

SilkCentral Test Manager 12.0



API Help

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Introduction

This guide provides the information you need to create and deploy plug-ins to integrate third-party tools into SilkCentral® Test Manager™ (Test Manager). It contains Web Service specifications, API descriptions, and explains how to integrate plug-ins into Test Manager.



Note: This guide assumes you are familiar with the implementation and usage of Web Services.

Overview

Test Manager offers an API for the integration of third-party applications. With SilkCentral APIs, you can integrate your existing source-control, issue-tracking, and requirements-management tools by configuring Test Manager plug-ins. A number of sample plug-ins ship with Test Manager.

Refer to the [Javadoc](#) for full details regarding available Java classes and methods. If the link does not work, click **Help > Documentation > Test Manager API Specification** in the Test Manager menu to open the Javadoc.

Test Manager Integration Plug-ins

The Test Manager plug-ins are provided "as is" and with all faults and without any warranty whatsoever. Borland disclaims all warranties and conditions, whether express, implied, or statutory, as to any matter whatsoever, including but not limited to, any warranties, duties, or conditions or related to merchantability, fitness for a particular purpose, lack of viruses, accuracy or completeness, title, quiet enjoyment, quiet possession and noninfringement.

Your use of the plug-ins is at your own risk. In no event shall Borland be liable for any direct, indirect, special, incidental or consequential damages of any kind, including, but not limited to, lost profits, incurred or arising out of your use of the plug-ins.

Creating Plug-Ins

Overview

This section describes how to create plug-ins for Test Manager. Only the tasks that are common to all plug-in types are discussed here.

Plug-In Species

Test Manager provides several plug-in APIs. Each API is considered a *species*.

Compilation

For developing and compiling plug-ins, see Test Manager Release Notes for the appropriate Java version. This is important for compatibility with the Test Manager Java runtime environment.

Deployment

After you create your plug-in classes and implement a species API, you can create a plug-in package (a JAR or ZIP file).

- If your plug-in has no further dependencies (or depends on libraries that are already part of SilkCentral), simply create a JAR file that contains your classes.
- If your plug-in depends on additional libraries, put the libraries into the subdirectory `lib` and pack all of the libraries together into a ZIP archive.

Place the created file into the plug-ins directory located at `<application server installation directory>\plugins\`.



Note: You must restart the application server and the front-end server to make the newly deployed plug-in available in Test Manager. Refer to the *SilkCentral Administration Module Help* for information about restarting servers.

Distribution


As the plug-in species types are known by SilkCentral, it is also known which servers (execution, application, and front-end) require which species. Each plug-in can be installed on the application server. SilkCentral automatically distributes the correct plug-ins to each server.

Code Coverage Integration


The Java API interface discussed in this chapter is required for creating plug-ins for Test Manager that enable the integration of a third-party (external) code coverage tool.

Code coverage tools enable you to deliver information about what code is covered by tests. Test Manager delivers the following code coverage tools out-of-the-box:

- SilkCentral Java Code Analysis (Java Code Analysis Agent)
- DevPartner Studio .NET Code Analysis (Windows Code Analysis Framework)


 **Note:** If your application under test runs on Linux, see the topic *Installing the Code Analysis Framework on a Linux AUT Environment*.


If the preceding two tools are not sufficient, you can create and deploy your own code coverage integration. See *Creating Your Own Code Coverage Plugin*.

 **Note:** In addition to deploying your custom application on the application server (see the *Creating Plugins* topic), you also need to deploy your custom application on the code analysis framework server. This is where your AUT and code coverage tool is located. The path is as follows: `\Silk\SC Test Manager\Plugins`

Creating Your Own Code Coverage Plugin

This topic describes how to create a code coverage plugin. You should be familiar with the SilkCentral baseline concept. In SilkCentral, a baseline is required before each run. A baseline includes all namespaces/packages/classes/methods in the test application.


 **Note:** The SilkCentral API requires an XML file to be returned for code coverage runs. This means that if your code coverage tool stores its code coverage information in a database, you will need to take additional steps to retrieve the data.

 **Note:** Multiple execution servers running tests against the same Code Analysis Framework at the same time is not supported.

1. Add the library `scc.jar` to your classpath as it contains the interfaces that must be extended. The JAR file can be found in the `lib` directory of the SilkCentral installation directory.
2. Add the following two import statements:

```
import com.seguae.scc.published.api.codeanalysis.CodeAnalysisProfile;  
import  
com.seguae.scc.published.api.codeanalysis.CodeAnalysisProfileException;
```

3. Create a class that implements `CodeAnalysisProfile`.
4. Add all the required methods from the code coverage interface which are listed in the following steps. You can either refer to the `Sample Interface Class` for its definition and manually implement the methods or you can copy and paste the topic `Sample Profile Class` which has the imports and method definitions in it for you.

-  **Note:** The methods in the following steps that you will write are actually called by SilkCentral when it needs them. This means that you will not be directly calling them.
5. Code `getBaseline`. This method should return an XML file that contains all the namespaces/packages/classes/methods in the application. See the `Sample XML Data` topic file for the format of the file. You should validate the XML using the sample XSD file. See the `Code Coverage XSD` topic for the XSD.

This function is called before starting coverage and is triggered by either the SilkCentral Execution Server starting a test run or the SilkCentral **Manual Test Client Start** button to start code analysis and

return all of the objects to be covered. The output needs to be converted into XML using the format specified in the XML schema included in the CA-Framework installation folder.

6. Code `startCoverage`. This call should tell your code coverage tool to start collecting data. Return `true` if it starts.

This is called by the SilkCentral Code Coverage Framework after the `getBaseLine()` method is complete. This is where you should start your code coverage tool collecting code coverage data .

7. Code `stopCoverage`. This call should tell your code coverage tool to stop collecting data. Return `true` for success.

This is called after `startCoverage` and is triggered by either the SilkCentral Execution Server finishing a test run or the SilkCentral **Manual Test Client Stop** button to stop code analysis.

8. Code `getCoverage`. This returns an XML file with collected data from between the `startCoverage` and `stopCoverage` methods. See the `Sample XML Data` topic file for the format of the file. You should validate the XML using the sample XSD file. See the `Code Coverage XSD` topic for the XSD.

This function is called after `stopCoverage()` and returns all the coverage data collected. The output needs to be converted into XML using the specified in the XML schema.

9. Code `GetName`. This should provide the name that will be used to refer to the code coverage tool. For example, this value will be used as one of the values in **Code Analysis Profile** list box on the **Edit Code Analysis Settings** dialog box.

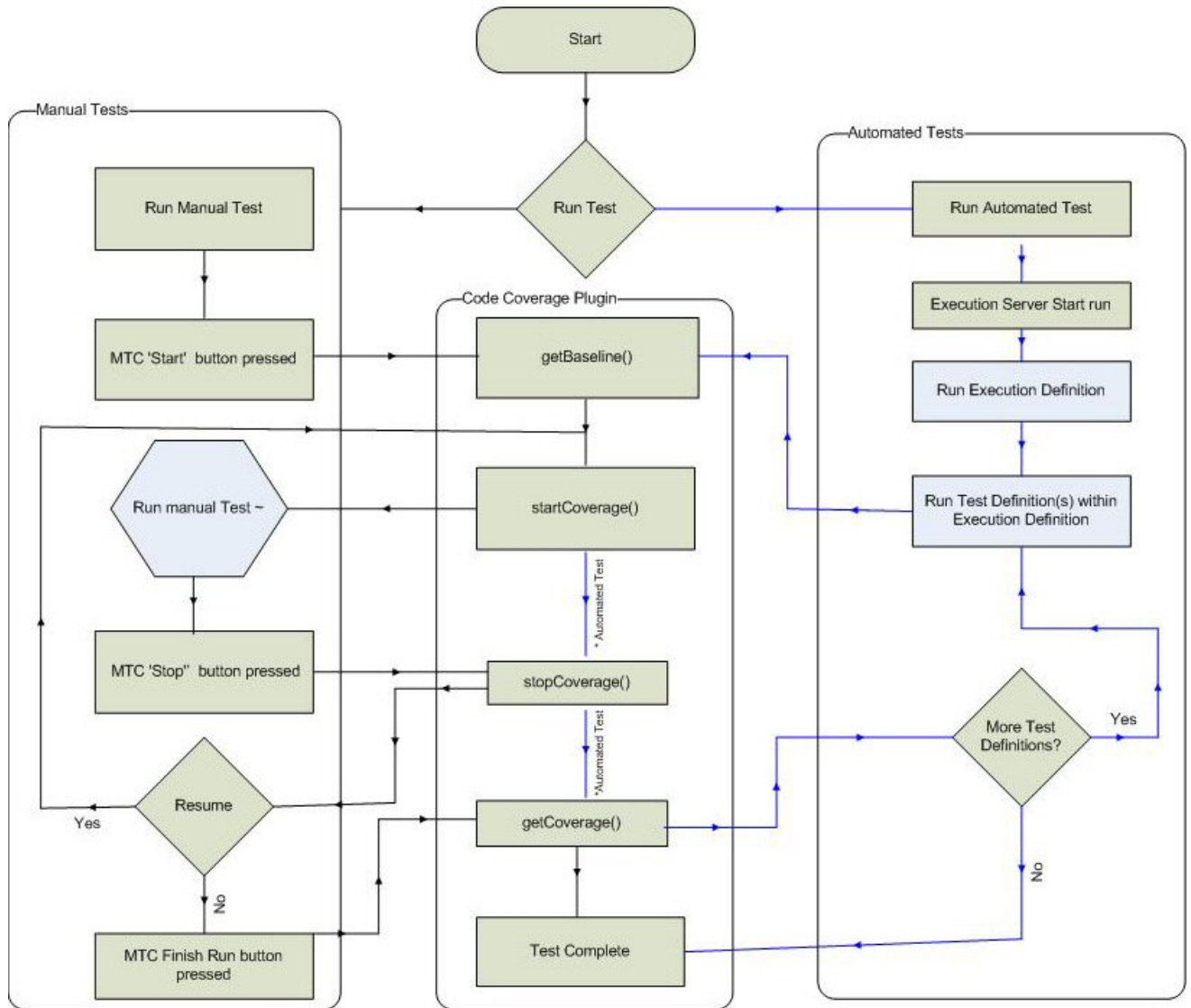
This is called first by the SilkCentral Code Coverage framework. The name of the plug-in is displayed in the code coverage drop down in The name of the plug-in is displayed in the code coverage drop down in SCTM.

10. Build the plug-in into a jar and put the jar into a zip file.

11. Deploy your plug-in to the following locations:

- In the `Plugins` directory of SilkCentral install folder.
- In the `Plugins` directory of CA-Framework install.

Test Manager Code Analysis Flow for Code Coverage Plugin



Sample Profile Class

This sample file outlines all the required methods, imports, and implements for a code coverage plugin.

```

//Add the library scc.jar to your classpath as it contains the interfaces that
//must be extended. The JAR file can be found in the lib directory of the
Test
//Manager installation directory.
//
//make sure to include these imports after adding the scc.jar external
reference
import com.segue.scc.published.api.codeanalysis.CodeAnalysisProfile;
import com.segue.scc.published.api.codeanalysis.CodeAnalysisProfileException;
import com.segue.scc.published.api.codeanalysis.CodeAnalysisResult;

public class myProfileClass implements CodeAnalysisProfile{

    // This function is called first by the SCTM Code Coverage framework
    // The name of the plug-in is displayed in the code coverage drop down in
SCTM
  
```

```

@Override
public String getName() {
    // The name of the plugin cannot be an empty string
    return "my plugin name";
}

// This function is called before starting coverage,
// this should return all of the objects to be covered and needs to be
// converted into xml using the format specified in the XML schema
// CodeCoverage.xsd included in the CA-Framework installation folder.
// This is triggered by either the SCTM Execution Server starting a test run
// or the SCTM MTC 'Start' button to start code analysis
@Override
public CodeAnalysisResult getBaseline() throws CodeAnalysisProfileException
{
    CodeAnalysisResult result = new CodeAnalysisResult();
    try{
        String baselineData = MyCodeCoverageTool.getAllCoveredObjectsData();
        String xmlString = xmltransformXML(baselineData);
        result.Xml(xmlString);
        String myCustomLogMessage = "Code Coverage baseline successfully
retrieved.";
        result.AddLogMsg(myCustomLogMessage);
    }catch(Exception e){
        throw new CodeAnalysisProfileException(e);
    }
    return result;
}

//This function is called by the SCTM Code Coverage Framework after the
getBaseLine() method is complete
// this is where you should start my code coverage tool
// collecting code coverage data

@Override
public boolean startCoverage() throws CodeAnalysisProfileException {
    try{
        MyCodeCoverageTool.StartCollectingCoverageData();
    }catch(Exception e){
        throw new CodeAnalysisProfileException(e);
    }
}
//This function is called after startCoverage,
//This is triggered by either the SCTM Execution Server finishing a test run
// or the SCTM MTC 'Stop' button to stop code analysis
//Call to my code coverage tool to stop collecting data here.
@Override
public boolean stopCoverage() throws CodeAnalysisProfileException {
    try{
        MyCodeCoverageTool.StopCollectingCoverageData();
    }catch(Exception e){
        throw new CodeAnalysisProfileException(e);
    }
}
// This function is called after stopCoverage(),
// this should return all the coverage data collected and needs to be
// converted into xml using the format specified in the XML schema
// CCoverage.xsd included in the CA-Framework installation folder

@Override
public CodeAnalysisResult getCoverage() throws CodeAnalysisProfileException
{
    CodeAnalysisResult result = new CodeAnalysisResult();

```

```

try{
    String coverageData = MyCodeCoverageTool.getActualCoverageData();
    String xmlString = xmltransformXML(coverageData);
    result.Xml(xmlString);
    String myCustomLogMessage = "Code Coverage successfully retrieved.";
    result.AddLogMsg(myCustomLogMessage);
}catch(Exception e){
    throw new CodeAnalysisProfileException(e);
}

return result;
}

private String transformXML(String myData){
    //code to transform from my data to the SCTM needed xml
    ...
    return xmlString;
}
}

```

Code Coverage XSD

The following is the code coverage XSD which you should use to validate the XML generated by your code coverage tool. This document is available in the following location: <CA Framework installation> \CodeAnalysis\CodeCoverage.xsd.

```

<?xml version="1.0" encoding="utf-8"?>
<xs:schema id="data" xmlns="" xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:element name="coverage">
    <xs:complexType>
      <!--type will be method when defined as a child to class or line when
defined as a child to method-->
      <xs:attribute name="type" type="xs:string" />
      <!--hits for the definition file will be 0, the update file will define
the hits count-->
      <xs:attribute name="hits" type="xs:string" />
      <!--the total count will be sent with both the definition and update
file, both counts will match-->
      <xs:attribute name="total" type="xs:string" />
      <!--this will be an empty string for the definition file, the line
numbers will be sent in the update file delimited by a colon-->
      <xs:attribute name="lines" type="xs:string" />
    </xs:complexType>
  </xs:element>
  <xs:element name="data">
    <xs:complexType>
      <xs:choice minOccurs="0" maxOccurs="unbounded">
        <xs:element ref="coverage" />
        <xs:element name="class">
          <xs:complexType>
            <xs:sequence>
              <xs:element name="sourcefile" minOccurs="0"
maxOccurs="unbounded">
                <xs:complexType>
                  <!--full path to the code file-->
                  <xs:attribute name="name" type="xs:string" />
                </xs:complexType>
              </xs:element>
              <xs:element ref="coverage" minOccurs="0"
maxOccurs="unbounded" />
              <xs:element name="method" minOccurs="0" maxOccurs="unbounded">
                <xs:complexType>

```

```

        <xs:sequence>
          <xs:element ref="coverage" minOccurs="0"
maxOccurs="unbounded" />
        </xs:sequence>
      <!--
        <field_signature> ::= <field_type>
        <field_type>      ::= <base_type>|<object_type>|
<array_type>

        <base_type>      ::= B|C|D|F|I|J|S|Z
        <object_type>    ::= L<fullclassname>;
        <array_type>     ::= [<field_type>

        The meaning of the base types is as follows:
        B byte signed byte
        C char character
        D double double precision IEEE float
        F float single precision IEEE float
        I int integer
        J long long integer
        L<fullclassname>; ... an object of the given class
        S short signed short
        Z boolean true or false
        [<field sig> ... array

        example signature for a java method 'doctypeDecl' with
3 string params and a return type void

        doctypeDecl : (Ljava/lang/String;Ljava/lang/
String;Ljava/lang/String;)V

        refer to org.apache.bcel.classfile.Utility for more
information on signatureToString
      -->
      <xs:attribute name="name" type="xs:string" />
      <!--method invocation count, this will be 0 for the
definition file-->
      <xs:attribute name="inv" type="xs:string" />
    </xs:complexType>
  </xs:element>
</xs:sequence>
  <xs:attribute name="name" type="xs:string" />
</xs:complexType>
</xs:element>
</xs:choice>
</xs:complexType>
</xs:element>
</xs:schema>

```

Sample XML Data

The code coverage API expects XML in the following format.

