How to Lookup Data Via a RFC User Defined Function?

Applies to:

To use the mapping lookup API you need SAP NetWeaver™ Exchange Infrastructure with at least SP13 or higher.

Summary

This paper provides details on the usage of the Generic Lookup API used for calling RFC from user defined Java functions in SAP PI Integration Builder.

As of SAP NetWeaver '04 SP13 a new mapping lookup API is available which simplifies using RFC lookups.

This guide assumes you already have some basic SAP PI knowledge.

Author: Danny De Roovere

Company: SAP Belgium Luxemburg

Created on: 12 March 2008

Author Bio

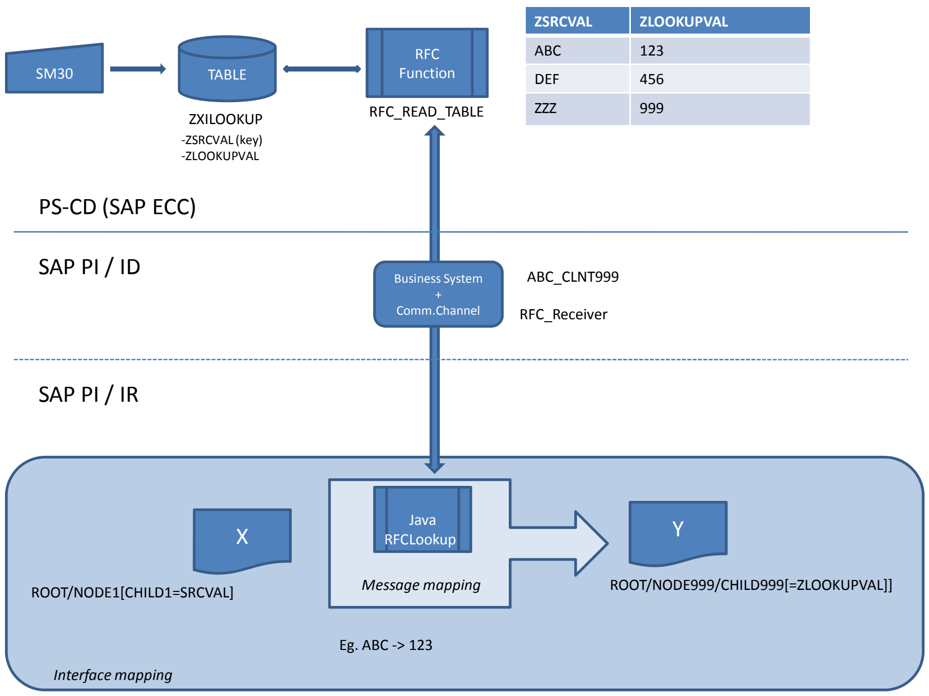
Danny De Roovere is a principal SAP NetWeaver consultant employed at SAP Belgium-Luxemburg. Danny started as a SAP basis consultant (in particular EDI-ALE), and immediately added a new dimension to his career when SAP released its NetWeaver platform. Today, his main focus is SAP's business-driven software architecture (eSOA), SAP Enterprise Portal, SAP Exchange Infrastructure and Duet.

Table of Contents

Prerequisites

To use the mapping lookup API you need SAP NetWeaver™ Exchange Infrastructure with at least SP13 or higher.

Scenario Overview



ZSRCVAL	ZLOOKUPVAL
ABC	123
DEF	456
ZZZ	999

The scenario demonstrates the look-up process.

Data in one of the child elements of an XML document (X) is taken as input for one of the child elements of XML document (Y). The data is not passed as such; the goal is to retrieve its equivalent data value from a qualified lookup table.

