

RDF – Connecting Software and People

Henry Story
Research and Development
Sun Microsystems



The Mythical Man Month Revisited

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- Where is the code?
 - What bugs have already been filed for this project?
 - Where is the mailing list?
 - Where is the web site?
 - Where is the wiki?
 - What other packages rely on this package?
 - Where are the translations?
 - Where is the documentation?
 - ...

The Mythical Man Month Revisited

- Adding people to a project can slow it down because of communication costs.
 - How can one reduce these costs?
 - How does Open Source change the situation?
 - > Reduced labor costs
 - > Many many more potential contributors
 - > Contributors with only passing interest
 - > Much more code, not all controlled by one entity
 - > A distributed network
- Where is the code?
 - What bugs have already been filed for this project?
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Syntax, Semantics & Ontologies

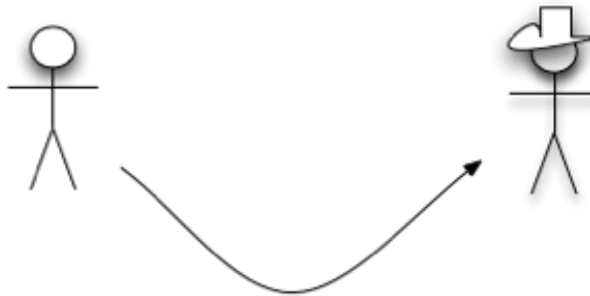
Henry connaît Tim

```
<Person>
  <name>Henry</name>
  <knows>
    <Person>
      <name>Tim</name>
    </Person>
  </knows>
</Person>
```

Henry knows Tim

Henry kennt Tim

```
Person h = new Person("Henry");
Person t = new Person("Tim");
h.setKnows(t);
```



Syntax, Semantics & Ontologies

Henry connaît Tim

```

<Person>
  <name>Henry</name>
  <knows>
    <Person>
      <name>Tim</name>
    </Person>
  </knows>
</Person>

```

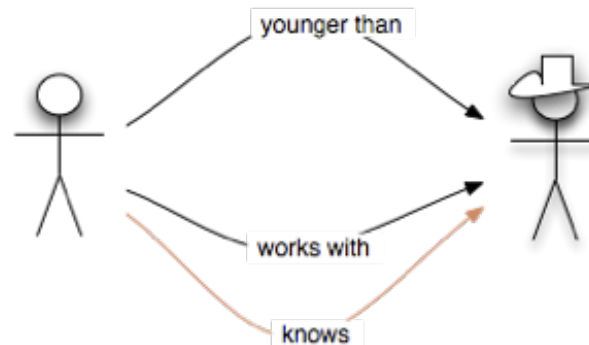
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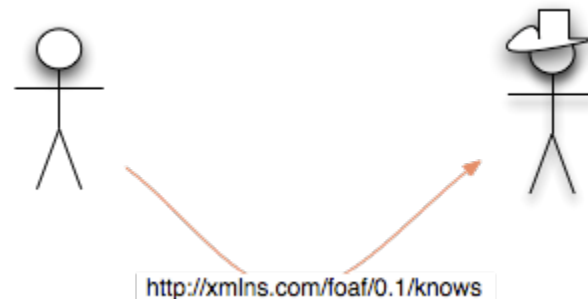
```



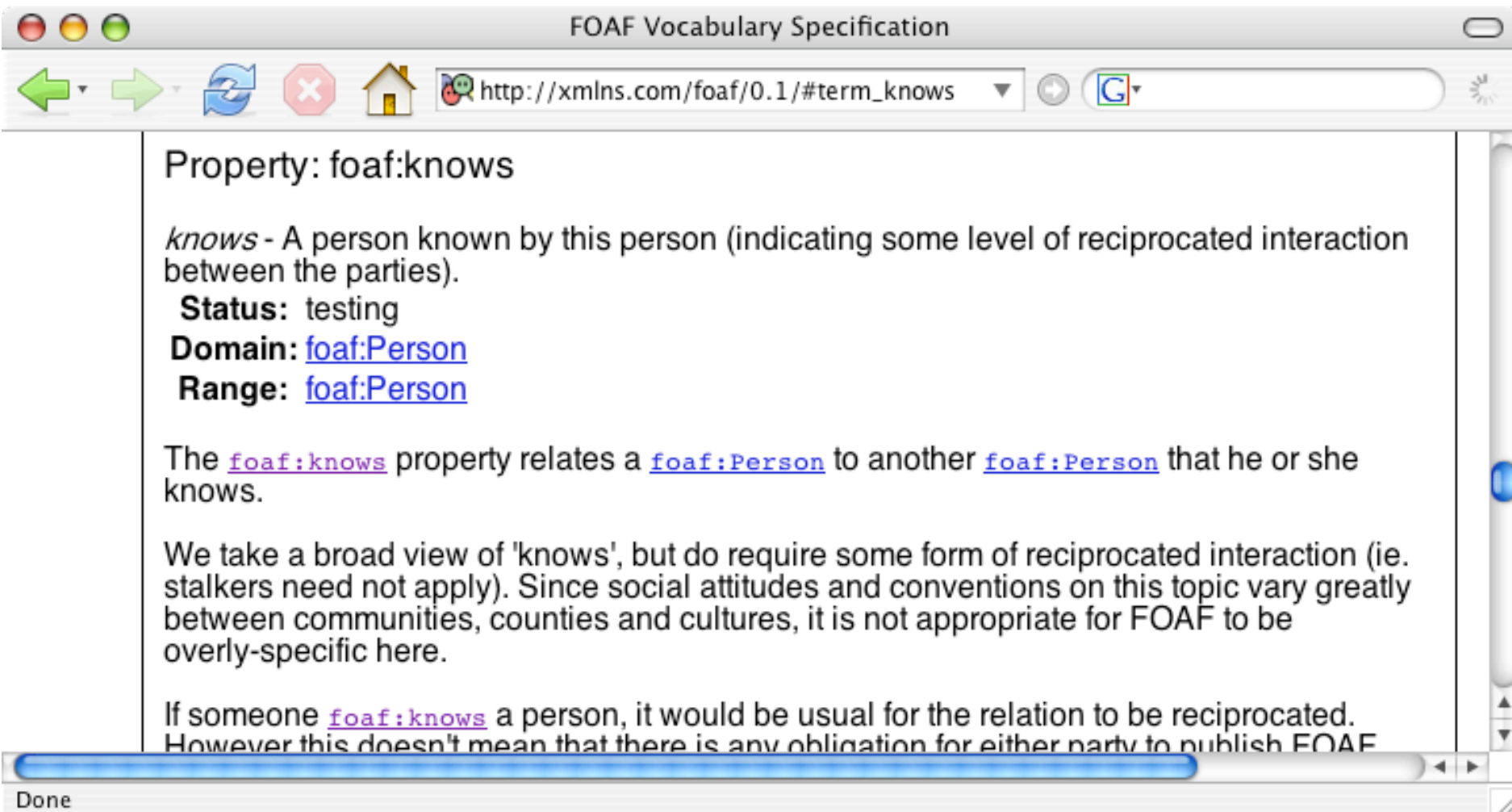
Syntax, Semantics & Ontologies

The URI is cornerstone of the Semantic Web.

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



Syntax, Semantics & Ontologies



FOAF Vocabulary Specification

http://xmlns.com/foaf/0.1/#term_knows

Property: foaf:knows

knows - A person known by this person (indicating some level of reciprocated interaction between the parties).

Status: testing

Domain: [foaf:Person](#)

Range: [foaf:Person](#)

The [foaf:knows](#) property relates a [foaf:Person](#) to another [foaf:Person](#) that he or she knows.

We take a broad view of 'knows', but do require some form of reciprocated interaction (ie. stalkers need not apply). Since social attitudes and conventions on this topic vary greatly between communities, counties and cultures, it is not appropriate for FOAF to be overly-specific here.

If someone [foaf:knows](#) a person, it would be usual for the relation to be reciprocated. However this doesn't mean that there is any obligation for either party to publish FOAF

Done

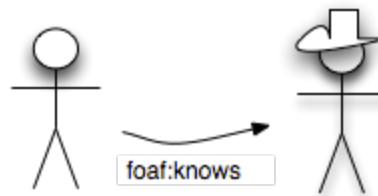
Syntax, Semantics & Ontologies

