Knowledge Graphs for Cultural Heritage

Andrea Giovanni Nuzzolese

STLab, ISTC-CNR, Rome , Italy

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STLab, ISTC-CNR

Aldo Gangemi

Valentina Presutti

Luigi Asprino

Ludovica Marinucci

Martina Sangiovanni

Alessandro Russo

Andrea Nuzzolese

Valentina Carriero

What we do

context
principles
dialogue
open
RDF
CNR
natural
digital
mining
machine reading
NLP
learning
taxonomic
metadata
Ontology
legal
language
access
eGovernment
learning
social
OWL
cognitive
published
quality
modeling
medical
semantic
modules
services
smart cities
network
robots
SPARQL
Linked data
knowledge
community
integration
datasets
schemes
eHealth
Data
project
sentiment
opinion
natural language
design patterns
crowdsourcing
data.cnr.it
applications

Research areas

Cognitive computing

Social robotics

Natural Language Understanding

Linked (Open) Data and Semantic Web

Machine learning

Ontology Design and Engineering

Knowledge and Data Integration

Knowledge Graphs for Cultural Heritage

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Cultural-ON & ArCo

OntoPiA

https://bit.ly/2K3UV8J

OntoPiA

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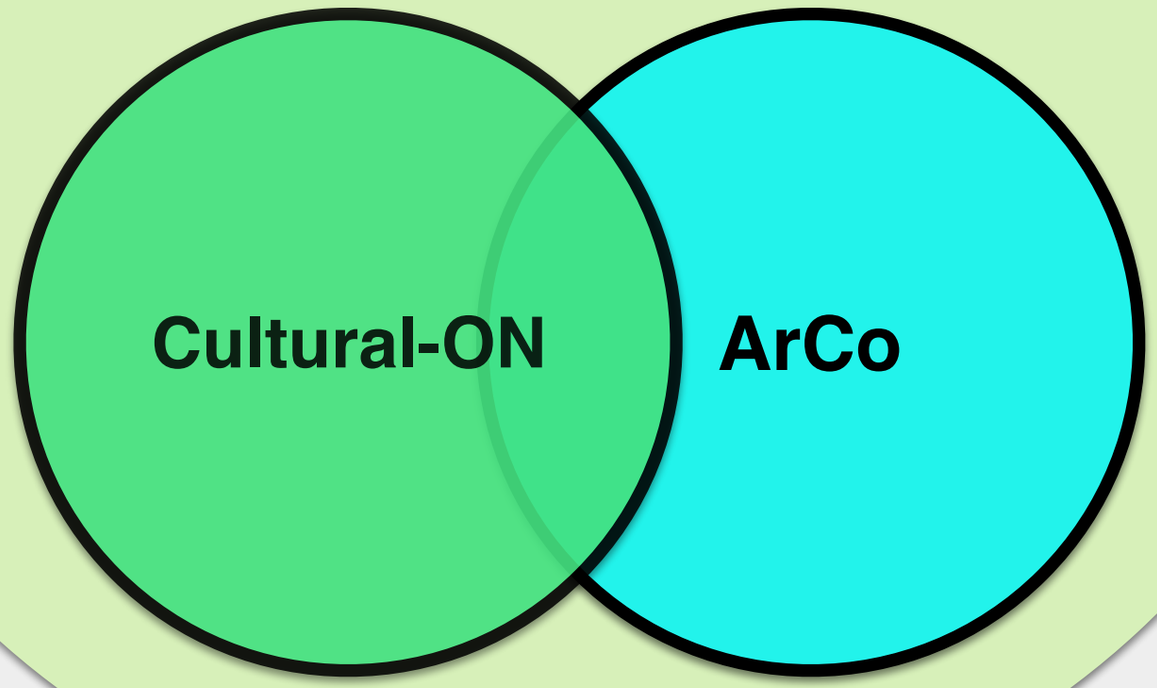
Ontology Network of the Italian Public Administration



TEAM PER LA TRASFORMAZIONE DIGITALE

AGID Agenzia per l'Italia digitale

CNR ISTC ISTITUTO DI SCIENZE E TECNOLOGIE DELLA COGNIZIONE

Cultural-ON

The knowledge graph of cultural institutes and cultural events that provides

- An ontology for representing cultural institutes (e.g., museums, historical archives, libraries, monuments, archaeological sites, etc.) and cultural events (e.g., exhibitions, seminars, conferences, etc.).
- A linked open dataset gathered from the official MiBAC's database (i.e. DBunico) about Italian cultural institutes, sites and their associated cultural events

MiBAC MINISTERO PER I BENI E LE ATTIVITÀ CULTURALI

Lodi G. et al. (2017) Semantic Web for Cultural Heritage Valorisation. In: Hai-Jew S. (eds) Data Analytics in Digital Humanities. Multimedia Systems and Applications. Springer, Cham. DOI: 10.1007/978-3-319-54499-1_1

