

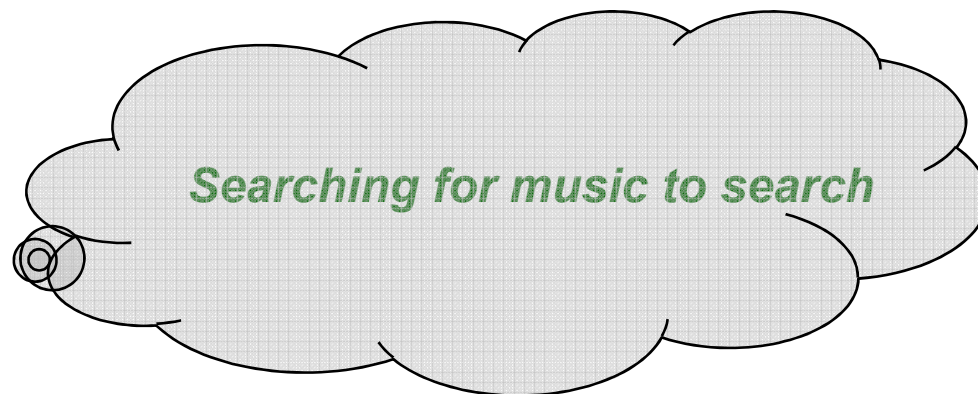
Symbolic Musical Data

ISMIR Tutorial 2008

Eleanor Selfridge-Field and Craig Stuart Sapp

Overview

- ▶ 1. Issues
- ▶ 2. Repositories*
- ▶ 3. Allied Topics
- ▶ 4. Summary
- ▶ 5. Uses



1. Issues

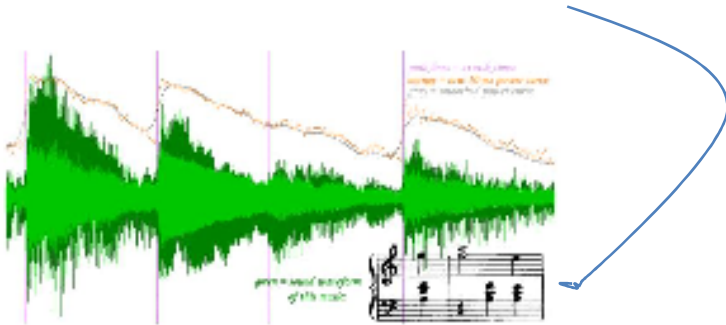
Advantages and Challenges

Major advantages of symbolic data

- ▶ (1) Data is discreet (events isolated)
- ▶ (2) Data is humanly readable
- ▶ (3) Data representation is explicit
- ▶ (4) Data is parsable

Major advantages of symbolic data

- ▶ (I) Data is **discreet** (events isolated)



- ▶ Data is humanly readable
- ▶ Data representation is explicit
- ▶ Data is parsable

Major advantages of symbolic data

- ▶ Data is discreet (events isolated)
- ▶ (2) Data is **humanly readable**

Stephen Foster: “Old Folks at Home”

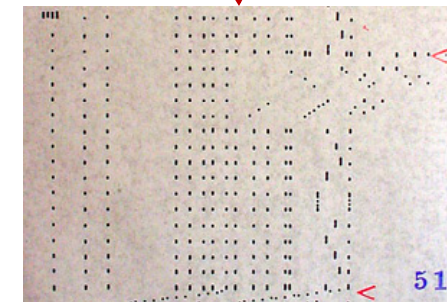
3__2|32|1_8_68_|5__3_1_|2____|

- ▶ Data representation is explicit
- ▶ Data is parsable

Major advantages of symbolic data

- ▶ Data is discreet (events isolated)
- ▶ Data is humanly readable
- ▶ (3) Data representation is **explicit**

C	D	E	F	G	A	B	Rest	
••	••	••	••	••	••	••	••	Wholes or 16ths
••	••	••	••	••	••	••	••	Halves or 32nds
••	••	••	••	••	••	••	••	Quarters or 64ths
••	••	••	••	••	••	••	••	8ths or 128ths



- ▶ Data is parsable

Major advantages of symbolic data

- ▶ Data is discreet (events isolated)
- ▶ Data is humanly readable
- ▶ Data representation is explicit
- ▶ (4) Data is **parsable**

FORWARD GAILY TOGETHER.
 CHORAL MARCH FOR S.A.T.B.
 (Printed by kind permission of Messrs. J. Curwen and Sons.)

WORDS AND MUSIC BY S. McBURNEY, MUS. DOC.
 (Fellow of the Tonic Sol-fa College.)

Do is A. Twelve measures Instrumental. \times

Bass.

1. For-ward gai-ly to- geth- er, Let us hail the fes- tive day,
 2. Hap- py homesteads sur- round us, In peace-ful ver- dure ar- rayed,
 Let us hail the fes- tive, fes- tive day,
 In peace-ful ver- dure ar- rayed, ar- rayed,

Na- ture smil- ing a- round us, Bids us cast dull care a- way,
 Beau- ty beams in the sun- shine That be- decks each ver- dant blade,

Friends are wait- ing be- fore us, With a wel- come soon to be ours, And our
 Glad- ly na- ture re- joi- ces In the bright- ness born of the day, And a
 hearts are light as our foot- steps Treas- ding quick- ly o'er the flowers.

thou- sand cheer- ful voi- ces Give a wel- come on our way.

Staff Notation in CURWEN'S CHORAL HANDBOOK, No. 233, price 2d.
 (32)

Tonic sol-fa "notation"

Major issues in symbolic data

- ▶ (1) How **complete** is the data representation?
- ▶ (2) How **accurate** is the data?
- ▶ (3) Will the data format be **maintained** over the long-term?
- ▶ (4) **How much** data is available?
- ▶ (5) What are the **terms of use**?
- ▶ (6) Is the format **widely used**?
- ▶ (7) Is the format openly (and well) **documented**?

Major issues in symbolic data

- ▶ (I) How **complete** is the data representation?

Stephen Foster: “Old Folks at Home”

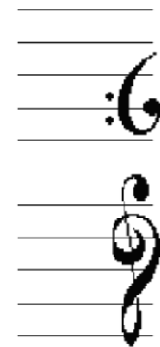


3__2|32|1_8_68_.|5__3_1_|2_____|

C E DCED|C C AC |G E C |D |

- ▶ How accurate is the data?
- ▶ Will the data format be maintained?
- ▶ How much data is available?
- ▶ What are the terms of use?
- ▶ Is the format widely used?
- ▶ Is the format openly (and well) documented?

MIDI number	Note name	Keyboard	Frequency
21	A0		27.500
22	B0		30.868
23	C1		32.703
24	D1		36.708
25	E1		41.203
26	F1		43.654
27	G1		46.999
28	A1		48.999
29	B1		55.000
30	C2		61.735
31	D2		65.406
32	E2		73.416
33	F2		77.782
34	G2		82.407
35	A2		87.307
36	B2		97.999
37	C3		99.999
38	D3		110.00
39	E3		103.83
40	F3		123.47
41	G3		130.81
42	A3		146.83
43	B3		164.81
44	C4		174.61
45	D4		196.00
46	E4		207.65
47	F4		246.94
48	G4		261.63
49	A4		293.67
50	B4		309.63
51	C5		349.23
52	D5		392.00
53	E5		440.00
54	F5		493.88
55	G5		523.25
56	A5		587.33
57	B5		659.26
58	C6		698.46
59	D6		783.99
60	E6		880.00
61	F6		987.77
62	G6		1046.5
63	A6		1174.7
64	B6		1318.5
65	C7		1396.9
66	D7		1568.0
67	E7		1760.0
68	F7		1975.5
69	G7		2093.0
70	A7		2349.3
71	B7		2637.0
72	C8		2793.0
73	D8		3136.0
74	E8		3520.0
75	F8		3951.1
76	G8		4186.0
77	A8		
78	B8		
79	C9		
80	D9		
81	E9		
82	F9		
83	G9		
84	A9		
85	B9		
86	C10		
87	D10		
88	E10		
89	F10		
90	G10		
91	A10		
92	B10		
93	C11		
94	D11		
95	E11		
96	F11		
97	G11		
98	A11		
99	B11		
100	C12		
101	D12		
102	E12		
103	F12		
104	G12		
105	A12		
106	B12		
107	C13		
108	D13		



Major issues in symbolic data

- ▶ How complete is the data representation?
- ▶ (2) How **accurate** is the data?
 - ▶ Is the **underlying source** identified?
 - ▶ Is **metadata** adequate?
 - ▶ Is the file **dated**?
 - ▶ Are **data format** and OS clearly identified?
 - ▶ Has symbol data been **verified** by eye? By ear?
- ▶ Will the data format be maintained over the long-term?
- ▶ How much data is available?
- ▶ What are the terms of use?
- ▶ Is the format widely used?
- ▶ Is the format openly (and well) documented?

Major issues in symbolic data

- ▶ How complete is the data representation?
- ▶ How accurate is the data?
- ▶ (3) Will the data format **be maintained** over the long-term?
 - ▶ Archival formats
 - ▶ Openly documented
 - ▶ Altered only incrementally and infrequently
 - ▶ Commercial formats
 - ▶ Not openly documented
 - ▶ Altered (or re-wrapped) frequently
- ▶ How much data is available?
- ▶ What are the terms of use?
- ▶ Is the format widely used?
- ▶ Is the format openly (and well) documented?

Major issues in symbolic data

- ▶ How complete is the data representation?
- ▶ How accurate is the data?
- ▶ Will the data format be maintained over the long-term?
- ▶ (4) **How much data** is available?
 - ▶ **Verbose** vs **compact** codes (KB, MB, TB, no. of files, etc.)
 - ▶ Numbers of **titles**, of **movements**, of **events**, of **notes**
- ▶ What are the terms of use?
- ▶ Is the format widely used?
- ▶ Is the format openly (and well) documented?

Major issues in symbolic data

- ▶ How complete is the data representation?
- ▶ How accurate is the data?
- ▶ Will the data format be maintained over the long-term?
- ▶ How much data is available?
- ▶ (5) What are the **terms of use**?
 - ▶ Can end-user **modify** the data?
 - ▶ Can end-user **redistribute** the data?
 - ▶ Can end-user **share** the data with collaborators?
- ▶ Is the format widely used?
- ▶ Is the format openly (and well) documented?

Copyright and other legal protections

Print copyright

- ▶ U.S.
 - ▶ Uniform (sort of)
- ▶ Europe
 - ▶ Varies by country

Recording copyright

- ▶ U.S.
 - ▶ Varies by state
- ▶ Europe
 - ▶ Varies by country

“Big Content”



Popular vs. classical

Copyright and other legal protections

Print copyright

- ▶ U.S.
 - ▶ Uniform (sort of)
- ▶ Europe
 - ▶ Varies by country

Other protections:

Derivative works issues

Recording copyright

- ▶ U.S.
 - ▶ Varies by state
- ▶ Europe
 - ▶ Varies by country

Other protections:

UK: graphical image copyright

Europe: cultural property protections

Major issues in symbolic data

- ▶ How complete is the data representation?
- ▶ How accurate is the data?
- ▶ Will the data format be maintained over the long-term?
- ▶ How much data is available?
- ▶ What are the terms of use?
- ▶ (6) Is the format **widely used**?
 - ▶ Double-edged question
- ▶ Is the format openly (and well) documented?

Major issues in symbolic data

- ▶ How complete is the data representation?
- ▶ How accurate is the data?
- ▶ Will the data format be maintained over the long-term?
- ▶ How much data is available?
- ▶ What are the terms of use?
- ▶ Is the format widely used?
- ▶ (7) Is the format openly (and well) **documented**?

