

The Coudenberg Heritage Building Information System

Roland Billen, 18/06/2020

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2. Coudenberg Heritage Building IS – Phase 1
 - Project description
 - Global approach
 - *User requirement analysis*
 - *Conceptual design level*
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Geomatics Unit

<http://geomatics.ulg.ac.be>

Faculty of Sciences / Dept. Geography /

~ 20 staff members



Geomatics Unit

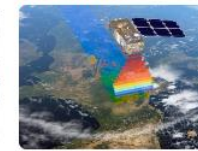
The Geomatics Unit brings together researchers and teachers in the field of geomatics. It is part of the Department of Geography (Faculty of Sciences) at the University of Liège. The Unit enjoys strong international recognition. It also plays an important role with Belgian institutions and professionals in the field

Research fields

Geographic Information Science



Remote Sensing and Photogrammetry



Global Navigation Satellite Systems



3D Terrestrial Data Acquisition



Projects

Erasmus, EnRHed



EORégions Sciences

E04SIBS



Terra Mosana



Coudenberg SIA3D



News

La SPI engage "ANALYSTE SIG - Système d'Information Géographique"

La SPI engage



La SPI souhaite renforcer ses équipes par le profil suivant :

- ANALYSTE SIG - Système d'Information Géographique

<https://www.proselect.be/fr/nos-offres-d-emploi/2911/analyste-sig-liege.html>

ou

<http://www.spi.be/fr/news/view/1540/la-spi-engage>

Twitter

Tweets by @Geomatics_Unit

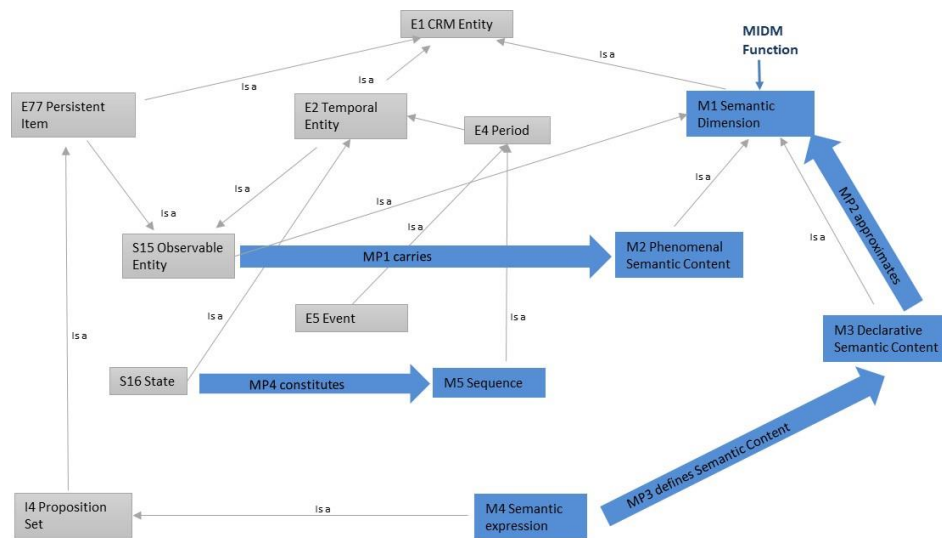
Geomatics Unit
@Geomatics_Unit

Florent Poux et Roland Billen, lauréats du prix Jack Dangermond 2019 geographie.uliege.be/cms/c_5724437/ via @universiteliege



Florent Poux et Roland Billen, lauréats du prix Jack ...
Ce prix récompense une publication scientifique de très haute qualité dans le domaine des sciences géo-spatiales. geographie.uliege.be

- 10 years of interaction with archaeologists

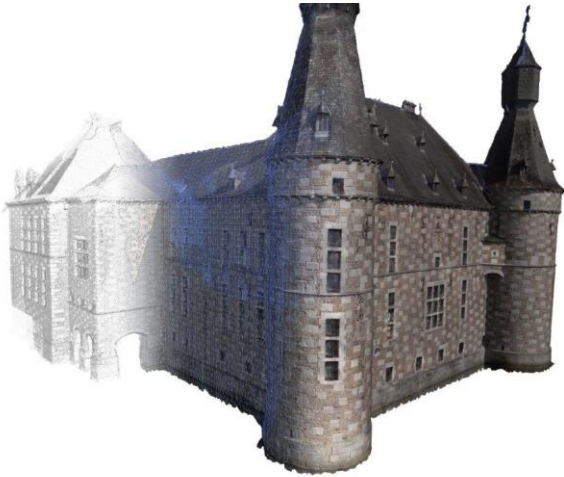


MIDM



Germany – Smart Point Cloud

Jehay 4D

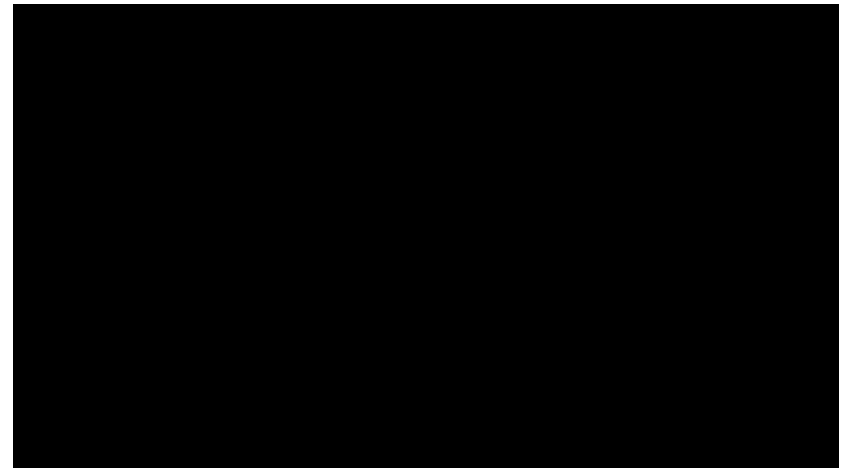
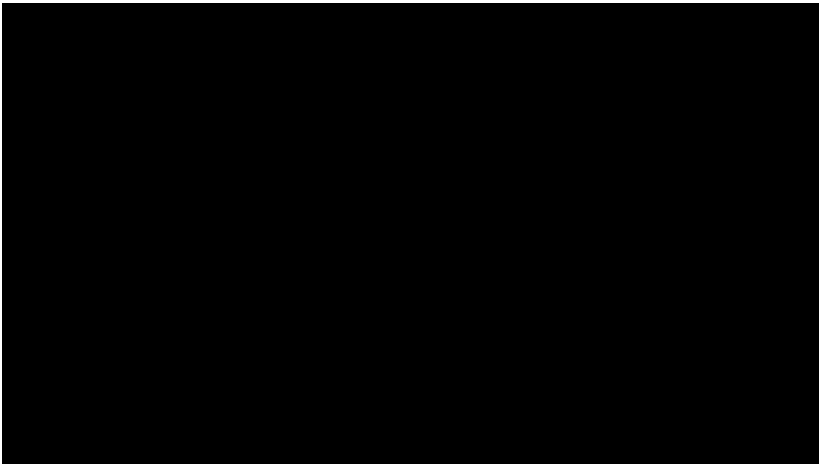


**TERRA
MOSANA**

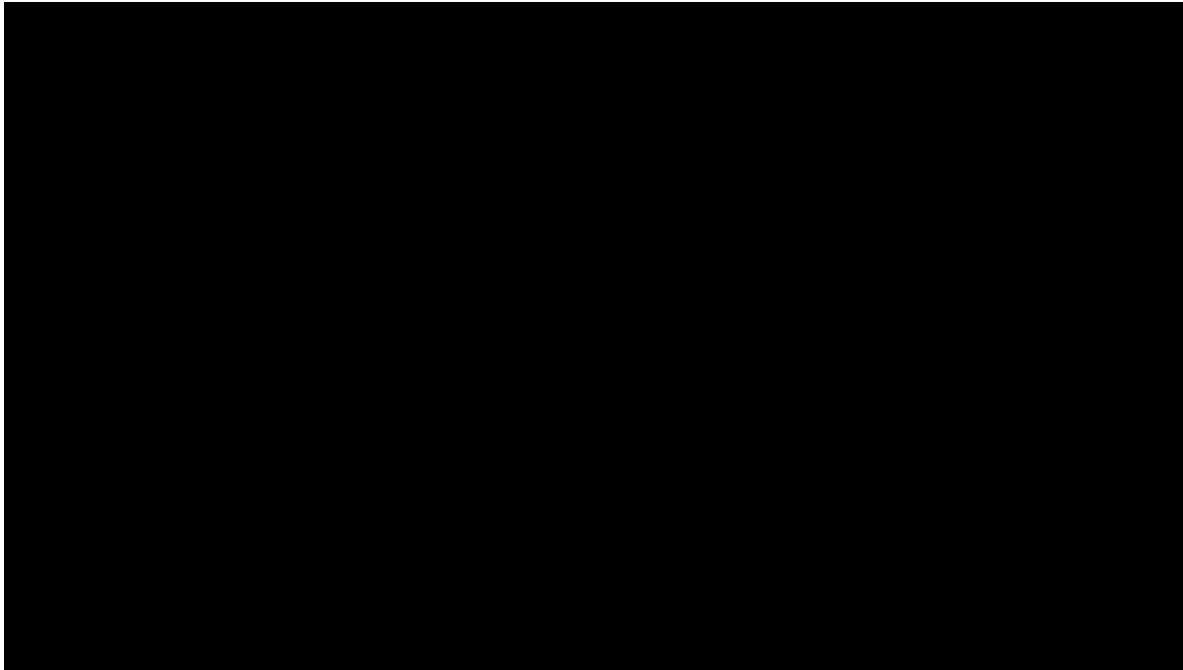
Interreg
Euregio Meuse-Rhin
Fonds Européen de Développement Régional