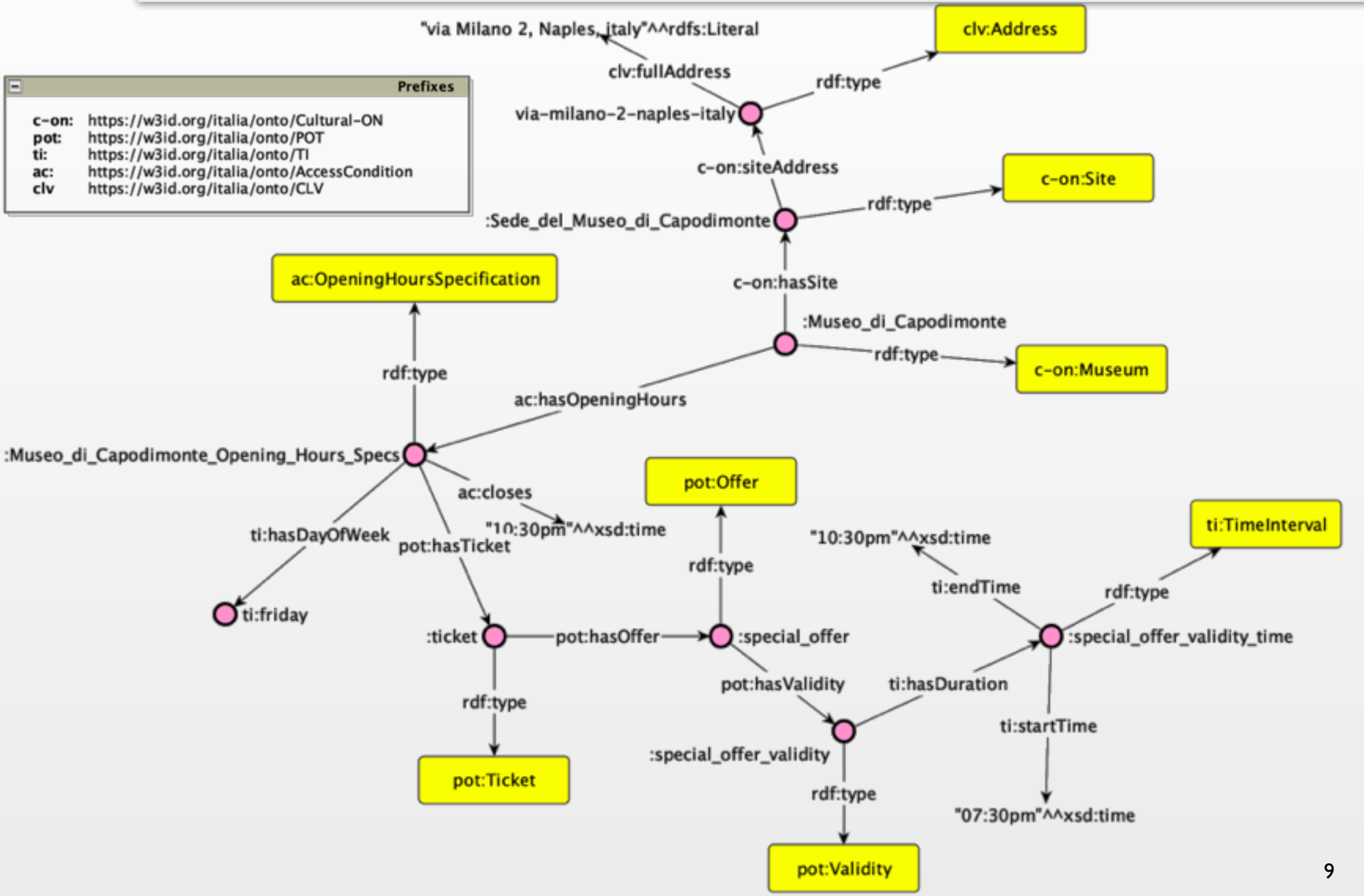
Example

The museum Museo di Capodimonte is located in via Milano 2, Naples. Italy.

