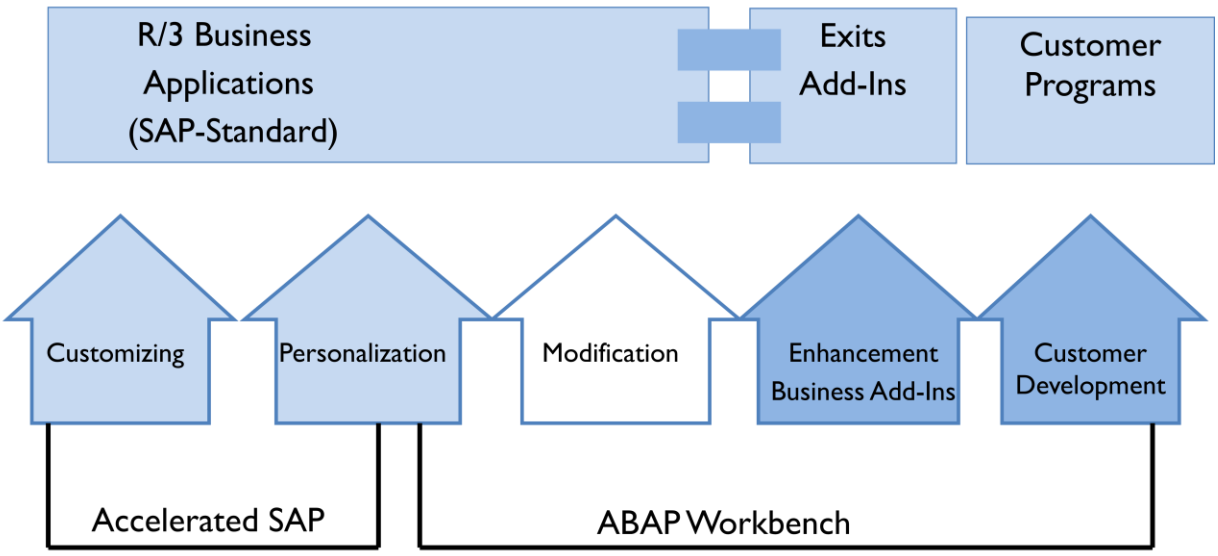
SAP Enhancements

Introduction

- SAP System provides a comprehensive infrastructure for business computing.
- To streamline the business processes some modifications may be done to the standards
- For a specific environment, the functions provided can be enhanced, modified or reduced.
- When making changes to the SAP standard, first determine which type of modification suits best.

Introduction



- There are several ways for modifying a SAP standard.
- R/3 system can be adjusted to meet the customer needs in different ways
  - Customizing
  - Personalization
  - Modifications
  - Enhancements
  - Customer Development

What is Customizing?

- Customizing is the setting of system parameters via SAP's own interface.
- Possible changes to the standards have been thought out and organized by SAP.
- Customizing is an obligatory part of the R/3 implementation process.

- If a company has decided to implement the SAP System, they must adopt the software to meet their individual business requirements
- This process of customizing the system can be controlled and accelerated using the Accelerated SAP method.
- The term Customizing refers to the process of system configuration during which the members of the project teams make the required system settings.
- In the SAP System, Customizing activities are performed through the Implementation Guide (IMG).
- Customizing supports the project teams in the following situations:
    - Implementing the SAP System
    - Enhancing the SAP System
    - in release and system upgrades

Functions of Customizing

- Customizing provides the following functions:
    - Tools for making and documenting system settings
    - Recommendations for system settings
    - Customizing provides a means for controlling the management, editing and analyzing the processes of implementation and upgrade projects
    - Support for transferring the system settings from the test system into the production system
    - Support for transferring the system settings by means of Business Configuration Sets in a group rollout
    - Tools for system upgrades and release upgrades and Pre-configured industry systems

Personalization

- Personalization means to adjust the SAP System to meet the work requirements of specific users or user groups.

- Personalization is aimed at accelerating and simplifying the business transactions that the SAP System processes.
- Based on the "What you see is what you need" slogan, application Personalization refers to two sub-areas:
  - Simplifying navigation
  - Simplifying transactions

Personalization - Simplifying Navigation

- The standard point of entry into the system is the SAP Easy Access user menu.
- Each user of the SAP System can be assigned a user menu tailored to the individual activities of that user that appears when the user logs on to the system.
- System administrators can choose from more than 1200 pre-defined standard roles and assign these roles to one, several or all users of a company.

Personalization - Simplifying Transactions

- Menus and the transactions of the SAP System can be adjusted to the business environment of the company.
- In many cases, the fields and options contained in the standard transactions are not needed for specific process flows.
- Besides other tools, transaction and screen variants are used to adjust the transactions of the SAP System.
- Transaction and screen variants are used to:
  - Hide fields and even entire screens
  - Pre-assign values to fields
  - Change the ready for input status of fields
  - Change the properties of table control columns and hide specific columns
  - Hide menu options

Enhancements to the Standard

- SAP organizes its exits in packages are called SAP enhancements.
- Each SAP enhancement can contain many individual exits.

- Enhancements represent potential customer requirements that have not been developed in the standard.
- Instead, the standard provides for further development of such exits at the customer site, using logic specific to the customer.
- Upward compatibility is assured since SAP guarantees that the call of an enhancement from the standard software and the calling interface will remain valid in future releases.

Enhancements with Customer-Exits

- Enhancements to the SAP Standard with Customer-Exits
  - The R/3 enhancement concept allows you to add your own functionality to SAP's standard business applications without having the need to modify the original applications.
  - SAP creates customer exits for specific programs, screens, and menus within standard R/3 applications.
  - These exits do not contain any functionality.
  - Instead, the customer exits act as hooks where add-on functionality can be hanged.
  - Customer exits are not available for all programs and screens found in the SAP System.
- There are two main reasons why exits should be used rather than modifying SAP software.
- Add-ons attached to exits have the advantage that:
  - They do not affect standard SAP source code
    - When a new functionality is added to SAP System using SAP's exits, the source code of standard SAP programs in not altered any way.
    - The code and screens created are encapsulated as separate objects.
    - These customer objects are linked to standard applications, but exist separately from SAP's standard software package.
  - They do not affect software updates

- When adding new functionality to SAP System using SAP's exits, the objects (called customer objects) must adhere to strict naming conventions.
- When it comes time to upgrade a to a new software release, customer objects' names ensure that they will not be affected by any changes or new additions to the standard software package.

Types of Exits

- There are several different types of customer exits.
- Each of these exits acts as hooks where add-ons can be attached or "hanged".
- Menu Exits
  - Menu exits add items to the pulldown menus in standard SAP applications.
  - These menu items can be used to call up own screens or to trigger entire add-on applications.
  - SAP creates menu exits by defining special menu items in the Menu Painter.
  - These special entries have function codes that begin with "+" (a plus sign).
  - Specify the menu item's text when activating the item in an add-on project.

- Screen Exits
  - Screen exits add fields to screens in R/3 applications.
  - SAP creates screen exits by placing special subscreen areas on a standard R/3 screen and calling a customer subscreen from the standard screen's flow logic.
  - The subscreen is called during flow control of the main screen with the CALL CUSTOMERSUBSCREEN statement.
  - Function Module Exits
  - Function module exits add functions to R/3 applications.
  - Function module exits play a role in both menu and screen exits.
  - SAP application developers create function module exits by writing calls to customer functions into the source code of standard R/3 programs.