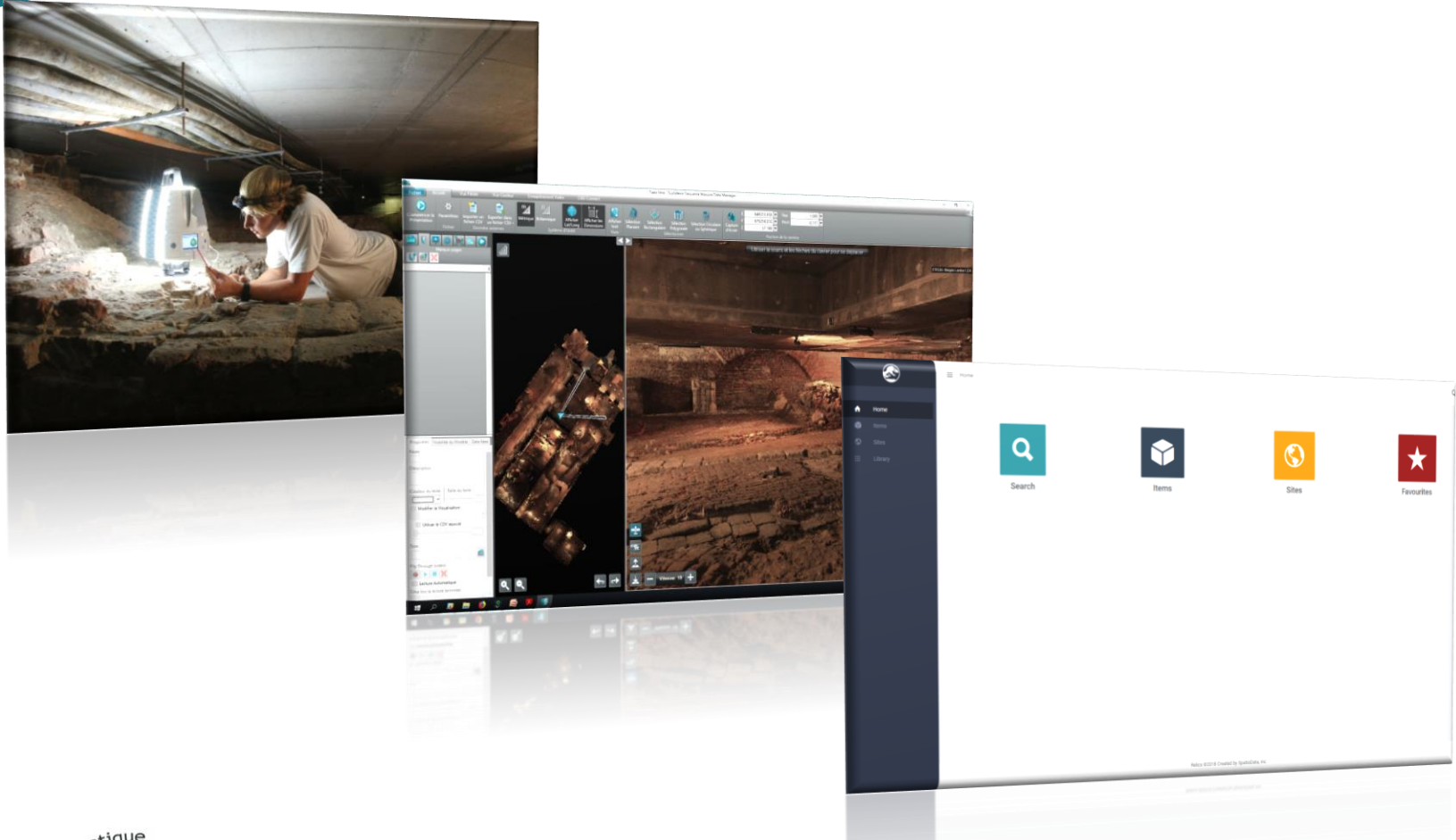
www.terramosana.org



e-thesaurus – médiation holographique 3D – Pierre Hallot



Coudenberg HeBIS - Phase 1



www.coudenberg.brussels

The Coudenberg archaeological site presents the remains of the palace of the Dukes of Brabant, destroyed by a fire in 1731 during the reign of Marie-Elisabeth of Austria, the Governess of the Netherlands



- COUD 2017-01
 - Get an accurate 3D model of the site
 - Manage archeological information in an Archeological Information System (AIS)
 - Link between the 3D model and the AIS

