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SPARQL

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2016/4/1

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SPARQL语法分析

SPARQL

SPARQL Protocol And Rdf Query Language

- **SPARQL** for triple store
- **SQL** for relationship database

Triple Store

- Oracle NoSQL

- AllegroGraph



- OpenLink Virtuoso



- Stardog



- Others

4store | BigData | TDB | MarcLogic

RDF Benefits

RDF-based solutions, have benefits such as the following:

- **A simple and uniform standard data model..**
- **A powerful standard query language.**
- **Standardized data interchange formats.**
 - JSON-LD RDF/XML N-Triples Turtle



SPARQL Form

PREFIX (Namespace Prefixes)

e.g. PREFIX plant: <<http://www.linkeddatatools.com/plants>>

SELECT (Result Set)

e.g. SELECT ?name

FROM (Data Set)

e.g. FROM <<http://www.linkeddatatools.com/plantsdata/plants.rdf>>

WHERE (Query Triple Pattern)

e.g. WHERE { ?planttype plant:planttype ?name }

ORDER BY, DISTINCT etc (Modifiers)

e.g. ORDER BY ?name

查询模式

- SELECT - 返回全部或者部分查询结果中的变量；
- ASK - 返回TRUE或FALSE，判断查询结果是否存在；
- DESCRIBE - 返回查询结果中资源的RDF Graph；
- CONSTRUCT - 依据查询结果中的三元组变量，返回新的RDF Graph。



查詢所有人

```
PREFIX vcard: <http://www.w3.org/2001/vcard-rdf/3.0#>
```

```
SELECT ?fn
```

```
WHERE {
```

```
    ?s vcard:FN ?fn.
```

```
} ORDER BY ?fn
```

fn
Becky smith
John Smith
Matt Jones
Sarah Jones

查詢 Family 为 Jones 的人

```
PREFIX vcard: <http://www.w3.org/2001/vcard-rdf/3.0#>
```

```
SELECT ?fn
```

```
WHERE {
```

```
    ?s vcard:FN ?fn ;
```

```
    vcard:N ?n .
```

```
    ?n vcard:Family 'Jones' .
```

```
} ORDER BY ?fn
```

fn
Matt Jones
Sarah Jones

圖模式

-
- **Basic Graph Patterns**, where a set of triple patterns must match
 - **Group Graph Pattern**, where a set of graph patterns must all match
 - **Optional Graph patterns**, where additional patterns may extend the solution
 - **Alternative Graph Pattern**, where two or more possible patterns are tried
 - **Patterns on Named Graphs**, where patterns are matched against named graphs



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查詢所有人及年齡

```
PREFIX vcard: <http://www.w3.org/2001/vcard-rdf/3.0#>
```

```
SELECT ?fn ?age
```

```
WHERE {
```

```
    ?s vcard:FN ?fn.
```

```
    ?s vcard:AGE ?age .
```

```
} ORDER BY ?fn
```

fn	age
Sarah Jones	29

查詢所有人及年齡

```
PREFIX vcard: <http://www.w3.org/2001/vcard-rdf/3.0#>
```

```
SELECT ?fn ?age
```

```
WHERE {
```

```
  ?s vcard:FN ?fn.
```

```
  OPTIONAL { ?s vcard:AGE ?age . }
```

```
} ORDER BY ?fn
```

fn	age
Becky smith	
John Smith	
Matt Jones	
Sarah Jones	29

结果修饰

结果修饰符能够影响查询的返回结果，从而使查询在作用范围的广度和作用效果的程度上都有显著地增强。结果修饰符主要包含以下几种：

- DISTINCT
- REDUCED
- ORDER BY
- OFFSET 和 LIMIT

Syntax for Literals

- "chat"
- 'chat'@fr with language tag "fr"
- "xyz"^^<http://example.org/ns/userDatatype>
- 1, which is the same as "1"^^xsd:integer
- 1.3, which is the same as "1.3"^^xsd:decimal
- 1.0e6, which is the same as "1.0e6"^^xsd:double
- true, which is the same as "true"^^xsd:boolean

ASK

PREFIX vcard: <<http://www.w3.org/2001/vcard-rdf/3.0#>>

ASK {

 ?s vcard:FN 'John Smith'.

}

true

ASK {

 ?s vcard:FN 'Jack Smith'.

