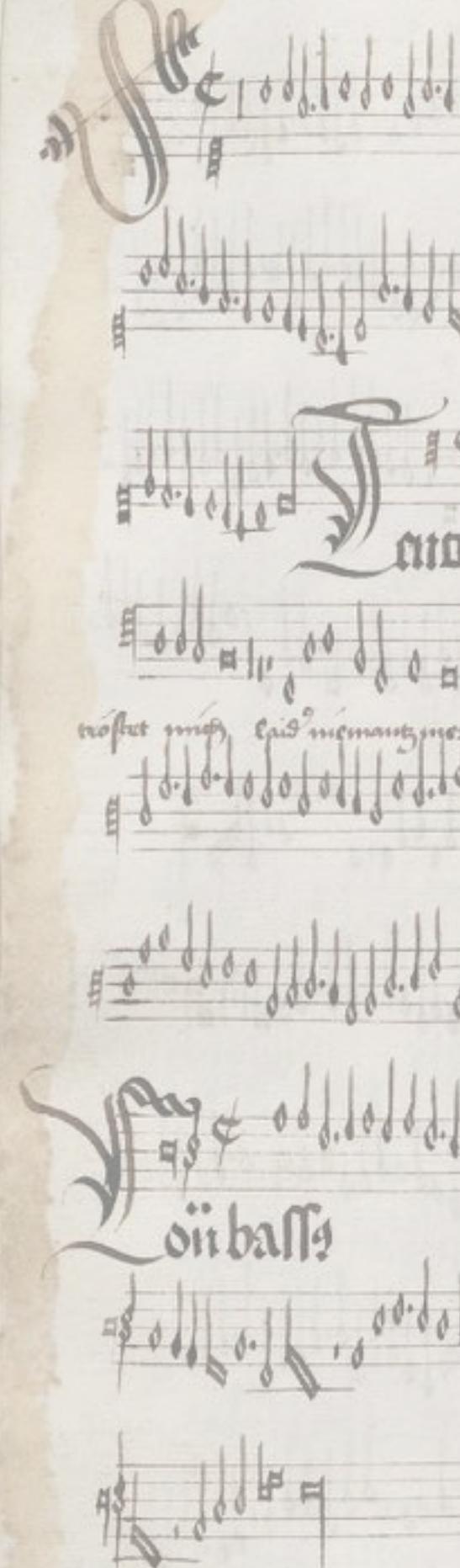


# Databases (en oude muziek)

*Marnix van Berchum - Huygens ING*

**DHclinics, Utrecht, 5 september 2017**



# Scope

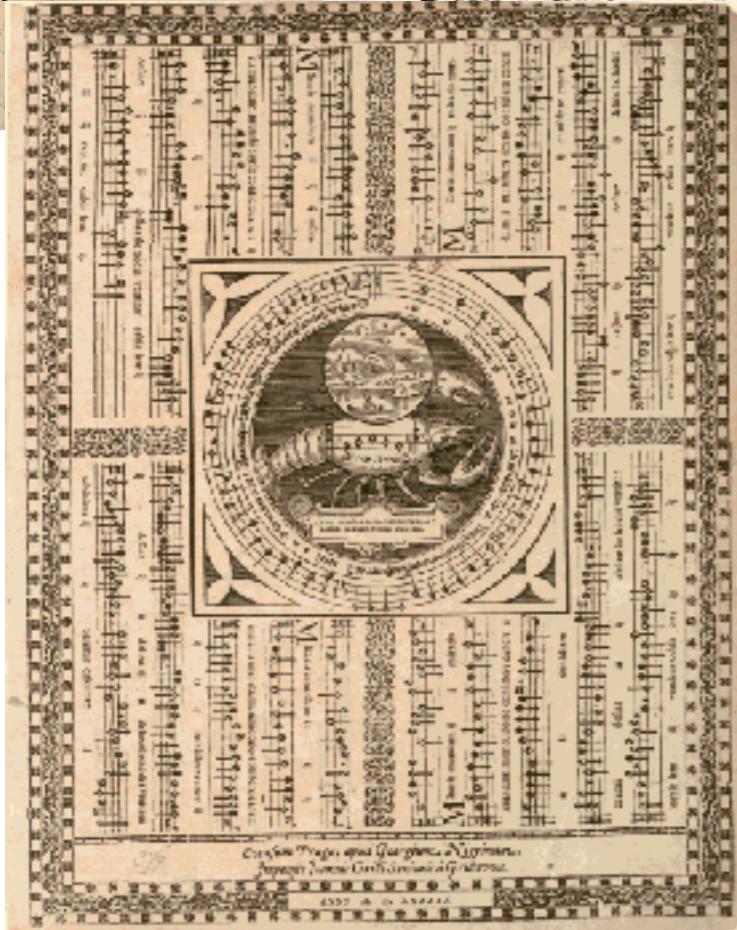
- achtergrond in de musicologie
- 15<sup>e</sup> en 16<sup>e</sup> eeuwse muziek
- vanaf 2006: CMME Project (Associate Director)
- vanaf 2013: proefschrift over network theory & de verspreiding van muziek in de 16<sup>e</sup> eeuw

**A** peintre folle

**B** peintre folle

*l'espous.*

Que vous madame le chante. Nostre sera de nos  
Perue. Et tant quanta de seuf die. Gade  
manez quis se parure.  
One foy adouc me domay. Onys porto meudonay.  
Er de seuf. Er de gracie



**C** Mille pro sociis d'Amiens.

*Equan. t'ma*

na deua ae

**D** Antiphona de die vienamore.

*E temia dona*

*et lue vexina*

*teccat cie.*

*All'Etemia dona*

*domine et lue vexina*

*teccat cie.*

**E** TACHET BERCIEN

*valu gladditatis dilecta mea qualis est dilectio mea dilectio mea*

*lis est dilecta filie sior non est lumen non est os si tis suntis tam suntis tam form*

*tam formosa nalle suntis gratiosa nalle suntis gratiosa super omnes speciosi super a*

*sa super omnes speciosa speciosa ex ergo gloriosa audi*

*thum te laudation exaltata te traxitum*

*sainte ma ria dia gloriosi sancta maria*

# Wat is een database?

Wikipedia (NL): *Een database, gegevensbank of databank is een digitaal opgeslagen archief, ingericht met het oog op flexibele raadpleging en gebruik.*