You can use the sample XSD document provided to validate your XML as well.

```

<?xml version="1.0" encoding="UTF-8"?><!-- Generated by 'MyPluginTool' at
'2010-11-05T16:11:09'
-->
<data>
  <class name="ProjectA.ClassA1">
    <sourcefile name="C:\Documents and Settings\TestApp\ProjectA\ClassA1.cs"/>
    <coverage hits="8" total="8" type="method"/>
    <coverage hits="30" total="30" type="line"/>
    <method inv="2" name="ClassA1 : ()V">
      <coverage hits="3" lines="11:2,12:2,14:2" total="3" type="line"/>

```

```

    </method>
    <method inv="2" name="BoolByteMethod : (LSystem/Boolean;LSystem/
SByte;)V">
        <coverage hits="3" lines="17:2,18:2,19:2" total="3" type="line"/>
    </method>
    <method inv="1" name="CharStringMethod : (LSystem/Char;LSystem/
String;)V">
        <coverage hits="3" lines="38:1,39:1,40:1" total="3" type="line"/>
    </method>
    <method inv="2" name="DateMethod : (LSystem/DateTime;)V">
        <coverage hits="3" lines="22:2,23:2,24:2" total="3" type="line"/>
    </method>
    <method inv="1" name="DecimalMethod : (LSystem/Decimal;LSystem/
Single;LSystem/Double;)V">
        <coverage hits="4" lines="27:1,28:1,29:1,30:1" total="4" type="line"/>
    </method>
    <method inv="1" name="IntMethod : (LSystem/Int32;LSystem/Int64;LSystem/
Int16;)V">
        <coverage hits="3" lines="33:1,34:1,35:1" total="3" type="line"/>
    </method>
    <method inv="1" name="passMeArrays : (LSystem/Int32[];LSystem/
Decimal[];)V">
        <coverage hits="6" lines="51:1,52:1,53:1,55:1,56:1,58:1" total="6"
type="line"/>
    </method>
    <method inv="1" name="passMeObjects : (LSystem/Object;LSystem/Object/
ClassA1;)V">
        <coverage hits="5" lines="43:1,44:1,45:1,46:1,48:1" total="5"
type="line"/>
    </method>
</class>
<class name="TestApp.Form1">
    <sourcefile name="C:\Documents and Settings\TestApp\Form1.Designer.cs"/>
    <coverage hits="2" total="10" type="method"/>
    <coverage hits="24" total="110" type="line"/>
    <method inv="1" name="btnClassA_Click : (LSystem/Object;LSystem/Object/
EventArgs;)V">
        <coverage hits="3" lines="25:1,26:1,27:1" total="3" type="line"/>
    </method>
    <method inv="1" name="CallAllClassAMethods : ()V">
        <coverage hits="21"
lines="35:1,36:1,37:1,38:1,39:1,40:1,41:1,42:1,43:1,44:1,45:1,46:1,48:1,49:1,5
0:1,51:1,52:1,53:1,54:1,55:1,56:1" total="21" type="line"/>
    </method>
</class>
</data>

```

Code Analysis Sample Interface Class

The following code sample defines the code analysis sample interface.

```

package com.segue.scc.published.api.codeanalysis;

public interface CodeAnalysisProfile
{
    /**
     * This function is called by the SCTM Code Coverage Framework
     * after the getBaseLine() method is complete
     * this is where you should start your code coverage tool
     * collecting code coverage data
     * @return true if the operation is successful
     * @throws CodeAnalysisProfileException if an error occurs in this operation
     */
}

```

```

boolean startCoverage() throws CodeAnalysisProfileException;
/**
 * This function is called after startCoverage,
 * This is triggered by either the SCTM Execution Server finishing a test
run
 * or the SCTM MTC 'Stop' button to stop code analysis
 * Call to your code coverage tool to stop collecting data here.
 * @return true if the operation is successful
 * @throws CodeAnalysisProfileException if an error occurs in this operation
 */
boolean stopCoverage() throws CodeAnalysisProfileException;
/**
 * This function is called before starting coverage.
 * This is triggered by either the SCTM Execution Server starting a test run
 * or the SCTM MTC 'Start' button to start code analysis
 * @return all of the objects to be covered. The output needs to be
 * converted into xml using the format specified in the XML schema
 * CCoverage.xsd included in the CA-Framework installation folder
 * @throws CodeAnalysisProfileException if an error occurs in this operation
 */
String getBaseline() throws CodeAnalysisProfileException;
/**
 * This function is called after stopCoverage().
 * @return all the coverage data collected. The output needs to be
 * converted into xml using the specified in the XML schema
 * CCoverage.xsd included in the CA-Framework installation folder
 * @throws CodeAnalysisProfileException if an error occurs in this operation
 */
String getCoverage() throws CodeAnalysisProfileException;
/**
 * This function is called first by the SCTM Code Coverage framework
 * The name of the plug-in is displayed in the code coverage drop down in
SCTM
 * @return the name of the plug-in tool
 */
String getName();
}

```

Installing the Code Analysis Framework on a Linux AUT Environment

The following steps should be performed if the code coverage plugin that you create will interact with your .NET application under test on the Linux operating system.

1. The code analysis framework for Linux is available from **Help > Tools > Linux Code Analysis Framework**. Download and copy this over to root or any other folder on the Linux machine.
2. Ensure that Java 1.6 or later is installed on the application under test machine.
3. Extract `CA-Framework.tar.gz`.
4. Place the code analysis plug-in into the `<install dir>/SC Test Manager 12.0/Plugins` folder.
5. Change directory to `<install dir>/SC Test Manager 12.0/Code Analysis`.
6. Find `startCodeAnalysisFramework.sh` shell script which will run the CA-Framework process.
7. Run the following command to convert the file to Unix format: `dos2unix startCodeAnalysisFramework.sh`.
8. Run the following command to set required permissions to execute the shell script: `chmod 775 startCodeAnalysisFramework.sh`.
9. Run the following shell script to run the CAFramework process: `./startCodeAnalysisFramework.sh`.

The code analysis framework is ready to be used from Test Manager.

Source Control Integration

Source control profiles enable Test Manager to integrate with external source control systems. Test Manager ships with plug-ins for the following source control systems:

- StarTeam®
- Serena® Version Manager™ (PVCS®)
- Concurrent Version System (CVS)
- Microsoft® Visual SourceSafe® (MSVSS)
- Universal Naming Convention (UNC) (file-system access)
- Subversion
- Apache Commons Virtual File System (VFS)
- Microsoft Team Foundation Server 2010 (TFS)

For information about additional plug-ins, contact customer support.

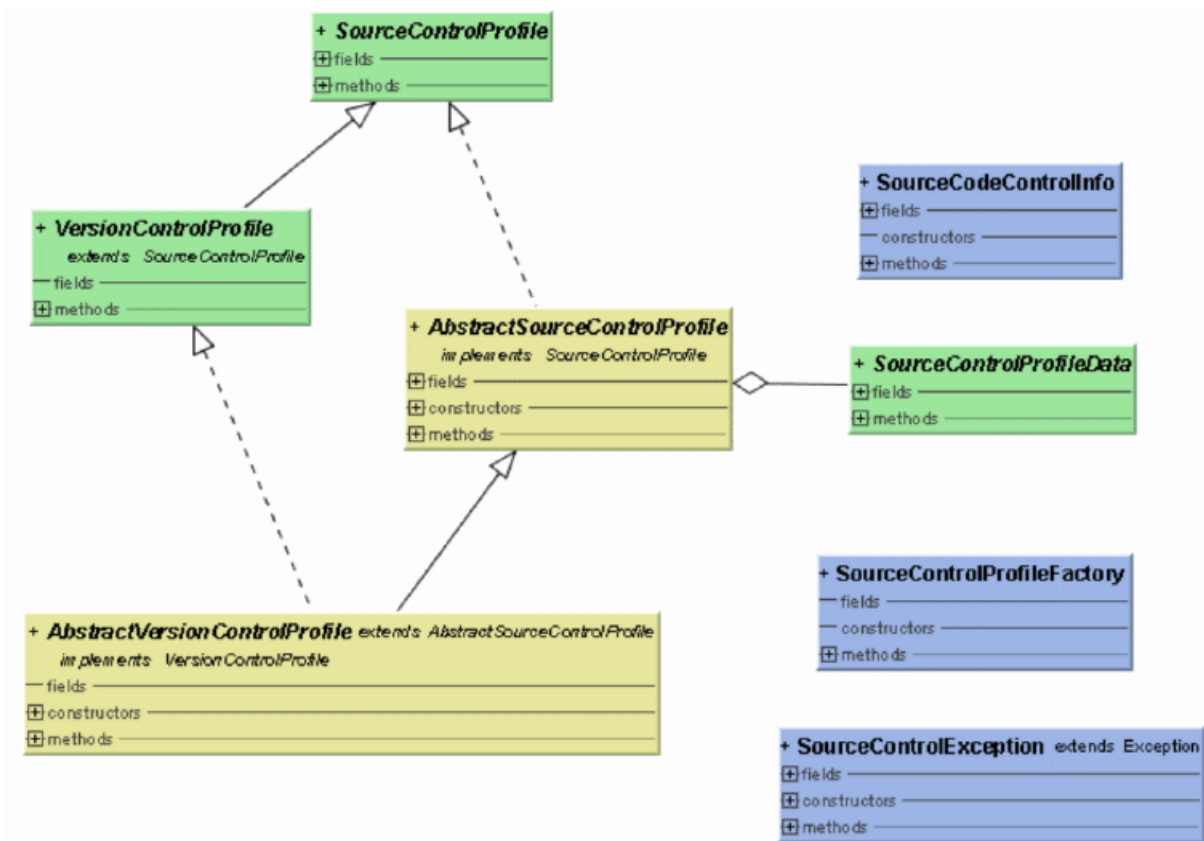
Once deployed, custom source control plug-ins can be configured in Test Manager, allowing you to define where Test Manager execution servers should retrieve program sources for test execution. Refer to the *SilkCentral Test Manager 12.0 Help* for additional information.

Source Control Integration Interface

Test Manager distinguishes between `SourceControlProfile` and `VersionControlProfile`. The difference is that `SourceControlProfile` is non-versioned and `VersionControlProfile` is versioned.

Following are the Test Manager interfaces that are used for source control integration:

- `SourceControlProfile`
- `VersionControlProfile`
- `SourceControlProfileData`
- `SourceControlException`
- `SourceControlInfo`



Refer to the [Javadoc](#) for full details regarding available Java classes and methods. If the link does not work, click **Help > Documentation > Test Manager API Specification** in the Test Manager menu to open the Javadoc.

Source Control Integration Conventions

Each implementation must provide a default constructor and, optionally, a constructor with a `SourceControlProfileData` as a parameter. If this constructor is not provided, a bean setter for `SourceControlProfileData` must be provided.

As each interface method specifies the `SourceControlException` that is to be thrown, it is not allowed to throw a `RuntimeException` in any method used by the interface.

Issue Tracking Integration

The interfaces discussed in this chapter are required for creating plug-ins for Test Manager that enable the integration of a third-party (external) Issue Tracking System (ITS).

Two types of integration are offered:

- Web Service interface
- Java API interface

Issue tracking profiles enable Test Manager to integrate with external issue tracking systems. The issue tracking software packages that are currently supported by Test Manager “out of the box” are:

- SilkCentral Issue Manager
- IBM® Rational® ClearQuest®
- StarTeam®
- Issue Tracking Web Service
- Bugzilla
- Atlassian JIRA

For information about additional plug-ins, contact customer support.

Defining issue tracking profiles allows you to link tests within the **Tests** area to issues in third-party issue tracking systems. Linked issue states are updated periodically from third-party issue tracking systems.

Refer to the *Test Manager Help* for additional information.

Web Service Interface

The interface the WSDL is based on is shown below. This interface also contains the documentation for the methods and types. The following Java code explains the interface, but does not imply that the Web Service must be written in Java.



Note: The Web Service needs to provide the same SOAP API as described in the WSDL specification, regardless of the programming language it is written in.



Note: The Web Service interface only allows the creation of new issues. If you want to assign existing issues to tests, you should use the Java API.

Web Service Interface

```
/**
 * This interface is used to generate the WSDL of the
 * Web Service a customer can implement
 * to integrate any, in the first place not supported,
 * Issue Tracking System.
 *
 * The WSDL document will be generated out of this
 * interface using Apache Axis Java2WSDL tool
 *
 */
public interface IssueTrackingSOAPInterface {

    /**
     * This method returns an ID that is used for all
     * actions during a session to identify the user. The
     * returned value will be passed to the other methods as
     * parameter.
     */
}
```

```

* @param user
* @param password
* @return a sessionID which is used for all other
* actions to determine the user
*/
public long logonUser(String user, String password)
    throws IssueTrackingServiceException;

/**
 * Will be called when starting to enter a new issue
 * @param sessionID
 * @return a (temporary) id for the new issue
 */
public String newIssue(long sessionID)
    throws IssueTrackingServiceException;

/**
 * Returns all IssueField objects of the (temporary)
 * issue with the provided issueID.
 * The IssueField objects contain the current values
 * of the fields.
 * @param sessionID
 * @param issueID
 * @return
 */
public IssueField[] getFields(long sessionID,
    String issueID)
    throws IssueTrackingServiceException;

/**
 * This method is used to synchronize with the current
 * states of the external tracking tool.
 * @param sessionID
 * @param issueIDs array containing the ids of the
 * requested issues
 * @return state info of requested issues [0] id, [1]
 * state, [2] longvalue (changedAt)
 */
public String[][] getStates(long sessionID,
    String[] issueIDs)
    throws IssueTrackingServiceException;

/**
 * This method is used to get all possible states an
 * issue may have to do a mapping between internal and
 * external states.
 * @param sessionID
 * @return all states an issue may have in this
 * profile
 */
public String[] getPossibleStates(long sessionID)
    throws IssueTrackingServiceException;

/**
 * This method is called if a field with type SELECT_
 * FIELD has dependent fields and was changed.
 * e.g.: The field "Product" has a depending field
 * "Release". If "Product" changes, the IssueField
 * for "Release" has to be returned containing the
 * proper options for the selected product.
 * @param sessionID
 * @param issueID (temporary) id of the issue
 * @param field that has changed
 * @return all fields of the issue that have changed

```

```

* (eg. other options) due to the change of the submitted
* field
*/
public IssueField[] fieldChanged(long sessionID,
    String issueID, IssueField field)
    throws IssueTrackingServiceException;

/**
 * this method stores the issue with the values which
 * are submitted in the fields array.
 *
 * @param sessionID
 * @param id the (temporary) id of the issue
 * @param fields array of fields containing the values
 * to store
 * @return new id of the issue after storing into the
 * tracking system
 */
public String store(long sessionID, String id,
    IssueField[] fields)
    throws IssueTrackingServiceException;

/**
 * This method returns the Http link to the issue with
 * the submitted id if available.
 * @param sessionID
 * @param id
 * @return http link to the issue, null if either no
 * link is available or the id is invalid
 */
public String getLink(long sessionID, String id)
    throws IssueTrackingServiceException;

/**
 * Not used in this version. May be used in a future
 * version to speed up the update process.
 * @param product only info of issues linked to this
 * product will be returned
 * @param changedSince timeMillis, only info of
 * issues changed after will be returned.
 * Can be ignored by
 * implementing services if not supported,
 * but then all issues of this
 * product will be returned (may slow down updates).
 * @return array with actual info about the changed
 * issues
 */
public IssueInfo[] getChanges(String product,
    long changedSince)
    throws IssueTrackingServiceException;
}

/**
 * The ComplexType IssueField corresponds to the following
 * definition.
 */

/**
 * An IssueField represents one input field in the
 * issue tracking dialog.
 * @param name A unique name for the field (ID)
 * @param type The GUI type of the field. SelectBox =
 * 1, Checkbox = 2, TextField = 3, TextArea = 4 (handled as TextField in this
 * version)

```

```

* @param value The current value of the field.
* @param options The options for a field of type
*   SelectBox (type = 1)
* @param label The label for the field shown in the
*   dialog
* @param required Defines whether the user has to
*   enter a value for this field or if it can be left blank
* @param length The maximum number of characters that
*   can be entered in a TextField or TextArea
* @param dependent Array of names of other fields
*   whose content depend on the selection of this field.
*   Used for SelectBoxes (type = 1)
*/

/**
* The ComplexType IssueInfo is not used in this version as
* the method getChanges is not yet called.
*/

```

WSDL Specification

A WSDL file (contents pasted below) describes the SOAP API that must be implemented to enable integration. You need to host a Web service that implements this WSDL.

