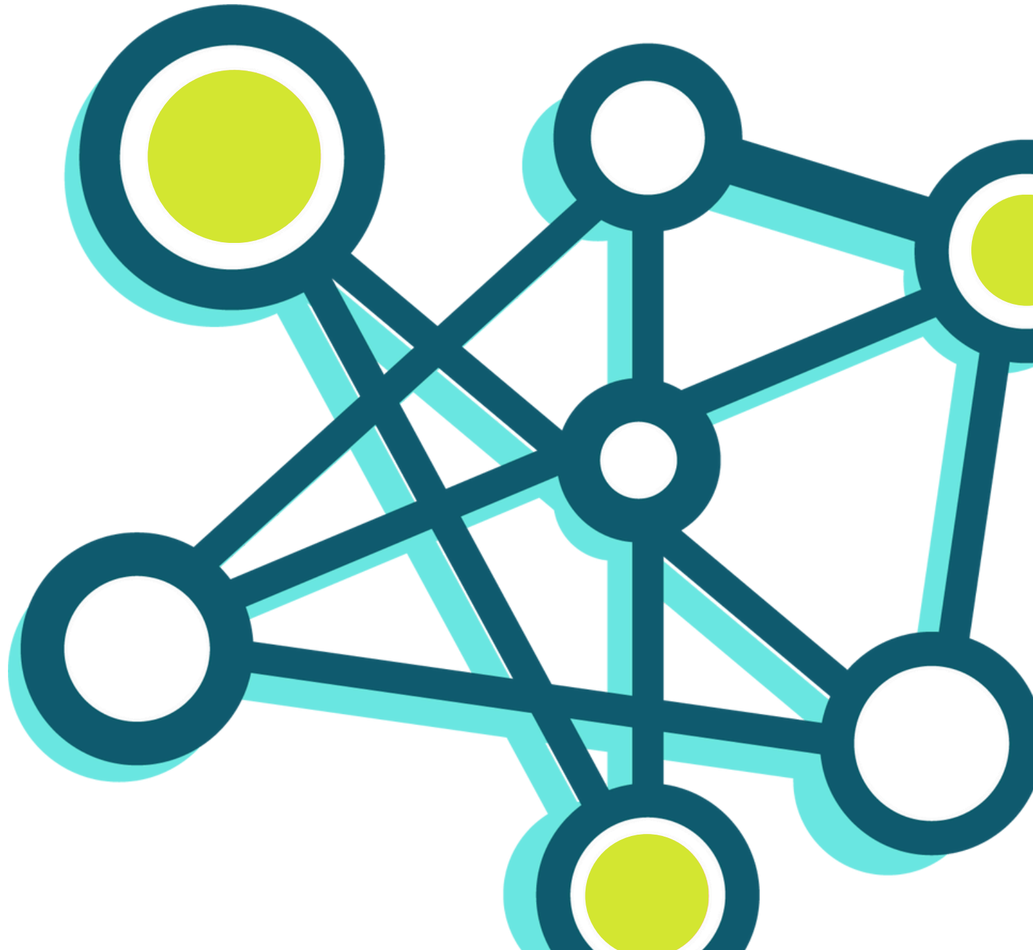
UNIVERSITY OF TRENTO - KNOWLEDGE GRAPH ENGINEERING

