How to extract RDF of link labels from RTC Workitem for LQE to index

This document describes how to extract RDF data from RTC Workitem RDF by using OSLC REST API. In this document, we will try to extract RDF of labels for Git ChangeSet. The attached sample code is based on OSL Workshop code (Example04) in https://jazz.net/library/article/635 article.

Once you will extract RDF, you can add it to Lifecycle Query Engine (LQE) as Vocabularies in order for LQE to query such labels by SPARQL.

Prerequisite:

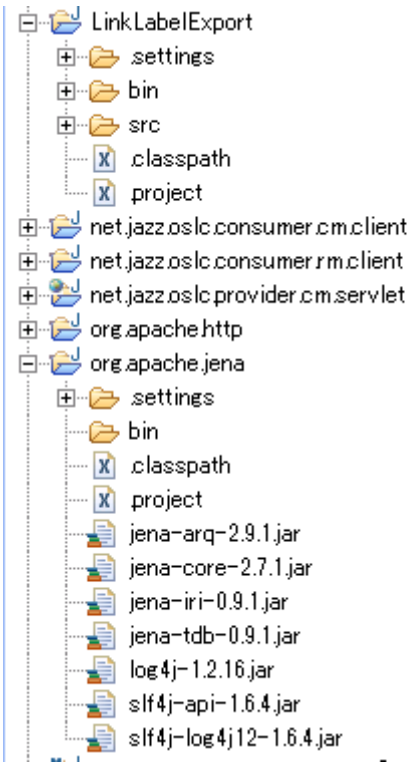
1. Download, setup and configure RTC v502 server and its Git adapter (Git adapter is shipped as another downloadable image with RTC v502)
2. Download, setup and configure Git server
3. Download and configure Eclipse (The source code is provided as Eclipse project)
4. Download OSLC Workshop zip(2014-09-25-oslc-workshop.zip) from https://jazz.net/library/article/635
5. Extract the attached sample code zip (LinkLabelExport.zip)
6. Download Apache Jena v2.7.1 from http://jena.apache.org. The direct link to the downloadable image is http://archive.apache.org/dist/jena/binaries/apache-jena-2.7.1.zip. The necessary libraries are
    1. jena-arq-2.9.1.jar
    2. jena-core-2.7.1.jar
    3. jena-iri-0.9.1.jar
    4. jena-tdb-0.9.1.jar
    5. log4j-1.2.16.jar
    6. slf4j-api-1.6.4.jar
    7. slf4j-log4j12-1.6.4.jar

Setup: Workitem

1. Start RTC and Git Server
2. Create a WorkItem
3. Commit and Push changes associated with Workitem created above.
4. Remember such Workitem ids.

Setup: Sample code

1. Start Eclipse
2. Import the downloaded workshop zip (2014-09-25-oslc-workshop.zip) to your workspace
3. Import the attached sample code zip (LinkLabelExport.zip) to your workspace
4. Copy 7 downloaded Jena libraries to org.apache.jena Java Project.
5. You will see the following Java projects



6. Update /LinkLabelExport/src/com/ibm/rtc/sample/params.properties file as follows

Property name	Value
server.url	RTC server url. Last slash character is needed. Example: https://rtcserver.mycompany.com:9443/ccm/
login.id	RTC Login ID Example: susan@mycompany.com
login.password	Password for the ID above Example: mypassword
pa.name	Project Area where the specified Workitems are in. Example: ProjectArea
cr.ids	The list of Workitem ID. You can use a comma to specify multiple IDs

	Example: 7, 8, 13
gitserver.path	The unique path name to be used to check Git ChangeSet. You don't have to change this if you want to query Git ChangeSet label.
link.type	Predicate name for Git Change Set. You don't have to change this if you want to query Git ChangeSet label.
output.rdf	RDF filename. Generated RDF will be saved in this file. Example: c:/tmp/changesets.rdf

7. Select LinkLabelExport project, open its context menu and select "Build Project" to get this project built
8. Make sure that there will be no compile errors.

Run the sample code

1. Select LinkLabelExport project, open its context menu, select Run As and select Java Application.
2. You will eventually see "`>> Extracted change sets.`" in Console view. Also you will see "c:¥tmp¥changesets.rdf" file.

How this code works ?