<https://nl.wikipedia.org/wiki/Database>

Wikipedia (EN): *A database is an organized collection of data. It is a collection of schemas, tables, queries, reports, views, and other objects.*

<https://en.wikipedia.org/wiki/Database>

# Functies

- informatie opslaan
  - informatie bewerken
  - informatie vinden
- ( CRUD: Create, Read, Update en Delete )



- AQL is a query language for the native multi-model database ArangoDB.
- .QL is a proprietary object-oriented query language for querying relational databases; successor of Datalog;
- Contextual Query Language (CQL) a formal language for representing queries to information retrieval systems such as web indexes or bibliographic catalogues.
- CQLF (CODASYL Query Language, Flat) is a query language for CODASYL-type databases;
- Concept-Oriented Query Language (COQL) is used in the concept-oriented model (COM). It is based on a novel data modeling construct, concept, and uses such operations as projection and de-projection for multi-dimensional data;
- Cypher is a query language for the Neo4j graph database;
- DMX is a query language for Data Mining models;
- Datalog is a query language for deductive databases;
- F-logic is a declarative object-oriented language for deductive databases and knowledge representation.
- FQL enables you to use a SQL-style interface to query the data exposed by the Graph API. It provides advanced features not available in the Graph API.<sup>[1]</sup>
- Gellish English is a language that can be used for queries in Gellish English Databases, for dialogues (requests and responses) as well as for information modeling and knowledge modeling.<sup>[2]</sup>
- Gremlin is an Apache Software Foundation graph traversal language for OLTP and OLAP graph systems.
- GraphQL is a data query language developed by Facebook as an alternate to REST and ad-hoc webservice architectures.
- HTSQL is a query language that translates HTTP queries to SQL;
- ISBL is a query language for PRTV, one of the earliest relational database management systems;
- LINQ query-expressions is a way to query various data sources from .NET languages
- LDAP is an application protocol for querying and modifying directory services running over TCP/IP;
- LogiQL is a variant of Datalog and is the query language for the LogicBlox system.
- MQL is a cheminformatics query language for a substructure search allowing beside nominal properties also numerical properties;
- MDX is a query language for OLAP databases;
- N1QL is a Couchbase's query language finding data in Couchbase Servers;
- OQL is Object Query Language;
- OCL (Object Constraint Language). Despite its name, OCL is also an object query language and an OMG standard;
- OPath, intended for use in querying WinFS Stores;
- OttoQL, intended for querying tables, XML, and databases;
- Poliqarp Query Language is a special query language designed to analyze annotated text. Used in the Poliqarp search engine;
- PQL is a special-purpose programming language for managing process models based on information about scenarios that these models describe;
- QUEL is a relational database access language, similar in most ways to SQL;
- RDQL is a RDF query language;
- ReQL is a query language used in RethinkDB ↗;
- SMARTS is the cheminformatics standard for a substructure search;
- SPARQL is a query language for RDF graphs;
- SPL is a search language for machine-generated big data, based upon Unix Piping and SQL.
- SCL is the Software Control Language to query and manipulate Endevor objects
- SQL is a well known query language and Data Manipulation Language for relational databases;
- SuprTool is a proprietary query language for SuprTool, a database access program used for accessing data in Image/SQL (formerly TurboIMAGE) and Oracle databases;
- TMQL Topic Map Query Language is a query language for Topic Maps;
- TSQL is a language used to query topology for HP products ↗
- Tutorial D is a query language for truly relational database management systems (TRDBMS);
- XQuery is a query language for XML data sources;
- XPath is a declarative language for navigating XML documents;
- XSPARQL is an integrated query language combining XQuery with SPARQL to query both XML and RDF data sources at once;
- YQL is an SQL-like query language created by Yahoo!

## Query languages...

# Gestructureerde data

Informatie heeft een structuur

die je kan modelleren;

die je kan standaardiseren.

Nosquon



Que vous madame fechue. Rest ne sera demoy  
seme. Et tant qu'aura die seef die. Grande  
namez qui se parture.



Une sois adoue me donne.

Ongz piez mens le rodomay.

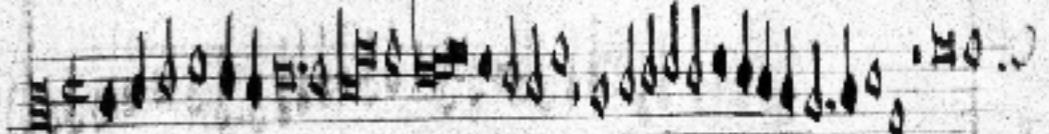


Cartes my donne.  
amoy sa donne.

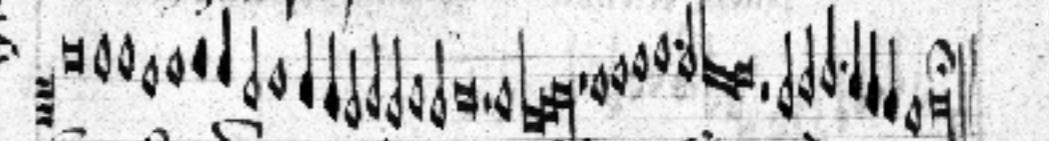
Et de mesf  
Eudre gracie

Grande me soit dite l'heure  
Saultre ame franchise assurie  
Et malheur auon desferme  
Se nulle dame me connue

Que vous madame

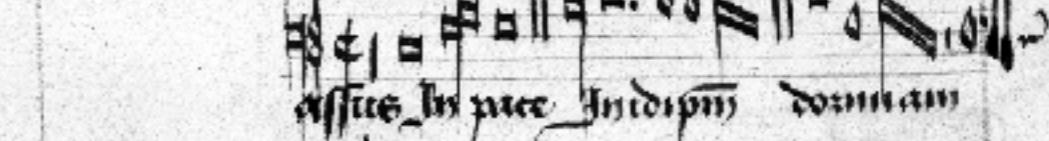


Enor. Que vous madame fechue. Rest ne segt  
de moy seme. Et tal quanta die seffre. Grande  
namez qui se parture

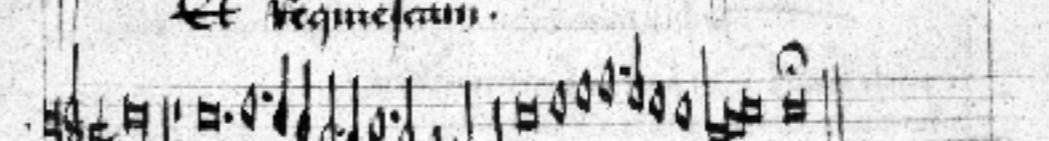


Une sois adoue me donne. Et de mesf die my donne.