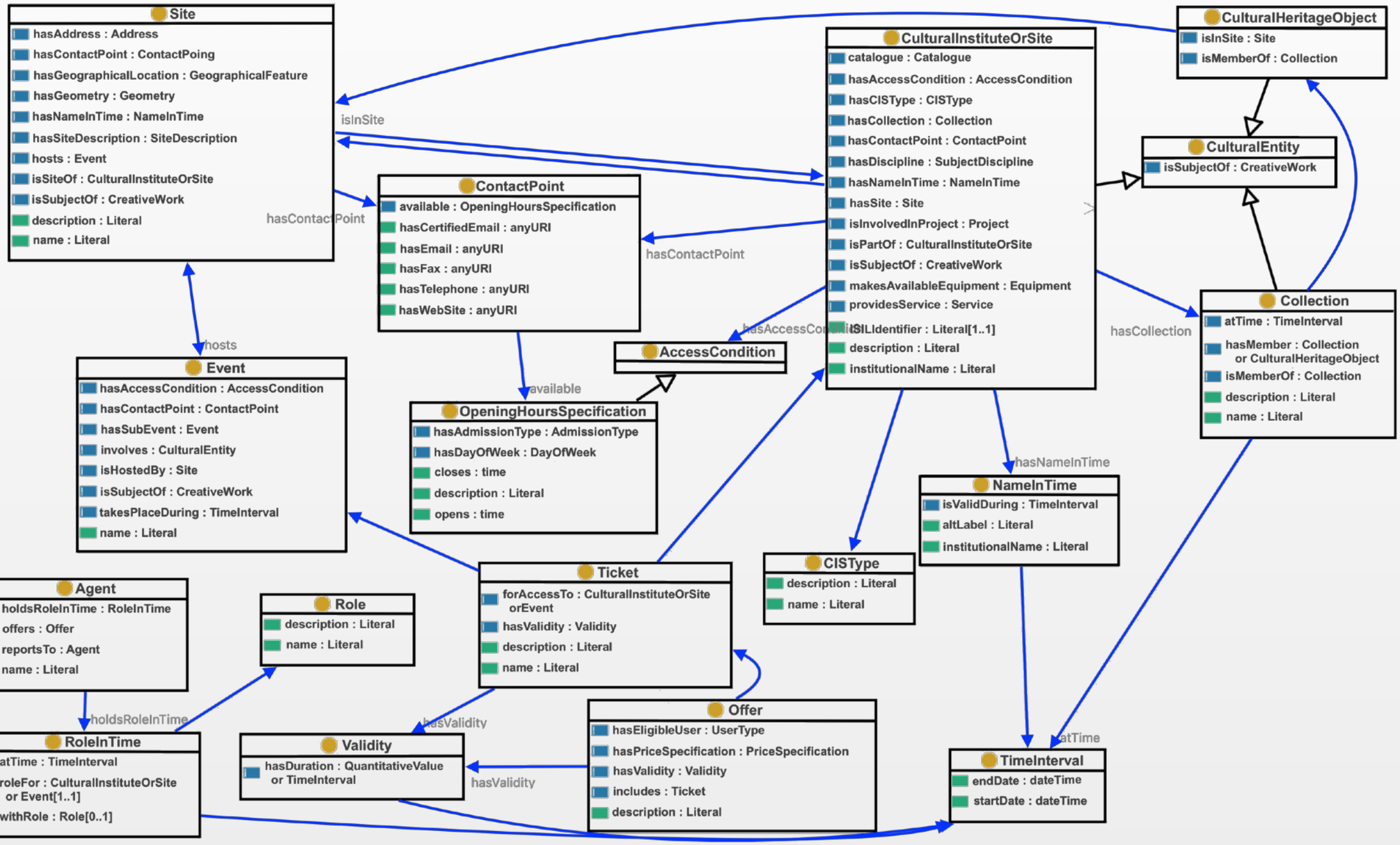
On Thursday, until September 29, the Museum of Capodimonte closes at 10.30 pm.

Ticket 1 Euro after 7.30 pm.

Resulting RDF



Ontology


Site
hasAddress : Address
hasContactPoint : ContactPoing
hasGeographicalLocation : GeographicalFeature
hasGeometry : Geometry
hasNameInTime : NameInTime
hasSiteDescription : SiteDescription
hosts : Event
isSiteOf : CulturalInstituteOrSite
isSubjectOf : CreativeWork
description : Literal
name : Literal
isInSite
hasContactPoint
ContactPoint
available : OpeningHoursSpecification
hasCertifiedEmail : anyURI
hasEmail : anyURI
hasFax : anyURI
hasTelephone : anyURI
hasWebSite : anyURI
hasContactPoint
CulturalInstituteOrSite
catalogue : Catalogue
hasAccessCondition : AccessCondition
hasCISType : CISType
hasCollection : Collection
hasContactPoint : ContactPoint
hasDiscipline : SubjectDiscipline
hasNameInTime : NameInTime
hasSite : Site
isInvolvedInProject : Project
isPartOf : CulturalInstituteOrSite
isSubjectOf : CreativeWork
makesAvailableEquipment : Equipment
providesService : Service
ISILIdentifier : Literal[1..1]
description : Literal
institutionalName : Literal
CulturalHeritageObject
isInSite : Site
isMemberOf : Collection
CulturalEntity
isSubjectOf : CreativeWork
Collection
atTime : TimeInterval
hasMember : Collection or CulturalHeritageObject
isMemberOf : Collection
description : Literal
name : Literal
hasCollection
hosts
Event
hasAccessCondition : AccessCondition
hasContactPoint : ContactPoint
hasSubEvent : Event
involves : CulturalEntity
isHostedBy : Site
isSubjectOf : CreativeWork
takesPlaceDuring : TimeInterval
name : Literal
AccessCondition
available
OpeningHoursSpecification
hasAdmissionType : AdmissionType
hasDayOfWeek : DayOfWeek
closes : time
description : Literal
opens : time
hasNameInTime
NameInTime
isValidDuring : TimeInterval
altLabel : Literal
institutionalName : Literal
CISType
description : Literal
name : Literal
Ticket
forAccessTo : CulturalInstituteOrSite or Event
hasValidity : Validity
description : Literal
name : Literal
Agent
holdsRoleInTime : RoleInTime
offers : Offer
reportsTo : Agent
name : Literal
Role
description : Literal
name : Literal
holdsRoleInTime
RoleInTime
atTime : TimeInterval
roleFor : CulturalInstituteOrSite or Event[1..1]
withRole : Role[0..1]
hasValidity
Validity
hasDuration : QuantitativeValue or TimeInterval
hasValidity
Offer
hasEligibleUser : UserType
hasPriceSpecification : PriceSpecification
hasValidity : Validity
includes : Ticket
description : Literal
atTime
TimeInterval
endDate : dateTime
startDate : dateTime

