PRORATIO
SMART SOLUTIONS

ProSAPCONN© & Kettle©

Version 2.1

Quick Start and Reference Guide

2005-12-09

© PRORATIO Systeme und Beratung GmbH
Bischheimer Weg 1
55129 Mainz, Germany

www.proratio.de/prosapconn

PRORATIO
SMART SOLUTIONS

Table of contents

1 What is ProSAPCONN & Kettle?

With **ProSAPCONN** you can read data from all tables of your SAP R/3 system.

We provide a special plugin for **Kettle** – an open source data warehouse ETL-tool for **E**xtraction, **T**ransformation, **T**ransportation and **L**oading of data, in short: ETTL.

All this makes data warehouses much easier to build, update and maintain. People working with ProSAPCONN find the extraction of SAP data very easy and usefull. Not only for data warehousing also for ad hoc analyses as a consultant, administrator or user.

Kettle provides a graphical user interface **Spoon** - a user friendly designer for your transformations, also for your SAP queries over tables.

After designing your transformations let them run interactive with Spoon or in batch mode with **Pan**.

A **free trial version** is available from www.proratio.de/prosapconn .

If you need any special feature, training or consulting don´t hesitate to contact us – we could do it.

2 Documentation overview

The following manuals are included in your **trial and registered** version:

Manual	**Description**
ProSAPCONN - 1 - Quick Start and Reference	a short reference for beginners and a more detailed reference
ProSAPCONN - 2 – FAQ and Trouble Shooting	all FAQs beginning with PSCFAQ will be found here and the trouble shooting part helps you solving problems

The following manuals describe SAP customizing. They are available for **registered** users only or upon special request.

Manual	**Description**
ProSAPCONN - A - Customizing for Optimization	You need this manual when using floating points, special numeric values, SAP release 4.7 or optimizing speed for big rows.
ProSAPCONN - B - Customizing for Security	This is a step by step introduction for customizing security with ProSAPCONN.

3 Installation

3.1 Software

3.1.1 Supported platforms, operating systems

The installation process is described for windows platforms. If you need further assistance for other platforms please let us know. ProSAPCONN & Kettle supports many different platforms.

3.1.2 Java Runtime Environment

You need Java 2 Platform, Standard Edition (J2SE) version 1.4 or higher. You could check if you have already installed it with:
Start / Settings / Control Panel / Add or remove programs
[German: Start / Einstellungen / Systemsteuerung / Software]

If you haven´t installed it yet, please download a version 1.4 or higher from http://java.sun.com/j2se/ and install it.

3.1.3 Kettle

Unzip the Kettle zip-file in a directory of your choice, e.g. in
C:\Program files\Kettle

Try to run Spoon.bat. If it fails the Java Runtime Environment is not installed or see the FAQ-Manual: PSCFAQ0001 - How to set the correct Java Runtime Version?

For a detailed description of the installation consult the Kettle manual.

3.1.4 ProSAPCONN as a Kettle plugin

The ProSAPCONN plugin is delivered with Kettle. If you want to install an update version see PSCFAQ0002 - How to install an updated version of ProSAPCONN without installing Kettle?

3.1.5 SAP JCo

The SAP Java Connector (SAP JCo) is a toolkit that allows a Java application to communicate with any SAP System. Unfortunately the redistribution of the SAP JCo is not allowed, so you have to download it from the SAP Service Marketplace at

http://service.sap.com/connectors SAP Java Connector / Tools & Services

There you will also find all available distribution packages for the various supported platforms and processors.

If you don´t have a login for the SAP Service Marketplace ask your SAP administrator or request the data by SAP (see PSCFAQ0003 - How to get access to the SAP Service Marketplace?).

After you have downloaded the latest JCo, e.g. sapjco-ntintel-2.1.6.zip extract this to a temporary folder.

Copy the following files out of the zip archive:

Filename	Target folder
sapjco.jar	Copy to the directory plugins\steps\ProSAPCONN below the kettle path: e.g. C:\Program files\Kettle\plugins\steps\ProSAPCONN
sapjcorfc.dll	Copy to the directory libswt\win32 below the kettle path: e.g. C:\Program files\Kettle\libswt\win32 [This is different to the JCo documentation.]
librfc32.dll	Copy to the directory [Windows]\System32

Important note for librfc32.dll:
Please check if you have an old version of librfc32.dll in your [Windows]\System32 folder. If so please update it with the newer librfc32.dll. Sometimes this fails because the DLL is in use by another process. If so, please restart your system and don´t start the SAP GUI before you replace the old DLL.

In future releases of ProSAPCONN this installation process will be more automated.

3.2 Firewall configuration

JCo uses the native RFC library with the CPI-C protocol based on TCP/IP for its low level network communication. For CPI-C you need special TCP/IP ports going through your firewall.

These ports are 3300 plus your target system number e.g. 3308 for system number 08.

For detailed information on the network configuration see the JCo documentation […]/docs/jco/configuration.html

3.3 Customizing security on your SAP system (basics)

In order to retrieve meta data information from the SAP system's data dictionary, you have to grant the access rights (authorization object: S_RFC, ACTVT: 16, FUGR) for the following function groups:

R/3 Release	Function Groups
since 3.1H	RFC1, SG00, SRFC, SUNI, SYST
since 4.0A	RFC1, SDIF, SG00, SRFC, SYST, SYSU, SUNI
since 4.6A	RFC1, SDIF, SG00, SRFC, SYST, SYSU
since 4.6D	RFC1, SDIFRUNTIME, SG00, SRFC, SYST, SYSU

For requesting the data we use RFC_READ_TABLE belonging to function group SDTX or a customized RFC belonging to function group ZPSCSDTX . So you have to grant the access rights (authorization object: S_RFC, ACTVT: 16, FUGR) also to **SDTX** or **ZPSCSDTX**.

The requested table is checked against the table group authorization, defined in the authorization object **S_TABU_DIS**. If you want to have security on table level (and not only on table groups as the default) or need a more detailed description on the above mentioned topics you can request the special **manual "Customizing for Security".** If you´re a registered user you already have this manual.

3.4 Customizing the SAP System for optimization

You should customize a special RFC (Remote Function Call) for

1. adding security to the **table level** (and not only on table groups) or
2. giving **better performance** on table rows exceeding 512 bytes or
3. using **floating point** values and special numerical values or
4. using release **4.7**

ProSAPCONN is automatically determining the capability of the SAP system and uses a customized RFC if it is available. If it uses the default RFC_READ_TABLE it runs automatically multiple queries to get the needed data exceeding the 512 bytes boundary. So more overhead is there and if data changes between queries you possibly get wrong data. There are some internal tests getting the right data but we recommend using the customized RFC.

You get a detailed description in the **manual "Customizing for Optimization"** as a registered user or upon special request.

4 Introduction - first steps

4.1 Start Spoon – the graphical user interface of Kettle

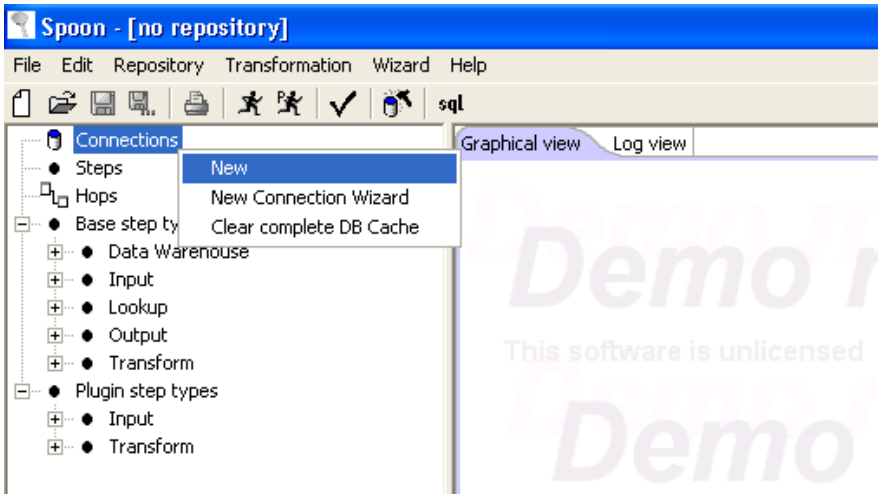
- Start Spoon.bat

- If you´re asked for “Select a repository” press “No repository” (you can save your work in XML files – later on you can use repositories for saving your transformations in a repository database). **In the demo version this screen is not displayed.**

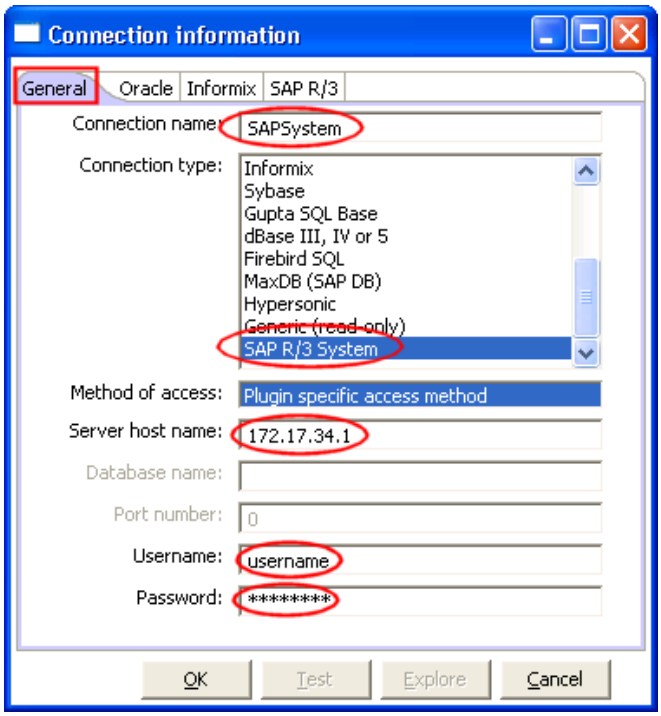
For a detailed description of Spoon consult the Kettle manual (see the PDFs in your Kettle-directory under docs).

