

Instructions to install and run the OSLC Simulink Adapter (for Matlab R2013b)


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1. Installing Eclipse Lyo

Follow the instructions in the document named “Instructions to install Eclipse Lyo”. The document also contains instructions on how to use a proxy server with Maven and Eclipse.

2. Downloading oslc4jsimulink repository

1. Open the Git Repositories View (Window -> Show View -> type “Git Repositories” in the search field)
2. Click on the Clone Repository icon 
3. In the URI field, paste the following URL:
`git://git.eclipse.org/gitroot/lyo/org.eclipse.lyo.adapter.simulink.git`
4. The Host and Repository fields will autofill. Leave the Username and Password fields empty.
5. Click Next until Finish.

3. Importing projects into the Eclipse workspace

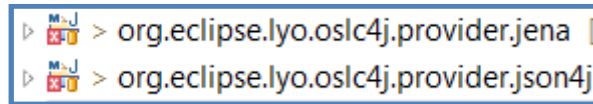
1. In the Git repositories view, right-click `org.eclipse.lyo.adapter.simulink` and select “Import Projects”. Click Next until Finish
2. The 3 projects are in the Eclipse workspace

4. Building the oslc4jsimulink projects

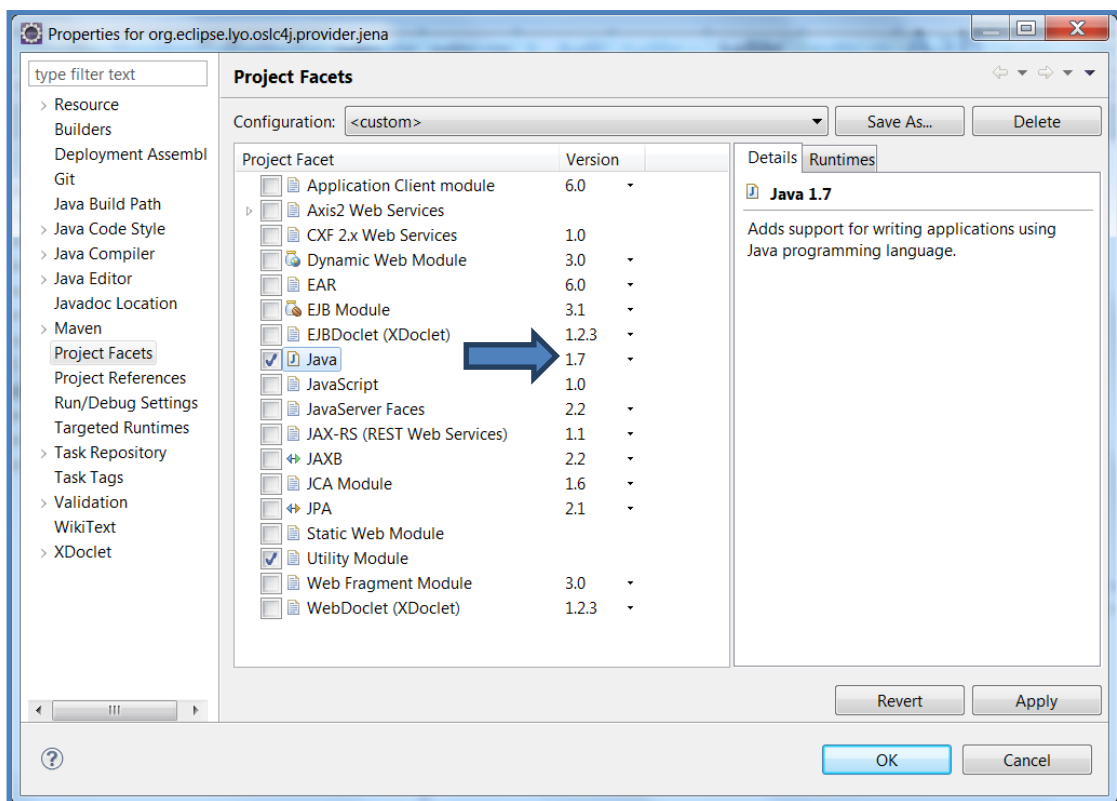
1. In Eclipse, open the Project Explorer view. (Window → Show View → Project Explorer)
2. Expand the **org.eclipse.lyo.adapter.simulink.ecore** project
3. Right click pom.xml -> Run As -> Maven clean
4. Right click pom.xml -> Run As -> Maven install
5. Expand the **org.eclipse.lyo.adapter.simulink.resources** project
6. Right click pom.xml -> Run As -> Maven clean
7. Right click pom.xml -> Run As -> Maven install
8. Expand the **org.eclipse.lyo.adapter.simulink** project
9. Right click pom.xml -> Run As -> Maven clean
10. Right click pom.xml -> Run As -> Maven install

If there is no error mark next to any project, you can skip the next steps.

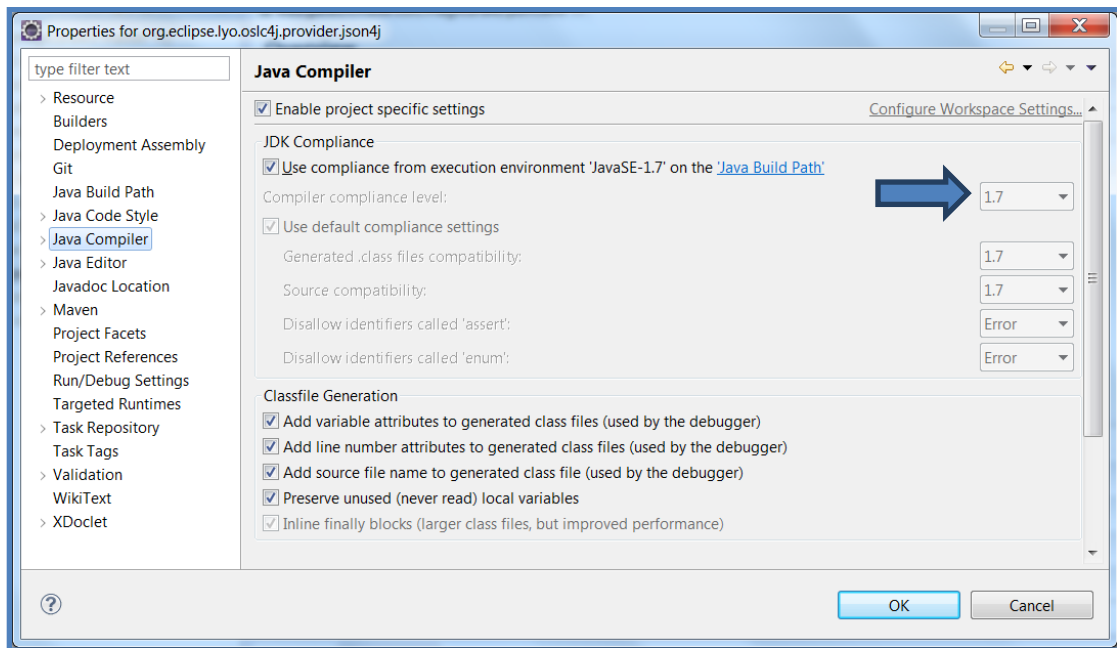
11. If there is a red error mark next to any project, select the project. Right-click->Maven->Update Project... and click OK
12. Make sure that the Eclipse projects displayed in the project explorer view do not contain any error icons displayed next to the project names as for example displayed below.