}

false

DESCRIBE

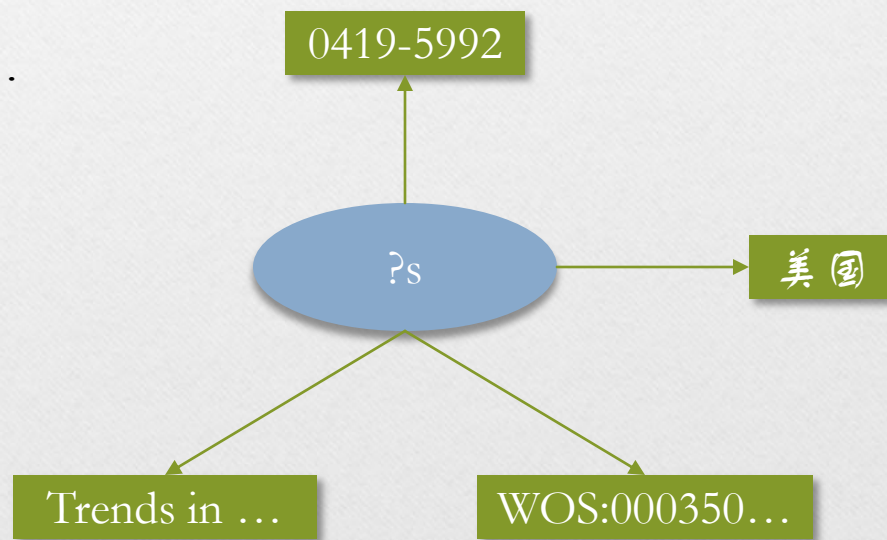
PREFIX bibo: <http://purl.org/ontology/bibo/>

DESCRIBE ?s

WHERE {

 ?s bibo:issn '0419-5992' .

}



Prefix Namespace IRI

dc <http://purl.org/dc/elements/1.1/>
sicls <http://www.sicls.ac.cn/ontology/>
n2 <http://www.sicls.ac.cn/data/article/>
rdf <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
bibo <http://purl.org/ontology/bibo/>
foaf <http://xmlns.com/foaf/0.1/>
gn <http://www.geonames.org/ontology#>
n7 <http://www.sicls.ac.cn/data/author/>
xsdh <http://www.w3.org/2001/XMLSchema#>

Subject Item

n2:f7b2904ab4b54574a85c7bed34c1f3a8

rdf:type

[bibo:Article](#)

dc:title

Trends in Diabetes Incidence: The Framingham Heart Study

bibo:issn

0149-5992

gn:countryName

美国

bibo:status

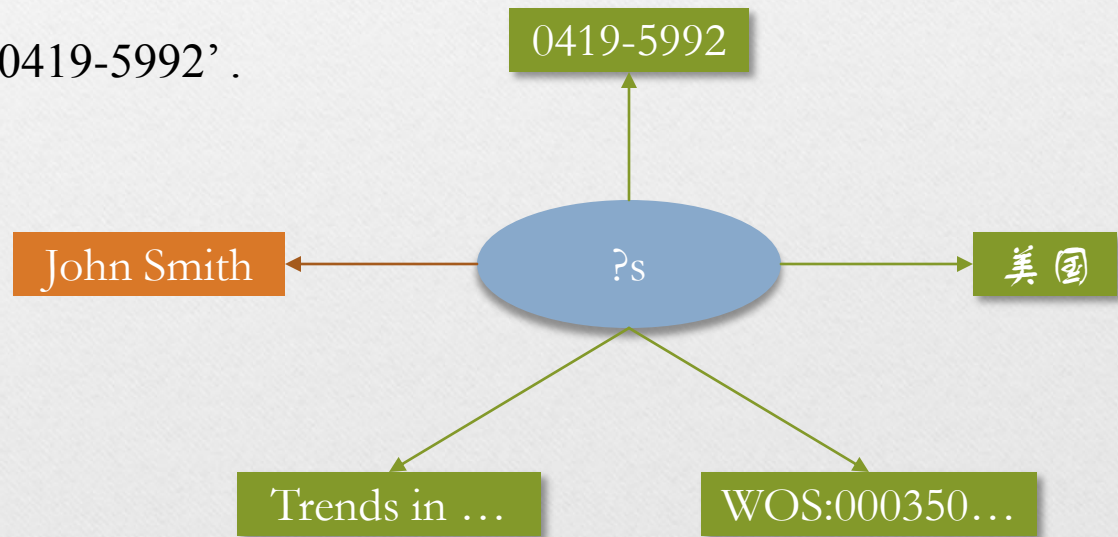
ref p c

sicls:isi

WOS:000350303700035

CONSTRUCT

```
PREFIX bibo: <http://purl.org/ontology/bibo/>  
CONSTRUCT {?s dc:author 'John Smith' .}  
WHERE {  
  ?s bibo:issn '0419-5992' .  
}
```



