



# CRM-EH and STELLAR

## An archaeological extension to CIDOC-CRM and tools for creating Linked Data



EAA Maastricht  
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## An archaeological ontology

- OWL became a W3C recommendation in 2004
- CIDOC-CRM became an ISO standard in 2006
- Around the same time the Centre for Archaeology (CfA) at English Heritage started Revelation, which began an assessment exercise to make the capture, analysis and dissemination of CfA's work more efficient, but became an ontological modeling project of CfA's existing systems.

## An archaeological ontology

- The resulting ontological model was specific to the working practices of EH and single context recording, so was not created as a universal domain ontology, but was made freely available as it could be useful to other UK archaeologists
- With the implementation of CIDOC-CRM as an OWL ontology expressed in RDF, plans were made to create an archaeology domain extension using the EH modeling

## An archaeological ontology

- These plans were realised as one aspect of Semantic Technologies for Archaeological Resources (STAR: 2007-2010) where the EH modeling was used to create a domain extension to the CIDOC-CRM called the CRM-EH
- Carried out in partnership with U South Wales
- A interoperability demonstrator was created using field data from different sources successfully mapped to the CRM-EH

# A bit of history...

crmeh (http://purl.org/crmeh#CRMEH) - [http://purl.org/crmeh#]

Active Ontology Entities **Classes** Object Properties Data Properties Individuals OWLViz DL Query OntoGraf

Class hierarchy Class hierarchy (inferred)

Class hierarchy: EHE0022\_ContextDepiction

- Thing
  - Concept
  - Data Type Property
  - E1\_CRM\_Entity
    - E2\_Temporal\_Entity
    - E52\_Time-Span
    - E53\_Place
    - E54\_Dimension
    - E77\_Persistent\_Item
      - E39\_Actor
        - E70\_Thing
          - E71\_Man-Made\_Thing
          - E72\_Legal\_Object
            - E18\_Physical\_Thing
            - E90\_Symbolic\_Object
              - E41\_Appellation
                - E35\_Title
                - E42\_Identifier
                - E44\_Place\_Appellation
                  - E45\_Address
                  - E46\_Section\_Definition
                  - E47\_Spatial\_Coordinates
                    - EHE0019\_AreaOfInvestigationDepiction
                    - EHE0022\_ContextDepiction**
                    - EHE0075\_IdentifiedFeatureDepiction
                    - EHE0088\_SiteSubDivisionDepiction
                    - EHE0093\_GroupDepiction
                    - E48\_Place\_Name
                    - E49\_Time\_Appellation
                    - E51\_Contact\_Point
                    - E75\_Conceptual\_Object\_Appellation
                    - E82\_Actor\_Appellation
                    - E73\_Information\_Object
  - E60\_Number
  - E62\_String
  - float
  - gYear

Annotations: EHE0022\_ContextDepiction

Annotations

**comment**  
"The Spatial co-ordinates of a Context, defining the actual spatial extent of the context. Usually recorded at the time of excavation or other investigative work"@en

**isDefinedBy**  
CRMEH

**label**  
"Context Depiction"@en

Description: EHE0022\_ContextDepiction

Equivalent classes +

Superclasses +

- E47\_Spatial\_Coordinates

Inherited anonymous classes

- P105\_right\_held\_by some E39\_Actor
- P104\_is\_subject\_to some E30\_Right
- P94i\_was\_created\_by some E65\_Creation
- P106\_is\_composed\_of some E90\_Symbolic\_Object
- P48\_has\_preferred\_identifier max 1 Thing

Members +

Keys +

Disjoint classes +

No Reasoner set. Select a reasoner from the Reasoner menu  Show Inferences

# A bit of history...

**Groups** | Contexts | Finds | Samples

- Site
- Find ID
- Find Type
- Find Material
- Find Notes
- Within Context

COIN

SILVER

---

**Run Query**

- SF4077
- 132
- 177
- 224
- 301
- 386
- 534
- 60
- 94
- 95
- 13

11 results

**Group Details**

Site  
#ehe0001.leap

Group ID  
50033

Location

Group Type

Group Notes  
<http://tempuri/star/base#ehe0005.leap.objects.object.50033>

**Context Details**

Hierarchy/Stratigraphy

Context Type  
Hearth

Location  
512.46E 513.22N

Notes  
Burnt clay platform or part of floor surface around a hearth. Situated just to the south east of found house 5570 and adjacent to...