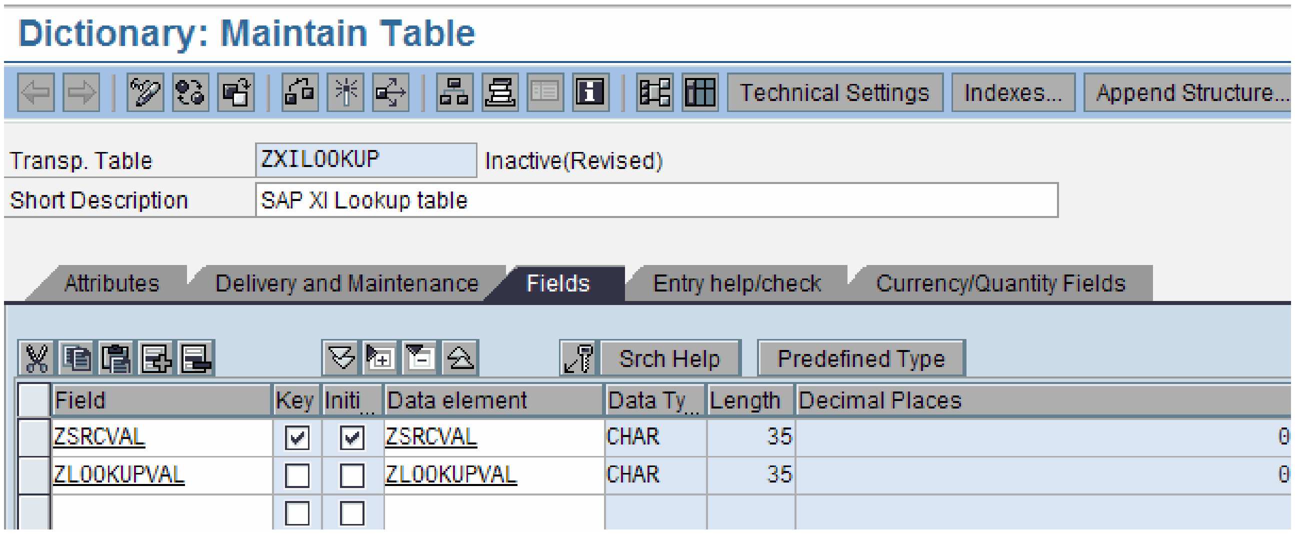
The table is created and maintained in the ABAP Business System. In our scenario this table only contains two columns: ZSRCVAL (input parameter) and ZLOOKUPVAL (output parameter).

The standard RFC Function Module, RFC_READ_TABLE, is responsible for the handling of the lookup request. The RFC Call is executed in a Java User Defined function using the RFC communication channel. This enables us not only to monitor the RFC adapter in case of any errors (using the Runtime Workbench) but also to store the passwords inside the channel and not inside the code.

Backend Configuration data

Table ZXILOOKUP (se11)

The following table will act as a lookup table for all XI value mappings



Transp. Table: ZXILOOKUP Inactive(Revised)
Short Description: SAP XI Lookup table

Field	Key	Initi...	Data element	Data Ty...	Length	Decimal Places
ZSRCVAL	✓	✓	ZSRCVAL	CHAR	35	0
ZLOOKUPVAL	☐	☐	ZLOOKUPVAL	CHAR	35	0
	☐	☐				

It consists of:

- ZSRCVAL: source value (key)
- ZLOOKUPVAL: value to be returned

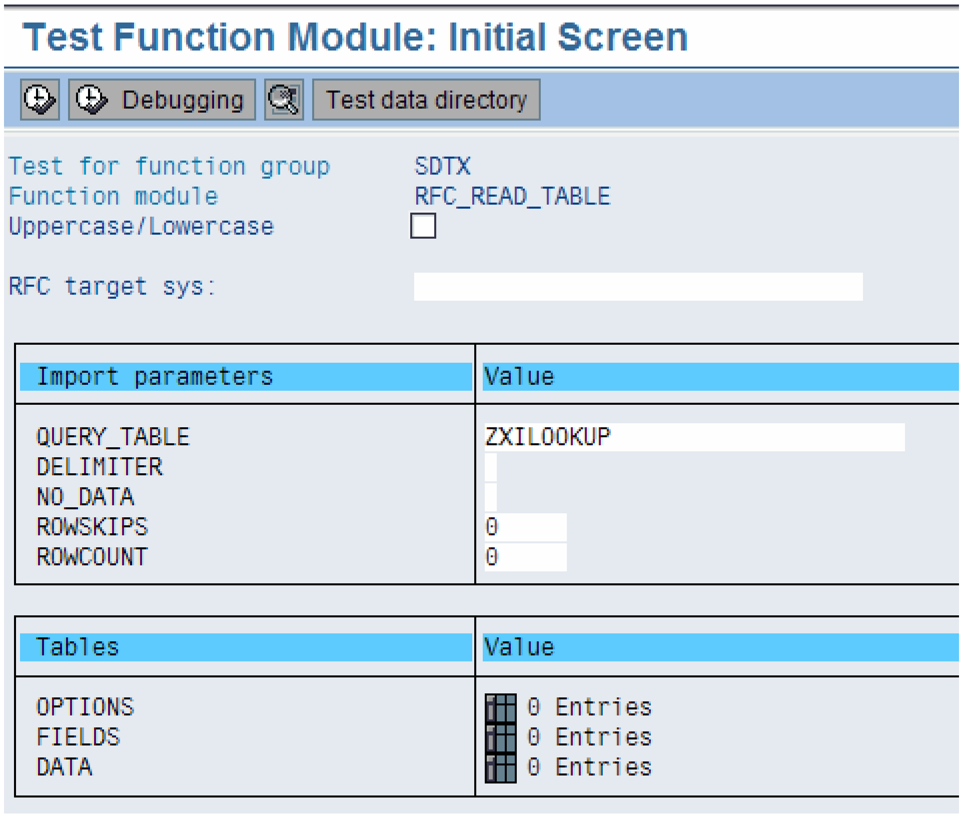
Note that the user that will access the table in read-mode (in our case an RFC user) needs to have the authorization profile S_TABU_DIS.