Prefix Namespace IRI

dc <http://purl.org/dc/elements/1.1/>
rdf <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
xsdh <http://www.w3.org/2001/XMLSchema#>
n2 <http://www.sicls.ac.cn/data/article/>

Subject Item

n2:f7b2904ab4b54574a85c7bed34c1f3a8

dc:author

John Smith

不会返回资源的所有信息

只返回Construct中要求的信息

SPARQL Endpoint 案例分享

SPARQL Endpoint

- **SPARQL Endpoint** in the semantic web world - and is the way in which the data on the semantic web is published to the outside world in a query enabled form.
- A SPARQL endpoint enables users (human or other) to query a knowledge base via the SPARQL language.

家谱知识库

- SPARQL Endpoint

<http://data.library.sh.cn:8890/sparql>

Virtuoso SPARQL Query Editor

Default Data Set Name (Graph IRI)

Query Text

```
select *  
where {  
  ?s bf:label ?name .  
  filter contains(str(?name), '陈')  
}
```

s	name
http://data.library.sh.cn/jp/entity/person/jrciy2qzlacngwzw	"伊忠陈"@chs
http://data.library.sh.cn/jp/entity/person/cx3sgvewxq9qcoin	"杜必陈"@chs
http://data.library.sh.cn/jp/entity/person/mzq2ux7ifdz6xz26	"吴陈聪"@chs
http://data.library.sh.cn/jp/entity/person/v2j1v2tfqyebx1vs	"冷陈"@chs
http://data.library.sh.cn/jp/entity/person/hcmjc1anetlag5xx	"竺陈茜"@chs
http://data.library.sh.cn/jp/entity/person/dp2r3ivfp6wbixa6	"金陈"@chs
http://data.library.sh.cn/jp/entity/person/3gs5h42de1rkq2wq	"金陈"@chs
http://data.library.sh.cn/jp/entity/person/svwu3z5q292jq37l	"金陈"@chs
http://data.library.sh.cn/jp/entity/person/z7ts7mby1mqfkshg	"金陈"@chs
http://data.library.sh.cn/jp/entity/person/vdrjt5v38zfablis	"胡陈"@chs
http://data.library.sh.cn/jp/entity/person/uwu6o88e95znjf32	"姜陈"@chs
http://data.library.sh.cn/jp/entity/person/d65rq2losvl7r87d	"莫君陈"@chs
http://data.library.sh.cn/jp/entity/person/wue16121f77dvvf5	"莫君陈"@chs
http://data.library.sh.cn/jp/entity/person/8z6a8agea4mtfc5p	"夏陈武"@chs
http://data.library.sh.cn/jp/entity/person/eobukv8921nqq1ts	"徐陈显"@chs
http://data.library.sh.cn/jp/entity/person/dcimm8npls93iu6r	"陈一士"@chs

RESTful调用

- <http://data.library.sh.cn:8890/sparql>

Client需要提交的参数:

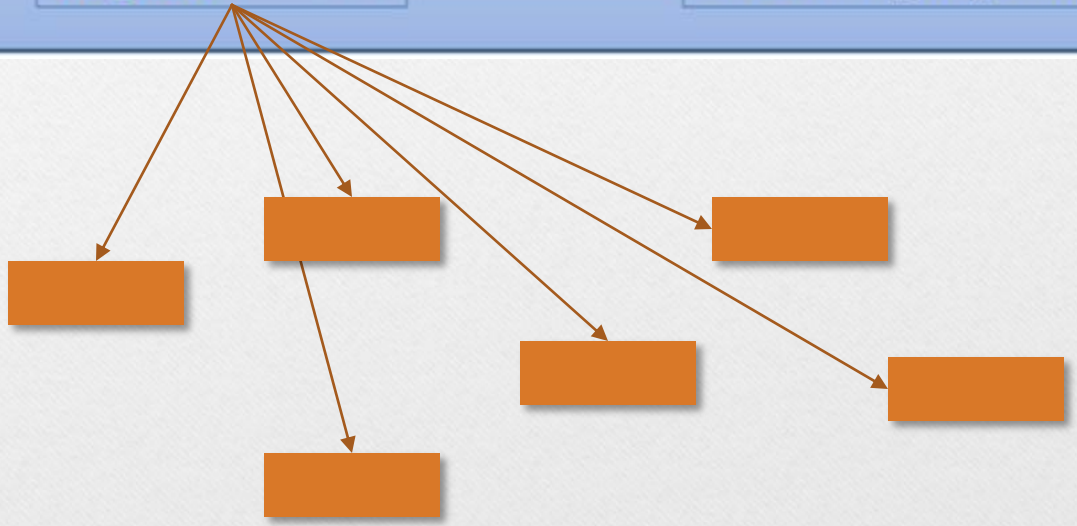
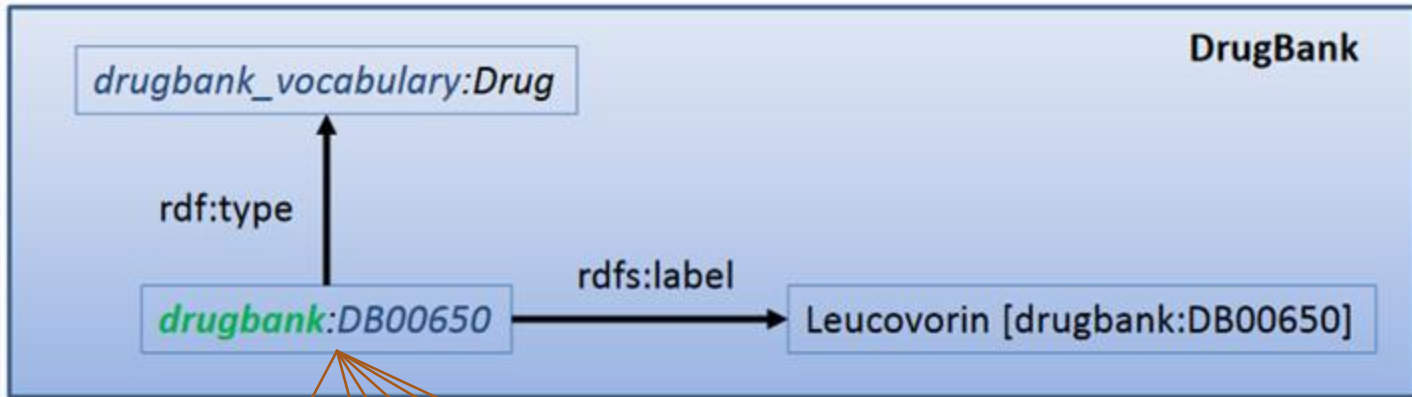
default-graph-uri=<http://gen.library.sh.cn/graph/person>