Web Service Interface

Here is the specification of the Web service interface. This file was generated using the Apache tool *Java2WSDL*.

```

<?xml version="1.0" encoding="UTF-8"?>
<wsdl:definitions
targetNamespace="http://scc.seguate.com/issuetracking"
xmlns="http://schemas.xmlsoap.org/wsdl/"
xmlns:apachesoap="http://xml.apache.org/xml-soap"
xmlns:impl="http://scc.seguate.com/issuetracking"
xmlns:intf="http://scc.seguate.com/issuetracking"
xmlns:soapenc="http://schemas.xmlsoap.org/soap/encoding/"
xmlns:wSDL="http://schemas.xmlsoap.org/wsdl/"
xmlns:wSDLsoap="http://schemas.xmlsoap.org/wsdl/soap/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  <wsdl:types>
    <schema targetNamespace="http://scc.seguate.com/issuetracking"
xmlns="http://www.w3.org/2001/XMLSchema">
      <import namespace="http://schemas.xmlsoap.org/soap/encoding/" />
      <complexType name="IssueField">
        <sequence>
          <element name="Name" nillable="true" type="xsd:string" />
          <element name="Type" type="xsd:int" />
          <element name="Value" nillable="true" type="xsd:string" />
          <element maxOccurs="unbounded" name="Options"
nillable="true" type="xsd:string" />
          <element name="Label" nillable="true" type="xsd:string" />
          <element name="IsRequired" type="xsd:boolean" />
          <element name="MaxLength" type="xsd:int" />
          <element maxOccurs="unbounded" name="Dependent"
nillable="true" type="xsd:string" />
        </sequence>
      </complexType>
      <complexType name="ArrayOfIssueField">
        <complexContent>
          <restriction base="soapenc:Array">
            <attribute ref="soapenc:arrayType"
wsdl:arrayType="impl:IssueField[]" />

```

```

    </restriction>
  </complexContent>
</complexType>
<complexType name="IssueTrackingServiceException">
  <sequence/>
</complexType>
<complexType name="ArrayOf_xsd_string">
  <complexContent>
    <restriction base="soapenc:Array">
      <attribute ref="soapenc:arrayType" wsdl:arrayType="xsd:string[]" />
    </restriction>
  </complexContent>
</complexType>
<complexType name="ArrayOfArrayOf_xsd_string">
  <complexContent>
    <restriction base="soapenc:Array">
      <attribute ref="soapenc:arrayType" wsdl:arrayType="xsd:string[][]" />
    </restriction>
  </complexContent>
</complexType>
<complexType name="IssueInfo">
  <sequence>
    <element name="Id" nillable="true" type="xsd:string" />
    <element name="Status" nillable="true" type="xsd:string" />
    <element name="Synopsis" nillable="true" type="xsd:string" />
    <element name="Product" nillable="true" type="xsd:string" />
    <element name="Component" nillable="true" type="xsd:string" />
    <element name="Platform" nillable="true" type="xsd:string" />
    <element name="Url" nillable="true" type="xsd:string" />
    <element name="ChangedOn" type="xsd:long" />
    <element name="ChangedBy" nillable="true" type="xsd:string" />
  </sequence>
</complexType>
<complexType name="ArrayOfIssueInfo">
  <complexContent>
    <restriction base="soapenc:Array">
      <attribute ref="soapenc:arrayType" wsdl:arrayType="impl:IssueInfo[]" />
    </restriction>
  </complexContent>
</complexType>
</schema>
</wsdl:types>
<wsdl:message name="getChangesRequest">
  <wsdl:part name="product" type="xsd:string" />
  <wsdl:part name="changedSince" type="xsd:long" />
</wsdl:message>
<wsdl:message name="fieldChangedResponse">
  <wsdl:part name="fieldChangedReturn" type="impl:ArrayOfIssueField" />
</wsdl:message>
<wsdl:message name="getFieldsResponse">
  <wsdl:part name="getFieldsReturn" type="impl:ArrayOfIssueField" />
</wsdl:message>
<wsdl:message name="getPossibleStatesResponse">
  <wsdl:part name="getPossibleStatesReturn" type="impl:ArrayOf_xsd_string" />
</wsdl:message>
<wsdl:message name="logonUserResponse">
  <wsdl:part name="logonUserReturn" type="xsd:long" />
</wsdl:message>
<wsdl:message name="getStatesResponse">
  <wsdl:part name="getStatesReturn" type="impl:ArrayOfArrayOf_xsd_string" />
</wsdl:message>
<wsdl:message name="getPossibleStatesRequest">
  <wsdl:part name="sessionID" type="xsd:long" />
</wsdl:message>

```

```

<wsdl:message name="newIssueResponse">
  <wsdl:part name="newIssueReturn" type="xsd:string"/>
</wsdl:message>
<wsdl:message name="getChangesResponse">
  <wsdl:part name="getChangesReturn" type="impl:ArrayOfIssueInfo"/>
</wsdl:message>
<wsdl:message name="logonUserRequest">
  <wsdl:part name="user" type="xsd:string"/>
  <wsdl:part name="password" type="xsd:string"/>
</wsdl:message>
<wsdl:message name="getFieldsRequest">
  <wsdl:part name="sessionID" type="xsd:long"/>
  <wsdl:part name="issueID" type="xsd:string"/>
</wsdl:message>
<wsdl:message name="storeResponse">
  <wsdl:part name="storeReturn" type="xsd:string"/>
</wsdl:message>
<wsdl:message name="getStatesRequest">
  <wsdl:part name="sessionID" type="xsd:long"/>
  <wsdl:part name="issueIDs" type="impl:ArrayOf_xsd_string"/>
</wsdl:message>
<wsdl:message name="getLinkRequest">
  <wsdl:part name="sessionID" type="xsd:long"/>
  <wsdl:part name="id" type="xsd:string"/>
</wsdl:message>
<wsdl:message name="newIssueRequest">
  <wsdl:part name="sessionID" type="xsd:long"/>
</wsdl:message>
<wsdl:message name="IssueTrackingServiceException">
  <wsdl:part name="fault" type="impl:IssueTrackingServiceException"/>
</wsdl:message>
<wsdl:message name="fieldChangedRequest">
  <wsdl:part name="sessionID" type="xsd:long"/>
  <wsdl:part name="issueID" type="xsd:string"/>
  <wsdl:part name="field" type="impl:IssueField"/>
</wsdl:message>
<wsdl:message name="getLinkResponse">
  <wsdl:part name="getLinkReturn" type="xsd:string"/>
</wsdl:message>
<wsdl:message name="storeRequest">
  <wsdl:part name="sessionID" type="xsd:long"/>
  <wsdl:part name="id" type="xsd:string"/>
  <wsdl:part name="fields" type="impl:ArrayOfIssueField"/>
</wsdl:message>
<wsdl:portType name="IssueTrackingPortType">
  <wsdl:operation name="getFields" parameterOrder="sessionID issueID">
    <wsdl:input message="impl:getFieldsRequest" name="getFieldsRequest"/>
    <wsdl:output message="impl:getFieldsResponse" name="getFieldsResponse"/>
    <wsdl:fault message="impl:IssueTrackingServiceException"
name="IssueTrackingServiceException"/>
  </wsdl:operation>
  <wsdl:operation name="store" parameterOrder="sessionID id fields">
    <wsdl:input message="impl:storeRequest" name="storeRequest"/>
    <wsdl:output message="impl:storeResponse" name="storeResponse"/>
    <wsdl:fault message="impl:IssueTrackingServiceException"
name="IssueTrackingServiceException"/>
  </wsdl:operation>
  <wsdl:operation name="logonUser" parameterOrder="user password">
    <wsdl:input message="impl:logonUserRequest" name="logonUserRequest"/>
    <wsdl:output message="impl:logonUserResponse" name="logonUserResponse"/>
    <wsdl:fault message="impl:IssueTrackingServiceException"
name="IssueTrackingServiceException"/>
  </wsdl:operation>
  <wsdl:operation name="newIssue" parameterOrder="sessionID">

```

```

        <wsdl:input message="impl:newIssueRequest" name="newIssueRequest" />
        <wsdl:output message="impl:newIssueResponse" name="newIssueResponse" />
        <wsdl:fault message="impl:IssueTrackingServiceException"
name="IssueTrackingServiceException" />
    </wsdl:operation>
    <wsdl:operation name="getStates" parameterOrder="sessionID issueIDs">
        <wsdl:input message="impl:getStatesRequest" name="getStatesRequest" />
        <wsdl:output message="impl:getStatesResponse" name="getStatesResponse" />
        <wsdl:fault message="impl:IssueTrackingServiceException"
name="IssueTrackingServiceException" />
    </wsdl:operation>
    <wsdl:operation name="getPossibleStates" parameterOrder="sessionID">
        <wsdl:input message="impl:getPossibleStatesRequest"
name="getPossibleStatesRequest" />
        <wsdl:output message="impl:getPossibleStatesResponse"
name="getPossibleStatesResponse" />
        <wsdl:fault message="impl:IssueTrackingServiceException"
name="IssueTrackingServiceException" />
    </wsdl:operation>
    <wsdl:operation name="fieldChanged" parameterOrder="sessionID issueID
field">
        <wsdl:input message="impl:fieldChangedRequest"
name="fieldChangedRequest" />
        <wsdl:output message="impl:fieldChangedResponse"
name="fieldChangedResponse" />
        <wsdl:fault message="impl:IssueTrackingServiceException"
name="IssueTrackingServiceException" />
    </wsdl:operation>
    <wsdl:operation name="getLink" parameterOrder="sessionID id">
        <wsdl:input message="impl:getLinkRequest" name="getLinkRequest" />
        <wsdl:output message="impl:getLinkResponse" name="getLinkResponse" />
        <wsdl:fault message="impl:IssueTrackingServiceException"
name="IssueTrackingServiceException" />
    </wsdl:operation>
    <wsdl:operation name="getChanges" parameterOrder="product changedSince">
        <wsdl:input message="impl:getChangesRequest" name="getChangesRequest" />
        <wsdl:output message="impl:getChangesResponse"
name="getChangesResponse" />
        <wsdl:fault message="impl:IssueTrackingServiceException"
name="IssueTrackingServiceException" />
    </wsdl:operation>
</wsdl:portType>
<wsdl:binding name="IssueTrackingSOAPBinding"
type="impl:IssueTrackingPortType">
    <wsdlsoap:binding style="rpc" transport="http://schemas.xmlsoap.org/soap/
http" />
    <wsdl:operation name="getFields">
        <wsdlsoap:operation soapAction="" />
        <wsdl:input name="getFieldsRequest">
            <wsdlsoap:body encodingStyle="http://schemas.xmlsoap.org/soap/
encoding/"
namespace="http://scc.seguate.com/issuetracking" use="encoded" />
        </wsdl:input>
        <wsdl:output name="getFieldsResponse">
            <wsdlsoap:body encodingStyle="http://schemas.xmlsoap.org/soap/
encoding/"
namespace="http://scc.seguate.com/issuetracking" use="encoded" />
        </wsdl:output>
        <wsdl:fault name="IssueTrackingServiceException">
            <wsdlsoap:fault encodingStyle="http://schemas.xmlsoap.org/soap/
encoding/"
namespace="http://scc.seguate.com/issuetracking" use="encoded" />
        </wsdl:fault>
    </wsdl:operation>

```

```

    <wsdl:operation name="store">
      <wsdlsoap:operation soapAction=""/>
      <wsdl:input name="storeRequest">
        <wsdlsoap:body encodingStyle="http://schemas.xmlsoap.org/soap/
encoding/"
namespace="http://scc.seguate.com/issuetracking" use="encoded"/>
      </wsdl:input>
      <wsdl:output name="storeResponse">
        <wsdlsoap:body encodingStyle="http://schemas.xmlsoap.org/soap/
encoding/"
namespace="http://scc.seguate.com/issuetracking" use="encoded"/>
      </wsdl:output>
      <wsdl:fault name="IssueTrackingServiceException">
        <wsdlsoap:fault encodingStyle="http://schemas.xmlsoap.org/soap/
encoding/"
namespace="http://scc.seguate.com/issuetracking" use="encoded"/>
      </wsdl:fault>
    </wsdl:operation>
    <wsdl:operation name="logonUser">
      <wsdlsoap:operation soapAction=""/>
      <wsdl:input name="logonUserRequest">
        <wsdlsoap:body encodingStyle="http://schemas.xmlsoap.org/soap/
encoding/"
namespace="http://scc.seguate.com/issuetracking" use="encoded"/>
      </wsdl:input>
      <wsdl:output name="logonUserResponse">
        <wsdlsoap:body encodingStyle="http://schemas.xmlsoap.org/soap/
encoding/"
namespace="http://scc.seguate.com/issuetracking" use="encoded"/>
      </wsdl:output>
      <wsdl:fault name="IssueTrackingServiceException">
        <wsdlsoap:fault encodingStyle="http://schemas.xmlsoap.org/soap/
encoding/"
namespace="http://scc.seguate.com/issuetracking" use="encoded"/>
      </wsdl:fault>
    </wsdl:operation>
    <wsdl:operation name="newIssue">
      <wsdlsoap:operation soapAction=""/>
      <wsdl:input name="newIssueRequest">
        <wsdlsoap:body encodingStyle="http://schemas.xmlsoap.org/soap/
encoding/"
namespace="http://scc.seguate.com/issuetracking" use="encoded"/>
      </wsdl:input>
      <wsdl:output name="newIssueResponse">
        <wsdlsoap:body encodingStyle="http://schemas.xmlsoap.org/soap/
encoding/"
namespace="http://scc.seguate.com/issuetracking" use="encoded"/>
      </wsdl:output>
      <wsdl:fault name="IssueTrackingServiceException">
        <wsdlsoap:fault encodingStyle="http://schemas.xmlsoap.org/soap/
encoding/"
namespace="http://scc.seguate.com/issuetracking" use="encoded"/>
      </wsdl:fault>
    </wsdl:operation>
    <wsdl:operation name="getStates">
      <wsdlsoap:operation soapAction=""/>
      <wsdl:input name="getStatesRequest">
        <wsdlsoap:body encodingStyle="http://schemas.xmlsoap.org/soap/
encoding/"
namespace="http://scc.seguate.com/issuetracking" use="encoded"/>
      </wsdl:input>
      <wsdl:output name="getStatesResponse">
        <wsdlsoap:body encodingStyle="http://schemas.xmlsoap.org/soap/
encoding/"

