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*This sample chapter illustrates the modification adjustment process. It first discusses the transactions that make up modification adjustment, and then focuses on Transaction SPDD, which is the most important and critical of the modification adjustment transactions when it comes to upgrades. It also briefly covers Transactions SPAU and SPAU\_ENH.*

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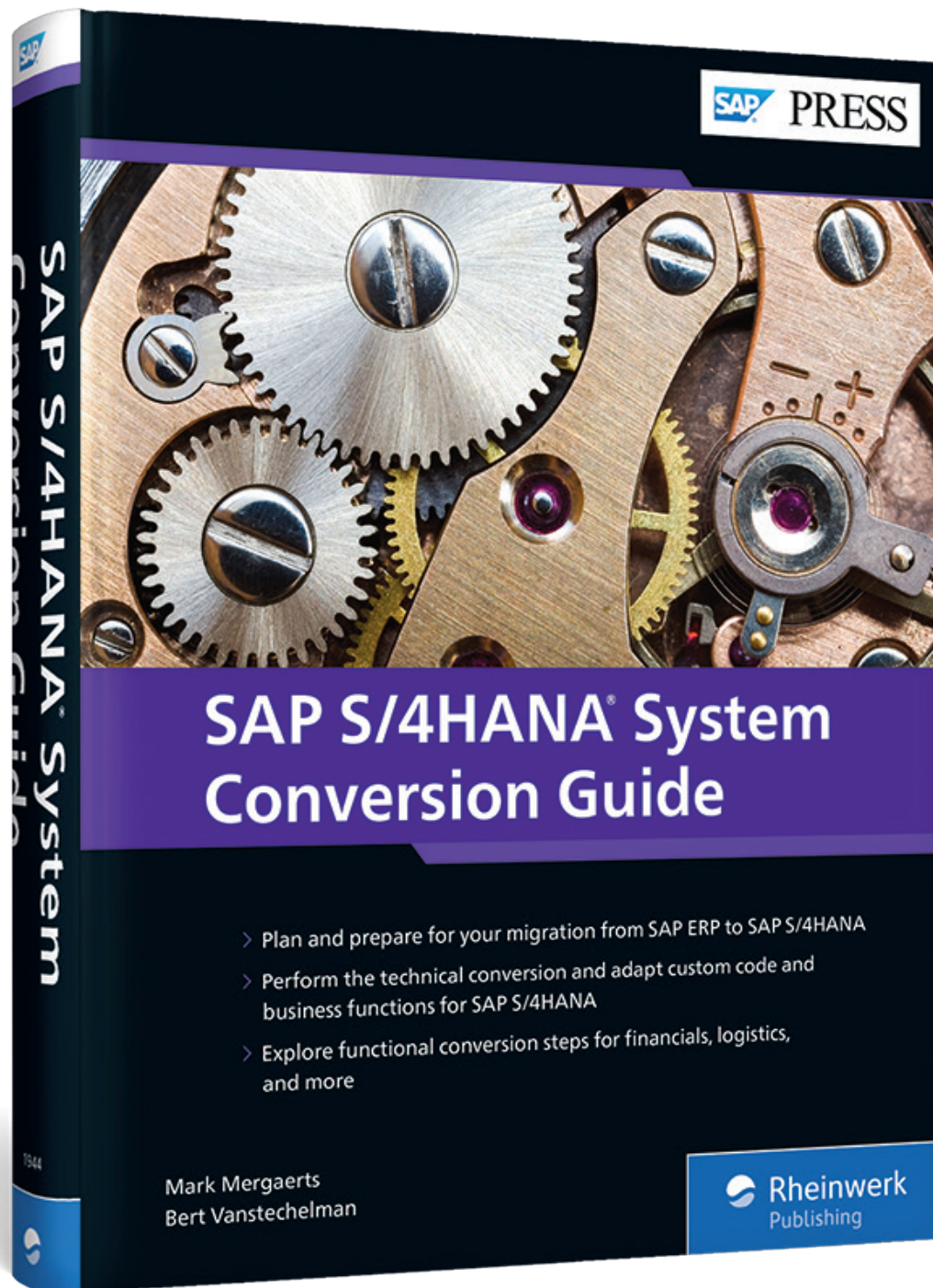
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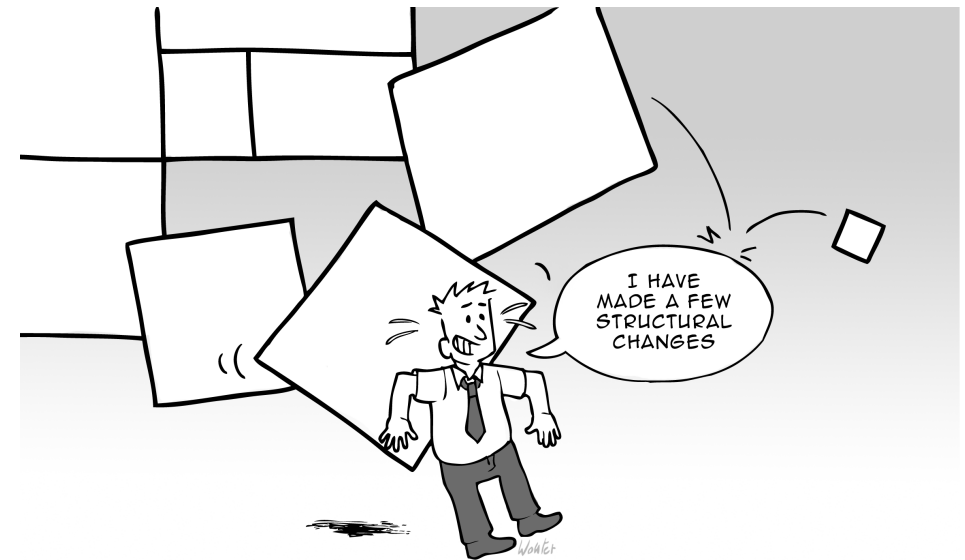


## Chapter 6

# Modification Adjustment

*The release upgrade imports thousands of objects into the SAP system. It's possible, and indeed likely, that developers have changed some of these objects in the local system to adapt them to the company's business needs. If these changes are to be kept in the new SAP release, then they must be combined with the changes SAP itself has made to the objects in the new version. This is where modification adjustment comes in, the subject of this chapter.*

*Modification adjustment is the process of reconciling changes made by SAP to standard ABAP repository objects (as a result of a release upgrade, Support Package update, or SAP Note correction) with customer changes to those same objects.*



Modification adjustment applies both to Data Dictionary objects (tables, structures, data elements, and domains) and development objects (such as programs, function groups, screens, and menus). Because an upgrade changes SAP objects on a massive scale, modification adjustment is critical to ensuring the preservation of data and functionality.

In this chapter, we'll illustrate the modification adjustment process. We'll first discuss the transactions that make up modification adjustment, and then focus on Transaction SPDD, which is the more important and critical of the modification adjustment transactions when it comes to upgrades. We'll also briefly cover Transactions SPAU and SPAU\_ENH at the end of this chapter.

## 6.1 Modification Adjustment Transactions

For technical reasons, modification adjustment is divided into two parts. Each part has its own transaction to carry out the adjustment:

1. Modifications of dictionary objects are performed with Transaction SPDD.
2. Modifications of development objects are performed with Transactions SPAU and SPAU\_ENH. Transaction SPAU deals with customer changes to workbench objects like programs, screens, or object classes, whereas Transaction SPAU\_ENH is used for enhancements.

This distinction is not a consequence of a developer's whim or a design flaw. There is an essential difference in the way the two types of objects are handled. Data Dictionary objects must be activated *during* the upgrade because structure changes may lead to physical conversion in the database, and the upgrade relies on all database objects having the expected structure. This has two important implications:

1. The modification adjustment of Data Dictionary objects must happen before the activation and thus relatively early in the upgrade process.
2. Omitting the modification adjustment, or doing it wrong, can cause a loss of data.

Development objects are less dangerous in this respect. They aren't used in the upgrade, so their adjustment can wait until afterwards. They don't store business data, so mistakes or omissions can cause dysfunctions (like generation errors, short dumps, or missing functionality) but not irretrievable data loss.

If you are the person performing the technical upgrade, then there's another important difference between Transaction SPDD on the one hand and Transactions SPAU/

SPAU\_ENH on the other. Because Transaction SPDD has to be performed during the upgrade, the person who will do so will often be *you*, providing you have at least an adequate knowledge of the Data Dictionary. If you aren't comfortable with the Data Dictionary, then you should delegate the task to someone who is.

