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ARS3D - Documenting facts and interpretations of African Red Slip Ware





Cheers!



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<http://cv.fthiery.de>

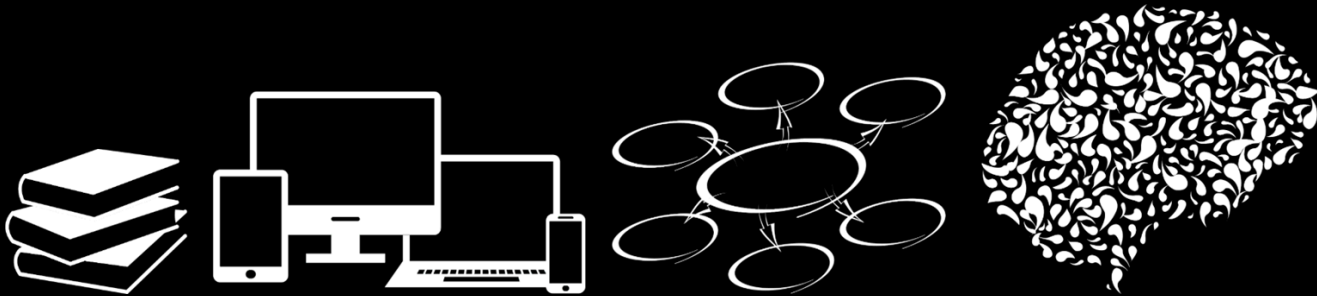


[@fthierygeo](https://twitter.com/fthierygeo)





we are on the way to Archaeology 4.0...





Archaeology 1.0

1 **analogue era**
books, monographs

Archaeology 3.0

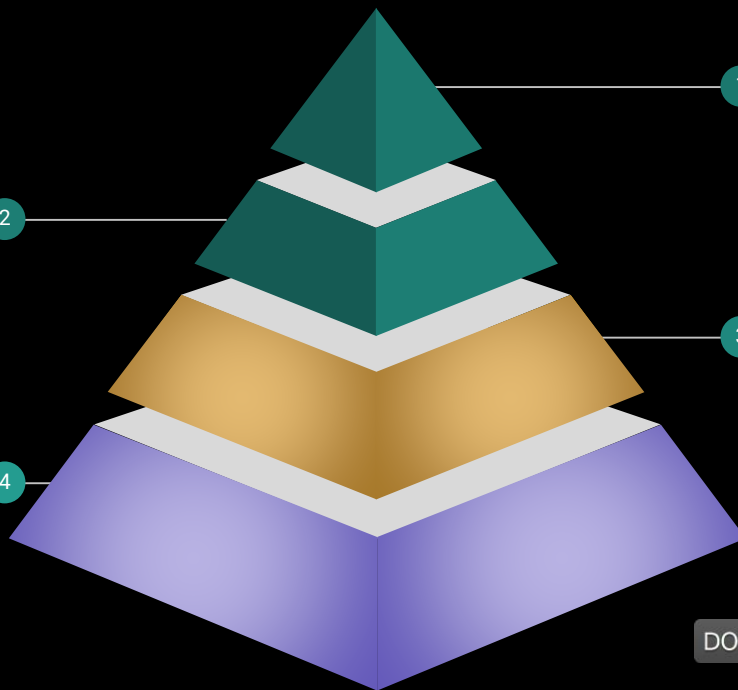
3 **semantic era**
Semantic Modelling
Linked Data

Archaeology 2.0

2 **digital era**
digitisation, online db

Archaeology 4.0

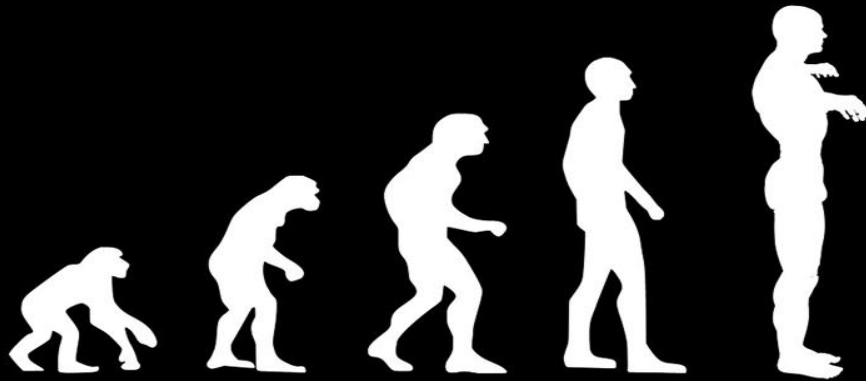
4 **knowledge era**
Machine Learning
Artificial Intelligence
Semantic Reasoning



DOI 10.5281/zenodo.2629595



**today: the story of ARS
from *Archaeology 1.0*
to *Archaeology 4.0***



the RGZM in Mainz owns a large collection of ARS



DAS RÖMISCHE REICH WÄCHT

GÖTTICHE LEGI

Die besondere W
bildet eine wich
Legislation kas
Gleichzeitig such
alle Bewohner de
religiösen Bindun
Vielfalt prägte di
dem Christentum
antiken Götterwe
Glaubensvorstell
Wurzeln entstand
der Spätantike:

313 n. Chr., in d
T., die sich dem C
religiöse Toleranz
Jahre 392 jedoch
Ausübung aller h
Darin verankerte
Staatsreligion em
christlichen Kaiser
Repräsentanten



African Red Slip Ware @ RGZM

- 336 objects, relief-decorated *ceramic*, distinguished by a *thick-orange red slip*
 - 100 complete objects
 - 152 fragments
 - 36 moulds
 - 6 stamps
 - 36 lamps
 - 6 lamp moulds
- mainly produced 3 AD - 6 AD, North Africa, Tunisia, traded in the whole Roman Empire
- Appliques show mythological, Old/New Testament scenes, circus, arena and hunting depictions as well as fish and plant images



O.39675



O.39450



O.41399



O.39676



O.39780



Weidemann 1990, 16.



Löwenstein 2015, 461.

53.199 Mainz, Römisch-Germanisches Zentralmuseum 0.39676
LRP Form 53
Restored from fragments. Dm. 17,0 cm.

Hercules (8.107); quiver and bow (1.44); club (1.45); tree (3.30).

Zaberns Archäologische Kalender 1977, Blatt 2.-15.5.
New York (1979) no. 140.
Frankfurt (1983) no. 179.
Munich (1989) no. 207.
Mainz (1990) no. 16.

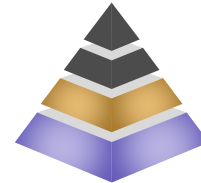
Armstrong 1993
*A thesaurus of applied motives on
African red slip ware*

the ARS objects are well documented in different granularities using analogue books and digital photographs, see **Archaeology 1.0** and **2.0**





but we need machine
readable data to
enable machines to
give us answers
we did not expect,
see **Archaeology 3.0**
and **4.0**





the African Red Slip Ware digital - *ARS3D* - project leads ARS into Archaeology 4.0!



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für Bildung
und Forschung

Römisch-Germanisches
Zentrum
Leibniz-Forschungsinstitut
für Archäologie

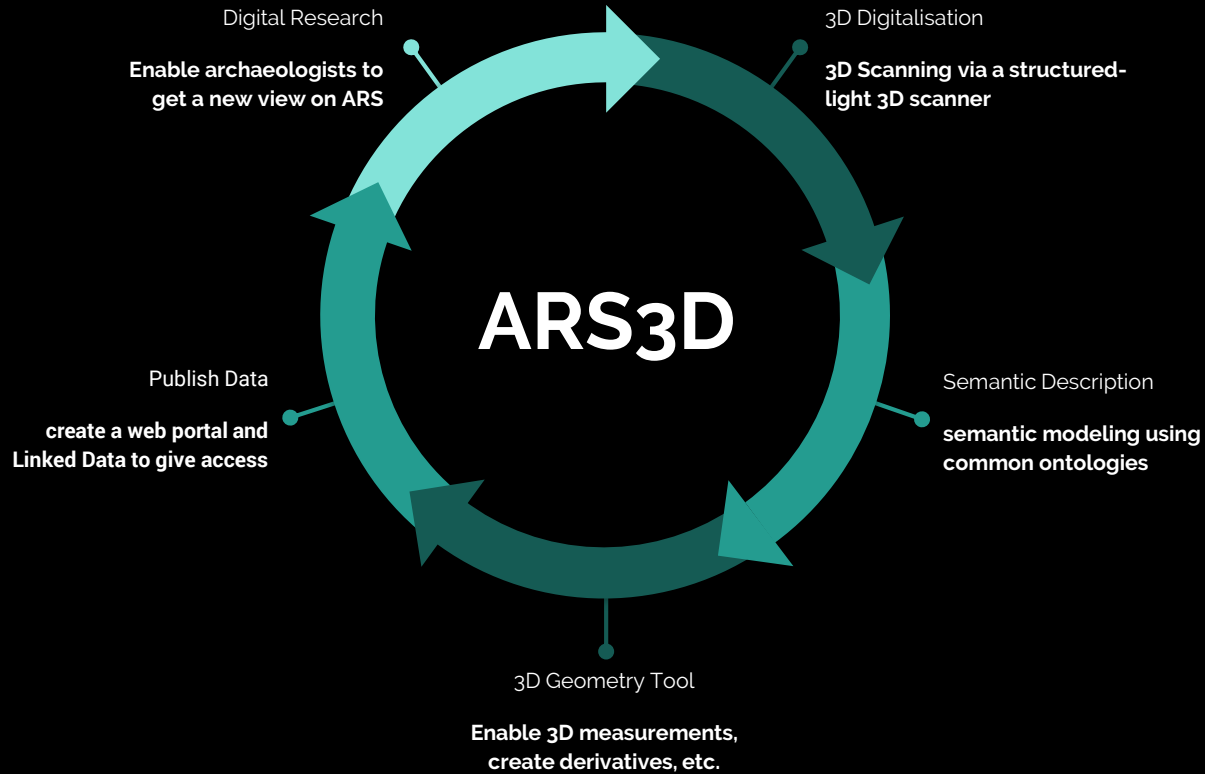
R | G | Z | M



ARS3D: the idea

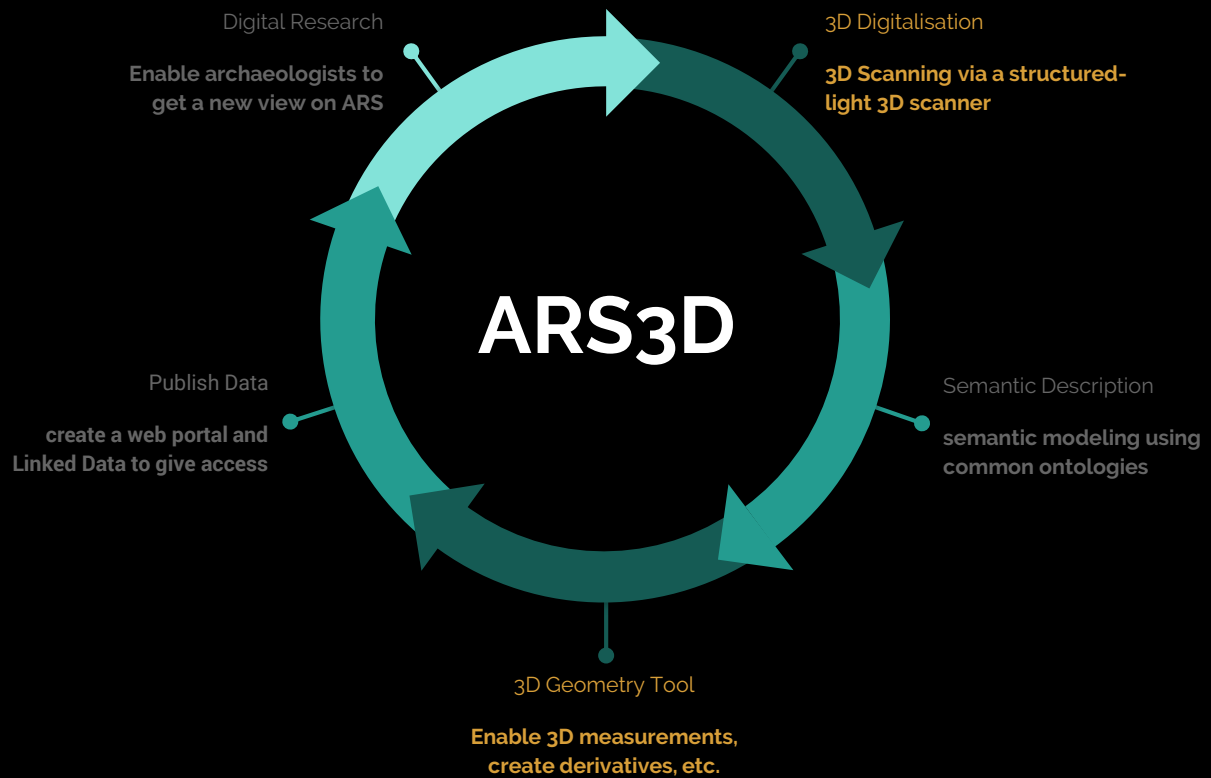
**3D documentation for a
multiperspective
analysis of a central
Late Antique object
type**

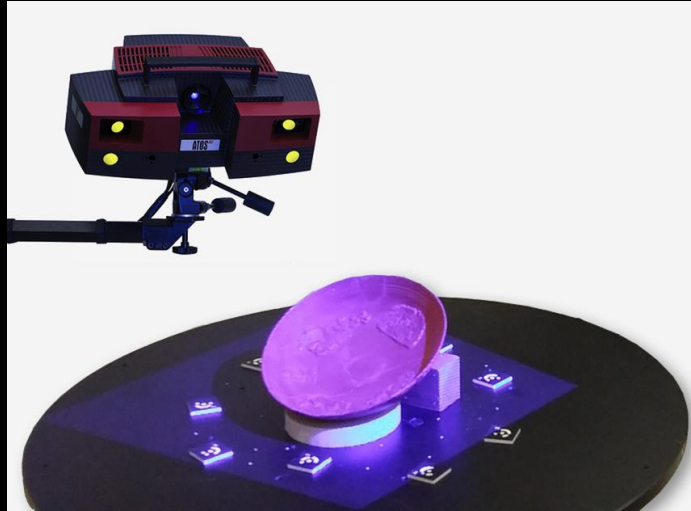
*the aim of the ARS3D project is
providing the research community
innovative and sustainable access
to a largely digital unpublished
object type to enable not only the
establishment of new research
questions, but also to set
documentation standards*



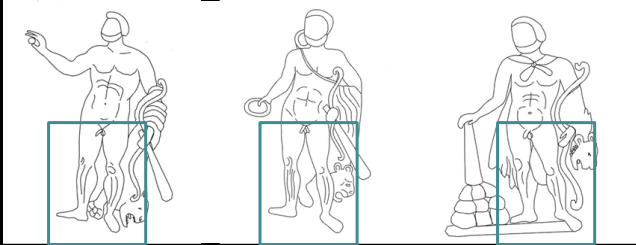


start the engines...

