Contributing to the Lapps Grid

Lapps Service Wrapping

Lapps Grid Group

May 26, 2014

Outline

- Introduction
- From Software to Web Service
- From NLP Tool to Lapps Service
  - Java Example
  - Python Example
- Conclusion
- Reference

The Language Application Gri

Availability & Interoperability of NLP Tools

- Java, Python, tools
- OpenNLP, Stanford NLP, Gate, NLTK

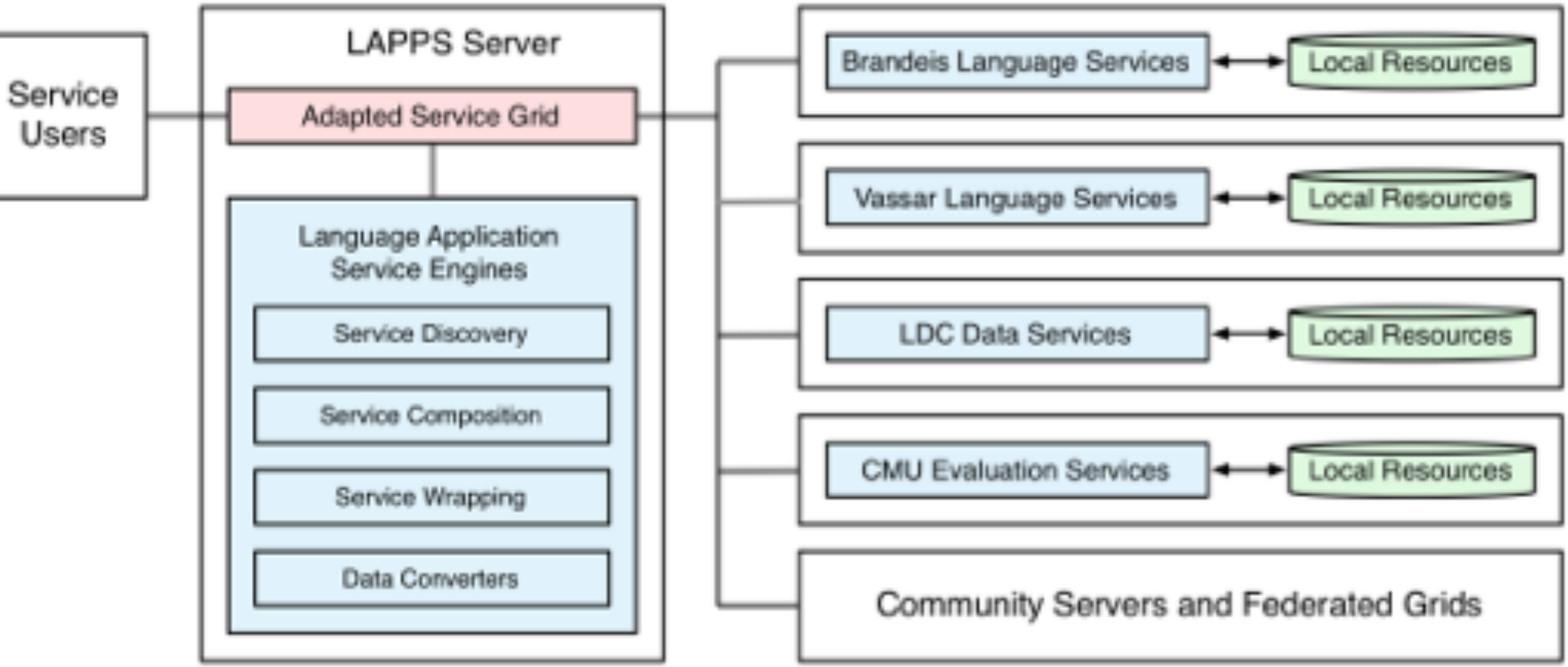
Language Application (Lapps) Grid Project

- Language Service
- Lapps API Design

Lapps Grid Architecture

Using Composite Lapps Services

Wrapping Atomic Lapps Services



Lapps API Design

Consistent Interface

Discriminator

JSON Format

Consistent Interface (Java

```java
package org.lappsgrid.api;

import jp.go.nict.langrid.commons.rpc.intf.Service;

@Service(namespace = "lapps:service")
public interface WebService {
  /**
   * Returns the set of data types that must be present in the
   * input to the {@link #execute(Data)} method
   */
  long[] requires();

  /**
   * Returns the set of data types that will be included in the output.
   */
  long[] produces();

  /**
   * Executes a web service on the given input. Returns the output, if any,
   * of the web service in a {@link Data} object.
   */
  Data execute(Data input);

  /**
   * Configures a DataSource.
   * <p/>
   * Returns any errors in a {@link Data} object. Otherwise returns a Data
   * object with the "ok" Discriminator type.
   *
   * @param config
   * @return
   */
```

Discriminator

g [] requires()
g [] produces()

Discriminator values

Discriminator	Name
Basic data types	
0	error
1	ok
2	meta
3	text
4	xml
5	string-list
Document types	
1024	document
1025	gate
1026	uima
1027	stanford
1028	opennlp
1029	graf
1030	ptb
1031	json
1032	json-ld

JSON


```
{   "@context": "http://vocab.lappsgrid.org/context-1.0.0.jsonld",
    "metadata": {},
    "text": {        "@value": "Hi, how are you today?"    },
    "steps": [
        { "metadata": {
                "contains": {
                    "Token": {
                        "producer": "edu.brandeis.cs.lappsgrid.opennlp.Tokenizer:0.0.4",
                        "type": "tokenizer:opennlp"       }  } },
            "annotations": [
                {  "@type": "Token", "id": "tok0", "start": 0, "end": 2,
                    "features": { "word": "Hi"}    },
                {  "@type": "Token", "id": "tok1", "start": 2, "end": 3,
                    "features": { "word": ","}    },
                {   "@type": "Token", "id": "tok2", "start": 4, "end": 7,
                    "features": { "word": "how"}  },
                {   "@type": "Token", "id": "tok3", "start": 8, "end": 11,
                    "features": { "word": "are" } },
                {   "@type": "Token", "id": "tok4", "start": 12, "end": 15,
                    "features": { "word": "you" } },
                {   "@type": "Token", "id": "tok5", "start": 16, "end": 21,
                    "features": { "word": "today" } },
                {   "@type": "Token", "id": "tok6", "start": 21, "end": 22,
                    "features": { "word": "?" } } ]
        }
    ]
}
```

Contributing to Lapps Gri

Wrapping Lapps Service

- NLP tools + Lapps API to atomic Lapps service

Registering to Service Manager

- Atomic Lapps services become available for searching and compositing

Service Wrapping Tutoria

Web Service: “Hello World!”

