



Material Number Ranges and Formatting

Technical Solution Guide

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Material Number Ranges and Formatting

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Material Number Ranges and Formatting

Material Numbers in R/3

The material number in R/3 is technically defined as an eighteen byte, character field. The logic that formats material numbers is contained in a conversion exit and is controlled by configuration tables, number range objects and standard R/3 customer functions. This document first explains how material number ranges are defined and then details a few methods for enhancing the standard functionality. The examples in this document are from a 4.6c system.

Relevant OSS Notes

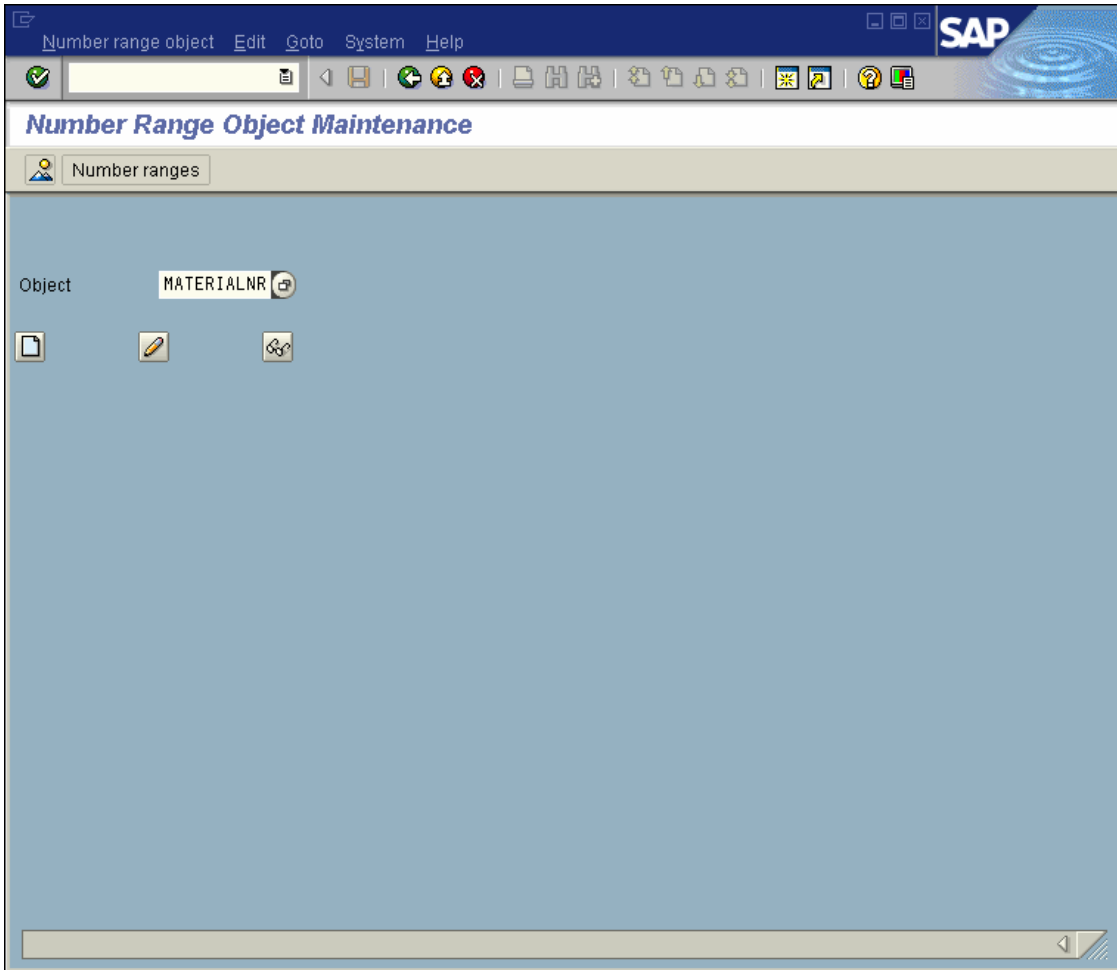
The following OSS notes may be useful in understanding this process:

72286	Lexicographical / non-lexicographical material number
78093	Display of alternative material identifiers

Material Number Ranges and Formatting

Material Number Range Object

R/3 uses Number Range Objects to assign numbers to almost everything within the system. For materials, the number range object used is MATERIALNR. Number range objects can be viewed and maintained using transaction SNRO.



Material Number Ranges and Formatting

The configuration for the number range object specifies a transaction (MMNR) for maintaining the intervals. The group section specifies that intervals will be assigned using groups. In this case, the group is the material type (MTART). Table T134 is the configuration table that defines material types. NUMKI and NUMKE are the fields in table T134 that contain the internal and external number range intervals.

The screenshot shows the SAP 'No. Range Object: Display' configuration screen. The window title is 'Number range object' and the SAP logo is visible in the top right corner. The main content area is divided into several sections:

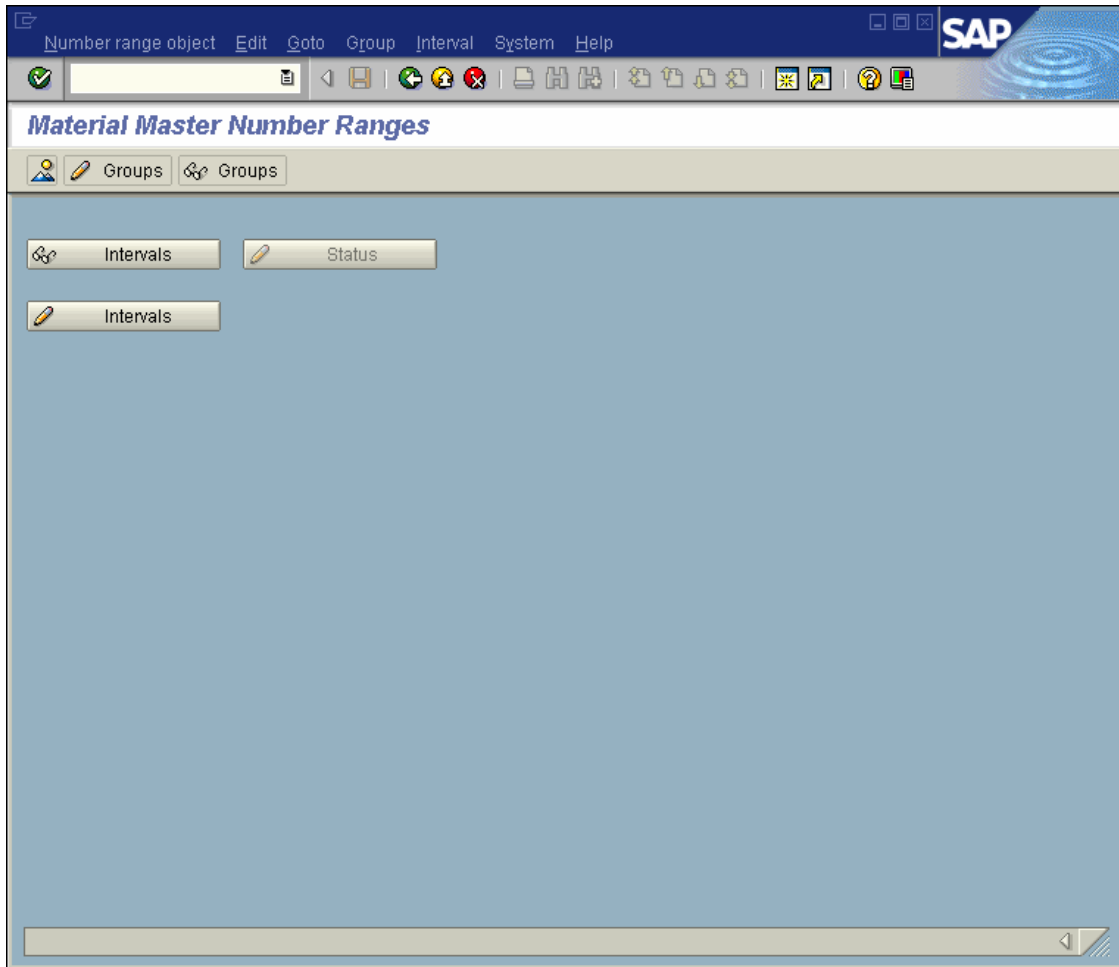
- Object:** MATERIALNR (No. range object has intervals)
- Short text:** Material master
- Long text:** Material Master Number Ranges
- Interval characteristics:**
 - To-year flag:
 - Number length domain: CHAR18
 - No interval rolling:
- Customizing specifications:**
 - Number range transaction: MMNR
 - Warning %: 10.0
 - Main memory buffering: No. of numbers in buffer: 10
- Group specification:**
 - Group table: T134 (Buttons: Maintain text, Delete group ref.)
 - Fld NoRangeElement: MTART
 - Fields int./ext. no.range no.: NUMKI (NUMKE)
 - Display element text:

Material Number Ranges and Formatting

Assigning Intervals to Material Types

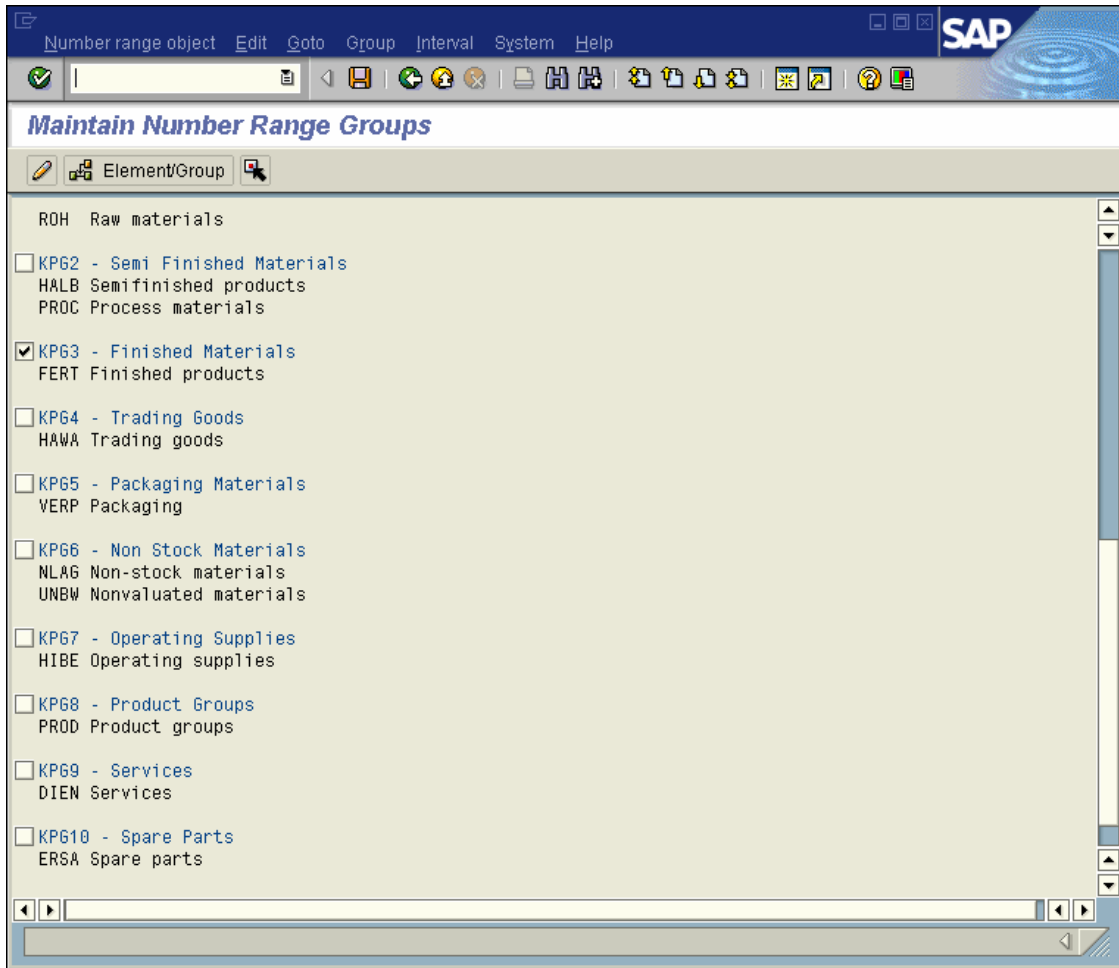
Transaction MMNR

Transaction MMNR is used to create and assign intervals to the material types.



