

IAML Salzburg 2025



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Encoding Musical Metadata in MEI

A Case Study of the Digital Mozart Edition

Iacopo Cividini, Roland Mair-Gruber, Oleksii Sapov-Erlinger

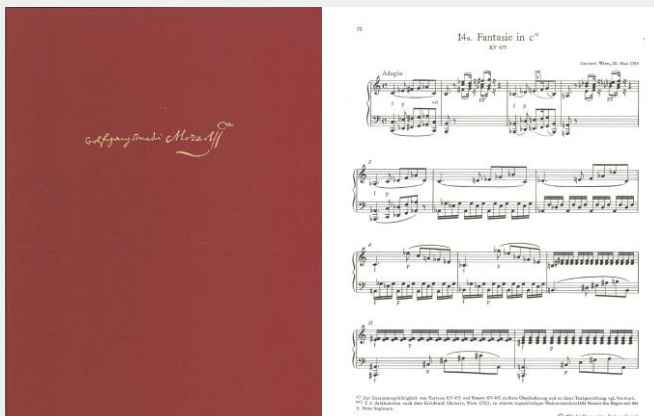
Digital Mozart Edition

<https://dme.mozarteum.at>

Konzerte
Wissenschaft
Museen

MUSIC EDITIONS

PRINT

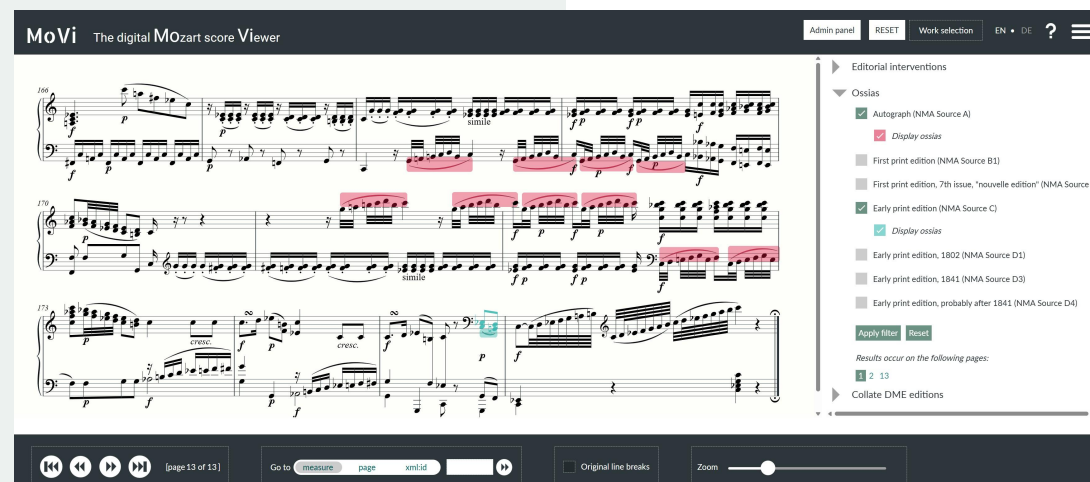


Neue Mozart-Ausgabe, Musical text



Neue Mozart-Ausgabe, Critical apparatus

DIGITAL



Digital Mozart Edition, Musical text + Critical apparatus



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MUSIC ENCODING INITIATIVE (MEI)

METADATA

FRBR

<work>
<expression>
<manifestation>
<item>

MUSICAL TEXT

<music>
<score>
<staff>
<note>

CRITICAL APPARATUS

<app>
<choice>
<expand>
<supplied>





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- VERSIONS
- VARIANTS
- EDITORIAL MARKUPS
- PARTS EXTRACTION
- METADATA ARCHITECTURE