```

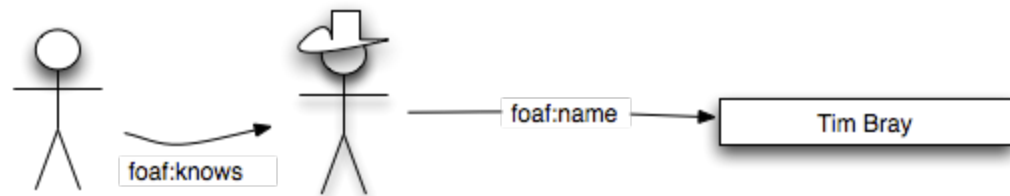
Terminal — vim — 131x(20+12)
Nick-Storys-Computer:~ nick$ curl -H "Accept: application/rdf+xml" -L --get http://xmlns.com/foaf/0.1/knows
<!-- This is the FOAF formal vocabulary description, expressed using W3C RDFS and OWL markup. -->
<!-- For more information about FOAF: -->
<!-- see the FOAF project homepage, http://www.foaf-project.org/ -->
<!-- FOAF developers site, http://rdfweb.org/ -->
<!-- FOAF specification, http://xmlns.com/foaf/0.1/ -->
<!-- first we introduce a number of RDF namespaces we will be using... -->
<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:owl="http://www.w3.org/2002/07/owl#"
  ...
  <rdf:Property rdf:about="http://xmlns.com/foaf/0.1/knows" vs:term_status="testing" rdfs:label="knows" rdfs:comment="A person know
n by this person (indicating some level of reciprocated interaction between the parties).">
    <rdf:type rdf:resource="http://www.w3.org/2002/07/owl#ObjectProperty"/>
    <rdfs:domain rdf:resource="http://xmlns.com/foaf/0.1/Person"/>
    <rdfs:range rdf:resource="http://xmlns.com/foaf/0.1/Person"/>
