Knowledge Graph Engineering Projects 2023-24

Knowdive Research Group

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iTelos Active Roles

> The efficiency of an iTelos project is based on the **effort** and the **cooperation** among the different actors who play on it.

The roles covered by those actors are four:

- **Project Manage**r (PM): in charge of coordinating the whole projects, as well as the cooperation among the other roles.

- **Domain Expert** (DE): most of the time represented by the final user, she is the expert regarding the domain of interest (context in which the final K will be exploited).

- **Knowledge Engineer** (KE): responsible for the management of knowledge resources (KG's knowledge layer building).

- **Data Scientist** (DS): responsible for the management of data resources (KG's data layer building).

iTelos Active Roles

- PM, DE, DS and KE form a iTelos project's *Team*.

- DS and KE are the most important roles along the process, and due to that, **they must be covered by, at least, two different people**.

- This means that the Team have to be composed by at least two actors, that in the worst case will cover all the four roles.

iTelos Project Planning

Role	Task	Purpose Definiton			Information Gathering		Language Definition		Knowledge Definiton		Data Definition		Publication and Presentation	
		Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11		Week 12	Week 13		
Project Manager	Coordination													
	Project report (general management)													
	Open project phase - set up													
	Project publicaiton phase													
	Project presentation													
Domain Expert	Purpose Definioin phase													
	Information Gathering (IG) phase													
	Project report (IG)													
	KG final evaluation													
	Project report (final)													
	Project Demo													
Knowledge Engineer	Kowledge metadata definiton													
	Purpose Definiton phase													
	Information Gathering phase													
	Project report (IG)													
	Language Definiton (LD) phase													
	Project report (LD)													
	Knowledge Definiotn (KD) phase													
	Project report (KD)													
	Data Definiotn (DD) phase													
	Project report (DD)													
Data Scientist	Data metadata definiton													
	Purpose Definiton phase													
	Information Gathering (IG) phase													
	Project report (IG)													
	Lanaguage Definiton (LD) phase													
	Project report (LD)													
	Knowledge Definiton (KD) phase													
	Project report (KD)													
	Data Definiton (DD) phase													
	Project report (DD)													

iTelos Project set-up

- Each iTelos project needs a specific **repository**, where the resources (Language, Knowledge, Data and Metadata) are maintained during the process execution.
    - such a repository can be cloned by a github template repository.

- **Documentation** is a crucial part during the execution of the iTelos process.

- A **project report** has to be completed at the end of the process execution.
    - At the end of each phase, a report template document has to be filled, by reporting the execution of the current phase activities.

- At the end of the project, a **set of slides summarizing the work done** needs to be produced and stored in the repository together with the project report, into the dedicated "Documentation" directory.

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Resource Types Legenda

- **Formal resources**: High quality resources ready to be used by a data consumer.
- **Semi-Formal resources**: Resources that have been already produced by an iTelos process. Nevertheless, these resources don't respect all the quality and interoperability criteria specified by the methodology. They have to be handled properly to be fully exploited by a data consumer
- **Informal resources**: Low quality resources. These resources are those mainly considered by the data producer, in order to transform them into Formal resources.

- **Note 1**: Both Knowledge and Data resources can be Formal, Semi-Formal or Informal.
- **Note 2**: Standard References for Knowledge resources (i.e., reference domain specific ontologies) can be considered as Formal, or Semi-Formal knowledge resources.

1 - Trentino Territory & Transportation - Purpose

- **Purpose**: The purpose of this project is to engineer a Knowledge Graph able to support application and services providing information about the Transportation service on the Trentino Province territory.

- **Objective**: The goal of the project is to build a KG starting from the above Purpose, and a set of knowledge and data resources (described here below). More in details, the iTelos process, applied to achieve such an objective, is executed:

  - as a data **producer**, to collect the informal resources specified, and transform them into quality resources, required to build the final KG;

  - as a data **consumer**, to compose the high quality formal resources into the final KG.

1 - Trentino Territory & Transportation - Resources

- **Knowledge Resources**
  - **Formal**: Open Street Map - Trentino Territory Lightweight Ontology
  - **Standard references**:
    - SCHEMA.ORG
    - SCHEMA.ORG LOV
    - GTFS STATIC
    - GTFS LOV
    - GTFS UPGRADED (Subashish)
    - GEOSPATIAL ONTOLOGY (Subashish)
    - TIME ONTOLOGY
- **Data resources**
  - **Formal**: Trentino OSM places
  - **Semi-Formal**: KGE22 - Trentino Urban Transportation
  - **Informal**: Dati Cartografici

2 - Trentino Territory & Tourism Facilities - Purpose

- **Purpose**: The purpose of this project is to engineer a Knowledge Graph able to support application and services providing information about the main Tourism Facilities (like Hotels, Restaurants, Museums, Natural parks, and others) on the Trentino Province territory.

