

DELIVERABLE

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This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both.

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CARARE brings together a network of heritage agencies and organisations, archaeological museums and research institutions and specialist digital archives from all over Europe to establish an aggregation service for Europeana. The project's main objectives are to:

- *make digital content for Europe's unique archaeological monuments and historic sites available to Europeana's users;*
- *establish tools and services to support and enable its network of partners to make their digital content interoperable with Europeana, and to share best practices;*
- *enable access to 3D and Virtual Reality content through Europeana; and*
- *establish the business model for sustainability.*

Summary of Activities

During its first year, the CARARE project has been preparing and enabling the network for harvesting and aggregation of content for Europeana. Building good communications amongst the partner network began at the project kick-off meeting in Copenhagen. A survey helped develop understanding of the content held by CARARE partners and their technical situations. The project has successfully completed conceptual and technical work to establish the technical architecture of the aggregation services and a CARARE metadata schema; described in a set of technical deliverables published on the project website. Systems have been implemented and are being tested ready to support ingestion and mapping of metadata and their storage on the CARARE repository. Work has been underway to define a methodology for providing 3D and Virtual Reality content to Europeana. After analysis of the content available, Europeana's requirements and user needs, CARARE has recommended 3D PDF as a publishing standard. CARARE has also completed a review of IPR issues in the content domain and an analysis of the sustainability issues relating to digital content as the first step in defining a sustainable business models for the aggregation service.

The project is now moving into the next phase with content partners actively planning to make the first contents available for harvesting in 2011.

Content

A survey was completed in early summer 2010 which provided a more detailed picture of the content that CARARE will deliver to Europeana.

80 collections containing around 3 million digital objects and metadata were identified. Images and text files make up the majority of the content but the collections contain an interesting body of video and audio as well as 3D and virtual reality objects. Subjects range from representations of archaeological monuments and buildings in recent photographs or 3D laser scans, to drawings, sketches and manuscript accounts from the 18th century, and the activities of archaeologists, antiquarians and early tourists.

As part of the survey, content partners completed a review of their technical environment and began planning the work required to enable harvesting of their content to begin.

