• Why do we care about interoperability? Isn’t it enough to just make our data available for re-use?
• Once you go through all the hard work of preserving and disseminating your data, a whole world opens up!
• By combining your data with the data of others in new ways, we can create new knowledge and understanding that was not possible before.
Overview

• Metadata
• Controlled vocabularies, thesauri or ontologies
• Geo-Data
• Linked Open Data
• Portals
• Metadata sits at the heart of interoperability. Without good metadata, interoperability isn’t possible.
• Metadata should, whenever possible be based on standards
• It often takes some time and research to determine what the appropriate standards are for your metadata
• Very often the metadata created for a project, may not conform to a standard, and mapping has to take place. This isn’t a bad thing, but if metadata is already standards compliant (all or in part), its much less work!
Use of standards-based ontologies, thesauri and controlled vocabularies can help your data become interoperable.

The most widely used ontology in Cultural Heritage is the CIDOC CRM, which is an ISO standard.

Not specific to any one domain, so no terminology or relationships are presented that are specific to archaeology.

Extensions have been developed like the CRM-EH and CRMarcheo
• Working with ontologies can require a lot of work and expert knowledge, which may or may not be necessary.

• Using thesauri; lists of agreed upon terms with simple, hierarchical relationships is often all that is needed.

• Even using controlled vocabularies, where you just map to a list of terms can be an easy path to interoperability.

• Example is the SENESCHAL project, which brought together archaeology vocabularies and thesauri used by the national agencies for England, Scotland and Wales, which can now be used as standards.
ARIADNE is using the CIDOC CRM and experimenting with the new CRMarchaeo, but for archaeological subjects has chosen to map to the Getty Art & Architecture Thesaurus (AAT) as a central spine.

Perceived as the most ‘neutral’ by most European partners.

Mappings are made in the partner’s native language (and English if desired).

This means you can search for a subject in Hungarian, and get results in German (English is just the glue).
Geo data

• Lots of work has been done with making archaeological data interoperable with regard to place

• One of the best examples is the Pelagios project
  – Links online resources to the historic past, primarily within the classical world, meant to be primarily machine readable
  – New initiative called Peripleo, which provides a map interface
Temporal Data

- Most of the work has been done on what and where, as its (relatively) easy.
- By far the most difficult aspect of making archaeological data interoperable is dealing with WHEN.
- When is always dependent on where (bronze age is different depending on where you are in the world).
- CRMarchaeo has tried to deal with this using a concept called ‘space-time’ volumes.
- PeriodO is using ‘assertions’ to build consensus around temporal terms.
Different Approaches

- Some approaches for making data interoperable use a top-down approach
  - Using a controlled vocabulary to which everyone agrees to map their data
  - Mapping to an ontology like the CIDOC CRM
- Some approaches for making data interoperable use a bottom-up approach
  - Using a variety of sources showing where an archaeological place is mentioned in a text to create a research resource
  - Using the assertions used by different people in different place to build up assertions about archaeological time periods
Most of what underlies all of the examples shown is based on technologies and concepts that use Linked Data, preferable Linked Open Data (LOD).

Linked Data is a very different way of organising data.

Rather than using relational tables found in most traditional databases, it uses a graph data structure, which has no hierarchy.
• Everything is built using a subject-predicate-object relationship that can linked in any direction, pulled apart and recombined in any direction.
• It allows the use of inference to leap across concepts.
• We even use it as important part of our CMS.
Portals

• Interoperable data can be brought together and searched from a single interface, often a portal. This is known as a federated query.

• One of the earliest examples of portal was part of the ARENA2 project.

• Most of the previous examples are portals, using data from a variety of sources which has been made interoperable.
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