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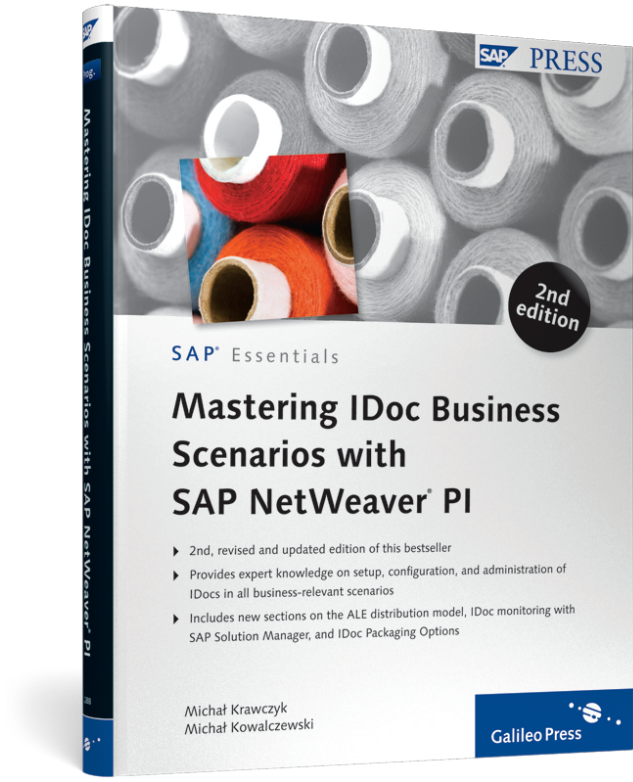
Mastering IDoc Business Scenarios with SAP® NetWeaver PI



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Contents

3 Master Data Distribution

In Chapter 2, you learned how to configure an SAP ECC system to send and receive transactional data. However, if there is a need to exchange transactional data there is also very often a requirement of exchanging master data.

As you have seen in previous chapters, you can use MC to send transactional data. However, this tool cannot be used for exchanging master data; instead, there are two procedures in SAP ECC for distributing master data, as follows:

- Sending master data directly.
- Distributing master data with the Shared Master Data (SMD) tool.

Both require an ALE layer and a distribution model to produce IDocs. First, we will focus on the differences and purposes of these two procedures. The configuration of the distribution model in the ALE layer will be explained later in this chapter.

Sending Master Data Directly

A set of standard reports is used to distribute different master data objects to other systems. These reports can be run manually or they can be scheduled and run automatically in the background. These reports often provide selection criteria and it is possible to customize which object should be distributed (e.g., lowering the amount of data by number ranges, plant, etc.).

These reports are used mostly for initial load purposes (when the interface is at go-live and other systems should be provided with the entire set of data) but can also be used as a background job to periodically supply the external system with up to date data. The limitation of this method is the amount of data. For example, it is not effective to use this tool every day to exchange hundreds of thousands of records when the actual changes concern only a few of the records. For this purpose it is more suitable to use the SMD tool, which will be described in the next section. You will find a list of different master data objects and the corresponding transactions in which to send them in Table 3.1.

Shared Master Data Tool

Using the SMD tool is a more sophisticated method to build master data interfaces. It allows for "delta" exchange. This means that the system sends only new records and changes to existing master data objects, not the entire data. This method is the common method for building highly efficient, message-driven interfaces for master data.

To learn how this method works, we have to look at the *SAP change document interface*. In SAP ECC, when a master data object is created or modified, a *change document* is created. Change documents consist of a header and different positions. The *header* consists of the document number, the type of change (creation or modification), and the date and the change number. *Positions* consist of fields that were modified with their old and new values. Technically, change documents are stored in `CDHDR` and `CDPOS` tables. There is also a set of standard function modules that are invoked in SAP transactions to fill these tables.

The change document interface is a part of SAP ECC and is used for different purposes. One of the recipients is shared master data, using *change pointers*. The change pointers mechanism consists of a set of customizing steps in which you can specify that changes in master data objects of a particular type should be distributed by IDocs. The procedure is as follows:

1. A user creates or changes a master data object.
2. A change document interface is started and a change document is recorded into the database.
3. The change document is transferred to the SMD tool. If a change pointer to a particular master object is switched on, the change pointer is recorded into the database

Technically, change pointers are stored in `BDCP` and `BDCPS` tables (with Web Application Server 6.10 and higher it could also be a `BDCP2` table). To create IDocs in the event of changes in master data, you need to periodically invoke the `RBDMIDOC` report. This report reads the change pointers table and produces master IDocs. The status of processed change pointers changes to *read* (to avoid sending the same changes more than once).