- These calls have the following syntax: CALL CUSTOMER-FUNCTION '001'.

Locating Applications that Have Exits

- To take advantage of exits if SAP has added them to one of its standard applications, we need to know how to locate the exits available in the SAP System.
- SAP organizes its exits in packages called SAP enhancements.
- Each SAP enhancement can contain many individual exits.

Locating Exits

- Choose Tools→ ABAP Workbnch → utilities -->Enhancements --> Project Management from the ABAP Workbench menu.
- The CMOD Screen is displayed.
- Then choose utilities --> SAP enhancements to call a selection screen that allows to look for the exits available in the standard applications.

Creating An ADD-ON Project

- To Use the exits , an add-on project has to be created
- This project allows to organize the enhancement packages and exits to be used.
- The add-on project also allows to hang add-on functionality onto the exit hooks contained with SAP enhancements.

Managing an Add-On Project

- An add-on project contains a series of exits, as well as the add-ons that is to be developed to attach to these exits.
- To create an add-on project from within the ABAP Workbench menu, choose

  Utilities→ Enhancements→Project management.

  - Before defining a project, decide which application, application component, or specific standard transaction would be added to the functionality .

- Give the project a name that indicates the type of functions it contains and that shows which transactions are affected. It may be useful to agree upon a company-wide naming convention for enhancement projects.

ADD-ON Project

- There are two factors to keep in mind when creating an add-on project.
  - The same SAP enhancement may not appear in two separate customer projects.
  - In order to make add-ons, such as menu items or screen fields, appear in standard R/3 applications, activate the add-on project.
    - When a project is activated, all of the add-ons created within this project are activated as well. For this reason, ensure that the exits included in the project contain functions that can be activated simultaneously.
    - It is not possible to activate exits individually.

Creating Add-Ons

- After the project name is specified :
  - Choose Create.
  - Describe the nature of the project by providing a short descriptive text.
  - Choose Save. The system then prompts to assign a change request. This assignment allows to transport the project and its components into a productive system once completed.
  - Specify which SAP enhancement packages has to be included in the project by choosing SAP enhancements.
  - Enter the names of these SAP enhancements in the spaces provided.

- Enhancement packages that logically belong together should be choosen.
  - For example, if we plan to use several enhancements that deal with Materials Management modules, include all of these enhancements in the same project.
  - If working on enhancements that deal with different applications, or if the enhancements are not logically related, include these enhancements in separate projects.

  - On identifying the SAP enhancements to be included in the project, add own functions to the exits offered in the enhancements.

- To display the individual components of the SAP enhancements, return to the main screen of the Project Management transaction and choose Enhancement components.
- The system displays all of the exits included in the enhancements assigned to the project.

Activating and Deactivating a Project

- After attaching the add-on functionality to the exits in the project, activate the project.
- Activating a project turns on all the add-ons.
- When activating the project, the system turns on all add-ons that the project contains.
- Individual add-ons cannot be activated separately.
- To activate an add-on project:
  - Call the Project management transaction.
  - Choose Activate project.
  - The system displays a message confirming that the project was activated.
- To make changes to any of the add-ons, first deactivate the project that contains that add-on.
- Deactivating a project turns off all of that project's add-ons.
- To deactivate an add-on project:
  - Call the Project management transaction.
  - Choose Deactivate.
  - The system confirms that the project was deactivated.
- Once the project is turned off, make changes to the project's add-ons or build new functions and attach them to other exits in the project.

Transporting Add-on Projects

- When an add-on project is created , assign the project to a change task.

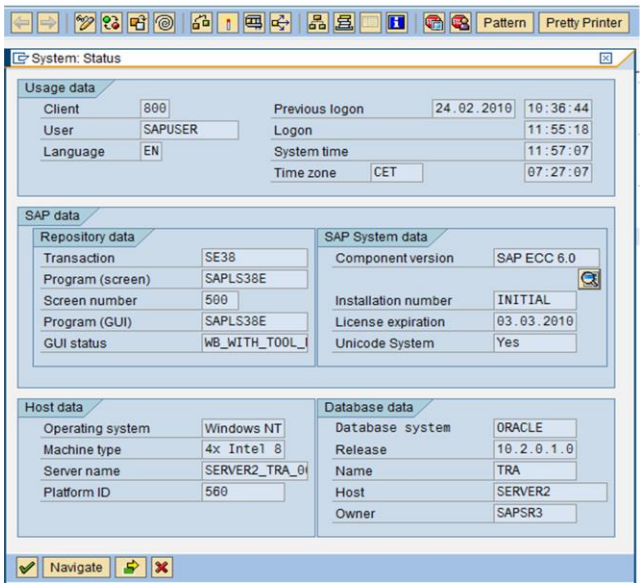
- Assign all of the add-on components (include programs, subscreens, and menu texts) a change task number.
- If the project is spread out over more than one change task, assign these tasks to the same change request.
- On completion, release the change tasks.
- As a final step, release the change request that contains all the change tasks for the project.
- The system will export the add-on project and coordinate its import into a either a consolidation system or productive system.
- Check to make sure that the add-on project is active in this system.

Customer-Specific Menus

- Menu exits allows to add own functions to the pulldown menus in standard R/3 transactions.
- To take advantage of a menu exit, create a project .
- Then, include the SAP enhancement package that contains the menu exit which is to be used in the project.

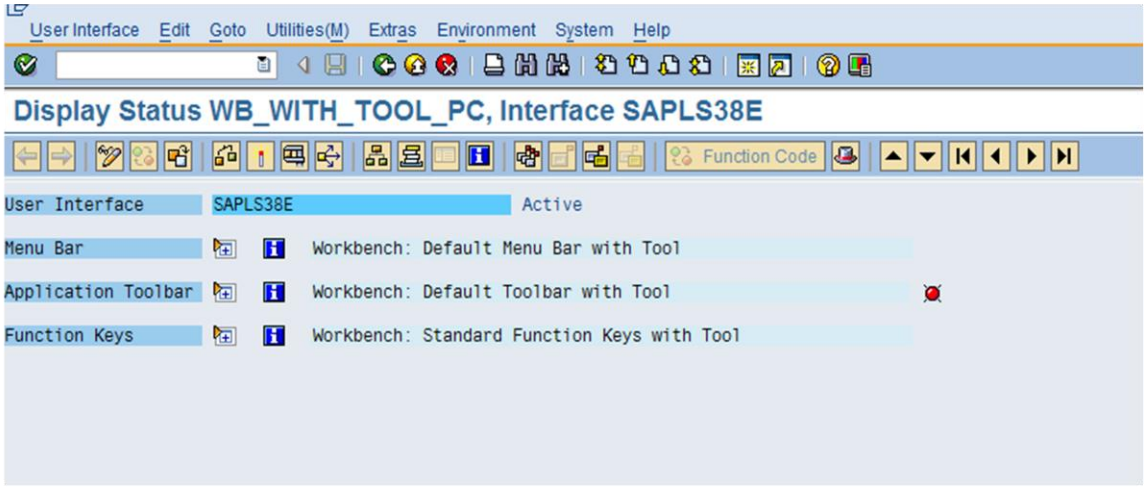
Locating Menu Exit : Example Tcode : SE38.

