

4 ore di RDF

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regesta.exe

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Abbiamo bisogno del
Web dei dati! (?)

perché parliamo di oggetti e non più di documenti



Il Web di oggi

oggetti = things

perché parliamo di oggetti e non più di documenti



Il Web di oggi

Almeno **1.85 miliardi** di documenti **indicizzati**
si mormora che online ci ne siano **1 trilione**

perché parliamo di oggetti e non più di documenti



Il Web di oggi

Almeno **1.85 miliardi** di documenti **indicizzati**
si mormora che online ci ne siano **1 trilione**

al momento il miglior parser HTML è ancora il
cervello umano

perché parliamo di oggetti e non più di documenti

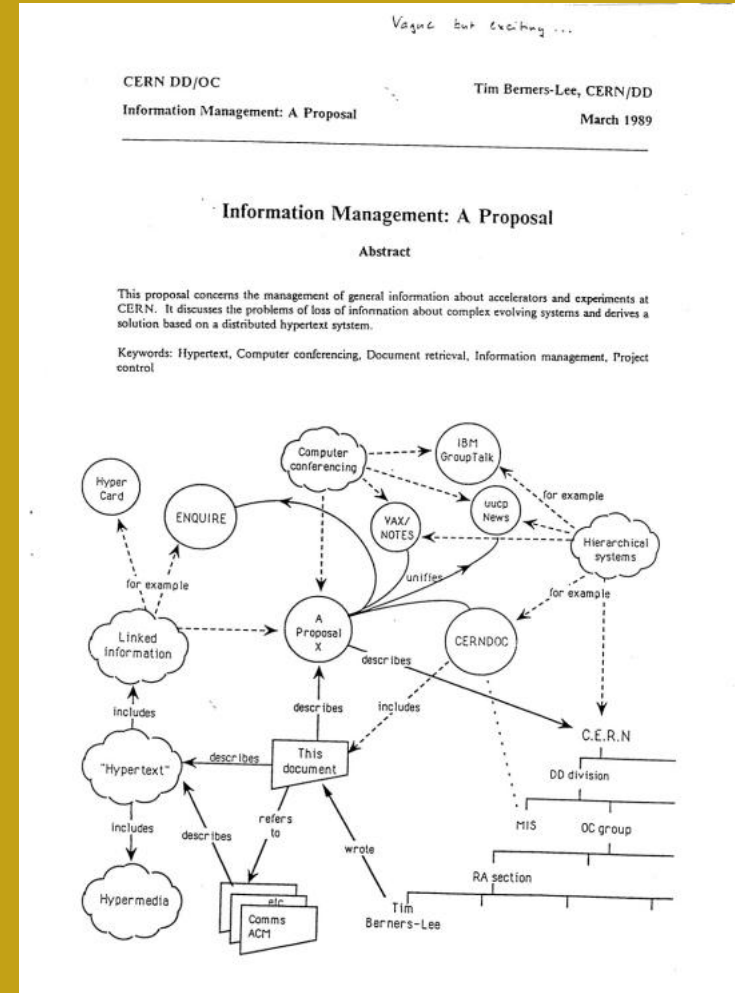
Il Web di oggi

non è il Web che
Tim propose nel 1989

perché parliamo di oggetti e non più di documenti

Il Web di oggi

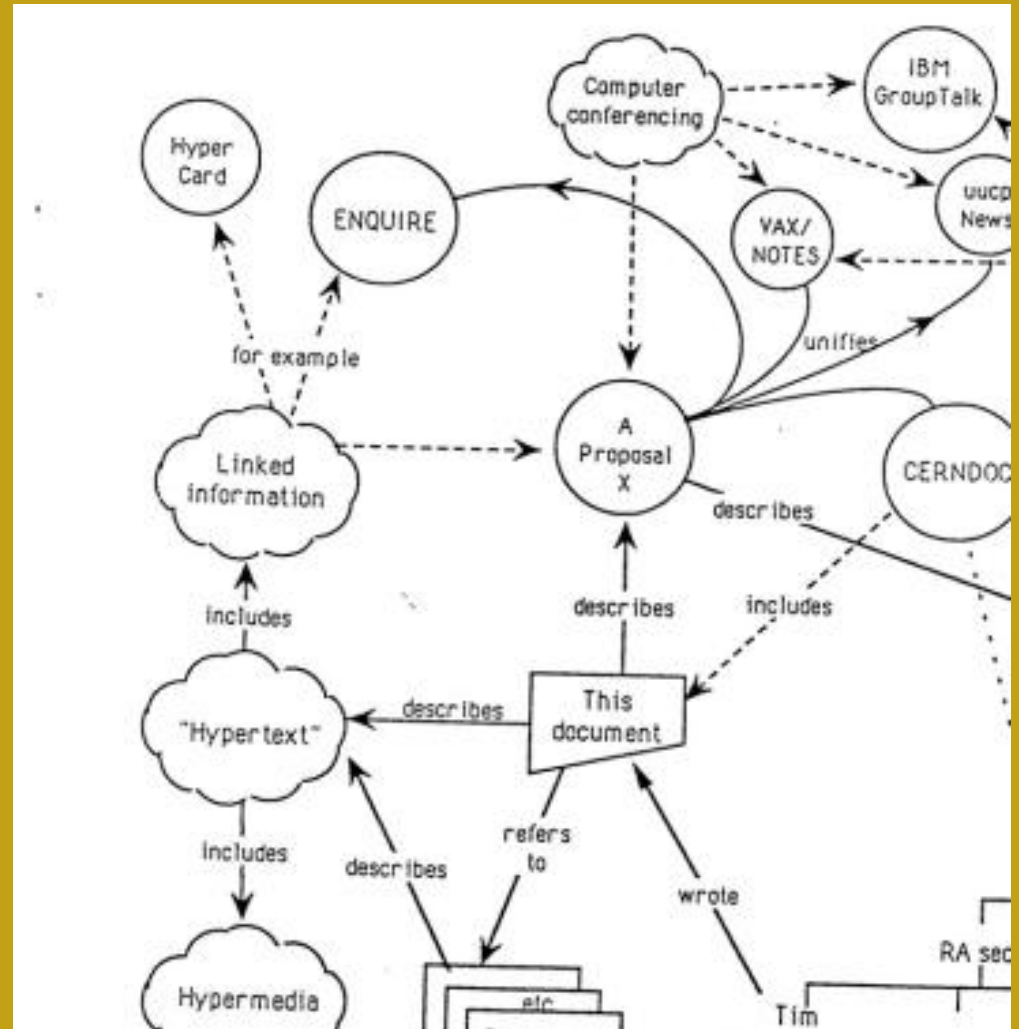
non è il Web che
Tim propose nel 1989



perché parliamo di oggetti e non più di documenti

Il Web di oggi

non è il Web che
Tim propose nel 1989



~~URI~~ IRI e RDF (opendata)

un nuovo modo per pubblicare dati



linked data principles

Tim Berners-Lee
July 27, 2006



Use **URIs**
as names for things



Use **HTTP URIs**
so that people can look up those names



Use the **standards** (RDF, SPARQL)
providing useful information



Include **links to other URIs**
so that they can discover more things

gli id sono ambigui e non piacciono a nessuno

IRI e RDF (opendata)

creando il Web dei dati

`HTTP://yourdomain.com/something`

gli id sono ambigui e non piacciono a nessuno

IRI e RDF (opendata)

creando il Web dei dati

`HTTP://yourdomain.com/something`

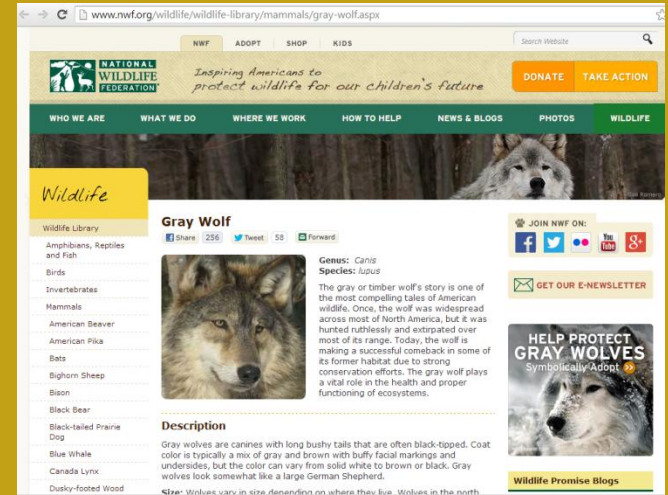
1. Proprietà
2. Univocità
3. Accessibilità

gli id sono ambigui e non piacciono a nessuno

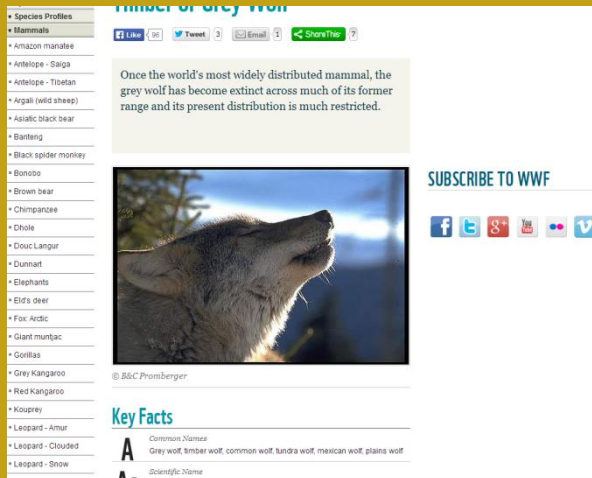
IRI e RDF (opendata) trasformando I documenti in dati



The screenshot shows the Wikipedia article for "Gray wolf". The article text includes: "Gray wolf" redirects here. For other uses of "wolf" and "wolves", see Wolf (disambiguation). "Gray Wolves" and "She-wolf" redirect here. For other uses, see Gray Wolves (disambiguation) and She-wolf (disambiguation). The gray wolf^(en) (Canis lupus^(en)), also known as the timber wolf^(en), true wolf^(en) or western wolf^(en) is a canid native to the wilderness and remote areas of North America, Eurasia, and North Africa. It is the largest extant member of its family, with males averaging 43–45 kg (95–99 lb), and females 36–38.5 kg (79–85 lb). Like the red wolf, it is distinguished from other Canis species by its larger size and less pointed features, particularly on the ears and muzzle.^[10] Its winter fur is long and bushy, and predominantly a mottled gray in color, although nearly pure white, red, or brown to black also occur.^[6] The gray wolf is the most specialised member of the genus Canis, as demonstrated by its morphological adaptations to hunting large prey, its more gregarious nature,^[11] and its highly advanced expressive behavior.^{[12][13]} It is nonetheless closely related enough to smaller Canis species, such as the eastern wolf^(en), coyote^(en) and golden jackal^(en) to produce fertile hybrids. It is the only species of Canis to have a range encompassing both the Old and New Worlds,^[6] and originated in Eurasia during the Pliocene, colonizing North America on at least three separate occasions during the Ranchoatobian.^[6] It is a social animal, travelling in nuclear families consisting of a mated pair, accompanied by the pair's adult offspring.^[17] The gray wolf is typically an apex predator throughout its range, with only humans and tigers^(en)^{[18][19][120]} posing a serious threat to it. It feeds primarily on large ungulates, though it also eats smaller animals, livestock, carrion, and garbage.^[6]