The master IDoc is handed over by the ALE layer, which creates regular IDocs and—because of the distribution model (see the next sections)—sends them to the appropriate receivers. The entire process is illustrated in Figure 3.1.

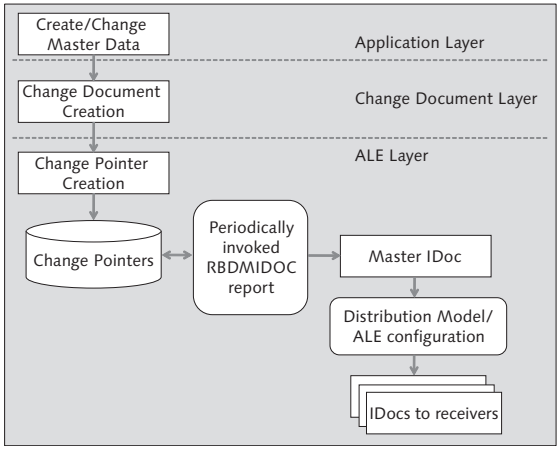

Figure 3.1 Generating IDocs of Master Data Changes

These two procedures (sending master data directly and using the SMD tool) are often combined. Reports for sending master data directly are used for initial load (at go-live) and change pointers are used to distribute changes during normal system usage.

You will see in the next sections how to configure these elements. In our example, we will cover the configuration for sending customers, vendors and material master data. We will exchange data between two SAP ERP systems, but the second system could also be an external, non-SAP system connected with SAP ERP via SAP NetWeaver PI. In a real business scenario, the SAP ERP system is often a master system for master data management. In this scenario, all changes to this data take place in the SAP ERP system and are propagated by SAP NetWeaver PI to other systems in landscape. Therefore, in this chapter, we will focus on sending master data from SAP ERP. However, at the end of the chapter, you will find information on how to receive master data using a distribution model to a second SAP ERP system.

3.1 Change Pointers

As you already know, change pointers are used to inform SMD that some objects have changed and that it is time to produce an IDoc. Change pointers are configured as follows:

1. First, you have to activate change pointers in general. To accomplish this, you have to open Transaction SALE (most of the configuration in this chapter will be performed in Transaction SALE), which can be seen in Figure 3.2.

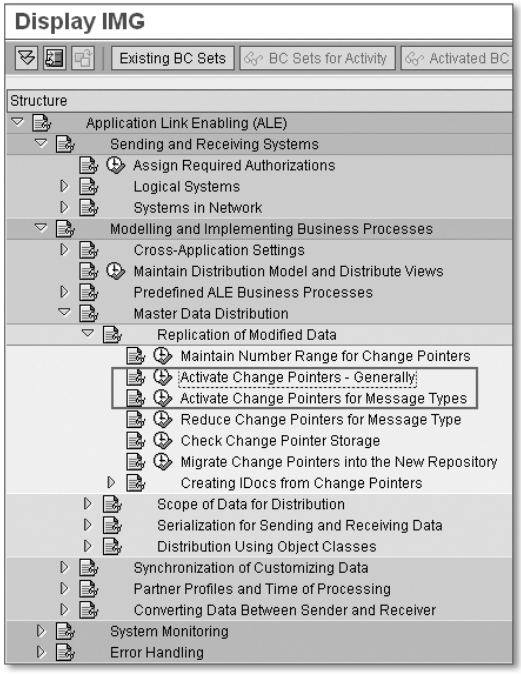

Figure 3.2 Transaction SALE

2. Next, select Application Linking Enabling (ALE) • Modelling and Implementing Business Processes • Master Data Distribution • Replication of Modified Data • Activating Change Pointers • Generally.
3. Then, select the checkbox Change pointers activated – generally and save your selection (see Figure 3.3).