- **Objective**: The goal of the project is to build a KG starting from the above Purpose, and a set of knowledge and data resources (described here below). More in details, the iTelos process, applied to achieve such an objective, is executed:

  - as a data **producer**, to collect the informal resources specified, and transform them into quality resources, required to build the final KG;

  - as a data **consumer**, to compose the high quality formal resources into the final KG.

2 - Trentino Territory & Tourism Facilities - Resources

- **Knowledge Resources**
  - **Formal**: Open Street Map - Trentino Territory Lightweight Ontology
  - **Standard references**:
    - SCHEMA.ORG
    - SCHEMA.ORG LOV
    - GTFS STATIC
    - GTFS LOV
    - GTFS UPGRADED (Subashish)
    - GEOSPATIAL ONTOLOGY (Subashish)
    - TIME ONTOLOGY

- **Data resources**
  - **Formal**: Trentino OSM places
  - **Semi-Formal**: KGE22 - Trentino Tourist Facilities
  - **Informal**:
    - ISTAT Turismo
    - OPEN DATA TRENTINO

3 - Trentino Territory & Health Facilities - Purpose

- **Purpose**: The purpose of this project is to engineer a Knowledge Graph able to support application and services providing information about the main Health Facilities (like Hospitals, Pharmacies, Medical Centers, and others) on the Trentino Province territory.

- **Objective**: The goal of the project is to build a KG starting from the above Purpose, and a set of knowledge and data resources (described here below). More in details, the iTelos process, applied to achieve such an objective, is executed:

  - as a data **producer**, to collect the informal resources specified, and transform them into quality resources, required to build the final KG;

  - as a data **consumer**, to compose the high quality formal resources into the final KG.

3 - Trentino Territory & Health Facilities - Resources

- **Knowledge Resources**
  - **Formal**: Open Street Map - Trentino Territory Lightweight Ontology
  - **Standard references**:
    - SCHEMA.ORG
    - SCHEMA.ORG LOV
    - GTFS STATIC
    - GTFS LOV
    - GTFS UPGRADED (Subashish)
    - GEOSPATIAL ONTOLOGY (Subashish)
    - TIME ONTOLOGY
    - FAIR
- **Data resources**
  - **Formal**: Trentino OSM places
  - **Semi-Formal**: KGE22 - Trentino Healthcare Facilities
  - **Informal**: Comune di Trento

4 - Trentino Transportation & Health Facilities - Purpose

- **Purpose**: The purpose of this project is to engineer a Knowledge Graph able to support application and services providing information about the main Health Facilities (like Hospitals, Pharmacies, Medical Centers, and others) and how they are connected through the Transportation service on the Trentino Province territory.

- **Objective**: The goal of the project is to build a KG starting from the above Purpose, and a set of knowledge and data resources (described here below). More in details, the iTelos process, applied to achieve such an objective, is executed:

    - as a data **producer**, to collect the informal resources specified, and transform them into quality resources, required to build the final KG;

    - as a data **consumer**, to compose the high quality formal resources into the final KG.

4 - Trentino Transportation & Health Facilities - Resources

- **Knowledge Resources**
  - **Formal**: Open Street Map - Trentino Territory Lightweight Ontology
  - **Standard references**:
    - SCHEMA.ORG
    - SCHEMA.ORG LOV
    - GTFS STATIC
    - GTFS LOV
    - GTFS UPGRADED (Subashish)
    - GEOSPATIAL ONTOLOGY (Subashish)
    - TIME ONTOLOGY
    - FAIR

- **Data resources**
  - **Formal**: Trentino OSM places
  - **Semi-Formal**: KGE22 - Trentino Urban Transportation
  - **Informal**: Comune di Trento

5 - Trentino Transportation & Education Facilities - Purpose

- **Purpose**: The purpose of this project is to engineer a Knowledge Graph able to support application and services providing information about the main Education Facilities (like Universities Faculties, Departments, Libraries, and others) and how they are connected through the Transportation service on the Trentino Province territory.

