Sports Facilities & Events in Trentino

GitHub: christiansassi/knowledge-graph-engineering-project

Website: Sports Facilities & Events in Trentino

**Group:** Mouez Khelifi, Pietro Bologna, Christian Sassi
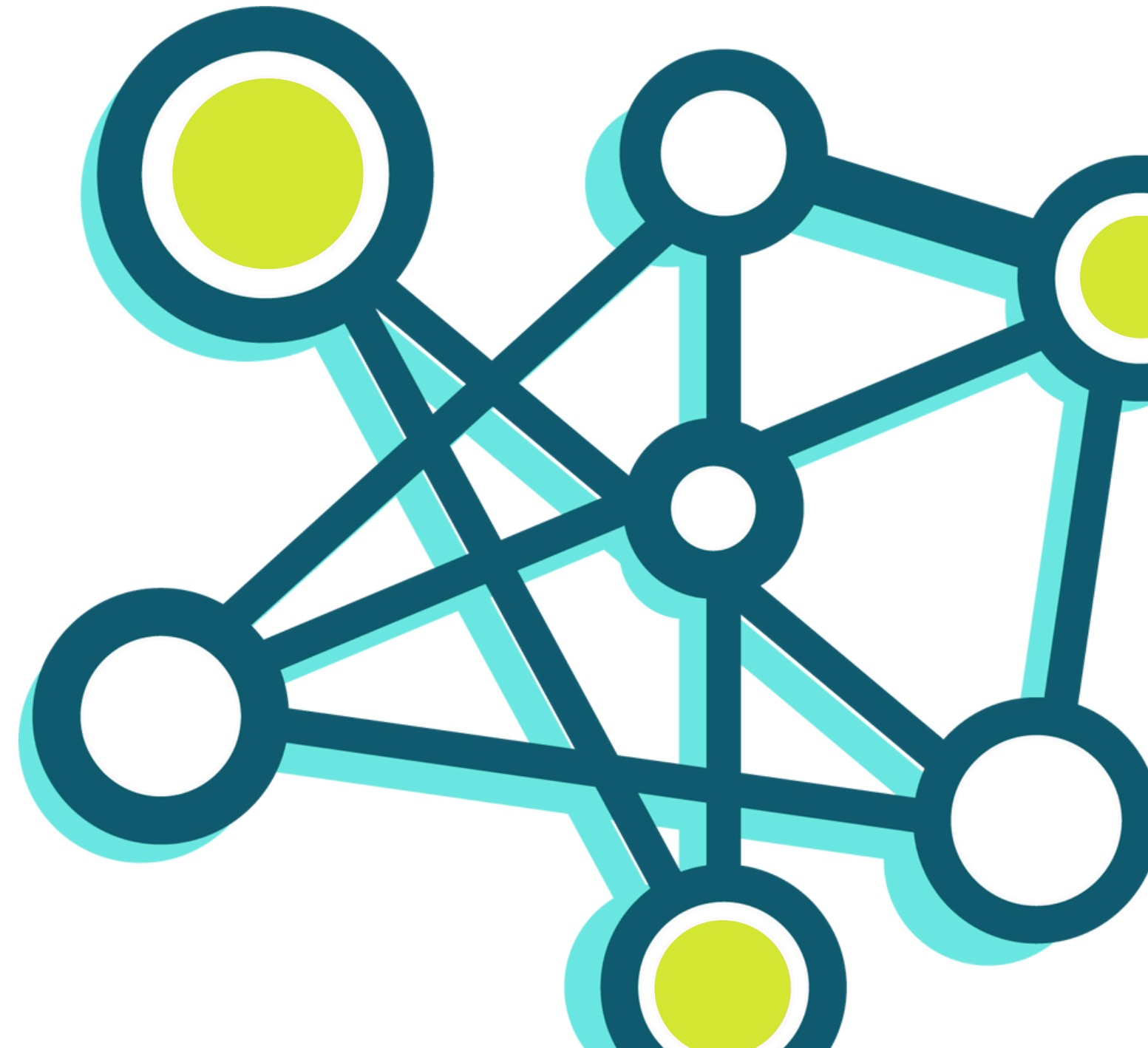
Phase 1

Purpose Definition

Purpose Definition

Access to sports facilities and events plays a crucial role in improving the quality of life in Trentino Province. Our project focuses on creating a Knowledge Graph to consolidate information about these resources, offering a unified platform for