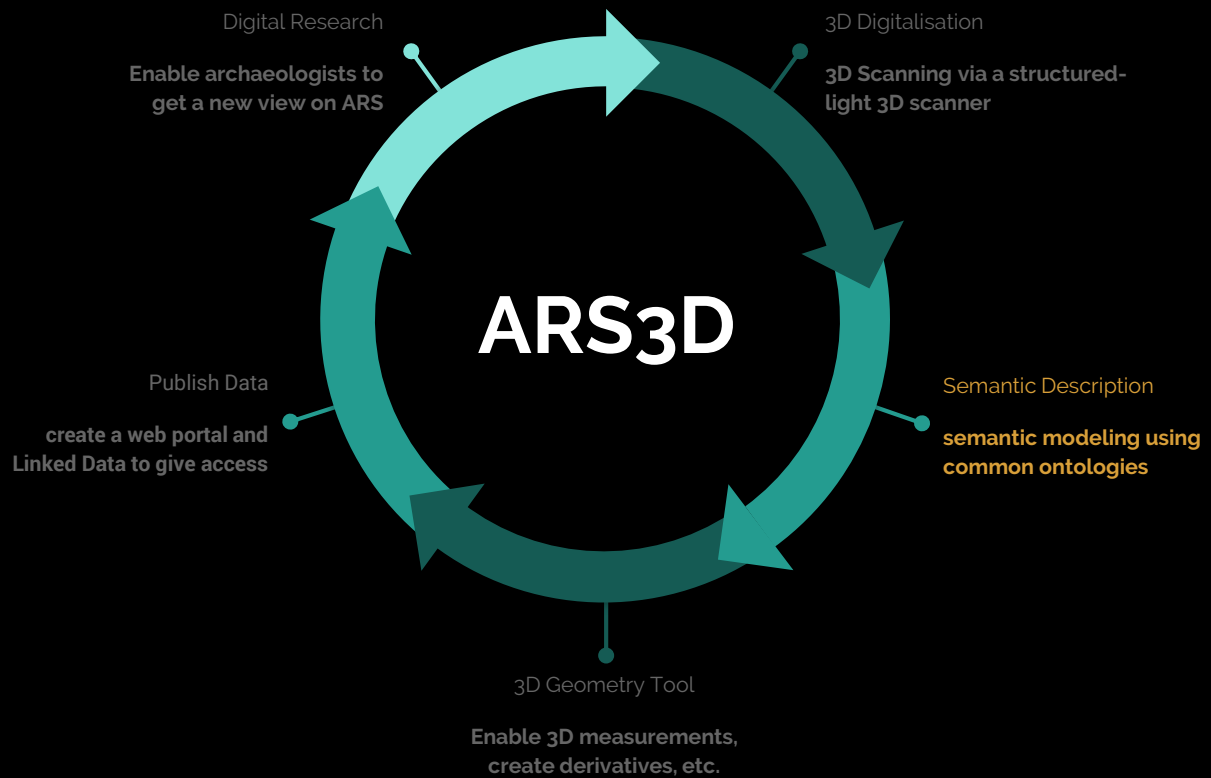




3D Scanning via a structured-light 3D scanner, GOM Atos Triple Scan plus color calibrated texture via photogrammetric techniques
du a standardised scan process: uniform light source, scan distances, location and focus

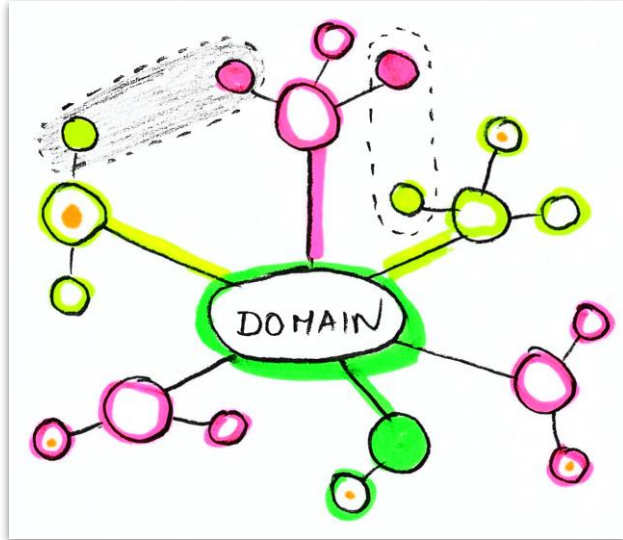


the **3D Geometry Tool** will provide a selection in an editor, the deformation of appliqués by flattening to the unformed original, a simplified similarity analysis and a comparison of stamps, modals and appliqués of a motive





we need a **semantic model**,
that formally represent a
specific fact or context from
the real world as piece of
data to enable technical
processing by machines
which is based on broad
agreements

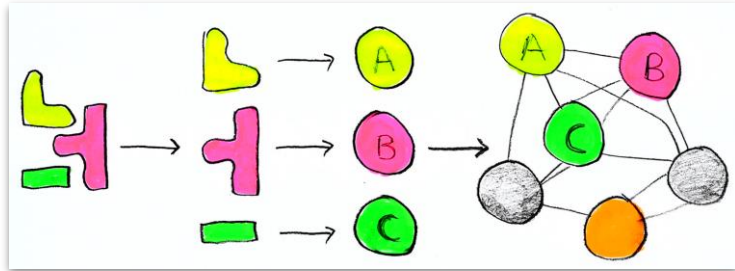


*semantic modeling of research data using an **ontology** is a way of defining, structuring, categorising, exchanging data as interoperable and long-term interpretable items*



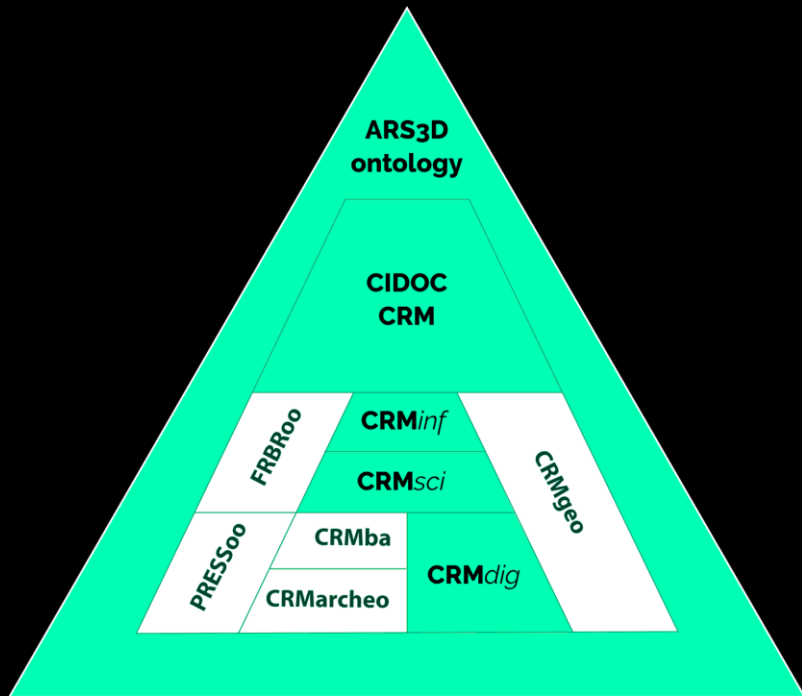
however,

**the modeling of the content
must meet the humanities
description
and analysis of inventory!**

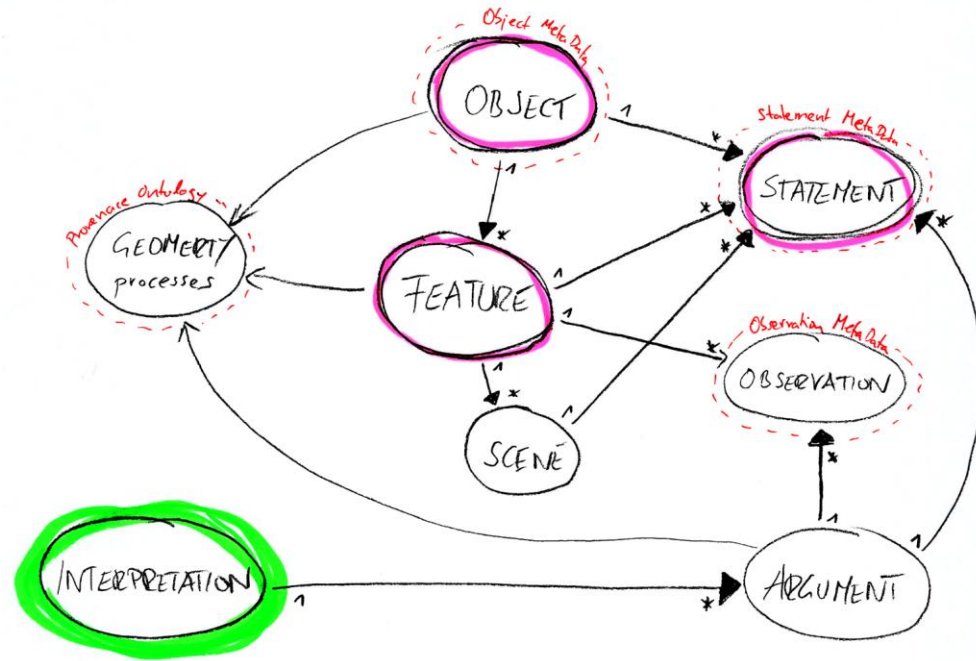


so,

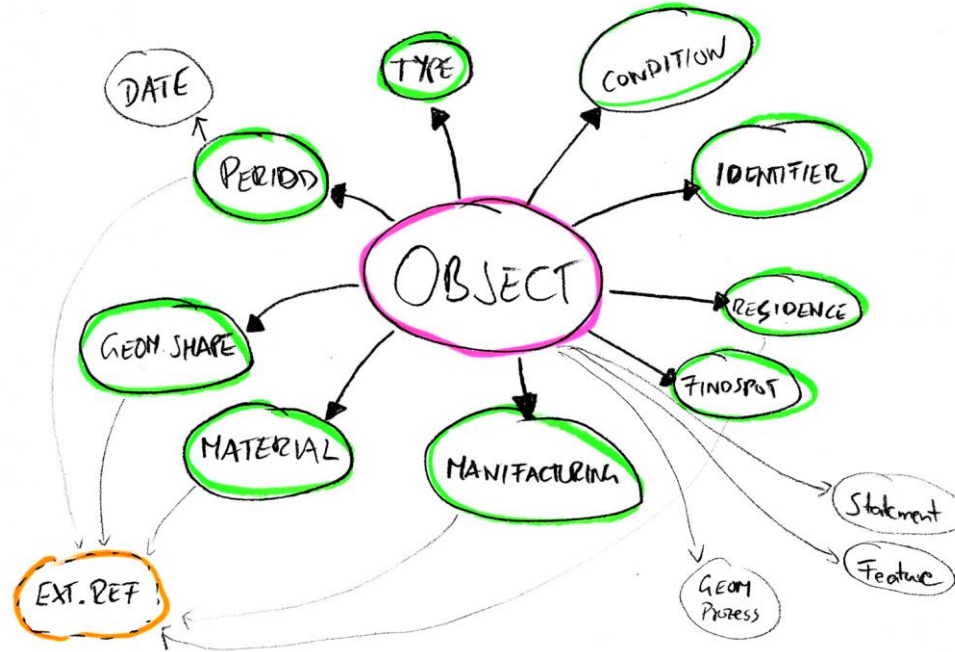
we are **creating** an **ARS3D ontology** to fulfill our special requirements as structural fundament for the documentation