- **Objective**: The goal of the project is to build a KG starting from the above Purpose, and a set of knowledge and data resources (described here below). More in details, the iTelos process, applied to achieve such an objective, is executed:

  - as a data **producer**, to collect the informal resources specified, and transform them into quality resources, required to build the final KG;

  - as a data **consumer**, to compose the high quality formal resources into the final KG.

5 - Trentino Transportation & Education Facilities - Resources

- **Knowledge Resources**
  - **Formal**: Open Street Map - Trentino Territory Lightweight Ontology
  - **Standard references**:
    - SCHEMA.ORG
    - SCHEMA.ORG LOV
    - GTFS STATIC
    - GTFS LOV
    - GTFS UPGRADED (Subashish)
    - GEOSPATIAL ONTOLOGY (Subashish)
    - TIME ONTOLOGY
    - VIVO
- **Data resources**
  - **Formal**: Trentino OSM places
  - **Semi-Formal**: KGE22 - Trentino Urban Transportation
  - **Informal**:
    - Digital University
    - Comune di Trento

6 - Trentino Territory & Education Facilities - Purpose

- **Purpose**: The purpose of this project is to engineer a Knowledge Graph able to support application and services providing information about the main Education Facilities (like Universities Faculties, Departments, Libraries, and others) on the Trentino Province territory.

- **Objective**: The goal of the project is to build a KG starting from the above Purpose, and a set of knowledge and data resources (described here below). More in details, the iTelos process, applied to achieve such an objective, is executed:

  - as a data **producer**, to collect the informal resources specified, and transform them into quality resources, required to build the final KG;

  - as a data **consumer**, to compose the high quality formal resources into the final KG.

6 - Trentino Territory & Education Facilities - Resources

- **Knowledge Resources**
  - **Formal**: Open Street Map - Trentino Territory Lightweight Ontology
  - **Standard references**:
    - SCHEMA.ORG
    - SCHEMA.ORG LOV
    - GTFS STATIC
    - GTFS LOV
    - GTFS UPGRADED (Subashish)
    - GEOSPATIAL ONTOLOGY (Subashish)
    - TIME ONTOLOGY
    - VIVO
- **Data resources**
  - **Formal**: Trentino OSM places
  - **Semi-Formal**: KGE22 - Trentino Education
  - **Informal**:
    - Digital University
    - Comune di Trento

7 - Weather and climate change in Trentino - Purpose

- **Purpose**: The purpose of this project is to engineer a Knowledge Graph able to support application and services providing information about the climate change, by considering weather information on the Trentino Province territory.

- **Objective**: The goal of the project is to build a KG starting from the above Purpose, and a set of knowledge and data resources (described here below). More in details, the iTelos process, applied to achieve such an objective, is executed:

  - as a data **producer**, to collect the informal resources specified, and transform them into quality resources, required to build the final KG;

  - as a data **consumer**, to compose the high quality formal resources into the final KG.

7 - Weather and climate change in Trentino - Resources

- **Knowledge Resources**
    - **Formal**: Open Street Map - Trentino Territory Lightweight Ontology
    - **Standard references**:
        - SCHEMA.ORG
        - SCHEMA.ORG LOV
        - GTFS STATIC
        - GTFS LOV
        - GTFS UPGRADED (Subashish)
        - GEOSPATIAL ONTOLOGY (Subashish)
        - TIME ONTOLOGY
        - Weather Ontology
        - Paper-1, Paper-2
- **Data resources**
    - **Formal**: Trentino OSM places
    - **Semi-Formal**: KGE22 - Trentino Weather
    - **Informal**:
        - PAT Geoportal
        - OPEN DATA TRENTINO

Knowdive Research Group

UNIVERSITY OF TRENTO
Department of Information Engineering and Computer Science

DataScientia
Unitas per Varietatem

Knowledge Graph Engineering , Projects 2023-24   Department of information engineering and computer science

8 - Sport Facilities & Events in Trentino - Purpose

- **Purpose**: The purpose of this project is to engineer a Knowledge Graph able to support application and services providing information about Sports Events and Sport Facilities on the Trentino Province territory.

- **Objective**: The goal of the project is to build a KG starting from the above Purpose, and a set of knowledge and data resources (described here below). More in details, the iTelos process, applied to achieve such an objective, is executed:

    - as a data **producer**, to collect the informal resources specified, and transform them into quality resources, required to build the final KG;

    - as a data **consumer**, to compose the high quality formal resources into the final KG.