- Goto SE38, ABAP Editor Change Report Screen.
- Choose System→ Status



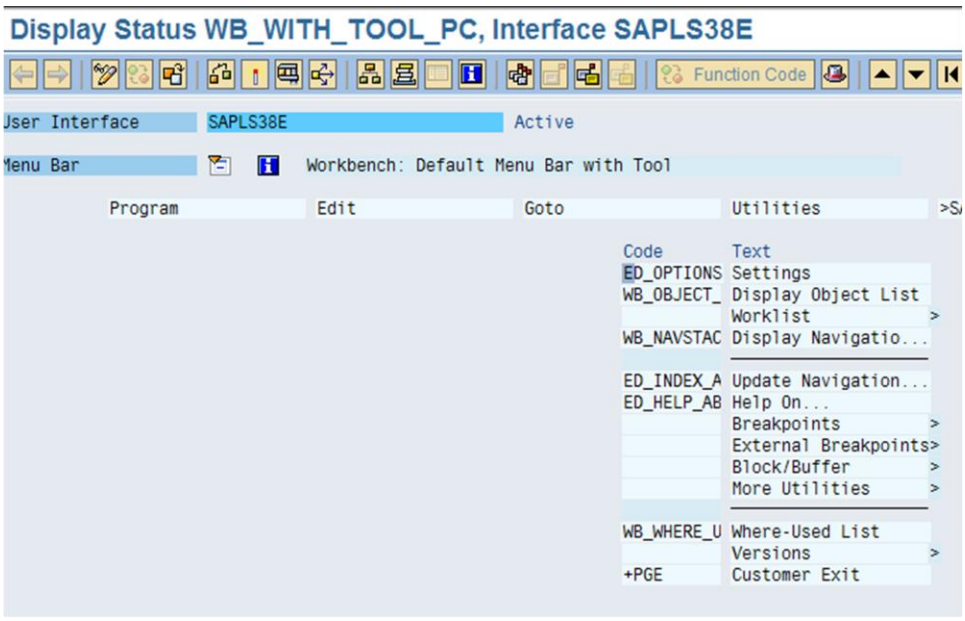
Menu Exit - Example

- Double Click on the GUI Status.
  - In this Example double click on WB_WITH_TOOL_PC which corresponds to GUI status.



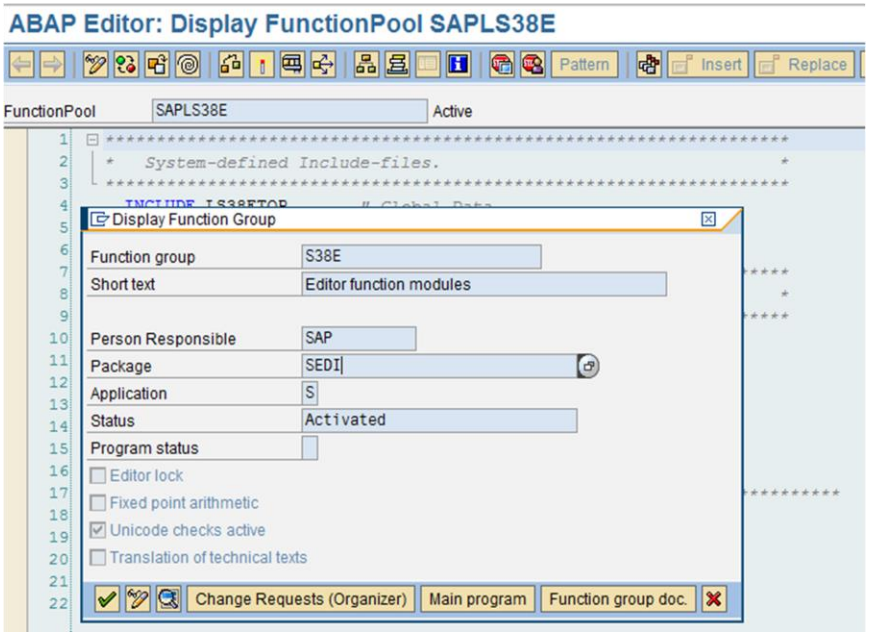
Menu Exit – Example (Contd.).

- Expand the Menu Bar to see if any of the menu items function code has a prefix '+'.



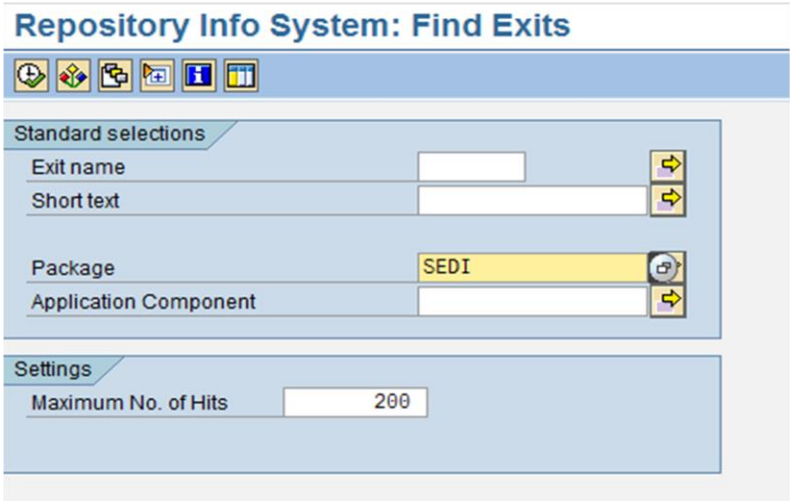
Menu Exit – Example (Contd.).

- There is one menu exit in the utilities menu attached to SE38.
- Find the package to which the program belongs to.



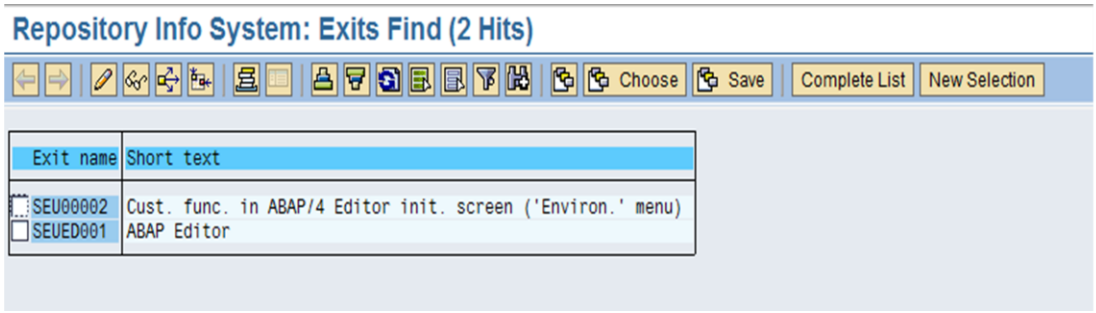
Menu Exit – Example (Contd.).

- Go to Transaction code SMOD or
  - Tools →ABAP Workbench →Utilities→ Enhancements →Project Management→ Utilities→SAP enhancements
  - Specify the package name and Execute.



Menu Exit – Example (Contd.).

- The list of exits belonging to that package is displayed.