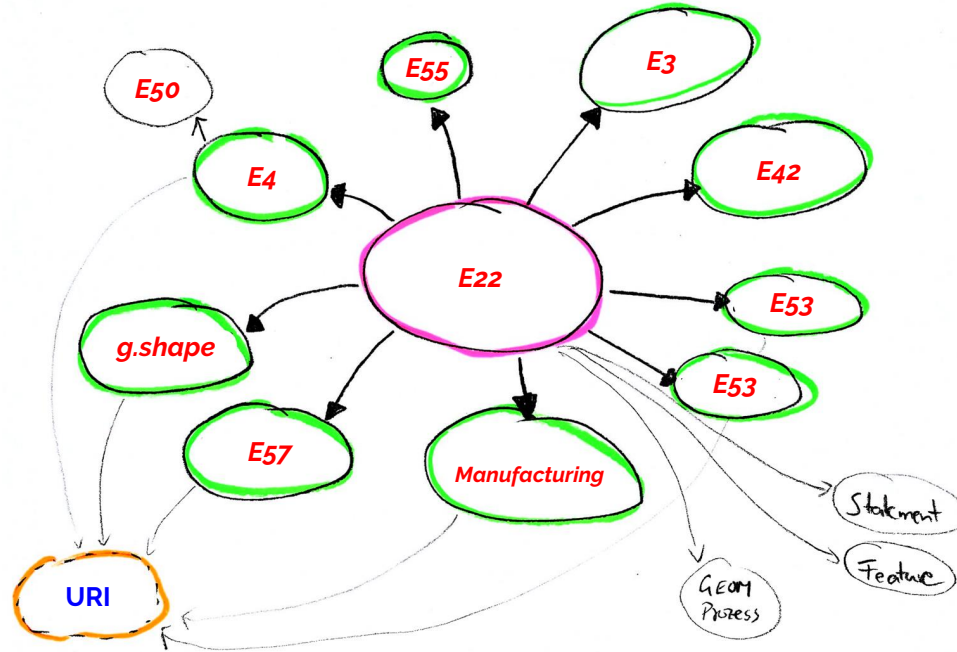
our **ontology** is based on
CIDOC-CRM,
CRM extensions
and **PROV-O**
with a few **additions**



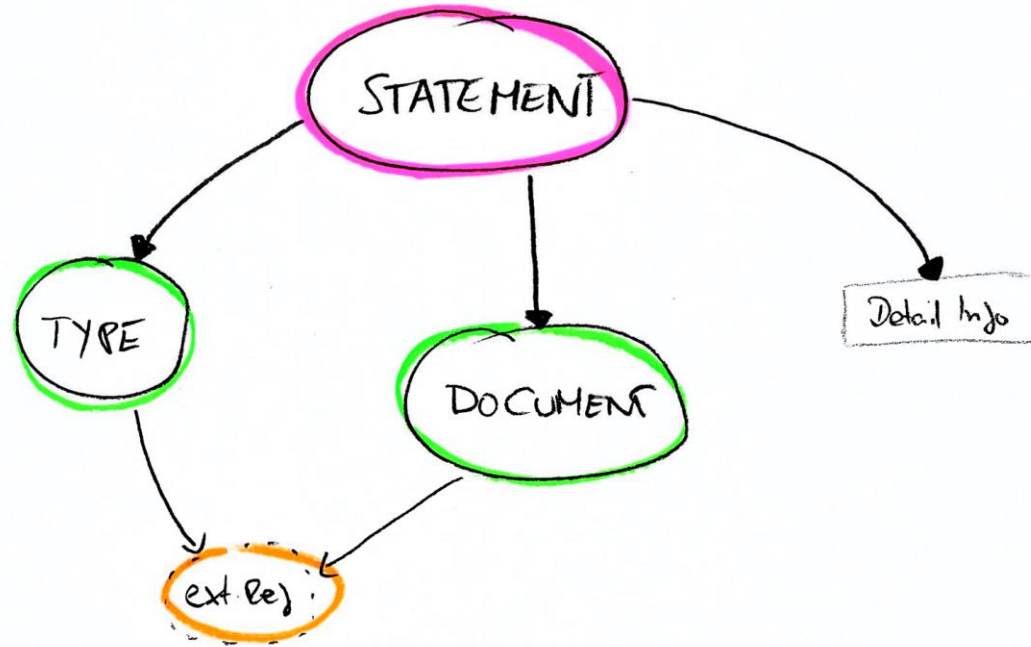
in our model **objects** consists of **features** (merged in **scenes**), depicting **observations**, which can be part of an **interpretation argument**



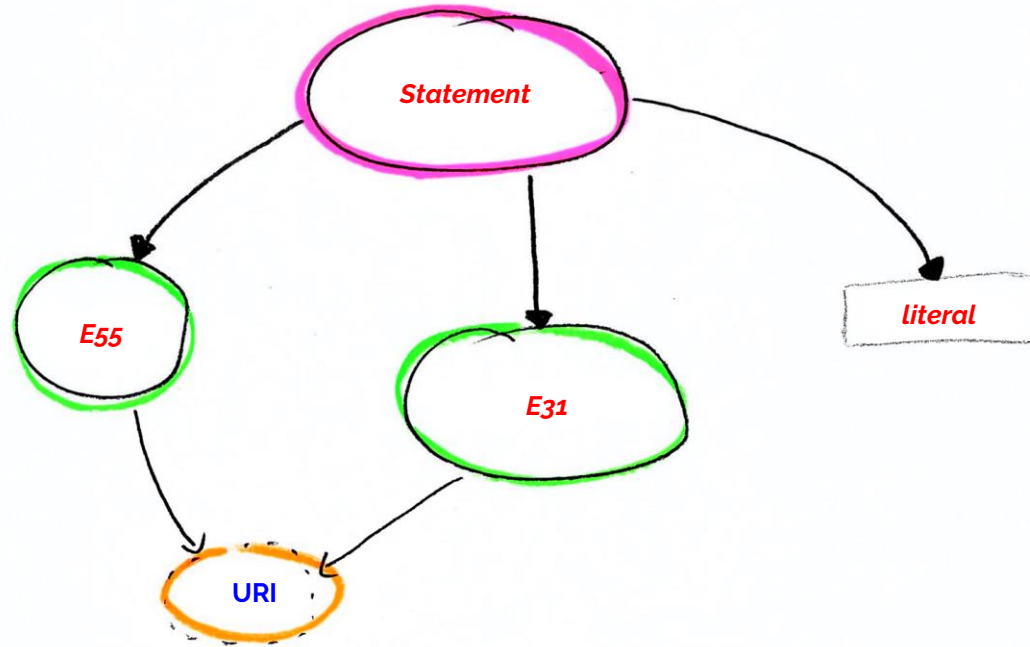
*an **African Red Slip Ware object** is characterised by provenance, chronological information, material and much more*



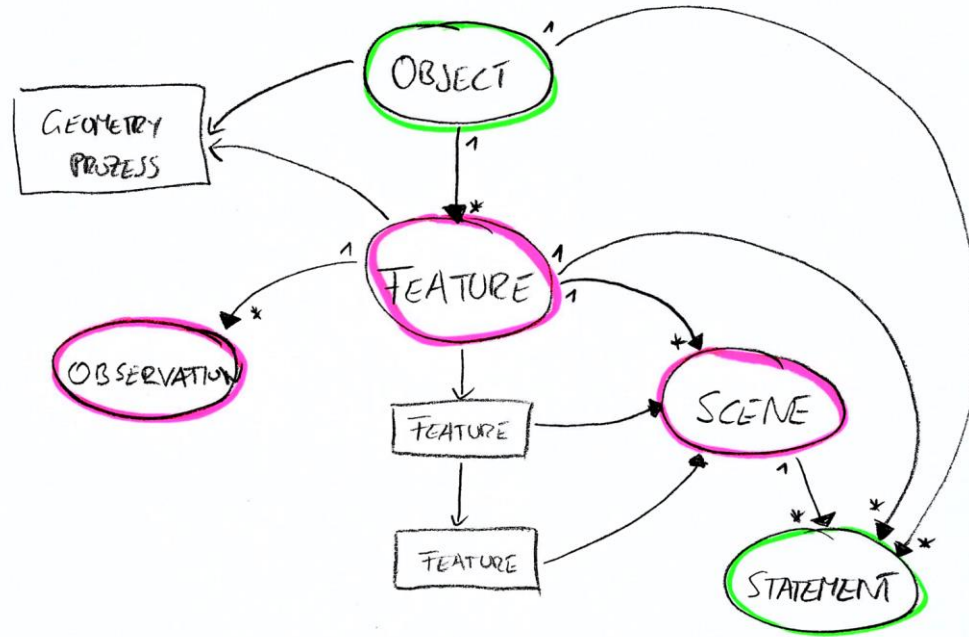
*this information will be described with **CIDOC CRM classes** and **ARS3D specific classes**, where individuals are linked to external references*



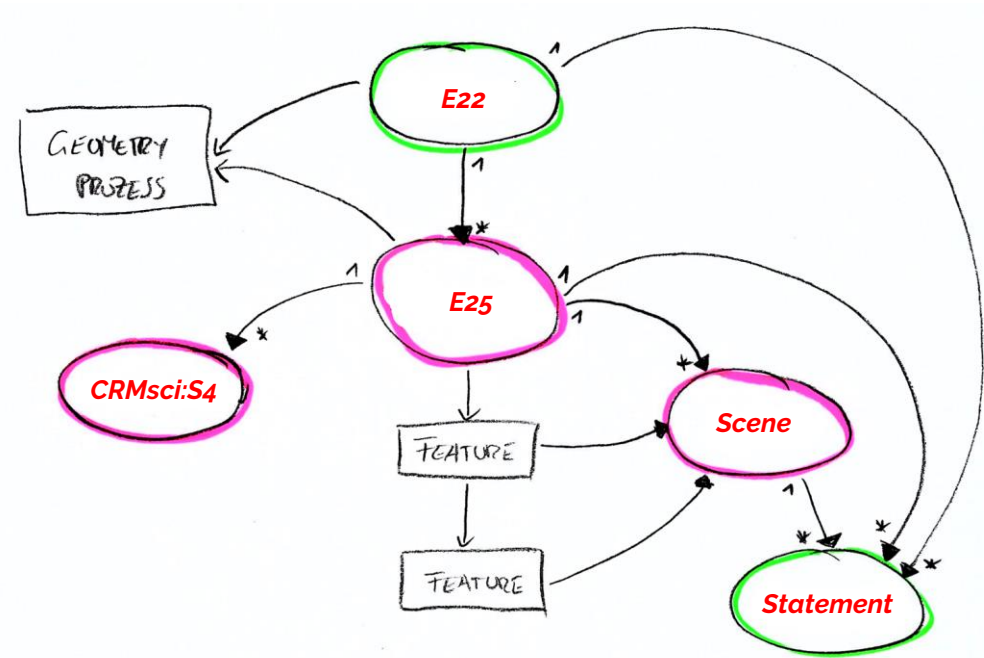
a stated **statement** documents **narrations** (types)
which are mostly documented in **books**



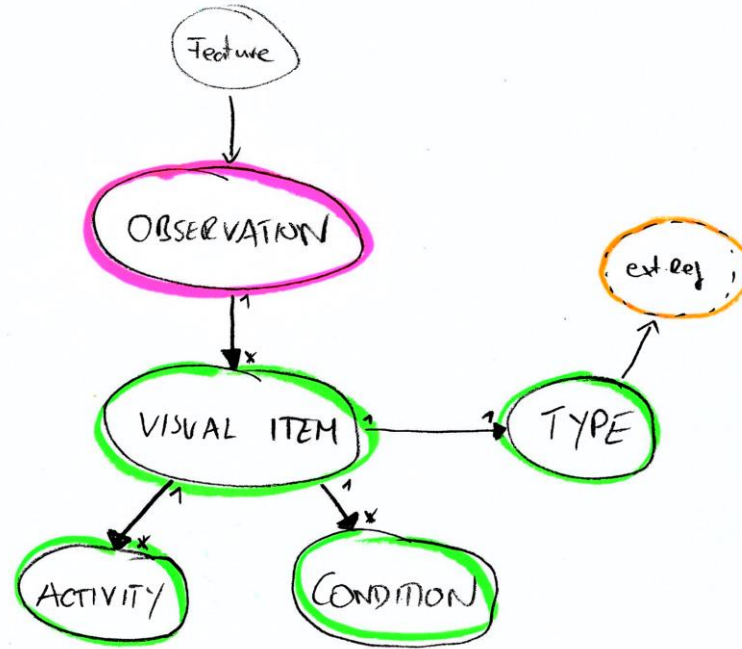
*a statement describes e.g. a **type**,
the associated **book** and its book **details***