Table entry (sm30)

Via transaction SM30 the table can be maintained (add rows, delete rows, modify rows).

Function Module RFC_READ_TABLE (se37)

The table entries will be fetched from ECC via the standard function module RF_READ_TABLE. With transaction se37 you can test the function module.



Test Function Module: Initial Screen

Test for function group	SDTX
Function module	RFC_READ_TABLE
Uppercase/Lowercase	☐
RFC target sys:	

Import parameters	Value
QUERY_TABLE	ZXILOOKUP
DELIMITER	
NO_DATA	
ROWSKIPS	0
ROWCOUNT	0

Tables	Value
OPTIONS	0 Entries
FIELDS	0 Entries
DATA	0 Entries

We'll pass three parameters to the function module:

- QUERY_TABLE: the name of the table. In our case **ZXILOOKUP**
- OPTIONS > TEXT: the 'WHERE' statement from the SQL query. E.g. **ZSRCVAL** = 'ABC' (this can be extended with eg the AND operand)
- FIELDS: the column to be returned: In our case **ZLOOKUPVAL**.

PI Development / Configuration

Function Module

At first you have to import the RFC function module RFC_READ_TABLE because you need its signature in the java User Defined function:

You are on the design maintenance screen in the Integration Builder.

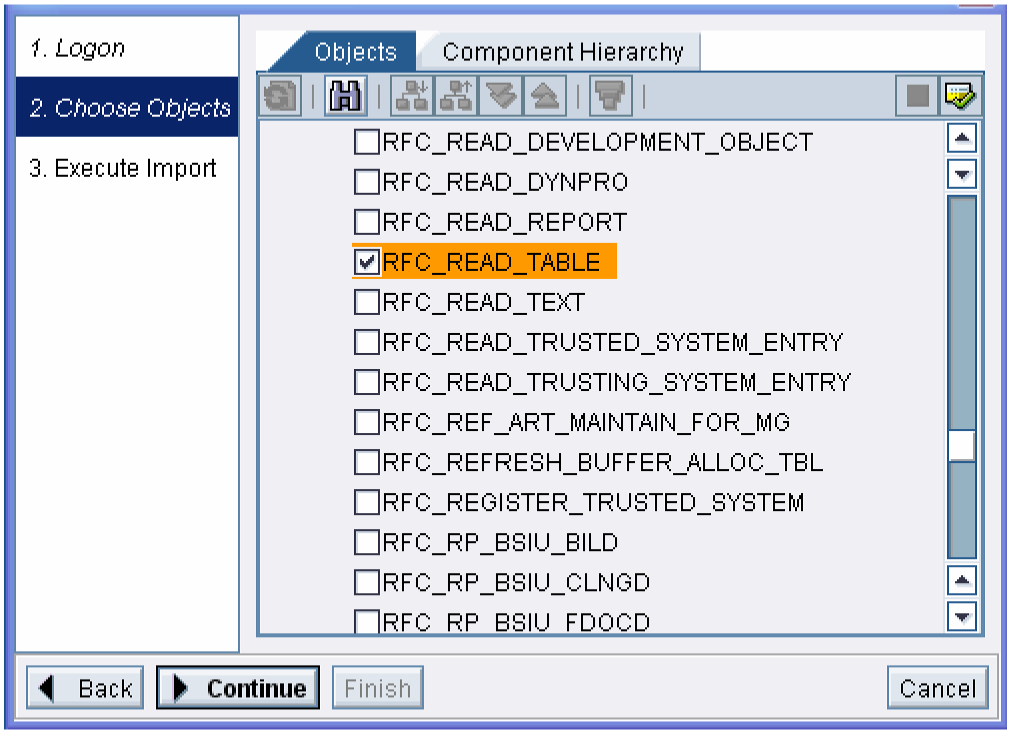
Expand the subnodes for the software component version for which you want to import interfaces.