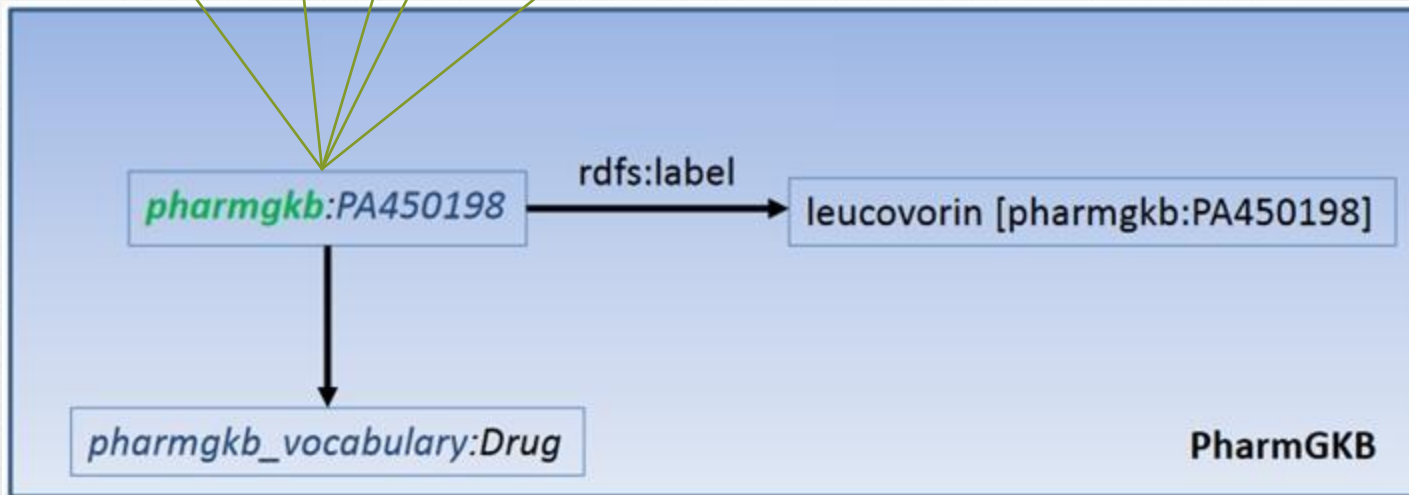
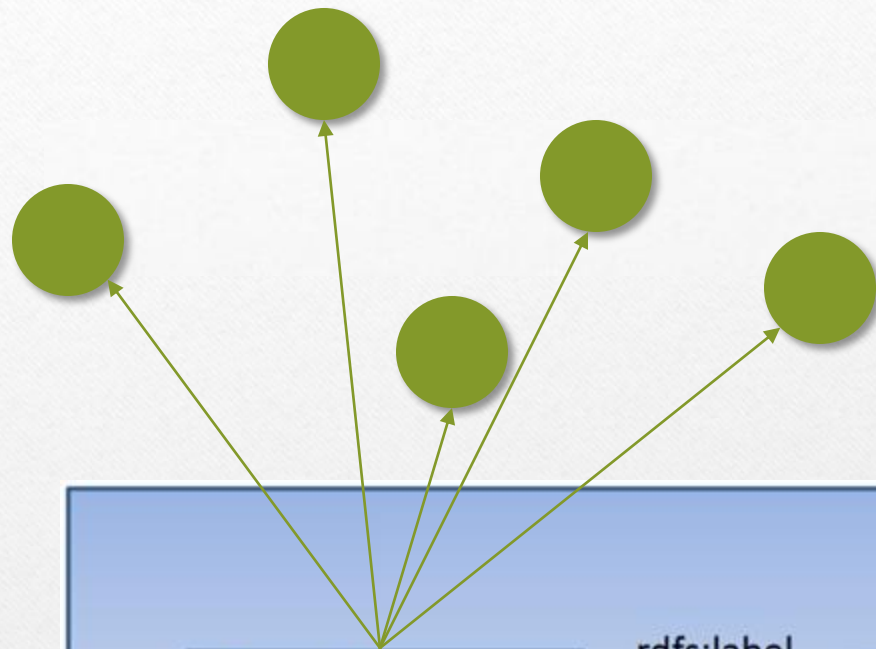
query=`select * where {?s bf:label ?name. filter contains(str(?name), '陈')}`