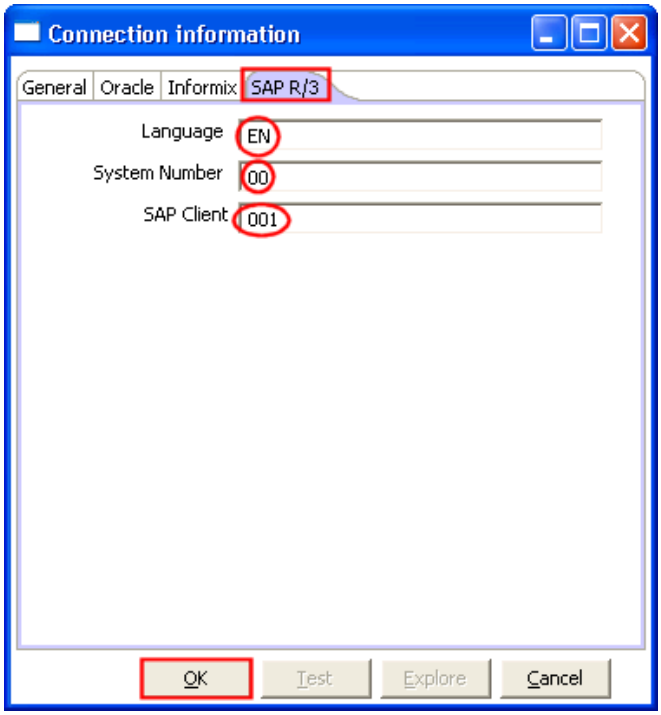
4.2 Setting up the connection

- Select “New” in the Connections context menu:



- Enter your corresponding connection information like this:

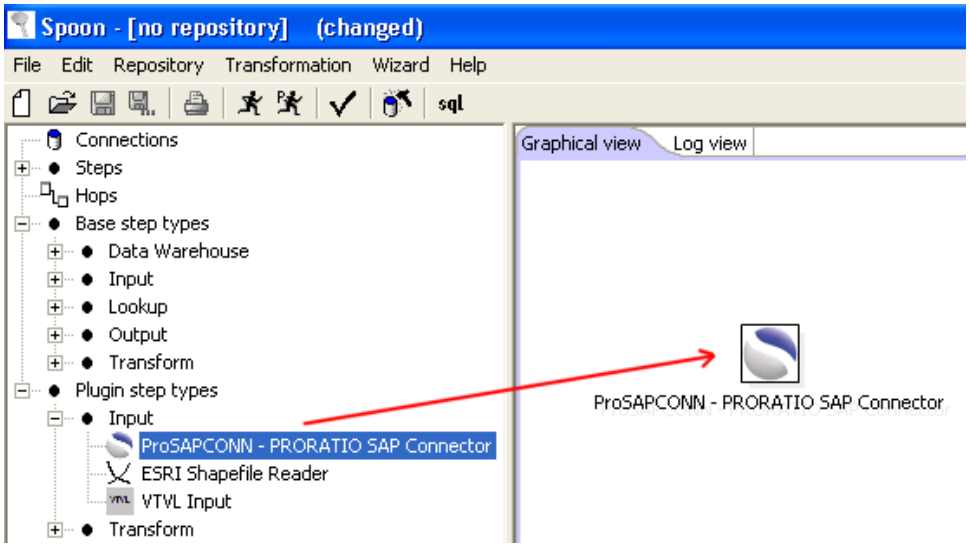




4.3 Entering the ProSAPCONN (trial) license code

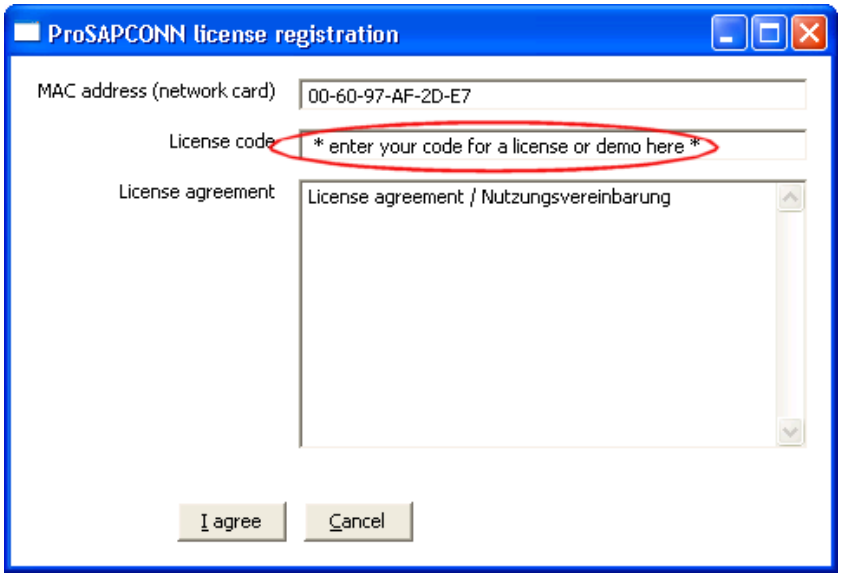
The first time you edit a ProSAPCONN – PRORATIO SAP Connection step you will be asked for your license code:

- **Draw** the "ProSAPCONN – PRORATIO SAP Connection" step from left to right **into the "Graphical view".**



- Select "Edit step" in the context menu

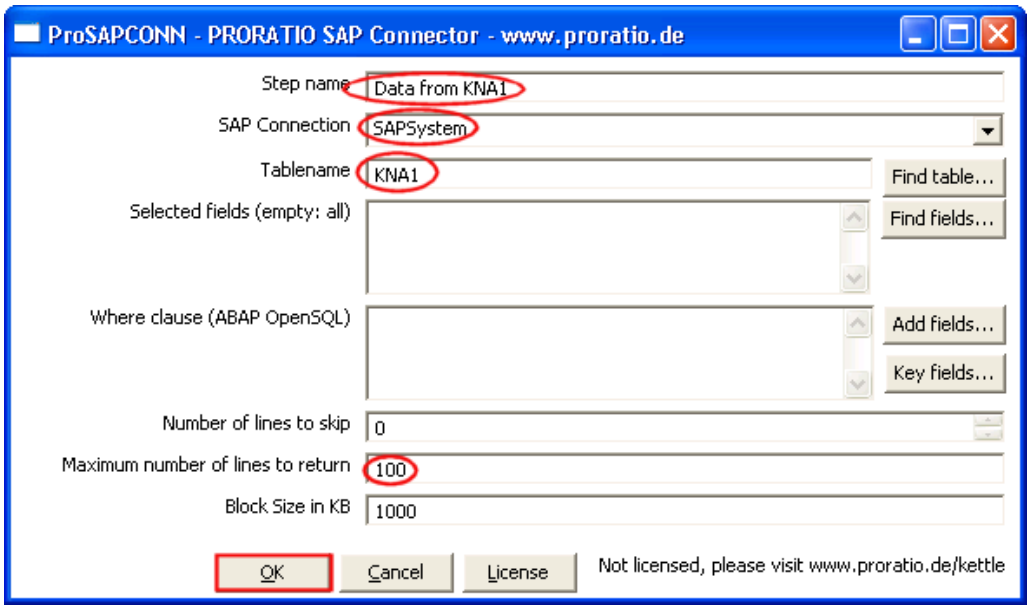
- The dialog ProSAPCONN license registration opens. You need to enter a full licence code or demo licence code here.



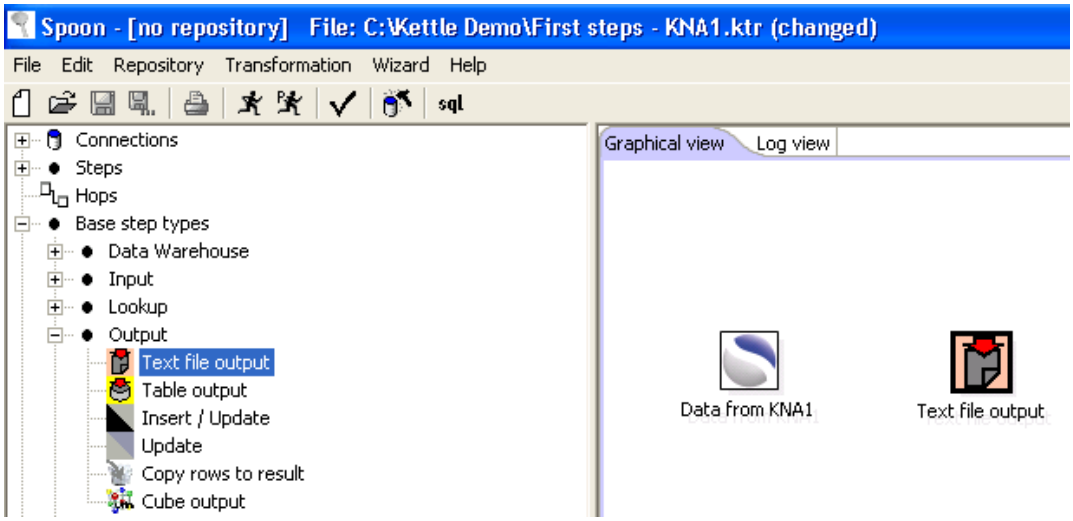
4.4 Example: Query the customer data table KNA1

This example is a simple query for the customer data table KNA1.

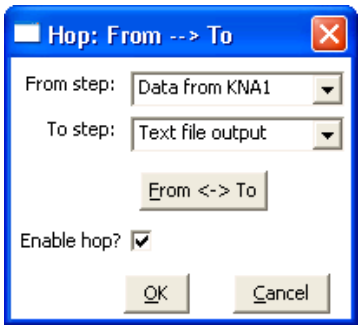
- Enter the following information (we first limit to 100 rows for testing):



- Draw the “Output / Text file output” step from left to right into the “Graphical view”.

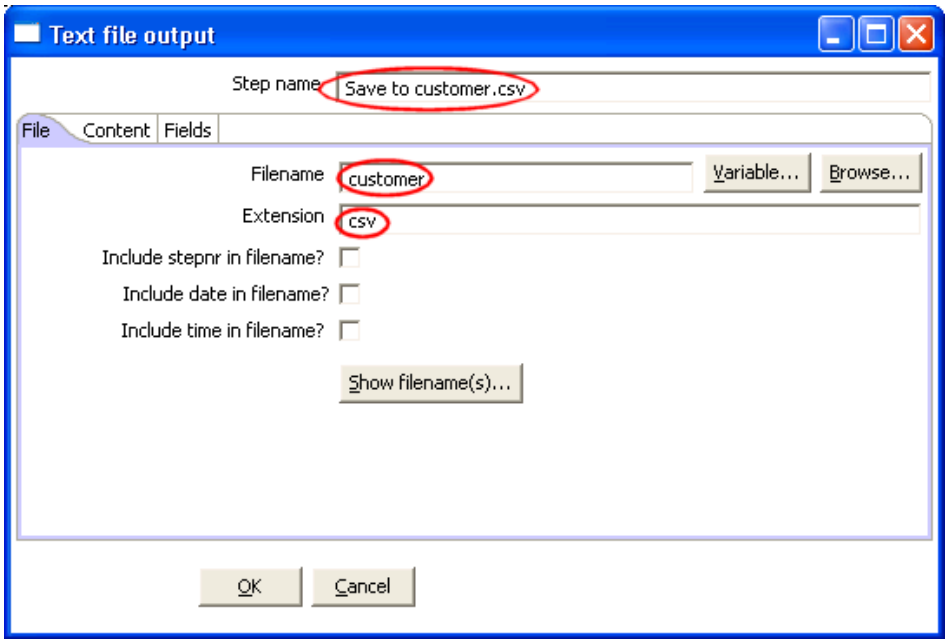


- Now connect these two steps - this connection is called a **hop**. To do this, **select both steps (by holding the Ctrl-key)** in the “Graphical view” and select “New hop” in the context menu:

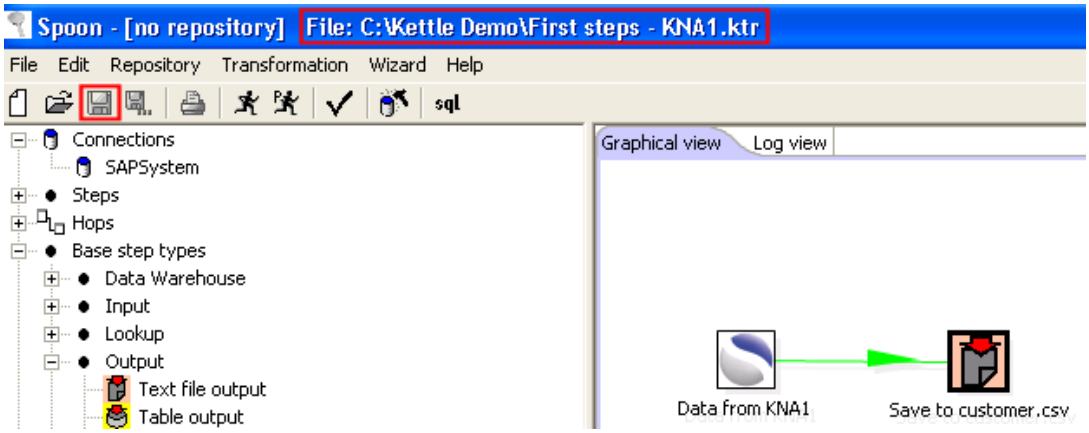


- The hop is created, now edit the step “Text file output”:

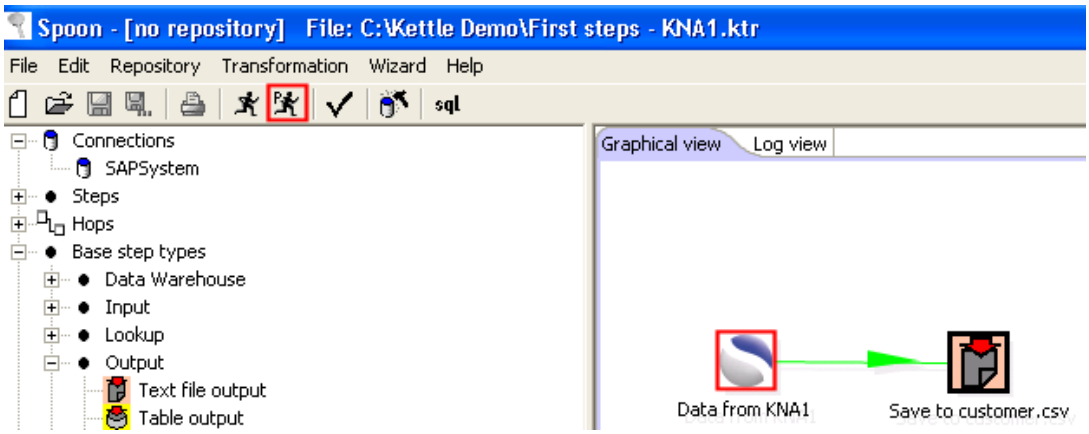
- Change the step name to “Save to customer.csv” and enter the filename “customer” and the extension “csv”. You could also use “txt” for the extension but with “csv” you can open this file directly with Excel.



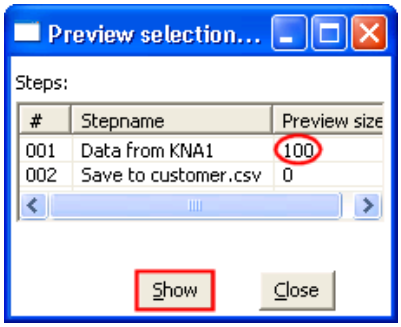
- Please save your transaction first (File / Save or CTRL-S) e.g. as “First steps - KNA1”:



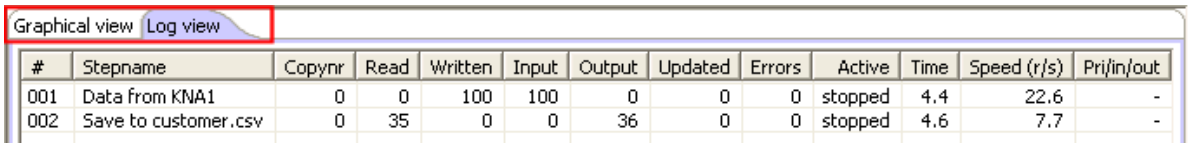
- Now you´re ready to run a preview. Select the “Data from KNA1” step and the icon for running a preview:



- The default preview size is 100 – press “Show”:



- Now you see the “Log view” and after successful connection the data. If you want to switch back to designing your transformation select the tab “Graphical view”.

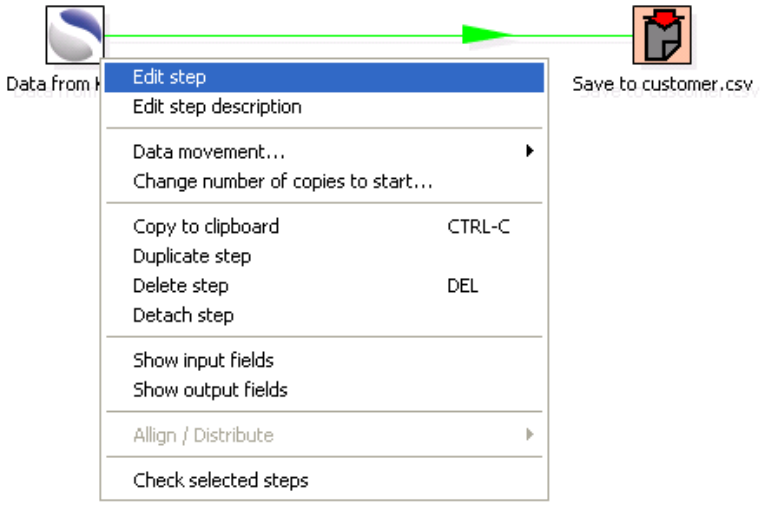


#	Stepname	Copynr	Read	Written	Input	Output	Updated	Errors	Active	Time	Speed (r/s)	Pri/in/out
001	Data from KNA1	0	0	100	100	0	0	0	stopped	4.4	22.6	-
002	Save to customer.csv	0	35	0	0	36	0	0	stopped	4.6	7.7	-

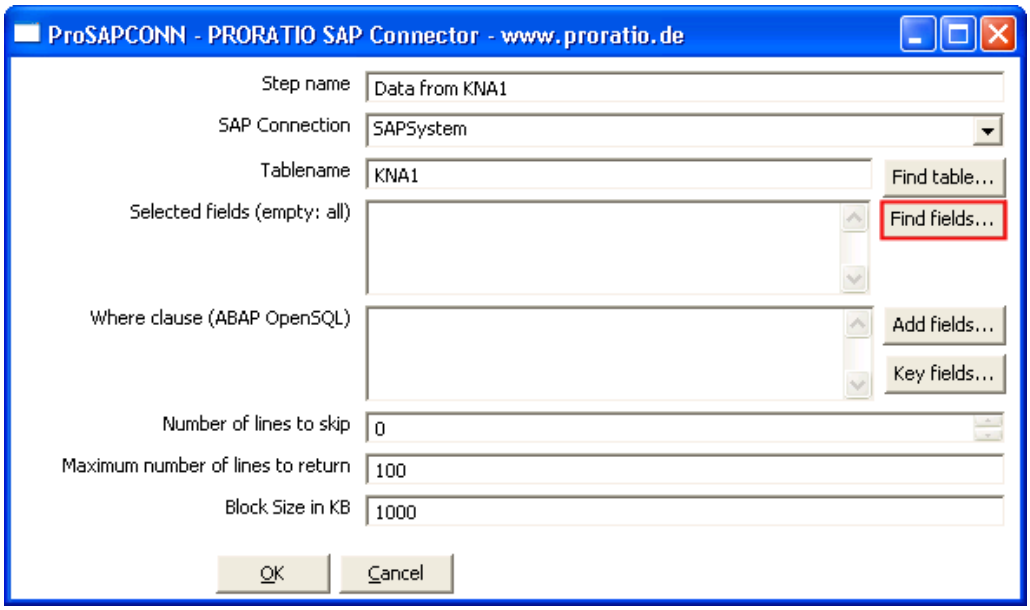
4.5 Example: Selecting fields on customer data table KNA1

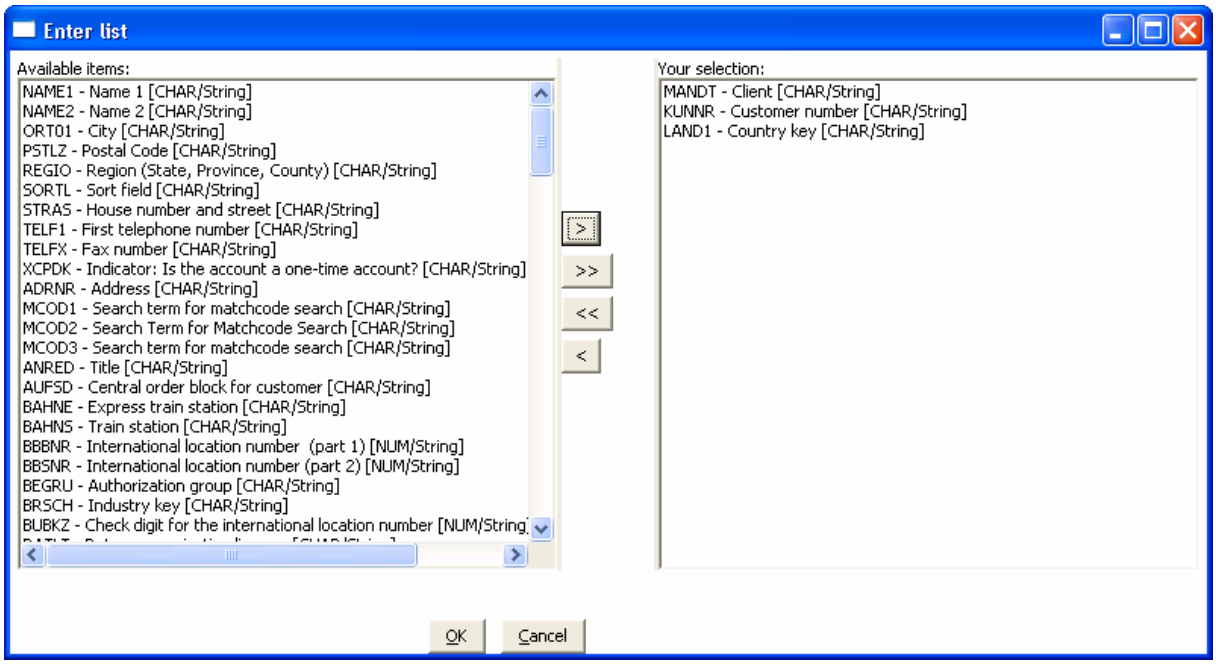
This example shows you how to select specific fields on the customer data table KNA1.

