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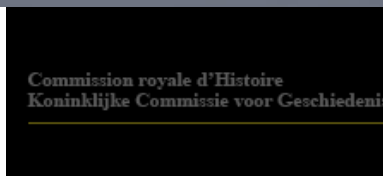
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José Enrique Pons Frías (University of Granada)

**When were medieval benefactors generous?**

**Time modelling in the development of the database**

*Diplomata Belgica*



# Overview

- Introduction
- *Diplomata Belgica* and the SMLC-project
- Handling of imperfect temporal information
- Research prospects: Patterns of generosity?
- Conclusion

# Introduction

- Prehistory of the *Diplomata Belgica*
  - 1866-1971: *Table chronologique des chartes et diplômes imprimés concernant l'histoire de la Belgique*
  - 1986: beginning of the project *Nouveau Wauters*: complete and computerised revision of the *Table chronologique*
  - Collaboration between Royal Historical Commission, Comité belge du dictionnaire latin médiéval and CETEDOC

# Introduction

- 1997 : *Thesaurus Diplomaticus* on CD-Rom (Brepols Publishers)
  - Analytical survey of all charters written between 640-1200 in the Southern Low countries: 12,745 documents
  - Edited or still unedited
  - Full text of 5,807 documents (Latin)
  - Photographs of 2,189 original charters
  - A pioneering electronic publication; today outdated
  - Main contract researcher: Philippe Demonty

# Introduction

- *Diplomata Belgica* 640-1250
  - 20,600 extra descriptions of documents
  - Full text of 12,167 documents (Latin & French)
  - Photographs of 2,400 charters
  - Threefold increase of the data in the *Thesaurus Diplomaticus*
  - Ongoing work: analysis of unedited cartularies
  - Not yet publicly accessible for research ends
  - Need for a well developed database structure and free online publication

# Introduction

- Project 'Sources from the Medieval Low Countries'
  - Flemish Hercules Foundation, 2010-2014
  - Project home institution: Ghent University
    - Henri Pirenne Institute for Medieval Studies
    - Database, Content and Document Management Research Group
  - Partners
    - Royal Historical Commission, Belgian State Archives
    - Universities of Leuven, Groningen and Utrecht
- Close collaboration between medievalists and IT-specialists
  - 'Custom made' software
  - New opportunities for both parties
  - E.g.: time modelling

# *Diplomata Belgica* and the SMLC-project

- 'Sources from the Medieval Low Countries' (SMLC)
  - Aim: a Multiple Database System for both *Diplomata Belgica* and *The Narrative Sources from the Medieval Low Countries* ([www.narrative-sources.be](http://www.narrative-sources.be))
  - Tasks
    - Updating the contents of *Narrative Sources*
    - Developing software for online consultation and content management of *Diplomata Belgica*
  - Two separate databases
    - Each with own online module for consultation
    - Each with own secured online module for data management
    - One extra module for combined searches in both databases

# Diplomata Belgica and the SMLC-project

Narrative Sources

The Narrative Sources from the Medieval Low Countries  
De verhalende bronnen uit de middeleeuwse Nederlanden  
Les sources narratives des Pays-Bas médiévaux

Royal Historical Commission  
Brussels - Since 2009  
September 29, 2011  
ISSN 2032-4677  
Nederlandse versie | Version française

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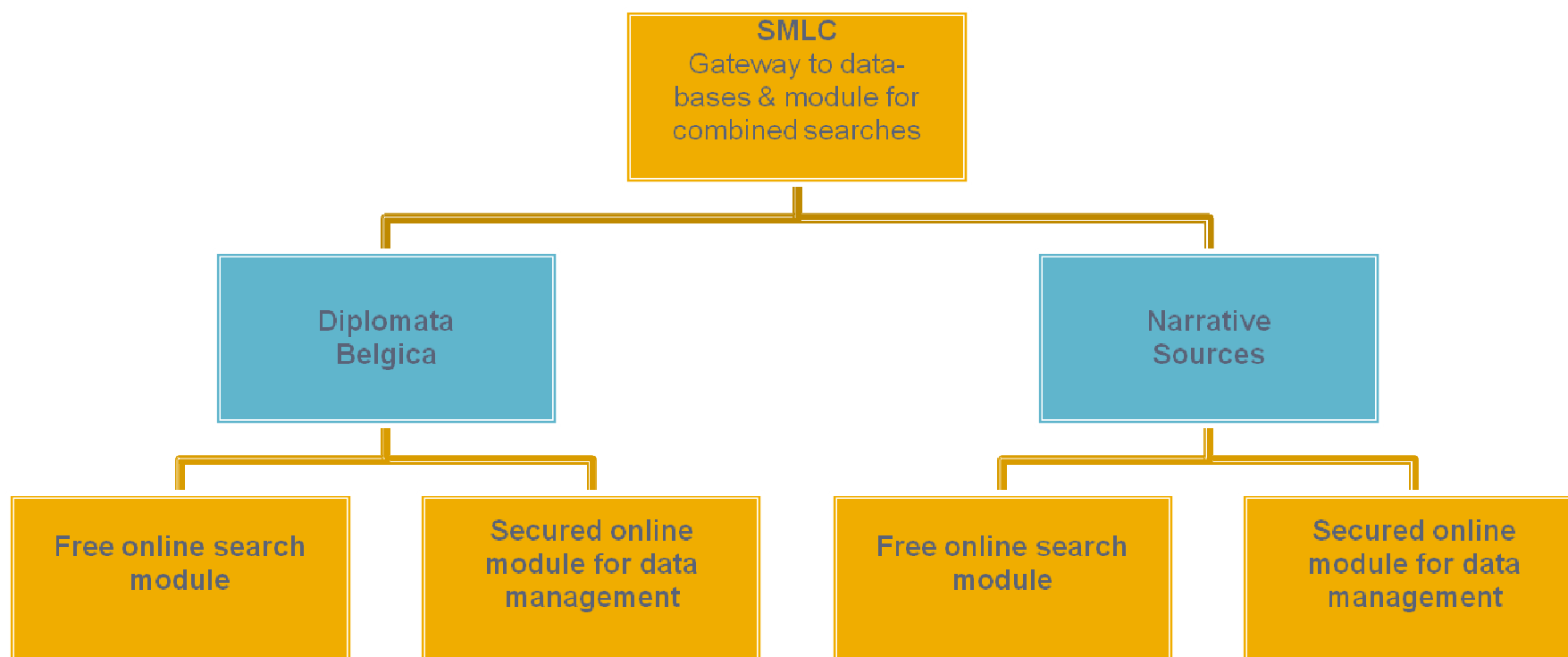
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Start | Narrative Sources - W... | Digital Diplomats 2011 - ... | Internet | Beveiligde modus: uitgeschakeld | 10:43