Resources

Ontology

Linked open dataset about cultural institutes or sites and related cultural events

ArCo

The knowledge graph of cultural properties that provides

- A set of networked ontologies for representing cultural properties and their related facts

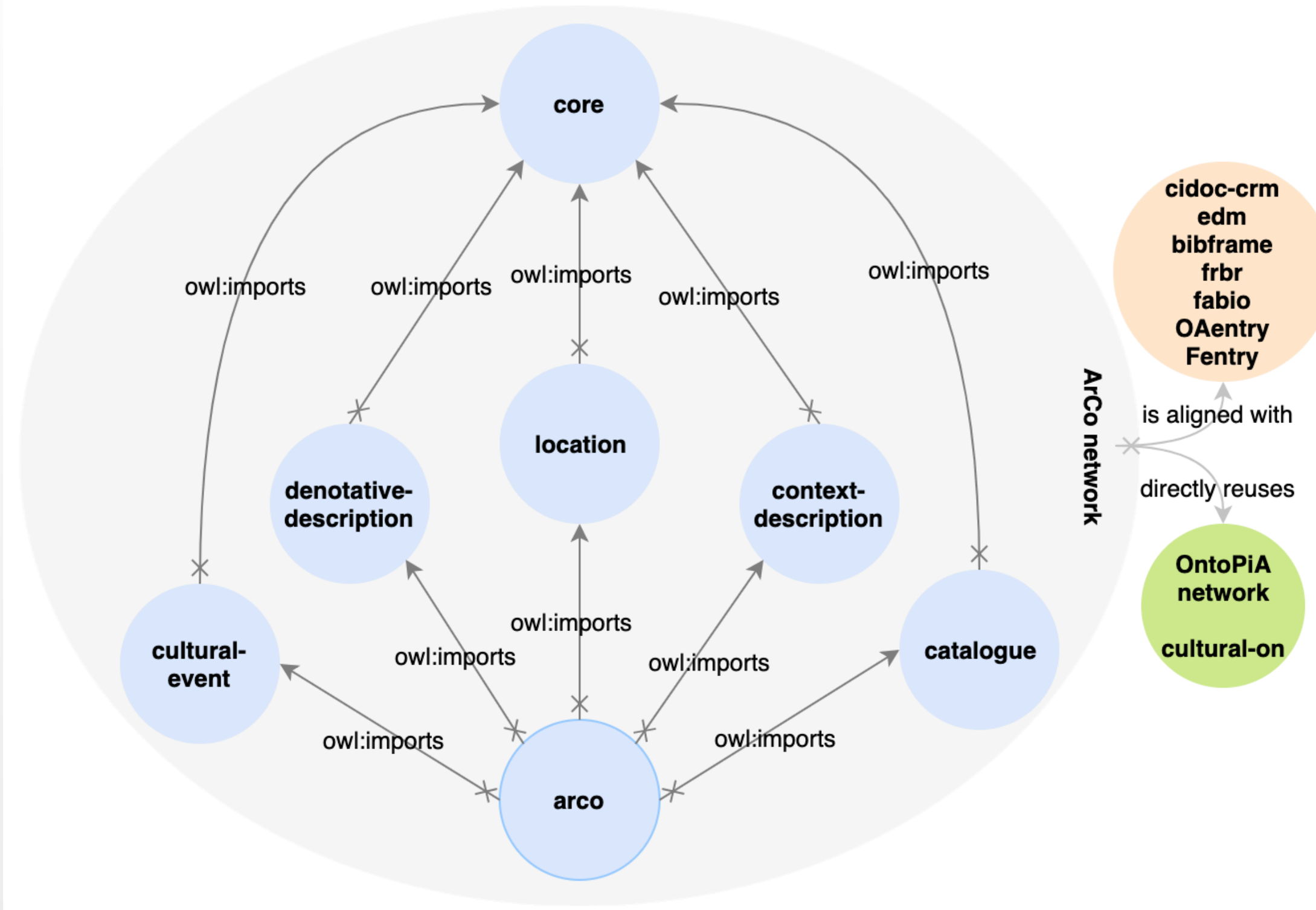
- A linked open dataset about the Italian cultural heritage resulting from the conversion to RDF of the ICCD-MiBAC's official General Catalogue

