

OWL Ontology on the European Integration Process between 1949 and 1979

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ABSTRACT (ENGLISH)

This proposal concerns the representation of the European Integration Process between 1949 and 1979, by means of a computational ontology described using the Web Ontology Language 2 (OWL2). This work of formalization aims at combining the participatory objectives of Public History with a relevant current topic, such as the historical-political process that led to the European Union we live in today. This matter often constitutes a source of widespread misunderstanding by European citizens. At last, some individuals of particular interest are explored, as well as some possible future developments and applications of this case study are listed.

Keywords: Computational ontologies; European Integration; EU Law; Semantic Web; Public History

ABSTRACT (ITALIANO)

Ontologia OWL sul Processo di Integrazione Europeo tra il 1949 e il 1979.

Viene presentata una proposta di rappresentazione del Processo di Integrazione Europeo nel periodo compreso tra il 1949 e il 1979, attraverso un'ontologia computazionale descritta utilizzando il Web Ontology Language 2 (OWL2). Questa formalizzazione intende coniugare gli obiettivi partecipativi della Public History con un tema di attualità: il percorso storico e politico che ha portato alla nascita dell'Unione Europea come la conosciamo oggi. Si tratta di un argomento spesso oggetto di incomprensione da parte dei cittadini europei. Infine, vengono analizzati alcuni individui di particolare interesse all'interno dell'ontologia e si presentano i possibili sviluppi futuri e le potenziali applicazioni di questo caso studio.

Parole chiave: Ontologie computazionali; Integrazione Europea; Diritto UE; Web Semantico; Storia Pubblica

1. INTRODUCTION. PREMISES AND OBJECTIVES OF THE ONTOLOGY

The work here discussed is an attempt to describe a complex subject, both on the historical (Rapone, 2002) and juridical side (Pocar, 1979; Pocar, 1986), using a computer tool. It was, in fact, created following the objectives of Public History, promoting culture and historical memory to an audience beyond academia. The purpose was to increase the participation and awareness of the community on these issues (Cauvin, 2016). European citizens have indeed shown ambivalent positions in the understanding of the functioning (De Waele, 2019) and in the support towards the European institutions (Motti-Stefanidi, 2018). In order to achieve this end, a computational ontology of the European Integration Process was developed using the W3C standard language for the representation of ontologies, the Web Ontology Language 2 (OWL2).

In this research project, the focus has been placed between the years 1949 and 1979. This specific time range has been selected, because it constitutes the basis of the "tree", that is the basis of the temporal ramification of events that have brought forward the evolution of the historical and political process of integration of the European institutions. 1949, the year of the creation of NATO and the Council of Europe, constitutes a historic break for European citizens from the war events of the previous fifty years. The European hegemony on the world stage was, in fact, definitively over and two new superpowers, the USA and the USSR, had emerged (Rapone, 2002).

The pro-European sentiment, whose demands were also present in the agendas of various partisan movements (both anti-fascist and anti-Nazi) in the post-war period, was also driven by a sense of unity, aimed at countering the spectre of communism that came from Eastern Europe (Rapone, 2002).

In this historical context, the first step in the process of integration and creation of a united Europe was the Schuman Plan. The French minister of Foreign Affairs, from whom the plan took its name, proposed to pool coal and steel resources of European countries that had wanted to join the initiative. The Treaty of Paris was signed on 18 April, 1951 by the governments of France, Italy, Netherlands, Belgium, Luxembourg and the Federal Republic of Germany, thus creating the ECSC (European Coal and Steel Community). At the time, (initially it was only an international organization) it would have constituted the initial nucleus of the future Community Europe (Rapone, 2002).

The first elections of the European Parliament, in 1979, marked a turning point in the history of this initial process and the beginning of a new phase (Rapone, 2002). Until then, the members of the European Parliament had been appointed by national governments (Pocar, 1986). The introduction of direct elections, on the other hand, contributed to a growing feeling among European citizens of greater control and influence over the decision-making bodies of the European Communities (Rapone, 2002).

2. MODELLING CRITERIA

The construction of this ontology required a deep analysis of this specific domain of knowledge, in order to extract the main characteristics and relations to be represented.

