Applies to:
SAP Netweaver Master Data Management Server 5.5, SAP ECC6 Server.
For more information, visit the Master Data Management homepage.

Summary
This article talks about the Master Data Extractor of SAP Netweaver MDM, its features & all the configuration details required for the successful functioning of this Master Data Extractor. This is a detailed description of the prerequisites for this Extractor to be available in ECC6 R3 System & then its detailed configuration along with the descriptions of the MDM Compatible Message Types & their usage in the ALE configuration which is also required for the successful functioning of the Master Data Extractor.

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1. Master Data Management Data Flow

The MDM System Landscape needs to be set up for the flow of data between MDM and its different backend systems with which it communicates by extracting data and then harmonizing the managed master data. After having configured the MDM components, XI content, and the remote system extractors as described in the figure given below, circulation of data is possible in the MDM System Landscape.

The following graphic shows a master data management system landscape and its data flow:
2. MDM Master Data Extractor

MDM Master Data Extractor facilitates the retrieval of master data from SAP remote systems such as SAP Enterprise Resource Planning (ERP), Supplier Relationship Management (SRM) or Customer Relationship Management (CRM) and then sends this master data to the MDM Server.

The MDM master data extractor MDM_CLNT_EXTR is a tool to extract the master data from backend SAP R/3 and mySAP systems.

Supported systems are:

- SAP R/3 and ERP (starting from release R/3 4.6C up to the latest ERP release)
- SAP CRM & SRM (starting from release CRM 4.0 and SRM 4.0 up to the latest releases)

The extractor is able to select, read, package and distribute master data objects. The distribution to the target receiving system (e.g. a PI system, or directly MDM) is realized by reusing existing technology:

- SAP R/3 and ERP use the ALE technology to distribute IDoc messages
- SAP CRM & SRM use the ABAP Proxy technology to distribute XML messages

MDM_CLNT_EXTR basically consists of two parts:

- The first part is a generic framework which allows creating extraction variants to configure the master data extraction. It supports executing and monitoring your extraction variants as well as the actual extraction variant runs.

- The second part is a so called extraction object which encapsulates different information about the master data object that you want to extract from your system.

The extractor can retrieve any master data needed for consolidation in the MDM and then harmonize the (consolidated) managed master data back to the SAP Remote Systems, any Legacy System or to BI for generation of high quality Analytical Business Reports. The extractor is generic because its use is independent of the type of SAP remote system.

The SAP ECC Plug-in PI_Basis enables the use of mass IDocs for Extraction of master data objects by using this MDM Master Data Extractor.
3. Setting Up the MDM Extractor for Master Data Extraction

The following version of components needs to be deployed in the Backend system. The Backend System can be any ERP system, SAP R/3 System, SAP SRM or CRM System and SAP for Retail.

- PI_BASIS 2005_1_700 Level 10 (Level 12 is latest)
- SAP_APPL 600 Level-06

The steps needs to be followed to check the current level of patch installed in the Backend System are:

- The Initial Screen of the Backend System should be opened
- Then the System→Status needs to be opened
- Then the Component Version needs to be checked

The following screenshots explains the above defined procedure:
4. Generic Framework and User Interface

The generic framework of transaction MDM_CLNT_EXTR is used to configure Extraction Variants for the extraction of master data from SAP remote system. The extraction can be performed in an integrated manner. The following screenshot shows an overview about the required Configuration settings.

Choose a variant or enter a new variant

| Variant | VAR_CUSTOMER |

Change the configuration of the existing variant

| Description | Extraction of Customer Master Data to XI using DEDMDM |
| Extraction Object | CUSTOMER_EXTRACT |
| Target System | MDM_REC_01 |
| Distribution Mode | I | Block Size | 10 |

➢ **Variant**

An existing variant can be selected using the input help, or alternatively entering the name of a new variant. If an existing variant is selected, then the fields for selecting the extraction object and the distribution mode can not be selected.