*Exiguous spaces
/ dark places*



*heterogeneous
set of data*



Duration

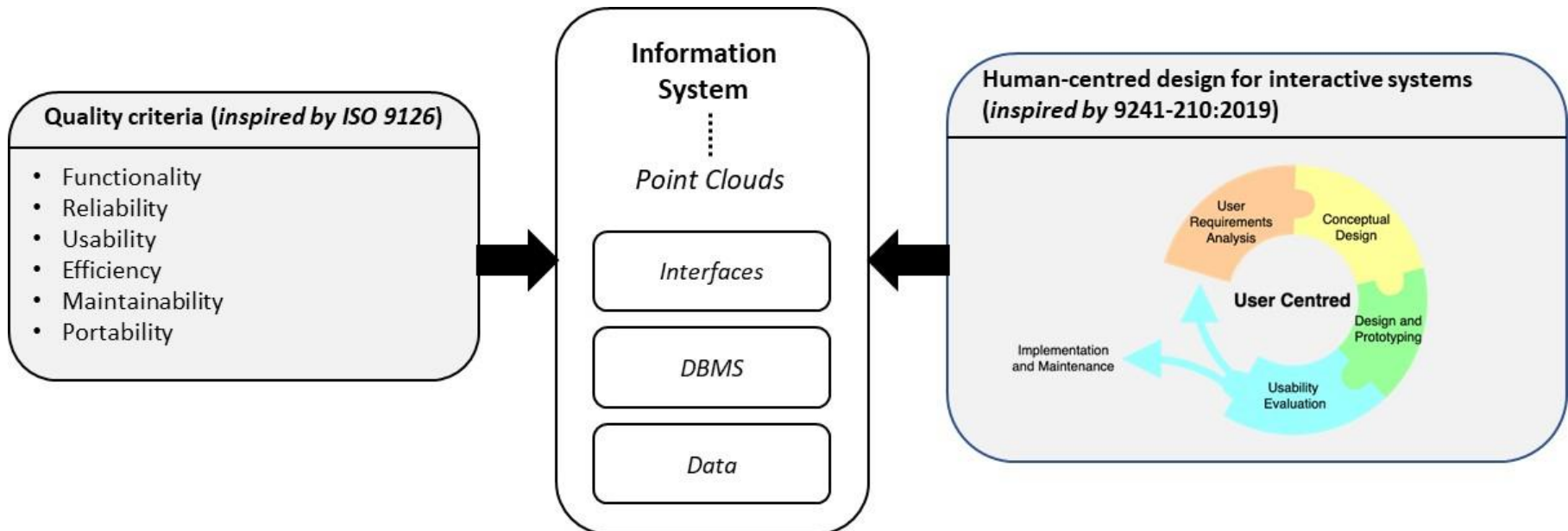


5 months
June 18 – Oct. 18

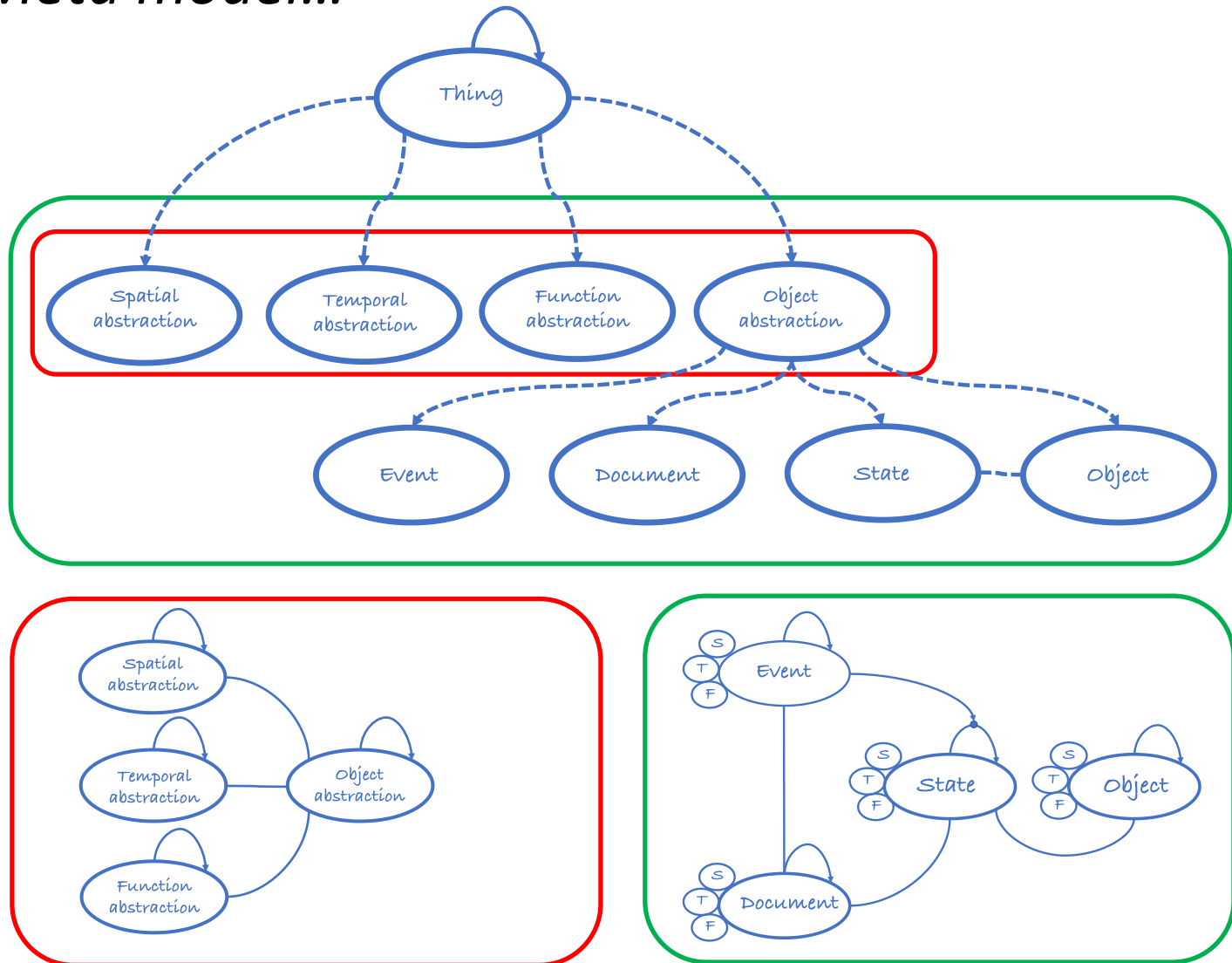
Phase 1



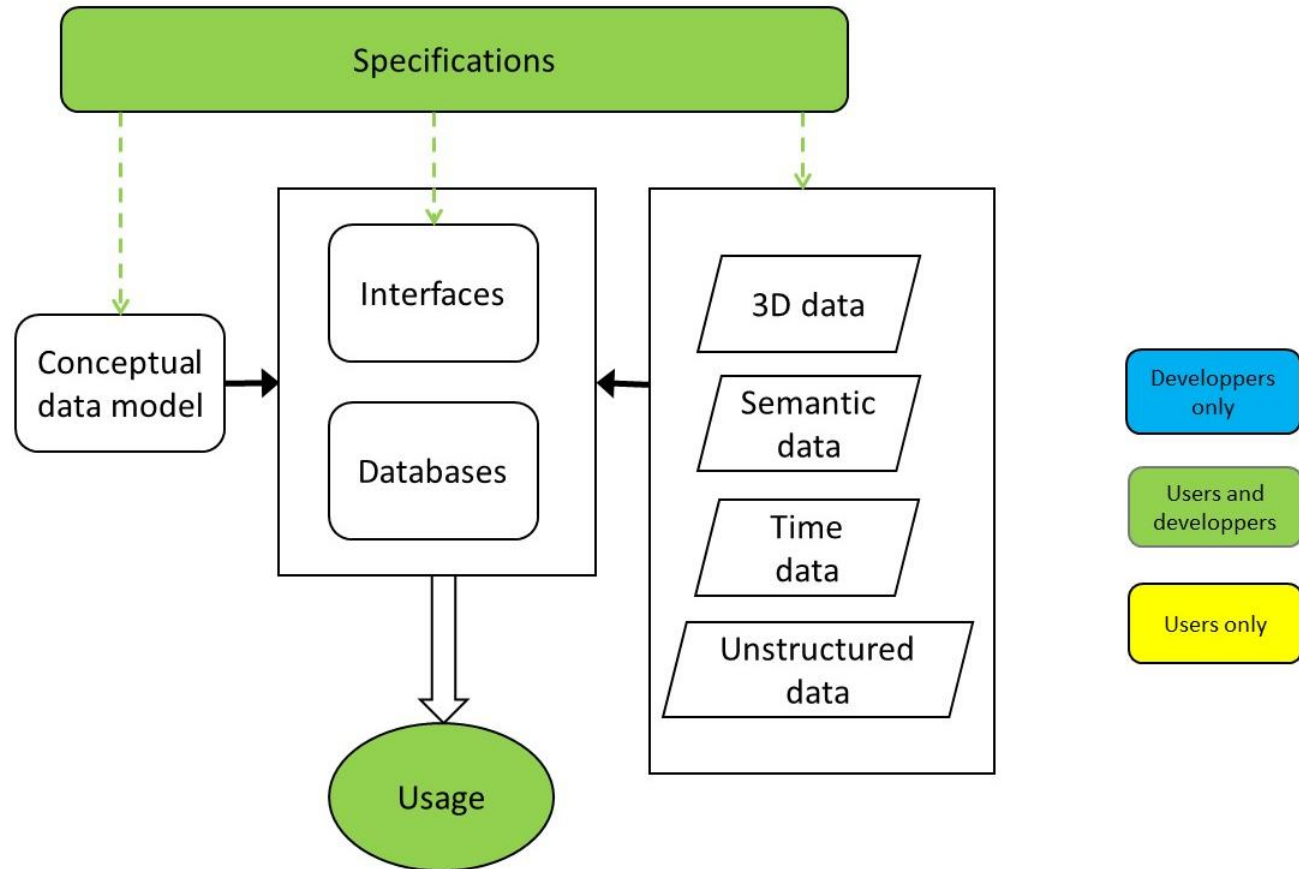
- *A methodology...*



- *A Meta model...*

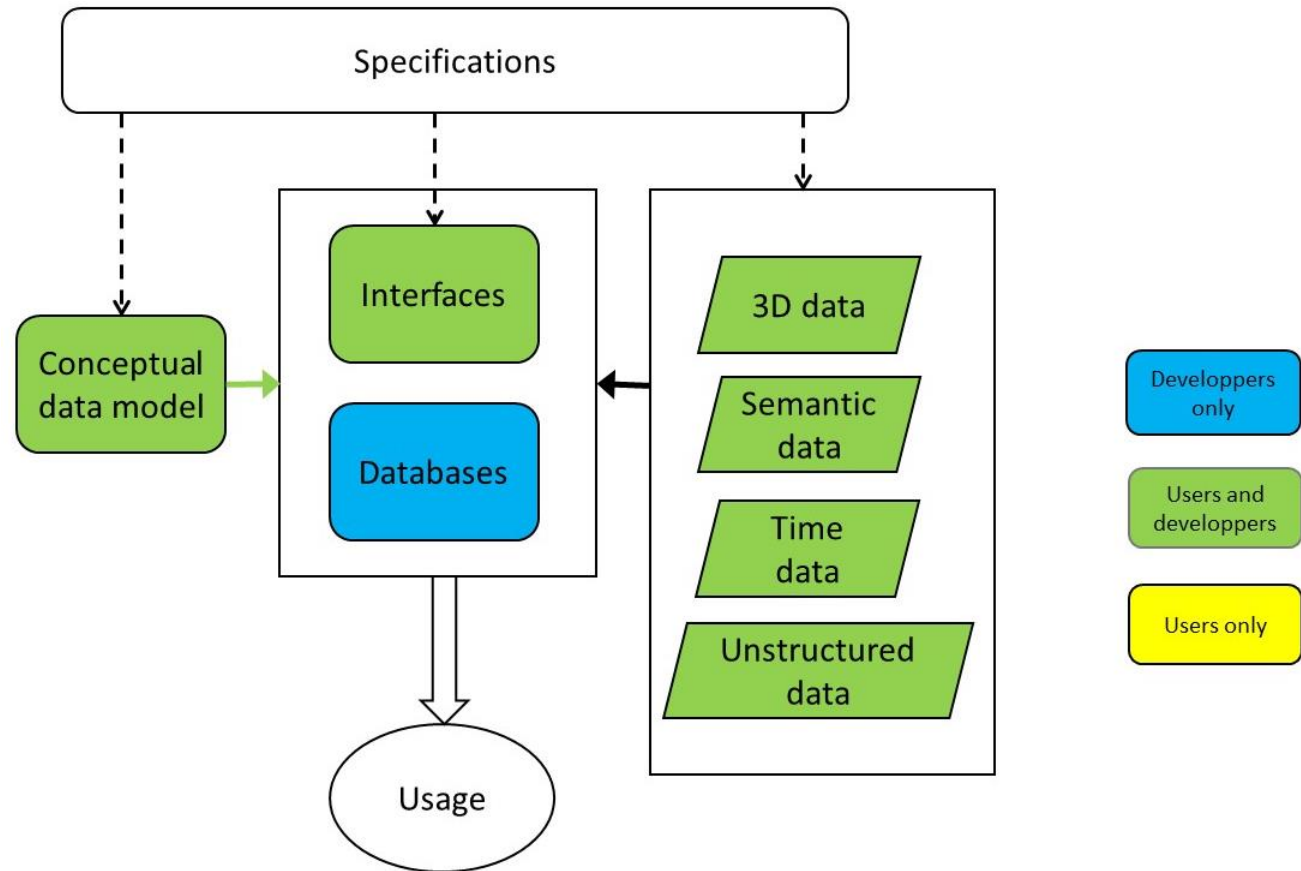


User requirements Analysis

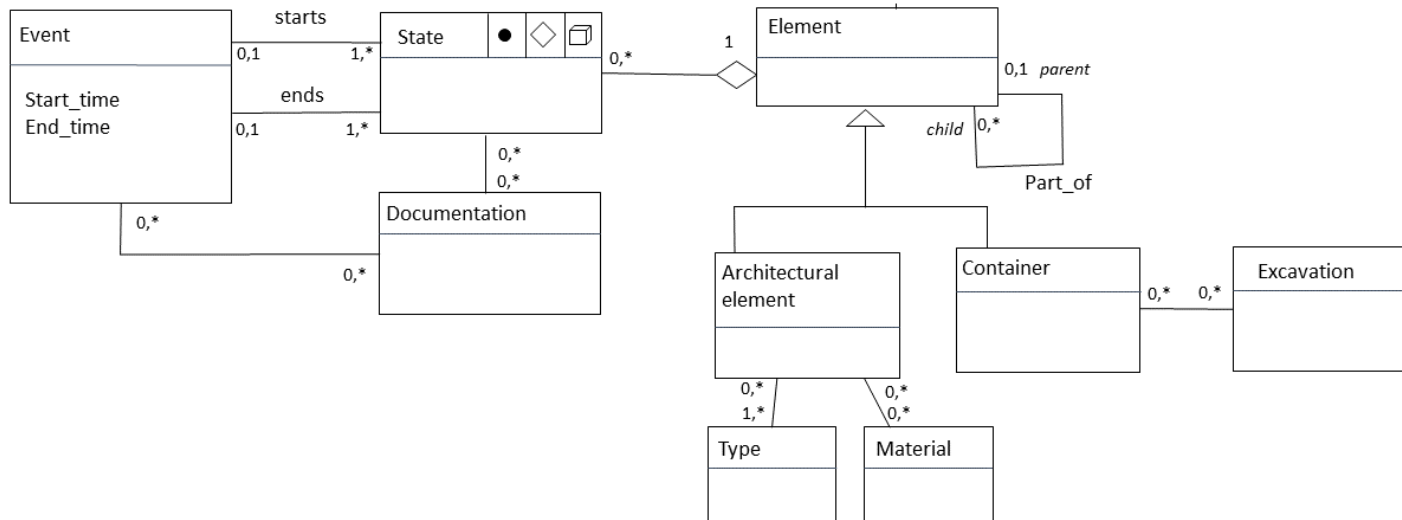
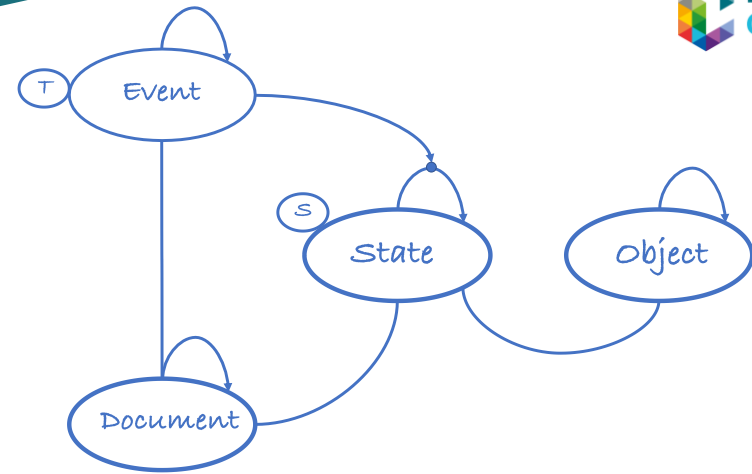


→ Detailed specifications (functionalities and data)

