FAIR Heritage
Digital Methods, Scholarly Editing and Tools for Cultural and Natural Heritage

LE STUDIUM
Loire Valley
Institute for Advanced Studies

LIÈGE université
Geomatics

The Coudenberg Heritage Building Information System

Roland Billen, 18/06/2020

TOC

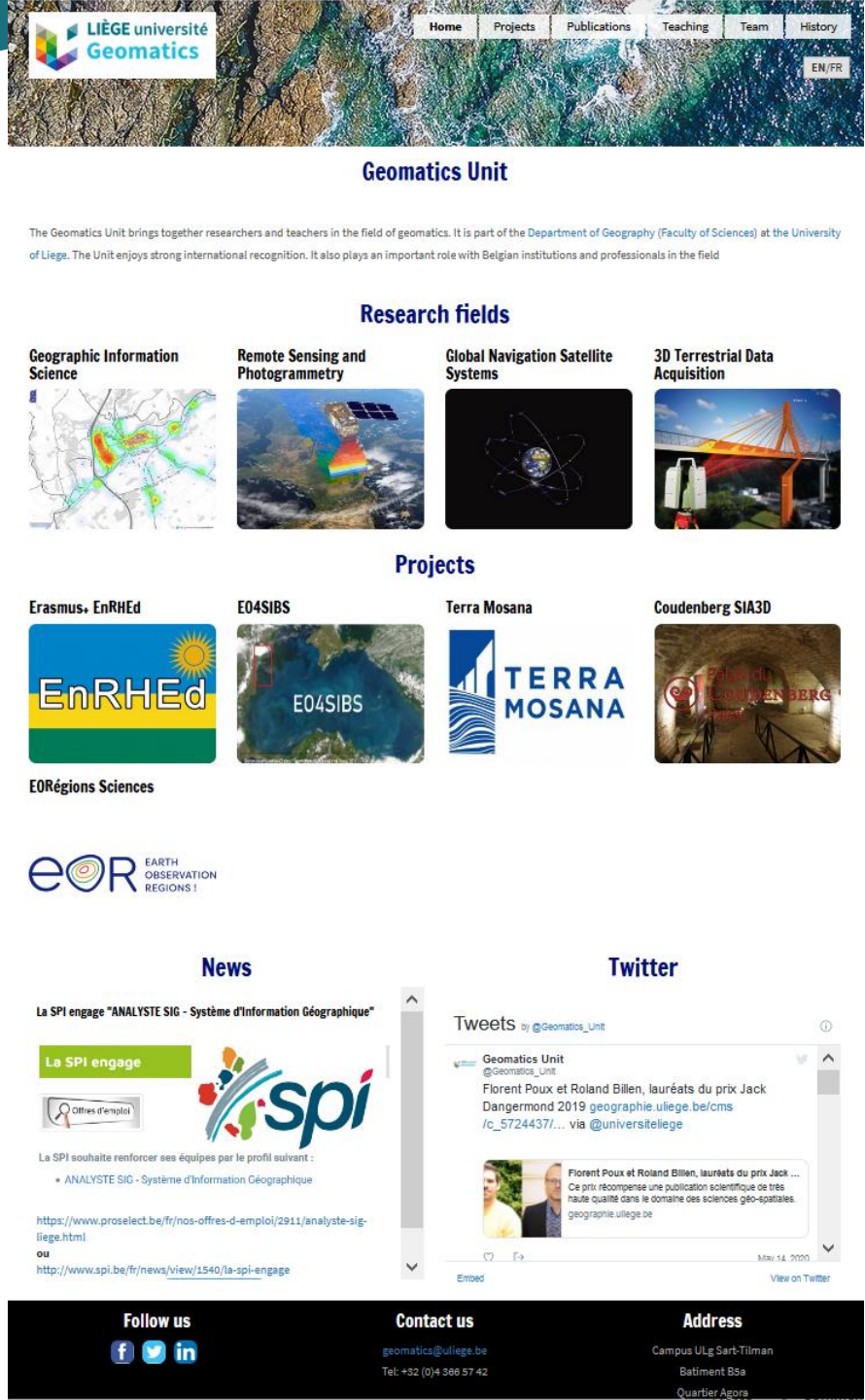
1. Geomatics Unit
2. Coudenberg Heritage Building IS – Phase 1
   - Project description
   - Global approach
   - *User requirement analysis*
   - *Conceptual design level*
   - *Design and implementation level*
   - *Usability evaluation*
3. Perspectives - Phase 2
4. Conclusions

Geomatics Unit

http://geomatics.ulg.ac.be

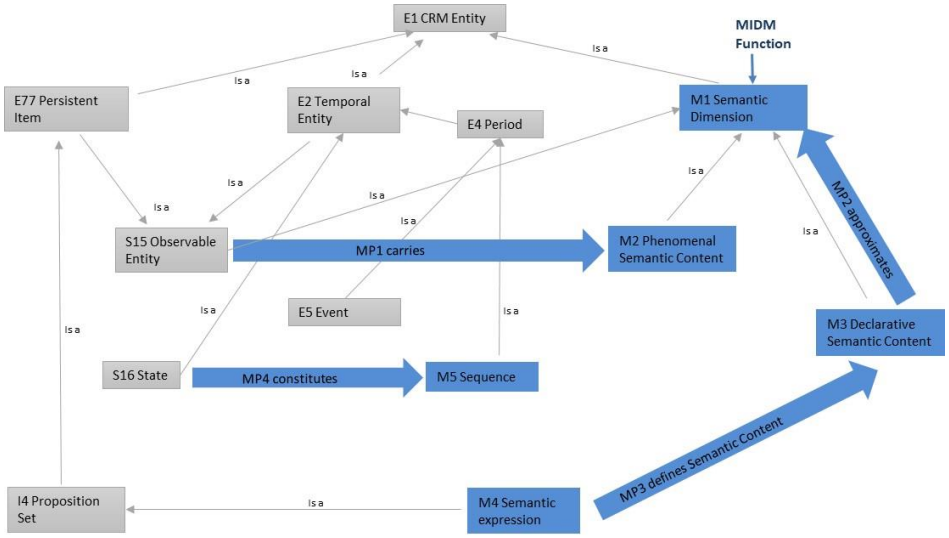
Faculty of Sciences / Dept. Geography /

~ 20 staff members



LIÈGE université Geomatics

- 10 years of interaction with archaeologists

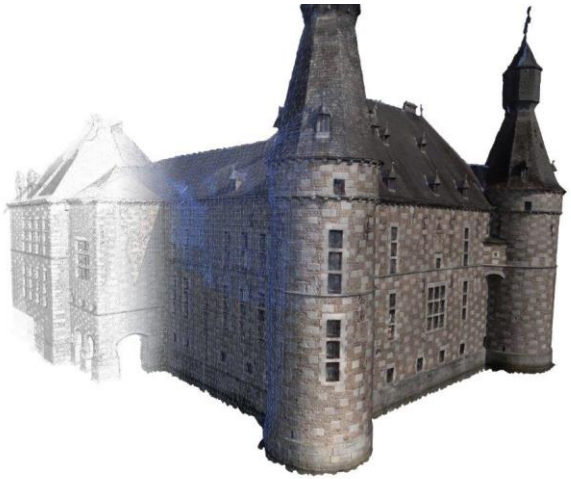


MIDM

Germiny – Smart Point Cloud

LIÈGE université Geomatics

Jehay 4D



TERRA MOSANA

Interreg
Euregio Meuse-Rhin
Fonds Européen de Développement Régional

UNION EUROPÉENNE

www.terramosana.org

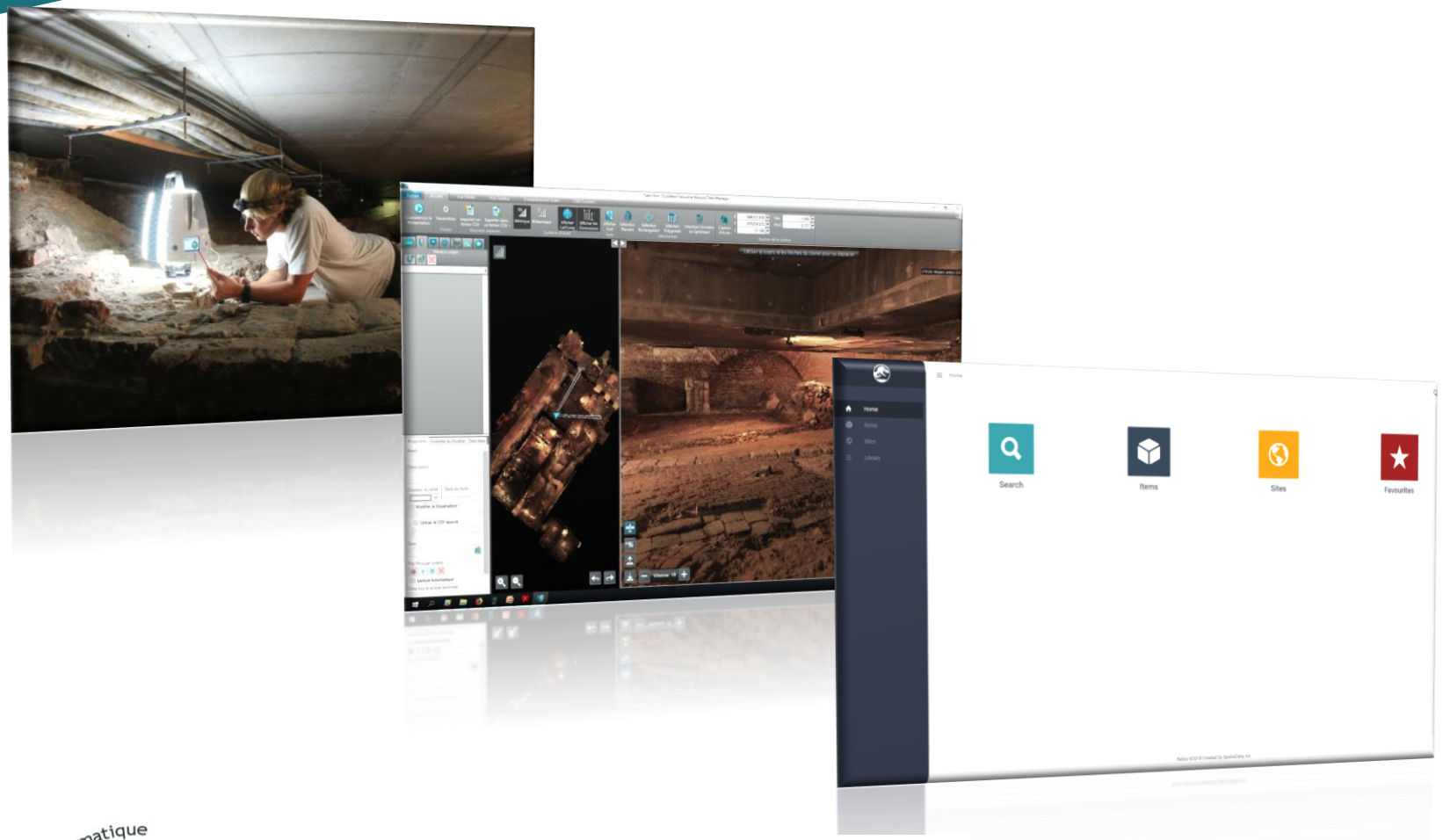
LIÈGE université Geomatics

e-thesaurus – médiation holographique 3D – Pierre Hallot

Université de Lille

holusion

Coudenberg HeBIS - Phase 1



Coudenberg

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

Call for tender

- 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

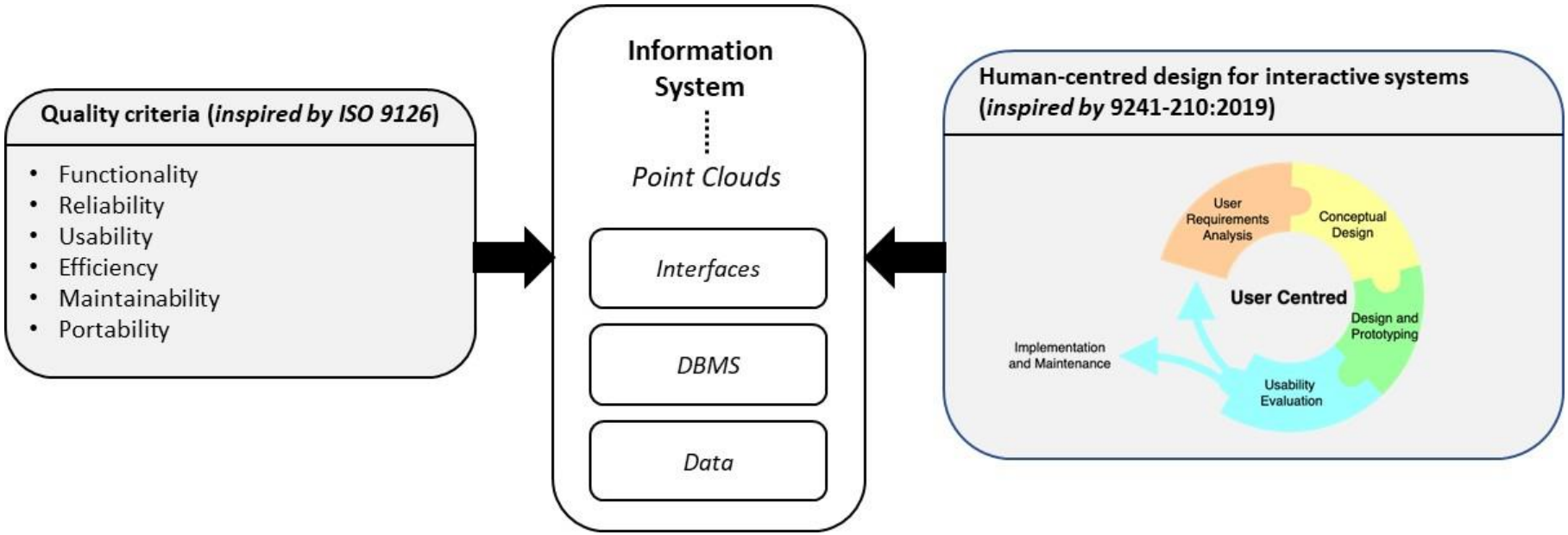
5 months
June 18 – Oct. 18

Phase 1

RUE ISABELLE -3
ISABELLASTRAAT -3
CHAPELLE -2
KAPEL -2
RUE ISABELLE -2
ISABELLASTRAAT -2
HOTEL D'HOOGSTRAETEN -2
HOF VAN HOOGSTRAETEN -2
CORPS DE LOGIS -2
WOONGEDEELTE -2
BELvue -1
RUE ISABELLE -1
ISABELLASTRAAT -1
AULA MAGNA -1