- “Hello World” Program (Java) —> WSDL

Lapps Service: “Stanford Tagger”

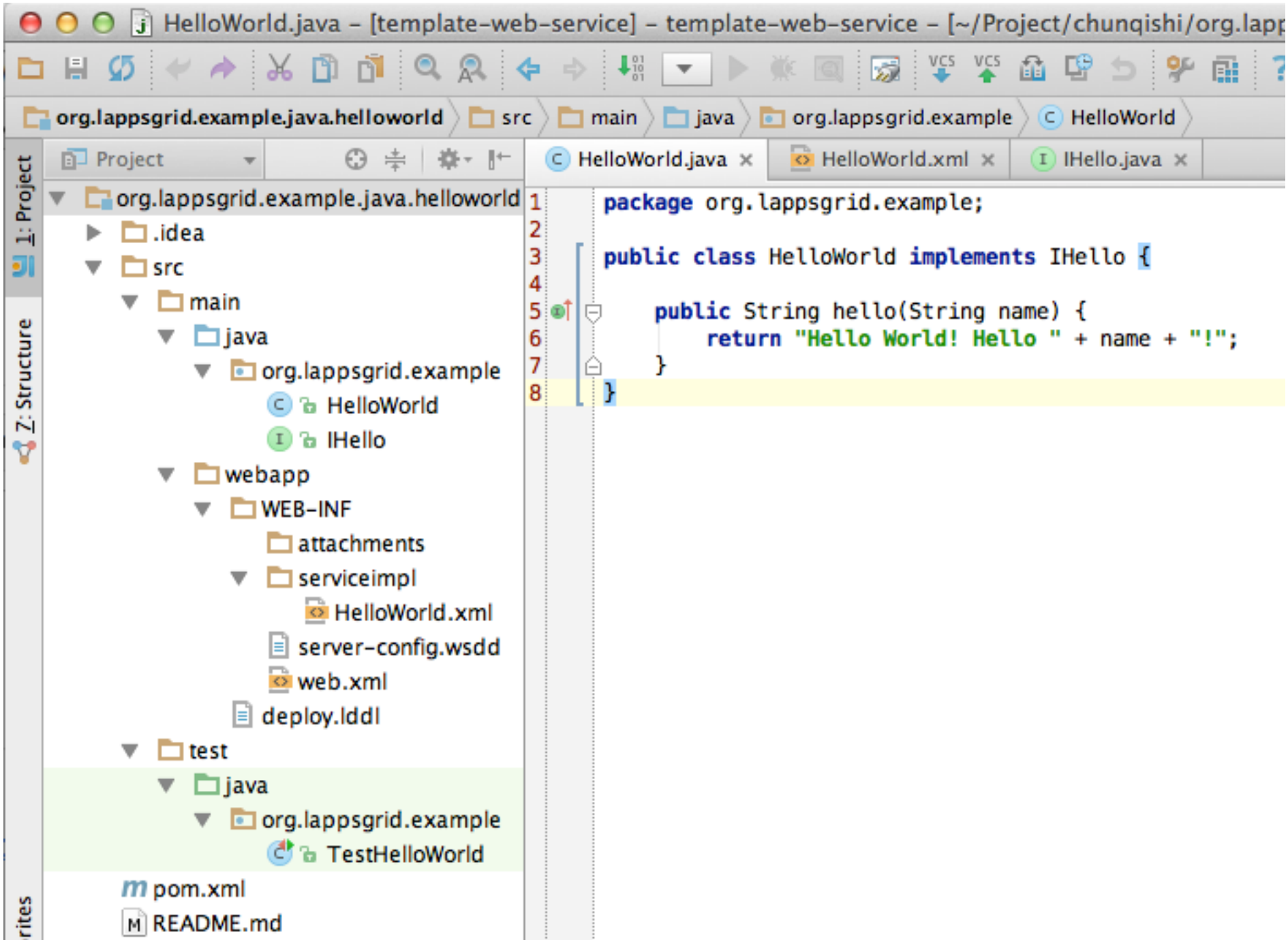
- Stanford Tagger (Java) + Lapps API —> WSDL

Lapps Service: “NLTK Tagger”

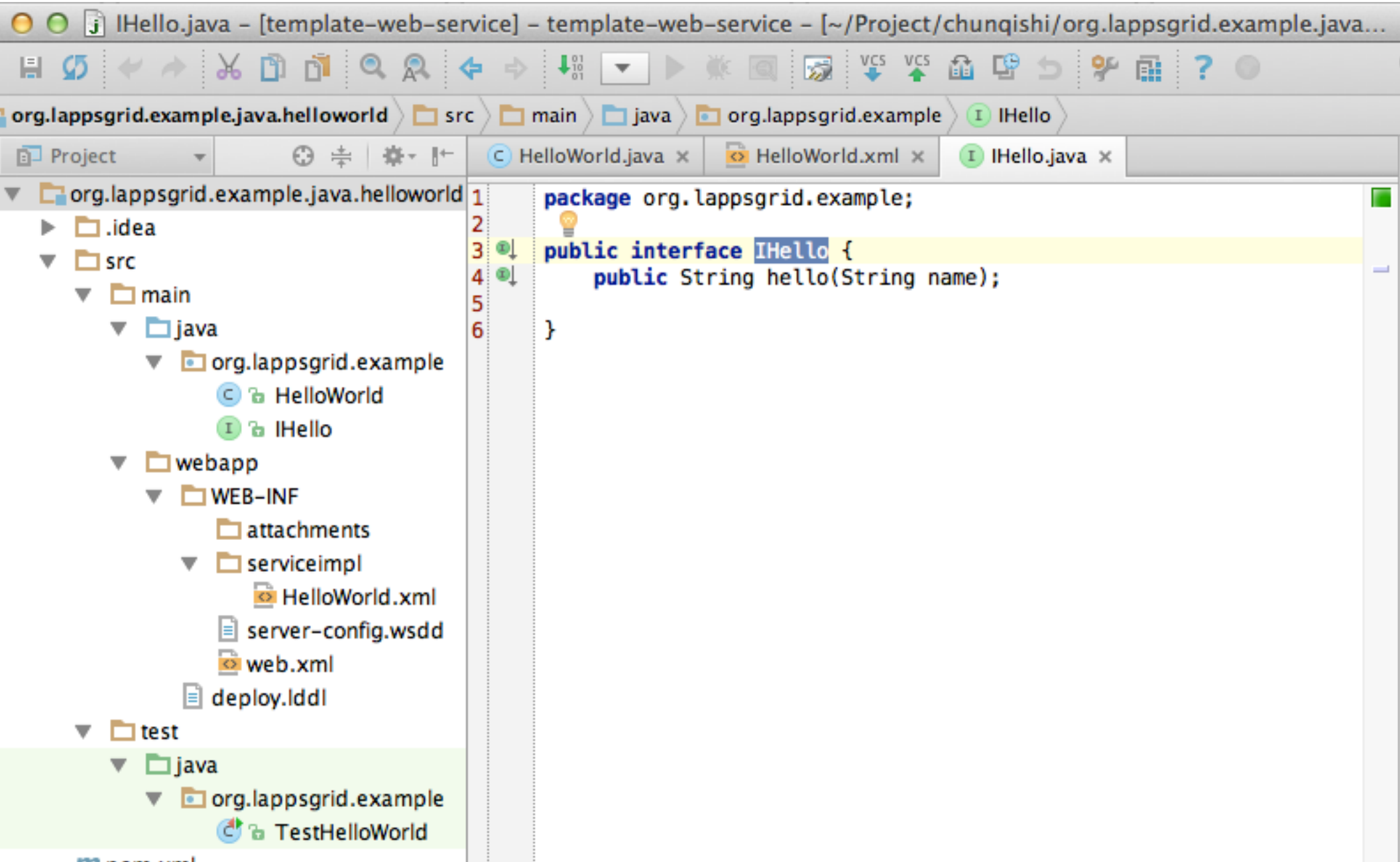
- NLTK Tagger (Python) + Lapps API —>WSDL