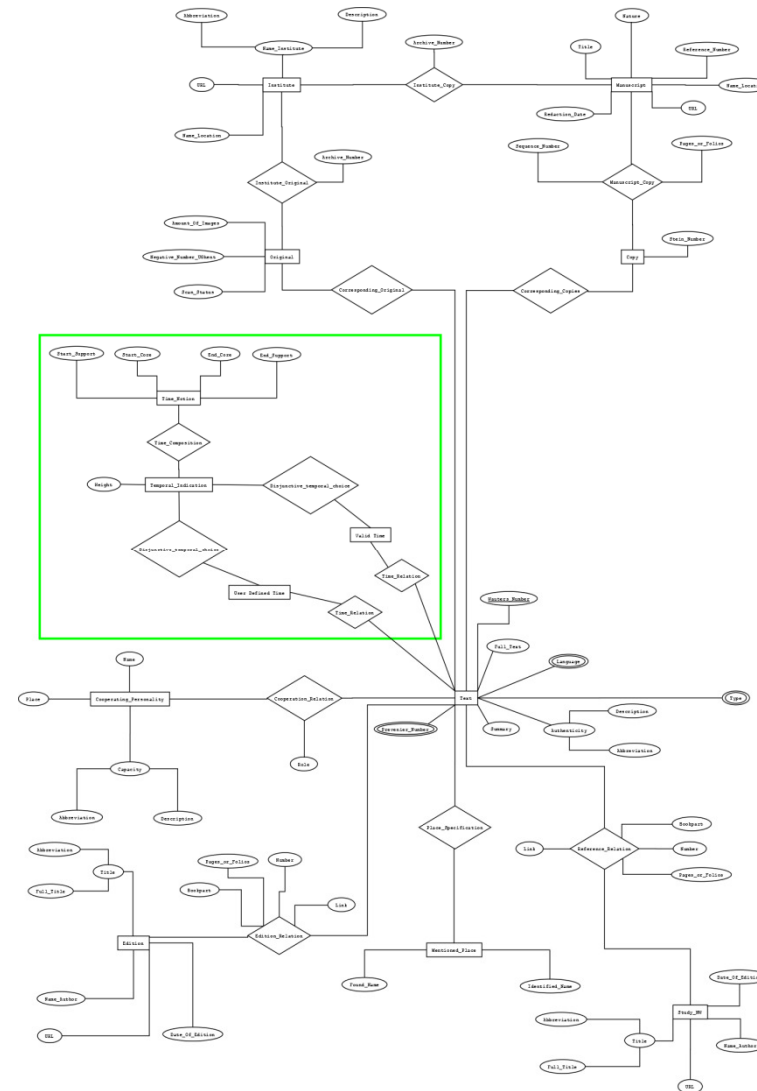


# *Diplomata Belgica* and the SMLC-project

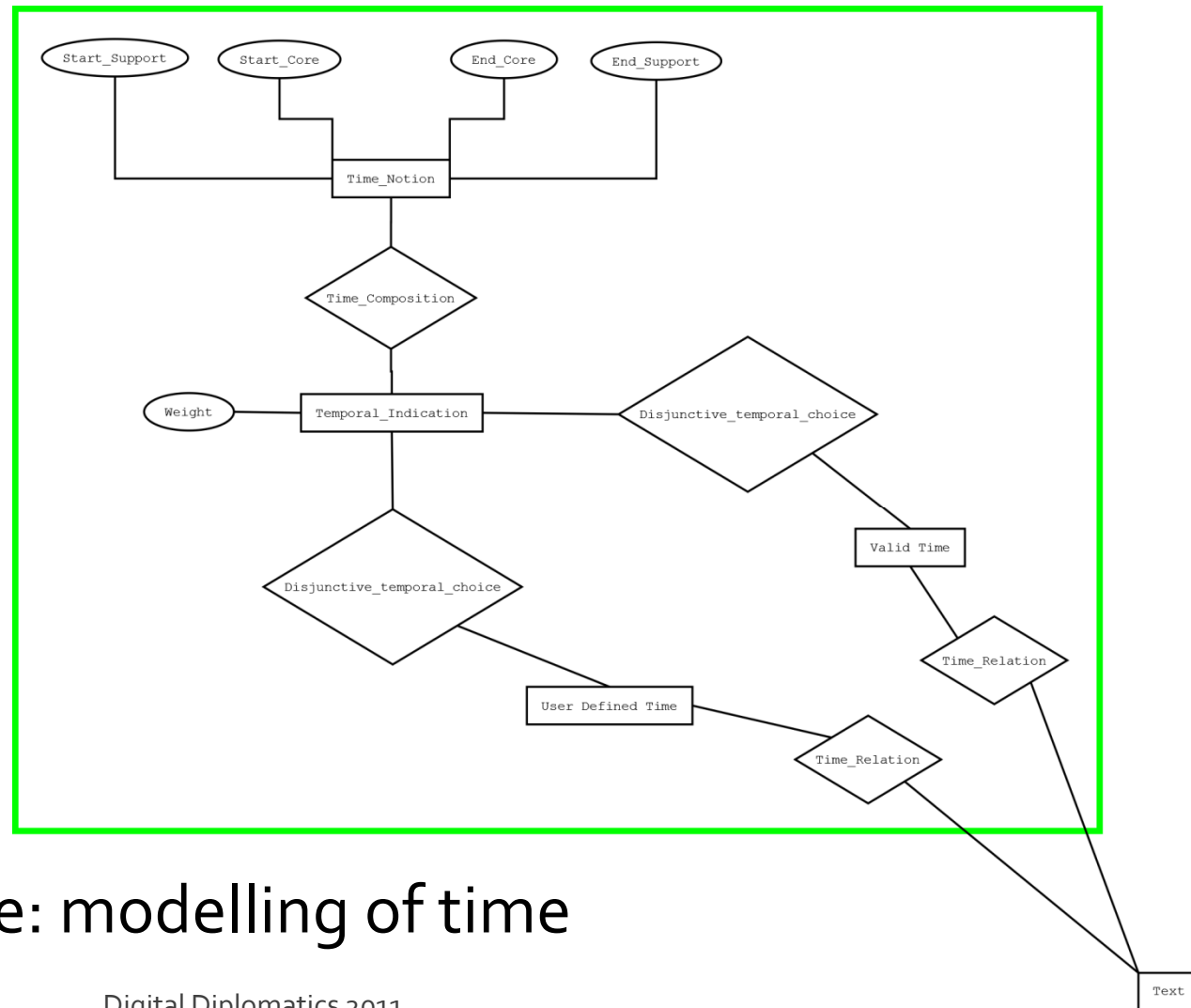


# Diplomata Belgica and the SMLC-project

- From a collection of datasets in Filemaker Pro to a relational database programmed in MySQL
- Reorganisation of data and fields in a new structure (see ER diagram)
- Facilitate future querying by end-users



# Diplomata Belgica and the SMLC-project



- Example: modelling of time

# *Diplomata Belgica* and the SMLC-project

- 'Date'-field in the *Thesaurus Diplomaticus*
  - Distinction between 'reference date' and 'more dating'