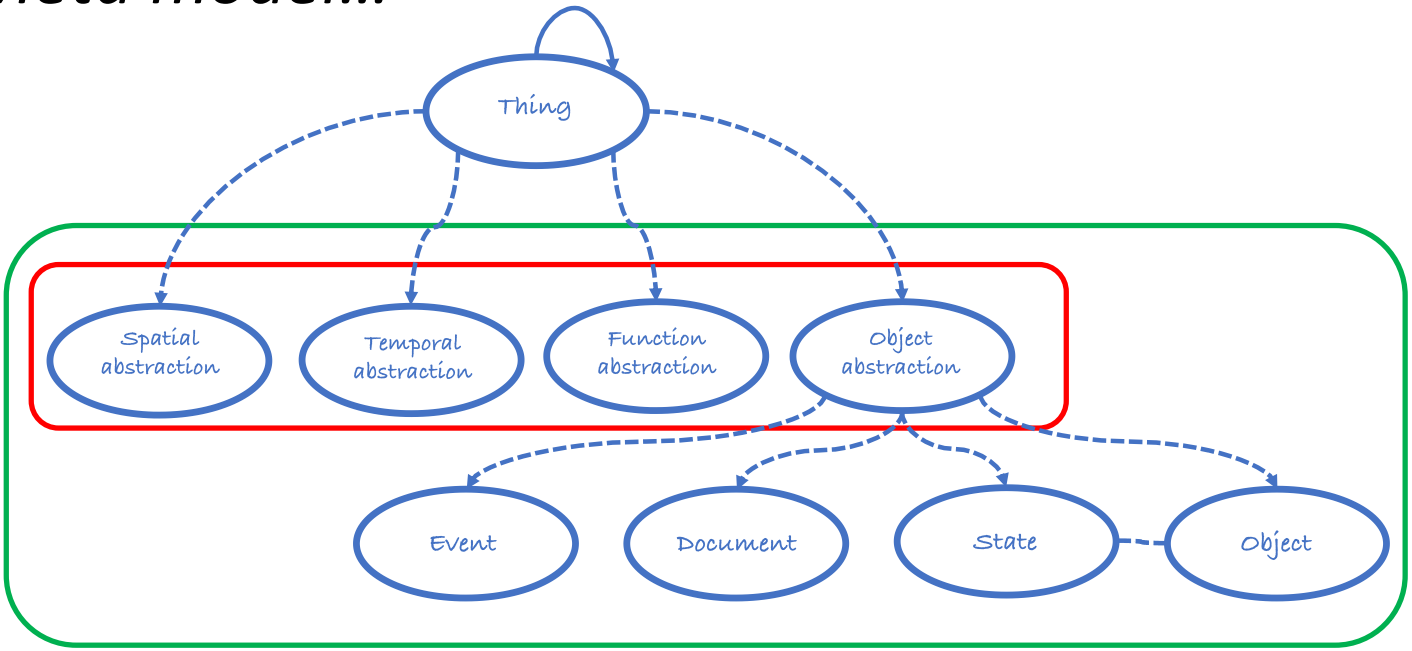
Global Approach

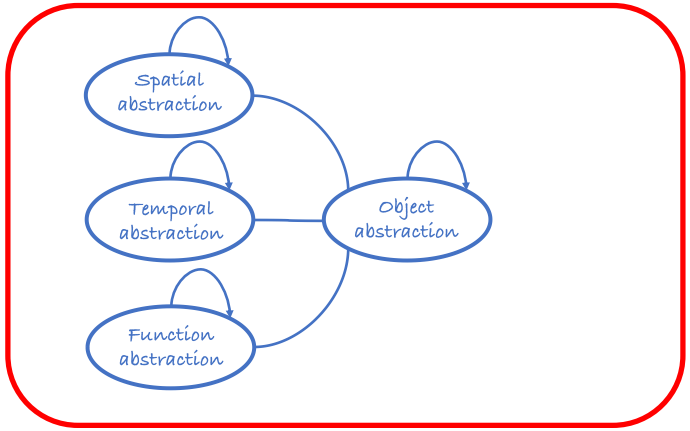
- *A methodology…*

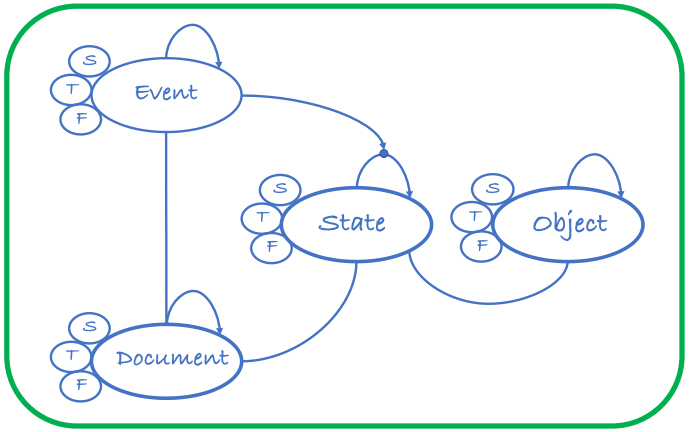


Global Approach

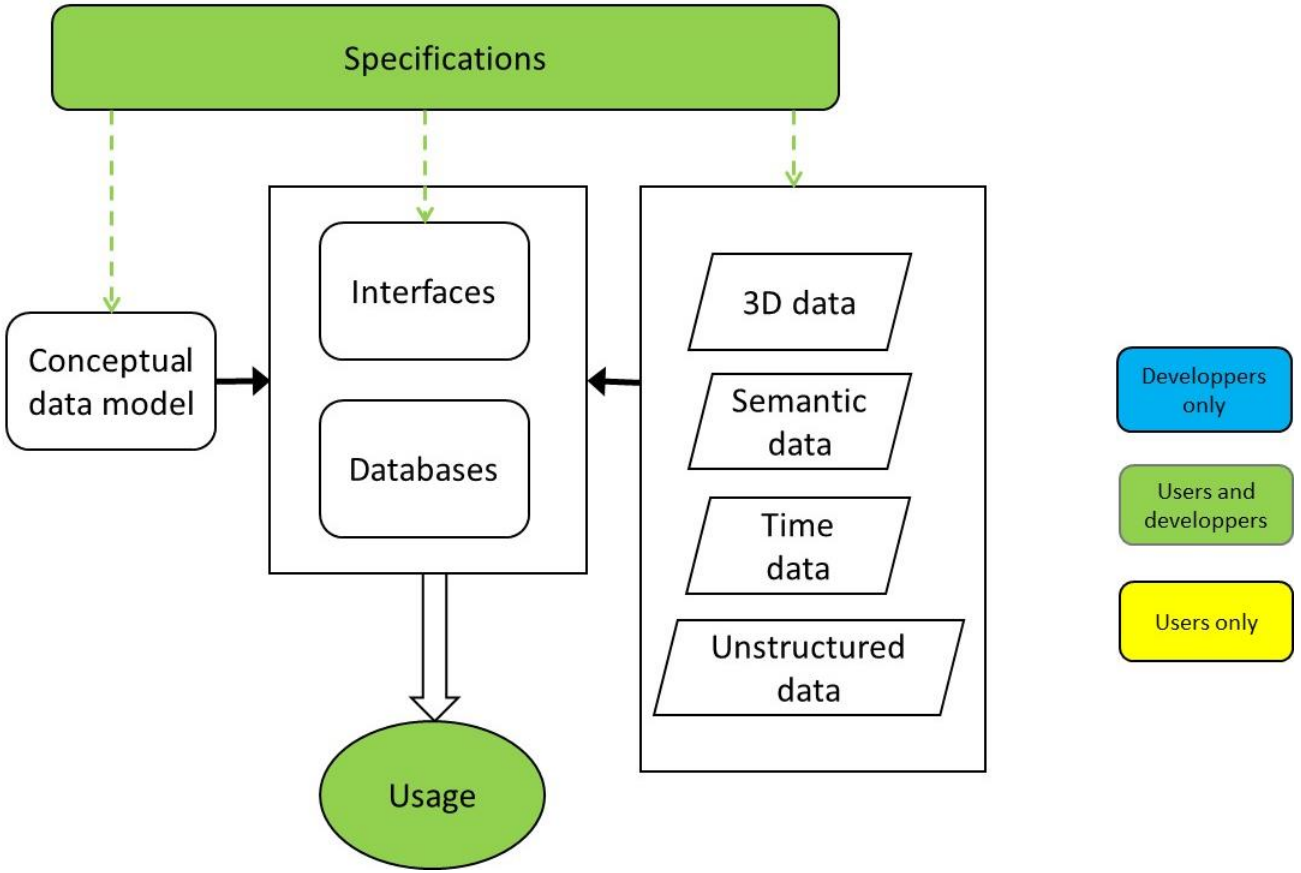
- *A Meta model…*





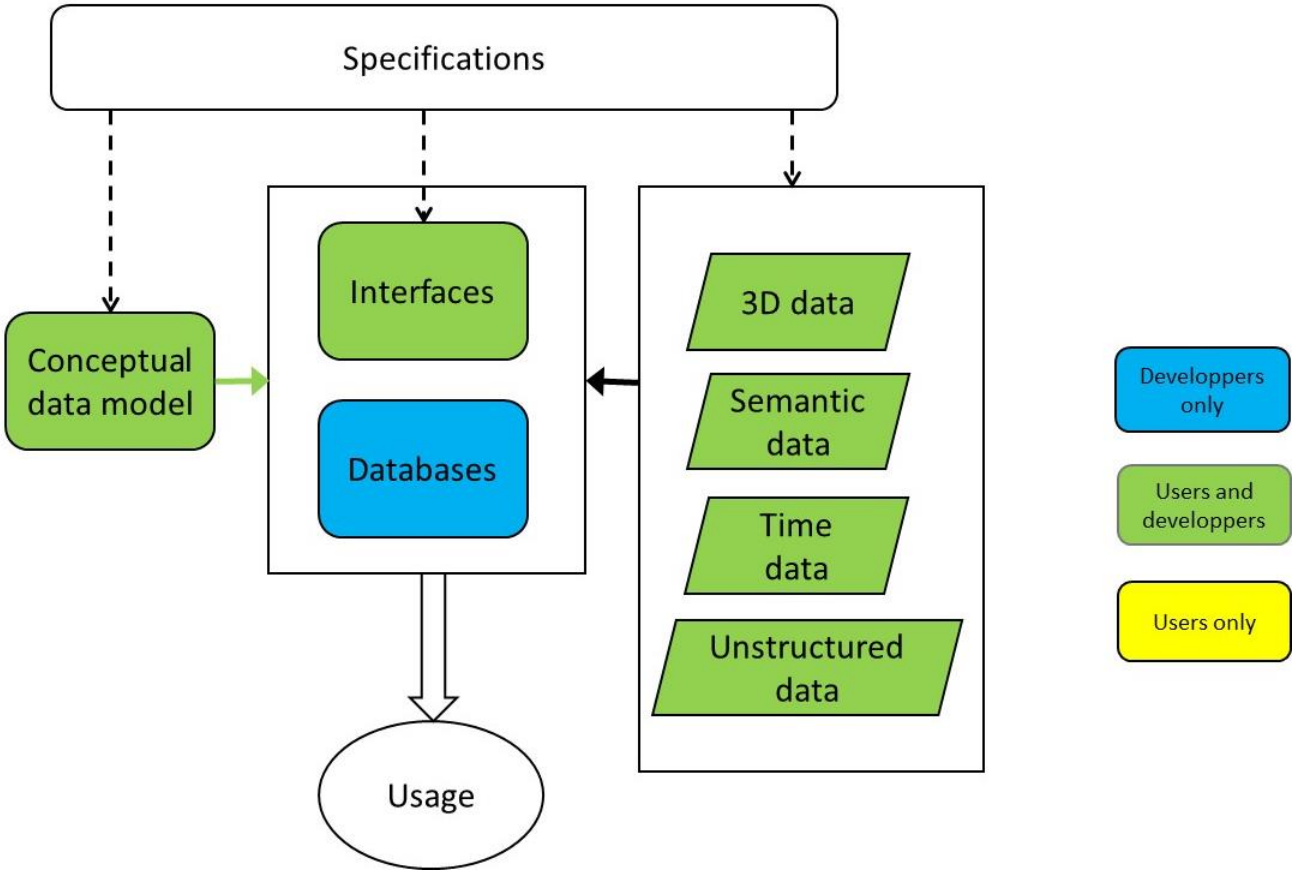


User requirements Analysis

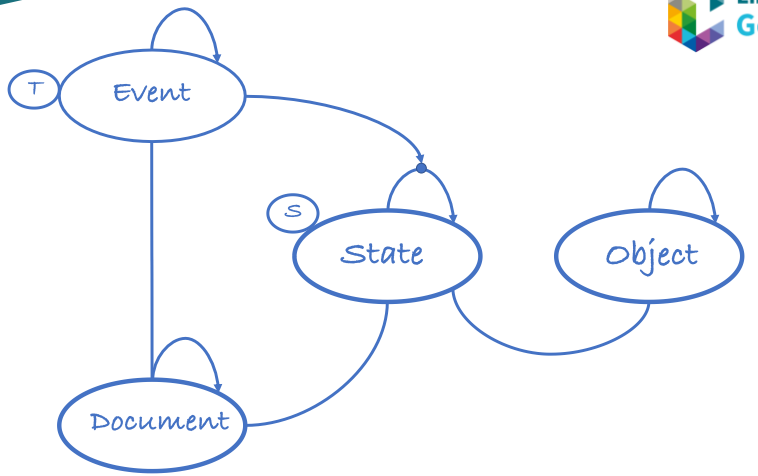


→ *Detailed specifications (functionalities and data)*

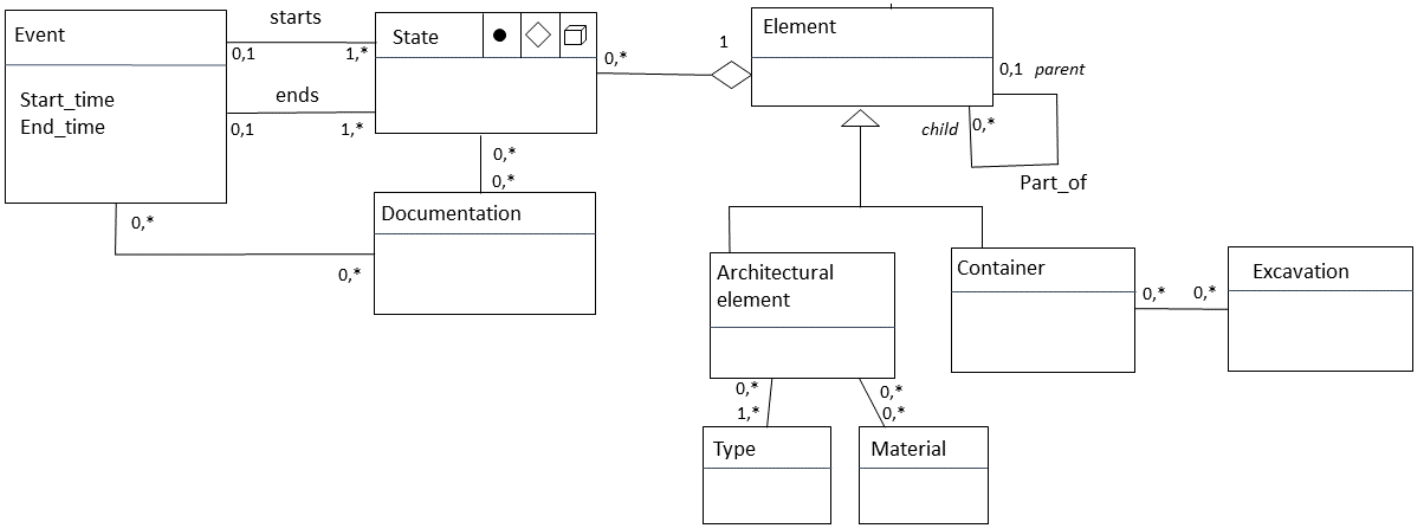
Conceptual design level