### Note

Our distinction between Data Dictionary and development objects isn't entirely accurate. In fact, Transaction SPAU also deals with certain types of Data Dictionary objects—namely, those that don't store data. Examples are views, type groups, table types, search helps, and lock objects. In addition, Data Dictionary objects are also development objects: creating a new table can hardly be called anything but development. Nonetheless, these terms are in fairly common usage, so we'll stick to them.

After reading these paragraphs, it may seem to you that Transaction SPDD is a real challenge and that compared to it, Transaction SPAU is a treat. Not quite: there is one thing that is definitely advantageous about Transaction SPDD. In terms of the number of objects to adjust, the workload in Transaction SPDD is almost always far smaller than that of Transaction SPAU. Transaction SPDD typically involves fewer than 100 objects, many of which only require routine handling. Transaction SPAU, on the other hand, can range from just a few to many thousands of objects (the highest tally we have seen to date is around 7,500). Fortunately (for you, that is), carrying out Transactions SPAU and SPAU\_ENH isn't a burden that will normally fall on your shoulders. In most cases, these adjustments are a task for the developers and, rather than everything being done by one individual, they can distribute the work among themselves. Nevertheless, it's essential for an upgrade or conversion specialist to know about Transactions SPAU and SPAU\_ENH, which is why we'll be spending some time on them in the last section of this chapter.

## 6.2 Preparing and Running Transaction SPDD

Modification adjustment of Data Dictionary objects is performed when the ABAP upgrade process stops at the beginning of the activation phase and instructs you to run Transaction SPDD. This happens during the **Preprocessing** roadmap step, which means that the SAP system is still running productively in the old release. Because modification adjustment is by definition something you do in the target release, you always execute Transaction SPDD in the *shadow* instance.

We'll start this section with an overview of the information and instructions Software Update Manager (SUM) is giving you, and then move on to Transaction SPDD itself. The first steps are logging on to the shadow instance, creating a user in client 000, and opening the system and client for repository changes.

### 6.2.1 Repository Modification

The SUM window that you have currently in front of you is the one shown in Figure 6.1.

**Repository Modifications**

You must now include your repository modifications in the new SAP import.

- 1 The program has found 121 modified objects that you need to adjust and 0 objects are automatically maintained by import of an adjustment transport that you have included into this procedure.
- 2 If you do not have included adjustment transports, please check log file SPDD\_RESET\_CANDIDATES.SBX for potential candidates to reset to SAP original. You may execute report RSUPG\_SPDD\_RESET\_CANDIDATES as an ordinary user (not "DDIC") in the shadow system to automatically perform this reset to SAP original for all identified candidates.
- 3 The S/4HANA conversion has found 53 modified objects that are not part of the target stack and therefore passively deleted. Check carefully if the objects are still required. The detailed list of the objects can be found in "E:\usr\sap\SBX\SUM\abap\warPASSIVE\_DELETED\_DDIC.SBX".
- 4 **CAUTION:** If you do not make adjustments now in transaction SPDD, your modifications will be lost. Even if you do not want to keep your modifications, use transaction SPDD to reset these objects to the original version.

To adjust your repository, proceed as follows:

- 5
  1. Logon to the shadow instance as user "DDIC" in client 000 on server sbxappl01 instance 02.
  2. Set the 'System Change' option with transaction SE06.
  3. Create users for modification adjustment by copying user "DDIC" with transaction SU01.
  4. Logon to the shadow instance as ordinary user and make adjustments with transaction SPDD. For more information, see the SUM guide.
- 6  Adjustments made, continue with procedure

Figure 6.1 SUM Stops for Modification Adjustment

There is quite a bit of useful information on this screen, so let's take a close look at it:

- 1 The first sentence informs you of the number of objects that were changed locally and will therefore appear in Transaction SPDD. In this case, there are 121. That may seem like a substantial number, but often many of these objects will simply need resetting to the original (i.e., SAP standard) version. We discuss the distinction between an actual modification and a return to the original later in this chapter.

Here you also learn that **0 objects are automatically maintained by import of an adjustment transport**. The count of zero simply means that no adjustment

transport is available or that you chose not to use one, something SUM prompted you about in an earlier phase.

If you do use an adjustment transport, then most objects will be adjusted automatically when the upgrade process imports this transport into the system. The number of objects that still need adjustments is then likely to be very low (or ideally, zero). Objects still to be adjusted manually either didn't exist in the source system where the adjustment transport was created, or they were modified in a different way in the current system compared with the source system.

This screenshot comes from a sandbox system, which was the very first in the company's landscape to be converted to SAP S/4HANA. This explains why no adjustment transport exists yet.

- 2 It's possible that some modifications were made based on advance corrections provided by SAP. The new release most probably includes this modification, which means that the new version of the object that comes in with the upgrade is identical to the modified version currently in the system. In this case, as we'll explain later, you will use the **Reset to Original** option in Transaction SPDD. Instead of doing this manually, you can also have the system do it for you by running the special program RSUPG\_SPDD\_RESET\_CANDIDATES in the shadow instance.

This function is relatively new and, to be honest, we've never used it and are unlikely to do so. It's always better to have very precise knowledge of the adjustment process for each object and to document this properly. Therefore, running the complete Transaction SPDD manually at least once is still our preferred way of working.

- 3 The message about objects that will be passively deleted won't always appear. What it means is this: The SAP standard contains tens of thousands of dictionary objects, and most of these are long-lived and remain part of the standard from one release to the next. However, some standard objects become obsolete, and SAP may then decide to leave them out of a new release. During the upgrade, these obsolete objects are deleted and, where applicable, a replacement object is created. This normally goes unnoticed, but if such a condemned object was modified in the local system, then a kind of dilemma occurs: Transaction SPDD can't show the object for adjustment because a new standard version doesn't exist, but on the other hand, the object having been modified means that the replacement object in the new release is unsuitable.

In that case, silently deleting it could lead to potential data loss or corruption. To avoid such a problem, SUM alerts you to the fact that some now-obsolete objects



have been modified and creates an upgrade log listing the affected objects. It's essential that you take this up with the system administration and development teams. If they decide the objects are still needed, then they should create a copy of the object in the customer (Y-Z) name range and replace any references to the obsolete SAP object with a reference to the customer object.

- 4 *Skipping* Transaction SPDD isn't an option! If you do this, then all modified objects will be replaced with the new SAP-standard versions, probably with disastrous consequences and with the only solution a full reset of the upgrade. A word of caution is therefore not out of place.
- 5 These are the steps in the Transaction SPDD process. We describe them in detail in the following paragraphs.
- 6 If you accidentally enable this checkbox and let the upgrade continue before Transaction SPDD is completely finished, then point 4 applies and it's start again from scratch time. To avoid catastrophic mistakes, it might therefore be better to close the browser session in which SUM is running and restart it later when modification adjustment is done.

### 6.2.2 Logging on to the Shadow Instance

There are two ways to open an SAP GUI session in the shadow instance:

- Create a new entry in your SAP Logon menu with the correct system and server name and the instance number of the shadow instance.
- The upgrade process also creates an RFC destination in the primary instance of the system (see Figure 6.2). This destination, with the name SAP\_UPGRADE\_SHADOW\_SYSTEM, points to the shadow instance. Open the destination in Transaction SM59 and use **Remote Logon**. Then log on as user DDIC in client 000.

RFC Destination	
Remote Logon	Connection Test Unicode Test
RFC Destination	SAP_UPGRADE_SHADOW_SYSTEM
Connection Type	3 ABAP Connection
Description	*** generated by SAPup ***
Description 1	
Description 2	
Description 3	

Figure 6.2 RFC Destination for Shadow Instance

### 6.2.3 Creating a User for the Modification Adjustment

Start Transaction SU01 and create a new user ID, preferably as a copy of DDIC or SAP\*. Note that even if you already have your own user in client 000 of the main system, that user doesn't exist in the shadow instance and you must create it again there.

Log off as DDIC and log on with the user you have just created. The upgrade process has unlocked the shadow instance automatically, so logging on as an ordinary user is now possible.

### 6.2.4 Enable Development Changes

For Transaction SPDD to work, both the system and client 000 must be open for workbench changes. Proceed as follows:

1. Call Transaction SEO6 and click **System Change Option**.
2. Change the **Global Setting** at the top of the screen to **Modifiable**.
3. Click **Save**.

#### Note

If the current setting is already **Modifiable**, then we still advise you to click **Save** anyway. We've witnessed situations in the past in which for some reason the setting wasn't properly registered and Transaction SPDD thought the system was still in a nonmodifiable state.

4. Next, call Transaction SCC4 (Client Maintenance), select client 000, and choose **Change**. Confirm the message that the table is cross-client.
5. Go to the **Cross-Client Object Changes** field, and set it to one of the following values:
  - **Changes Allowed to Repository and Cross-Client Customizing**
  - **No Changes to Cross-Client Customizing Objects**
6. Click **Save**.