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

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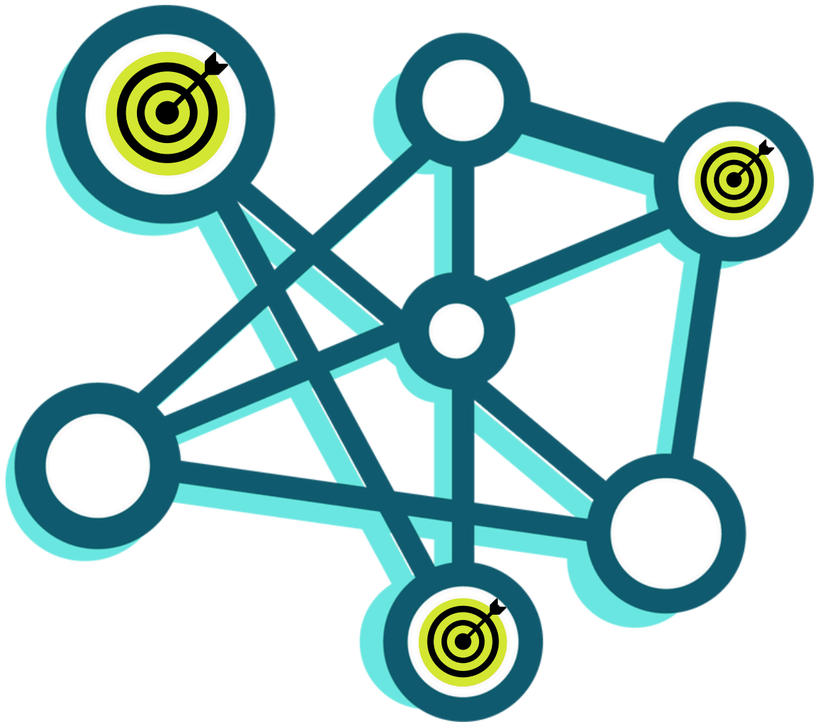
Access to sports facilities and events plays a crucial role in improving the quality of life in Trentino Province. Our project focuses on creating a Knowledge Graph to consolidate information about these resources, offering a unified platform for residents, tourists, and local authorities. With this 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**.