    - 'Reference date' (1 possibility) = most probable date
    - More dating (more possibilities) = alternative dates
    - Search screen: two different fields
  - "yyyy-mm-dd-code"

# *Diplomata Belgica* and the SMLC-project

## Possible codes

- 0 date mentioned in the document including at least the year
- 1 precise conjecture
- 2 impossible date
- 3 *terminus ante quem*
- 4 date belonging to a number of possible dates
- 5 date expressed in new style
- 8 approximation
- 9 *terminus post quem*

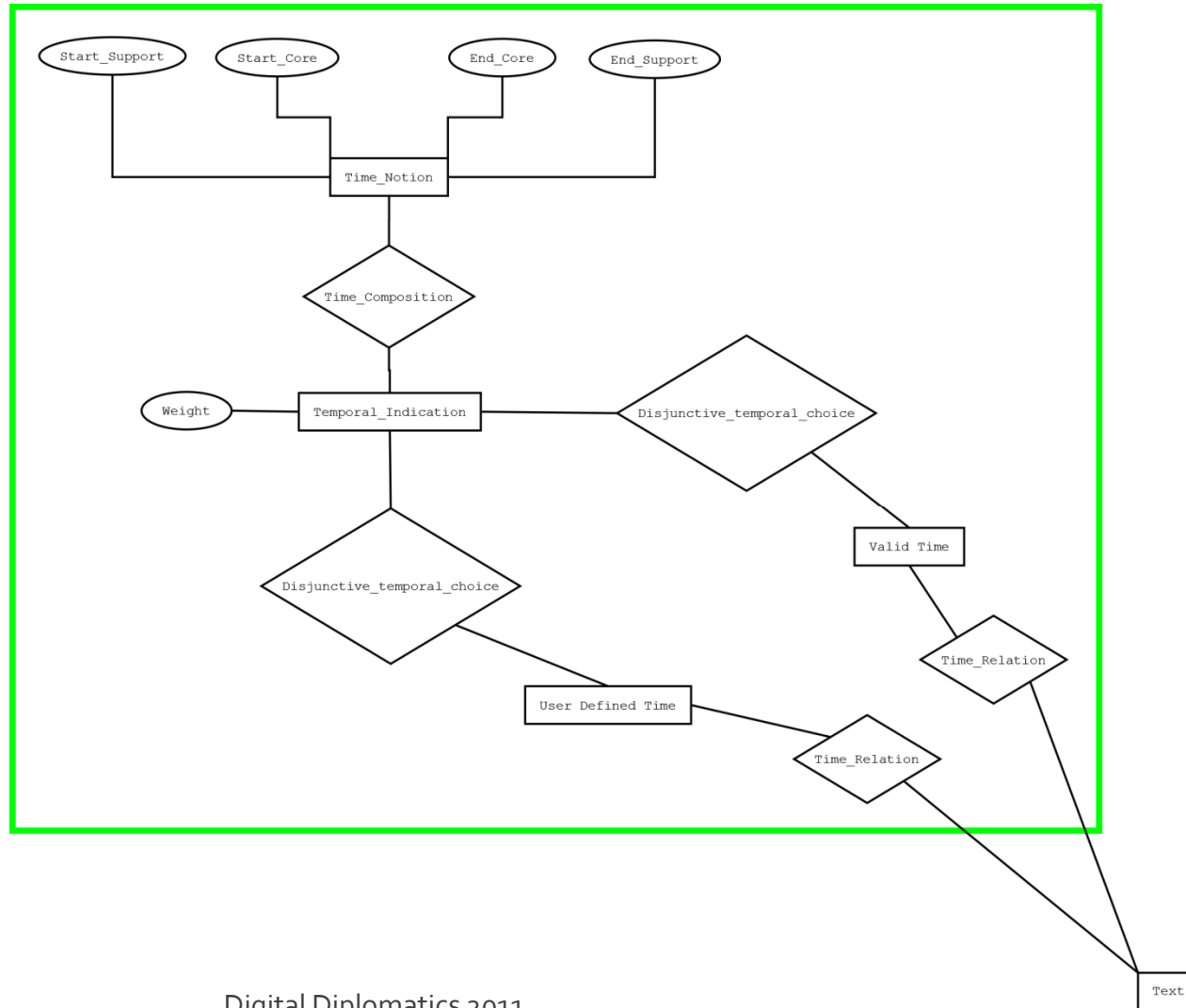
# *Diplomata Belgica* and the SMLC-project