In particular, as in regard to the historical aspect, some fundamental issues were examined: the Schuman Declaration; the creation of the ECSC (and also the cases of EDC¹ and EPC,² described as prospects of political integration and defence between 1950 and 1953); the signing of the Treaties of Rome with the subsequent birth of the EEC³ and Euratom or EAEC⁴ in 1957; the birth of the CAP⁵ in 1962; the crisis of the "Empty Chair" and the beginning of some specific Intergovernmental Summits, which would in future become known as the "European Council" since 1965; the launch of the Treaty of Fusion of the Executive Bodies of the European Communities (Merger Treaty); the first enlargement of the European Communities to Denmark, Ireland and the United Kingdom in 1973; and finally, the official birth of the European Council in 1974 and the first elections by universal suffrage to the European Parliament in 1979 (Rapone, 2002). Instead, as in regard to the people included and described in the ontology, who have contributed (even involuntarily) or were decisive in the process of community construction, it was decided to start the analysis from the list of "Pioneers of the European Union" on the official website.⁶ It was then, however, chosen to integrate the list with other relevant personalities (absent in the website) of this historical-political process. The definition "Outstanding Personalities" was chosen, in the end, to describe (in a common category) all these people, since it is not possible to associate them all with the labels of "Pioneers" or "Founding Fathers" of the European Union. The following "Outstanding Personalities" have therefore been described: Alcide De Gasperi; Altiero Spinelli; Charles de Gaulle; Jean Monnet; Johan Willem Beyen; Joseph Bech; Konrad Adenauer; Paul-Henri Spaak and Walter Hallstein (Rapone, 2002). Another fundamental aspect of the adaptation of the community theme to the ontological representation was the need to take into account the dichotomy between the ideas of federalism and unionism. These themes were, in fact, heated sources of debate among the pro-European movements of the 1950s, as they expressed different visions on how the integration process could be achieved. The first, looking at the institutional model of the United States, tended towards the creation of supranational powers. The latter, on the other hand, was sceptical about the hypothesis of limitations of states' sovereignty, leaning instead towards the use of an intergovernmental method of agreement on individual issues. In the end, the first conception prevailed and was implemented into political initiative through the use of the functionalist method. Political integration, in short, was not achieved through the creation of supranational entities, with limitations to the sovereignty of states "imposed" from above. Rather, it turned to sectoral integration for specific areas, as in the initial case of the coal and steel market, with the aim of building a united Europe, one sector at a time. This can be clearly seen stated in the Schuman Declaration.

The main elements which were represented in the ontology were: the institutions and executive bodies of the European Communities; the treaties establishing the international organizations regarding this field; Nation-states; cities mentioned and the values of the European institutions.

It is also important to highlight that the work here presented is not a totally faithful portrayal of reality, but rather a useful modelling of it, in order to translate and define it within the representation limits provided by a language for the representation of knowledge, such as OWL2.

Moreover, in the construction of the ontology, it was also necessary to take into account the discrepancies between: the handbooks on history of European integration (Rapone, 2002); the handbooks on

¹ European Defence Community

² European Political Community

³ European Economic Community

⁴ European Atomic Energy Community

⁵ Common Agricultural Policy

⁶ European Union official website. EU pioneers https://european-union.europa.eu/principles-countries-history/history-eu/eu-pioneers_en (cons. 11/01/2025)

Community Law (Pocar, 1979; Pocar, 1986); and the official websites of the European Union,⁷ of its bodies and institutions operating close to its geo-political areas of interest,⁸ as a way to develop a mediation between them. However, despite the attempts to respect the juridical reality, both in terms of terminology and time dates, it was chosen to give priority to the historical handbooks and official websites of the European institutions. This was due to discrepancies between sources, especially in the case of dates. As a result, a historical reading was provided.

More importantly, the historical framework has made it possible to highlight the elements of structural change in the Community system, even when they have not yet been fully formalised and have not yet been translated into juridical form, such as in the case of the European Council, which will be discussed in detail shortly. On the other hand, however, juridical language has proved essential in defining the objects of the ontology, given its univocity, resulting more dialoguing with the world of information technology. The juridical discourse has thus played a bridging role between history and information technology.

Finally, during the study phase to assess the criteria and characteristics to be implemented in the modelling process of the ontology, a research was also carried out on the official websites of the European institutions. This was accomplished to check whether ontologies exist concerning the subject discussed here, or similar. Following the research, on the website of the Publications Office of the European Union, it emerged that there are several Ontological Vocabularies⁹ such as the "Common Meta-Data Model" and the "European Commission Conceptual Framework (ECCF)". Each of these ontologies offer useful insights for a modelling work, but many of them have been found to be meager in terms of the number of individuals or properties represented, sometimes possessing only the class structure. For these reasons they have not been used.

