Application Development

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Telefónica
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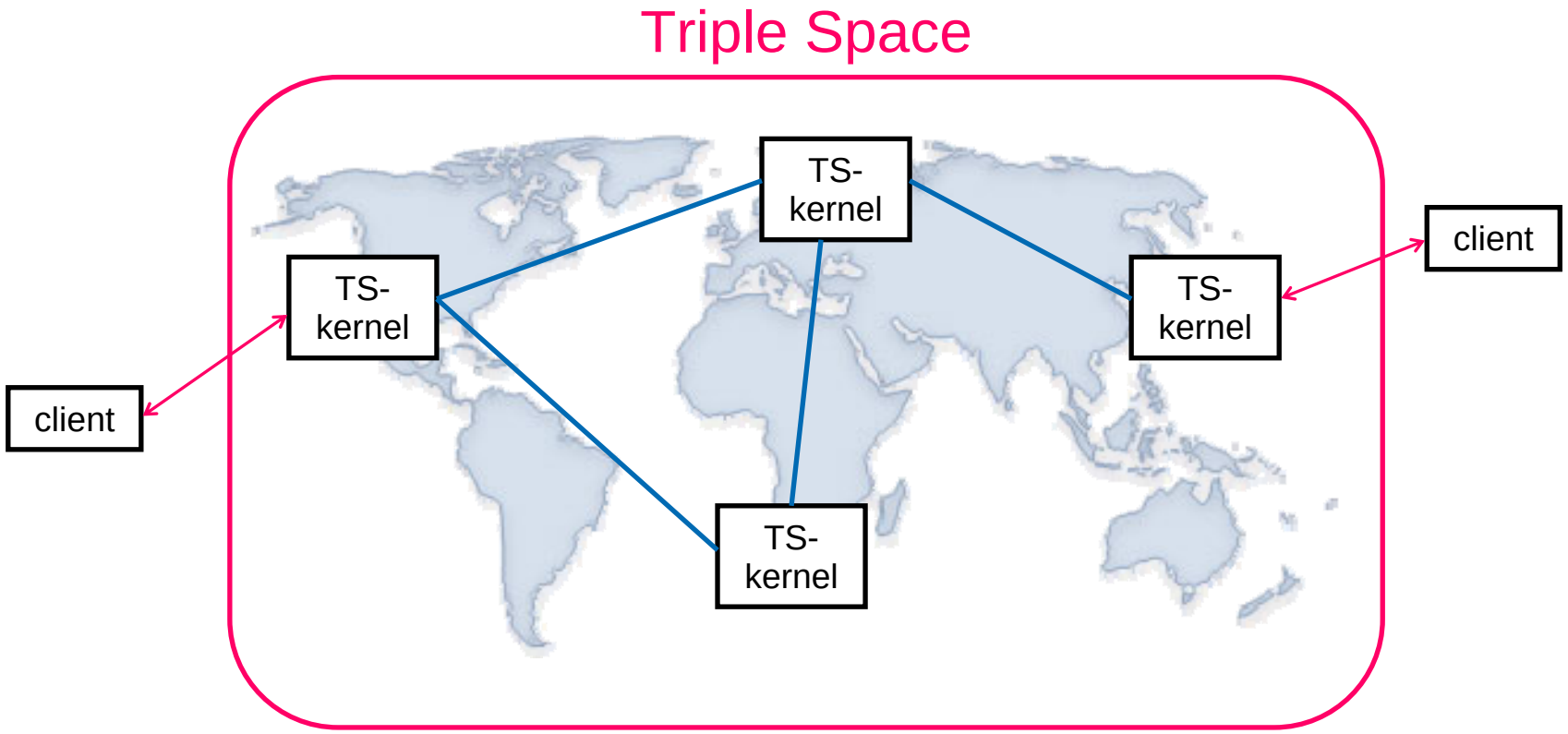
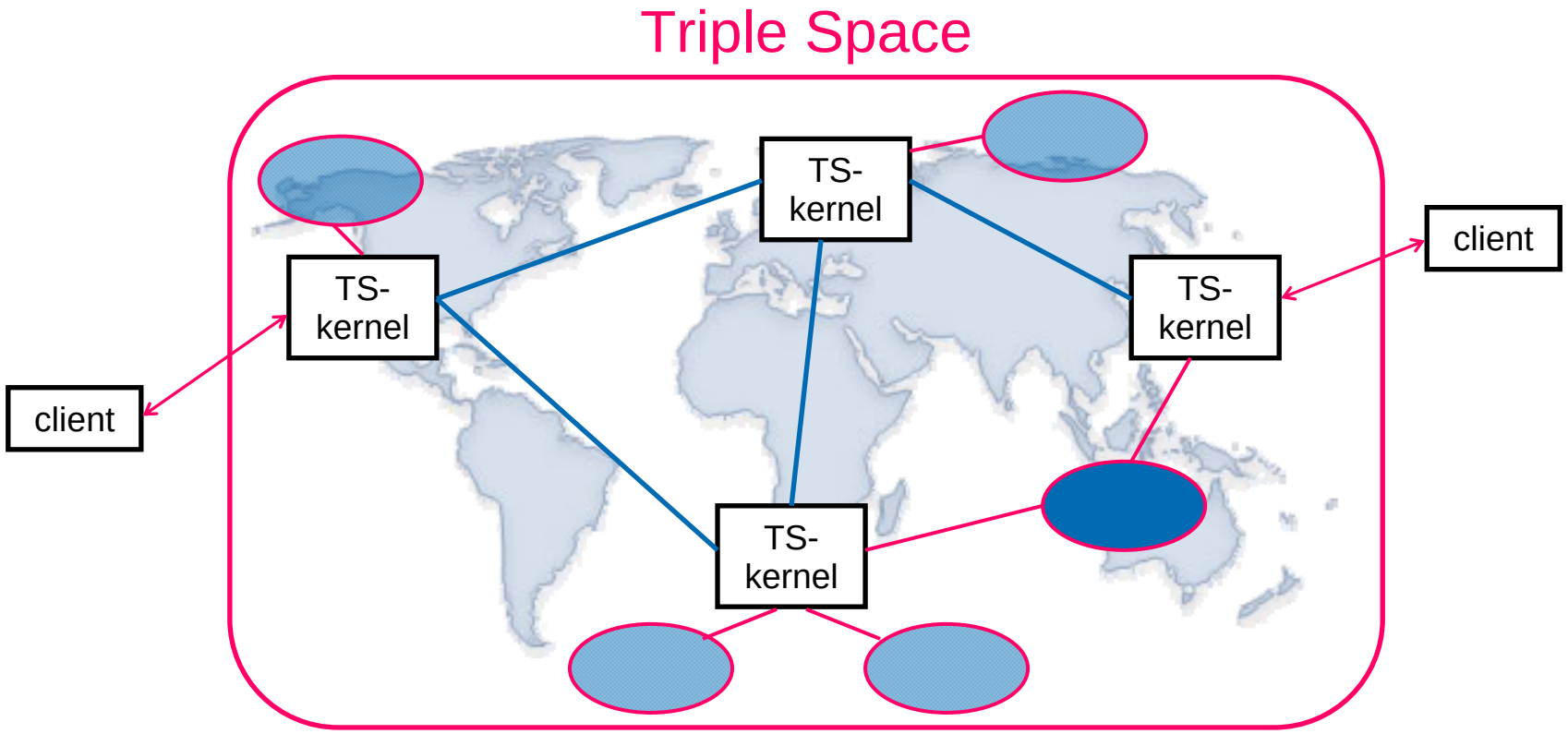
Client Access