residents, tourists, and local authorities. With this tool, we aim to inspire active lifestyles, foster community engagement, and support informed decision-making. Ultimately, this initiative promotes public health and cultivates a vibrant sports culture in the region
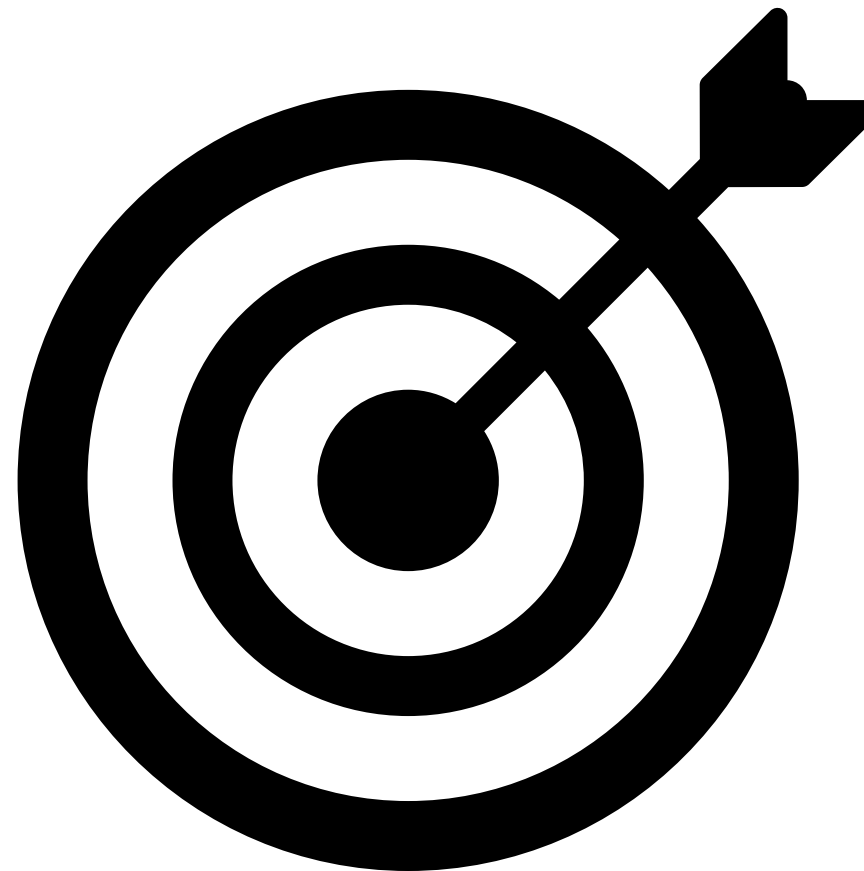
Purpose Definition

Scenarios

Four different scenarios: **Weekday**, **Weekend**, **Holidays** and **Festival dello Sport**.

Personas

Four types of personas with different backgrounds: **Luca**, **Anna**, **Matteo** and **Camilla**.