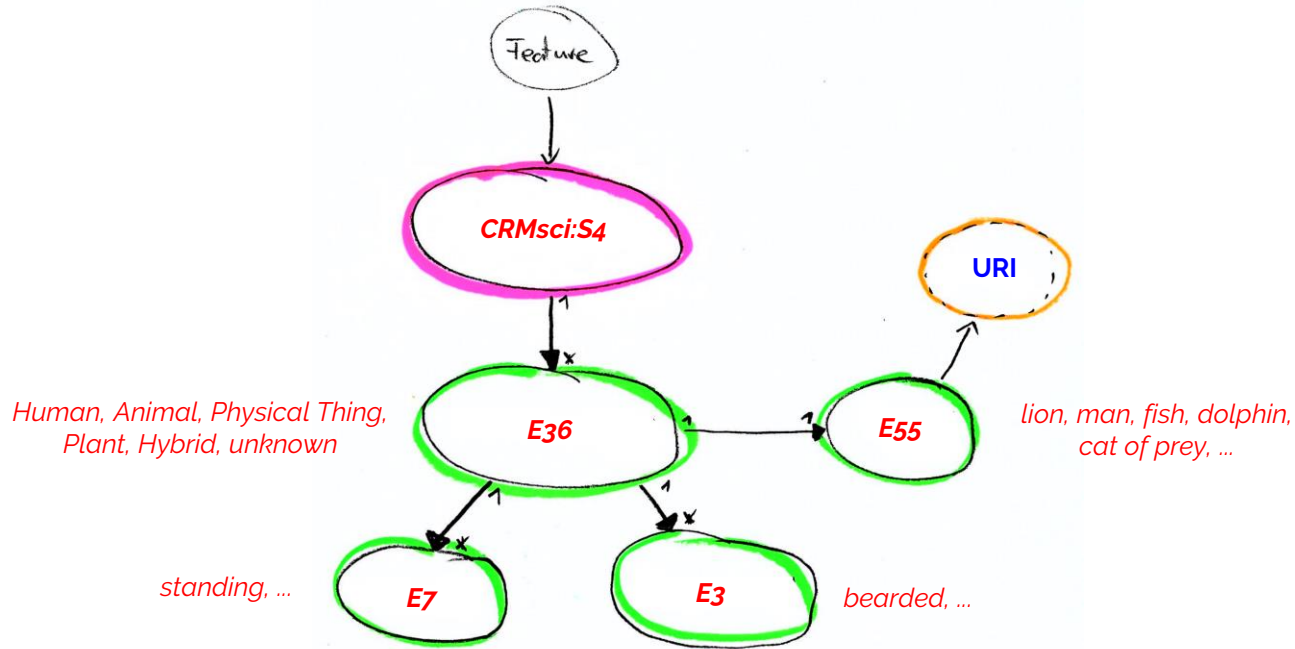
*1 object consists of n features (related to n other features),
having n observations, also features can be sum up in scenes*



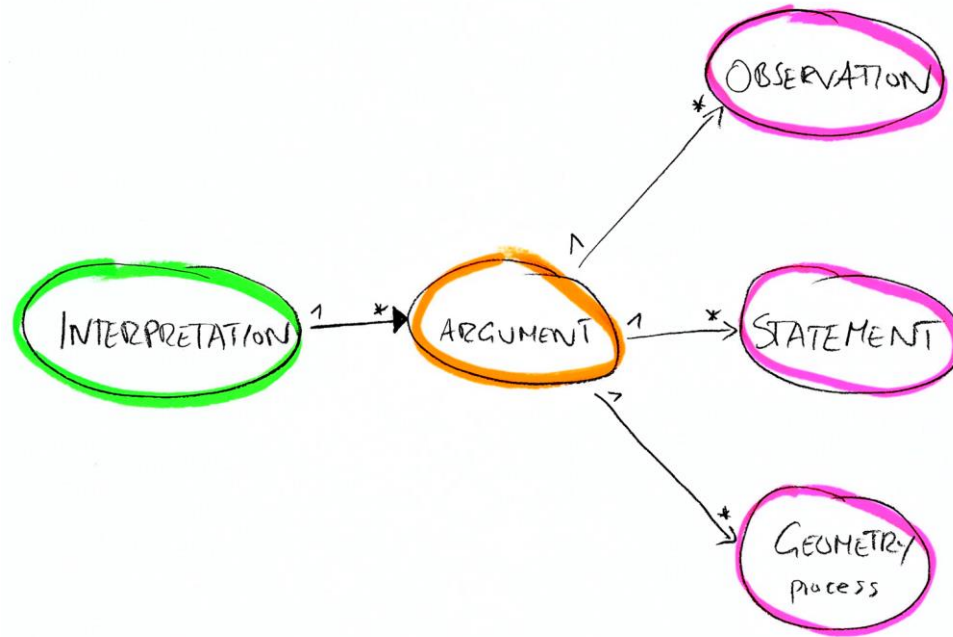
objects can be modelled as **E22** or **E24**, what do you prefer?



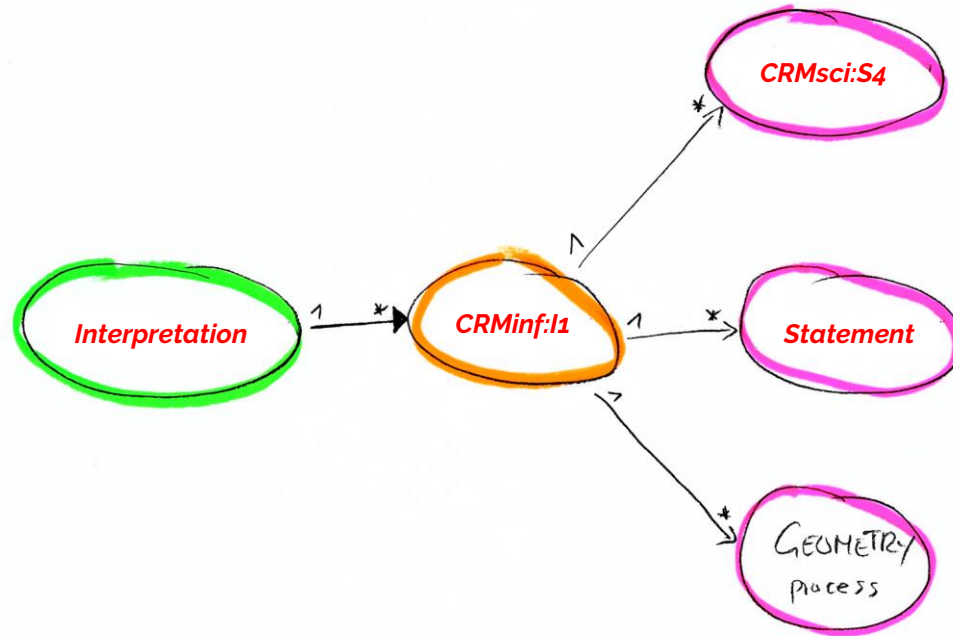
an feature observation is assigned to n visual items, related to a type, which are acting and/or having certain conditions



visual items hold several subclasses, connected to a class specific type, as well as class specific activities and/or conditions



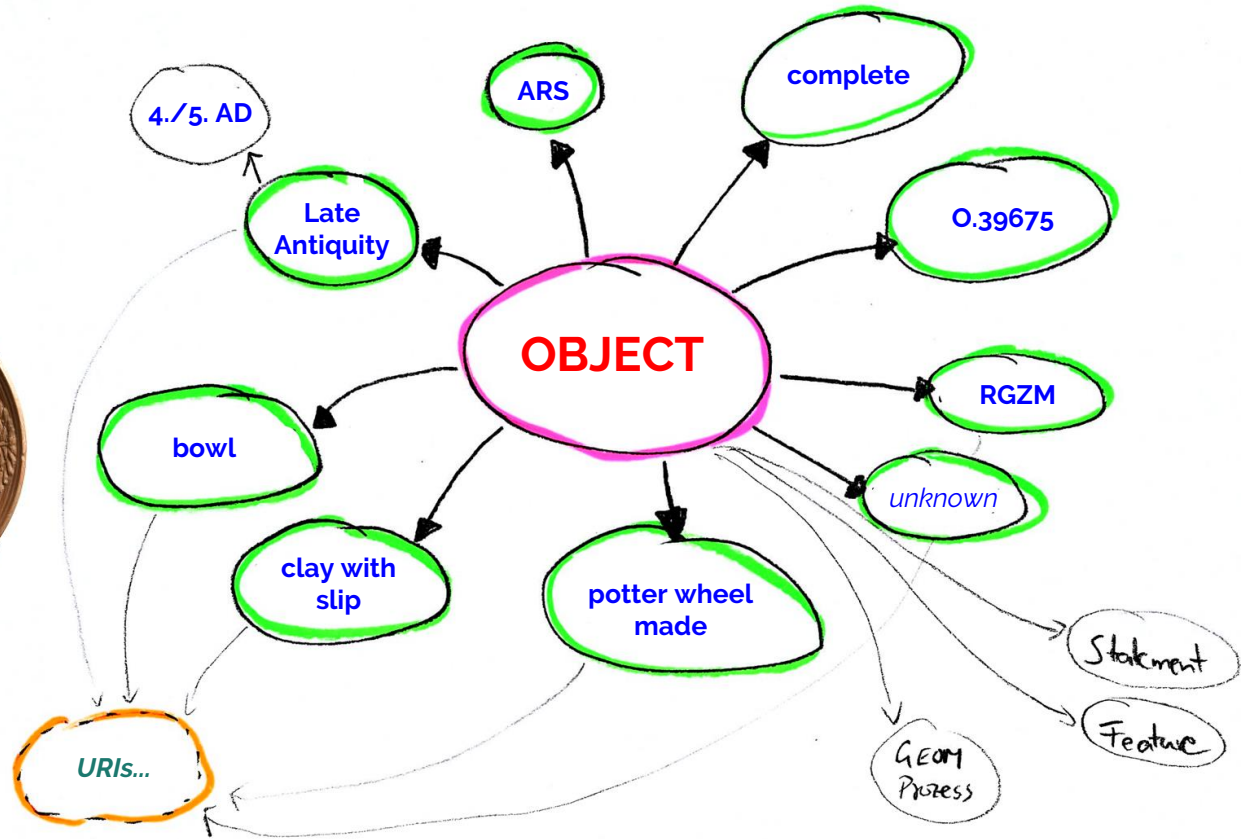
*1 interpretation is based on n arguments,
referring to n observations, n statements or n geometry processes*

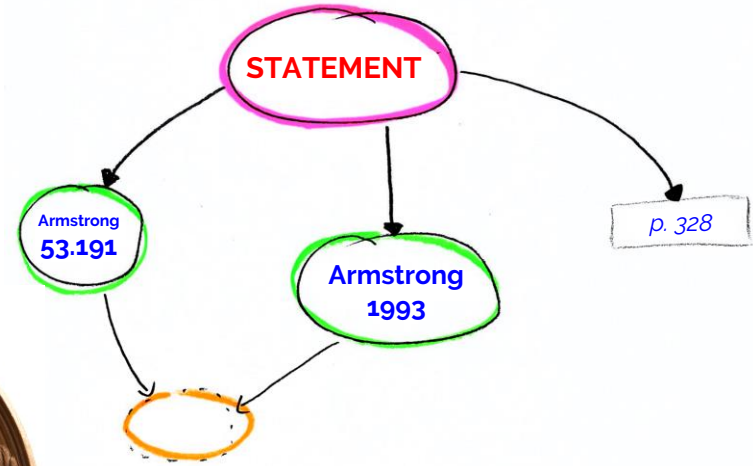
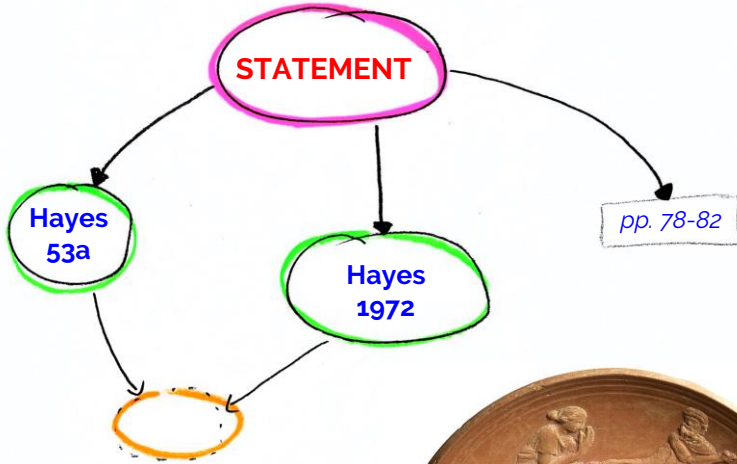