Conceptual design level



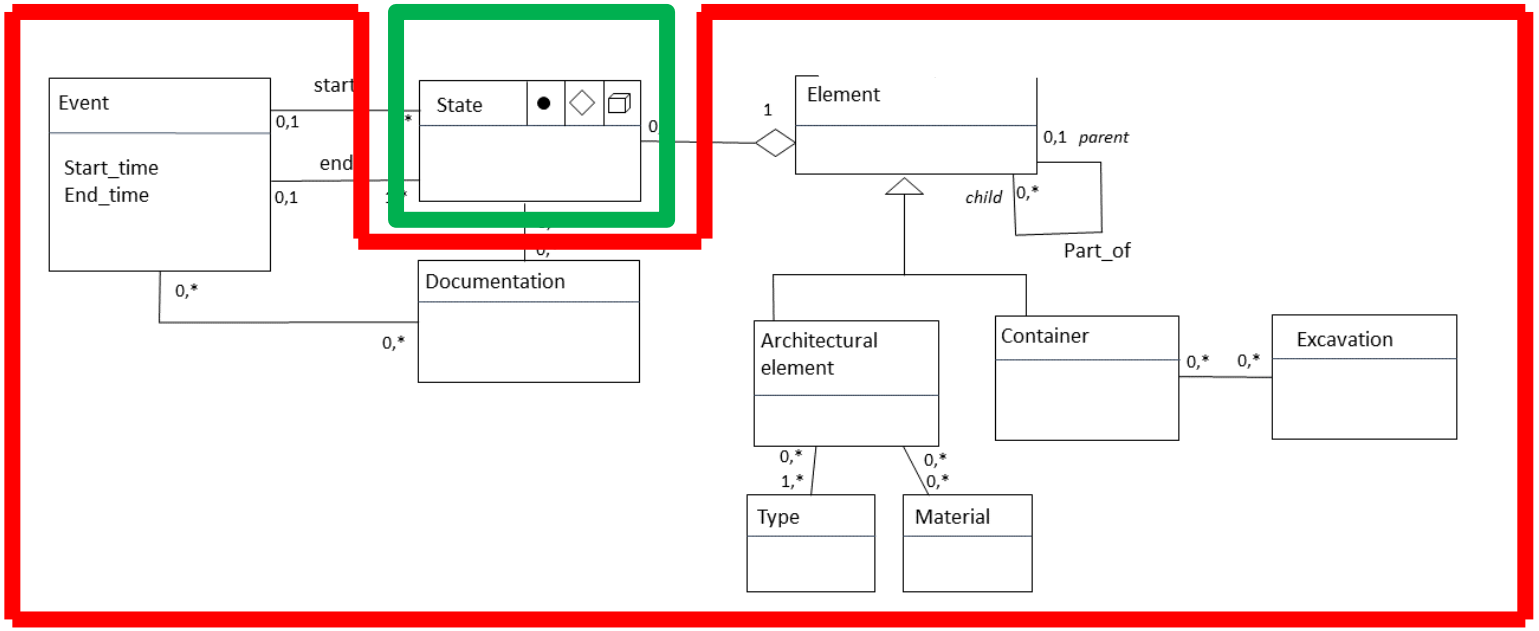
Conceptual Data Model



Conceptual design level

LIÈGE université Geomatics

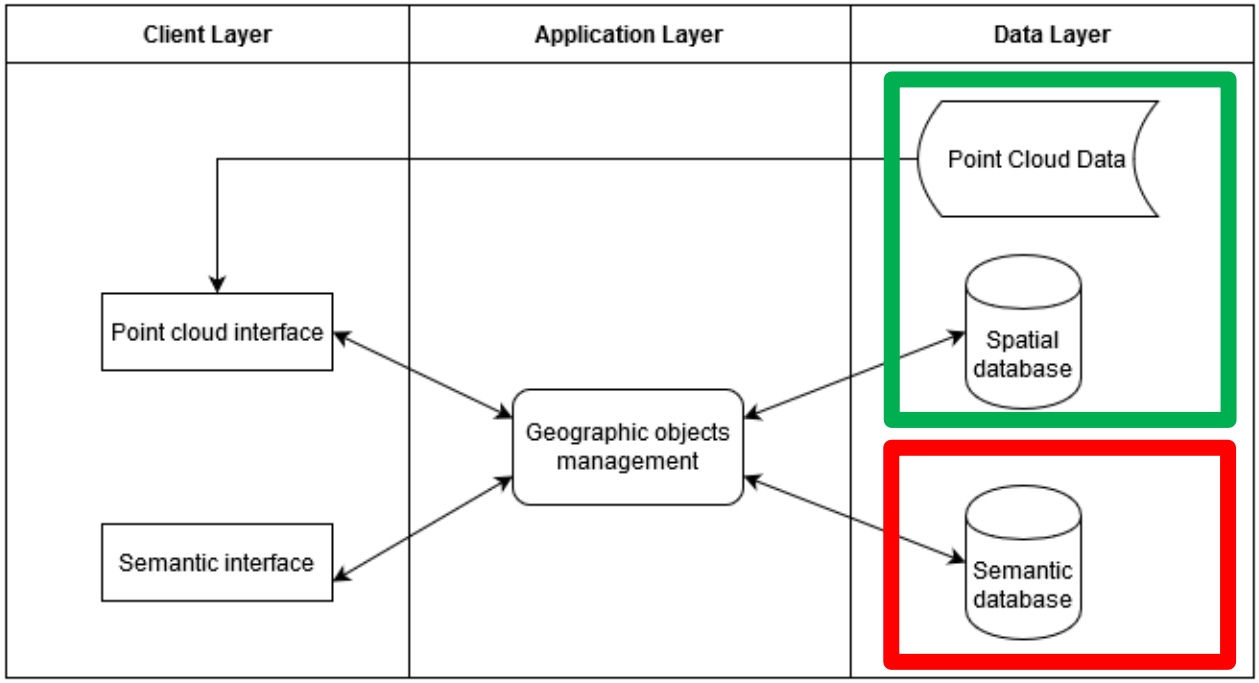
Conceptual Data Model



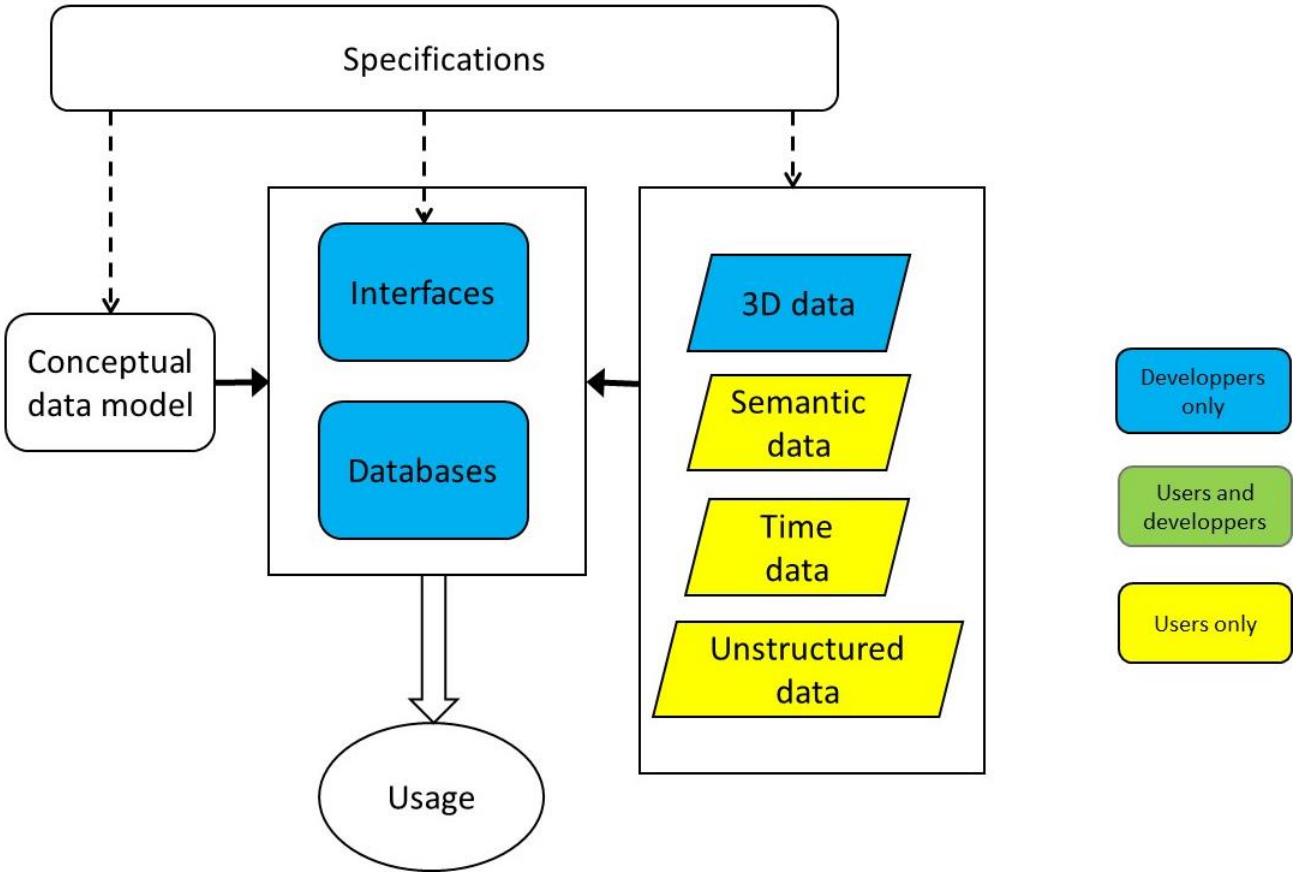
Conceptual design level

LIÈGE université Geomatics

Information System Structure



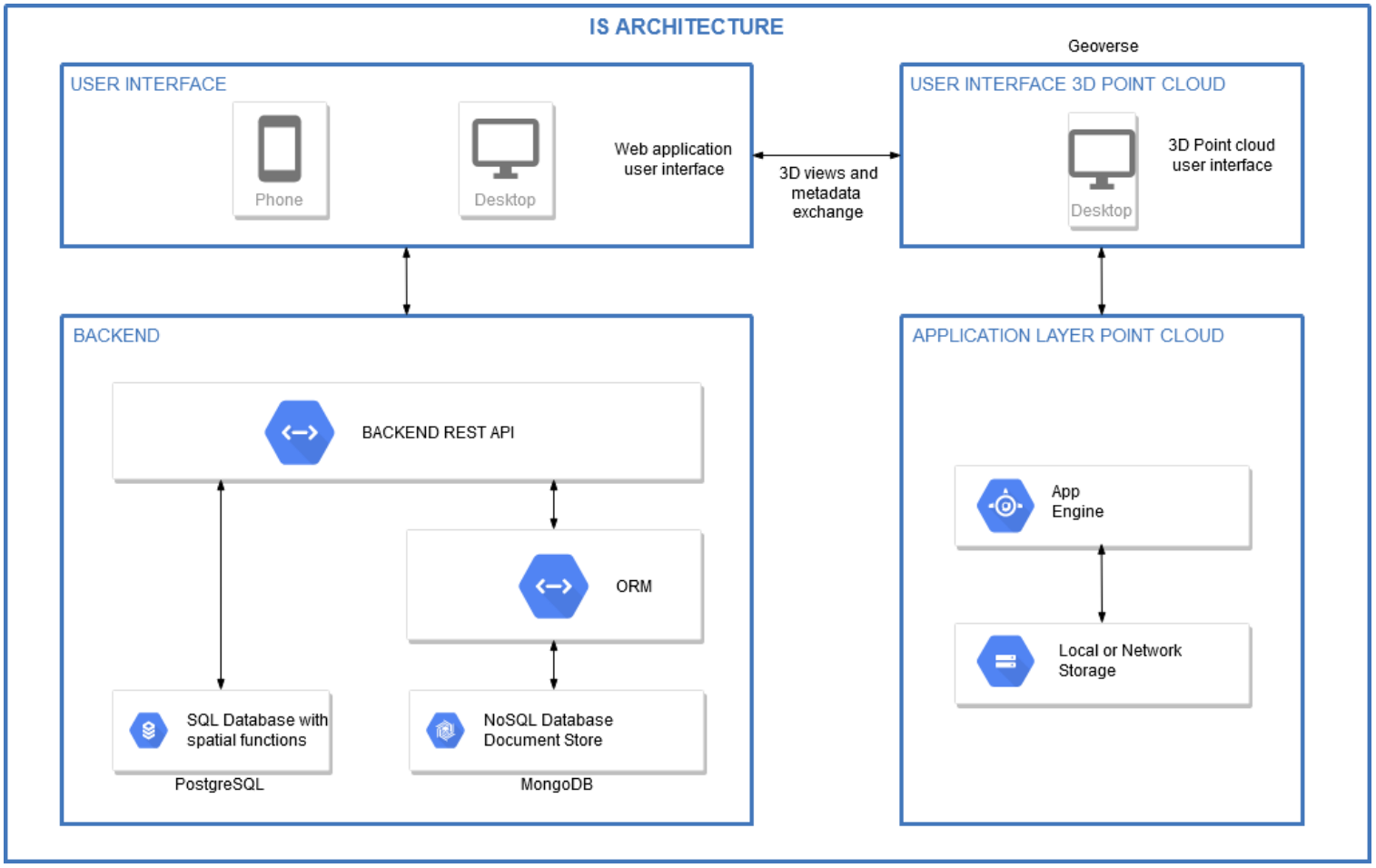
Design and implementation level



Design and implementation level

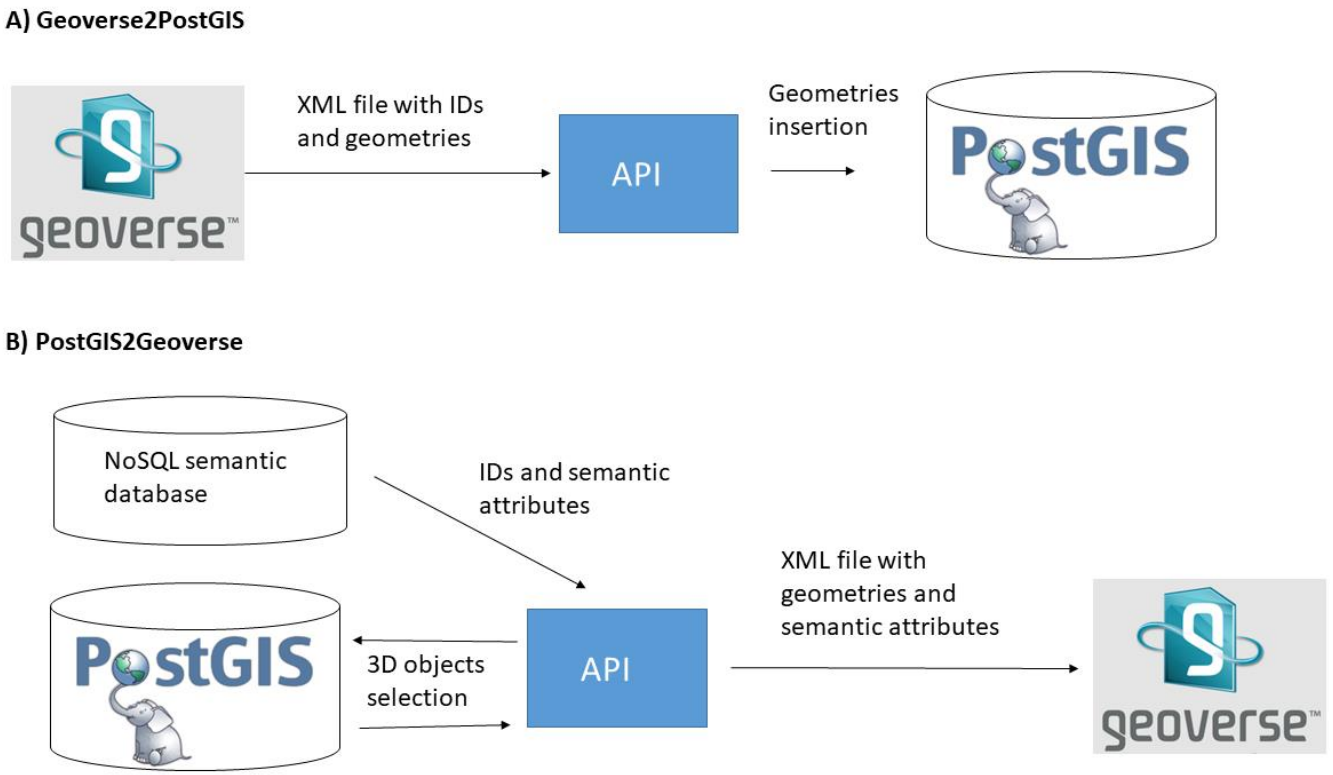