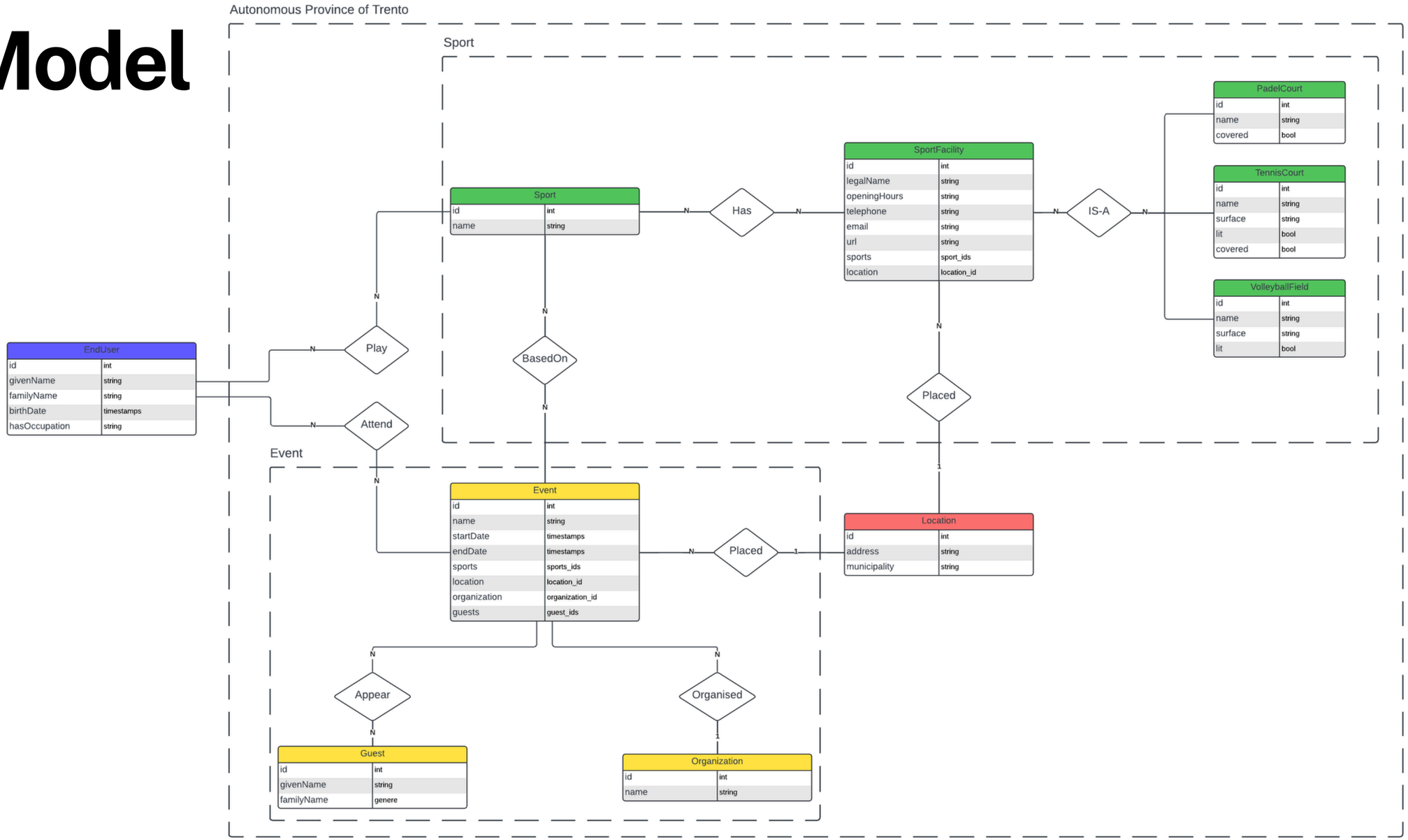
Personas

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


Autonomous Province of Trento
Sport
Event
EndUser
id int
givenName string
familyName string
birthDate timestamps
hasOccupation string
Play
Attend
Sport
id int
name string
Has
SportFacility
id int
legalName string
openingHours string
telephone string
email string
url string
sports sport_ids
location location_id
IS-A
PadelCourt
id int
name string
covered bool
TennisCourt
id int
name string
surface string
lit bool
covered bool
VolleyballField
id int
name string
surface string
lit bool
BasedOn
Placed
Event
id int
name string
startDate timestamps
endDate timestamps
sports sports_ids
location location_id
organization organization_id
guests guest_ids
Placed
Location
id int
address string
municipality string
Appear
Organised
Guest
id int
givenName string
familyName genere
Organization
id int
name string

Phase 2

Information Gathering

Information Gathering

Phase 3

Language Definition

Language Definition

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-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-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.

Phase 4

Knowledge Definition

Ontology

Schema.org

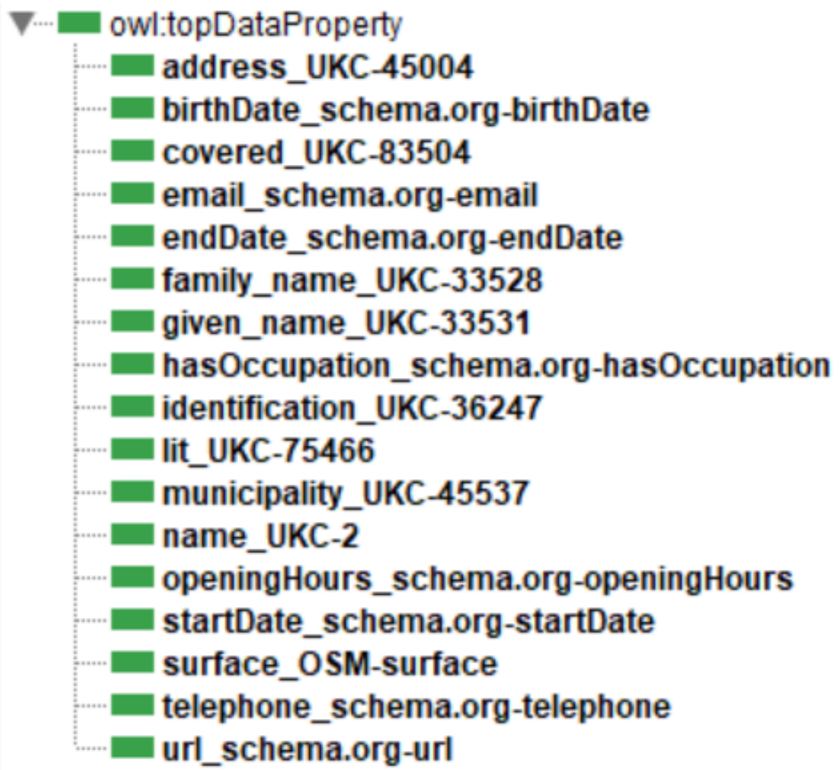
- Thing > Event
- Thing > Organization
- Thing > Person > EndUser
- Thing > Person > Guest
- Thing > Place > LocalBusiness > SportsActivityLocation > Facility
- Thing > Place > LocalBusiness > SportsActivityLocation > PadelCourt
- Thing > Place > LocalBusiness > SportsActivityLocation > TennisCourt
- Thing > Place > LocalBusiness > SportsActivityLocation > VolleyballField