1. In com.ibm.rtc.sample.ChangeSetLabelExport.getChangeRequestAsRDF(String, Model), you can see the following snippet.

```
 HttpGet query = new HttpGet(queryWIs);
query.addHeader("Accept", "application/rdf+xml");
query.addHeader("OSLC-Core-Version", "2.0");


HttpResponse response = HttpUtils.sendGetForSecureDocument(
   ChangeSetLabelExport.server, query,
   ChangeSetLabelExport.login,
   ChangeSetLabelExport.password, httpclient);
if (response.getStatusLine().getStatusCode() != 200) {
  response.getEntity().consumeContent();
  throw new HttpResponseException(response.getStatusLine().
      getStatusCode(), response.getStatusLine().getReasonPhrase());
}
// Create RDF model
Model model = ModelFactory.createDefaultModel();
```

```
model.read(new InputStreamReader(response.getEntity()
    .getContent()),null);
model.write(System.out);
```

This is OSLC API call to extract WorkItem as RDF. and Jena Model is instantiated(*model*) from this data.

2. When you will take a look at Console View, you may see something like :

```
<rdf:Description rdf:nodeID="A0">
  <rdf:subject
    rdf:resource="https://rtcserver.mycompany.com:9443/ccm/
  resource/itemName/com.ibm.team.workitem.WorkItem/8" />
  <rdf:predicate rdf:resource="http://open-services.net/ns/
  cm#tracksChangeSet" />
  <rdf:object
    rdf:resource="https://rtcserver.mycompany.com:9443/ccm/
    com.ibm.team.git.internal.resources.IGitResourceRestS
    ervice/commit?value=H4sIAAAAAAAAAEXOuQ7CMBBF0Z6vGLkFI
    dvjNRV0CEEHHY2XiQghBBFTIf4dIhTx2nuK95rBdyyxCtg6Z6gbuu
    YBShhasAvIVFMq4Nji5_LoTuxwfsI-PECDFJXklRYgudAw557zE5s
    0_fR2t93t14fj6nJfNrFbpr77m3Y0XKG1Xgh0NikMGKQ0xjqPnKzJ
    aCZ8G_GmefQltOH7oAzPri_9lIcxUxIoa2WTpsi1Ni4iCh-jCmiIg
    pe1s0bJzGbvDzN4SoT9AAAA" />
  <rdf:type rdf:resource="http://www.w3.org/1999/02/22-rdf-
    syntax-ns#Statement" />
  <dcterms:title>Add fields task 7, defect 8</dcterms:title>
</rdf:Description>
```

This is an RDF representation for Git ChangeSet. This RDF representation is called as "Reification" (or reified statement) In detail, please see http://open-services.net/bin/view/Main/OslcCoreSpecAppendixLinks?sortcol=table;up=#2_Anchor. The next step is to extract it.

3. The following snippet is to extract RDF data above from the instantiated Jena model(*model*).

```
Property predicateProp = model.createProperty("http://www.
      w3.org/1999/02/22-rdf-syntax-ns#", "predicate");
Resource tracksChangeSetObj = model.createResource(Change
```

```
        SetLabelExport.linkType);
    Selector selector = new SimpleSelector(null, predicateProp,
        tracksChangeSetObj) {
      public boolean selects(Statement stmt) {
        Resource subject = stmt.getSubject();
        Property objectProp = stmt.getModel().createProperty(
                  "http://www.w3.org/1999/02/22-rdf-syntax-ns#", "object");
        Statement stmt2 = subject.getProperty(objectProp);
        RDFNode object = stmt2.getObject();
        if (object instanceof Resource) {
          Resource res = (Resource)object;
          if (res.getURI().startsWith(ChangeSetLabelExport.server
                    +ChangeSetLabelExport.gitserver)) {
            return true;
          }
        }
        return false;
      }
    };
    Property subjectProp = model.createProperty("http://www.w3.org
        /1999/02/22-rdf-syntax-ns#", "subject");
    Property objectProp = model.createProperty("http://www.w3.org/
        1999/02/22-rdf-syntax-ns#", "object");
    Property typeProp =  model.createProperty("http://www.w3.org/1
        999/02/22-rdf-syntax-ns#", "type");
    Property titleProp = model.createProperty("http://purl.org/dc/
      terms/", "title");
    StmtIterator itr = model.listStatements(selector);
    List<Statement> statements = new ArrayList<Statement>();
    while(itr.hasNext()) {
      Statement stmt = itr.nextStatement();
      Resource sub = stmt.getSubject();
      statements.add(sub.getProperty(subjectProp));
      statements.add(sub.getProperty(predicateProp));
      statements.add(sub.getProperty(objectProp));
      statements.add(sub.getProperty(typeProp));
```

```
      statements.add(sub.getProperty(titleProp));
    }
    outputModel.add(statements.toArray(new Statement[0]));
```

