SDIF
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*

```
File Header
"1NVT" Informations Table
  No or One or more Padding
"1TYP" Types Declarations
  No or One Padding
"1IDS" Stream IDs Table
  No or One Padding
Frames
  t1
  ...
  tn
```

```
Frame
  time t1
Frame
  time t2
Frame
  time tn
```

```
Frame
  Frame Header
Frame
  Frame
```

```
Matrix
  Matrix Header
  Matrix
  Structure simple 1
  ...
  Matrix
  Structure simple N
```

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Matrix
  Field1
  EIL
  FieldC
```

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Matrix
  Matrix
  Structure simple 1
  ...
  Matrix
  Structure simple N
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Matrix
  EIL
  FieldC
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Matrix
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  EIL
  FieldC
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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
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
Future Propositions (1)

- 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.
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- Information and developer resources

- Mailing lists
  - sdif@ircam.fr on http://list.ircam.fr
  - sdif-devel@lists.sourceforge.net