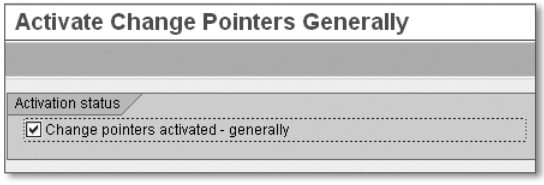

Figure 3.3 Activating Change Pointers In General

4. After having activated change pointers in general, you need to turn on change pointers for particular objects. As mentioned, we have chosen customers, vendors and material data. From the same position in the tree in Transaction SALE, select Activate Change Pointers for Message Types. This is where you define which master data object changes generate IDocs.
5. From the list, select the IDoc message types CREMAS (for vendors), DEBMAS (for customers) and MATMAS (for material master), select the checkboxes in the Activate column, and save your changes. As shown in Figure 3.4, within the list, you can see the different IDoc message types you can activate to send IDocs with changes. Table 3.1 contains master data objects and the corresponding IDoc message types.

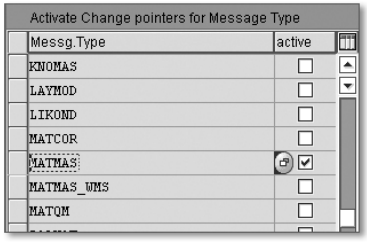

Figure 3.4 Activating Change Pointers for Particular Objects

Master data object	IDoc message type	Transaction to send
Material master	MATMAS	BD10
Vendor	CREMAS	BD14
Customer	DEBMAS	BD12
Product catalog	PRDCAT	–
Price list	PRICAT	–
Price conditions	COND_A	–
Bill of materials (BOM)	BOMMAT	BD30
G/L account	GLMAST	BD18
Cost center	COSMAS	BD16
Cost element	COELEM	BD24

Table 3.1 Different Master Data Objects and the Corresponding IDoc Message Types

The system is now configured to generate change pointers for customers, vendors, and materials. You can verify this making a modification in any material master record (using Transaction MM02) and then opening Transaction SE16 and looking at the last entry in table BDCP (or, depending on the system version, table BDCP2). There should be a record related to your change. Table CDPOS (linked via the field CHANGENR) should show the technical name of the fields you changed, with the old and new values.

The next step is configuring the distribution model. It tells you who will be a receiver of the created IDocs.

3.2 Distribution Model

When change pointers are configured, the system knows that it has to register changes in master data because they will be sent as IDocs. But it does not know who will be the IDoc receiver. The main purpose of the distribution model is to specify receivers for IDocs. It also consists of tools that simplify the entire configuration for sending and receiving master data.

As you know, IDocs can be exchanged directly between SAP systems and non-SAP systems using an integration server such as SAP NetWeaver PI (IDocs are translated into internet standards such as Web Services).

For the direct exchange between two SAP ECC systems, the distribution model allows you to do configure both systems in one place. In this scenario, one system is the sender of a set of master data and the other is the recipient.

For our example, we will assume that we have two SAP ECC systems. One is called BCS and the other is called BE6. The logical names of these systems are BCSCLNT800 and BE6CLNT100. We want to establish interfaces for master data such as material master, vendors, and customers (for which we turned on change pointers in the previous section). The BCSCLNT800 system will be the sender and the BE6CLNT100 system will be the receiver (see Figure 3.5).

When we operate with system names in the distribution model, we use logical systems (refer to Chapter 1 for details). As you remember, logical systems are also managed in Transaction SALE. For this example, you could define a system different from BE6CLNT100 in your landscape. In this case, you need to define the receiver system in the logical systems via Transaction SALE and the path Applica-

tion Link Enabling (ALE) • Sending and Receiving Systems • Logical systems • Define Logical System.

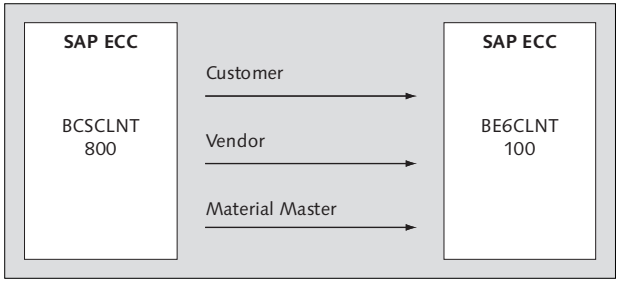

Figure 3.5 Message Flow for the Master Data Scenario

In addition, the sender system (`BCSCLNT800`) has to be assigned to the client via SALE • Application Link Enabling (ALE) • Sending and Receiving Systems • Logical systems • Assign Client to logical system. (This task is always performed during the Basis system installation; therefore, you probably do not have to do it now).