    <rdfs:isDefinedBy rdf:resource="http://xmlns.com/foaf/0.1/" />
  </rdf:Property>
  <rdf:Property rdf:about="http://xmlns.com/foaf/0.1/interest" vs:term_status="testing" rdfs:label="interest" rdfs:comment="A page
about a topic of interest to this person.">
    <!-- we should distinguish the page from the topic more carefully. danbri 2002-07-08 -->
    <rdf:type rdf:resource="http://www.w3.org/2002/07/owl#ObjectProperty"/>
    <rdfs:domain rdf:resource="http://xmlns.com/foaf/0.1/Person"/>
    <rdfs:range rdf:resource="http://xmlns.com/foaf/0.1/Document"/>
    <rdfs:isDefinedBy rdf:resource="http://xmlns.com/foaf/0.1/" />
  </rdf:Property>
  <rdf:Property rdf:about="http://xmlns.com/foaf/0.1/topic_interest" vs:term_status="testing" rdfs:label="interest_topic" rdfs:comm
ent="A thing of interest to this person.">
    <!-- we should distinguish the page from the topic more carefully. danbri 2002-07-08 -->
    <!-- foaf:interest_topic(P,R)

```

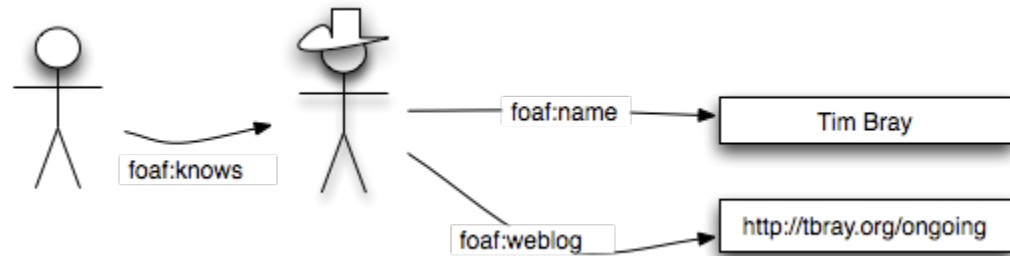
Syntax, Semantics & Ontologies



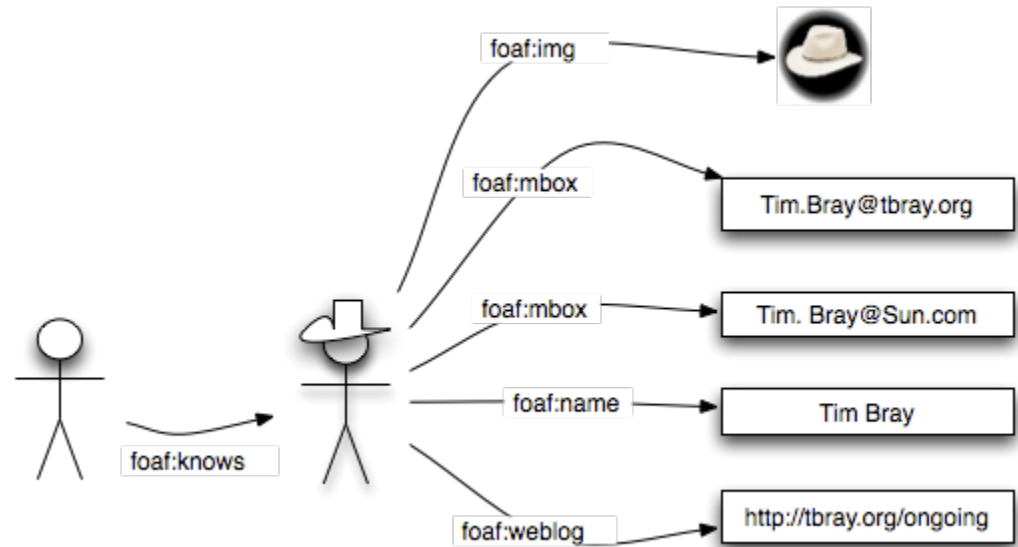