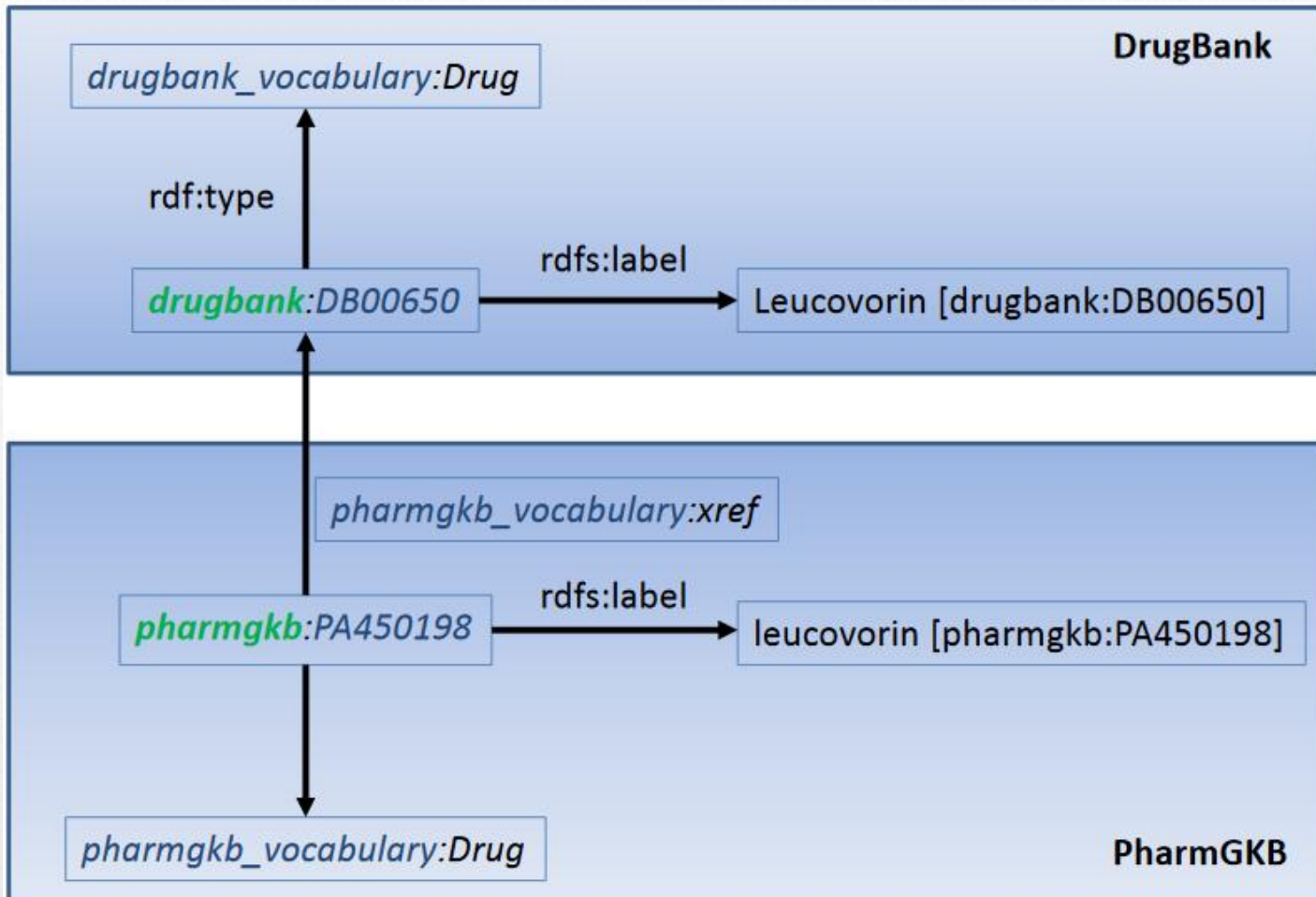
format=json

```
{ "head": { "link": [], "vars": ["s", "name"] },
  "results": { "distinct": false, "ordered": true, "bindings": [
    { "s": { "type": "uri", "value": "http://data.library.sh.cn/jp/entity/person/jrciy2qztlacngwzw" },
      "name": { "type": "literal", "xml:lang": "chs", "value": "\u4F0A\u5FE0\u9648" }},
    { "s": { "type": "uri", "value": "http://data.library.sh.cn/jp/entity/person/cx3sgvewxq9qcoin" },
      "name": { "type": "literal", "xml:lang": "chs", "value": "\u675C\u5FC5\u9648" }},
    { "s": { "type": "uri", "value": "http://data.library.sh.cn/jp/entity/person/mzq2ux7ifdz6xz26" },
      "name": { "type": "literal", "xml:lang": "chs", "value": "\u5434\u9648\u806A" }},
    { "s": { "type": "uri", "value": "http://data.library.sh.cn/jp/entity/person/v2jlv2tfqyebx1vs" },
      "name": { "type": "literal", "xml:lang": "chs", "value": "\u51B7\u9648" }},
    { "s": { "type": "uri", "value": "http://data.library.sh.cn/jp/entity/person/hcmjclanetlag5xx" },
      "name": { "type": "literal", "xml:lang": "chs", "value": "\u7AFA\u9648\u8469" }},
    { "s": { "type": "uri", "value": "http://data.library.sh.cn/jp/entity/person/dp2r3ivfp6wbixa6" },
      "name": { "type": "literal", "xml:lang": "chs", "value": "\u91D1\u9648" }},
    { "s": { "type": "uri", "value": "http://data.library.sh.cn/jp/entity/person/3gs5h42de1rkq2wq" },
      "name": { "type": "literal", "xml:lang": "chs", "value": "\u91D1\u9648" }},
    { "s": { "type": "uri", "value": "http://data.library.sh.cn/jp/entity/person/svwu3z5q292jq371" },
      "name": { "type": "literal", "xml:lang": "chs", "value": "\u91D1\u9648" }},
    { "s": { "type": "uri", "value": "http://data.library.sh.cn/jp/entity/person/z7ts7mbyl1mqfkshg" },
      "name": { "type": "literal", "xml:lang": "chs", "value": "\u91D1\u9648" }},
    { "s": { "type": "uri", "value": "http://data.library.sh.cn/jp/entity/person/vdrjt5v38zfablis" },
      "name": { "type": "literal", "xml:lang": "chs", "value": "\u80E1\u9648" }},
    { "s": { "type": "uri", "value": "http://data.library.sh.cn/jp/entity/person/uwu6o88e95znjf32" },
      "name": { "type": "literal", "xml:lang": "chs", "value": "\u59DC\u9648" }},
    { "s": { "type": "uri", "value": "http://data.library.sh.cn/jp/entity/person/d65rq2losv17r87d" },
      "name": { "type": "literal", "xml:lang": "chs", "value": "\u83AB\u541B\u9648" }},
    { "s": { "type": "uri", "value": "http://data.library.sh.cn/jp/entity/person/wue16121f77dvfv5" },
      "name": { "type": "literal", "xml:lang": "chs", "value": "\u83AB\u541B\u9648" }},
    { "s": { "type": "uri", "value": "http://data.library.sh.cn/jp/entity/person/8z6a8agea4mtfc5p" },
      "name": { "type": "literal", "xml:lang": "chs", "value": "\u590F\u9648\u6B66" }},
    { "s": { "type": "uri", "value": "http://data.library.sh.cn/jp/entity/person/eobukv8921nqglts" },
      "name": { "type": "literal", "xml:lang": "chs", "value": "\u5F90\u9648\u663E" }},
    { "s": { "type": "uri", "value": "http://data.library.sh.cn/jp/entity/person/dcimm8npls93iu6r" },
      "name": { "type": "literal", "xml:lang": "chs", "value": "\u9648\u4E00\u58EB" }},
```