- Connect to **one** Triple Space (TS-) kernel
- Read/Write semantic data via Triple Space API
- Interact with other clients



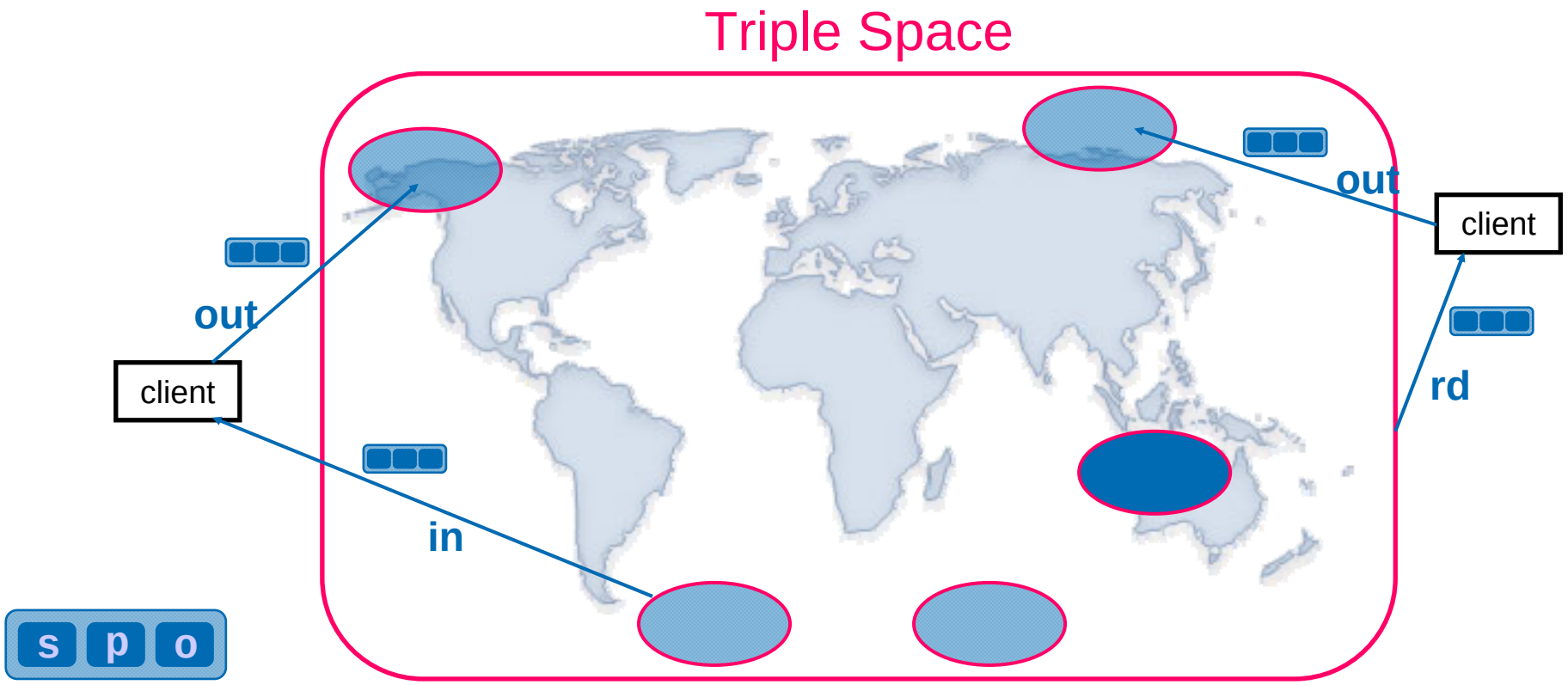
Structure of Triple Space

- Composed of single spaces
  - logical entity, addressed via unique URI
  - stored on one kernel, or distributed onto more kernels



Structure of Triple Space

- Triple Space access operations
  - **out**, **in, rd**: adress particular triplespace („with URI“)
  - **rd** can also adress Triple Space („without URI“)



Terms

- A (tuple-)space is a shared associative memory whose elementary data units are tuples. A tuple is a heterogeneous, ordered collection of typed values
- A triplespace is a tuplespace in which every tuple represents an RDF statement in terms of a triple (subject, predicate, object)
- A triplespace is identified by a unique identifier, i.e., the name of the triplespace
- A triplespace is accessed via the Triple Space (TS) API primitives