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VERSIONS

FRBR in MEI
<meiHead>

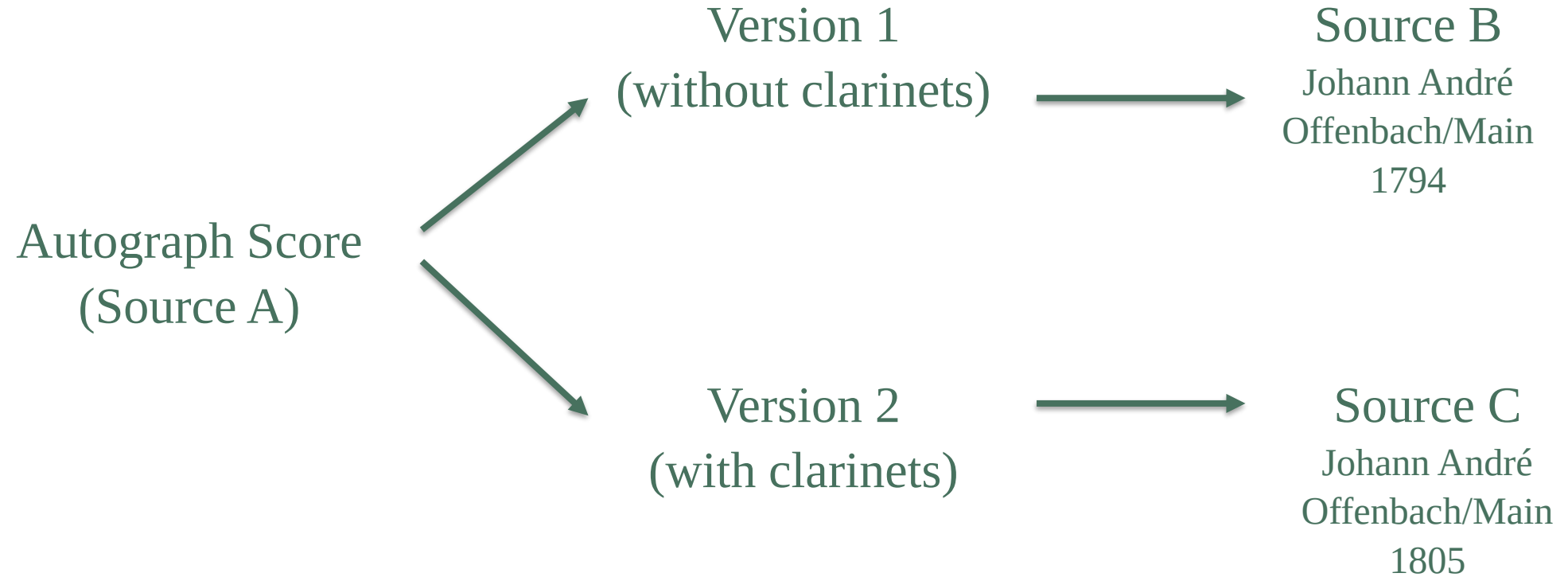


<work>
<expression>
<manifestation>
<item>



<music>

VERSIONS



Wolfgang Amadé Mozart, Symphony in G Minor, KV 550

VERSIONS

Versions

<expressionList>

```
<expression n="1" xml:id="expression_01">
  <title>First Version (without clarinets)</title>
  <relationList>
    <relation rel="hasEmbodiment" target="#Source_A #Source_B"/>
  </relationList>
</expression>
```

```
<expression n="2" xml:id="expression_02">
  <title>Second Version (with clarinets)</title>
  <relationList>
    <relation rel="hasEmbodiment" target="#Source_A #Source_C"/>
  </relationList>
</expression>
```

Sources

<manifestationList>

```
<manifestation n="2" xml:id="Source_B">
  <relationList>
    <relation rel="isEmbodimentOf" target="#expression_01"/>
  </relationList>
</manifestation>

<manifestation n="1" xml:id="Source_A">
  <relationList>
    <relation rel="isEmbodimentOf" target="#expression_01 #expression_02"/>
  </relationList>
</manifestation>

<manifestation n="3" xml:id="Source_C">
  <relationList>
    <relation rel="isEmbodimentOf" target="#expression_02"/>
  </relationList>
</manifestation>
```

Wolfgang Amadé Mozart, Symphony in G Minor, KV 550

VERSIONS

Musical text
Score definition

Versions

Sources

```
<app type="version">
```

```
<rdg n="1" corresp="#expression_01">
  <scoreDef>
    [...]
  </scoreDef>
</rdg>
```

```
<rdg n="2" corresp="#expression_02">
  <scoreDef>
    <staffDef>
      <label>Clarinetto I, II in Sib</label>
    </staffDef>
  </scoreDef>
</rdg>
```

```
</app>
```

```
<expressionList>
```

```
<expression n="1" xml:id="expression_01">
  <title>First Version (without clarinets)</title>
  <relationList>
    <relation rel="hasEmbodiment" target="#Source_A #Source_B"/>
  </relationList>
</expression>
```

```
<expression n="2" xml:id="expression_02">
  <title>Second Version (with clarinets)</title>
  <relationList>
    <relation rel="hasEmbodiment" target="#Source_A #Source_C"/>
  </relationList>
</expression>
```

```
<manifestationList>
```

```
<manifestation n="2" xml:id="Source_B">
  <relationList>
    <relation rel="isEmbodimentOf" target="#expression_01"/>
  </relationList>
</manifestation>
```

```
<manifestation n="1" xml:id="Source_A">
  <relationList>
    <relation rel="isEmbodimentOf" target="#expression_01 #expression_02"/>
  </relationList>
</manifestation>
```

```
<manifestation n="3" xml:id="Source_C">
  <relationList>
    <relation rel="isEmbodimentOf" target="#expression_02"/>
  </relationList>
</manifestation>
```

Wolfgang Amadé Mozart, Symphony in G Minor, KV 550

VERSIONS

Version 1

Version 2 (clarinets)

MoVi The digital MOZart score Viewer

Admin panel RESET Work selection EN • DE ?