Web Service Wrapping

Hello World (Java)



Interface Design



Developing Template

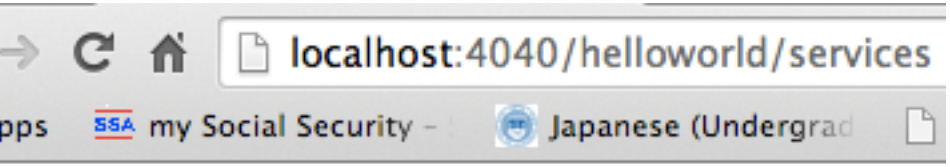
Developing Template

- Maven for Dependency Library Management
- Github Repository
  - https://github.com/chunqishi/org.lappsgrid.example.java.helloworld

Local Test

- Maven Compile/Package & Jetty Server based Testin
- Command: *mvn clean package jetty:run*

Web Service WSDL

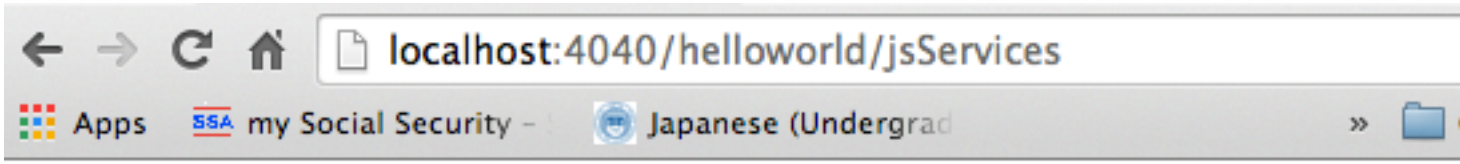


d now... Some Services

AdminService *(wsdl)*
- AdminService

Version *(wsdl)*
- getVersion

HelloWorld *(wsdl)*
- hello



And now... Some JsonRpc Services

- **HelloWorld**
  - interfaces
    - IHello
      - String **hello**(String) [sample] +

LREC [invoke][clear]

Mon May 19 2014 17:00:09 GMT-0400 (EDT), 148msec
request:

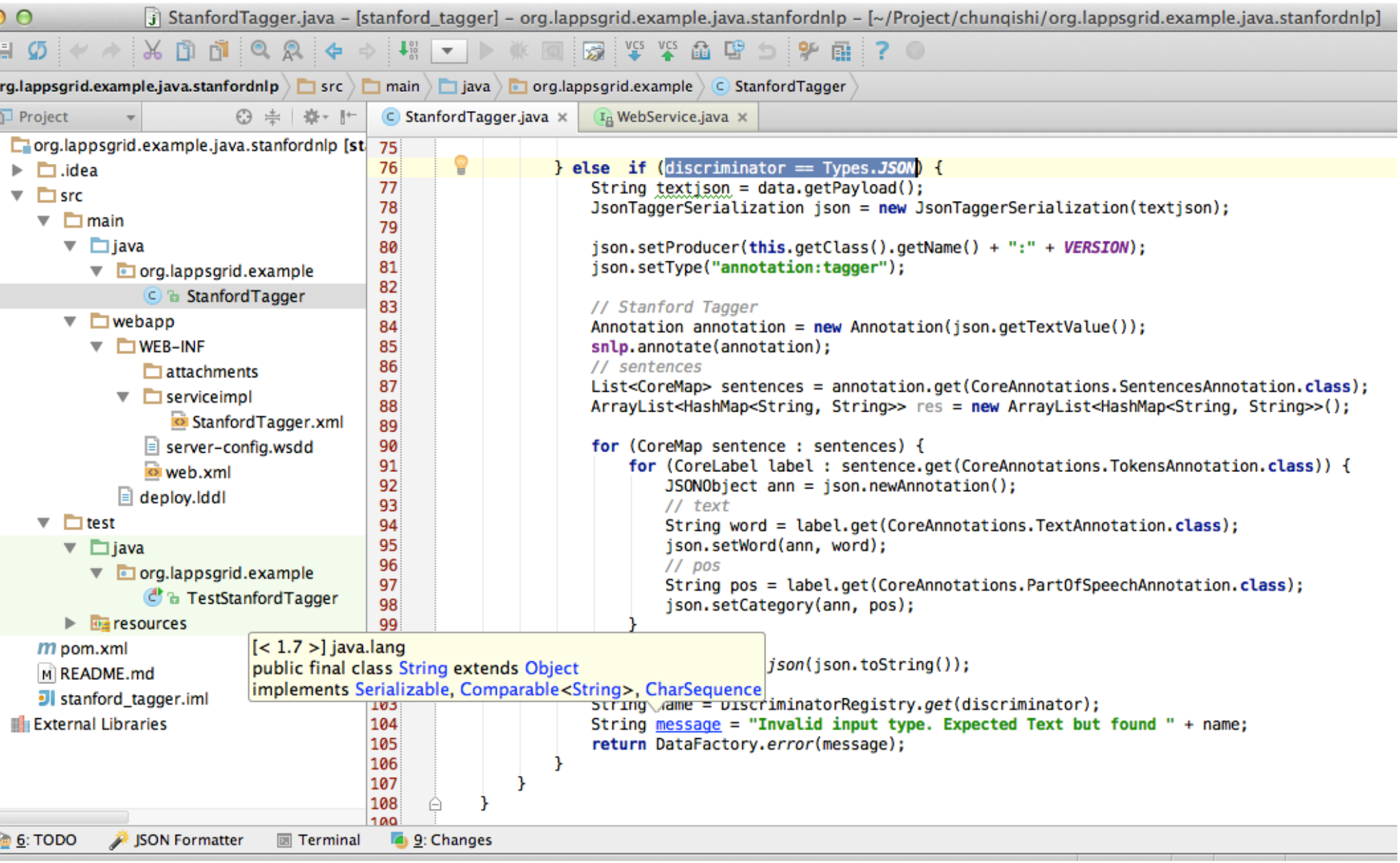
Object	
method	"hello"
params	Array(1)
	0 "LREC"

response:

Object

Lapps Service Wrapping (Java)

Developing Template



https://github.com/chunqishi/org.lappsgrid.example.java.stanfordnlp

Stanford Tagger Wrappin

Java Wrapping

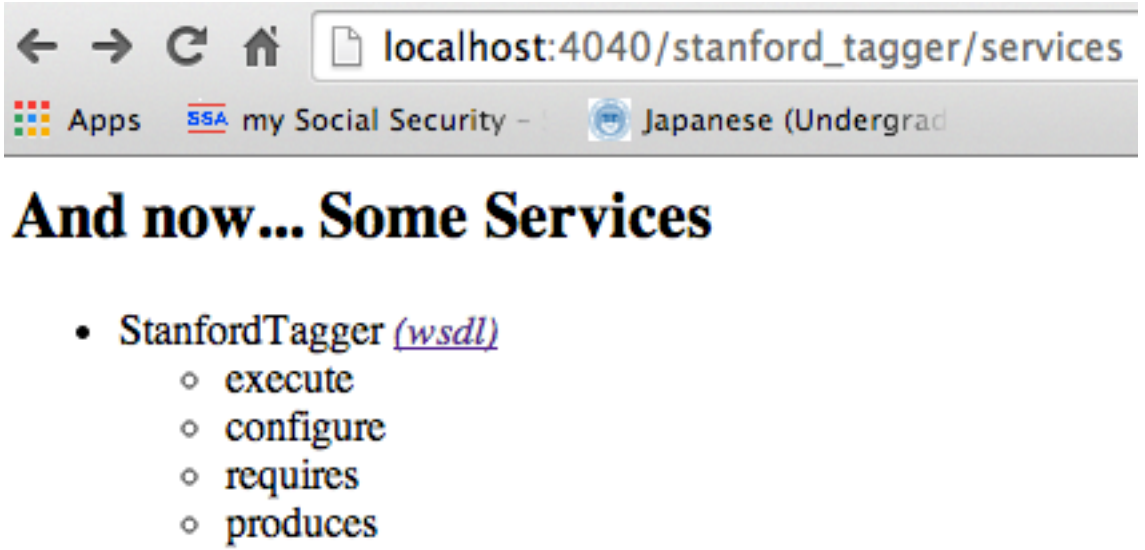
```java
// Stanford Tagger
Annotation annotation = new Annotation(json.getTextValue());
snlp.annotate(annotation);
// sentences
List<CoreMap> sentences = annotation.get(CoreAnnotations.SentencesAnnotation.cl
ArrayList<HashMap<String, String>> res = new ArrayList<HashMap<String, String>>

for (CoreMap sentence : sentences) {
    for (CoreLabel label : sentence.get(CoreAnnotations.TokensAnnotation.class)
        JSONObject ann = json.newAnnotation();
        // text
        String word = label.get(CoreAnnotations.TextAnnotation.class);
        json.setWord(ann, word);
        // pos
        String pos = label.get(CoreAnnotations.PartOfSpeechAnnotation.class);
        json.setCategory(ann, pos);
    }
}
```

Jetty Running

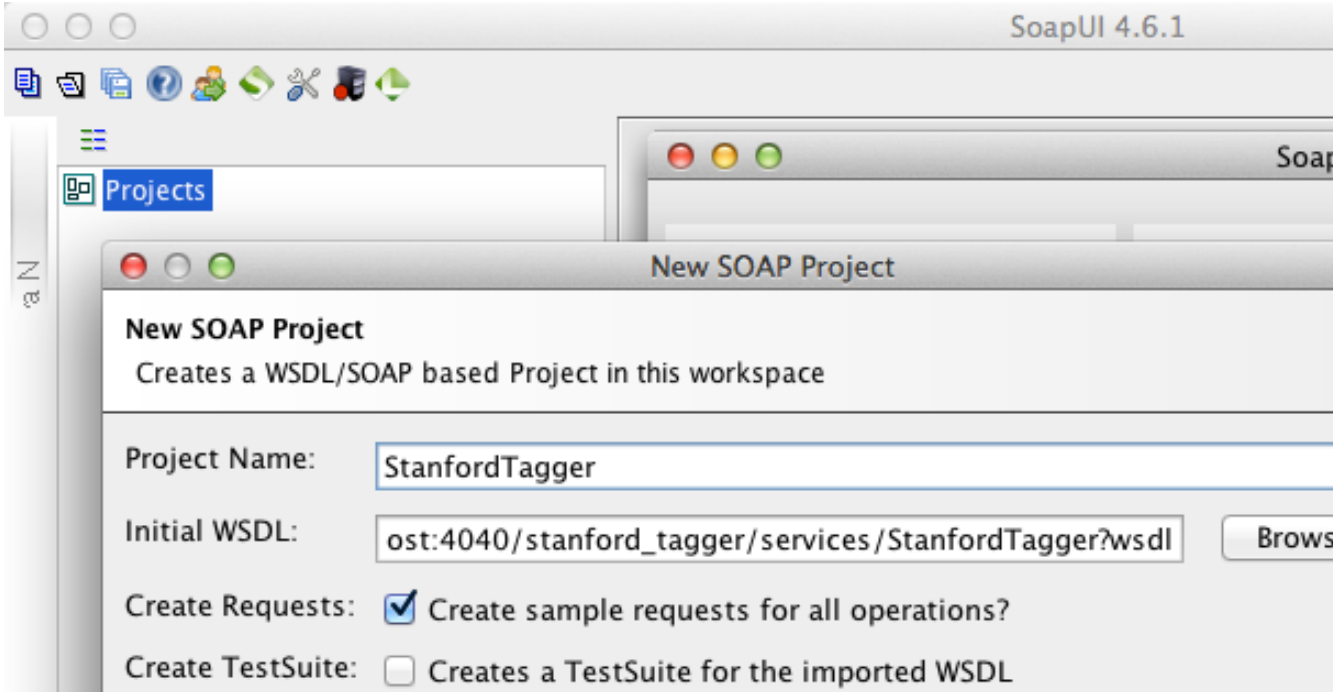
```
shis-MacBook-Air:org.lappsgrid.example.java.stanfordnlp shi$
shis-MacBook-Air:org.lappsgrid.example.java.stanfordnlp shi$ export MAVEN_OPTS="-Xmx10Z
shis-MacBook-Air:org.lappsgrid.example.java.stanfordnlp shi$ mvn jetty:run
[INFO] Scanning for projects...
[INFO]
[INFO] ------------------------------------------------------------------------
[INFO] Building Java Stanford NLP Tagger Example 0.0.1-SNAPSHOT
[INFO] ------------------------------------------------------------------------
```