LIÈGE université Geomatics

Information System Architecture

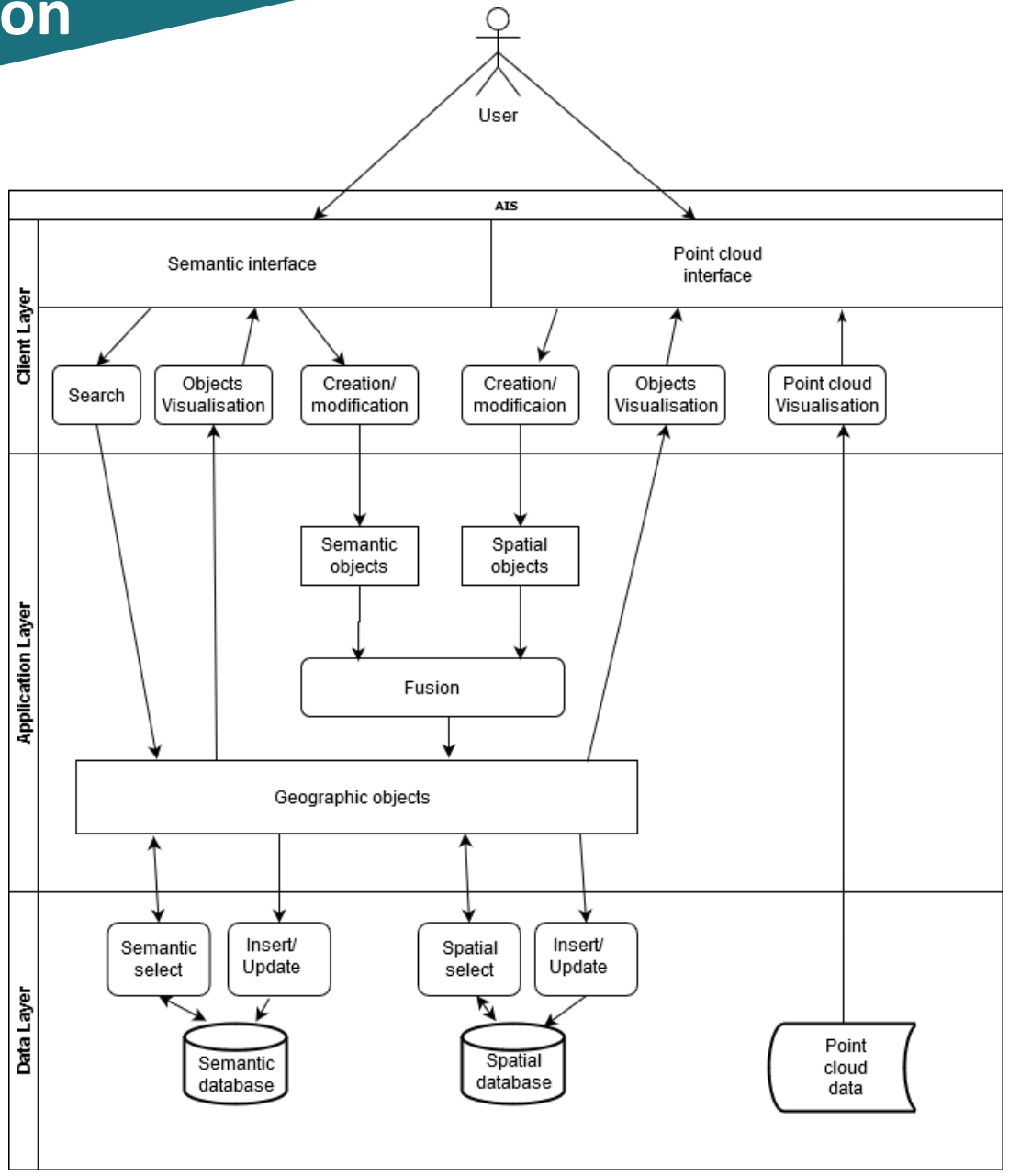


Design and implementation level

- Linking 3D models and DBs



Design and implementation level

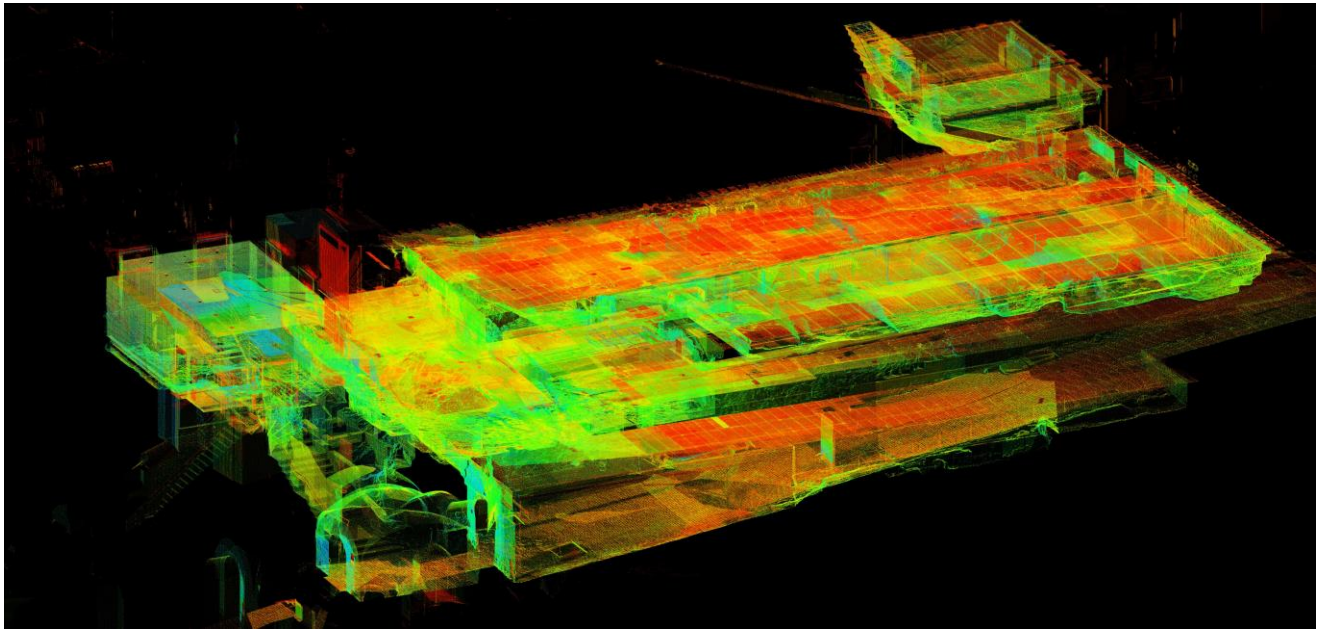


Design and implementation level

LIÈGE université Geomatics

Data acquistion

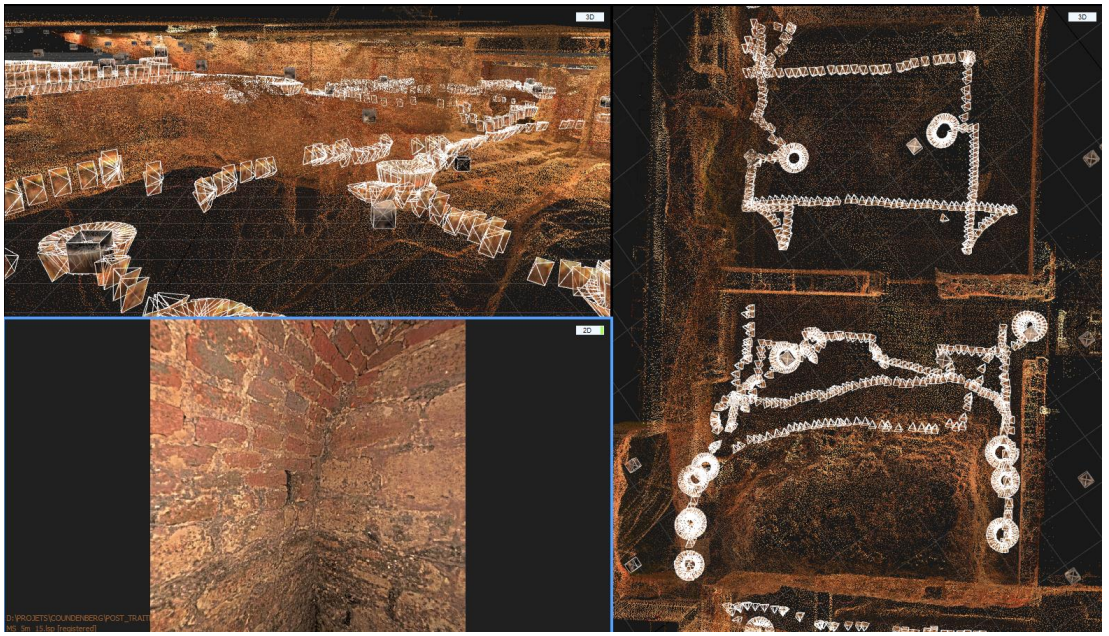
- 24 315 758 526 points / 12000 photos / 17 stations / 110 scans (25 min/scan)
- 34 man-day (acquisition)