- Example of code '0'
  - TEXT: *Actum Leodii in synodo generali V kalendas nouembris anno incarnationis domini ML indictione III anno XII regni III imperii domni Heinrici augusti Cuonradi Cesaris filii*
  - FULL DATE CODE 1080-10-28-0
- Example of code '1' (conjecture)
  - TEXT: *sub die XII kalendas februarii anno XVI regnante dominum Hludouuico gloriosissimo imperatore*
  - FULL DATE CODE: 0830-01-21-1 WAUTERS / BERINGS

# *Diplomata Belgica* and the SMLC-project

- No strict distinction is made between what is in the text (medieval user defined time) of the charter and what derives from scholarship (valid time)
  - Possible relations between user defined time and valid time:
    - a a
    - a b
    - a null
    - null b
    - null null
- Resolved in ER-diagram

# Diplomata Belgica and the SMLC-project





# *Diplomata Belgica* and the SMLC-project

- Example of code '4' (number of possibilities)
  - TEXT: *XII kalendas februarii indictione VII-ma anno XXVI regni inclyti regis Hlotarii et regiminis domni abbatis Womari XXVII*
  - FULL DATE CODE
    - 0980-01-21-4 GYSSELING-KOCH
    - 0975-01-21-4 GYSSELING-KOCH
- Example of code '5' (new style)
  - TEXT: *actum apud sanctum Germanum in Laya anno uerbi incarnati MCXCII mense februario*
  - FULL DATE CODE: 1193-02-99-5 DELABORDE

# Diplomata Belgica and the SMLC-project

Thesaurus Diplomaticus - Document Database

File Edit Index List Options Help

Search Result Text/Image Notice

CO X Godefrid et Mathilde épouse AB Gest (S.Pierre)  
1047-03-28-3 (0980-01-21-4) - Chartre - Document douteux - Original - D645 - [Original]

[ARENKA] -CHRISMON- cum plurima salutis remedia content larga deificae pietatis miseratione prouisa omnibus sanctae matris e+cclesie+ filius in hac conuale plorationis spei superne+ beatitudinis suspirantibus id felix et omni laudis pre+conio dignum inter diuina probatur negotia commercium quod ualet quisque [5] fidelium penturis temporalium rerum facultatibus aeternas ce+lestis regni conquirere diuitias. Auctor siquidem ce+ti et terre+ Iesus christus ad huius sancte+ negotationis studium fideles in sacro exhortans euangelio sic salutari cunctis intonauit uoce : tesaurizate uobis tesuros in ce+lo. [NARRATIO] Haec [PROTOCOLE] ego Godefridus gratia dei comes et uxor mea Mathildis [NARRATIO] sollicita mente pertractantes aeterni que flagrantis amore premi [10] cupientes que aliquantulum beatitudinis portionem consequi cum illis qui terrena sui patrimonia ad ce+lestes transtulerunt tesuros hoc nobis salubre usum est ut ex bonis a summo omnium rerum distributore clementer concessis tam nobis quam prodecessoribus nostris aliquid salutis remedium procurarem. Ideo que ad monasterium uocabulo Blandinum in primordiis [15] ab apostolico patre sanctissimo pontifice Amando constructum atque in honore principis apostolorum beatissimi Petri et doctores gentium Pauli consecratum processu uero temporis ab Arnulfo excellenti a fundamentis exstructum aedifici ut inueniuntur patet oculis in quo domus abbas Womarus non modico regularium collegio monachorum industrius pastor praesesse uidetur [DISPOSITIO] ad hoc ergo monasterium pro remedio anime+ nostre+ [20] filiorum que nostrorum donamus deo ac sancto Petro ce+lestis regni claugero res nostras perpetuo hoc est fiscum Holinum dictum situm in pago Tornacensi cum e+cclesia in honore sancti Martini et omnibus ad se pertinentibus id est Ramelgeis e+cclesia cum terra ad se pertinente quod est mansum I et Spethenul Idelandi mansum Lesdennum noua quoque uilla et quicquid pars fisci sperare uidentur in circumuentibus pascuis [25] pratis siluis aquarum que decursibus. Haec igitur omnia a presenti in futurum iugi e+uo possidenda ego Godefridus et uxor mea Mathildis in ius et potestatem ipsius loci tradimus atque transcribimus et ipsis dei famulis regularis uite+ studis sub monachi habitu in eodem coenobio christo famulantibus donata atque firmata esse uolumus quatinus he+c absque ullius refragatoris inquietudine uel contradictione habeant teneant [30] possideant propriis necessitatibus et stipendiis quo liberos in exequendis ualeant esse mandatis secundum sancti patris Benedicthi regulam sibi traditis atque pro nobis et nostris prodecessoribus deuotus domini misericordiam implorant. [CORROBORATIO] Si quis uero de omnibus successoribus nostris hereditibus aut prohereditibus peruersus contradictor seu extranea que+hibet persona huic traditionem nostre+ largitioni intui diuine+ pietatis pacte+ [35] et firmate+ unius refragatoribus contraire uoluerit atque hanc ausu nefario temerare presumpserit pre+sumptuosa illius audacia nullum obtineat effectum immo pro iniusta repetitione distringente fisco auro libras C et argenti CCCC coactus exsoluat. Preterea quod repetit non euadit sed presens donationis nostre+ testamentum nostra fidelium que roboratum astipulatione stabile et inuoluntum perenni e+uo maneat. [ESCHATOCOLE] [40] Actum publice in coenobio Blandino XII kalendas februarii indictione VII-ma anno XXXVI regni inclyti regis Hlotharii et regimini domni abbatis Womarum XXXVII Signum Godefridi comitis et coniugis eius Mathildis qui hanc traditionem fecerunt et firmari petierunt. Signum Arnulfi gloriosi marchysi iunioris. Signum Herimanni comitis [45] filii Godefridi comitis. Signum domni Uuomari abbatis. Signum Uuiggeri. Signum Lietberti. Signum Uuicberti. Signum Ingelberti aduocati. Signum Uuidonis pre+positi. Signum Geldhali. Signum Uualkeri. Signum Teodrici. Signum Bernardi. Ego quoque Rodulfus monachus uidi et cartam conscripsi.

