

SAP BW Training

Lesson 04: Data Acquisition Part 1 – ETL
Components



Components of ETL

➤ Components of ETL are:

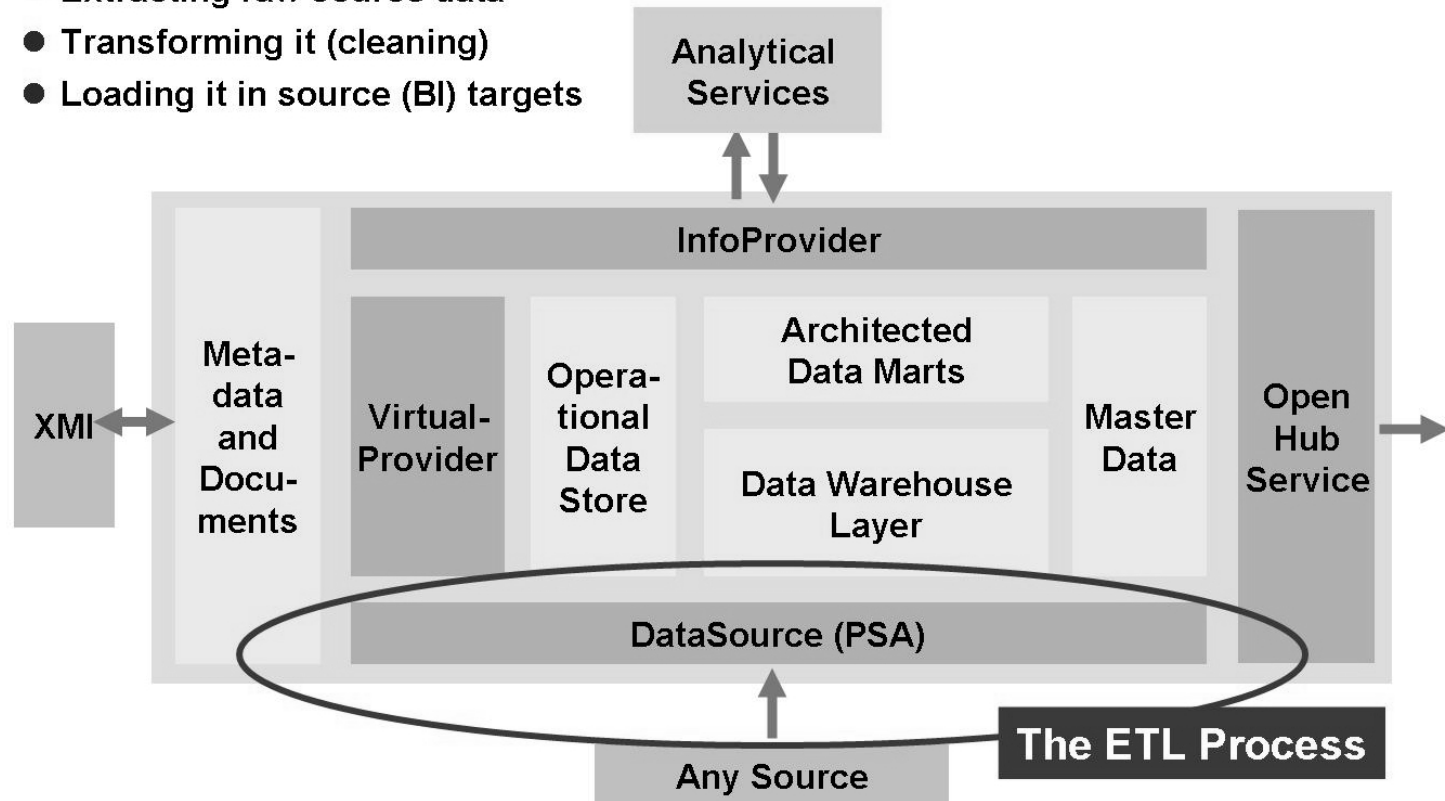
- Source system
- DataSource
- InfoPackage
- InfoSource
- Transformation
- DTP

ETL Process

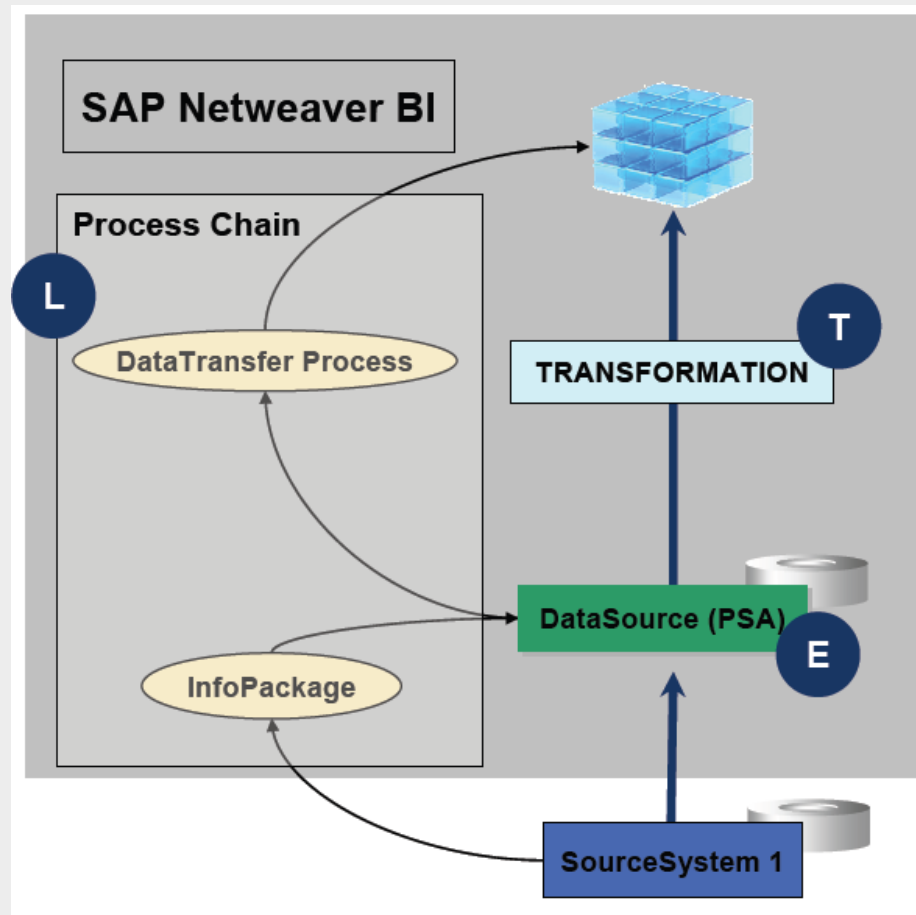


The ETL process:

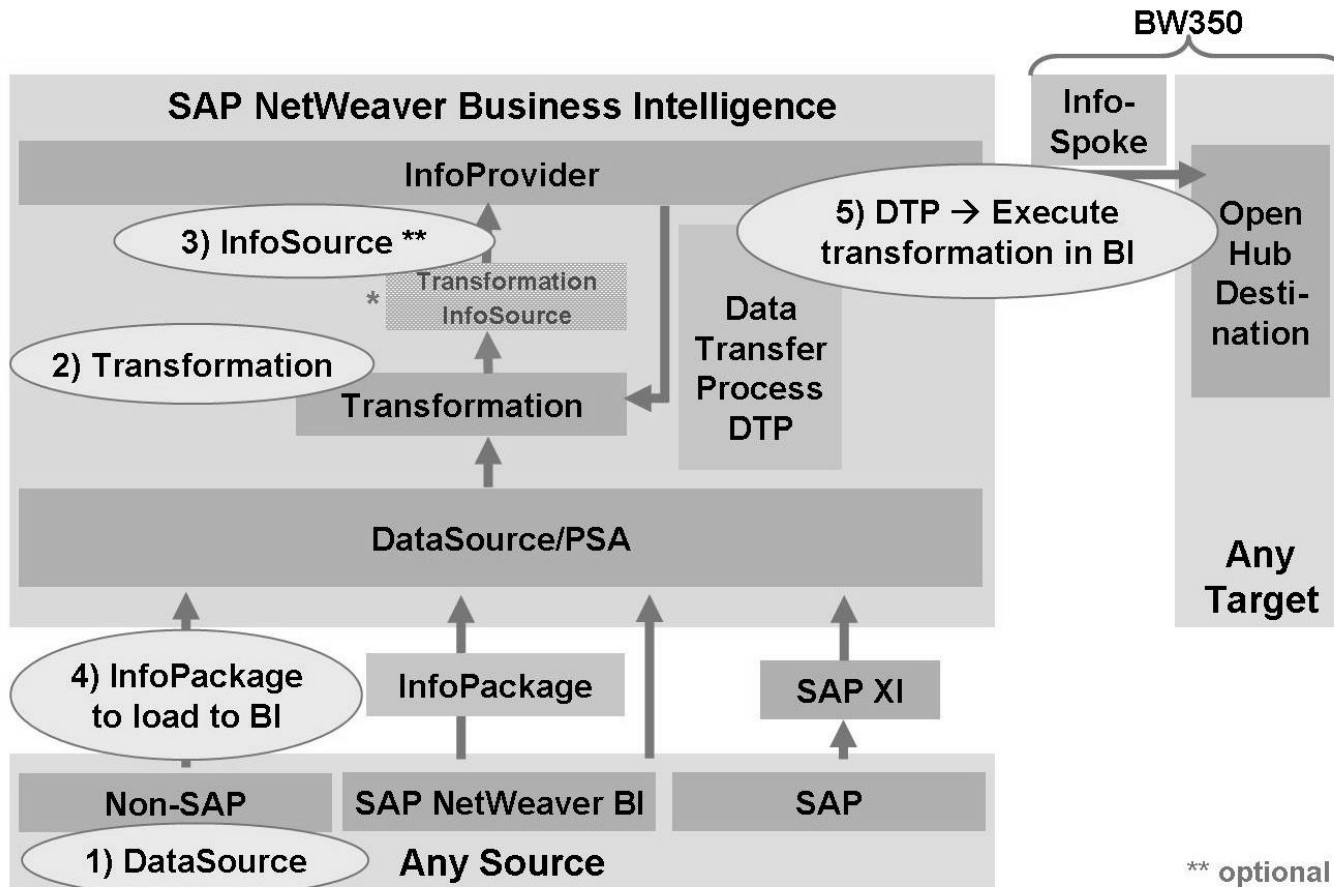
- Extracting raw source data
- Transforming it (cleaning)
- Loading it in source (BI) targets