```

```

namespace="http://scc.seguate.com/issuetracking" use="encoded"/>
  </wsdl:output>
  <wsdl:fault name="IssueTrackingServiceException">
    <wsdlsoap:fault encodingStyle="http://schemas.xmlsoap.org/soap/
encoding/"
namespace="http://scc.seguate.com/issuetracking" use="encoded"/>
  </wsdl:fault>
  </wsdl:operation>
  <wsdl:operation name="getPossibleStates">
    <wsdlsoap:operation soapAction=""/>
    <wsdl:input name="getPossibleStatesRequest">
      <wsdlsoap:body encodingStyle="http://schemas.xmlsoap.org/soap/
encoding/"
namespace="http://scc.seguate.com/issuetracking" use="encoded"/>
  </wsdl:input>
  <wsdl:output name="getPossibleStatesResponse">
    <wsdlsoap:body encodingStyle="http://schemas.xmlsoap.org/soap/
encoding/"
namespace="http://scc.seguate.com/issuetracking" use="encoded"/>
  </wsdl:output>
  <wsdl:fault name="IssueTrackingServiceException">
    <wsdlsoap:fault encodingStyle="http://schemas.xmlsoap.org/soap/
encoding/"
namespace="http://scc.seguate.com/issuetracking" use="encoded"/>
  </wsdl:fault>
  </wsdl:operation>
  <wsdl:operation name="fieldChanged">
    <wsdlsoap:operation soapAction=""/>
    <wsdl:input name="fieldChangedRequest">
      <wsdlsoap:body encodingStyle="http://schemas.xmlsoap.org/soap/
encoding/"
namespace="http://scc.seguate.com/issuetracking" use="encoded"/>
  </wsdl:input>
  <wsdl:output name="fieldChangedResponse">
    <wsdlsoap:body encodingStyle="http://schemas.xmlsoap.org/soap/
encoding/"
namespace="http://scc.seguate.com/issuetracking" use="encoded"/>
  </wsdl:output>
  <wsdl:fault name="IssueTrackingServiceException">
    <wsdlsoap:fault encodingStyle="http://schemas.xmlsoap.org/soap/
encoding/"
namespace="http://scc.seguate.com/issuetracking" use="encoded"/>
  </wsdl:fault>
  </wsdl:operation>
  <wsdl:operation name="getLink">
    <wsdlsoap:operation soapAction=""/>
    <wsdl:input name="getLinkRequest">
      <wsdlsoap:body encodingStyle="http://schemas.xmlsoap.org/soap/
encoding/"
namespace="http://scc.seguate.com/issuetracking" use="encoded"/>
  </wsdl:input>
  <wsdl:output name="getLinkResponse">
    <wsdlsoap:body encodingStyle="http://schemas.xmlsoap.org/soap/
encoding/"
namespace="http://scc.seguate.com/issuetracking" use="encoded"/>
  </wsdl:output>
  <wsdl:fault name="IssueTrackingServiceException">
    <wsdlsoap:fault encodingStyle="http://schemas.xmlsoap.org/soap/
encoding/"
namespace="http://scc.seguate.com/issuetracking" use="encoded"/>
  </wsdl:fault>
  </wsdl:operation>
  <wsdl:operation name="getChanges">
    <wsdlsoap:operation soapAction=""/>

```

```

    <wsdl:input name="getChangesRequest">
      <wsdlsoap:body encodingStyle="http://schemas.xmlsoap.org/soap/
encoding/" namespace="http://scc.seguate.com/issuetracking" use="encoded"/>
    </wsdl:input>
    <wsdl:output name="getChangesResponse">
      <wsdlsoap:body encodingStyle="http://schemas.xmlsoap.org/soap/
encoding/" namespace="http://scc.seguate.com/issuetracking" use="encoded"/>
    </wsdl:output>
    <wsdl:fault name="IssueTrackingServiceException">
      <wsdlsoap:fault encodingStyle="http://schemas.xmlsoap.org/soap/
encoding/" namespace="http://scc.seguate.com/issuetracking" use="encoded"/>
    </wsdl:fault>
  </wsdl:operation>
</wsdl:binding>
<wsdl:service name="IssueTrackingService">
  <wsdl:port binding="impl:IssueTrackingSOAPBinding"
name="IssueTrackingPort">
    <wsdlsoap:address location="http://issuetracking.endpoint"/>
  </wsdl:port>
</wsdl:service>
</wsdl:definitions>

```

Configuring a Web Service Profile

Once your custom issue tracking Web service is hosted, you can configure an issue tracking profile.

1. In the menu, click **Project Settings > Issue Tracking**. The **Issue Tracking** page opens listing all the issue tracking profiles that have been created for the system.
2. Type a **Name** and **Description** for the new issue tracking profile.
3. Select **Issue Tracking Web Service** from the **Type** list box.
4. Type the URL of your hosted Web service in the **Endpoint** field.
5. Type a valid **Login name** and **Password** into the respective fields.
6. Click **OK**.

Java API Interface

Refer to the [Javadoc](#) for full details regarding available Java classes and methods. If the link does not work, click **Help > Documentation > Test Manager API Specification** in the Test Manager menu to open the Javadoc.

Build environment

Add the library `scc.jar` to your classpath, as it contains the interfaces that must be extended. The JAR file can be found in the `lib` directory of the Test Manager installation directory.

You must extend two interfaces/classes:

- `com.seguate.scc.published.api.issuetracking82.IssueTrackingProfile`
- `com.seguate.scc.published.api.issuetracking.Issue`

Classes/Interfaces



- IssueTrackingProfile
- IssueTrackingData
- Issue
- IssueTrackingField
- IssueTrackingProfileException

Requirements Management Integration

Test Manager can be integrated with third-party Requirements Management System (RMS) tools to link and synchronize requirements.

This section describes a Java application programming interface that enables you to implement third-party plug-ins for synchronization of requirements in Test Manager with the requirements of a third-party Requirements Management System. This section describes the interfaces that identify a requirement plug-in and its deployment.

A JAR or ZIP file is provided following the standard Test Manager plug-in concept, which is automatically deployed to all front-end servers, thereby enabling access to third-party tools for configuration and synchronization. This plug-in implements a specified interface that allows Test Manager to identify it as a requirements plug-in and provides the required login properties to log in to the third-party tool.

Refer to the [Javadoc](#) for full details regarding available Java classes and methods. If the link does not work, click **Help > Documentation > Test Manager API Specification** in the Test Manager menu to open the Javadoc.

For information about additional plug-ins, contact customer support.

Refer to the *SilkCentral Administration Module Help* for additional information.

Java API Interfaces

Refer to the [Javadoc](#) for full details regarding available Java classes and methods. If the link does not work, click **Help > Documentation > Test Manager API Specification** in the Test Manager menu to open the Javadoc.

The basic interface to start with is `RMPluginProfile` (`com.segue.tm.published.api.requirements.javaplugin`). `RMPluginProfile` specifies the plug-in as a requirements plug-in.

The requirements Java plug-in API includes the following additional interfaces:

- `RMAction`
- `RMAttachment`
- `RMDataProvider`
- *Optional:* `RMIconProvider`
- `RMNode`
- `RMNodeType`
- `RMPluginProfile`
- `RMPProject`
- `RMTTest`
- `RMTTestParameter`
- *Optional:* `RMTTestProvider`
- `RMTTestStep`

Third-Party Test Type Integration

Test Manager enables you to create custom plug-ins for test types beyond the standard set of available test types, which includes SilkPerformer, SilkTest Classic, manual tests, NUnit, JUnit, and Windows Scripting Host (WSH). Upon creating a new test-type plug-in, your custom test type becomes available in the **Type** list box on the **New Test** dialog box, alongside the standard test types that are available for creating new tests in Test Manager.

A plug-in specifies which properties are required for configuring a test and implementing execution of a test. Meta information about properties is defined through a *Configuration XML File*.

The goal of the plug-in approach is to support tests based on common testing frameworks such as JUnit and NUnit, or scripting languages (WSH), for easy customization of Test Manager to your specific testing environment. The well-defined Test Manager public API allows you to implement a proprietary solution that meets your automated test needs. Test Manager is open and extensible to any third-party tool that can be invoked from a Java implementation or via command line call.

Refer to the [Javadoc](#) for full details regarding available Java classes and methods. If the link does not work, click **Help > Documentation > Test Manager API Specification** in the Test Manager menu to open the Javadoc.

The classes that are described in the Javadoc are included in the file `tm-testlaunchapi.jar`.

For information about additional plug-ins, contact customer support.

This section includes a code sample that implements the process executor test type. The process executor can be used to launch any executable and extends the published process test launcher class. For additional information, download the *Test Launch Plug-In Sample* from **Help > Tools** and read the `Readme.txt` file.

Plug-In Implementation

The principles of the API are based on widely known Java Beans concepts. This allows developers to easily implement test launch plug-ins. To avoid putting textual information in Java code, meta information about properties is defined in an XML file.

The plug-in implementation is packaged in a zip archive and implements a callback interface so that it can be integrated. Other interfaces are in turn provided by the plug-in framework and allow the implementation to access information or return results.

Packaging

The plug-in is packaged in a zip archive that contains the Java codebase and the XML configuration file. The archive also contains some test launch plug-in implementations. The codebase may be contained in a Java archive file (`.jar`) or directly in `.class` files within folders representing the Java package structure.

The `TestLaunchBean` plug-in class follows the Bean standard and implements the `TestLaunchBean` interface. The XML configuration file in the `.zip` archive has the same name as this class. This allows you to package multiple plug-ins and XML files in a single archive.

Passing Parameters to the Plug-In

The plug-in interface provides full access to all custom parameters that have been defined in the Test Manager **Tests** area. Only custom parameters are supported for third-party test types. The plug-in cannot

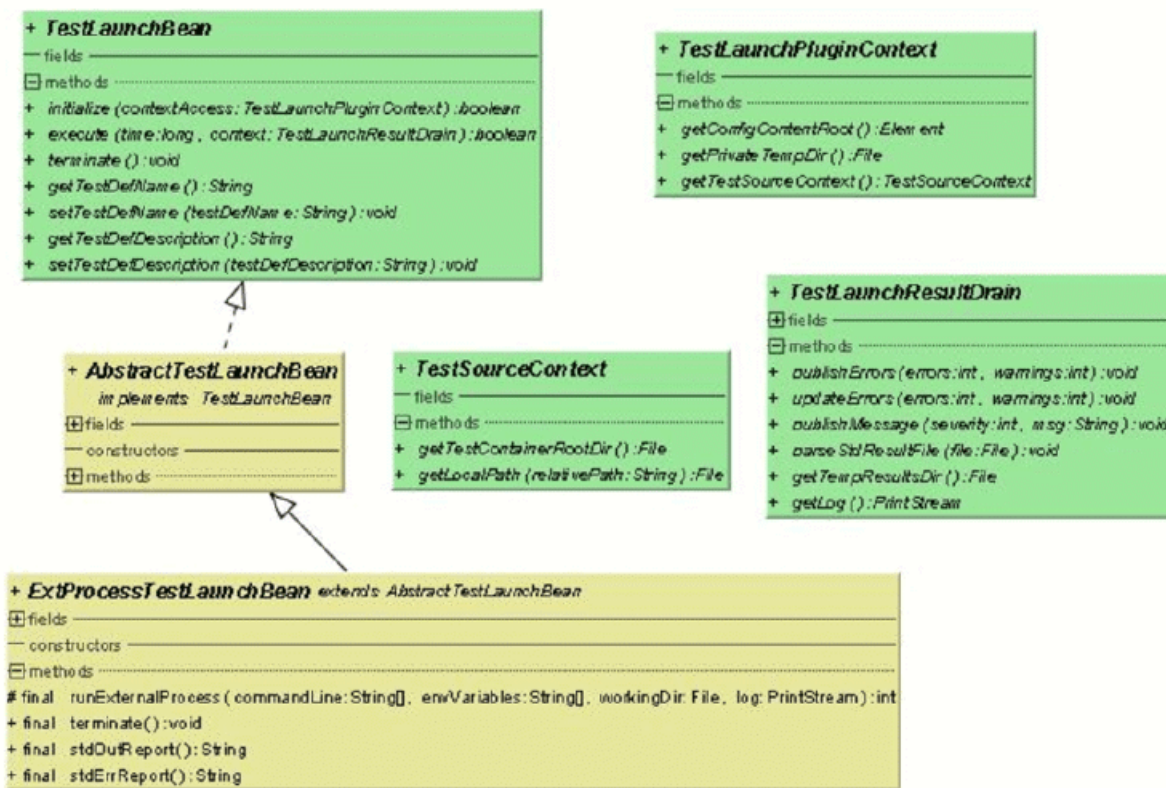
specify predefined parameters; the plug-in implementation determines if and how parameters are defined for specific tests.

Use the `getParameterValueStrings()` method in the `TestLaunchPluginContext` interface to obtain a container with mappings from parameter names (key) to their values represented as `String`.

For JUnit test types, any JUnit test class can access a custom parameter of the underlying test as a Java system property; the launcher passes these parameters to the executing virtual machine using the `"-D"` VM argument.

Structure of the API

This image details the structure of the API for third-party test type integration.



Refer to the [Javadoc](#) for full details regarding available Java classes and methods. If the link does not work, click **Help > Documentation > Test Manager API Specification** in the Test Manager menu to open the Javadoc.

Available Interfaces

- `TestLaunchBean`
- `ExtProcessTestLaunchBean`
- `TestLaunchPluginContext`
- `TestSourceContext`
- `TestLaunchResultDrain`

Sample Code

This sample code block implements the process executor test type, which can be used to launch any executable and extends the published `ExtProcessTestLaunchBean` class.

```
package com.borland.sctm.testlauncher;

import java.io.File;
import java.io.IOException;
import java.util.ArrayList;

import com.segue.tm.published.api.testlaunch.ExtProcessTestLaunchBean;
import com.segue.tm.published.api.testlaunch.TestLaunchResultDrain;

/**
 * Implements an SCTM test type that can be used to launch
 * any executables, for example from a command line.
 * Extends SCTM published process test launcher class,
 * see Test Manager API Specification (in Help -> Documentation) for
 * further details.
 */
public class ProcessExecutor extends ExtProcessTestLaunchBean {

    // test properties that will be set by SCTM using appropriate setter
    // methods (bean convention),
    // property names must conform to property tags used in the XML file

    /**
     * Represents property <command> defined in ProcessExecutor.xml.
     */
    private String command;

    /**
     * Represents property <arguments> defined in ProcessExecutor.xml.
     */
    private String arguments;

    /**
     * Represents property <workingfolder> defined in ProcessExecutor.xml.
     */
    private String workingfolder;

    /**
     * Java Bean compliant setter used by SCTM to forward the command to be
     * executed.
     * Conforms to property <command> defined in ProcessExecutor.xml.
     */
    public void setCommand(String command) {
        this.command = command;
    }

    /**
     * Java Bean compliant setter used by SCTM to forward the arguments
     * that will be passed to the command.
     * Conforms to property <arguments> defined in ProcessExecutor.xml.
     */
    public void setArguments(String arguments) {
        this.arguments = arguments;
    }

}
```

```

* Java Bean compliant setter used by SCTM to forward the working
* folder where the command will be executed.
* Conforms to property <workingfolder> defined in
* ProcessExecutor.xml.
*/
public void setWorkingfolder(String workingfolder) {
    this.workingfolder = workingfolder;
}

/**
* Main plug-in method. See Test Manager API Specification
* (in Help &gt; Documentation) for further details.
*/
@Override
public boolean execute(long time, TestLaunchResultDrain context)
    throws InterruptedException {
    try {
        String[] cmd = getCommandArgs(context);
        File workingDir = getWorkingFolderFile(context);
        String[] envVariables = getEnvironmentVariables(context);

        int processExitCode = runExternalProcess(cmd, envVariables, workingDir,
            context.getLog());

        boolean outputXmlFound = handleOutputXmlIfExists(context);

        if (! outputXmlFound && processExitCode != 0) {
            // if no output.xml file was produced, the exit code indicates
            // success or failure
            context.publishMessage(TestLaunchResultDrain.SEVERITY_ERROR,
                "Process exited with return code "
                + String.valueOf(processExitCode));
            context.updateErrors(1, 0);
            // set error, test will get status 'failed'
        }
    } catch (IOException e) {
        // prints exception message to Messages tab in Test Run
        // Results
        context.publishMessage(TestLaunchResultDrain.SEVERITY_FATAL,
            e.getMessage());
        // prints exception stack trace to 'log.txt' that can be viewed in Files
        // tab
        e.printStackTrace(context.getLog());
        context.publishErrors(1, 0);
        return false; // set test status to 'not executed'
    }
    return true;
}

/**
* Initializes environment variables to be set additionally to those
* inherited from the system environment of the Execution Server.
* @param context the test execution context
* @return String array containing the set environment variables
* @throws IOException
*/
private String[] getEnvironmentVariables(TestLaunchResultDrain context)
    throws IOException {
    String[] envVariables = {
        "SCTM_EXEC_RESULTS_FOLDER="
        + context.getTempResultsDir().getAbsolutePath(),
        "SCTM_EXEC_SOURCE_FOLDER="
        + sourceAccess().getTestContainerRootDir().getAbsolutePath(),
    };
}