- Use the transformation from the previous chapter and edit the “Data from KNA1” step:

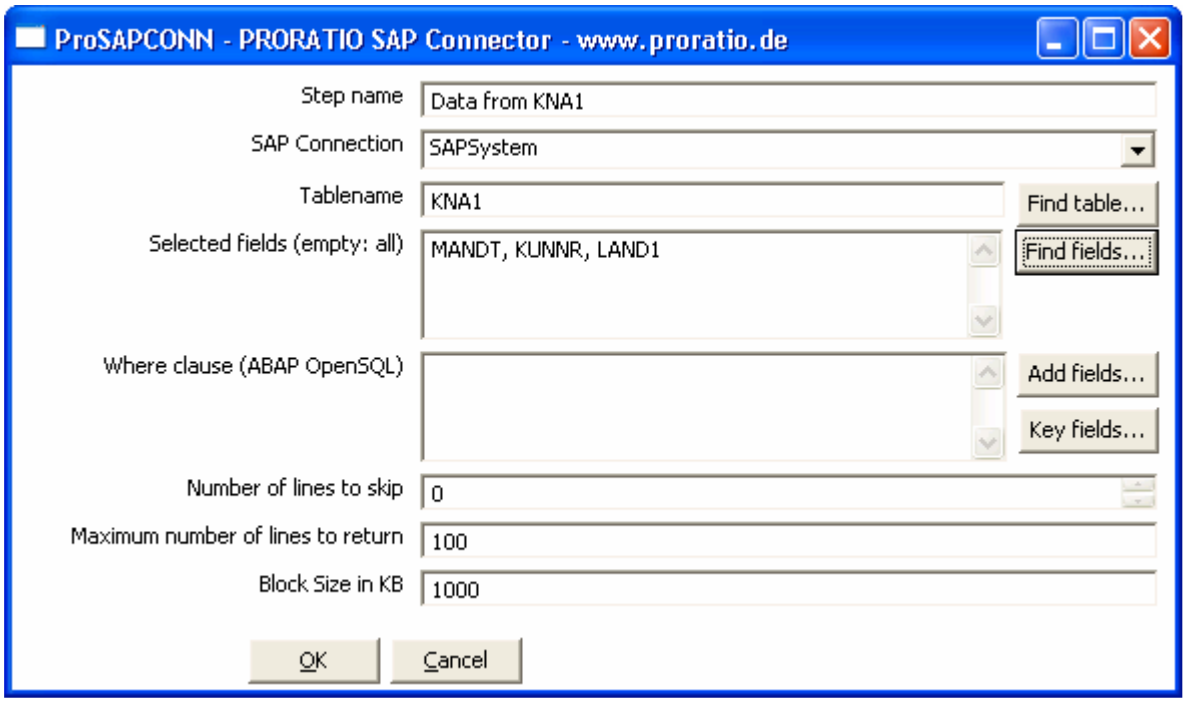


- Press “Find fields” and select some:

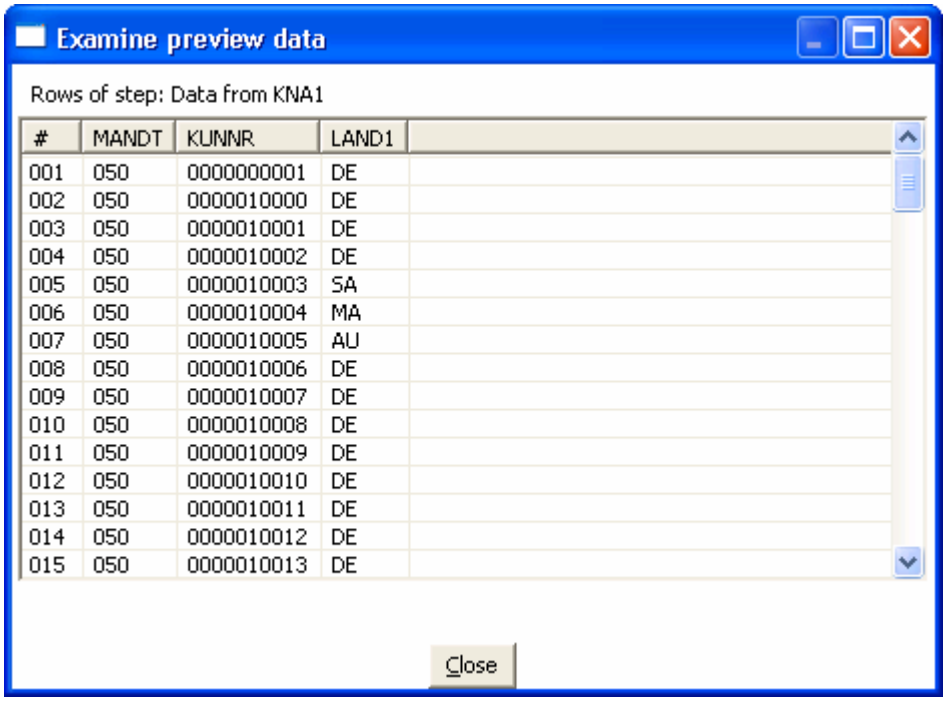




- Now the step looks like this:



- You can press OK and test the transformation by running the preview as described before. The preview could look like this:



4.6 Example: Combining data with customer data table KNA1

Now we want to check which customer is in the european community and combine the data with table T005. We have two possibilities for this:

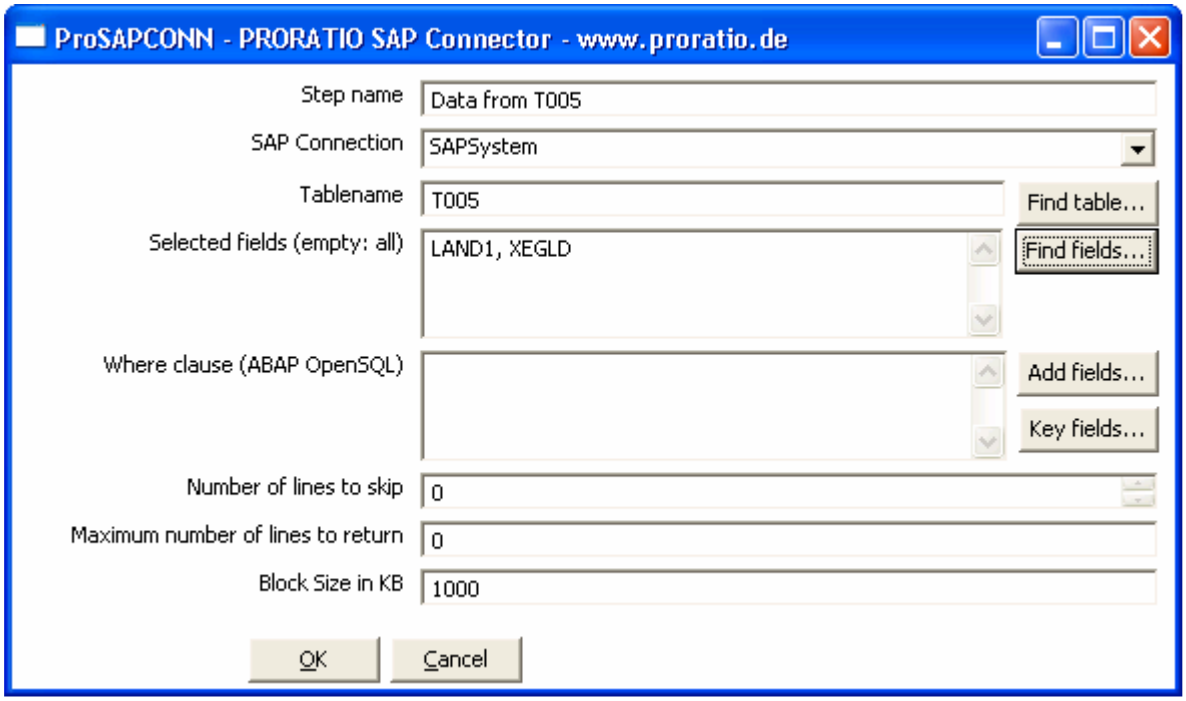
1) Download all country data from the SAP system and do a lookup for every customer row. This is better when the lookup table (in this case T005) is small and the source data (KNA1) is big.

2) Or run a query against the lookup table T005 for each row in the source data (KNA1). This is better when the lookup table is big and would take a long time to download from the SAP system.

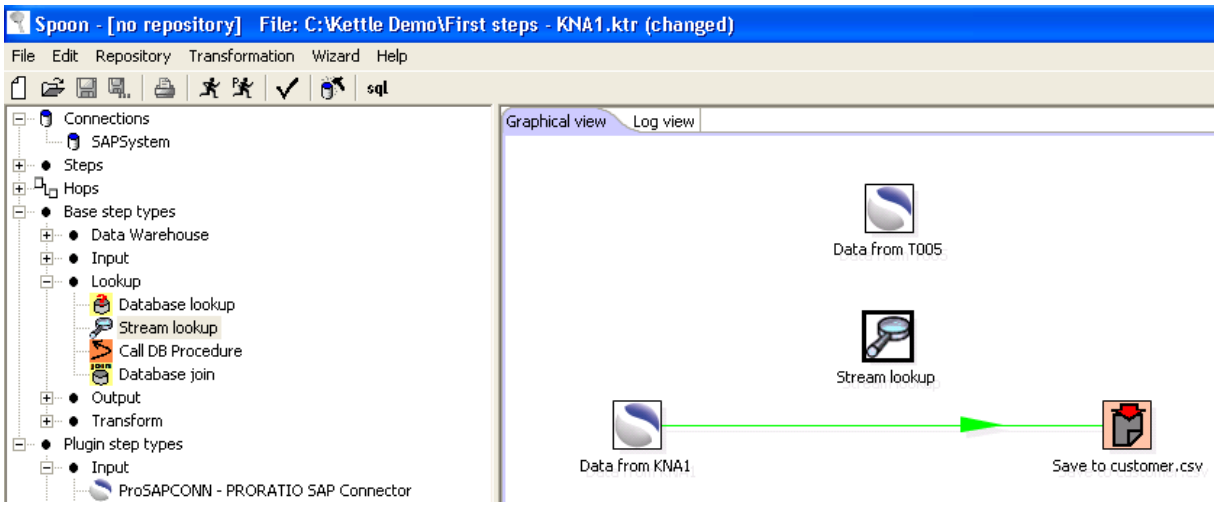
In our case solution 1) would be better because the lookup table T005 is small. For completeness we show you both solutions in the following.

4.6.1 First possibility: Download T005 and combine it with KNA1

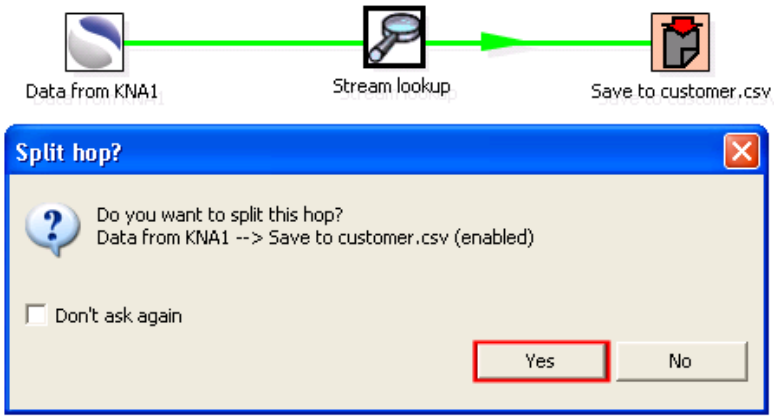
- Create a new step with the following data:



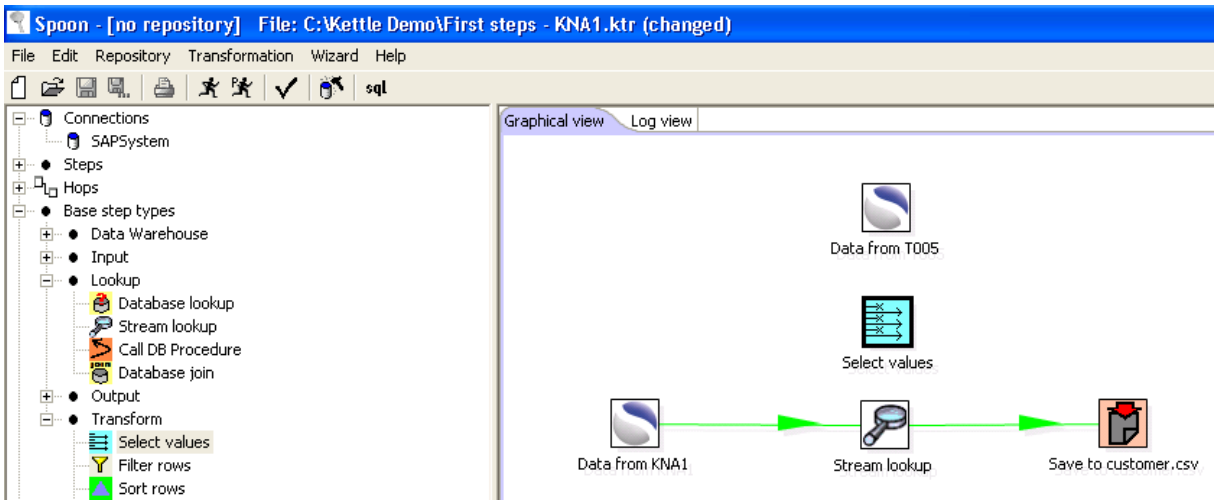
- Add a “Lookup / Stream lookup” step:



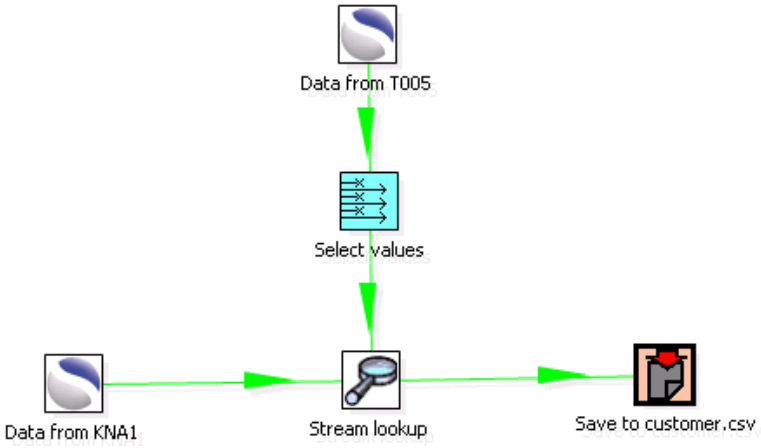
- Move the “Stream lookup” over the hop between “Data from KNA1” and “Save to customer.csv”, so the arrow will be bold – release the mouse button and answer “Yes” to the following dialog:



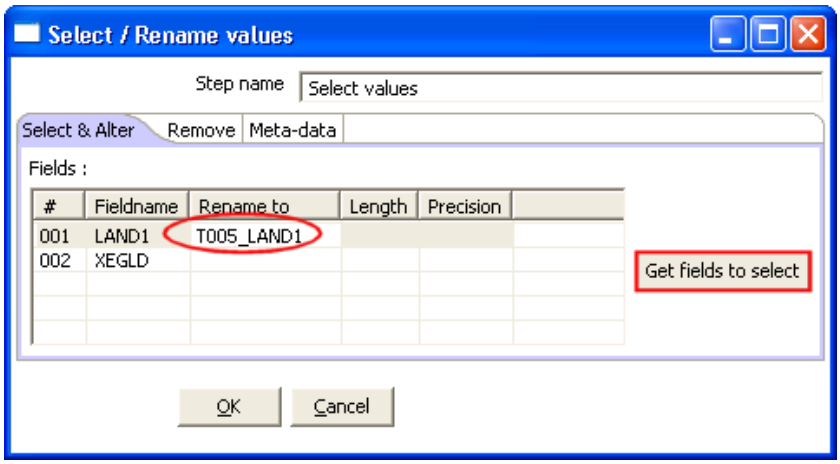
- Add a “Transformation / Select values” step:



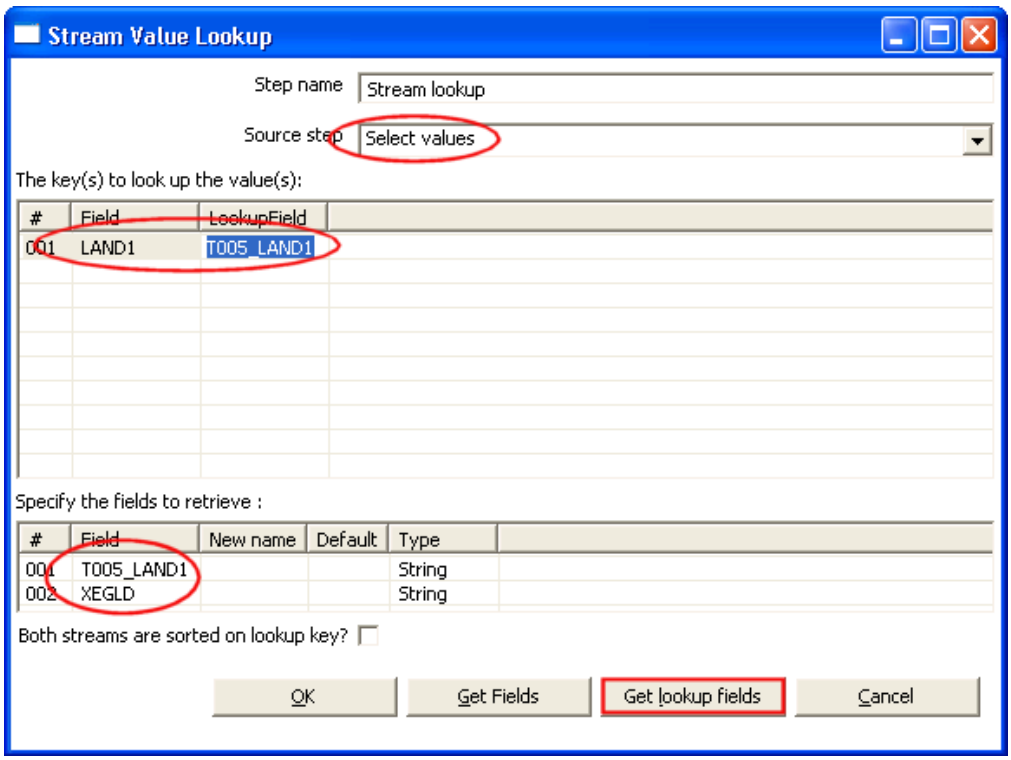
- Add hops from “Data from T005” to “Select values” and to “Stream lookup”:



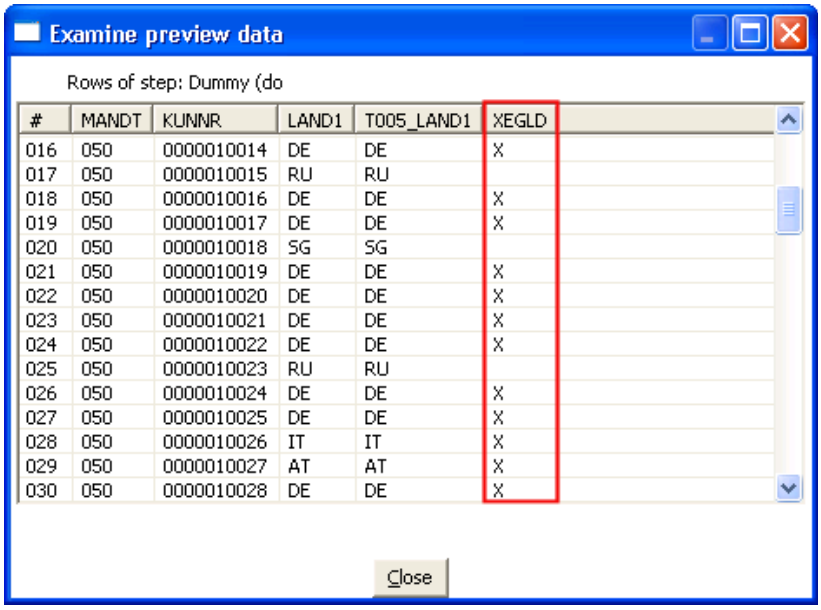
- Edit the “Select values” step: Press the button “Get fields to select” and rename “LAND1” to “T005_LAND1” (this is needed for the “Stream lookup” process when field names in KNA1 and T005 are identical.)



- Now edit the “Stream lookup” step like this:



- Now we are ready and could check the result. Select the “Save to customer.csv” and run a preview:



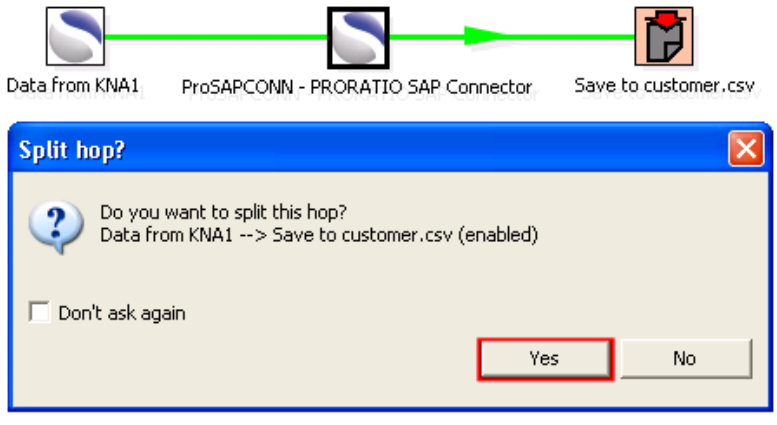
#	MANDT	KUNNR	LAND1	T005_LAND1	XEGLD
016	050	0000010014	DE	DE	X
017	050	0000010015	RU	RU	
018	050	0000010016	DE	DE	X
019	050	0000010017	DE	DE	X
020	050	0000010018	SG	SG	
021	050	0000010019	DE	DE	X
022	050	0000010020	DE	DE	X
023	050	0000010021	DE	DE	X
024	050	0000010022	DE	DE	X
025	050	0000010023	RU	RU	
026	050	0000010024	DE	DE	X
027	050	0000010025	DE	DE	X
028	050	0000010026	IT	IT	X
029	050	0000010027	AT	AT	X
030	050	0000010028	DE	DE	X

The column XEGLD shows you which customer is in the european community.

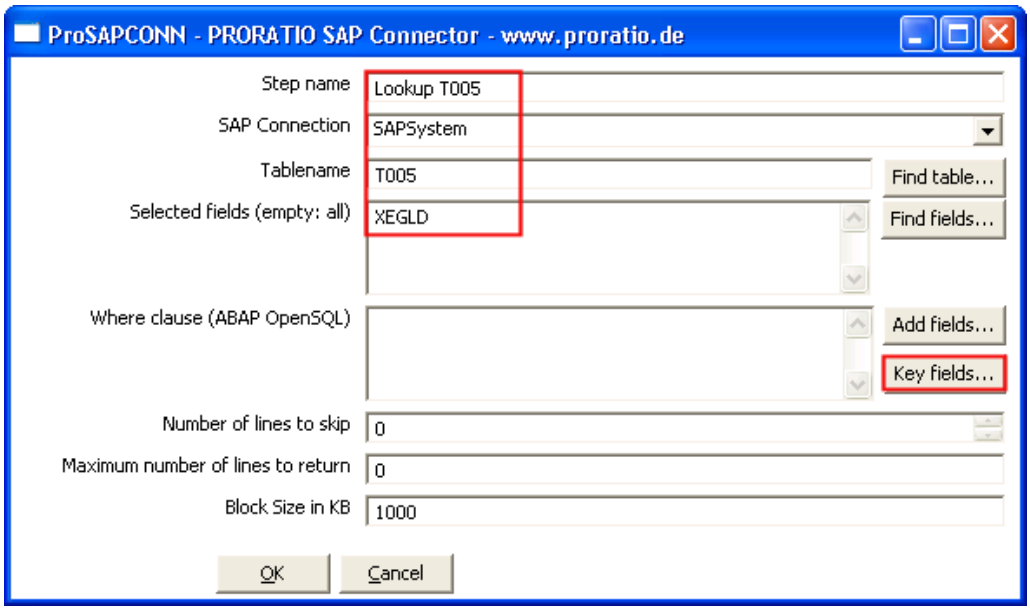
4.6.2 Second possibility: Query T005 for each KNA1 row

The second possibility is a little bit easier to customize because ProSAPCONN does a little bit helping on the relations. As mentioned above mind that this step could be slower when much rows have to be combined.