Simple Data Flow in BW



BI Data Flow Details



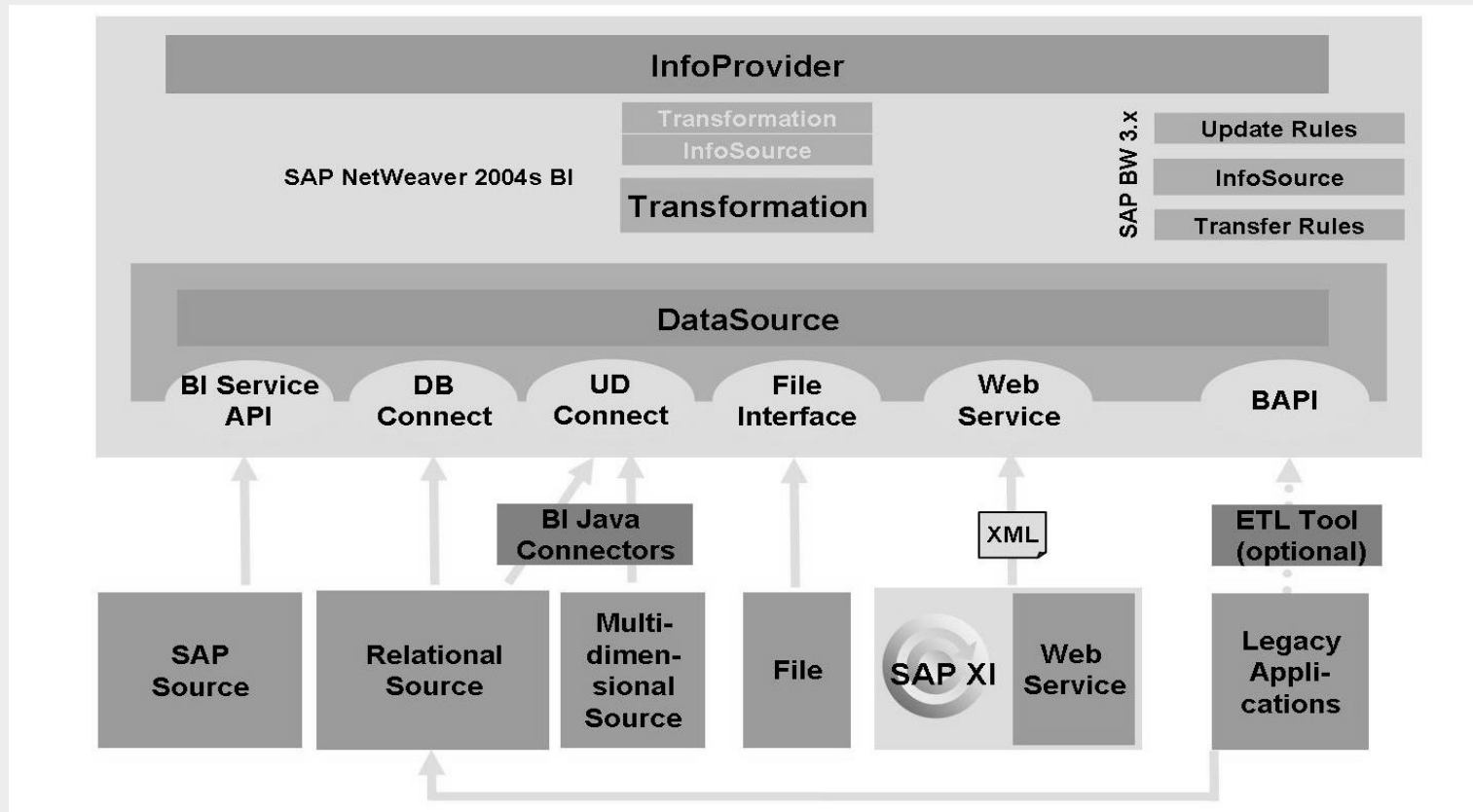


Source System

Source System



- All systems that provide the SAP Business Information Warehouse with data are described as source systems.





Source System Types

1. SAP systems
2. BI systems
3. Flat files for which metadata is maintained manually and transferred to BI using a file interface
4. Database management systems into which data is loaded from a database supported by SAP using *DB Connect*, without using an external extraction program
5. Relational or multidimensional sources that are connected to BI using *UD-Connect*
6. Web Services that transfer data to BI by means of a push
7. Non-SAP systems for which data and metadata is transferred using staging BAPIs
8. Data services is a direct connection between SAP NetWeaver BW 7.3 and SAP Business Objects Data Integrator . It enables you to establish connections between SAP NetWeaver BW and non-SAP systems, and trigger the generation of metadata and data flows.

Source Systems Types Shown in RSA1



Data Warehousing Workbench

Edit Goto Tools Environment Settings System Help

Data Warehousing Workbench: Modeling

Modeling

- Favorites
- Find
- History
- Data Flows
- InfoProvider
- InfoObjects
- InfoSources
- DataSources
- Source Systems
- Open Hub Destination
- Planning Sequences
- Process Chains

Administration

Transport Connection

Documents

BI Content

Translation

Metadata Repository

Source Systems

| | Tech. Name | Execute Function | O.. | Object Infor... |
|----------------------------------|------------|------------------|-----|-----------------|
| BW | BW | Create... | | |
| SAP | SAP | Create... | | |
| ODP - BW | ODP_BW | Create... | | |
| ODP - SAP (Extractors) | ODP_SAP | Create... | | |
| ODP - SAP HANA Information Views | ODP_HANA | Create... | | |
| ODP - SLT Queue | ODP_SLT | Create... | | |
| ODP - SAP Business ByDesign | ODP_BYD | Create... | | |
| ODP - Other Contexts | ODP | Create... | | |
| Data Services | BOBJDS | Create... | | |
| External System | PARTNERS | Create... | | |
| File | FILE | Create... | | |
| DB Connect | DB | Create... | | |
| UD Connect | UDC | Create... | | |
| Web Service | WEB | Create... | | |

Select Source System Type

- ☒ Automatic. Create SAP System
- ☐ Manually Create SAP System
- ☐ SAP Business Information Warehouse
- ☐ Dummy for SAP System / SAP Business Information Warehouse
- ☐ ODP Data Replication
- ☐ Business Objects Data Services
- ☐ File System (Manual Metadata, Data Using File Interface)
- ☐ Database System (Data and Metadata Using SAP DB Connect)
- ☐ SAP UDC System (Data and Metadata from UDC and Portal Server)
- ☐ WebService System (Metadata Manually, Data with WebService Push)
- ☐ External System (Data and Metadata Transfer Using Staging BAPIs)

Creating a Flat File Source System



Data Warehousing Workbench: Modeling

Modeling

- Favorites
- Find
- History
- Data Flows
- InfoProvider
- InfoObjects
- InfoSources
- DataSources
- **Source Systems**
- Open Hub Destination
- Planning Sequences
- Process Chains

Source Systems

FILE

Create...

Transfer Exchange Rates

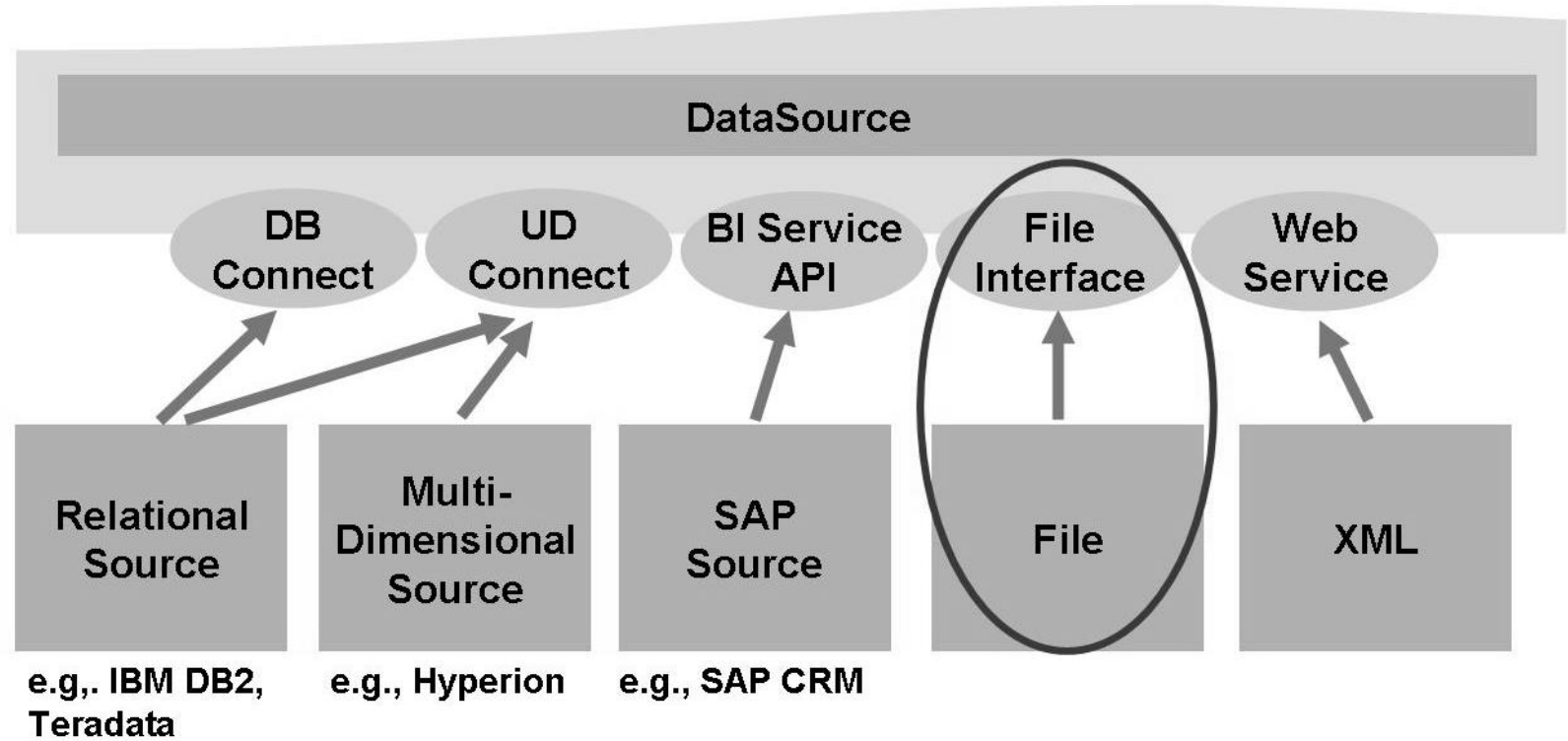
| | Tech. Name | Execute Function | O.. | Object In |
|--|------------|-------------------------|-----|-----------|
| | FILE | Create... | | |
| | ADEMPLOYID | Display DataSource Tree | | |
| | ANI_DATA | Display DataSource Tree | | |
| | FILEAT | Display DataSource Tree | | |
| | FF_EQMYO | Display DataSource Tree | | |
| | AGE_FILE | Display DataSource Tree | | |
| | AF FILE | Display DataSource Tree | | |
| | FILE_MARC | Display DataSource Tree | | |
| | ZARUN | Display DataSource Tree | | |
| | ZAYUSVINO | Display DataSource Tree | | |
| | BGFFILE | Display DataSource Tree | | |
| | BIM_GER_S | Display DataSource Tree | | |
| | FILE_DEMO | Display DataSource Tree | | |
| | ZBWFLAT12 | Display DataSource Tree | | |
| | BW73_MAS | Display DataSource Tree | | |