<http://tempuri/star/base#ehe0007.leap.contexts.context.6637>

**Context Sample Details**

Site  
[not set]

Sample ID  
[not set]

Sample Type  
[not set]

Sample Notes

**Context Find Details**

Find Dating  
1st C BC, 1st C AD

Material  
Silver

Find Notes  
COLEM: C050937. Date in: 21-09-05. Date finished: 03-02-06. Condition: Deteriorated. Encrusted with amorphous layer of soft corrosion and leached earthy soil. This has already been seen...

<http://tempuri/star/base#ehe0009.leap.finds.id.sf4077>

## Ontological mapping is hard!

- One of the lessons learned from STAR is that mapping data to an ontology requires specialist expertise beyond the skill (or interest level) of most archaeologists
- Converting a mapping to Linked Data was not trivial – tools available at the time had steep technical learning curves
- Plans were made to create tools to bridge this gap, both for mapping and conversion to LD

## STELLAR

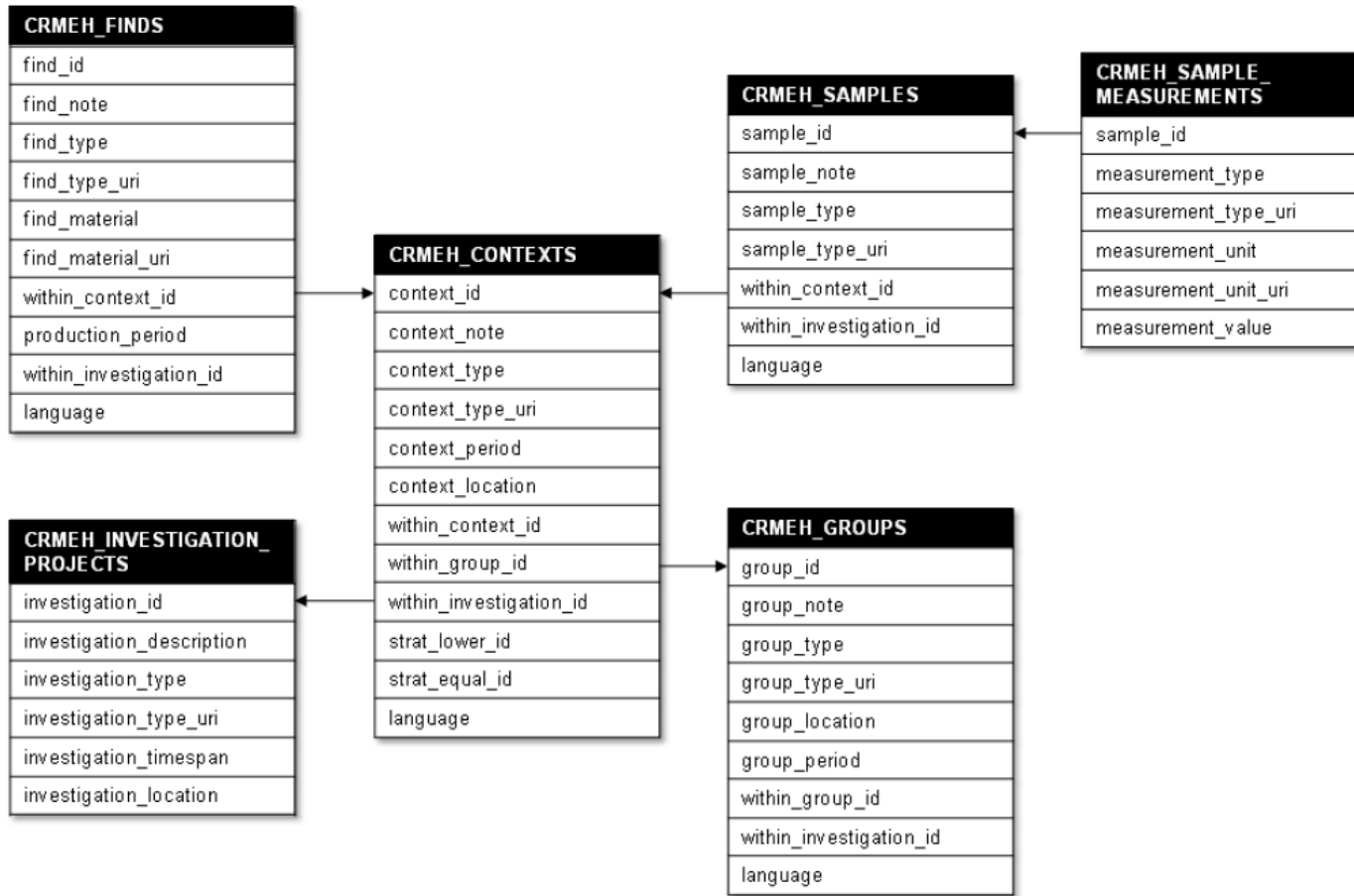
- Tools were created through the Semantic Technologies Enhancing Links and Linked data for Archaeological Resources (STELLAR: 2010-11) project
- The STELLAR tools:
- Allowed mapping of field data to the CRM-EH: using a simple spreadsheet format and terminology recognisable to archaeologists mapped to a group of templates