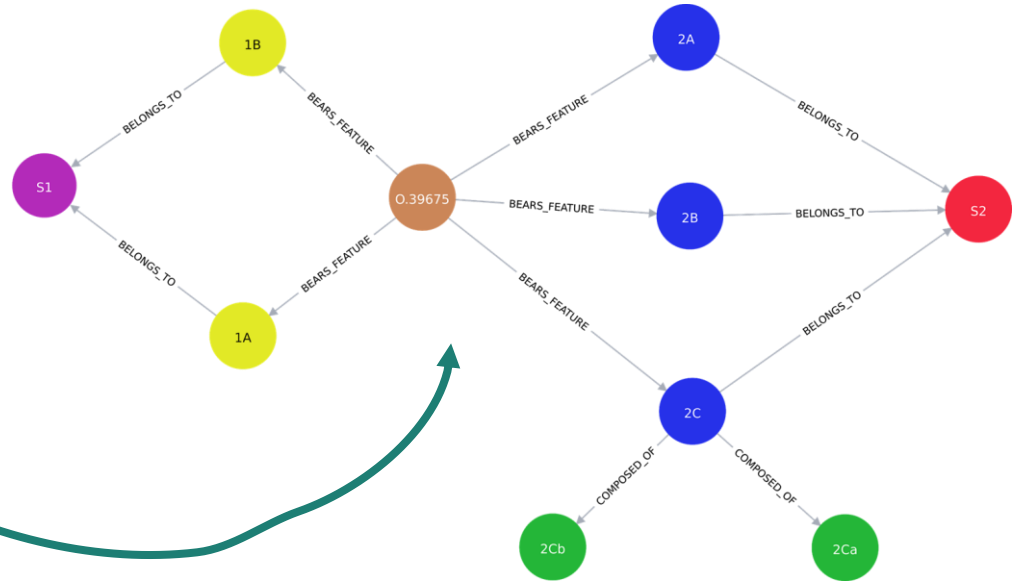
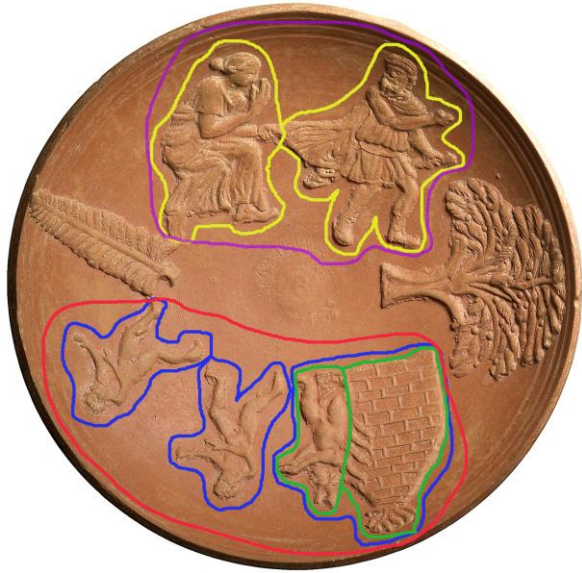
*interpretations are based on **CRMinf** and **CRMsci** extensions, as well as ARS3D specific classes and properties*

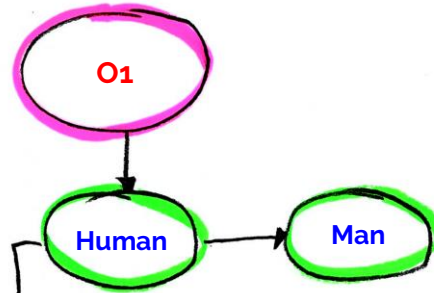


Let us model O.39675!





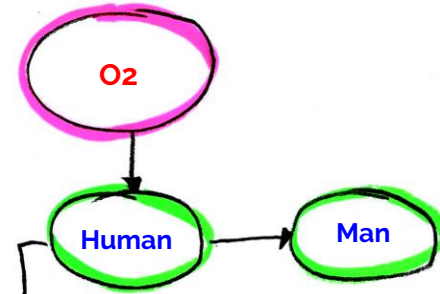




beard (E3)

walking to the right (E7)

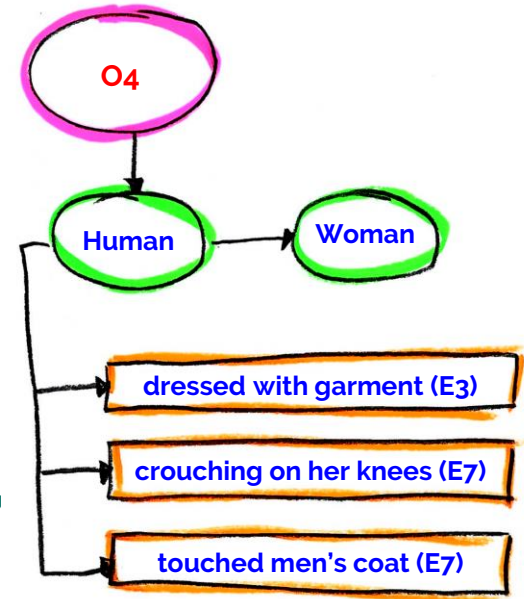
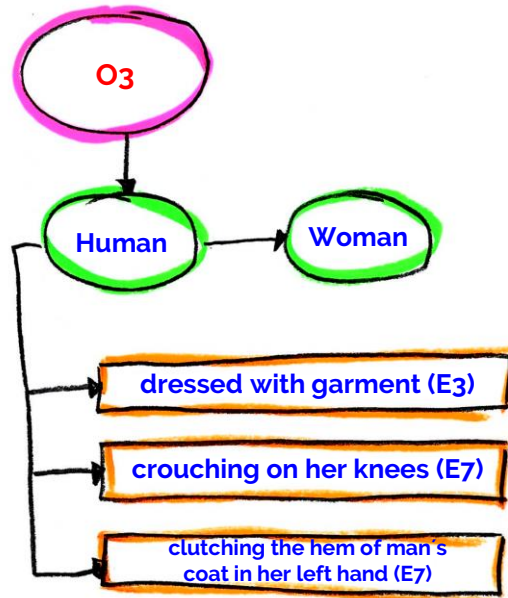
clutched by a woman behind him on his coat (E7)

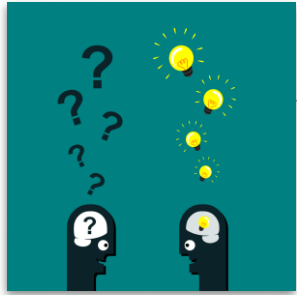


beard (E3)

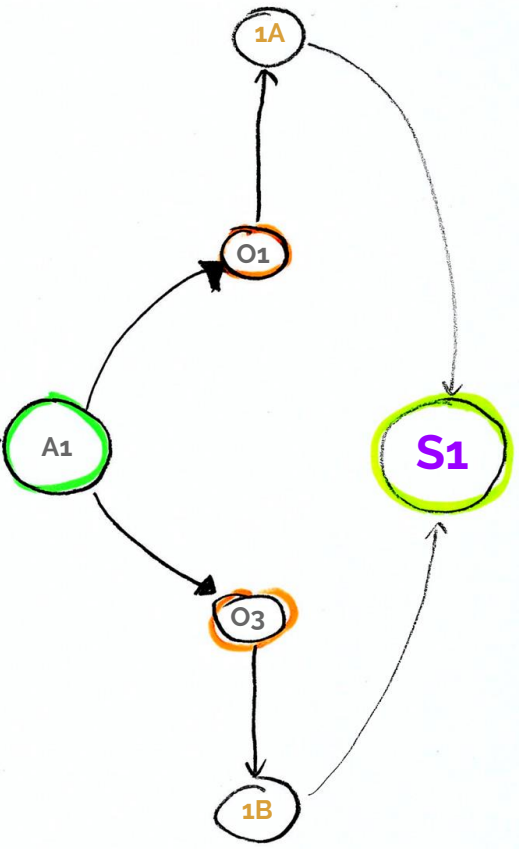
walking to the right (E7)

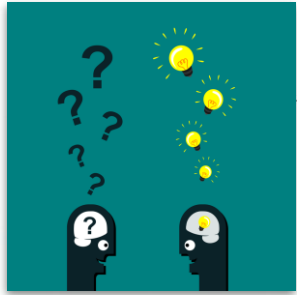
touched by a woman on his coat (E7)



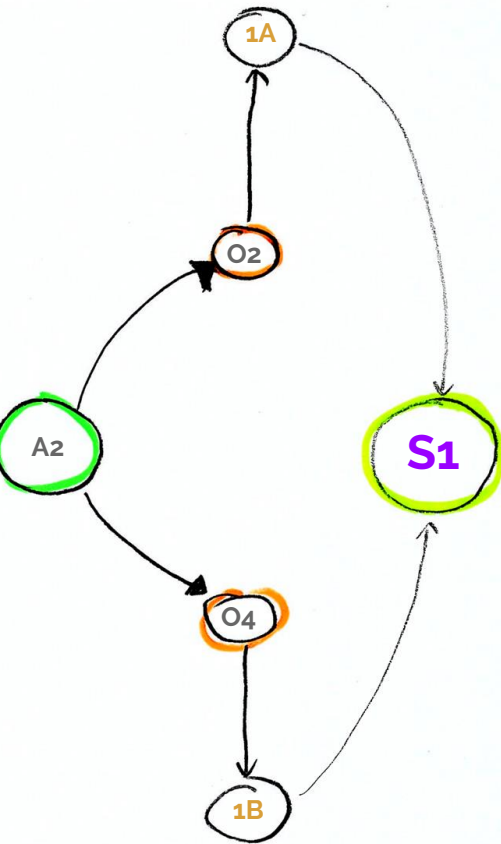


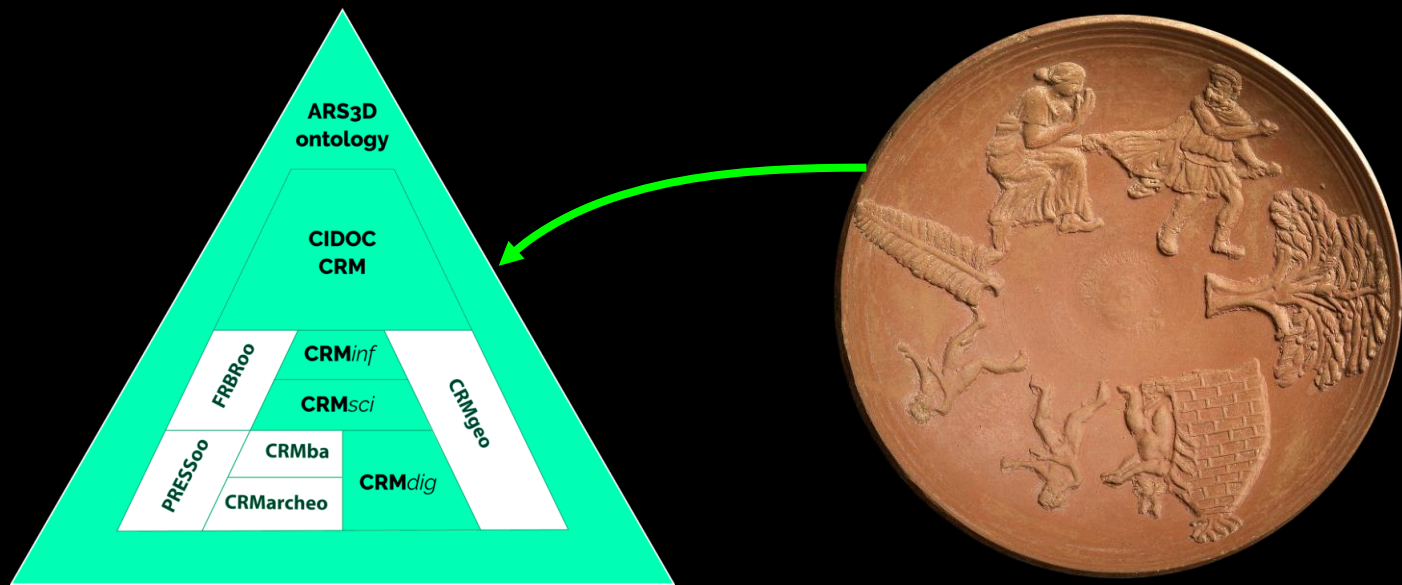
Joseph and Potiphar's wife



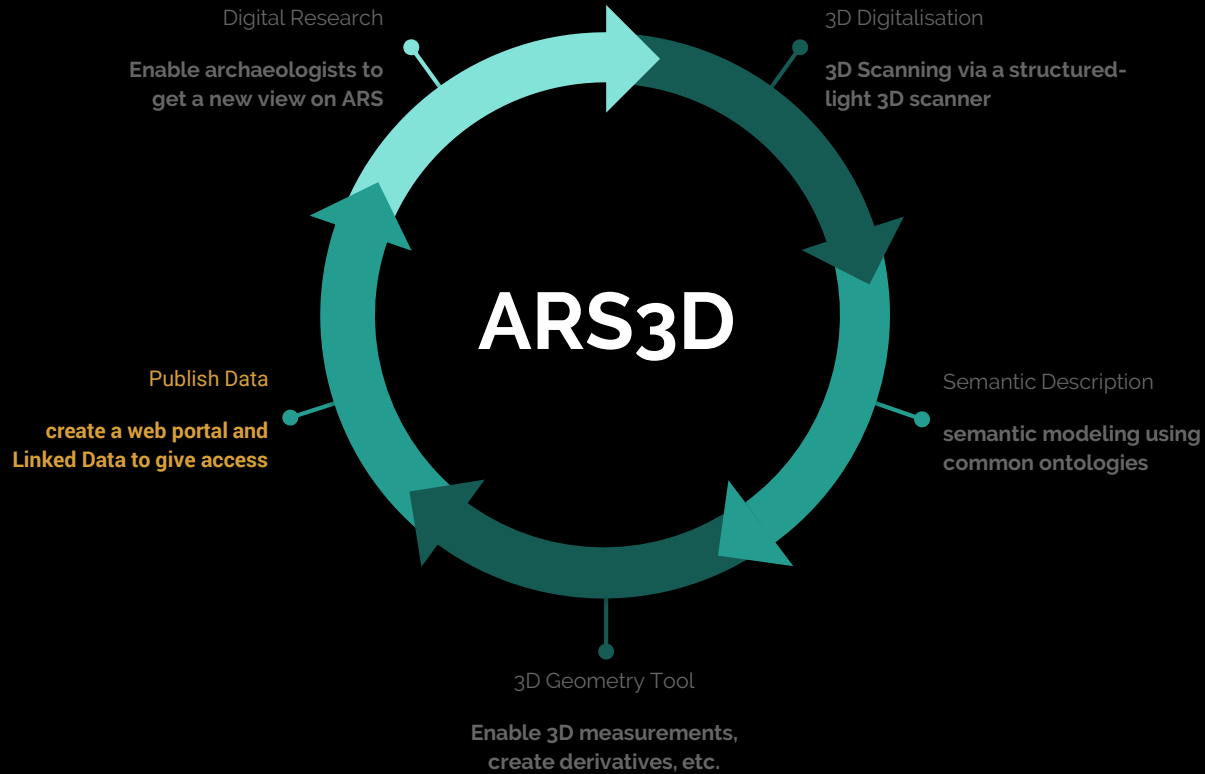


Woman with an issue of blood -
Christ is healing a woman
with an issue of blood





so, we can model the ARS world in the Web 3.0!