Call the context menu for the *Imported Objects* subnode of this software component version and choose *Import of SAP Objects*.

The first step of the import wizard is *Logon.* Enter the user that you want to use to import the interfaces from the SAP system.

The second step of the import wizard is *Choose Objects*. Select the object RFC_READ_TABLE to import. Note that it takes approximately one minute before all objects are displayed. The import wizard displays the objects on the *Objects* tab page (sorted alphabetically) and on the *Component Hierarchy* tab page (sorted by application components).)

In the third step, *Execute Import*, you choose *Continue* and *Finish.*

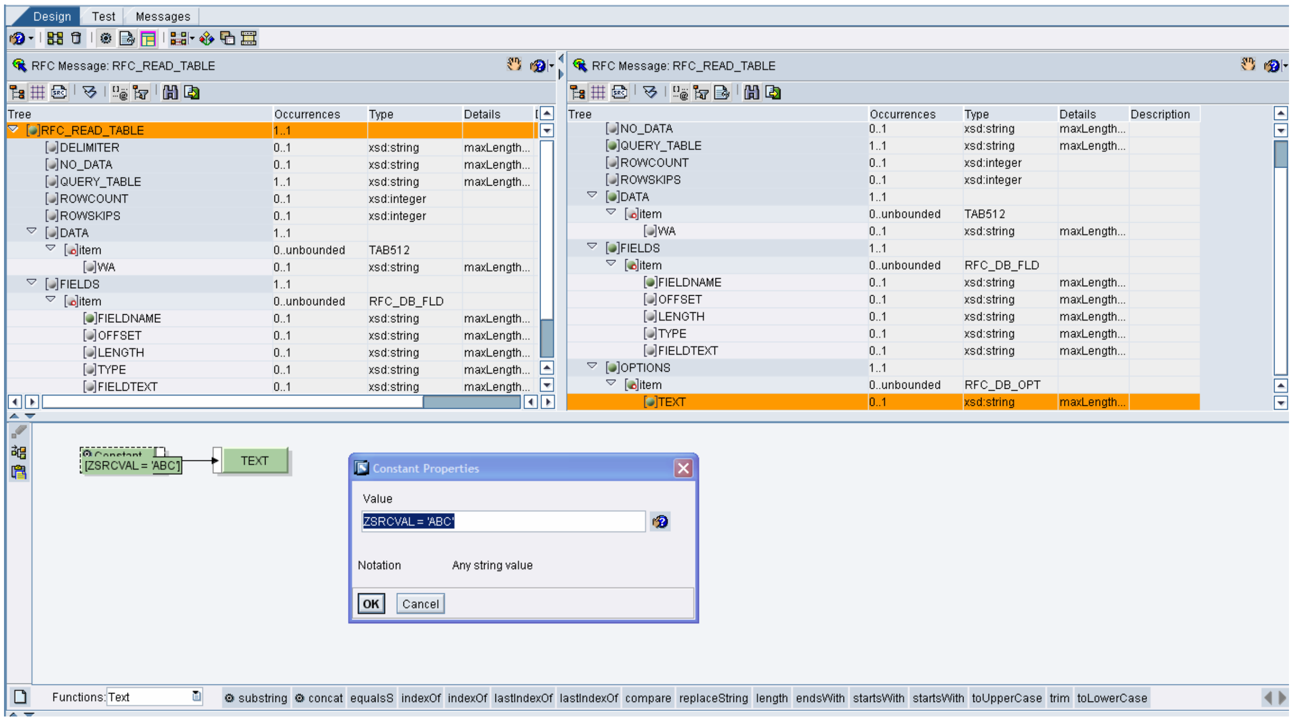


- [ ] RFC_READ_DEVELOPMENT_OBJECT
- [ ] RFC_READ_DYNPRO
- [ ] RFC_READ_REPORT
- [x] RFC_READ_TABLE
- [ ] RFC_READ_TEXT
- [ ] RFC_READ_TRUSTED_SYSTEM_ENTRY
- [ ] RFC_READ_TRUSTING_SYSTEM_ENTRY
- [ ] RFC_REF_ART_MAINTAIN_FOR_MG
- [ ] RFC_REFRESH_BUFFER_ALLOC_TBL
- [ ] RFC_REGISTER_TRUSTED_SYSTEM
- [ ] RFC_RP_BSIU_BILD
- [ ] RFC_RP_BSIU_CLNGD
- [ ] RFC_RP_BSIU_FDOCD

Once the function imported, you need its RFC XML signature.

A trick to lookup the signature is to create a 1-1 Message Mapping for the function module and run a test.

Map a constant value in the element ‘TEXT’. The constant represents the WHERE_CLAUSE of the SQL statement to be carried out.



Tree	Occurrences	Type	Details
RFC_READ_TABLE	1..1		
DELIMITER	0..1	xsd:string	maxLength...
NO_DATA	0..1	xsd:string	maxLength...
QUERY_TABLE	1..1	xsd:string	maxLength...
ROWCOUNT	0..1	xsd:integer	
ROWSKIPS	0..1	xsd:integer	
DATA	1..1		
item	0..unbounded	TAB512	
WA	0..1	xsd:string	maxLength...
FIELDS	1..1		
item	0..unbounded	RFC_DB_FLD	
FIELDNAME	0..1	xsd:string	maxLength...
OFFSET	0..1	xsd:string	maxLength...
LENGTH	0..1	xsd:string	maxLength...
TYPE	0..1	xsd:string	maxLength...
FIELDTEXT	0..1	xsd:string	maxLength...

Tree	Occurrences	Type	Details	Description
NO_DATA	0..1	xsd:string	maxLength...	
QUERY_TABLE	1..1	xsd:string	maxLength...	
ROWCOUNT	0..1	xsd:integer		
ROWSKIPS	0..1	xsd:integer		
DATA	1..1			
item	0..unbounded	TAB512		
WA	0..1	xsd:string	maxLength...	
FIELDS	1..1			
item	0..unbounded	RFC_DB_FLD		
FIELDNAME	0..1	xsd:string	maxLength...	
OFFSET	0..1	xsd:string	maxLength...	
LENGTH	0..1	xsd:string	maxLength...	
TYPE	0..1	xsd:string	maxLength...	
FIELDTEXT	0..1	xsd:string	maxLength...	
OPTIONS	1..1			
item	0..unbounded	RFC_DB_OPT		
TEXT	0..1	xsd:string	maxLength...	

[ZSRCVAL = 'ABC']