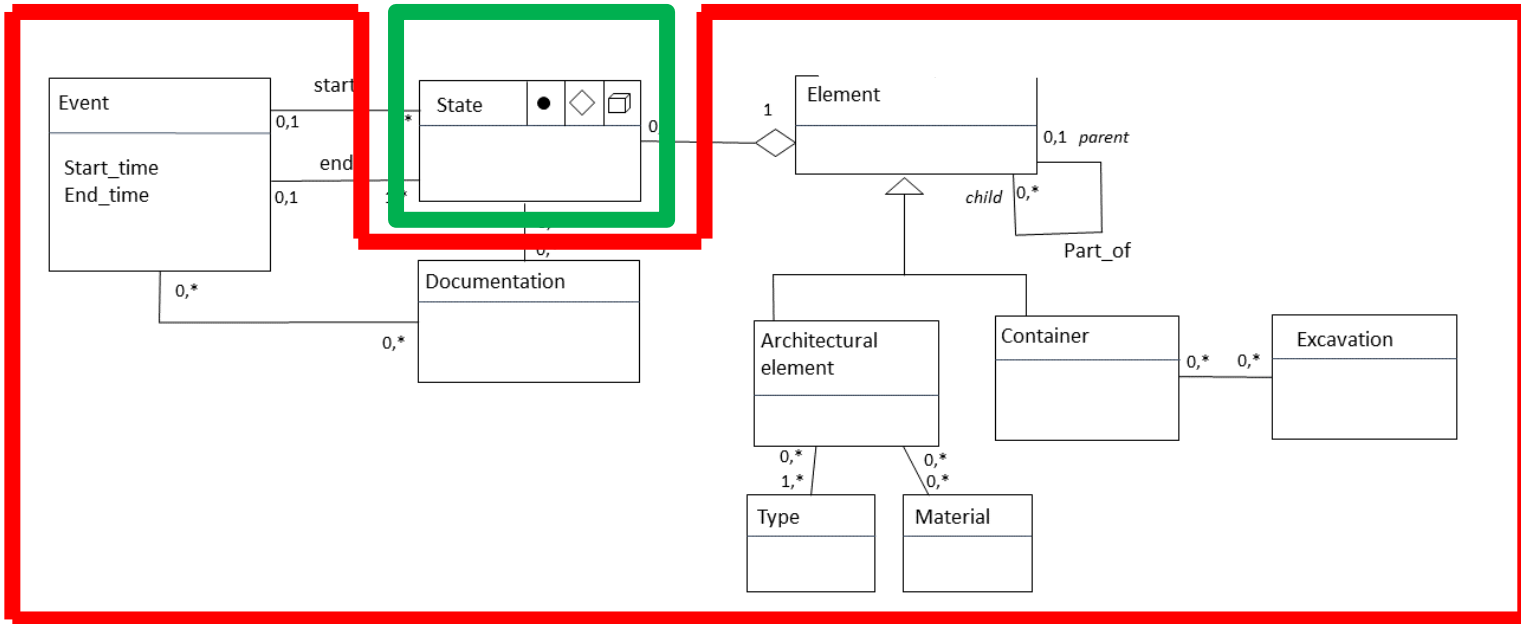
Conceptual design level



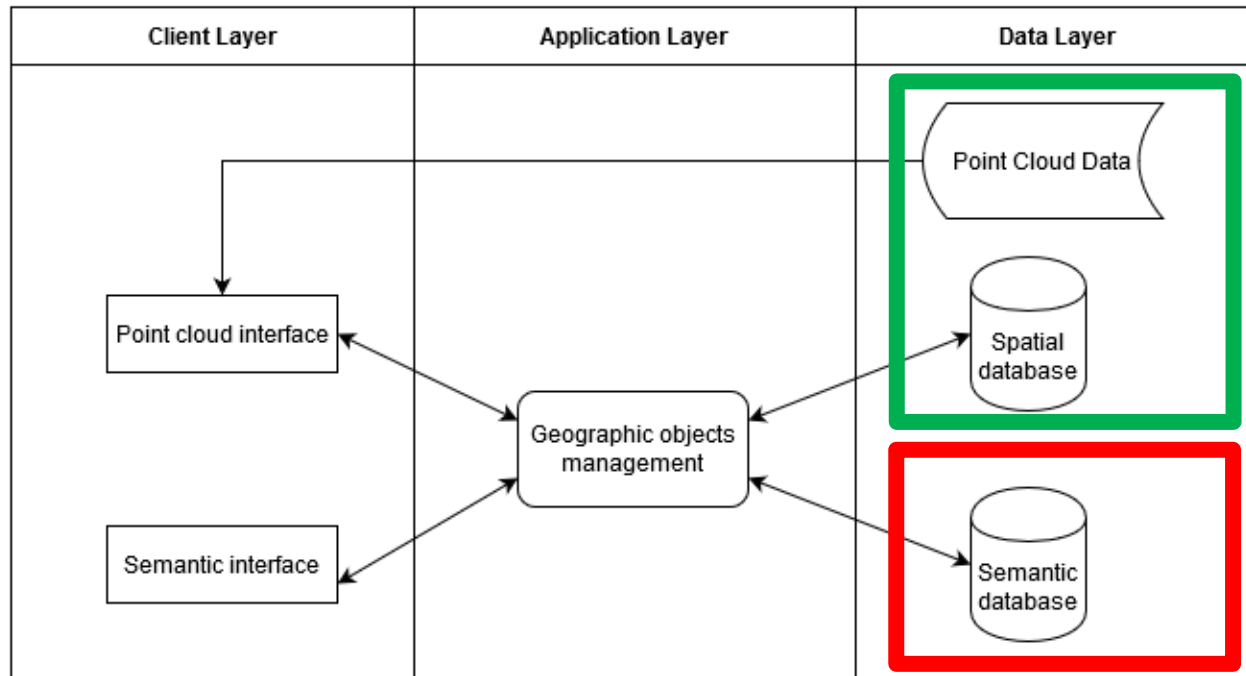
Conceptual Data Model



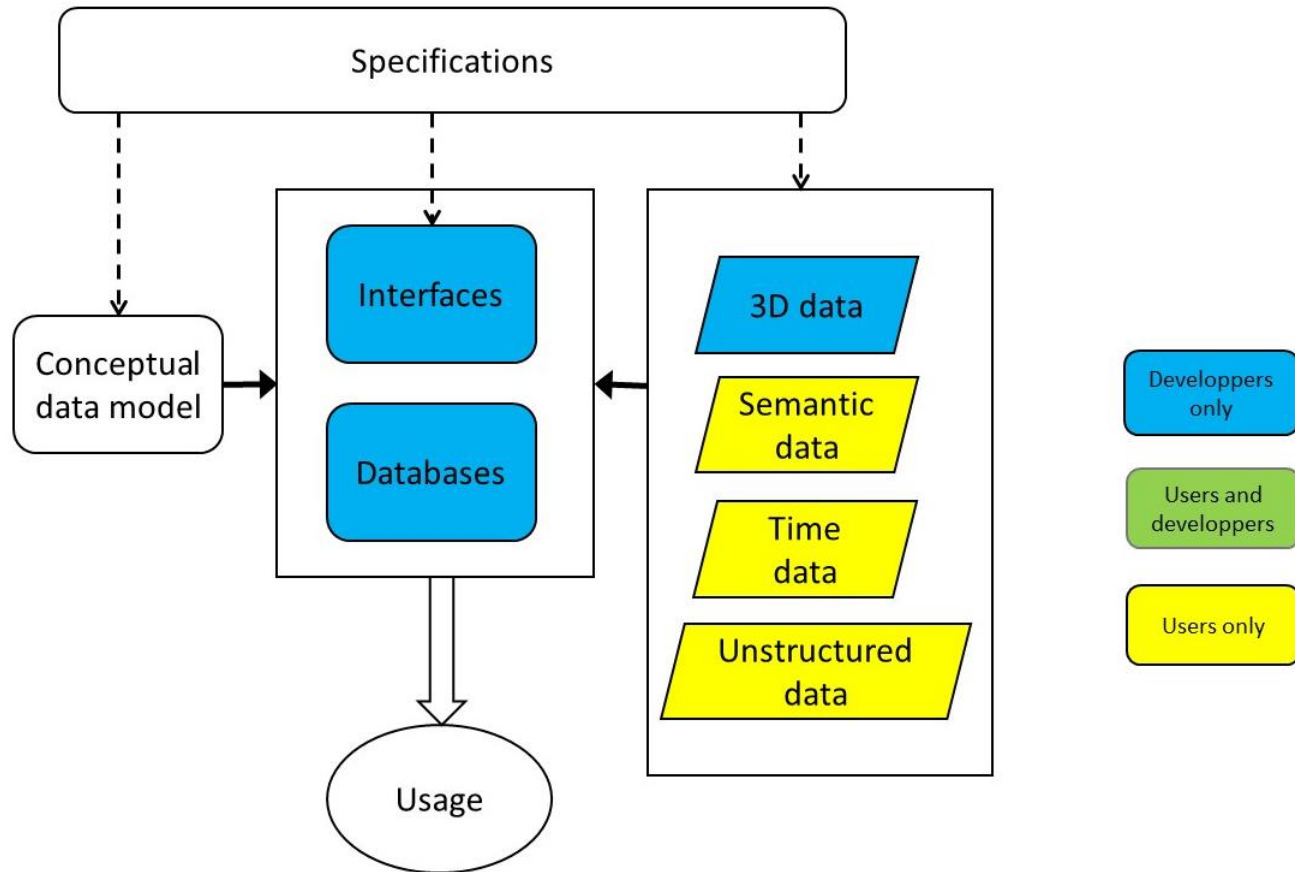
Conceptual Data Model



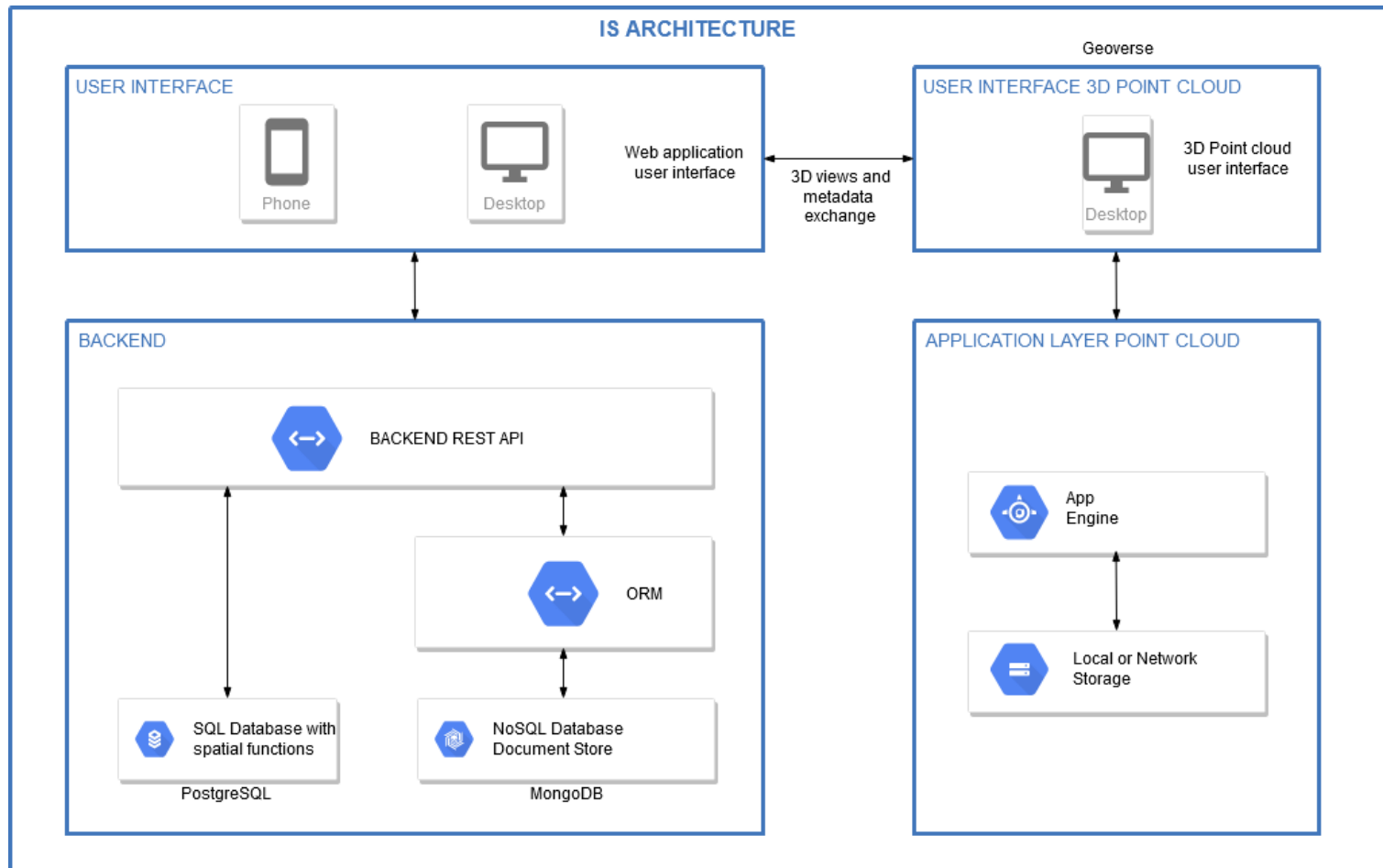
Information System Structure



Design and implementation level

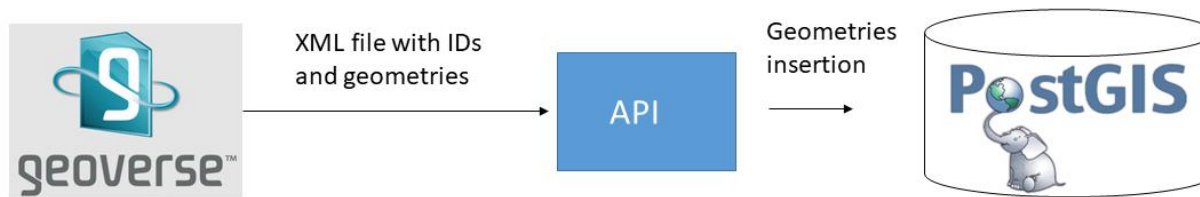


Information System Architecture

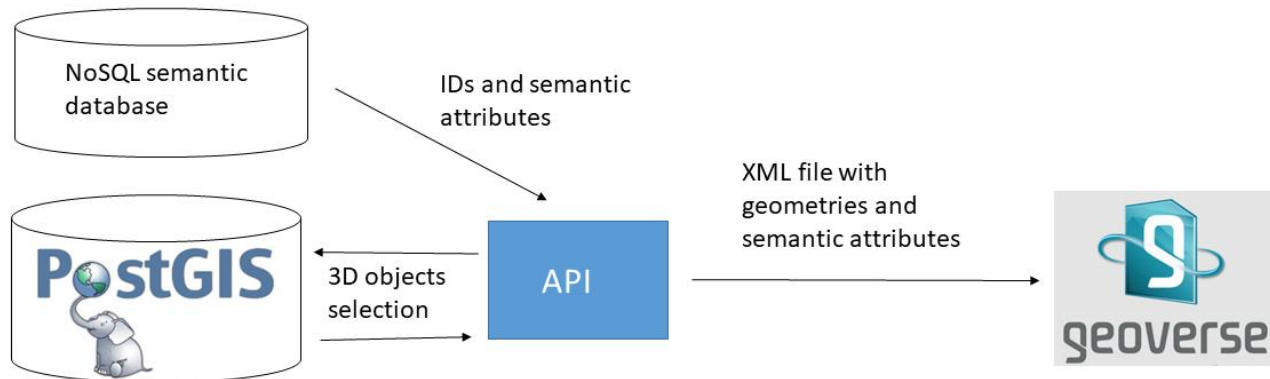