OVERVIEW • DASHBOARD • MEI CODE

Flauto

Oboi

Fagotti

Corno in Si $\flat$ alto/B hoch

Corno in Sol/G

Violino I

Violino II

Viola

Violoncello e Basso

Bibliographic Metadata

Original Title: Grande Sinfonie pour deux Violons, Alto & Basses, 1 Flûte, 2 Haut-bois, 2 Clarinettes 2 Bassons, & 2 Cors : Oeuvre 45 ; [KV 550] / composée par W. A. Mozart

Uniform title: Sinfonien : KV 550.

Composer: Mozart, Wolfgang Amadeus G

Publisher: Johann André

Published: Offenbach s/M ; Jean André, [1805]

Edition: [Stimmen], Édition d'après le manuscrit, augmenté par des Clarinettes et avec des changements dans les Haut-bois par l'auteur

Description: 13 St.

Annotation: Bibliogr. Nachweis: RISM A/I: M 5563 ; Haberkamp, Erstdrucke Bd. 1, S. 310-311. Vorlageform des Erscheinungsvermerks: A Offenbach s/M, chez Jean André. Prix 3 Fl.-

Shelf mark: ISM-Rara 550/1

Keywords: Offenbach, am Main

Marginalia: Handschriftliche Eintragungen

Provenance: Besitzvermerk: Museum zu Salzburg (gestempelt) - Stempel: Dom-Musik-Verein u. Mozarteum ; Internationale Stiftung: "Mozarteum" 1881

URN: urn:nbn:at:at-moz:2-15936

Symphony in G
K. 550 NMA digital
1st mvt.
Molto Allegro

View score in the NMA Online

Select a version:
Version 1
Version 2

Search work (by K.nr.): 550

[page 1 of 53]

Go to measure page xml:id

Original line breaks

Zoom

MoVi The digital MOZart score Viewer

Admin panel RESET Work selection EN • DE ?

OVERVIEW • DASHBOARD • MEI CODE

Flauto

Oboi

Clarinetten in Si $\flat$ /B

Fagotti

Corno in Si $\flat$ alto/B hoch

Corno in Sol/G

Violino I

Violino II

Viola

Violoncello e Basso

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URN: urn:nbn:at:at-moz:2-15936

Symphony in G
K. 550 NMA digital
1st mvt.
Molto Allegro

View score in the NMA Online

Select a version:
Version 1
Version 2

Search work (by K.nr.): 550

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Go to measure page xml:id

Original line breaks

Zoom

Wolfgang Amadé Mozart, Symphony in G Minor, KV 550



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VARIANTS



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Metadata

<meiHead>

<workList>

<expressionList>

<manifestationList>

<manifestation n="1" xml:id="Source_A">

<identifier auth="ISM-QDB">10712</identifier>

<titleStmt>

<title xml:lang="EN">Autograph (NMA: Source A)</title>

</titleStmt>

<physDesc>

<scoreFormat>Score</scoreFormat>

</physDesc>

<itemList>

<item n="1">

<availability>

<distributor>

<corpName sameas="#ISM">Internationale Stiftung Mozarteum, Bibliotheca Mozartiana, Salzburg</corpName>

<identifier auth="RISM" auth.uri="https://rism.online/institutions/30000372" type="library_siglum">A-Sm</identifier>

<identifier type="shelfmark">Autogr 475</identifier>

<ref target="https://resolver.obvsg.at/urn:nbn:at:at-moz:x2-37199" targettype="PURL"/>

</distributor>

</availability>

</item>

</itemList>

</manifestation>

<manifestation n="2" xml:id="Source_B"/>

<manifestation n="3" xml:id="Source_C"/>

</manifestationList>

Musical text

<rdg>

<app type="variant">

<rdg source="#Source_A">

<slur endid="#chord_50562" startid="#chord_50544"/>

</rdg>

<rdg source="#Source_B #Source_C">

<slur endid="#chord_50610" startid="#chord_50592"/>

</rdg>

</app>

Wolfgang Amadé Mozart, Fantasy in C minor for Clavier, KV 475

VARIANTS



Admin panel

RESET

Work selection

EN • DE



Bibliographic Metadata

Main title [title on cover:] FANTASIA AND SONATA I IN C MINOR
Original Title [caption title:] Phantasia
Additional Titles Fantasie in c für Klavier
Uniform title Fantasies. pf : . KV 475, c-Moll.
Composer Mozart, Wolfgang Amadeus
Place and Date of Creation 1785
Description 1 part ; pf p.1-4
Shelf mark Autogr 457
Keywords Fantasies / Fantasies
URN urn:nbn:at:at-moz:x2-37199

Links

Social Media
Reference RISM (Répertoire International des Sources Musicales)
IIIF IIIF Manifest

Files

caption title Phantasia (PDF 10.85 MB)