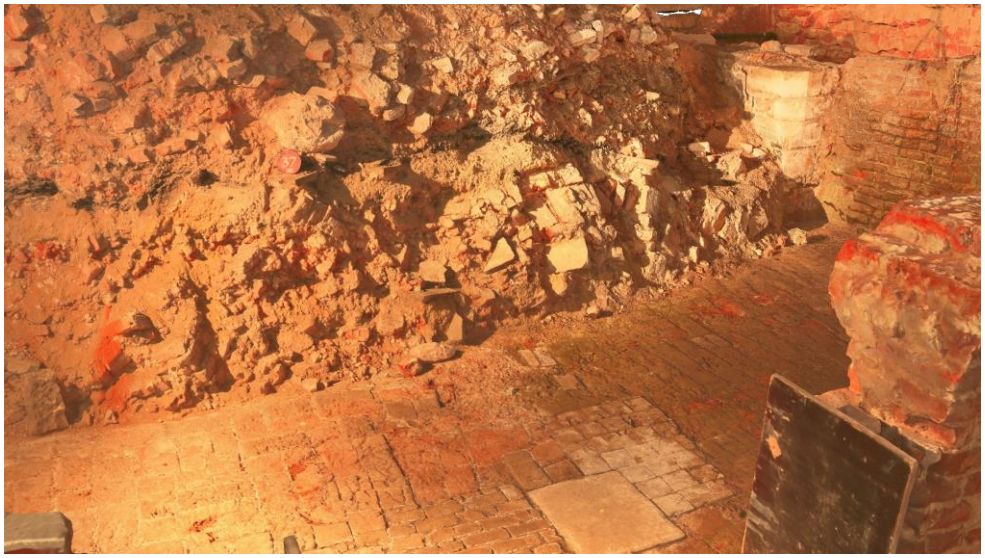


Design and implementation level

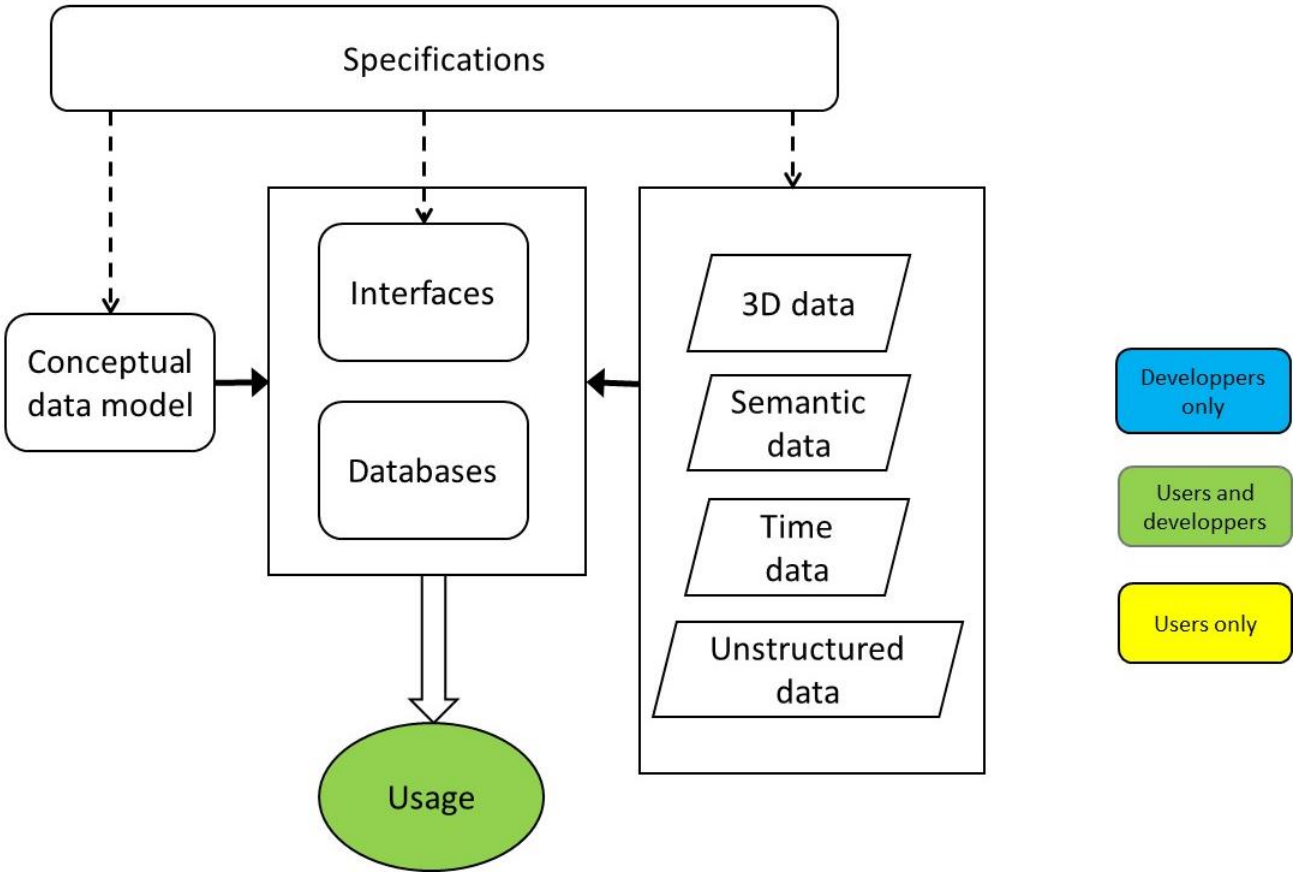
LIÈGE université Geomatics

Data acquistion





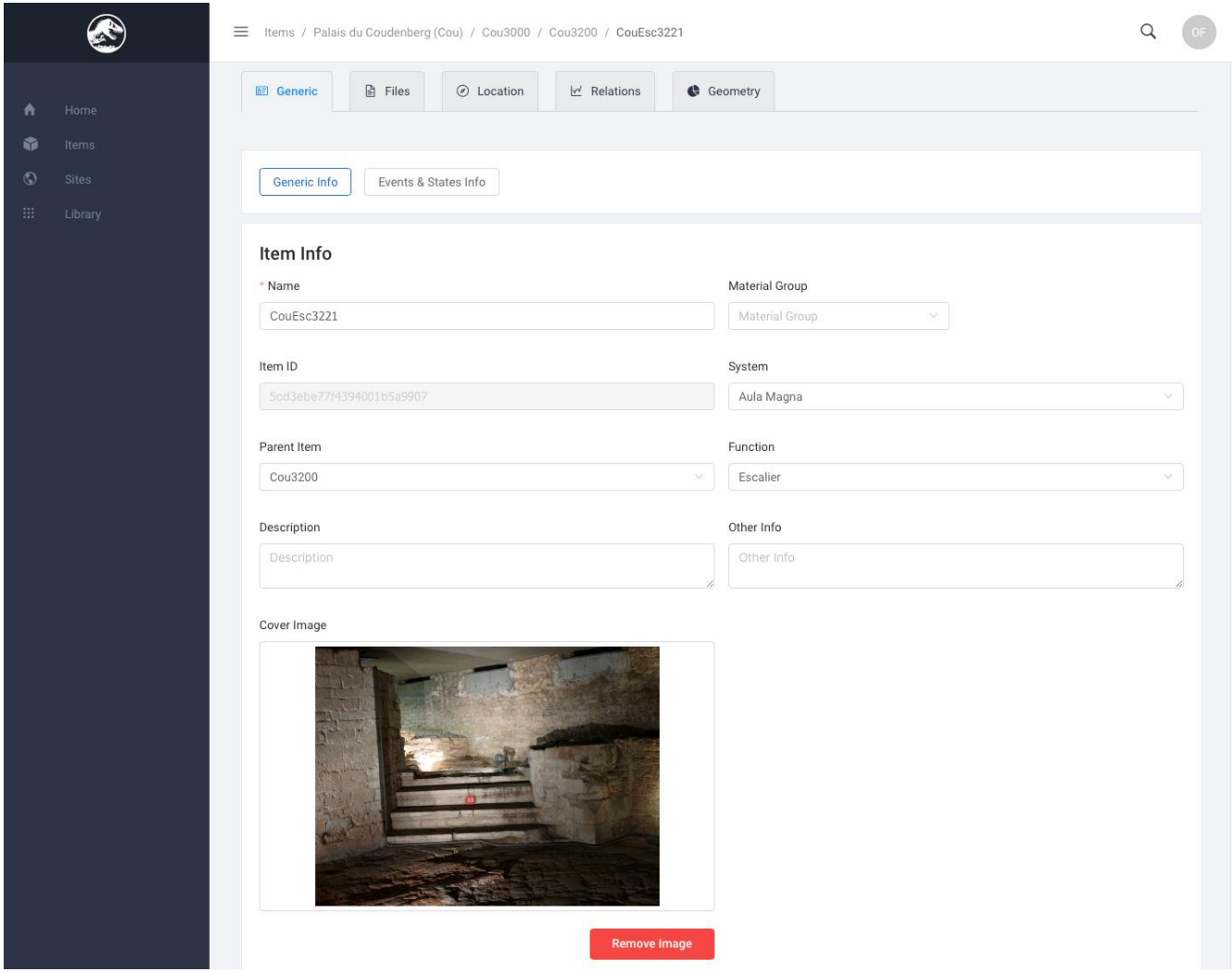
Usability evaluation



- Training sessions / feedback

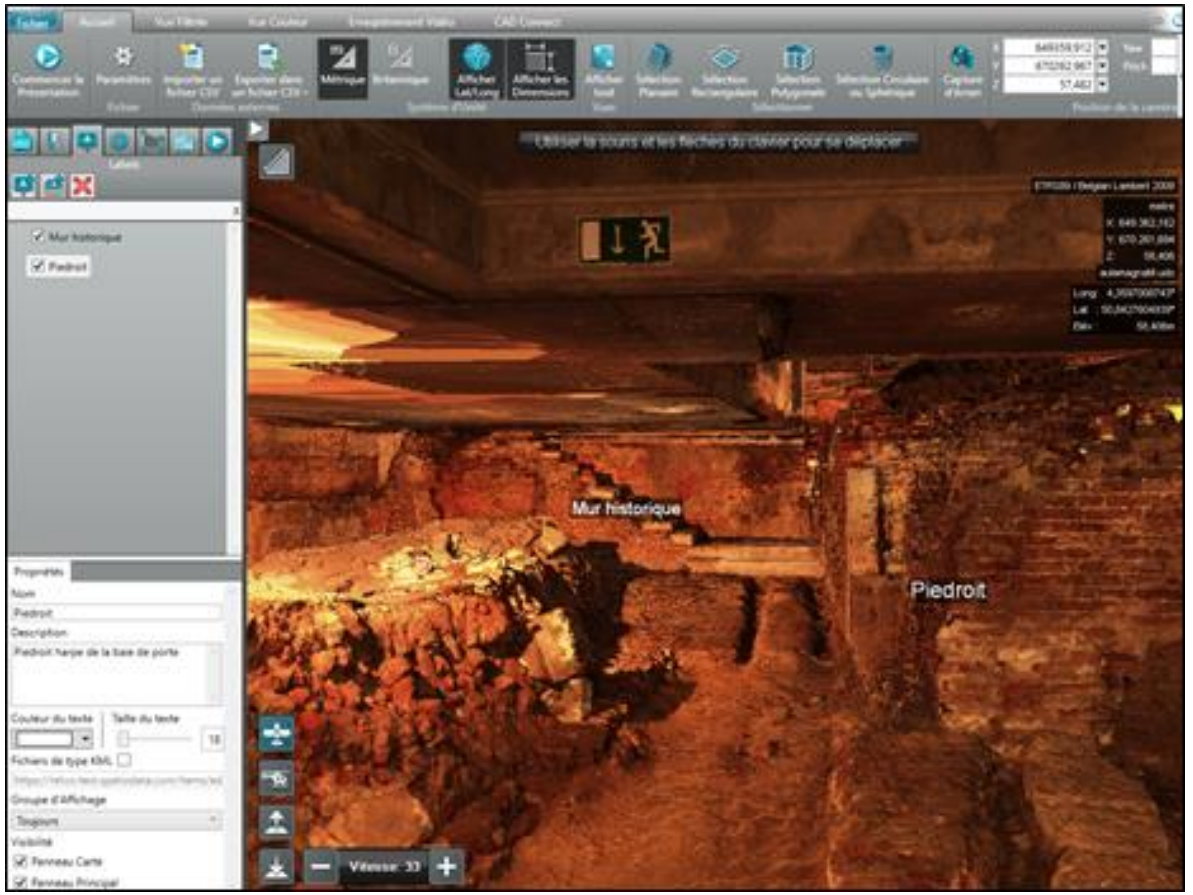
Usability evaluation

- Semantic Interface



Usability evaluation