Stanford Tagger Testing

Local Service

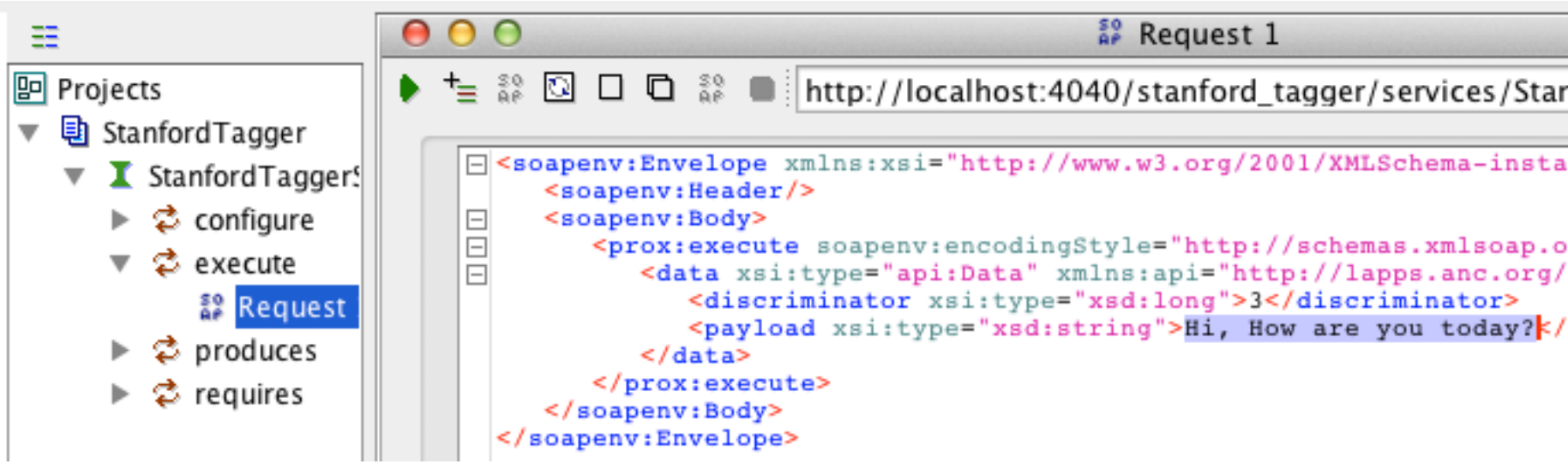


SoapUI Testing

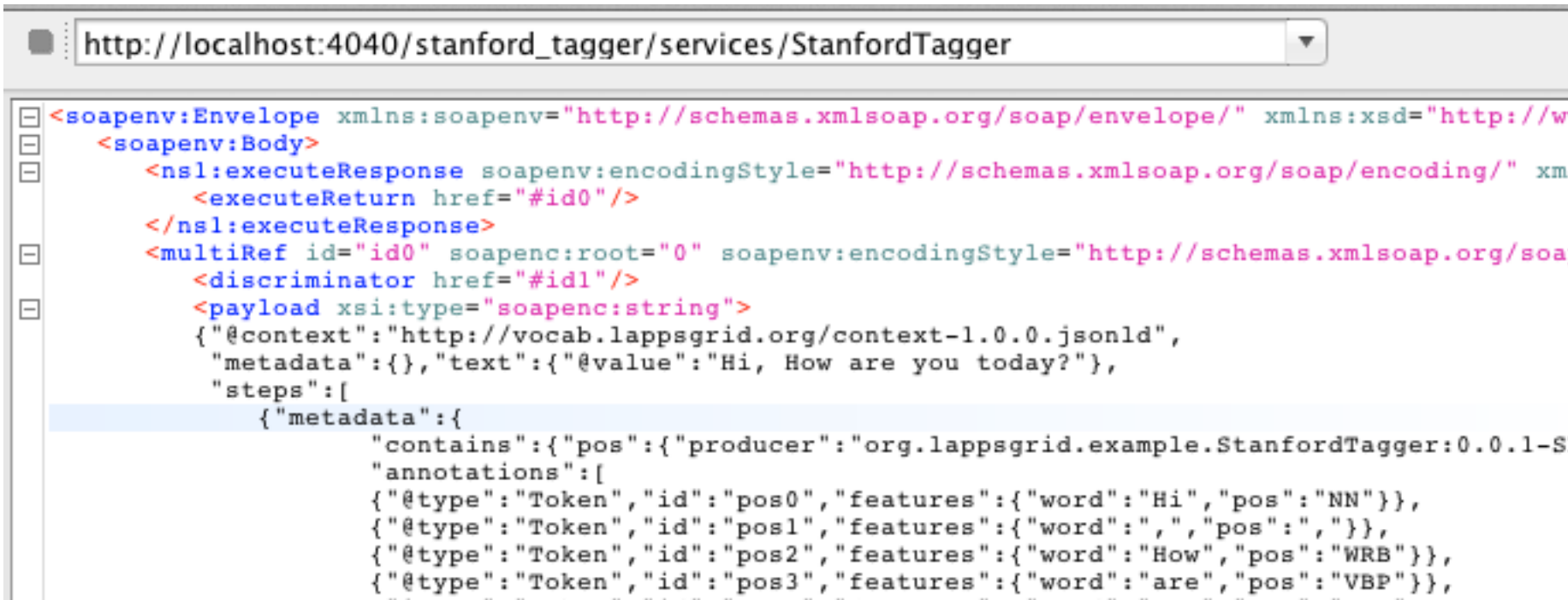


Stanford Tagger Testing Result

uest

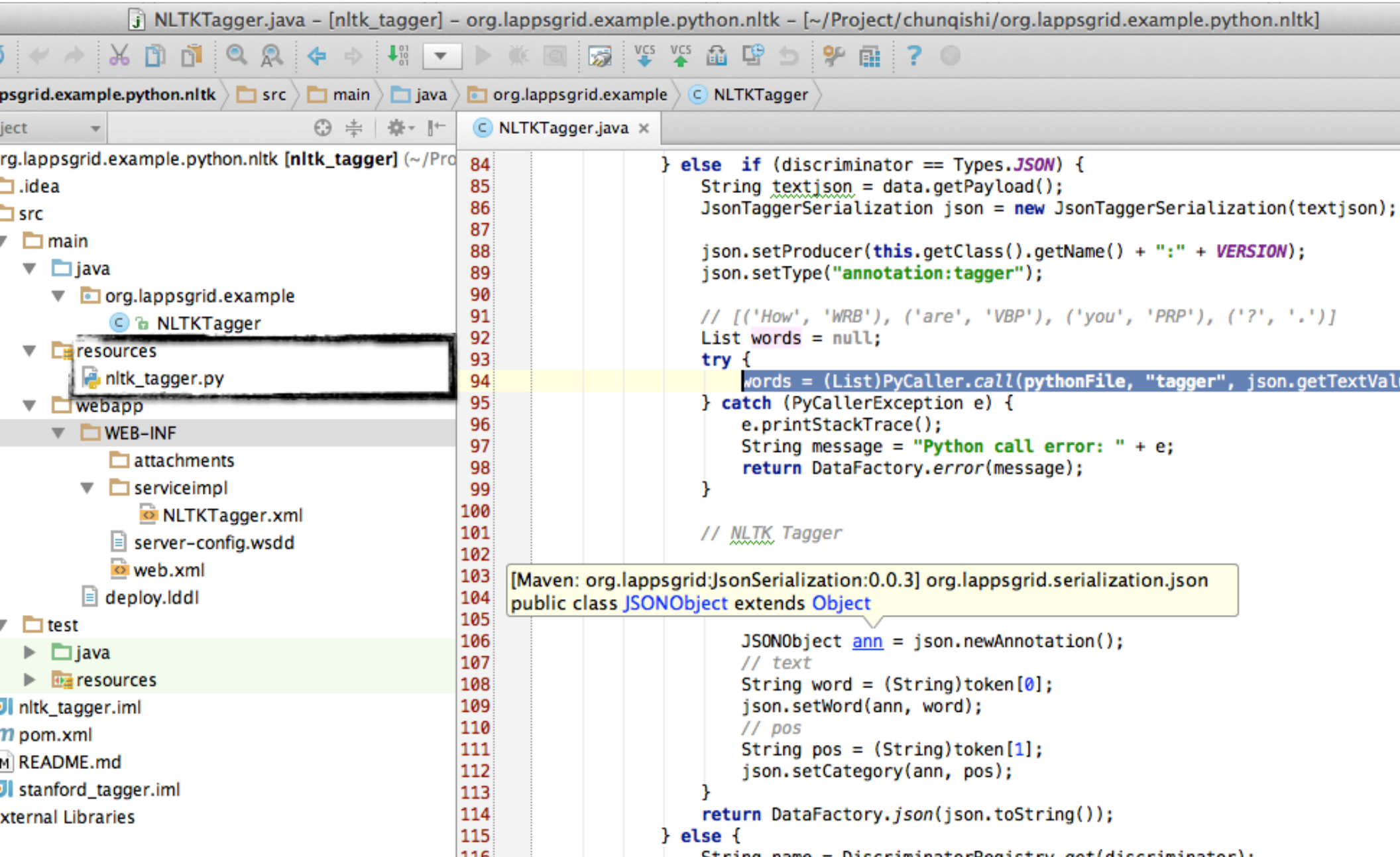


ponse



Lapps Service Wrapping (Python)

Developing Template



NLTK Python

Python Program

```
nltk_tagger.py
#!/usr/bin/python
import nltk

def tagger(sent):
    text = nltk.word_tokenize
    return nltk.pos_tag(text)

if __name__ == "__main__":
    import sys
    print tagger(sys.argv[1])
~
```