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# A bit of history...



# A bit of history...

# STELLAR

An application for converting delimited (CSV) format data to valid RDF data conforming to a chosen 'template'.

**Delimited Data File** ⓘ

Choose File

**Template name** ⓘ

**Namespace prefix** ⓘ

**Validator** ⓘ

**cernat**   **for**

Type the two words:

↺↻❌🔄

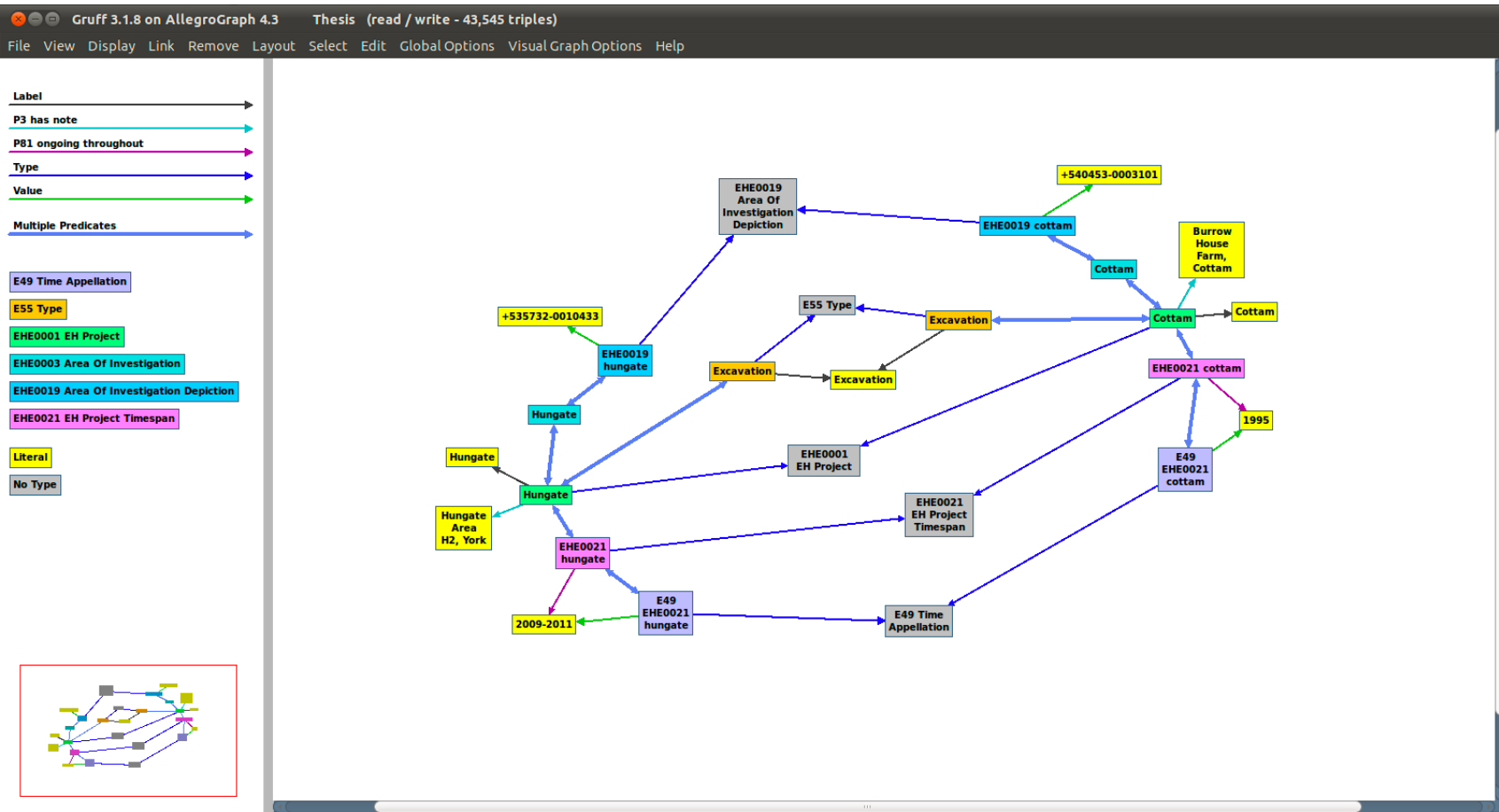
reCAPTCHA™  
stop spam.  
read books.