We will now start with the configuration of the distribution model:

1. Log in to `BCSCLNT800` (the sender system).
2. Open Transaction SALE and select Application Link Enabling (ALE) • Modelling and Implementing Business Processes • Maintain Distribution Model and Distribute Views (see Figure 3.6).

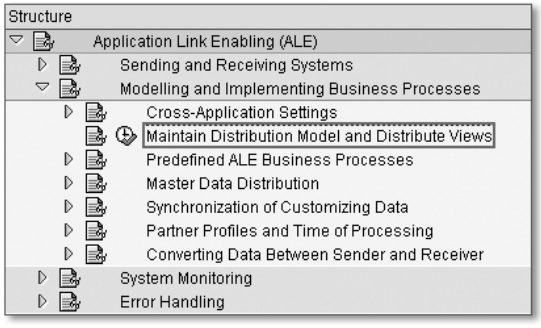

Figure 3.6 Transaction SALE and the Distribution Model

3. Switch to edit mode and click the Create model view button.

4. Next, enter a short name, a technical name, and a start and end date for this model (see Figure 3.7). The start and end dates are very useful. If there are known changes that will be made to your system landscape, you can set the end date of the existing model to the date of the landscape changes and prepare a new model with a start date from that point.

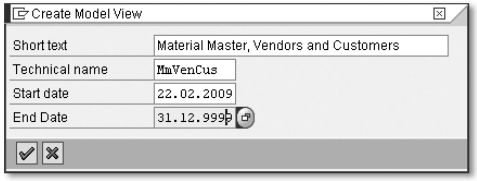

Figure 3.7 Creating a New Model

5. Highlight the model, click the ADD MESSAGE TYPE button, and specify SENDER SYSTEM, RECEIVER SYSTEM and MESSAGE TYPE. In our example, the settings would be as follows:
   - Model view: `MMVENCUS`
   - Sender: `BCSCLNT800`
   - Receiver: `BE6CLNT100`
   - Message type: `MATMAS` (for material master exchange)
6. We also want to send vendors and customers; therefore, repeat this step for these message types as follows:
   - `CREMAS` (for Vendors)
   - `DEBMAS` (for Customers)

   (Provide the same sender and receiver system as specified previously.) Your screen should look similar to the one shown in Figure 3.8.

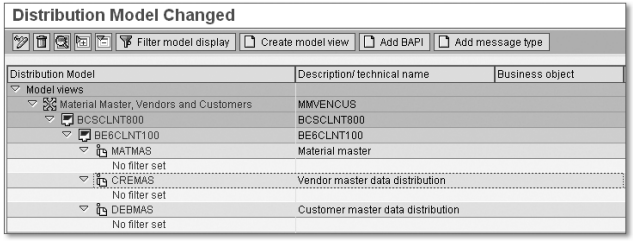

Figure 3.8 Example of a Distribution Model for Material Master, Vendors, and Customers

With the current configuration, all customers, vendors, and materials will be sent. However, it is possible to place filters and thus limit the data that is sent. In our example, we want to send only master data that fulfills filter requirements; therefore, we will place a filter for material master. As you know, different material types can be maintained in SAP ECC. For example, there are finished products (type FERT) and finished goods (type HAVA). We will use material type as a parameter to filter materials, limiting the interface to send only master data of finished products. Proceed as follows:

1. Select the NO FILTER SET field under MATMAS and double-click.
2. A new window opens and you can create filters by choosing CREATE FILTER GROUP. After expanding the subtree, you should see all of the possible fields you can use for filtering. For our example, select MATERIAL TYPE and double-click. Next, by using the "+" icon, enter a FERT value. FERT is a standard material type for finished goods.
3. Return to the main screen of the distribution model. You will see that instead of NO FILTER SET, DATA FILTER ACTIVE is displayed under MATMAS. Save your changes.