Syntax, Semantics & Ontologies



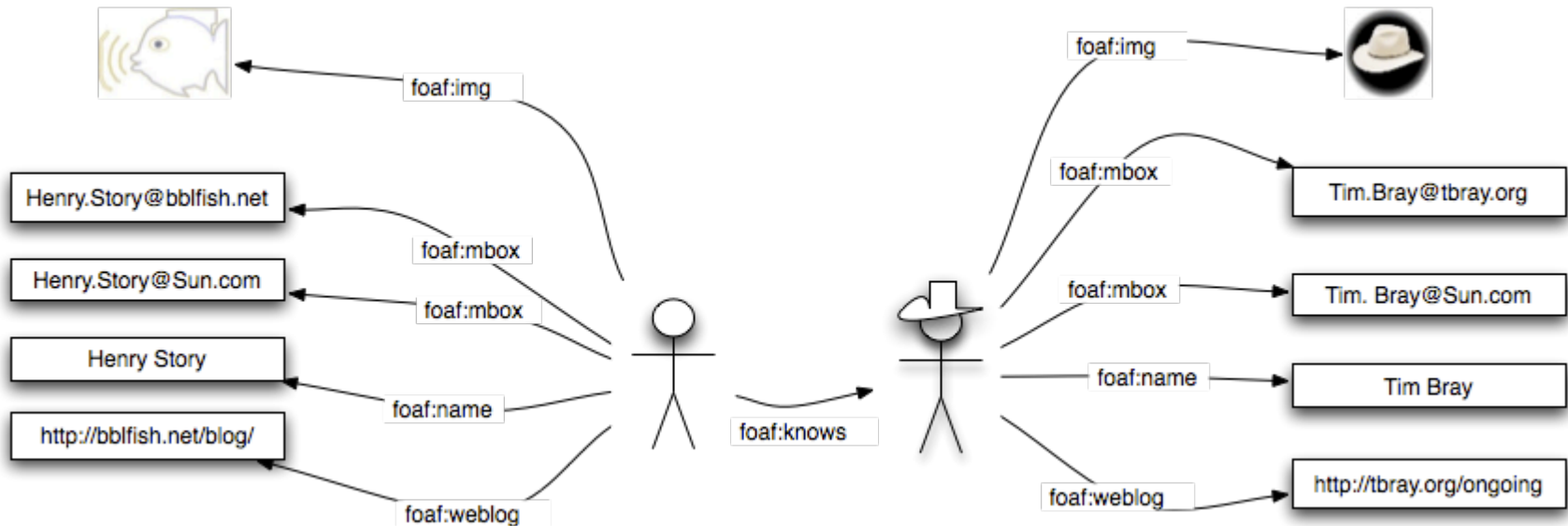
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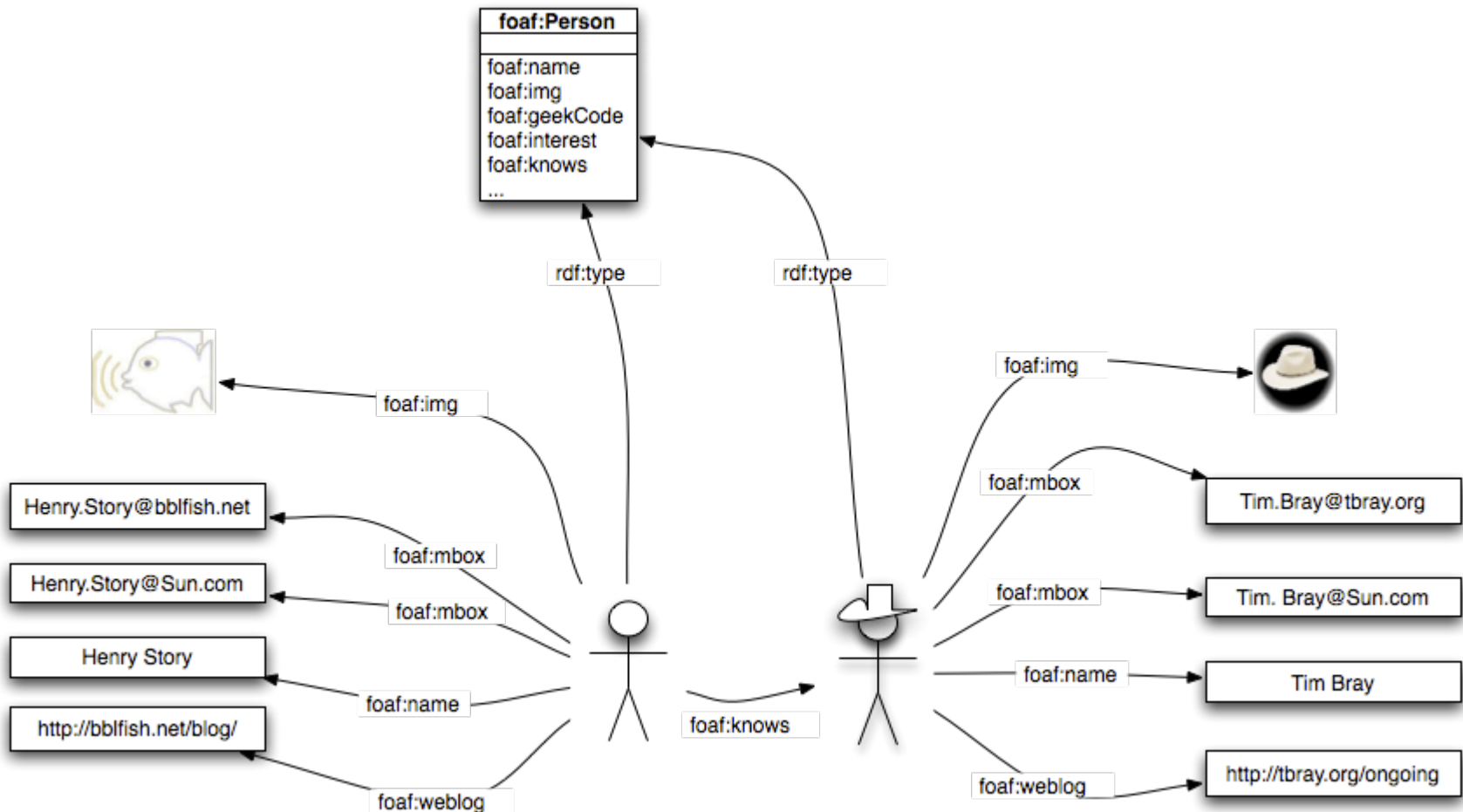
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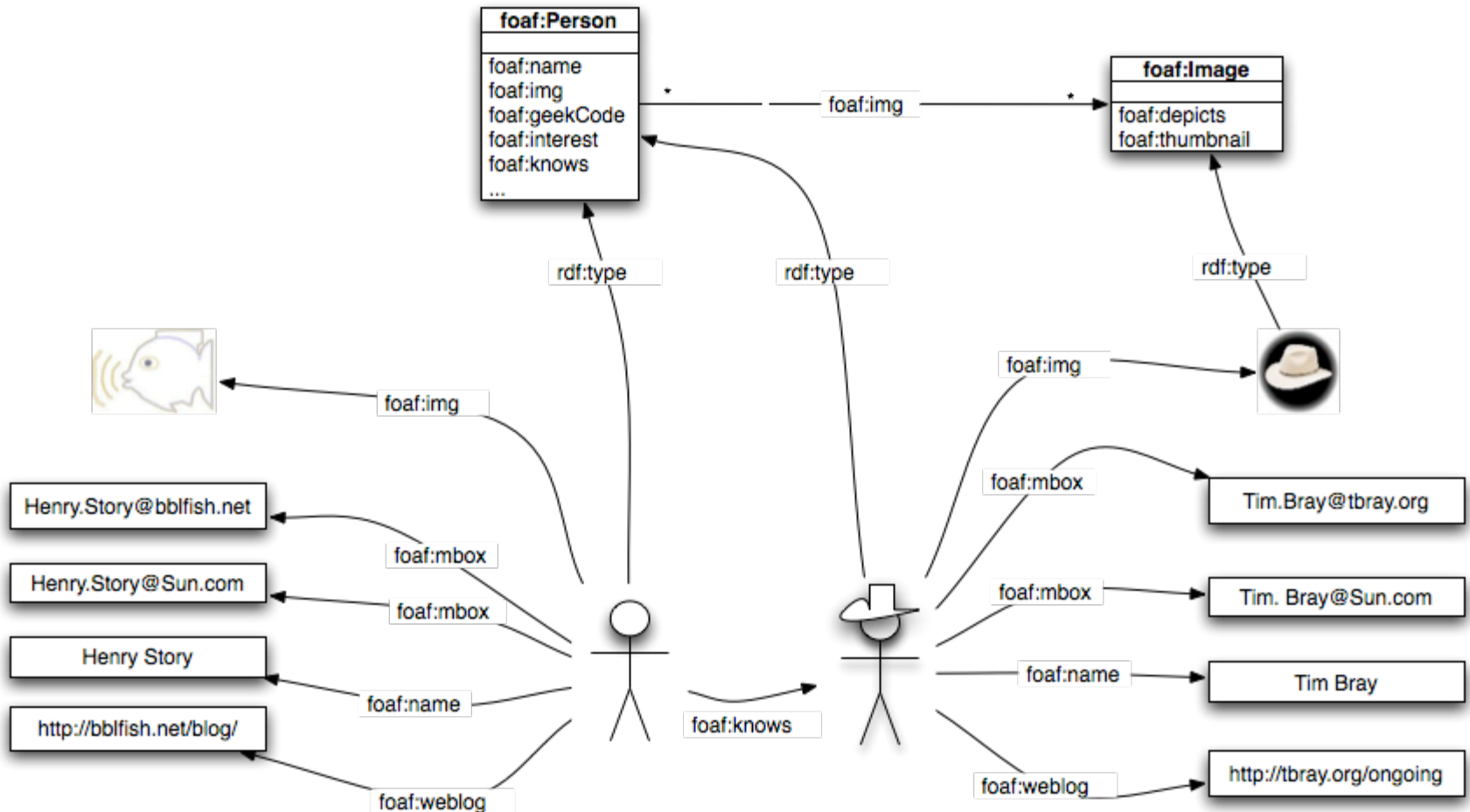
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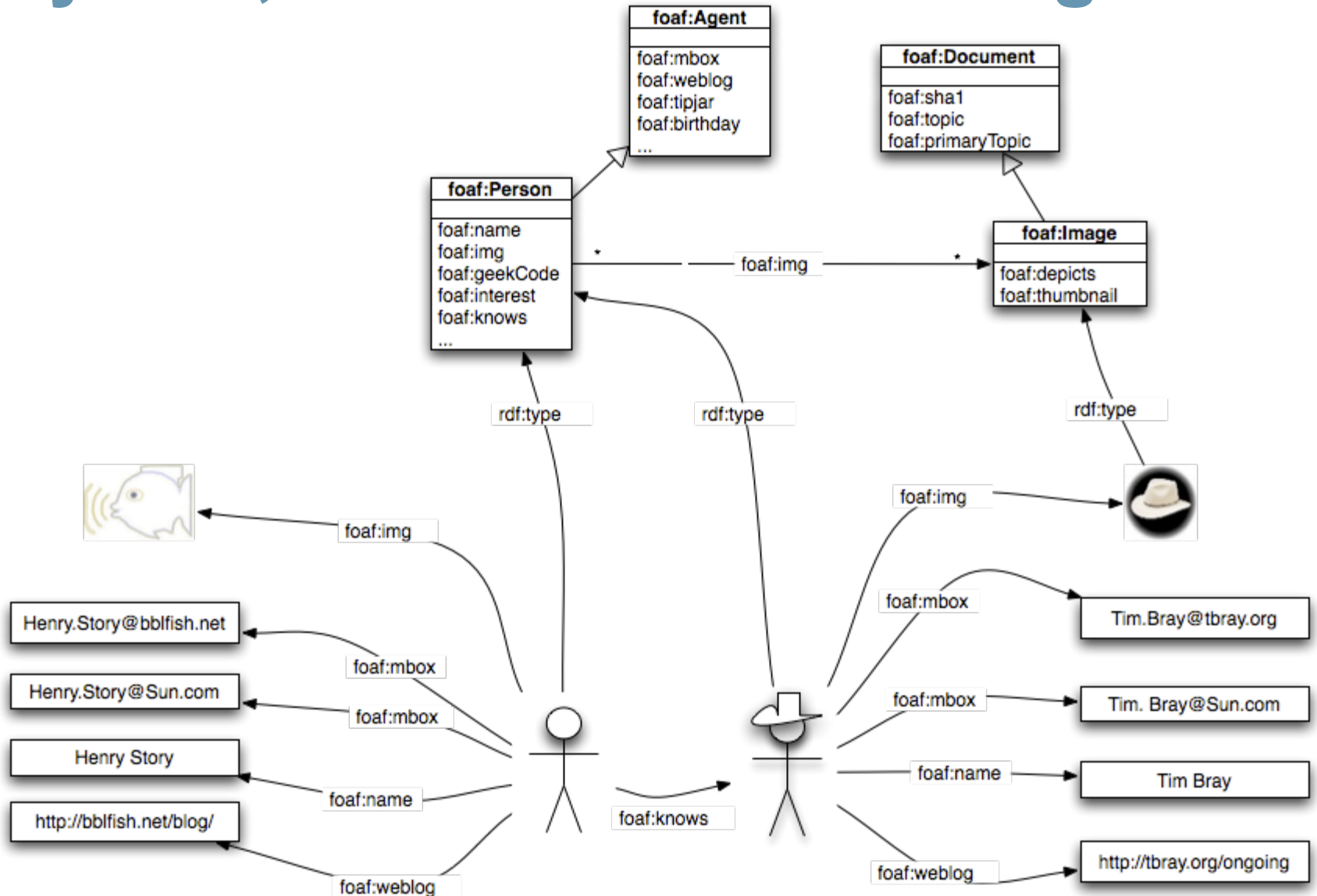
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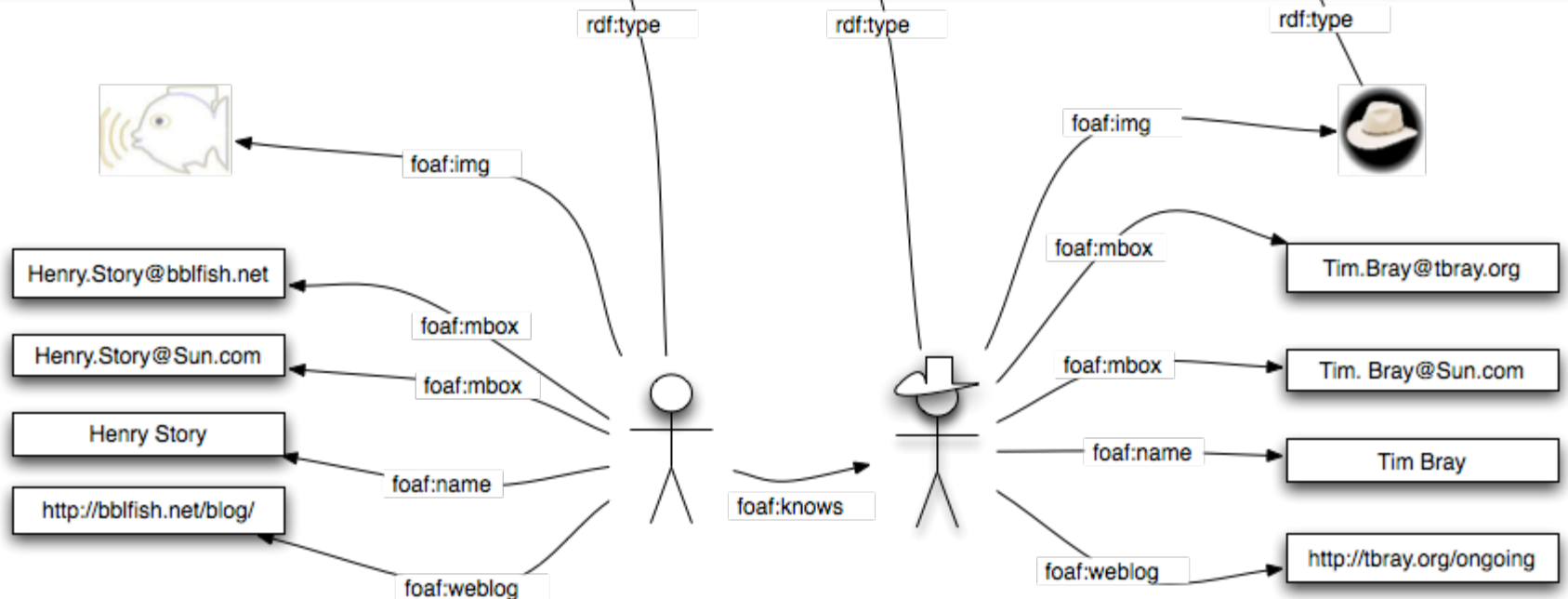
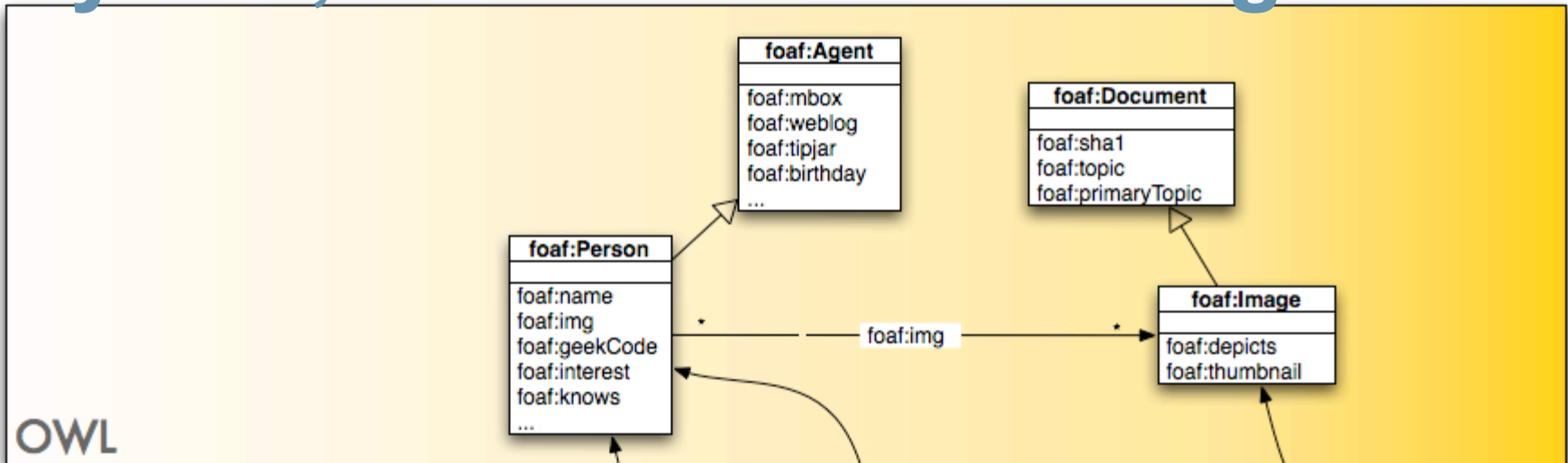
Syntax, Semantics & Ontologies



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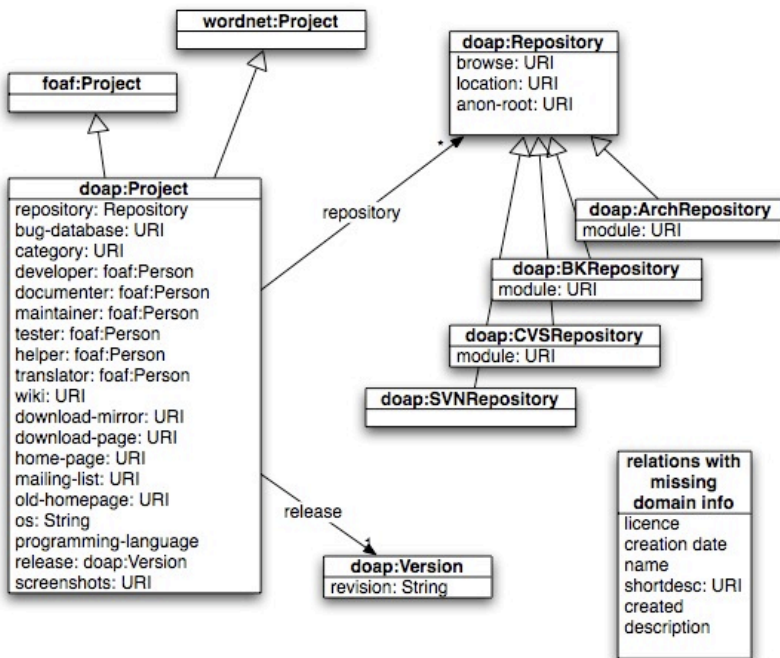
Ontologies & Questions

doap:Project
repository: Repository
bug-database: URI
category: URI
developer: foaf:Person
documenter: foaf:Person
maintainer: foaf:Person
tester: foaf:Person
helper: foaf:Person
translator: foaf:Person
wiki: URI
download-mirror: URI
download-page: URI
home-page: URI
mailing-list: URI
old-homepage: URI
os: String
programming-language
release: doap:Version
screenshots: URI

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Ontologies & Questions



SPARQL query