Ongz piez mens le rodomay. Se die grace amoy sa donne



assus. In pice. In idipm. domian  
Et regnescam.



Si dedero sompnum oculis mie.

# Gestructureerde data

- Entiteiten
- Attributen
- Relaties

>> domein specifiek!

# Gestructureerde data



componeerde

Naam: Josquin Desprez  
Geboortedatum: 1450/55  
Sterftedatum: 1521



werkte in



# Standaardisatie

- Josquin Desprez
- Josquin Lebloitte
- Des Prez, Josquin
- Iosquinus Pratensis
- Iodocus a Prato



# Standaardisatie

1 July 1450

01/07/1450

1450/07/01



# Typen databases

- \* Document georiënteerd
  - \* Relationale
  - \* Graph-gebaseerd
- >> afhankelijk van type informatie  
& benodigde functionaliteit

# Document databases

- op basis van ‘document’
- als je bestaande (verschillende) documenten hebt; niet bepaald door database structuur
- bijv. XML-files: hierarchisch, zelfbeschrijvend, boomstructuur
  - software: MongoDB, eXist
  - query language: Xquery, Xpath

# Relationele databases

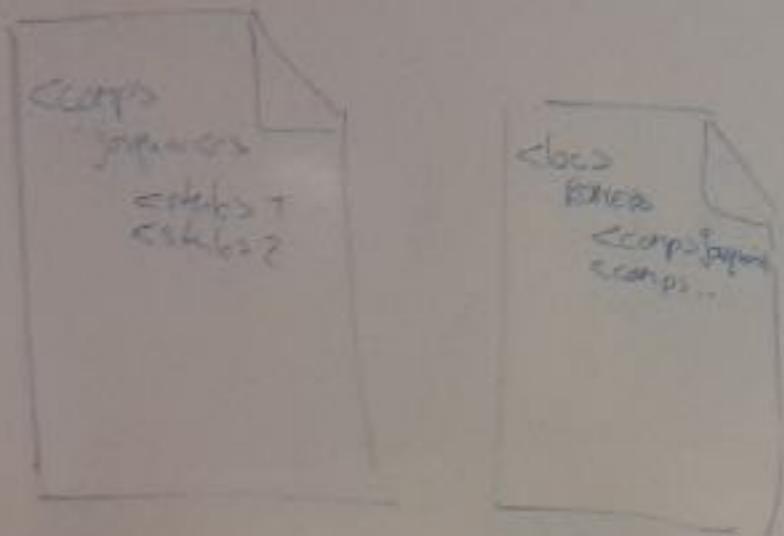
- afzonderlijke entiteiten en attributen ondergebracht in tabellen
  - koppeling tussen tabellen ('many-to-many' relaties)
  - reductie van redundante informatie
- software: MS Access, Filemaker, MySQL, SQLite
- query language: SQL

# Graph databases

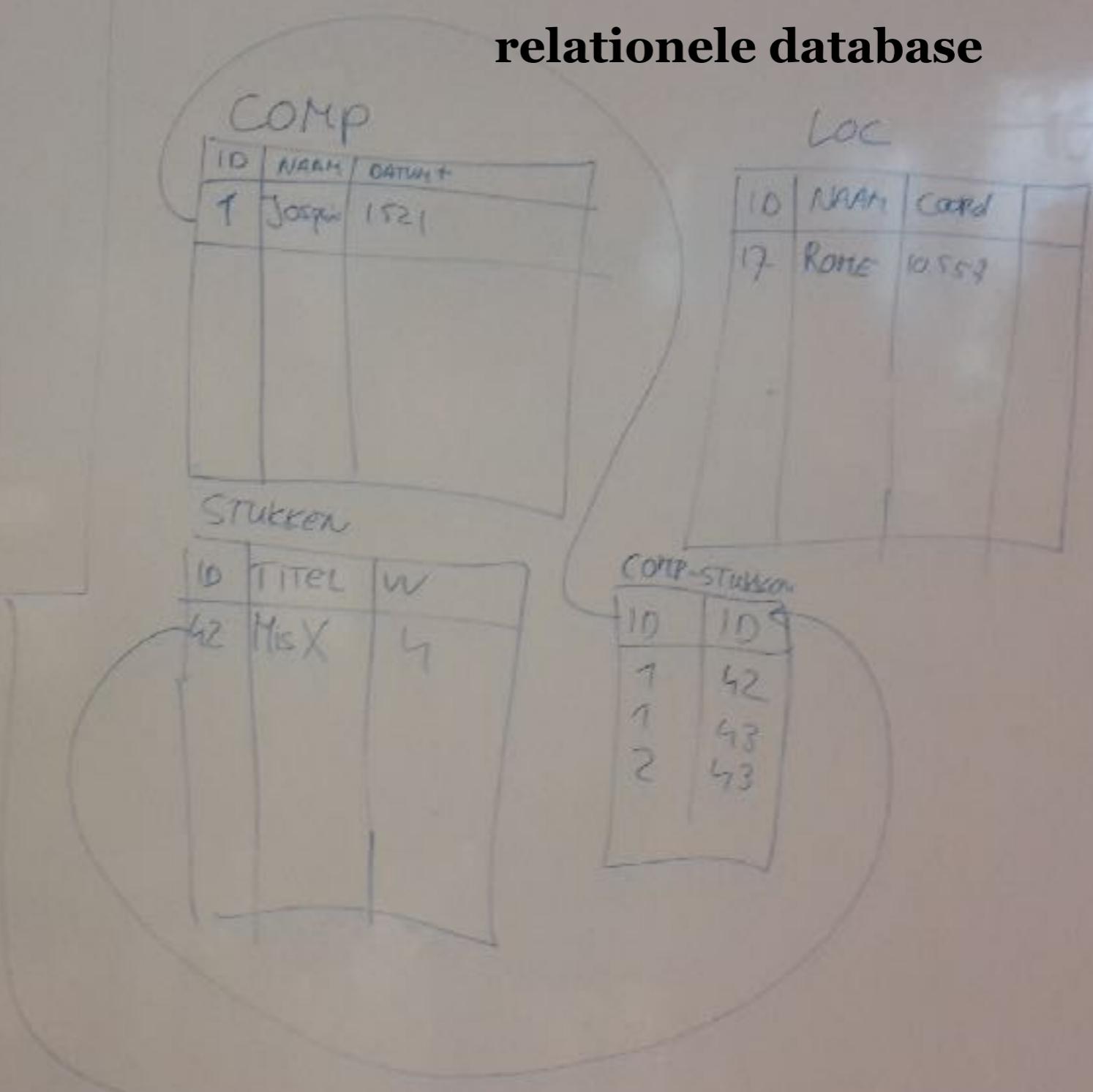
- goed in relaties (*edges*) tussen informatie (*nodes*)
- informatie (sneller) benaderbaar vanaf elk punt
- koppeling met het *semantic web*
  - software: Neo4j
  - query language: SPARQL, GraphQL