CQs

11 CQs were designed to provide optimal coverage of both scenarios and personas.

ER Model
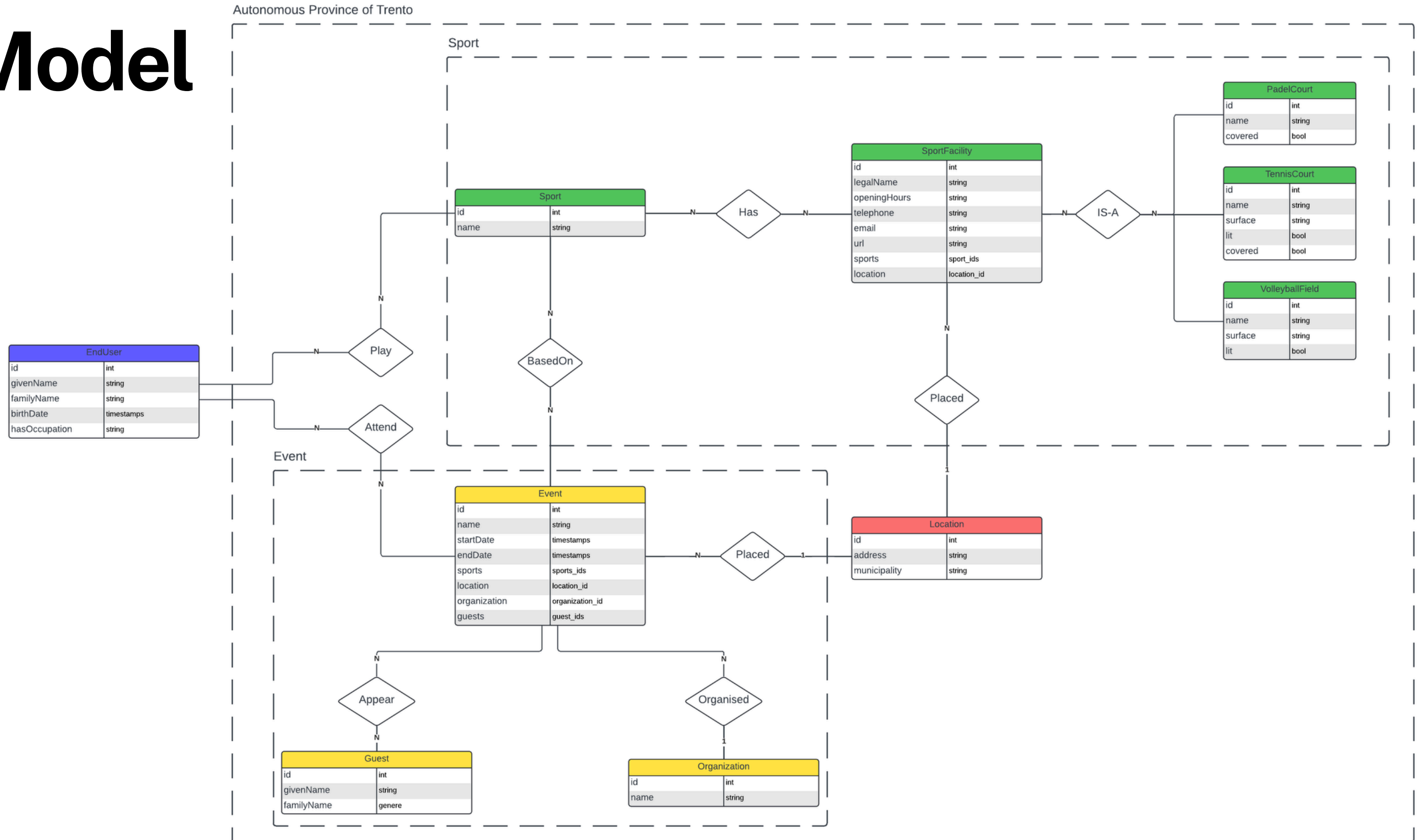
Phase 2

Information Gathering

Information Gathering

La Gazzetta dello Sport

PagineGialle

OpenStreetMap Foundation

Comune di Trento

Trentino

Trentino Digitale SpA

Phase 3

Language Definition

Language Definition

ConceptID	Word-en	Gloss-en
UKC-2593	sport	An active diversion requiring physical exertion and competition.
UKC-17619	facility	A building or place that provides a particular service or is used for a particular industry.
UKC-56	event	Something that happens at a given place and time.
UKC-43416	organization	The persons (or committees or departments etc.) who make up a body for the purpose of administering something.
UKC-695	location	The persons (or committees or departments etc.) who make up a body for the purpose of administering something.
UKC-53492	user	A person who makes use of a thing; someone who uses or employs something.
KGE24-SportFacilities&SportEvents-8001	guest	Represents a guest or participant involved in a sports event.
KGE24-SportFacilities&SportEvents-8002	padelCourt	A court dedicated to padel, a racquet sport.
KGE24-SportFacilities&SportEvents-8003	tennisCourt	A court dedicated to tennis.
KGE24-SportFacilities&SportEvents-8004	volleyballField	A field dedicated to volleyball.

Table 1: EType concept labels and descriptions.