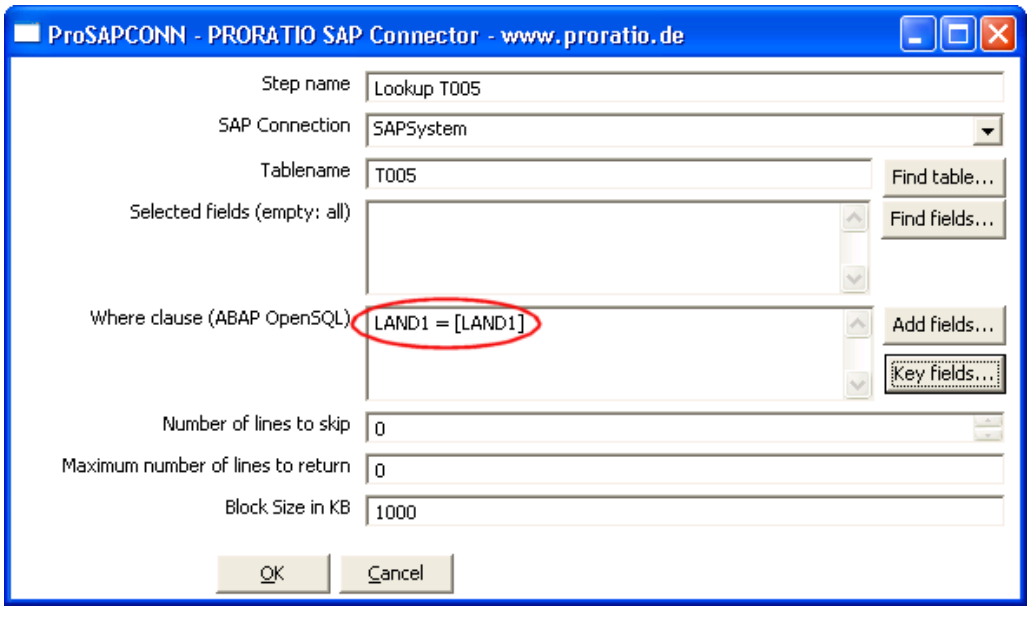
- Move a new “ProSAPCONN” step over the hop between “Data from KNA1” and “Save to customer.csv”, so the arrow will be bold – release the mouse button and answer “Yes” to the following dialog:



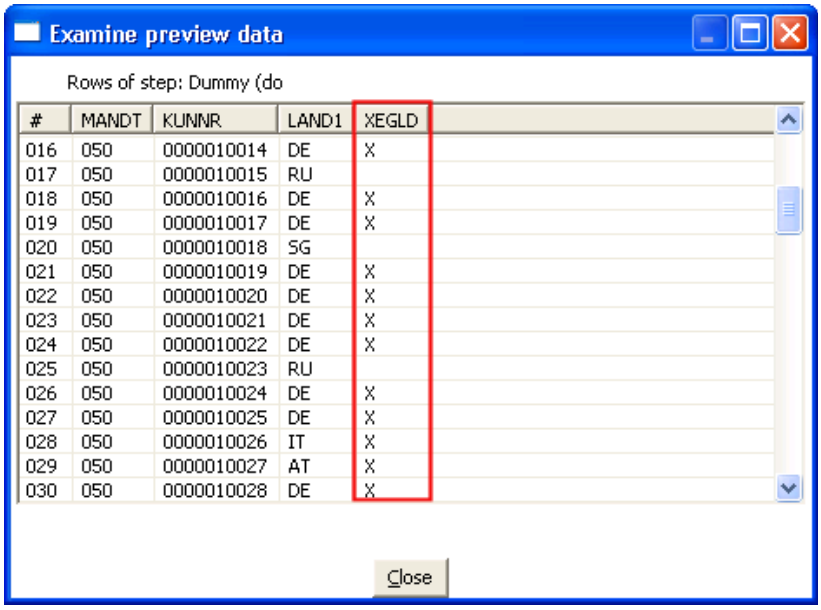
- Edit the new step as descibed here and press “Key fields”:



Now the relations will be automatically inserted…



- That´s right – so let´s run the transformation by selecting “Save to customer.csv” and do the preview:



#	MANDT	KUNNR	LAND1	XEGLD
016	050	0000010014	DE	X
017	050	0000010015	RU	
018	050	0000010016	DE	X
019	050	0000010017	DE	X
020	050	0000010018	SG	
021	050	0000010019	DE	X
022	050	0000010020	DE	X
023	050	0000010021	DE	X
024	050	0000010022	DE	X
025	050	0000010023	RU	
026	050	0000010024	DE	X
027	050	0000010025	DE	X
028	050	0000010026	IT	X
029	050	0000010027	AT	X
030	050	0000010028	DE	X

As you saw this transformation could be a little bit slower (there is also more network traffic due to more queries so connections via VPN are slower, too).

As a further difference to the first method you see the column T005_LAND1 is no more needed. Now it´s up to you which method to use in the future.

4.7 Some examples of where clauses (ABAP OpenSQL)

Here you will find some examples of where clauses in queries running against KNA1.

Mind that **ABAP OpenSQL always needs a space as a seperator** before and after a fieldname and some other parts of the where part. If you run in an error check the spaces first (e.g. an error “One of the field names in the SELECT clause was not recognized” is caused by a missing space).

Wrong: PSTLZ='55129'
Correct: PSTLZ = '55129'

Combine your selections with AND OR NOT and brackets

e.g. LAND1 = ‘DE’ AND PSTLZ = ‘55129’
e.g. LAND1 = ‘DE’ AND (PSTLZ = ‘55129’ OR PSTLZ = ‘55129’)

Use of BETWEEN, LIKE, IN, IS NULL:

field **BETWEEN** a AND b
e.g. PSTLZ BETWEEN ‘55129’ AND ‘55131’
finds 55129, 55130, 55131

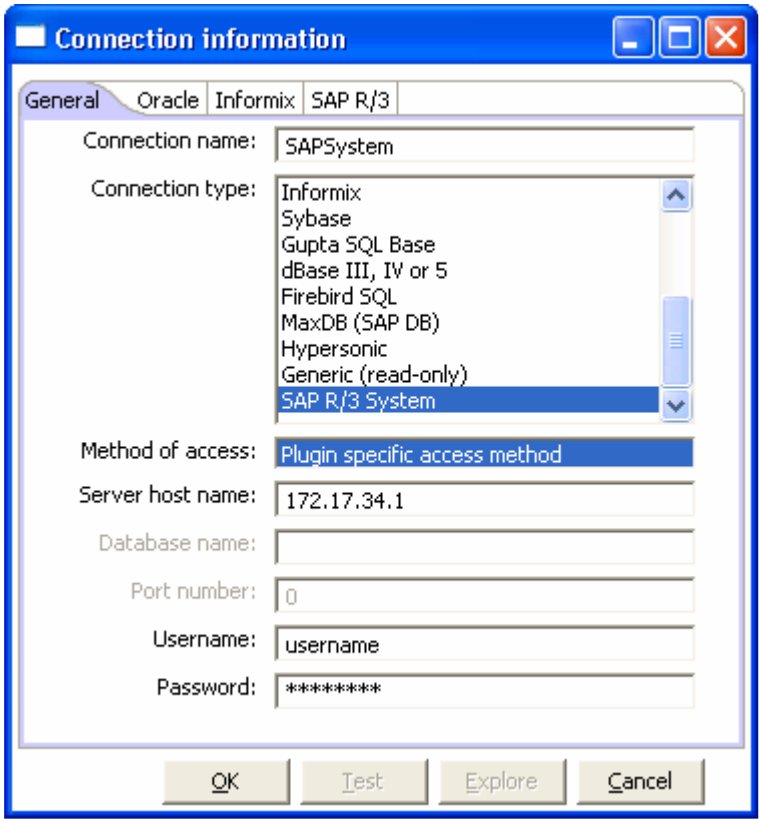
field **LIKE** '%town'
e.g. ORT01 LIKE 'MAIN%'
finds MAINZ, MAINHAUSEN, MAINZ-KASTEL

field **IN** ('a', 'b', 'c')
e.g. PSTLZ IN (‘55129’, ‘55131’)
finds rows with 55129, 55131

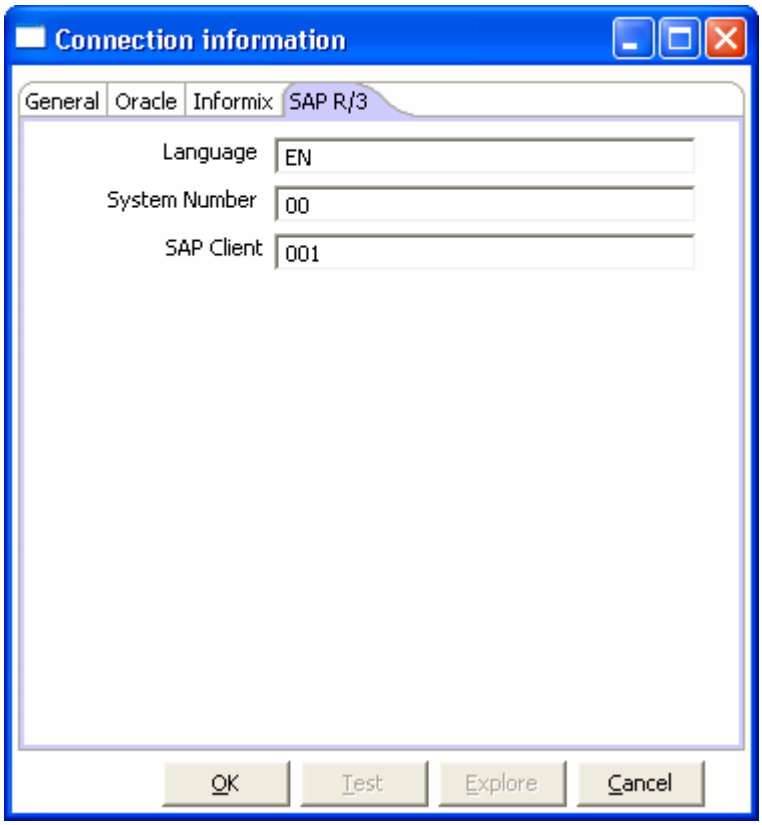
A real NULL (nothing) could be checked with IS NULL.
e.g. PSTLZ IS NULL
mostly this doesn´t happen in base SAP tables