- Linking 3D models and DBs

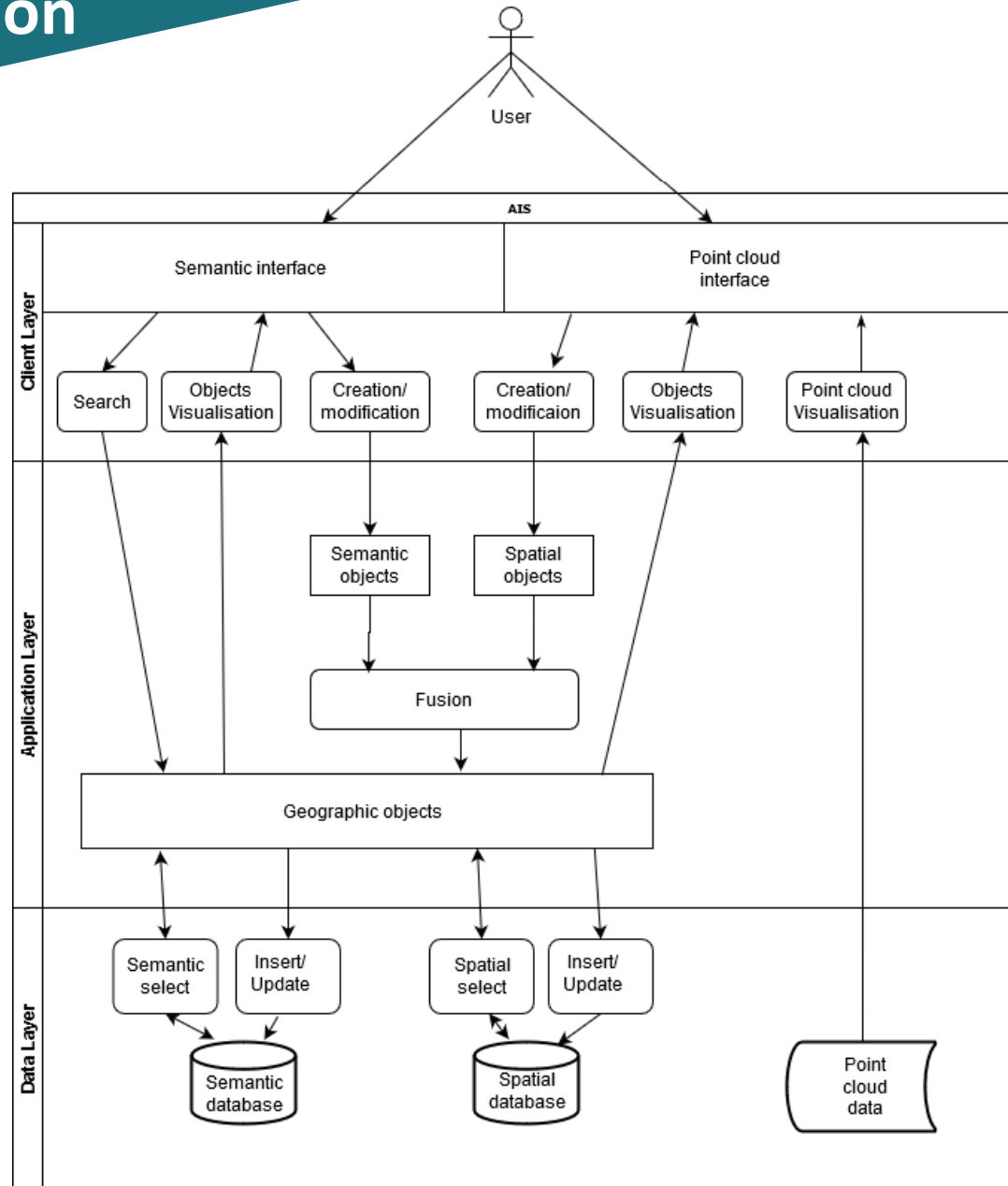
A) Geoverse2PostGIS



B) PostGIS2Geoverse

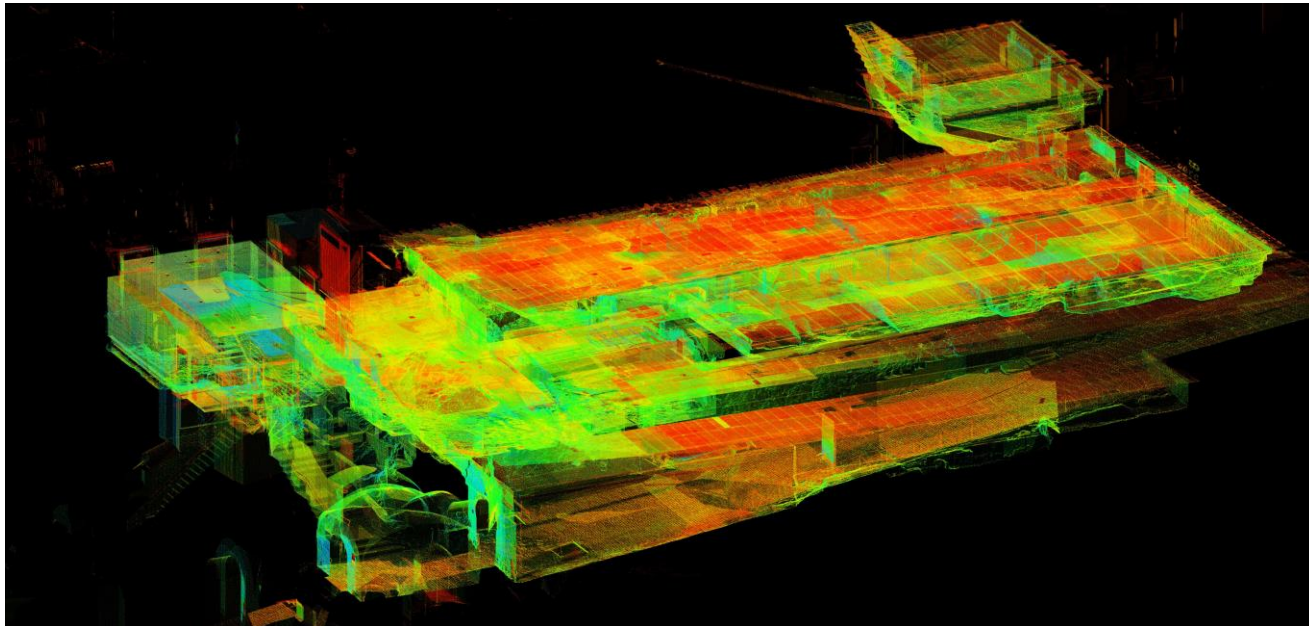


Design and implementation level

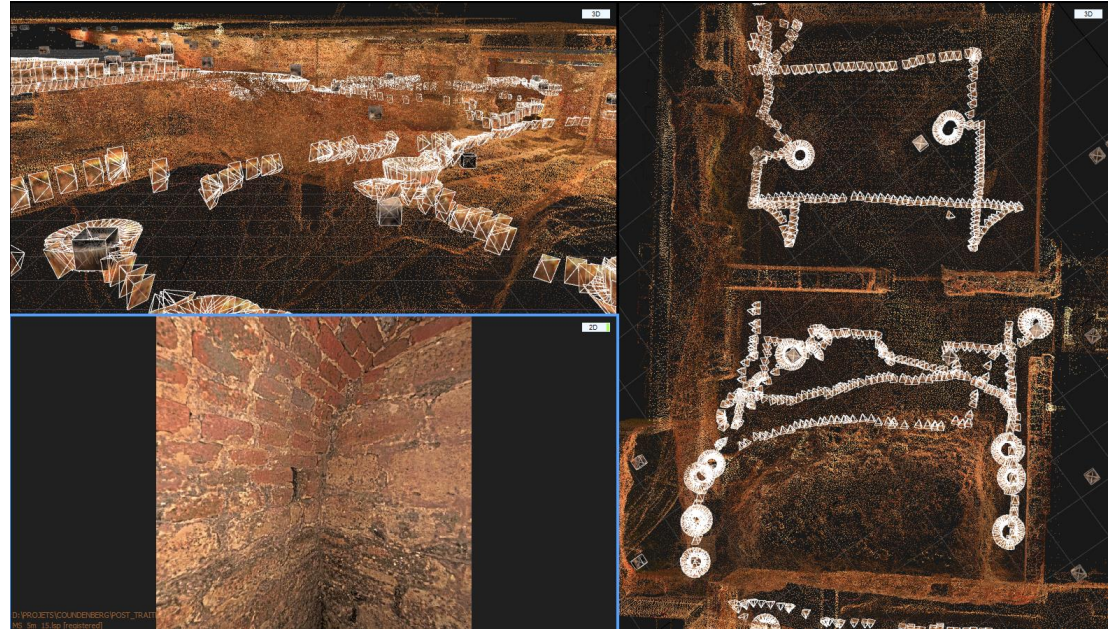


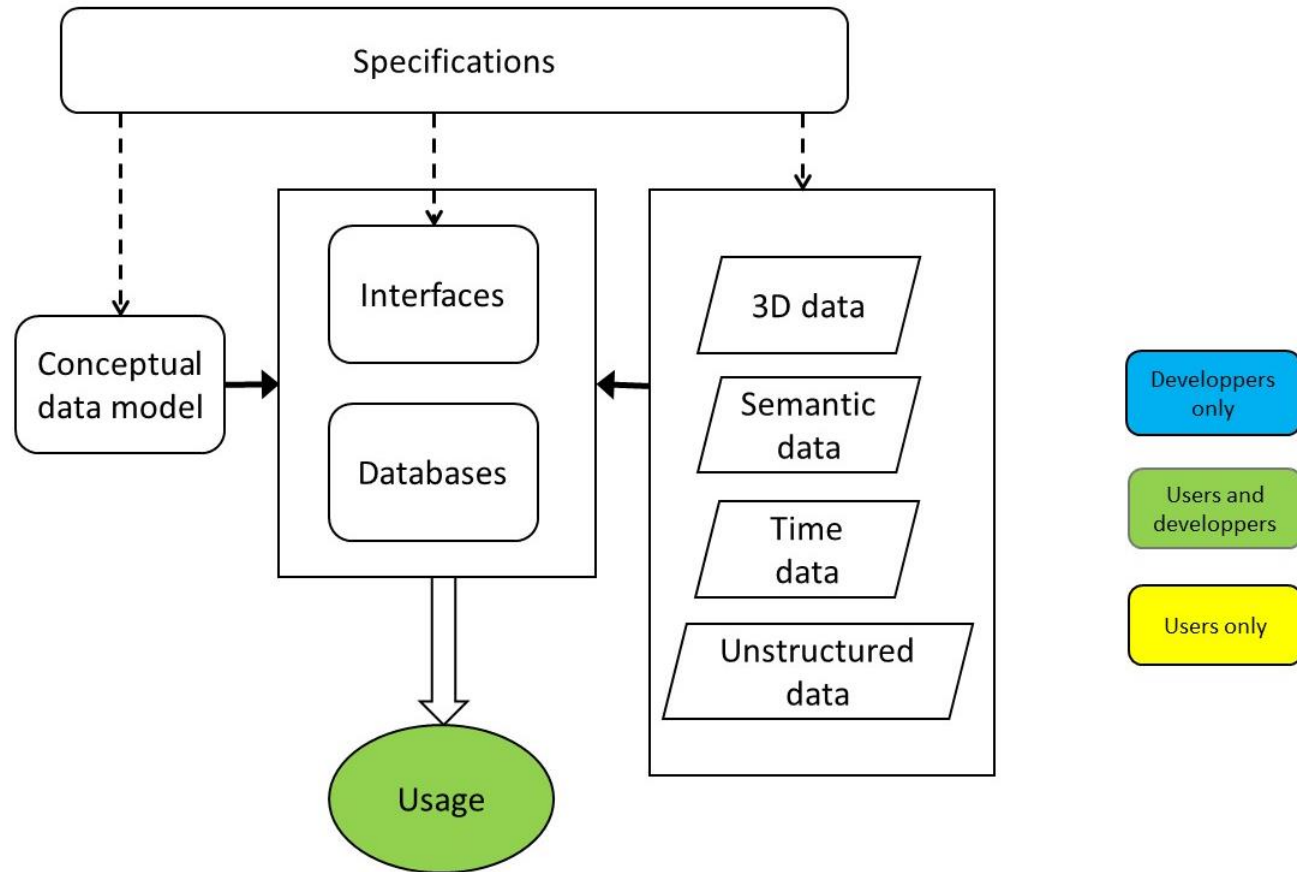
Data acquisition

- 24 315 758 526 points / 12000 photos / 17 stations / 110 scans (25 min/scan)
- 34 man-day (acquisition)