➢ **Description**

A description can be added to the extraction variant in order to explain what extraction variant is doing.

➢ **Extraction Object**

The extraction object defines which object type or types are to be extracted. An extraction encapsulates several components like the used IDoc / XML structure, selection fields, function modules to extract the data, and so on.

➢ **Target System**

A target system is defined that receives the extracted master data. The system must be defined as receiver for the corresponding messages in the distribution customizing. If no system is defined, the receiver is determined when the extraction is performed based on the distribution customizing. The target system must be a valid system of the System Landscape Directory.
Distribution Mode

The distribution mode defines whether an initial load or a delta load should be performed for the given objects during the extraction.

For a delta load, only changes since the last delta load are sent.

Furthermore, the transaction checks if the selected records have been initially extracted at least once. If not, the records are skipped during the delta extraction.

The delta extraction mode reuses the Transfer Structure and Data Selection settings of the defined objects. This means that Transfer Structure and Data Selection settings cannot be defined in delta mode. The available values for the distribution mode depend on the selected extraction object.

Block Size

The block size defines the maximum number of objects that may be sent at one time with a message. If the amount of selected objects is larger than the block size, several messages can be sent to the target system.

The next figure shows the data selection which can be used to narrow down the objects that shall be extracted.
Transfer Structure / Transfer Identifier

If an extraction object is selected, a tree structure appears in the lower left area reflecting the structure of the extraction object. With the Transfer checkbox it can be defined whether the selected substructure should be sent during the extraction. If the corresponding segment need not to be distributed then this indicator should not be set. As it can be seen, some of the substructures are grayed out for selection. This depends on the configuration of the extraction object itself.

Data Selection / Object Selection

If a segment is selected in the structure tree, the lower right area displays the fields contained in this segment. Entries can be made for some of these fields. With these fields the selection criteria for the objects to be sent during the extraction can be defined. The available substructures useable for selection as well as the active fields of a substructure depend on the configuration of the extraction object itself.
The next figure shows the top level buttons which can be used to control the transaction.

### Local Control of Extraction

- **Copy Variant**

  Using this button the selected variant can be copied to a different name. The button is only visible if an extraction variant is chosen.

- **Delete Variant**

  Using this button the selected variant can be deleted. The button is only visible if an extraction variant is chosen.

- **Start Extraction**

  To start the extraction, the current variant needs to be saved. Then the extraction can be started with the appropriate button or from the menu. The extraction is performed as a job in the background.

- **Display Jobs**

  An overview of the background jobs is available with the Display Jobs button. Information about the extractions that were performed is displayed. To display any messages during the extraction, a job should be and the job log should be called.
5 Extraction Object

5.1 Overview

SAP delivers a set of extraction objects with pre-defined extraction content: which fields/segments are transferred, which fields/segments can be used for selection, which function modules are called during the extraction process, and so on. Each delivered extraction object is related to a single, specific master data object. This includes a specific binding of the extraction object to the SAP Remote system, the extraction function module, the logical and physical message types, the transfer and selection segments, and so on.

For example Extraction Object MATERIAL_EXTRACT is useable in SAP R/3 and ERP systems only. It uses the function module MATERIAL_EXTRACT to read, package and send Material master data objects. During the extraction it uses the logical message type MATMAS (e.g. for the retrieval of change pointers in the delta mode) and the physical message type MATMASxx (whereas xx is a placeholder for the latest IDoc type available in the system) for the creation of the corresponding IDocs. In addition to this, SAP delivers a possibility to change or create new extraction objects.

To change an existing extraction object, it should be copied to a new one within the customer namespace to prevent loosing the changes been made during further updates of the extractor. In general the definition and/or change of an extraction object consist of two components:

- The extraction objects itself.
- The function module used to extract the data.