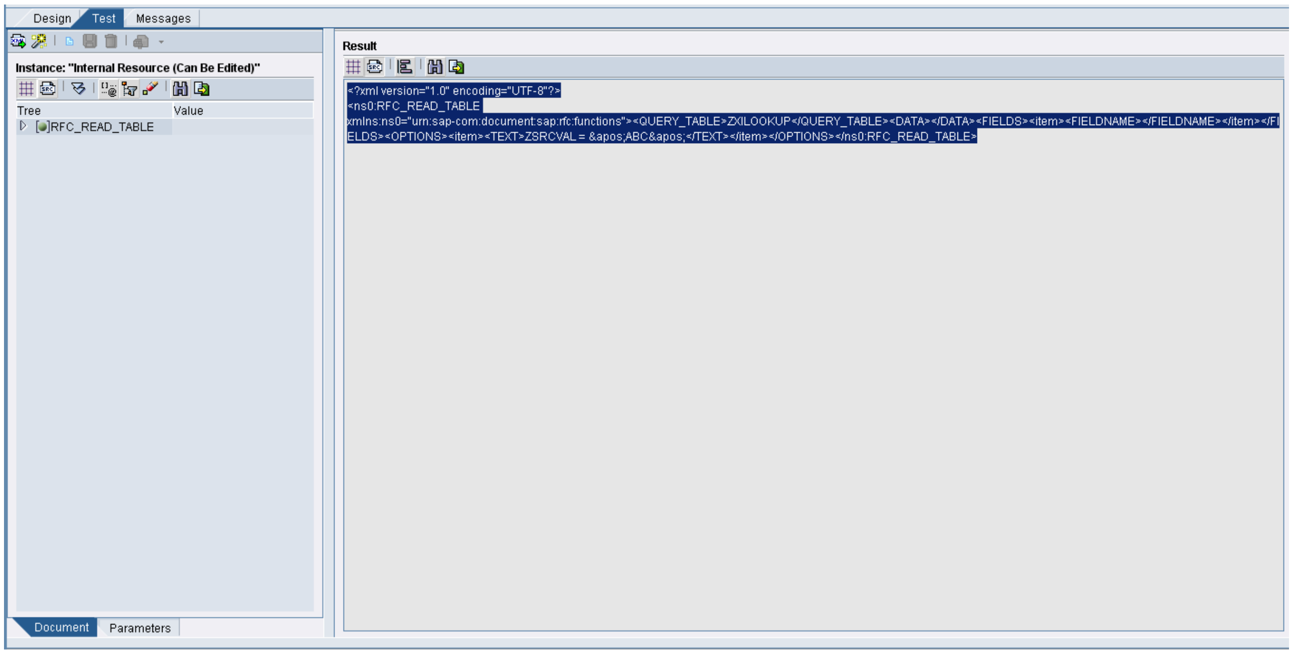
Constant Properties

Value: ZSRCVAL = 'ABC'

Notation: Any string value

OK Cancel

To lookup the XML signature click, test the mapping and click on the source icon in the result pane.



```
<?xml version="1.0" encoding="UTF-8"?>
<ns0:RFC_READ_TABLE
xmlns:ns0="urn:sap-com:document:sap:rfc:functions"><QUERY_TABLE>ZXILOOKUP</QUERY_TABLE><DATA></DATA><FIELDS><item><FIELDNAME></FIELDNAME></item></FI
ELDS><OPTIONS><item><TEXT>ZSRCVAL = &apos;ABC&apos;</TEXT></item></OPTIONS></ns0:RFC_READ_TABLE>
```