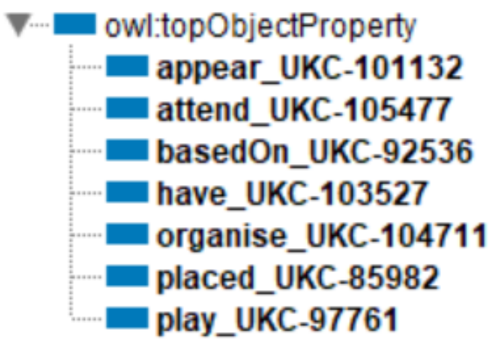
Custom

- Thing > Activity
- Thing > Location

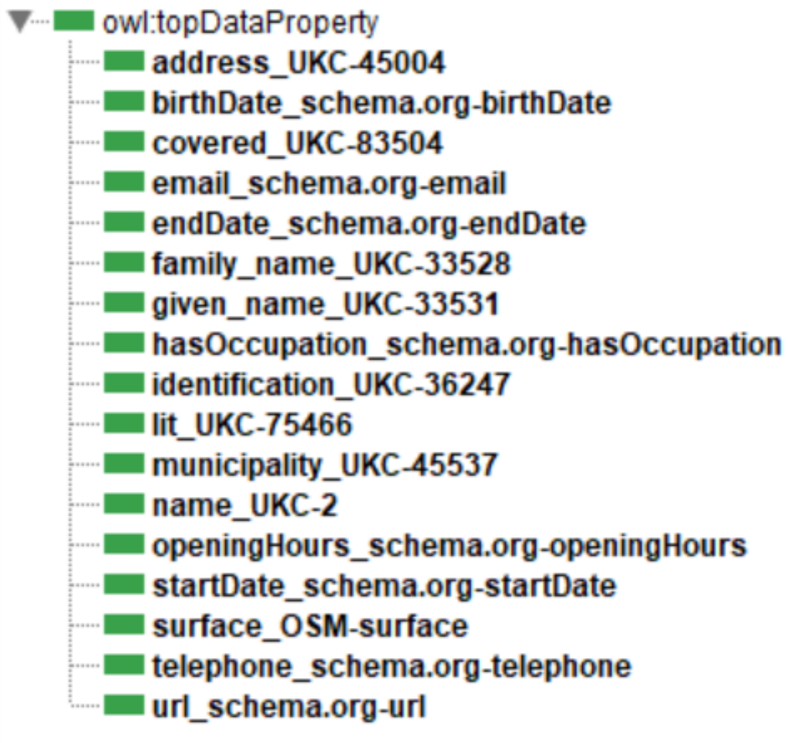
Teleology

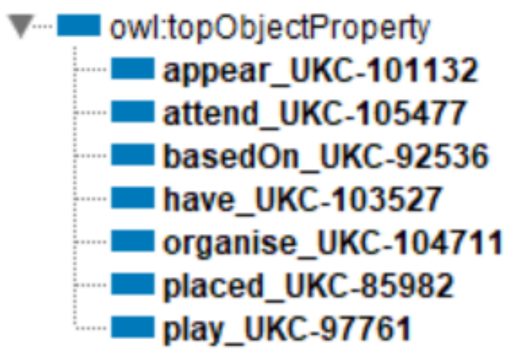

owl:Thing
Event_UKC-56
Facility_UKC-17619
Guest_KGE24-SportFacilities&SportEvents-8001
Location_UKC-695
Organization_UKC-43416
PadelCourt_KGE24-SportFacilities&SportEvents-8002
Sport_UKC-2593
TennisCourt_KGE24-SportFacilities&SportEvents-8003
User_UKC-53492
VolleyballField_KGE24-SportFacilities&SportEvents-8004