5.2 Defining or Changing of Extraction Objects

Report MDM_METADATA_MAINTAIN is used to configure an extraction object. If changes are made to any SAP delivered standard extraction object, all changes within this object are treated as modifications with the risk to loose these if a new SAP Support Package or Patch is applied to your system. It is strongly recommended to create a new extraction object within the customer namespace and to use the SAP extraction object as template. Report MDM_META_DISPLAY is used to view an existing extraction object. To create or change existing extraction objects, the following steps needs to be performed:

- Run report MDM_METADATA_MAINTAIN.
- Maintain the following parameters in the report's start screen:
**MDM Metadata Maintenance**

<table>
<thead>
<tr>
<th>Extraction Object</th>
<th>ZCUSTOMER_EXTRACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Object Version</td>
<td>A</td>
</tr>
<tr>
<td>Content Version</td>
<td>0001</td>
</tr>
<tr>
<td>Message Type</td>
<td>I</td>
</tr>
<tr>
<td>IDOC Basis Type/DDIC Structure</td>
<td>DEBMDM06</td>
</tr>
<tr>
<td>Delta Session</td>
<td>002</td>
</tr>
<tr>
<td>Function Module</td>
<td>CUSTOMER_EXTRACT</td>
</tr>
<tr>
<td>Processing Mode</td>
<td>6</td>
</tr>
</tbody>
</table>

**Extraction Object**
- Defines the name of the extraction object.
- Enter a new name for a new extraction object or an existing name to change an existing extraction object.

**Object Version**
- Defines the status of the extraction object.
- Enter A for an active and executable extraction object.

**Content Version**
- Defines the version number of the extraction object.
- Enter 1 for an active and executable extraction object.

**Message Type**
- Defines the physical message type (IDoc or Proxy XML) that is sent to the receiver system. This physical message type depends on SAP Remote Systems and the used technology for message distribution. SAP R/3 & ERP systems usually use ALE and IDocs whereas SAP CRM & SRM systems use ABAP Proxies and XML messages for distribution.
- Choose I (IDoc) or P (Proxy/XML message).

**IDOC Basis Type / DDIC Structure**
- Defines the name of the IDoc Basic type or the proxy DDIC structure that is used to create the corresponding physical messages.
- Enter a valid name of an IDoc Basis type or DDIC Structure.

**Delta Session**

- Defines if your extraction object can be used for delta processing or not.
- Choose one of the values from the F4 help.

**Function Module**

- Defines the name of the extraction function module that is used to select the data from the system.
- Enter a valid name of an extraction function module.
- Processing Mode
  - Defines what you want to do with your extraction object.
  - Choose one of the values from the F4 help.

On starting the report a screen is displayed that shows the general settings for the extraction object.
The extraction object should be selected and Field Groups needs to be chosen from the tree menu. A list of field groups are seen related to the Message Type you’ve maintained in the settings.
The Transfer Column defines which parts of the message structure are used and filled with data during the extraction. The column is used to control the message structure that needs to be send to the receiving system. The structure itself is hierarchical (although it is not hierarchically displayed). Including a parent field group in the transfer automatically includes all children field groups although they are not explicitly defined for transfer.

To define the content of a field group and to influence the usage of a specific field within a group as selection field, a field group is selected and Fields are chosen in the tree menu. A list of fields related to the Field Group chosen is seen.
The Fields overview shows all fields of the selected segment. The field Meta Data (names, data types, and so on) as well as some attributes related to the extraction itself can be seen. The Selection column defines which fields are active for selecting data if an extraction variant is created. This behavior can be influenced by marking the fields of ones choice.

- New Extraction Object should be saved.

5.3 Defining or Changing of Extraction Function Modules.

The SAP delivered standard extraction function modules support a limited set of fields only. If enhancements needs to be done on an existing extraction object, the corresponding extraction function modules should be analyzed and then determine, whether they cover the enhancements. If not, or if a completely new extraction object is created, a new extraction function module should be enhanced or created that is able to extract the desired data. The recommended way to do this is copying the complete function group and adjusting it according to the needs.