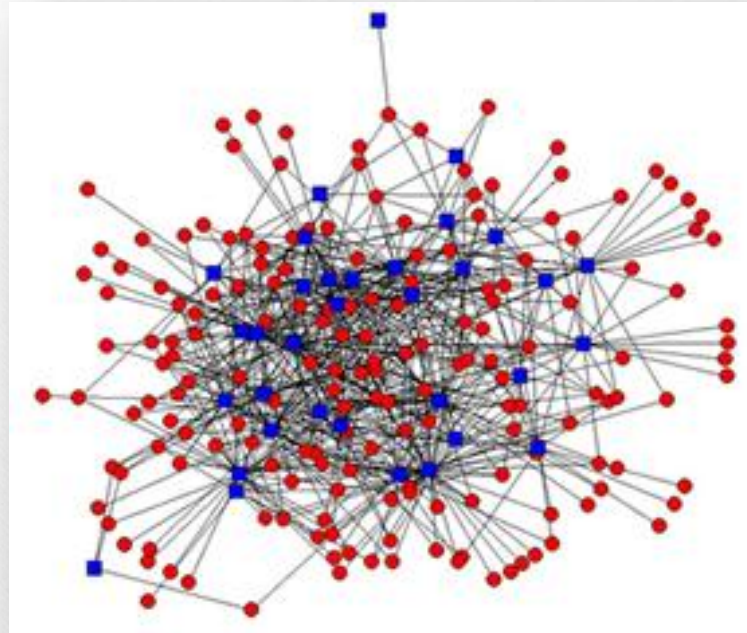
Data Mashup







Leucovorin

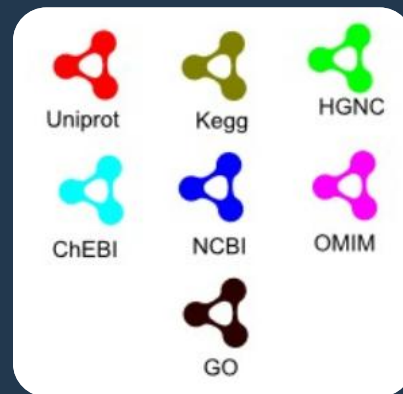


BIO2RDF

独立



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Give a little, Get a little!