#DH

## Document database



## relationele database



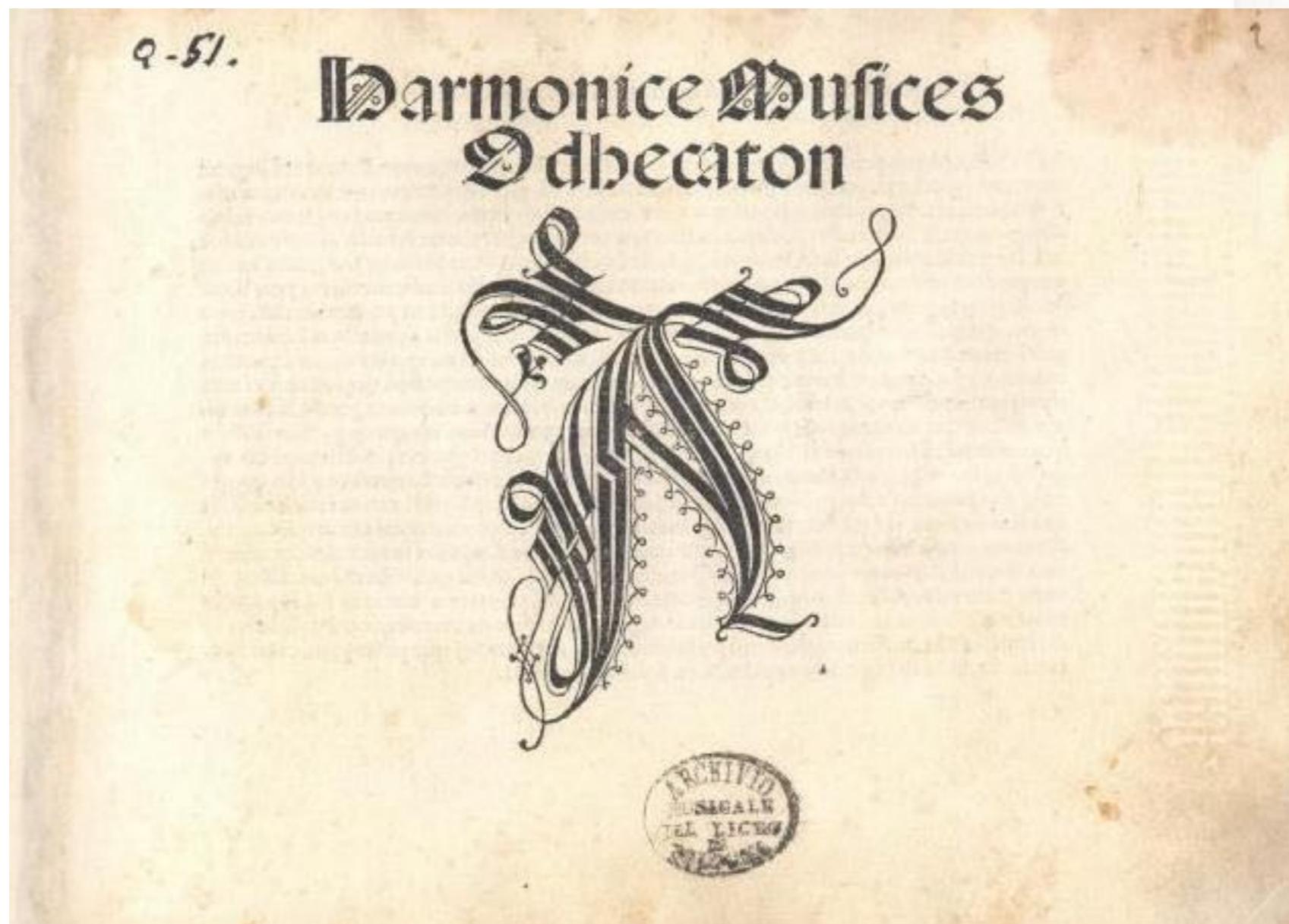
## Graph database



# Wat wanneer gebruiken?

- soort data / structuur van data
- hoeveelheid data
- technische kennis / affiniteit
- technische context
- ‘populariteit’

# Een voorbeeld



Petrucci's *Odhecaton A* (1501) - de 'eerste muziekdruk'