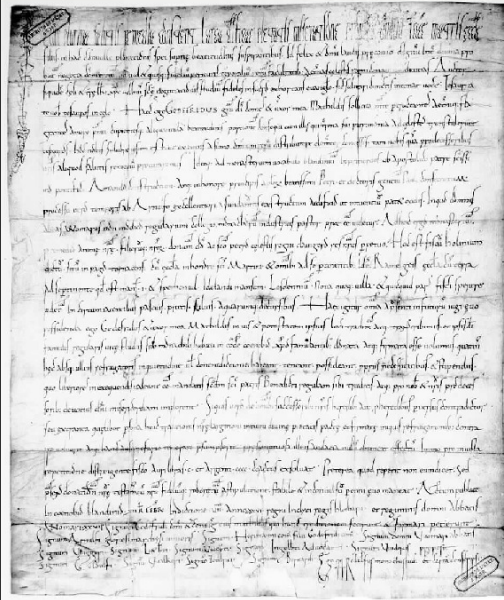


Image 1/1

Result: 2

# Diplomata Belgica and the SMLC-project

The screenshot shows a web browser window titled "Thesaurus Diplomaticus - Document Database". The interface includes a menu bar (File, Edit, Index, List, Options, Help) and a toolbar with various icons. Below the toolbar are tabs for "Search", "Result", "Text/Image", and "Notice". The main content area displays the following information:

Charte - Document douteux - Latin W560 / D645

0980-01-21-4 GYSELING-KOCH

0980-01-21-4 GYSELING-KOCH  
0975-01-21-4 GYSELING-KOCH  
0980-01-21-4 KOCH  
0979-01-21-4 KOCH  
0979-01-21-1 OPPERMANN  
0979-99-99-1 MIRAEUS  
0974-01-21-0 LIBER TRADITIONUM  
1047-03-28-3 FALSIFICATION (GYSELING-KOCH)

**Place document:** in coenobio Elandinio  
**Place date:** Gent (S.Pierre)

**Author(s)** CO X. Godefroid et Mathilde épouse  
**Issuer(s)** CO X. Godefroid et Mathilde épouse  
**Addressee(s)** AB Gent (S.Pierre)

donnent le "fiscus" de Hollain avec l'église et toutes les dépendances [Original] [Texte] - collationné sur original]

**EDITION(S)**  
**In Wauters** I,399/ VII,98  
**In Thesaurus Diplomaticus**  
GYSELING M.-KOCH A.C.F., *Diplomata Belgica*, I, p.168-169, n.67 (+ face).  
FAYEN A., *Liber Traditionum*, p.85-86, n.86 (notice).  
OPPERMANN O., *Die älteren Urkunden*, II, pl.7 (facs. fragm.).  
GYSELING M.-KOCH A.C.F., *Diplomata Belgica*, I, p.168-169, n.67 (+ face).

**STUDY(S)**  
OPPERMANN O., *éd. cit.*, *passim*.  
GYSELING M.-KOCH A.C.F., *éd. cit.*.  
KOCH A.C.F., *De dateringen*, p.172.