- 3D Interface

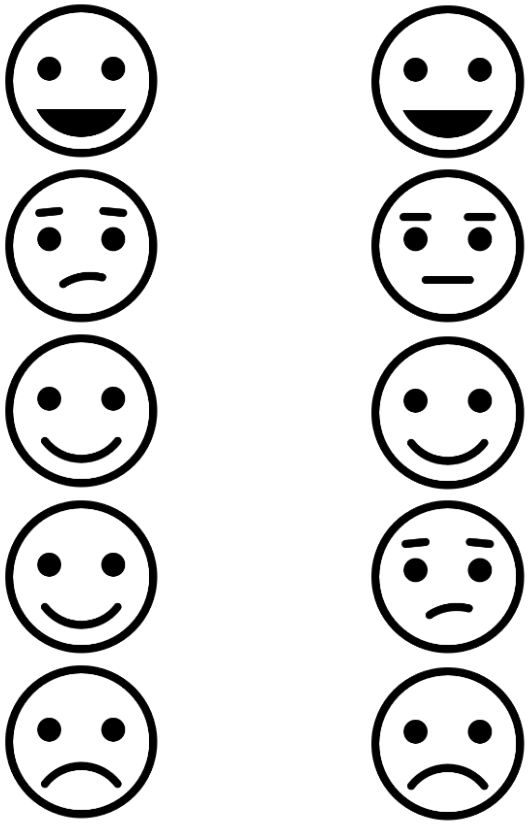


Usability evaluation

Usability evaluation

Usability evaluation

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

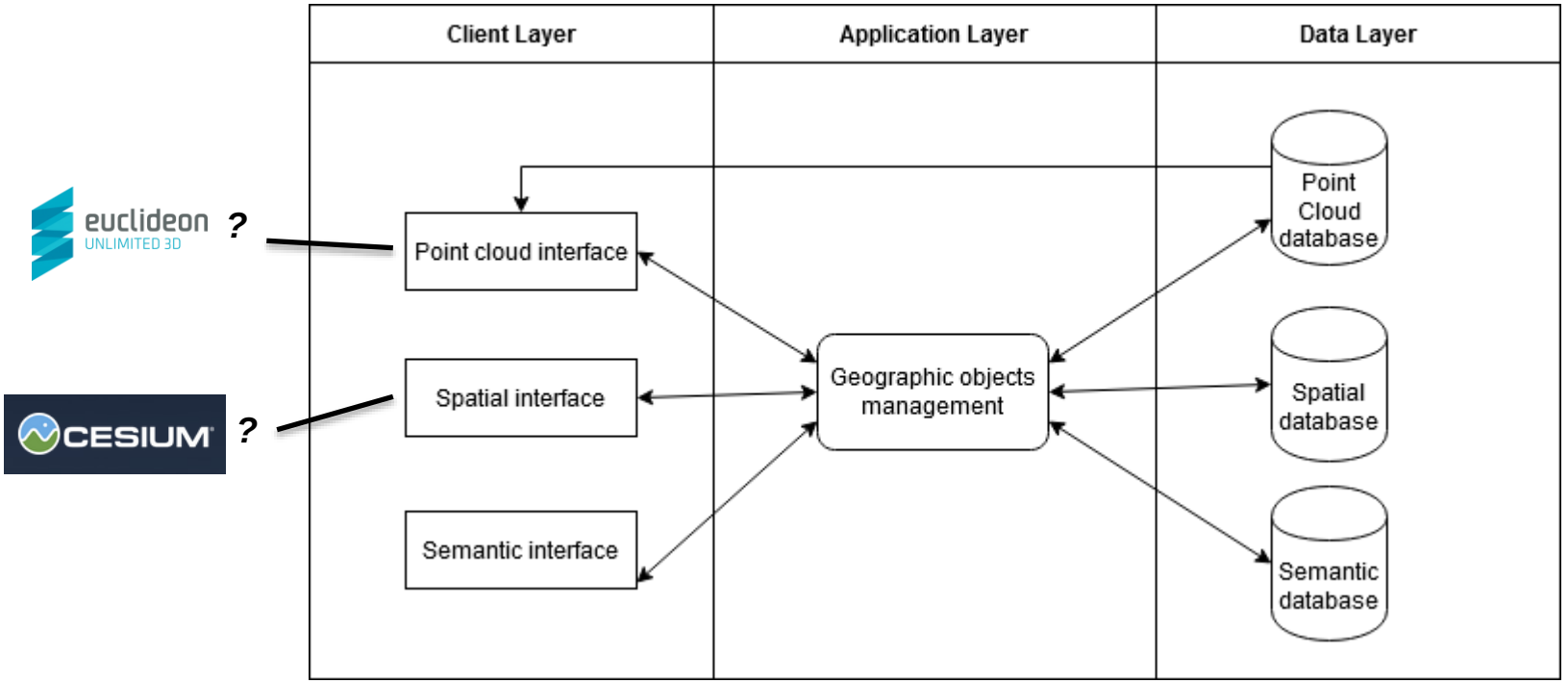


Perspectives

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

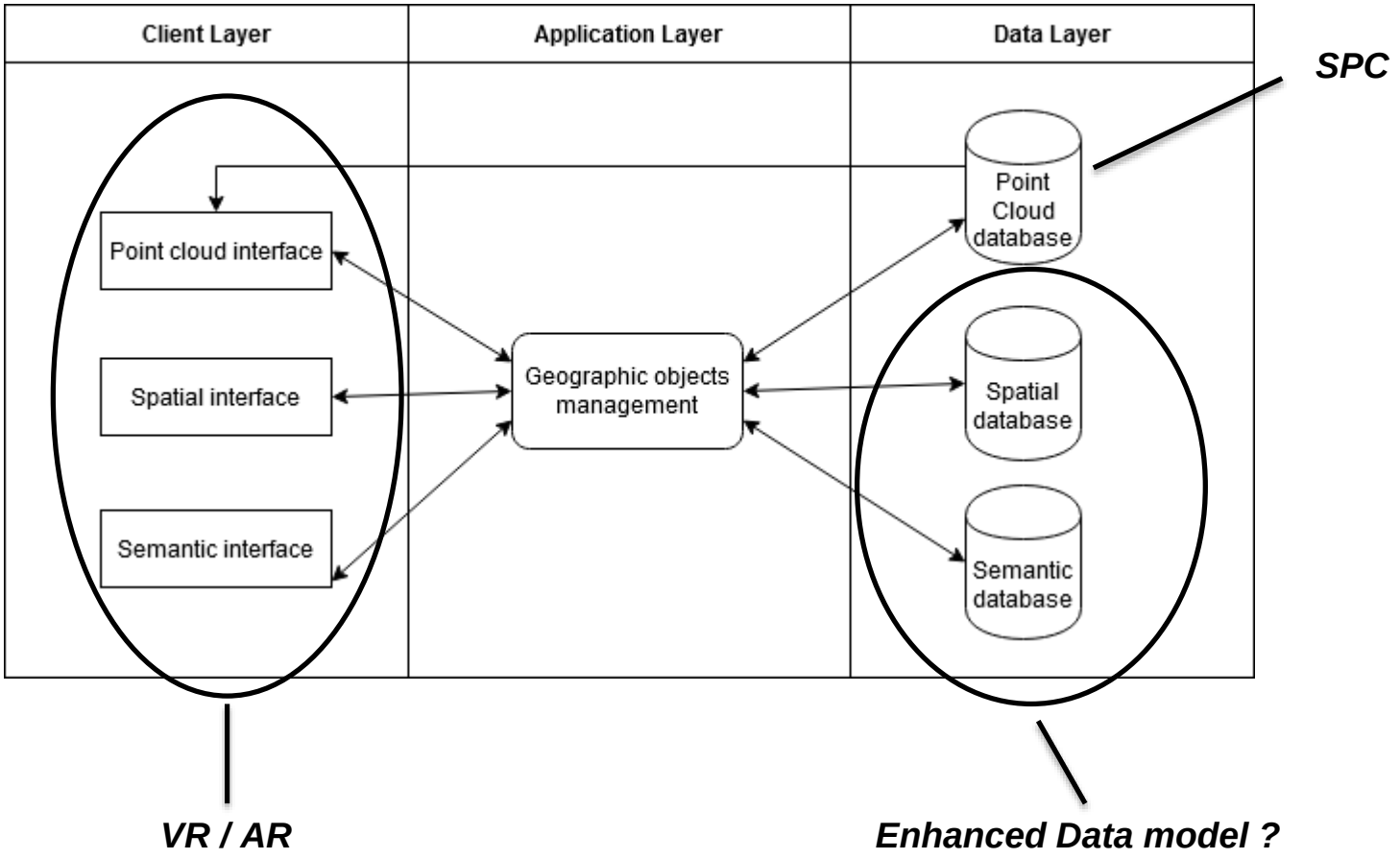
Perspectives

- IS – phase 2 ?