```

```

    return envVariables;
}

/**
 * Let SCTM parse the standard report xml file (output.xml) if exists.
 * See also Test Manager Web Help - Creating a Test Package. A XSD file
 * can be found in SCTM Help -> Tools -> Test Package XML Schema
 * Definition File
 * @param context the test execution context
 * @return true if output.xml exists
 * @throws IOException
 */
private boolean handleOutputXmlIfExists(TestLaunchResultDrain context)
    throws IOException {
    String outputFileName = context.getTempResultsDir().getAbsolutePath()
        + File.separator + TestLaunchResultDrain.OUTPUT_XML_RESULT_FILE;
    File outputfile = new File(outputFileName);
    boolean outputXmlExists = outputfile.exists();
    if (outputXmlExists) {
        context.parseStdResultFile(outputfile);
        context.publishMessage(TestLaunchResultDrain.SEVERITY_INFO,
            String.format("output.xml parsed from '%s'", outputFileName));
    }
    return outputXmlExists;
}

/**
 * Retrieves the working folder on the Execution Server. If not configured
 * the results directory is used as working folder.
 * @param context the test execution context
 * @return the working folder file object
 * @throws IOException
 */
private File getWorkingFolderFile(TestLaunchResultDrain context)
    throws IOException {
    final File workingFolderFile;
    if (workingfolder != null) {
        workingFolderFile = new File(workingfolder);
    } else {
        workingFolderFile = context.getTempResultsDir();
    }
    context.publishMessage(TestLaunchResultDrain.SEVERITY_INFO,
        String.format("process is executed in working folder '%s'",
            workingFolderFile.getAbsolutePath()));
    return workingFolderFile;
}

/**
 * Retrieves the command line arguments specified.
 * @param context the test execution context
 * @return an array of command line arguments
 */
private String[] getCommandArgs(TestLaunchResultDrain context) {
    final ArrayList<String> cmdList = new ArrayList<String>();
    final StringBuilder cmd = new StringBuilder();
    cmdList.add(command);
    cmd.append(command);
    if (arguments != null) {
        String[] lines = arguments.split("[\\r\\n]+");
        for (String line : lines) {
            cmdList.add(line);
            cmd.append(" ").append(line);
        }
    }
}

```

```

context.publishMessage(TestLaunchResultDrain.SEVERITY_INFO,
    String.format("executed command '%s'", cmd.toString()));
context.getLog().printf("start '%s'%n", cmd.toString());
return (String[]) cmdList.toArray(new String[cmdList.size()]);
}
}

```

Configuration XML File

The configuration XML file contains meta information about the third-party test type plug-in.

Plug-In Meta Information

Plug-in meta information generally provides information about the plug-in and test type. Available information types are listed below.

Type	Description
id	An internal string that is unique among all installed plug-ins identifying this type.
label	The GUI text displayed in the choice list and edit dialogs for this type.
description	Additional textual information describing this test type.
version	Distinguishes different versions of a type.

General Property Meta Information

For editable properties, there is general information that is the same for each property type in addition to the type-specific information. The name of a property must match those defined in the code by `get<<propertyname>>` methods, with the first character in lowercase.

Type	Description
label	The text displayed in the GUI.
description	Additional textual information describing the property.
isOptional	A value of true indicates that user input is not required.
default	The default value for the property when creating a new test. This value must match the property type.

String Property Meta Information

Here are the types of string-property meta information that are available in the plug-in.

Type	Description
maxLength	Denotes the maximum length the user can enter.
editMultiLine	Denotes if the edit field should have multiple rows.
isPassword	A value of true hides the user input as ***.

File Property Meta Information

Here are the types of file-property meta information that are available in the plug-in.

For specified file values, non version-controlled files with absolute paths on the execution server are distinguished from version-controlled files. Files under source control are always relative to the root directory of the test container and are typically used to specify a test source to be executed. Absolute paths need to exist on the execution server, typically specifying a tool or resource used to invoke the test on the execution server.

Type	Description
<code>openBrowser</code>	A value of <code>true</code> indicates that a browser should be opened to select the file from the files in a test container.
<code>isSourceControl</code>	A value of <code>true</code> indicates that the file originates from a source control system.
<code>fileNameSpec</code>	Denotes a restriction for allowed file names as known from the standard Windows file browse dialog.

Custom Icons

You can design custom icons for your test type to make the test type identifiable. To define these icons for the plug-in, for which you have defined the identifier `PluginId` in the configuration XML file, you have to place the following four icons into the root directory of the plug-in ZIP container.


Name	Description
<code><PluginId>.gif</code>	The default icon for your tests type. For example, <code>ProcessExecutor.gif</code> .
<code><PluginId>_package.gif</code>	The icon used for the test package root and the suite nodes, in case you convert a test of the specified test type into a test package. For example, <code>ProcessExecutor_package.gif</code> .
<code><PluginId>_linked.gif</code>	The icon used if the parent folder of the test is a linked test container. For example, <code>ProcessExecutor_linked.gif</code> .
<code><PluginId>_incomplete.gif</code>	The icon used if the product or the source control profile of the parent test container of the test is not defined.

When you design a new icon for a test type, apply the following rules:


- Use only icons of type GIF. The file extension is case sensitive and must always be lowercase (.gif).
- Remove old or invalid icons from `<SCTM deploy folder>\wwwroot\silkroot\img\PluginIcons`, because otherwise the icons will not be updated with the new icons in the root directory of the plug-in ZIP container.
- The size of the icon is 16x16 pixels.
- The maximal number of colors allowed for an icon is 256.
- The icon includes a 1 bit transparency.

Deployment

The plug-in ZIP archive must reside in the `Plugins` subdirectory within the Test Manager installation directory. To integrate plug-ins residing in this directory, restart your application server and front-end server through SilkCentral Service Manager.

 **Note:** Hot deployment is not supported.

Each time an archive is modified, these two servers must be restarted. The archive is uploaded automatically to execution servers.

 **Note:** Never remove a plug-in archive after a test based on that plug-in has been created. A test which is based on a no longer existing plug-in archive will throw unknown errors when being changed or executed.

Indicating Start and Finish for Video Capturing

Refer to the [Javadoc](#) for full details regarding available Java classes and methods. If the link does not work, click **Help > Documentation > Test Manager API Specification** in the Test Manager menu to open the Javadoc.

When you create a new third-party test plug-in for Test Manager, with a third-party test type that supports processing multiple test cases in a single test execution, and you want to associate captured videos to specific test cases, you can proceed in two ways.

Third-Party Tests that are Running in the Plug-In

For these tests, we recommend you to use the `indicateTestStart` and `indicateTestStop` methods of the `TestLaunchResultDrain` class.

Third-Party Tests that are Running in an External Process

For these tests, you can use a TCP/IP-based service to send `START` and `FINISH` messages to port 19138 of the Test Manager execution server. These message types inform the execution server that a test case in the test has started or respectively finished. The messages must be encoded in Unicode (UTF8) or ASCII format.

Message Type Format

START `START <Test Name>, <Test ID> <LF>`, where LF has ASCII code 10.

FINISH `FINISH <Test Name>, <Test ID>, <Passed> LF`, where LF has ASCII code 10.
`Passed` can be `True` or `False`. If video capturing is set to be performed `On Error`, the video is only saved to the results if `Passed` is set to `False`.

The execution server responds with the message `OK`, if the request was recognized, or otherwise the execution server responds with an error message. Always wait for the response of the execution server before you execute the next test case, because otherwise the recorded video might not match the actual test case.

If the external process, where the test is executed, is based on a Java environment, we recommend you to use the `indicateTestStart` and `indicateTestStop` methods of the `TestCaseStartFinishSocketClient` class, which is included in the file `tm-testlaunchapi.jar`.

SilkCentral Web Services

Web Services do not require setup, they are enabled by default on each front-end server. For example, if `http://www.yourFrontend.com/login` is the URL that you use to access SilkCentral, then `http://www.yourFrontend.com/Services1.0/services` and `http://www.yourFrontend.com/AlmServices1.0/services` are the base URLs you use to access available Web Services.

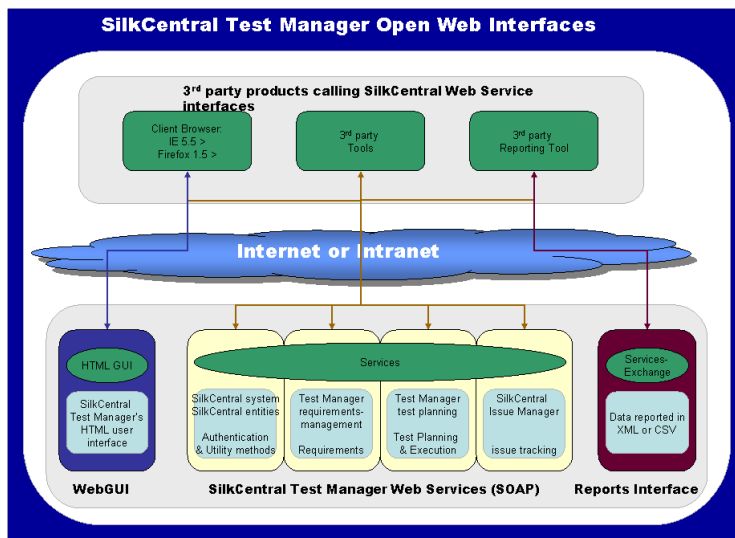
When you access the base URL using your browser, you are presented with a simple HTML list of all available Web Services. This list is provided by Apache Axis. The SOAP stack that SilkCentral uses is `http://ws.apache.org/axis/`.

The base URL provides links to WSDL (Web Service Definition Language) standardized XML files, where each file describes the interface of a single Web Service. These files are not human readable. For this reason, SOAP-enabled clients (for example, SilkPerformer Java Explorer) read WSDL files and thereby retrieve information required for invoking methods on corresponding Web Services.

Refer to the [Javadoc](#) for full details regarding available Java classes and methods. If the link does not work, click **Help > Documentation > Test Manager API Specification** in the Test Manager menu to open the Javadoc.



Note: The original Web Services implemented in Test Manager before version 2008 are still available at `http://hostname:port/services`.



Web Services Quick Start

This section includes prerequisites, a use-case example, and other topics related to Web Services integration.

Prerequisites

The following prerequisites must be considered before attempting to develop a Web Services client:

- Basic knowledge of Object Oriented Programming (OOP). Java experience would be helpful, since examples will be given in that language. A developer with no Java but C++, C#, Python, or Perl

experience should still be able to easily follow the examples. Experience in manipulating collections such as HashMaps and Lists is desirable.

- JUnit tests are briefly mentioned. This Java testing framework is not required, but is helpful to know.
- Introductory exposure to Web Services technology. This help does not offer an introductory course in Web Services or SOAP. At a minimum you should have experience coding and successfully running a "Hello World!" Web Services client.
- Knowledge of the Test Manager Web Services architecture.

Getting Started with Web Services

Refer to the *Test Manager Release Notes* to ensure that you have the appropriate SDK version installed and in your PATH.

It is helpful to have the JUnit jar in your classpath. You can download the `JUnit.jar` file from <http://www.junit.org/index.htm>.

1. Download the Axis Web Services library from <http://ws.apache.org/axis/>.

2. Unpack all jars into the `lib` directory in your classpath.

It is helpful to use an environment variable `AXISCLASSPATH` for this.

3. Run the following command, pointing to the WSDL of the desired Web Service.

```
java -cp %AXISCLASSPATH%
      org.apache.axis.wsdl.WSDL2Java
      -o . -d Session -p
package.structure.you.want.to.use.for.your.client.yourwebservice
      -t http://url.to.your.service/yourWebService?wsdl
```

4. Look for the automatically generated Java class `YourWebServiceTestCase`.

This class is ready for you to use all of the methods that `YourWebService` provides. Just replace the default empty variables.

The empty username and password strings in the `login(String username, String password)` call should be replaced with the actual username and password values. This class is a JUnit test, but you could simply copy and paste code into a simple main-method Java-driver class to build a client.

Web Services Client Overview

Web Services typically use a SOAP over HTTP protocol. In this scenario, SOAP envelopes are sent out. When collections and other complex objects are bundled in SOAP envelopes, the ASCII data structures can become difficult to read and edit. Novice developers should not try to build Web services clients by direct manipulation of SOAP envelopes. Experienced developers typically do not build Web Services clients at the SOAP envelope level. Doing so is tedious and error prone. For this reason, all major programming languages provide Web Services development kits. Axis is the most widely used Java kit. SOAP is the most common tool for C++ and C. Others exist for Perl and Python.

Regardless of the implementation language (Java, C++, C#, Perl, or Python), building Web Service clients generally follows the same pattern:

1. Point a development kit tool to the Web Services WSDL.
2. Get a client stub returned.
3. Edit the client stub generated in step 2 to obtain a full-blown client.

Axis follows this pattern. Here, the `WSDL2Java` tool is used to build the client stubs from the WSDL. Detailed information on how to use `WSDL2Java` can be found in the [Axis Reference Guide](#). A brief description of the switches used in the above summary is as follows:

- `-o`: The output directory of the client stubs
- `-d`: The scope of the Web Services connection
- `-p`: Use package structure for namespaces, deploy to this package structure

- -t: Output a JUnit test case class for the Web Service.

Generate the JUnit test case class. This class not only provides code that binds to the Web Service, but it also outputs test code that exercises every method of the service.

The WSDL2Java tool generates several classes to support a client to the Web Service. If `YourWebService` is the name of the service, then one can expect the following classes to be output:

- `YourWebService`: An interface representing `YourWebService`.
- `YourWebServiceService`: An interface representing the `YourWebService` Locator.
- `YourWebServiceServiceLocator`: A `YourWebService` Locator, implements `YourWebServiceService`.
- `YourWebServiceSoapBindingStub`: A client stub that handles the serialization of `YourWebService` POJOs
- `YourWebServiceServiceTestCase`: A JUnit test case that exercises all methods of `YourWebService`
- `Serializeable` Objects: Client-side objects corresponding to the objects `YourWebService` uses.

Rename the interfaces and implementing classes to human-readable form:

- `YourWebServiceService` => becomes `IYourWebServiceLocator` (Leading "I" indicates "Interface").
- `YourWebServiceServiceLocator` => becomes `YourWebServiceLocator`, implements `IYourWebServiceLocator`.
- `YourWebService` => becomes `IYourWebService`.