Istituto Centrale per il Catalogo e la Documentazione

MiBAC MINISTERO PER I BENI E LE ATTIVITÀ CULTURALI

Carriero V. A. et al. (2019) ArCo: the Italian Cultural Heritage Knowledge Graph. arXiv: https://arxiv.org/abs/1905.02840v1

ArCo ontology network



ArCo Linked Open Dataset

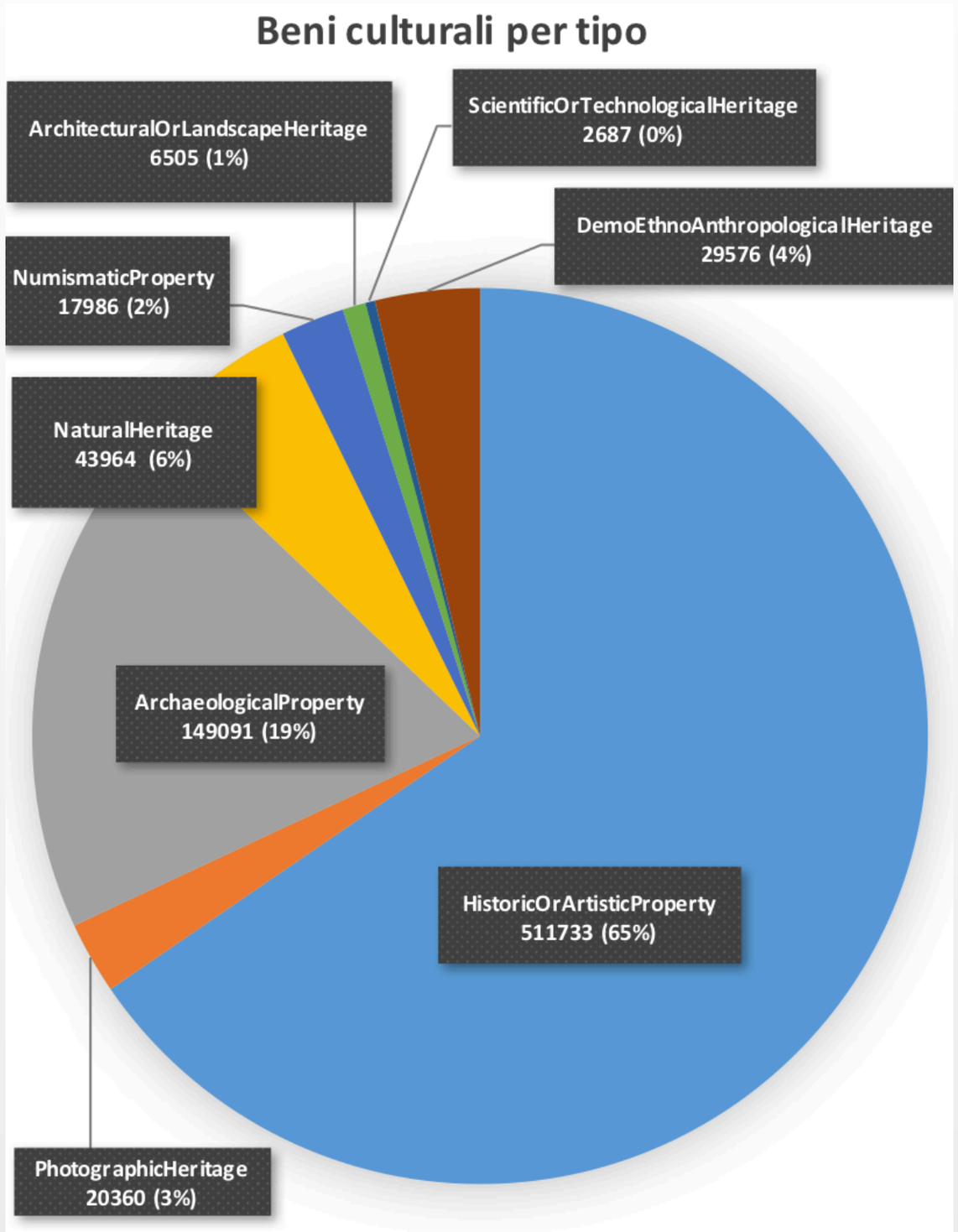
Material

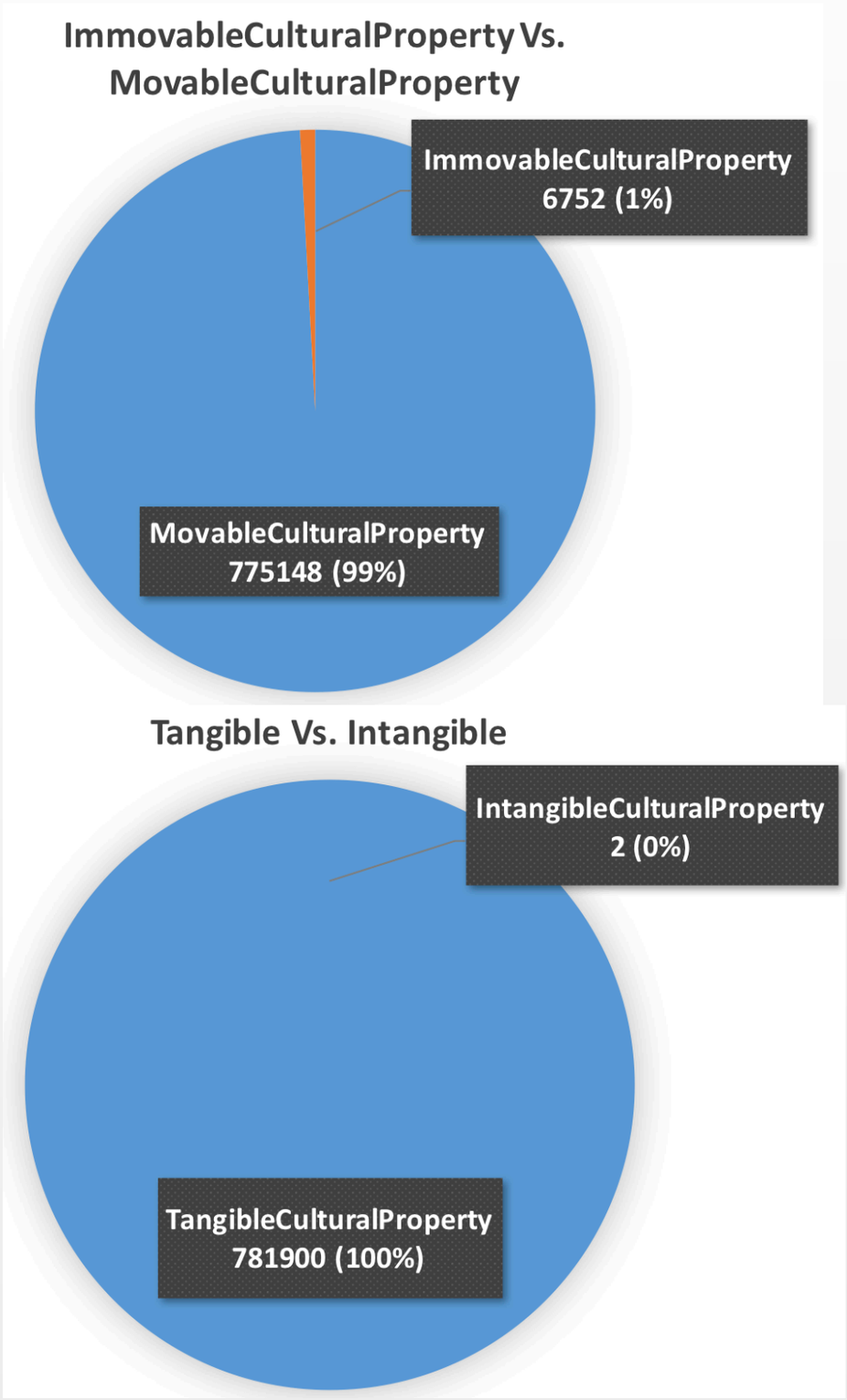
- Data source: ~800M XML cataloguing records from the ICCD-MiBAC's General Catalogue of Cultural Properties

Results

- 173,662,153 triples about 781,902 Cultural Properties
- 24,008 owl:sameAs axioms for linking 18,746 distinct ArCo entities with other entities in the LOD cloud

Dataset figures





Albert Friscia's self-potrait

definition «**painting**»

```
<OGTD hint="Defini
```

title

```
<SGTT hint="Titolo
```

measurements

unit, height, width

```
<MIS hint="MISURE">
   <MISU hint="Unita
   <MISA hint="Altez
   <MISL hint="Largh
</MIS>
```