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

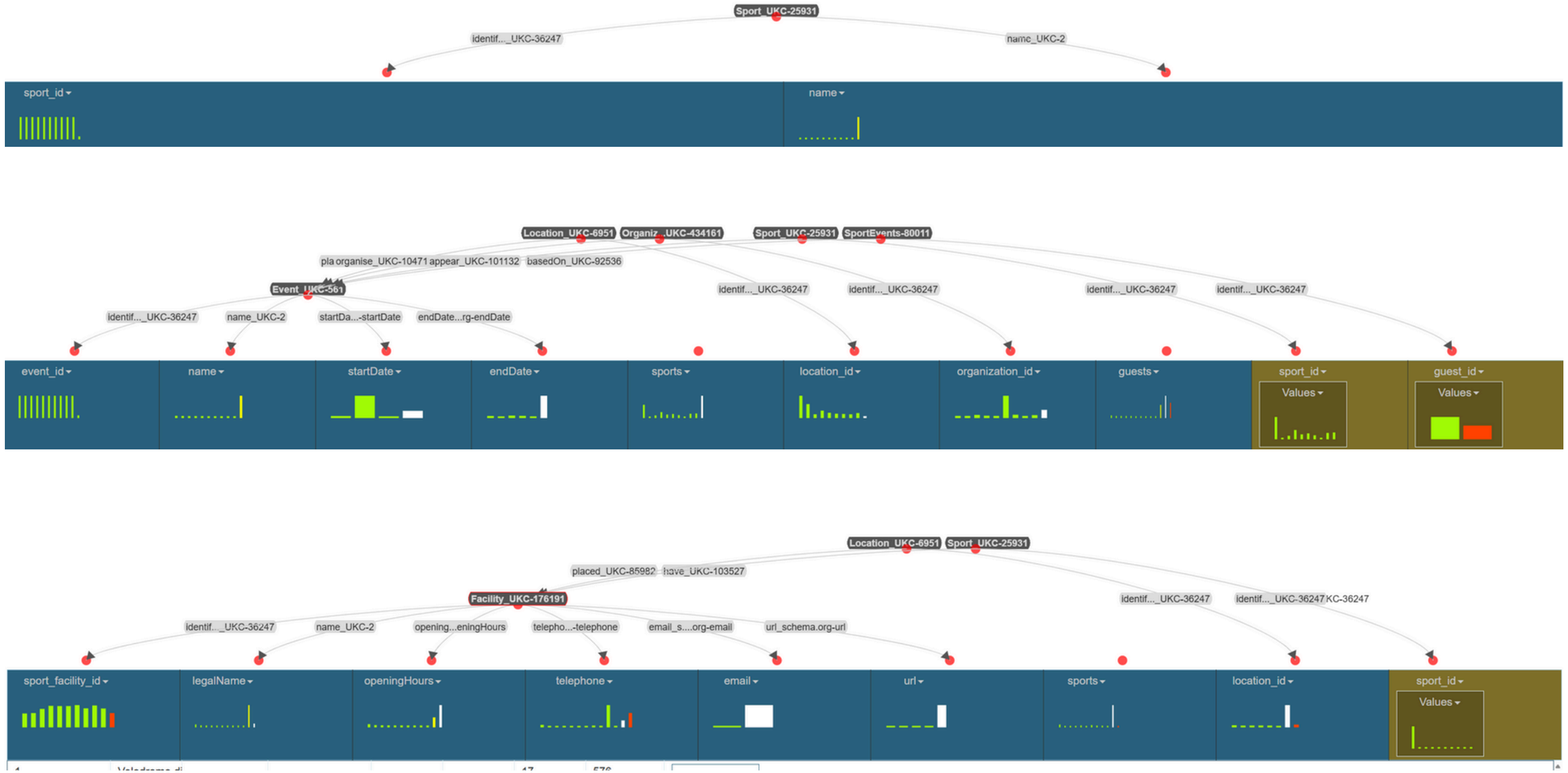




Phase 5

Entity Definition

Entity mapping