If a project has an error icon, then select the project and open its properties view (Project->right click->Properties). Under the Projects Facet tab, make sure that 1.7 is selected as Java version as shown below.



If a project still shows an error, then change its **JDK compliance** to 1.7. Select the project, right-click -> Properties. Select Java Compiler and select **1.7** in the drop down menu next to the JDK compliance setting as highlighted below.



5. Manual configuration

The OSLC Simulink adapter currently supports the retrieval of Simulink models within a specific directory. The location of the directory containing the Simulink projects is currently hard coded in a configuration file. Several Simulink models are already located in the **matlab** folder in the **org.eclipse.lyo.adapter.simulink** project.

1. Specify the **location of the folder containing Simulink models** which will be considered by the OSLC Simulink SysML adapter in the config.properties file under *org.eclipse.lyo.adapter.simulink/configuration*. As an example displayed below, the location of the folder containing Simulink models for the OSLC adapter is specified to **C:/Users/.../git/oslc4jsimulink / org.eclipse.lyo.adapter.simulink /matlab/**

Note: The file path can contain backslashes

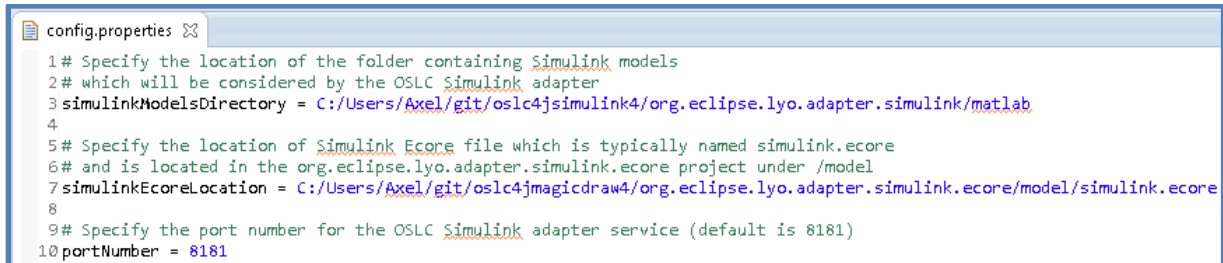
Warning: Do not put quotes around the file path!

2. Specify the **location of Simulink Ecore file** in the config.properties file under *org.eclipse.lyo.adapter.simulink/configuration*. The location of the Simulink ecore file named simulink.ecore is in the **org.eclipse.lyo.adapter.simulink.ecore** project under */model/simulink.ecore*. As an example displayed below, the location of the simulink.ecore file is specified to **C:/Users/.../git/oslc4jmagicdraw/ org.eclipse.lyo.adapter.simulink.ecore /model/simulink.ecore**

Note: The file path can contain backslashes

Warning: Do not put quotes around the file path and add nothing at the end!

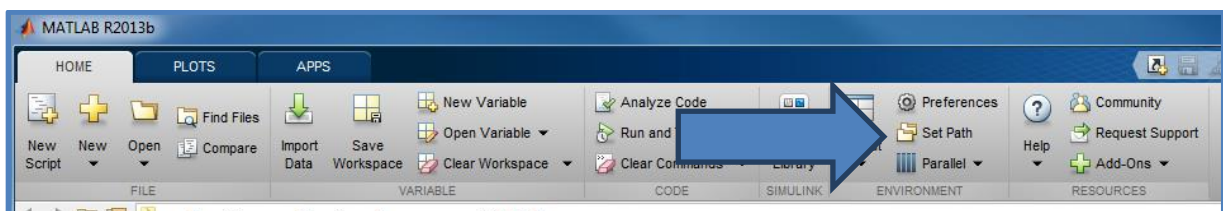
3. Specify the **port number** of the OSLC Simulink adapter service of in the config.properties file under *org.eclipse.lyo.adapter.simulink/configuration*. By default, port 8181 will be used. As an example displayed below, the port number is set to **8181**.



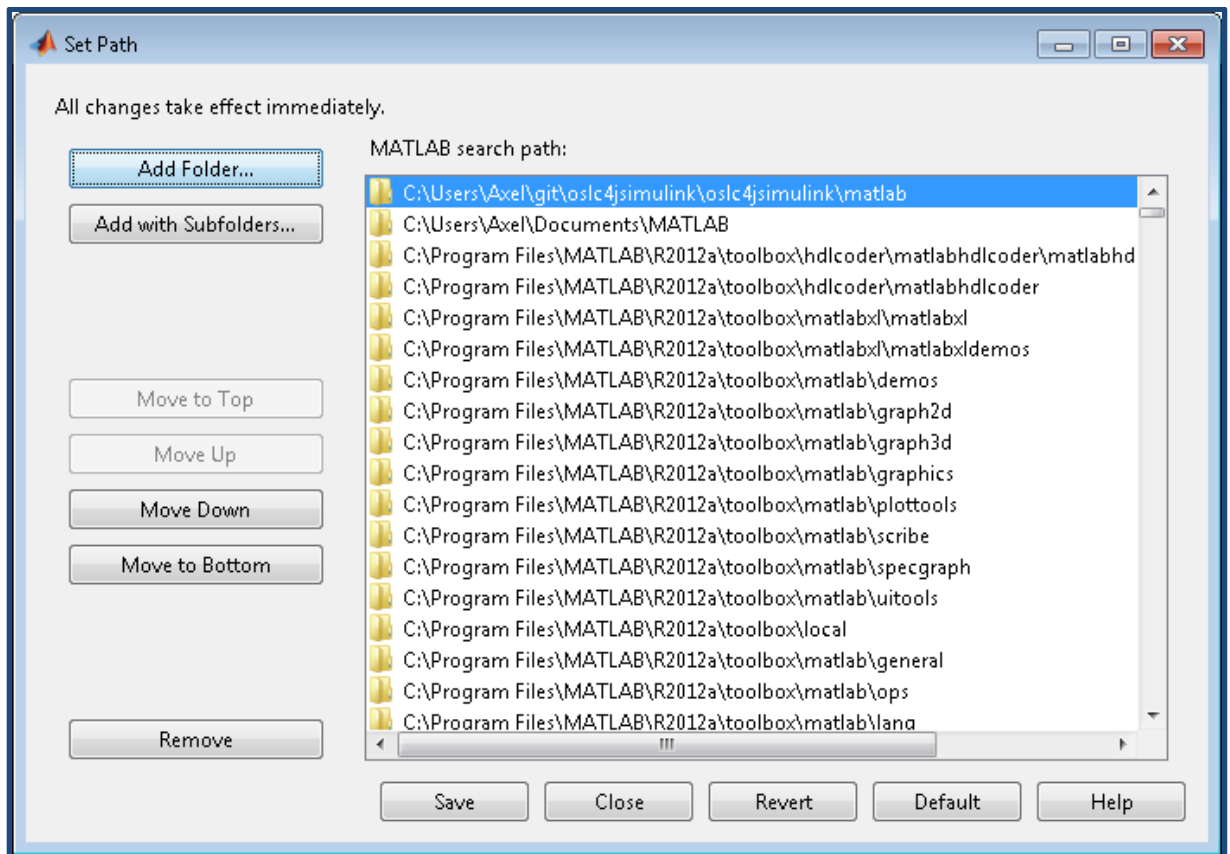
```
config.properties
1# Specify the location of the folder containing Simulink models
2# which will be considered by the OSLC Simulink adapter
3simulinkModelsDirectory = C:/Users/Axel/git/oslc4jsimulink4/org.eclipse.lyo.adapter.simulink/matlab
4
5# Specify the location of Simulink Ecore file which is typically named simulink.ecore
6# and is located in the org.eclipse.lyo.adapter.simulink.ecore project under /model
7simulinkEcoreLocation = C:/Users/Axel/git/oslc4jmagicdraw4/org.eclipse.lyo.adapter.simulink.ecore/model/simulink.ecore
8
9# Specify the port number for the OSLC Simulink adapter service (default is 8181)
10portNumber = 8181
```