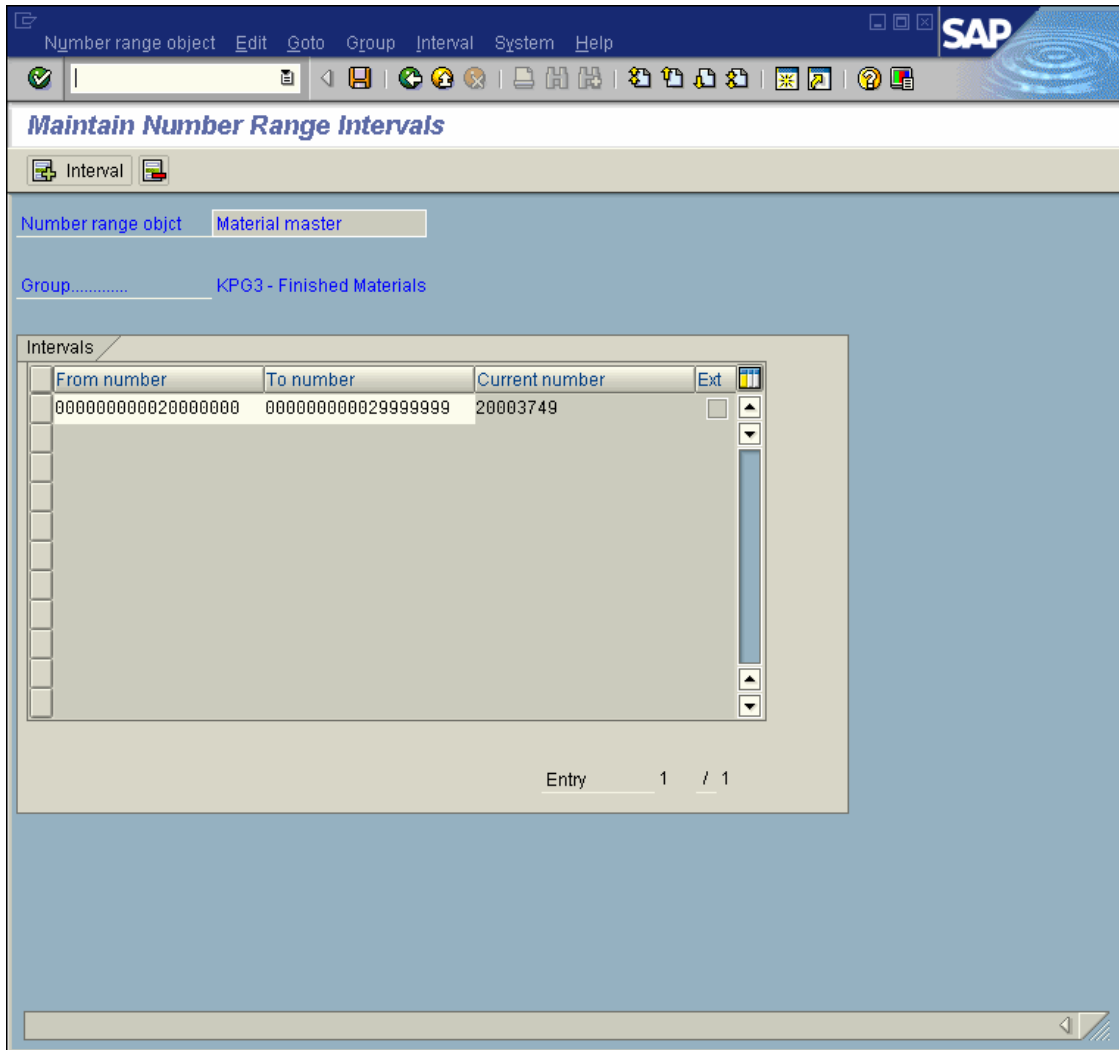
Material Number Ranges and Formatting

Each group is displayed with the material types assigned. In this case, a group corresponds to an interval.



Material Number Ranges and Formatting

The interval for material type FERT is displayed when the maintain button is pressed from the previous screen.



Notice that the interval range contains leading zeros. This explains why zero filled material numbers exist even though the MATNR domain is defined as a character type.

Material Number Ranges and Formatting

Configuration Tables

When transaction MMNR is processed, the configuration tables in the following sections are referenced/updated.

Table TNRGT Number Range Groups

The screenshot shows the SAP Data Browser interface for Table TNRGT. The title bar indicates 'Data Browser: Table TNRGT Select Entries' with 12 entries. The table has 4 columns: Object name, No. range no., No. range no., and Group text. The data is as follows:

Object name	No. range no.	No. range no.	Group text
<input type="checkbox"/> MATERIALNR		04	KP611 - Kodak Trade Goods
<input type="checkbox"/> MATERIALNR	01	02	Group 1
<input type="checkbox"/> MATERIALNR	03		KP61 - Raw Materials
<input type="checkbox"/> MATERIALNR	05		KP62 - Semi Finished Materials
<input type="checkbox"/> MATERIALNR	07		KP63 - Finished Materials
<input type="checkbox"/> MATERIALNR	09		KP64 - Trading Goods
<input type="checkbox"/> MATERIALNR	11		KP65 - Packaging Materials
<input type="checkbox"/> MATERIALNR	12		KP66 - Non Stock Materials
<input type="checkbox"/> MATERIALNR	13		KP67 - Operating Supplies
<input type="checkbox"/> MATERIALNR	15		KP68 - Product Groups
<input type="checkbox"/> MATERIALNR	17		KP69 - Services
<input type="checkbox"/> MATERIALNR	18		KP610 - Spare Parts

Material Number Ranges and Formatting

Table T134 Material Type Master

Table T134 is the configuration table that contains the material type parameters. The fields listed below are the subset related to material number ranges.

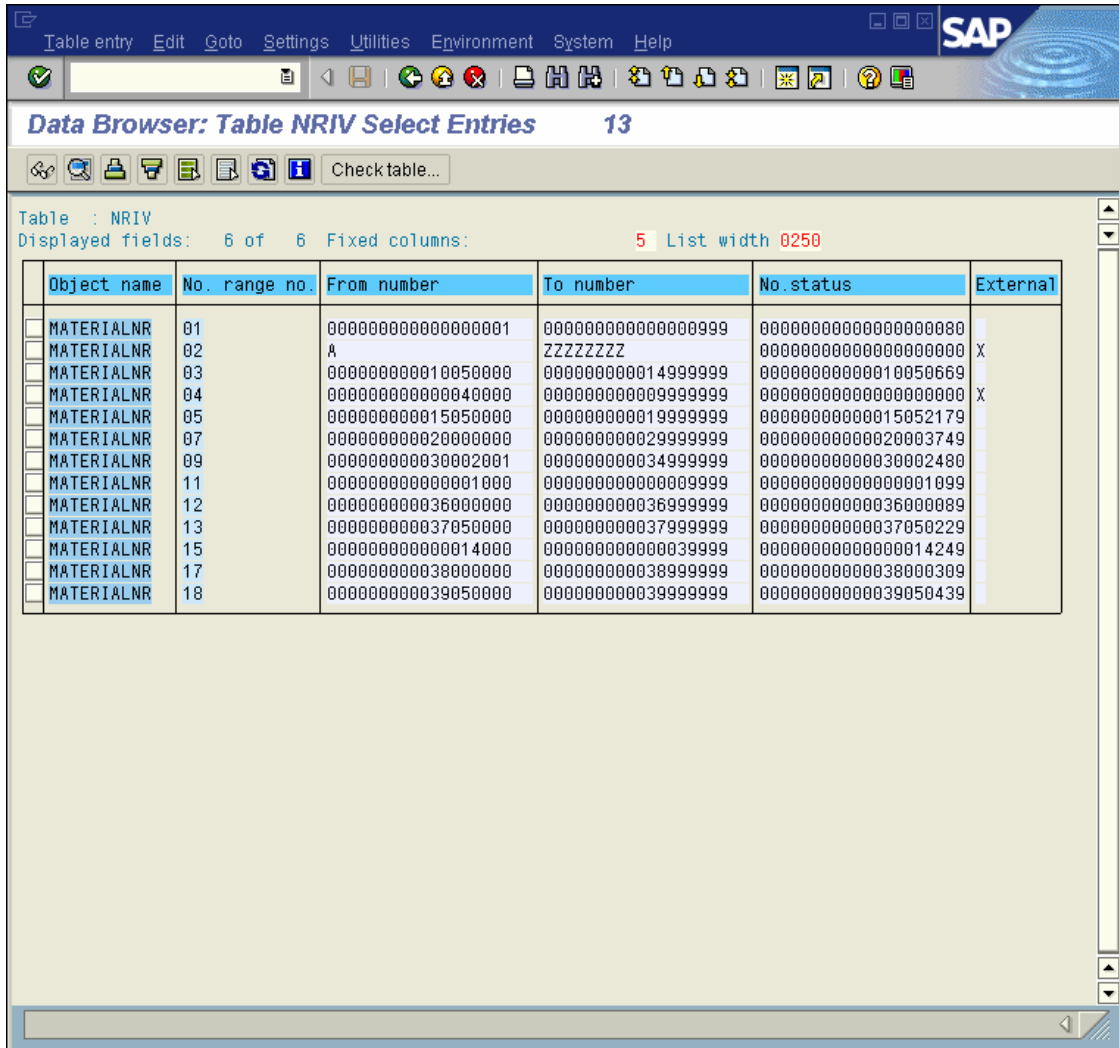
The screenshot shows the SAP Data Browser interface for Table T134. The table has the following columns: Material type, Number range, Number range, Ext. NA w/o ck, and Mat.type descr. The data is as follows:

Material type	Number range	Number range	Ext. NA w/o ck	Mat.type descr.
<input type="checkbox"/> ZTRD		04		Kodak Trading Goods
<input type="checkbox"/> MODE	01	02	X	Apparel (seasonal)
<input type="checkbox"/> LGUT	01	02		Empties (retail)
<input type="checkbox"/> LEIH	01	02	X	Returnable packaging
<input type="checkbox"/> LEER	01	02		Empties
<input type="checkbox"/> KMAT	01	02		Configurable materials
<input type="checkbox"/> INTR	01	02		Intra materials
<input type="checkbox"/> NOF1	01	02	X	Nonfoods
<input type="checkbox"/> WETT	01	02		Competitor products
<input type="checkbox"/> WERT	01	02	X	Value-only materials
<input type="checkbox"/> WERB	01	02	X	Product catalogs
<input type="checkbox"/> VOLL	01	02		Full products
<input type="checkbox"/> VKHM	01	02	X	Additional
<input type="checkbox"/> PIPE	01	02		Pipeline materials
<input type="checkbox"/> FHMI	01	02		Prod. resources/tools
<input type="checkbox"/> FOOD	01	02	X	Foods (excl. perishables)
<input type="checkbox"/> FRIP	01	02	X	Perishables
<input type="checkbox"/> FGTR	01	02	X	Beverages
<input type="checkbox"/> COUP	01	02	X	Coupons
<input type="checkbox"/> HERS	01	02	X	Manufacturer parts
<input type="checkbox"/> IBAU	01	02		Maintenance assemblies
<input type="checkbox"/> CONT	01	02	X	Kanban containers
<input type="checkbox"/> ROH	03			Raw materials
<input type="checkbox"/> PROC	05			Process materials
<input type="checkbox"/> HALB	05			Semifinished products
<input type="checkbox"/> FERT	07			Finished products
<input type="checkbox"/> HAWA	09			Trading goods
<input type="checkbox"/> VERP	11			Packaging
<input type="checkbox"/> NLAG	12			Non-stock materials

Material Number Ranges and Formatting

Table NRIV Number Range Intervals

Table NRIV contains the actual number range intervals



The screenshot shows the SAP Data Browser interface for Table NRIV. The window title is "Data Browser: Table NRIV Select Entries 13". The table has 6 columns: Object name, No. range no., From number, To number, No. status, and External. The data is as follows:

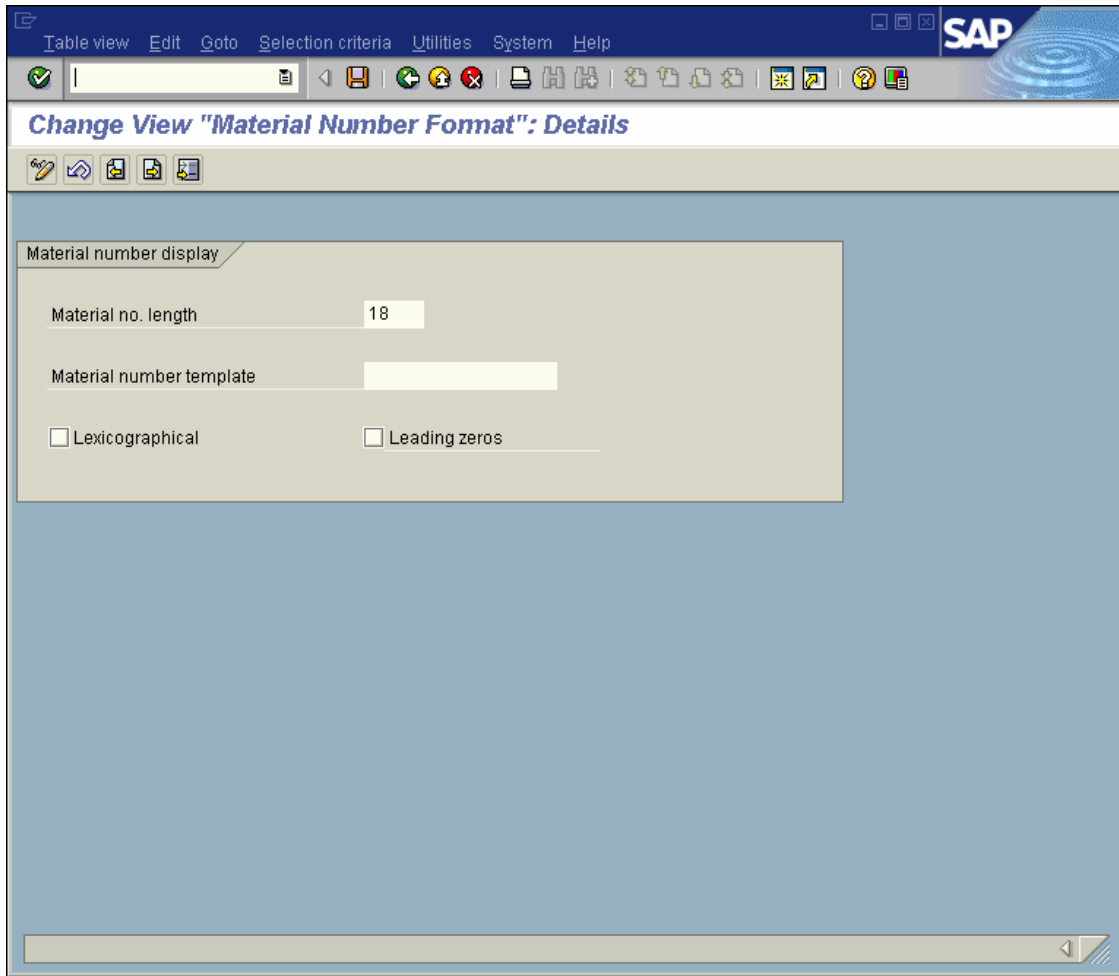
Object name	No. range no.	From number	To number	No. status	External
<input type="checkbox"/> MATERIALNR	01	0000000000000001	0000000000000999	0000000000000000	
<input type="checkbox"/> MATERIALNR	02	A	ZZZZZZZZ	0000000000000000	X
<input type="checkbox"/> MATERIALNR	03	00000000010050000	00000000014999999	0000000000010050669	
<input type="checkbox"/> MATERIALNR	04	0000000000040000	00000000009999999	0000000000000000	X
<input type="checkbox"/> MATERIALNR	05	00000000015050000	00000000019999999	0000000000015052179	
<input type="checkbox"/> MATERIALNR	07	00000000020000000	00000000029999999	0000000000020003749	
<input type="checkbox"/> MATERIALNR	09	00000000030002001	00000000034999999	0000000000030002480	
<input type="checkbox"/> MATERIALNR	11	00000000000001000	00000000000099999	000000000000001099	
<input type="checkbox"/> MATERIALNR	12	00000000036000000	00000000036999999	000000000003600089	
<input type="checkbox"/> MATERIALNR	13	00000000037050000	00000000037999999	0000000000037050229	
<input type="checkbox"/> MATERIALNR	15	00000000000014000	00000000000399999	000000000000014249	
<input type="checkbox"/> MATERIALNR	17	00000000038000000	00000000038999999	0000000000038000309	
<input type="checkbox"/> MATERIALNR	18	00000000039050000	00000000039999999	0000000000039050439	

Material Number Ranges and Formatting

Controlling the Format

Transaction OMSL Material Number Format

Transaction OMSL is used to access table TMCNV, which is the configuration table that contains control settings for formatting the material number.



Material Number Ranges and Formatting

Table TMCNV

Below is the SE16 view of the TMCNV table.

The screenshot shows the SAP SE16 view for the TMCNV table. The window title is "Table TMCNV Display". The SAP logo is visible in the top right corner. The menu bar includes "Table entry", "Edit", "Goto", "Settings", "Environment", "System", and "Help". The toolbar contains various icons for navigation and editing. The main area displays the following configuration fields:

Client	400
Key TMCNV	MATCONV
Matl no. length	18
Template length	0
Edit.characters (ATRENN)	0
Tot.edit.chars	0
Signific.chars.	18
Mat.no.template	
Edit.characters (TZ)	
Leading zeros	
Lexicographical	
Separator	

Material Number Ranges and Formatting

Material Number Domain

Conversion exits are assigned at the domain level within the data dictionary. The following screen displays the material number domain (MATNR). The standard R/3 conversion routine is specified (MATN1)

The screenshot shows the SAP Dictionary: Display Domain screen for the domain MATNR. The domain is active and has the short text 'Material number (field C18)'. The screen is divided into three tabs: Attributes, Definition, and Value range. The Attributes tab is selected, showing the following settings:

Formatting		
Data type	CHAR	Character string
No. characters	18	
Decimal places	0	

Output characteristics	
Output length	18
Convers. routine	MATN1
<input type="checkbox"/> Sign	
<input type="checkbox"/> Lowercase	

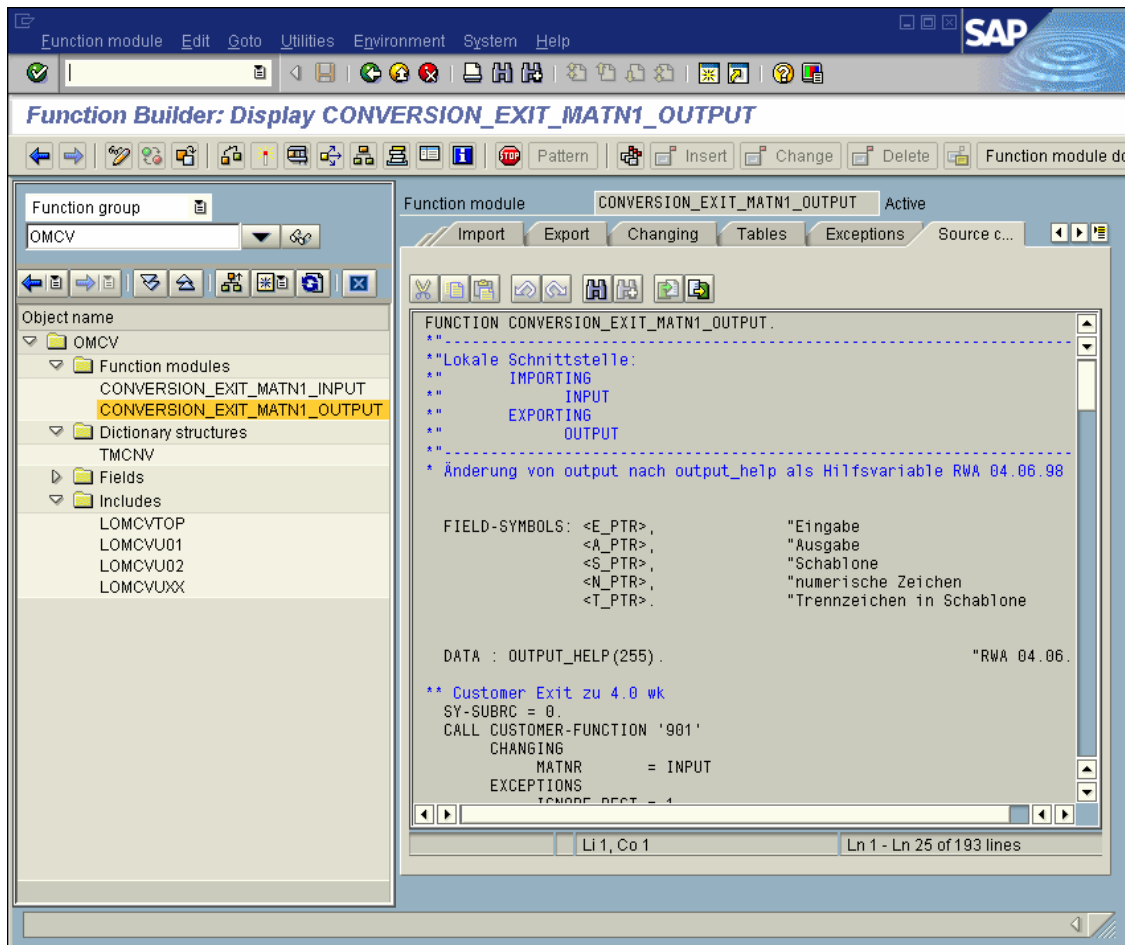
Material Number Ranges and Formatting

Function Group OMCV

The material number conversion exit function modules are contained in function group OMCV. For each conversion exit defined, there are two function modules. One function is for input and, the other is for output. SAP has a standard naming convention for these functions that must be followed. It consists of a prefix, the conversion routine name and a suffix as follows:

'CONVERION_EXIT_' + Conversion routine name + '_INPUT'

'CONVERION_EXIT_' + Conversion routine name + '_OUTPUT'



Material Number Ranges and Formatting

Function CONVERSION_EXIT_MATN1_INPUT

Converts the internal material number to the output format. The logic flow is as follows:

- Calls customer function 001 if it exists.
- Reads table TMCNV and formats the number based on the settings in the table.
- Calls customer function 002 if it exists.

Function CONVERSION_EXIT_MATN1_OUTPUT

Converts the external material number to the internal format. The logic flow is as follows:

- Calls customer function 901 if it exists.
- Reads table TMCNV and formats the number based on the settings in the table.
- Calls customer function 902 if it exists.

Material Number Ranges and Formatting

Custom Output Format Example 1

The following example demonstrates how to format the material number output using an edit mask.

Business Requirement

The customer wants to display the material using the format xxxx-xxx-xx.