The screenshot shows the National Wildlife Federation website page for "Gray Wolf". The page features a header with the organization's logo and tagline "Inspiring Americans to protect wildlife for our children's future". Below the header is a navigation menu with options like "WHO WE ARE", "WHAT WE DO", "WHERE WE WORK", "HOW TO HELP", "NEWS & BLOGS", "PHOTOS", and "WILDLIFE". The main content area includes a "Wildlife Library" sidebar with categories like "Amphibians, Reptiles and Fish", "Birds", "Invertebrates", "Mammals", "American Beaver", "American Pike", "Bats", "Bighorn Sheep", "Bison", "Black Bear", "Black-tailed Prairie Dog", "Blue Whale", "Canada Lynx", and "Dusky-footed Wood". The main article for "Gray Wolf" includes a "Description" section: "Gray wolves are canines with long bushy tails that are often black-tipped. Coat color is typically a mix of gray and brown with buffy facial markings and undersides, but the color can vary from solid white to brown or black. Gray wolves look somewhat like a large German Shepherd." There is also a "HELP PROTECT GRAY WOLVES" banner with a "Symbolically Adopt" button.



The screenshot shows the WWF website page for "Timber of Gray Wolf". The page features a sidebar with a "Species Profiles" menu, including "Mammals" and "Amazon manatee". The main content area includes a "SUBSCRIBE TO WWF" button and a "Key Facts" section: "Once the world's most widely distributed mammal, the grey wolf has become extinct across much of its former range and its present distribution is much restricted." Below the text is a photograph of a wolf's head. The page also includes social media sharing options and a "Share This" button.



È giunto il tempo delle macchine

(per analizzare i documenti)

[...] l'animaletto venne indicato come:
“il tasso del tasso del Tasso”

Achille Campanile

È giunto il tempo delle macchine (per analizzare i documenti)

<http://it.dbpedia.org/resource/Taxus>



http://it.dbpedia.org/resource/Torquato_Tasso



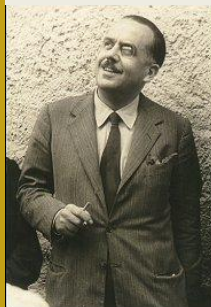
..] l'animaletto venne indicato come:
“il tasso del tasso del Tasso”

http://it.dbpedia.org/resource/Meles_meles



Achille Campanile

http://it.dbpedia.org/resource/Achille_Campanile



(autore)

Un nuovo modo di disegnare le basi di dati **RDF**

(ovvero, definire la conoscenza)

Go Triples, go!

l'approccio standard

ID_P	COGNOME	NOME	REF_ID_SOCIETA	GENERE
1	Camarda	Diego	1	maschio
2

ID_SOCIETA	DENOMINAZIONE	SITO
1	Regesta.exe srl	www.regesta.com



Go Triples, go!

il nuovo (fantastico) approccio

Subject <<http://www.regesta.com/diego>>

Go Triples, go!

il nuovo (fantastico) approccio

Subject <<http://www.regesta.com/diego>>

Predicate <<http://xmlns.com/foaf/0.1/familyName>>

Go Triples, go!

il nuovo (fantastico) approccio

Subject <<http://www.regesta.com/diego>>

Predicate <<http://xmlns.com/foaf/0.1/familyName>>

Object **'Camarda'**.

Go Triples, go!

il nuovo (fantastico) approccio

<http://www.regesta.com/**diego**>

<http://xmlns.com/foaf/0.1/**familyName**> '**Camarda**'.

<http://www.regesta.com/**diego**>

<http://xmlns.com/foaf/0.1/**firstName**> '**Diego**'.

<http://www.regesta.com/**diego**>

<http://xmlns.com/foaf/0.1/**gender**> '**male**'.

Go Triples, go!

il nuovo (fantastico) approccio

<http://www.regesta.com/**diego**>

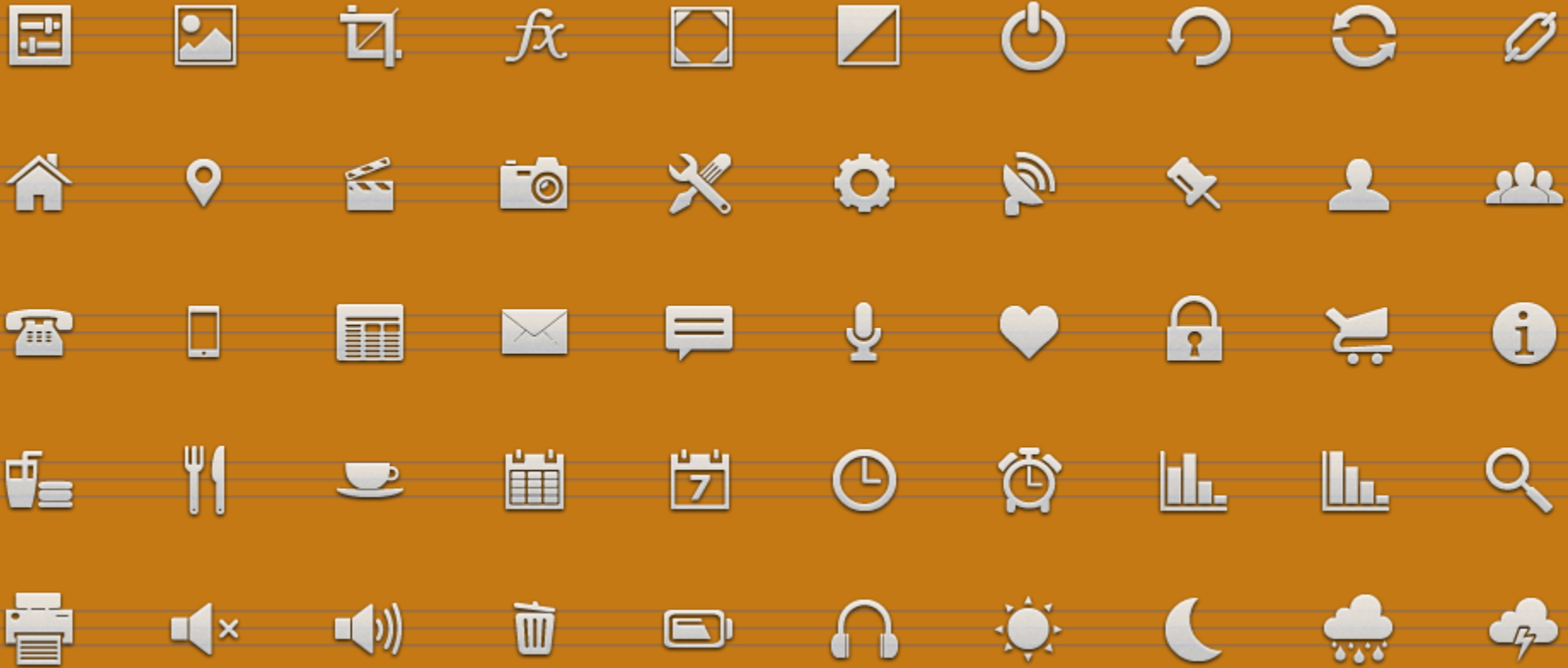
<http://xmlns.com/foaf/0.1/**familyName**> 'Camarda' ;

<http://xmlns.com/foaf/0.1/**firstName**> 'Diego' ;

<http://xmlns.com/foaf/0.1/**gender**> 'male' .

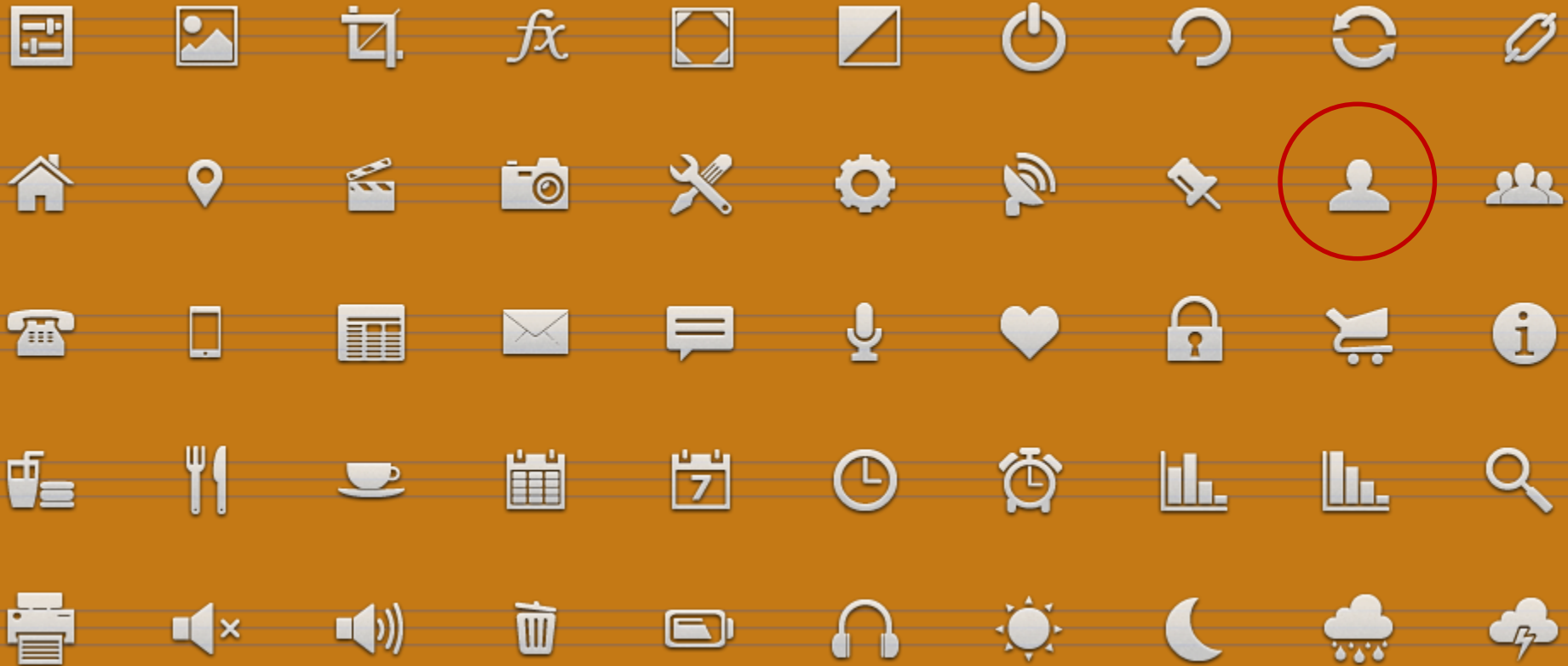
Go Triples, go!

ma cosa è un "diego"?