The Axis generated JUnit test case is valuable. Out of the box, it is a ready-to-run client. You only need to change the default initialized variables to reflect valid values for the Web Service. It also provides binding code that uses the locator to start the "Find-Bind-Execute" SOA cycle. Here is an excerpt from the test case provided for the `tmrequirementsmanagement` Web Service:

```

/* default test automatically generated by WSDL2Java */
public void test2tmrequirementsmanagementLogin() throws Exception {
    com.borland.tm.webservices.tmrequirementsmanagement
        .TmrequirementsmanagementSoapBindingStub binding;
    try {
        binding = (com.borland.tm.webservices.tmrequirementsmanagement
            .TmrequirementsmanagementSoapBindingStub)
            new com.borland.tm.webservices.tmrequirementsmanagement
                .RequirementsServiceLocator().gettmrequirementsmanagement();
    }
    catch (javax.xml.rpc.ServiceException jre) {
        if(jre.getLinkedCause()!=null)
            jre.getLinkedCause().printStackTrace();
        throw new junit.framework.AssertionFailedError("JAX-RPC
            ServiceException caught: " + jre);
    }
    assertNotNull("binding is null", binding);

    // Time out after a minute
    binding.setTimeout(60000);

    // Test operation
    try {
        java.lang.String value = null;
        value = binding.login(new java.util.HashMap());
    }
    catch
    (com.borland.tm.webservices.tmrequirementsmanagement.RMServiceException e1) {
        throw new junit.framework.AssertionFailedError("RMServiceException
            Exception caught: " + e1);
    }
}

```

```
// TBD - validate results
}
```

Note that the JUnit test provides code for binding and logging in. You only need to fill in the default HashMap to complete the code for logging in. Thus, if creating a POJO Web Service client, a simple copy, paste, and edit will provide ready-made bind and login methods:

```
public TmrequirementsmanagementSoapBindingStub getBinding()
    throws Exception {
    TmrequirementsmanagementSoapBindingStub binding;
    try {
        binding = (TmrequirementsmanagementSoapBindingStub)
            new RequirementsServiceLocator().gettmrequirementsmanagement();
    }
    catch (ServiceException jre) {
        // Handle error
    }

    if(binding == null)
    {
        // handle error here
        System.err.println("binding is null.");
        System.exit(0);
    }

    // Time out after a minute
    binding.setTimeout(60000);

    return binding;
}

public String login(String username, String password)
{
    // mBinding = getBinding() already obtained
    // Now get mSessionID member variable
    try {
        HashMap map = new HashMap();
        map.put("username", username);
        map.put("password", password);
        mSessionID = mBinding.login(map);
    }
    catch (RMSERVICEException e1) {
        // Handle error here
    }
    return mSessionID;
}
```

Example Use Case: Adding a Requirement

Following up on previous steps detailed in this section, this topic completes a use case for adding a requirement to Test Manager.

Before proceeding you must have satisfied the following pre-requisites:

- You have completed the steps detailed for the *tmrequirementsmanagement* Web Service.
 - A working POJO or JUnit class with binding, login, and other *tmrequirementsmanagement* methods has been created.
 - You have familiarized yourself with the other Test Manager API help topics.
1. Bind to the service by using the login method and a property map that includes the user credentials.
 2. Save the session ID obtained from the previous step.
 3. Construct a requirements object that contains the desired data.

4. Call the `updateRequirement` method by using the session ID and the requirements object you have generated.
5. Save the requirement ID that is returned by the `updateRequirement` method.
6. Create a `PropertyValue` array of the requirement properties.
7. Call the `updateProperties` method using the previously created array.

The WSDL2Java will create the above mentioned Web Service objects:

- Requirement
- PropertyValue

You can now use the OOP methods of the above objects to consume the Web Service. No SOAP envelope construction is required. Below are excerpts of the code that is required to complete this use case.

```

/** propertyID for requirement risk */
public static final String PROPERTY_RISK = "Risk";

/** propertyID for requirement reviewed */
public static final String PROPERTY_REVIEWED = "Reviewed";

/** propertyID for requirement priority */
public static final String PROPERTY_PRIORITY = "Priority";

/** propertyID for requirement obsolete property */
public static final String PROPERTY_OBSOLETE = "Obsolete";

// Construct Top Level Requirement
Requirement topLevelRequirement = new Requirement();
topLevelRequirement.setName("tmReqMgt TopLevelReq");
topLevelRequirement.setDescription("tmReqMgt TopLevel Desc");
PropertyValue propRisk = new PropertyValue("1", PROPERTY_RISK, null);
PropertyValue propPriority = new PropertyValue("1", PROPERTY_PRIORITY, null);
PropertyValue[] properties = new PropertyValue[]{propRisk, propPriority};

/* First add requirement skeleton, get its ID
 * mWebService is a binding stub, see above getBinding() snippet
 * mSessionID is the stored session ID, see above login() snippet
 */
String requirementID = mWebService.updateRequirement(mSessionID,
topLevelRequirement, null);

// Now loop through and set properties
for(PropertyValue propValue: properties)
{
    propValue.setRequirementId(requirementID);
    mWebService.updateProperty(mSessionID, requirementID, propValue);
}

// Add Child Requirement
Requirement childRequirement = new Requirement();
childRequirement.setName("tmReqMgt ChildReq");
childRequirement.setDescription("tmReqMgt ChildLevel Desc");
childRequirement.setParentId(requirementID);
propRisk = new PropertyValue("2", PROPERTY_RISK, null);
propPriority = new PropertyValue("2", PROPERTY_PRIORITY, null);
properties = new PropertyValue[]{propRisk, propPriority};
String childReqID = mWebService.updateRequirement(mSessionID,
        childRequirement, null);

// Now loop through and set properties
for(PropertyValue propValue: properties)
{

```

```

propValue.setRequirementId(requirementID);
    mWebService.updateProperty(mSessionID, childReqID, propValue);
}

// Print Results
System.out.println("Login Successful with mSessionID: "
    + mSessionID);
System.out.println("Top Level Requirement ID: " + requirementID);
System.out.println("Child Requirement ID: " + childReqID);

```

Session Handling

SilkCentral data is protected against unauthorized access. Login credentials must be provided before data access is granted. This is true not only when working with the HTML front-end, but also for communication with Test Manager through SOAP calls.

The first step in querying data, or applying configuration changes for Test Manager, is authentication. When authentication is successful, a user session is created that allows execution of subsequent operations in the context of that user login.

When accessing Test Manager through a Web browser, session information is not visible to the user. The browser handles session information with the use of cookies. In contrast to using SilkCentral through HTML, SOAP calls must handle the session information manually.

Authentication through Web Services is done through the `logonUser()` SOAP call of the `sccsystem` Web Service. The method call returns a session identifier that references the session created on the server and at the same time is used as a key to access SilkCentral in the context of that session.

Each subsequent SOAP call that requires a session for execution takes such a returned identifier as one of its parameters, checks its validity, and executes in the context of the corresponding session.

The following Java code sample demonstrates simple access to Test Manager through Web Services and the use of the session identifier:

```

long sessionID = sccsystem.logonUser("admin", "admin");
Project[] projects = sccentities.getProjects(sessionID);


```

A SilkCentral session created through Web Services can not be ended explicitly. Instead, sessions end automatically when they are not used for a period of time. As soon as a session times out on a server, the subsequent SOAP calls that attempt to use the session throw exceptions.


A demonstration client is available for download from <http://sso.borland.com> in the Test Manager section. This demo project utilizes the Test Manager execution Web Service, helping you to get familiar with the Web service interface.

Available Web Services

The following table lists the available SilkCentral Web Services.

 **Note:** The WSDL URL also lists system-internal Web Services that are not intended for creating Web Services clients. This document describes only the published Web Services.


Refer to the [Javadoc](#) for full details regarding available Java classes and methods. If the link does not work, click **Help > Documentation > Test Manager API Specification** in the Test Manager menu to open the Javadoc.

 **Note:** When you work with Web Services, all times returned by the system are in the Universal Time Coordinated (UTC). Use the UTC too in all time references in the Web Services you work with.

WS Name (Interface)	WSDL URL	Description
sccsystem (SystemService)	/Services1.0/services/sccsystem?wsdl	This is the root service that provides authentication and simple utility methods.
sccentities (MainEntities)	/axislegacy/sccentities?wsdl	This service provides access to the <i>Project</i> and <i>Product</i> entities on the SilkCentral platform.
tmrequirementsmanagement (RMservice)	/Services1.0/services/tmrequirementsmanagement?wsdl	This service provides access to the Requirements area of SilkCentral Test Manager.
tmplanning (IPlanningService)	/Services1.0/services/tmplanning?wsdl	This service provides access to the Tests area of SilkCentral Test Manager. It also enables starting executions and fetching execution results.
tmexecution (IExecutionWebservice)	/Services1.0/services/tmexecution?wsdl	This service provides access to the Executions area of SilkCentral Test Manager.
tmfilters (FilterService)	/Services1.0/services/tmfilters?wsdl	This service allows you to create, read, update, and delete filters.
scim (RadarServiceIF)	/axislegacy/scim?wsdl	This service provides access to Issue Manager. .

Services Exchange

This section describes the HTTP based interfaces that are used to handle reports, attachments, test plans, executions, and libraries in Services Exchange.

 **Note:** When you work with Web Services, all times returned by the system are in the Universal Time Coordinated (UTC). Use the UTC too in all time references in the Web Services you work with.

reportData Interface

The `reportData` interface is used to request the data of a report. The following table shows the parameters of the `reportData` interface:

Interface URL	Parameters	Descriptions
/servicesExchange?hid=reportData	sid	Session ID: User authentication
	reportFilterID	Report filter ID
	type	Response body format: (csv or xml)
	includeHeaders	Include report headers or not. (true or false)
	userName	(Optional) User name: Used instead of sid
	passWord	(Optional) User password:

Interface URL	Parameters	Descriptions
		Used instead of sid

reportData Interface Example

```
String sessionID;
String reportID;

URL report = new URL("http", host, port,
    "/servicesExchange?hid=reportData" +
    "&type=csv" +
    "&sid=" + sessionID +
    "&reportFilterID=" + reportID +
    "&includeHeaders=true" +
    "&execNode_Id_0=1");

BufferedReader in =
    new BufferedReader(
        new InputStreamReader(
            report.openStream(), "UTF-8"));
```

If the report requires parameters, you need to add the following code to the report URL for each parameter:

```
"&parametername=parametervalue"
```

In the example, the parameter `execNode_Id_0` is set to the value 1.

TMAccess Interface

The TMAccess interface is used to upload attachments to a test or requirement. The following table shows the parameters of the TMAccess interface.

Interface URL	Parameter	Descriptions
/servicesExchange? hid=TMAccess	sid	Session ID: user authentication
	entityType	Target entity type: (test, requirement, or TestStepParent)
	entityID	Target entity ID: (test ID, requirement ID, or manual test ID)
	description	Description of the attachment: URL encoded text, used to describe the attachment.
	isURL	If true, the attachment is a URL. If false, the attachment is a file.
	URL	Optional - URL to be attached.
	stepPosition	Optional - Test step order. Identifies the step of a manual test (for example, the order of the first step is 1). The order is mandatory if the

Interface URL	Parameter	Descriptions
		entityType is TestStepParent.
	userName	(Optional) User name: Used instead of sid
	passWord	(Optional) User password: Used instead of sid

TMAttach Web Service Example

The following code uses Apache HttpClient to get a convenient HTTP-POST API for uploading a binary attachment. Only one attachment can be uploaded per request.

Only one attachment can be uploaded per request. To download Apache HttpComponents, visit <http://hc.apache.org/downloads.cgi>. Refer to the documentation of the component for the required libraries.

```
import org.apache.commons.httpclient.*; // Apache HttpClient

String sessionId = null;
String testNodeID = null; // receiving test
File fileToUpload = null; // attachment
String AttachmentDescription = ""; // descriptive text

HttpClient client = new HttpClient();
String formURL = "http://localhost:19120/
  servicesExchange?hid=TMAttach" +
  "&sid=" + sessionId +
  "&entityID=" + testNodeID +
  "&entityType=Test" +
  "&isURL=false";
PostMethod filePost = new PostMethod(formURL);
Part[] parts = {
  new StringPart("description", attachmentDescription),
  new FilePart(fileToUpload.getName(), fileToUpload)
};
filePost.setRequestEntity(new MultipartRequestEntity(parts,
  filePost.getParams()));
client.getHttpConnectionManager().
  getParams().setConnectionTimeout(60000);
// Execute and check for success
int status = client.executeMethod(filePost);
// verify http return code...
// if(status == HttpStatus.SC_OK) ...
```

createTestPlan Interface

The createTestPlan interface is used to create new tests. The HTTP response of the call contains the XML structure of the changed tests. You can obtain the identifiers of the new nodes from the updated XML test structure.

The following table shows the parameters of the createTestPlan interface.

Interface URL	Parameter	Descriptions
/servicesExchange? hid=createTestPlan	sid	Session ID – User authentication
	parentNodeID	ID of the container to which the new test is added in the Tests tree
	userName	<i>Optional:</i> User name – Used instead of sid
	passWord	<i>Optional:</i> User password – Used instead of sid

The XML schema definition file that is used to validate test plans can be downloaded by using the front-end server URL `http://<host>:<port>/silkroot/xsl/testplan.xsd` or copied from the front-end server installation folder `<Test Manager installation folder>/wwwroot/silkroot/xsl/testplan.xsd`.

createTestPlan Web Service Example

The following code uses Apache HttpClient to create tests.

```
import org.apache.commons.httpclient.*; // Apache HttpClient

long sessionID = mWebServiceHelper.getSessionId();

URL service = new URL("http", mWebServiceHelper.getHost(),
    mWebServiceHelper.getPort(),
    String.format("/servicesExchange?hid=%s&sid=%s&parentNodeID=%d",
        "createTestPlan", sessionID,
        PARENT_NODE_ID));

HttpClient client = new HttpClient();
PostMethod filePost = new PostMethod(service.toExternalForm());
String xmlFile = loadTestPlanUtf8("testPlan.xml");
StringPart xmlFileItem = new StringPart("testPlan", xmlFile,
    "UTF-8");
xmlFileItem.setContentType("text/xml");
Part[] parts = {xmlFileItem};

filePost.setRequestEntity(new MultipartRequestEntity(parts,
    filePost.getParams()));
client.getHttpConnectionManager().getParams().setConnectionTimeout(60000);
int status = client.executeMethod(filePost);
System.out.println(filePost.getStatusLine());
```

Only one attachment can be uploaded per request. To download Apache HttpComponents, visit <http://hc.apache.org/downloads.cgi>. Refer to the documentation of the component for the required libraries.

Test Example

The following code shows an example test that can be uploaded to Test Manager by using the `createTestPlan` service.

```
<?xml version="1.0" encoding="UTF-8"?>
<TestPlan xmlns="http://www.borland.com/TestPlanSchema"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.borland.com/TestPlanSchema
    ../../../../../../TM/wwwroot/silkroot/xsl/testplan.xsd">
```

```

<Folder name="Folder1" id="5438">
  <Description>Description of the folder</Description>
  <Property name="property1">
    <propertyValue>value1</propertyValue>
  </Property>
  <Test name="TestDef1" type="plugin.SilkTest">
    <Description>Description of the test</Description>
    <Property name="property2">
      <propertyValue>value2</propertyValue>
    </Property>
    <Property name="property3">
      <propertyValue>value3</propertyValue>
      <propertyValue>value4</propertyValue>
    </Property>
    <Parameter name="param1" type="string">string1</Parameter>
    <Parameter name="param2" type="boolean">true</Parameter>
    <Parameter name="paramDate"
type="date">01.01.2001</Parameter>
    <Parameter name="paramInherited" type="string"
      inherited="true">
      inheritedValue1
    </Parameter>
    <Step id="1" name="StepA">
      <ActionDescription>do it</ActionDescription>
      <ExpectedResult>everything</ExpectedResult>
    </Step>
    <Step id="2" name="StepB">
      <ActionDescription>and</ActionDescription>
      <ExpectedResult>everything should come</ExpectedResult>
    </Step>
  </Test>
  <Test name="ManualTest1" id="5441" type="_ManualTestType"
    plannedTime="03:45">
    <Description>Description of the manual test</Description>
    <Step id="1" name="StepA">
      <ActionDescription>do it</ActionDescription>
      <ExpectedResult>everything</ExpectedResult>
    </Step>
    <Step id="2" name="StepB">
      <ActionDescription>and</ActionDescription>
      <ExpectedResult>everything should come</ExpectedResult>
    </Step>
    <Step id="3" name="StepC">
      <ActionDescription>do it now</ActionDescription>
      <ExpectedResult>
        everything should come as you wish
      </ExpectedResult>
    </Step>
  </Test>
</Folder name="Folder2" id="5439">
  <Description>Description of the folder</Description>
  <Property name="property4">
    <propertyValue>value5</propertyValue>
  </Property>
  <Parameter name="param3" type="number">123</Parameter>
  <Folder name="Folder2_1" id="5442">
    <Description>Description of the folder</Description>
    <Test name="TestDef2" type="plugin.SilkPerformer">
      <Description>Description of the test</Description>
      <Property name="_sp_Project File">
        <propertyValue>ApplicationAccess.ltp</propertyValue>
      </Property>
      <Property name="_sp_Workload">

```

```

        <propertyValue>Workload1</propertyValue>
    </Property>
</Test>
<Test name="TestDef3" type="JUnitTestType"
externalId="com.borland.MyTest">
    <Description>Description of the test</Description>
    <Property name="_junit_ClassFile">
        <propertyValue>com.borland.MyTest</propertyValue>
    </Property>
    <Property name="_junit_TestMethod">
        <propertyValue>testMethod</propertyValue>
    </Property>
    <Step id="1" name="StepA">
        <ActionDescription>do it</ActionDescription>
        <ExpectedResult>everything</ExpectedResult>
    </Step>
    <Step id="2" name="StepB">
        <ActionDescription>and</ActionDescription>
        <ExpectedResult>everything should come</
ExpectedResult>
    </Step>
</Test>
</Folder>
</Folder>
</Folder>
</TestPlan>

```

exportTestPlan Interface

The `exportTestPlan` interface is used to export test plans as XML files. The following table shows the parameters of the `exportTestPlan` interface.