Note that in this snippet, you can see the following code

```
       if (object instanceof Resource) {
         Resource res = (Resource)object;
         if (res.getURI().startsWith(ChangeSetLabelExport.server
                    +ChangeSetLabelExport.gitserver)) {
           return true;
         }
       }
```

This code is to check the <rdf:object> is an URI to Git ChangeSet. If you will try to extract the labels of other link types, such as RTC SCM ChangeSet, you need to change this code.

4. After this sample programme is completed, you can see something like the following RDF in the specified output file

```
<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:j.0="http://purl.org/dc/terms/">
  <rdf:Description rdf:nodeID="A0">
    <rdf:subject
      rdf:resource="https://rtcserver.mycompany.com:9443/ccm/res
      ource/itemName/com.ibm.team.workitem.WorkItem/7" />
    <rdf:predicate rdf:resource="http://open-services.net/ns/cm#
    tracksChangeSet" />
    <rdf:object
      rdf:resource="https://rtcserver.mycompany.com:9443/ccm/com
      .ibm.team.git.internal.resources.IGitResourceRestService/
    commit?value=H4sIAAAAAAAAAEXOvY7CMBAE4J6nWLkFoXXW8dqpoEMI
    Ok7X0DhZI-VyiVF-rjnx7pcIRTftfCPN7wbmqEoVoI4i0NYdVGnqxtjDT
    _ieIhRwC0MDrHZvKgu9q88ocA09aAfaFhqLnCBDncMWPeJdrTy--flyvl
    yPt4_D13Nfl-2-Su2_aRaDhpi91uS4MhQoZJm17DxhZCtkV9wt-FT3aQx
    NmC-Mw9SmMa31sNRGrA3sHt76XEo9r51kKOzICHJeGnKijX-ozesPnLP6
    IAEBAAA." />
```