Aquetro.		Jay pris amours. Japart 24	B.tre.	
Aue maria. Folio	xii	James James	39 Elles regres; Agricola	54 Ille dosbt
Amours amours	xvi	Denay dueal	43 Elles regres; Hayne.	55 Ille le bouche
Eldien mes amours	xvii	Jay pris amours . Busnois	Elles mon cor.	63 Ille bouche rit
Amours amours amours	xxvi	Iene demande,	45 Benedict <sup>o</sup> Yzac.	71 Ille des pensees
Elons ferēs barbe	29	Lenzotta mia	48 Lela sans plus: Josquin	83 Illeater patris
Amor fait molt	34	Loseraie dire.	x Lelons nouel.	87 Maloz me bat.
Accordes moy	36	Le serviteur	xxii De tousbiés: Bourdō	82 Madame helas
Ala audienche	99	Latura tu.	xxviii Dissant adiu madame.	80 Illeuseule dame
Brunetta.	8	Mon mignault	101 Est il possible	94 Ilmon sour enir
Bergerette sauoyene.	xiii	Meskin es hu.	20 Fortuna pta crudelte	179 Margueritte
Lest mal charche.	xv	Mūqua fue pena masor	103 Fortuna dū gran tépo	66 Mais que ce fust
Lela sans plus	27	Notre cambriere	7 Barisses moy	81 Quenus bant
Dit le bourgniguon	xxi	Nous sommes delordre	xxiv Gentil prince	64 Mensif mari
Detous biens	23	Pour quoyn non	41 Helas . Yzac.	95 Muſ que de vo <sup>o</sup>
De tous biens	Josgn 103	Pour quoyn iene puis dire	xviii Helas : Tintoriss.	56 Royne de fleurs
Et qui le dira	xvii	Ronpeltier.	19 Ha traître amours.	58 Royne du ciel
Braticuse.	20	Secugie pris. Japart	28 Jay bien hauer	93 Semieulx
Hbor oires.	6	Emeskin vas funch	25 La morra	96 Si dedero
Helas . Laron.	xxvi	Tan bien mi son pesa	xxix Lome bant.	50 Si atort on ma blamee
Helas ce nest pas	22	T sat een meskin	xxvii La stangerita	53 Tant ha bon ocul
Helas q il est amongre	xxxiii	Uteray dieu damours	97 La plus des plus	55 Tander naken
Helogeron nous	46	Ung franc archier.	xxxi Le corps.	70 Tlenis regres
De cuide.	5	Clostre bargeronette	47 Le renuoy.	73 Tlenus tu ma pris
Jay pris amours.	9		La alfonsina	78
Je ne fay plus.	xii		Le eure e venue	84
				88
				89

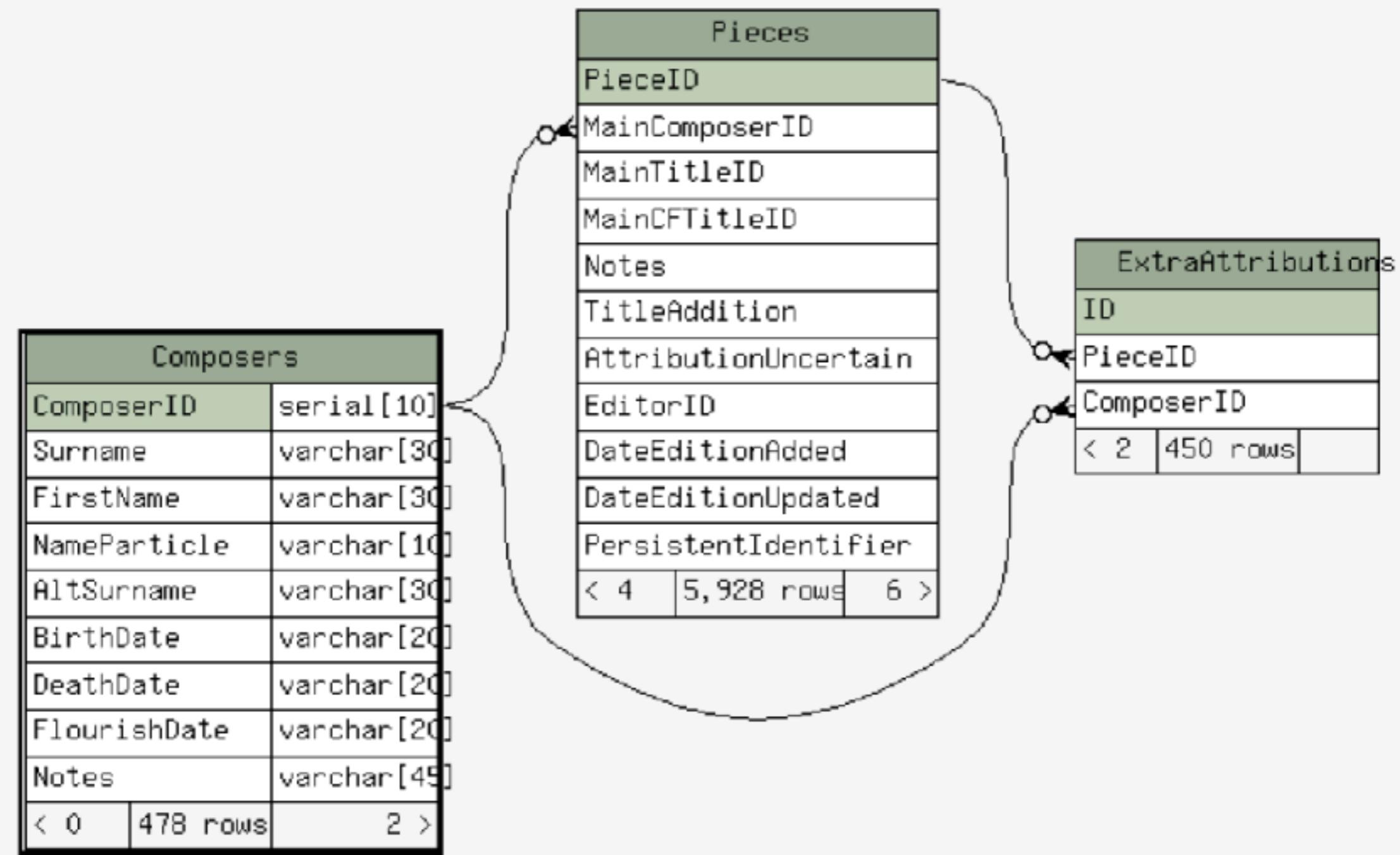
**1501**  
**HARMONICE MUSICES ODHECATON A (VENICE, 1501)**