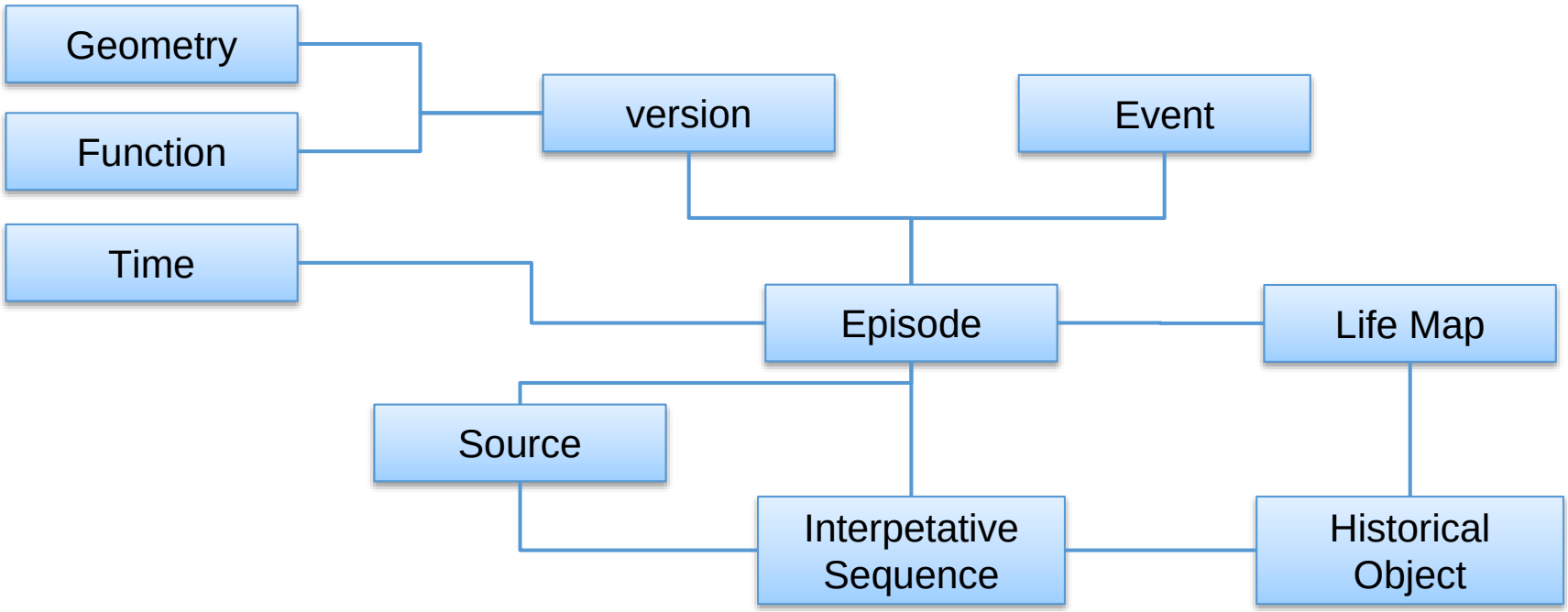
Perspectives

- Future IS ?



Perspectives

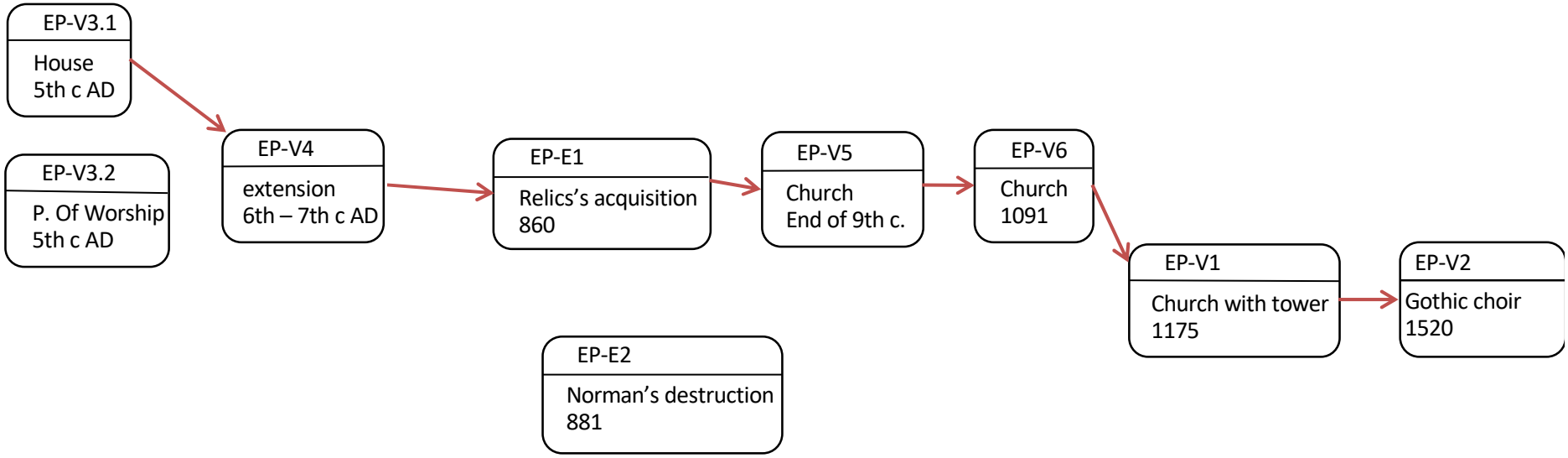
- Enhanced CDM?