Step-by-step process for creating Menu Exit

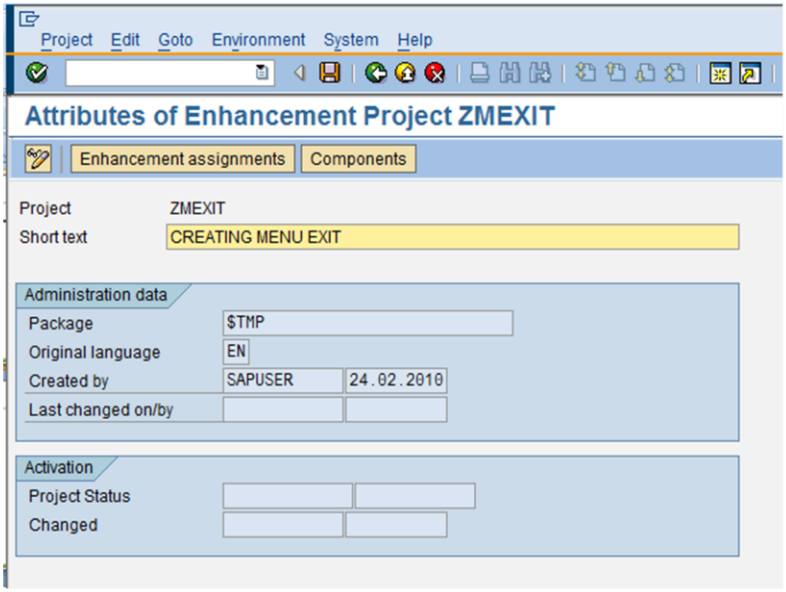
- Tools →ABAP Workbench →Utilities→ Enhancements →Project Management

(or)

- Evoke the transaction code CMOD
- Specify the project name

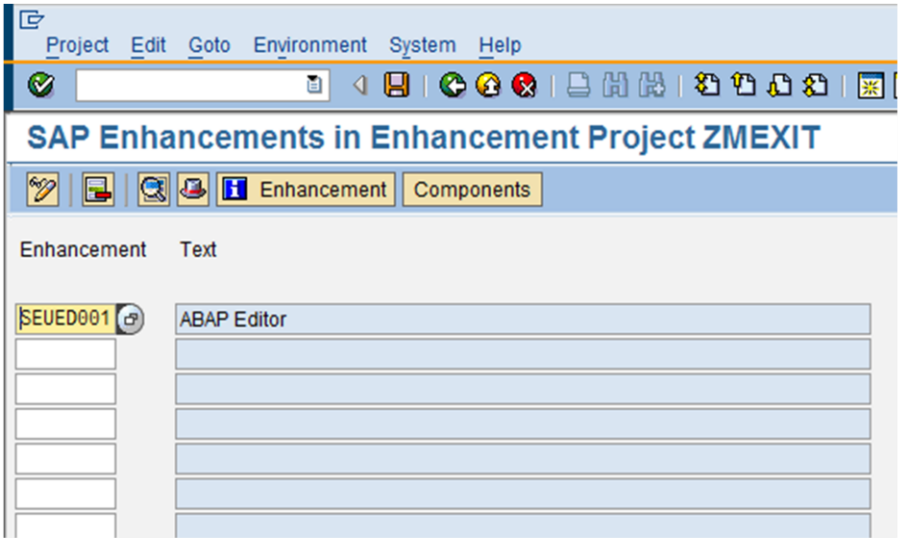
Menu Exit – Example (Contd.).

- Enter the description of the project and save it.



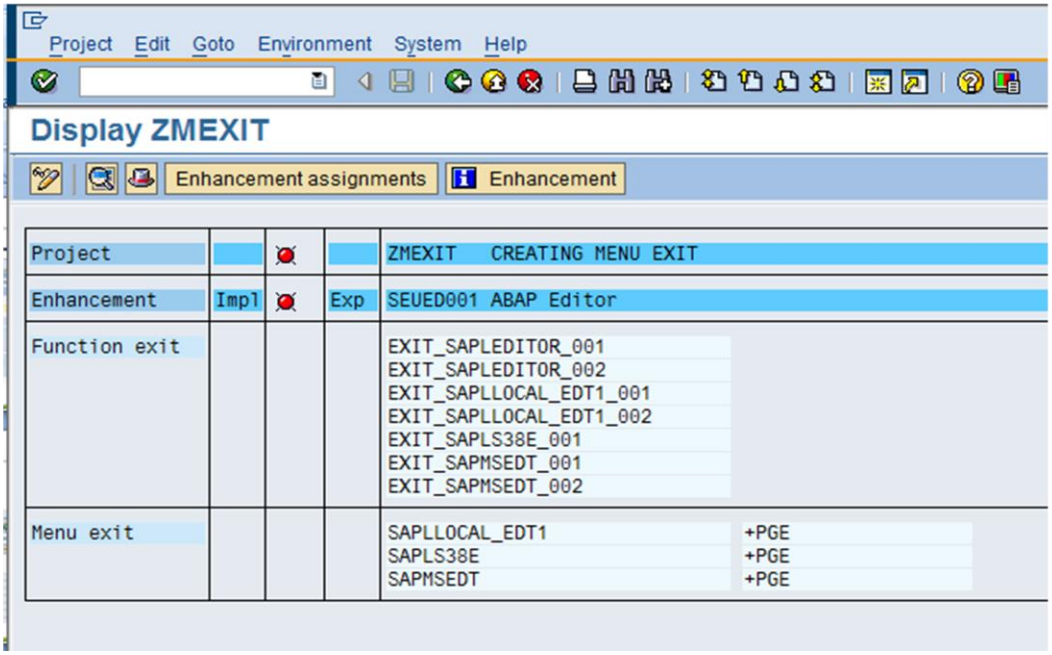
Menu Exit – Example (Contd.).

- Select enhancement assignments.
- Choose the menu exit.



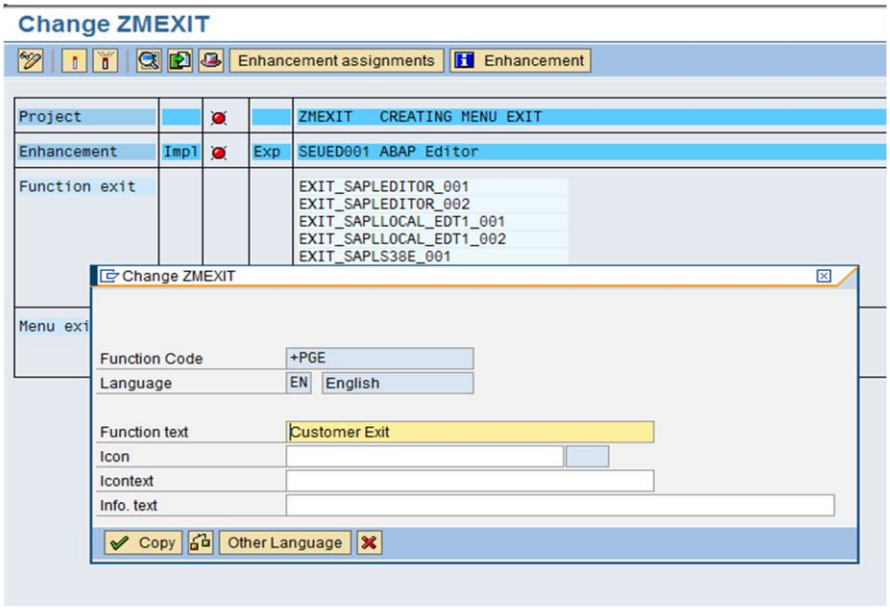
Menu Exit – Example (Contd.).