Origin: Venice  
 Date: 1501

Contents

<i>Loc.</i>	<i>Title</i>	<i>Voices</i>	<i>Composer</i>
A3v-A4r	<a href="#"><u>Ave maria gratia plena</u></a>	4	<a href="#"><u>Marbrianus de Orto</u></a>
A4v-A5r	<a href="#"><u>Je cuide se ce temps me dure</u></a>	4	<a href="#"><u>[Petrus Congiet]</u></a>
A5v-A6r	<a href="#"><u>Hor oires une chanzon</u></a>	5	<a href="#"><u>Anonymous</u></a>
A6v-A7r	<a href="#"><u>Nunca fue pena maior</u></a>	4	<a href="#"><u>[Johannes Wreedel]</u></a>
A7v-A8r	<a href="#"><u>Brunette m'amiette</u></a>	5	<a href="#"><u>Johannes de Stokem</u></a>
A8v-B1r	<a href="#"><u>J'ay pris amours - De tous biens</u></a>	4	<a href="#"><u>Anonymous</u></a>
B1v-B2r	<a href="#"><u>Nenciozza mia</u></a>	4	<a href="#"><u>[Jean Japart]</u></a>
B2v-B3r	<a href="#"><u>Je ne fay plus</u></a>	4	<a href="#"><u>[Busnoys/Compère/Mureau]</u></a>
B3v-B4r	<a href="#"><u>Amours amours trop me fiers</u></a>	4	<a href="#"><u>Hayne van Ghizeghem</u></a>
B4v-B5r	<a href="#"><u>Bergerette savoyenc</u></a>	4	<a href="#"><u>Josquin Desprez</u></a>
B5v-B6r	<a href="#"><u>Et qui la dira dira</u></a>	4	<a href="#"><u>[Henricus Isaac]</u></a>
B6v-B7r	<a href="#"><u>C'est mal charché</u></a>	4	<a href="#"><u>Alexander Agricola</u></a>
B7v-B8r	<a href="#"><u>Helas que pourra devenir</u></a>	4	<a href="#"><u>Firminus Caron</u></a>
B8v-C1r	<a href="#"><u>Adieu mes amours a4</u></a>	4	<a href="#"><u>Josquin Desprez</u></a>
C1v-C2r	<a href="#"><u>Pourquoy non ne veuil je morir</u></a>	4	<a href="#"><u>Pierre de La Rue</u></a>
C2v-C3r	<a href="#"><u>Pourquoy je ne puis dire - Vray dieu d'amour,</u></a>	4	<a href="#"><u>Johannes de Stokem</u></a>
C3v-C4r	<a href="#"><u>Mon mignault - Gracieuse playsante muniere</u></a>	4	<a href="#"><u>[Antoine Busnoys]</u></a>
C4v-C5r	<a href="#"><u>Dit le bourguignon</u></a>	4	<a href="#"><u>Anonymous</u></a>
C5v-C6r	<a href="#"><u>Helas ce nest pas sans rayson</u></a>	4	<a href="#"><u>Johannes de Stokem</u></a>
C6v-C7r	<a href="#"><u>De tous biens playne</u></a>	4	<a href="#"><u>[Hayne van Ghizeghem]</u></a>
C7v-C8r	<a href="#"><u>J'ay pris amours I</u></a>	4	<a href="#"><u>Jean Japart</u></a>
C8v-D1r	<a href="#"><u>Se congic pris</u></a>	4	<a href="#"><u>[Jean Japart]</u></a>

Aquetro.			B.tra.		
Aue maria. Folio	xiiii	Jay pris amours. Japart 24	Elle dosbt	51	
Amours amours	xvi	James fames	Elles regres: Maricola	54	elle le bouche
Eldien mes amours	xvii	Denay dueal	Alcs regres: Hayne.	53	elle bouche rit
Amours amours amours	xxvi	Jay pris amours. Busnois	Elles mon coz.	71	elles pensees
Elons ferés barbe	29	Iene demande,	Benedict' Yzac.	83	ellesater patris
Amor fait molt	34	Lenzotta mia	Lela sans plan: Josquin	67	Maloz me bat.
Accordes moy	36	Loseraie dire.	x Lelons nouer.	62	Madame helas
Ala audiencie	99	Le seruiteur	xxii De tousbiés: Bourdō	80	asseule dame
Brunetta.	8	Latura tu.	xxviii Dissant adiu madame.	94	mon sour enir
Bergerette sauoyene.	xiii	Mon mignault	101 Est il possible	179	Margueritte
Lest mal charche.	xv	Meskin es hu.	20 Fortuna pta crudelte	66	Mais que ce fust
Lela sans plus	27	Muqua fue pena masor	103 Fortuna dū gran tépo	81	Ouenus bant
Dit le bourgniguon	xxi	Notre cambriere	xxiv Gentil prince	64	Pensif mari
Detous biens	23	Nous sommes delordre	41 Helas. Yzac.	95	Wuis que de vo*
De tous biens	103	Pour quoynon	xxviii Helas: Lintori.	56	Royne de fleurs
Et qui le dira	xiii	Pour quoyn iene puis dire	19 La trailli amour.	58	Royne du ciel
Braticuse.	20	Ronpeltier.	28 Jay bien hauer	93	Semiculx
Hbor oires.	6	Secugie pris. Japart	25 La morra	96	Si dedero
Helas. Laron.	xxvi	Temeskin vas tunc	xxix Lome bant.	50	Si atort on ma blamee
Helas ce nest pas	22	Tan bien mis son pesa	La stangerita	53	Tant ha bon ocul
Helas q'il est amongre	xxxi	T sat een meskin	97 La plus des plus	55	Tander naken
Helogeron nous	46	Uteray dieu damours	xxviii Le corps.	70	Tlenis regres
De cuide.	5	Ung franc archier.	xxxi Le grans regres	73	Tlenus tu ma pris
Jay pris amours.	9	Clostre bargeronette	47 Le renvoi.	78	
Je ne fay plus.	xii		La alfonsina	84	
			Le eure e venue	88	
				89	



**Aquatro.**

Ave maria. Folio  
 Amours amours  
 Eidiem mes amours  
 Amours amours amours  
 Elons ferés barbe  
 Amor fait molt  
 Accordes moy  
 Ala audiencie  
 Brunetta.  
 Bergerette saj oyene.  
 Lest mal chardie.  
 Lela sans plue  
 Dit le bourgnouon  
 Detous biens  
 De tous biens  
 E qui le dira  
 Graticuse.  
 Moroires.  
 Melas. Laton.  
 Melas ce nest pas  
 Melas q'il est amongre  
 Melogeron nous  
 Ne cuide.  
 Jay pris amours.  
 Je ne fay plus.