Interface URL	Parameter	Descriptions
/servicesExchange? hid=exportTestPlan	sid	Session ID – User authentication
	nodeID	The node with this ID and, recursively, all of the node's children nodes are exported
	userName	<i>Optional:</i> User name – Used instead of sid
	passWord	<i>Optional:</i> User password – Used instead of sid

exportTestPlan Web Service Example

The following code uses Apache HttpClient to export tests.

```

import org.apache.commons.httpclient.*; // Apache HttpClient

long sessionID = mWebServiceHelper.getSessionId();

URL service = new URL("http", mWebServiceHelper.getHost(),
    mWebServiceHelper.getPort(),
    String.format("/servicesExchange?hid=%s&sid=%s&nodeID=%d",
        "exportTestPlan", sessionID,
        PARENT_NODE_ID));

HttpClient client = new HttpClient();

```

```

client.getHttpConnectionManager().getParams().setConnectionTimeout(60000);
HttpMethod fileGet = new GetMethod(service.toExternalForm());
int status = client.executeMethod(fileGet);
System.out.println(fileGet.getStatusLine());
String exportedTestPlanResponse =
fileGet.getResponseBodyAsString();
System.out.println(exportedTestPlanResponse);

```

To download Apache HttpComponents, visit <http://hc.apache.org/downloads.cgi>. Refer to the documentation of the component for the required libraries.

updateTestPlan Interface

The `updateTestPlan` interface is used to update tests with existing root nodes from XML files. The HTTP response of the call contains the XML structure of the changed tests. You can obtain the identifiers of the new nodes from the updated XML test structure.

The following table shows the parameters of the `updateTestPlan` interface.

Interface URL	Parameter	Descriptions
/servicesExchange? hid=updateTestPlan	sid	Session ID – User authentication
	userName	<i>Optional:</i> User name – Used instead of sid
	passWord	<i>Optional:</i> User password – Used instead of sid

The XML schema definition file that is used to validate test plans can be downloaded by using the front-end server URL `http://<host>:<port>/silkroot/xsl/testplan.xsd` or copied from the front-end server installation folder `<Test Manager installation folder>/wwwroot/silkroot/xsl/testplan.xsd`.

updateTestPlan Web Service Example

The following code uses Apache HttpClient to update tests.

```

import org.apache.commons.httpclient.*; // Apache HttpClient

long sessionID = mWebServiceHelper.getSessionId();
String xml = loadTestPlanUtf8(DEMO_TEST_PLAN_XML);
HttpClient client = new HttpClient();

URL webServiceUrl = new URL("http", mWebServiceHelper.getHost(),
mWebServiceHelper.getPort(),
String.format("/servicesExchange?hid=%s&sid=%s",
"updateTestPlan",
sessionID));
StringPart testPlanXml = new StringPart(DEMO_TEST_PLAN_XML, xml,
"UTF-8");
testPlanXml.setContentType("text/xml");
Part[] parts = {testPlanXml};
PostMethod filePost = new
PostMethod(webServiceUrl.toExternalForm());
filePost.setRequestEntity(new MultipartRequestEntity(parts,
filePost.getParams()));
client.getHttpConnectionManager().getParams().setConnectionTimeout(60000);
int status = client.executeMethod(filePost);

```

```
System.out.println(filePost.getStatusLine());

String responseXml = filePost.getResponseBodyAsString();
```

Only one attachment can be uploaded per request. To download Apache HttpComponents, visit <http://hc.apache.org/downloads.cgi>. Refer to the documentation of the component for the required libraries.

createRequirements Interface

The `createRequirements` interface is used to create new requirements. The HTTP response of the call contains the XML structure of the changed requirements. You can obtain the identifiers of the new nodes from the updated XML requirement structure.

The following table shows the parameters of the `createRequirements` interface.

Interface URL	Parameter	Descriptions
/servicesExchange? hid=createRequirements	sid	Session ID – User authentication
	parentNodeID	ID of the container to which the new requirement is added in the requirements tree
	userName	<i>Optional:</i> User name – Used instead of sid
	passWord	<i>Optional:</i> User password – Used instead of sid

The XML schema definition file that is used to validate requirements can be downloaded by using the front-end server URL `http://<host>:<port>/silkroot/xsl/requirements.xsd` or copied from the front-end server installation folder `<Test Manager installation folder>/wwwroot/silkroot/xsl/requirements.xsd`.

createRequirements Web Service Example

The following code uses Apache HttpClient to create requirements.

```
import org.apache.commons.httpclient.*; // Apache HttpClient

long sessionID = mWebServiceHelper.getSessionId();

URL service = new URL("http", mWebServiceHelper.getHost(),
    mWebServiceHelper.getPort(),
    String.format("/servicesExchange?hid=%s&sid=%s&parentNodeID=%d",
        "createRequirements", sessionID,
        PARENT_NODE_ID));

HttpClient client = new HttpClient();
PostMethod filePost = new PostMethod(service.toExternalForm());
String xmlFile = loadRequirementsUtf8("requirements.xml");
StringPart xmlFileItem = new StringPart("requirements", xmlFile,
    "UTF-8");
xmlFileItem.setContentType("text/xml");
Part[] parts = {xmlFileItem};

filePost.setRequestEntity(new MultipartRequestEntity(parts,
    filePost.getParams()));
client.getHttpConnectionManager().getParams().setConnectionTimeo
```

```

ut(60000);
int status = client.executeMethod(filePost);
System.out.println(filePost.getStatusLine());

```

Only one attachment can be uploaded per request. To download Apache HttpComponents, visit <http://hc.apache.org/downloads.cgi>. Refer to the documentation of the component for the required libraries.

exportRequirements Interface

The `exportRequirements` interface is used to export requirements as XML files. The following table shows the parameters of the `exportRequirements` interface.

Interface URL	Parameter	Descriptions
/servicesExchange? hid=exportRequirements	sid	Session ID – User authentication
	nodeID	The node with this ID and, recursively, all of the node's children nodes are exported
	userName	<i>Optional:</i> User name – Used instead of sid
	passWord	<i>Optional:</i> User password – Used instead of sid

exportRequirements Web Service Example

The following code uses Apache HttpClient to export requirements.

```

import org.apache.commons.httpclient.*; // Apache HttpClient

long sessionID = mWebServiceHelper.getSessionId();

URL service = new URL("http", mWebServiceHelper.getHost(),
    mWebServiceHelper.getPort(),
    String.format("/servicesExchange?hid=%s&sid=%s&nodeID=%d",
        "exportRequirements", sessionID,
        PARENT_NODE_ID));

HttpClient client = new HttpClient();
client.getHttpConnectionManager().getParams().setConnectionTimeo
ut(60000);
GetMethod fileGet = new GetMethod(service.toExternalForm());
int status = client.executeMethod(fileGet);
System.out.println(fileGet.getStatusLine());
String exportedRequirementResponse =
fileGet.getResponseBodyAsString();
System.out.println(exportedRequirementResponse);

```

To download Apache HttpComponents, visit <http://hc.apache.org/downloads.cgi>. Refer to the documentation of the component for the required libraries.

updateRequirements Interface

The `updateRequirements` interface is used to update requirements with existing root nodes from XML files. The requirements are identified by their internal Test Manager node ID in the requirements tree. The requirement tree node and all of the node's children are updated. New nodes are added, missing nodes

are set to obsolete, and moved nodes are similarly moved in Test Manager. The HTTP response of the call contains the XML structure of the changed requirements. You can obtain the identifiers of the new nodes from the updated XML requirement structure.

The following table shows the parameters of the `updateRequirements` interface.

Interface URL	Parameter	Descriptions
/servicesExchange? hid=updateRequirements	sid	Session ID – User authentication
	userName	<i>Optional:</i> User name – Used instead of sid
	passWord	<i>Optional:</i> User password – Used instead of sid
	NodeID	The node with this ID and recursively all of the node's children nodes are updated.

The XML schema definition file that is used to validate requirements can be downloaded by using the front-end server URL `http://<host>:<port>/silkroot/xsl/requirements.xsd` or copied from the front-end server installation folder `<Test Manager installation folder>/wwwroot/silkroot/xsl/requirements.xsd`.

updateRequirements Web Service Example

The following code uses Apache HttpClient to update requirements.

```
import org.apache.commons.httpclient.*; // Apache HttpClient

long sessionID = mWebServiceHelper.getSessionID();
URL service = new URL("http", mWebServiceHelper.getHost(),
    mWebServiceHelper.getPort(),
    String.format("/servicesExchange?hid=%s&sid=%s&nodeID=%s",
        "updateRequirements",
        sessionID, rootNodeId));

HttpClient client = new HttpClient();
PostMethod filePost = new PostMethod(service.toExternalForm());
String xmlFile = loadRequirementsUtf8(fileName);
StringPart xmlFileItem = new StringPart("requirements", xmlFile,
    "UTF-8");
xmlFileItem.setContentType("text/xml");
Part[] parts = {xmlFileItem};

filePost.setRequestEntity(new MultipartRequestEntity(parts,
    filePost.getParams()));
client.getHttpConnectionManager().getParams().setConnectionTimeout(60000);
int status = client.executeMethod(filePost);
System.out.println(filePost.getStatusLine());

String responseXml = filePost.getResponseBodyAsString();
```

Only one attachment can be uploaded per request. To download Apache HttpComponents, visit <http://hc.apache.org/downloads.cgi>. Refer to the documentation of the component for the required libraries.

updateRequirementsByExternalID Interface

The `updateRequirementsByExternalID` interface is used to update requirements with existing root nodes from XML files. The requirements are identified by external IDs. The requirement tree node and all of the node's children are updated. New nodes are added, missing nodes are set to obsolete, and moved nodes are similarly moved in Test Manager. The HTTP response of the call contains the XML structure of the changed requirements. You can obtain the identifiers of the new nodes from the updated XML requirement structure.

The following table shows the parameters of the `updateRequirementsByExternalID` interface.

Interface URL	Parameter	Descriptions
/servicesExchange? hid=updateRequirements	sid	Session ID – User authentication
	nodeID	ID of the node in the requirement tree to be updated.
	userName	<i>Optional:</i> User name – Used instead of sid
	passWord	<i>Optional:</i> User password – Used instead of sid

The XML schema definition file that is used to validate requirements can be downloaded by using the front-end server URL `http://<host>:<port>/silkroot/xsl/requirements.xsd` or copied from the front-end server installation folder `<Test Manager installation folder>/wwwroot/silkroot/xsl/requirements.xsd`.

updateRequirementsByExternalID Web Service Example

The following code uses Apache HttpClient to update requirements.

```
import org.apache.commons.httpclient.*; // Apache HttpClient

long sessionID = mWebServiceHelper.getSessionId();
URL service = new URL("http", mWebServiceHelper.getHost(),
    mWebServiceHelper.getPort(),
    String.format("/servicesExchange?hid=%s&sid=%s",
        "updateRequirementsByExternalID",
        sessionID));

HttpClient client = new HttpClient();
PostMethod filePost = new PostMethod(service.toExternalForm());
string xmlFile = loadRequirementsUtf8(fileName);
StringPart xmlFileItem = new StringPart("requirements", xmlFile,
    "UTF-8");
xmlFileItem.setContentType("text/xml");
Part[] parts = {xmlFileItem};

filePost.setRequestEntity(new MultipartRequestEntity(parts,
    filePost.getParams()));
client.getHttpConnectionManager().getParams().setConnectionTimeo
ut(60000);
int status = client.executeMethod(filePost);
System.out.println(filePost.getStatusLine());

String responseXml = filePost.getResponseBodyAsString();
```

Only one attachment can be uploaded per request. To download Apache HttpComponents, visit <http://hc.apache.org/downloads.cgi>. Refer to the documentation of the component for the required libraries.

createExecutionDefinitions Interface

The `createExecutionDefinitions` interface is used to create new execution plans. The HTTP response of the call contains the XML structure of the changed execution plans. You can obtain the identifiers of the new nodes from the updated XML execution plan structure.

The following table shows the parameters of the `createExecutionDefinitions` interface.

Interface URL	Parameter	Descriptions
/servicesExchange? hid=createExecutionDefinitions	sid	Session ID – User authentication
	parentNodeID	ID of the node to which the new execution plan is added in the execution tree
	userName	<i>Optional:</i> User name – Used instead of sid
	passWord	<i>Optional:</i> User password – Used instead of sid

The XML schema definition file that is used to validate executions can be downloaded by using the front-end server URL `http://<host>:<port>/silkroot/xsl/executionplan.xsd` or copied from the front-end server installation folder `<Test Manager installation folder>/wwwroot/silkroot/xsl/executionplan.xsd`.

createExecutionDefinitions Web Service Example

The following code uses Apache HttpClient to create execution plans.

```
import org.apache.commons.httpclient.*; // Apache HttpClient

long sessionID = mWebServiceHelper.getSessionId();

URL service = new URL("http", mWebServiceHelper.getHost(),
    mWebServiceHelper.getPort(),
    String.format("/servicesExchange?hid=%s&sid=%s&parentNodeID=%d",
        "createExecutionDefinitions", sessionID,
        PARENT_NODE_ID));

HttpClient client = new HttpClient();
PostMethod filePost = new PostMethod(service.toExternalForm());
String xmlFile =
loadExecutionDefinitionsUtf8("executionplan.xml");
StringPart xmlFileItem = new StringPart("executionplan",
xmlFile,
    "UTF-8");
xmlFileItem.setContentType("text/xml");
Part[] parts = {xmlFileItem};

filePost.setRequestEntity(new MultipartRequestEntity(parts,
    filePost.getParams()));
client.getHttpConnectionManager().getParams().setConnectionTimeout(60000);
```

```
int status = client.executeMethod(filePost);
System.out.println(filePost.getStatusLine());
```

Only one attachment can be uploaded per request. To download Apache HttpComponents, visit <http://hc.apache.org/downloads.cgi>. Refer to the documentation of the component for the required libraries.