8 - Sport Facilities & Events in Trentino - Resources

- **Knowledge Resources**
  - **Formal**: Open Street Map - Trentino Territory Lightweight Ontology
  - **Standard references**:
    - SCHEMA.ORG
    - SCHEMA.ORG LOV
    - GTFS STATIC
    - GTFS LOV
    - GTFS UPGRADED (Subashish)
    - GEOSPATIAL ONTOLOGY (Subashish)
    - TIME ONTOLOGY
    - BBC Sport
- **Data resources**
  - **Formal**: Trentino OSM places
  - **Semi-Formal**: KGE22 - Trentino Sports
  - **Informal**: Sport Events

9 - Tourism & Waste Management in Trentino - Purpose

- **Purpose**: The purpose of this project is to engineer a Knowledge Graph able to support application and services providing information about the waste management connected to the tourism influence on the Trentino Province territory.

- **Objective**: The goal of the project is to build a KG starting from the above Purpose, and a set of knowledge and data resources (described here below). More in details, the iTelos process, applied to achieve such an objective, is executed:

  - as a data **producer**, to collect the informal resources specified, and transform them into quality resources, required to build the final KG;

  - as a data **consumer**, to compose the high quality formal resources into the final KG.

9 - Tourism & Waste Management in Trentino - Resources

- **Knowledge Resources**
  - **Formal**: Open Street Map - Trentino Territory Lightweight Ontology
  - **Standard references**:
    - SCHEMA.ORG
    - SCHEMA.ORG LOV
    - GTFS STATIC
    - GTFS LOV
    - GTFS UPGRADED (Subashish)
    - GEOSPATIAL ONTOLOGY (Subashish)
    - TIME ONTOLOGY
    - Paper - ontological model
- **Data resources**
  - **Formal**: Trentino OSM places
  - **Semi-Formal**: KGE22 - Trentino Tourist Facilities
  - **Informal**: ISPRA catasto rifiuti

10 - Sports Facilities & Transportation in Trentino - Purpose

- **Purpose**: The purpose of this project is to engineer a Knowledge Graph able to support application and services providing information about the waste management connected to the tourism influence on the Trentino Province territory.

- **Objective**: The goal of the project is to build a KG starting from the above Purpose, and a set of knowledge and data resources (described here below). More in details, the iTelos process, applied to achieve such an objective, is executed:

  - as a data **producer**, to collect the informal resources specified, and transform them into quality resources, required to build the final KG;

  - as a data **consumer**, to compose the high quality formal resources into the final KG.

10 - Sports Facilities & Transportation in Trentino - Resources

- **Knowledge Resources**
  - **Formal**: Open Street Map - Trentino Territory Lightweight Ontology
  - **Standard references**:
    - SCHEMA.ORG
    - SCHEMA.ORG LOV
    - GTFS STATIC
    - GTFS LOV
    - GTFS UPGRADED (Subashish)
    - GEOSPATIAL ONTOLOGY (Subashish)
    - TIME ONTOLOGY
    - Paper - ontological model
- **Data resources**
  - **Formal**: Trentino OSM places
  - **Semi-Formal**: KGE22 - Trentino Tourist Facilities
  - **Informal**: ISPRA catasto rifiuti

11 - DISI Student Lives & Points of interest in Trentino - Purpose

- **Purpose**: The purpose of this project is to engineer a Knowledge Graph able to support application and services providing information for the students at the DISI school. This information encapsulates various aspects of their daily lives, including their visiting points of interest, conducting events, and more. Based this information, we can learn their life sequences with varying focuses.

- **Objective**: The goal of the project is to builds a KG starting from the above Purpose, and a set of knowledge and data resources (described here below). More in details, the iTelos process, applied to achieve such an objective, is executed:

  - as a data **producer**, to collect the informal resources specified, and transform them into quality resources, required to build the final KG;

  - as a data **consumer**, to compose the high quality formal resources into the final KG.

11 - DISI Student Lives & Points of interest in Trentino - Resources

- **Knowledge Resources**
  - **Formal**: Open Street Map - Trentino Territory Lightweight Ontology
  - **Standard references**:
    - SCHEMA.ORG
    - Paper - A Context Model for Personal Data Streams
- **Data resources**
  - **Formal**: Trentino OSM places
  - **Semi-Formal**: KDI21 - The SU2 situational context dataset
  - **Informal**:
    - SmartUnitn2 project dataset (available after signing the GDPR file)
    - Punti di interesse del Trentino