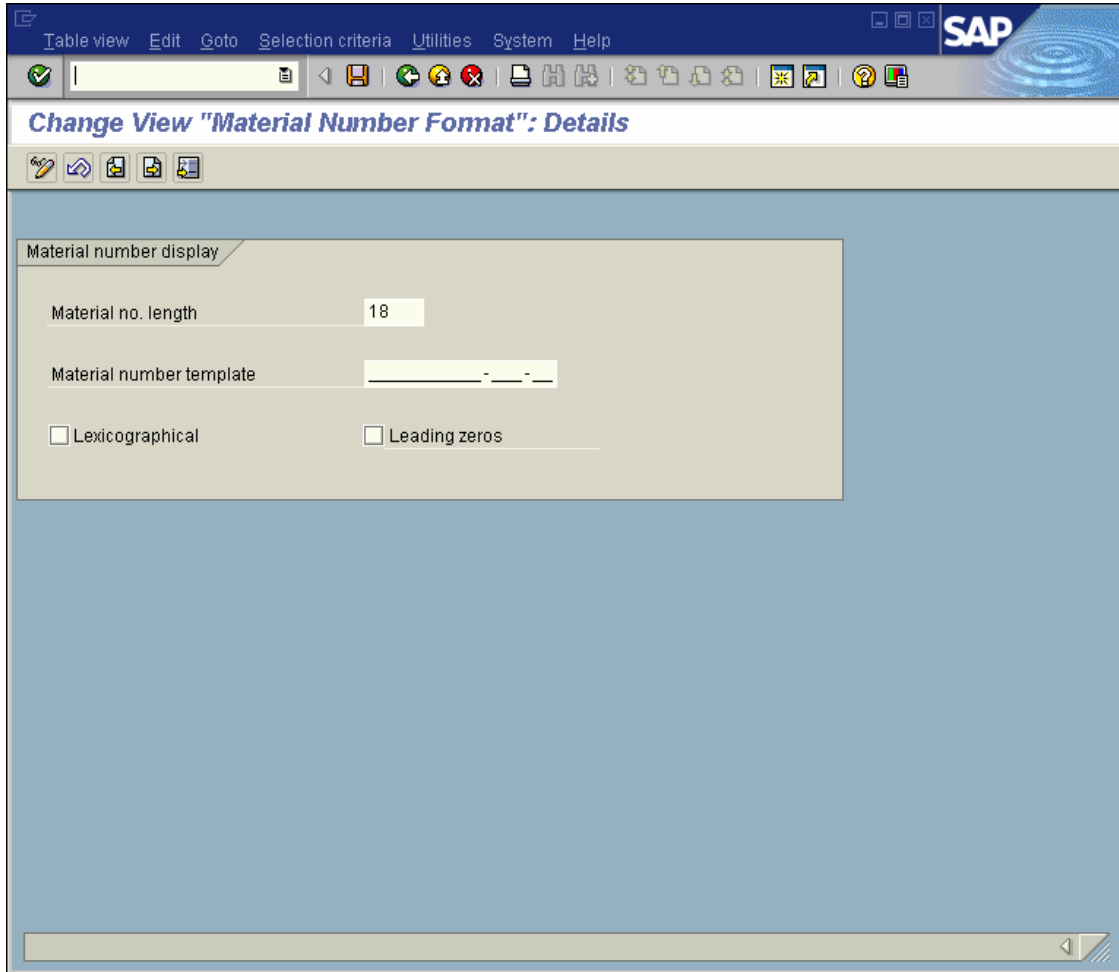
Solution

To solve this problem, standard configuration will be used to add an edit mask to the material number.

Material Number Ranges and Formatting

Step 1 **Define the Edit Mask via TMCNV Configuration**

Using transaction OMSL, the edit mask is specified in the material number template field.



Material Number Ranges and Formatting

Once the configuration is complete, table TMCNV contains the edit mask. Several other fields related to the edit mask are also present. These fields are used by the standard logic in the conversion exit to apply the mask to the number.

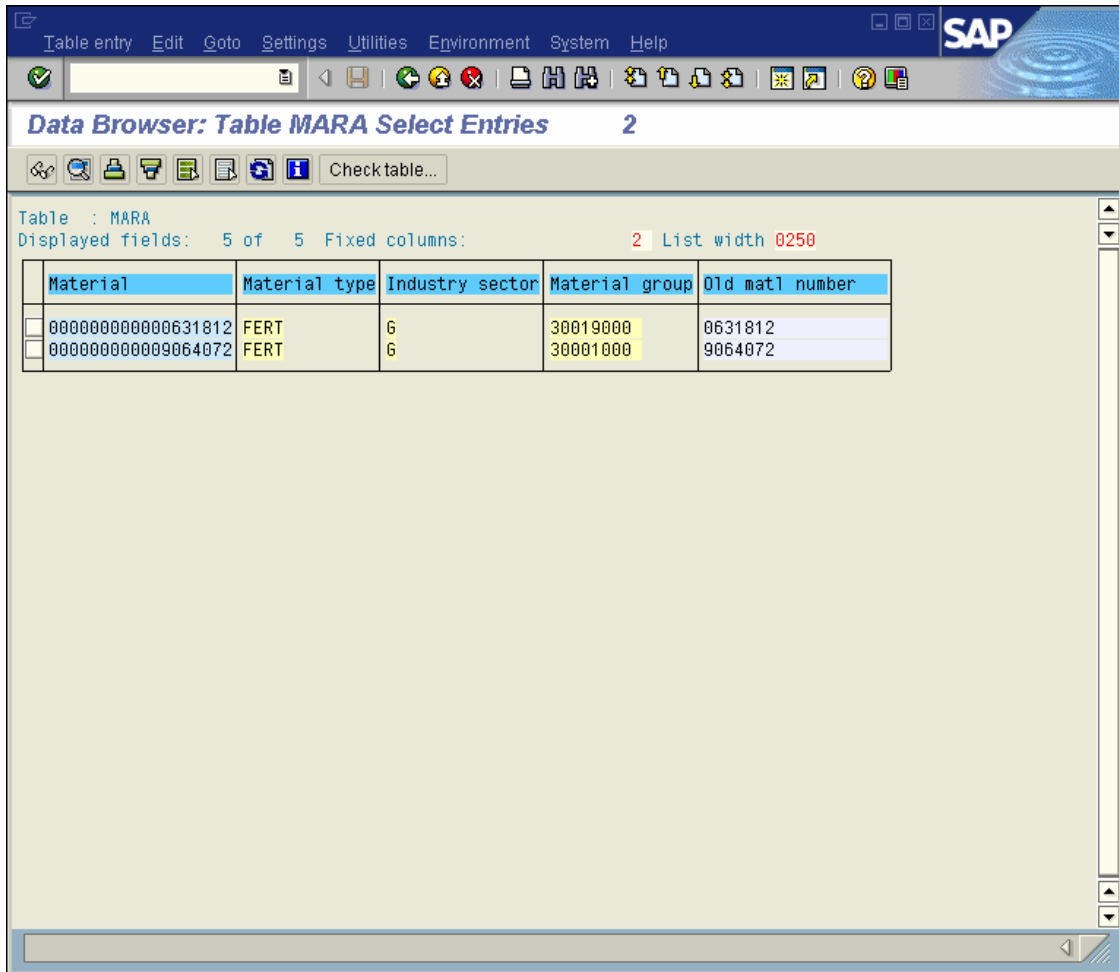
The screenshot shows the SAP 'Table TMCNV Display' window. The title bar includes 'Table entry', 'Edit', 'Goto', 'Settings', 'Environment', 'System', and 'Help'. The SAP logo is visible in the top right corner. The main content area displays the following configuration fields:

Client	400
Key TMCNV	MATCONV
Matl no. length	18
Template length	18
Edit.characters (ATRENN)	1
Tot.edit.chars	2
Signific.chars.	16
Mat.no.template	_____ - - -
Edit.characters (TZ)	-
Leading zeros	<input type="checkbox"/>
Lexicographical	<input type="checkbox"/>
Separator	<input type="checkbox"/>

Material Number Ranges and Formatting

Step 2 Test the Configuration Change

Using transaction SE16, two MARA records are displayed. The conversion exit does not execute until the record detail is displayed. The material number internal format has not changed. It is still eighteen bytes, zero filled.

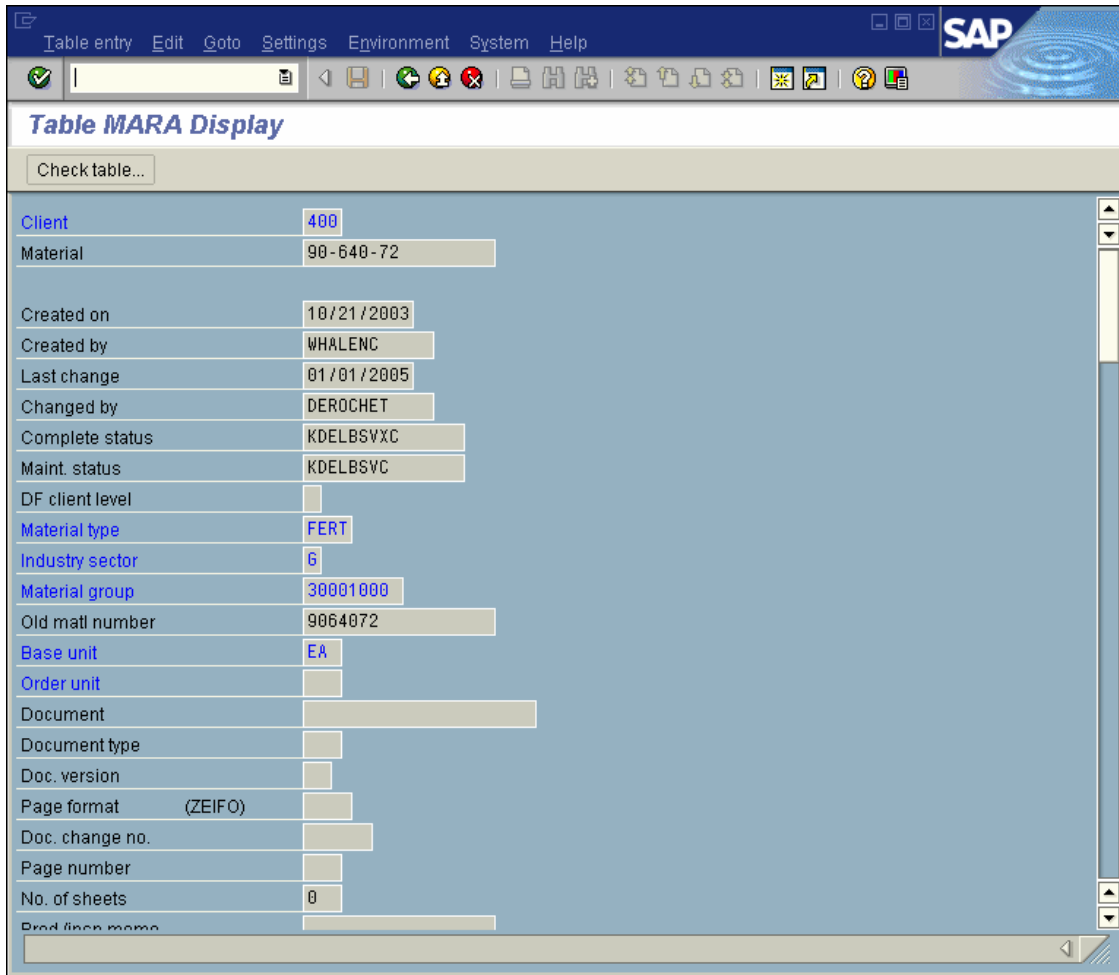


The screenshot shows the SAP Data Browser interface for the MARA table. The window title is "Data Browser: Table MARA Select Entries 2". The table has 5 columns: Material, Material type, Industry sector, Material group, and Old matl number. Two records are displayed, both with zero-filled material numbers.

Material	Material type	Industry sector	Material group	Old matl number
<input type="checkbox"/> 0000000000000631812	FERT	6	30019000	0631812
<input type="checkbox"/> 0000000000009064072	FERT	6	30001000	9064072

Material Number Ranges and Formatting

Once the record detail is displayed, the conversion exit logic applies the masking logic based on the TMCNV record.



Material Number Ranges and Formatting

Custom Output Format Example 2

The following example demonstrates how to implement a custom material number output routine.

Business Requirement

The customer uses material numbers that are either six or seven bytes long. They always want seven bytes displayed, even if the actual number is six bytes long. For numbers that are six bytes long, they want a leading zero to display.