The distribution model is now ready. The following summarizes what we have achieved in this section:

- We have created the distribution model and the system BCSCLNT800 will send master data to BE6CLNT100.
- The set of data contains material master, vendors, and customers.
- By using a filter on material master, we limited the scope of materials to only finished products (FERT material type).

In the next section, we will finish the configuration for the sending system. The missing steps are creating the partner profiles and scheduling a report for IDoc generation.

3.3 Partner Profile for the Distribution Model

As you know from previous chapters, sending IDocs requires an appropriate partner profile. A partner profile is a set of rules that specifies how an IDoc to be sent to a specific receiver should be created (e.g., which program has to be used to cre-

ate the IDoc, should it be send one by one or in packets, etc.). Refer to Chapter 1 for more general information on this topic.

The advantage of creating a partner profile from the distribution model is that it is possible to generate the profile automatically.

There is a single prerequisite to automatically create partner profiles from the distribution model. You need to have the same name for the sender logical system and an R/3 connection managed in Transaction SM59. This requirement is easy to fulfill because the common naming convention for the R/3 connection is similar to logical system names (refer to Chapter 1 for more information on this topic). To create a partner profile from the distribution model, proceed as follows:

1. Open Transaction SALE and go to Maintaining Distribution Model (Application Link Enabling (ALE) • Modelling and Implementing Business Processes • Maintain Distribution Model and Distribute Views). Alternatively, you can open Transaction BD64 directly.
2. In the main screen, select your distribution model (in our example, it is `MMVENCUS`) and choose Environment • Generate partner profiles from the menu.
3. In the next screen, you can set parameters (see Figure 3.9). The predefined values are fine for our example. Click Execute to begin the creation of partner profiles. The results should be the same as shown in Figure 3.10. The results are:
   - A partner profile has been created for the logical system.
   - The system found that the same R/3 connection name as the logical system name exists (Transaction SM59; refer to Chapter 1 for more information on this transaction) and the port was created. As you learned previously, the connection requires the same name as the logical system to be able to create the partner profile from scratch using this tool.
   - The following outbound messages were added:
     - `CREMAS04` for sending vendors
     - `DEBMAS06` for sending customers
     - `MATMAS05` for sending materials
     - `SYNCHON` for technical purposes

After generating the partner profile, the scenario for sending master data is almost complete. From here, it is possible to test the scenario for Sending Master Data Directly. If you want to send changes in master data automatically, there is one additional step, described in Section 3.4.