**ORIGINAL**  
Gent RA S.Pieters 51

Result: 2

# *Diplomata Belgica* and the SMLC-project

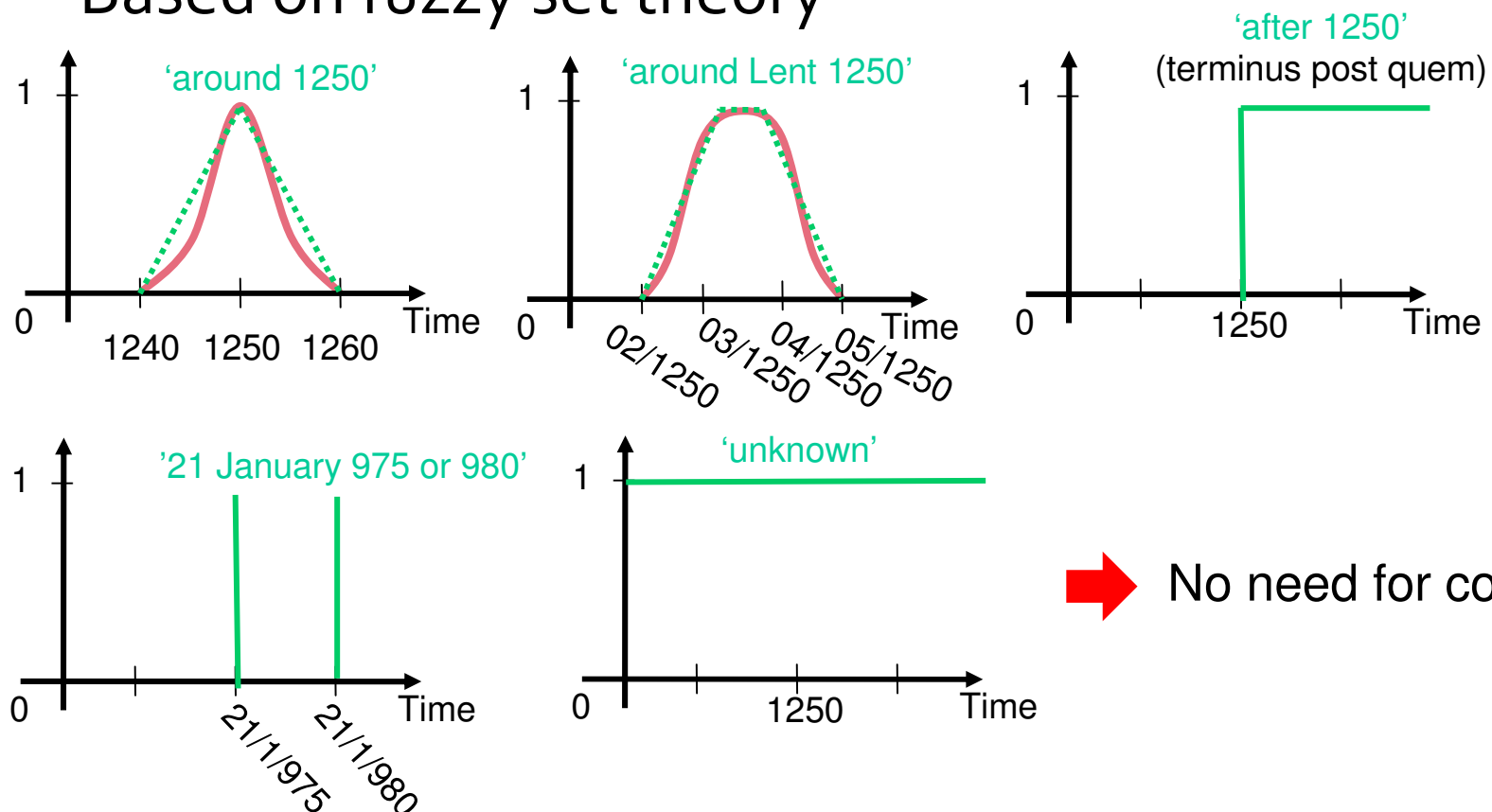
- Problems and ambiguities
  - Date field contains both data and code: 'hard time coding'
- Answers of the database specialists?

# Handling of imperfect temporal information

- **Disadvantages** of hard time coding
  - Difficult interpret by end-users
  - Information loss
  - Difficult to extend
  - Difficult to manipulate and query
- Need for a more '**natural**' approach
  - Based on mathematical model
  - Able to cope with uncertainty
  - Support for flexible querying

# Handling of imperfect temporal information

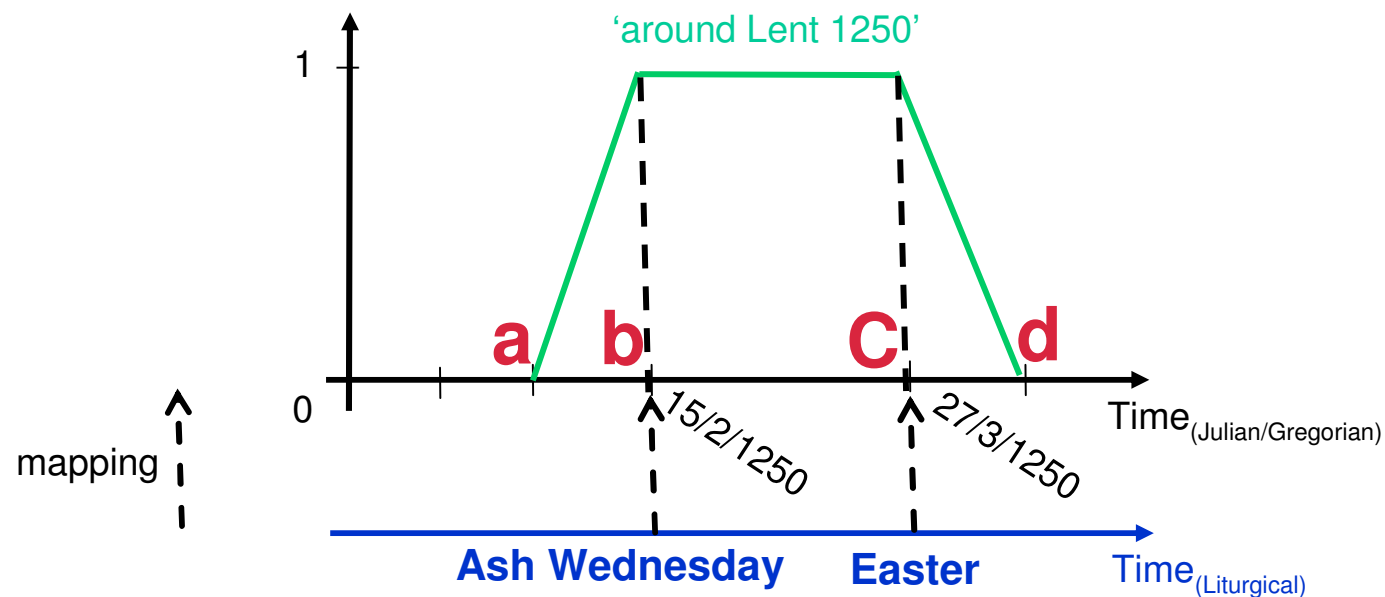
- Time modelling in databases
  - Based on fuzzy set theory