Solution

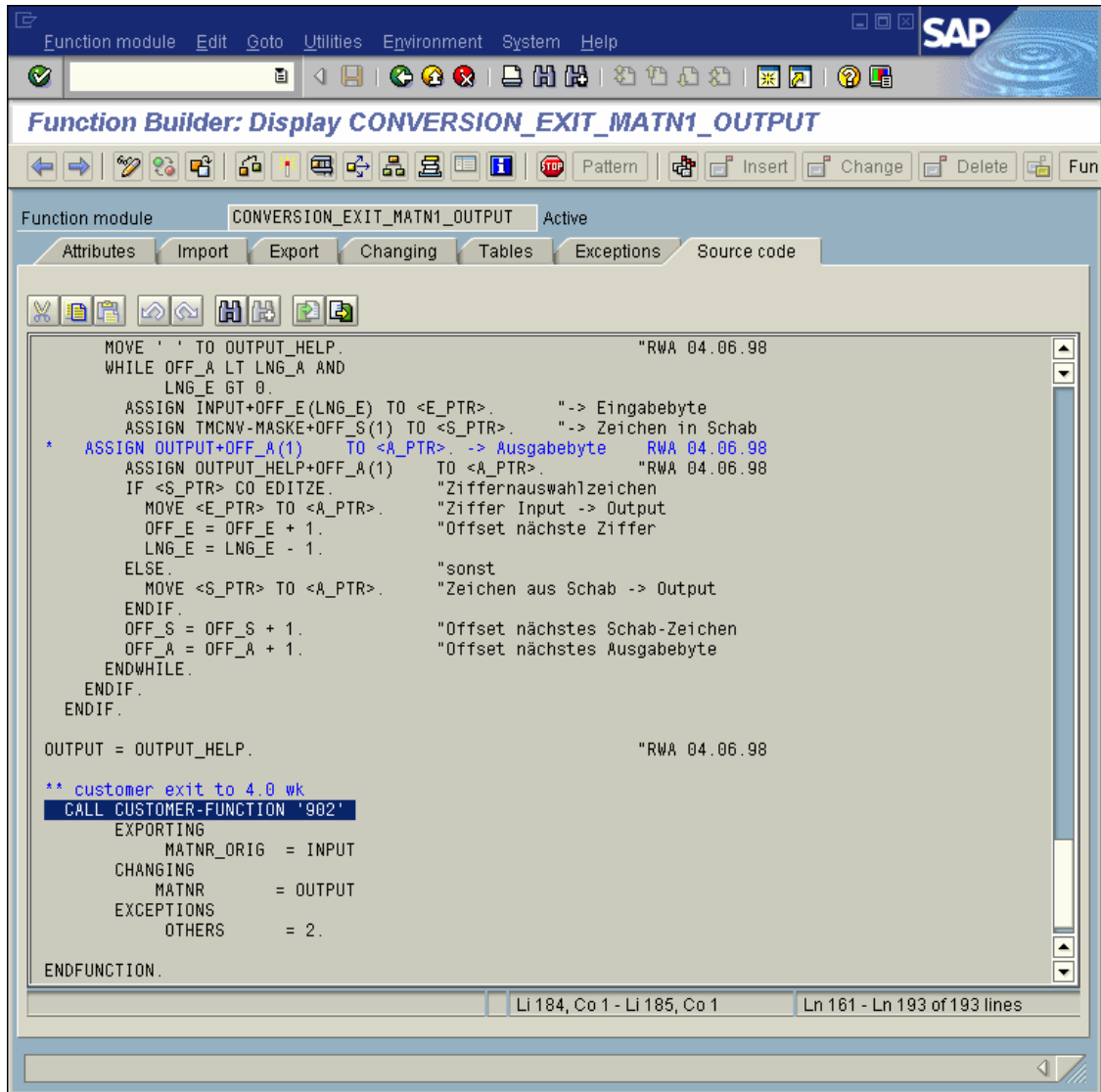
To solve this problem, we will add logic to zero fill six byte numbers (to seven bytes) when outputting the material number. This logic will be added to customer function 902 in the output conversion exit of the material number (CONVERSION_EXIT_MATN1_OUTPUT).

It is assumed that the reader understands the CMOD/SMOD enhancement concept.

Material Number Ranges and Formatting

Step 1 Identify the Standard Customer Function

The output conversion exit for material numbers contains two customer function calls. Function 901 is called at the beginning of the logic and function 902 is called at the end, just before the exit. For this project, we will use function 902.

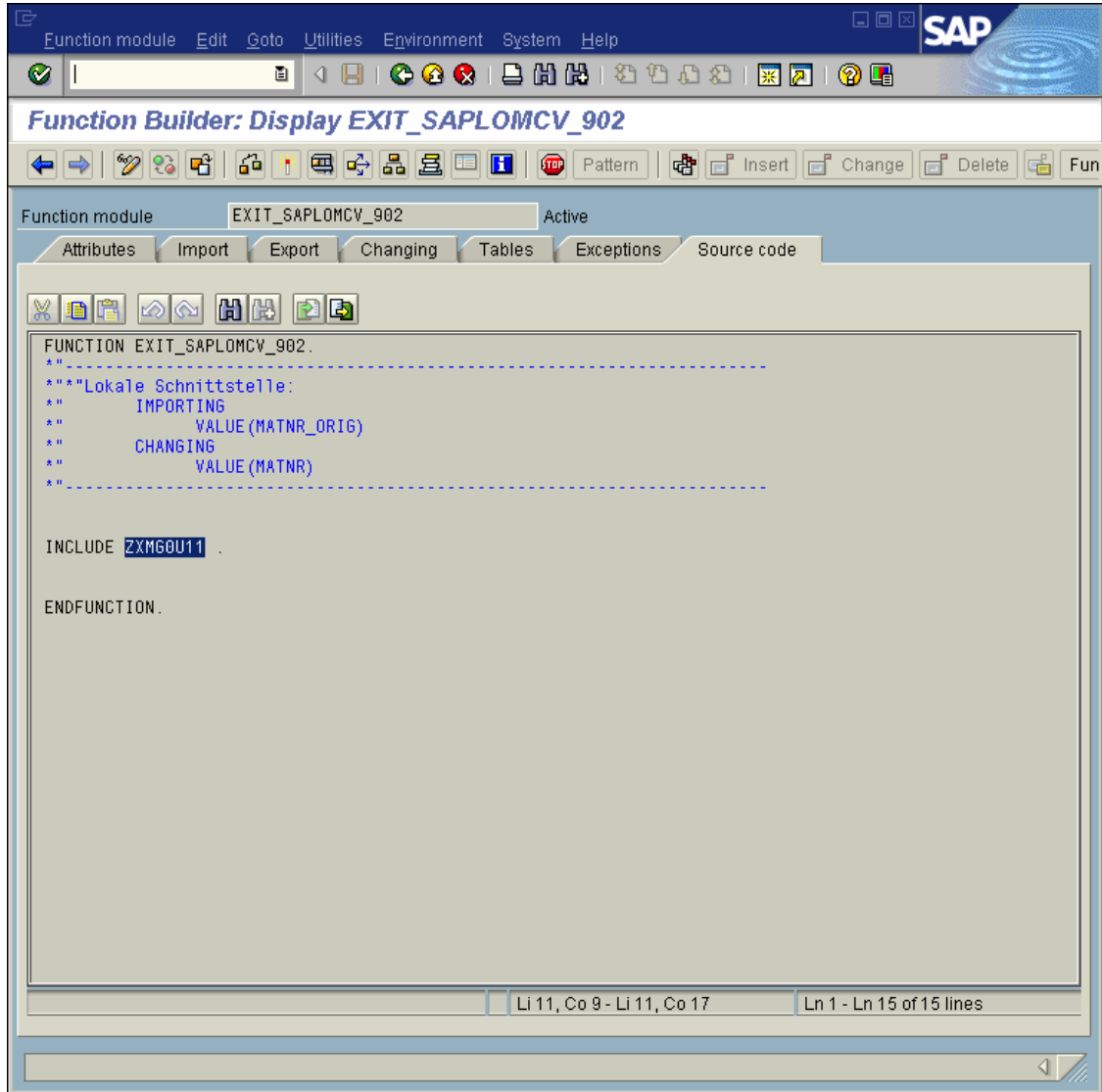


To navigate into the customer function, double click on the function name '902'.

Material Number Ranges and Formatting

Step 2 Create the Customer Function INCLUDE

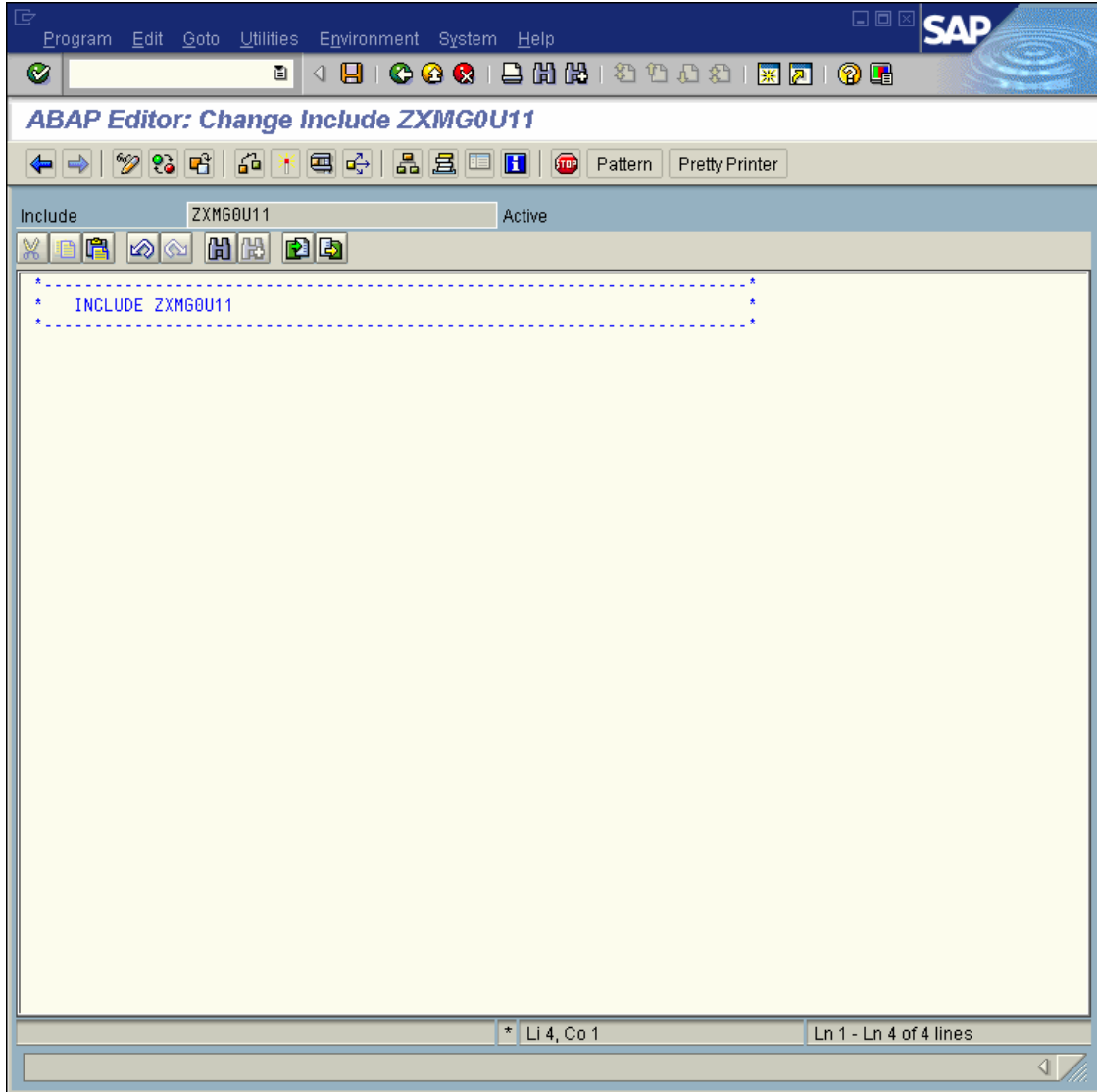
The customer function does not contain any code, only an INCLUDE. The actual code will be added to the INCLUDE.



Double click on the include name ZXMG0U11. The system will respond with 'Include ZXMG0U11 does not exist, Do you wish to create it'. You need to go thru the normal steps to create the INCLUDE, assign a transport request, etc.