**Results** ⓘ

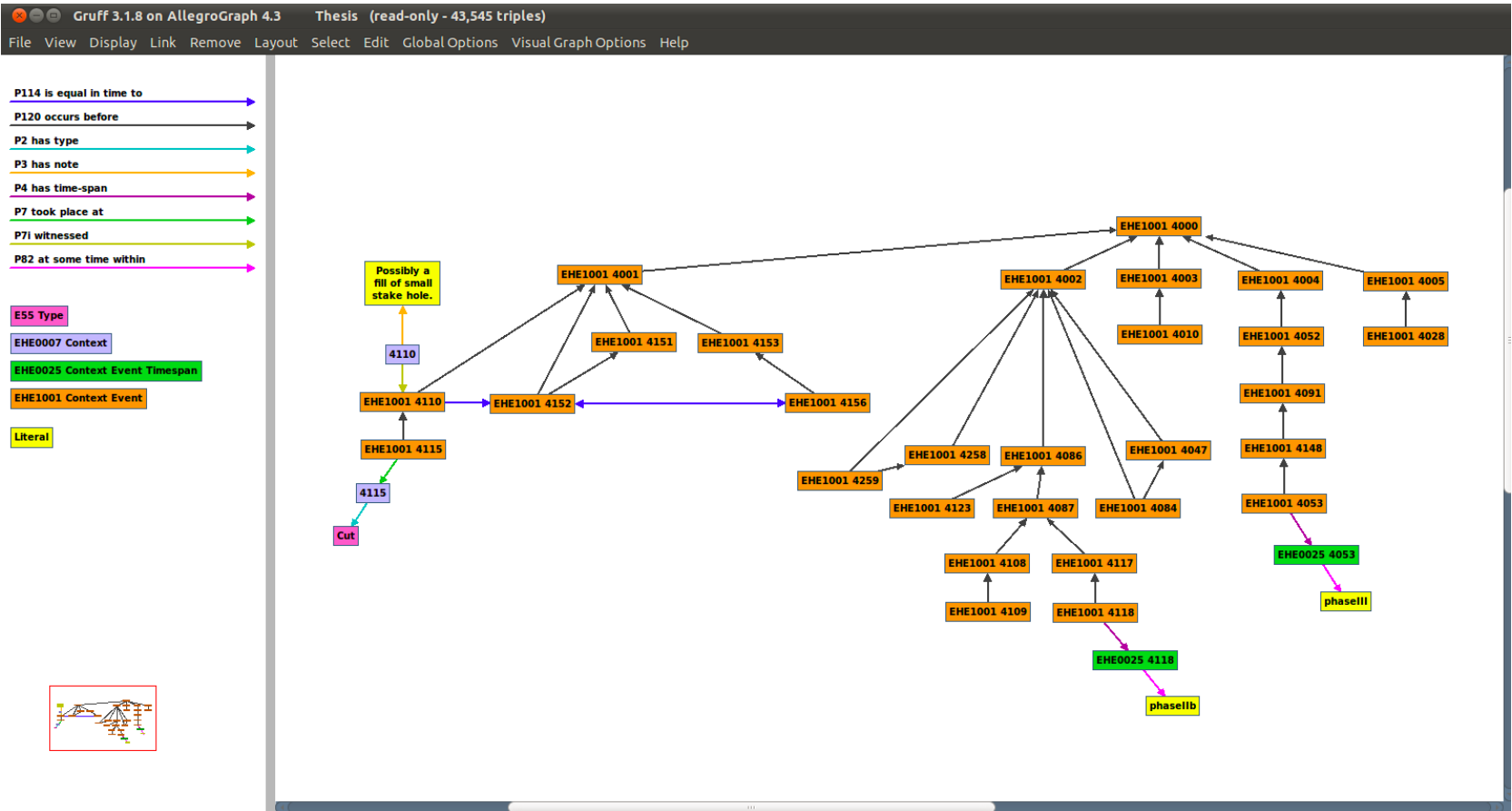
**Help**

**Delimited data file**

# A bit of history...



# A bit of history...



## STELLAR

- A range of exemplar datasets taken from ADS archives were mapped to the CRM-EH and converted using the STELLAR tools and published as Linked Data from our SPARQL endpoint
- We used CRM-EH, but STELLAR.Console is customisable for use with other ontologies, thesauri, SKOS vocabularies, etc.

- EU FP7 project under the ‘Infrastructures’ theme, including 23 European partners across 16 countries
- Four-year project: ended January 2017
- 17 Workpackages – primary deliverable: collection level metadata aggregation portal
- Coordinator: PIN Scri - Polo Universitario "Città di Prato" at the University of Florence