```
PREFIX doap <http://usefulinc.com/doap/>
```

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

```
SELECT ?who ?did ?what
```

```
WHERE {
```

```
    ?who a foaf:Person.
```

```
    ?what a doap:Project.
```

```
    ?what ?did ?who.
```

```
}
```

```
LIMIT 100
```

Ontologies & Questions

```
<?xml version="1.0"?>
<sparql xmlns="http://www.w3.org/2001/sw/DataAccess/rf1/result2">
  <head>
    <variable name="who"/>
    <variable name="did"/>
    <variable name="what"/>
  </head>
  <results>
    <result>
      <binding name="who">...</binding>
      ...
    </result>
  </results>
</sparql>
```

Try out the [UniProt SPARQL front end](#)

RDF and Databases

	Property	
Subject	Value	

RDF and Databases

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 - > Kowari
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RDF and Databases

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- Pure rdf databases:
 - > Sesame
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 - > Intellidimension
- Using a Rel DB
 - > Sesame
 - > Jena
 - > Oracle

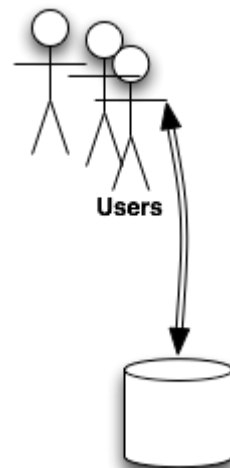
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RDF and Databases

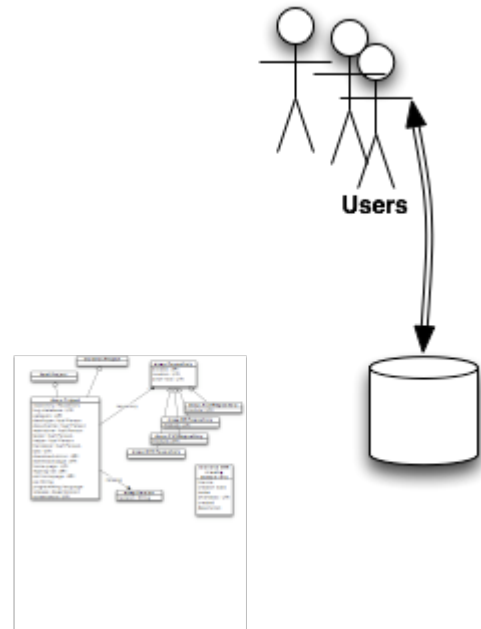
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- Mapping to Rel: d2rq

	Property	
Subject	Value	

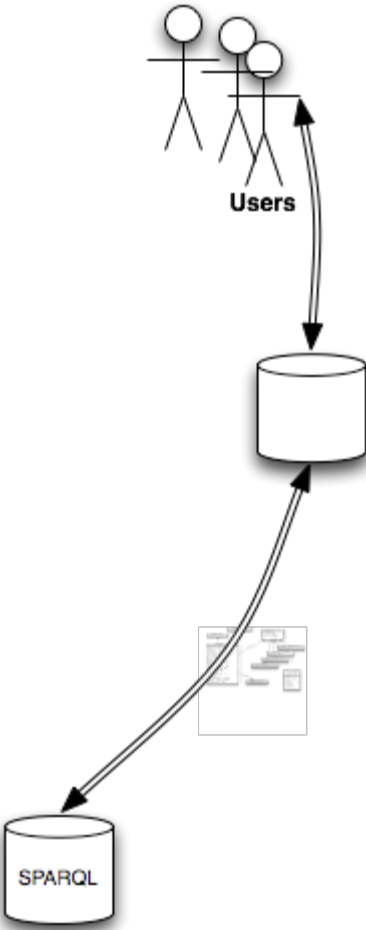
Connecting



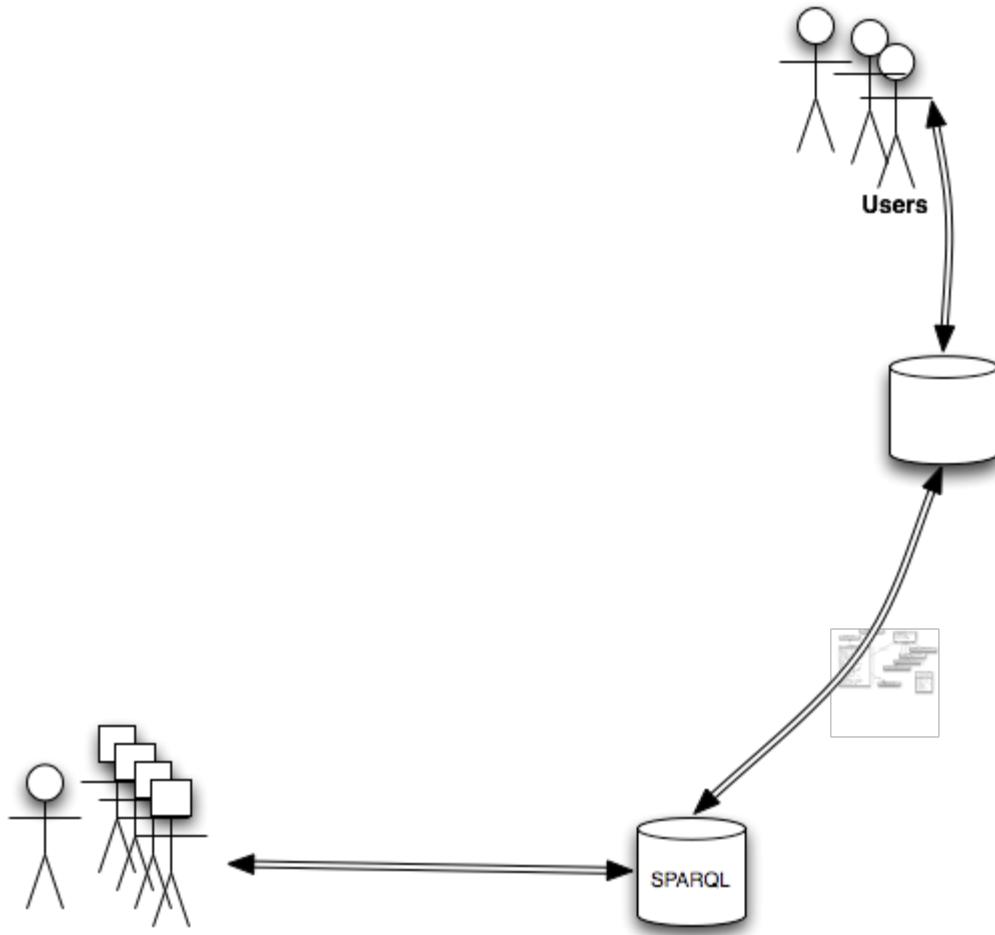
Connecting



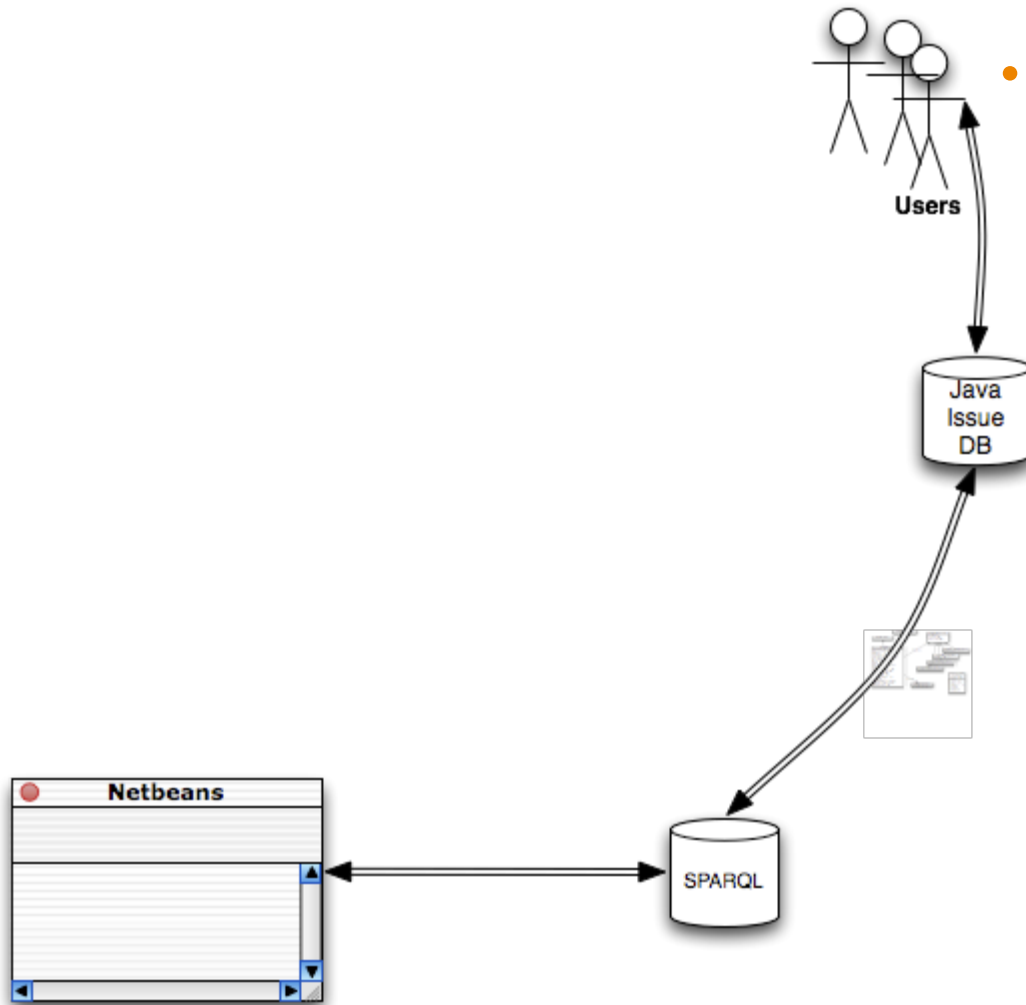
Connecting



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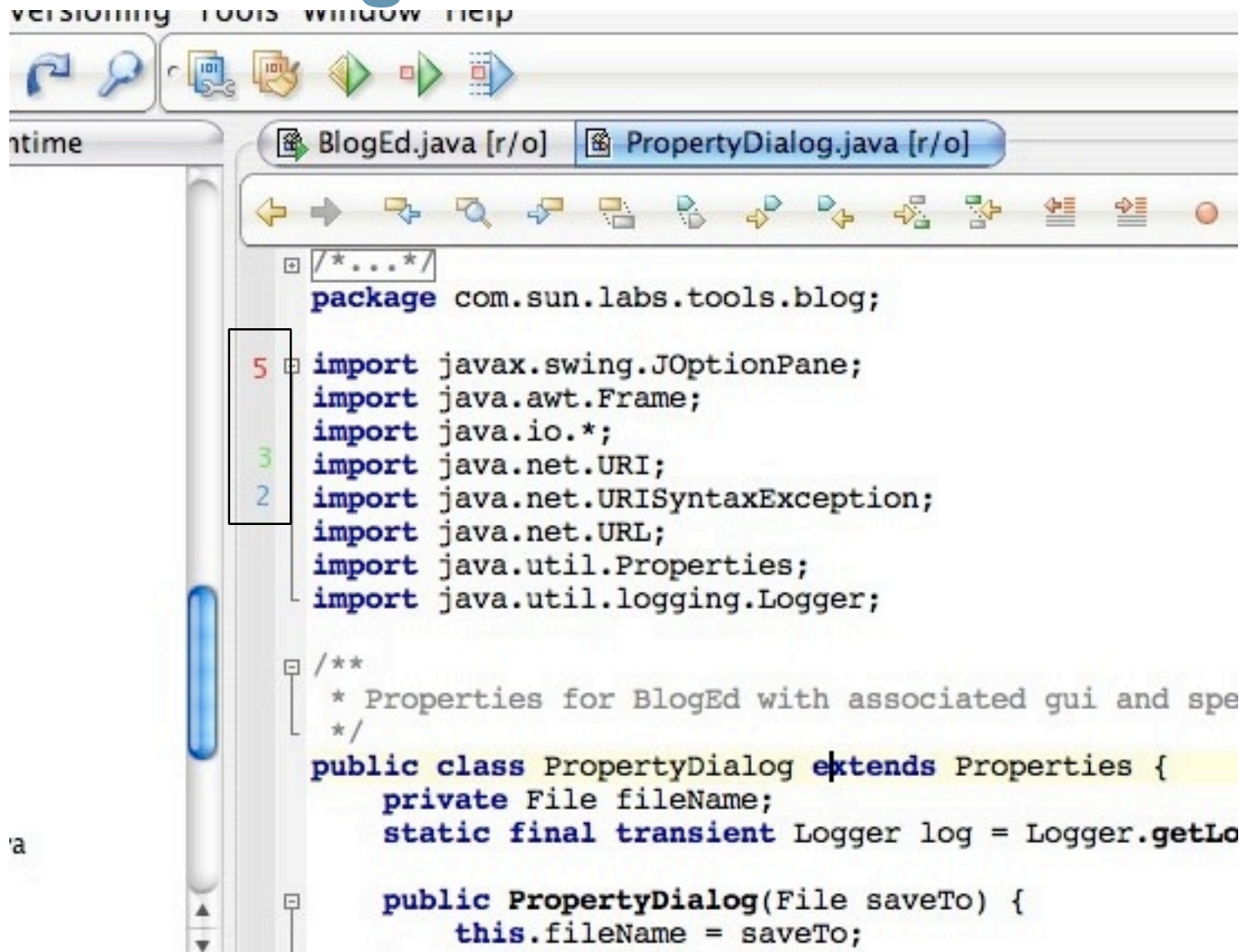


Connecting



- Issue database is opened to SPARQL queries

Connecting