Some classes were instead used from the CIDOC (Conceptual Reference Model) ontology (Bekiari, 2023) and from DBpedia (Lehmann, 2015) as superclasses of classes created *ad hoc* for modelling objectives.

3. ONTOLOGY

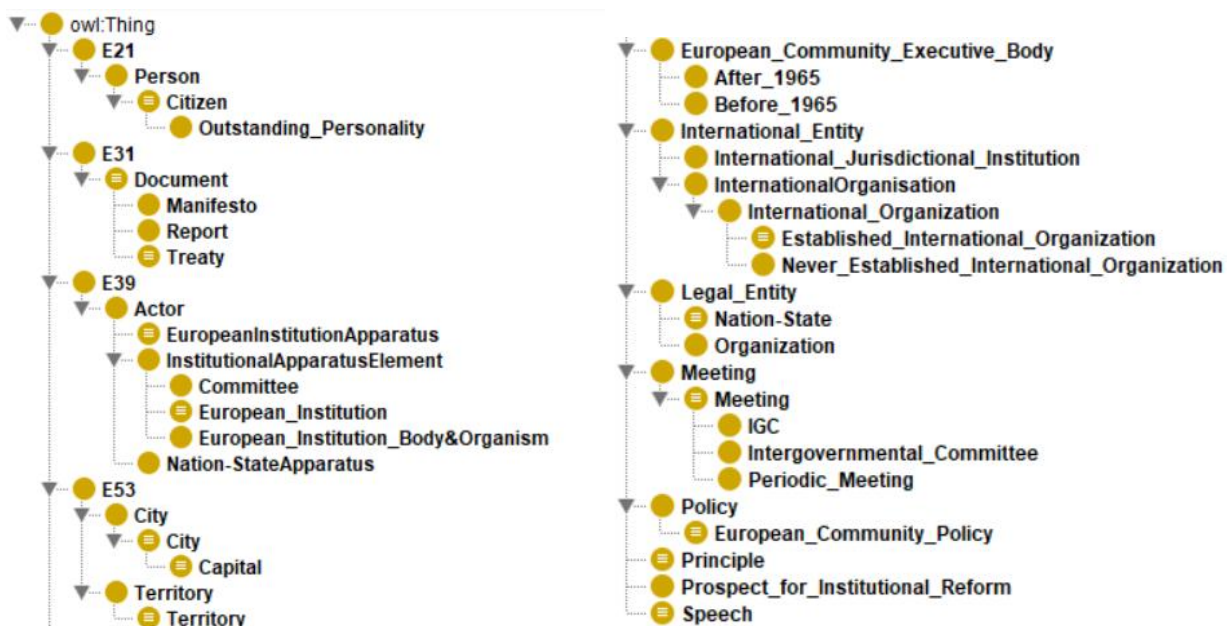


Figure 1. Classes structure

The ontology consists of 45 classes (see Fig. 1), 212 individuals, 87 object properties (39 of which are their inverse properties) and 16 data properties. It was created using the Protégé (Musen, 2015) editor. It

⁷ European Union https://european-union.europa.eu/index_it (cons. 11/01/2025). Centre virtuel de la connaissance sur l'Europe (CVCE) <https://www.cvce.eu/en> (cons. 11/01/2025).

⁸ Council of Europe <https://coe.int/it/web/portal/> (cons. 11/01/2025).

NATO <https://www.nato.int/> (cons. 11/01/2025).

⁹ Publications Office of the European Union. EU Vocabularies <https://op.europa.eu/en/web/eu-vocabularies/ontologies> (cons. 11/01/2025).

was also possible to check the consistency of the axiomatic assertions, by using the Reasoner "Hermit 1.4.3.456", present by default in the editor. To increase the efficiency of the reasoner, inference rules have also been introduced (Antoniou, 2004).

Some individuals who have posed challenges in the modelling process will be discussed below.