Furthermore the extraction function module contains the binding of the extraction object to the logical message type which is used during the extraction (e.g. for retrieving change pointers for a specific message type). This binding is hard coded in the TOP INCLUDE of the corresponding function group.
6 Automatic Extraction of Master Data

Transaction MDM_CLNT_EXTR is currently intended for manual usage. Nevertheless, with a few manual steps a report can be created to run the extraction process automatically with a scheduled background job. A report needs to be created that calls the extraction function module with an existing variant. Then the report can be used to plan regular background jobs for the automatic extraction.

6.1 Creation of Report ZMDM_CLNT_EXTR

The report needs to be created only once. Therefore the steps needs to be followed are as follows:

- Logon to SAP System.
- Start transaction SE38.
- Enter ZMDM_CLNT_EXTR (or any other suitable name) as report and push the CREATE Button.
- Define the following settings:
  - Type = Executable Program
  - Status = Test Program
  - Application = Basis
  - Start using variant = checked
The following Source Code needs to be written:

REPORT ZMDM_CLNT_EXTR.

PARAMETERS: p_var TYPE mdm_exvariant.

* Start the Extraction

CALL FUNCTION 'MDM_START_EXTRACTION_FROM_VARI'

EXPORTING

IV_VARIANT = p_var.

Now this report can be used to create report variants.
6.2 Creation of a Report Variant for ZMDM_CLNT_EXTR

If several objects are distributed from SAP remote system to MDM, the report can be reused for the distribution of all objects. Therefore multiple report variant can be created linked to the multiple extraction variants of MDM_CLNT_EXTR. To do so:

- Logon to the SAP System.
- Run transaction SE38 for report ZMDM_CLNT_EXTR.
- Mark radio button VARIANTS.
- Click on the CHANGE Button.
- In the report variant’s initial screen define a name for your report variant.

- Push the CREATE Button.
- In the next screen click on the ATTRIBUTES Button.
- Maintain a short description and mark the variant for background processing.
- Save the variant.
10. Now enter your defined extraction variant of transaction MDM_CLNT_EXTR as parameter (P_VAR respectively Variant for Extraction).

### 6.3 Scheduling the Report/Extraction Variant.

The automatic extraction is realized by creating a scheduled background job. A single job can be created for each of the defined report (extraction) variants. Therefore:

- Logon to the SAP System.
- Choose System → Services → Jobs → Define Jobs from the menu (SM).
- Define a name for the Job.
- Define an execution target (mostly the SAP system).
- Push button START CONDITION to define the job's schedule.
- Push button STEP to define the job's steps.

#### Define Background Job

![Define Background Job Table](image-url)
Create a job for ABAP Program
Enter the report name ZMDM_CLNT_EXTR as program
- Hitting the enter key a pop-up will be received with the maintained variant. Select the variant to be scheduled.

- Save the job.

Depending on the job definition, the extraction will now be executed automatically.
7 Delta Extraction

7.1 Overview

MDM_CLNT_EXTR offers the possibility to distribute Deltas of master data objects. A Delta means in this case the change or update of an existing master data object. As a prerequisite for a successful delta extraction changed object must be distributed at least one time in the Initial Mode. MDM_CLNT_EXTR checks if this has been the case. If not, the object is removed from the delta extraction. This behavior of the extractor is a valid and planned functionality as some systems are able to distribute only the changed parts of the object. It is mandatory that the object does already exist in MDM to be able to update it with the changed information. If the object does not exist, it would be possible to create invalid, incomplete data in MDM. This is prevented by checking if the data has at least been distributed once with the Initial Mode. To run a delta distribution, the value D has to be chosen as distribution mode.