5 Reference

5.1 Connection properties

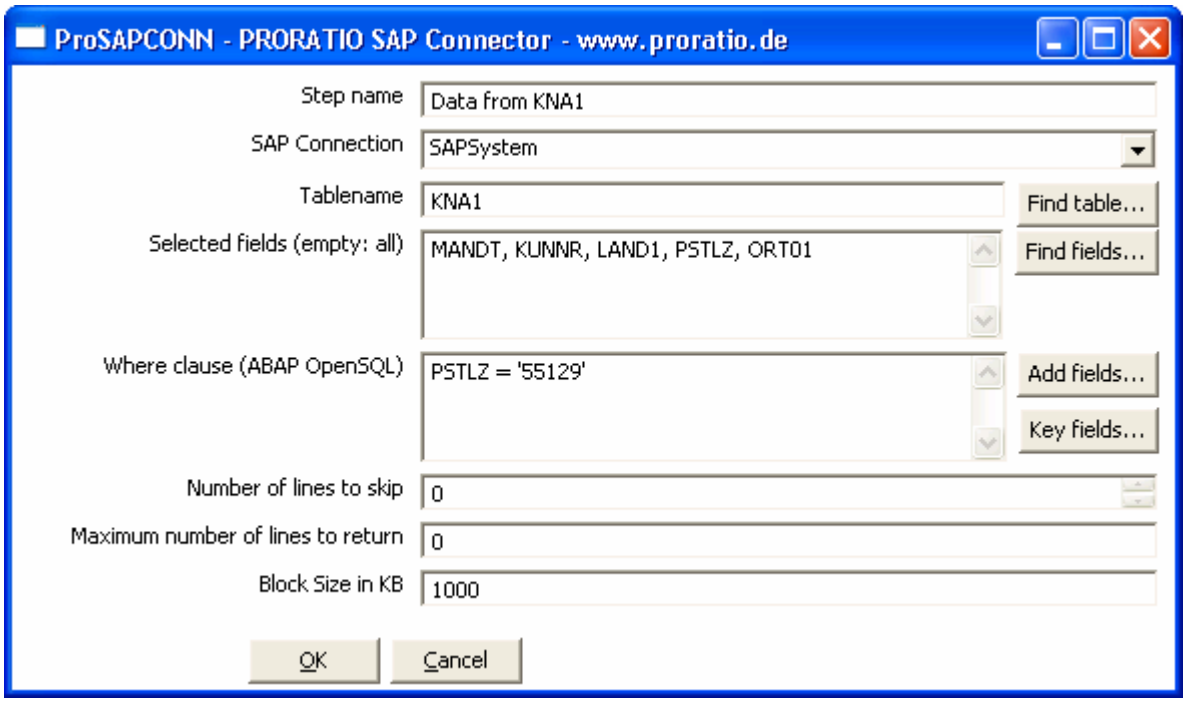


Connection name	a unique connection name of your choice
Server host name	the server name or IP-Adress of your SAP system
Username	valid user name for your SAP system
Password	password (remind it could be case sensitive – on some systems you have to use uppercase letters even though your GUI logon don´t need it in uppercase)



Language	select your language – mostly needed for error messages or as the default language for table or field descriptions
System Number	system number of your SAP system
SAP Client	your dedicated SAP client used internal for all table queries

5.2 ProSAPCONN step properties



Step name	a unique step name of your choice
SAP Connection	select your defined SAP connection
Tablename	select the SAP table or view
Selected fields	enter the fields returned by this step separated by commas – needed spaces are internal inserted automatically
Where clause	enter the where clause in ABAP OpenSQL syntax – also see chapter “Some examples of where clauses”
Number of lines to skip	when reading data skip this number of lines
Maximum number of lines to return	when reading data stop after this maximum number of lines
Block size in KB	When reading large tables they are loaded in blocks and stored internal in memory. Giving a higher block size reduces the blocking overhead. On the other hand you need more memory and in worst case run out of memory. For getting more memory see the Java runtime options (e.g. set OPT=-Xmx256m).

5.2.1 Tablename: “Find table” button

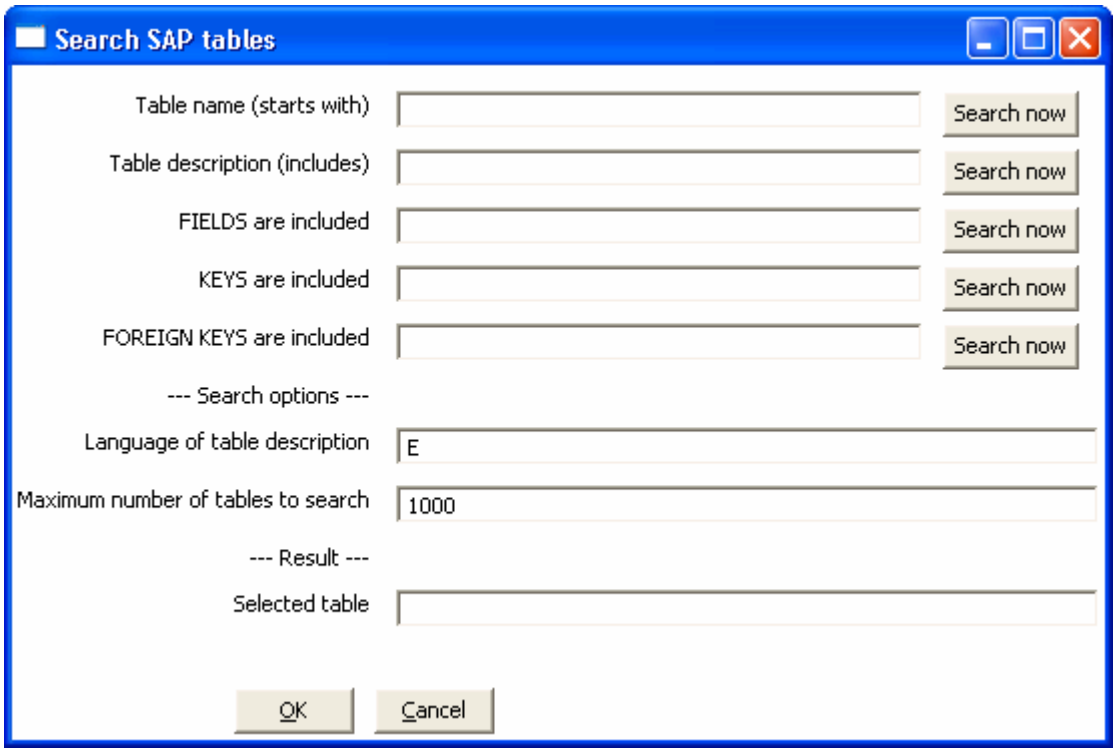
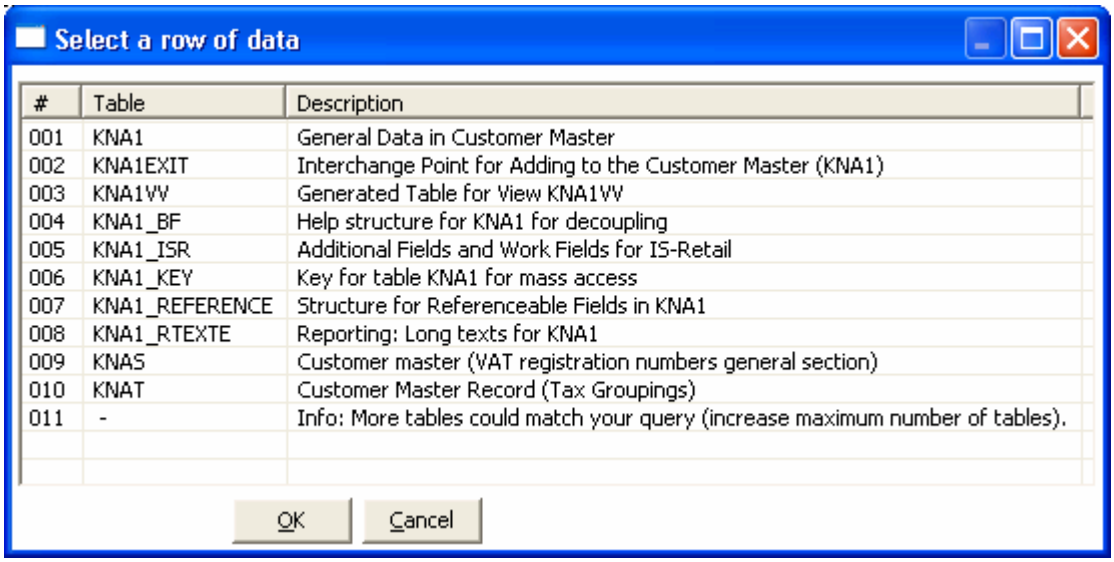


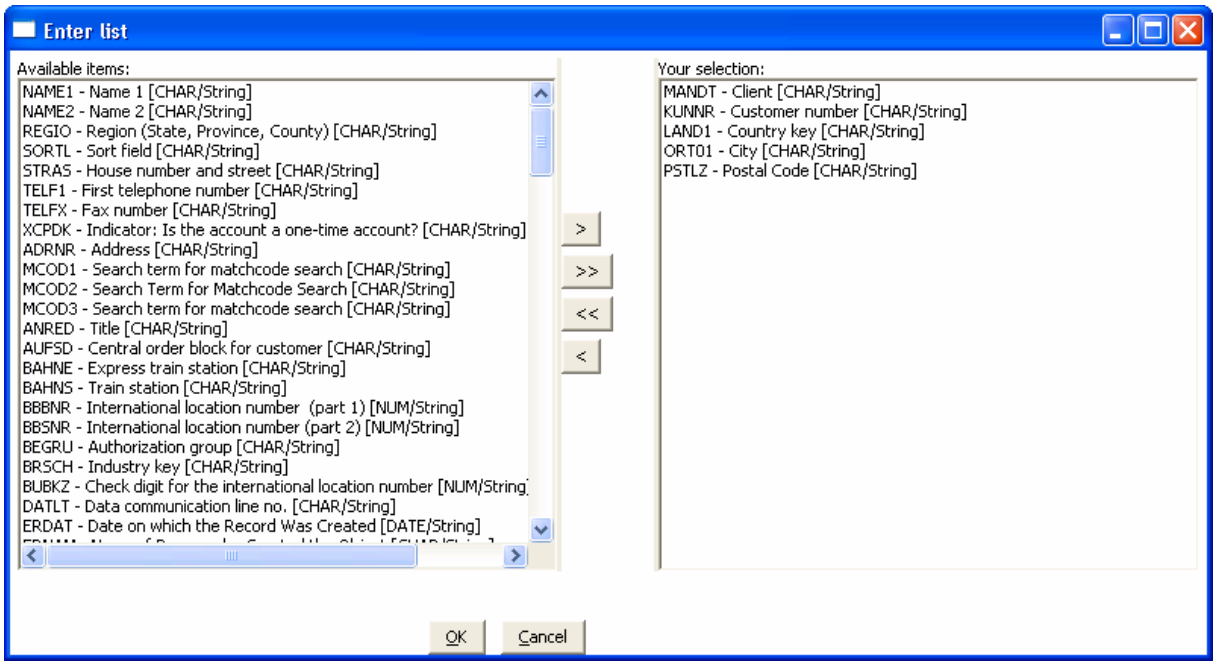
Table name	search for tables beginning with
Table description	search for tables they include this description as a part
FIELDS are included	search for tables by the given fields – all fields separated by commas must be included in the table
KEYS are included	same as FIELDS but for KEYS
FOREIGN KEYS as included	same as FIELDS but for FOREIGN KEYS
Search options: Language	select the language (one letter) for the given descriptions – mind this language must be installed in your system
Search options: Maximum number of tables to search	Especially for searching the FIELDS or (FOREIGN)KEYS combination you can limit the size of tables to search. If ProSAPCONN finds more results a warning in the last line is given: “Info: More tables could match your query (increase maximum number of tables).”
Result: Selected table	This table will be transferred to the ProSAPCONN step as the selected table when pressing “OK”.