Material Number Ranges and Formatting

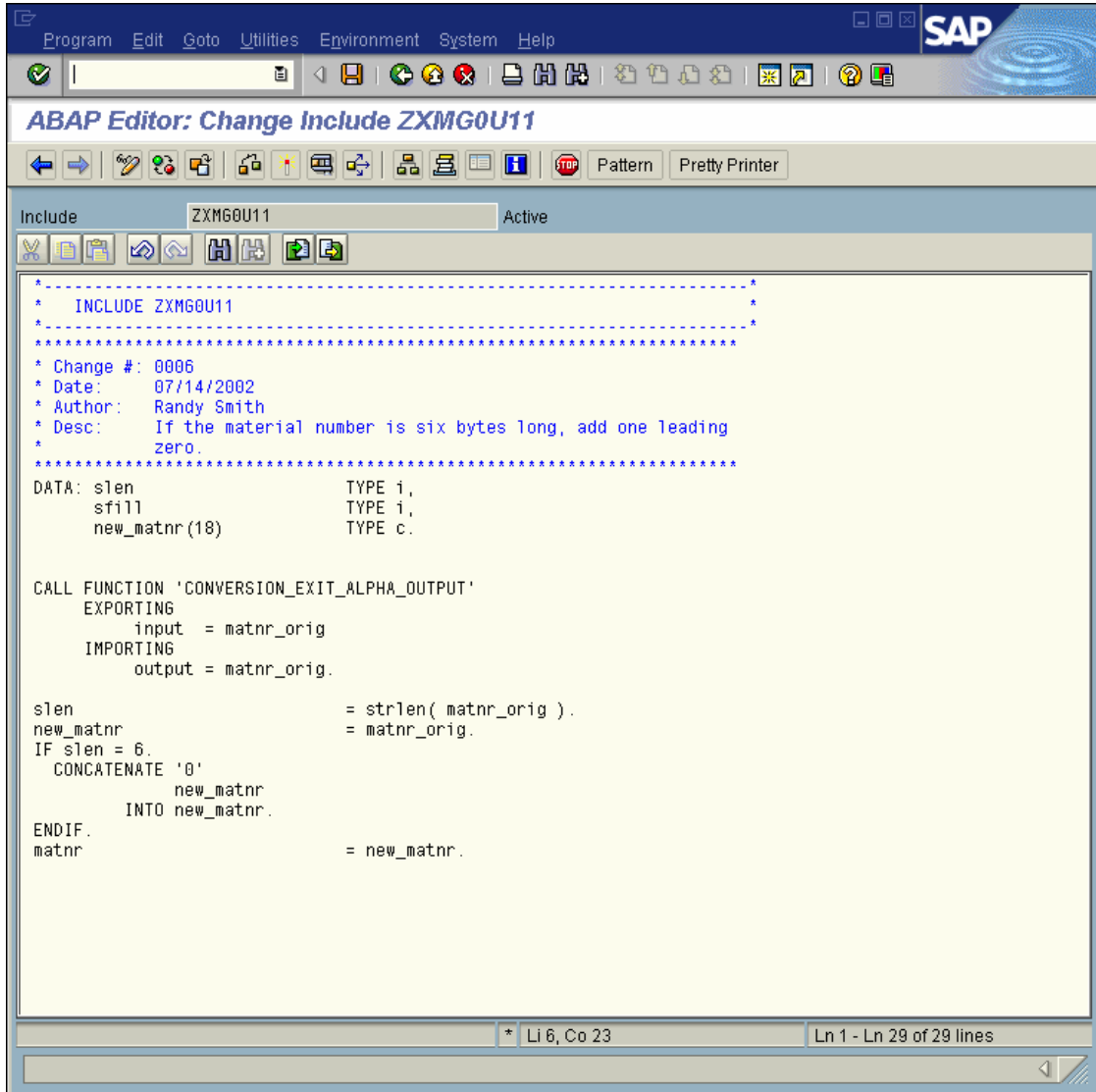
The system will create an empty include to which we will add our logic.



Material Number Ranges and Formatting

Step 3 Code the Logic

The logic is added into the INCLUDE. This logic is quite simple. We check the length of the material number. If it is six bytes long, a single leading zero is added.



```
ABAP Editor: Change Include ZXM60U11
-----
* INCLUDE ZXM60U11
*-----
* Change #: 0006
* Date:    07/14/2002
* Author:  Randy Smith
* Desc:    If the material number is six bytes long, add one leading
*          zero.
*-----
DATA: slen              TYPE i,
      sfill            TYPE i,
      new_matnr(18)    TYPE c.

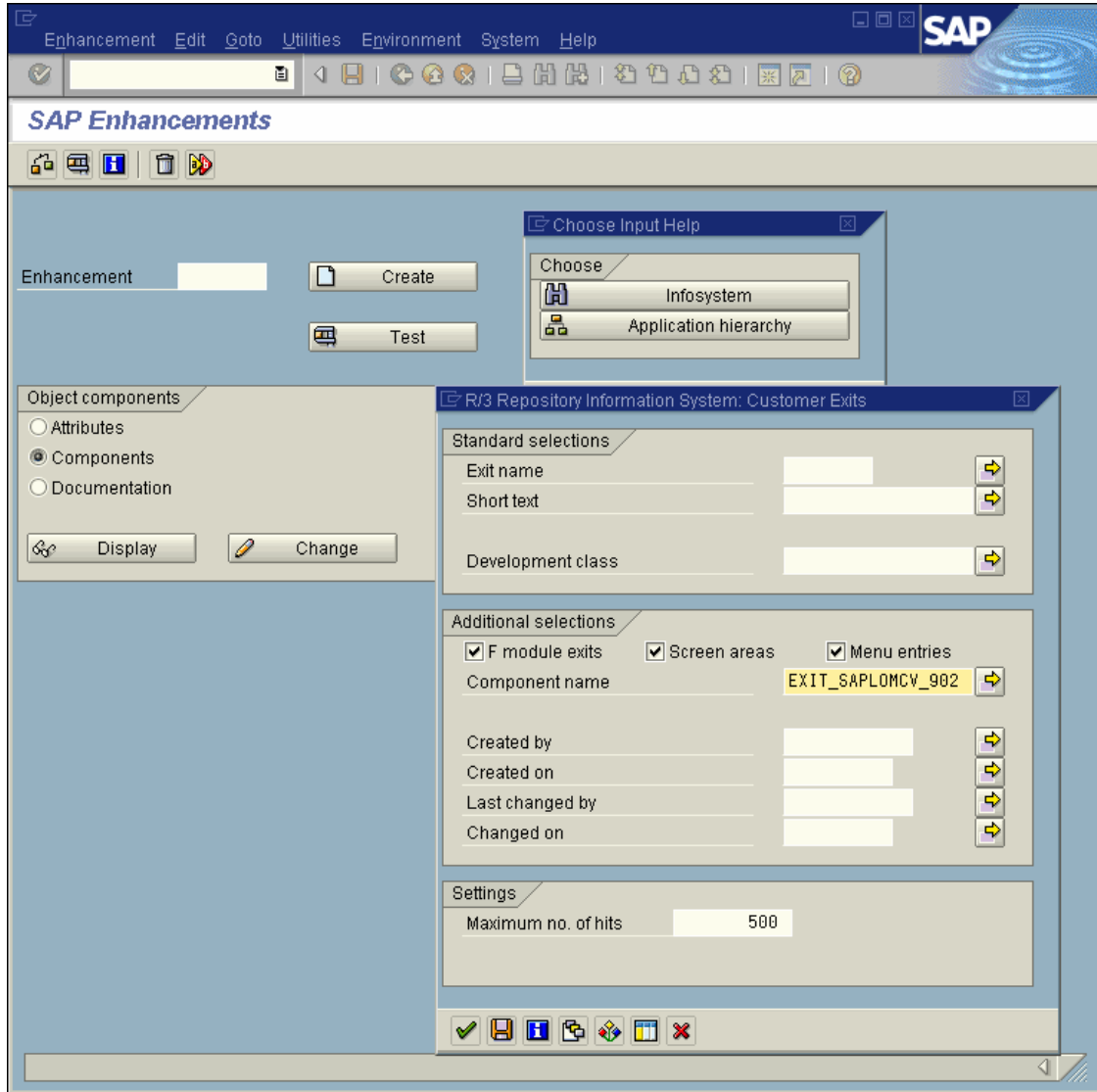
CALL FUNCTION 'CONVERSION_EXIT_ALPHA_OUTPUT'
  EXPORTING
    input = matnr_orig
  IMPORTING
    output = matnr_orig.

slen = strlen( matnr_orig ).
new_matnr = matnr_orig.
IF slen = 6.
  CONCATENATE '0'
             new_matnr
             INTO new_matnr.
ENDIF.
matnr = new_matnr.
```

Material Number Ranges and Formatting

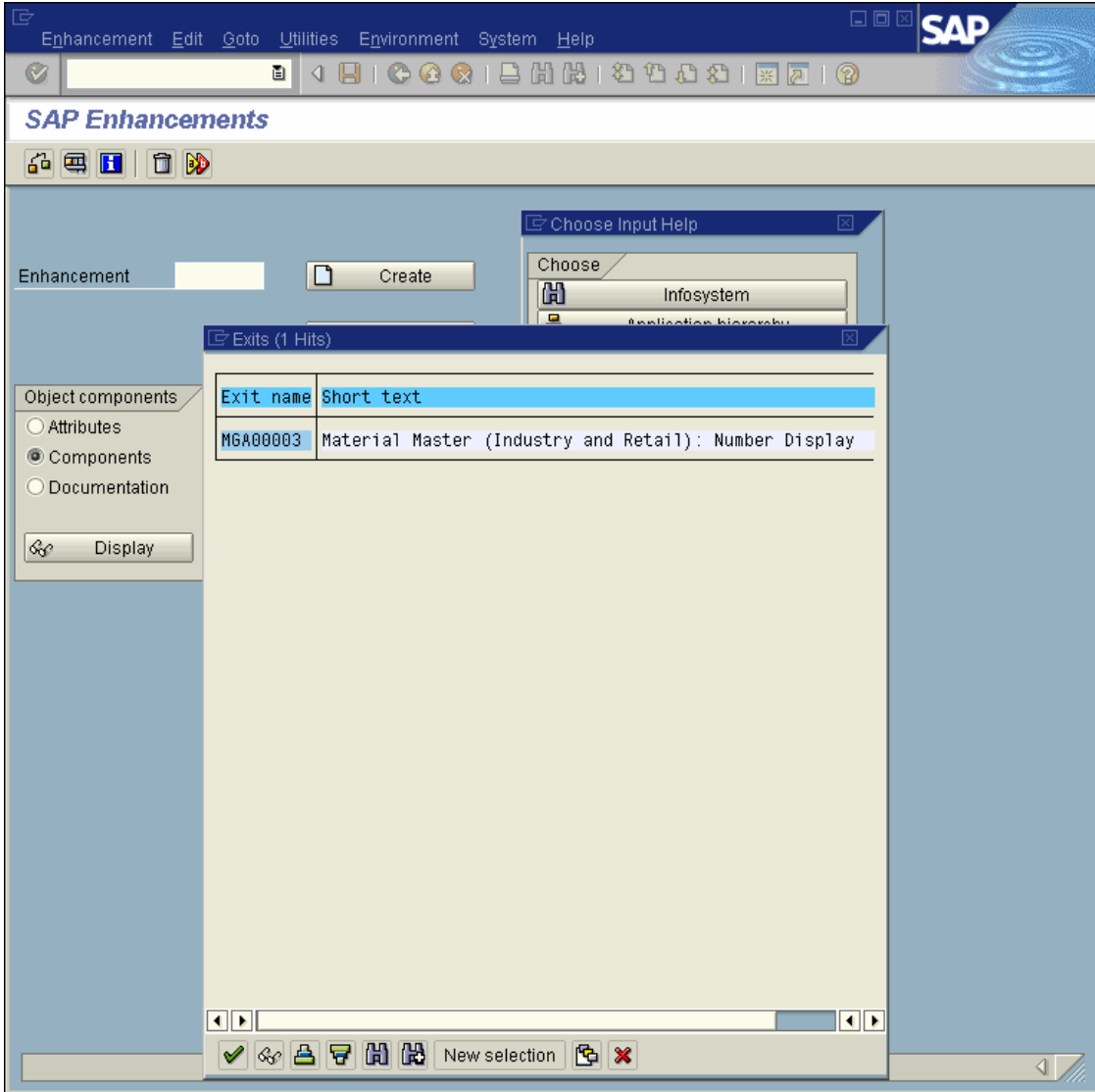
Step 4 Find the Standard Enhancement (SMOD)

For standard customer functions, there will be an existing enhancement. It can be found using the search tool in transaction SMOD.