Cut and paste the XML string in e.g. Notepad. You need it later.

```
<?xml version="1.0" encoding="UTF-8"?>
<ns0:RFC_READ_TABLE xmlns:ns0="urn:sap-
com:document:sap:rfc:functions"><QUERY_TABLE>ZXILOOKUP</QUERY_TABLE><DATA></DATA><FIE
LDS><item><FIELDNAME></FIELDNAME></item></FIELDS><OPTIONS><item><TEXT>ZSRCVAL =
&apos;ABC&apos;</TEXT></item></OPTIONS></ns0:RFC_READ_TABLE>
```

User Defined Function

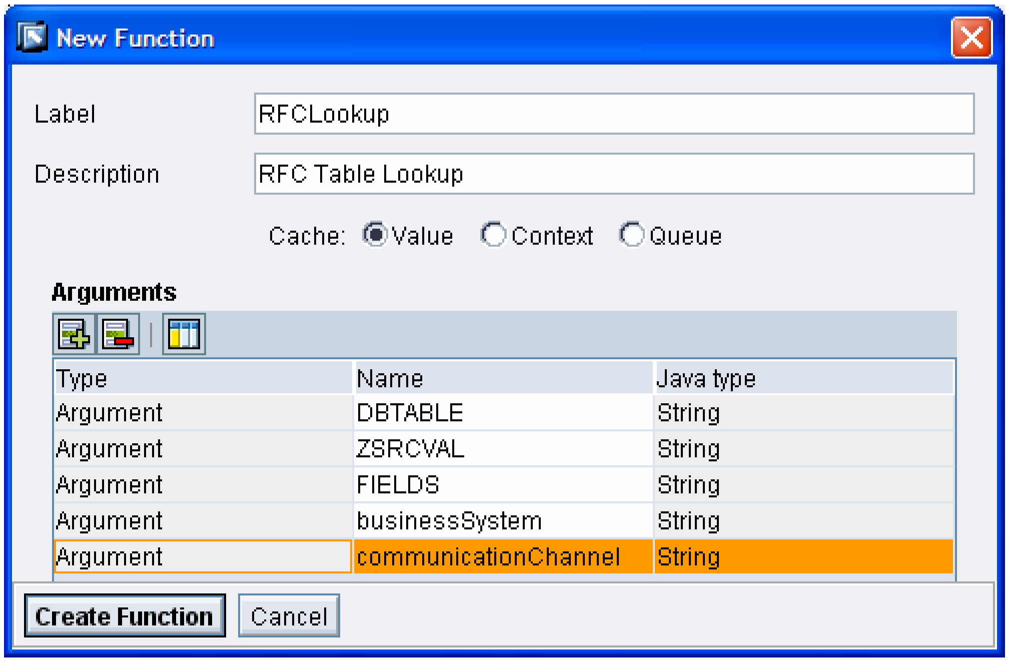
As we'll be using the RFC lookup from a user defined function we have to create it first (for each message mapping that will make use of this function).