DataSource



DataSources Based on Flat Files



DataSource (RSDS)



- DataSources are used for extracting data from a source system and for transferring data into the BI.
- DataSources make the source system data available on request to the BI in the form of the (if necessary, filtered and enhanced) extraction structure.
- The DataSources subdivide the data that is provided by a source system into self-contained business areas.

DataSource (RSDS)



➤ In SAP source systems, the DataSources are assigned to applications, for example HR (Human Resources).

The advantage here is that you are able to specifically access data evaluation for this application.

➤ The information required for the extraction process, that is, the BI-relevant properties of the DataSource, is replicated in the BI by comparing metadata.



DataSource Types

1. DataSources for Transaction Data
2. DataSources for Master Data
 - i. for Attributes **_ATTR*
 - ii. for Texts **_TEXT*
 - iii. for Hierarchies **_HIER*

Example: Refer to RSA5 in SAP R/3 for DataSources



DataSource MetaData (RSA2)

➤ DS-Metadata: Describes the data to be extracted and how this data is to be extracted.

➤ Metadata is Source-system Specific:

- A number of logically related fields that are offered in a flat structure
- Extraction structure, for transferring data to BI.
- Application Component
- Extraction method
- Extractor
- Delta process
- Transfer method

Example: Refer to RSA2 for DataSources

Create a DataSource



Data Warehousing Workbench: Modeling

Modeling

- Favorites
- Find
- History
- Data Flows
- InfoProvider
- InfoObjects
- InfoSources
- **DataSources**
- Source Systems
- Open Hub Destination
- Planning Sequences
- Process Chains

DataSource for ANI_DATA ANI_DATA

Unassigned

- Application
- EMP_D
- ZARN_I
- tXT

Change
Delete
Create Application Component...
Create DataSource...

| Tech. Name | M.. | Execute Func... | Display Tree | O.. | Object Infor... |
|-----------------|-----|-------------------|--------------|-----|-----------------|
| MODEMOTCONNE... | | Replicate Meta... | InfoSources | | |
| RNG | | Replicate Meta... | InfoSources | | |
| TA01 | = | Change | | | ANI_DATA |
| | = | Change | | | ANI_DATA |
| S_TXT | = | Change | | | ANI_DATA |

File System DataSource: Extraction Tab



SAP Scheduler (Maintain InfoPackage)

InfoPackage: ZMDNEO_TEXT(ZPAK_9W0X3XW66JKDX14AGRURZ1L42)

DataSource: ZMDNEO_TEXT(ZMDNEO_TEXT)

Data Type: Texts

Source System: ZPC_NEO(ZPC_NEO)

Last Changed By: IDADMIN Date: 07.07.2011 Time: 10:13:23

Adapter: Load Text-Type File from Local Workstation

File Name: C:\Documents and Settings\smamidip\Desktop\Training

Header Rows to be Ignored: 1

Character Set Settings: Default Setting

System Codepage: 4103 UTF-16LE Unicode / ISO/IEC 10646

Data Format: Separated with Separator (for Example, CSV)

Data Separator: , ☐ Hex

Escape Sign: " ☐ Hex

DataSource: Fields

DataSource Edit Goto Extras System Help

DataSource: ZMDNEO_TEXT ZMDNEO_TEXT

Source System: ZPC_NEO ZPC_NEO

Version: Active Compare with...

Active Version Executable Edited Version

General Info. Extraction Proposal Fields Preview

| Pos. | Field | Descript. | D | T | InfoObject | Data type | Lngh | Decim | Extern | L | K | Conv | Form |
|------|----------------|-------------|---|-------------------------------------|------------|-----------|------|-------|--------|--------------------------|--------------------------|-------|------|
| 1 | /BIC/ZEMPLOYEE | Employee | | <input checked="" type="checkbox"/> | ZEMPLOYEE | CHAR | 8 | 0 | 8 | <input type="checkbox"/> | <input type="checkbox"/> | ALPHA | Ext |
| 2 | /BIC/ZEMPNAME | Employee Na | | <input checked="" type="checkbox"/> | ZEMPNAME | CHAR | 40 | 0 | 40 | <input type="checkbox"/> | <input type="checkbox"/> | ALPHA | Ext |



PSA



PSA (Persistent Staging Area)

- PSA is the inbound storage area for data from the source systems in BI system.
- The requested data is saved, unchanged from the source system
- Requested data is stored in the DataSource structure format in transparent, relational database tables in the BI system.
- The data format remains unchanged, meaning that no summarization or transformations take place, as is the case with InfoCubes



InfoPackage



Infopackage

➤ Infopackage is used to load data from source system to PSA in BI system.