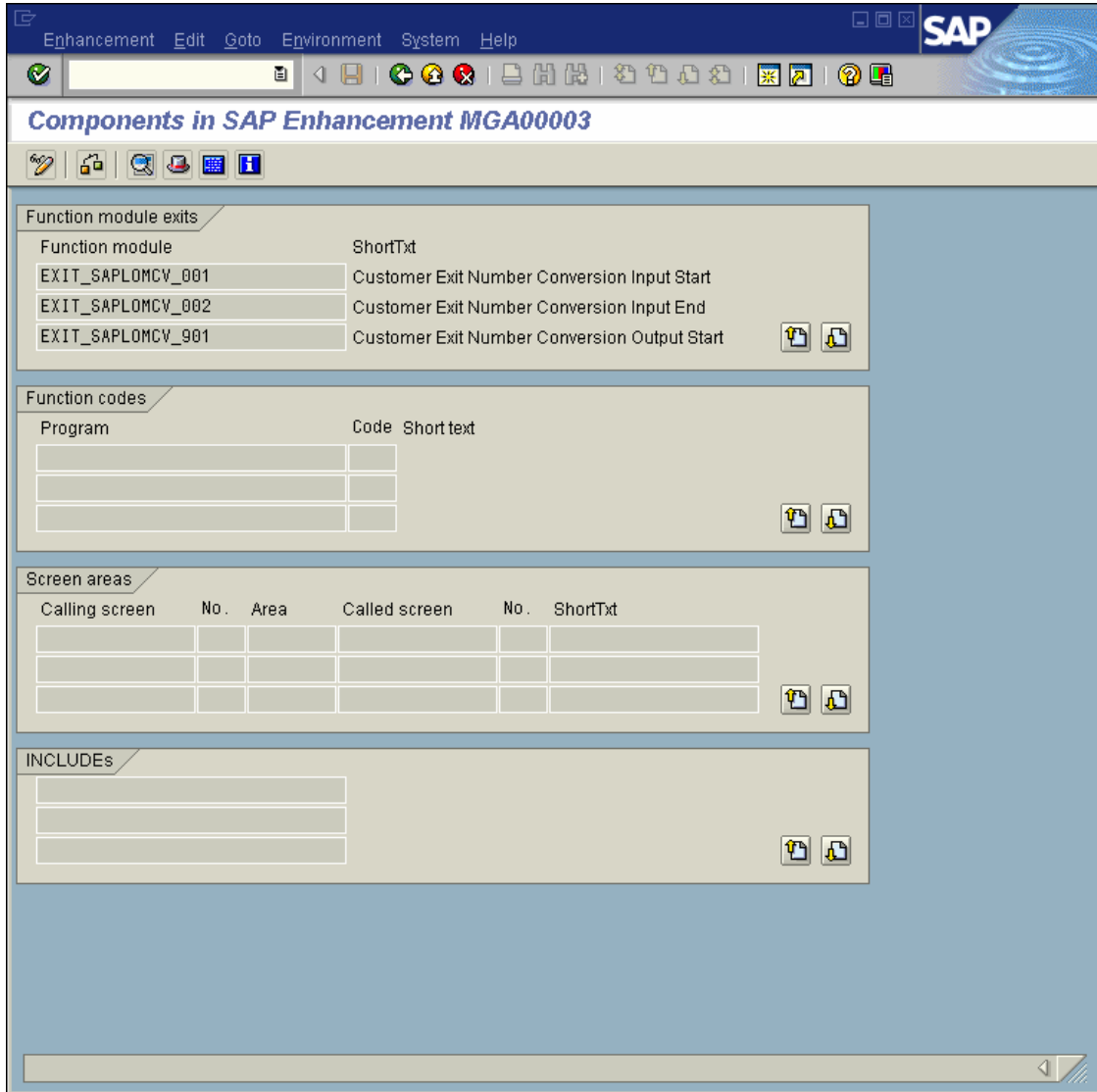
Material Number Ranges and Formatting

The standard enhancement for material number customer functions is MGA00003.



Material Number Ranges and Formatting

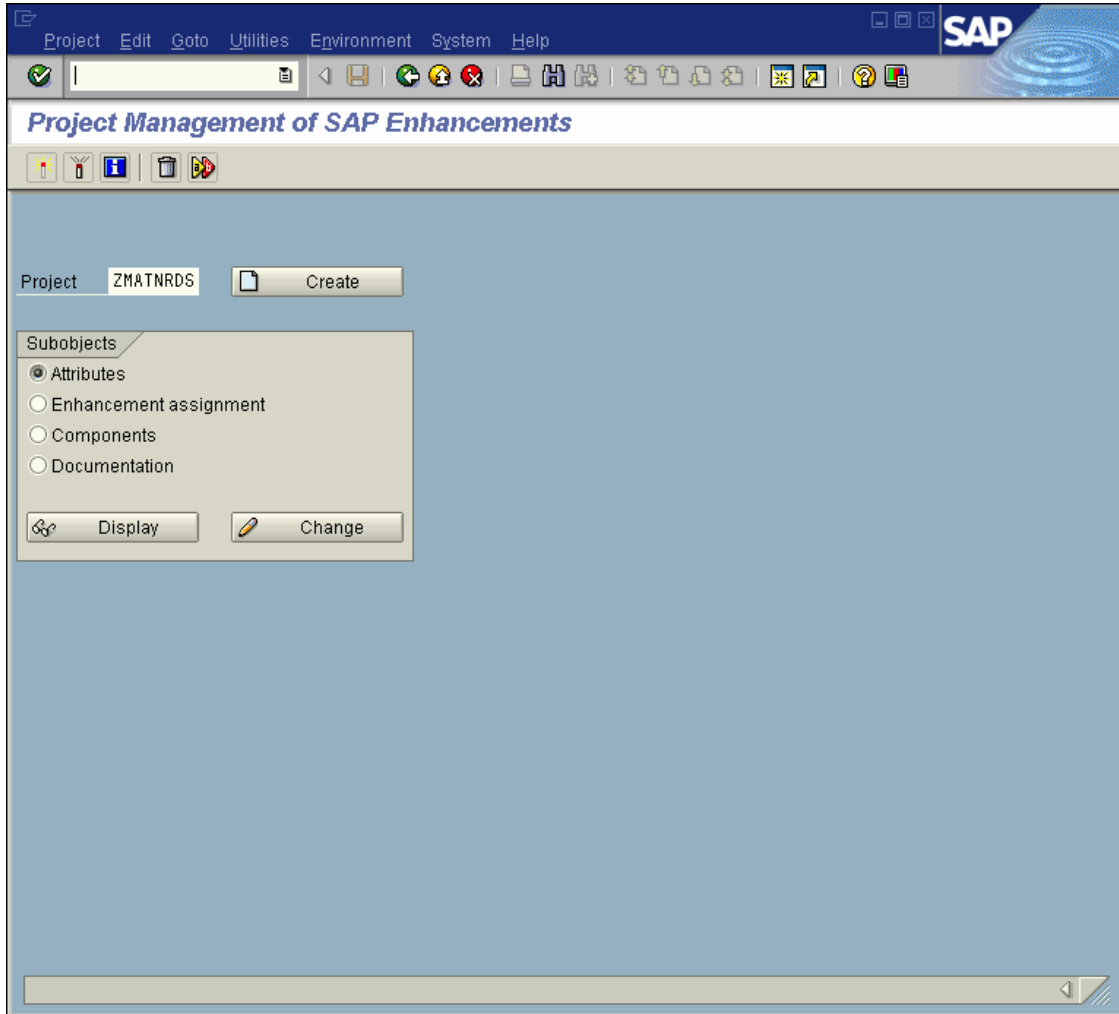
The standard enhancement contains all four of the customer functions contained in the conversion exits. It does not matter that we aren't using the others. Alternatively, we could create a custom enhancement that contains only the customer function we are using.



Material Number Ranges and Formatting

Step 5 Create a Project (CMOD)

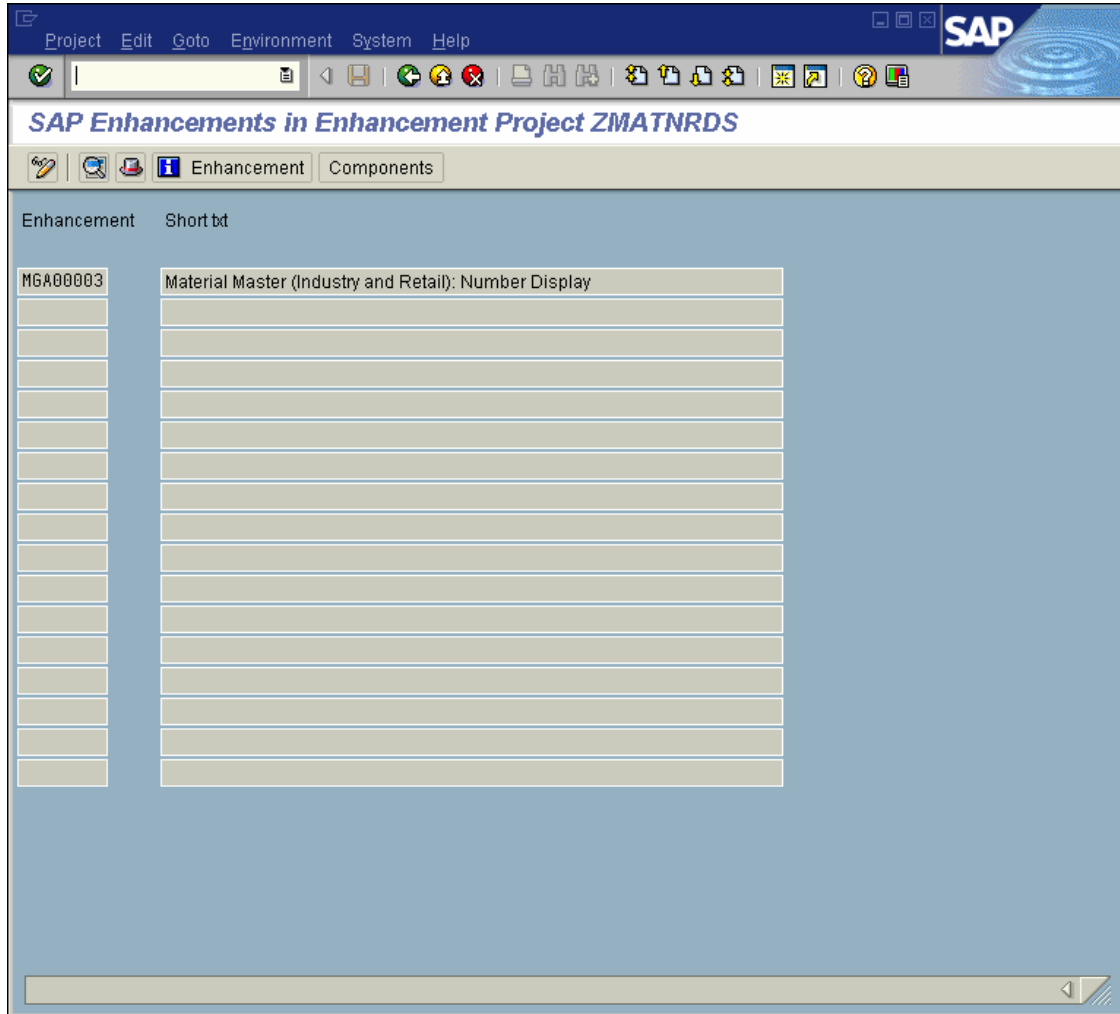
Using transaction CMOD, create a customer specific project. Customer specific projects must begin with the letter 'Z'.