Phase 6

Evaluation

Coverage

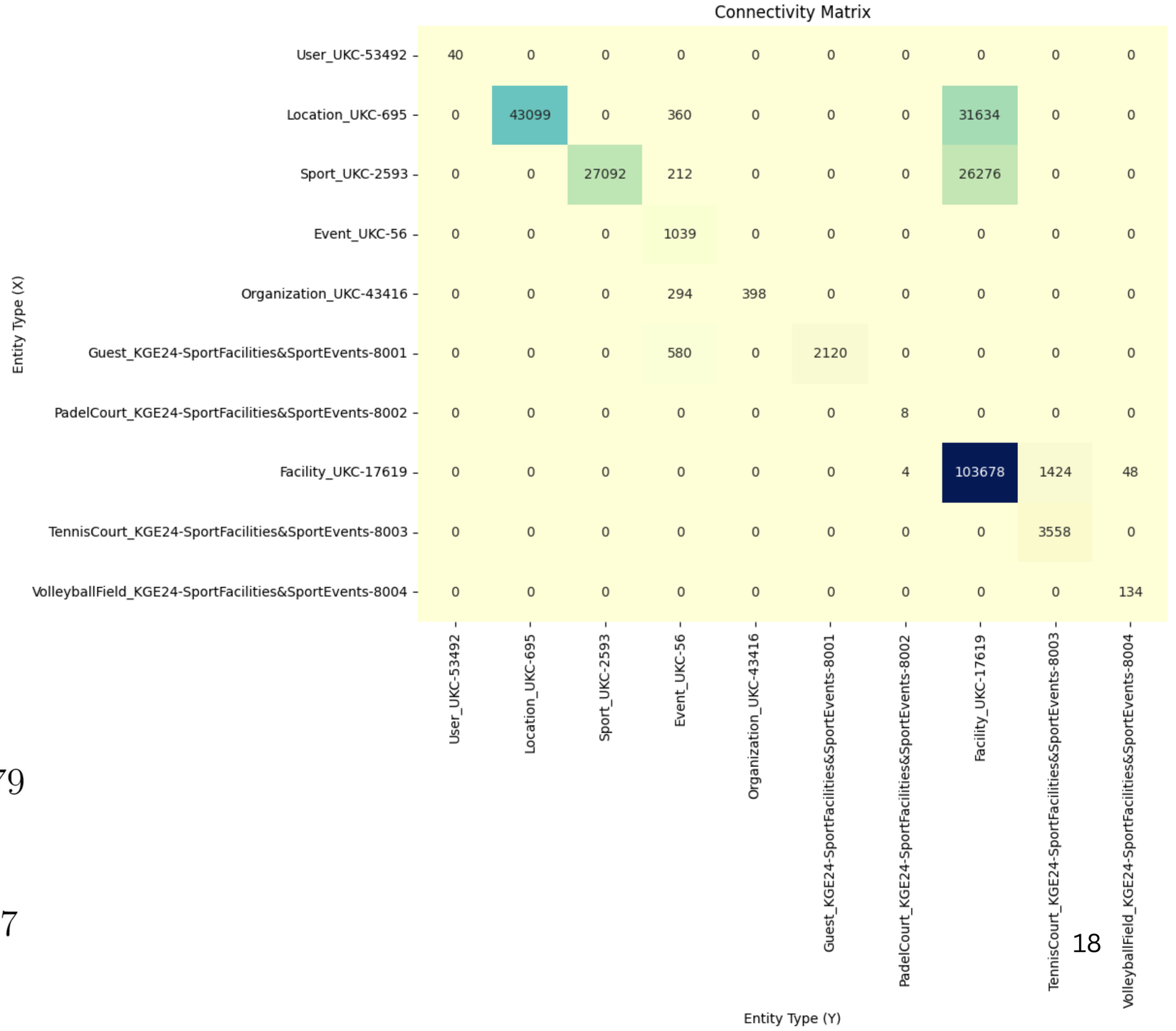
$$Cov_E\left(CQ_E\right) = \frac{|CQ_E \cap T_E|}{|CQ_E|} = \frac{10}{10} = 1$$