### 6.2.5 Log on to the Primary System

During modification adjustment with Transaction SPDD, you will probably need to compare Data Dictionary objects in the shadow instance with their current versions in the main system. It's therefore a good idea to also log on to the primary system in parallel with the session you have open in the shadow instance.

**Avoiding Confusion between Sessions**

A possible problem here is that it isn't easy to visually distinguish the two sessions, leading to the risk of inadvertently making changes in the wrong place. A useful tip: in the main system, log on to a client other than 000—for instance, the default client configured for the system. Because the SAP GUI window clearly shows the client number, that makes it easy to see where you are. Also, to look at Data Dictionary objects in the main system, use Transaction SE12 (which is display-only) rather than Transaction SE11 (which allows object maintenance).

**6.2.6 Checking for Possible Data Loss**

Although Transaction SPDD is intended to safeguard modifications to tables and structures and thus to prevent data loss, there is one situation in which such loss could occur without Transaction SPDD being aware of it. This case is described in SAP Note 2535651 and applies both to conversions to SAP S/4HANA and to normal release upgrades—for example, from one Enhancement Package level to a higher one. In Chapter 4, we mentioned that you have to apply SAP Note 2535651 with Transaction SNOTE, but we didn't go into the details of why this SAP Note is necessary.

The potential problem arises if SAP Notes were applied in the system that introduced new database tables or made structural changes to existing tables (e.g., adding new fields). If these SAP Notes are part of the target release and Support Package, then there is no risk of losing data. However, if the SAP Note isn't part of the new release and Support Package, then it's possible that these changes won't be kept. If the modified object is a database table or a structure included in the definition of a database table in the Data Dictionary, not reapplying the modification is likely to cause a data loss.

Before you start Transaction SPDD, call Transaction SE38 and run report RESCUE\_OBJECTS\_WITH\_DATALOSS. You'll see a screen like the one shown in Figure 6.3.

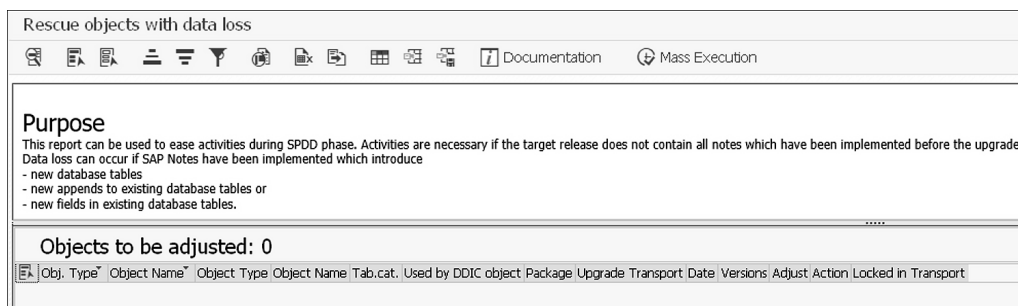


Figure 6.3 Report RESCUE\_OBJECTS\_WITH\_DATALOSS

You can expand the top section by dragging down the separator line. This will display the complete program documentation.

In this example, you're getting a free pass: no objects at risk of data loss were found. You may leave the program and start Transaction SPDD. If objects do appear here, then you must adjust them. The instructions in the program documentation aren't really sufficient to guide you in this; we recommend referring to the text of SAP Note 2535651, which is more helpful.

**6.2.7 Run Transaction SPDD**

Now, it's finally time to run Transaction SPDD itself. Figure 6.4 shows the initial screen of the transaction.

Here, you can narrow your search to just a subset of Data Dictionary objects. With Transaction SPDD, however, you normally accept the default selections and click **Execute**.

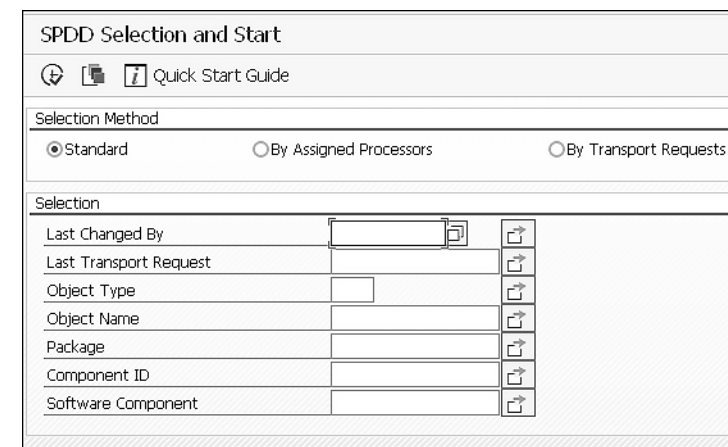


Figure 6.4 Transaction SPDD Selection Screen

The first time you run Transaction SPDD, the system will ask you to create a protocol (log) of the modification adjustments, as shown in Figure 6.5. This protocol holds a record of all actions in Transaction SPDD (and later Transaction SPAU). If a protocol from a previous upgrade exists, then it's possible to use it (the system warns you if the protocol appears outdated, as you can see in the screenshot), but it's better to start a new one for each release upgrade or Support Package update.

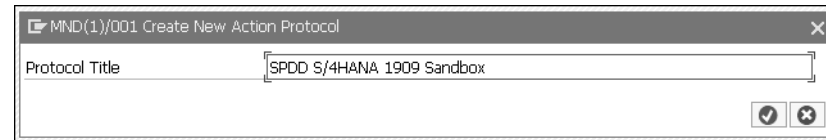


Figure 6.5 Transaction SPDD Protocol Request

Enter a meaningful title for the protocol and press . The system now displays the list of modified Data Dictionary objects.

### 6.3 Transaction SPDD Object List

Before we dive into the details of the object list, it's perhaps best to answer a very basic question: What are you supposed to do here? In essence, Transaction SPDD will present a list of SAP-standard objects that were modified locally at some point in the past. A good example is adding one or more customer fields to a standard table with transaction data to cover some specific business need. For each object, you'll have to decide between two courses of action:

- **Adjust**

This means reapplying the modification in the new version. Remember that the upgrade has overwritten the modified version of the SAP object with a new unmodified one, so to keep a modification you must reapply it to this new version.

- **Reset to original**

It's possible that you don't want to keep the old modification, perhaps because its function is no longer relevant. The modification might also have been incorporated into the new SAP release, in which case the new standard object and the old modified one are actually identical. Resetting an object to its original state means that you accept the new standard version of that object and all changes made to it in the past are discarded. Furthermore, resetting to original sets a flag in the version management for that object, indicating that all past custom modifications to the object are no longer relevant. The object will then no longer appear in Transaction SPDD for future upgrades.

#### Warning

There's obviously a third possibility, which is to do nothing. In practice, that will get you the worst of both worlds: you'll lose the custom change to the object, and even if the new version is identical to the old one, the object will keep appearing in future

Transaction SPDD runs because you didn't formally reset it to original. At the end of Transaction SPDD, every single object must have been treated!

Looking at the top of the list, you'll notice that the screen has three tabs: **With Assistant**, **Without Assistant**, and **Deletions**. The labels of the tabs also show the number of objects in each group, as you can see in Figure 6.6.

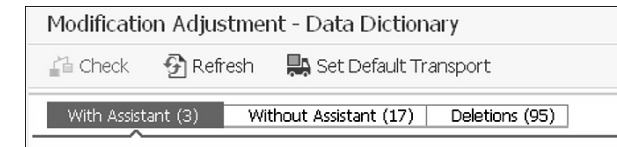


Figure 6.6 Object List Tabs

The assistant mentioned in the labels is the Modification Assistant. This is a standard tool of the ABAP Workbench, which supports developers when making modifications to SAP-standard objects and also helps them when they have to reapply modifications during an upgrade.

For objects listed in the **With Assistant** section, the Modification Assistant can reapply the modification in the new version of the object. This can either be done fully automatically (in which case the object is shown with a green traffic light) or partly automatically, with some manual actions necessary (the object then has a red traffic light).

For objects in the **Without Modification Assistant** section, the Modification Assistant is unable to determine unambiguously how the objects need to be adjusted, and a manual action is therefore necessary. In Transaction SPDD, this is the most critical group of objects: here you will need to decide upon an action (although, as we will see, Transaction SPDD will in most cases create a proposal, which you can simply accept). Unadjusted objects in this section have a yellow traffic light icon.

The **Deletions** list contains SAP objects that were locally changed at some time in the past but which no longer exist in the new release. In most cases, such objects are unproblematic. Exceptions occur when a deleted object is referenced in another customer modification. A typical example of this is customer (Z) tables or structures containing fields that have a standard SAP data type. If that data type no longer exists in the new release, then the Z table becomes invalid.