Generally **not an issue** with non-commercial data

Summary of Issues

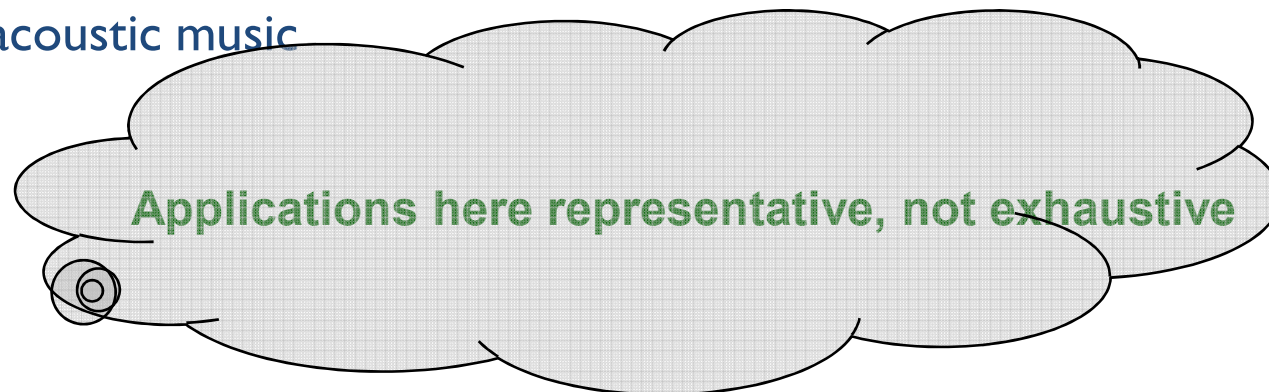
- ▶ How **complete** is the data representation?
- ▶ How **accurate** is the data?
- ▶ Will the data format be **maintained**?
- ▶ **How much data** is available?
- ▶ What are the **terms of use**?
- ▶ Is the format **widely used**?
- ▶ Is the format openly (and well) **documented**?

2. Repositories

Purposes and Means

Symbolic Data =

- ▶ Data for **notation**
- ▶ Data for **musical analysis**
- ▶ Data used in **layered applications**
 - ▶ Pedagogy
 - ▶ Analytical markup
 - ▶ Music perception
 - ▶ Music cognition
 - ▶ Electro-acoustic music



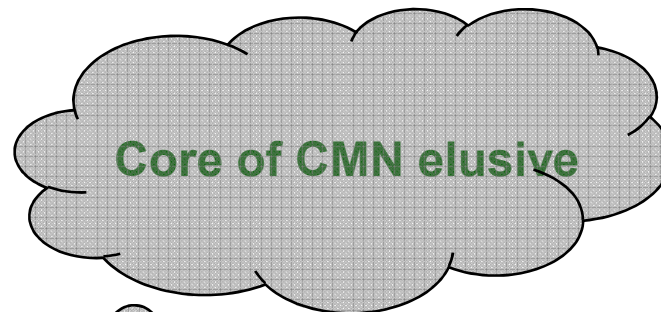
Preface: Common Music Notation (CMN) (or music from Common Practice Period)

Assumptions

- ▶ Large body of classical and popular music
- ▶ No market for special notation
- ▶ Can't accommodate
 - ▶ non-Western music
 - ▶ Early music
 - ▶ Recent music

...and (but)....

- ▶ _____ confined to limited symbolic sets
- ▶ _____ only affects a few small repertoires
- ▶ _____ not important because there is **so much** in the core repertoires



Writing systems outside CMN



solfege doh ra re ma mi fa fi soh si la ta ti doh¹

Staff Notation

Hindi sarega स रे रे ग ग स स प प नि नि सं

Roman sarega SA re RE ga GA MA ma PA dha DHA ni NI SA

A collection of various musical notations including rhythmic symbols, staff notations, and symbols for accidentals and dynamics.

A grid of guitar chord diagrams for various chords including A, C, D, E, F, G, A7, B7, C7, D7, E7, F7, G7, Am, Bm, Dm, Em, and Fm.

Musical notation for a drum set including Cymbal (C), Snare (S), Bass (B), and Hi-Hat (H).

Handwritten musical manuscript with lyrics and musical notation.

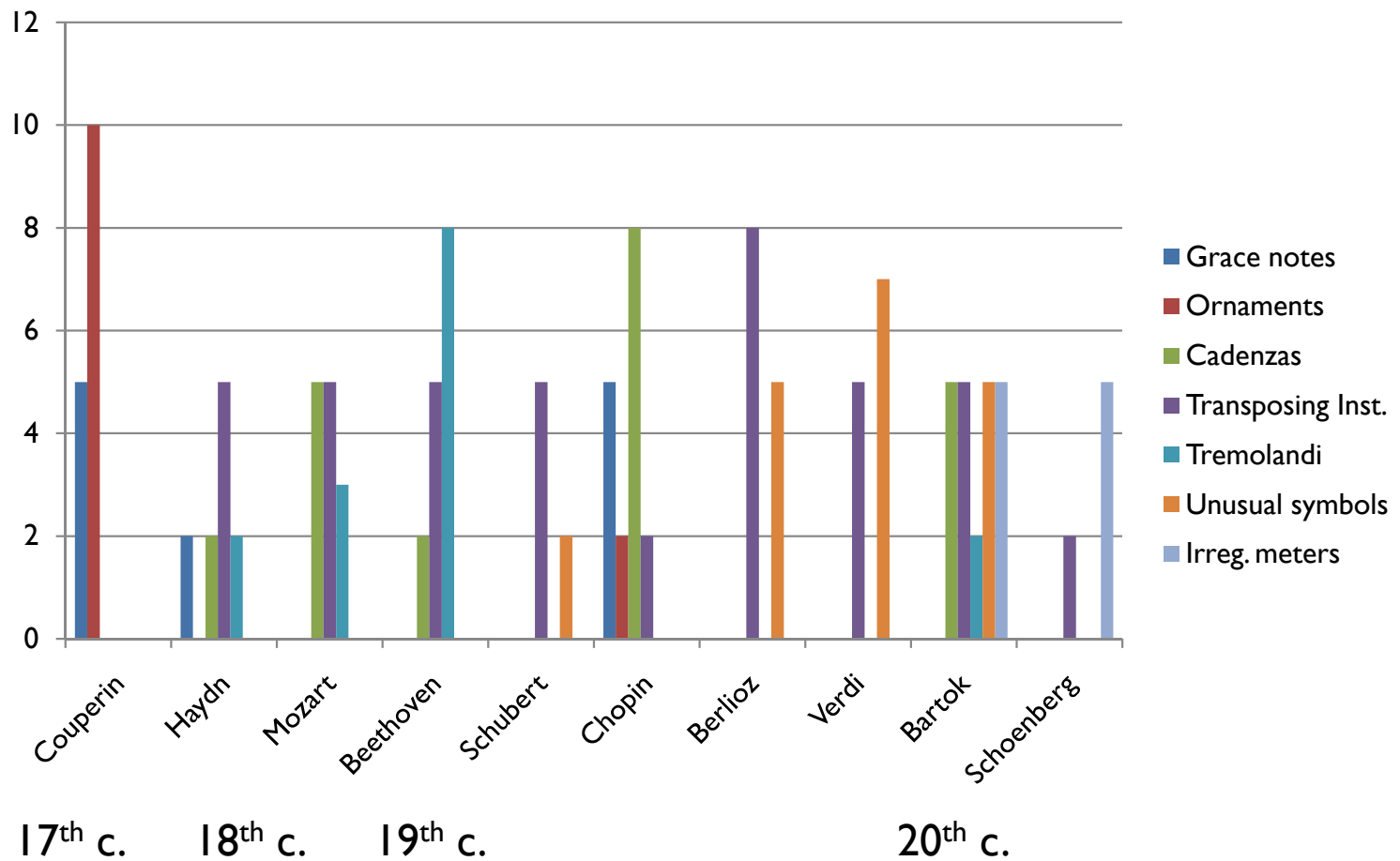
Handwritten musical manuscript for a piano piece.

Musical score for "I was a lover and his life, With a hope with a toward a day" with lyrics.

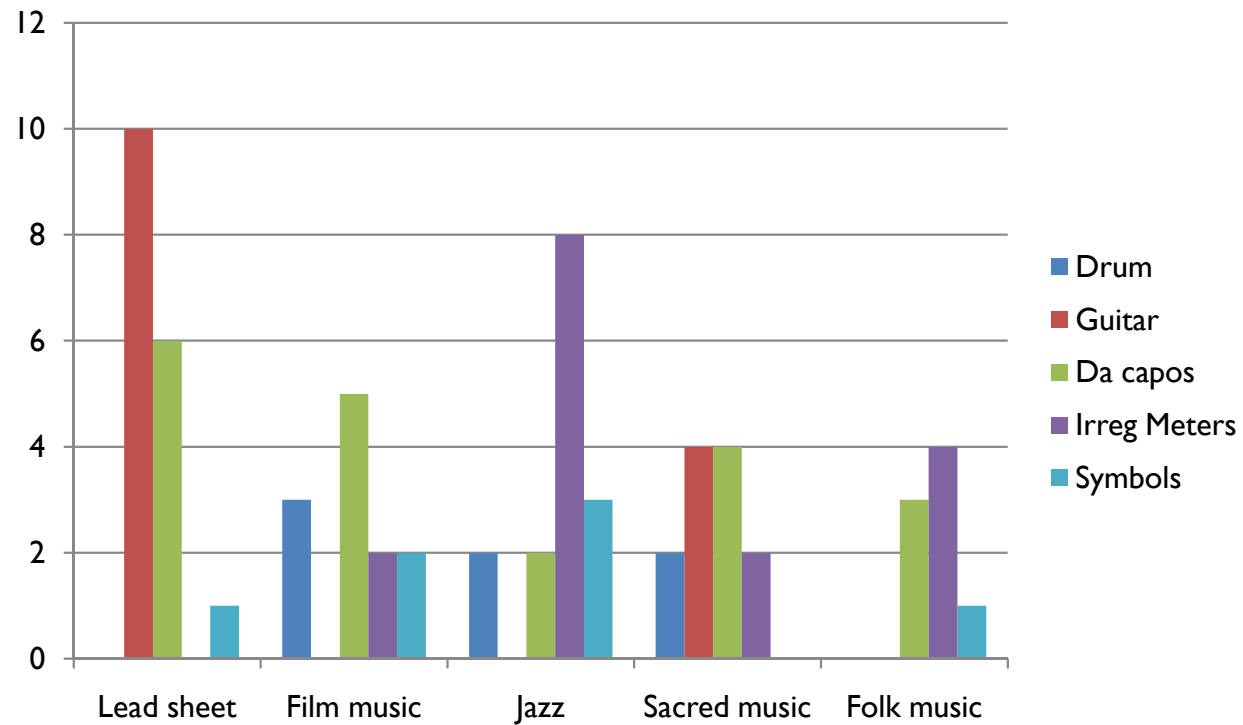
Musical score for "Gibert Lightfoot" with lyrics.

A digital score visualization showing multiple staves with colored notes and stems.

Writing systems inside CMN?



Inside Common Western Notation?



Repository Types

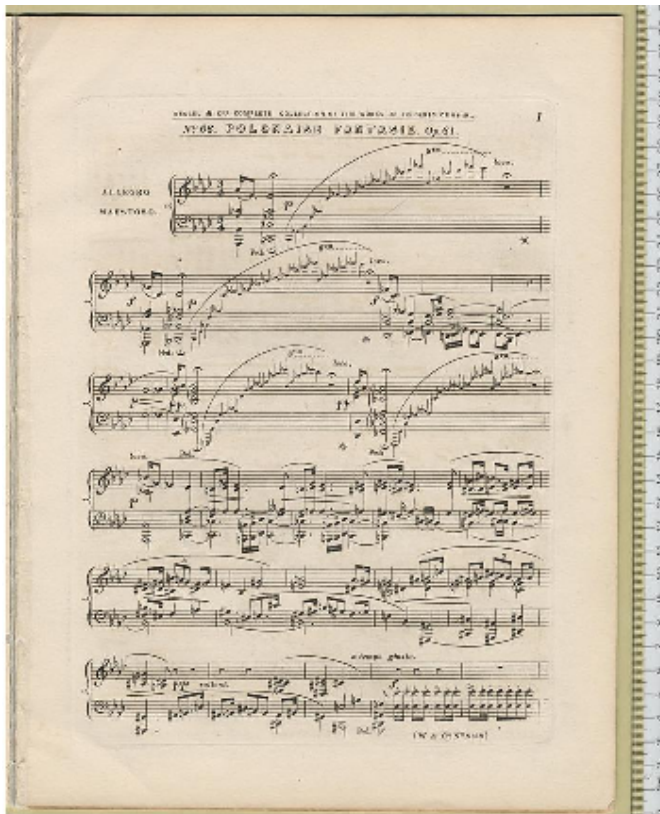
- ▶ (1) Image archives
- ▶ (2) Edition-based archives
- ▶ (3) Musical-data archives
- ▶ (4) Music-bibliographical archives
- ▶ (5) Collection-based archives
- ▶ (6) Cultural-heritage archives
- ▶ (7) Collaborative projects