Classification

Music manuscripts → Autographs of Mozart's works

Music Incipits

1.1.1 pf, c Phantasia. Adagio; c



166

f

simile

f p *f p* *f*

p *f* *p* *f* *p* *f*

170

p

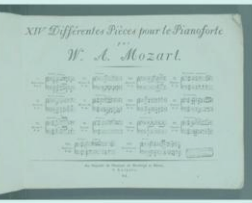
simile

f p *f p* *f*

f *p* *f* *p* *f*

173

p *cresc.* *f* *p* *cresc.* *f* *p*



Bibliographic Metadata

Main title Oeuvres complètes / de Wolfgang Amadeus Mozart
Original Title 1,6: Oeuvres complètes / de Wolfgang Amadeus Mozart. [Musique pour le Piano-forte], Cahier 6 / XIV Différentes Pièces pour le Piano-forte / par W. A. Mozart
Uniform title 1,6: Musik für Klavier Ausw
Composer Mozart, Wolfgang Amadeus G
Publisher Breitkopf & Härtel G
Published à Leipzig : Au Magazin de Musique de Breitkopf et Härtel, [1799-1800]
Edition [Erstdruck, 1. Ausgabe]
Description 103 S. quer-4° : Titelvignette
Annotation Bibliogr. Nachweis: RISM A/1: M 7319 ; Haberkamp, Erstdrucke Bd. 1, S. 189-190
Erstdruck von KV 399, KV Anh. 135
Vorlageform des Erscheinungsvermerks: Au Magazin de Musique de Breitkopf et Härtel, à Leipsic. VI.
Typendruck; Bogensignatur VI auf Bandtitel (= S. [5], S. 9, 13 etc. (-101) ; Bogenzählung 1,2,3 etc. (-25) auf denselben Seiten
Shelf mark ISM-Rara Sbd 15-I-6/3
Keywords Leipzig G
Copy-specific Information Grüner Umschlag fehlt
URN urn:nbn:at:at-moz:2-66547

Content

I. Fantasia. [KV 475. Fantasie für Klavier c-Moll] II. Sonata. [KV 457. Sonate für Klavier c-Moll] III. Rondo I.

Editorial interventions

Ossias

- ☒ Autograph (NMA Source A)
- ☒ Display ossias
- ☐ First print edition (NMA Source B1)
- ☐ First print edition, 7th issue, "nouvelle edition" (NMA Source B4)
- ☒ Early print edition (NMA Source C)
- ☒ Display ossias
- ☐ Early print edition, 1802 (NMA Source D1)
- ☐ Early print edition, 1841 (NMA Source D3)
- ☐ Early print edition, probably after 1841 (NMA Source D4)

filter Reset

occur on the following pages:

3

DME editions



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EDITORIAL MARKUPS



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Metadata
<meiHead>

Linking attributes



Musical text
<music>

EDITORIAL MARKUPS



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Original:



Editorial intervention:



`<choice>`
 `<orig>`
 `<!-- source reading -->`
 `</orig>`
 `<corr`
 `corresp="#note_4782"`
 `evidence="analogy"`
 `resp="#DME-editors">`
 `<!-- editorial intervention -->`
 `</corr>`
`</choice>`

EDITORIAL MARKUPS



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Metadata

```
<respStmt>
  <corpName role="editor" xml:id="DME-editors">
    <persName auth="GND" auth.uri="https://d-nb.info/gnd/10403128X"
      codedval="10403128X" label="MI-PID_64597"
      xml:id="UL">Ulrich Leisinger</persName>
  </corpName>
</respStmt>
```



GEMEINSAME
NORMDATEI

Musical text

```
<choice>
  <orig>
    <!-- source reading -->
  </orig>
  <corr
    corresp="#note_4782"
    evidence="analogy"
    resp="#DME-editors">
    <!-- editorial intervention -->
  </corr>
</choice>
```

EDITORIAL MARKUPS



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Original:

[illegible]

Editorial intervention:

[illegible]

```
<choice>
  <orig>
    <!-- source reading -->
  </orig>
  <corr
    corresp="#note_4782"
    evidence="analogy"
    resp="#DME-editors">
    <!-- editorial intervention -->
  </corr>
</choice>
```



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PARTS EXTRACTION



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Allegro

Oboe I, II

Corno I, II
in Fa

Violino I

Violino II

Viola I, II

Soprano

Violoncello, Basso
ed Organo

6 6 7
4

Allegro

Violino I

The image displays a musical score for an orchestra. The top section contains staves for Oboe I, II; Corno I, II in Fa; Violino I (highlighted with a red box); Violino II; Viola I, II; Soprano; and Violoncello, Basso ed Organo. The tempo is marked 'Allegro'. Below the staves, there are two horizontal lines with the numbers 6, 6, and 7 above them, and a 4 below the first line. A red arrow points from the Violino I staff to a separate staff below labeled 'Violino I', which also has the tempo 'Allegro' marked above it.