ConceptID	Word-en	Gloss-en.
UKC-36247	identification	Evidence of identity; something that identifies a person or thing (full form of "id").
UKC-33531	given_name	The name that precedes the surname.
UKC-33528	family_name	The name used to identify the members of a family (as distinguished from each member's given name).
schema.org-birthDate	birthDate	Date of birth.
schema.org-hasOccupation	hasOccupation	The person's occupation.
UKC-2	name	A language unit by which a person or thing is known.
schema.org-startDate	startDate	The start date and time of the item.
schema.org-endDate	endDate	The end date and time of the item.
UKC-45004	address	The place where a person or organization can be found or communicated with.
UKC-45537	municipality	An urban district having corporate status and powers of self-government.
OSM-surface	surface	Describes the surface of a feature.
UKC-75466	lit	Provided with artificial light.
UKC-83504	covered	Overlaid or spread or topped with or enclosed within something; sometimes used as a combining form.
schema.org-openingHours	openingHours	The general opening hours for a business. Opening hours can be specified as a weekly time range, starting with days, then times per day.
schema.org-telephone	telephone	The telephone number.
schema.org-email	email	Email address.
schema.org-url	url	URL of the item.

Table 3: Data properties concept labels and descriptions.

ConceptID	Word-en	Gloss-en.
UKC-85982	placed	Situated in a particular spot or position.
UKC-104711	organise	Create (as an entity).
UKC-101132	appear	Character on stage or appear in a play, etc.
UKC-97761	play	Participate in games or sport.
UKC-105477	attend	Be present at (meetings, church services, university), etc.
UKC-92536	basedOn	Being derived from (often followed by 'on' or 'upon').
UKC-103527	have	Have or possess, either in a concrete or an abstract sense.

Table 2: Relationships concept labels and descriptions.

9

Knowledge Definition

Ontology

Schema.org

- Thing > Event

- Thing > Organization

- Thing > Person > EndUser

- Thing > Person > Guest

- Thing > Place > LocalBusiness > SportsActivityLocation > Facility

- Thing > Place > LocalBusiness > SportsActivityLocation > PadelCourt

- Thing > Place > LocalBusiness > SportsActivityLocation > TennisCourt

- Thing > Place > LocalBusiness > SportsActivityLocation > VolleyballField

Custom

- Thing > Activity

- Thing > Location

11

Teleology

owl:Thing
- Event_UKC-56
- Facility_UKC-17619
- Guest_KGE24-SportFacilities&SportEvents-8001
- Location_UKC-695
- Organization_UKC-43416
- PadelCourt_KGE24-SportFacilities&SportEvents-8002
- Sport_UKC-2593
- TennisCourt_KGE24-SportFacilities&SportEvents-8003
- User_UKC-53492
- VolleyballField_KGE24-SportFacilities&SportEvents-8004

owl:topDataProperty
- address_UKC-45004
- birthDate_schema.org-birthDate
- covered_UKC-83504
- email_schema.org-email
- endDate_schema.org-endDate
- family_name_UKC-33528
- given_name_UKC-33531
- hasOccupation_schema.org-hasOccupation
- identification_UKC-36247
- lit_UKC-75466
- municipality_UKC-45537
- name_UKC-2
- openingHours_schema.org-openingHours
- startDate_schema.org-startDate
- surface_OSM-surface
- telephone_schema.org-telephone
- url_schema.org-url

owl:topObjectProperty
- appear_UKC-101132
- attend_UKC-105477
- basedOn_UKC-92536
- have_UKC-103527
- organise_UKC-104711
- placed_UKC-85982
- play_UKC-97761