- Choose Components.



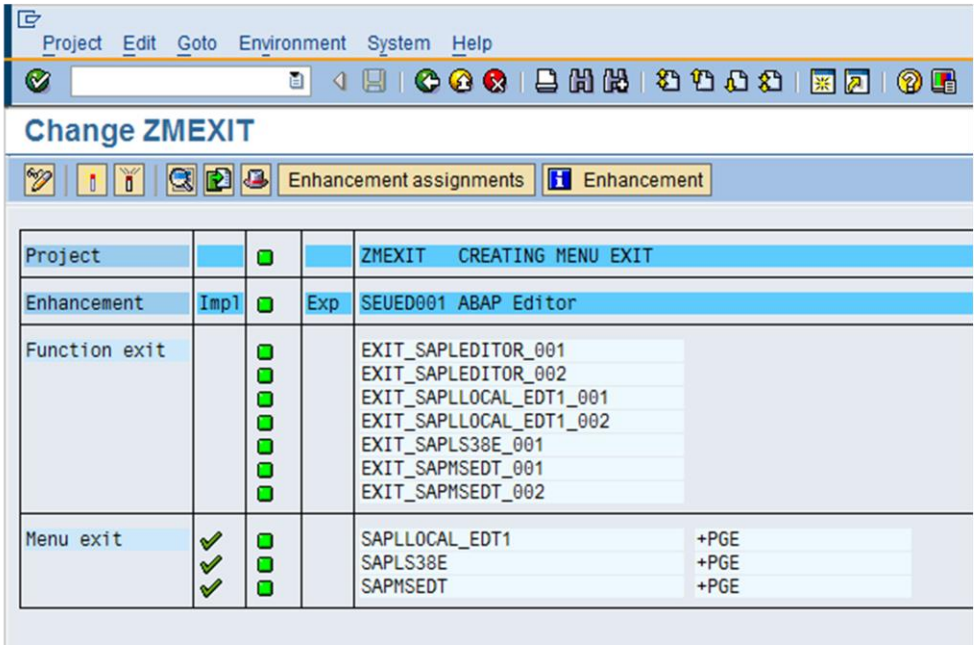
Menu Exit – Example (Contd.).

- Double click on the function code (In this example:'+PGE').
- Enter the name of the menu function in the function text.



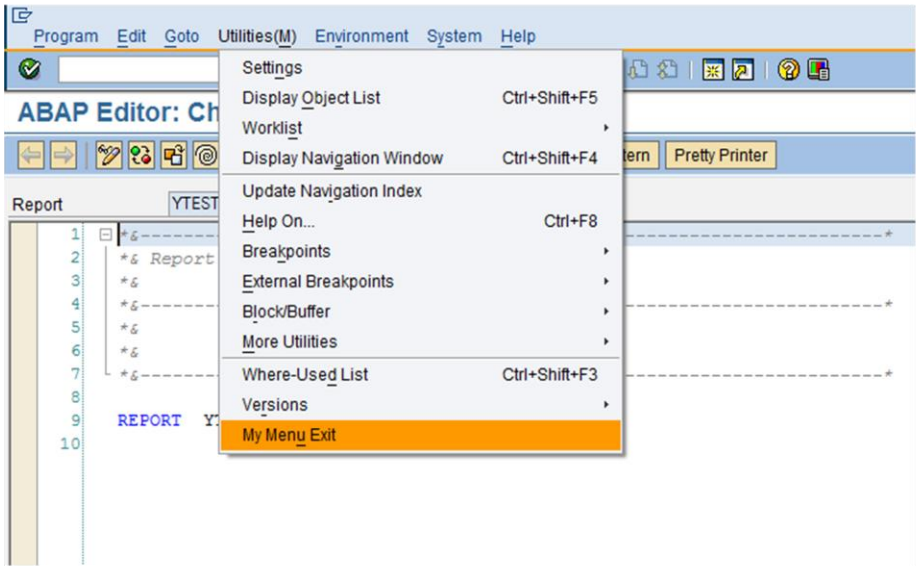
Menu Exit – Example (Contd.).

- Save and activate.



Menu Exit – Example (Contd.).

- The menu is displayed in the ABAP Editor.



- Customer Development
  - During customer development, customer-specific objects are created in the customer namespace.
  - SAP has reserved namespaces for customer objects.
  - Using these namespaces ensures that the objects are not overwritten by SAP objects when new objects are imported into the system or during a release upgrade.

Different ways for locating the exits:

I way:

To find the user exit for custom master-XD01.

a) Go to transaction XD01.

b) Go to System--> Status in menu bar.

c) Double click on the program SAPMF02D.

d) Select Find -- CALL CUSTOMER-FUNCTION & Enter

e) Double click on result i.e. '001'

f) It takes to EXIT_SAPMF02D_001.

G) Double click on Include and write custom code in it.

(OR)

a) Take the middle name from Function module SAPMF02D.

b) Go to SMOD.

c) Enter SAPMF02D(Enhancement name).

II WAY: In case of not middle name.

a) Go to System->Staus of XD01.

b) Go to Program.

c) Go to Attributes.

d) From Package name (VS)

e) Go to SMOD

f) CTRL F.

g) Provide package name & execute.

h) Shows the enhancement name.

III WAY:

a) Go to SMOD.

b) Press F4.

c) Click on SAP APPLICATION BUTTON.

d) SD->SD->VS->shows enhancements.

IV WAY: a) Go to SE93.

b) Give The T-CODE (MM01) DIsplay.

c) Go to System-> Status. u will get a Package.

Enhancements to ABAP Dictionary Element

- Following enhancement techniques are available to Enhance ABAP Dictionary elements
- Add custom fields to SAP tables without modifications using,
  - Append Structure
  - CI Include
- Text enhancements to Change the field label and documentation of data element.
- Create secondary indexes for SAP tables without making modifications using Extension Index.
- Add additional fixed values to SAP domains without making modifications using Fixed Value Append.

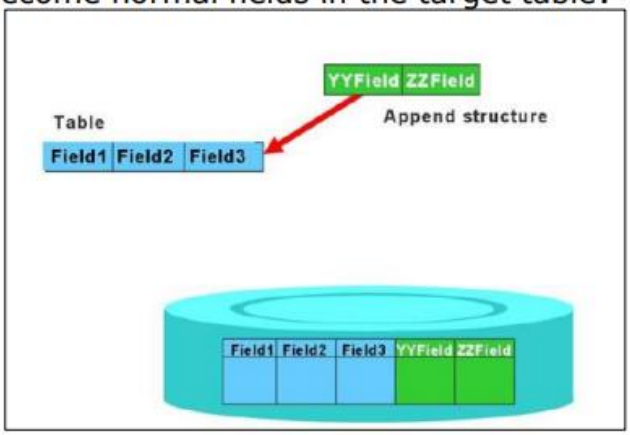
Note: Enhancement techniques 3 & 4 are available In SAP NetWeaver 7.0.