Repository Types

- ▶ (I) **Image archives**
 - ▶ Images only
 - ▶ Enhanced image
 - ▶ Images with extensive metadata
 - ▶ Images with stored symbolic data
- ▶ Edition-based archives
- ▶ Musical data archives
- ▶ Music-bibliography archives
- ▶ Collection-based archives
- ▶ Cultural-heritage archives
- ▶ Collaborative projects

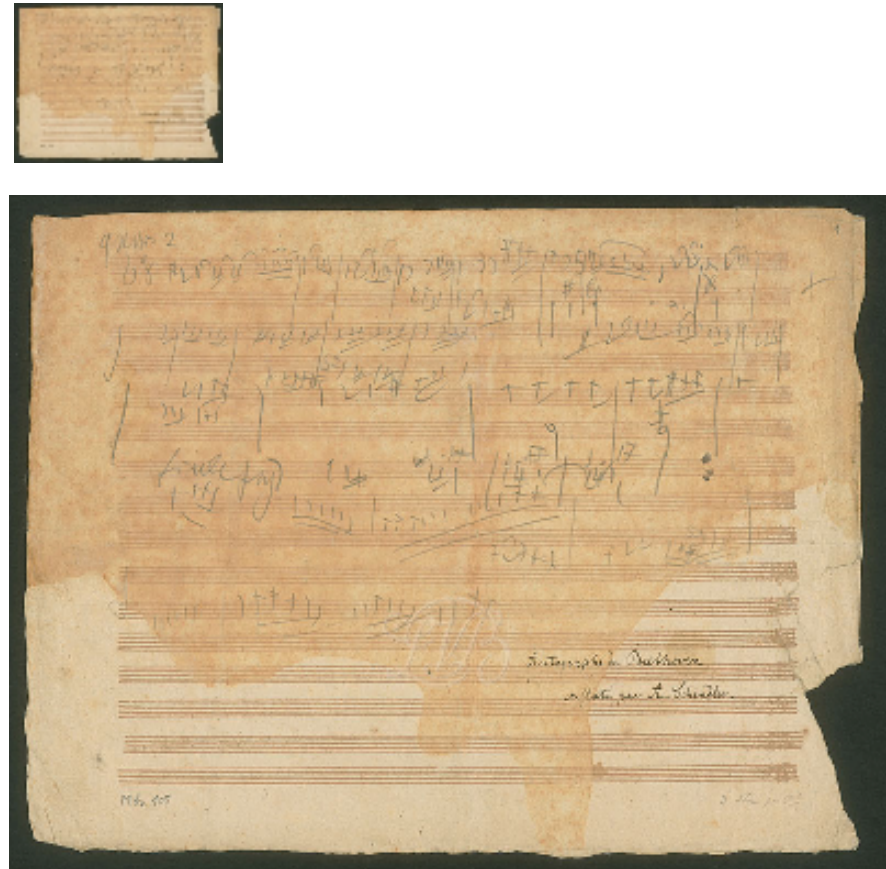
Images only

(a) U. of Chicago Library,
Chopin Op. 61



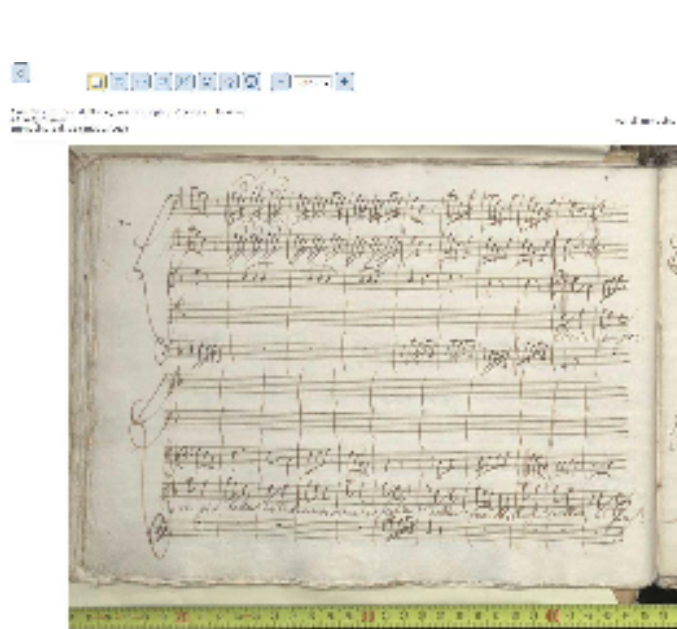
[View this image online](#)

(b) Beethoven-Haus, Bonn
Op. 132, sketch

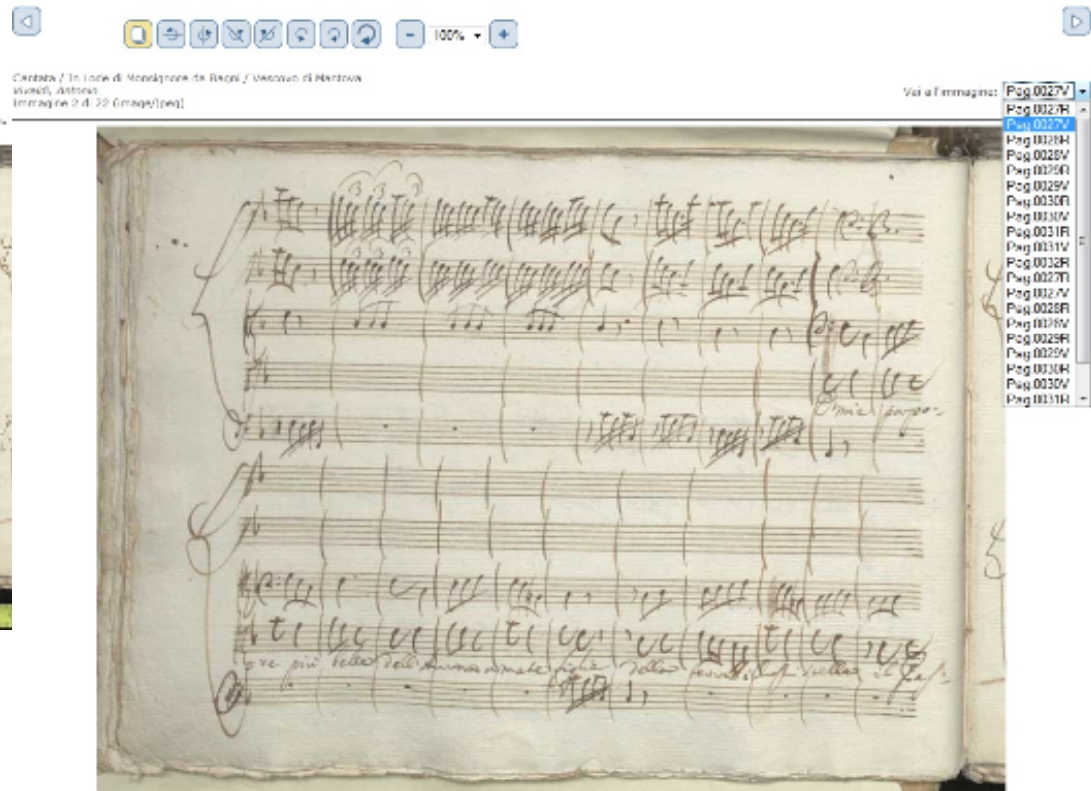


Turin National Library

Vivaldi Cantata (Lo-res)



Vivaldi cantata,(Hi-res)



University of North Texas: Virtual Rare-Book Music Room

- About 100 scan collections for long works, mainly operas, 17-19th centuries
- High-quality images suitable for research



British Library, Music Division



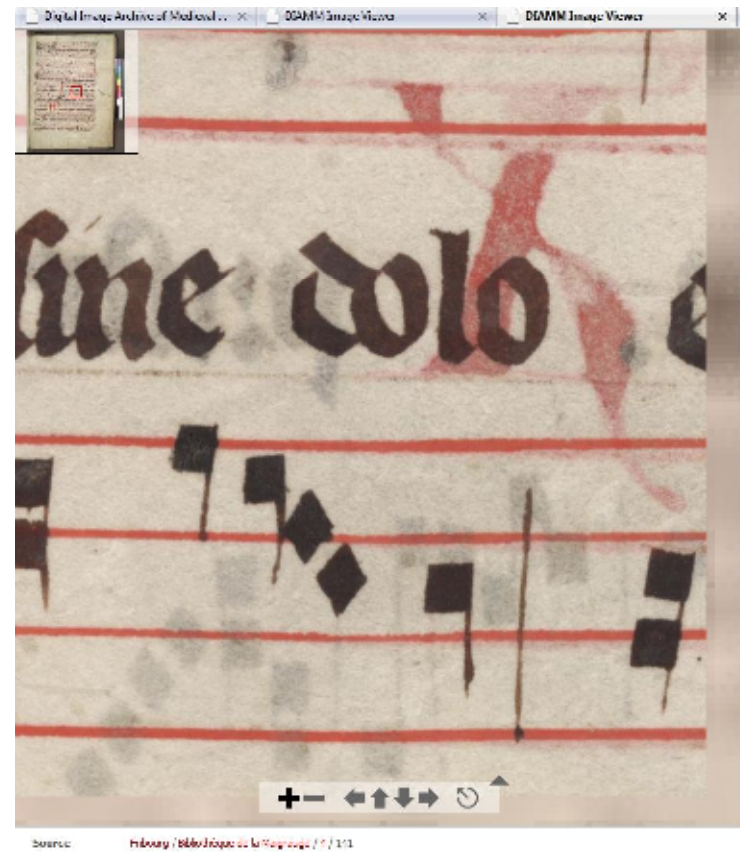
Purcell |
← Handel
W. F. Bach →

Enhanced images

Digital Image Archive of Medieval Music (DIAMM)

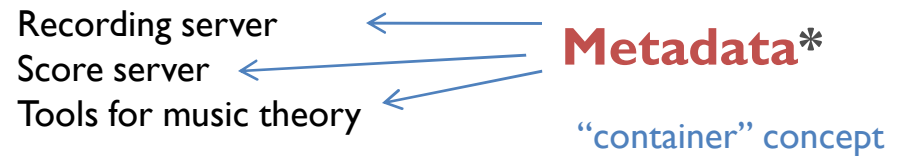
DIAMM

Magnification*



Images with extensive metadata

Variations 3 (Indiana U.): Brahms's Academic Fest. Ov.



ACADEMIC FESTIVAL
 Overture
 Johannes Brahms
 Op. 80 (Academische Festouvertüre) 1833-1897

Instrument list:
 1 Flute
 2 Flutes
 2 Oboes
 2 Clarinets in Bb
 2 Bassoons
 4 Horns in F
 3 Trumpets in C
 3 Trombones
 1 Tuba
 1 Snare Drum
 1 Cymbal
 1 Triangle
 1 Bass Drum
 1 Timpani
 10 Violins I
 10 Violins II
 8 Violas
 8 Cellos
 4 Double Basses

LIBRARIES
 IU CAT
 Indiana University's Online Library Catalog

Academic Festival, Overture, op. 80
 Brahms, Johannes 1833-1897
 Author/Composer, and Performer(s): Brahms, Johannes 1833-1897
 Published/Produced: New York: G. Schirmer, 1902
 Includes: Academic Festival Overture.

Holdings	Location
Bligh - Music Library (1) 181963	(1) Bligh Music
MLC 1201	(2) Chedokey - Bligh 9012001
	(2) Chedokey - Bligh 9012001
	(4) Bligh Music
	(2) Bligh Music
	(2) Bligh Music

FRBR

Images with (some) stored symbolic data

Levy (Civil War) Sheet Music
Coll., Johns Hopkins U.*

Bavarian State Library,
Munich (Vifamusik Project)*



Guido Music Notation



Several parallel formats

Repository Types

- ▶ Image archives
- ▶ **Edition-based archives**
 - ▶ Replication of printed edition with critical notes
 - ▶ Electronic edition
 - ▶ Electronic apparatus for created new printed/virtual edition
 - ▶ Viewable edition with sound playback
- ▶ Musical data archives
- ▶ Music-bibliography archives
- ▶ Collection-based archives
- ▶ Cultural-heritage archives
- ▶ Collaborative projects

Digital replication of printed editions

Neue Mozart Ausgabe

The screenshot shows the homepage of the Neue Mozart Ausgabe (NMA) website. At the top, there is a red navigation bar with the text "INTERNATIONALE GIETTING MOZARTEUM" and "ÜBERSICHT NMA-PUBLIKATIONEN". Below this, there is a search bar with "KV" and "Suchwort" fields. A dropdown menu for "Geltung" is set to "Werkzeuge ausblenden". There are also buttons for "Kontakt", "Herausgeber", and "Herausgeber ausblenden". A section titled "Suchen nach:" contains radio buttons for "NMA-Zählung" (selected) and "Fremdnummern". A "Neue Ausgabe" button with a question mark icon is visible. Below the search area, a list of "ausgewählte Serien: 117" is shown, including Serie I: Geistliche Gesangswerke, Serie II: Bühnenwerke, Serie III: Lieder, mehrstimmige Gesänge und Kanons, Serie IV: Orchesterwerke, Serie V: Konzerte, Serie VI: Kirchensonaten, Serie VII: Ensemblesmusik für größere Solo-Besetzungen, Serie VIII: Kammermusik, Serie IX: Klaviermusik, and Serie X: Supplement. At the bottom, it states "INTERNATIONAL MOZART EDITION" and "A Project of the Internationale Stiftung Mozarteum and The Packard Humanities Institute".