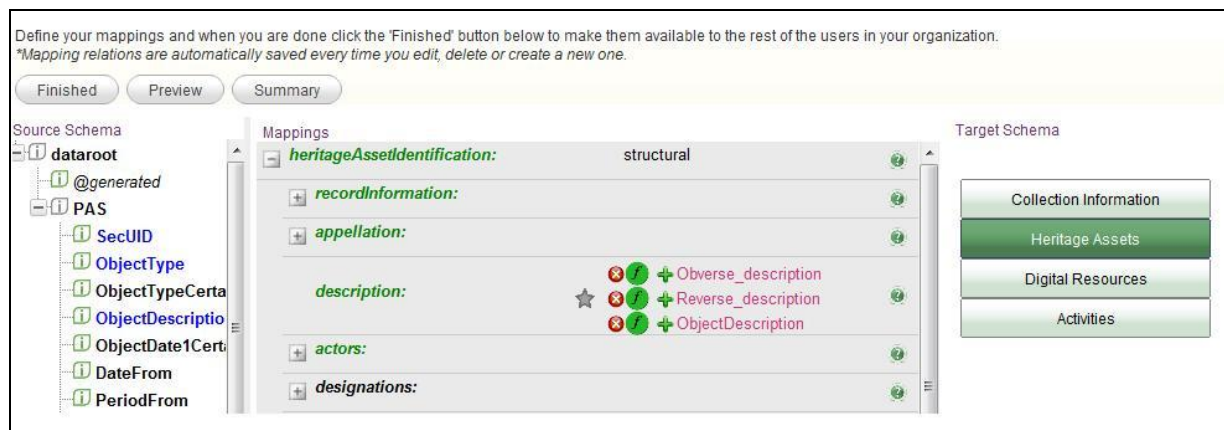


Rune stone, Käma, Östergötland, Sweden

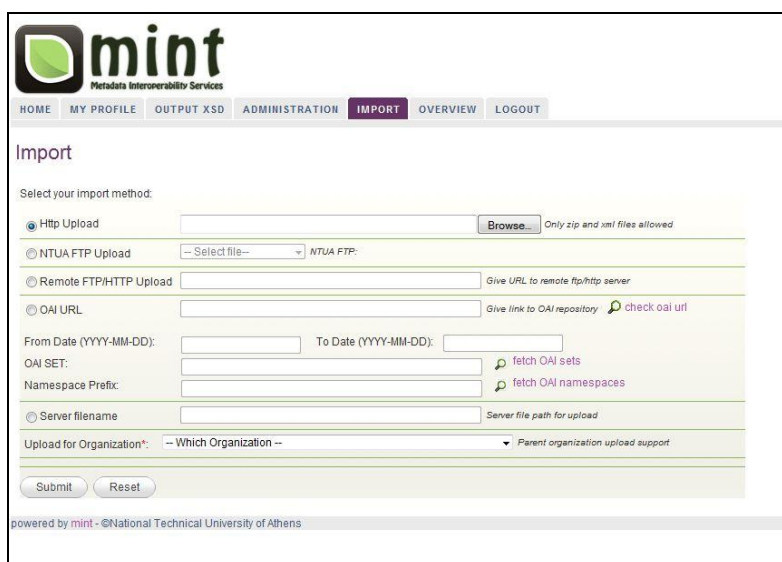
Technical approach and systems

The technical architecture of the CARARE aggregation service has been defined.

A first step was defining a rich and powerful metadata schema for CARARE to use to mediate between the diverse range of locally customised metadata schemas provided by the content partner's repositories and the metadata specified by Europeana. The project has established a **metadata mapping and ingestion tool** based on MINT, a tool developed by the National Technical University of Athens and implemented in a number of Europeana aggregation services, in which the CARARE metadata schema has been installed:



The interface is designed to help content providers to achieve semantic interoperability by mapping local elements in their metadata to elements in the CARARE schema. The tool includes a system which allows content partners to deliver their data to CARARE via OAI-PMH harvesting (this is preferred) or as XML files uploaded via HTTP or FTP.



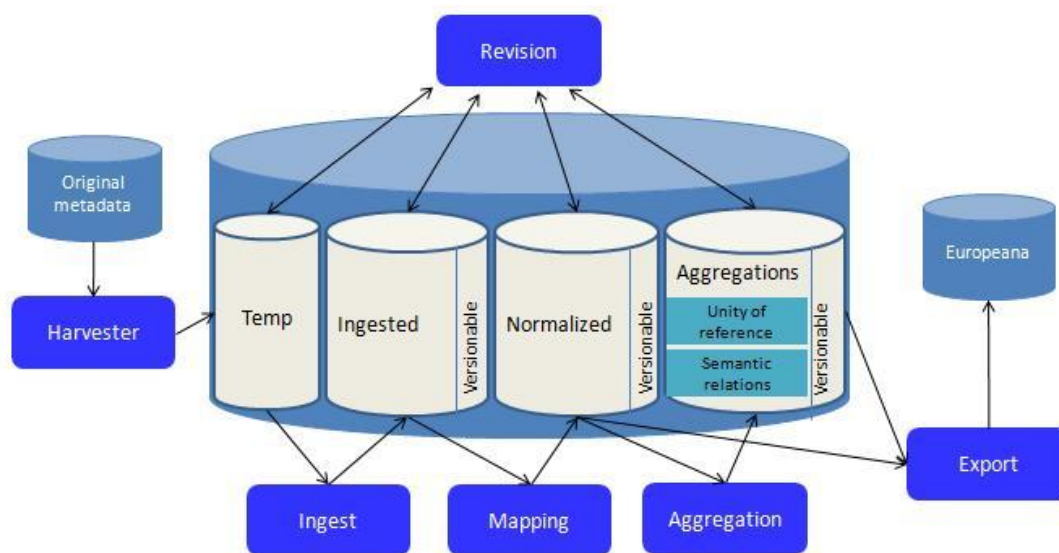
The main requirements for the **content providers** are:

- Digital objects must be published online and must have unique identifiers.
- Repositories must expose metadata using the OAI-PMH protocol (this is preferred) or export metadata to XML for upload.