Go Triples, go!

ma cosa è un "diego"?



`<http://www.regesta.com/diego>` a `<http://xmlns.com/foaf/0.1/Person>`

Go Triples, go!

aggiungiamo una classe

```
<http://www.regesta.com/diego>  
<http://xmlns.com/foaf/0.1/familyName> 'Camarda' ;  
<http://xmlns.com/foaf/0.1/firstName> 'Diego' ;  
<http://xmlns.com/foaf/0.1/gender> 'male' .
```

```
<http://www.regesta.com/diego>  
<http://www.w3.org/1999/02/22-rdf-syntax-ns#type>  
<http://xmlns.com/foaf/0.1/Person> .
```


Go Triples, go!

costruiamo un grafo

```
<http://www.regesta.com/diego>  
<http://xmlns.com/foaf/0.1/familyName> 'Camarda' ;  
<http://xmlns.com/foaf/0.1/firstName> 'Diego' ;  
<http://xmlns.com/foaf/0.1/gender> 'male' ;  
<http://www.w3.org/1999/...#type> <http://xmlns.com/foaf/0.1/Person> .
```

```
<http://www.regesta.com/diego>
```

```
<http://www.w3.org/ns/org#memberOf>
```

```
<http://www.regesta.com/about> .
```

Go Triples, go!

costruiamo un grafo

```
<http://www.regesta.com/diego>  
<http://xmlns.com/foaf/0.1/familyName> 'Camarda' ;  
<http://xmlns.com/foaf/0.1/firstName> 'Diego' ;  
<http://xmlns.com/foaf/0.1/gender> 'male' ;  
<http://www.w3.org/1999/...#type> <http://xmlns.com/foaf/0.1/Person> ;  
<http://www.w3.org/ns/org#memberOf> <http://www.regesta.com/about> .
```

```
<http://www.regesta.com/about>
```

```
<http://www.w3.org/1999/02/22-rdf-syntax-ns#type>
```

```
<http://www.w3.org/ns/org#Organization> .
```

Go Triples, go!

costruiamo un grafo

```
<http://www.regesta.com/diego>  
<http://xmlns.com/foaf/0.1/familyName> 'Camarda' ;  
<http://xmlns.com/foaf/0.1/firstName> 'Diego' ;  
<http://xmlns.com/foaf/0.1/gender> 'male' ;  
<http://www.w3.org/1999/...#type> <http://xmlns.com/foaf/0.1/Person> ;  
<http://www.w3.org/ns/org#memberOf> <http://www.regesta.com/about> .  
  
<http://www.regesta.com/about>  
<http://www.w3.org/1999/...#type> <http://www.w3.org/ns/org#Organization> .
```

Go Triples, go!

costruiamo un grafo

```
<http://www.regesta.com/diego>  
<http://xmlns.com/foaf/0.1/familyName> 'Camarda' ;  
<http://xmlns.com/foaf/0.1/firstName> 'Diego' ;  
<http://xmlns.com/foaf/0.1/gender> 'male' ;  
<http://www.w3.org/1999/...#type> <http://xmlns.com/foaf/0.1/Person> ;  
<http://www.w3.org/ns/org#memberOf> <http://www.regesta.com/about> .
```

```
<http://www.regesta.com/about>  
<http://www.w3.org/1999/...#type> <http://www.w3.org/ns/org#Organization> ;  
<http://www.w3.org/2004/02/skos/core#prefLabel> 'Regesta.exe srl' ;  
<http://xmlns.com/foaf/0.1/homepage> <http://www.regesta.com> .
```

Go Triples, go!

gli Oggetti possono essere dei Soggetti



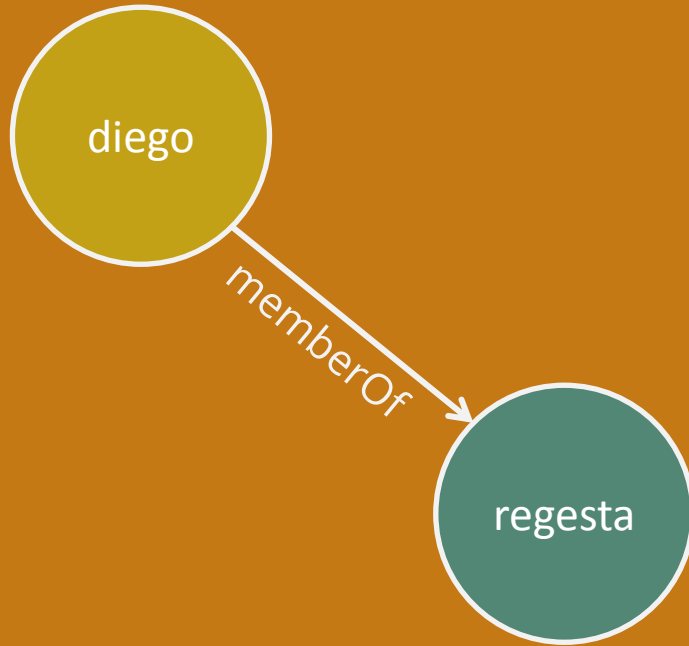
Go Triples, go!

consideriamo diego e regesta



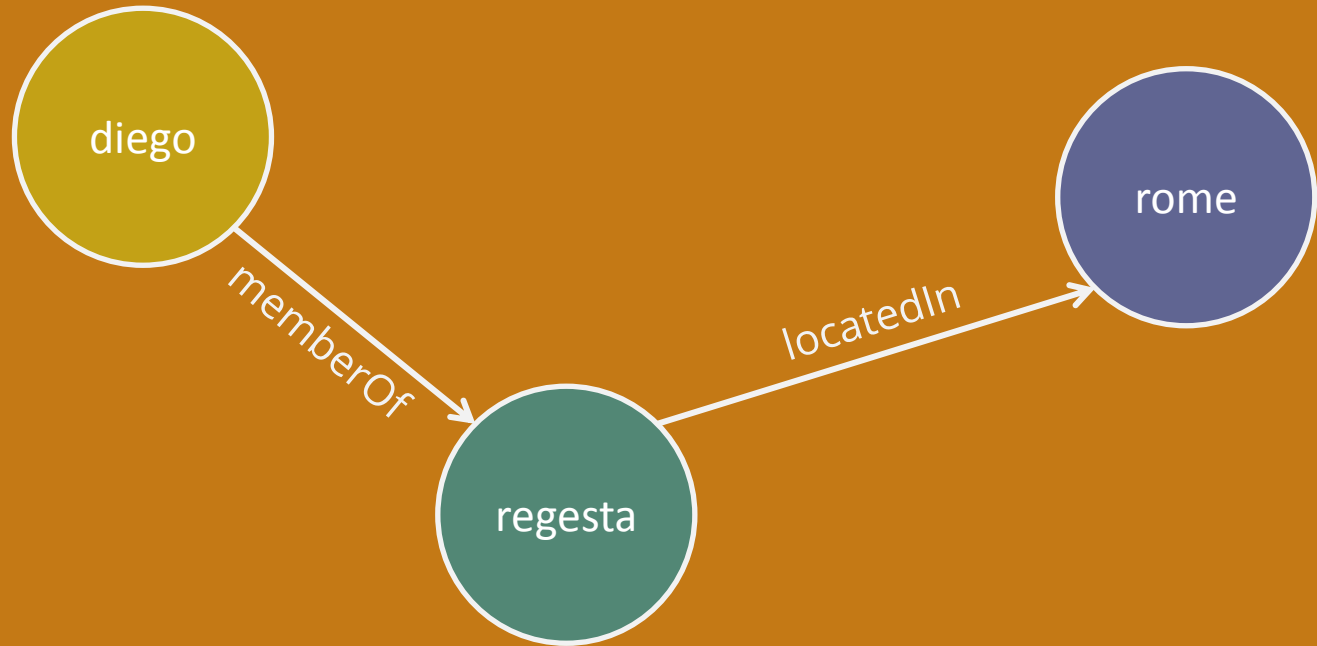
Go Triples, go!

<diego> <memberOf> <regesta>



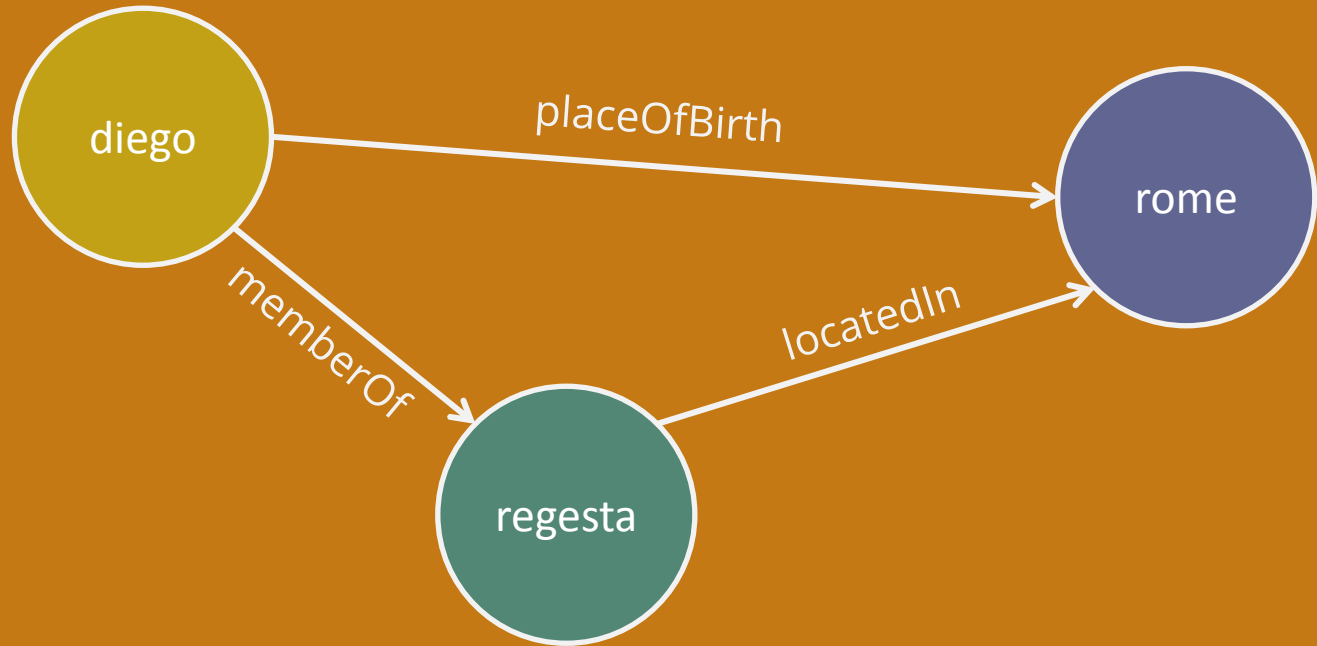
Go Triples, go!