Our function will be a simple type function with 5 inbound arguments. To create a new user-defined function, in the data-flow editor, choose *Create New Function*, which is located on the lower left-hand side of the screen. In the menu, choose *Simple Function* or *Advanced Function*.

In the window that appears, specify the attributes of the new function:

- *Label*
  Technical name of the function. The name is displayed in the function chooser and on the data-flow object.
- *Description*
  Description of how the function is used.
- *Cache*
  Function type
- *Arguments*
  In this table, you specify the number of input values the function can process, and name them. All functions are of type `String`.

Our function will be a simple type function with 5 arguments:



Label: RFCLookup

Description: RFC Table Lookup

Cache: [✓ Value] Context Queue

Arguments

Type	Name	Java type
Argument	DBTABLE	String
Argument	ZSRCVAL	String
Argument	FIELDS	String
Argument	businessSystem	String
Argument	communicationChannel	String

DBTABLE	The name of the lookup table
ZSRCVAL	The value to be looked up in the table
FIELDS	Columns to be returned by the RFC function module (RFC_READ_TABLE)
businessSystem	The application server that hosts the RFC function module
communicationChannel	The RFC receiver communication channel used for the connection between SAP PI and the backend.

RFC accessor and XML parser

In order to use the API you have to add the following packages to the User defined function:

- RFC accessor
  - com.sap.aii.mapping.lookup.*
  - java.io.*
- XML parser
  - javax.xml.parsers.DocumentBuilder
  - org.xml.sax.*
  - javax.xml.transform.dom.DOMSource
  - javax.xml.parsers.*
  - org.w3c.dom.*
  - javax.xml.transform.stream.StreamResult
  - javax.xml.transform.*

Replace it by your own WHERE_CLAUSE for your lookup

RFC XML signature.

Cut-and-paste from Notepad and replace the string in the TEXT element by the WHERE_CLAUSE parameter