- Deputy Coordinator: ADS



**[ariadne-infrastructure.eu](http://ariadne-infrastructure.eu)**

Catalog Services About

## ARIADNE

All fields Search for resources in the Ariadne catalog ...

### Welcome

ARIADNE brings together and integrates existing archaeological research data infrastructures so that researchers can use the various distributed datasets and new and powerful technologies as an integral component of the archaeological research methodology.

### Browse the Catalog

**Where**

**When**

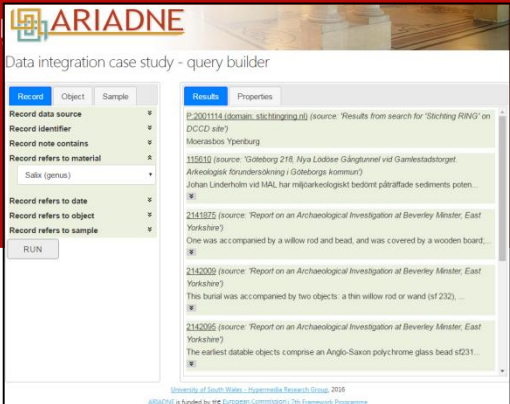
**What**

- pits (earthworks)
- churches (buildings)
- lime kilns
- forts
- ditches
- cairns
- churchyards
- houses**
- drains
- farms
- farmhouses
- vessels (containers)