6. Setting up the Matlab workspace


1. Launch Matlab
2. From the File menu, select *Set Path...* (if your Matlab version has a ribbon-based user interface such as in R2013, choose *Set Path* in the *Home* ribbon in the *Environment* section)



3. Use the *Add Folder...* command to add the *matlab* folder of the *oslc4jsimulink* project to the Matlab search path as shown below based on the location of your local git repository
4. Click *Save* and then *Close*

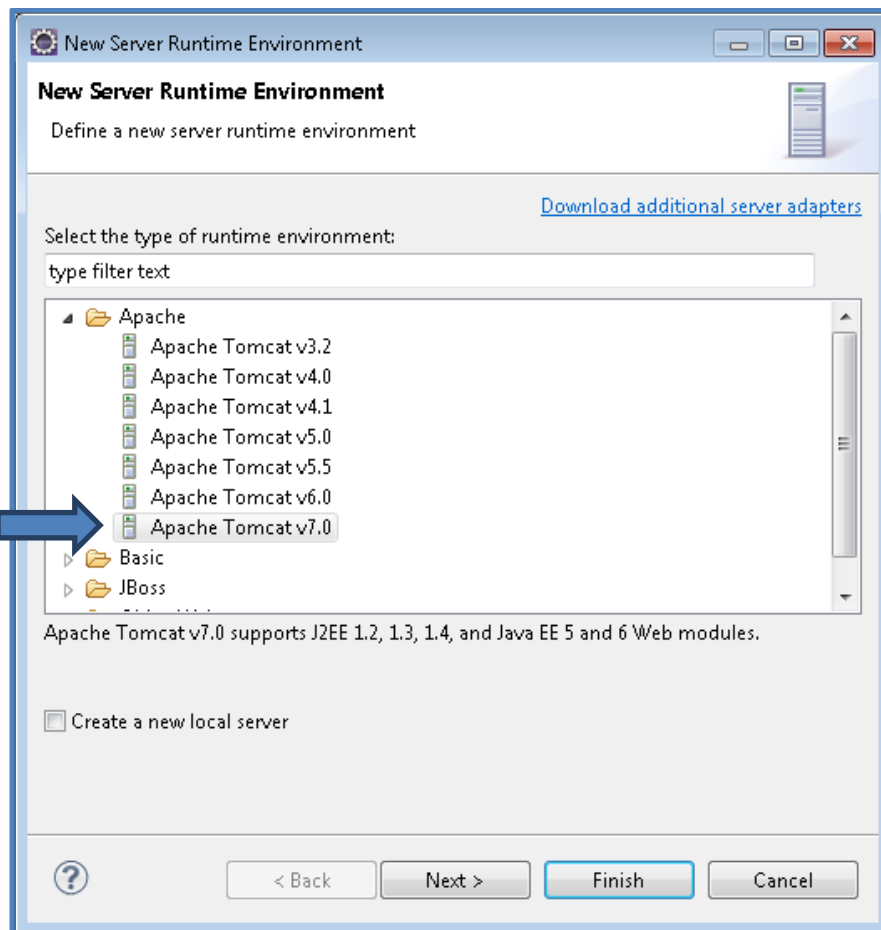


7. Installing Apache Tomcat

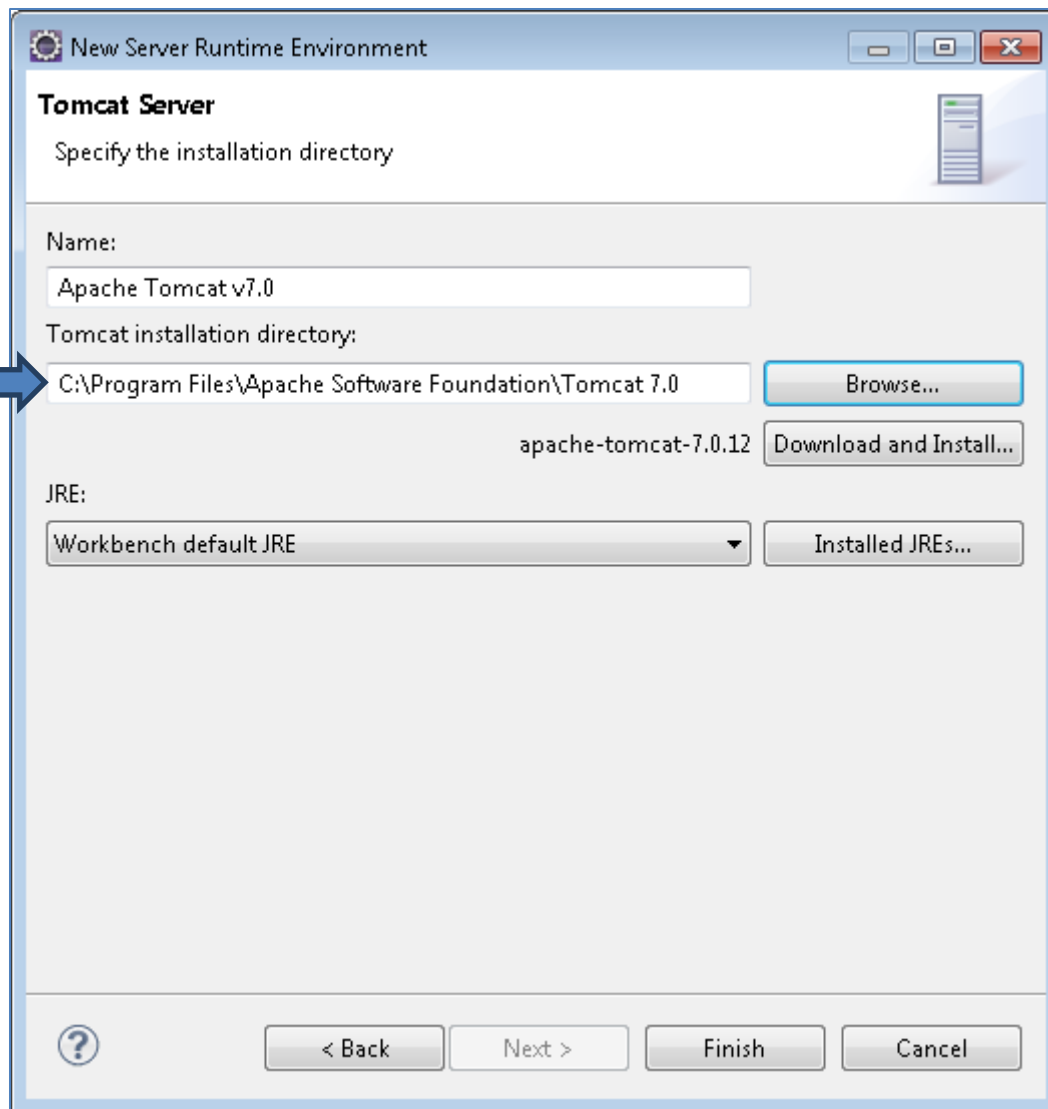
1. Go on the web page <http://tomcat.apache.org/download-70.cgi> 
2. Download the apache 7 distribution for your operating system. If you are using Windows, the easiest is to select 32-bit/64-bit Windows Service Installer (<http://tomcat.apache.org/download-70.cgi>) and run the Apache Tomcat 7 installer