MIDM – Muriel Van Ruymbeke

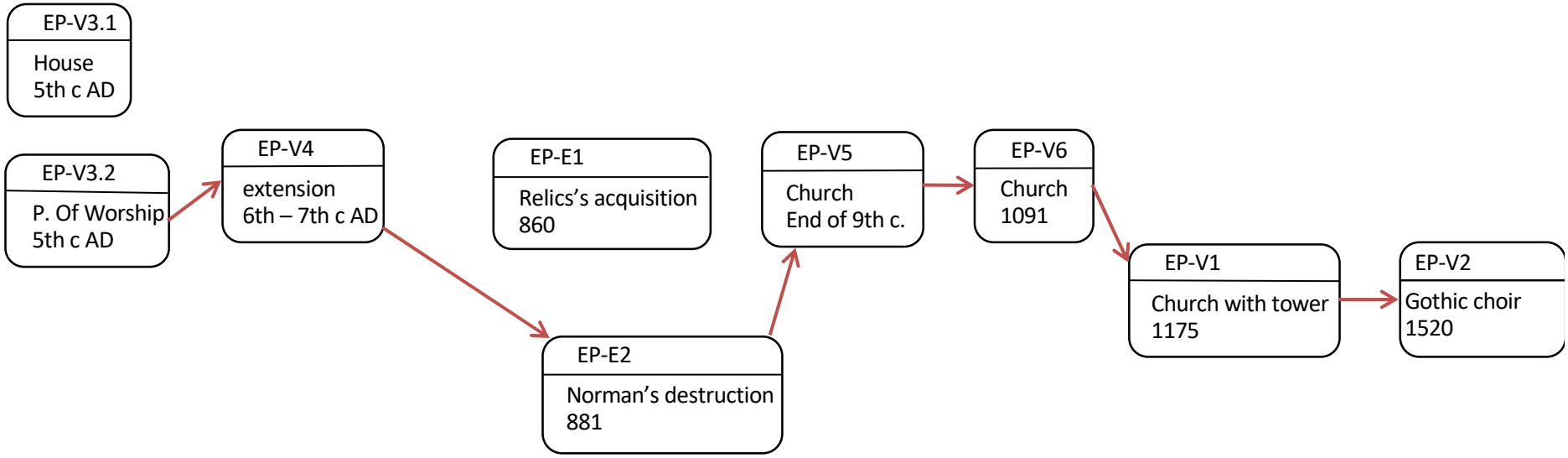
Perspectives

- Interpretative sequence by author 1



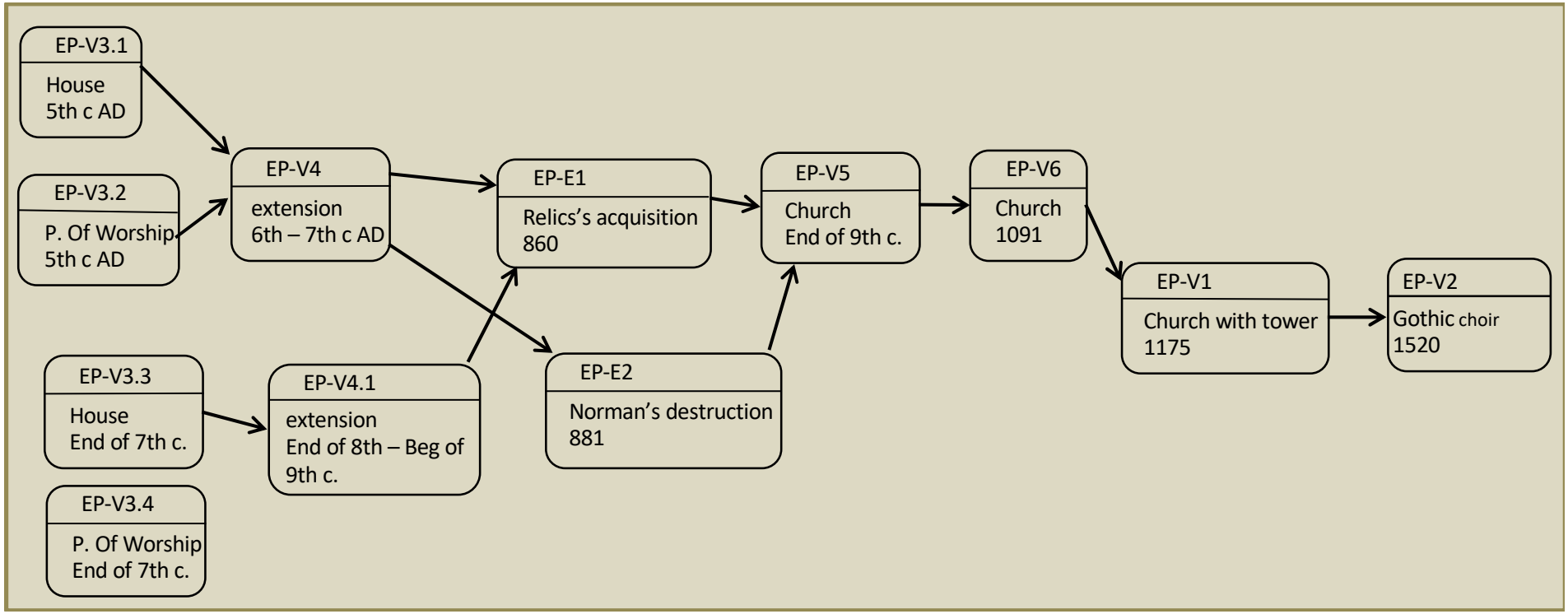
Perspectives

- Interpretative sequence by author 2



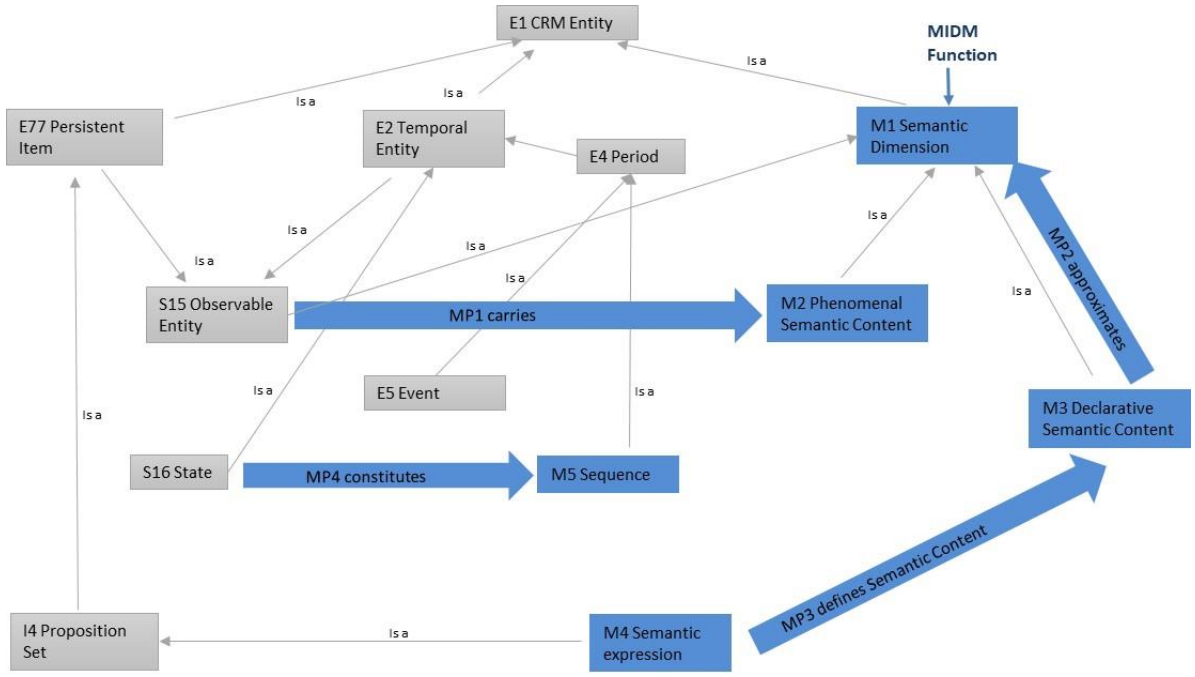
Perspectives

- Life Map



Perspectives

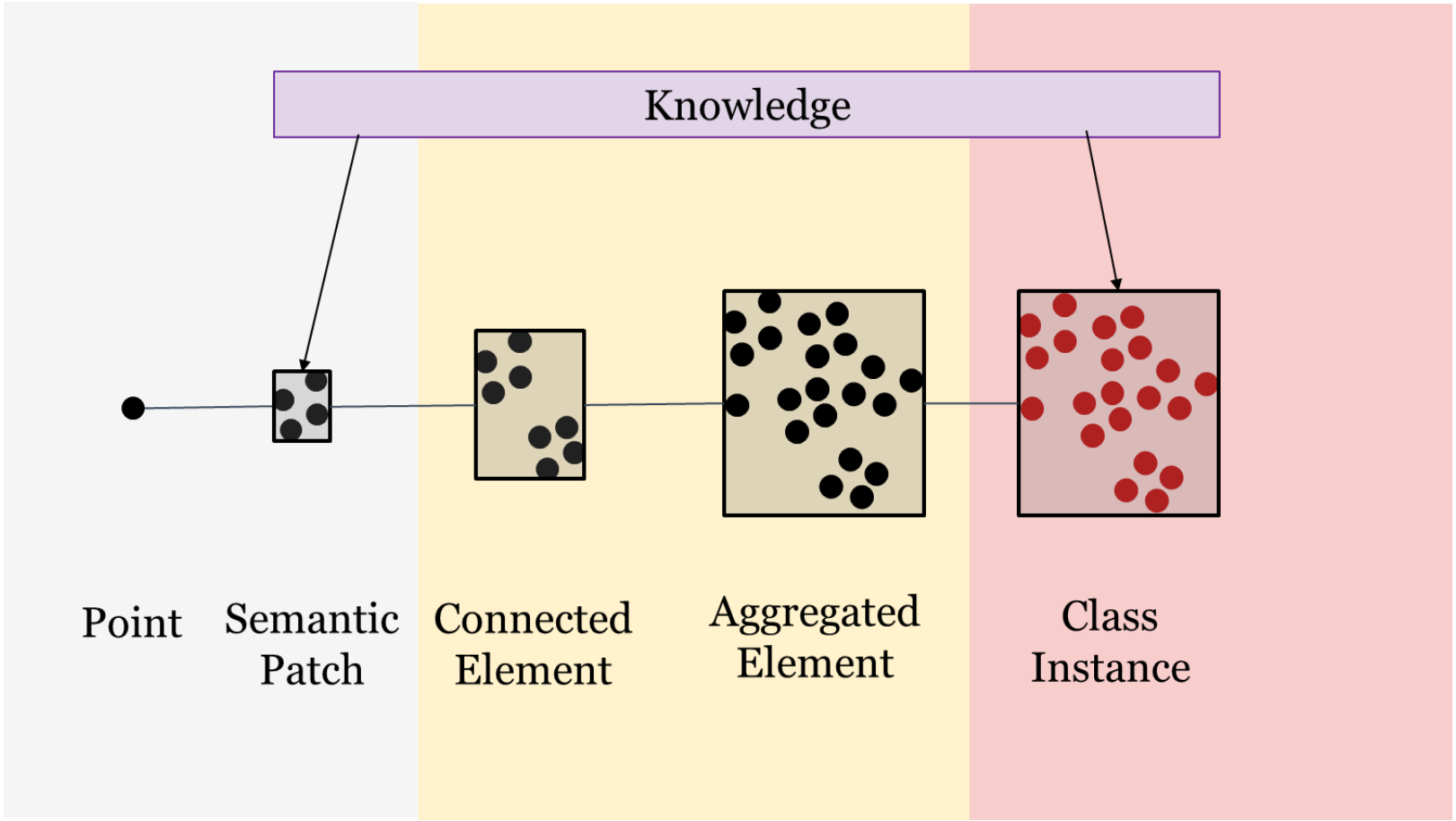
- Enhanced CDM?



MIDM mapping to CIDOC CRM

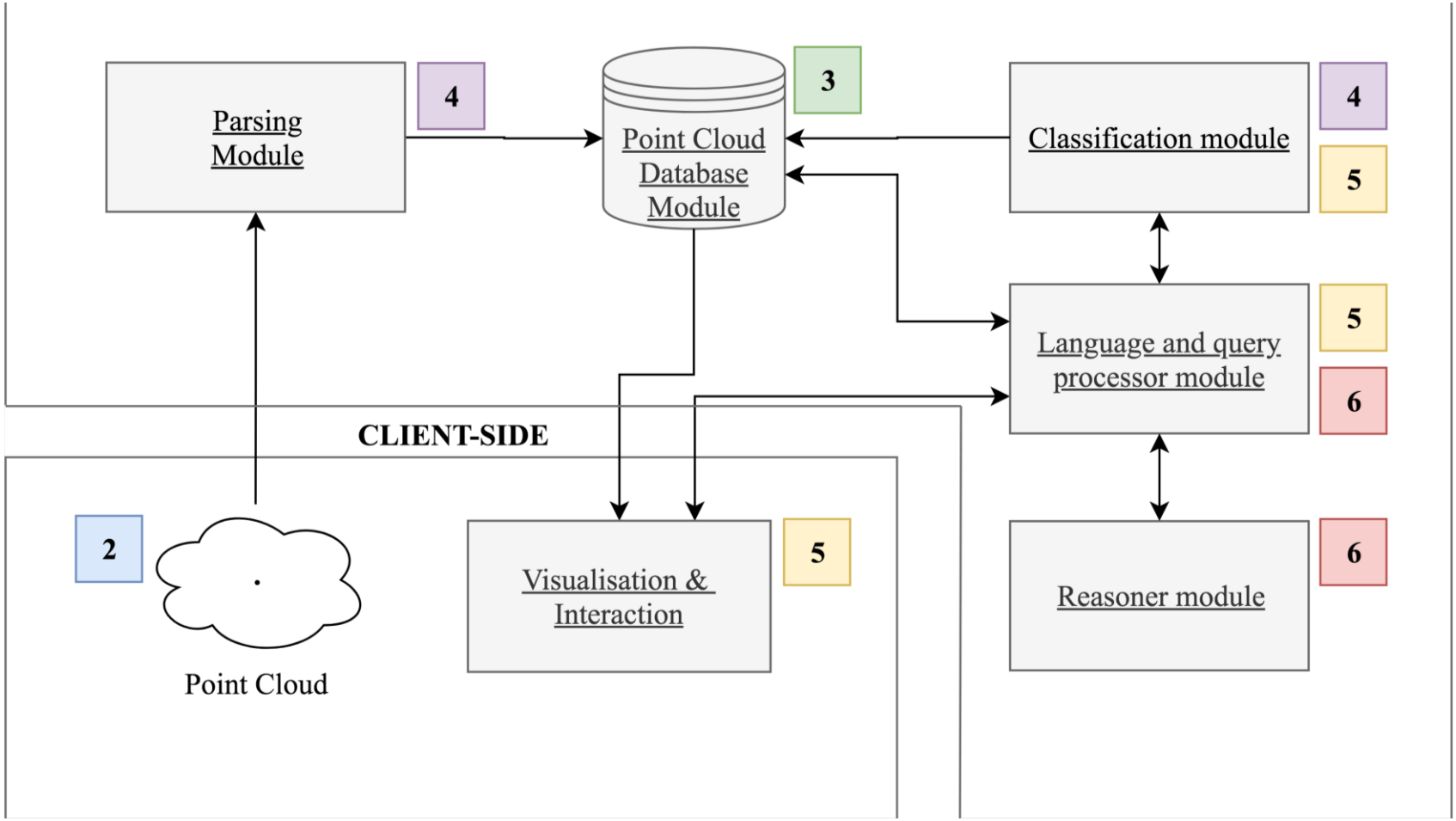
Perspectives

- Smart Point Cloud (Florent Poux)



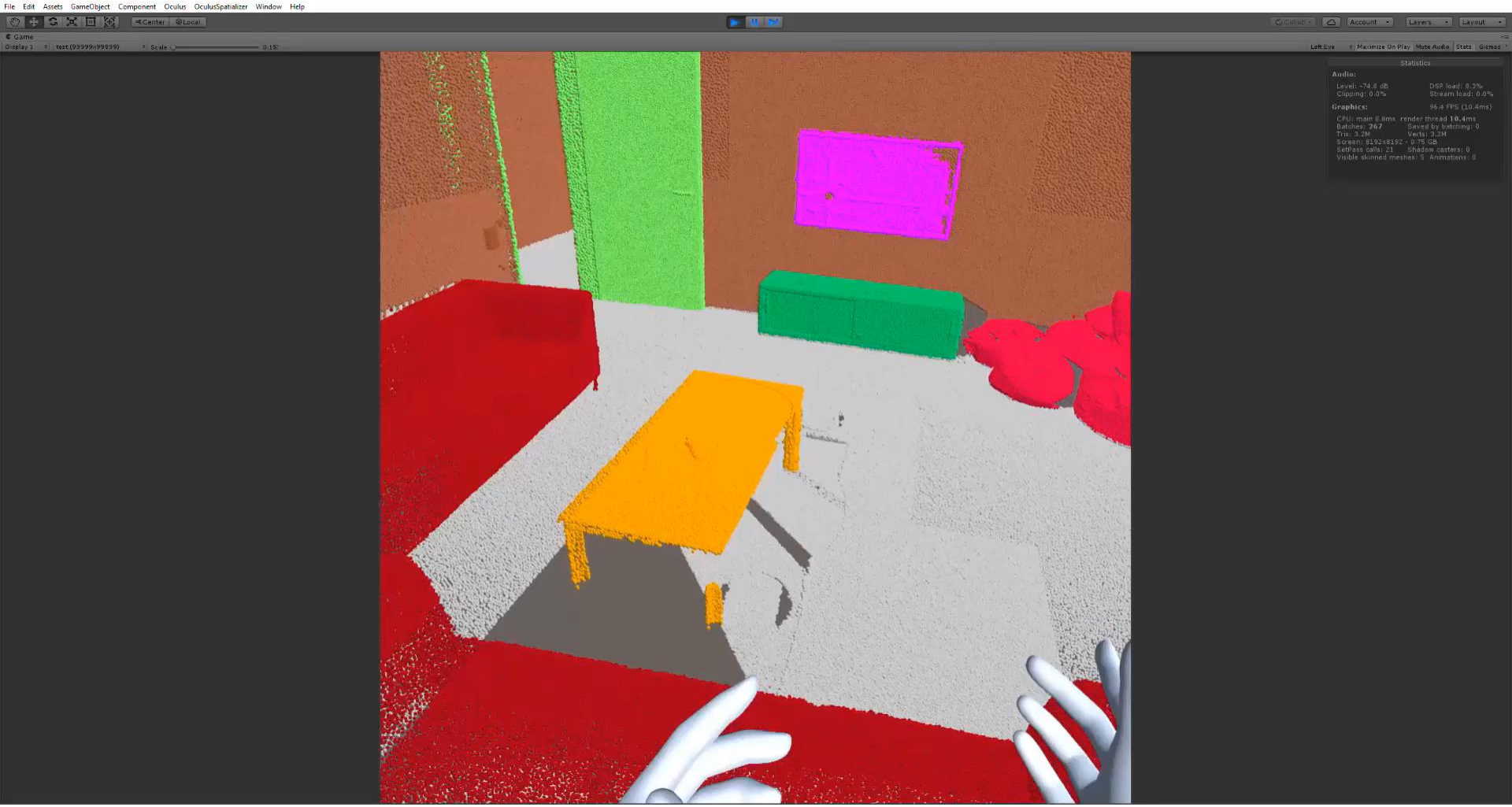
Perspectives

- 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

LIÈGE université
Geomatics

Geomatics Unit
19 Allée du Six Août (B5A) | 4000 Liège
geomatics.ulg.ac.be