Teleontology
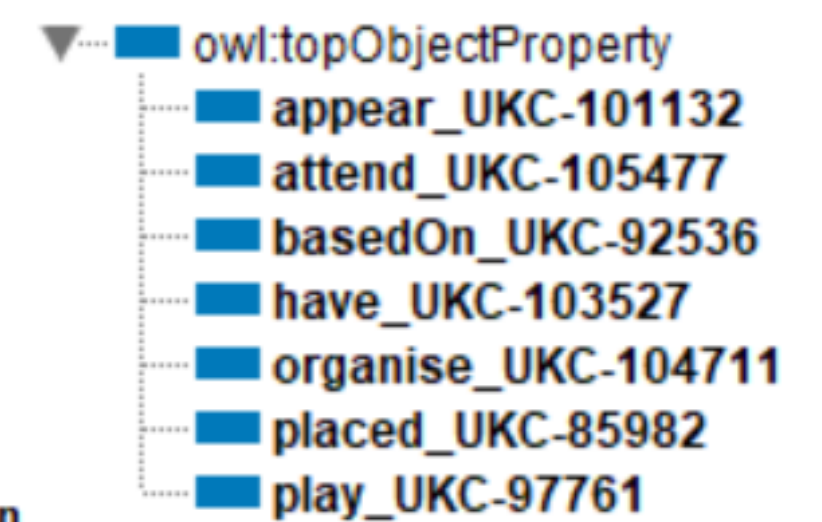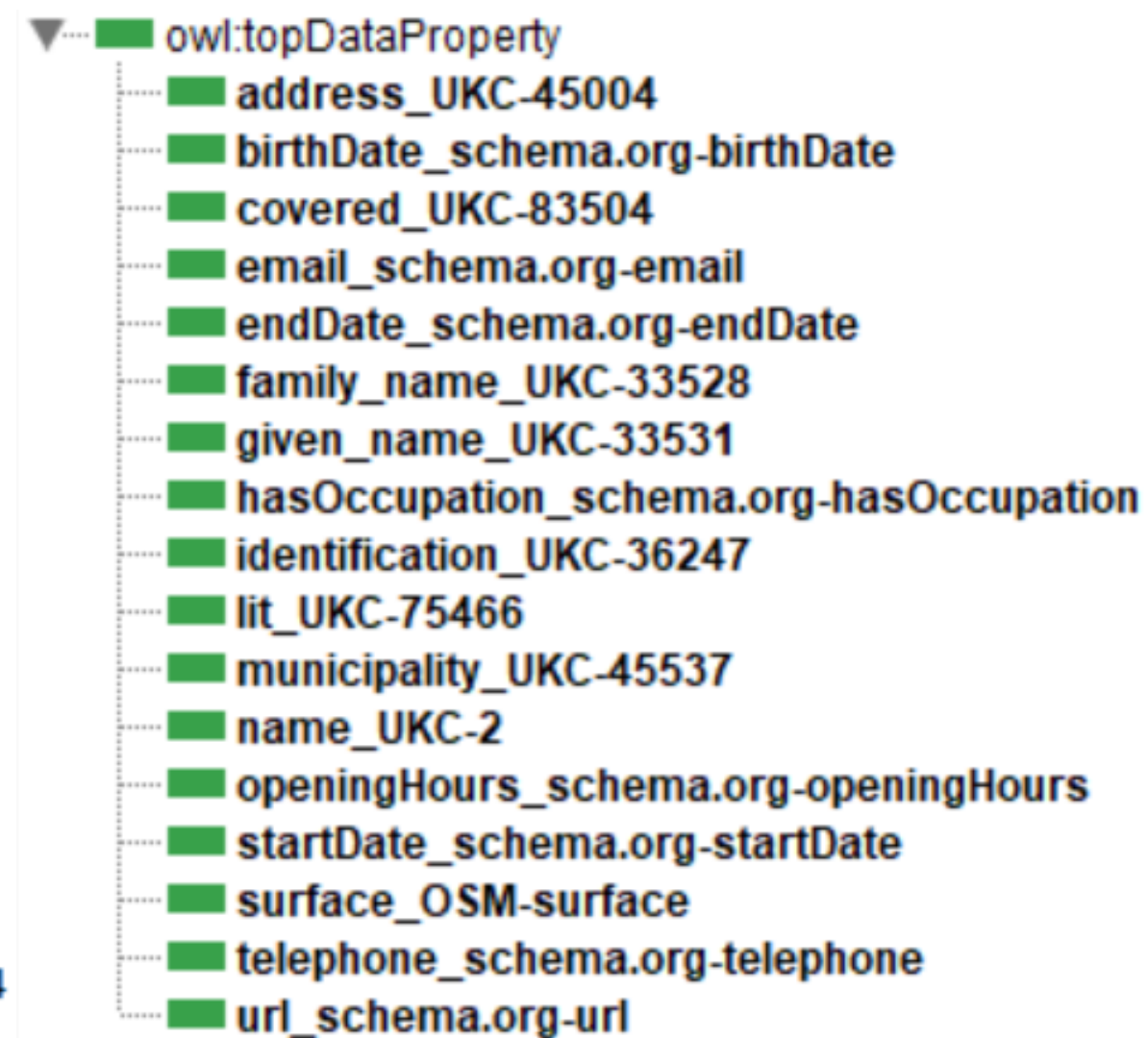
Phase 5