Salzburg Mozarteum

The image displays a page of musical notation for "VAR. VII". It features three systems of music, each with a treble and bass staff. The notation includes various musical symbols such as notes, rests, and dynamic markings like "p" (piano) and "f" (forte). The score is presented in a clean, digital format.

Internationale Stiftung Mozarteum, Online Publications (2006)

Electronic apparatus for new editions

EDIROM Project, U. Detmold:
CM v. Weber



EDIROM Project, Prague:
Dvorak Edition

Überblick – Startbildschirm

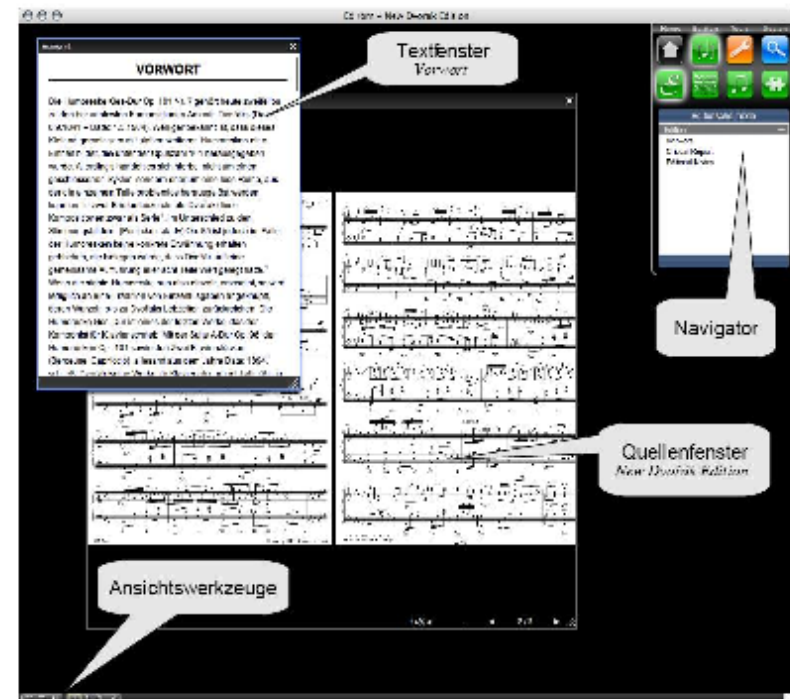


Abbildung 1: Startseite der Edition

“Born digital” editions

Web Library of Seventeenth-Century Music (Duke U.)

Werner Icking Music Library

Dialogo: Mergellina e Zefiro, of Marius-Louise Calsalia, January 1908

p. 1

Dialogo: Mergellina e Zefiro per canto e alto con violini

1. Introduzione e Ballata

Introduzione, Andante Allargando

Violini
Violini
[Cello/Basso]

© Marius-Louise Calsalia

Largo

Introduction, critical notes, editorial indications

11
32
26
27

© Johan Tirkkoonen

Non-commercial copying welcome
<https://www.kyotodai.ac.jp/~vidson/sonata/mariniop8>

Revised: 1.10

Marini: Sonata variata from Op. 8 (1629)

Repository Types

- ▶ Image archives
- ▶ Edition-based archives
- ▶ **Musical data archives**
 - ▶ For teaching
 - ▶ For performance
 - ▶ For research
- ▶ Music-bibliography archives
- ▶ Collection-based archives
- ▶ Cultural-heritage archives
- ▶ Collaborative projects

Viewable edition with sound playback

Variations 3 (teaching)

ACADEMIC FESTIVAL
Overture
Op. 81 (Academische Festouvertüre) Johannes Brahms 1833-1897

Allegro.

Flute I & II
2 Clarinet in Bb
2 Bassoon
2 Horn in F
3 Trumpet in C
3 Trombone in C
Horn in F
2 Violin I
2 Violin II
Viola
Cello
Double Bass

Also indirectly ...

- ▶ Choral Public Domain Library
- ▶ Werner Icking Music Library

Data Archives for Performers (Collaborative Projects)

Choral Public Domain Library (CPDL)

- ▶ **Formats**
 - ▶ Finale
 - ▶ Sibelius
 - ▶ MIDI
 - ▶ PDF (Finale, Sibelius), *.ps
 - ▶ MUP
- ▶ **Features**
 - ▶ Wiki format
 - ▶ Text translations (> 3,000)
 - ▶ >9700 pp.
 - ▶ Score and composer catalogs

Werner Icking Music Archive (WIMA)

- ▶ **Formats**
 - ▶ MusiXTeX (*.ps)
 - ▶ Finale
 - ▶ PDF (Finale, capella)
 - ▶ mp3
- ▶ **Features:**
 - ▶ Almost 500 composers
 - ▶ Apparatus for revisions
 - ▶ Identification of sw versions
 - ▶ Performing parts

Data archives for performers

Werner Icking Archive (WIMA)

Canzon Vigesimaseconda, à 5.
(Canzon per Sonora con una voce di tromba, Libro Primo, Theoria, A. Bonetij, 1588)

Basian (Chilise)
(1493)

Soprano (S)
Alto (A)
Tenore (T)
Basso (B)
Organo (O)

Canzon Vigesimaseconda, à 5.
(Canzon per Sonora con una voce di tromba, Libro Primo, Theoria, A. Bonetij, 1588)

Basian (Chilise)
(1493)

Soprano (S)
Alto (A)
Tenore (T)
Basso (B)
Organo (O)

Choral Public Domain Library (CPDL)

Tanto è ver che neo verno
Maligòc

Antonio Lalli (1657-1700)

Soprano (S)
Alto (A)
Tenore (T)

Data archives for research

MuseData

- ▶ c. 1,200 encoded full scores
- ▶ Repertories:
 - ▶ 17-19th centuries
 - ▶ Mainly orchestra, chamber, opera, oratorio
- ▶ File types
 - ▶ Raw MuseData (edited and verified)
 - ▶ Kern
 - ▶ MIDI (two versions)
 - ▶ SCORE
 - ▶ PDF

KernScores

- ▶ c. 1,000 encoded full scores
- ▶ Repertories:
 - ▶ 15th-early 20th centuries
 - ▶ Mainly keyboard
- ▶ File types
 - ▶ Kern
 - ▶ MIDI
 - ▶ PDF
 - ▶ On-the-fly
 - ▶ Guido Music Notation
 - ▶ Piano-roll files
 - ▶ Keyscapes (graphical harmonic analysis)

Data archives for research: MuseData

Symphony No. 5

I
Allegro con brio. (♩ = 108)

Flute 1, 2
Flute 3, 4
Clarinet 1, 2 in Bb
Bassoon 1, 2
Oboe 1, 2 in Eb
Trombone 1, 2 in C
Trumpet in C, G
Piano I
Piano II
Viola
Violoncello
Contrabbasso

© 2008 Eleanor Selfridge-Field
Department of Music and Musicology
© 2008 Center for Computer-Assisted Research in the Humanities (CCARH)

page 2
7 Aug 2008

▶ Main strength

▶ Multi-format consistency:

- ▶ data content matches **across formats**
- ▶ data content matches **between score and parts**

▶ Repertories with PDFs

- ▶ Bach, J.S.: WTC I, II; Chorales
- ▶ Beethoven: 6 symphonies
- ▶ Haydn: 12 symphonies
- ▶ Vivaldi: 12 concertos

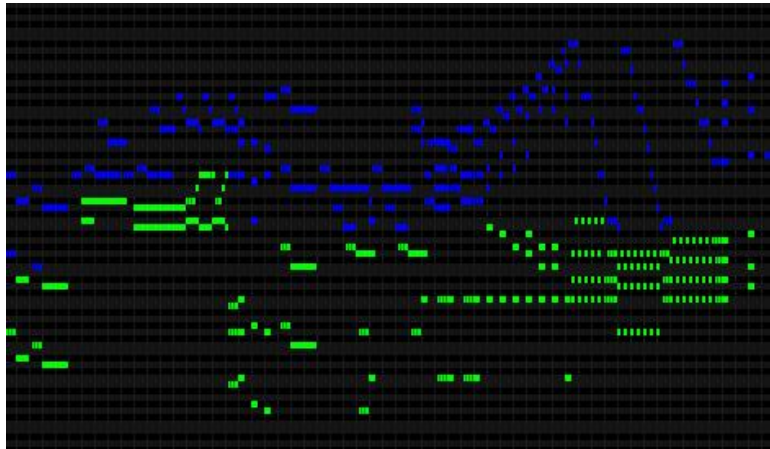
When consistency matters

Data archives for research: KernScores*

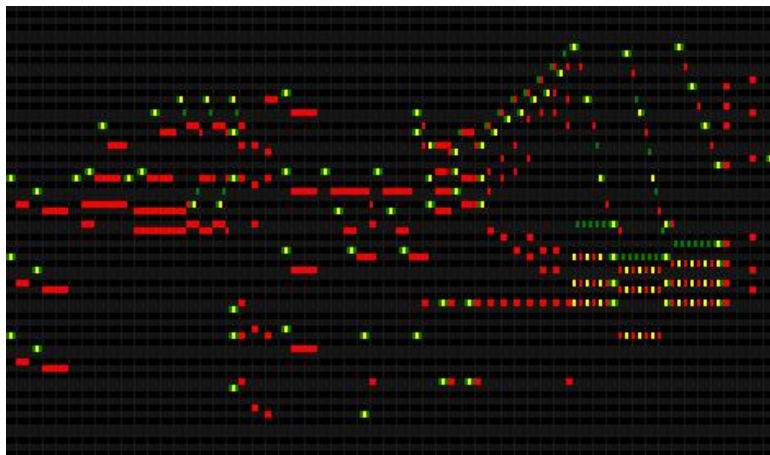
Beethoven's Fifth Symphony (beginning)

Kern: piano rolls

Green = left hand



Red = downbeat



- (a) By pitch and duration
- (b) By metrical accent

Kern: visual harmonic analyses

Seeing



Hearing



- (a) Without repeats; (b) with repeats

Repository Types

- ▶ Image archives
- ▶ Edition-based archives
- ▶ Musical data archives
- ▶ **Music-bibliography archives**
 - ▶ For metadata
 - ▶ For cross-reference
- ▶ Collection-based archives
- ▶ Cultural-heritage archives
- ▶ Collaborative projects

Music-bibliographical repositories

RISM (Rép. Int. des Sources Musicales)

- ▶ Audiences
 - ▶ librarians
 - ▶ researchers
- ▶ Purposes
 - ▶ Manuscript inventory
 - ▶ Musical concordances
- ▶ Contents
 - ▶ Metadata
 - ▶ Musical code

Themefinder (CCARH)

- ▶ Audiences
 - ▶ Search researchers
 - ▶ Music librarians
 - ▶ A few analysts, psychologists
- ▶ Purposes
 - ▶ Study of search methods
 - ▶ Study of query constructions

RISM Interface Dialects

RISM-UK

Advanced search

Show results that meet at least 1 of the following conditions

Composer - [contains the word(s)] [Contains]
 Title - [contains the word(s)] []
 Incipit - [contains the word(s)] []
 Liturgical feast - [contains the word(s)] []
 Manuscript - [] []

Quick help for music Incipit (tune) searches:

Click 'Add incipit search' and enter at least 7 notes in any key. No rhythms are needed.