e <regesta> <locatedIn> <rome>



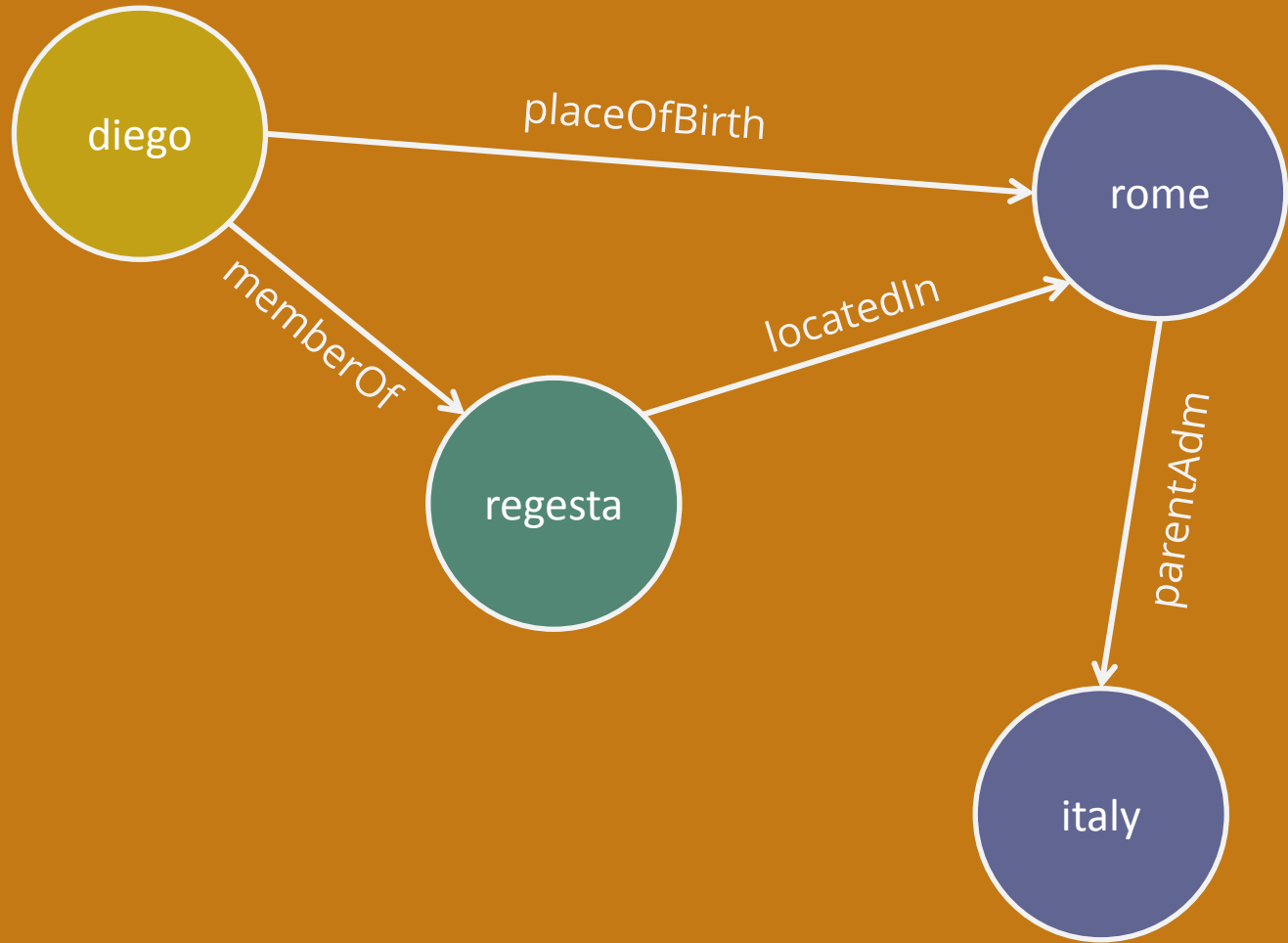
Go Triples, go!

<diego> <placeOfBirth> <rome>



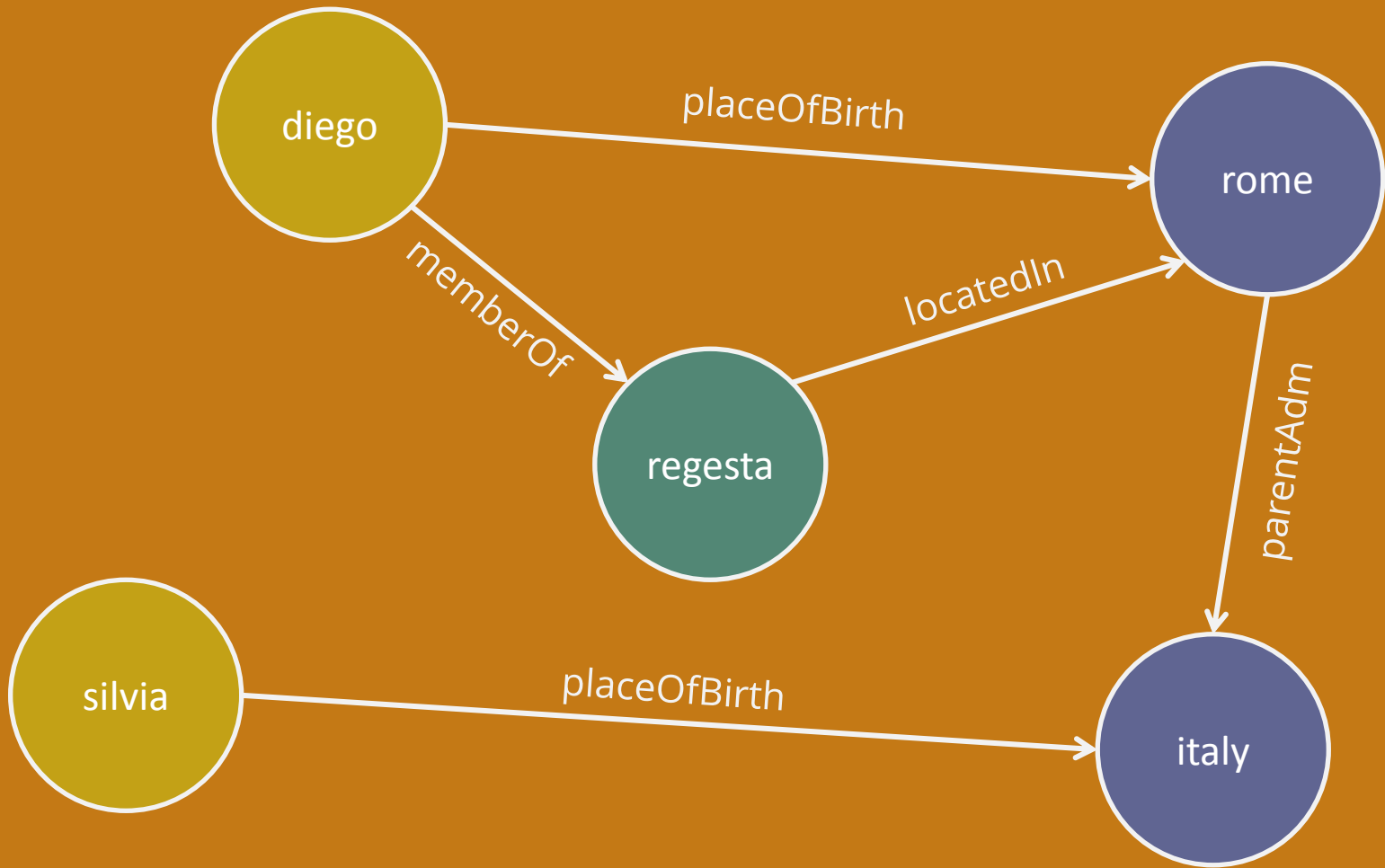
Go Triples, go!

<rome> <parentADM> <italy>



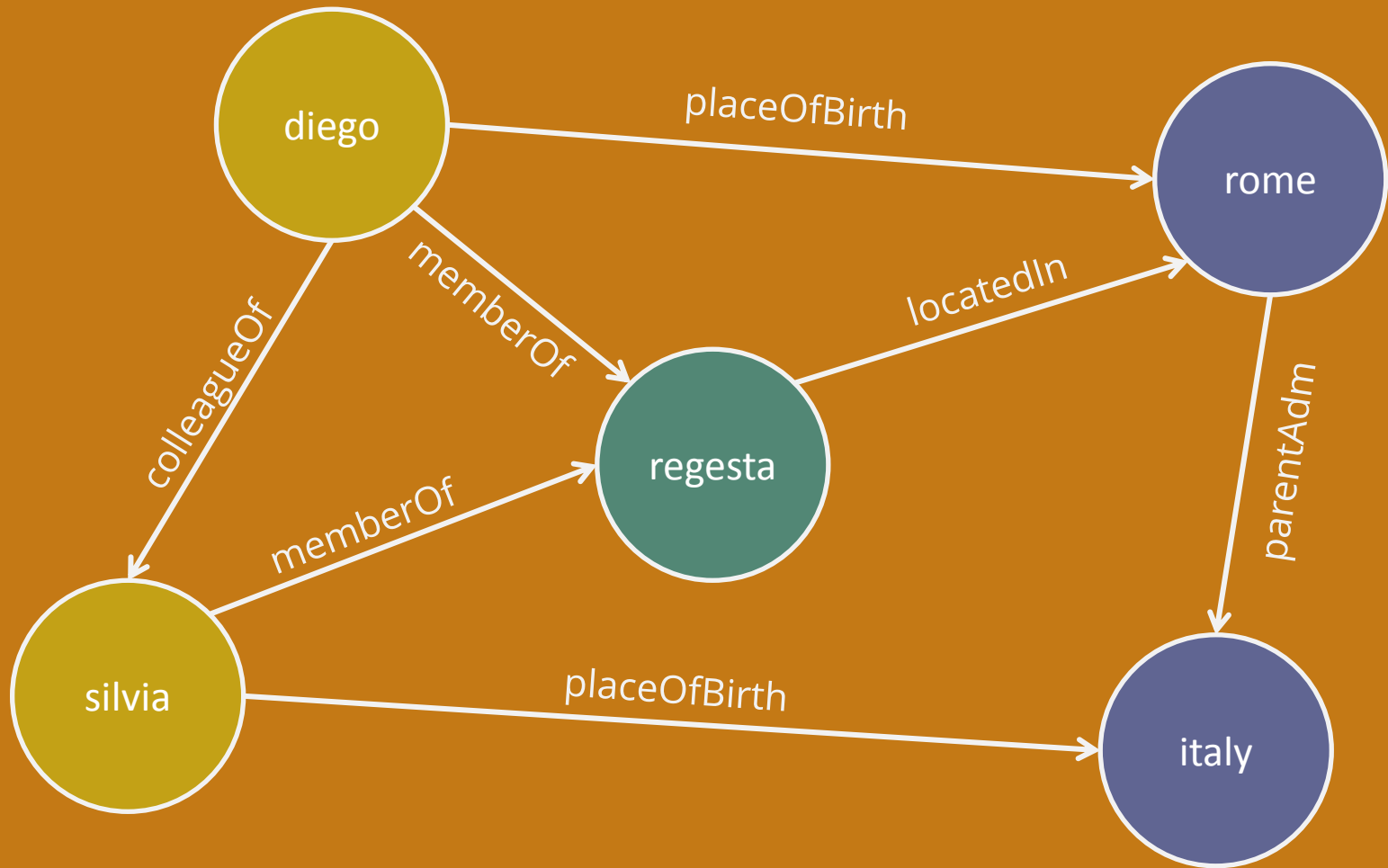
Go Triples, go!