```

versioning  TOOLS  window  help
[Icons]
runtime
BlogEd.java [r/o]  PropertyDialog.java [r/o]
[Icons]
/*...*/
package com.sun.labs.tools.blog;

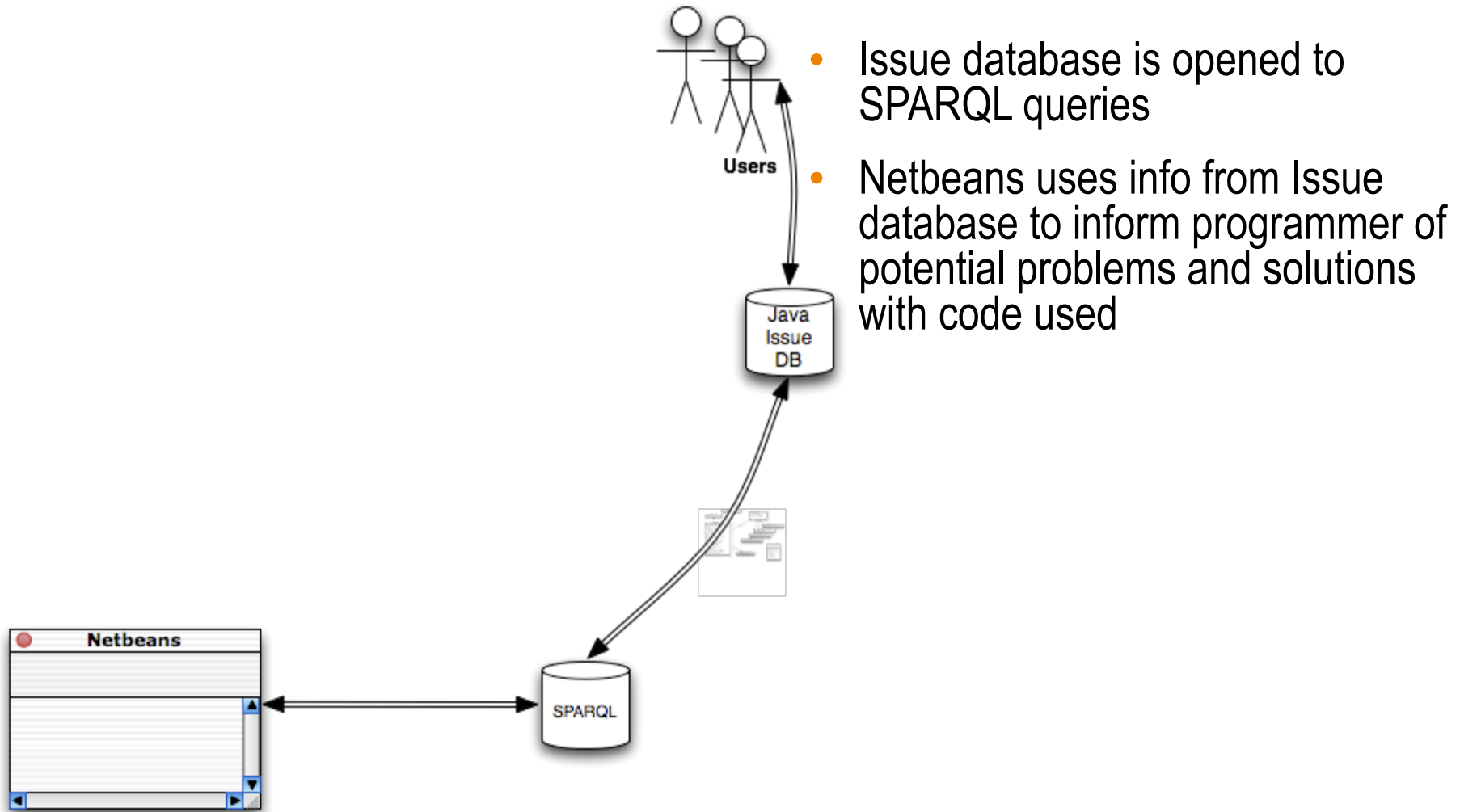
5 import javax.swing.JOptionPane;
import java.awt.Frame;
import java.io.*;
3 import java.net.URI;
2 import java.net.URISyntaxException;
import java.net.URL;
import java.util.Properties;
import java.util.logging.Logger;

/**
 * Properties for BlogEd with associated gui and spe
 */
public class PropertyDialog extends Properties {
    private File fileName;
    static final transient Logger log = Logger.getLo