Diases = A to C (in upper case)

Crises (ages)

middle C to B above = C to B
 one octave higher = C to B
 two octaves higher = C to B
 one octave lower = C to B
 two octaves lower = C to B

Sharp = #
 Flat = b

Type sharp and flat signs before EVERY instance of a sharped or flattened note.

RISM-CH

Search

- Tritone (ecclesiastical)
- and tone (hypodorian)
- Dorian (phrygian)
- 4th tone (hyperphrygian)

Autograph
 Probably autograph
 Manuscript or part with autograph entries
 No autograph manuscript
 Print

More RISM, Themefinder

RISM-Italy

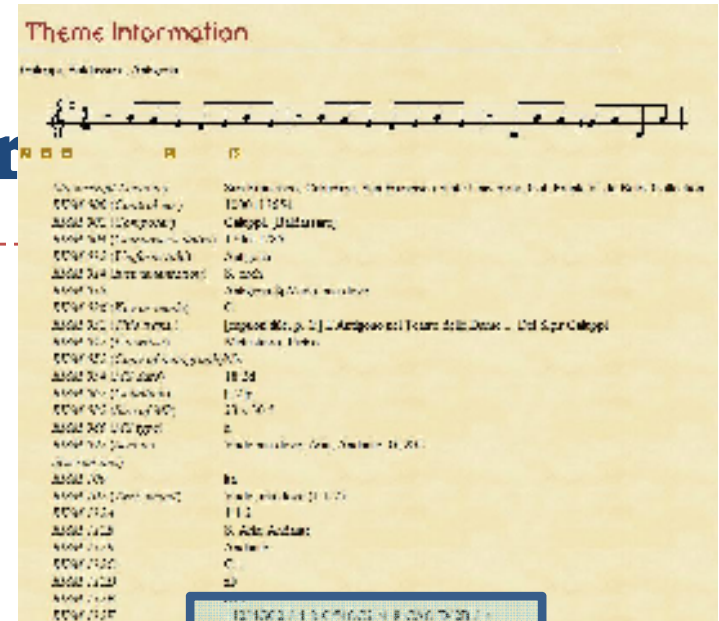
Scheda in formato XML

Scheda: 10/223

Indice in formato Unicode • Indice in formato HTML • Servizio Unimec

Livello bibliografico	Soglio
Tipo di documento	Musica manoscritta
Autore	Marcella, Benedetto (1585?-1619)
Titolo	Cantata a' Voce sola Dell'Ecc.mo/Sig.r Benedetto Marcella nobile /veneto [MANOSCRITTO]
Presentazione	partitura
Publicazione	(Napoli : Copia, 180?)
Descrizione base	cc. 7
Nota uniforme	- Questa Fibra quella che un tempo esser solea - 18/p. - 8, 92
Numero	Segnatura - I-No. 33.3.30@07
Fa parte di	Composizioni vocali profane
Ncm	- [Compositore] Marcella, Benedetto (1585?-1619)
Altri titoli collegati	[Incipit (testuale)] Questa Fibra quella che un tempo esser solea
Componibile	N
Antiche esecuzioni	Cantata 30@07
Progressivo	1 - 1
Incipit letterario	QUELLA FIBRA QUELLA, CHE UN TEMPO ESSER SOLEA
Chiave	c: 1
Abbronzioni	181
Tempo	
Incipit musicale	
Lingua di pubblicazione	ITALIANO
Codice del documento	IT\CCU\PM\00132501420
Localizzazioni	

RISM-US



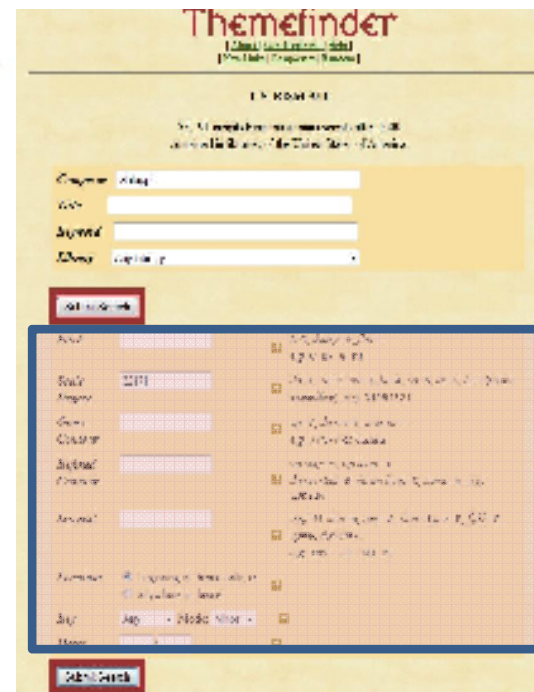
Theme Information

Findings: 1010021130760014804070001

R **I** **F**

- 1010021130760014804070001 Cantata a' Voce sola Dell'Ecc.mo/Sig.r Benedetto Marcella nobile /veneto [MANOSCRITTO]
- 1010021130760014804070002 Cantata a' Voce sola Dell'Ecc.mo/Sig.r Benedetto Marcella nobile /veneto [MANOSCRITTO]
- 1010021130760014804070003 Cantata a' Voce sola Dell'Ecc.mo/Sig.r Benedetto Marcella nobile /veneto [MANOSCRITTO]
- 1010021130760014804070004 Cantata a' Voce sola Dell'Ecc.mo/Sig.r Benedetto Marcella nobile /veneto [MANOSCRITTO]
- 1010021130760014804070005 Cantata a' Voce sola Dell'Ecc.mo/Sig.r Benedetto Marcella nobile /veneto [MANOSCRITTO]
- 1010021130760014804070006 Cantata a' Voce sola Dell'Ecc.mo/Sig.r Benedetto Marcella nobile /veneto [MANOSCRITTO]
- 1010021130760014804070007 Cantata a' Voce sola Dell'Ecc.mo/Sig.r Benedetto Marcella nobile /veneto [MANOSCRITTO]
- 1010021130760014804070008 Cantata a' Voce sola Dell'Ecc.mo/Sig.r Benedetto Marcella nobile /veneto [MANOSCRITTO]
- 1010021130760014804070009 Cantata a' Voce sola Dell'Ecc.mo/Sig.r Benedetto Marcella nobile /veneto [MANOSCRITTO]
- 1010021130760014804070010 Cantata a' Voce sola Dell'Ecc.mo/Sig.r Benedetto Marcella nobile /veneto [MANOSCRITTO]
- 1010021130760014804070011 Cantata a' Voce sola Dell'Ecc.mo/Sig.r Benedetto Marcella nobile /veneto [MANOSCRITTO]
- 1010021130760014804070012 Cantata a' Voce sola Dell'Ecc.mo/Sig.r Benedetto Marcella nobile /veneto [MANOSCRITTO]
- 1010021130760014804070013 Cantata a' Voce sola Dell'Ecc.mo/Sig.r Benedetto Marcella nobile /veneto [MANOSCRITTO]
- 1010021130760014804070014 Cantata a' Voce sola Dell'Ecc.mo/Sig.r Benedetto Marcella nobile /veneto [MANOSCRITTO]
- 1010021130760014804070015 Cantata a' Voce sola Dell'Ecc.mo/Sig.r Benedetto Marcella nobile /veneto [MANOSCRITTO]
- 1010021130760014804070016 Cantata a' Voce sola Dell'Ecc.mo/Sig.r Benedetto Marcella nobile /veneto [MANOSCRITTO]
- 1010021130760014804070017 Cantata a' Voce sola Dell'Ecc.mo/Sig.r Benedetto Marcella nobile /veneto [MANOSCRITTO]
- 1010021130760014804070018 Cantata a' Voce sola Dell'Ecc.mo/Sig.r Benedetto Marcella nobile /veneto [MANOSCRITTO]
- 1010021130760014804070019 Cantata a' Voce sola Dell'Ecc.mo/Sig.r Benedetto Marcella nobile /veneto [MANOSCRITTO]
- 1010021130760014804070020 Cantata a' Voce sola Dell'Ecc.mo/Sig.r Benedetto Marcella nobile /veneto [MANOSCRITTO]

1010021130760014804070001



Themefinder

[Home] [About] [Help]

[Introduzione]

1010021130760014804070001

1010021130760014804070002

1010021130760014804070003

1010021130760014804070004

1010021130760014804070005

1010021130760014804070006

1010021130760014804070007

1010021130760014804070008

1010021130760014804070009

1010021130760014804070010

1010021130760014804070011

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1010021130760014804070014

1010021130760014804070015

1010021130760014804070016

1010021130760014804070017

1010021130760014804070018

1010021130760014804070019

1010021130760014804070020

[Introduzione]

Repository Types

- ▶ Image archives
- ▶ Edition-based archives
- ▶ Musical data archives
- ▶ Music-bibliography archives
- ▶ **Collection-based archives**
- ▶ Cultural-heritage archives
- ▶ Collaborative projects

Bayerische Staatsbibliothek (Vifamusik)*

Edition Reprints: G. F.
Händel (Chrysander)

Early prints and MSS

ACT I.

OVERTURA.

maestriato. *con dignità!*

Violino I.
Violino II.
Viola.
Oboe I. II.
Violoncello,
Basso e Fagotti.
PIANOFORTE.

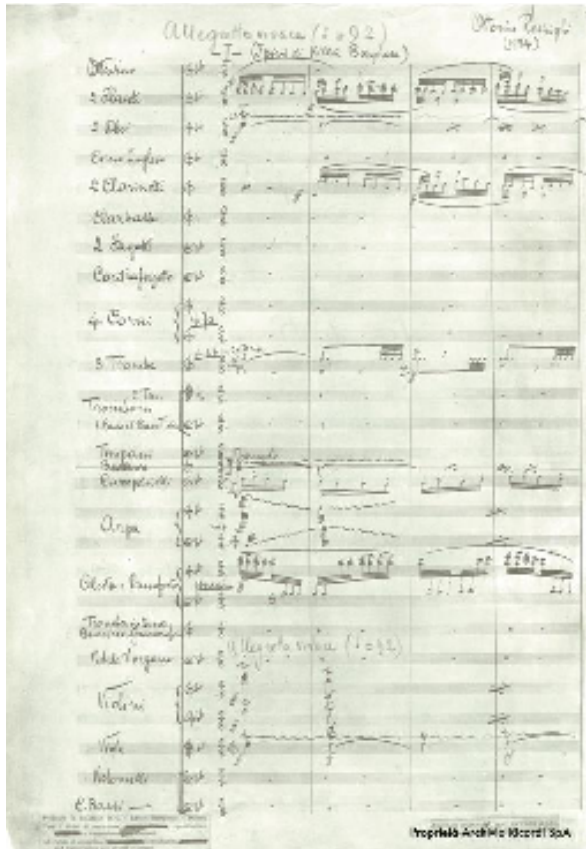
Terzetto.

1. Stimme.
2. Stimme.
3. Stimme.
Larghetto.

Schick ... als Hör-te: Doch dich nicht liebes, du Liebel! Dies heiffe nicht von mir, dies haße
Schick ... als Hör-te: Doch dich nicht liebes, du Liebel! Dies heiffe nicht von mir, dies haße
Schick ... als Hör-te: Doch dich nicht liebes, du Liebel! Dies heiffe nicht von mir, dies haße

Ricordi Archive (Milan)

Respighi: Pines of Rome



Paganini Capriccio



Signed musical score, Paganini, Capricci, 1816.
Click to view full-size image
(2 / 5)



Repository Types

- ▶ Image archives
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- ▶ Musical data archives
- ▶ Music-bibliography archives
- ▶ Collection-based archives
- ▶ **Cultural-heritage archives**
- ▶ Collaborative projects

Cultural Heritage Library of Congress—American Memory

Aaron Copland, 1908-1918

The Aaron Copland Collection, 1950-1990
Includes: 1. Aaron Copland Collection, 1950-1990
2. Aaron Copland Collection, 1950-1990

Item 101

The Aaron Copland Collection, 1950-1990
This collection contains the original manuscript of the score for the opera *Appassionata*.