4. EDC TREATY

The treaty (which would have established the European Defence Community) was described by (see Fig. 2): the Nation-states that signed the treaty; the city where it was signed; the Plevén Plan, which led to the drafting of the treaty; the respect for the values and principles that it would have enshrined and the fact that, if it had been ratified by all the signatory states, it would have established the EDC. The individual representing this institution was classified in the class "Never_Established_International_Organization". It was necessary to create this class and distinguish it from the "Established_International_Organization" class, since in this case the treaty had not been ratified (Rapone, 2002). In the case of the European Political Community (EPC), on the other hand, it was only drafted as a treaty by the ECSC assembly and never reached the national parliaments.¹⁰ These two institutions (both of which are in the same class) that were never created, represented, in fact, a major setback for the process of integration of the origins, which had to return to the limited sectoral integrations of the functionalist method (Rapone, 2002). The particularity of the description of the EDC was expressed by the object property "IfRatifiedWasSupposedToEstablish", to indicate that if the treaty establishing the EDC had been ratified by all signatory states it would have been established, but this did not happen due to the non-ratification by the French Parliament.

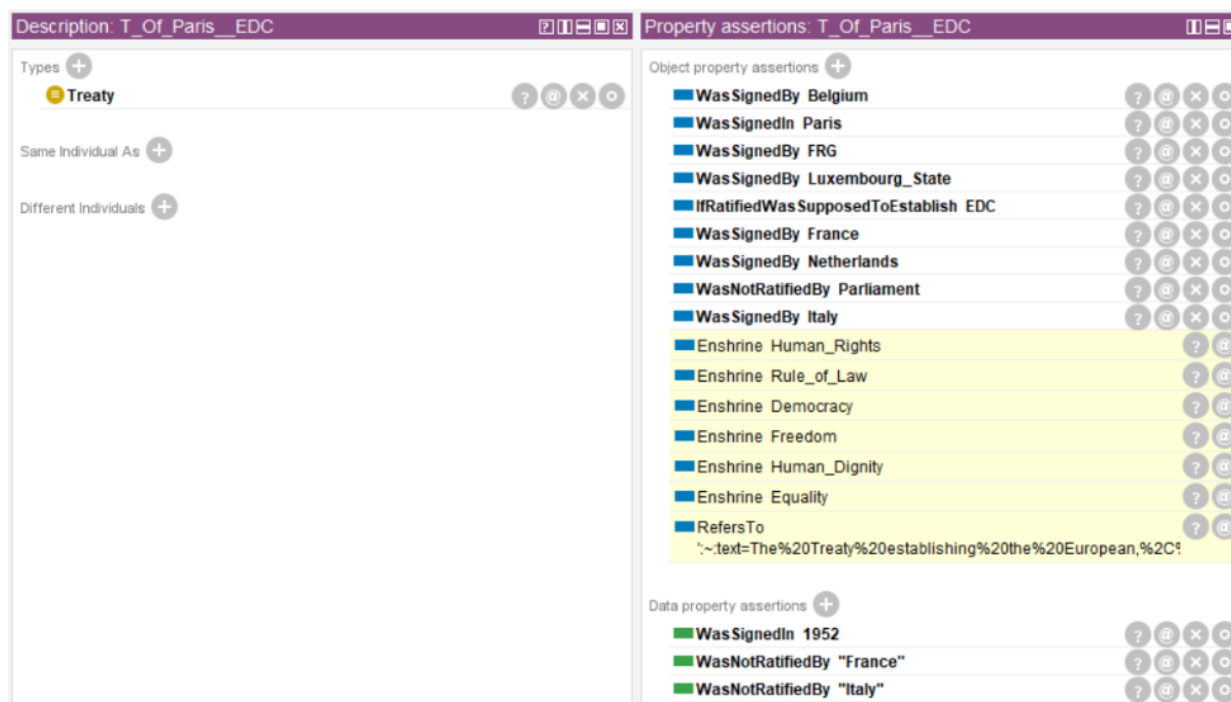


Figure 2. Individual EDC Treaty

5. EUROPEAN COUNCIL

In particular, representing the European Council (see Fig. 3) has been challenging while modelling this aspect of the ontology. First, there was a discrepancy between the sources, regarding the handbooks of history of European integration (Rapone, 2002), the official website of the European Union and the handbooks of Community Law (Pocar, 1979; Pocar, 1986). In the first case, the official date of birth of the European Council is 1975, but the decision was taken in 1974. In the second case, its creation is placed in 1974 as an informal forum, 1992 with official status (Maastricht Treaty) and 2009 as a real official

¹⁰ Centre virtuel de la connaissance sur l'Europe (CVCE). EPC https://www.cvce.eu/collections/unit-content/-/unit/en/02bb76df-d066-4c08-a58a-d4686a3e68ff/6550430e-98c0-4441-8a60-ec7c001c357b/Resources#8b63810a-e5bd-4979-9d27-9a21c056fc8d_en&overlay (cons. 11/01/2025).

institution of the EU (Lisbon Treaty). Whereas, in the last case, the nature of institution of the European Council is mentioned, for the first time, only in the draft treaty establishing the European Union approved in 1984.