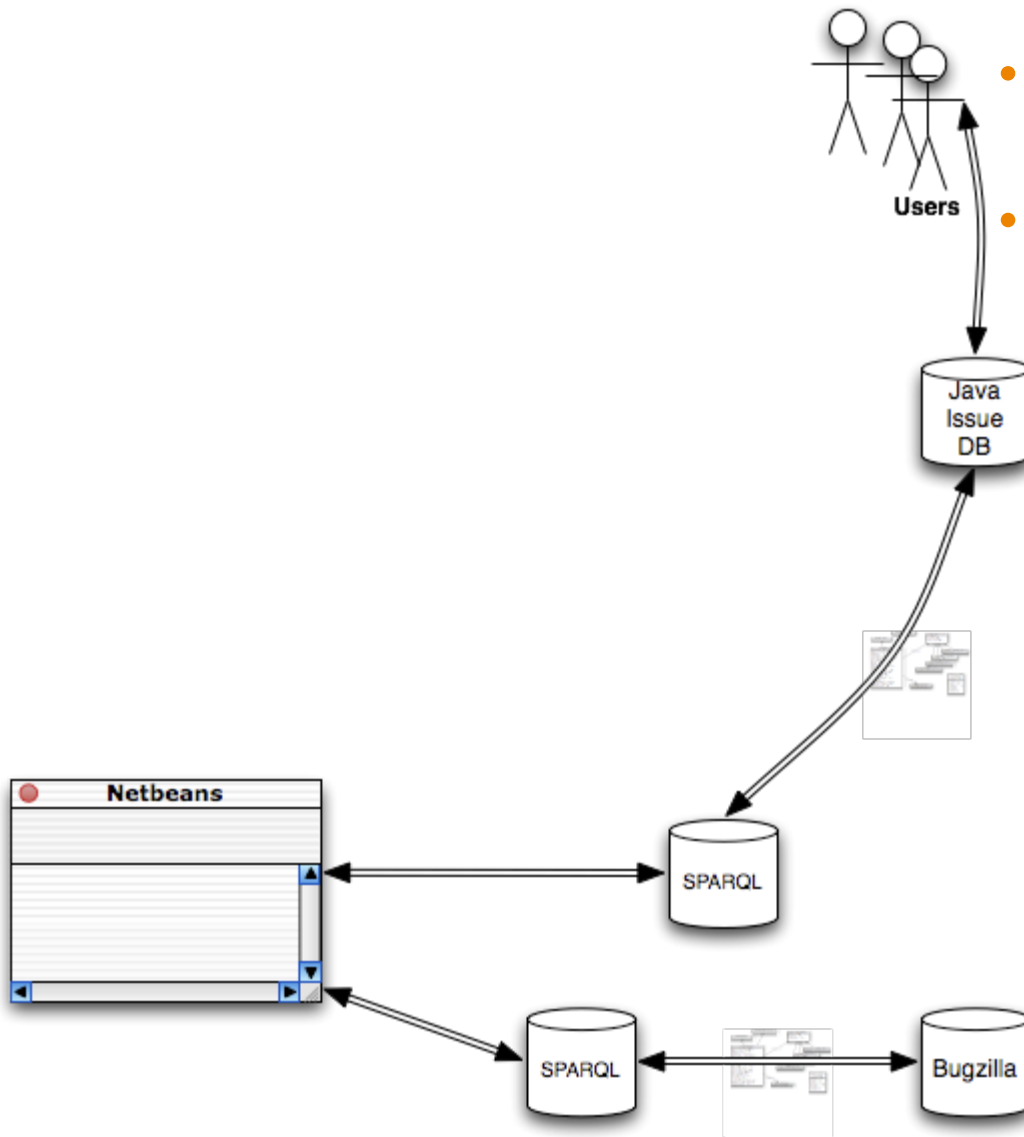
    public PropertyDialog(File saveTo) {
        this.fileName = saveTo;
    }

```

Connecting

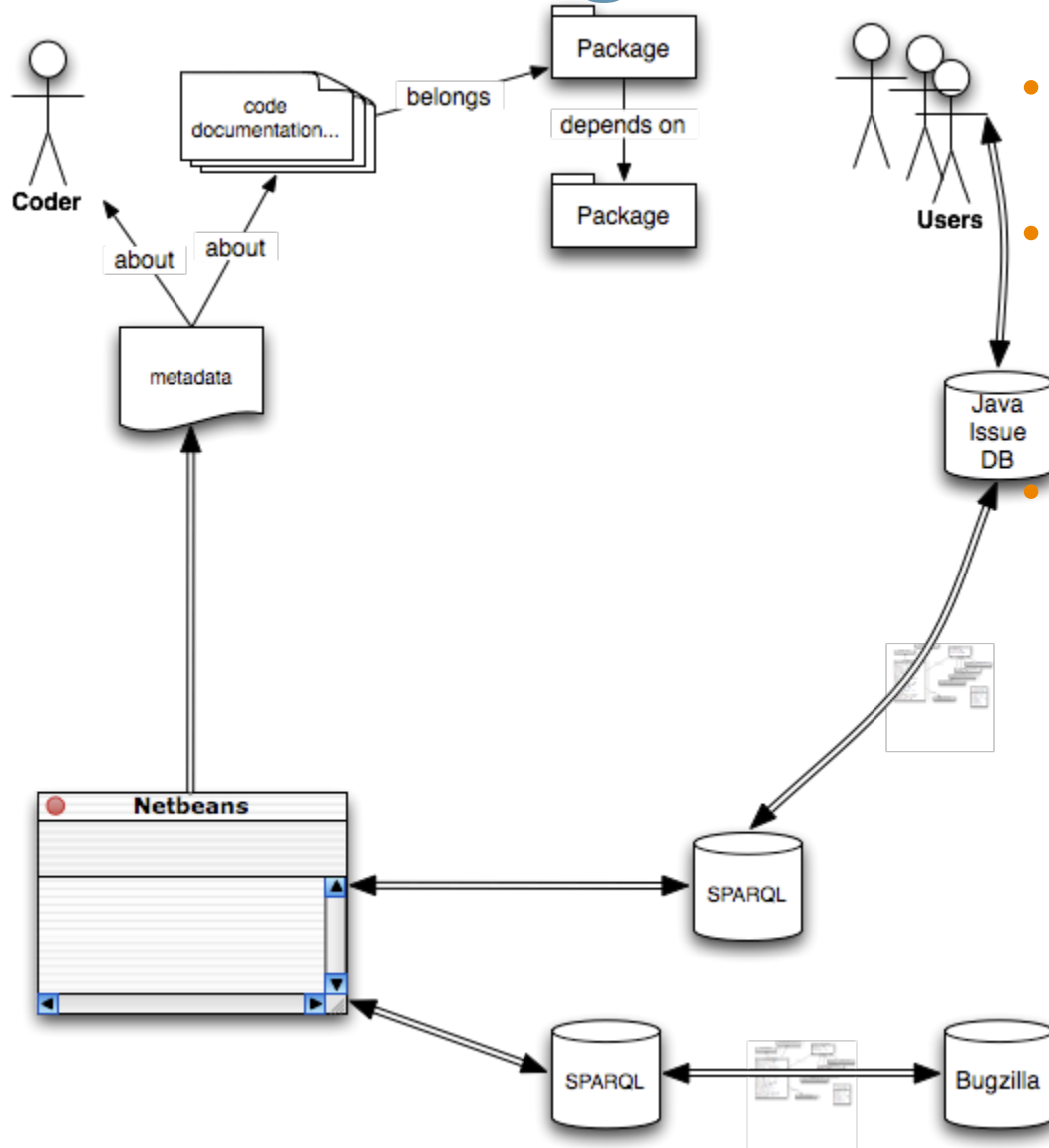


Connecting



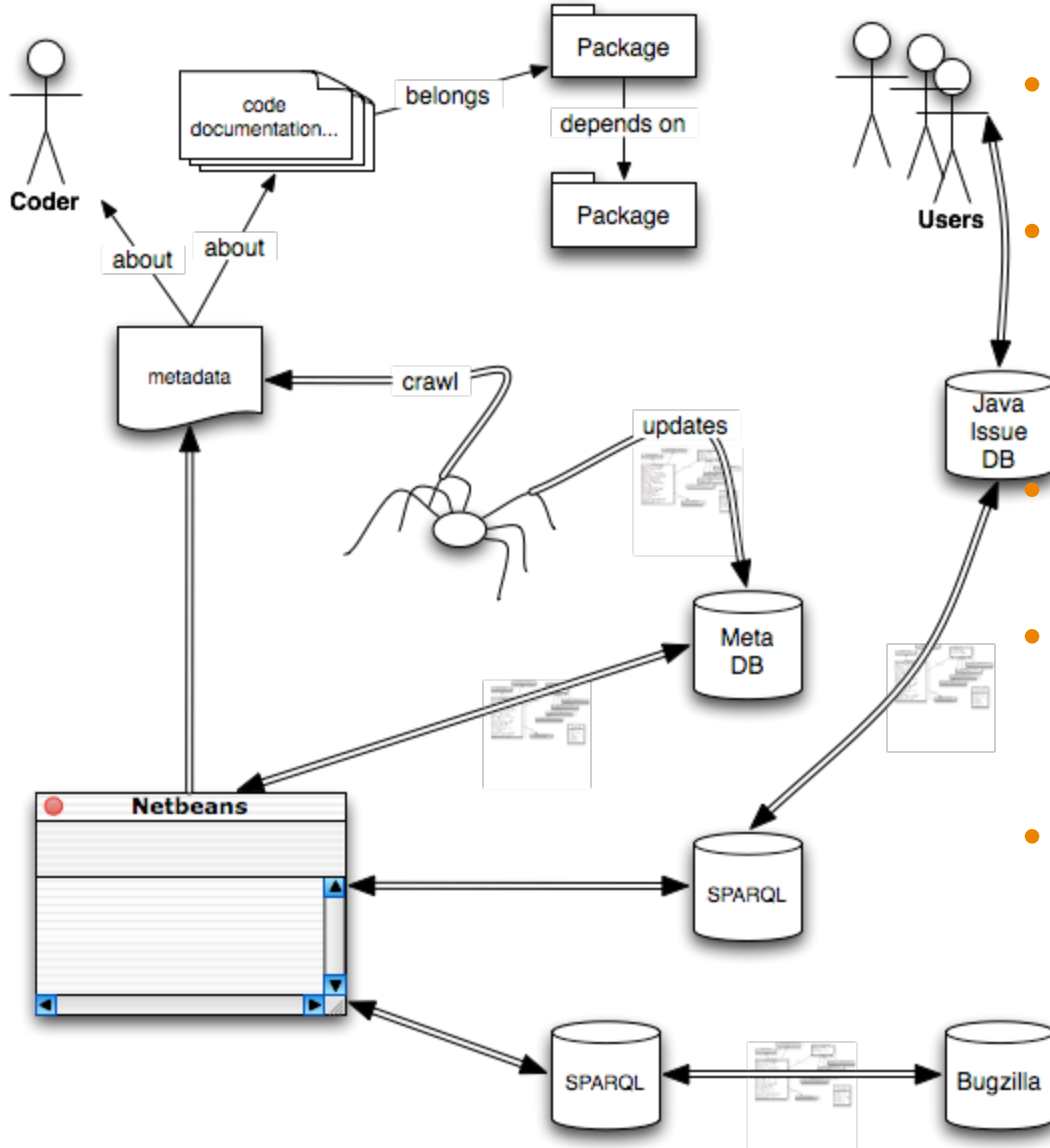
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- Netbeans uses info from Issue database to inform programmer of potential problems and solutions with code used
- Netbeans creates RDF metadata that is published in an Atom feed
- Spider crawls the world wide developer sites for this metadata and enters it into the rdf database
- Testers, packagers, managers from different organisations can all query the databases to help them with their work

Todo:

- Open up databases with SPARQL
- From usage deduce needs
- Improve tools:
 - > RDFHibernate
 - > Inferencing databases
 - > SPARQL front ends
 - > Developer tools integration
- Use URIs for properties in file system metadata