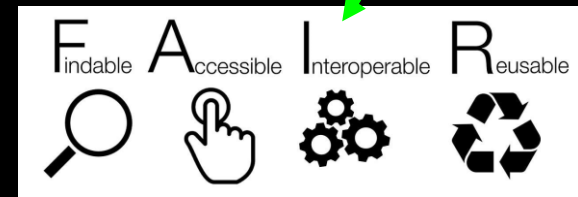
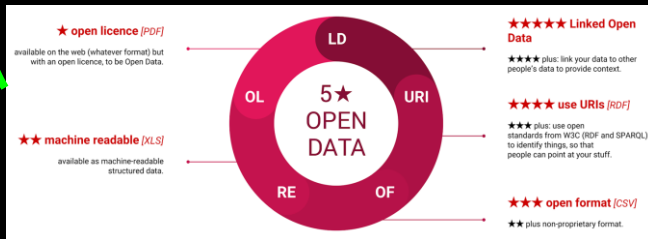
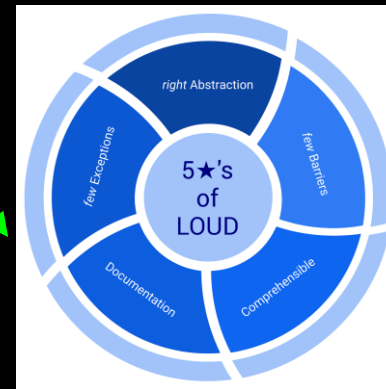
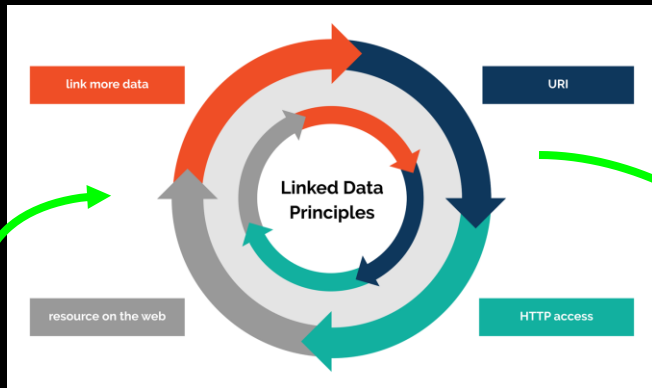


"Hic sunt dracones" (transl. "Here be Dragons"), is used on some old maps to describe an area that was unknown

<https://utrikewuttke.wordpress.com/2019/04/09/open-data-humanities/>
<https://doi.org/10.5281/zenodo.2630154>



we have to fight against the data dragons archeology!



LOUD and FAIR Data in archaeology...?

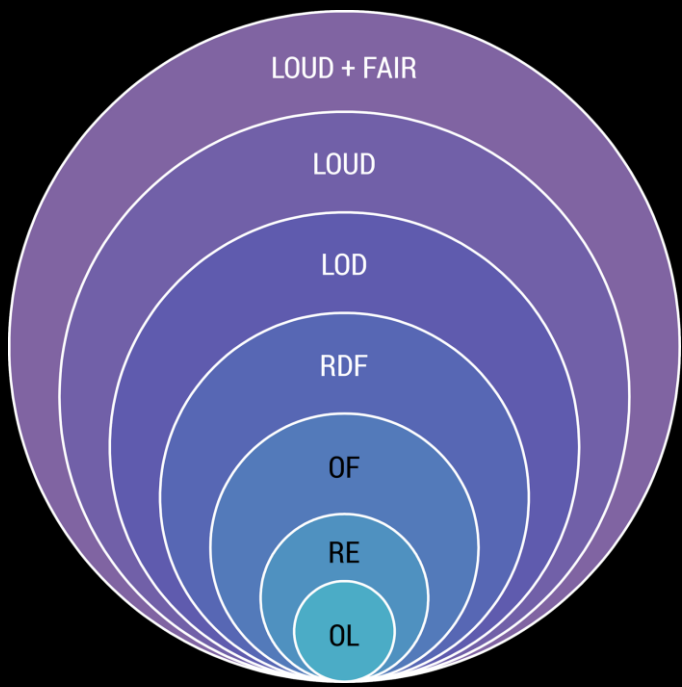


a short historical excursus: Aristotle's seven spheres of heaven...

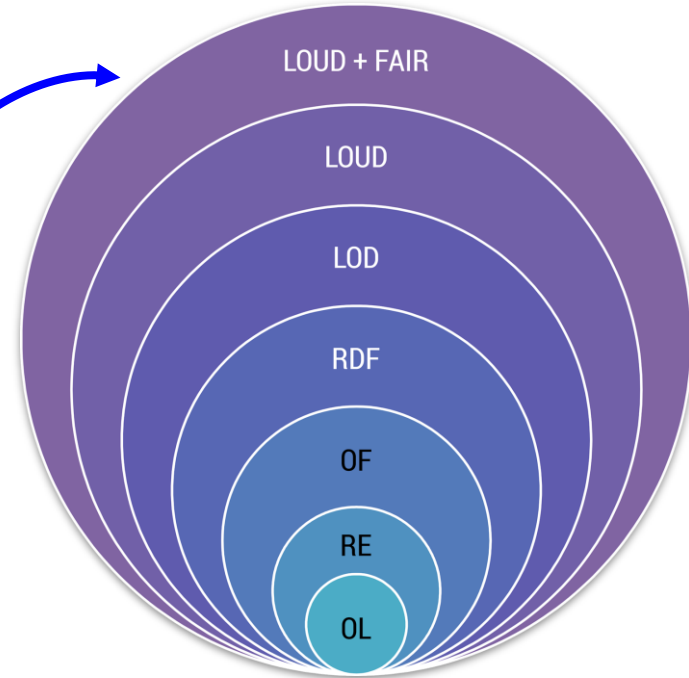
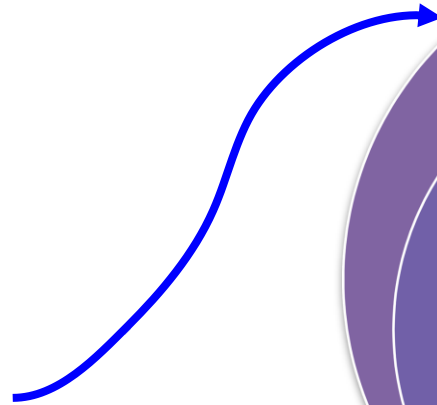


<https://www.w3.org/DesignIssues/LinkedData>
<https://5stardata.info/en/>
<https://linked.art/LOUD/>
<https://doi.org/10.1038/sdata.2016.18>

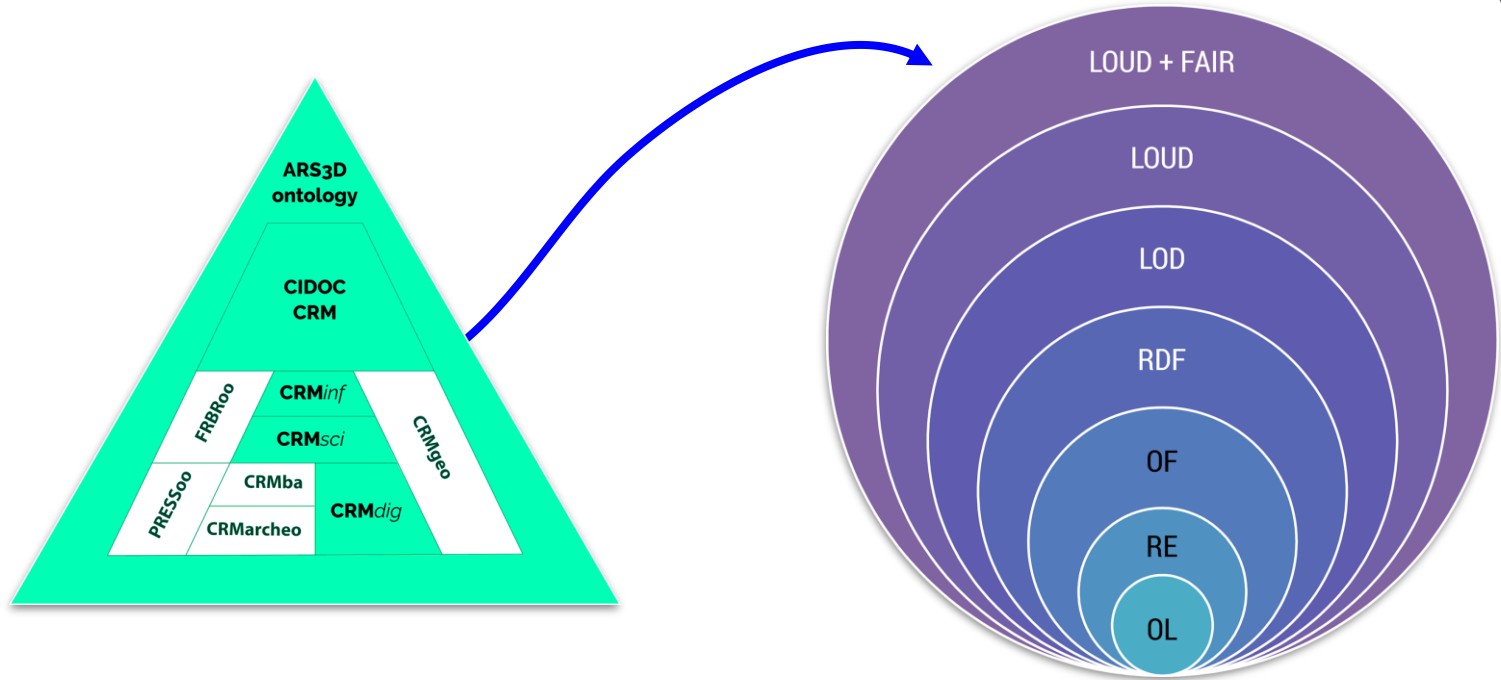
DOI 10.5281/zenodo.2643469



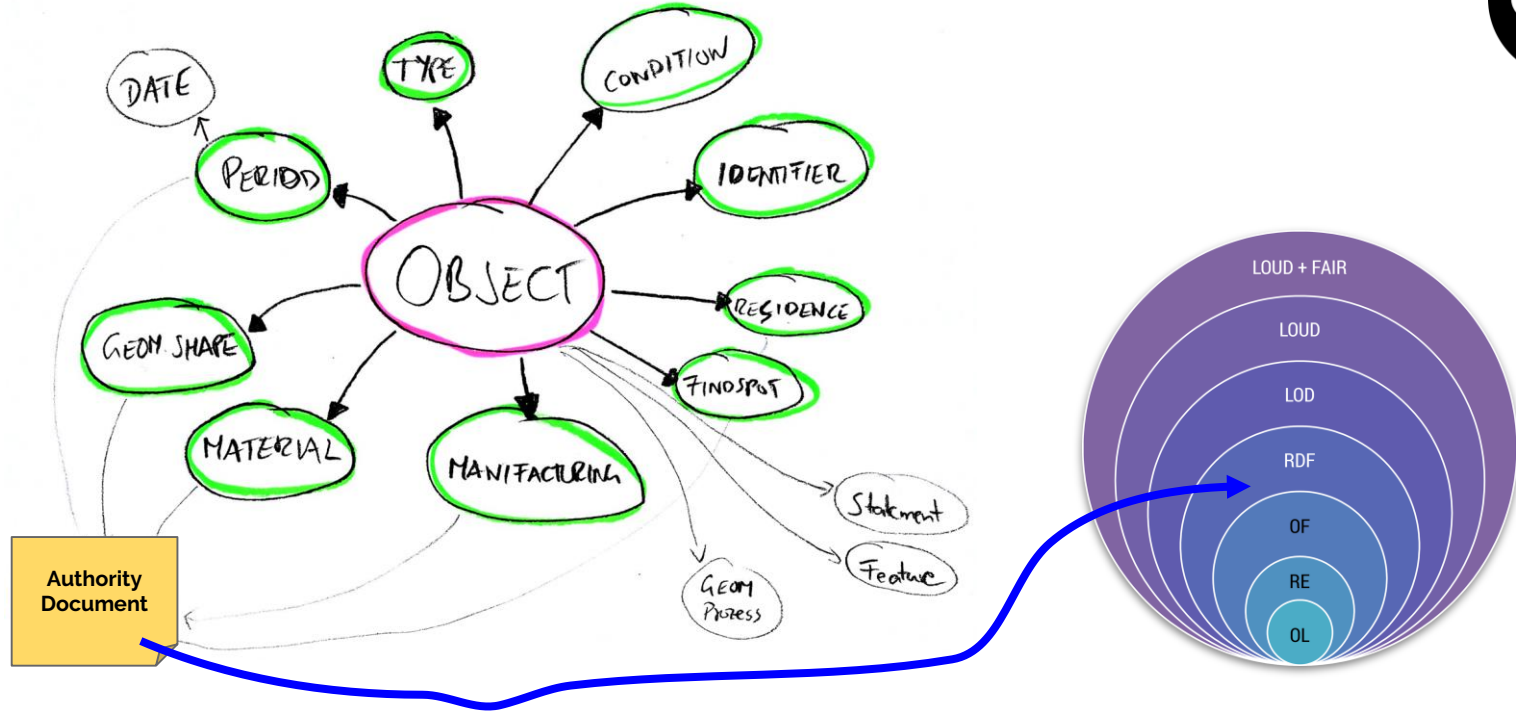
... the Model of Seven Data Spheres !