7.2 Change Pointers in R/3 & ERP Systems

The most important requirement for a delta distribution is that the SAP system logs the changes to the master data object. This is realized in R/3 (ERP) by using the ALE change pointers. It has to be ensured that the change pointers for the master data objects are enabled:

- Login to SAP system and start transaction SALE.
- Navigate to Modeling and Implementing Business Processes ➔ Master Data Distribution
- Replication of modified Data.
- Activate the change pointers generally.
- Activate the change pointers for those logical message types that are used in distribution.
Although MDM_CLNT_EXTR is sending mass IDocs for customers and vendors (DEBMDM and CREMDM), the change pointers have to be activated for message types DEBMAS and CREMAS. Additionally, if address data is changed and the Business Address Service is been used, the change pointer should be activated for the ADRMAS message type as well.

7.3 Change Pointers in CRM & SRM Systems

The most important requirement for a delta distribution is that the SAP system logs the changes to the master data object. In CRM and SRM systems, change pointers are activated differently. Business Partner change pointers are activated within the maintenance of Business Partner Data Exchange Function Modules. Start transaction CRMC_BUT_CALL_FU. The function module BUPA_CREATE_CHANGE_POINTER needs to be activated for the event Business Partner Outbound and for the object Business Partner.

7.4 Automatic Distribution of New Records as Deltas

Although it is not the intended usage of MDM_CLNT_EXTR to Delta distribute newly created records automatically, there is a technical possibility to do so. The technical check if a record has already been distributed initially is implemented as a search for the record ID within the initial distribution extraction variants. The information of all executed extractions is stored in the database table MDM_SELECT_TRANS. If the Delta extraction is able to retrieve the ID of the new record within this storage, the Delta distribution is executed.

Otherwise the record is skipped. The workaround for new records to fulfill this requirement is to create and run initial extractions that cover the whole number range of the object type. The instructions for creating an initial extraction as described above should be followed. It must be ensured that the complete number range for the object is maintained (Number Range settings can be retrieved in the corresponding IMG Reference Customizing settings of transaction SPRO) in the Data Selection screen.

This will store in table MDM_SELECT_TRANS that the record was already extracted although it does not yet exist. With the help of enabled change pointers for the object and the creation of an Automatic Extraction for Master Data with the Delta mode it is possible to distribute newly created records automatically as Deltas.
8 MDM Standard IDOC Types

8.1. CREMAS/CREMDM and DEBMAS/DEBMDM IDOC Types

CREMAS and DEBMAS are original IDoc types delivered by the Logistics Component of SAP R/3 & ERP. Unfortunately, those IDoc types are only capable to transport one single data record. This is not sufficient for MDM scenarios that are usually mass data related. Therefore, MDM introduced two new IDoc types CREMDM and DEBMDM that are able to encapsulate multiple objects. In MDM scenarios it is recommended to use this IDoc types for the extraction of remote system data.

8.2. MATMAS IDOC Type

The MATMAS IDoc type is delivered by the Logistics Component of SAP R/3 & ERP. It is already mass capable and therefore not enhanced by MDM. If configurable materials are used in the R/3 & ERP and this information needs to be distributed with the materials, this have to be specified explicitly in the General Control Indicators for materials (transaction OMT0).
8.3. MDMRECEIPT IDOC Type

MDMRECEIPT is an old message type that has its origin in MDM 2.0 and MDM 3.0. As transaction MDM_CLNT_EXTR still has to support the old MDM releases, this IDoc type have to be configured in ALE, although it is not used in standard MDM 5.5 scenarios. If an extraction is run and it fails with error "BI 003 – Could not determine recipients for message type MDMRECEIPT", then the ALE is not configured correctly.
9  Tips, Tricks & Trouble Shooting

9.1  Monitoring

Each SAP System contains a basic monitor for data distribution. All monitors allow checking the current state of the data messages. Failed messages can be restarted, too. Transaction WE02/WE05 is used in SAP R/3 & ERP systems for the IDoc-List reporting. By using this report, IDocs in the system can be searched.