<silvia> <placeOfBirth> <italy>



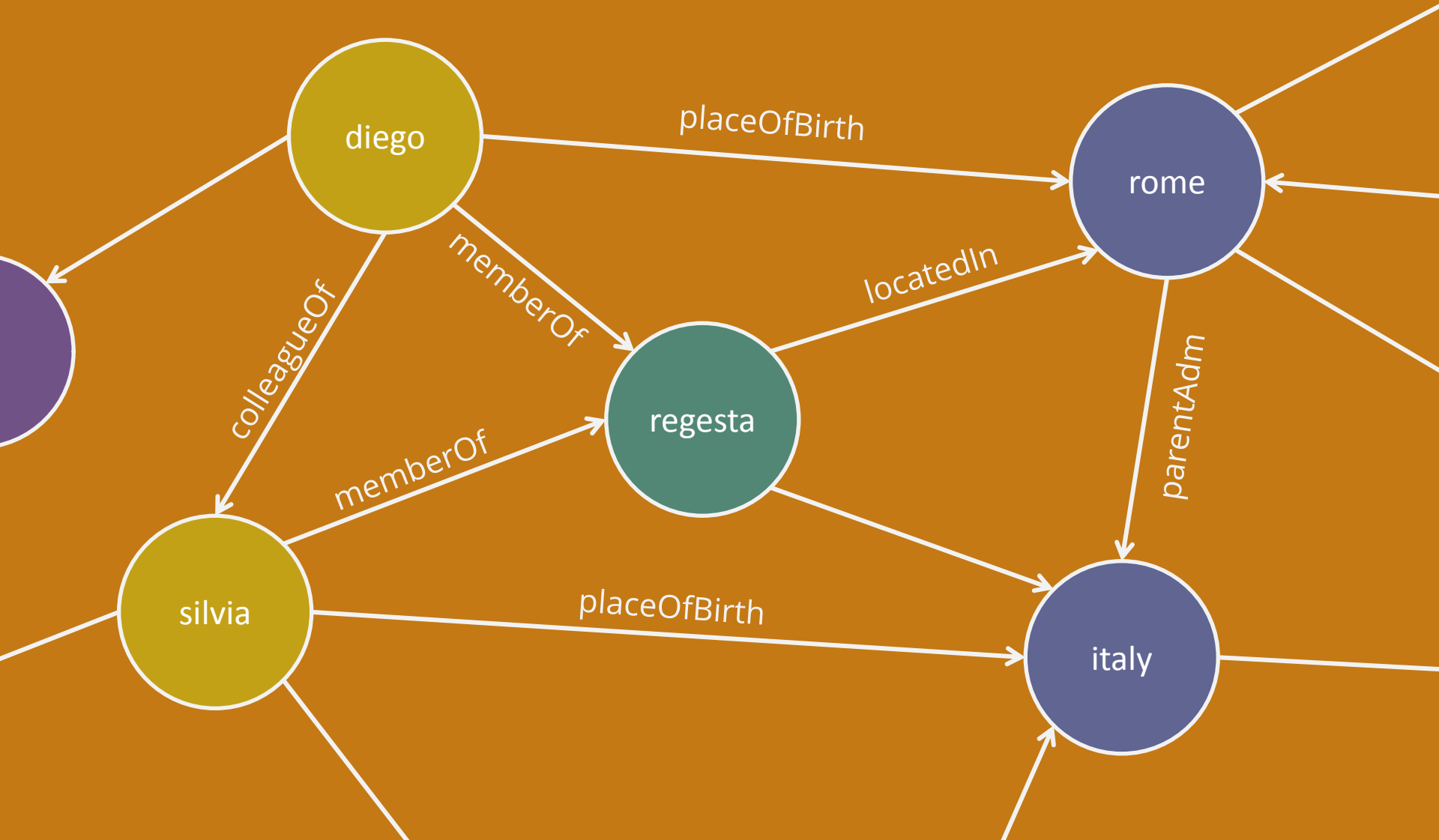
Go Triples, go!

<silvia> <...> <...>



Go Triples, go!

<...> <...> <...> = un knowledge graph!



Un sacco di affermazioni per raggiungere la libertà (descrittiva)

```
<http://www.regesta.com/diego> <http://xmlns.com/foaf/0.1/familyName>  
<http://www.regesta.com/diego> <http://xmlns.com/foaf/0.1/firstName>  
<http://www.regesta.com/diego> <http://xmlns.com/foaf/0.1/gender>  
<http://www.regesta.com/diego> a  
<http://www.regesta.com/diego> <http://www.w3.org/ns/org#memberOf>  
<http://www.regesta.com/silvia> <http://xmlns.com/foaf/0.1/familyName>  
<http://www.regesta.com/silvia> <http://xmlns.com/foaf/0.1/firstName>  
<http://www.regesta.com/silvia> <http://xmlns.com/foaf/0.1/gender>  
<http://www.regesta.com/silvia> a  
<http://www.regesta.com/silvia> <http://www.w3.org/ns/org#memberOf>  
<http://www.regesta.com/about> a  
<http://www.regesta.com/about> <http://www.w3.org/2004/02/skos/core#prefLabel> 'Regesta.exe srl'.  
<http://www.regesta.com/silvia> <http://xmlns.com/foaf/0.1/knows>
```

```
'Camarda' .  
'Diego' .  
'male' .  
<http://xmlns.com/foaf/0.1/Person> .  
<http://www.regesta.com> .  
'Mazzini' .  
'Silvia' .  
'female' .  
<http://xmlns.com/foaf/0.1/Person> .  
<http://www.regesta.com> .  
<http://www.w3.org/ns/org#Organization> .  
'Regesta.exe srl' .  
<http://www.regesta.com/diego> .
```

<...> <...> <...>.

```
<noBeer> <makeGoCreazy> <homer>. <noTv> <makeGoCreazy> <homer>.<noBeer> <makeGoCreazy> <homer>. <noTv>  
<makeGoCreazy> <homer>. <noBeer> <makeGoCreazy> <homer>. <noTv> <makeGoCreazy> <homer>. <noBeer>  
<makeGoCreazy> <homer>. <noTv> <makeGoCreazy> <homer>. <noBeer> <makeGoCreazy> <homer>. <noTv> <makeGoCreazy>  
<homer>. <noBeer> <makeGoCreazy> <homer>. <noTv> <makeGoCreazy> <homer>. <noBeer> <makeGoCreazy> <homer>.  
<noTv> <makeGoCreazy> <homer>. <noBeer> <makeGoCreazy> <homer>. <noTv> <makeGoCreazy> <homer>. <noBeer>  
<makeGoCreazy> <homer>. <noTv> <makeGoCreazy> <homer>. <noBeer> <makeGoCreazy> <homer>. <noTv> <makeGoCreazy>  
<homer>. <noBeer> <makeGoCreazy> <homer>. <noTv> <makeGoCreazy> <homer>. <noBeer> <makeGoCreazy> <homer>.  
<noTv> <makeGoCreazy> <homer>. <noBeer> <makeGoCreazy> <homer>. <noTv> <makeGoCreazy> <homer>. <noBeer>  
<makeGoCreazy> <homer>. <noTv> <makeGoCreazy> <homer>. <noBeer> <makeGoCreazy> <homer>. <noTv> <makeGoCreazy>  
<homer>. <noBeer> <makeGoCreazy> <homer>. <noTv> <makeGoCreazy> <homer>. <noBeer> <makeGoCreazy> <homer>.  
<noTv> <makeGoCreazy> <homer>. <noBeer> <makeGoCreazy> <homer>. <noTv> <makeGoCreazy> <homer>. <noBeer> ...
```

Parola chiave
aggregazione

Non è solo un cambio di formato

Parco “dummy”

- nome del parco
- ha estensione
- ha orari di apertura
- ha un indirizzo
- ha cap 00xxx
- ha shape