8. Adding Server Runtime Environment in Eclipse

1. In Eclipse. Open **Window -> Preferences -> Server -> Runtime Environments** to create a Tomcat installed runtime.
2. Click on **Add...** to open the New Server Runtime dialog,
3. From the drop down menu, select Tomcat 7.0 as shown below. Click Next.



4. Enter the **Tomcat 7.0 installation directory** (not the Apache installation directory!) as highlighted below.
5. Click on Finish.



9. Enabling PUT on Apache Tomcat

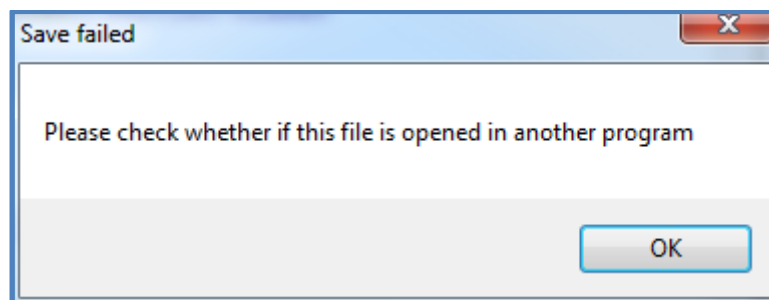
Tomcat by default is not enabled for HTTP PUT command. But, it can easily be configured to support it.

1. In your Apache Tomcat 7 installation directory, open **/conf/web.xml**
2. Add the **readonly** init param to the web.xml file as shown below and save the file

```
<init-param>
    <param-name>readonly</param-name>
    <param-value>>false</param-value>
</init-param>
```

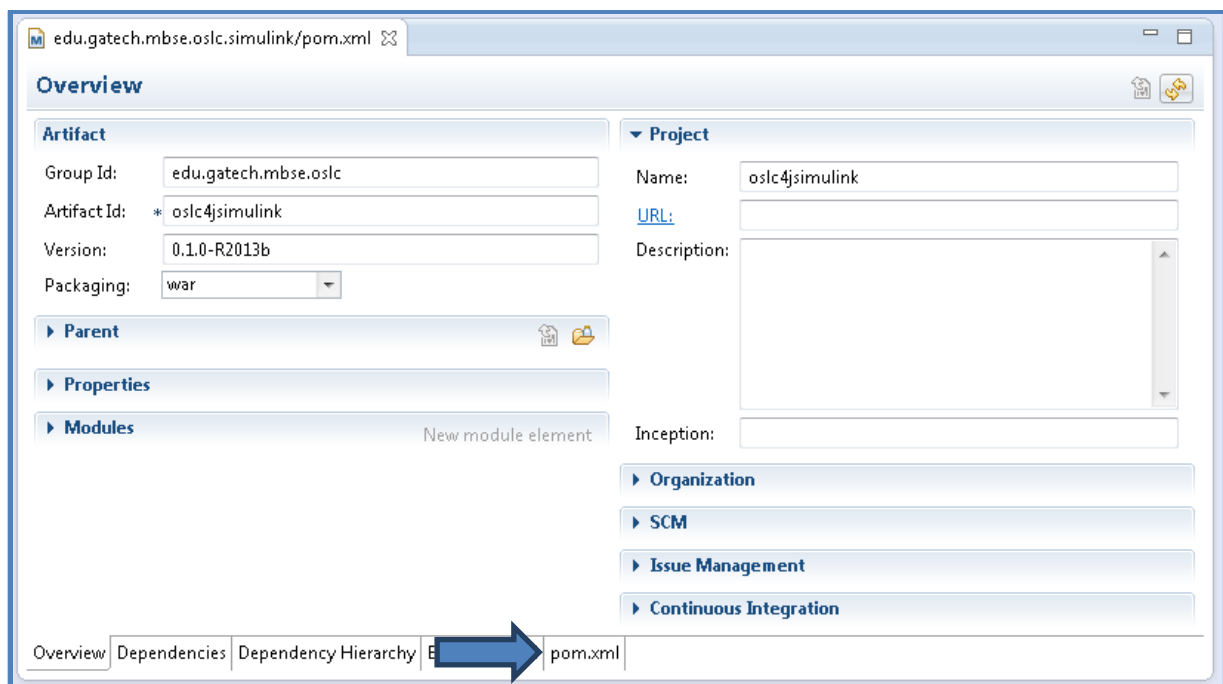
```
<servlet>
    <servlet-name>default</servlet-name>
    <servlet-class>org.apache.catalina.servlets.DefaultServlet</servlet-class>
    <init-param>
        <param-name>debug</param-name>
        <param-value>0</param-value>
    </init-param>
    <init-param>
        <param-name>listings</param-name>
        <param-value>>false</param-value>
    </init-param>
    <init-param>
        <param-name>readonly</param-name>
        <param-value>>false</param-value>
    </init-param>
    <load-on-startup>1</load-on-startup>
</servlet>
```

Note: If you get the warning shown below while trying to save the file, then copy the web.xml file into another location, modify it, and then replace the original web.xml file by the modified web.xml file.



10. Setting the Apache Tomcat server port

1. By default, the OSLC Simulink adapter service will run on port 8181. Change the port of the oslc4jsimulink service only if you need to avoid a conflict with another service already running on port 8181. Skip the next steps if you do not need to change the port.
2. In Eclipse, open the Project Explorer view. (Window → Show View → Project Explorer)
3. Expand the **org.eclipse.lyo.adapter.simulink** project
4. Select and open the maven **pom.xml** file through double-click
5. The pom.xml file contains several tabs. By default, the overview tab will be displayed. The various available tabs are displayed at the bottom of the editor window. Click on the **pom.xml tab** of the pom.xml file as highlighted below.