We already mentioned that for every object in the list, Transaction SPDD shows a status icon, usually a traffic light. Other icons are possible as well. To give you a good understanding of how to interpret them, we describe them here in some more detail:

- **Green checkmark**

If a modification has a green checkmark as its status, then the modification has been successfully applied. No further action is needed (or possible).

- **Green traffic light**

For modifications shown with a green traffic light, you only have to decide whether to let the system reapply the modification or to reset the object to the SAP original. You choose the action from the menu on the right, which we'll look at in a moment.

- **Yellow traffic light**

For objects with a yellow traffic light, you also have to decide whether to adjust them or reset them to original. The difference is that here the Modification Assistant can't help you. To reapply a custom change, you must adjust the object manually (although in some cases the system will present a proposal). You'll therefore have to compare the new standard version with the custom modification. If you decide that the modification must remain, apply it manually yourself. The remainder of this chapter is devoted mainly to describing how to deal with the most common types of modifications.

- **Red traffic light**

In the **With Modification Assistant** section, a red light means that automatic adjustment by the Modification Assistant is only able to apply part of the adjustment; some additional manual action is necessary.

- **Dark traffic light (no color)**

This status normally appears only for the **Note Corrections** category. If you see a dark traffic light in front of an SAP Note, then the associated correction instructions are obsolete because the correction is contained in the upgrade or in the imported Support Package.

- **Trash can**

This status icon appears only in the **Deletions** section and means that the object has been, well, deleted.

## 6.4 Transaction SPDD Transport Request

All decisions about objects, either to adjust or reset to the original, are recorded in a transport request. The first time you keep a modification, you'll be prompted to open a new change request. Enter a meaningful description for this request so that it's clear

that it contains Transaction SPDD modifications; also mention the version (e.g., "SPDD: Conversion S/4HANA 1909"). You'll also be prompted for a change request the first time you reset an object to SAP standard.

### Important

It's very important that all Transaction SPDD actions are registered in just one change request. If several people (e.g., a team of developers) are working on the Transaction SPDD list, make sure they create a single change request, and let all developers create tasks and repairs under that request.

The last action in Transaction SPDD will be to register this transport request for use in later upgrades.

## 6.5 Adjusting Objects

You should now have sufficient background knowledge to get started with the real work, which is to look at each object and adjust it or reset it to the original. Objects in the Data Dictionary can have many different attributes, so there are many ways to modify them. We can't possibly discuss all of these, but long years of using Transaction SPDD have given us a good idea of the types of modifications you're most likely to encounter. We'll begin by showing you the general procedure flow to follow for each object, then we'll cover these modifications in more detail:

- Data elements and domains
- Customer fields added to SAP tables and structures
- Changes in field format (like data type or length) in SAP tables in structures
- Technical settings of tables

Finally, we'll walk you through processing deleted objects.

### 6.5.1 General Procedure

You start by selecting an object in the list. You'll then see a new pane open on the right-hand side of the screen. Figure 6.7 shows an example for a data element.

This pane is subdivided into three parts. At the top, you see details about the object, such as its dictionary type, description, and application component. This section also shows when the object was changed and by whom and in which transport request the



change was recorded. For several items (object name, transport request, and version history), there is a **Display** icon on the far right, which lets you display the detailed information directly from Transaction SPDD instead of having to start a separate session.

The second part of the pane lists all the actions that are available for this object. The contents of this list may differ depending on the type and modification status of the object; we'll discuss the most common actions later in this chapter. To actually perform the action, double-click its **Execute** icon. Simply clicking the activity name shows information about it in the bottom part of the pane.

Let's now do some real work with the objects in the list. We'll begin with the object in Figure 6.7, a data element: data elements, along with domains, will almost always appear in the Transaction SPDD list, and in most cases handling them is relatively straightforward.

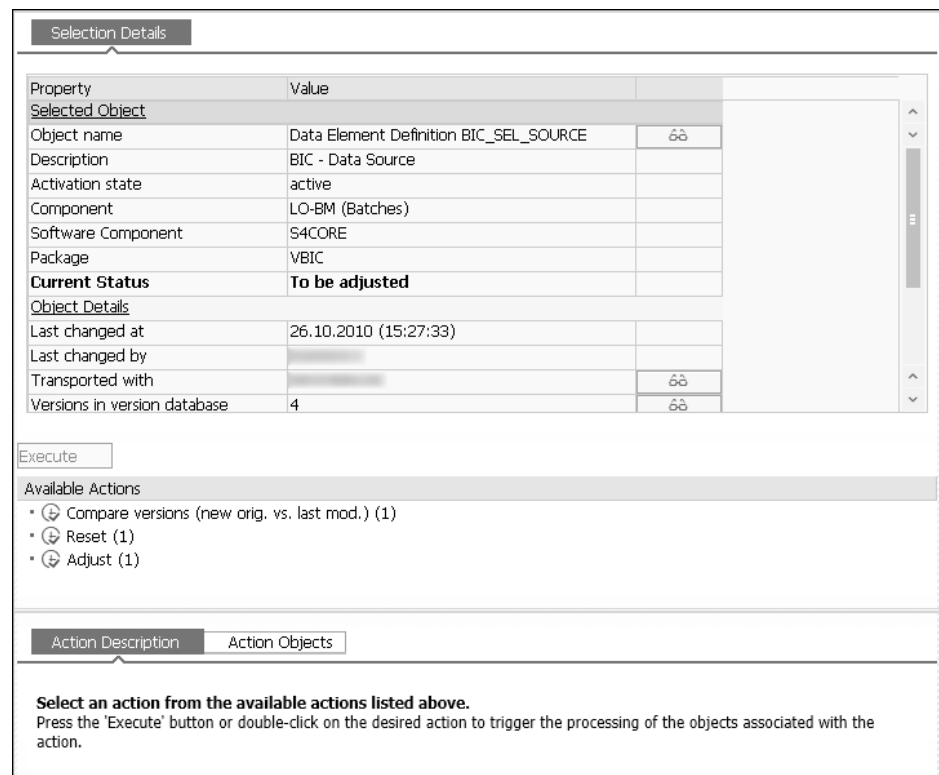


Figure 6.7 Object Information Pane

## 6.5.2 Data Elements and Domains

In the **Available Actions** section in Figure 6.7, you see three actions:

1. **Compare Versions** (new original vs. last modification)
2. **Reset**
3. **Adjust**

The logical first step is to find out in what way the object was changed, and you do that by looking at the version history. Therefore, click the **Execute** icon next to **Compare Versions**. As the full name of the action indicates, this brings up a comparison between the last change—that is, the object as it was before the upgrade replaced it with a new version—and the new standard.

For data elements and domains, version management compares numerous attributes, which can make the screen look a little cluttered. It's best to choose **Delta Display**, which only shows the attributes that are different between the two versions.

With this data element, BIC\_SEL\_SOURCE, you're lucky. The delta display (Figure 6.8) shows that the new standard doesn't differ from the old modified one. This probably means that the change has become part of the standard. The correct decision therefore is to accept the new standard—in other words, reset to original. In the action list, click **Execute** next to the **Reset** action. Because this is the first object you are processing, you're asked to open a new change request.

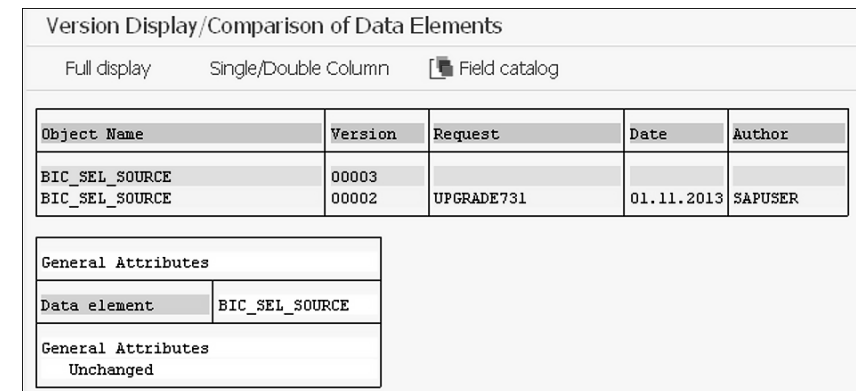


Figure 6.8 Object without Differences

In the main list, you now see the object as shown in Figure 6.9. Note that the status column shows an icon we didn't mention before when we described the various status icons.