Python Result

```
shis-MacBook-Air:resources shi$ python nltk_tagger.py "Hi, how are you today?"
[('Hi', 'NNP'), (',', ','), ('how', 'WRB'), ('are', 'VBP'), ('you', 'PRP'), ('today', 'NN'), (
shis-MacBook-Air:resources shi$
```

Java Wrapping

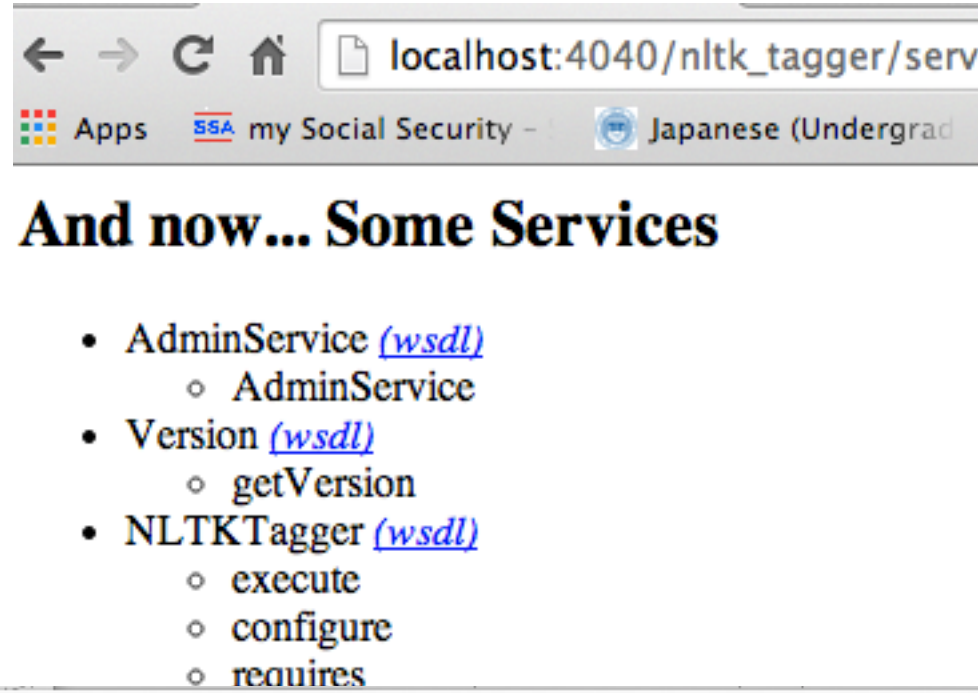
```
List words = null;
try {
    words = (List)PyCaller.call(pythonFile, "tagger", json.getTex
} catch (PyCallerException e) {
    e.printStackTrace();
    String message = "Python call error: " + e;
    return DataFactory.error(message);
}
```