conservation status «g

```
<STCC hint="Stato d
    conservazione">
```

dating «20th century»

```
<DTZG hint="Secolo">
```

material, technique

canvas/ oil-painting

```
<MTCI hint="Material
           pittura
```

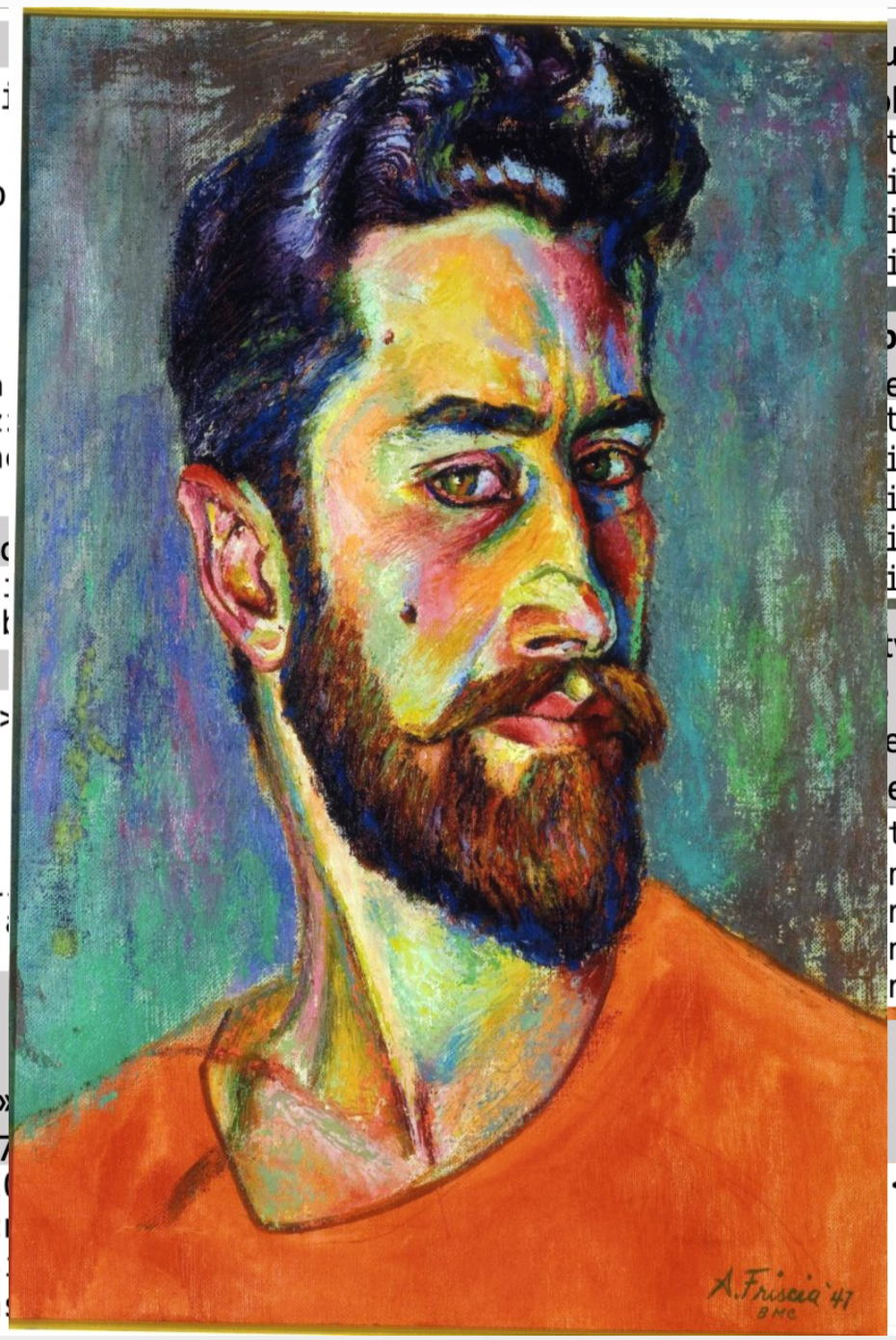
inscription

technique «painting»

position «bottom right»

transcript «A. Friscia '47

```
<ISR hint="ISCRIZI
   <ISRS hint="Tec
   <ISRP hint="Pos
   <ISRI hint="Tra
```



unique code, name «Albert Friscia»

hical data «active from 1935 to 1989»

```
t="AUTORE">
int="Codice univoco ICCD">00001499</NCUN>
int="Nome scelto">Albert Friscia</AUTN>
int="Dati anagrafici">Attivo dal 1935 al 1989</AUTA>
```

on type «donation», previous owner «Di Bello, Lidia»

e, location

```
t="ACQUISIZIONE">
int="Tipo acquisizione">donazione</ACQT>
int="Nome">Di Bello, Lidia</ACQN>
int="Data acquisizione">10/ 02/ 2000</ACQD>
int="Luogo acquisizione">RM/Roma/Via Muratte,94</ACQL>
```

type «previous location»

«private house»

e «house of Mr and Mrs Friscia»

ess, specifications «inside, 2° floor»

```
t="Tipo localizzazione">luogo di provenienza</TCL>
nt="Tipologia">casa privata</PRCT>
nt="Denominazione">casa dei coniugi Friscia</PRCD>
nt="Denominazione via">Via Muratte,94 Roma</PRCU>
nt="Specifiche">interno</PRCS>
```

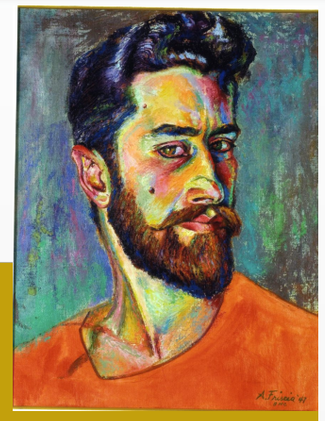
photographic documentation

category «attached», type «color»

owner agency

```
<FTA hint="DOCUMENTAZIONE FOTOGRAFICA">
 <FTAX hint="Genere">documentazione allegata</FTAX>
 <FTAP hint="Tipo">fotografia colore</FTAP>
 <FTAE hint="Ente proprietario">SPSAE MT</FTAE>
```