Entity Definition

Entity mapping

15
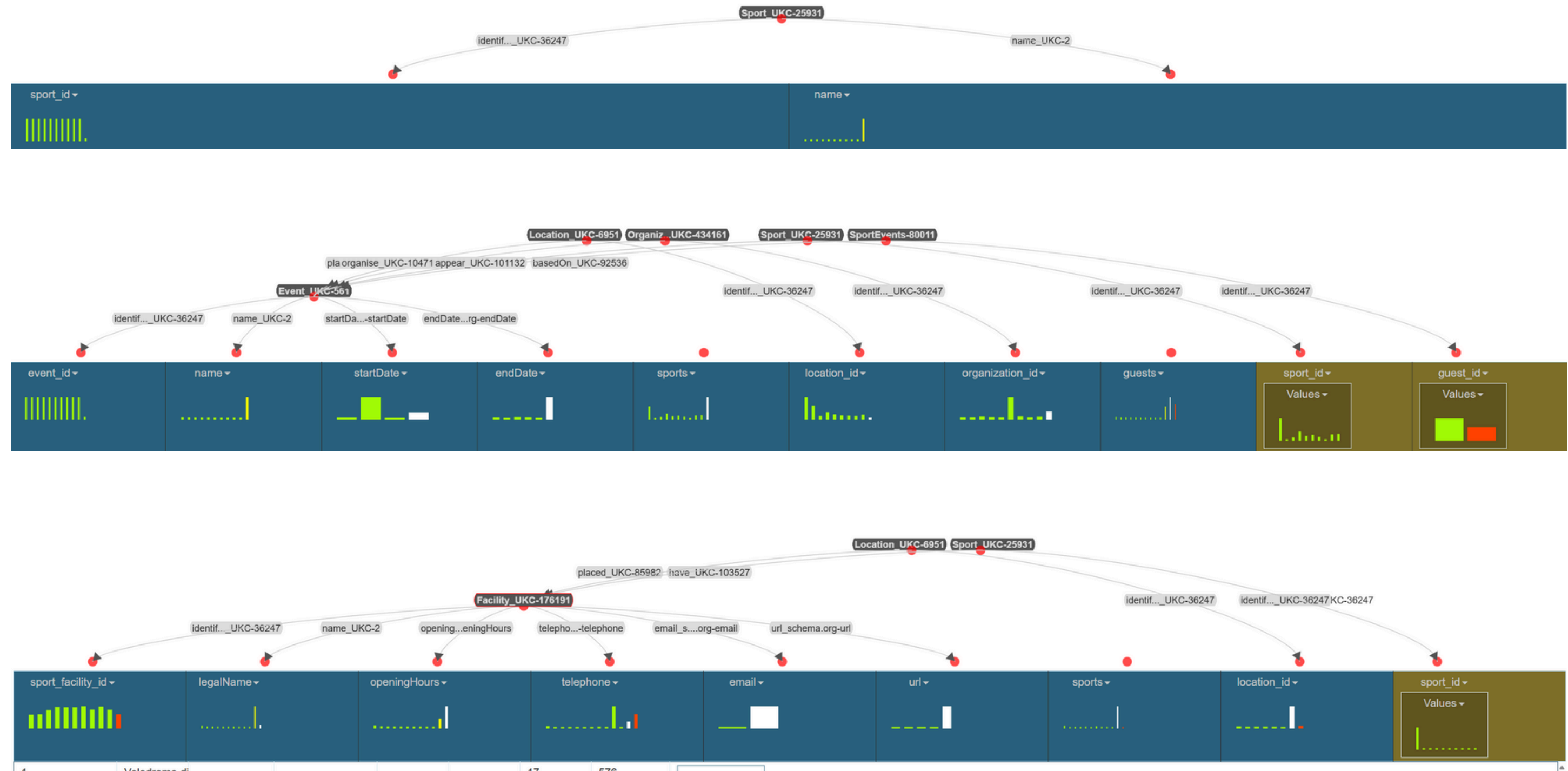
Phase 6

Evaluation

Coverage

$$Cov_E\left(CQ_E\right) = \frac{|CQ_E \cap T_E|}{|CQ_E|} = \frac{10}{10} = 1$$

$$Cov_P\left(CQ_P\right) = \frac{|CQ_P \cap T_P|}{|CQ_P|} = \frac{24}{24} = 1$$

$$Cov_E\left(RO_E\right) = \frac{|RO_E \cap T_E|}{|RO_E|} = \frac{6}{6} = 1$$

$$Cov_P\left(RO_P\right) = \frac{|RO_P \cap T_P|}{|RO_P|} = \frac{24}{24} = 1$$

Connectivity

Connectivity Matrix

Entity Type (X)	User_UKC-53492	Location_UKC-695	Sport_UKC-2593	Event_UKC-56	Organization_UKC-43416	Guest_KGE24-SportFacilities&SportEvents-8001	PadelCourt_KGE24-SportFacilities&SportEvents-8002	Facility_UKC-17619	TennisCourt_KGE24-SportFacilities&SportEvents-8003	VolleyballField_KGE24-SportFacilities&SportEvents-8004
User_UKC-53492	40	0	0	0	0	0	0	0	0	0
Location_UKC-695	0	43099	0	360	0	0	0	31634	0	0
Sport_UKC-2593	0	0	27092	212	0	0	0	26276	0	0
Event_UKC-56	0	0	0	1039	0	0	0	0	0	0
Organization_UKC-43416	0	0	0	294	398	0	0	0	0	0
Guest_KGE24-SportFacilities&SportEvents-8001	0	0	0	580	0	2120	0	0	0	0
PadelCourt_KGE24-SportFacilities&SportEvents-8002	0	0	0	0	0	0	8	0	0	0
Facility_UKC-17619	0	0	0	0	0	0	4	103678	1424	48
TennisCourt_KGE24-SportFacilities&SportEvents-8003	0	0	0	0	0	0	0	0	3558	0
VolleyballField_KGE24-SportFacilities&SportEvents-8004	0	0	0	0	0	0	0	0	0	134

Entity Type (Y)

$$PC(KG) = \sum_{X=1}^{N} PC(X) = 36242.79$$

$$EC(KG) = \sum_{X=1}^{N} EC(X) = 96912.67$$

Phase 6

Exploitation

Query