Execution Plan Example

The following code shows an example execution plan that can be uploaded to Test Manager by using the `createExecutionDefinitions` service. The example creates a custom schedule for one of the execution definitions and assigns tests to an execution plan, both through a manual assignment and a filter. The example also creates a configuration suite with configurations.

```
<?xml version="1.0" encoding="UTF-8"?>
<ExecutionPlan xmlns="http://www.borland.com/ExecPlanSchema"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.borland.com/ExecPlanSchema
  ../../../../../../../../../../TM/wwwroot/silkroot/xsl/
  executionplan.xsd">

  <Folder name="Folder1">
    <Description>Description of the folder</Description>
    <ExecDef name="ExecutionDefinition1" TestContainerId="1">
      <Description>Description1</Description>
      <CustomSchedule>
        <start>2009-11-26T21:32:52</start>
        <end>
          <forever>true</forever>
        </end>
        <Interval day="1" hour="2" minute="3"></Interval>
        <adjustDaylightSaving>false</adjustDaylightSaving>
        <exclusions>
          <days>Monday</days>
          <days>Wednesday</days>
          <from>21:32:52</from>
          <to>22:32:52</to>
        </exclusions>
        <definiteRun>2009-11-27T21:35:12</definiteRun>
      </CustomSchedule>
      <ReadFromBuildInfoFile>true</ReadFromBuildInfoFile>
      <Priority>High</Priority>
      <SetupTestDefinition>73</SetupTestDefinition>
      <CleanupTestDefinition>65</CleanupTestDefinition>
      <AssignedTestDefinitions>
        <ManualAssignment useTestPlanOrder="true">
          <TestId>6</TestId>
          <TestId>5</TestId>
        </ManualAssignment>
      </AssignedTestDefinitions>
    </ExecDef>
    <ExecDef name="ExecutionDefinition2" TestContainerId="1">
      <Description>Description2</Description>
      <Build>1</Build>
      <Version>1</Version>
      <Priority>Low</Priority>
      <SourceControlLabel>Label1</SourceControlLabel>
      <DependentExecDef id="65">
        <Condition>Passed</Condition>
        <Deployment>
          <Specific>
            <Execution type="Server" id="1"/>
          </Specific>
        </Deployment>
      </DependentExecDef>
    </ExecDef>
  </Folder>
</ExecutionPlan>
```

```

        <Execution type="Tester" id="0"/>
    </Specific>
</Deployment>
</DependentExecDef>
<DependentExecDef id="70">
    <Condition>Failed</Condition>
    <Deployment>
        <Specific>
            <Execution type="Tester" id="0"/>
        </Specific>
    </Deployment>
</DependentExecDef>
<DependentExecDef id="68">
    <Condition>Any</Condition>
    <Deployment>
        <UseFromCurrentExedDef>>true</UseFromCurrentExedDef>
    </Deployment>
</DependentExecDef>
</ExecDef>

<ConfigSuite name="ConfigSuite1" TestContainerId="1">
    <Description>ConfigSuite1 desc</Description>
    <CustomSchedule>
        <start>2009-11-26T21:32:52</start>
        <end>
            <times>1</times>
        </end>
        <Interval day="1" hour="2" minute="3"/>
        <adjustDaylightSaving>>false</adjustDaylightSaving>
        <exclusions>
            <days>Monday</days>
            <days>Wednesday</days>
            <from>21:32:52</from>
            <to>22:32:52</to>
        </exclusions>
        <definiteRun>2009-11-27T21:35:12</definiteRun>
    </CustomSchedule>

    <ConfigExecDef name="Config1">
        <Description>Config1 desc</Description>
        <Priority>Medium</Priority>
    </ConfigExecDef>

    <ConfigExecDef name="Config2">
        <Priority>Medium</Priority>
        <DependentExecDef id="69">
            <Condition>Any</Condition>
            <Deployment>
                <UseFromCurrentExedDef>>true</UseFromCurrentExedDef>
            </Deployment>
        </DependentExecDef>
    </ConfigExecDef>

    <Build>8</Build>
    <Version>2</Version>
    <SourceControlLabel>ConfigSuite1 label</
SourceControlLabel>
    <SetupTestDefinition>73</SetupTestDefinition>
    <CleanupTestDefinition>65</CleanupTestDefinition>
    <AssignedTestDefinitions>
        <ManualAssignment useTestPlanOrder="true">
            <TestId>6</TestId>
            <TestId>5</TestId>
        </ManualAssignment>

```

```

    </AssignedTestDefinitions>
  </ConfigSuite>
</Folder>
</ExecutionPlan>

```

exportExecutionDefinitions Interface

The `exportExecutionDefinitions` interface is used to export execution plans as XML files. The following table shows the parameters of the `exportExecutionDefinitions` interface.

Interface URL	Parameter	Descriptions
/servicesExchange? hid=exportExecutionDefinitions	sid	Session ID – User authentication
	nodeID	The node with this ID and, recursively, all of the node's children nodes are exported
	userName	<i>Optional:</i> User name – Used instead of sid
	passWord	<i>Optional:</i> User password – Used instead of sid

exportExecutionDefinitions Web Service Example

The following code uses Apache HttpClient to export execution plans.

```

import org.apache.commons.httpclient.*; // Apache HttpClient

long sessionID = mWebServiceHelper.getSessionId();

URL service = new URL("http", mWebServiceHelper.getHost(),
    mWebServiceHelper.getPort(),
    String.format("/servicesExchange?hid=%s&sid=%s&nodeID=%d",
        "exportExecutionDefinitions", sessionID,
        NODE_ID));

HttpClient client = new HttpClient();
client.getHttpConnectionManager().getParams().setConnectionTimeout(60000);
GetMethod fileGet = new GetMethod(service.toExternalForm());
int status = client.executeMethod(fileGet);
System.out.println(fileGet.getStatusLine());
String exportedExecutionPlanResponse =
    fileGet.getResponseBodyAsString();
System.out.println(exportedExecutionPlanResponse);

```

To download Apache HttpComponents, visit <http://hc.apache.org/downloads.cgi>. Refer to the documentation of the component for the required libraries.

updateExecutionDefinitions Interface

The `updateExecutionDefinitions` interface is used to update execution plans from XML files. The HTTP response of the call contains the XML structure of the changed execution plans. You can obtain the identifiers of the new nodes from the updated XML execution plan structure.

The following table shows the parameters of the `updateExecutionDefinitions` interface.

Interface URL	Parameter	Descriptions
/servicesExchange? hid=updateExecutionDefinitions	sid	Session ID – User authentication
	userName	<i>Optional:</i> User name – Used instead of sid
	passWord	<i>Optional:</i> User password – Used instead of sid

The XML schema definition file that is used to validate executions can be downloaded by using the front-end server URL `http://<host>:<port>/silkroot/xsl/executionplan.xsd` or copied from the front-end server installation folder `<Test Manager installation folder>/wwwroot/silkroot/xsl/executionplan.xsd`.

updateExecutionDefinitions Web Service Example

The following code uses Apache HttpClient to update execution plans.

```
import org.apache.commons.httpclient.*; // Apache HttpClient

long sessionID = mWebServiceHelper.getSessionId();
String xml = loadExecutionPlanUtf8(DEMO_EXECUTION_PLAN_XML);
HttpClient client = new HttpClient();

URL webServiceUrl = new URL("http", mWebServiceHelper.getHost(),
    mWebServiceHelper.getPort(),
    String.format("/servicesExchange?hid=%s&sid=%s",
        "updateExecutionDefinitions",
        sessionID));
StringPart ExecutionPlanXml = new
StringPart(DEMO_EXECUTION_PLAN_XML, xml,
    "UTF-8");
ExecutionPlanXml.setContentType("text/xml");
Part[] parts = {ExecutionPlanXml};
PostMethod filePost = new
PostMethod(webServiceUrl.toExternalForm());
filePost.setRequestEntity(new MultipartRequestEntity(parts,
    filePost.getParams()));
client.getHttpConnectionManager().getParams().setConnectionTimeo
ut(60000);
int status = client.executeMethod(filePost);
System.out.println(filePost.getStatusLine());

String responseXml = filePost.getResponseBodyAsString();
```

Only one attachment can be uploaded per request. To download Apache HttpComponents, visit <http://hc.apache.org/downloads.cgi>. Refer to the documentation of the component for the required libraries.

createLibraries Interface

The `createLibraries` interface is used to create new libraries. The HTTP response of the call contains the XML structure of the changed libraries. You can obtain the identifiers of the new nodes from the updated XML library structure.

The following table shows the parameters of the `createLibraries` interface.

Interface URL	Parameter	Descriptions
/servicesExchange? hid=createLibraries	sid	Session ID – User authentication
	userName	<i>Optional:</i> User name – Used instead of sid
	passWord	<i>Optional:</i> User password – Used instead of sid

The XML schema definition file that is used to validate libraries can be downloaded by using the front-end server URL `http://<host>:<port>/silkroot/xsl/libraries.xsd` or copied from the front-end server installation folder `<Test Manager installation folder>/wwwroot/silkroot/xsl/libraries.xsd`.

createLibraries Web Service Example

The following code uses Apache HttpClient to create libraries.

```
import org.apache.commons.httpclient.*; // Apache HttpClient

long sessionId = mWebServiceHelper.getSessionId();

URL service = new URL("http", mWebServiceHelper.getHost(),
    mWebServiceHelper.getPort(), String.format("/servicesExchange?
hid=%s&sid=%s",
    "createLibraries", sessionId));

HttpClient client = new HttpClient();
PostMethod filePost = new PostMethod(service.toExternalForm());
String xmlFile = loadTestPlanUtf8("libraries.xml");
StringPart xmlFileItem = new StringPart("libraries", xmlFile,
"UTF-8");
xmlFileItem.setContentType("text/xml");
Part[] parts = {xmlFileItem};

filePost.setRequestEntity(new MultipartRequestEntity(parts,
filePost.getParams()));
client.getHttpConnectionManager().getParams().setConnectionTimeo
ut(60000);
int status = client.executeMethod(filePost);
System.out.println(filePost.getStatusLine());
```

To download Apache HttpComponents, visit <http://hc.apache.org/downloads.cgi>. Refer to the documentation of the component for the required libraries.

Libraries Example

The following code shows an example library that can be uploaded to Test Manager by using the `createLibraries` service. A new library is not restricted to be used in certain projects, unless one or more projects are defined in the `GrantedProjects` Section.

```
<?xml version="1.0" encoding="UTF-8"?>
<LibraryStructure xmlns="http://www.borland.com/TestPlanSchema"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.borland.com/TestPlanSchema
    ../../../../../../TM/wwwroot/silkroot/xsl/libraries.xsd">

    <Library name="Library 1">
        <Folder name="Folder 1">
```

```

    <Folder name="Folder 1.1">
      <SharedSteps name="Basic create user steps">
        <Step name="Login">
          <ActionDescription>
            Login with user admin.
          </ActionDescription>
          <ExpectedResult>Succesful login.</ExpectedResult>
        </Step>
        <Step name="Create User">
          <ActionDescription>Create user tester</
ActionDescription>
          <ExpectedResult>User created</ExpectedResult>
        </Step>
        <Step name="Logout">
          <ActionDescription>
            Logout using start menu
          </ActionDescription>
          <ExpectedResult>Logged out.</ExpectedResult>
        </Step>
      </SharedSteps>
    </Folder>
  </Folder>
  <GrantedProjects>
    <ProjectId>0</ProjectId>
    <ProjectId>1</ProjectId>
  </GrantedProjects>
</Library>
</LibraryStructure>

```

exportLibraryStructure Interface

The exportLibraryStructure interface is used to export libraries, folders, and shared steps objects as XML files. The following table shows the parameters of the exportLibraryStructure interface.

Interface URL	Parameter	Descriptions
/servicesExchange? hid=exportLibraryStructure	sid	Session ID – User authentication
	userName	<i>Optional:</i> User name – Used instead of sid
	passWord	<i>Optional:</i> User password – Used instead of sid
	nodeID	The library node or folder in the libraries tree that is to be exported. IDs of shared steps nodes are not allowed.

exportLibraryStructure Web Service Example

The following code uses Apache HttpClient to export libraries.

```

import org.apache.commons.httpclient.*; // Apache HttpClient

long sessionID = mWebServiceHelper.getSessionId();

URL service = new URL("http", mWebServiceHelper.getHost(),
mWebServiceHelper.getPort(), String.format("/servicesExchange?
hid=%s&sid=%s&nodeID=%d",
"exportLibraryStructure", sessionID, NODE_ID));

```

```

HttpClient client = new HttpClient();
client.getHttpClientConnectionManager().getParams().setConnectionTimeout(60000);
GetMethod fileGet = new GetMethod(service.toExternalForm());
int status = client.executeMethod(fileGet);
System.out.println(fileGet.getStatusLine());
String exportedTestPlanResponse =
fileGet.getResponseBodyAsString();
System.out.println(exportedTestPlanResponse);

```

To download Apache HttpComponents, visit <http://hc.apache.org/downloads.cgi>. Refer to the documentation of the component for the required libraries.

exportLibraryStructureWithoutSteps Interface

The `exportLibraryStructureWithoutSteps` interface is used to export libraries, folders, and shared steps objects as XML files. The steps included in the shared steps objects are not exported. The following table shows the parameters of the `exportLibraryStructureWithoutSteps` interface.

Interface URL	Parameter	Descriptions
/servicesExchange? hid=exportLibraryStructureWithoutSteps	sid	Session ID – User authentication
	userName	<i>Optional:</i> User name – Used instead of sid
	passWord	<i>Optional:</i> User password – Used instead of sid
	nodeID	The library node or folder in the libraries tree that is to be exported. IDs of shared steps nodes are not allowed.

exportLibraryStructureWithoutSteps Web Service Example

The following code uses Apache HttpClient to export libraries.

```

import org.apache.commons.httpclient.*; // Apache HttpClient

long sessionID = mWebServiceHelper.getSessionId();

URL service = new URL("http", mWebServiceHelper.getHost(),
mWebServiceHelper.getPort(), String.format("/servicesExchange?
hid=%s&sid=%s&nodeID=%d",
"exportLibraryStructureWithoutSteps", sessionID, NODE_ID));

HttpClient client = new HttpClient();
client.getHttpClientConnectionManager().getParams().setConnectionTimeout(60000);
GetMethod fileGet = new GetMethod(service.toExternalForm());
int status = client.executeMethod(fileGet);
System.out.println(fileGet.getStatusLine());
String exportedTestPlanResponse =
fileGet.getResponseBodyAsString();
System.out.println(exportedTestPlanResponse);

```

To download Apache HttpComponents, visit <http://hc.apache.org/downloads.cgi>. Refer to the documentation of the component for the required libraries.

getLibraryInfoByName Interface

The `getLibraryInfoByName` interface returns the ID, name, and description of all libraries with a specified name. The interface returns only the properties of libraries, not their structure. The following table shows the parameters of the `getLibraryInfoByName` interface.

Interface URL	Parameter	Descriptions
/servicesExchange? hid=exportLibraryStructureWithoutSteps	sid	Session ID – User authentication
	userName	<i>Optional:</i> User name – Used instead of sid
	passWord	<i>Optional:</i> User password – Used instead of sid
	libraryName	The name of the library

getLibraryInfoByName Web Service Example

The following code uses Apache HttpClient to get library information.

```
import org.apache.commons.httpclient.*; // Apache HttpClient

long sessionID = mWebServiceHelper.getSessionId();

URL service = new URL("http", mWebServiceHelper.getHost(),
    mWebServiceHelper.getPort(), String.format("/servicesExchange?
hid=%s&sid=%s",
    "exportLibraryStructureWithoutSteps", sessionID,
    LIBRARY_NAME));

HttpClient client = new HttpClient();
client.getHttpConnectionManager().getParams().setConnectionTimeout(60000);
GetMethod fileGet = new GetMethod(service.toExternalForm());
int status = client.executeMethod(fileGet);
System.out.println(fileGet.getStatusLine());
String response = fileGet.getResponseBodyAsString();
System.out.println(response);
```

To download Apache HttpComponents, visit <http://hc.apache.org/downloads.cgi>. Refer to the documentation of the component for the required libraries.

Web Service Demo Client

The Web Service Demo Client is a tool that demonstrates how to use the Test Manager Web Services. Download the client from **Help > Tools**.

The Web Service Demo Client shows all the attributes that are available in **Tests > Manage Test Attributes** for each test, and all properties for each available test type.



Attention: The Web Service Demo Client is designed to demonstrate usage of the Web Services. Do not use the demo client in a production environment.

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