PARTS EXTRACTION

Parts that share a staff



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Oboe I, II

Allegro

Oboe I

Allegro

Oboe II

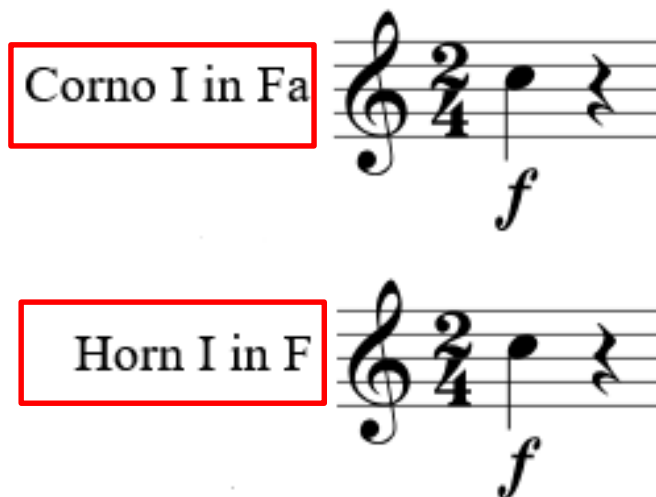
Allegro

PARTS EXTRACTION

Updating staff labels



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PARTS EXTRACTION



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Cross-references between the score definition and the metadata

Metadata

```
<perfRes codedval="ba" n="2" trans.diat="-4" trans.semi="-7" xml:id="perfRes_02">Corno</perfRes>
```

Score definition

```
<layerDef decls="#perfRes_02" n="1" type="part" xml:id="scoreDef_01_layerDef_Cor1-A"/>
```

@decls (declarations)

Instruments and voices list (DME-XML)

```
<item dme.db="cor" loc.codedval="ba" xml:id="Corno">
  <name label.abbr="Cor" xml:lang="IT">Corno</name>
  <name label.abbr="Hr" xml:lang="DE">Horn</name>
  <name label.abbr="Hr" xml:lang="EN">Horn</name>
  <!-- -->
  <transposition trans.diat="-4" trans.semi="-7">
    <label label.abbr="(Fa)" xml:lang="IT">in Fa</label>
    <label label.abbr="(F)" xml:lang="DE">in F</label>
    <label label.abbr="(F)" xml:lang="EN">in F</label>
  </transposition>
  <!-- -->
</item>
```

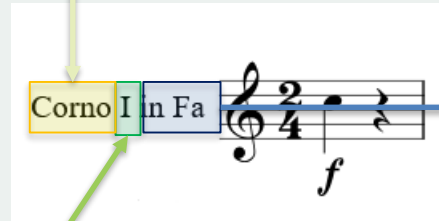
PARTS EXTRACTION

The generation of the staff label



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```
<perfRes codedval="ba" n="2" trans.diat="-4" trans.semi="-7" xml:id="perfRes_02">Corno</perfRes>
```



```
<layerDef decls="#perfRes_02" n="1" type="part" xml:id="scoreDef_01_layerDef_Cor1-A"/>
```

```
<item dme.db="cor" loc.codedval="ba" xml:id="Corno">  
  <name label.abbr="Cor" xml:lang="IT">Corno</name>  
  <name label.abbr="Hr" xml:lang="DE">Horn</name>  
  <name label.abbr="Hr" xml:lang="EN">Horn</name>  
  <!-- -->  
  <transposition trans.diat="-4" trans.semi="-7">  
    <label label.abbr="(Fa)" xml:lang="IT">in Fa</label>  
    <label label.abbr="(F)" xml:lang="DE">in F</label>  
    <label label.abbr="(F)" xml:lang="EN">in F</label>  
  </transposition>  
  <!-- -->  
</item>
```


PARTS EXTRACTION

Instruments taxonomy based on those of the Library of Congress



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MEI metadata

```
<perfMedium>
  <perfResList auth="marcmusperf"
    auth.uri="https://www.loc.gov/standards/valuelist/marcmusperf.html">
    <!--[...]-->
    <perfRes codedval="ba" n="2" trans.diat="-4" trans.semi="-7" xml:id="perfRes_02"
      >Corno</perfRes>
    <!--[...]-->
  </perfResList>
</perfMedium>
```

LOC taxonomy

The Library of Congress » Librarians, Archivists » Standards

Value Lists for Codes and Controlled Vocabularies

LIBRARY OF CONGRESS, NETWORK DEVELOPMENT & MARC STANDARDS OFFICE

ba
Brass - Horn

Instruments and voices list (DME:XML)

```
<item dme.db="cor" loc.codedval="ba" xml:id="Corno">
  <name label.abbr="Cor" xml:lang="IT">Corno</name>
  <name label.abbr="Hr" xml:lang="DE">Horn</name>
  <name label.abbr="Hr" xml:lang="EN">Horn</name>
  <!-- -->
  <transposition trans.diat="-4" trans.semi="-7">
    <label label.abbr="(Fa)" xml:lang="IT">in Fa</label>
    <label label.abbr="(F)" xml:lang="DE">in F</label>
    <label label.abbr="(F)" xml:lang="EN">in F</label>
  </transposition>
  <!-- -->
</item>
```

PARTS EXTRACTION

Special instruments

- Schellen (jingle bells)
- Becken (cymbals)
- Posthorn (post horn)
- Orgelwalze (organ roller)
- Glasharmonika (glass harmonica)
- Etc.



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PARTS EXTRACTION

Special instruments



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LOC taxonomy

bz
Brass - Other

Instruments and voices list (DME:XML)