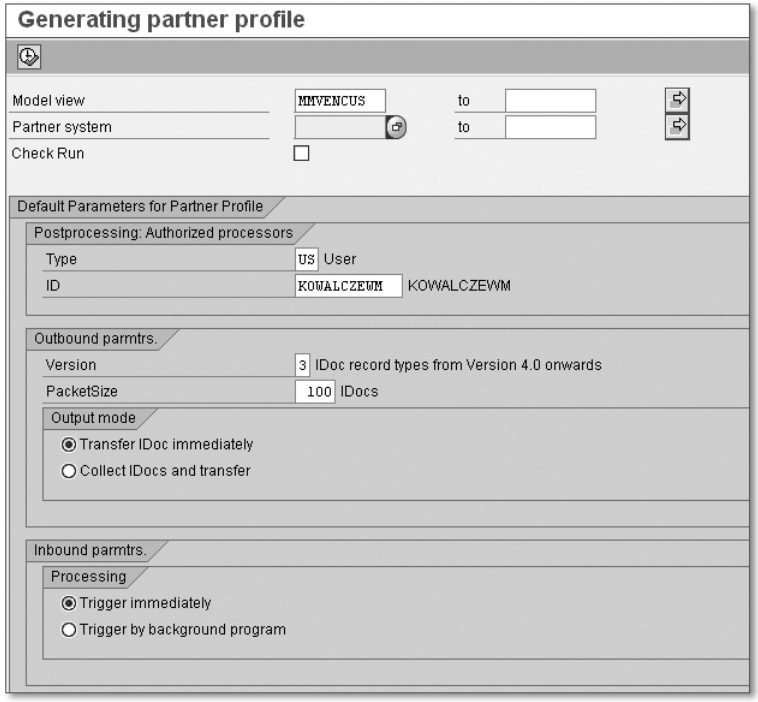

Figure 3.9 Generating a Partner Profile Directly from the Distribution Model

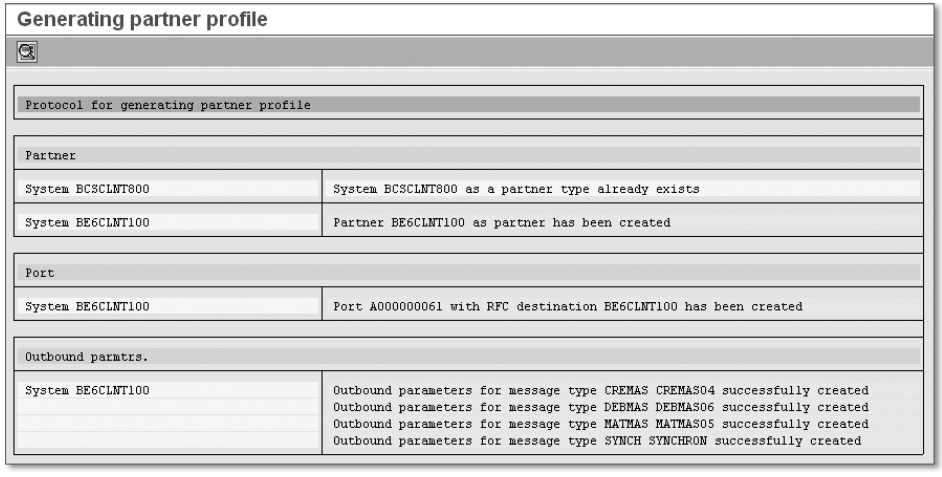

Figure 3.10 Creating Partner Profiles

To test the scenario Sending Master Data Directly, use Transactions BD10, BD12, and BD14 and send one material, vendor, and customer.

3.4 Scheduling Reports

To fully make use of change pointers, you have to schedule the report RBDMIDOC. This report periodically sends any changes collected. Proceed as follows:

1. In Transaction SALE, select Application Link Enabling (ALE) • Modelling and Implementing Business Processes • Master IDoc Distribution • Replication of Modified Data • Creating IDocs from Change Pointers. In the tree you see two options:
   - Choose/Define Variants
   - Schedule Report
2. The first step involves creating a variant for every message of the distribution model for which changes should be sent automatically. Select Define Variants and in the next screen, select Goto • Variants from the menu.

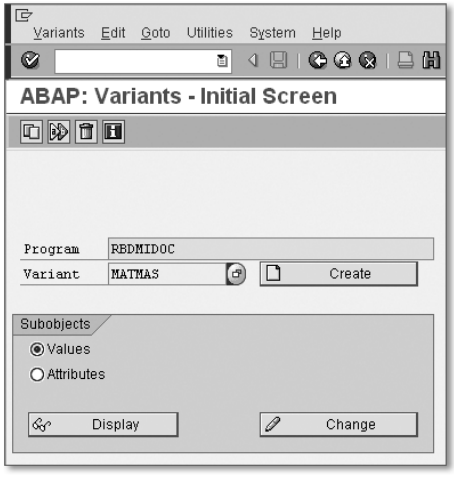

Figure 3.11 Variant Maintenance

3. Next, enter the name of the variant. It is good practice to choose a name similar to the message type for which the variant is being created. Click Create (see Figure 3.11).

4. You also have to create variants for the message types MATMAS, DEBMAS and CREMAS.
5. Enter "MATMAS" and click CREATE.
6. In the next screen, enter the MESSAGE TYPE "MATMAS" and click the BACK icon.
7. Click YES in the pop-up to confirm.
8. In the next screen, enter a description for the variant (for example: "Sending MATMAS IDocs") in the field MEANING and click the SAVE button. Repeat this procedure for the message types DEBMAS and CREMAS.

After variant preparation, the second step involves scheduling the report RBDMIDOC for each message type. Proceed as follows:

1. Go back to Transaction SALE and select SCHEDULE REPORT.
2. In the first screen, enter the job name, for example "Sending MATMAS IDocs" and click START CONDITION.
3. In the next screen, click IMMEDIATE (see Figure 3.12) and click the PERIOD VALUES button.

