Larger goals in representation: Data archiving, interchange, and analysis
Durable (non-audio) encoding projects

**Single-focus**
- Folk-music collections (esp. German)
- Music-manuscript finding aids

**Multi-focus** (vertical integration)
- MuseData (classical/orchestral-chamber)
- KernScores (classical/keyboard)
- Choral Public-domain Library (CPDL)
Characteristics of most

• Representation: Neither time nor space is a dominant consideration

• Central aim: Repurposeable data, interoperability

• Examples
  ◦ Archiving: canonical format that facilitates interoperability
  ◦ Interchange: canonical format that is easily interpreted by sending and receiving systems whose formats may be unknown
  ◦ Analysis: flexible format that can be modified to suit a range of needs (can sometimes be distilled from richer format)
Common distinguishing features

**Monophonic encodings**
- EsAC, P&E (monophonic)

**Polyphonic encodings**
- MuseData (polyphonic)

**Markup and interchange codes**
- MusicXML, MEI

**Essential feature sets**
- Humdrum (Toolkit)

*De facto* datasets *(e.g. SCORE repertories)*
(1) Folk music research (network)
EsAC network model (1982-1994)

EsAC = Essen Associative

PC-era model

Developed in Essen, DE, by Helmut Schaffrath from the Kiel/DVA archive and other sources

esac-data.org

Above: H. Schaffrath, L: Ewa Dahlig

Reflected widely used 19th century typescript encoding foundation
Essen Associative Code (EsAC)

Music rep. in general
- Pitch name
- Pitch inflection
- Octave name or number

EsAC specifics
- Pitch = number
- Inflection = symbol
- Octave = symbol

See [http://www.esac-data.org](http://www.esac-data.org)
EsAC code vs other codes

Pitch relative to a “tonic”

Duration relative to a stated value

Octave relative to central 8ve

Mozart trio (EsAC with 5 data translations)

http://esac-data.org/

http://kern.humdrum.org/search?s=t&keyword=essen&type=Text
Schloss in Oesterreich
Es ligt ein schlos in Ostereich,
Das ist gar wol erbawet
Mitteleuropa, Deutschland
1549 gedruckt in Nuernberg
Kleinere Melodievarianten aus anderen Quellen abgedruckt.
Refrainartiges Anhaengsel an der letzten Zeile.

Music one field in a text database
EsAC: Essen Folksong Collection

Monophonic music (8500 songs)

Purposes
- Archiving
- Comparing versions
- Teaching
- Sound output

Contributions
- Earliest model of analysis
  (Leppig, 1987)

Analytical recoding

Pitch and duration uncoupled

R: nearest matches for Mozart trio

Code-recode comparison
(2) Collaborative music indexing: RISM’s Plaine & Easie (P&E) Code

• Designed in 1967 for music-indexing

• Most widely use in the RISM database of music manuscripts (60+ countries)
  ◦ 60+ countries
  ◦ 2.3 million entries (c1.75 million currently online)
  ◦ Most fields (of 112) bibliographical; one music field for encoded incipits
  ◦ Original purpose: to attribute anonymous manuscripts

Website: https://rism.info/
Plaine & Easie Code

Monophonic

Industrial strength (interfaces with MARC et al.)

Manual: https://www.iaml.info/plaine-easie-code
Beethoven’s Fifth Symphony
Listing in RISM
(3) Full-score repositories

**MuseData**: overview

- Developed by Walter Hewlett (from 1982)
- Served by CCARH
- Many implementations, extensions, refinements by Craig Sapp
- Largest verified dataset online

[http://www.musedata.org](http://www.musedata.org)
MuseData’s “solar” network models

Classical music focus

- Analytical apps
- Sound apps (MIDI only)
- Notation apps (Full encodings)
Comparison of models
Part/score orientation in *MuseData*

1. Encode voice by voice for full movement
2. Add lyrics, other refinements
3. Repeat until all movements are encode
4. Assemble score
Two-step process
  ◦ MIDI-level data
  ◦ Non-sounding data

Serial processes

Storage formats
  ◦ Stage 1 (pitch, duration)
  ◦ Stage 2 (stems, lyrics, etc)
  ◦ Internal format (notation)
Encoding in multiple domains: Actualities
Encoding in multiple domains: samples

From PDF list

| Haydn, Franz Joseph | Symphony in B-flat Major, H I:99
|                     | Symphony in G Major (“Military”), H I:100
|                     | Symphony in D Major (“The Clock”), H I:101
|                     | Symphony in B-flat Major, H I:102
|                     | Symphony in G Major (“Drumroll”), H I:103
| Vivaldi, Antonio    | Concerto in E Major (“La Primavera”), Op. 8, No. 1
|                     | Concerto in G Minor (“L’Estate”), Op. 8, No. 2
|                     | Concerto in F Major (“L’Antonino”), Op. 8, No. 3
|                     | Concerto in F Minor (“L’Inverno”), Op. 8, No. 4
|                     | Concerto in B-flat Major (“La Tempesta di Mare”), Op. 8, No. 5
|                     | Concerto in C Major (“Il Piacer”), Op. 8, No. 6
|                     | Concerto in D Minor, Op. 8, No. 7
|                     | Concerto in G Minor, Op. 8, No. 8
|                     | Concerto in D Minor, Op. 8, No. 9
|                     | Concerto in B-flat Major (“La Caccia”), Op. 8, No. 10
|                     | Concerto in D Major, Op. 8, No. 11
|                     | Concerto in C Major, Op. 8, No. 12

From MIDI file list

| Beethoven, Ludwig van | Piano Concerto No. 2 in E-flat Major, Op. 19
|                       | Violin Concerto in D Major, Op. 61
|                       | Symphony No. 5 in C Minor, Op. 67
| Haydn, Franz Joseph   | Symphony in D Major, H I:1
|                       | String Quartet in C Major, H III:57
|                       | Symphony in E-flat Major, H I:99
|                       | Symphony in G Major (“Military”), H I:100
|                       | Symphony in D Major (“The Clock”), H I:101
|                       | Symphony in B-flat Major, H I:102
|                       | Symphony in E-flat Major (“Drumroll”), H I:103
|                       | Symphony in B-flat Major, H I:103

Work Information

- [Organizer](organizer@email.com)
- [Title](title)
- [Popular](popular)
- [Scholarly](scholarly)
- [Copyright](copyright)
- [Stamp](stamp)
- [License](license)
- [Thesaurus](thesaurus)
- [Thesaurus Link](thesaurus_link)
- [Copyright Information](copyright_info)

Musical Data

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</tbody>
</table>

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23
MuseData uses

- Performing editions
- Study scores (see Dover Publications)
- Experimental psychology (Krumhansl, Palmer)
- Data modeling (MusicXML)
- Data interchange
- Source comparison (musicology)
Comparison of sources: Corelli Sonata Op. 5, No. 1
Alternative readings: Vivaldi—Juditha triumphans

Notation for *viola d’amore* (retunable)

1.15 Aria: Quanto magis generosa
Viola d’amore (Vivaldi, Juditha)

Brentner: part for viola d’amore with tuning key