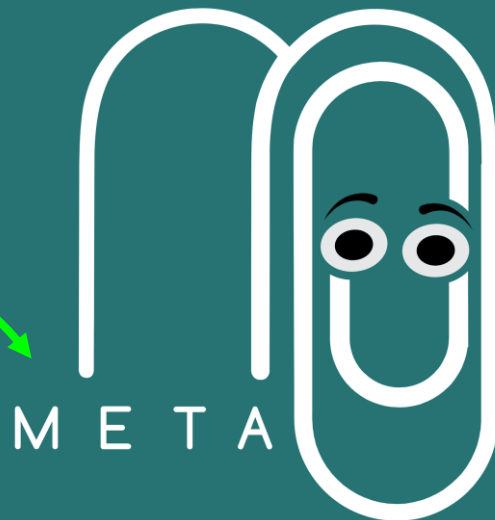
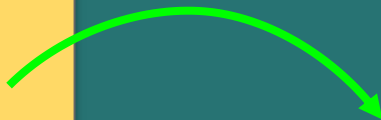
let us model sphere 7 data in archaeology!



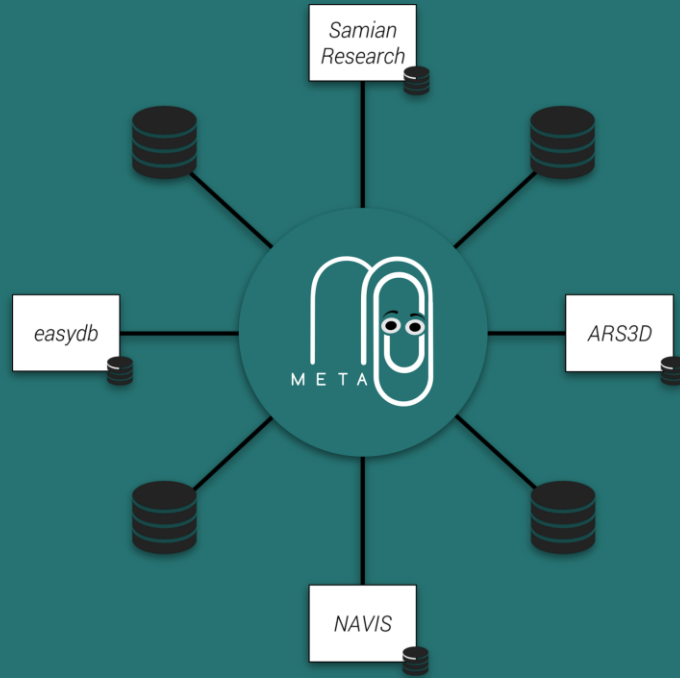
but how to do it in ARS3D?



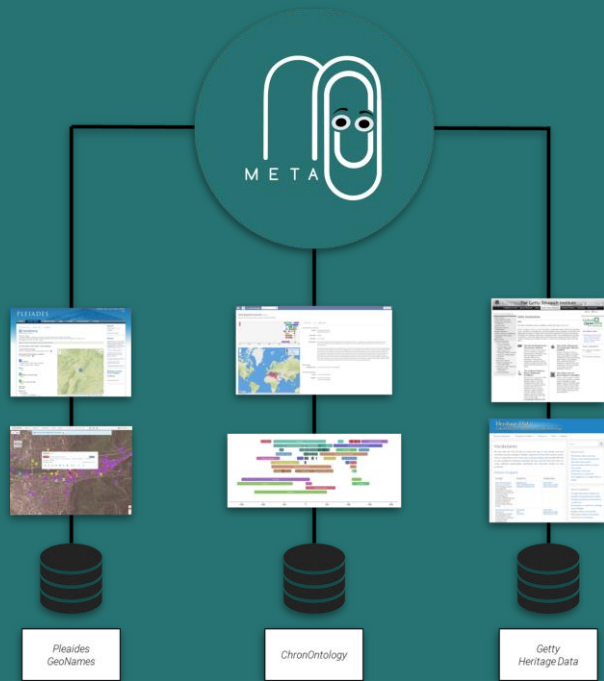
step 1: link instances to Authority Documents modelled as sphere 4+



*all authority documents are stored in the "RGZM Meta-Index" - **meta***



meta's aim is to provide a central access point to enable a global search across the distributed databases based on Linked Data principles



the core concept comprises a **central index**, as Linked Data Hub for **aligning the data** of the **distributed databases** by **versioned index terms** (aka keywords)

these are represented in **different languages** or **descriptions**

meta is modelled in **RDF** and **linked to external resources** (e.g. Pleiades, GeoNames, Getty, ...) into the Linked Open Data Cloud in order to resolve ambiguities



RGZM Meta-Index

Roman Empire → Reign of Emperor Nero

show logbook show modification graph show relation graph/tree show overall map

permalink: <https://java-dev.rgzm.de/ld/54/ld/terms/1411>

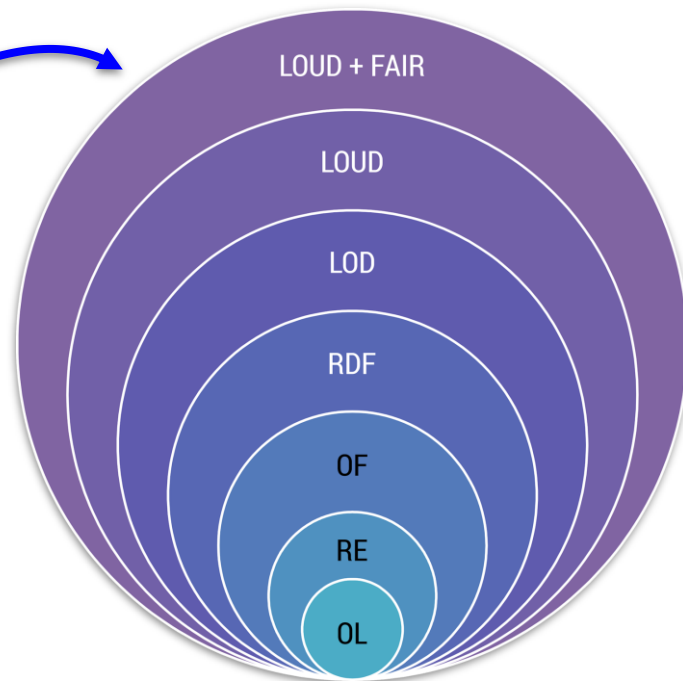
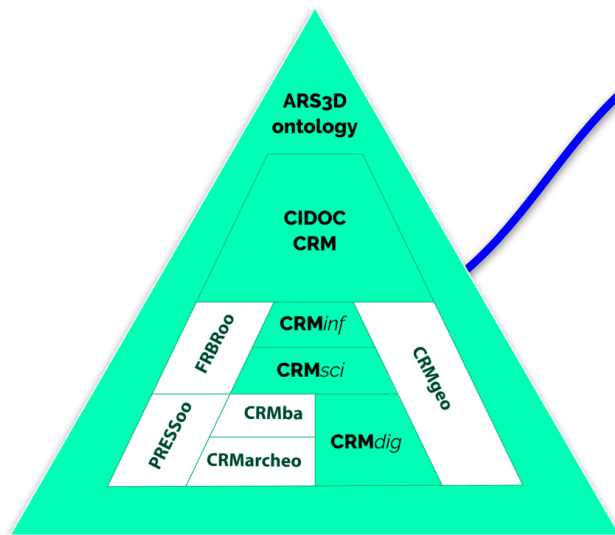
add name add label add relation add resource add time add geometry

	id		parent
1411	Regierungszeit Kaiser Nero	DE	Römische Kaiserzeit / Roman Empire
	typ		ist ähnlich
Zeit	Reign of Emperor Nero	EN	Nero / Nero
	status		ist exakt gleich
draft	Regierungszeit Kaiser Nero		http://chronontology.dainst.org/period/vV2CwUdD0aww
	database	chronontology	
NAVIS Schiffsdatenbank	Neronische Zeit	DE	
	time span	chronontology	
54 to 68	Neronisch	DE	
	time span (chronontology)	chronontology	
54 to 68	Herrschaft von Nero	DE	

a user-friendly **GUI** will help archaeological researchers to create the index terms and **structure** them

- **hierarchically** (broader, narrower)
- **semantically** (e.g. similar, related)
- by **type** (e.g. geography, person)
- and by **label** (e.g. site, material)

this structure is **related to the SKOS-ontology** but **extended to RGZM specific needs**



but, what will we link in ARS3D?



the LOD cloud and **Paris**

Cultural Objects Names Authority® Iconography Display

[Home](#) [Previous Page](#) [Help](#)

ID: 901001347
Page link: <http://vocab.getty.edu/page/ia/901001347> Record Type: Character/Person

Paris (Greek character)

Note: In Greek legend, son of King Priam of Troy and his wife, Hecuba. A dream regarding his birth was interpreted as an evil portent, and he was consequently expelled from his family as an infant. Left for dead, he was either nursed by a bear or found by shepherds. He was raised as a shepherd to his parents. As a young man he entered a boxing contest at a Trojan festival, in which he defeated Priam's other sons. After his identity was revealed, he was received home again by Priam.

Names:
Paris (Greek character) (preferred,English-P,D,N)
Alexandros (Greek character) (Greek, transliterated),U,N)
Alexander (Greek character) (English,U,N)
Πάρις (Greek,U,N)

Hierarchical Position:
Legend, Religion, Mythology (P)
.....<Greek iconography> (P)
.....<Greek characters> (G)
.....Paris (Greek character) (I)

Related Iconography:
is actor for Judgment of Paris
.....<Legend, Religion, Mythology, Greek iconography, Greek narratives, Judgment of Paris (Greco-Roman narrative) [901000536]>
is actor for Abduction of Helen
.....<Legend, Religion, Mythology, Greek iconography, Greek narratives, Trojan War (Greek-Trojan legend, 12th/13th century BCE), Abduction of Helen (Greek narrative) [901001939]>

<http://vocab.getty.edu/page/ia/901001347>

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<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#" xmlns:skos="http://www.w3.org/2004/02/skos/core#">
  <rdf:Description rdf:about="http://iconclass.org/95A28PARIS29">
    <rdf:type rdfs:resource="http://www.w3.org/2004/02/skos/core#Concept"/>
    <skos:prefLabel xml:lang="fr">histoire de Paris (Alexandre)/<skos:prefLabel>
    <skos:prefLabel xml:lang="en">(story of) Paris (Alexander)/<skos:prefLabel>
    <skos:prefLabel xml:lang="de">die Geschichte von Paris (Alexander)/<skos:prefLabel>
    <skos:prefLabel xml:lang="it">(storia di) Paride(Alessandro)/<skos:prefLabel>
    <skos:prefLabel xml:lang="fi">Paris (Aleksanteri) (Pariksen taru)/<skos:prefLabel>
    <skos:inScheme rdfs:resource="http://id1911.org/">
    <skos:notation>95A(PARIS)/<skos:notation>
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[http://iconclass.org/95A\(PARIS\).rdf](http://iconclass.org/95A(PARIS).rdf)



the LOD cloud and the **snake**

Art & Architecture Thesaurus® Online
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ID: 300250870 Record type: concept

Page Link: <http://vocab.getty.edu/page/aat/300250870>

Serpentes (suborder) (Squamata (order), Reptilia (class), ... Living Organisms (hierarchy name))

Note: Suborder containing around 2,900 species of reptiles with a greatly elongated body, tapering tail, smooth scaly integument, and in some species, venomous properties. Snakes represent a lizard that, over the course of evolution, has undergone structural reduction, amputation, and loss as well as specialization of characteristics. All snakes lack external limbs, but not all legless reptiles are snakes. All snakes are carnivorous and can be distinguished from legless lizards by their lack of eyelids, limbs, external ears, and vestiges of fontanelles.