➤ Following are the different tabs of an Infopackage

- Data Selection : Restricts the data to be loaded
- Extraction : For selection of flat files
- Processing : PSA staging options
- Update : Full / Delta / Initial Load
- Schedule : Foreground or Background processing

InfoPackage



SAP

Scheduler (Maintain InfoPackage)

Process Chain Maint.

| | | | |
|-----------------|--|------|------------|
| InfoPackage | inf pack for cust attr(ZPAK_D3SHSHN26960UY162W3BPKOC4) | | |
| DataSource | data source for cust attr(ZTDS_CATTR) | | |
| Data Type | Master Data | | |
| Source System | 5 FLAT FILE(Z5_FF) | | |
| Last Changed By | LSHAIK | Date | 29.07.2008 |
| | | Time | 21:11:12 |

Data Selection Extraction Processing Update Schedule

Adapter Load Text-Type File from Local Workstation Properties

Name of the File C:\Documents and Settings\Administrator\Desktop\traini...

Header rows to be ignored 2

Data Format Separated with Separator (for Example, CSV)

Data Separator , ☐ Hex

Escape Sign ; ☐ Hex



Transformation

Transformation - Definition

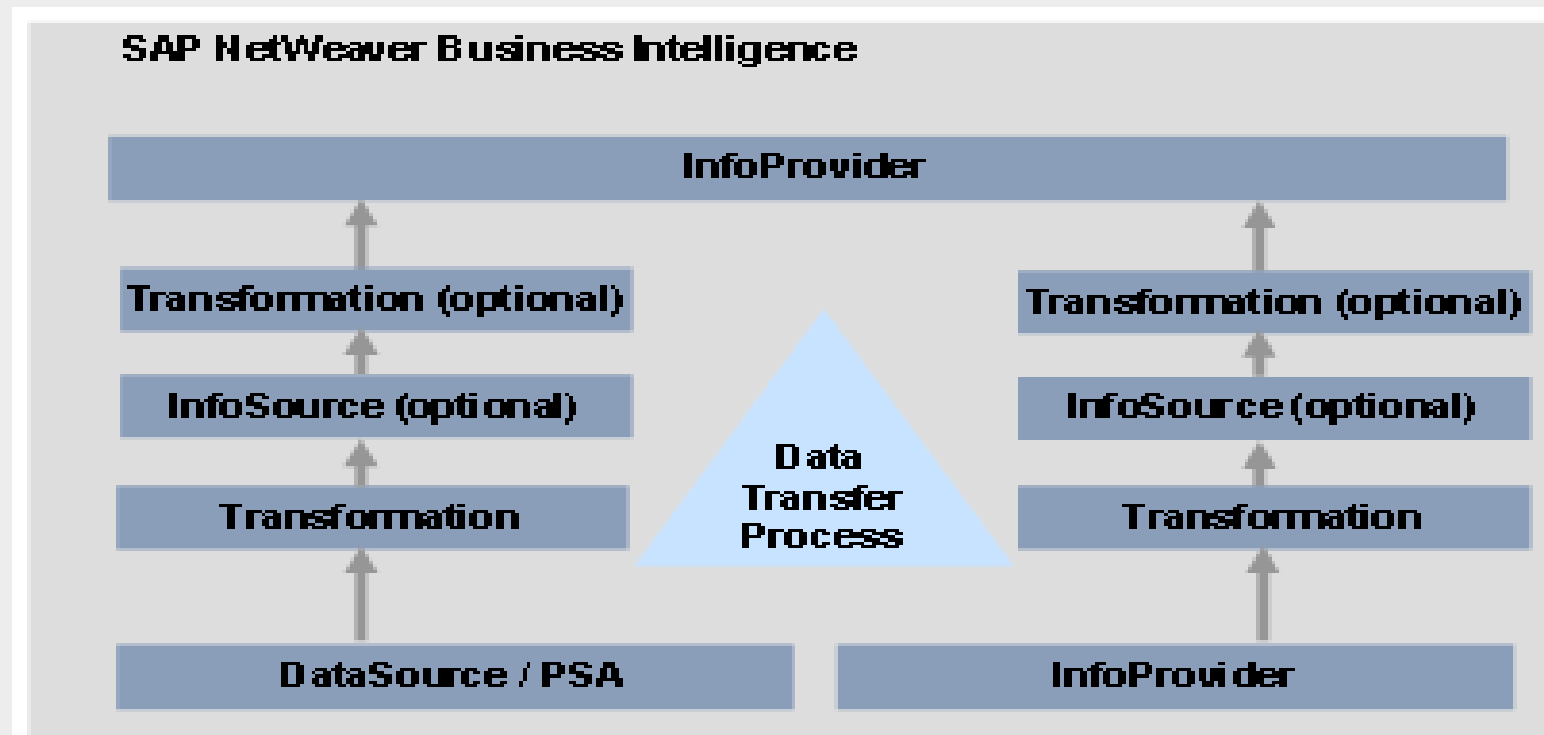


- The process that facilitates to consolidate, cleanse, and integrate data.
 - Semantically synchronize data from heterogeneous sources.
 - A transformation converts the fields of the source into the format of the target.



Transformation in the Flow

- Improved performance, flexibility and usability
- Unit Conversion Capabilities for unit conversion during data load (and reporting)



Transformation GUI



Transformation Change

Transformation: ODSO RHORDTM -> CUBE RHSALES

Source: Sales Order Items (RHORDTM)

Target: Sales Order Analysis (RHSALS)

Version: Active Save

Active Version: Executable Edited Version

80% Rule Group Rule

Source
fields

| Posit | Key | Info Object | Icon | Descript. |
|-------|-----|--------------|------|--|
| 1 | | ODOC_NUMBER | | Document number |
| 2 | | OS_ORD_ITEM | | Sales Order Item |
| 3 | | OMATERIAL | | Material |
| 4 | | OCUSTOMER | | Customer number |
| 5 | | OSALESORG | | Sales Organization |
| 6 | | OCUST_GROUP | | Customer group |
| 7 | | ODISTR_CHAN | | Distribution Channel |
| 8 | | ODIVISION | | Division |
| 9 | | OCALDAY | | Calendar Day |
| 10 | | OCONF_QTY | | Confirmed quantity |
| 11 | | OSALES_UNIT | | Sales unit |
| 12 | | OORECORDMODE | | BW Delta Process: Update Mode |
| 13 | | ONET_VALUE | | Net value of the order item in document currency |
| 14 | | ODOC_CURRCY | | Document Currency |