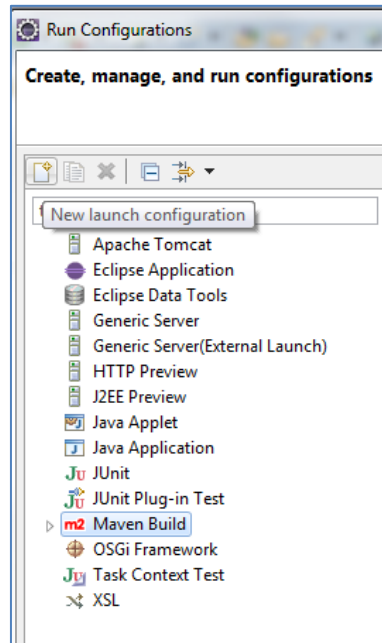
6. In the pom.xml tab of the pom.xml file, specify the **port of the OSLC Simulink adapter service** in the Maven tomcat plugin configuration found at the **bottom of the pom.xml** tab of the pom.xml file as highlighted below. Enter the port number in the configuration section as shown below.

```
<build>
  <plugins>
    <plugin>
      <groupId>org.apache.tomcat.maven</groupId>
      <artifactId>tomcat7-maven-plugin</artifactId>
      <version>2.0</version>

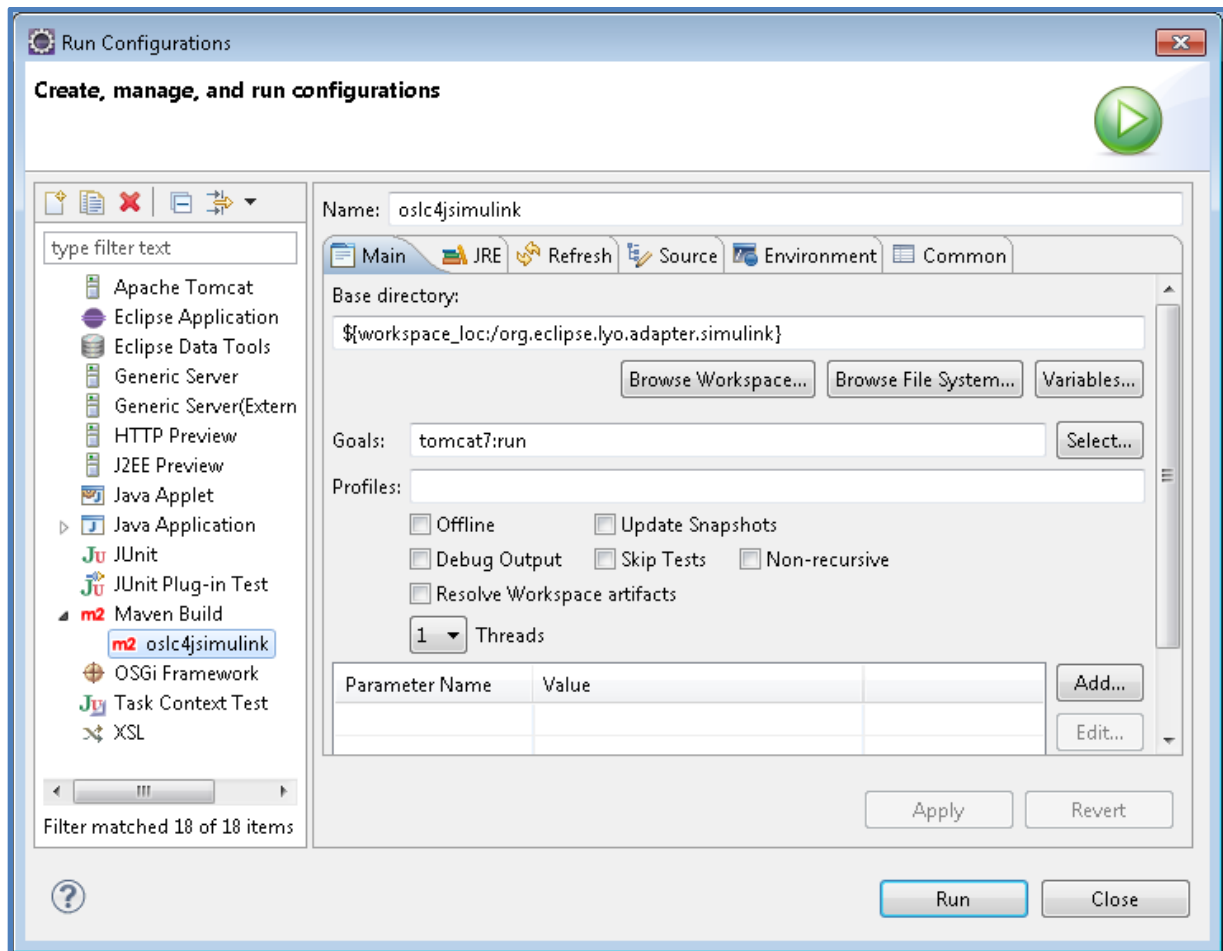
      <configuration>
        <server>tomcat-development-server</server>
        <port>8181</port>
      </configuration>
    </plugin>
  </plugins>
</build>
```

11. Creating a launch configuration

1. Open the launch configuration window (Run -> Run Configurations...)
2. Select the “Maven Build category” and click on “New Launch Configuration” (leftmost icon at the top left, right above the search field)

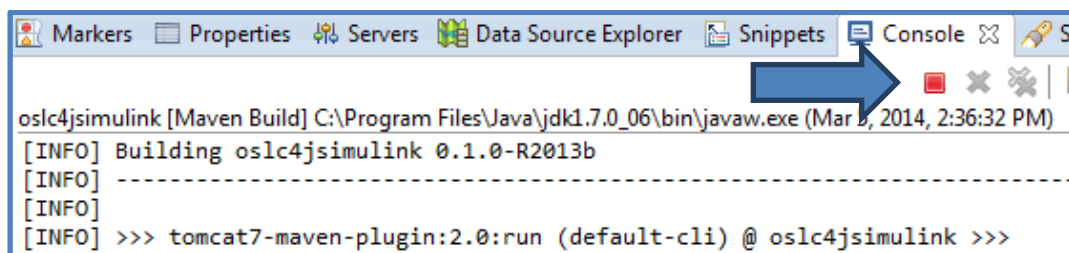


3. In the launch configuration window, edit the name field and set it to **oslc4jsimulink**.
4. Under “Base Directory”, select Browse Workspace and select the **org.eclipse.lyo.adapter.simulink** project
5. In the “Goals” field, set **tomcat7:run** as shown below



Note: Only run a single instance of the oslc4jsimulink web application at a time.

Note: In order to stop a running oslc4jsimulink web application, click Terminate in the Console window, as shown below, or in the toolbar of the debug perspective.



12. Installing the Chrome/Firefox Postman plugin (or any REST client)

1. For Google Chrome, add the Postman REST client to your browser:
<https://chrome.google.com/webstore/detail/postman-rest-client/fdmmgilgnpjigdojojpjoooidkmcomcm?hl=en>
2. And the Postman launcher: <https://chrome.google.com/webstore/detail/postman-launcher/igofndmnioofoabmmpfonmdnhgchoka?hl=en>

13. Launching oslc4jsimulink (OSLC Simulink Adapter)

Select the oslc4jsimulink launch configuration (Run -> Run Configurations... and select in the Maven build category the launch configuration named **oslc4jsimulink**) and click Run.