Status	Main Object Name	Obj.	Object Name
Main	DTEL BIC_SEL_SOURCE	DTED	

Figure 6.9 Object Status after Reset

This status means that the object has been reset to original. The reason why we didn't talk about it is that reset objects disappear from the list as soon as you click **Refresh** or when you leave and restart Transaction SPDD. In (very) old releases, an object that was reset to original didn't disappear from the Transaction SPDD list, and it was even possible to reverse the **Reset** status so that you could edit the object again. Unfortunately, these possibilities no longer exist. You must use version management for the object in question if you want to make any changes after having reset the object to original in Transaction SPDD or SPAU. To find out which objects were reset, you can use the Transaction SPDD protocol or Transaction SE95\_UTIL (Modification Browser Utilities). For the next object we'll examine, a domain, there's a little more work to do, as shown in Figure 6.10.

Object Name	Version	Request	Date	Author
LMBP_FCODE	00004			
LMBP_FCODE	00003	PRDK900043	02.11.2013	UPGRADE6

General Attributes	
Domain name	LMBP_FCODE
General Attributes Unchanged	

Fixed Values			
	Fixed	Upper limit	Short text
9000000010			User-defined function code 10
9000000010			Print Ship SSCC Label
9000000011			User-defined function code 11
9000000011			Get Case Pick task data
9000000012			User-defined function code 12
9000000012			Get Other Case Pick To line
9000000013			User-defined function code 13
9000000013			User-Defined Funct. code

Fixed Values	
Changed:	4

Figure 6.10 Domain Needing Adjustment

Here, the text associated with several fixed values of the domain has changed. The color pattern helps you to distinguish between the old, modified version (darker background) and the new standard version (lighter background). Looking at the texts, it's clear that this is a case in which you want to preserve the modification: SAP supplies this domain with a series of generic texts, and the customer chose to replace the text for values 900000010 to 900000012 with something more meaningful for their business (900000013 also differs, but here both texts are generic).

To process the object, click **Execute** next to the **Adjust** action. This opens the maintenance screen for the domain (which you can also reach via Transaction SE11). Open the **Value Range** tab and replace the three generic texts with the customer's own, as shown in Figure 6.11.

I	Fix.Val.	Short Descript.
	900000007	User-defined function code 7
	900000008	User-defined function code 8
	900000009	User-defined function code 9
	900000010	Print Ship SSCC Label
	900000011	Get Case Pick Task Data
	900000012	Get Other Case Pick to Line
	900000013	User-defined function code 13
	900000014	User-defined function code 14

Figure 6.11 Adjustment in Data Dictionary

Save the change (which prompts you for a change request, with the open Transaction SPDD request as default choice). There's no need to activate; this will be handled by the upgrade later.

Press the **Back** key to return to Transaction SPDD. The status icon of the object has changed to a green checkmark, showing that the adjustment is finished (Figure 6.12).

Status	Main Object Name	Obj.	Object Name
Main	DOMA LMBP_FCODE	DOMD	

Figure 6.12 Object Status after Adjustment

### 6.5.3 Customer Fields in SAP Tables and Structures

We'll now move on to a slightly more complex case. It's possible to extend standard database tables and structures with extra customer-specific fields. Because the new SAP version may itself introduce new fields, these two changes must be merged. Consider the schema shown in Figure 6.13.

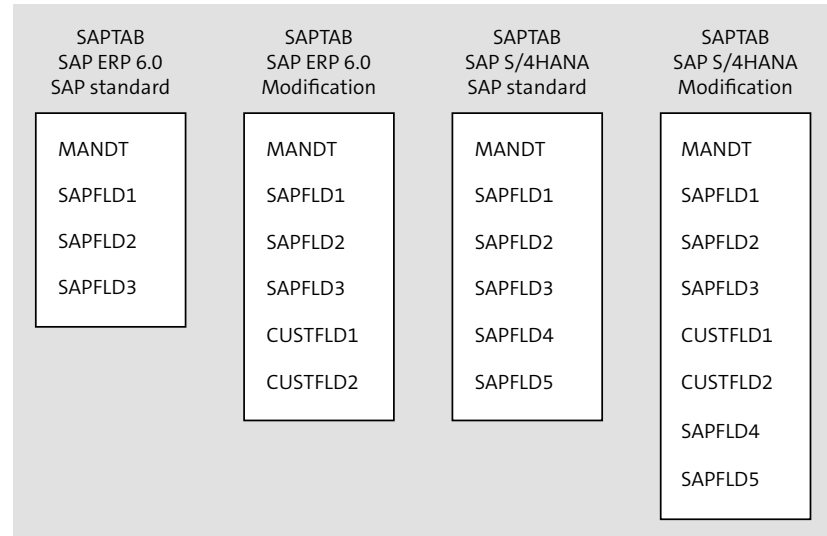


Figure 6.13 Structure with Custom Fields and New Standard Fields

In SAP ERP 6.0, SAP delivered the table with the MANDT and SAPFLD1–3 fields. Based on specific business requirements, the customer added two fields, CUSTFLD1 and CUSTFLD2. The new standard delivered with SAP S/4HANA contains two extra fields, SAPFLD4 and SAPFLD5. However, the customer decides that the added fields remain relevant and must be preserved. This means that you must end up with a table structure that contains both the SAP fields and the locally added fields (far right).

The Data Dictionary handles this kind of scenario by placing the customer fields in a separate object called an append structure. The Data Dictionary definition of the SAP table contains only the standard fields, but it also contains a reference to the append structure, which stores the customer fields. When analyzing the Data Dictionary objects in preparation for Transaction SPDD, the modification adjustment process notices the conflict between the old modification and the new standard. It then creates a proposal, which places the customer fields in a new append structure, as shown schematically in Figure 6.14.

By convention, append structures take the name of their parent object, plus the ZA prefix. Note that this is an object in the customer namespace.

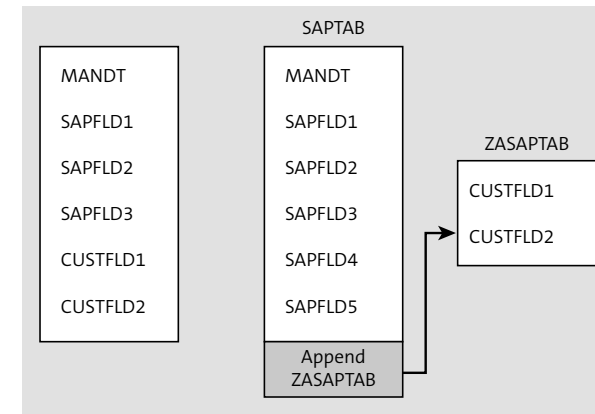


Figure 6.14 Append Structure

Let's look at a real example in Transaction SPDD. Our object list contains an SAP structure, KOMKBZ4. For tables and structures, the list of possible actions will offer two different adjustment modes:

- Adjust with Proposal
- Adjust Manually

Executing **Adjust with Proposal** brings up the screen shown in Figure 6.15.

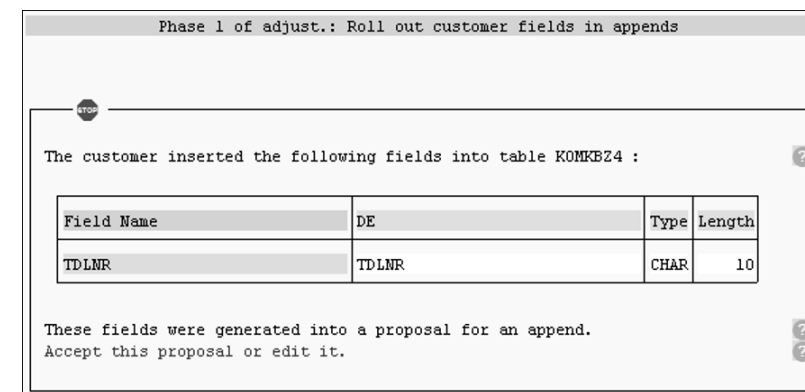


Figure 6.15 Proposal for Append Structure

Here the customer added the TDLNR field to the standard layout. When you choose **Accept Proposal**, a pop-up opens showing the name of the generated append structure (Figure 6.16).

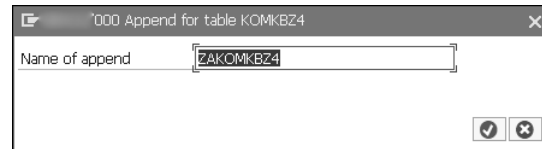


Figure 6.16 Name of Append Structure

Confirm this with **Enter**. Because this is a new object, you'll have to assign it to a customer (Z) package (Figure 6.17).