➔ No need for codes

# Handling of imperfect temporal information

- Basic component: trapezoidal fuzzy set

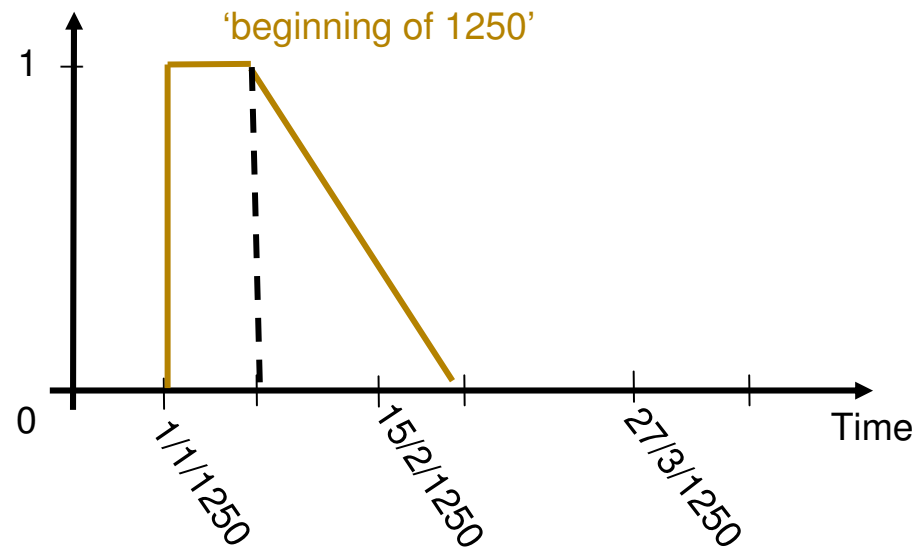


- Only four values to store in database (a,b,c,d)
- Expresses the uncertainty we have about the exact date
- Possibility to work with multiple time scales

# Handling of imperfect temporal information

- Time querying in databases
  - Flexibility in query formulation
  - E.g. 'Find all charters issued at the

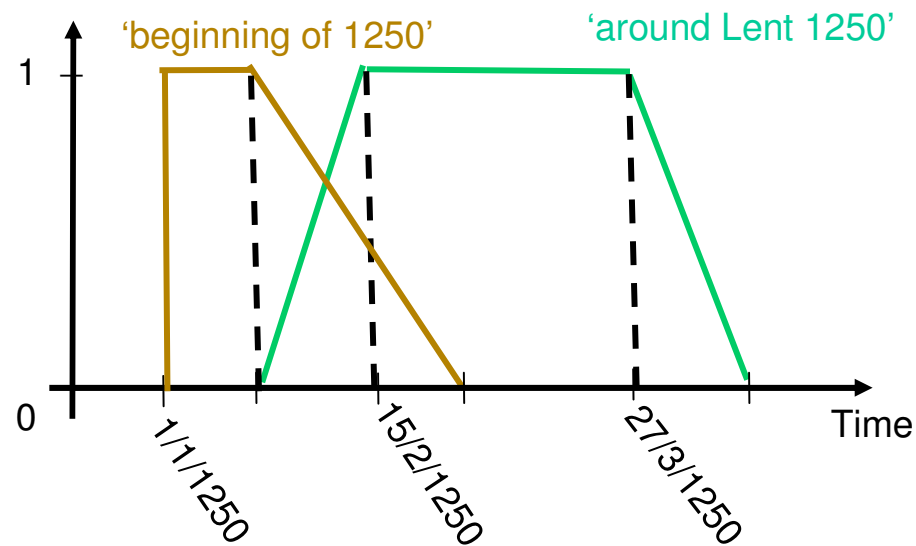
beginning of 1250'