Enhancements to ABAP Dictionary Element

- There are two ways that you can add extra fields to an SAP table without a modification:
  - Append structure
    - Created in Customer Namespace
    - Customers can create an append structure for an SAP table (without SAP preparation)
    - Multiple append structures can be used with a single SAP table
    - They can be used in the same way as normal structures in programs
  - Customizing include
    - Is already integrated into SAP tables by SAP
    - The customer fills it with the desired additional fields
    - May contain source code or screen exits provided by SAP for processing or displayi the fields

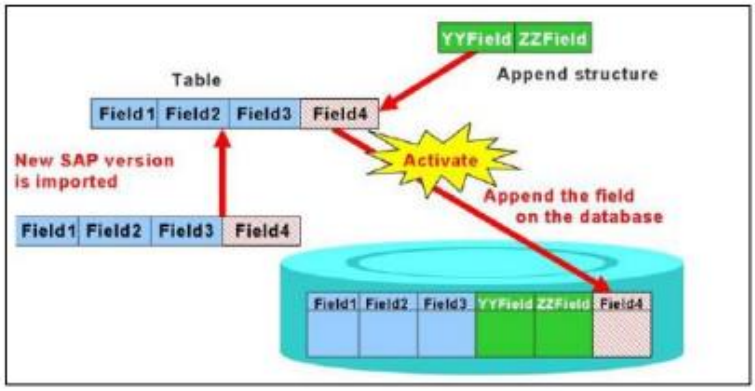
Append Structures

- Append structures allow you to attach fields to a table without the need to modify the table itself.
- If you copy a table that has an append structure attached to it, the fields in the append structure become normal fields in the target table.



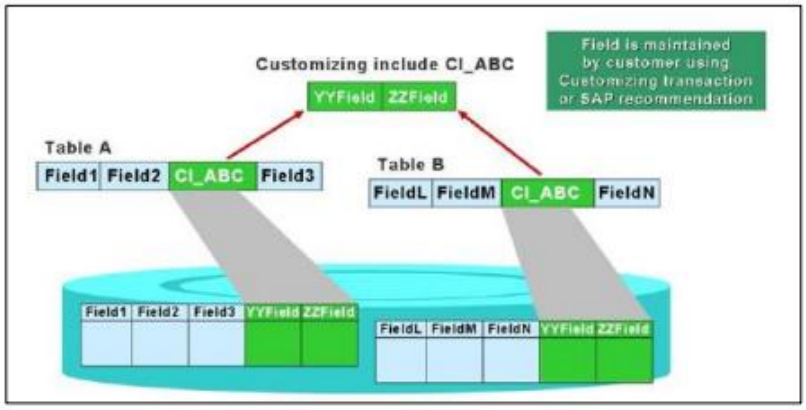
- Append Structures at Upgrade
  - You create append structures in the customer namespace. This protects them from being overwritten at upgrade or during release upgrade.
  - New versions of standard tables are loaded during upgrades. The fields contained in the active append structures are then appended to the new standard tables when these new standard tables are activated for the first time.
  - From Release 3.0, the field sequence in the ABAP Dictionary can differ from the field sequence in the database. As a result, no conversion of the database table is required when adding an append structure or inserting fields into an existing one.
  - All the necessary structure adjustment is taken care of automatically when you adjust the database catalog, ALTER TABLE.

- Append Structures at Upgrade

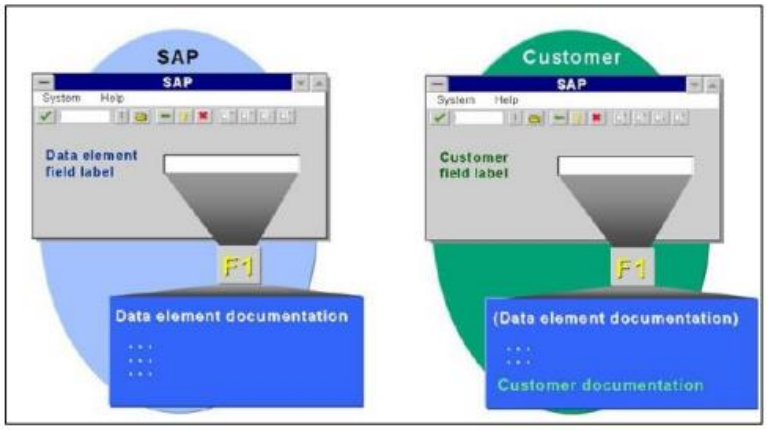


- Customizing includes
  - Some of the tables and structures delivered with the R/3 standard contain special include statements: These are known as Customizing includes.
  - Customizing includes are part of the customer namespace, and their names start with "CI_". This naming convention guarantees that nonexistent Customizing includes do not lead to errors.
  - The Customizing include field names must lie in the customer namespace just like field names in append structures. These names must all begin with either "YY" or "ZZ".
  - In contrast to append structures, Customizing includes can be inserted into more than one table. This provides for data consistency throughout the tables and structures affected whenever the include is altered.

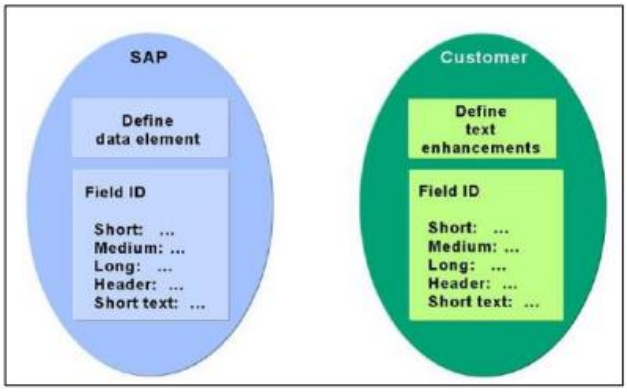
- Customizing includes



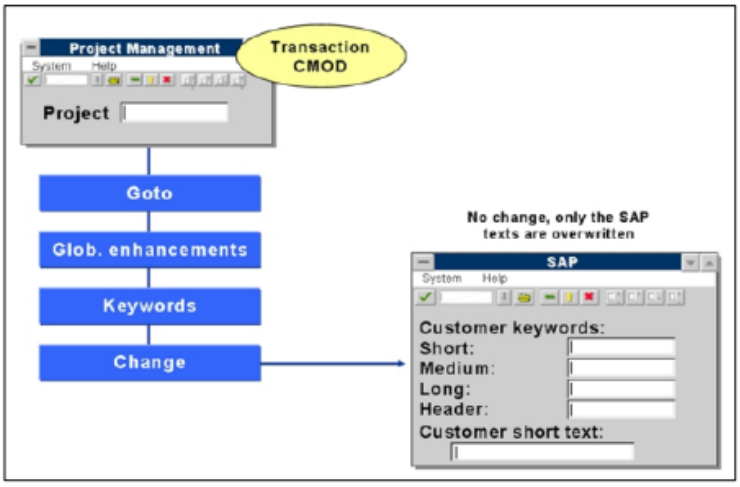
- Text Enhancements: Overview
  - Possible text enhancements include "Customer keywords" and "Customer documentation" of data elements.
  - Text enhancements differ from other application enhancements in that they take effect globally in all the related SAP applications after activation (Global enhancements)