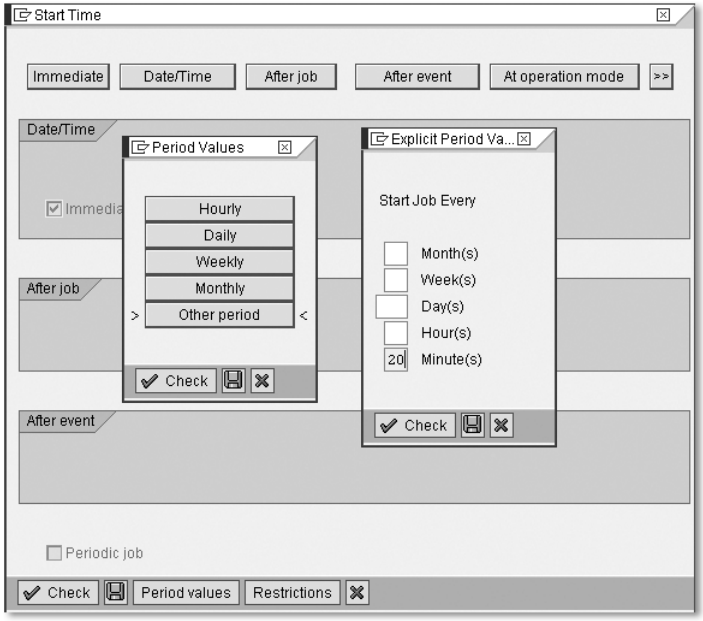

Figure 3.12 Period Maintenance

4. You can now specify how often the job will be executed and the time when IDocs with changes will be populated. Click Other period and then enter the time. For our example, specify 20 minutes between two jobs.
5. Click Save and go back to the first job creation screen.
6. Next, click the Step button on the first job creation screen. This is where you will specify the action in the system. In the Name field you should see the name of the report RBDMIDOC.
7. Select a variant for the report from the previously created variants and save your changes. In our example, we will first use the MATMAS variant (see Figure 3.13).
8. This completes the procedure of scheduling the job. Repeat this procedure for the other messages, DEBMAS and CREMAS. For these, you can specify a different start time so that each starts after the previous job has finished.

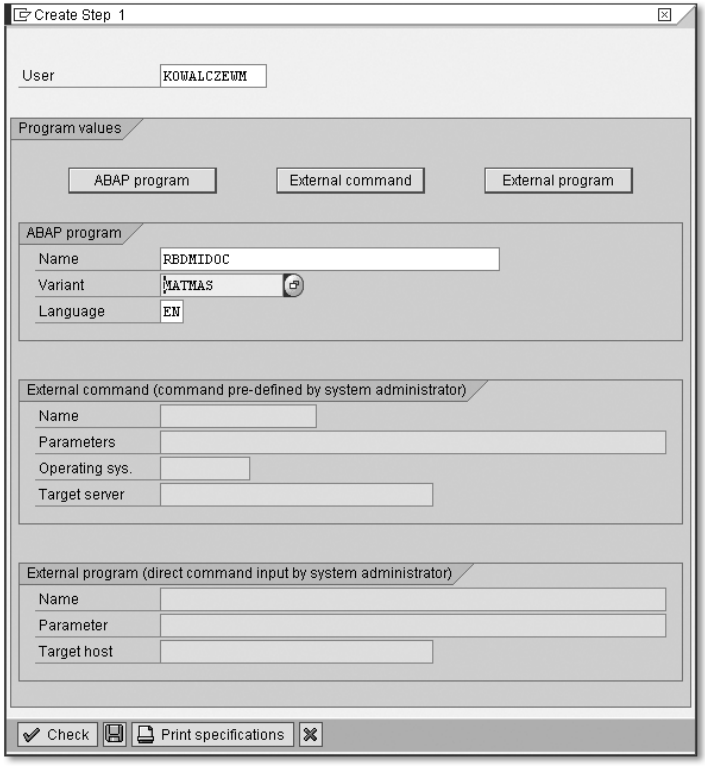

Figure 3.13 The Step Configuration

It is good practice to also schedule report RBDCPCLR for deleting used change pointers. This practice will keep the change pointer tables at a reasonable size. The maintenance of the report is very simple; therefore, this is not explained further in this book.