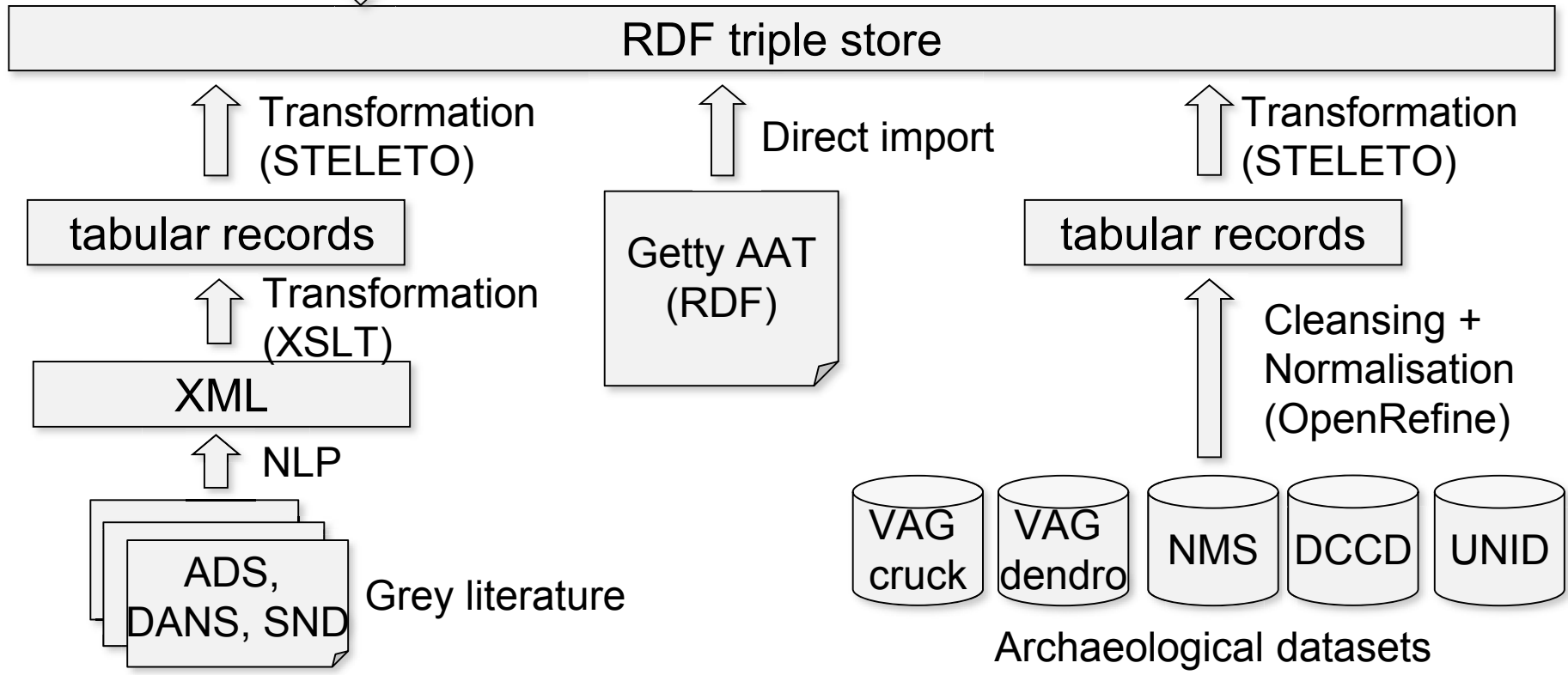


## STELETO

- Data conversion application
- Created for a data integration case study
- Simpler, cross-platform version of STELLAR.Console
- Performs bulk transformations of tabular data via user-defined templates
- Data integration via CIDOC-CRM and Getty AAT
- Demonstration query builder for easier cross-search and browse of the integrated data



# ARIADNE





## Data integration case study - query builder

Record

Object

Sample

**Record data source** ⌵

**Record identifier** ⌵

**Record note contains** ⌵

**Record refers to material** ⌴

Salix (genus) ⌵

**Record refers to date** ⌵

**Record refers to object** ⌵

**Record refers to sample** ⌵

RUN

Results

Properties

[P:2001114 \(domain: stichtingring.nl\)](#) (source: 'Results from search for 'Stichting RING' on DCCD site')

Moerasbos Ypenburg

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[115610](#) (source: 'Göteborg 218, Nya Lödöse Gångtunnel vid Gamlestadstorget. Arkeologisk förundersökning i Göteborgs kommun')

Johan Linderholm vid MAL har miljöarkeologiskt bedömt påträffade sediments poten...

⌵

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[2141875](#) (source: 'Report on an Archaeological Investigation at Beverley Minster, East Yorkshire')

One was accompanied by a willow rod and bead, and was covered by a wooden board;...

⌵

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[2142009](#) (source: 'Report on an Archaeological Investigation at Beverley Minster, East Yorkshire')

This burial was accompanied by two objects: a thin willow rod or wand (sf 232), ...

⌵

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[2142095](#) (source: 'Report on an Archaeological Investigation at Beverley Minster, East Yorkshire')

The earliest datable objects comprise an Anglo-Saxon polychrome glass bead sf231...

⌵

[University of South Wales - Hypermedia Research Group](#), 2016

ARIADNE is funded by the [European Commission's 7th Framework Programme](#)

## STELETO

- <https://github.com/cbinding/steleto>

## Further Information

**<http://archaeologydataservice.ac.uk>**



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**<http://www.facebook.com/archaeology.data.service>**