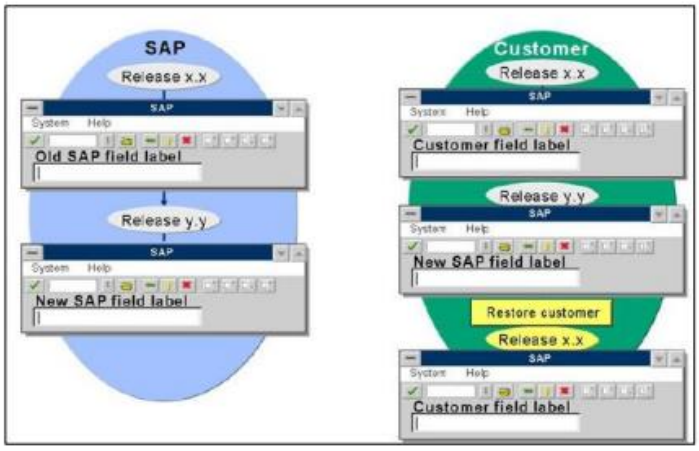
- Overwriting SAP Field Labels (Keywords)
  - SAP application programmers define keywords in different lengths and provide a short description for each data element.
  - Use the project management function to change these keywords and short text.
  - All the screen fields that use the keyword text of data elements can be renamed in this way.



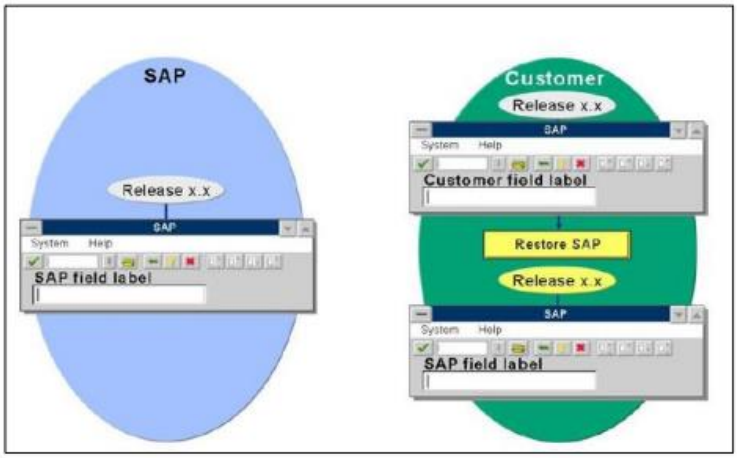
- Overwriting SAP Field Labels (Keywords)
  - To edit the text elements in project management, choose ABAP Workbench→ Utilities→ Enhancements→ Project management.



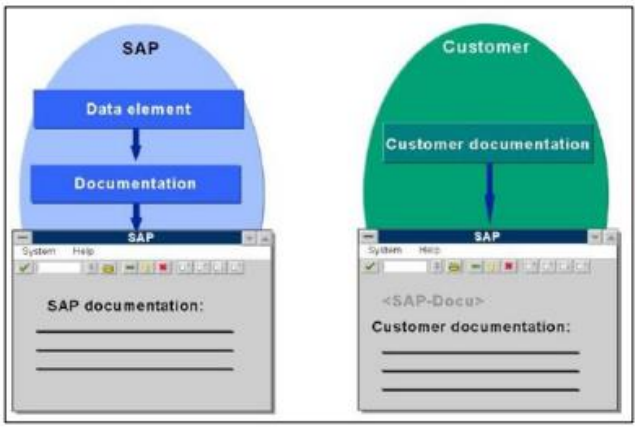
- Overwritten Texts in Upgrades
  - You must always restore keywords after a release upgrade or after new corrections have been imported whenever SAP has redelivered the existing keywords.
  - If customers want to retain their own keywords from the last release, they should choose the menu option, Restore customer.
  - SAP recommends that you always restore your keywords after a release upgrade



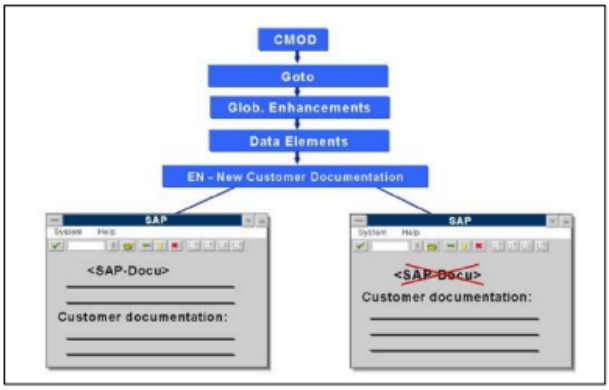
- Restoring SAP Field Labels
  - To undo keyword changes, choose the menu option, Restore SAP.
  - Keywords are restored by a program running in the background. This program checks all the data elements that you have edited and restores their keywords and short text, if necessary.



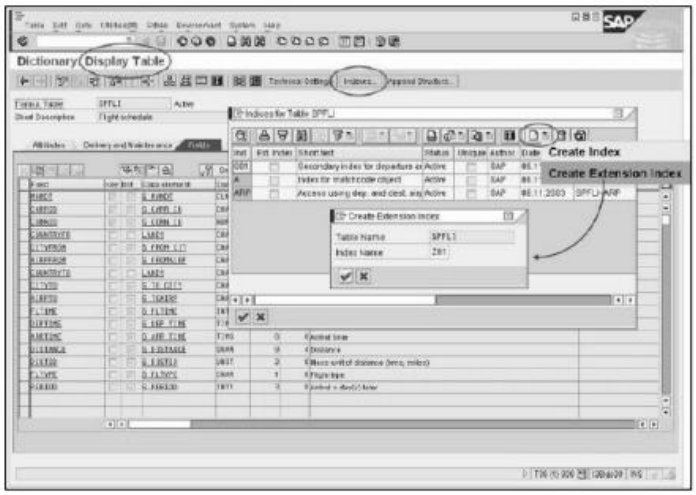
- Enhanced Documentation for Data Elements
  - When enhancing data element documentation, include your SAP documentation as an include module. By doing this, you do not lose the reference to SAP documentation. Any following documentation delivered by SAP is also taken into account.
  - Simply delete your own documentation if you want the original SAP documentation to be displayed



- Creating Customer Documentation
  - You also have the option to create your own data element documentation independent of the SAP documentation.
  - Notice that this is not recommended because the reference to SAP documentation is lost.
  - If SAP R/3 Enterprise delivers a new version of the documents in question, you may miss important information