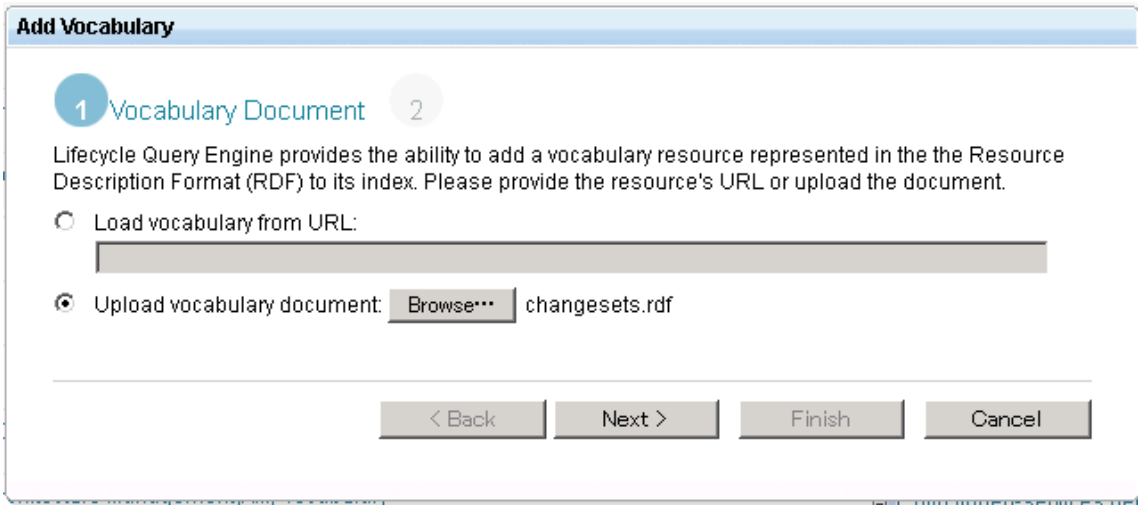
```
  <rdf:type rdf:resource="http://www.w3.org/1999/02/22-rdf-synt
  ax-ns#Statement" />
  <j.0:title>Add min counter value : Task 7</j.0:title>
</rdf:Description>
<rdf:Description rdf:nodeID="A1">
  <rdf:subject
    rdf:resource="https://rtcserver.mycompany.com:9443/ccm/resou
  rce/itemName/com.ibm.team.workitem.WorkItem/7" />
  <rdf:predicate rdf:resource="http://open-services.net/ns/cm#tr
  acksChangeSet" />
  <rdf:object
    rdf:resource="https://rtcserver.mycompany.com:9443/ccm/com.i
  bm.team.git.internal.resources.IGitResourceRestService/commi
  t?value=H4sIAAAAAAAAAEXOuQ7CMBBF0Z6vGLkFIdvjNRV0CEEHHY2XiQgh
  BBFTIf4dIhTx2nuK95rBdyyxCtg6Z6gbuuYBShhasAvIVFMq4Nji5_LoTuxw
  fsI-PECDFJXklRYgudAw557zE5s0_fR2t93t14fj6nJfNrFbpr77m3Y0XKG1
  Xgh0NikMGKQ0xjqPnKzJaCZ8G_GmefQltOH7oAzPri_9lIcxUxIoa2WTpsi1
  Ni4iCh-jCmiIgpe1s0bJzGbvDzN4SoT9AAAA" />
  <rdf:type rdf:resource="http://www.w3.org/1999/02/22-rdf-synta
x-ns#Statement" />
  <j.0:title>Add fields task 7, defect 8</j.0:title>
</rdf:Description>
<rdf:Description rdf:nodeID="A2">
  <rdf:subject
    rdf:resource="https://rtcserver.mycompany.com:9443/ccm/resou
  rce/itemName/com.ibm.team.workitem.WorkItem/8" />
  <rdf:predicate rdf:resource="http://open-services.net/ns/cm#tr
  acksChangeSet" />
  <rdf:object
    rdf:resource="https://rtcserver.mycompany.com:9443/ccm/com.i
  bm.team.git.internal.resources.IGitResourceRestService/commi
  t?value=H4sIAAAAAAAAAEXOuQ7CMBBF0Z6vGLkFIdvjNRV0CEEHHY2XiQgh
  BBFTIf4dIhTx2nuK95rBdyyxCtg6Z6gbuuYBShhasAvIVFMq4Nji5_LoTuxw
  fsI-PECDFJXklRYgudAw557zE5s0_fR2t93t14fj6nJfNrFbpr77m3Y0XKG1
  Xgh0NikMGKQ0xjqPnKzJaCZ8G_GmefQltOH7oAzPri_9lIcxUxIoa2WTpsi1
  Ni4iCh-jCmiIgpe1s0bJzGbvDzN4SoT9AAAA" />
```

```
  <rdf:type rdf:resource="http://www.w3.org/1999/02/22-rdf-synta
  x-ns#Statement" />
  <j.0:title>Add fields task 7, defect 8</j.0:title>
</rdf:Description>
<rdf:Description rdf:nodeID="A3">
  <rdf:subject
    rdf:resource="https://rtcserver.mycompany.com:9443/ccm/resou
  rce/itemName/com.ibm.team.workitem.WorkItem/13" />
  <rdf:predicate rdf:resource="http://open-services.net/ns/cm#tr
  acksChangeSet" />
  <rdf:object
    rdf:resource="https://rtcserver.mycompany.com:9443/ccm/com.
  ibm.team.git.internal.resources.IGitResourceRestService/com
  mit?value=H4sIAAAAAAAAAEXOMU_DMBCG4b2_4uQVVN35Yl-cCTZUtRNh6
  3KxE1GiYJS4YkD8dxpVEd_6PsP3s4PbTDQNmNeic4HvPI_QQKvLCMTm8Q7S
  Cs6mfb_CSWdwYKlxdWMtWCQHDxgQz2bT_V0fjofj6bl9e_r42l-6aR_z9G_
  G1WDFIoGIa4kVK6u13ksdGHvxif2GP1f8cplz0VFvD8pynXLJW17WHCKLSz
  L4ikhU-5DqJCjdMCAldNSJJxe5M7vfP29edy32AAAA" />
  <rdf:type rdf:resource="http://www.w3.org/1999/02/22-rdf-synt
  x-ns#Statement" />
  <j.0:title>Start work : Task 13</j.0:title>
</rdf:Description>
<rdf:Description rdf:nodeID="A4">
  <rdf:subject
    rdf:resource="https://rtcserver.mycompany.com:9443/ccm/reso
  urce/itemName/com.ibm.team.workitem.WorkItem/13" />
  <rdf:predicate rdf:resource="http://open-services.net/ns/cm#t
  racksChangeSet" />
  <rdf:object
    rdf:resource="https://rtcserver.mycompany.com:9443/ccm/com.
  ibm.team.git.internal.resources.IGitResourceRestService/com
  mit?value=H4sIAAAAAAAAAEXOMQvCMBAF4N1fcWRV5JJrc6mTbiJ2083l2
  jSgtUbaKoL4322R4uNt7xveewZDVKlWoDbeg0AjL3jK9VFBiC0cpKtBk1r8
  nB_dSeXxBrm0kIHm1dA0BYM6hTlmiCc16eqnd_vdPt8cjuvLfXkummUZm7-
  pR4MJMWdak-MyISExxlp2GWHF1pOd8G3E23Mbe6lleNB3jyb2cZq7cQ6hYO
  ecCAViSVzChE7bQGhSXZkC2TvSvlSzzxfqz5WZ_QAAAA.." />
```