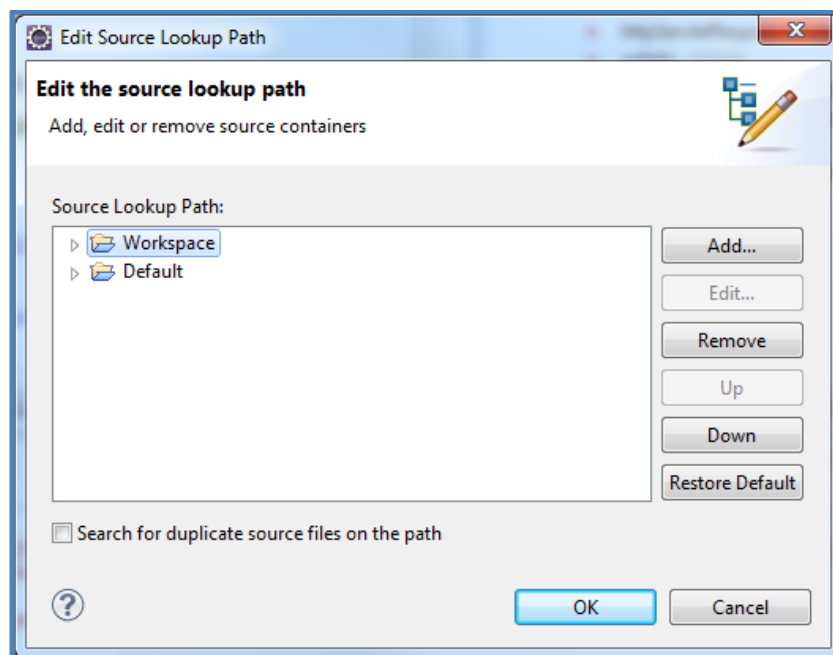
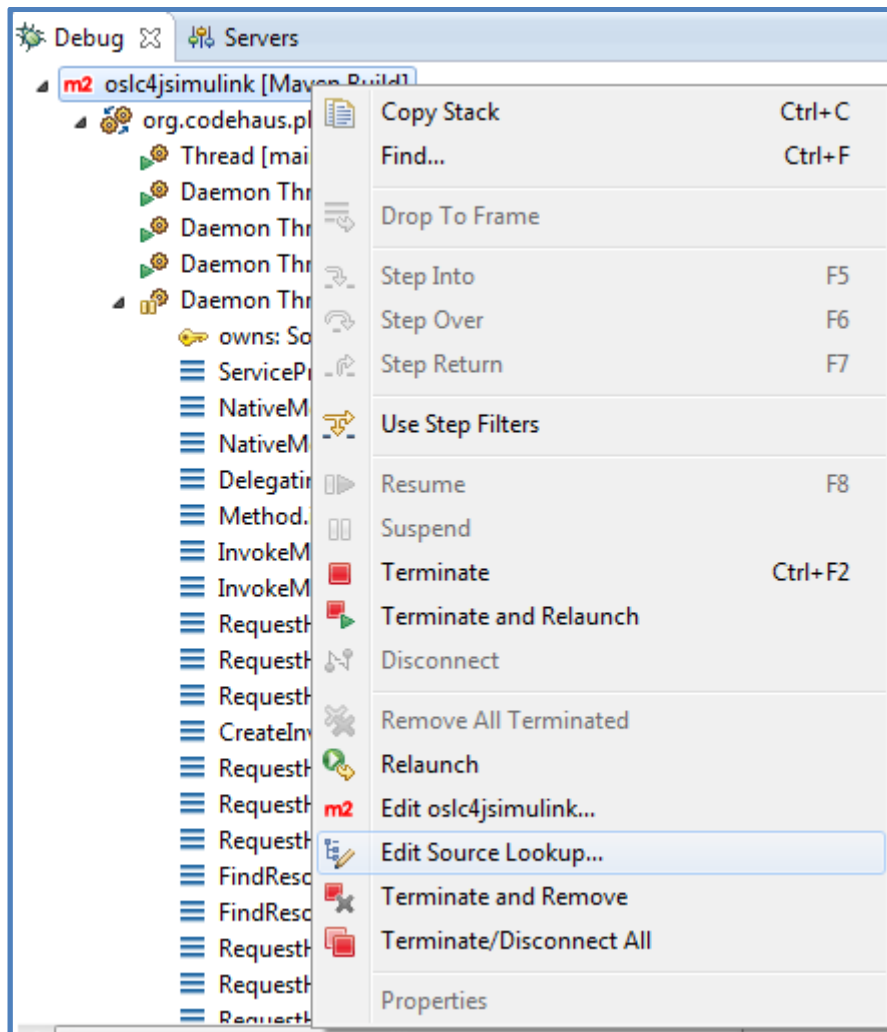
In the console window, several logging related exceptions will appear (SLF4J and log4j). This is not critical.

The OSLC Simulink adapter is running and following statements can be seen in the Eclipse Console windows displayed below

```
[INFO] Running war on http://localhost:8181/oslc4jsimulink
[INFO] Using existing Tomcat server configuration at C:\Users\Axel\git\oslc4jsimulink3\oslc4jsimulink\target\tomcat
[INFO] create webapp with contextPath: /oslc4jsimulink
Mar 19, 2014 9:06:25 PM org.apache.coyote.AbstractProtocol init
INFO: Initializing ProtocolHandler ["http-bio-8181"]
Mar 19, 2014 9:06:25 PM org.apache.catalina.core.StandardService startInternal
INFO: Starting service Tomcat
Mar 19, 2014 9:06:25 PM org.apache.catalina.core.StandardEngine startInternal
INFO: Starting Servlet Engine: Apache Tomcat/7.0.30
SLF4J: Class path contains multiple SLF4J bindings.
SLF4J: Found binding in [jar:file:/C:/Users/Axel/.m2/repository/org/slf4j/slf4j-log4j12/1.6.4/slf4j-log4j12-1.6.4.jar!/
SLF4J: Found binding in [jar:file:/C:/Users/Axel/.m2/repository/org/slf4j/slf4j-simple/1.6.4/slf4j-simple-1.6.4.jar!/c
SLF4J: See http://www.slf4j.org/codes.html#multiple_bindings for an explanation.
log4j:WARN No appenders could be found for logger (org.apache.wink.common.internal.registry.metadata.ProviderMetadataC
log4j:WARN Please initialize the log4j system properly.
log4j:WARN See http://logging.apache.org/log4j/1.2/faq.html#noconfig for more info.
Mar 19, 2014 9:06:27 PM org.apache.coyote.AbstractProtocol start
INFO: Starting ProtocolHandler ["http-bio-8181"]
```

Warning: If the OSLC Simulink adapter service fails to launch due to a **java.net.BindException**, a different port for the OSLC Simulink adapter needs to be used since there is a conflict with another service using the same port. By default, the OSLC Simulink adapter uses port 8181. A **java.net.BindException** means that a different service is already using this port. Go back to Steps #5 and #10 to change the port number.