Jetty Running

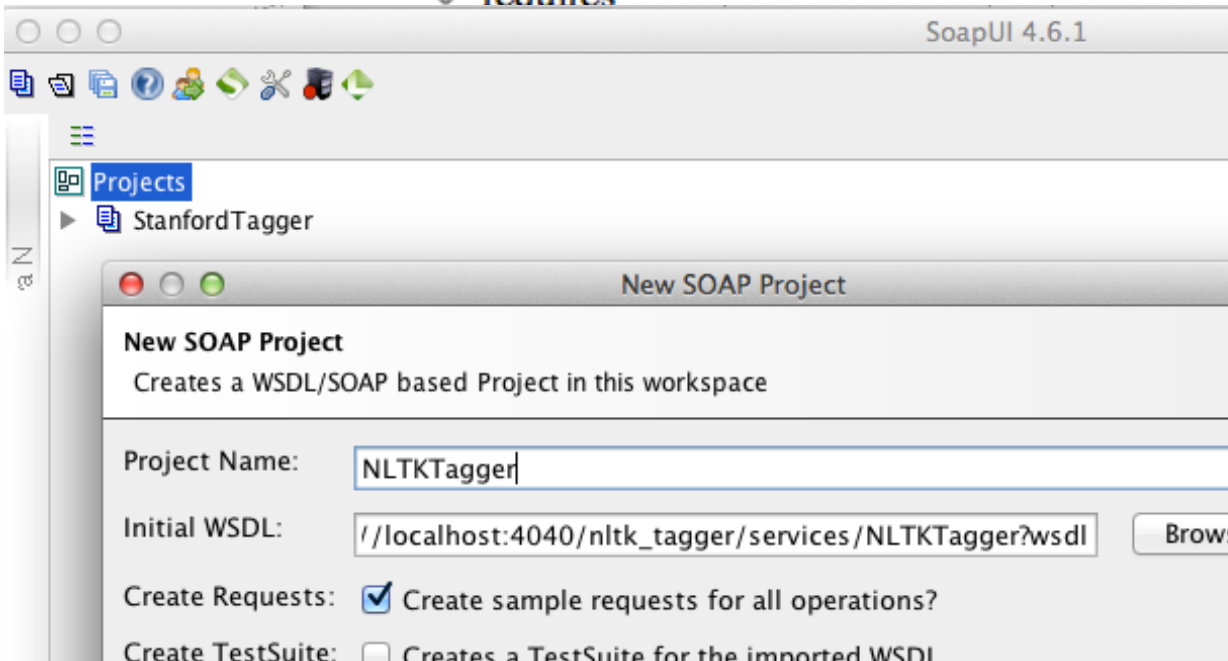
```
shis-MacBook-Air:org.lappsgrid.example.python.nltk shi$
shis-MacBook-Air:org.lappsgrid.example.python.nltk shi$ mvn jetty:run
[INFO] Scanning for projects...
[INFO]
```