ITEM TITLE:
Original manuscript of the score for the opera *Appassionata*

ALTERNATE TITLES:
None

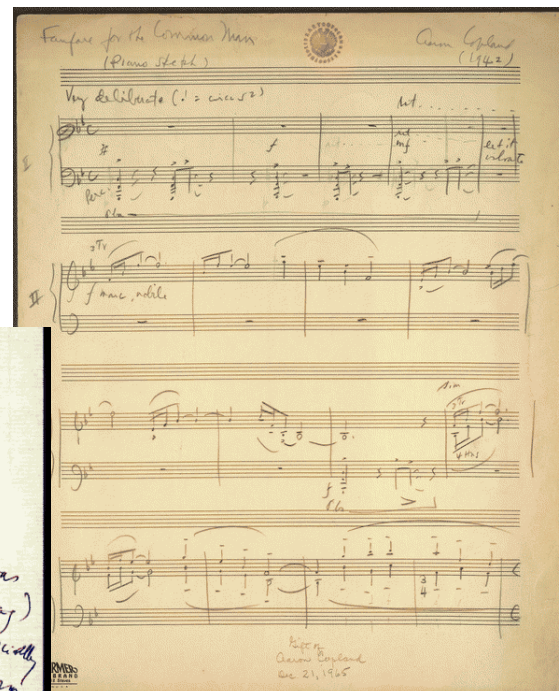
COPYRIGHT:
© 1950-1990 by Aaron Copland

SOURCE:
The original manuscript of the score for the opera *Appassionata* was deposited with the Library of Congress by Aaron Copland in 1990.

IDENTIFYING INFORMATION:
None



Aaron Copland, 1965



Aaron Copland
1942

Fanfare for the Common Man
(Piano Solo)

Very delicatissimo (1 = c.m.s.)

f marc.obile

Ad lib.

rit. cresc.

Aaron Copland
Nov 21, 1965

AARON COPLAND
Rock Hill R. F. D. 1 Peekskill, N. Y. 10566

Dear Ned,

Always such a pleasure to get a birthday greeting from you. When I was in Warsaw last week (conducting) we spoke of you constantly, especially with my aunts. What a charming fellow he is!

I'm sorry my travels didn't bring me to Paris this time, but perhaps next year. In the meantime all my affectionate devotion to you

Aaron

Nov 20 1965

Repository Types

- ▶ Image archives
- ▶ Edition-based archives
- ▶ Musical data archives
- ▶ Music-bibliography archives
- ▶ Collection-based archives
- ▶ Cultural-heritage archives
- ▶ **Collaborative projects**

Collaborative Projects: MIDI-based

(Die) Kunst der Fuge

- ▶ 16,500 classical MIDI files
- ▶ PDF sheet music (<8000 scanned pp from 171 books)
- ▶ Mainly piano, Romantic era, Russian, Bach, anything out of copyright
- ▶ Some quality-of-performance IDs

Classical MIDI Archive

- ▶ >40,000 files by >2,000 composers
- ▶ Multiple performances of some items

Collaborative, non-MIDI projects

Aruspix scanning*

- ▶ Scan (Aruspix) to *Wolfgang*
 - ▶ *Notation software optimized for 16th-17th centuries*
 - ▶ *Projects*
 - ▶ *Geneva University*
 - ▶ *McGill University*
 - ▶ *Marenzio edition*

IMSLP

- ▶ PDF (bit-mapped) archive
- ▶ User-contributed
- ▶ Claim 20,000 PDF scores (many restrictions due to copyright*)
- ▶ c. 1,200 composers
- ▶ Repertory: mainly 19th-century orchestral, Russian and Polish chamber music and songs
- ▶ Operates under Canadian copyright provisions
- ▶ Linked (off-and-on) to Project Gutenberg

Collaborative, non-MIDI

- ▶ Notation-software sharing sites (aided by viewers)
 - ▶ Finale
 - ▶ Sibelius
- ▶ Free-agent sites
 - ▶ Gordon Callon's web sites (Acadia U.)
 - ▶ Baroque
 - ▶ Teaching pieces
 - ▶ Canadian traditional music
 - ▶ Alain Naigeon (France)
 - ▶ Mainly Renaissance


Mutopia

- ▶ OS: Linux
- ▶ Typesetting software: Lilypond
- ▶ Other formats: MIDI, PDF
- ▶ Features
 - ▶ Lulu link
 - ▶ Shows incipits at website

BWV 1006a - Gigue

by J. S. Bach (1685-1750)



Instrument(s): Piano	Style: Baroque
Opus: BWV 1006a	Date of composition: Not known
Source: Bach-Gesellschaft Edition 1879, Part 42	Copyright: Creative Commons Attribution-ShareAlike 3.0 
Last updated: 2008 Jun 17 View changes history	Music ID Number: Mutopia-2008/07/17-1484
Typeset using: Lulu/Lulu version 2.11.49	

Download:	
Lulu/Lulu file	MIDI file
A4 PDF file	Letter PDF file

Maintainer: Wojciech Dzurkowski	Mail: gdj@mutopia.com	http://www.mutopia.de/
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3. Allied Topics

Data interchange and linking

Allied topics

- ▶ Manually encoded repertories
- ▶ Interchange codes and schemes
- ▶ PDF viewer/players
- ▶ Linking symbolic data with audio

Interchange codes

- ▶ XML schemes for music
 - ▶ MusicXML (Recordare)
 - ▶ MusicXML Library (Grame)
 - ▶ Music-Encoding Initiative (MEI)
 - ▶ IEEE I599 (Laboratorio d'Informatica Musicale, Milan U.)
 - ▶ Corpus Mensurabilis Musicarum Electronicum (CMME)
- ▶ Electronic repertories: ChuckK et al. (Stanford)

MusicXML*

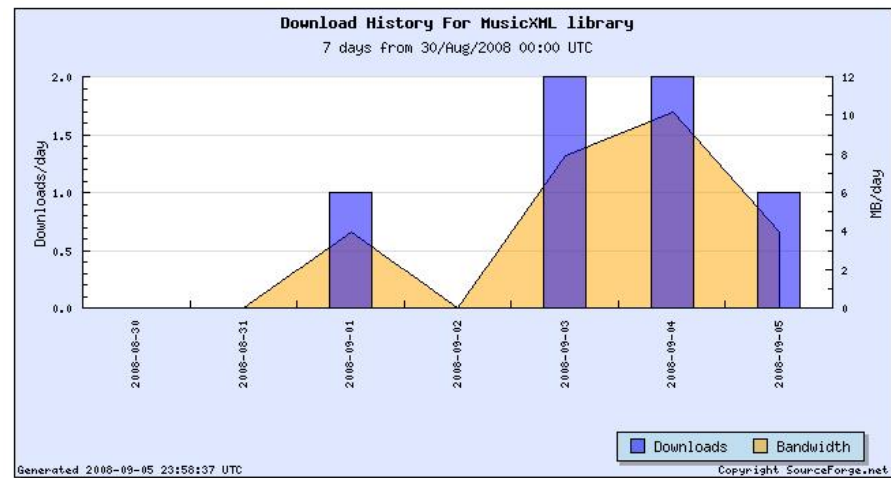
- ▶ Provider
 - ▶ Recordare, LLC
- ▶ (Mainly) commercial code
 - ▶ Finale
 - ▶ Sibelius
 - ▶ PriMus
- ▶ Aims
 - ▶ Archival interchange format
- ▶ Versions
 - ▶ 1=OS specific
 - ▶ 2=Java-based

MusicXML Library (GRAME)

Sourceforge.net

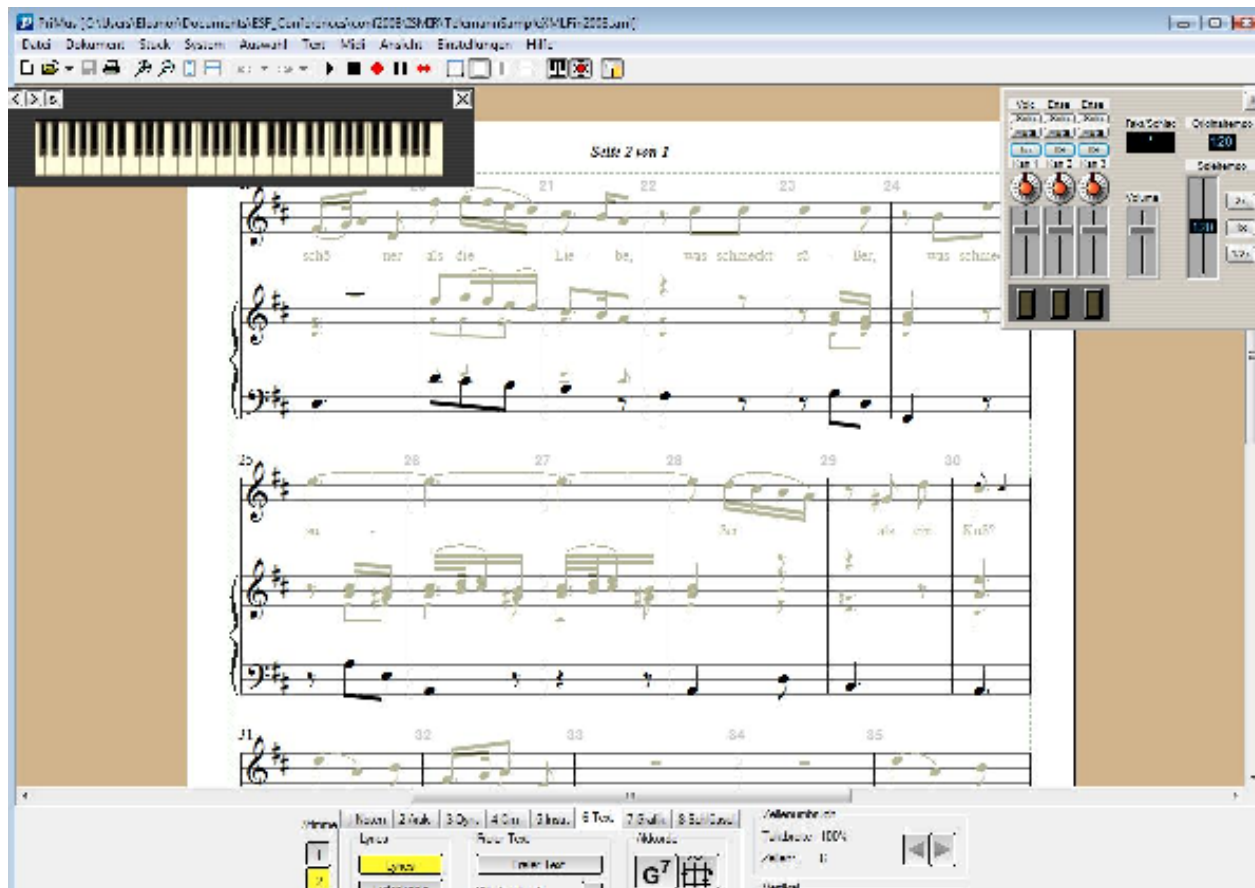
- ▶ OS's supported:
 - ▶ Mac
 - ▶ Linux
 - ▶ Win
- ▶ Versions
 - ▶ 2
- ▶ Main developer
 - ▶ Dominique Fober