Example of finding tables beginning with KNA:



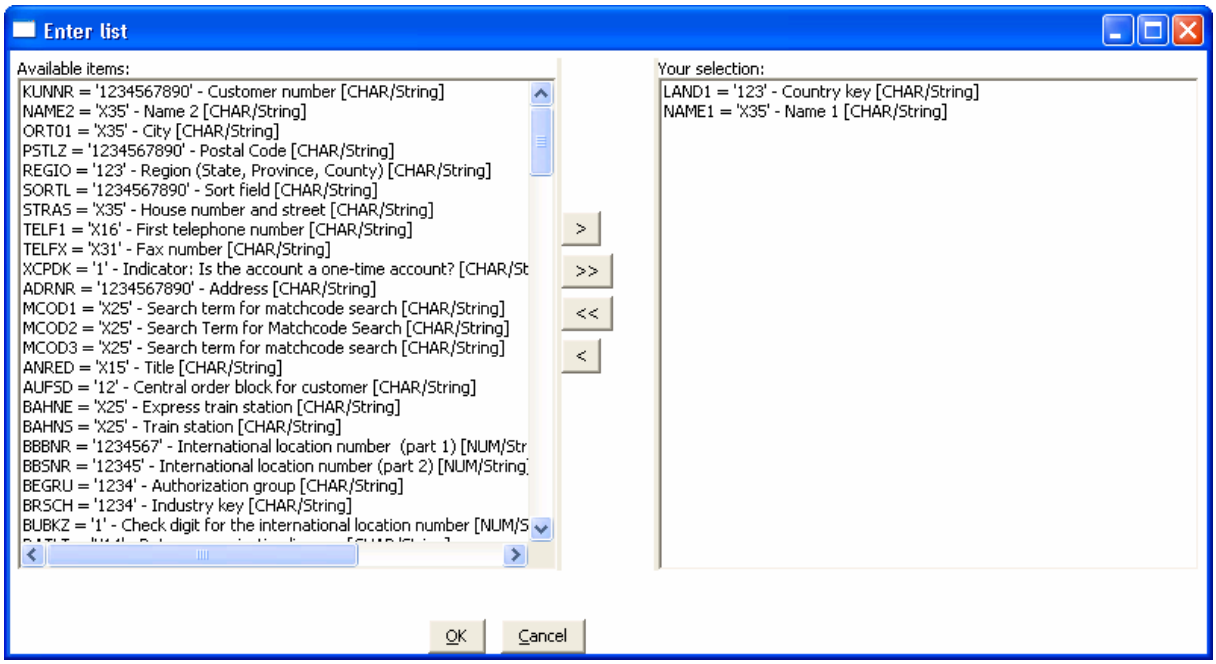
5.2.2 Selected fields: “Find fields” button

Press this button for selecting the desired fields, example:



5.2.3 Where clause: “Add fields” button

Use the “Add fields” button for selecting where fields. For the convenience the type and length of each field is given: If a field is numeric no quote signs are added. If a field is not numeric quote signs are added and the field length is given as a proposal – e.g. field size for LAND1 is 3, given as LAND1 = '123'. If the field size is bigger than 10 it is prefixed with X and the actual length is given, e.g. NAME1 = 'X35'. More than one field is automatically added with ADD, e.g. LAND1 = '123' AND NAME1 = 'X35'



5.2.4 Where clause: “Key fields” button

The “Key fields” button automatically inserts the needed Key fields except for key field MANDT (which is fixed by the user logon). As an example for table VBRP the key fields are POSNR = '123456' AND VBELN = '1234567890'.

If you use this step as a lookup step as described in chapter “Example: Combining data with customer data table KNA1” the relations are automatically determined and inserted – the lookup key is given in brackets. e.g. LAND1 = [LAND1]

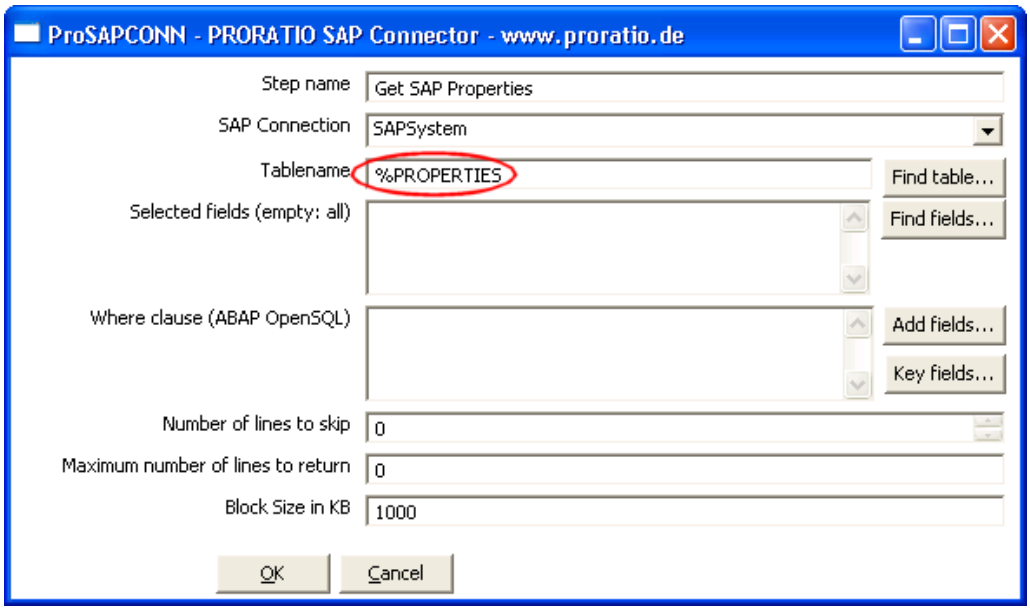
5.3 Conversion of data types

The following table lists the conversion from SAP data types to Kettle types. The JCo data type is shown for completeness and is used internally. You can check the data types if you right click on a step and choose “Show output fields”. In the columns “Step origin” you will see the field description followed by [JCo data type/Kettle data type]. **For using data types marked with * you should read the “Customizing for Optimization Guide”.**

SAP data type	JCo data type	Kettle data type
ACCP	DATE	STRING (length 8, YYYYMMDD)
CHAR	CHAR	STRING
CLNT	CHAR	STRING (length 3)
CUKY	CHAR	STRING (length 5)
CURR (*)	BCD	BIGNUMBER (see DEC, needs CUKY)
DATS	DATE	STRING (length 8, YYYYMMDD)
DEC (*)	BCD	BIGNUMBER (maximum length 31)
FLTP (*)	FLTP	NUMBER (significance 16 digits)
INT1	INT1	INTEGER (0 to 255)
INT2	INT2	INTEGER (-32767 to 32767)
INT4	INT	INTEGER (-2177483647 to 2177483647)
LANG	CHAR	STRING (length 1)
LCHAR	CHAR	STRING (not allowed in where clause)
LRAW (*)	BYTE	STRING (Hex values, not allowed in where clause)
NUMC	NUM	STRING (only digits, fixed size,'0' padded)
PREC	CHAR	STRING (length 2)
QUAN	BCD	BIGNUMBER (see DEC, needs UNIT)
RAW (*)	BYTE	STRING (Hex values, not allowed in where clause)
TIMS	TIME	STRING (length 6, HHMMSS)
UNIT	CHAR	STRING (length 2 or 3)
STRING	-	- not used in SAP database tables -
RAWSTRING	-	- not used in SAP database tables -
VARC	CHAR	STRING (not allowed in where clause)

5.4 Get Information about ProSAPCONN, JCO and the SAP Environment

You can use a special table named “%PROPERTIES” in a ProSAPCONN step that retrieves information about ProSAPCONN and the SAP Environment. This data (e.g. CON_USER or CON_SYSTEMID) can be used in subsequent steps or as a reference. You also see the installed and supported RFC_TABLE_READ on the SAP system (e.g. ZRFC_READ_TABLE_PSC1024).



This step produces the following rows:

PropertyID	PropertyDescription	PropertyValue (Example)
PSC_KernelVersion	Version of the ProSAPCONN Kernel	2.1.0
PSC_Debug	ProSAPCONN debugging to console	false
RFC_512	Installed and supported RFC_TABLE_READ on the SAP system	ZRFC_READ_TABLE_PSC512
RFC_1024	Installed and supported RFC_TABLE_READ on the SAP system	ZRFC_READ_TABLE_PSC1024
JCO_Version	Version of the JCO-library	2.1.6 (2005-06-20)
JCO_jco.middleware.name	Name of the middleware implementation	sapjcorfc
JCO_jco.middleware.version	Version of the middleware	2.1.6 (2005-06-20)

	implementation	
JCO_jco.middleware.libjrfc _version	Version of the sapjcorfc library	2.1.6 (2005-06-20)
JCO_jco.middleware.libjrfc _path	Path to loaded sapjcorfc library	…\Kettle\libswt\win32\sapjcorfc.dll
JCO_jco.middleware.librfc _version	Path to loaded sapjcorfc library	
JCO_jco.middleware.librfc _numversion	Version of the RFC library as numerical string	640.0.81
JCO_jco.middleware.librfc _path	Path to loaded RFC library	
JCO_jco.middleware.librfc _sap_codepage	SAP_CODEPAGE environment variable	
JCO_jco.middleware.librfc _rfc_trace	RFC_TRACE environment variable	
JCO_jco.middleware.librfc _cpic_trace	CPIC_TRACE environment variable	
JCO_jco.middleware.snc_lib	Path to SNC library	SECUDE.dll
JCO_jco.middleware.wait _for_request_time	Time in seconds to wait incessantly for incoming requests	2
JCO_jco.middleware.max _startup_delay	Maximum server startup delay time in seconds	3600
JCO_jco.middleware.allow _start_of_programs	List of programs that are allowed to be started by the RFC library	
JCO_jco.middleware.monitoring	Turns on reporting performance data for each call	
CON_Client	Client	0
CON_CPICConversationID	Low-level CPIC conversion ID for this connection	6862779
CON_Destination	Destination	proratiosap
CON_Host	Host	proratiosap
CON_ISOLanguage	Logon language of the connection, two-byte character string	EN
CON_KernelRelease	Release of the remote SAP system's kernel	46D
CON_Language	Logon language of the connection, one-byte character string	E
CON_OwnBytesPerChar	Number of bytes per character for the currently used local codepage	1
CON_OwnCharset	Java charset equivalent of the local SAP codepage	ISO8859_1
CON_OwnCodepage	Local codepage in SAP notation	1100

CON_OwnEncoding	MIME encoding equivalent of the local SAP codepage	ISO-8859-1
CON_PartnerBytesPerChar	Number of bytes per character for the currently used remote codepage	1
CON_PartnerCharset	Java charset equivalent of the codepage used by the remote system	ISO8859_1
CON_PartnerCodepage	Codepage used by the remote system in SAP notation	1100
CON_PartnerEncoding	MIME encoding equivalent of the remote SAP codepage	ISO-8859-1
CON_PartnerHost	Partner host, i.e. the name of the remote host	172.17.34.1
CON_PartnerRelease	Release of the remote SAP system	46D
CON_PartnerType	Type which specifies the partner of the communication	3
CON_Release	Release of the local SAP system or transport library	640
CON_RfcRole	Role of the connection	C
CON_SSOTicket	SSO Ticket	
CON_SystemID	System ID	SAPTST
CON_SystemNumber	System number	0
CON_Trace	Trace	false
CON_Type	Type which specifies the local program	E
CON_User	User ID the connection is associated with	USERNAME

6 History

6.1 Changes to ProSAPCONN

Version	Released	Description
2.1.1	2005-09-29	Added support for data types RAW and LRAW.

6.2 Documentation changes

Relates to version	since	Document	Description
2.1.1	2005-09-29	Customizing for Optimization Guide	Added support for data types RAW and LRAW, see Chapter "Changes for special numerical values, data types RAW/LRAW"
2.1.1	2005-12-09	Quick Start and Reference	Some minor changes because Kettle is open source now