Material Number Ranges and Formatting

Step 6 Assign the Enhancement to the Project

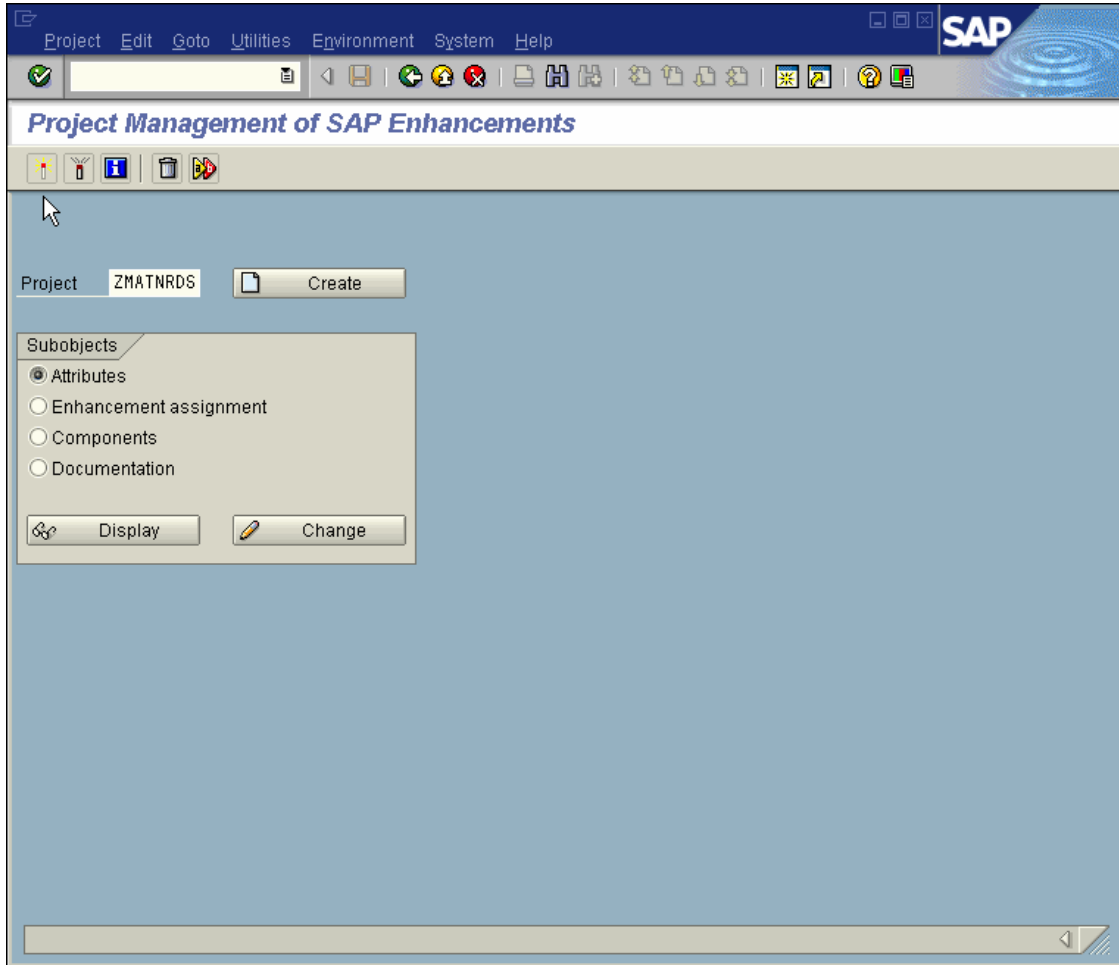
One or more enhancements (SMOD) can be assigned to a project. In this case, we will assign the standard material number enhancement.



Material Number Ranges and Formatting

Step 7 *Activate the Project*

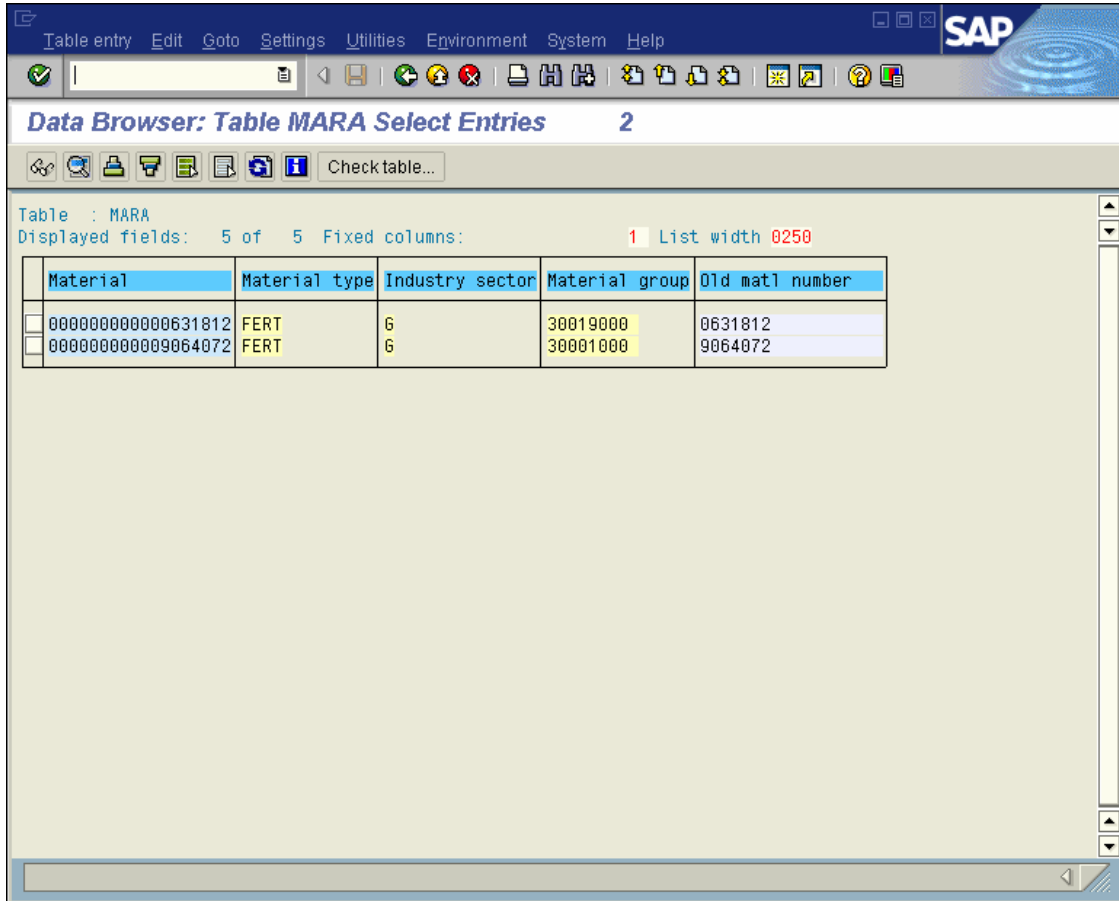
On the main screen of transaction CMOD are the activate/deactivate buttons. The project must be activated from this screen.



Material Number Ranges and Formatting

Step 8 Test the New Logic

Using transaction SE16, two MARA records are displayed. The conversion exit does not execute until the record detail is displayed. The material number internal format has not changed. It is still eighteen bytes, zero filled.

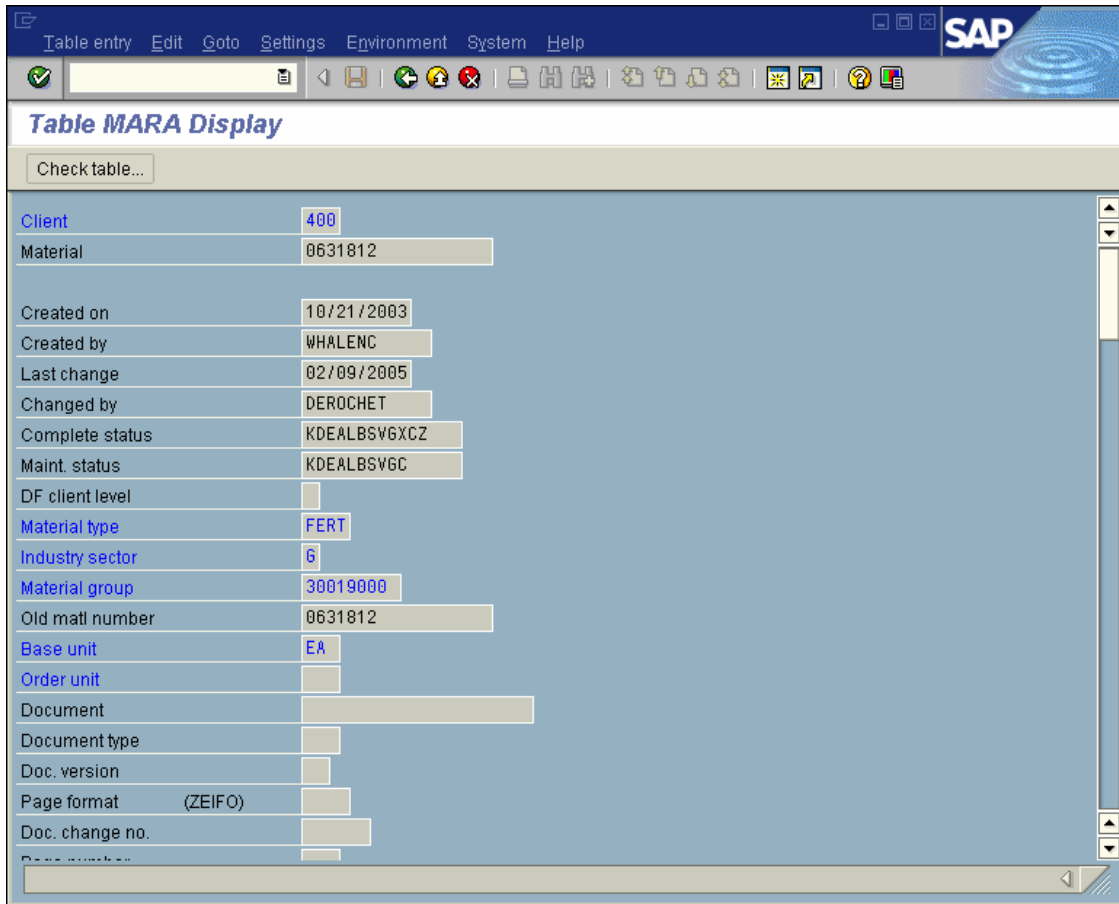


The screenshot shows the SAP Data Browser interface for the MARA table. The title bar reads "Data Browser: Table MARA Select Entries 2". Below the title bar, there are icons for search, print, and other functions, along with a "Check table..." button. The main area displays the table structure and data. The table has five columns: Material, Material type, Industry sector, Material group, and Old matl number. Two records are shown, both with material numbers starting with 00000000000000000000.

Material	Material type	Industry sector	Material group	Old matl number
00000000000000000000631812	FERT	6	30019000	0631812
000000000000000000009064072	FERT	6	30001000	9064072

Material Number Ranges and Formatting

Below is the detail view of the record containing the six byte material number. The logic added one leading zero to the number for output.



The screenshot shows the SAP 'Table MARA Display' window. The title bar includes 'Table entry', 'Edit', 'Goto', 'Settings', 'Environment', 'System', and 'Help'. The SAP logo is in the top right corner. Below the title bar is a toolbar with various icons. The main area displays the following data:

Client	400
Material	0631812
Created on	10/21/2003
Created by	WHALENC
Last change	02/09/2005
Changed by	DEROCHET
Complete status	KDEALBSVGXCZ
Maint. status	KDEALBSVGC
DF client level	
Material type	FERT
Industry sector	6
Material group	30019000
Old matl number	0631812
Base unit	EA
Order unit	
Document	
Document type	
Doc. version	
Page format (ZEIFO)	
Doc. change no.	
Doc. number	

Material Number Ranges and Formatting

Below is the detail view of the record containing the seven byte material number. The logic was not applied to this number.

The screenshot shows the SAP 'Table MARA Display' interface. The title bar includes 'Table entry', 'Edit', 'Goto', 'Settings', 'Environment', 'System', and 'Help'. The SAP logo is visible in the top right corner. Below the title bar is a toolbar with various icons. The main content area displays the following data:

Client	400
Material	9064072
Created on	10/21/2003
Created by	WHALENC
Last change	01/01/2005
Changed by	DEROCHET
Complete status	KDELSVXC
Maint. status	KDELSVVC
DF client level	
Material type	FERT
Industry sector	6
Material group	30001000
Old matl number	9064072
Base unit	EA
Order unit	
Document	
Document type	
Doc. version	
Page format (ZEIFO)	
Doc. change no.	
Doc. number	