Faggio monumentale

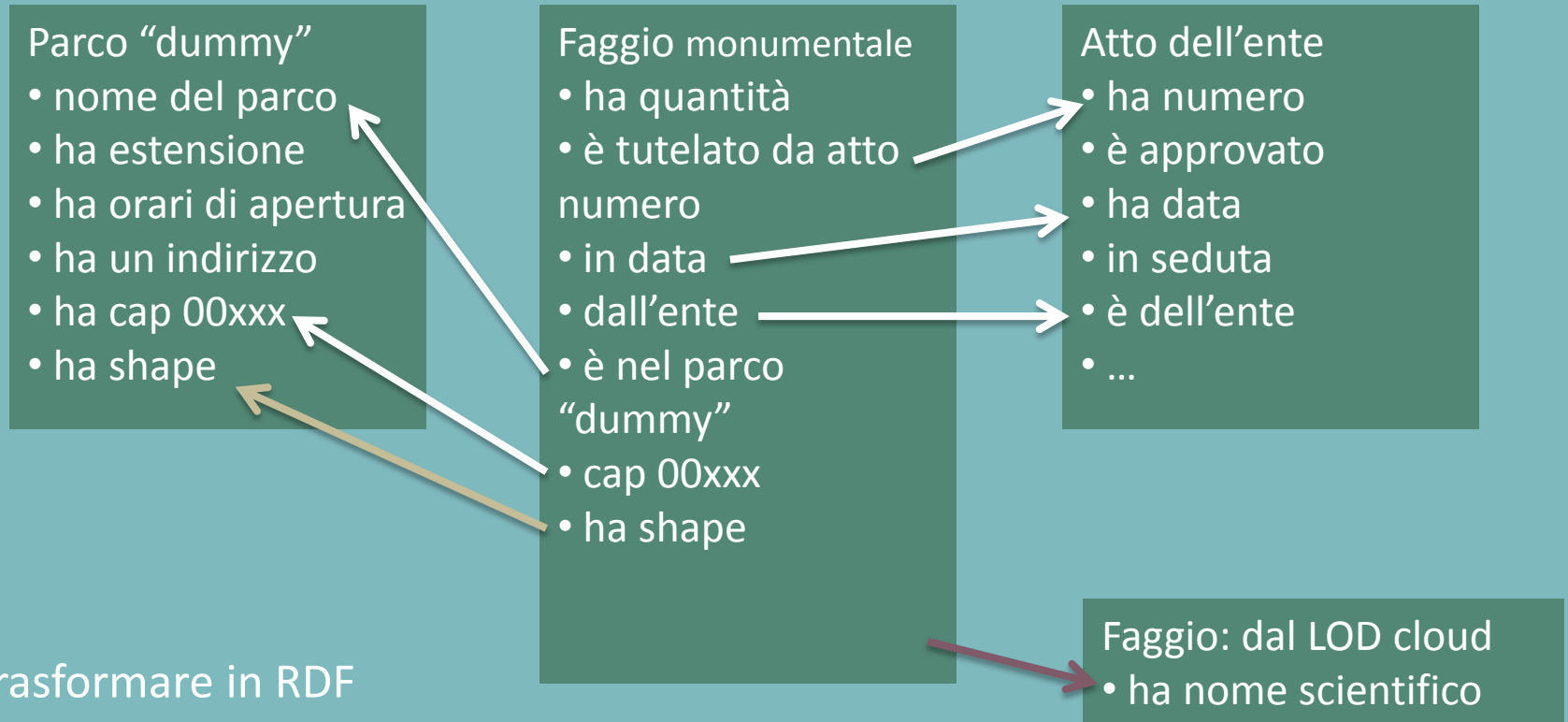
- ha quantità
- è tutelato da atto numero
- in data
- dall’ente
- è nel parco “dummy”
- cap 00xxx
- ha shape

Atto dell’ente

- ha numero
- è approvato
- ha data
- in seduta
- è dell’ente
- ...

Nei portali opendata
pubblichiamo sempre
gli stessi stessi dati

Non è solo un cambio di formato



Trasformare in RDF
significa concettualizzare
ed integrare (e delegare!)

Valore ripetuto →

Valore verificabile →

Valore aggiunto →

Gli standard per il **semantic web**

Avete studiato l'HTML? Bene! ora è tempo di ricominciare

RDF

<http://www.w3.org/standards/techs/rdf>

SPARQL

<http://www.w3.org/standards/techs/sparql>


ONTOLOGIES

<http://www.w3.org/standards/semanticweb/ontology>

È tempo per un nuovo standard RDF

The **Resource Description Framework**
is a general-purpose language for representing
information in the Web.

È tempo per un nuovo standard SPARQL



The SPARQL Protocol and RDF Query Language
is a query language and protocol for RDF.

È tempo per un nuovo standard Ontologies

On the Semantic Web, vocabularies define the concepts and relationships (also referred to as “terms”) used to describe and represent an area of concern.

Pre:fixes (ontologies)

solo poche parole

PREFIX foaf: <<http://xmlns.com/foaf/0.1/>>

PREFIX dc: <<http://purl.org/dc/elements/1.1/>>

PREFIX rdfs: <<http://www.w3.org/2000/01/rdf-schema#>>



foaf:firstName

dc:title

rdfs:label

URI, IRI, URN, ...

e pasta e ceci

Internationalized Resource Identifier (IRI)

Uniform Resource Identifier (URI)

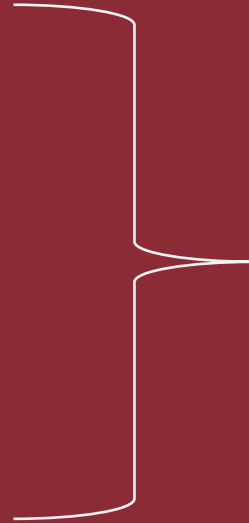
Uniform Resource Locator (URL)

Uniform Resource name (URN)

Browsing the **web of data**

Resource Description Framework

- › SPARQL endpoint
- › IRI deferenziabili
- › content negotiation



obbligator!

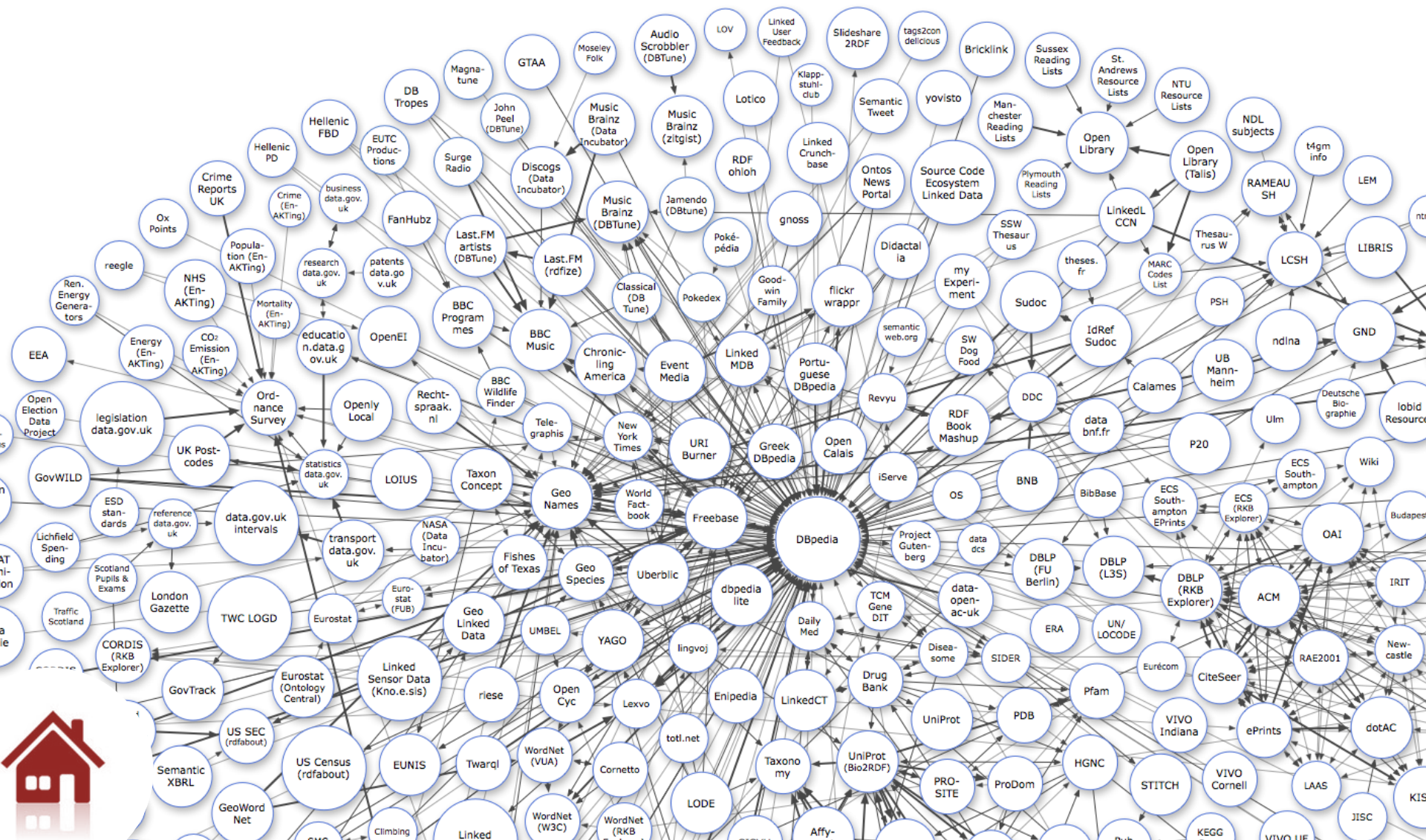
Resource Description Framework

- › SPARQL endpoint
- › IRI deferenziabili
- › content negotiation

facoltativi!
(ma necessari)

- › up-to-date
- › la URL dell'endpoint deve essere deducibile dalle risorse
- › le risorse devono essere descritte da dc:title o rdfs:label
- › bisogna fornire una maschera di accesso per umani
- › supporto JSONP
- › porte standard, come 80 (HTTP)

Una sola API un mondo da esplorare



Una sola API

interlinking

```
<a href="...">clicca qui</a>
```



owl:sameAs

rdfs:seeAlso

...

Negotiate content (and sin no more!)

Hi dude, I accept:

text/html,application/xhtml+xml

Great! I'll serve you a web page

Html
page

Hi dude, I accept:

application/rdf+xml

Great... 303, redirect!

RDF
data

Hi dude, I accept:

pizza/margherita

mmm... sorry

406
error

application/rdf+xml

http://it.dbpedia.org/resource/Politecnico_di_Torino

```
<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
xmlns:dbpedia-owl="http://dbpedia.org/ontology/"
xmlns:foaf="http://xmlns.com/foaf/0.1/" >
```

```
<rdf:Description rdf:about="http://it.dbpedia.org/resource/Politecnico_di_Torino">
  <rdf:type rdf:resource="http://schema.org/Organization" />
  <rdfs:label xml:lang="it">Politecnico di Torino</rdfs:label>
  [...]
  <dbpedia-owl:rector rdf:resource="http://it.dbpedia.org/resource/Marco_Gilli" />
  [...]
  <foaf:homepage rdf:resource="http://www.polito.it" />
</rdf:Description>
```

```
[...]
</rdf:RDF>
```

text/n3

http://it.dbpedia.org/resource/Politecnico_di_Torino

```
@prefix dbpedia-owl:      <http://dbpedia.org/ontology/> .
@prefix dbpedia-it:      <http://it.dbpedia.org/resource/> .
@prefix rdf:              <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix rdfs:             <http://www.w3.org/2000/01/rdf-schema#> .
@prefix foaf:             <http://xmlns.com/foaf/0.1/> .
```

```
dbpedia-it:Politecnico_di_Torino    rdfs:label      "Politecnico di Torino"@it ;
dbpedia-it:Politecnico_di_Torino    foaf:homepage   <http://www.polito.it> ;
dbpedia-owl:rector                   dbpedia-it:Marco_Gilli ;
rdf:type <http://schema.org/Organization>.
```

[...]