Albert Friscia's self-potrait



Self portrait, Autoritratto (dipinto)

https://w3id.org/arco/resource/HistoricOrArtisticProperty/1700168615

ENTITÀ DI TIPO: **HistoricOrArtisticProperty**

rdfs:**comment**	dipinto
rdfs:**label**	Self portrait, Autoritratto (dipinto)
arco:**catalogueNumber**	00168615
arco:**regionIdentifier**	17
arco:**uniqueIdentifier**	1700168615
a-cd:**subject**	Autoritratto
a-cd:**title**	Self portrait
arco:**description**	La tela raffigura l'autoritratto del pittore, dipinto a mezzo busto, con il capo ruotato di tre quarti verso sinistra. Il colore arancio acceso della maglietta spicca sul fondo bluastro della tela; il volto è segnato da tratti spigolosi, da una folta barba e da un neo sullo zigomo destro.
rdf:**type**	arco:HistoricOrArtisticProperty ↳ Bene Storico o Artistico arco:MovableCulturalProperty ↳ Bene mobile

Resources

ICCD-MiBACT / **ArCo**

Unwatch 12 | Star 16 | Fork 1

Code | Issues 9 | Pull requests 0 | Projects 0 | Wiki | Insights

Branch: master **ArCo** / **ArCo-release** /

Create new file | Upload files | Find file | History

ValentinaPasqual Update index-it.html — Latest commit 60057a4 7 hours ago

..		
httpd	Update index-it.html	7 hours ago
lode	Change name of the release.	a year ago
ontologie	refactoring	a day ago
rdfizer	rdfizer version 1.0	21 hours ago
test	Update testcase-26b.owl	4 days ago
virtuoso	Release v0.5	a month ago
README.md	minor	a year ago
docker-compose.yml	Release 0.4	4 months ago

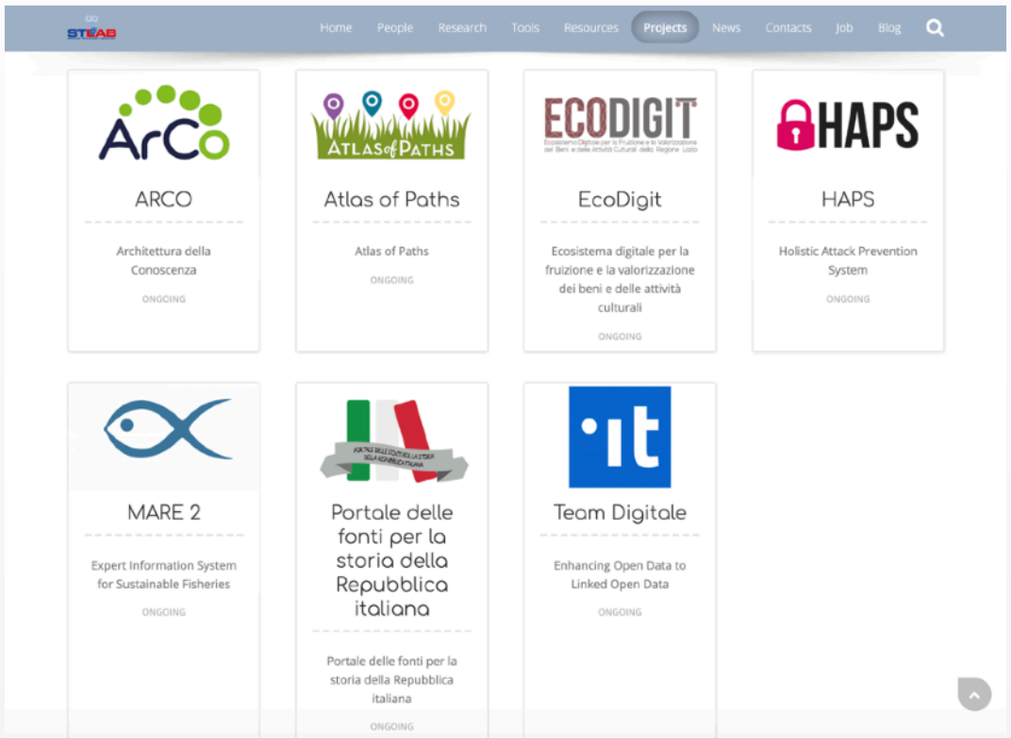
README.md

ArCo

ArCo on-line

https://w3id.org/arco

More projects and tools on our website



http://stlab.istc.cnr.it/stlab/projects/

http://stlab.istc.cnr.it/stlab/tools/

Questions?

Andrea Giovanni Nuzzolese
STLab, ISTC-CNR
andrea.nuzzolese@cnr.it

We offer student internships