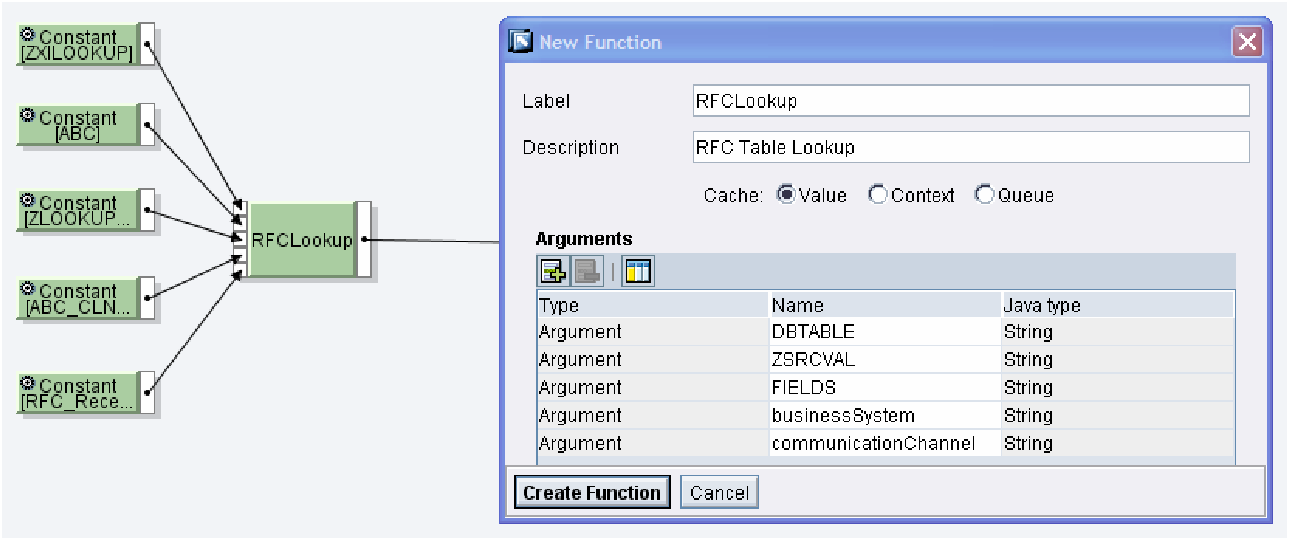
```
// Danny De Roovere
// SAP Belgium
// March 12, 2008

// declare parameters
String returnValue = "";
String WHERE_CLAUSE = "ZSRCVAL = &apos;" + ZSRCVAL + "&apos;";
String rfcXML = "<?xml version=\"1.0\" encoding=\"UTF-8\"?><ns0:RFC_READ_TABLE
xmlns:ns0=\"urn:sap-com:document:sap:rfcfunctions\"><QUERY_TABLE>" + DBTABLE +
"</QUERY_TABLE><DATA></DATA><FIELDS><item><FIELDNAME>"+ FIELDS +
"</FIELDNAME></item></FIELDS><OPTIONS><item><TEXT>" + WHERE_CLAUSE +
"</TEXT></item></OPTIONS></ns0:RFC_READ_TABLE>";

AbstractTrace trace = container.getTrace();
RfcAccessor accessor = null;
ByteArrayOutputStream out = null;

try
{

// 1. Determine a communication channel (Business system + Communication channel)
Channel channel = LookupService.getChannel(businessSystem,communicationChannel);

// 2. Get a RFC accessor for the channel.
accessor = LookupService.getRfcAccessor(channel);

// 3. Create an XML input stream that represents the RFC request message.
InputStream inputStream = new ByteArrayInputStream(rfcXML.getBytes());

// 4. Create the XML Payload
XmlPayload payload = LookupService.getXmlPayload(inputStream);

// 5. Execute the lookup.
Payload result = null;
result = accessor.call(payload);
InputStream in = result.getContent();

// 6. Create a DOM structure from the input XML
DocumentBuilderFactory factory = DocumentBuilderFactory.newInstance();
DocumentBuilder builder = factory.newDocumentBuilder();
Document document = builder.parse(in);
NodeList list = document.getElementsByTagName("WA"); // The lookupValue is available
as WA tag in the response
Node node = list.item(0);
if (node != null) {
   node = node.getFirstChild();
   if (node != null) {
          returnValue = node.getNodeValue();
   }
}

// 7. To free resources, close the accessor..
if (accessor!=null) {
try {
accessor.close();
} catch (LookupException e) {
trace.addWarning("Error while closing accessor " + e.getMessage() );
}
}

} catch (Exception e) {
   trace.addWarning("Error" + e);

}

// 8. return a single id value to the message mapping
return returnValue;
```

Message Mapping

During message mapping the source value will be passed to the user defined function parameter **ZSRCVAL**. The returned result is the corresponding value that is maintained in the table ZXILOOKUP in ECC (**ZLOOKUPVAL**).

The other parameters to be passed are constant values:

- **DBTABLE**: name of the table. In our case ZXILOOKUP
- **FIELDS**: column to be returned. In our example we are only interested in one column hence ZLOOKUPVAL
- **businessSystem**: business system where the RFC function module is hosted (to be setup in the Integration Directory)
- **communicationChannel**: RFC receiver communication channel that contains all connection parameters (to be setup in the Integration Directory)



Label: RFCLookup

Description: RFC Table Lookup

Cache: [✓ Value] Context Queue

Arguments

Type	Name	Java type
Argument	DBTABLE	String
Argument	ZSRCVAL	String
Argument	FIELDS	String
Argument	businessSystem	String
Argument	communicationChannel	String

To be complete, an interface mapping needs to be created as well (and used in the interface determination during runtime). Also the scenario

Useful URL's

Using JDBC Connection Pool in XI Message Mapping:	https://www.sdn.sap.com/irj/sdn/weblogs?blog=/pub/wlg/6183
RFC_READ_TABLE :	SAP Note Number: 382318
User Defined Functions :	http://help.sap.com/saphelp_nw04/helpdata/en/22/e127f28b572243b4324879c6bf05a0/frameset.htm

Related Content

Sample Code and API documentation: https://help.sap.com/javadocs/pi/SP3/xpi/index.html

Copyright