Negotiate content

(and sin no more!)

application/rdf+xml

application/xml

text/plain

text/turtle

application/x-turtle

application/trix

application/x-trig

text/n3

text/rdf+n3

application/trix

application/x-trig

application/x-binary-rdf

text/x-nquads

application/ld+json

application/rdf+json

application/xhtml+xml

text/xml

application/json

application/rdf+xml

application/rdf+n3

application/sparql-results+xml

application/sparql-results+json

Negotiate content

usare CURL...

```
curl -L -H "Accept: application/rdf+xml"  
http://dati.camera.it/ocd/governo.rdf/g102
```

```
curl -L -H "Accept: text/n3"  
http://dati.camera.it/ocd/governo.rdf/g102
```

Negotiate content

...o un framework!

Java : Sesame / Jena

Python : RDFLib

Ruby : RDF.rb

nodejs : sparql-client

o, come faccio io,
semplici chiamate HTTP GET +
parsing del risultato come json o xml

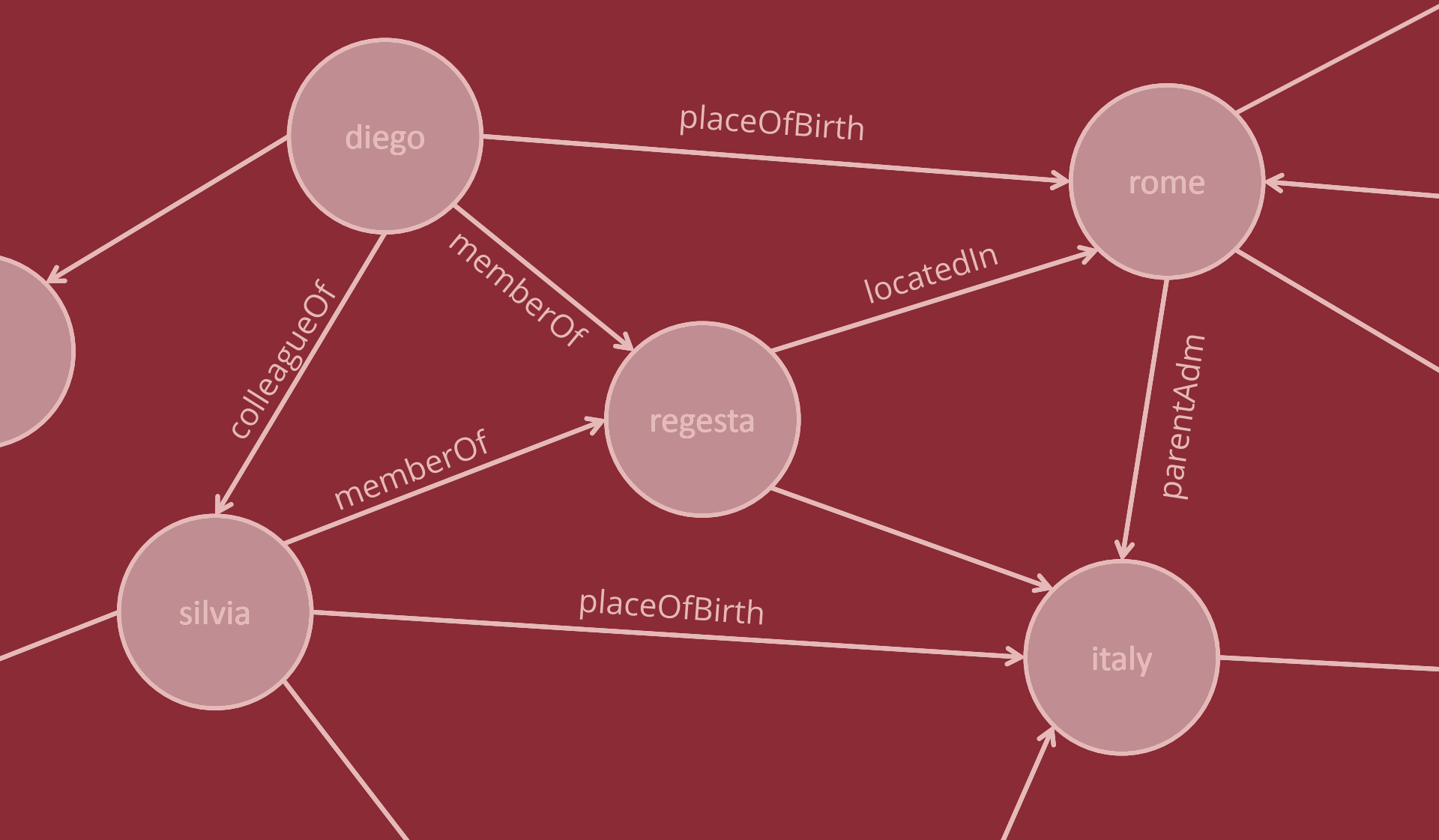
SPARQL

un linguaggio da conoscere

```
SELECT * {?minnesota ?banana ?sole}
```

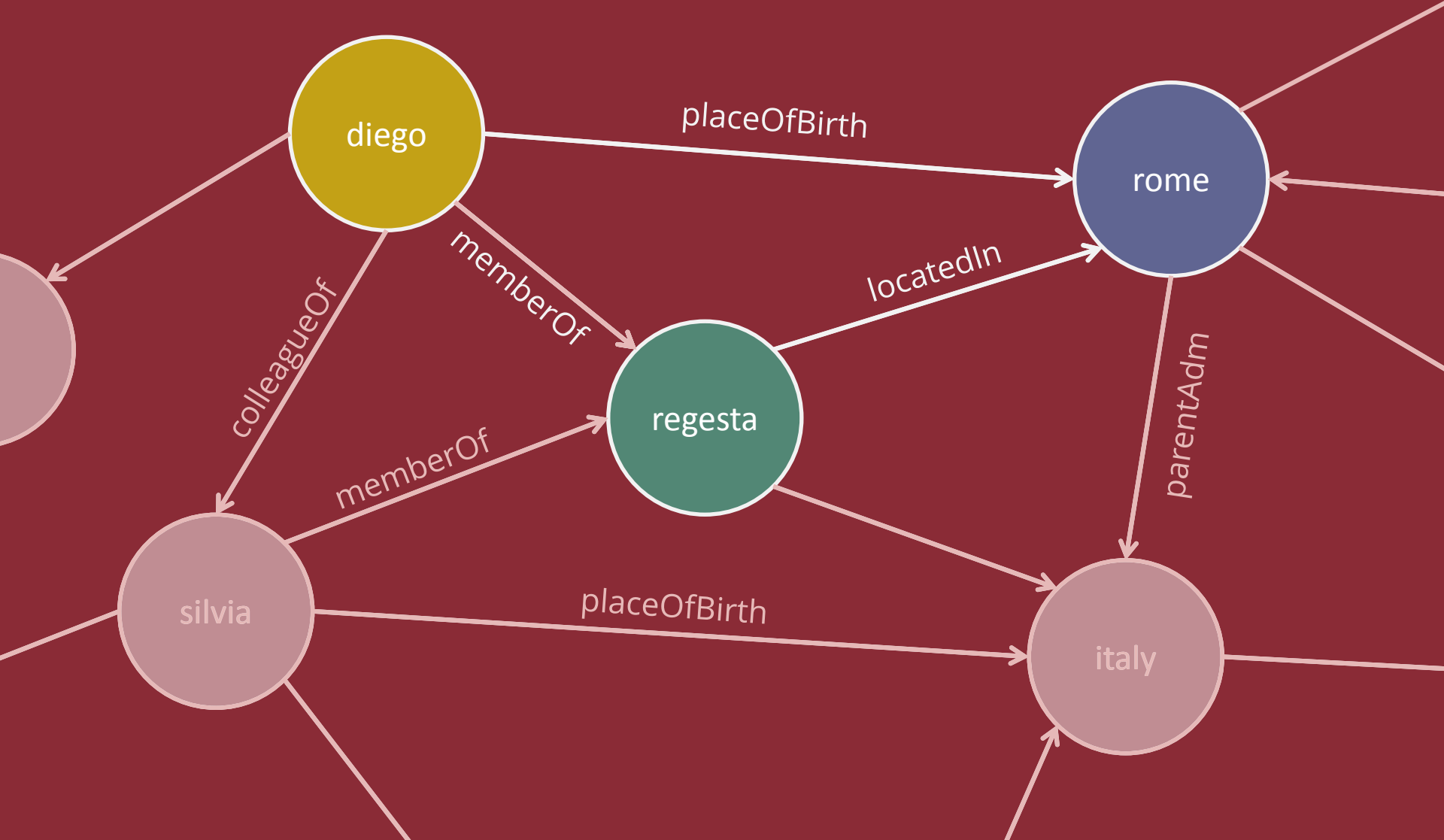
SPARQL

group graph pattern



SPARQL

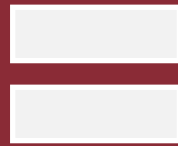
group graph pattern



SPARQL

group graph pattern

```
SELECT ?person {  
  ?person <placeOfBirth> ?place ;  
          <memberOf> ?company .  
  ?company <locatedIn> ?place .  
}
```

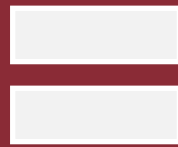


<diego>

SPARQL

group graph pattern

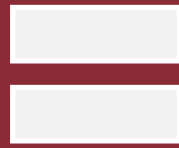
```
SELECT ?person ?prop ?obj {  
  ?person <placeOfBirth> ?place ;  
    <memberOf> ?company ;  
  ?prop ?obj .  
  ?company <locatedIn> ?place .  
}
```



(gira la pagina)

SPARQL

group graph pattern



person

prop

obj

<diego>

rdf:type

foaf:Person

<diego>

foaf:firstName

'Diego'

<diego>

foaf:familyName

'Camarda'

<diego>

foaf:gender

'male'

<diego>

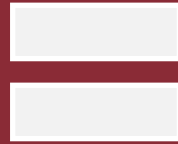
org:memberOf

<regesta>

SPARQL

describe

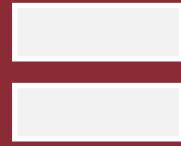
DESCRIBE <diego>



(gira la pagina)

SPARQL

describe

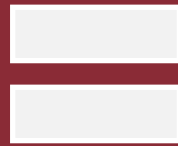


```
<diego> rdf:type foaf:Person .  
<diego> foaf:firstName 'Diego' .  
<diego> foaf:familyName 'Camarda' .  
<diego> foaf:gender 'male' .  
<diego> org:memberOf <regesta> .  
<silvia> foaf:knows <diego> .
```

SPARQL

construct

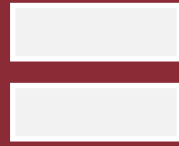
```
CONSTRUCT {<diego> foaf:donaldDuck ?c}  
WHERE{<diego> ?b ?c. }
```



(turn the page)

SPARQL

construct



<diego>	foaf:donaldDuck	foaf:Person .
<diego>	foaf:donaldDuck	'Diego' .
<diego>	foaf:donaldDuck	'Camarda' .
<diego>	foaf:donaldDuck	'male' .
<diego>	foaf:donaldDuck	<regesta> .