Data acquisition





- Training sessions / feedback

- Semantic Interface



- Home
- Items
- Sites
- Library

Items / Palais du Coudenberg (Cou) / Cou3000 / Cou3200 / CouEsc3221

Generic

Files

Location

Relations

Geometry

Generic Info

Events & States Info

Item Info

Name

CouEsc3221

Material Group

Material Group

Item ID

5cd3e8e77f4394001b5a9907

System

Aula Magna

Parent Item

Cou3200

Function

Escalier


Description

Description

Other Info

Other Info

Cover Image



Remove Image

- 3D Interface



Usability evaluation

Usability evaluation

- Semantic Interface
- Point cloud Interface
- 3D data
- Other data
- Coudenberg IT issues

USERS



DESIGNERS

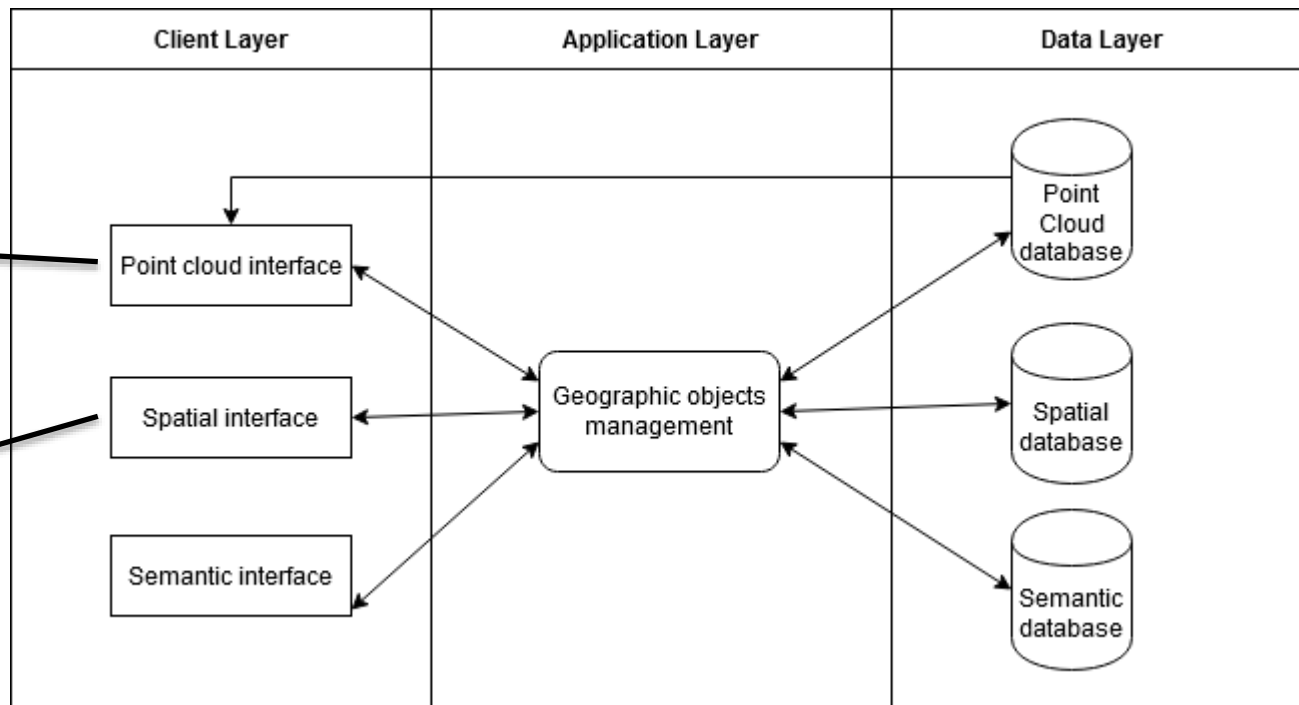


- Phase 2 – started in May 2020 – on process...

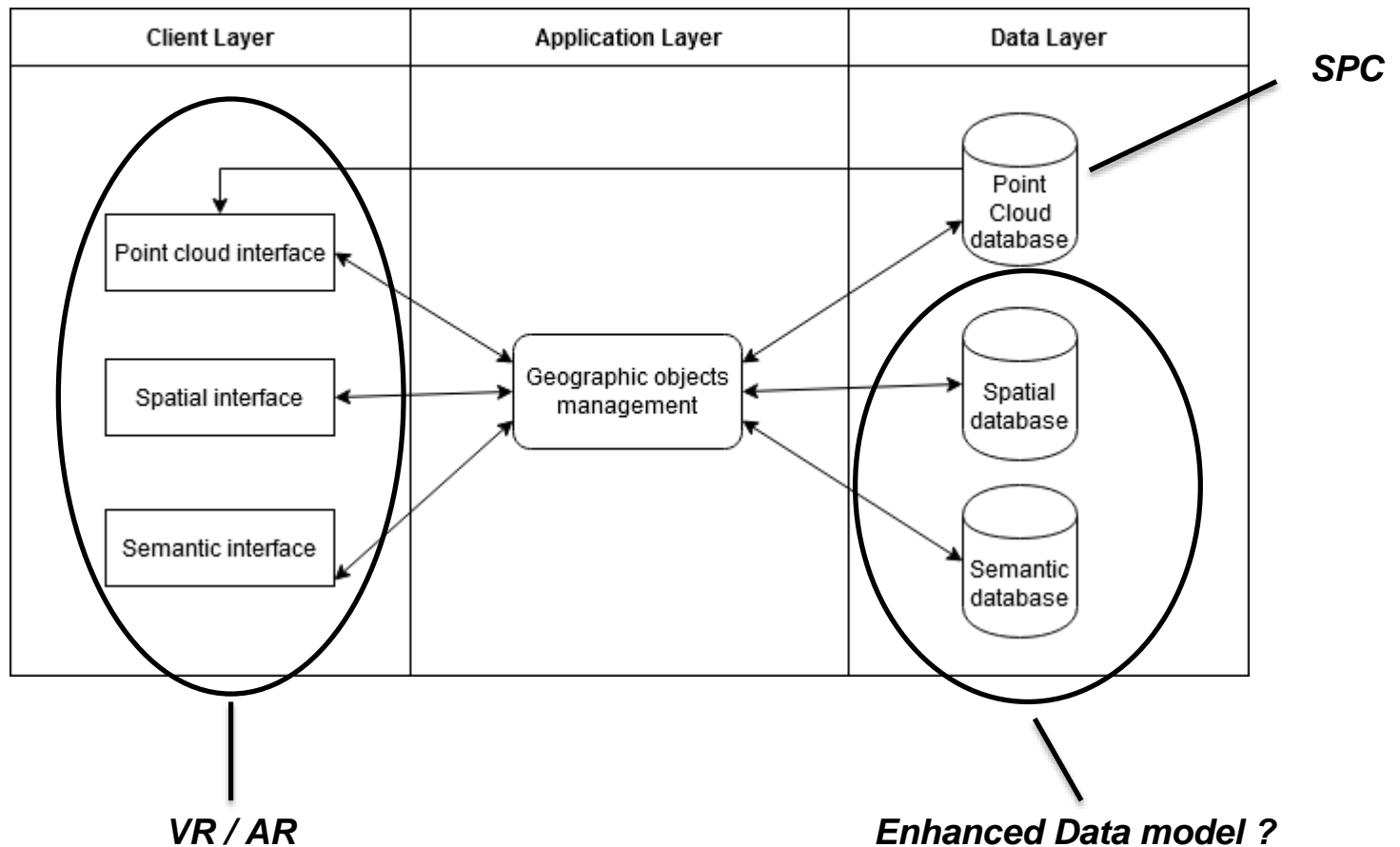


Perspectives

- IS – phase 2 ?

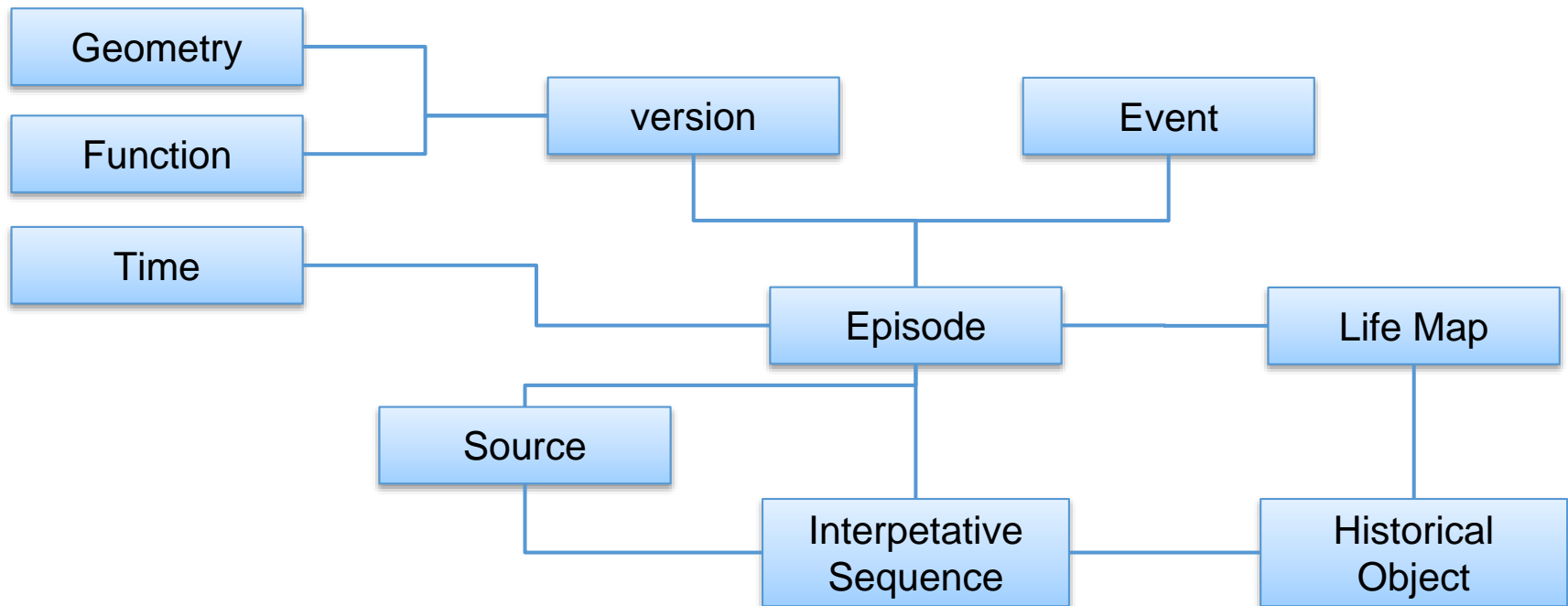


- Future IS ?