Target
fields

| Rule Group | Standard | Group | | |
|------------|-------------|-------------|-------------|--|
| Posit | Key | Info Object | Icon | Descript. |
| 1 | OMATERIAL | 1 | OMATERIAL | Material |
| 2 | OCUSTOMER | 2 | OCUSTOMER | Customer number |
| 3 | OSALESORG | 3 | OSALESORG | Sales Organization |
| 4 | OCUST_GROUP | 4 | OCUST_GROUP | Customer group |
| 5 | ODISTR_CHAN | 5 | ODISTR_CHAN | Distribution Channel |
| 6 | ODIVISION | 6 | ODIVISION | Division |
| 7 | OCALMONTH | 7 | OCALMONTH | Calendar Year/Month |
| 8 | OCALDAY | 8 | OCALDAY | Calendar Day |
| 9 | OCALYEAR | 9 | OCALYEAR | Calendar Year |
| 10 | OCALQUARTER | 10 | OCALQUARTER | Calendar Year/Quarter |
| 11 | OCONF_QTY | 11 | OCONF_QTY | Confirmed quantity |
| 12 | ONET_VAL_S | 12 | ONET_VAL_S | Net value in statistics currency |
| 13 | ONET_VALUE | 13 | ONET_VALUE | Net value of the order item in document currency |



Transformation Rules

- Transformation rules: Transformation rules map any number of source fields to at least one target field. You can use different rules types for this.
- Rule type: A rule type is a specific operation that is applied to the relevant fields using a transformation rule.
- Transformation type: The transformation type determines how data is written into the fields of the target.
- Rule group: A rule group is a group of transformation rules. It contains one transformation rule for each key field of the target. A transformation can contain multiple rule groups



Transformation - Rule Types

1. Direct Assignment
2. Constants
3. Formula
4. Reading Master Data
5. Reading DSO
6. Routine
7. Time Update
8. Initial
9. Unit of measure conversion & Currency Translation



Transformation(update) Type

Def: To control how a key figure/data field is updated to the InfoProvider.

BI

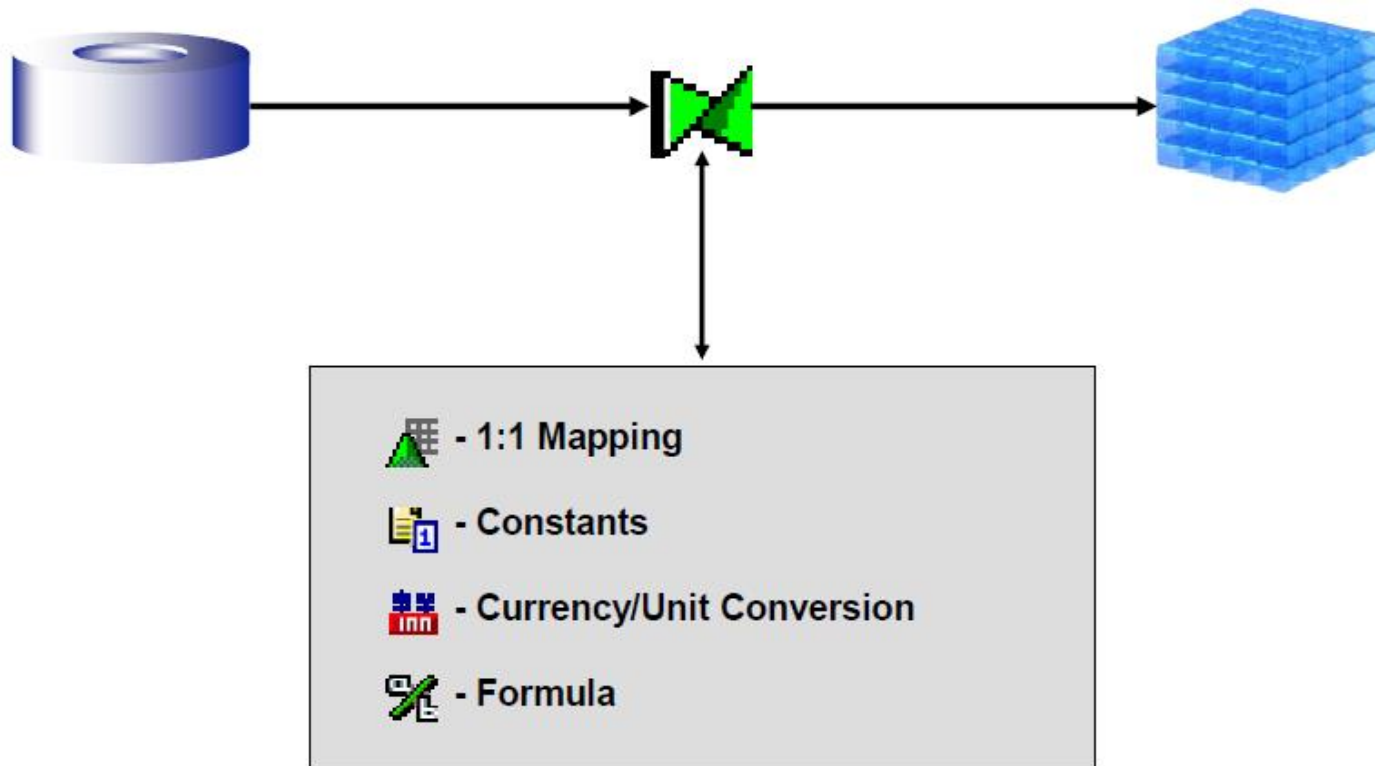
| InfoProvider Update Type | InfoCube | Data Store Object | | Char.-InfoObject |
|---------------------------------|------------|-------------------|------------|------------------|
| | Key Figure | Data Field | | Attribute / Text |
| | | Char. | Key Figure | |
| Addition | X | - | X | - |
| Maximum | X | - | X | - |
| Minimum | X | - | X | - |
| Overwrite | - | X | X | X |
| No Update | X | X | X | X |



Scenarios for Transformation

- On the Fly Transformation
- Data Enrichment – Cross Reference (LOOKUPS)
- Conditional Update

On the Fly Transformation



**Transformation on record level by using standard transformation features of BI.
No master data or InfoProvider read.**



1:1 mapping (Direct Assignment)

Transformation: RSDS ZETL_DS PC_FILE -> ODSO ZSAL_CUS

Source: ETL Training DS (ZETL_DS)

Target: Sales Customer (ZSAL_CUS)

Version: Active

Active Version: Executable

Edited Version

100%

Rule Group

Rule Group

Rule

Rule

ETL Training DS (ZETL_DS)

| Pos | Key | Field | Descript. |
|-----|-----|---------------|---------------------|
| 1 | | DOC_NUM | BW: Document Number |
| 2 | | /BIC/ZCUSTMER | Customer |