```
<item dme.db="cordipost" loc.codedval="bz" xml:id="Corno di posta">
  <name label.abbr="CorPost" xml:lang="IT">Corno di posta</name>
  <name label.abbr="PostHr" xml:lang="DE">Posthorn</name>
  <name label.abbr="PostHr" xml:lang="EN">Post horn</name>
  <transposition trans.diat="-1" trans.semi="-2">
    <label label.abbr="(Si&#9837;)" xml:lang="IT">in Si&#9837;</label>
    <label label.abbr="(B)" xml:lang="DE">in B</label>
    <label label.abbr="(B&#9837;)" xml:lang="EN">in B&#9837;</label>
  </transposition>
  <transposition trans.diat="-2" trans.semi="-3">
    <label label.abbr="(La)" xml:lang="IT">in La</label>
    <label label.abbr="(A)" xml:lang="DE">in A</label>
    <label label.abbr="(A)" xml:lang="EN">in A</label>
  </transposition>
  <transposition trans.diat="-4" trans.semi="-7">
    <label label.abbr="(Fa)" xml:lang="IT">in Fa</label>
    <label label.abbr="(F)" xml:lang="DE">in F</label>
    <label label.abbr="(F)" xml:lang="EN">in F</label>
  </transposition>
</item>
```



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The instruments and voices list is available on GitHub:

<https://github.com/ism-dme/Extract-Parts/blob/main/lib/lists/instruments.xml>

The screenshot shows the GitHub interface for the repository `ism-dme / Extract-Parts`. The `Code` tab is selected. On the left, the file explorer shows the directory structure: `config`, `docs`, `encoding-utils`, `lib` (expanded), `functions`, and `lists`. The file `instruments.xml` is selected under `lib/lists`. The main content area shows the file path `Extract-Parts / lib / lists / instruments.xml` and a commit by `o-sapov` at version `v5.1.1`. Below this, the `Code` tab is active, displaying the XML content of the file. The XML starts with a version declaration and a root element `<list>` with attributes `xml:id="instruments"` and `xmlns="http://www.mozarteum.at/ns/dme"`. It contains a `<class label="brass">` element, which in turn contains an `<item>` for `Corno`. The `<item>` has attributes `dme.db="cor"`, `loc.codedval="ba"`, and `xml:id="Corno"`. It lists three names for the instrument: `Corno` (Italian), `Horn` (German), and `Horn` (English). It also specifies a `transposition` of `-7` semitones and a `diat` of `-12`. The first label is `Do` (Italian).