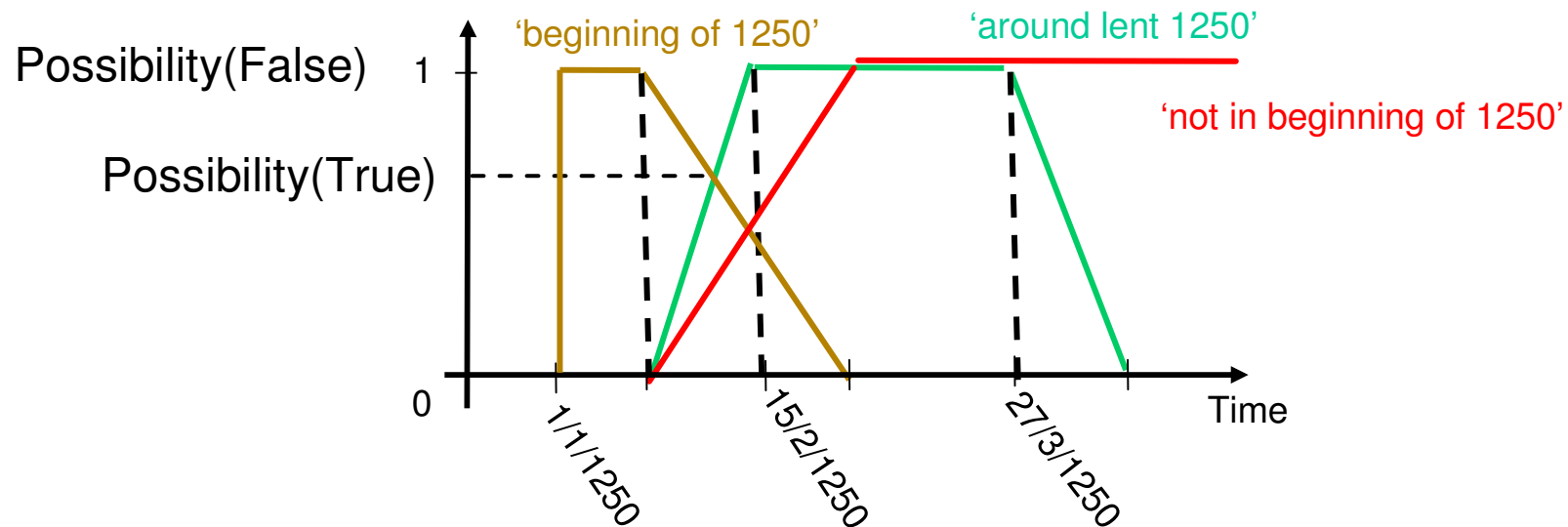
# Handling of imperfect temporal information

- Query evaluation
  - Uncertainty in data should be reflected in query result



Compatibility?

# Handling of imperfect temporal information



Is charter issued around Lent 1250 also issued at the beginning of 1250?

$$\text{Possibility(True)} = \sup_t \min(\pi_{\text{'around lent 1250'}}(t), \mu_{\text{'beginning of 1250'}}(t)) = 0.66$$

$$\text{Possibility(False)} = \sup_t \min(\pi_{\text{'around lent 1250'}}(t), \mu_{\text{'not in beginning of 1250'}}(t)) = 1$$

# Handling of imperfect temporal information

- Elaborated example

- 'Find all medieval charters issued in a short period before Easter'

- Shortly before Easter:



- Medieval period shortly before Easter



# Research Prospects: Patterns of generosity?

- Close collaboration with researchers from a database and content management department
  - Structuration of information
  - Enhancing the effectiveness of querying
    - E.g. through time modelling
      - Mathematical model
      - Working with different time scales (mapping of scales)
  - Developing new historical research questions

# Research Prospects: Patterns of generosity?

- Example: how to study patterns of generosity?
  - Up to now: chronological approaches (yearly development)
  - E.g.: C. Bouchard, *Holy entrepreneurs. Cistercians, knights, and economic exchange in twelfth-century Burgundy* (Ithaca, 1991).

*Gifts and Countergifts* 67

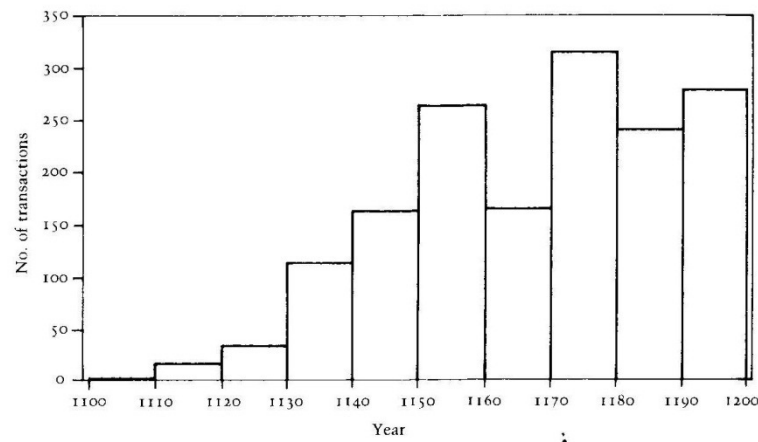


Figure 5. Distribution of gifts by decade

# Research Prospects: Patterns of generosity?

- New approach: can we see recurrent patterns of gift giving within the year?
  - Analysis of deeds of donation
  - Seasonal fluctuations? Specific dates?
  - Other time scale: liturgical year
    - Saint's days?
    - Lent? Holy week? Pentecost?
  - Differentiation?
    - Regional? Over time? Religious orders? Individual benefactors?

# Conclusion

- Importance of simultaneous collaboration between historians and software developers
- Prospect:
  - *Diplomata Belgica* online: early 2013
  - SMLC-search module: late 2013
- Bibliography:
  - J. Deploige, B. Callens, P. Demonty, G. De Tré, 'Remedying the Obsolescence of Digitised Surveys of Medieval Sources. *Narrative Sources and Diplomata Belgica*', *Bulletin de la Commission Royale d'Histoire*, 176 (2010), 151-166
  - J. E. Pons, C. Billiet, G. De Tré, O. Pons, E. De Paermentier, J. Deploige, 'Consultas bipolares en bases de datos temporales. Aplicación en bases de datos con datos históricos', in: *Actas de las Jornadas Andaluzas de Informática 2011* (forthcoming).