Unlike all the other institutions, however, the European Council was not established by a treaty but was conceived as a further form of consultation (not formally belonging to the institutional framework of the Community at that time) among the Heads of State and Government of the European Communities. The European Council was born as a specific intergovernmental summit in the mid-1960s (Pocar, 1979). Unlike the other summits, in fact, this became periodic and in 1974 was officially called, for the first time, "European Council". It will also be officially incorporated into the institutional framework, only with the Single European Act in 1986, while its functions and frequency of meetings will be defined, officially, only with the Treaty of the European Union (or Maastricht) of 1992.¹¹

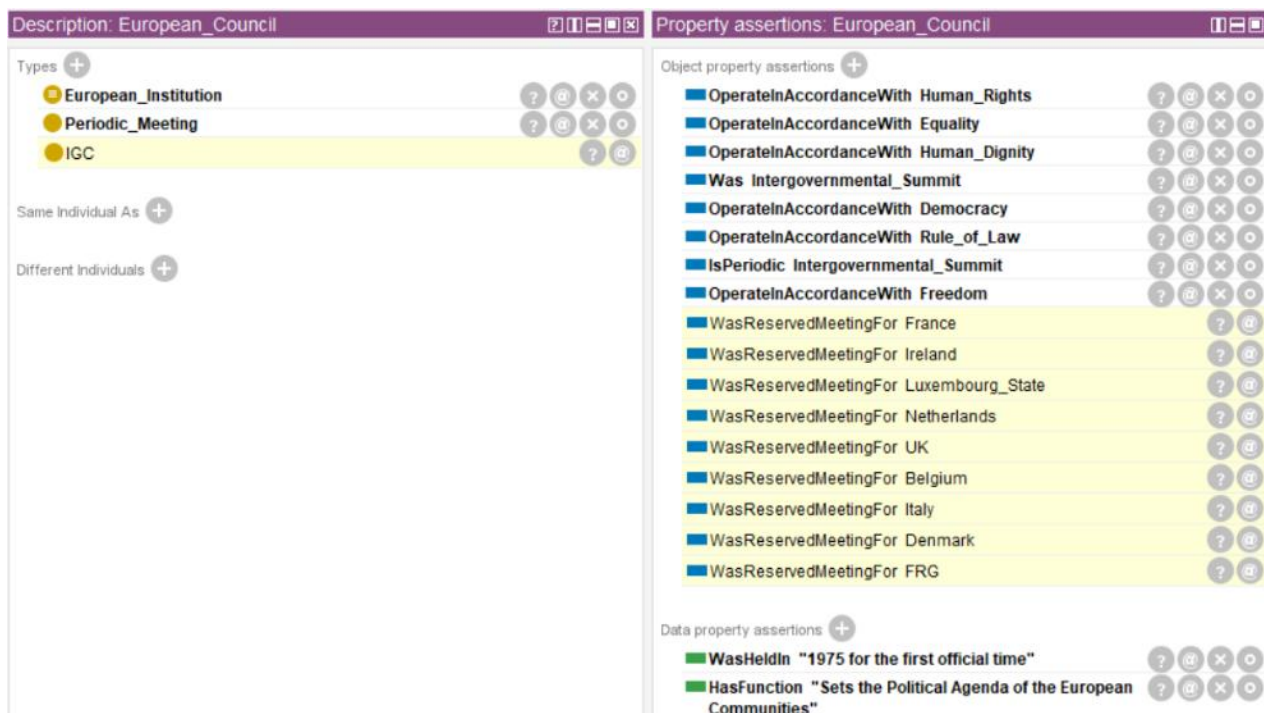


Figure 3. Individual European Council

For the purposes of research and modelling of this ontology, however, it was decided to follow the historical reading, as the date on which the first - official - European Council is placed, in Dublin in March 1975, although the decision was taken a year earlier (Rapone, 2002).