3.5 Configuring the Production System

Unfortunately, not all of the configuration we have described is automatically added to transport requests. Some of the work has to be done manually in the production system the same way it was done in the development system. We will describe step by step which elements require additional effort.

The activation of the general indicator and of particular change pointers is automatically added to a transport request. However, with the distribution model, it is not as easy. As you know, the model is prepared for particular logical systems. Therefore, in the development system, you should build three different models for the entire landscape (development, quality assurance, and production system). It is good practice to build the model for the development system and perform all tests. If the model fulfills all business requirements, create another one for the quality assurance landscape, using a copy of the development landscape (change only logical system names). If all tests here also complete without issue, use the quality assurance landscape as a reference for the production environment (creating a copy of the quality assurance landscape and changing only logical system names).

To build a model from an existing model, open the Maintenance of Distribution model (using a link from Transaction SALE or using Transaction BD64 directly), go to edit mode, and highlight a model to copy. Then, select Edit • Model view • Copy from the menu.

In the next screen (see Figure 3.14), enter a name and the sending and receiving systems for the next landscape and confirm.

After creating a distribution model copy, you can add the model to the transport request by selecting Edit • Model View • Transport from the menu.

At each system in the landscape you also need to manually perform the following: Create partner profiles (Section 3.3) and schedule jobs (Section 3.4). Variants for reports are transportable; therefore, you can schedule reports using the same variants as those you created in the development system.

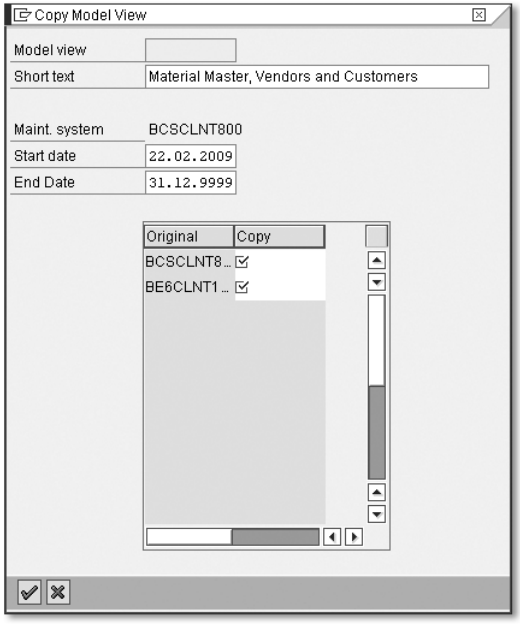

Figure 3.14 Copying an Existing Distribution Model

3.6 The Receiving System

There is another big advantage of using the distribution model versus manual configuration. This book is concerned with SAP NetWeaver PI; however, when the receiving system is another SAP ECC system (without an integration server), it is possible to send the distribution model to the receiving system and import and create all of the necessary configuration for incoming IDocs on the receiving system side.

To send the distribution model, open Transaction BD64 or locate the distribution model in Transaction SALE. Then, select Edit • Model View • Distribute from the menu. Select the name of the model you want to distribute. In our example it is `MMVENCUS`. On the next screen, the system displays a list of the existing logical systems and the receiving system should be highlighted. Confirm in the pop-up screen, and the model should be sent to the second SAP ECC system.

Next, log on to the receiving system and open the distribution model there (using Transaction SALE or directly by using Transaction BD64). The imported model

should be visible. In this system, the model has the status *read only* because the master version is located on the other system. However, we do not want to perform any changes in interface logic—our purpose is to generate partner profiles for inbound IDocs. To accomplish this, perform the same steps as those outlined in Section 3.3. From the menu, select ENVIRONMENT • GENERATE PARTNER PROFILES and confirm the generation of the partner profiles in the next screen (see Figure 3.9). As you can see, this function creates the necessary partner profiles from the distribution model for both outgoing and incoming IDocs.

3.7 Summary

This chapter provided you with information on how to create an interface for master data. You were provided with two approaches:

- Sending master data directly using predefined reports.
- Sending "delta" changes using change pointers.

These two methods require the definition of a distribution model and the creation of partner profiles. Sending "delta" changes also requires special *report scheduling*.

This as well as the previous chapter explained different ways of interfacing transactional documents. As such, they described the most common cases of configuring SAP ECC interfaces.

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