Perspectives

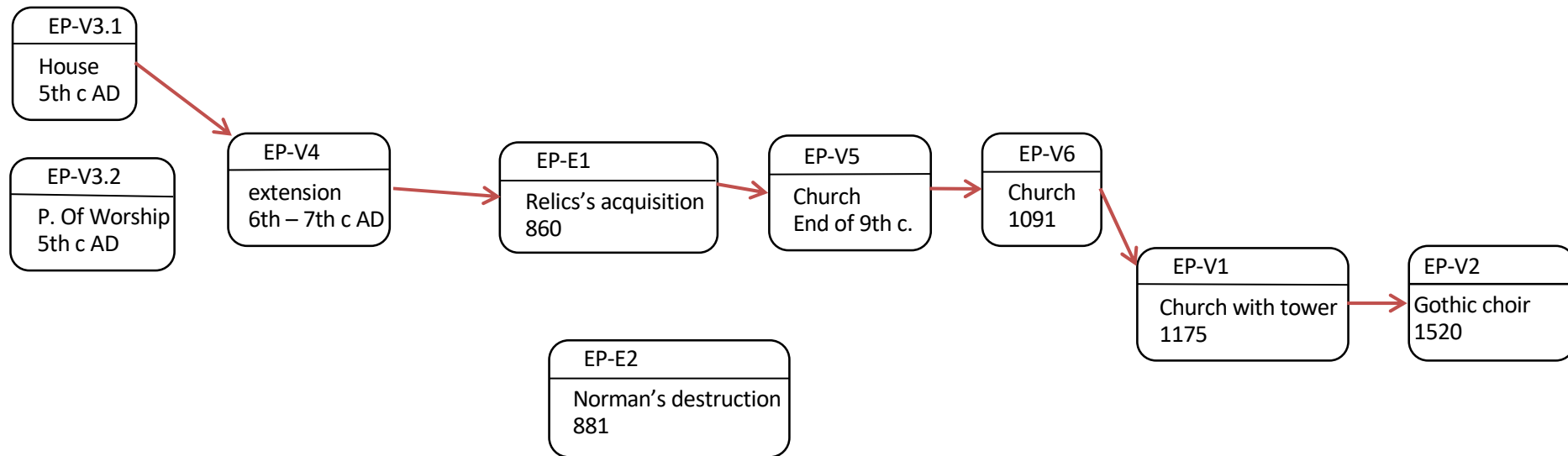
- Enhanced CDM?