**Jay pris amours. Japart 24**

foli James James  
 xii Denay dueal  
 xvii Jay pris amours . Busnois  
 xxvi Tene demande,  
 29 Lenzotta mia  
 34 Loseraie dire.  
 36 Le serviteur  
 99 Latura tu.  
 8 Mon mignault  
 xiii Meskin es hu.  
 xv Nüqua fue pena masor  
 27 Mostre cambriere  
 xxi Nous sommes delordre  
 23 Pour quoyn non  
 Josgn 103 Pour quoyn iene puis dire  
 xiiii Ronpeltier.  
 20 Secugie pris. Japart  
 6 Emeskin vas funch  
 xvi Tan bien mi son pesa  
 22 T sat een meskin  
 xxxiii Uteray dieu damours  
 46 Ung franc archier.  
 5 Mostre bargeronette  
 9  
 xi

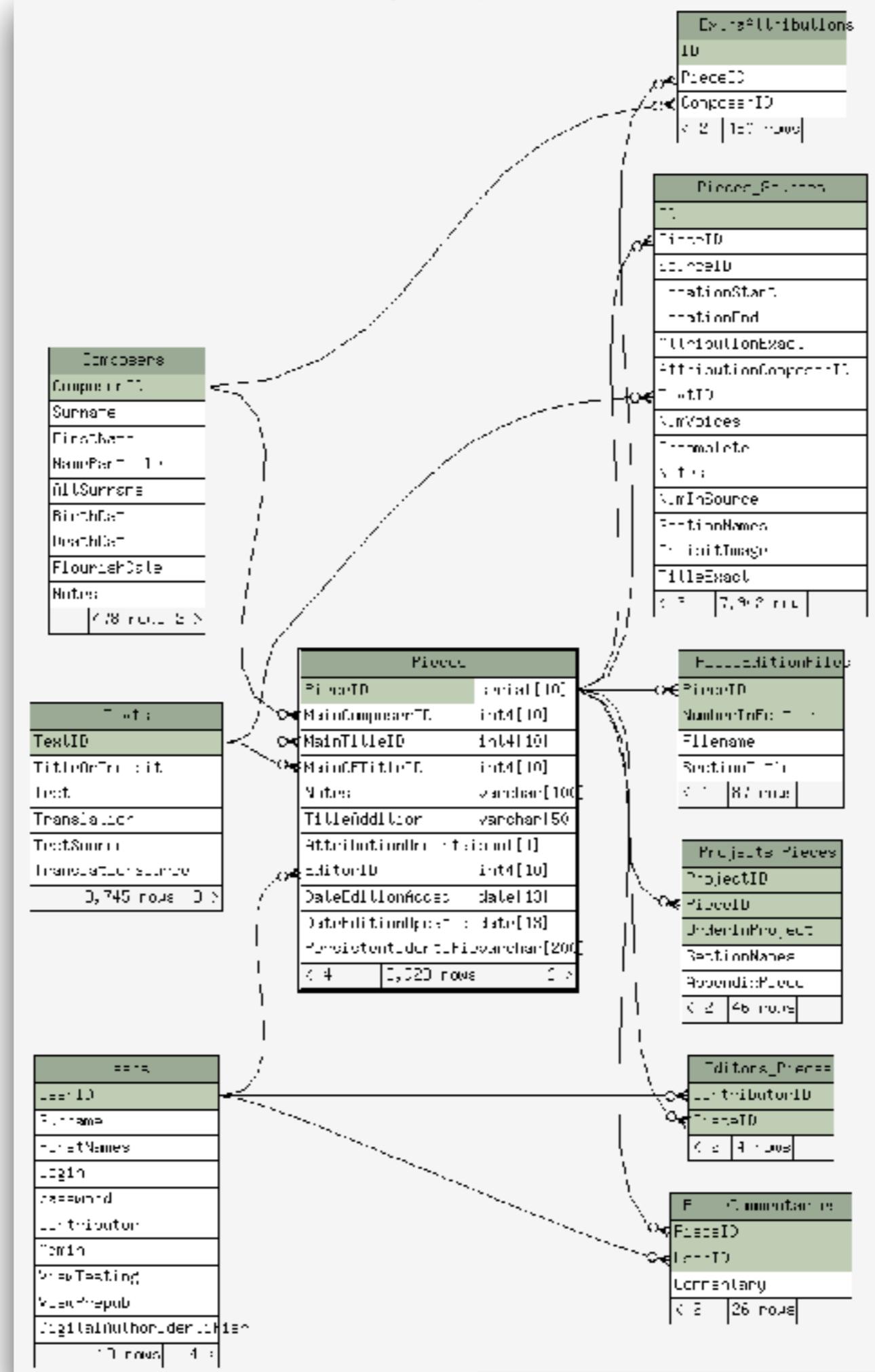
**B.tre.**

39 Elles regres; Agricola  
 43 Elles regres; Hayne.  
 Busnois Elles mon cor.  
 45 Benedict<sup>9</sup> Yzac.  
 48 Lela sans plus: Josquin  
 x Lelons nouel.  
 xxxii De tousbiés: Bourdō  
 xxviii Dissant adiu madame.  
 101 Est il possible  
 20 Fortuna pta crudelte  
 103 Fortuna du gran tépo  
 7 Barisses moy  
 xxxv Gentil prince  
 41 Melas. Yzac.  
 xviii Melas: Tintorff.  
 19 Ha traître amours.  
 28 Jay bien hauer  
 25 La morra  
 xxx Lome bant.  
 xxvii La stangerita  
 97 La plus des plus  
 xviii Le corps.  
 xxxi Le grans regres  
 47 Le renvoi.  
 La alfonsina  
 Le eure e venue