In the ontology, the European Council has been classified as: "European_Institution", since it operated in accordance with the values of the European institutions; as "IGC" or Intergovernmental Conference; and as "Periodic_Meeting". It was also expressed (through the object properties) the participation, at that time, by the Heads of State and Government of the nine member states in these meetings reserved only for them with the property "WasReservedMeetingFor" (inverse property of "HadAccessToReservedMeeting"). Other IGCs might not have the Heads of State or Government as representatives. The function of the European Council was to set the political agenda for the European Communities (Pocar, 1986).

The class "European_Institution" represents the instances of all the european institutions up to 1979. The European Community executive bodies before and after the Merger Treaty; the European Parliament; the Court of Justice of the European Communities; the European Council and the European Court of Auditors. The class "European_Institution" was placed as equivalent to the expression "OperateInAccordanceWith value Democracy, Equality, Freedom, Human_Dignity, Human_Rights, Rule_of_Law", which means that, European Institutions operate in accordance with those principles. The "IGC" class, on the other hand, represents the instances of intergovernmental meetings between Heads of State and Government. Its instances include: the Brussels conference; the European Council; the Hague summit; the Messina

¹¹ Centre virtuel de la connaissance sur l'Europe (CVCE). European Council <https://www.cvce.eu/en/education/unit-content/-/unit/d5906df5-4f83-4603-85f7-0cab24b9fe1/f53d9750-e539-4fe0-9ee8-2910f099eff1> (cons. 11/01/2025).

conference; the Paris summits of 1972 and 1974; the Venice conference and a generic instance of intergovernmental summit.

In addition, SWRL¹² (Antoniou, 2004) inference rules were defined to express some class affiliations and properties of the European Council.

Rule1: OperateInAccordanceWith(European_Council, Human_Rights),
OperateInAccordanceWith(European_Council, Equality), OperateInAccordanceWith(European_Council,
Human_Dignity), OperateInAccordanceWith(European_Council, Democracy),
OperateInAccordanceWith(European_Council, Rule_of_Law), OperateInAccordanceWith(European_Council,
Freedom), IsPeriodic(European_Council, Intergovernmental_Summit) -> IGC(European_Council)

Rule2: Periodic_Meeting(European_Council) -> WasReservedMeetingFor(European_Council, FRG),
WasReservedMeetingFor(European_Council, Italy), WasReservedMeetingFor(European_Council, France),
WasReservedMeetingFor(European_Council, Belgium), WasReservedMeetingFor(European_Council,
Netherlands), WasReservedMeetingFor(European_Council, Luxembourg_State),
WasReservedMeetingFor(European_Council, Denmark), WasReservedMeetingFor(European_Council, UK),
WasReservedMeetingFor(European_Council, Ireland)

The first of these two rules can be read as follows: if the European Council operates in accordance with values such as human rights, equality, human dignity, democracy, rule of law and freedom and is also a periodic intergovernmental summit; then the individual "European Council" is definable as an instance of the IGC class. The second one states that: if the European Council is part of the "Periodic_Meeting" class, then the European Council is a meeting reserved for the Federal Republic of Germany, Italy, France, Belgium, Netherlands, Luxembourg, Denmark, the United Kingdom and Ireland.

6. CONCLUSIONS AND POSSIBLE DEVELOPMENTS

Querying the ontology presented so far, on Protégé, was possible by means of the Protégé plugin "Snap SPARQL Query", which produced in output the correct data requested by the provided QUERIES. In the future, it is planned to make the ontology and the data accessible online through the creation of a SPARQL Endpoint. One of the most used platforms, to achieve this goal, is Virtuoso OpenLink.¹³ It has a multi-model architecture, which can handle data of various types: from relational databases (queryable with SQL) to RDF knowledge graphs (queryable with SPARQL), to XML data, documents and much more. Virtuoso is known for its high performance and scalability. Virtuoso is also used in the Linked Open Data (LOD) Cloud, the world's largest publicly accessible knowledge graph.¹⁴

The ontological dictionaries on the EU's Publications Office website also provide a further opportunity to reflect on possible developments. In a future, possible extension, it could be considered to integrate them into this ontology by reaching the second decade of the 21th century and increasing the level of detail of its representation by integrating those themes treated.

These plans of expansion and online usability would fully meet the participatory objectives of Public History (Cauvin, 2016) and would constitute a break from the "elite" academic practice of historical research.

¹² Semantic Web Rule Language

¹³ Virtuoso OpenLink <https://docs.openlinksw.com/virtuoso/> (cons. 11/01/2025)

¹⁴ The Linked Open Data Cloud <https://lod-cloud.net/> (cons. 11/01/2025)

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