Available data

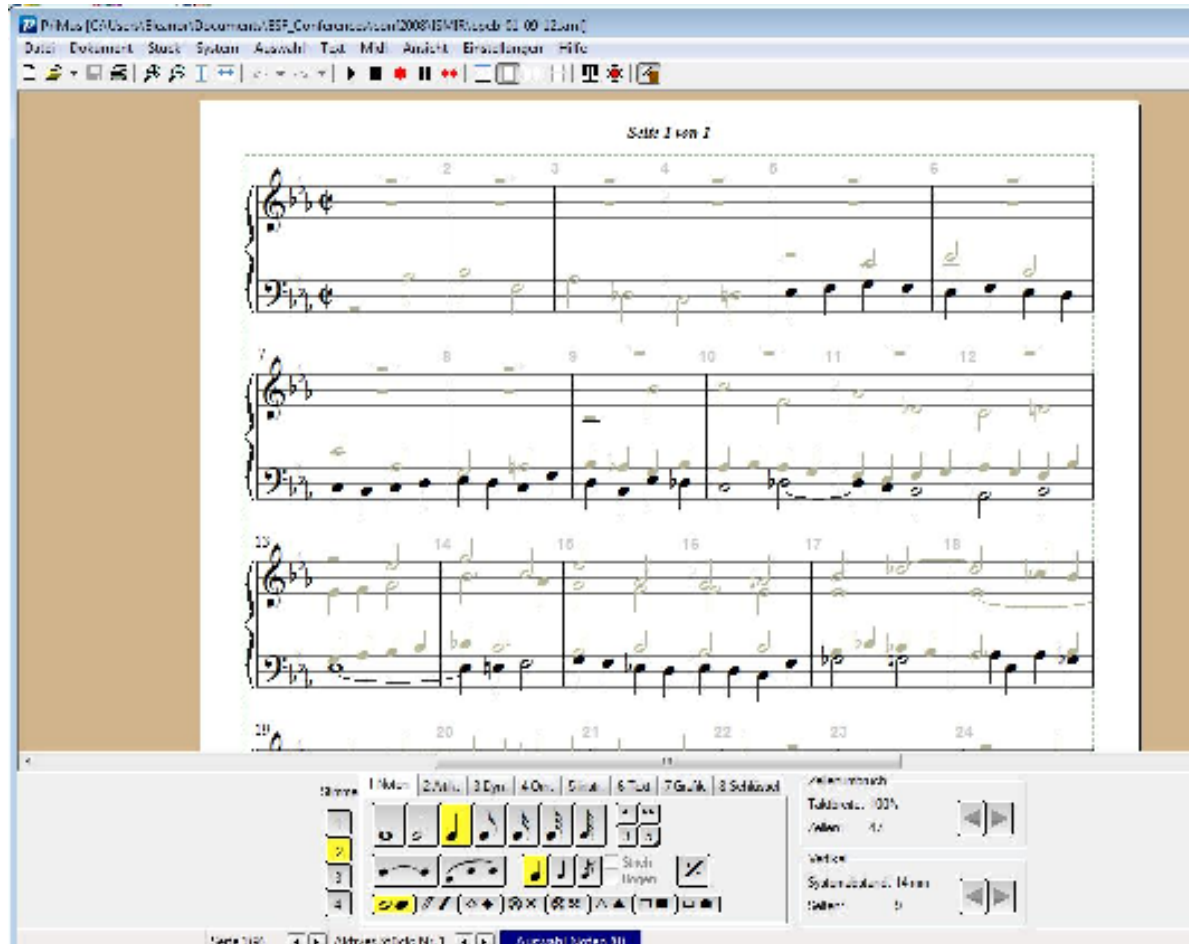


MusicXML import to notation software (PriMus)

MusicXML example imported into Primus



MusicXML import to notation software (PriMus)

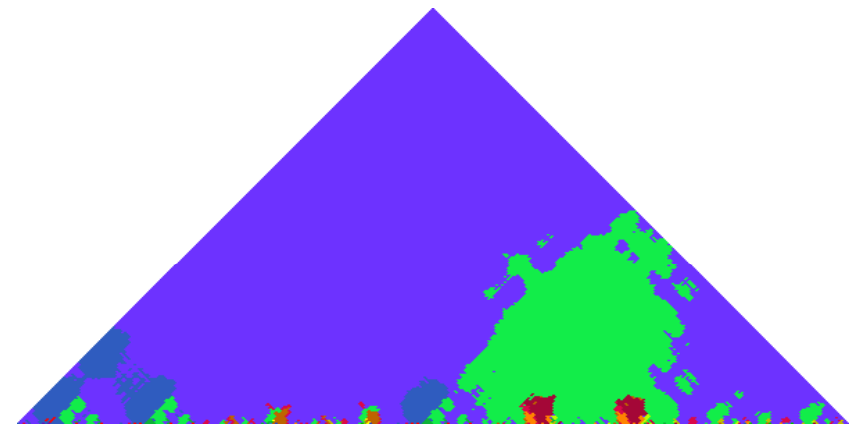


**SCORE *.eps to
print to scan ...**

MusicXML import to notation software (Primus)



KernScores automatically-generated
MusicXML, imported into Primus



Keyscape showing harmonic structure of
Joplin's Maple Leaf Rag

Music Encoding Initiative (MEI)

- ▶ Where: U. of Virginia
- ▶ Orientation
 - ▶ Bibliographical apps
 - ▶ Thematic indices
 - ▶ Scholarly apps
 - ▶ Critical apparatus supported
 - ▶ TEI analogues
 - ▶ General features in place
- ▶ I/O links with
 - ▶ MuseData
 - ▶ MusicXML
 - ▶ PS (via MUP)
 - ▶ PDF
 - ▶ TEI



IEEE 1599—U. of Milan

- ▶ Background: coord. With Ricordi Archive
- ▶ Aims:
 - ▶ synchronization of
 - ▶ Manuscripts
 - ▶ Prints
 - ▶ Pictures (still and moving)
 - ▶ Recordings
- ▶ Status: IEEE listed project

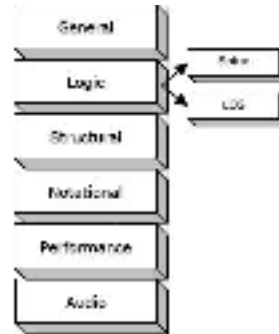


Figure 1. MX multi-layer structure.