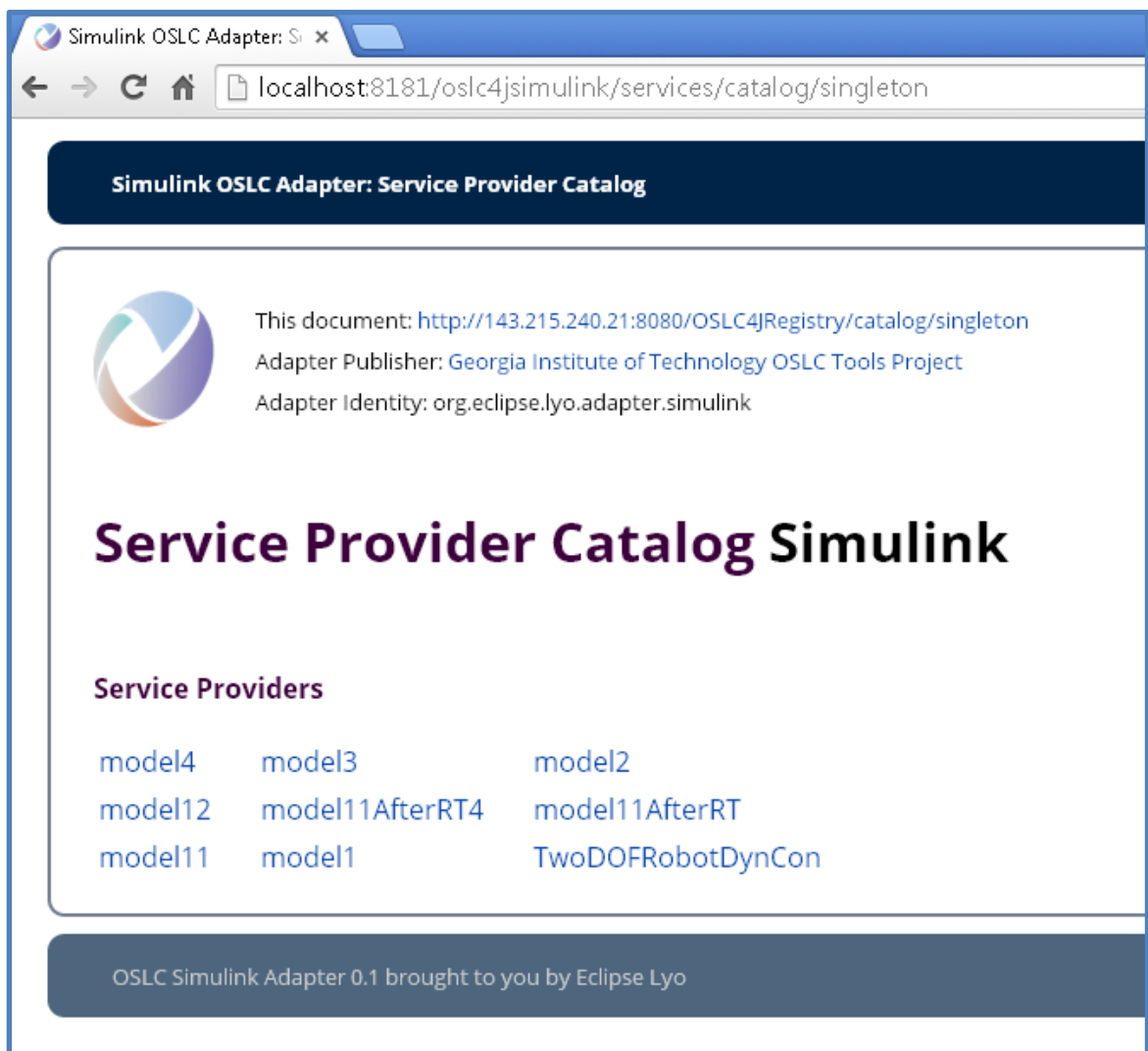
Note: If you launch the Maven launch configuration (OSLC Simulink adapter) in **debug mode**, and do not see the Java code when the application hits a breakpoint, then you need to add the Eclipse workspace to the source lookup path. In the Debug view, right click on the running thread (in threads tab), or on the application as shown below and select **Edit Source Lookup**, and add the workspace. Re-launch the Maven launch configuration and the code should be visible in the editor when the application hits a breakpoint.



14. Testing the OSLC Simulink Adapter


Testing the retrieval of OSLC resources in HTML

1. Launch Google Chrome
2. In the URL field, type for test purposes:
<http://localhost:8181/oslc4jsimulink/services/catalog singleton>. This will send a HTTP GET request to retrieve the HTML representation of the Simulink Service Provider Catalog. This will launch a Matlab command window which will close automatically. The Matlab command window may display warnings if it is an older version than R2013b.
3. You will then see an HTML page showing you the list of Service Providers. **You can browse from the Service Providers (e.g. for model11) to the Services and ultimately to the OSLC Simulink resources.**



Simulink OSLC Adapter: S
localhost:8181/oslc4jsimulink/services/serviceProviders/model11

Simulink OSLC Adapter: Service Provider



This document: <http://localhost:8181/oslc4jsimulink/services/serviceProviders/model11>
Adapter Publisher: Georgia Institute of Technology OSLC Tools Project
Adapter Identity: org.eclipse.lyo.adapter.simulink

Service Provider model11


Query Capabilities of OSLC Services

- [Simulink Model Query Capability](#)
- [Simulink Parameter Query Capability](#)
- [Simulink Line Query Capability](#)
- [Simulink Output Port Query Capability](#)
- [Simulink Block Query Capability](#)
- [Simulink Input Port Query Capability](#)

OSLC Simulink Adapter 0.1 brought to you by Eclipse Lyo

Simulink OSLC Adapter: S
localhost:8181/oslc4jsimulink/services/model11/blocks

Simulink OSLC Adapter: Simulink Blocks



This document: <http://localhost:8181/oslc4jsimulink/services/model11/blocks>
Adapter Publisher: Georgia Institute of Technology OSLC Tools Project
Adapter Identity: org.eclipse.lyo.adapter.simulink

Simulink Blocks model11

Blocks


Constant	Model	Step
Subsystem1	Subsystem1::In1	Subsystem1::Gain
Subsystem1::Out1	Subsystem2	Subsystem2::In1
Subsystem2::In2	Subsystem2::In3	Subsystem2::Sum
Subsystem2::Out1	Out1	

OSLC Simulink Adapter 0.1 brought to you by Eclipse Lyo

Simulink OSLC Adapter: Si x

localhost:8181/oslc4jsimulink/services/model11/blocks/Constant

Simulink OSLC Adapter: Simulink Block

 This document: <http://localhost:8181/oslc4jsimulink/services/model11/blocks/Constant>
 Adapter Publisher: [Georgia Institute of Technology OSLC Tools Project](#)
 Adapter Identity: [org.eclipse.lyo.adapter.simulink](#)

Simulink Block Constant

Type: Constant

Parameters

SamplingMode	SampleTime	LockScale
Value	FramePeriod	OutMax
OutMin	VectorParams1D	OutDataTypeStr