SPARQL

requisiti minimi

DISTINCT, COUNT

GRAPH, PREFIX

FILTER (isBlank, isIRI, isLiteral, isNumeric)

REGEX, STR

FILTER NOT EXISTS, MINUS

ORDER BY, OFFSET, LIMIT

tutto quello che bisogna sapere sulla sintassi

<http://www.w3.org/TR/sparql11-query/>

RDF data

conservazione e

pubblicazione

È tutto molto lento

quindi manteniamo la calma

In media

1 record → **15 triples**

Es. alla Camera dei deputati

2.949.771 votes → **64.948.856 triples**

Se prima avevamo "data" ora abbiamo "big data"

data → **big data**

Triplestores

obiettivo: SPARQL endpoint

C++	Virtuoso
Java	Sesame
Java	Fuseki (Jena)
Java	Owlrim / Bigdata (Sesame)
C++	AllegroGraph
Java	D2R server
PHP	ARC2
	...

<http://yourdomain/sparql>

Triplestores

obiettivo: SPARQL endpoint

Virtuoso

Sesame

Fuseki (Jena)

Owlim / Bigdata (Sesame)

AllegroGraph

D2R server

ARC2

...

<http://yourdomain/sparql>

Ingaggiare un **endpoint**

SPARQL magic

una query per tutte le stagioni

```
select distinct ?o where {?s a ?o}
```

```
select ?o count(distinct ?s) where {?s a ?o}
```

```
select count(?s) where {?s ?p ?o}
```

```
select count(?s) ?class where {?s ?p ?o; a ?class}
```

```
select distinct ?p where {?s a <http://classe>; ?p ?o}
```

```
select ?p count(?p) where {?s a <http://classe>; ?p ?o}
```

```
select ?s where {?s a <http://classe>}
```

```
?p ?o where {<http://URI> ?p ?o} ?p ?o ?p1 ?o2  
where {<http://URI> ?p ?o. OPTIONAL{?o ?p1 ?o2. FILTER(isBlank(?o))}}
```

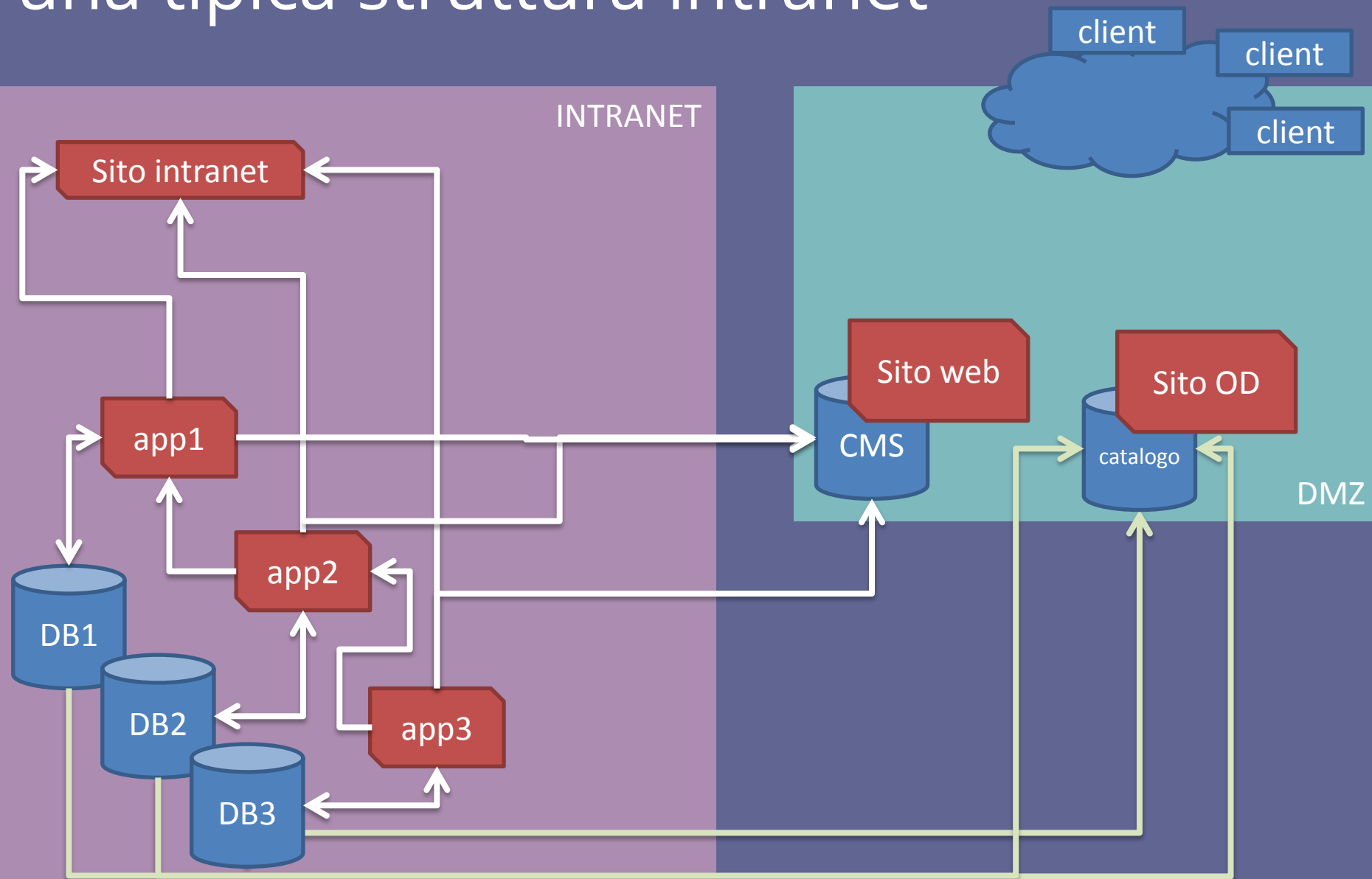
```
select distinct ?s ?title where {?s a <http://classe>;  
dc:title ?title. FILTER(REGEX(? title,'parola','i'))} LIMIT 100
```

LDP

Linked Data Platform

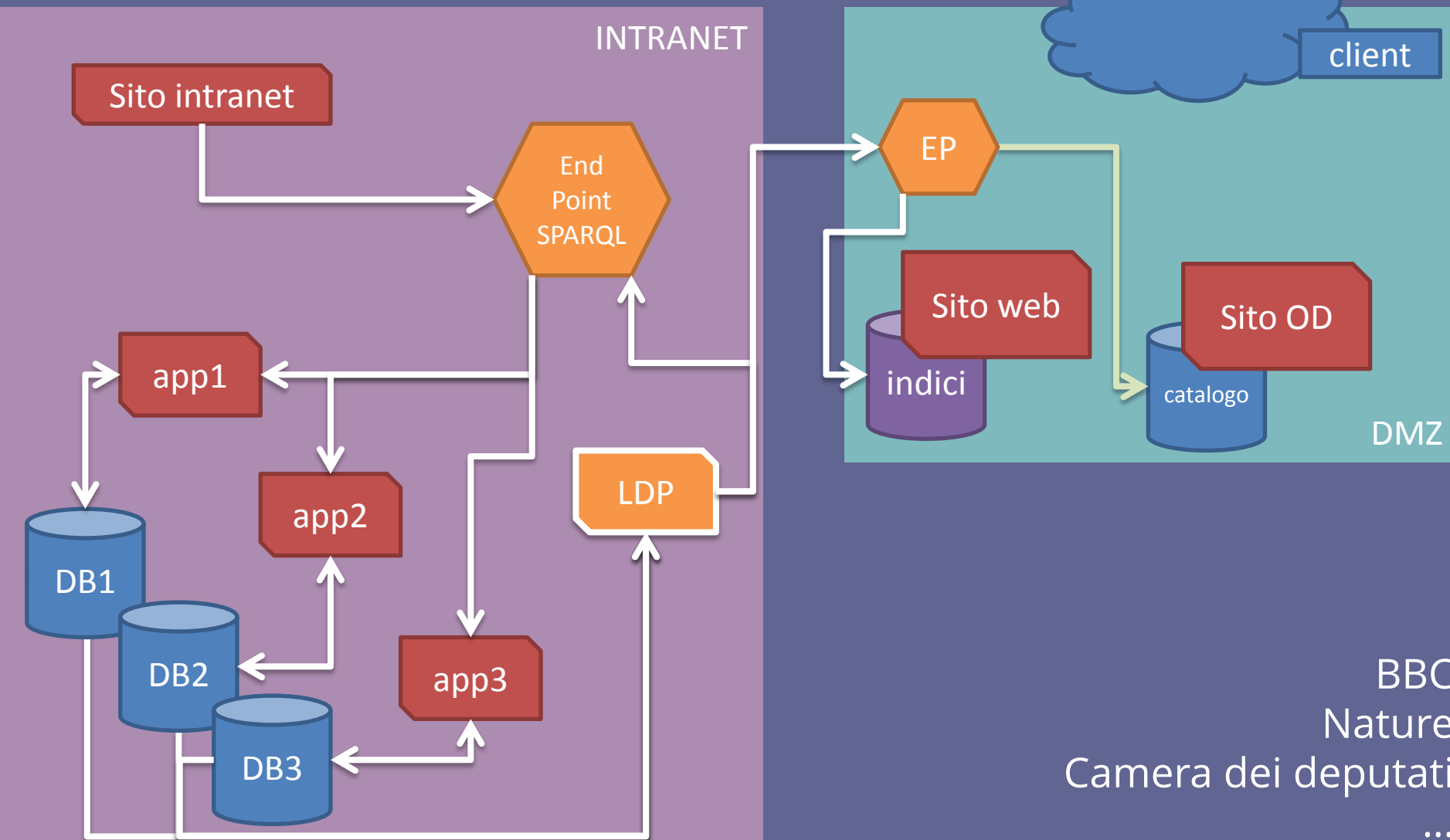
Enterprise Linked Data

una tipica struttura intranet



Enterprise Linked Data

la rivoluzione LDP



Useful links

W3C standards

<http://www.w3.org/standards/semanticweb/>

OKFN endpoints status (and list)

<http://sparqls.okfn.org>

LodLive (a SPARQL navigator)

<http://en.lodlive.it>

a very good intro to RDF

<https://github.com/JoshData/rdfabout/blob/gh-pages/intro-to-rdf.md>

Tim Berners-Lee's "Linked Data – 5 stars ranking"

<http://www.w3.org/DesignIssues/LinkedData.html>

My github page

<http://github.com/dvcama>

My email

<mailto:diego.camarda@regesta.com>