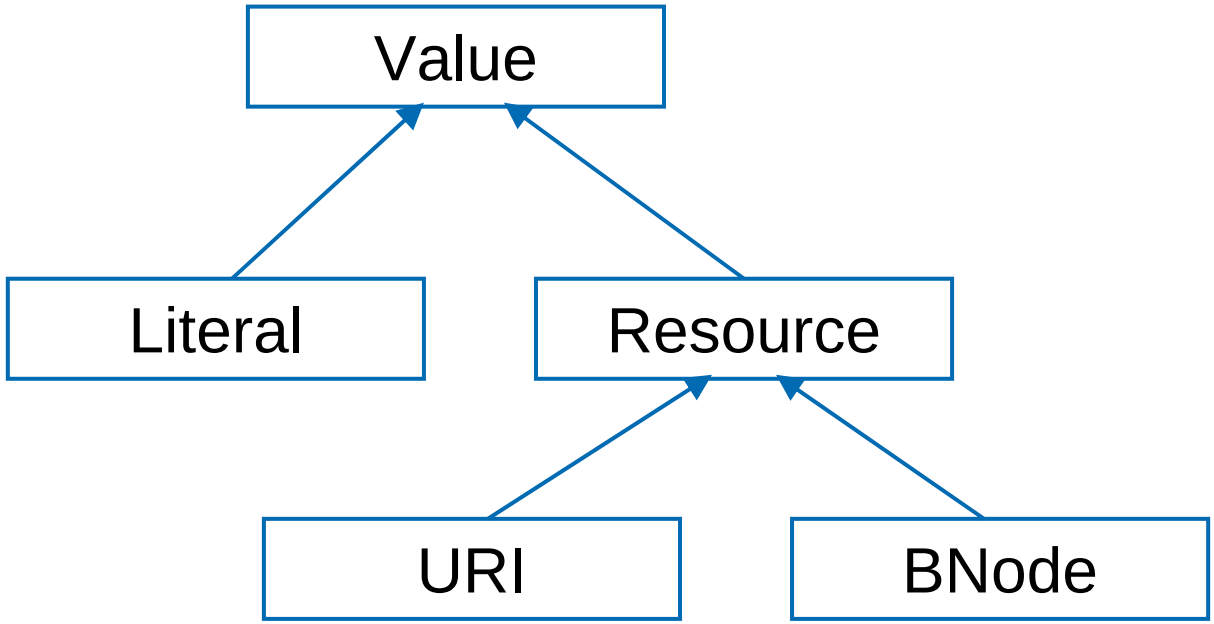
Terms (2)

- A triplespace can be divided into virtual subspaces
- A subspace is a part of a triplespace that complies to the definition of a triplespace and can have subspaces itself
- If a triple is in two spaces, then one of them must be a subspace of the other, i.e., subspaces cannot arbitrarily overlap.
- A space which is not a subspace is termed a root space

Sixth Framework Programme Priority 2
Information Society Technologies (IST)
Specific Targeted Research Project