Terms:

- Serpentes (suborder) (preferred) (C,U,S,English-P,U,U,N)
- (suborder) (Latin-P,D,U,N)
- snakes (suborder) (C,U,S,English,AD,U,N)
- snake (suborder) (C,U,English,AD,U,N)
- serpents (suborder) (C,U,English,SP,U,N)

Facet/Hierarchy Code: H.H.

Hierarchical Position:

- Living Organisms (hierarchy name) (G)
- Living organisms (entities) (G)
- Eukaryota (domain) (G)
- Animalia (kingdom) (G)
- Chordata (phylum) (G)
- Ventrolata (subphylum) (G)
- Reptilia (class) (G)
- Squamata (order) (G)
- Serpentes (suborder) (G)

<http://vocab.getty.edu/aat/300250870>

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<http://iconclass.org/25F42/rdf>



the LOD cloud and
manufacturing ***potter wheel***


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ID: 300022820 **Record Type:** concept
Page Link: <http://vocab.getty.edu/page/aat/300022820>

 **potter's wheels** (<tools and equipment for clayworking>, <equipment by material processed>, ... Furnishings and Equipment (hierarchy name))








Note: Devices with a rotating flat disc or turntable on which clay may be shaped to create symmetrical forms; the process of forming clay objects on a potter's wheel is throwing.

Terms:

- potter's wheels** (**preferred**, C,U,English-P,D,U,U)
- potter's wheel** (C,U,English,AD,U,U)
- throwing wheels** (C,U,English,UF,U,U)
- wheels, potter's** (C,U,English,UF,U,U)
- wheels (potter's wheels)** (C,U,English,UF,PN)
- 陶輪** (C,U,Chinese (traditional)-P,D,U,U)
- 拉坯機** (C,U,Chinese (traditional),UF,U,U)
- 陶車** (C,U,Chinese (traditional),UF,U,U)
- táo lún** (C,U,Chinese (transliterated Hanyu Pinyin)-P,UF,U,U)
- tao lun** (C,U,Chinese (transliterated Pinyin without tones)-P,UF,U,U)
- t'ao lun** (C,U,Chinese (transliterated Wade-Giles)-P,UF,U,U)

Facet/Hierarchy Code: V.TH

Hierarchical Position:

-  Objects Facet
-  Furnishings and Equipment (hierarchy name) (G)
-  Tools and Equipment (hierarchy name) (G)
-  equipment (G)
-  <equipment by material processed> (G)
-  <tools and equipment for clayworking> (G)
-  potter's wheels (G)

<http://vocab.getty.edu/aat/300022820>



the LOD cloud and late antiquity

DAJ chronontology Search for [] About ChronOntology FAQ API English []

Late Antique political, cultural (Mittelmeerregion)

<http://chronontology.dainst.org/period/sTAlISCHCKzd>

Information [] Download JSON

About the period

Names Spätantik (de)
Late Antique (en)
Late Antiquity (en)

Period type political
cultural

Digital provenance chronOntology

Description For a half century now, a diverse range of historiographical models for the end of antiquity has been increasingly resurfaced (Mazzarino 1959, Demandt 1984, Ingelbert 2002, Marcone 2005, James 2009, Jodel 2009). "Late Antiquity," a term first attested in German, has, since 1900, been delineated by four main characteristics: (1) a periodization, more or less long in duration; (2) a geographical area, more or less expansive; (3) central themes, either numerous or singular; and, especially, (4) a judgment of overall value. In 1949 (and subsequently), Henri Irénée Marrou explained why it is preferable to replace the weak adjectives "Bas-empire," "spätromisch," and "Late Roman"—all of which suggest a universal Roman decline that never happened—with the strong nouns "Antiquité tardive" "Spätantike," and "Late Antiquity" (Marrou 1949; 1977). These latter terms allow for an understanding of the period into itself, and art historians, under Riegl's influence (Elsner 2002), had already been using such terms for half a century by Marrou's time. [...] this volume [...] "from Constantine to Muhammad" was to be the chronological span. [...] differs from the periods typically reserved among classicists for the late Roman Empire; which begins with the accession of the emperor Diocletian (i.e., 284) and draws to a close—depending on the author—with the death of the emperors Justinian (565), Maurice (602), Phocas (610), or Heraclius (641). To begin with Constantine rather than with Diocletian and to end with the prophet of Islam rather than with a Roman emperor is a choice in favor of religious themes. In the debates over the nature of late Antiquity, this chronology insists on continuity, as opposed to drastic change. Rupture, by contrast, is what a political periodization usually champions, not least because of the disappearance of the Roman empire in the West. [...] Late Antiquity, which lasted from Constantine up to Heraclius, the Roman emperor (610–641) contemporary with both the "king of kings" Khuro II (593–628) and the prophet Muhammad (610–632). [...] Constantine (306–337). (source: The Oxford Handbook of Late Antiquity, 2015, ed: Scott Fitzgerald Johnson; <http://www.worldcat.org/oclc/941068128>)

Tags roman_chronology

Temporal extent Original text: from Constantine (306-337) to Muhammad (610-632)
Berlin, 306 (ca.)

<http://chronontology.dainst.org/period/sTAlISCHCKzd>



*the RGZM Linked Data Infrastructure expects an
RDF resource as answer for the question:
“Give me all resources including Index term XYZ”*



what will be
the answer?



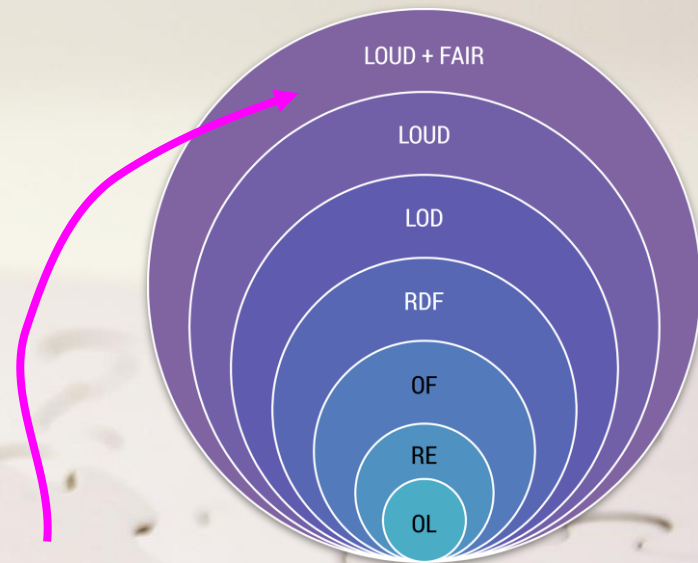


we will share

- Objects
- Features
- Statements

as LOD resources...



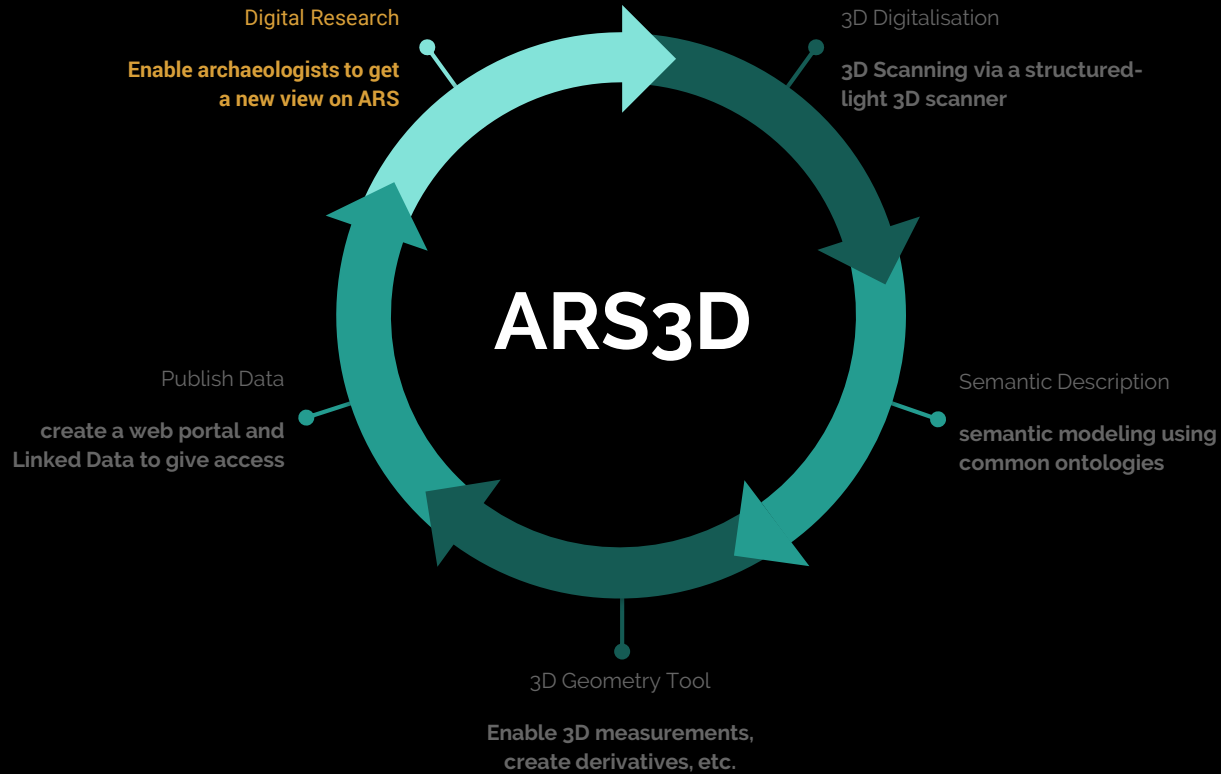


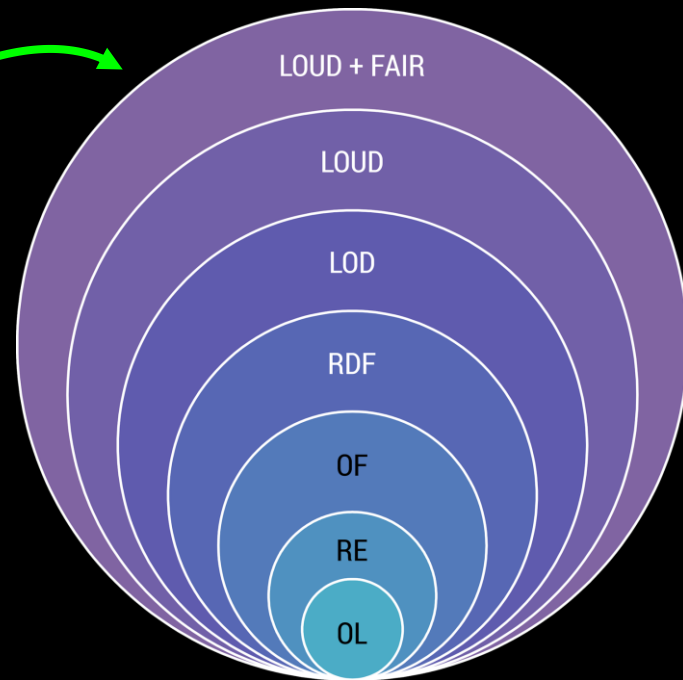
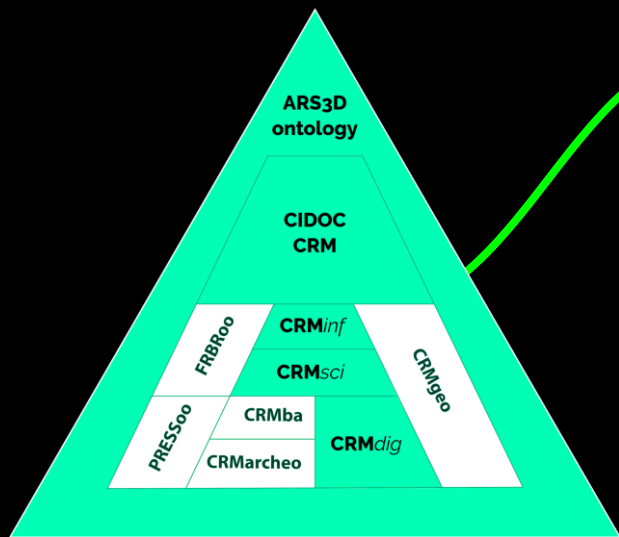
... as sphere 7 data in archaeology ...



**... and if the project
is finished
end of 2020,
it is up to you ...**







... to lead ARS to Archaeology 4.0 using LOUD and FAIR sphere 7!



Thx!

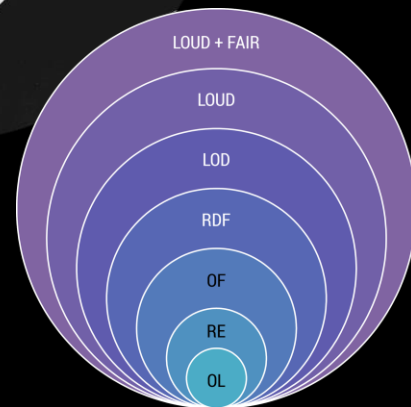


Any questions?

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