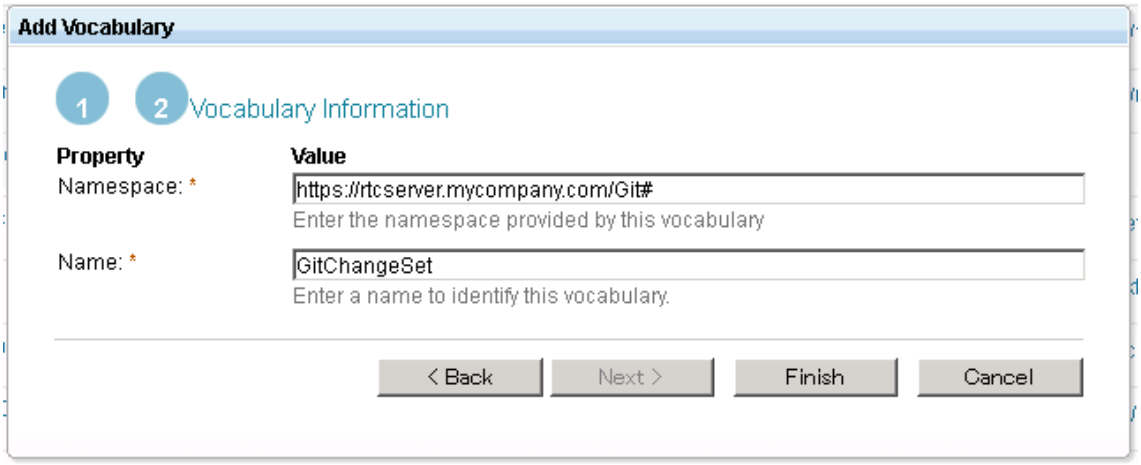
```
    <rdf:type rdf:resource="http://www.w3.org/1999/02/22-rdf-synt
    ax-ns#Statement" />
    <j.0:title>Add a max value for Task 13</j.0:title>
  </rdf:Description>
</rdf:RDF>
```

This is RDF which has all labels for the specified link type. (In this example, the link type is Git ChangeSet.)

5. Login Lifecycle Query Engine(LQE)
6. Select Administration > Vocabularies
7. Click Add Vocabulary
8. Select Upload vocabulary document and select the RDF file generated above..