CQ4: Anna wants to know what sports can be practiced in Trentino.

```
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX etype: <http://knowdive.disi.unitn.it/etype#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>

SELECT DISTINCT ?givenName ?familyName ?name
WHERE {

    ?user rdf:type etype:User_UKC-53492 ;
        etype:identification_UKC-36247 "2" ;
        etype:given_name_UKC-33531 ?givenName ;
        etype:family_name_UKC-33528 ?familyName .

    # Get Facilities
    ?facility rdf:type etype:Facility_UKC-17619 .

    # Retrieve sports associated with the facility
    ?have etype:have_UKC-103527 ?facility ;
        etype:identification_UKC-36247 ?have_sport_id .

    # Match sports details
    ?sport rdf:type etype:Sport_UKC-2593 ;
        etype:identification_UKC-36247 ?have_sport_id ;
        etype:name_UKC-2 ?name .

}
```

	givenName	familyName	name
1	"Anna"	"Bianchi"	"cycling"
2	"Anna"	"Bianchi"	"soccer"
3	"Anna"	"Bianchi"	"tennis"
4	"Anna"	"Bianchi"	"volleyball"
5	"Anna"	"Bianchi"	"equestrian"
6	"Anna"	"Bianchi"	"boules"
7	"Anna"	"Bianchi"	"judo"
8	"Anna"	"Bianchi"	"swimming"
9	"Anna"	"Bianchi"	"basketball"
10	"Anna"	"Bianchi"	"gymnastics"
11	"Anna"	"Bianchi"	"fencing"
12	"Anna"	"Bianchi"	"baseball"
13	"Anna"	"Bianchi"	"hockey"
14	"Anna"	"Bianchi"	"skateboard"
15	"Anna"	"Bianchi"	"athletics"

20

Thank you!

GitHub: christiansassi/knowledge-graph-engineering-project

Website: Sports Facilities & Events in Trentino

Group: Mouez Khelifi, Pietro Bologna, Christian Sassi