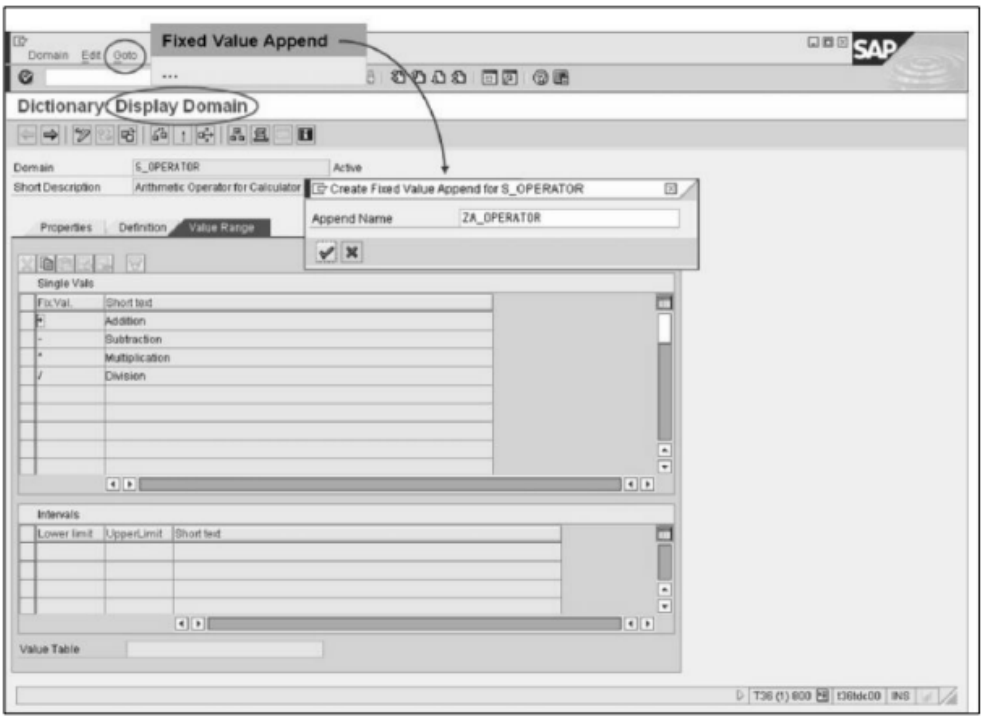


- Extension Index for SAP Tables
  - Creating a secondary index for an SAP table is a modification even though the customer name space is retained.
  - In SAP NetWeaver 7.0, you have the option of creating secondary indexes without making modifications. This type of index is called an Extension Index.



- Fixed Value Append for SAP Domains
  - Previously, you had to use modifications to add additional fixed values to SAP domains.
  - 2.In SAP NetWeaver 7.0, you can use fixed value appends to add additional fixed values and you do not have to use modifications.
  - 3.The following two figures(next 2 slides) illustrate how to create a fixed value append for an SAP domain.

- Creating a fixed value append



Enhancement Framework

Goal

The Enhancement Framework enables you to add functionality to standard SAP software without actually changing the original repository objects and to organize these enhancements as effectively as possible.
With this new technology you can enhance global classes, function modules, Web Dynpro ABAP components, and all source code units using implicit enhancement options provided by the system. An application developer can also define additional explicit enhancement options for source code plug-ins and new kernel-based BAdIs, which are also integrated in this new framework.

Previous Concepts

The previous concepts include two different methods for adapting SAP software that go beyond the scope of customization:

- Modifications – changes to development objects delivered by SAP with or without the Modification Assistant
- Enhancements – inserting user developments into SAP development objects at predefined positions using customer exits, appends, includes, and classical Business Add-Ins (BAdIs).

The new Enhancement Framework is intended to integrate the existing enhancement and modification concepts, to replace and improve some of them and to add some new ones to address recent developments like Web Dynpro, for example.

Enhancement Point and Enhancement Section are used during **explicit enhancement**.

The basic difference is

Enhancement Point -

If you have written code using enhancement point your custom code will be executed along with the standard code.

Enhancement Section -

If you have written code using enhancement section, only your custom code will be executed replacing standard code. Standard code will not be executed.

The ABAP statements ENHANCEMENT-POINT and ENHANCEMENT-SECTION identify positions where code can be inserted or replaced.

The enhancement spots are used to manage explicit enhancement options. Enhancement spots carry information about the positions at which enhancement options were created. One enhancement spot can manage several enhancement options of a Repository object. Conversely, several enhancement spots can be assigned to one enhancement option.

Enhancement Framework → Explicit Enhancement → Enhancement section

Enhancement Framework -

Enhancement framework is a new technology which brings all the enhancement techniques under a single roof.

→ It has a very good advantage of the 'SWITCH' Framework as it acts like a switch.

There are various techniques which come under the enhancement framework which are,

1. Source code enhancements (plug-ins)
2. Function group enhancements
3. Class Enhancements
4. Kernel-BADI enhancements

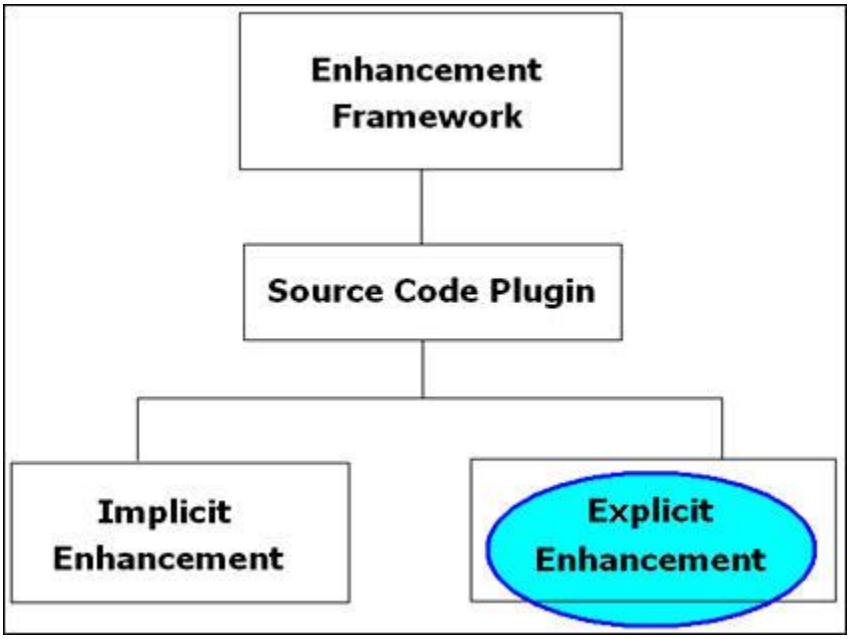
Here our main concern is '**Source code enhancements**'.

→ Source code enhancements (plug-ins) allow us to directly enhance the standard source code without any modifications in the source code.

There are two possible source code enhancements,

1. Implicit Source code enhancement option
2. Explicit Source code enhancement option

→ **Enhancement Source Code Plugin -**



Here our main concern is '**Explicit Enhancement technique**'.

→ **Explicit Enhancement -**

As implicit enhancements are predefined enhancements provided by SAP in the source code, the explicit enhancements can be implemented by the customers or partners.

Note - Explicit enhancements though can be placed anywhere in the source code but, not just anywhere except some areas where SAP would allow (program allows).

→ **Example - (Enhancement not allowed)**

In Explicit Enhancements there are more two ways of enhancing,

1. Enhancement point (Syntax - **ENHANCEMENT-POINT**)
2. Enhancement section (Syntax - **ENHANCEMENT-SECTION**)

Finally, the Wiki will deal with only '**ENHANCEMENT-SECTION**'

Enhancement section is used to replace a set of code or statements with the customer (custom code)

In this technique the original source code does not get executed but, the customer implementation (custom code) gets executed.

To find out how this really works observe a simple scenario,

→ Create a package in transaction **SE80** (**Object navigator**)

→ Navigate to '**Enhancements**' folder of your package.

→ **Package** (say ZDAVE) → **Enhancements**.

→ Right click the '**Enhancements**' → '**Create**' → '**Enhancement Spot**'.

→ Fill in the details in the '**Create Enhancement Spot**' dialog.