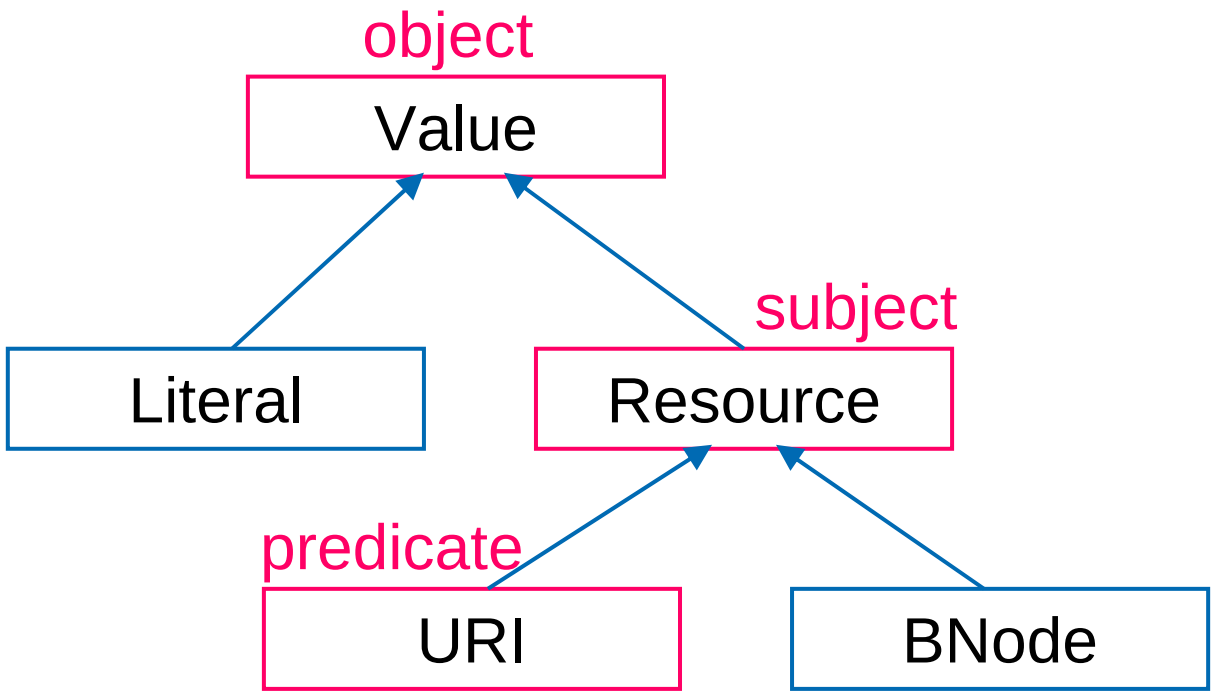
Representation of RDF Triples

- Defined in the OpenRDF Sesame API
- www.openrdf.org/doc/sesame2/2.0.1/apidocs/



Representation of RDF Triples

- Defined in the OpenRDF Sesame API
- www.openrdf.org/doc/sesame2/2.0.1/apidocs/
- RDF triple: org.openrdf.model.Statement



Core TS API

- interface org.tripcom.api.ts.CoreAPI
  - void **out**(Statement **triple**, URI **space**)
    - writes a single triple into the space
    - no guarantee if and when the triple will be available in the space
    - client is immediately free to perform further activities
    - client has to provide a resolvable URI which identifies a space
  - Set<Statement> **rd**(String **query**, URI **space**, int **timeout**)
    - query is a single triple pattern: triple with subject, predicate, or object being variable or exact value (?s, p, o), (?s, ?p, o), ...
    - returns one match of the query
    - return may be set of triples, e.g., Concise Bounded Description
    - no guarantee when the match would be returned
    - timeout gives bound for returning a match, timeout = 0: no timeout
    - if no match has been found within timeout, an empty set is returned
    - allows no conclusion regarding the existence of a match
  - Set<Statement> **rd**(String **query**, int **timeout**)
    - as above, without space URL
    - system can select a match from anywhere in Triple Space

Extended TS API

- interface org.tripcom.api.ts.ExtendedAPI
  - void **out**(Set<Statement> **triples**, URI **space**)
    - like CoreAPI.out, but writes set of triples
    - *deprecated:*
      - *time value can be specified which defines the minimal lifetime of the triples emitted to the space*
      - *after the lifetime, there is no guarantee that a triple within that set will still be available*
  - Set<Statement> **rd**(String **query**, URI **space**, int **timeout**)
    - like CoreAPI.rd, but supports SPARQL queries
  - Set<Statement> **rd**(String **query**, int **timeout**)
    - as above, without space URL
    - system can select a match from anywhere in Triple Space
  - Set<Set<Statement>> **rdmultiple**(String **query**, URI **space**, int **timeout**)
    - like rd, but returns multiple matches of the given templatematch may be set of triples, e.g. Concise Bounded Description
    - no completeness guarantee: the response to the client may not contain all matches within the space

Extended TS API - Subscriptions

- interface org.tripcom.api.ts.ExtendedAPI
  - URI **subscribe**(String **query**, Callback **callback**, URI **space**)
    - established a subscription via a callback (javax.security.auth.callback.Callback)
    - when a set of triples matching the template is written into the specified space, the matched set of triples is sent to the callback
    - returns a URI identifying the subscription
  - void **unsubscribe**(URI **subscription**)
    - cancels the subscription with the given URI if it exists

Further Extended TS API - in

- interface org.tripcom.api.ts.FurtherExtendedAPI
  - Set<Statement> **in**(String **query**, URI **space**, int **timeout**)
    - like rd, but removes the matched triples
  - Set<Set<Statement>> **inmultiple**(String **query**, URI **space**, int **timeout**)
    - like rdmultiple, but removes the matched triples