```
<?xml version="1.0" encoding="UTF-8"?>
<list xml:id="instruments" xmlns="http://www.mozarteum.at/ns/dme">
  <class label="brass">
    <item dme.db="cor" loc.codedval="ba" xml:id="Corno">
      <name label.abbr="Cor" xml:lang="IT">Corno</name>
      <name label.abbr="Hr" xml:lang="DE">Horn</name>
      <name label.abbr="Hr" xml:lang="EN">Horn</name>
      <transposition trans.diat="-7" trans.semi="-12">
        <label label.abbr="(Do)" xml:lang="IT">in Do</label>
        <label label.abbr="(C)" xml:lang="DE">in C</label>
      </transposition>
    </item>
  </class>
</list>
```

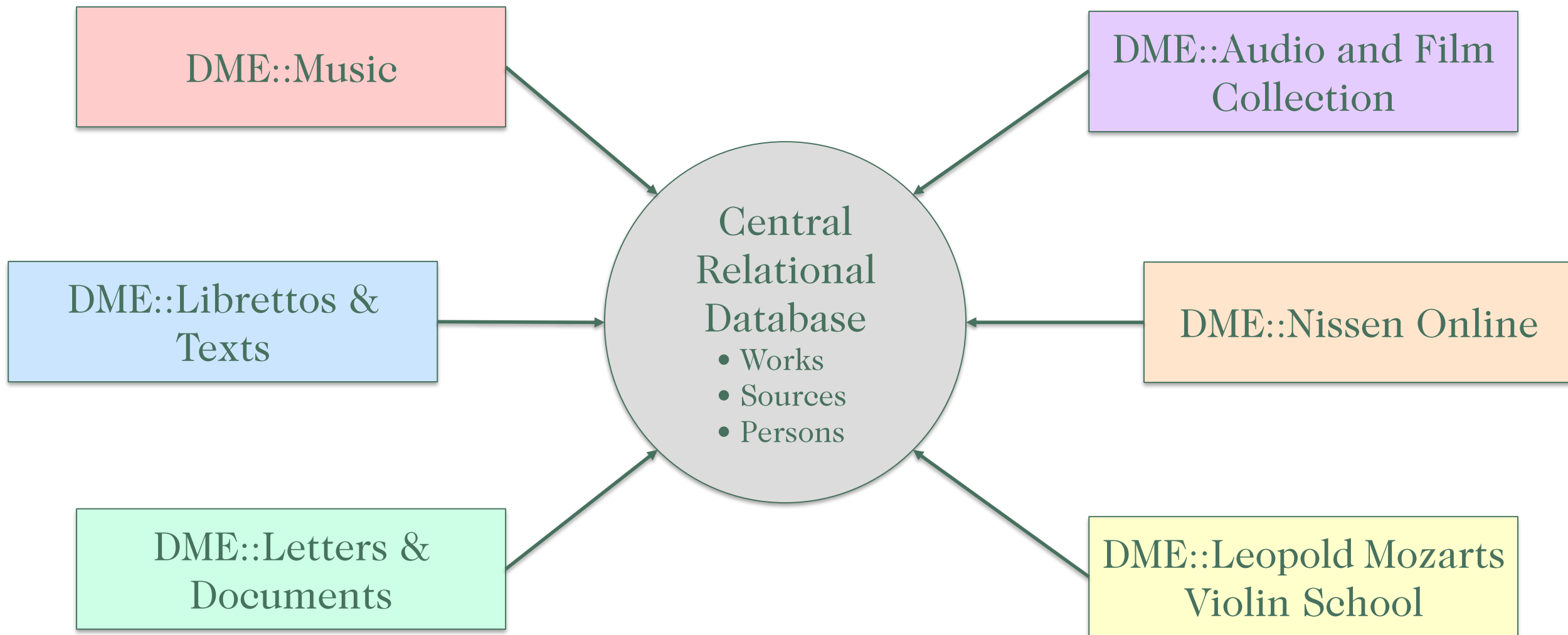


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- VERSIONS
- VARIANTS
- EDITORIAL MARKUPS
- PARTS EXTRACTION
- METADATA ARCHITECTURE

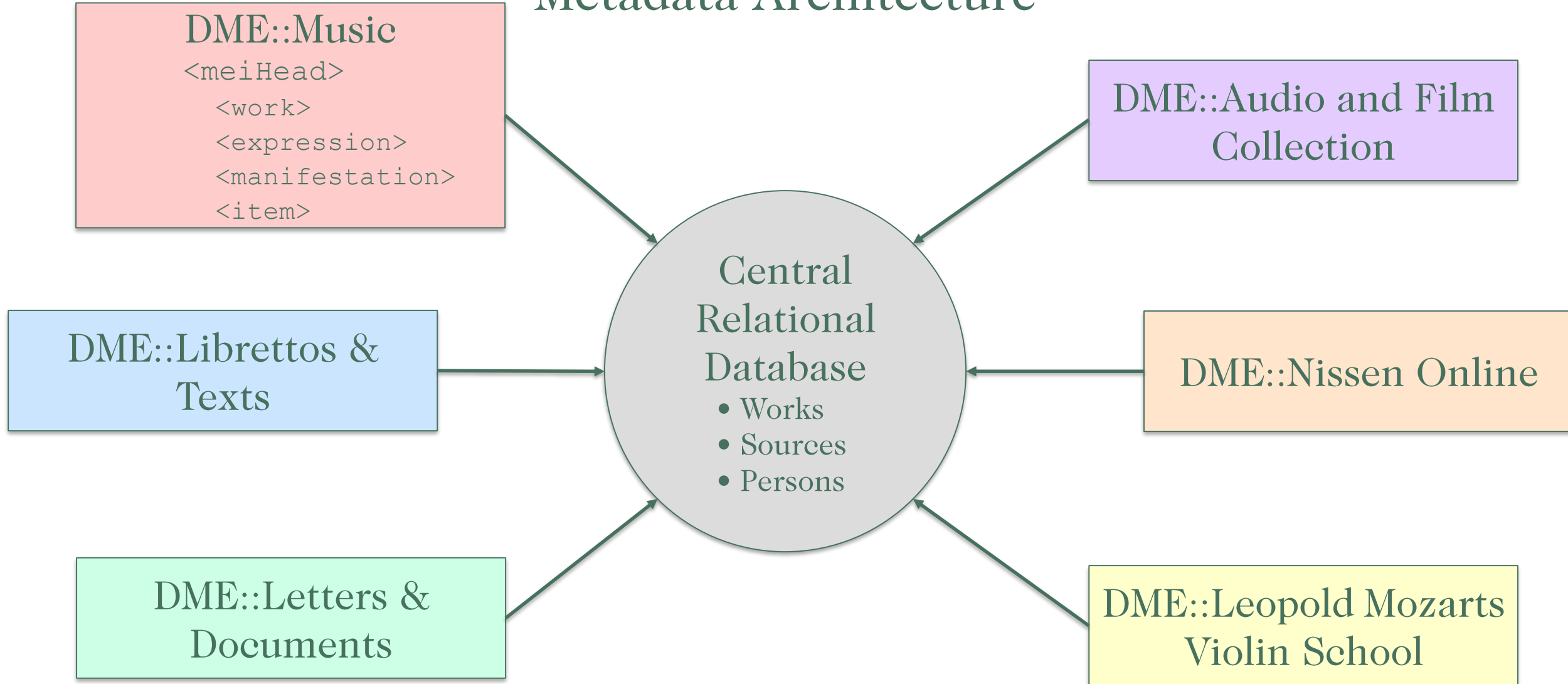
DIGITAL MOZART EDITION

Metadata Architecture

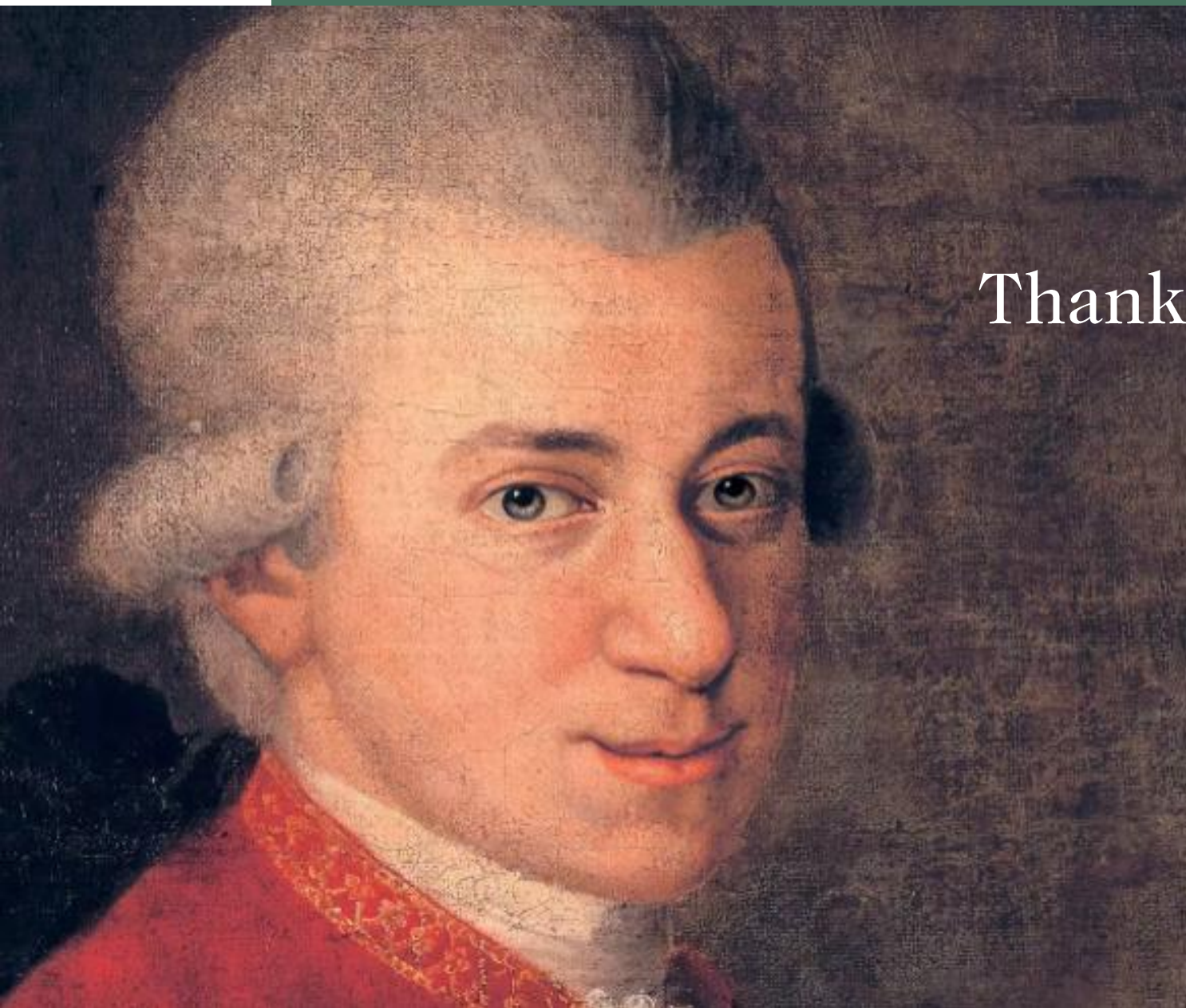


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Metadata Architecture



Hybrid metadata architecture: Central governance + domain-specific models



STIFTUNG
MOZARTEUM
SALZBURG

Thank you for your attention!

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Konzerte
Wissenschaft
Museen