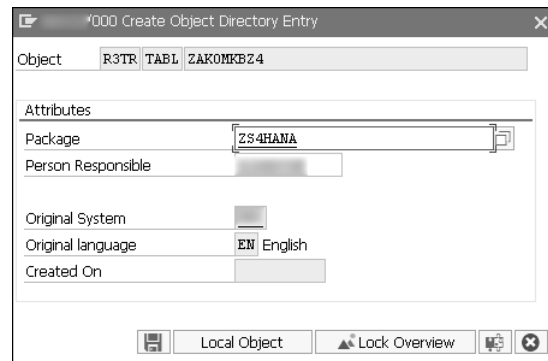


Figure 6.17 Register Append Structure in Customer Package

Click **Save**. The screen now changes, showing information for a **Phase 2** (Figure 6.18).

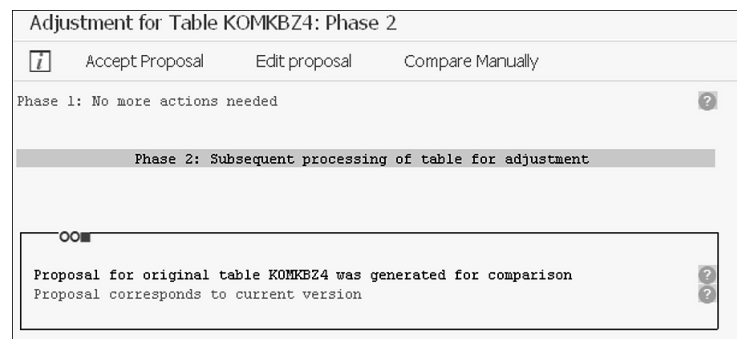


Figure 6.18 Adjustment Phase 2

This phase deals with format changes for individual fields, which we'll look at shortly. In our example, no format changes were detected, so no further adjustment action is needed. Click **Back** to return to the object list.

What if there are no differences between the old modified version and the new standard one? You'll often encounter this situation—for example, if the customer fields were added as an advance correction that is now part of the SAP standard. In that case, the adjustment screen informs you that the proposal already corresponds to the current version (Figure 6.19).

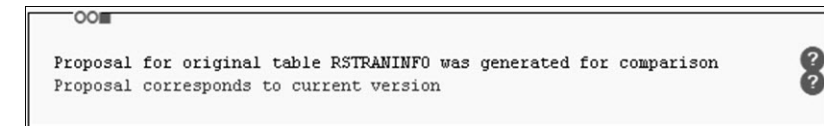


Figure 6.19 Proposal Corresponds to New Version

There's no need to choose **Accept Proposal** here. Simply click **Back**; Transaction SPDD informs you that the table will be reset to original, which you only have to confirm.

### 6.5.4 Field Format Changes

Another type of modification occurs when you change the attributes of a standard field by assigning a different data type (which may or may not cause the field length or other physical characteristics to change). This situation is handled in phase 2 of the adjustment for tables and structures.

The Transaction SPDD proposal lists the fields for which the data type was changed. For example, look at the screenshot shown in Figure 6.20. Here, a table or structure contains a VB Typ field, the data type (data element) of which was VB Typ in the old modified version and becomes VB TypL in the new standard. An important element is that the length of the field also changes, from one character to four. If you kept the modification, then the upgrade would reduce the defined length of that field in the database from four positions down to one. Needless to say, this is very dangerous: any value longer than one character would be truncated, resulting in corrupt data.

The display has three columns: **Old Version** shows the previous (modified) version, **Current Version** is the new SAP standard, and **Proposal** is the field format proposed by Transaction SPDD. Values shown with a red background are those that differ from the current proposal. In this case, the proposal is for the new, longer data type. If this is



indeed what you want (and you have precious little choice here), then you may simply return to the main object list by clicking **Back** and reset the object to original.

Definition changes were determined for the following fields: ?

Field VBTP			
Attribute	Old Version	Current Version	Proposal
Key Field	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Data Element	VBTP	VETYP	VETYP
Data Type	CHAR	CHAR	CHAR
Length	1	4	4

You can include attributes in the proposal by double-clicking. ?

Figure 6.20 Format of Field Changes

If for some reason you do decide (or, more precisely, the customer decides) that the old data type and field length must be kept, then proceed as follows:

1. Double-click in the header of the **Old Version** column. The old version will then become the proposal (and the values in **New Version** will be displayed with a red background).
2. Choose **Accept Proposal** to confirm your decision.

### 6.5.5 Technical Settings

The technical settings of a table determine where and how that table is stored in the database; they also control certain forms of special treatment for the table inside the SAP application layer, such as logging and buffering. The delta display is comparable to the one we saw for data elements and domains, where the darker background is for the older version and the lighter background for the new.

Figure 6.21 shows an example. In Transaction SPDD, we executed the **Compare Versions (New Orig. vs. Last Mod.)** action and switched to **Delta Display** in the version management.

Here the new standard enables logging for the table and specifies that in SAP HANA, the table must reside in the **Column Store**. If the new settings are acceptable, then execute the **Reset** action in Transaction SPDD. Otherwise, execute **Adjust** and make the necessary changes.

Object Name	Version	Request	Date	Author
T130F_C	00002	UPGRADE754	11.01.2020	SAPUSER
T130F_C	00001		11.01.2020	

General Attributes:	
Table Name	T130F_C
Log	<input checked="" type="checkbox"/>
Log	<input type="checkbox"/>
Storage Type	Column Store
Storage Type	Not Defined

General Attributes:	
Changed:	2

Figure 6.21 Technical Settings

Changing the technical settings can never lead to data loss or table conversions, but that doesn't mean it's entirely risk-free. For example, disabling logging when it's enabled by default in the SAP standard might upset auditors. Changes to the table buffering mode (also part of the technical settings but not shown in this example) can cause performance problems. And tinkering with the SAP HANA storage type (which is the setting affected in our example) is highly unwise unless SAP tells you to. This is a case that has reset to original written all over it—which is precisely what we did in this upgrade.

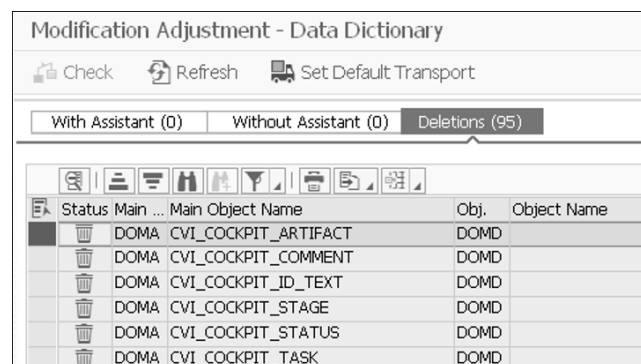
### 6.5.6 Processing Deleted Objects

Having worked through the adjustments in both the **With Modification Assistant** and **Without Modification Assistant** lists, let's turn our attention to the **Deletions** section. As we explained earlier in this chapter, here you find a list of SAP objects that were modified locally but no longer exist in the new SAP standard. The fact that they were modified at all is of course a strong indication that there was an actual functional need for them and that their disappearance might therefore be problematic.

Figure 6.22 shows (part of) the deletion list for the upgrade. The status icon is a trash can (a definite improvement over old versions of Transaction SPDD, in which it was a red light, sometimes causing great alarm).

It isn't a rarity for the deletions list to be quite long, longer even than the two modification lists. This is mostly because your predecessors who carried out previous upgrades (or was that *you*?) never bothered to clean up the list. Earlier we said that doing nothing for an object in Transaction SPDD is not an option: you either have to adjust or to reset to original. This isn't true for deletions. You could just ignore this

list, which means objects will simply accumulate here (we have even recently seen lists with deletions dating back to the last century).



Status	Main Object Name	Obj.	Object Name
DOMA	CVI_COCKPIT_ARTIFACT	DOMD	
DOMA	CVI_COCKPIT_COMMENT	DOMD	
DOMA	CVI_COCKPIT_ID_TEXT	DOMD	
DOMA	CVI_COCKPIT_STAGE	DOMD	
DOMA	CVI_COCKPIT_STATUS	DOMD	
DOMA	CVI_COCKPIT_TASK	DOMD	

Figure 6.22 List of Deleted Objects

In the majority of cases, the action you will execute here is **Delete Modification Log**. This means that you acknowledge that the once-modified object no longer exists—that you have no further use for it and don't want to be reminded again that it once existed.

Another action available to you here is **Retrieve Last Version**. Although the object has been deleted, the version database still contains a trace of it. If it's really (and we mean *really really*) necessary to keep the object, then **Retrieve Last Version** will resurrect it. However, having seen plenty of zombie and vampire movies, we think that bringing an object back from the grave isn't a good idea. First, it's misleading because it creates the impression that the object is part of the SAP standard, whereas in reality it's a relict. Second, future upgrades will delete it again, forcing your successor (or yourself) to redo the investigation and possibly to decide again to keep it in its undead state. If a standard object that is of use to you disappears, then it's better to create a copy of that object in the customer name range (remember, you're working in the shadow instance; in the primary instance, the object still exists).

