p* dynamic and a *plectre* instruction.
- Vib.:** Starts with a circled 'C10' and 'a tempo'. Includes 'Vib. superball' and 'Led. sempre' instructions. Dynamics include *p* and *sfz*.

# Future Propositions (I)

## ■ Stream Relationships Language (SDIF SRL)

- new header frame that stores the following relationships between entities (streams or external files):

- *contains* (stream contains frame, matrix types)

- *groups* (label groups labels or streams)

- *segments* (stream contains segmentation information for entity)

- *derives* (entity is derived from entity)

- [Burred, Cella, Peeters, Röbel, Schwarz ISMIR 2008]

## ■ SDIF Directory

- index information appended to file, in a specific frame type

- allows random access to file positions by frame-time and type



# Future Propositions (2)

- OSC stream capture to SDIF file
  - one stream per message,
    - address cached as optional text matrix (first occurrence only)
  - data as matrices, OSC bundles as frames
- SQLite Virtual Tables on a set of SDIF files
  - SQLite = small, fast DBMS in a C-library, no server needed
  - The virtual table mechanism allows an application to publish interfaces that are accessible from SQL statements as if they were tables. Queries from a virtual table invoke callback methods on the virtual table object instead of reading and writing to the database file.





# Acknowledgements

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  - Dominique Virolle, Diemo Schwarz, Patrice Tisserand, Fabien Tisserand, Niels Bogaards, Axel Röbel, Juan-José Burred, Carmine Cella, Frédéric Cornu, Xavier Rodet, Nicholas Ellis, Norbert Schnell and some others for sure
- Information and developer resources
  - **<http://sdif.sourceforge.net>**
- Mailing lists
  - **[sdif@ircam.fr](mailto:sdif@ircam.fr)** on **<http://list.ircam.fr>**
  - **[sdif-devel@lists.sourceforge.net](mailto:sdif-devel@lists.sourceforge.net)**