Output Port


Constant::output::1

OSLC Simulink Adapter 0.1 brought to you by Eclipse Lyo

Simulink OSLC Adapter: Si x

localhost:8181/oslc4jsimulink/services/model11/lines/Constant::output::1

Simulink OSLC Adapter: Simulink Line

 This document: <http://localhost:8181/oslc4jsimulink/services/model11/lines/Constant::output::1>
 Adapter Publisher: [Georgia Institute of Technology OSLC Tools Project](#)
 Adapter Identity: [org.eclipse.lyo.adapter.simulink](#)


Simulink Line Constant::output::1

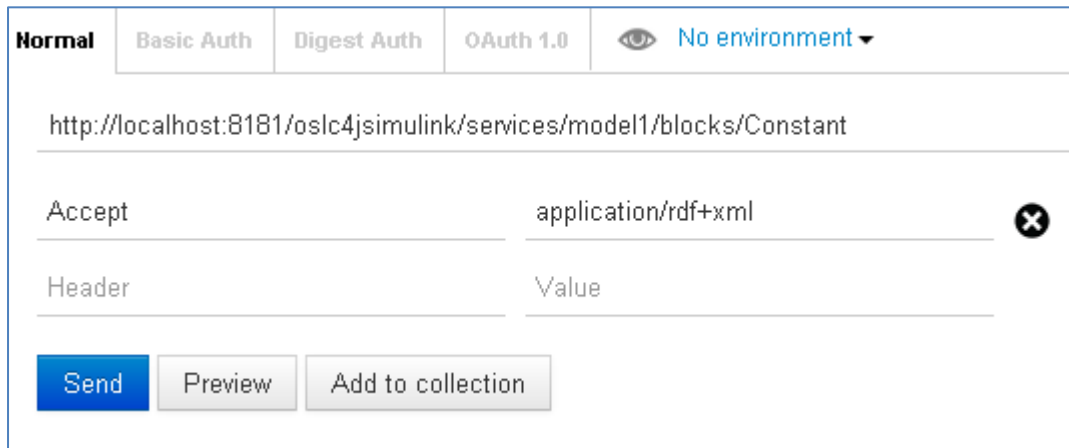
Source Port: Constant::output::1

Target Port: Model::inport::1

OSLC Simulink Adapter 0.1 brought to you by Eclipse Lyo

Testing the retrieval of OSLC resources in RDF

1. Click on the Postman icon at the top right of the Chrome browser . A new tab will open.
2. In the URL field, type for test purposes:
<http://localhost:8181/oslc4jsimulink/services/model1/blocks/Constant>.
3. Click on the *Headers* field to the right of the URL field
4. Enter *Accept* in the Header field and *application/rdf+xml* in the value field as shown below
5. Click Send



The image shows the Postman REST client interface. At the top, there are tabs for 'Normal', 'Basic Auth', 'Digest Auth', and 'OAuth 1.0'. To the right of these tabs is an eye icon and the text 'No environment'. Below the tabs is a text field containing the URL 'http://localhost:8181/oslc4jsimulink/services/model1/blocks/Constant'. Underneath the URL field is a table with two columns: 'Header' and 'Value'. The first row has 'Accept' in the 'Header' column and 'application/rdf+xml' in the 'Value' column. To the right of the 'Value' field is a close button (an 'X' in a circle). At the bottom of the interface are three buttons: 'Send' (highlighted in blue), 'Preview', and 'Add to collection'.

6. This will send a HTTP GET request to retrieve the RDF/XML representation of the Simulink block named “Constant”.

The Postman REST client will display the RDF/XML representation of the Simulink block named “constant”. Other HTTP requests to retrieve other SysML elements can be sent.

```
1 <?xml version="1.0" encoding="UTF-8"?>
2 <rdf:RDF
3
4   xmlns:simulink_line="http://mathworks.com/simulink/rdf#Line/"
5
6   xmlns:simulink="http://mathworks.com/simulink/rdf#"
7
8   xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
9
10  xmlns:oslc_rm="http://open-services.net/ns/rm#"
11
12  xmlns:oslc="http://open-services.net/ns/core#"
13
14  xmlns:oslc_data="http://open-services.net/ns/servicemanagement/1.0/"
15
16  xmlns:foaf="http://xmlns.com/foaf/0.1/"
17
18  xmlns:simulink_parameter="http://mathworks.com/simulink/rdf#Parameter/"
19
20  xmlns:simulink_outputport="http://mathworks.com/simulink/rdf#Outputport/"
21
22  xmlns:dcterms="http://purl.org/dc/terms/"
23
24  xmlns:simulink_block="http://mathworks.com/simulink/rdf#Block/"
25
26  xmlns:simulink_model="http://mathworks.com/simulink/rdf#Model/"
27
28  xmlns:simulink_inputport="http://mathworks.com/simulink/rdf#Inputport/"
29
30  xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#" >
31   <rdf:Description rdf:about="http://localhost:8181/oslc4jsimulink/services/model1/blocks/Constant">
32     <simulink_block:parameter rdf:resource="http://localhost:8181/oslc4jsimulink/services/model1/parameters/Constant::SamplingMode"/>
33     <simulink_block:parameter rdf:resource="http://localhost:8181/oslc4jsimulink/services/model1/parameters/Constant::FramePeriod"/>
34     <simulink_block:parameter rdf:resource="http://localhost:8181/oslc4jsimulink/services/model1/parameters/Constant::OutDataTypeStr"/>
35     <simulink_block:parameter rdf:resource="http://localhost:8181/oslc4jsimulink/services/model1/parameters/Constant::SampleTime"/>
36     <simulink_block:parameter rdf:resource="http://localhost:8181/oslc4jsimulink/services/model1/parameters/Constant::OutMin"/>
37     <simulink_block:outputPort rdf:resource="http://localhost:8181/oslc4jsimulink/services/model1/outputports/Constant::output::1"/>
38     <simulink_block:parameter rdf:resource="http://localhost:8181/oslc4jsimulink/services/model1/parameters/Constant::Value"/>
39     <rdf:type rdf:resource="http://mathworks.com/simulink/rdf#Block"/>
40     <simulink_block:parameter rdf:resource="http://localhost:8181/oslc4jsimulink/services/model1/parameters/Constant::VectorParamsID"/>
41     <simulink_block:name rdf:datatype="http://www.w3.org/1999/02/22-rdf-syntax-ns#XMLLiteral">Constant</simulink_block:name>
42     <simulink_block:parameter rdf:resource="http://localhost:8181/oslc4jsimulink/services/model1/parameters/Constant::LockScale"/>
43     <simulink_block:type rdf:datatype="http://www.w3.org/1999/02/22-rdf-syntax-ns#XMLLiteral">Constant</simulink_block:type>
44     <simulink_block:parameter rdf:resource="http://localhost:8181/oslc4jsimulink/services/model1/parameters/Constant::OutMax"/>
45   </rdf:Description>
```

15. Testing the OSLC Simulink Adapter through example Simulink model

The org.eclipse.lyo.adapter.simulink project contains example Simulink models containing different types of Simulink elements. The example models are located in the folder named **matlab**.

model11 contains blocks, subsystems, model reference blocks, ports, lines, and lines with multiple target ports