#### Note

We didn't mention this explicitly before, but in every object list it's possible to select multiple objects at once. Transaction SPDD will then calculate which actions are common to all objects in the selection and show only those in the action list. This feature is particularly useful when you decide to delete the modification log for an entire group of objects.

## 6.6 Final Steps

Once you've worked through all the object lists in Transaction SPDD, there are two things left to do. First, you have the option to register your transport for later use. Then, you log off from the shadow instance and start the activation phase of the upgrade.

### 6.6.1 Registering the Transaction SPDD Transport for Later Use

You can use the transport request in which all the Transaction SPDD changes were collected for the modification adjustment in later upgrades to the same target version. The upgrade process will then automatically apply the modifications that are the same as those in the source system in which the Transaction SPDD request was created. If the upgrade finds any differences, then you will have to run Transaction SPDD to handle them.

If you decide to use this transport technique, then perform the following steps:

1. When you're finished with the adjustments, go to the Transport Organizer (Transaction SE09) and list your open requests. The change request that you opened for Transaction SPDD will be listed. Click to open this request and show the tasks and/or repairs, then release all the tasks and repairs. You can't release the change request itself because that isn't allowed at this point in the upgrade; the system will refuse to do so. SUM itself will release the transport later on.
2. Leave Transaction SE09 and return to the Transaction SPDD object list. Click the **Select for Transport** button on the far right of the Transaction SPDD toolbar. A search window opens. Locate and select the open Transaction SPDD request.
3. Transaction SPDD asks you for which SL Toolset tool you want to flag this modification adjustment transport. You have a choice between **Upgrade** and **OCS** (Support Package updates or add-on installations). Choose **Upgrade**. This choice ensures that SUM only uses these transports for their correct purpose.
4. You may now leave Transaction SPDD. The upgrade process records the number of the transport request in a file in the transport directory.

### 6.6.2 Start Activation

With Transaction SPDD behind you, return to SUM, which is still displaying the screen shown in Figure 6.1. Enable the **Adjustments Made, Continue with Procedure** checkbox and choose **Next**. The upgrade process now starts the long activation

phase. This process and the probable interventions to fix activation errors are described in Chapter 5.

## 6.7 Transaction SPAU

The companion transactions of SPDD for development objects (as opposed to Data Dictionary objects) are Transactions SPAU and SPAU\_ENH; the latter transaction is used for enhancements. Both transactions are built on the modification adjustment concept and support automatic and semiautomatic reconciliation of changes to objects.

As we remarked in the beginning of this chapter, it isn't entirely true that Transaction SPAU deals only with non-Data Dictionary objects. Modified ABAP code will always show up in Transaction SPAU, but so will modifications to objects that are technically part of the Data Dictionary, like views and search helps. One thing they have in common is that adjustments in Transaction SPAU can't give rise to changes in the physical structure of data. This is also the reason that, unlike Transaction SPDD, Transactions SPAU and SPAU\_ENH are executed after the upgrade.

One question to ask regarding Transaction SPAU is this: Is running it something that you (by which we mean the technical expert performing the conversion) should be expected to do? The answer to that is a clear no, and there are at least two good reasons for this:

- The number of objects in Transaction SPAU is often much higher than in Transaction SPDD. Transaction SPAU lists containing several thousand objects are not exceptional. Performing Transaction SPAU after an upgrade is almost always a team effort, with developers and functional experts in different application areas collaborating. Even if you possessed all the technical and functional knowledge to evaluate and adjust every Transaction SPAU object, it would probably take far too long for a single person to do all this work.
- Not only the number of objects but also the complexity tends to be higher. You may have learned from what we've shown you about Transaction SPDD that you need to be careful and know what you're doing, but it's also true that there's rarely much doubt about the decisions. In most cases, the choice to adjust or reset in Transaction SPDD is fairly straightforward. In Transaction SPAU, it isn't. When you find that custom code was added in an SAP program two or three releases ago, how can you be sure that those changes are still needed? Perhaps the

changed functionality is now covered by the standard, or perhaps by a new program or transaction. There's no simple way to tell.

This raises another question: Should you know about Transaction SPAU at all? Here the answer is yes, absolutely. Transaction SPAU is an integral part of the upgrade process, and you must be fully aware of its function and its impact on the upgrade or conversion even if you don't actually do the work yourself. For this reason, we end this chapter by giving you a brief introduction to Transactions SPAU and SPAU\_ENH.

We can summarize the main characteristics of Transaction SPAU in a series of bullet points:

- Like Transaction SPDD, Transaction SPAU adjustments are based on the Modification Assistant.
- The user interface is the same as that of Transaction SPDD, with modified objects assigned to several object lists.
- The decision process is also the same: adjust (i.e., keep the modification) or reset (forget about the modification and accept the new SAP standard).
- Transaction SPAU covers more object types than Transaction SPDD; most are ABAP code objects (programs, function modules, object methods), but others are Data Dictionary-based (like views or search helps) or other noncode objects (like message sets or transaction definitions). Occasionally, some exotic beast may even show up (does anyone know what a HRDSYS Logical Information Object is?), requiring specialist knowledge.
- Also like Transaction SPDD, it's possible to concentrate all Transaction SPAU adjustments (including resets) in a single transport request, which you can then register for use in subsequent upgrades. For Transaction SPAU, this is less of a necessity though. Because Transaction SPAU-based modifications are enacted only after the upgrade, it's perfectly feasible to create several Transaction SPAU requests and import them when the technical upgrade itself has finished. In some cases, it's even impossible to keep everything in one request; for example, the HRDSYS Logical Information Object we mentioned in the previous paragraph is client-dependent by nature and modifications thus get recorded in a Customizing rather than a workbench request.

Normally, whenever a developer makes a change to an SAP object, the system will ask for an object key. These keys, which depend on the object itself, the installation number of the system, and the SAP release, can be generated in the SAP Software Change

Registration (SSCR) system in the SAP Support Portal. Transaction SPAU may entail having to adjust dozens or even hundreds of objects, and in such circumstances having to request an object key for every single one would be tedious and time-consuming. That's why the end of the technical upgrade marks the beginning of a 14-day grace period during which SAP objects can be modified with Transaction SPAU without the need to provide an object key. Transaction SPDD never requests object keys.

As we mentioned earlier, the main Transaction SPAU screen looks very much like that of Transaction SPDD. Figure 6.23 shows an example.

Status	Note	Short text
✓	175960	Activation of open item management using RFSEPA02/03
○○○	1460933	Correction for SAP CQC Transport Execution Analysis
○○○	1502069	OCFM_FL_TRA_ATTR cannot be tested with RSA3
○○○	1995550	Enabling SNOTE for transport based correction instruction
○○○	2408383	TCI - Enabling System for SAP Note Transport-Based Correction Instruction (TCI)
○○○	2576306	Transport-Based Correction Instruction (TCI) for Download of Digitally Signed SA

Figure 6.23 Transaction SPAU Object List

The **Notes** tab lists all SAP Notes that were applied since the last upgrade (or earlier, if they weren't handled properly in a past Transaction SPAU run). A dark (gray) traffic light means that the SAP Note is obsolete; that is, the correction it introduced is now part of the standard. SAP Notes with a colored traffic light require some kind of adjustment.

The list of available actions on the right will automatically adapt to the type and status of the selected object. For example, if you select one or more obsolete SAP Notes, only the **Confirm Obsolete SAP Note** action will be available.

You're already familiar with the **With Assistant** and **Without Assistant** sections. They have the same meaning as in Transaction SPDD. The first list contains objects that can be handled by the Modification Assistant, either fully automatically or with some additional manual work. Objects in the second list can't be adjusted with the Modification Assistant and require manual adjustment.

The actions for these objects are the same as in Transaction SPDD. You normally start by comparing the last modified version with the new standard version using **Compare Versions (New Original vs. Last Modification)**. Based on this comparison, you then decide either to accept the new standard and mark past modifications as no

longer relevant in the version control system (**Reset** action), or to keep the change by reapplying it or letting the Modification Assistant reapply it (**Adjust** action).

If you look again at the screenshot in Figure 6.23, you'll see an ellipsis (...) to the right of the three screen tabs. When you click here, you'll see three more areas appear (Figure 6.24).