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

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

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

Connectivity



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

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

Phase 6

Exploitation

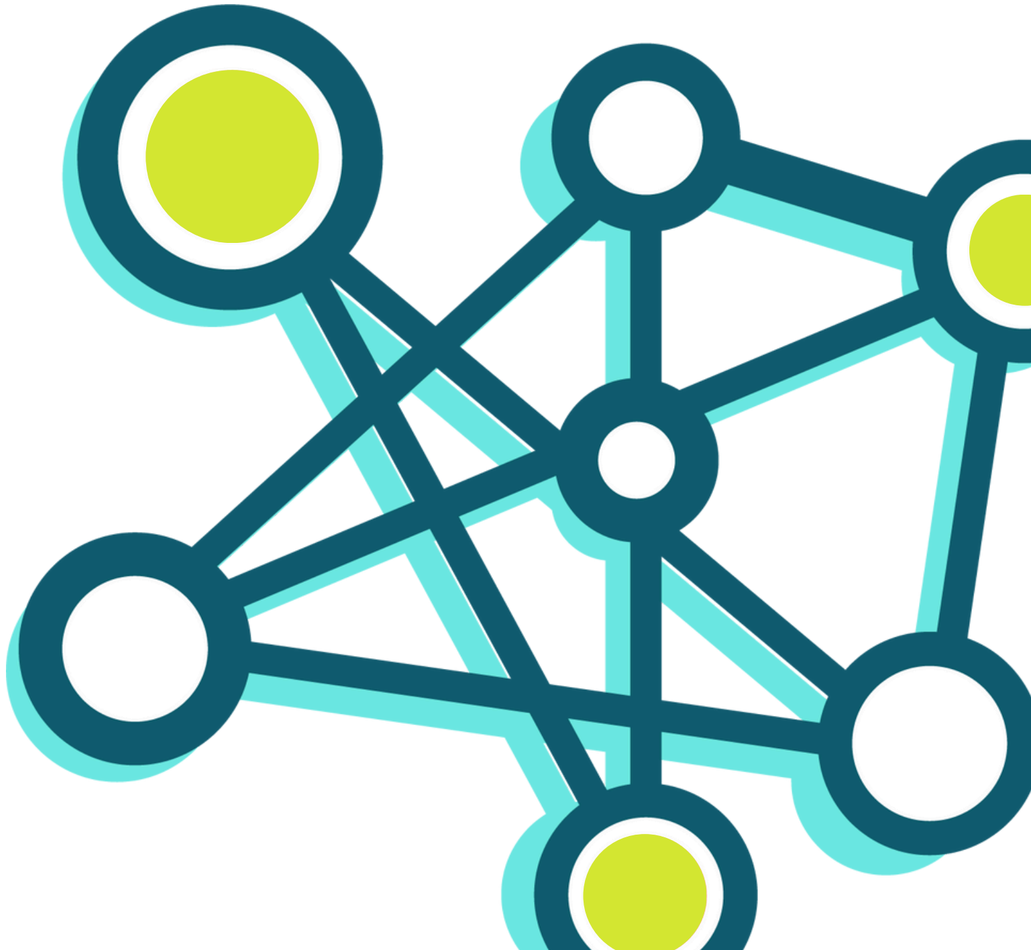
Query

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"

Thank you!



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