MIDM – Muriel Van Ruymbeke

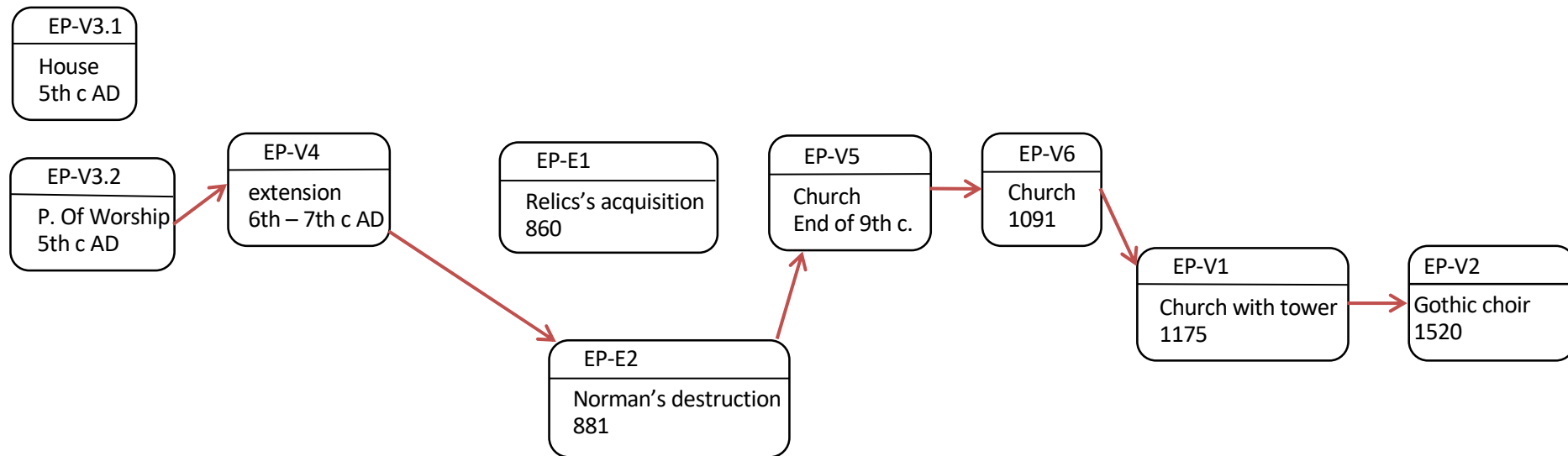
Perspectives

- Interpretative sequence by author 1



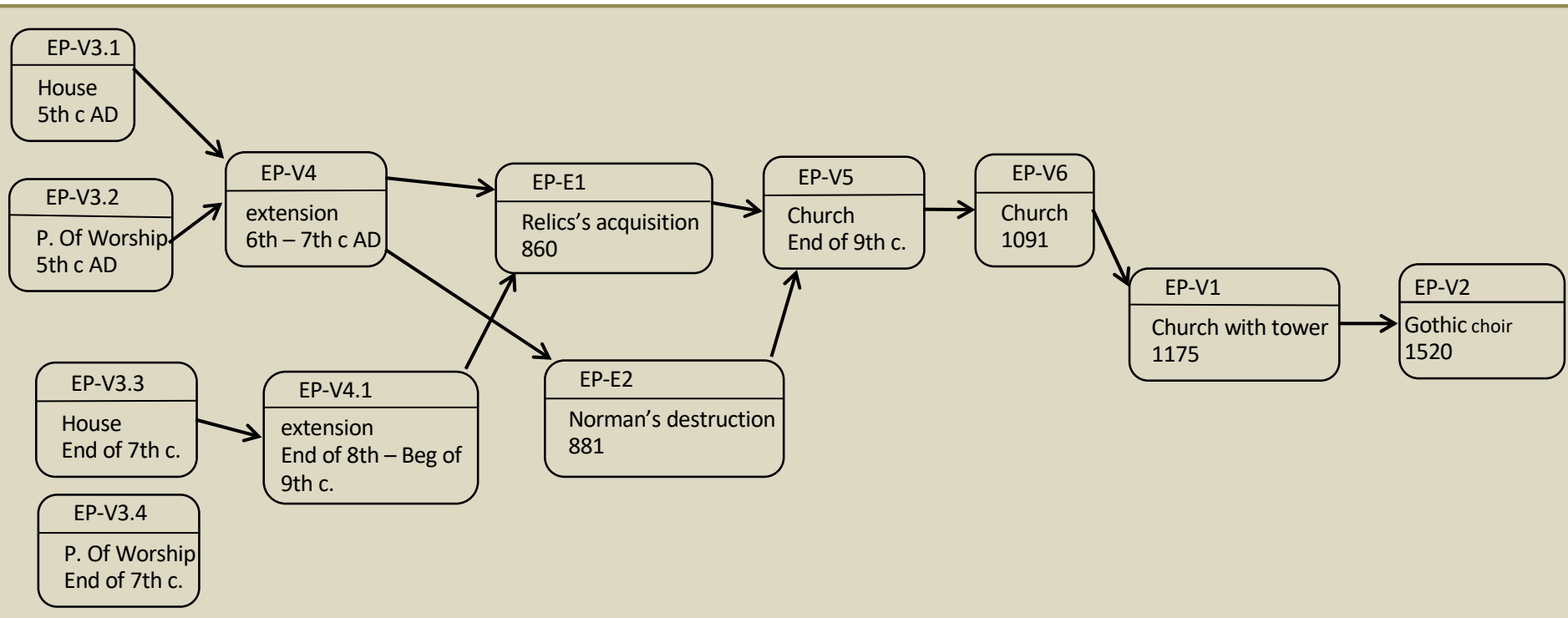
Perspectives

- Interpretative sequence by author 2

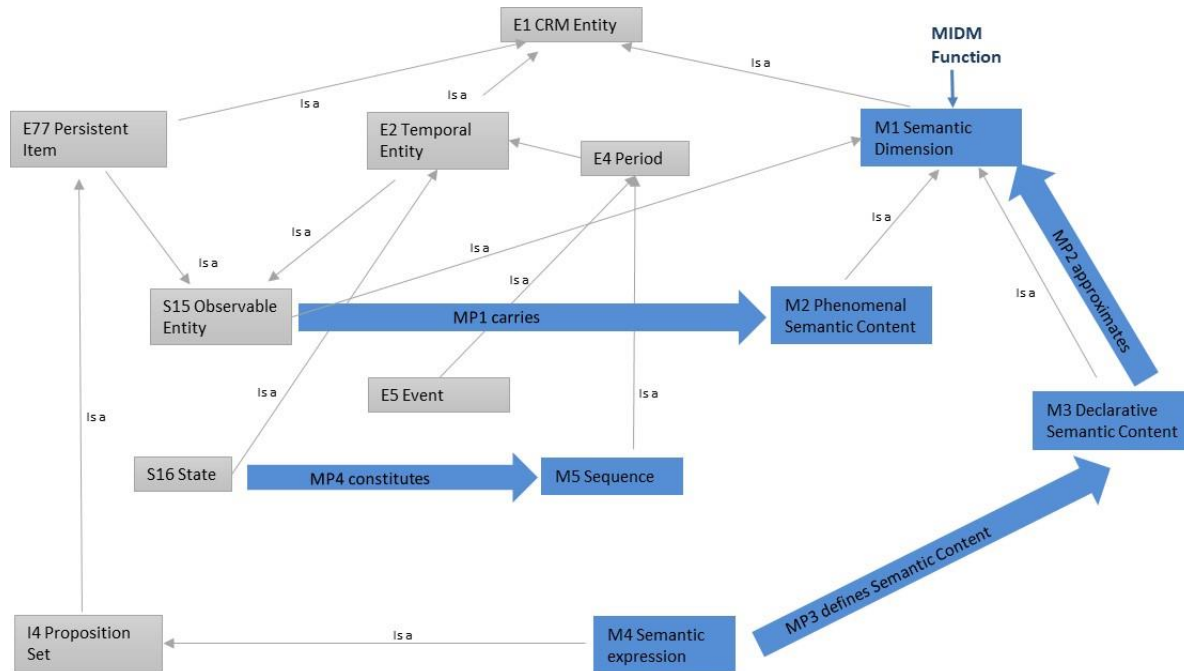


Perspectives

- Life Map



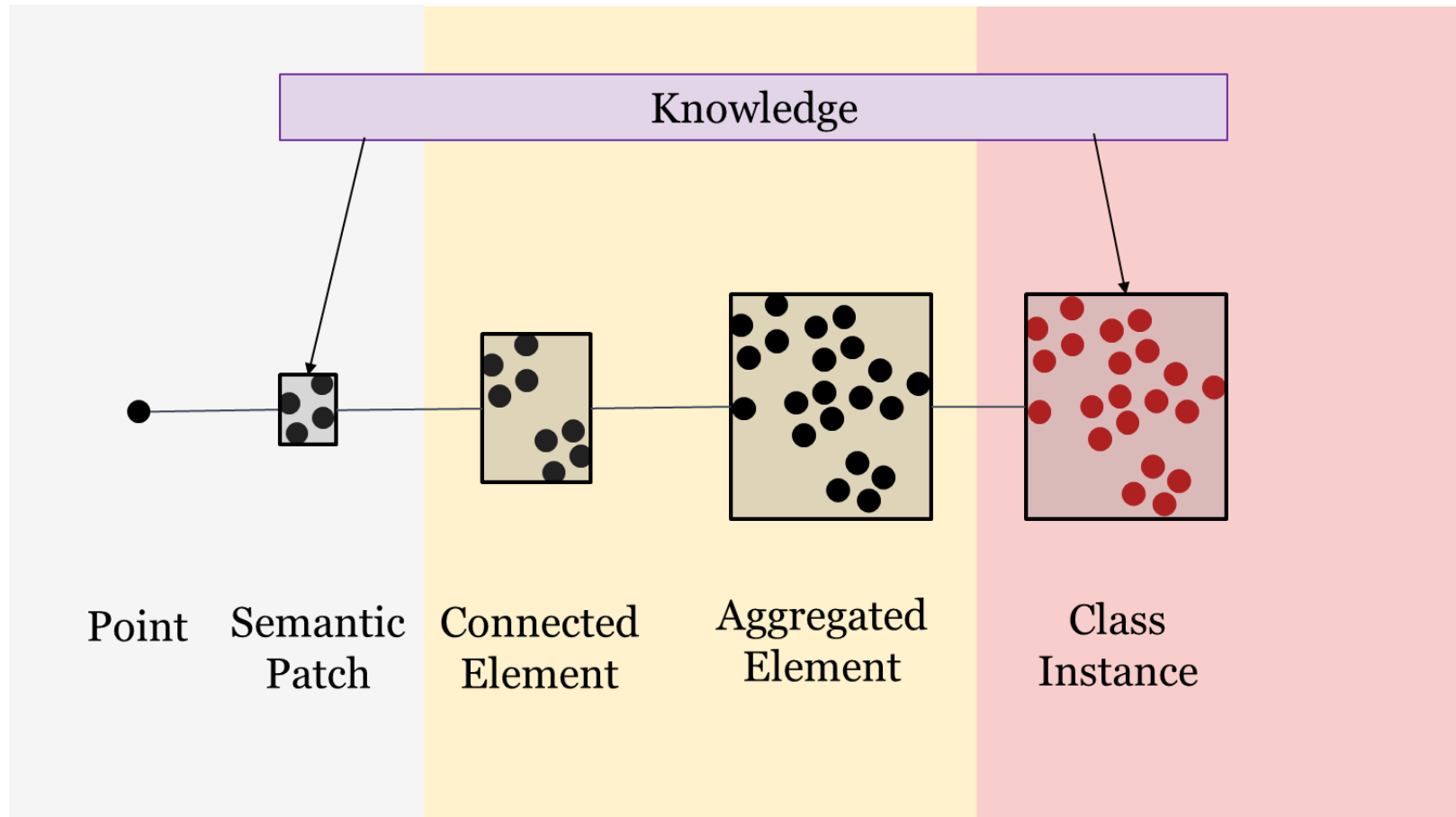
- Enhanced CDM?



MIDM mapping to CIDOC CRM

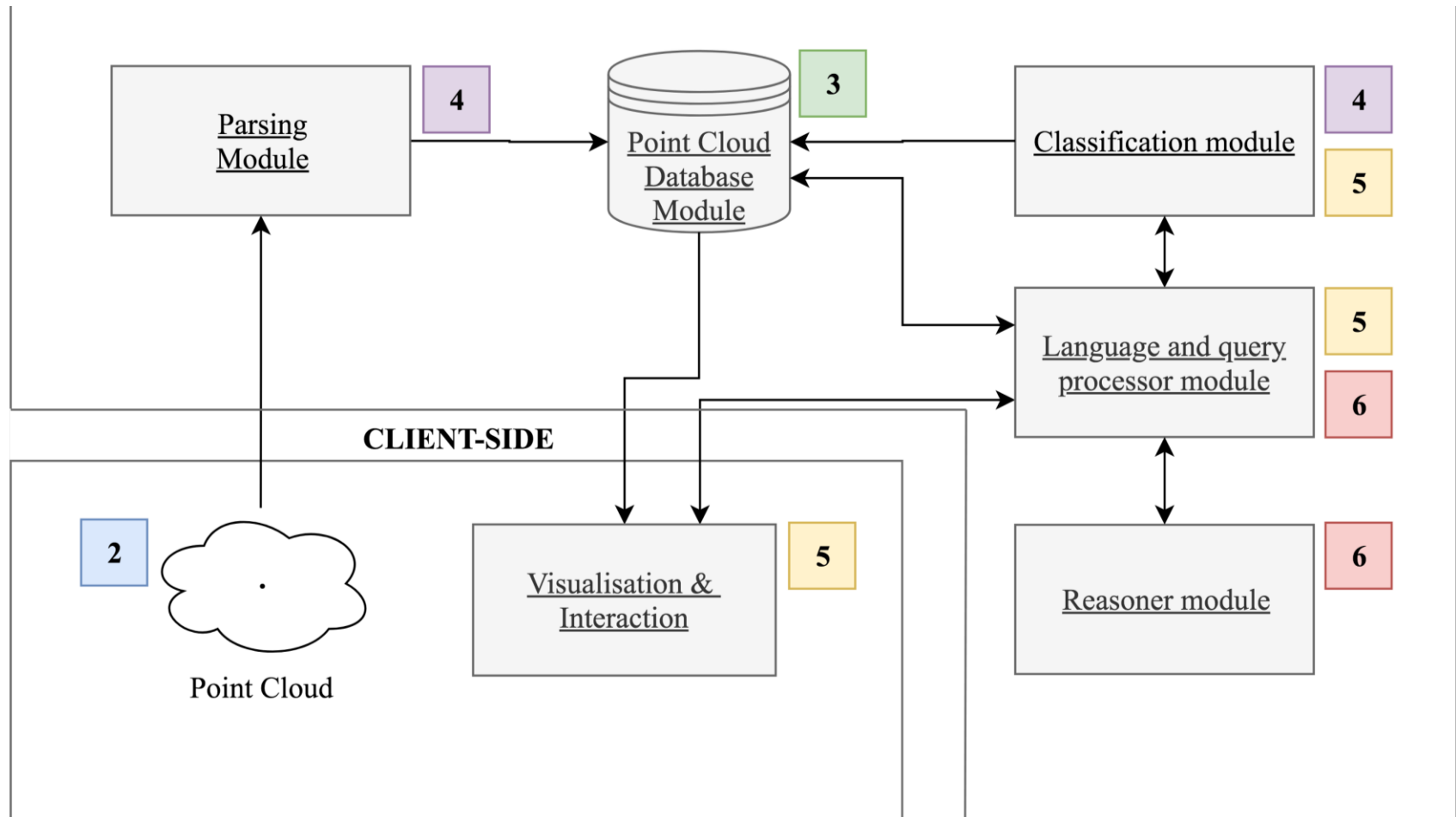
Perspectives

- Smart Point Cloud (Florent Poux)



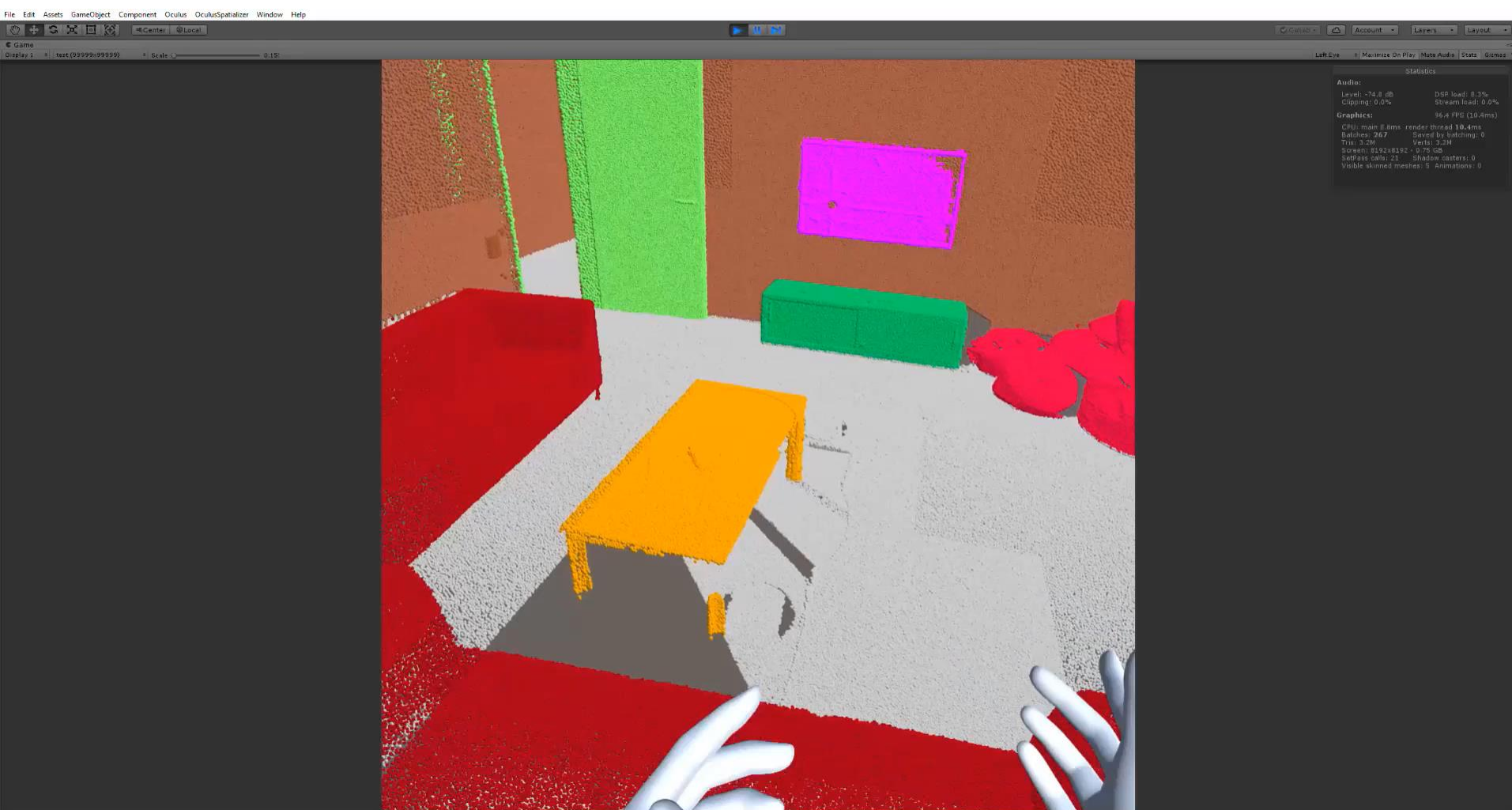
Perspectives

- Smart Point Cloud (Florent Poux)



Perspectives

- VR in Point Cloud



Conclusions

- High challenging project for a University lab
→ Real scale experience!
- « Collaborative » IS design approach
→ Requires interdisciplinarity
- Such IS needs to be open and maintainable
 - Fast growing acquisition techniques
 - Fast growing IT solutions
- Huge change of paradigm for Heritage experts

References

- Poux, F., Neuville, R., Van Wersch, L., Nys, G.-A., & Billen, R. (2017). 3D Point Clouds in Archaeology: Advances in Acquisition, Processing and Knowledge Integration Applied to Quasi-Planar Objects. *Geosciences*, 7(4), 96.
- Van Ruymbeke, M., Hallot, P., Nys, G.-A., & Billen, R. (2018). Implementation of multiple interpretation data model concepts in CIDOC CRM and compatible models. *Virtual Archaeology Review*, 9(19), 50-65.
- Poux, F., & Billen, R. (2019). Voxel-Based 3D Point Cloud Semantic Segmentation: Unsupervised Geometric and Relationship Featuring vs Deep Learning Methods. *ISPRS International Journal of Geo-Information*, 8(5), 213.

Forthcoming

- *Marker-less mobile augmented reality application for massive 3D point clouds and semantics, KHARROUBI, Abderrazzaq; Billen, Roland; Poux, Florent*
- *HeBIS-PC An Heritage Building Information System based on Point Cloud Data*



Prof. R. Billen



Prof. P. Hallot



Dr. P-H. Lefebvre



Dr. C. Dubois



Dr. F. Poux



Dr. J-P. Kasprzyk

Thanks for your attention



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