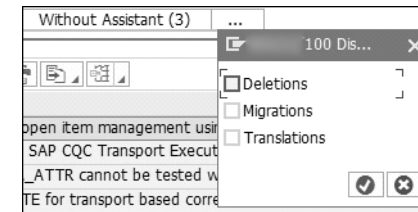


Figure 6.24 Additional Transaction SPAU Tabs

Transaction SPAU also has its **Deletions** list, and we strongly advise you to deal with the objects here like you did in Transaction SPDD. The other two lists, which are deselected by default, are used less frequently, although they should of course always be looked at. The **Migrations** tab is for Business Add-Ins (BADIs) that need to be migrated. **Translations** is for language-dependent objects, such as messages or menu items, that have been translated by SAP but for which a custom translation existed in the old release.

## 6.8 Transaction SPAU\_ENH

Since SAP introduced the enhancement concept, which allows customers to make changes to standard functionality without actually altering the SAP source code itself, there has been a third transaction for modification adjustment besides Transactions SPDD and SPAU: Transaction SPAU\_ENH. With this transaction, you adjust customer implementations of enhancements to the new release.

The user interface of Transaction SPAU\_ENH is different from that of its two companions; actually, Transaction SPAU\_ENH calls the ABAP Workbench and specifically the Enhancement Information System with the object type **Enhancements (Upgrade View)**. All objects that need reviewing are listed on the left, as shown in Figure 6.25. We apologize for the ugly blurring of the object names and descriptions, which is necessary for confidentiality reasons, but the objects listed here are the enhancement implementations that you can call up and display with Transaction SE20.



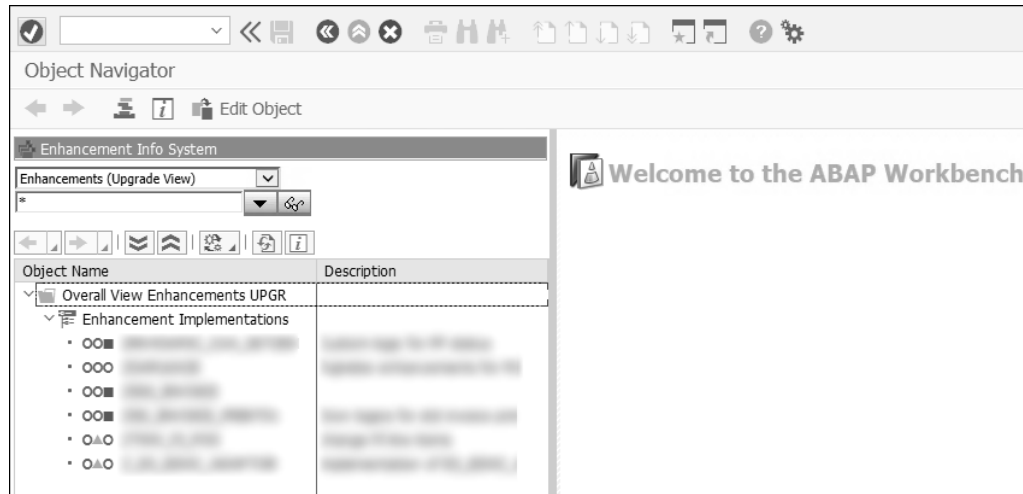


Figure 6.25 Transaction SPAU\_ENH Object List

You must review, possibly adjust, and confirm each object in the list regardless of the color of the status icon. The normal order of operations is as follows:

1. Double-click the object. This displays its details in the right-hand pane.
2. The **Adjustment** tab shows the reason the object needs to be reviewed and adjusted. There may even be more than one reason. In the example in Figure 6.26, there are two adjustments: one with medium priority (green) and the other with low priority (gray).

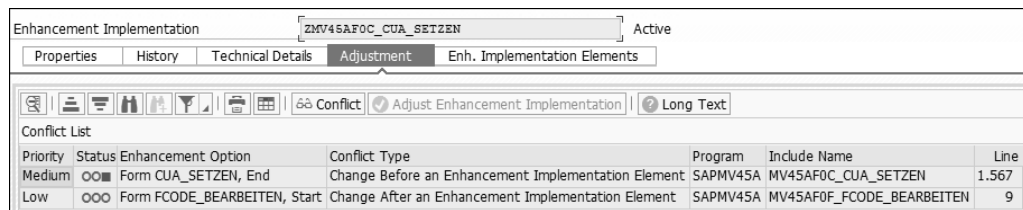


Figure 6.26 Adjustment List for Enhancement

3. The **Conflict Type** column informs you why there is a conflict between the two versions. Click **Long Text** for a somewhat more complete explanation of the conflict type.
4. Click **Display Conflict** to display the differences between the current and new versions.

5. Click **Display <-> Change** to switch to change mode. The toolbar on the right now changes, as shown in Figure 6.27. If you decide the adjustment must be kept, use the **Process Conflict** button to make the necessary changes to the implementation. Click **Adjust Enhancement Implementation**, which changes the object status to **Adjusted**.

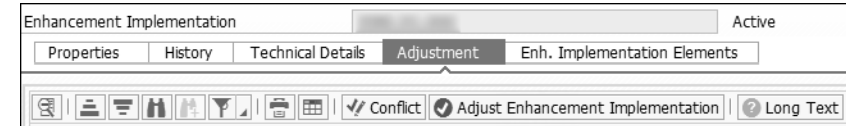


Figure 6.27 Adjusting Enhancement

## 6.9 Summary

In this chapter, we took a detailed look at the transactions used to preserve customer changes or reset to standard SAP objects, a process known as modification adjustment. Transaction SPDD deals with Data Dictionary objects and is carried out during the upgrade, usually by the technical consultant doing the upgrade. Transaction SPAU (and Transaction SPAU\_ENH for enhancements) covers ABAP objects (such as programs or object classes) and Data Dictionary objects that do not affect physical data storage (e.g., views). Transactions SPAU and SPAU\_ENH are performed after the upgrade, in most cases by a developer or team of developers.

Modification adjustment, and especially Transaction SPDD, has something of a fearsome reputation among developers and technical consultants. We have known quite a few colleagues, both experienced and novice, to quake in their boots at the thought of having to work their way through an intimidating Transaction SPDD list (just like we were quaking in ours when we did our first Transaction SPDD run).

With this chapter, we've hopefully had some success in demystifying Transactions SPDD and SPAU. Nevertheless, modification adjustment remains a critical and technically challenging task, and the ability to perform it correctly requires very good knowledge of the Data Dictionary and ABAP Workbench.

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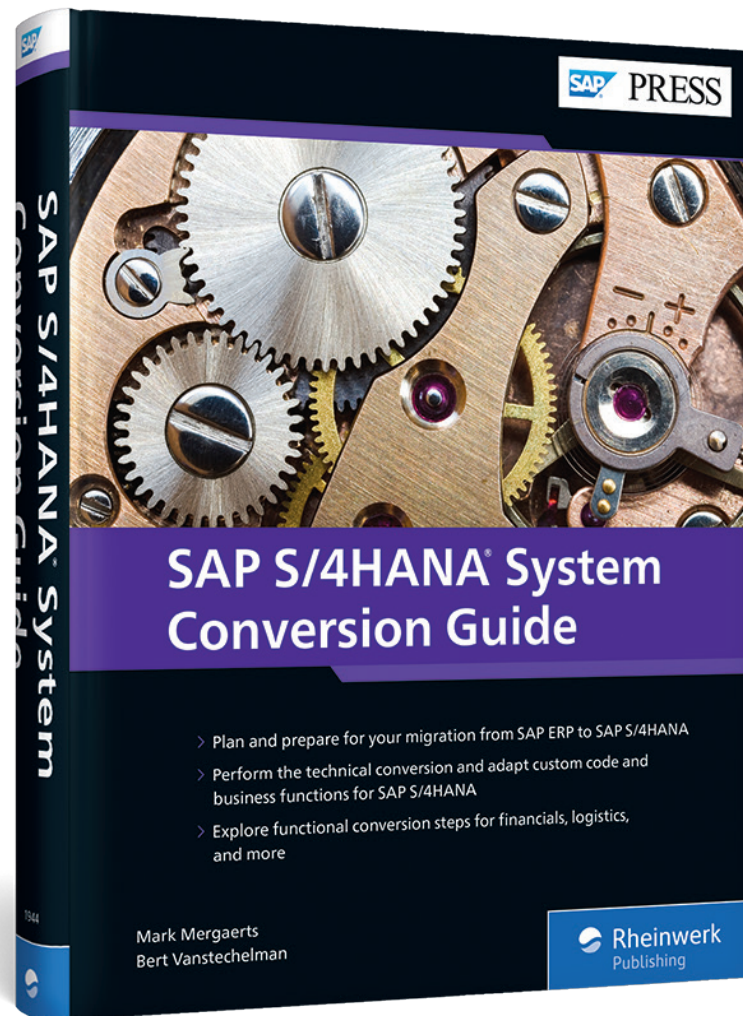
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