**IDoc List**

Transaction SXMB_MONI is used in SAP CRM & SRM systems for the Integration Engine Monitoring. The Monitor for processed XML Message is chosen to see the message flow in the system. If a PI System is used for the message distribution in the local system landscape, transaction SXMB_MONI can be used in the PI system to check if messages were correctly transformed and distributed.
9.2 Alternative Data Extraction

SAP systems contain several other transactions & reports to distribute Master Data. Within an MDM scenario MDM_CLNT_EXTR should be always used. Nevertheless, other data extractors are:
### 9.3 “No Data was Found” for selection

If the extraction fails with error message No Data was found, the following possible reasons should be checked for this issue:

**Initial Extraction (Distribution Mode I)**

- All existing objects need to be extracted from the system and therefore any selection criterion is not entered.

<table>
<thead>
<tr>
<th>SAP System</th>
<th>Transaction/Report</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>R/3 (ERP)</td>
<td>BD10</td>
<td>Distribution of Material and Article – this transaction is delivered as SAP Basis Component (LO-MD-MM)</td>
</tr>
<tr>
<td>R/3 (ERP)</td>
<td>BD12</td>
<td>Distribution of Customers – this transaction is delivered as SAP Basis Component (LO-MD-BP) and is able to send DEBMAS (single record) IDocs only</td>
</tr>
<tr>
<td>R/3 (ERP)</td>
<td>BD14</td>
<td>Distribution of Vendors – this transaction is delivered as SAP Basis Component (LO-MD-BP) and is able to send CREMAS (single record) IDocs only</td>
</tr>
<tr>
<td>R/3 (ERP)</td>
<td>BD21</td>
<td>Distribution of objects related to change pointers (Delta Distribution) – this transaction is delivered as SAP Basis Component (LO-MD) and is able to send IDocs for any R/3 (ERP) IDoc type that is using change pointers</td>
</tr>
<tr>
<td>R/3 (ERP)</td>
<td>BD91 – BD93</td>
<td>Distribution of Classification data for Materials (including characteristics, classes and hierarchies) – these transactions are delivered as SAP Basis Component (LO-MD-MM)</td>
</tr>
<tr>
<td>R/3 (ERP)</td>
<td>MDMC</td>
<td>Distribution of Customers – this transaction is delivered as SAP MDM Component and is able to send DEBMAS and DEBMMDM (mass records) IDocs</td>
</tr>
<tr>
<td>R/3 (ERP)</td>
<td>MDMV</td>
<td>Distribution of Vendors – this transaction is delivered as SAP MDM Component and is able to send CREMAS and CREMDM (mass records) IDocs</td>
</tr>
<tr>
<td>R/3 (ERP)</td>
<td>PFAL</td>
<td>Distribution of Employees – this transaction is delivered as SAP Basis Component</td>
</tr>
<tr>
<td>CRM/SRM</td>
<td>ABA_BUSINESS_PARTNER_SEND</td>
<td>Distribution of ABA Business Partners – this report is delivered as SAP Basis Component (AP-MD-BP) and is able to send ABA Business Partners as Proxy XML message</td>
</tr>
</tbody>
</table>
2) Selection criteria but MDM_CLNT_EXTR is unable to find the data. Please check the selection criteria if it is correct. In some cases (e.g. for business partner numbers) leading zeros needs to be added to the maintained values. This depends on the data type of the selection field!

- Delta Extraction (Distribution Mode D)
- It should be ensured that the change pointers are activated in the system.

9.4 Extraction Runs Out of Memory

It is possible that the SAP System runs out of memory during an extraction run. A short dump is received with the error code “TSV_TNEW_PAGE_ALLOC_FAILED” or “SYSTEM_IMODE_TO_LARGE”. The reason for this error is most probably the selection criteria or the block size of the extraction variant being used. MDM_CLNT_EXTR gathers all information to distribute within an internal table. If too many records are selected and the block size is too large, the size of the internal table might grow beyond the available memory. To avoid this memory issue, the block size can be decreased or the object selection can be narrowed down of the extraction variant, or more RAM can be added to physical host. Alternatively, if the complete structure of Master Data Object need not be extracted, segments from the transfer can be excluded as well.
Related Content
For more information, visit the Master Data Management homepage.
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