Further Ext. TS API - Transactions

- interface org.tripcom.api.ts.FurtherExtendedAPI
  - URI **createTransaction**(String **type**)
    - type: „local“ to a client (URI is only known to the client)
    - type: „shared“: transaction shareable with others.
      - Identifiers of shared transactions would be made available to other clients, who can then „get“ the shared transaction to participate in it
    - Transactions may be supported optimistically or pessimistically
      - pessimistically would potentially make less guarantees
  - boolean **beginTransaction**(URtransactionID)
    - begins the transaction
    - all subsequent interactions by all clients sharing this transaction are handled transactionally
  - boolean **commitTransaction**(URI **transactionID**)
    - commits all interactions made within this transaction in the space
  - boolean **rollbackTransaction**(URI **transactionID**)
    - rolls back all interactions made within this transaction in the space
  - boolean **getTransaction**(URI **transactionID**)
    - join in a shared transaction with other clients

Management API

- interface org.tripcom.api.management.ManagementAPI
  - public URI **create**(String **path**, URI **space**);
  - public void **destroy**(URI **space**);
  - public Set<URI> **children**(URI **space**);
  - public void **addMetadata**(Set<Statement> **metadata**, URI **space**);
  - public boolean mOut(Set<Statement> **policies**, URI **space**);

Example program

```
import org.openrdf.model.*;
import org.tripcom.api.ts.*;

// create instance of the CoreAPI wita a valid CERTIFICATE
CoreAPI tsapi = new CoreAPIImplementation(CERTIFICATE);

// create RDF triple
ValueFactory factory = new ValueFactoryImpl();

URI subject =
   factory.createURI("http://tripcom.sourceforge.net/tutorial");
URI predicate =
   factory.createURI("http://purl.org/dc/elements/1.1/title");
Literal object =
   factory.createLiteral(“TripCom Tutorial");
```

Example program (cont.)

```
Statement statement = new StatementImpl(
   subject, predicate, object);

// write the triple into a space
tsapi.out(statement, new
   URIImpl("tsc://www.tsexample.com/"));

// Create a simple query
String query = "SELECT * WHERE { ?x ?y ?z . }";

// read triples from the space
Set<Statement> result = tsapi.rd(query, new
   URIImpl("tsc://www.tsexample.com/"), 30000);

Sytem.out.println(result);
```

Kernel Installation

Required software

- Java JDK version 1.5
  - http://java.sun.com/javase/downloads/index_jdk5.jsp
- Apache Maven version 2.0
  - http://maven.apache.org/
- Subversion version 1.4
  - http://subversion.tigris.org/

Getting the source / Compile

- Getting the source
  - Subversion checkout

svn co \ https://tripcom.svn.sourceforge.net/svnroot/tripcom

- Compiling the source

cd tripcom/trunk

mvn clean package assembly:assembly

  - skipping the tests

(-Dmaven.test.skip=true)

Dependencies

- TripCom repository
  - passwort protected
- ~/.m2/settings.xml

```
<settings>
  <servers>
    <server>
      <id>TripComRepository</id>
      <username>tripcom</username>
      <password>TP!56tsc</password>
    </server>
  </servers>
</settings>
```

Using the repository

- pom.xml

```
<project>
  ...
  <repositories>
    <repository>
    <id>TripComRepository</id>
    <url>http://tripcom.sourceforge.net/repository</url>
    </repository>
    ...
  </repositories>
  ...
</project>
```

TripCom assembly

- tripcom-0.0.1-bin.zip

/libs Third party libraries

/bin TripCom jars

/conf configuration files

start.[sh|bat] start scripts

Applications

- jini

  http://www.jini.org/wiki/Category:Getting_Started

- blitz

  http://sourceforge.net/project/showfiles.php?group_id=126322&package_id=138181

  - installer_pj_2_0-rc4.jar

Starting the kernel

- starting blitz

sh blitz.sh

- removing the log/database file

rm -rf log/dbfiles_dancres/*

- starting the kernel

sh start.sh