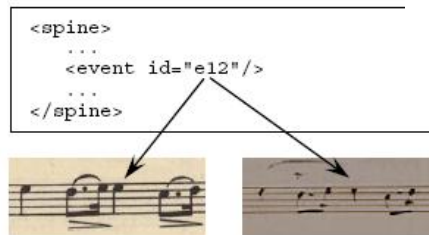


Figure 3. Event e12 graphical mappings.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE mx SYSTEM ...>
<mx>
  <general>
    ...
  </general>
  <logic>
    ...
  </logic>
  <structural>
    ...
  </structural>
  <notational>
    ...
  </notational>
  <performance>
    ...
  </performance>
  <audio>
    ...
  </audio>
</mx>
```

Figure 2. General structure of an MX file.

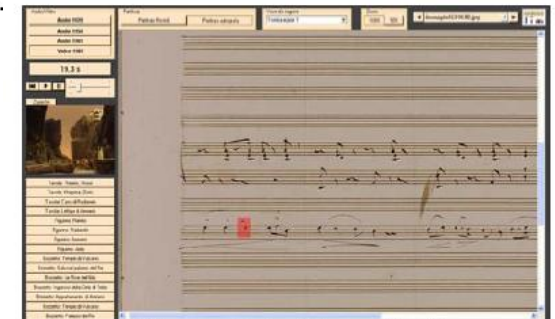


Figure 4. Screenshot of the application.

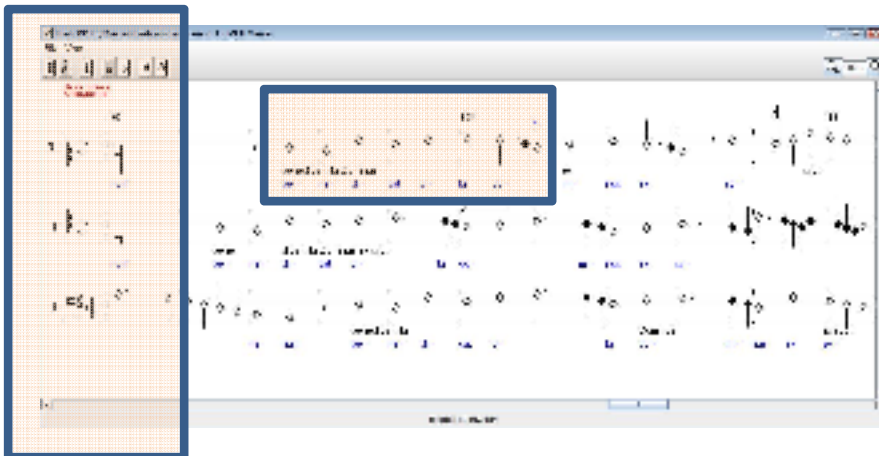
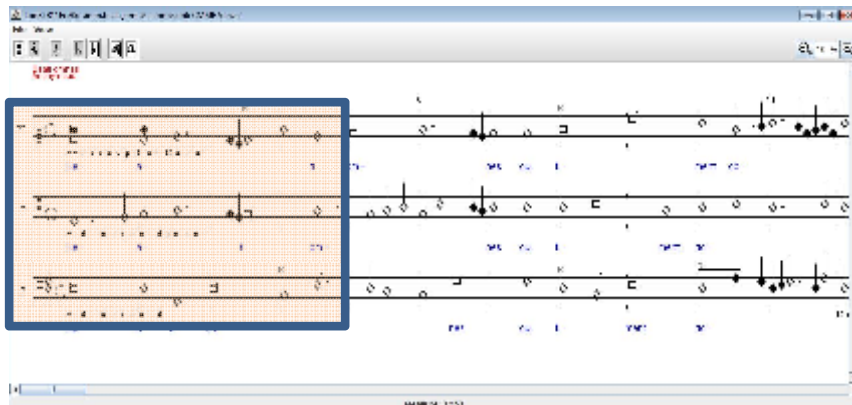
Corpus Mensurabilis Musicarum Electronicarum (CMME)

▶ Aims

- ▶ Archive for music in mensural notation (variant system[s] of meter and prolation)
- ▶ Critical apparatus
- ▶ Reference pages for sources and incipits
- ▶ Flexible graphical representations in modern notation
- ▶ Expandable apparatus for integration of multiple projects concerned with Renaissance music

CMME 2

Beate omnes



CMME Description

- <Pisces xmlns:cmme="http://www.cmme.org/cmme.xsd" CMME:version="0.81" >
- <GeneralData>
- <Title>Beate omnes</Title>
- <Composer>Anonymous</Composer>
- <Editor>Franklin Dambrosius</Editor>
- <GeneralData>
- <VoicesData>
- <NumVoices>4</NumVoices>
- <Voice>
- <Name>[Superius]</Name>
- </Voice>
- <Voice>
- <Name>Tenor</Name>
- </Voice>
- <Voice>
- <Name>Bassus</Name>
- </Voice>
- <VoicesData>
- <ManuscriptMusic>
- <NumVoices>4</NumVoices>
- <Voice>
- <VoiceNum>1</VoiceNum>
- <FootList>
- <Foot>
- <Appearance>1</Appearance>
- <StaffLine>1</StaffLine>
- <Pitch>
- <LetterName>C</LetterName>
- <OctaveNum>5</OctaveNum>
- </Pitch>
- </Foot>
- <ManuscriptMusic>
- <Sign>
- <MainSymbol>C</MainSymbol>
- <Strokes>1</Strokes>
- </Sign>
- </ManuscriptMusic>

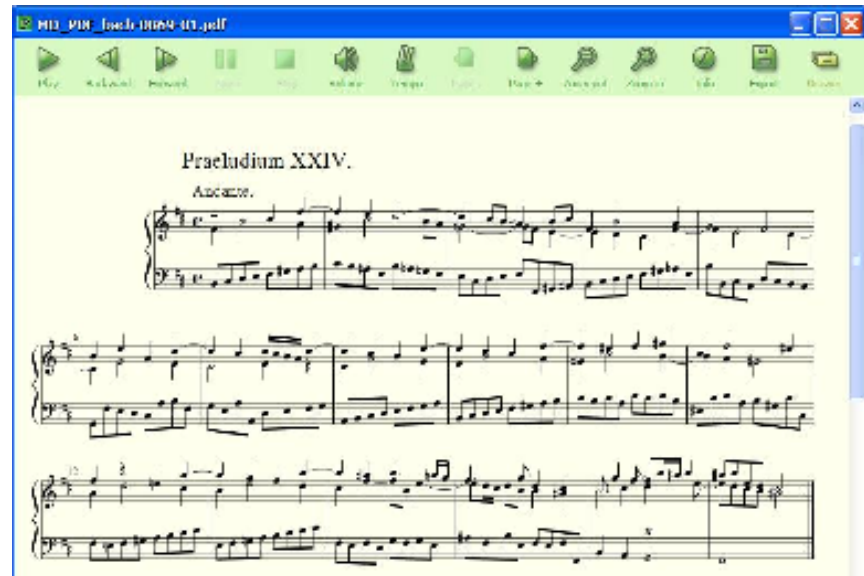
PDF viewers/players (*PDF-to-MusicPro*)*

- ▶ What it does (viewing)
 - ▶ Captures vector graphics info from PDFs
 - ▶ What programs output this?
 - ▶ Finale
 - ▶ Sibelius
 - ▶ SCORE
 - ▶ Secondary production: *.ps files distilled by Acrobat; *.eps files
- ▶ What it does not do
 - ▶ Read bit-mapped images
- ▶ What it does (playing)
 - ▶ Outputs piano rendition of keyboard music if not too complicated
- ▶ What it does not do
 - ▶ Read orchestral music (tries to output individual tracks to separate playbacks)
 - ▶ Keep beat synchronized with score
 - ▶ Always start at beginning of file

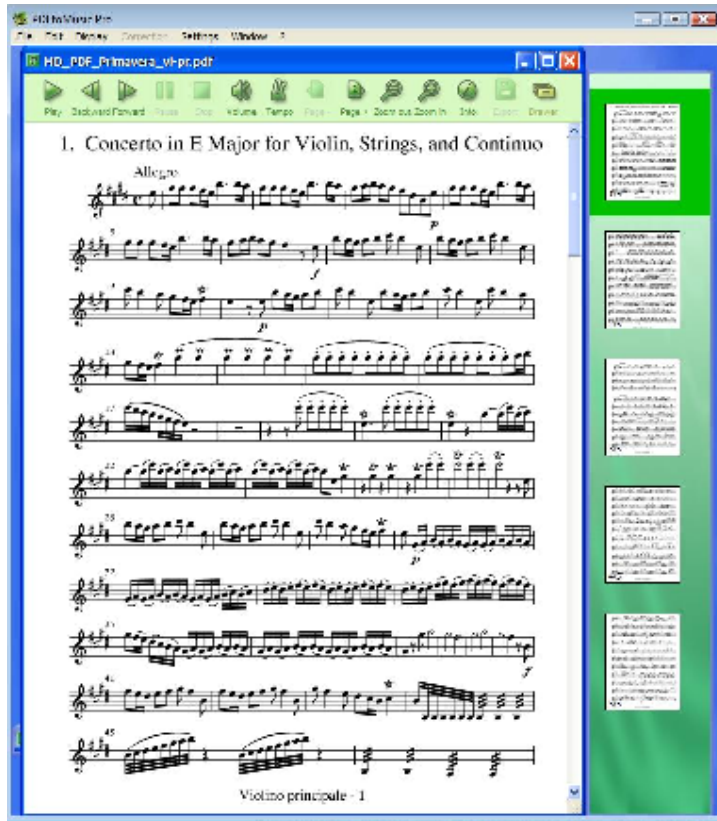
PDF-to-Music-Pro Examples



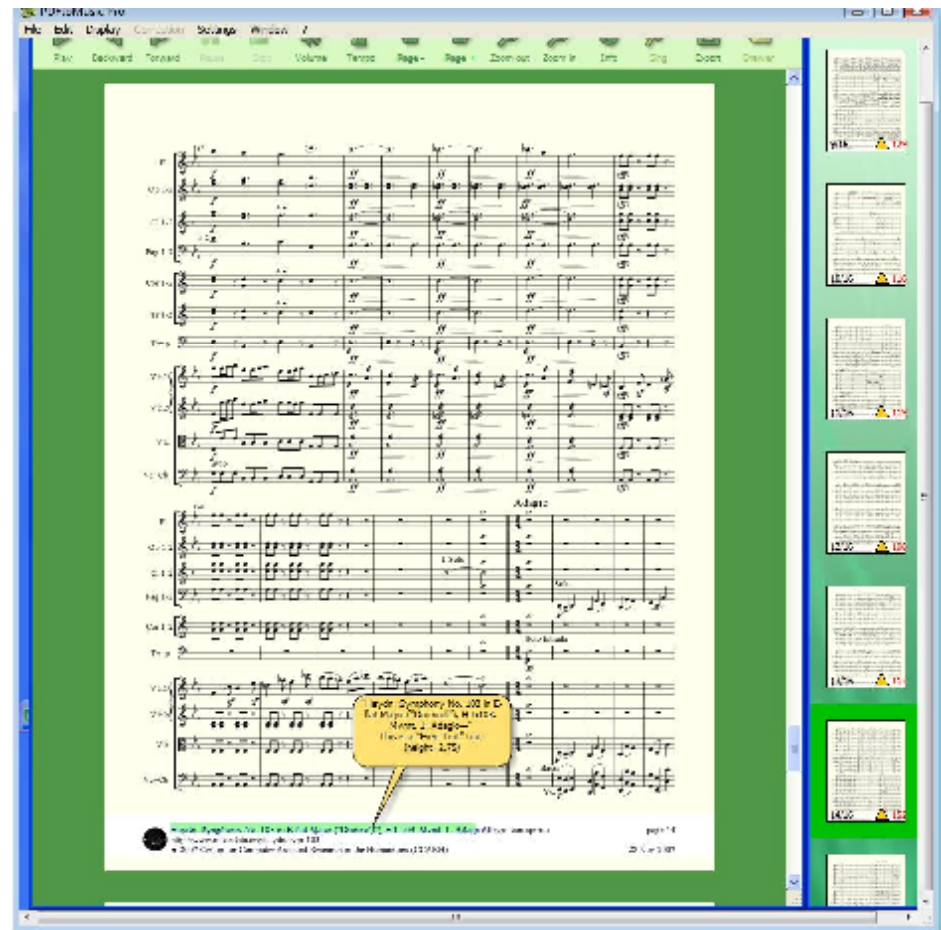
MuseData PDF to MusicPro



PDF-to-Music-Pro Examples



MuseData PDF to MusicPro



PDF-to-Music-Pro Examples

LUCA MARENZIO, QUELL'AUGELLIN CHE CANTA,
(IL SETTIMO LIBRO DE MADRIGALI, 1595, no. 2)

Musical score for 'Quell'au-gel-lin, che can-ta' by Luca Marenzio. The score is arranged for five voices: CANTO, ALTO, TENORE, QUINTO, and BASSO. The CANTO part has the lyrics 'Quell' au - gel - lin, che can - ta'. The ALTO part has the lyrics 'Quell' au - gel - lin, che can - ta'. The TENORE part has the lyrics 'Che can - ta'. The QUINTO and BASSO parts are silent.

Gordon Callon's website

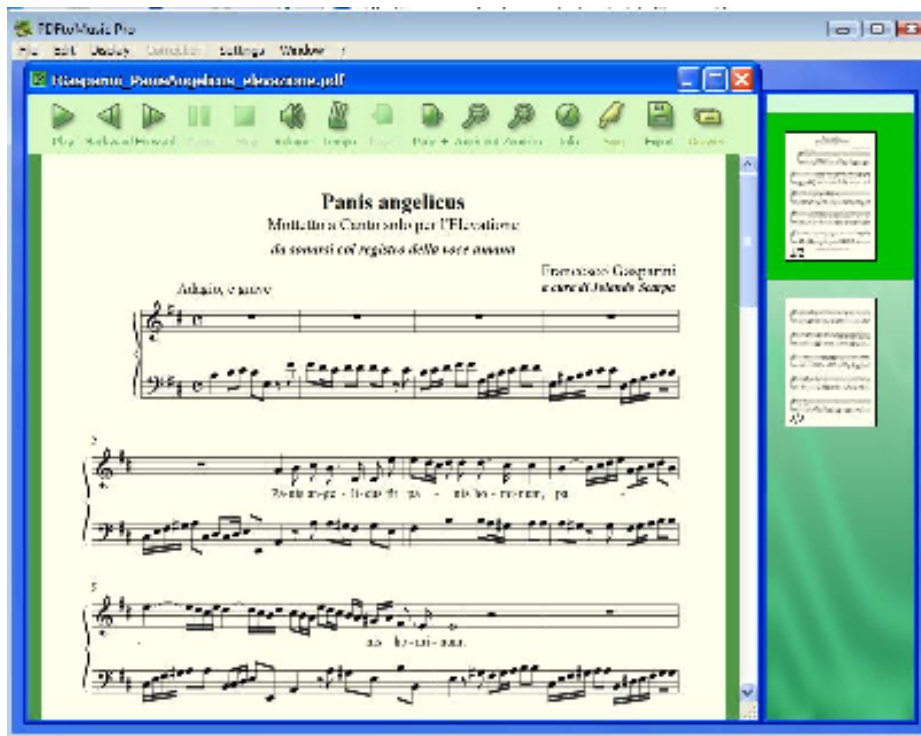
SCORE *.eps to Distiller to PDF to MusicPro

LUCA MARENZIO, QUELL'AUGELLIN CHE CANTA,
(IL SETTIMO LIBRO DE MADRIGALI, 1595, no. 2)

Musical score for 'Quell'au-gel-lin, che can-ta' by Luca Marenzio. The score is arranged for five voices: CANTO, ALTO, TENORE, QUINTO, and BASSO. The CANTO part has the lyrics 'Quell' au - gel - lin, che can - ta'. The ALTO part has the lyrics 'Quell' au - gel - lin, che can - ta'. The TENORE part has the lyrics 'Che can - ta'. The QUINTO and BASSO parts are silent.

PDF-to-Music-Pro Examples

icking Music Archive *.ps to Distiller to PDF to MusicPro



Symbolic-audio synchronization

MIDI-based

- ▶ Jeremy Pickens et al. (2003)*
 - ▶ Project: Use of MIDI as intermediate layer between audio and symbolic data (2003)
 - ▶ Motive: synchronization
- ▶ Meinard Müller et al. (2005—)*
 - ▶ Project: All of above plus video synchronization
 - ▶ Motivations: tools for use with RWC (Real World Computing database)

Kern-based

- ▶ Kyogu Lee (Yahoo), 2007*
 - ▶ Project: Use of kern as intermediate layer between MIDI “encodings” and audio (2007)
 - ▶ Motive: chordal analysis
- ▶ Craig Sapp, CHARM (2006—)*
 - ▶ Motive: alignment of temporal information in score, MIDI, and audio data

Image-symbol-audio based

VifaMusik (Munich SB)
IEEE 1599 (Milan)

Symbolic-audio synchronization: new music

Rob Hamilton

- ▶ Archival format for (rescue of) electro-acoustic music
 - ▶ Humdrum with spine for controller description



Dexter Morrill, John Chowning (1980s)

Open Music and Chuck*

- ▶ Matt Wright
 - ▶ Open Music (200—): open standard for electronic music
- ▶ Ge Wang
 - ▶ Chuck: realtime interactive synthesis among collaborating computers (time control fundamental)



Slork 2008

4. Summary

Review of Symbolic Data

- (1) How complete is the data representation?
- (2) How accurate is the data?
- (3) Will the data format be maintained over the long-term?
- (4) How much data is available?

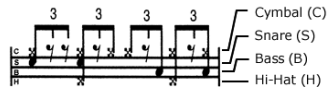
- (5) Does the code suit all the **needs** of the project?
- (6) Is the format potentially **archival**?
- (7) Are originating **software**, encoding **versions**, and other contextual details adequately **documented**?

Musical needs, stability, annotation

- ▶ Evaluation difficult because
 - ▶ High scores in all categories unlikely
- ▶ Each goal important in a different way
 - ▶ Musical needs fundamental
 - ▶ Code stability suggests long(er) life for projects
 - ▶ Annotation essential for survival

Projects and data with potential

▶ Musical needs



CMN??



▶ Code stability

- ▶ MusicXML
- ▶ MEI (?)
- ▶ SCORE
- ▶ Kern
- ▶ MuseData
- ▶ Lilypond (?)
- ▶ *.ps, *.eps, *.pdf (!!)

Projects and data with potential

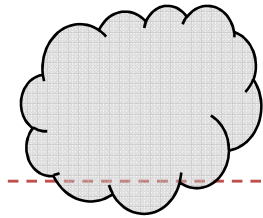
▶ Code acceptance

- ▶ Interchange
 - ▶ MusicXML
 - ▶ CMME
- ▶ Native
 - ▶ Kern
 - ▶ MuseData
 - ▶ MIDI????
- ▶ With version creep
 - ▶ Finale
 - ▶ Sibelius

▶ Contextual annotation

- ▶ Werner Icking Music Archive
- ▶ MuseData
- ▶ KernScores
- ▶ Variations
- ▶ DIAMM
- ▶ CMME
- ▶ British Library
- ▶ U Texas

Hidden code clusters



▶ Editions

- ▶ Neue Mozart Ausgabe (SCORE and PHI code)
- ▶ C.P.E. Bach Edition (SCORE and PHI code)
- ▶ Most Schott collected editions (SCORE)
- ▶ Many Bärenreiter collected editions (SCORE et al.)
- ▶ Some Ricordi editions (e.g., Verdi) SCORE
- ▶ Some Henle editions (customized version of Finale)

◦ ▶ Archives

- ▶ Bayerische Staatsbibliothek
- ▶ Werner Icking Archive
- ▶ MuseData Archive
- ▶ KernScore Archives

▶ Converging projects

- ▶ CMME/DIAMM/Motet DB
- ▶ Edirom/new editions

▶ Commercial publishing

- ▶ In-house data translation sw

5. Using Symbolic Data

Go to Craig Sapp's presentation