As well as supporting the ingestion and mapping of content providers' datasets, the MINT tool enables data to be previewed, analysed (for example the values in each field) and quality assured (for missing or badly formed values). Content providers are able to repeat any of the steps in the ingestion and mapping process until they

are satisfied with the results at which point they submit their metadata for ingestion to the CARARE repository.

A **repository** has been set up as part of the CARARE aggregation service by the Digital Curation Unit of the Athena Research Centre based on its MOPSEUS software. The repository will hold the content providers' metadata and allow a number of functions to be performed with the aim of enriching the metadata before it is supplied to Europeana. The repository consists of a set of storage spaces and of a set of services that perform various operations on the metadata.



The services offered by the repository will include checking content quality, adding data required by Europeana, and normalizing geographic coordinates (to the standard spatial reference system specified by Europeana). Content providers will be able to preview their content and add semantic relations between items from different collections.

The final stage and function defined in CARARE's technical architecture is the delivery of the content to **Europeana**. Metadata will be supplied in the format specified by Europeana (currently this is EDM v5.2). A mapping from the CARARE metadata schema to the EDM has been completed to enable metadata to be transformed into EDM format on export to Europeana.

3D and VR

CARARE has been considering the methodology for providing 3D and VR content to Europeana. Three main issues were identified: the 3D content available from CARARE partners and cultural institutions is in a wide range of formats which require different viewers; Europeana prefers content to be in open and standardised formats and to minimise the need for its users to download viewers; Europeana users use a wide range of different browsers on different computer platforms.


Following analysis of the issues and the available solutions, 3D PDF was identified as being currently the best option for publishing 3D content online for access by Europeana's users. The PDF viewer is widely available to ordinary computer users and is already supported by Europeana. Importantly, since PDF is an open standard, authoring software is available from several different companies and provides for file conversion from a wide range of 3D formats. PDF is an attractive publishing option for 3D as it allows for interaction between descriptive text and 3D model.

CARARE has been experimenting with converting existing 3D content into 3D PDF both to test the methodology and with the aim of providing case studies.

CARARE 3D PDF example – Pompeii 28/08/2010 1/1

The Macellum of Pompeii


The Macellum of Pompeii is located outside the northeast corner of the forum. As the city continued to grow, it was necessary to relieve pressure on the forum. When the **Macellum** was first discovered, because of the twelve column bases in the center, the excavators at first believed it was a kind of pantheon, a temple dedicated to many gods.



Vue du Panthéon, F. Mazois, 1829


However, when subsequent excavation turned up the remains of cereals and fruits in the north side of the building and fish scales and bones in the middle of the courtyard, the archeologists realised that this was a market, surrounded by **shops**.

The Macellum had three entrances: two **main entrances**, one in the middle of the west side to the forum and one in the middle of the north side to Via degli Agustali (a local road), plus a side entrance on the southeast that could only be reached using a small stairway.




Shops at the Forum side (photo: Radomil)

Due to the course excavation techniques of the 18th and 19th century, we have no clear info about the **function of each shop**.



The main entrance at the forum, L. Rossini, 1831



For content partners the process of publishing 3D PDF online and of providing metadata to CARARE is the same as for 2D objects. The technical approach for both CARARE and Europeana is simplified. However, 3D PDF does not provide a solution for more complex 3D objects (such as virtual townscapes) and CARARE will continue to evaluate options and new developments.

Impact & Sustainability

CARARE aims to enable Europeana to become a first point of access to information about the archaeological and architectural heritage by creating a critical mass of content for unique monuments, historic buildings and places to be brought together and in this way expanding Europeana's user base. By establishing a methodology for content providers to publish 3D content for Europeana, CARARE will add a new and engaging type of content to Europeana with the potential to attract new and younger users to Europeana. CARARE has completed a review of IPR issues in the content domain. It is investigating business models that allow for the provision of long-term services and aggregation of content to Europeana. It has completed an analysis of the sustainability issues in the broad context of digital content which looked at the strengths and weaknesses of various business models.

Future work

The project is now moving into its implementation phase with content partners actively planning to make the first contents available for harvesting in 2011. A series of training courses is planned and online tools are being implemented to support partners as they move through the content workflow.

Contacts

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CARARE has 30 partners in 21 countries: <http://www.carare.eu/eng/About/Partners>