9. Click Next
10. Type Name space and Name. (Note: Good namespace is your rtc server name.)



11. Finish
12. You can try to query such link label by SPARQL. For example, if you will execute

the following SPARQL,

```
PREFIX oslc_cm: <http://open-services.net/ns/cm#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX dcterms: <http://purl.org/dc/terms/>



select * where {
   OPTIONAL{ ?stmt rdf:subject ?resourceL;
               rdf:predicate oslc_cm:tracksChangeSet;
               rdf:object ?changeSets;
               dcterms:title ?changeSetsTitle. }
}
```

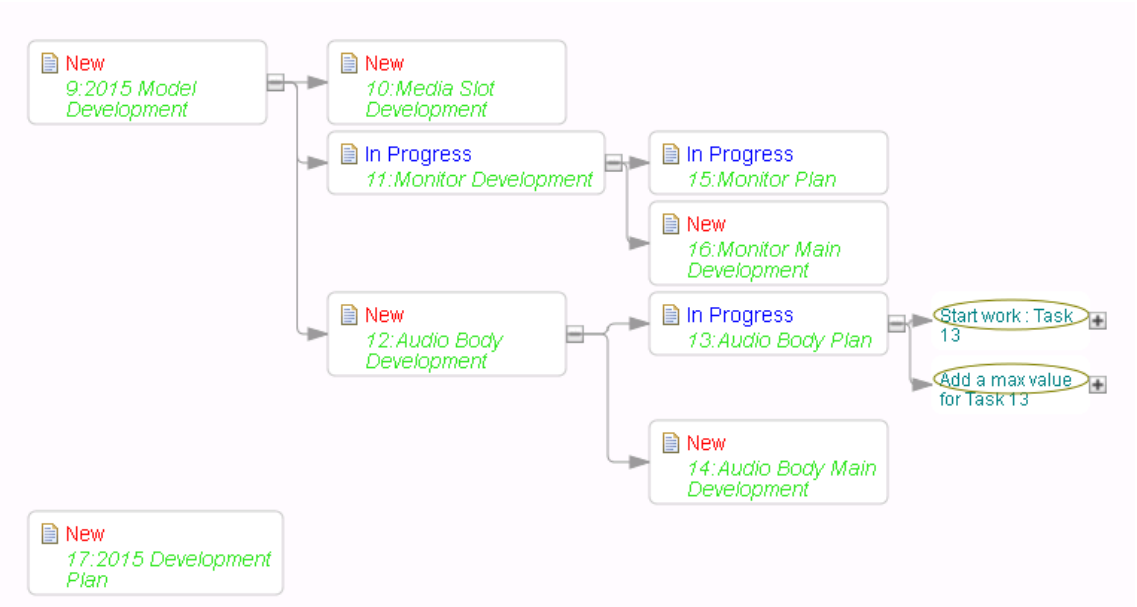
you might see the following result

Show All Items per Page Previous | 1 - 5 of 5 | Next

#	stmt	resourceL	changeSets	changeSetsTitle
1	b0	7: Git Repo Integration Test	Add fields task 7, defect 8	Add fields task 7, defect 8
2	b1	13: Audio Body Plan	Add a max value for Task 13	Add a max value for Task 13
3	b2	7: Git Repo Integration Test	Add min counter value : Task 7	Add min counter value : Task 7
4	b3	13: Audio Body Plan	Start work : Task 13	Start work : Task 13
5	b4	8: Git Repo Integration Test2	Add fields task 7, defect 8	Add fields task 7, defect 8

In “changeSetsTitle” column, you can see the link labels.

13. In addition to Query, you can use this label for Rational Engineering Lifecycle Manager View. For example,



What if you want to see other link type's label?

1. For example, if you want to see RTC SCM ChangeSet title, try to update /LinkLabelExport/src/com/ibm/rtc/sample/params.properties file as follows

Property name	Value
gitserver.path	resource/itemOid/com.ibm.team.scm.ChangeSet
link.type	http://jazz.net/xmlns/prod/jazz/rtc/cm/1.0/com.ibm.team.filesystem.workitems.change_set.com.ibm.team.scm.ChangeSet

   without any code changes
2. Execute this programme, and add the output RDF file to LQE as Vocabularies..
3. Try to execute the following SPARQL

```
PREFIX rtc_cm: <http://jazz.net/xmlns/prod/jazz/rtc/cm/1.0/>
PREFIX oslc_cm: <http://open-services.net/ns/cm#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX dcterms: <http://purl.org/dc/terms/>



select * where {
   OPTIONAL{ ?stmt rdf:subject ?resourceL;
               rdf:predicate
rtc_cm:com.ibm.team.filesystem.workitems.change_set.com.ibm.team.scm.Chang
eSet;
               rdf:object ?changeSets;
               dcterms:title ?changeSetsTitle. }
}
```

4. You will see RTC Workitem with the title of RTC SCM ChangeSet.