NLTK Tagger Testing

Local Service

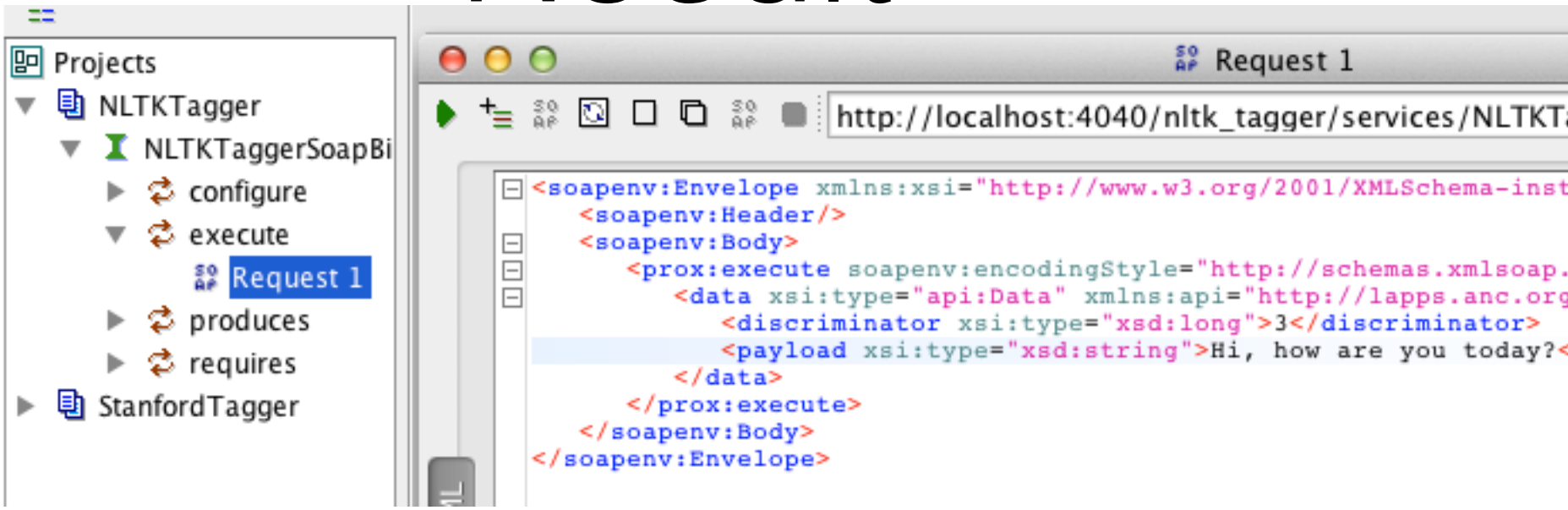


SoapUI Testing

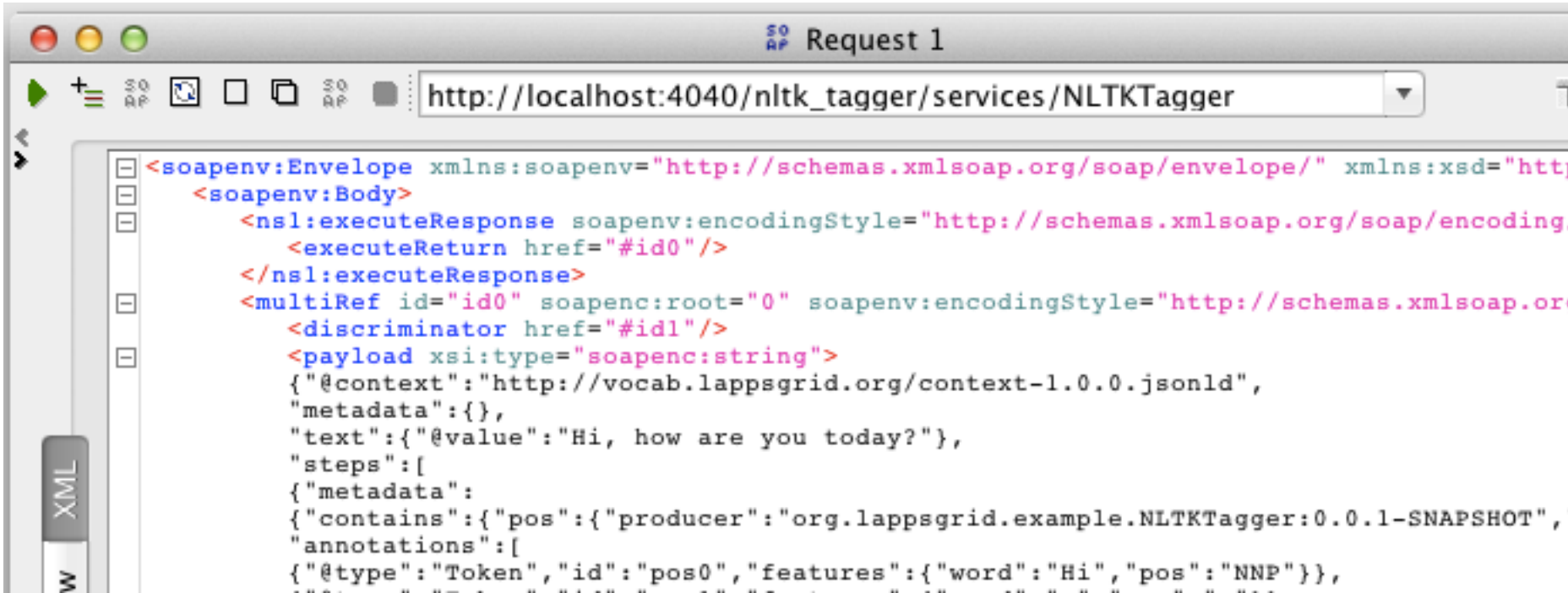


NLTK Tagger Testing Result

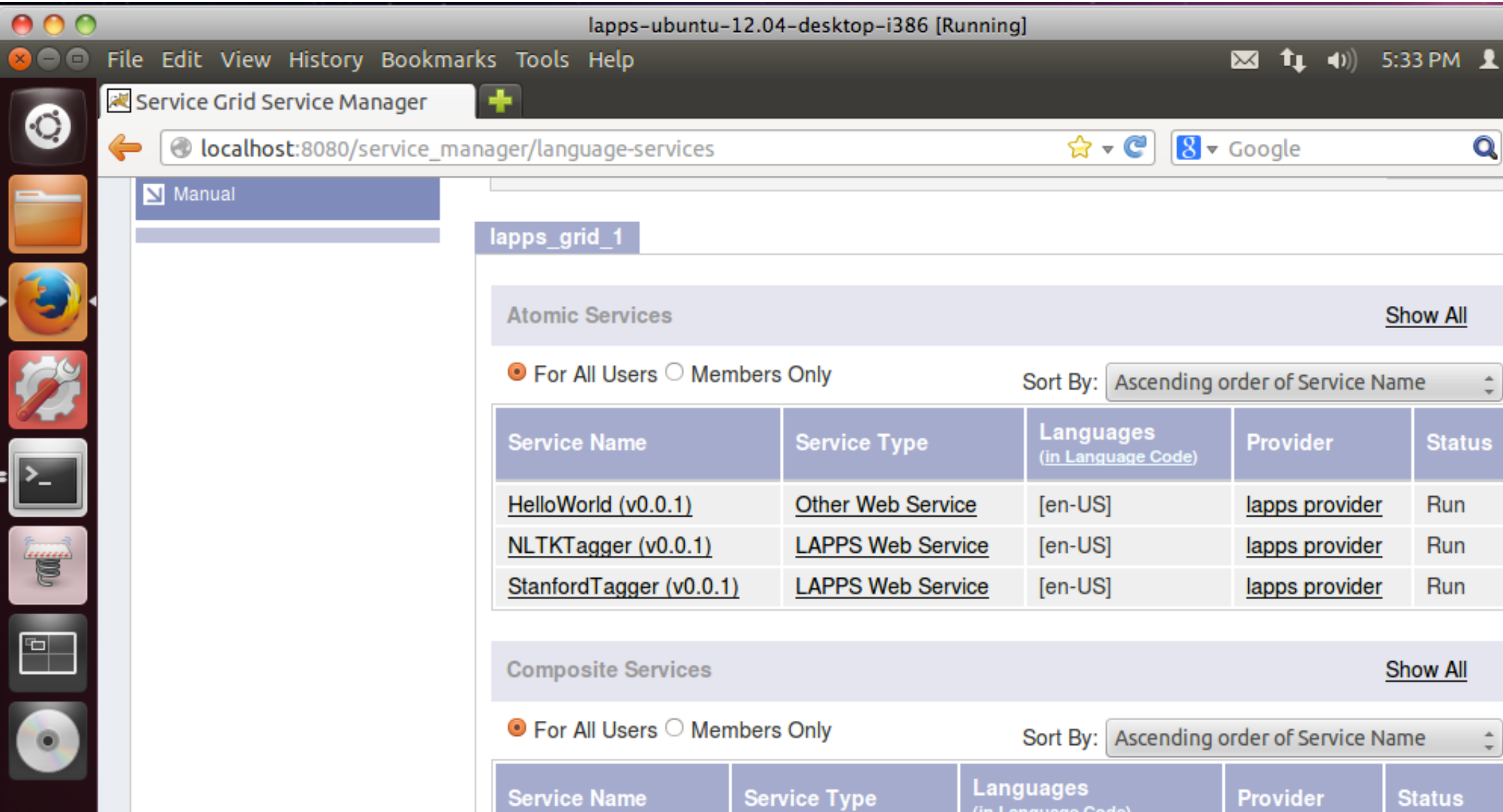
uest



ponse



Service Register



Conclusion

Contributing to the Lapps Grid

Wrapping Lapps Service

- Java / Python Wrapping
- Templates from Github Repository

Registering into Service Manager

- Service Manager Installation Script

Developing Environment

- VirtualBox Image: Ubuntu

Reference

PI Docs: http://www.anc.org/projects/lapps/api/project-info.html

ervice Templates:

https://github.com/chunqishi/org.lappsgrid.example.java.helloworld

https://github.com/chunqishi/org.lappsgrid.example.java.stanfordnlp

https://github.com/chunqishi/org.lappsgrid.example.python.nltk

ervice Managers:

http://eldrad.cs-i.brandeis.edu/service_manager/language-services

http://grid.anc.org:8080/service_manager/language-services

rtualBox Image:

http://eldrad.cs-i.brandeis.edu/download/lapps-ubuntu-12.04-desktop-i386.tar.gz