**Alle dosbt**

54 Al le bouche  
 63 Alha bouche rit  
 71 Albel pensees  
 83 Alater patris  
 67 Maloz me bat.  
 81 Madame helas  
 80 Alaseule dame  
 94 Alson sour enir  
 179 Margueritte  
 66 Mais que ce fust  
 81 Quenus bant  
 64 Mensifmari  
 95 Muis que de vo<sup>9</sup>  
 56 Royne de fleurs  
 58 Royne du ciel  
 93 Semieulx  
 96 Si dedero  
 50 Si atort on ma blamee  
 53 Tant ha bon ocul  
 55 Tander naken  
 70 Tlenis regres  
 73 Tlenus tu ma pris  
 78  
 84  
 88  
 89





DeathDate
FlourishDate
Notes

SectionNames
IncipitImage
TitleExact

Texts
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TitleOrIncipit
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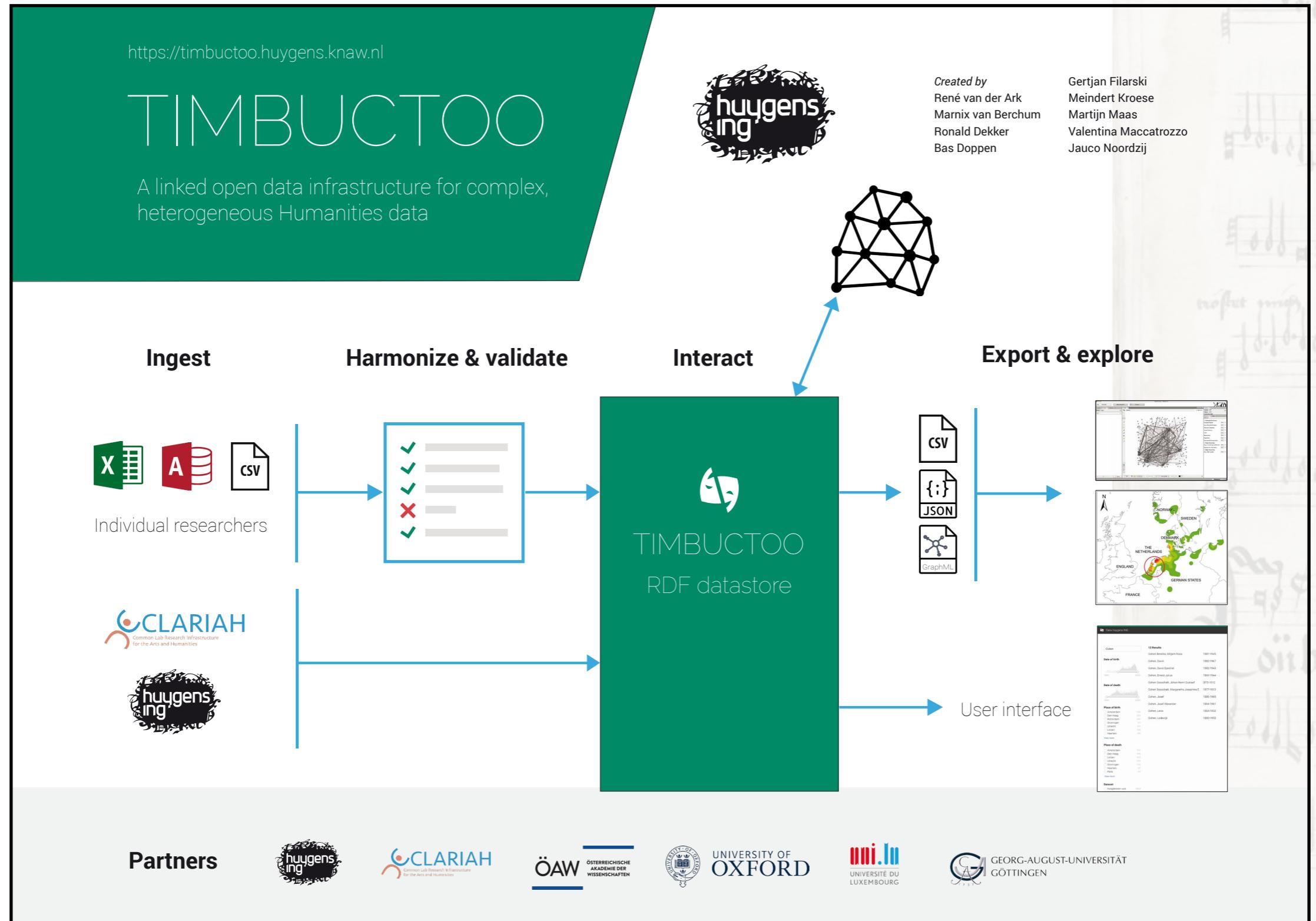
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UserID
Commentary

# Waarom gebruikt?

- soort data / structuur van data
- hoeveelheid data
- technische kennis / affiniteit
- technische context
- ‘populariteit’

# Een ander voorbeeld



# Waarom gebruikt?

- soort data / structuur van data
- hoeveelheid data
- technische kennis / affiniteit
- technische context
- ‘populariteit’

# Meer lezen?

Stephen Ramsay, “Databases”, in *A Companion to Digital Humanities*, ed. Susan Schreibman, Ray Siemens, John Unsworth. Oxford: Blackwell, 2004.  
<http://www.digitalhumanities.org/companion/>

Digital Humanities Questions & Answers » Databases & Data Structures, <http://digitalhumanities.org/answers/forum/databases-and-data-structures>

Overzicht oude muziek databases:

[https://docs.google.com/spreadsheets/d/  
1U3vxAGVQ32wtoHT7boTHBjirDzbhETASrTpM9TpHh-4/edit?usp=sharing](https://docs.google.com/spreadsheets/d/1U3vxAGVQ32wtoHT7boTHBjirDzbhETASrTpM9TpHh-4/edit?usp=sharing)  
[in bewerking]

Project Computerized Mensural Music Editing (CMME): <http://www.cmme.org>

en:

[http://dilbert.com/search\\_results?terms=database ;-\)](http://dilbert.com/search_results?terms=database ;-))

# Dank!

**Marnix van Berchum - Huygens ING**

mail: [marnix.van.berchum@huygens.knaw.nl](mailto:marnix.van.berchum@huygens.knaw.nl)

skype: marnixvb09

twitter: @marnixvb