Rule Group: Standard Group

| Rule | Rule Name | Pos | Key | InfoObject | Icor | Descript. | Inte |
|------|-----------|-----|-----|------------|----------------|---------------------|------|
| = | ODOC_NUM | 1 | Key | ODOC_NUM | Green triangle | BW: Document Number | |
| = | ZCUSTMER | 2 | | ZCUSTMER | Green triangle | Customer | |

"Direct Assignment" as Rule Type

Field Values will be updated without any transformation

Target Fields of Rule:

| | | | | | |
|------------|-------|-------------------|------|--------|-----------|
| | | | | | |
| InfoObject | Ic... | Long Description | Type | Lng... | Conv.R... |
| ODOC_NUM | | BW: Document N... | CHAR | 10 | ALPHA |

Constants



Sales DSO (ZT_DSO)

| Posi | Key | InfoObject | Ico | Descript. |
|------|-----|-------------|-----|-------------------------------|
| 1 | 🔑 | ODOC_NUM | 📄 | BW: Document Number |
| 2 | 🔑 | ODOC_ITEM | 📄 | BW: Document Item Number |
| 3 | | OMATERIAL | 📄 | Material |
| 4 | | OQUANTITY | 📄 | Quantity |
| 5 | | OUNIT | 📄 | Unit of Measure |
| 6 | | ORECORDMODE | 📄 | BW Delta Process: Update Mode |
| 7 | | ZDOCSALES | 📄 | Sales Value in Doc Currency |
| 8 | | ODOC_CURRCY | 📄 | Document currency |
| 9 | | OCOUNTRY | 📄 | Country key |
| 10 | | ODATE | 📄 | Date |
| 11 | | ZCUSTMER | 📄 | Customer |

Rule Group: Standard Group

| Rule | Rule Name | Posi | Key | InfoObject | Ico | Des |
|------|-----------|------|-----|------------|-----|------|
| = | OMATERIAL | 1 | 🔑 | OMATERIAL | 📄 | Mat |
| 📄 | OAF_COLOR | 2 | 🔑 | OAF_COLOR | 📄 | AFS |
| 🕒 | OCALDAY | 3 | 🔑 | OCALDAY | 🕒 | Cale |
| 🕒 | OCALMONTH | 4 | 🔑 | OCALMONTH | 🕒 | Cale |
| 🕒 | OCALYEAR | 5 | 🔑 | OCALYEAR | 🕒 | Cale |
| = | OQUANTITY | 6 | | OQUANTITY | 📄 | Qua |
| = | ZDOCSALES | 7 | | ZDOCSALES | 📄 | Sale |
| 🕒 | 100 | 10 | 🔑 | OSALESORG | 📄 | Sale |

Rule Details

Description: 100

Target InfoObject: 📄 OSALESORG Sales Organization

Rule Type: 🕒 Constant Constant Value: 100

Source Fields of Rule:

| InfoObject | Ic... | Long Description | Type | Lng... | Conv.R... | IOAssignmnt | Long Des... |
|------------|-------|------------------|------|--------|-----------|-------------|-------------|
|------------|-------|------------------|------|--------|-----------|-------------|-------------|

Target Fields of Rule:

| InfoObject | Ic... | Long Description | Type | Lng... | Conv.R... |
|------------|-------|--------------------|------|--------|-----------|
| OSALESORG | 📄 | Sales Organization | CHAR | 4 | |

"Constant" as Rule Type

e.g. OSALESORG will be populated with constant '100' in all the records

Currency/Unit Conversion



■ Information on

- Rule type
- Currency/
Unit
Conversion
- Source
fields
- Target
fields

Rule Details

Description: [Empty]

Target InfoObject: 0D_NETVAL_S Net Value in Statistics Currency (SAP DEMO)

Rule Type: Direct Assignment

Aggregation: Summation

Currency

Target Currency: 0STAT_CURR Statistics Currency

Currency: from Source

Source Currency: 0STAT_CURR

Source Fields of Rule:

| InfoObject | Field | Icon | Long Description | Type | Len... | Conv... |
|------------|------------|------|--------------------|------|--------|---------|
| | D_NETVAL_S | | Netval. in statCur | CURR | 9 | |
| | STAT_CURR | | | CUKY | 10 | |

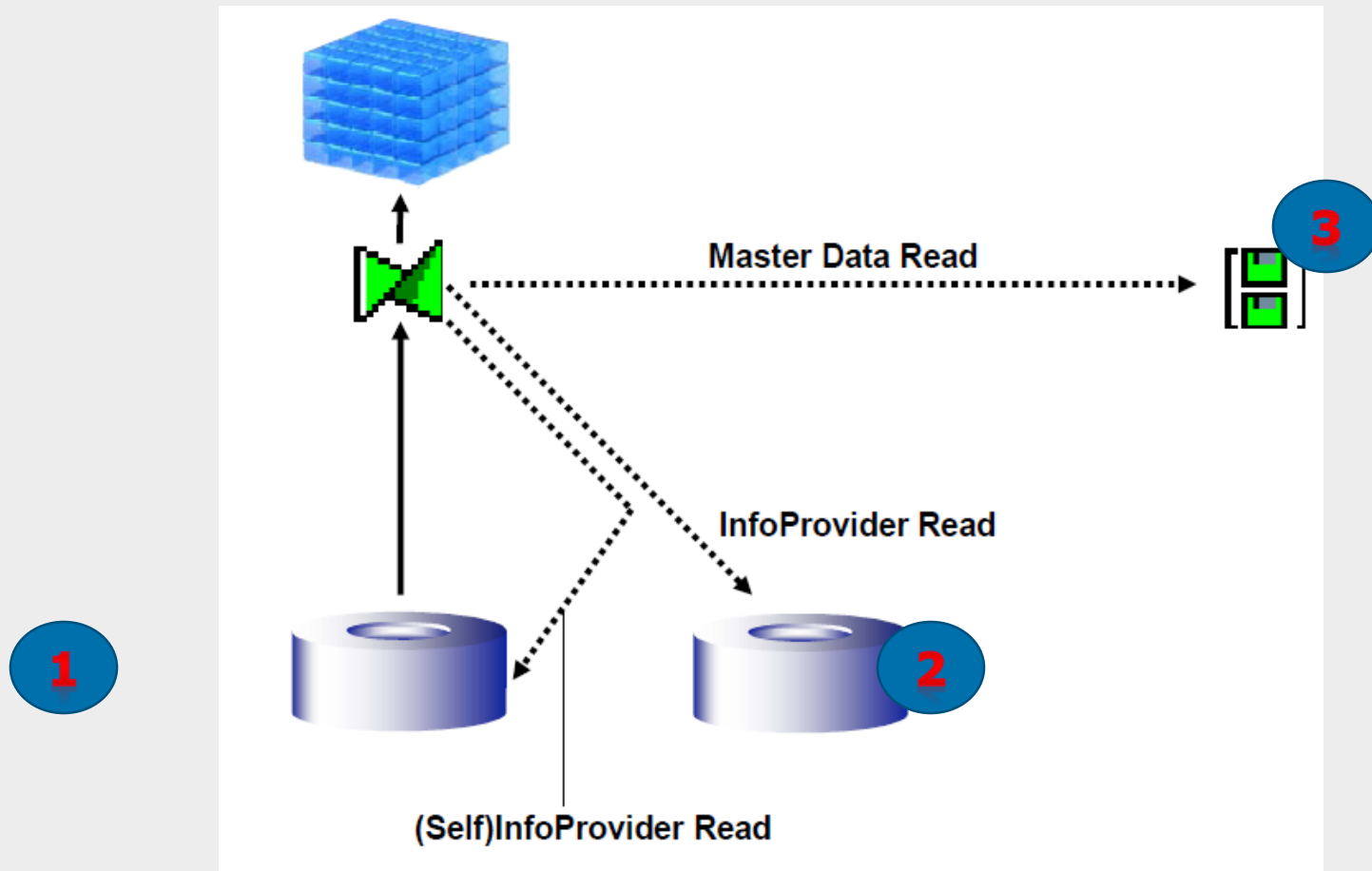
Target Fields of Rule:

| InfoObject | Field | Icon | Long Description | Type | Len... | Conv... |
|-------------|------------|------|------------------------------------|------|--------|---------|
| 0D_NETVAL_S | D_NETVAL_S | | Net Value in Statistics Currency (| CURR | 9 | |
| 0STAT_CURR | STAT_CURR | | Statistics Currency | CUKY | 10 | |

Transfer Values



Data Enrichment - Cross Reference (LOOKUPS)





Read Master Data

Ade.g.

| Posi | Key | InfoObject | Icon | Descript. |
|------|-----|-------------|------|-------------------------------|
| 1 | Key | ODOC_NUM | Icon | BW: Document Number |
| 2 | Key | ODOC_ITEM | Icon | BW: Document Item Number |
| 3 | | OMATERIAL | Icon | Material |
| 4 | | OQUANTITY | Icon | Quantity |
| 5 | | OUNIT | Icon | Unit of Measure |
| 6 | | ORECORDMODE | Icon | BW Delta Process: Update Mode |
| 7 | | ZDOCSALES | Icon | Sales Value in Doc Currency |
| 8 | | ODOC_CURRCY | Icon | Document currency |
| 9 | | OCOUNTRY | Icon | Country key |
| 10 | | ODATE | Icon | Date |
| 11 | | ZCUSTMER | Icon | Customer |

| Rule | Rule Name | Posi | Key | InfoObject | Icon |
|------|-----------|------|-----|------------|------|
| = | OMATERIAL | 1 | Key | OMATERIAL | Icon |
| ≡ | OAF_COLOR | 2 | Key | OAF_COLOR | Icon |
| ⌚ | OCALDAY | 3 | Key | OCALDAY | Icon |
| ⌚ | OCALMONTH | 4 | Key | OCALMONTH | Icon |
| ⌚ | OCALYEAR | 5 | Key | OCALYEAR | Icon |
| = | OQUANTITY | 6 | | OQUANTITY | Icon |
| = | ZDOCSALES | 7 | | ZDOCSALES | Icon |

“Read Master Data” as Rule Type

Rule Details

Description

Target InfoObject: OAF_COLOR AFS Elementary Field "Color"

Rule Type: Read Master Data From Attrib. of OMATERIAL

Source Fields of Rule:

| InfoObject | Icon | Long Description | Type | Lng... | Conv.R... | IOAssignmnt | Long Description |
|------------|------|------------------|------|--------|-----------|-------------|------------------|
| OMATERIAL | Icon | Material | CHAR | 18 | MATN1 | | |

Target Fields of Rule:

| InfoObject | Icon | Long Description | Type | Lng... | Conv.R... |
|------------|------|----------------------|------|--------|-----------|
| OAF_COLOR | Icon | AFS Elementary Fi... | CHAR | 5 | |

OAF_COLOR is an attribute of
OMATERIAL.

Value for OAF_COLOR

will be read from the master data of
OMATERIAL during transformation.



Read Data Store

Testing DS (ZDSLKUP2)

| Pos | Key | Field | Descript. |
|-----|-----|------------|---------------------|
| 1 | | COMP_CODE | Company code |
| 2 | | DEBITOR | Customer |
| 3 | | PSTNG_DATE | Posting date |
| 4 | | AC_DOC_NO | Document no. |
| 5 | | ITEM_NUM | Item |
| 6 | | FI_DSBITEM | Due Date Item |
| 7 | | C_CTR_AREA | Credit Control Area |
| 8 | | DEB_CRE_LC | Debit/Credit Amount |
| 9 | | LOC_CURRCY | Local currency |

Lookup Trial DSO (ZOLKUP2) Rule Group: Standard Group

| Rule | Rule Name | Pos | Key | InfoObject | Icon | Descript. | Inb |
|------|-------------|-----|-----|-------------|------|--------------------------------|-----|
| = | 0COMP_CODE | 1 | | 0COMP_CODE | | Company code | |
| = | 0DEBITOR | 2 | | 0DEBITOR | | Customer Number | |
| = | 0FISCPER | 3 | | 0FISCPER | | Fiscal year / period | |
| = | K4 | 4 | | 0FISCVARNT | | Fiscal year variant | |
| = | 0AC_DOC_NO | 5 | | 0AC_DOC_NO | | Accounting document number | |
| = | 0ITEM_NUM | 6 | | 0ITEM_NUM | | Number of line item within acc | |
| = | 0FI_DSBITEM | 7 | | 0FI_DSBITEM | | Due Date Item Number | |
| = | 0C_CTR_AREA | 9 | | 0C_CTR_AREA | | Credit Control Area | |
| = | 0DEB_CRE_LC | 10 | | 0DEB_CRE_LC | | Amount in Local Currency with | |
| = | 0LOC_CURRCY | 11 | | 0LOC_CURRCY | | Local currency | |
| = | 0CRED_LIMIT | 12 | | 0CRED_LIMIT | | Customer's Credit Limit | |
| = | 0CURRENCY | 13 | | 0CURRENCY | | Currency key | |

"Read Data Store" as Rule Type

Eg:

Value of 0CRED_LIMT will be read from DSO 0FIAR_009 during the transformation based on C_CTR_AREA and DEBITOR

This feature is most useful if you have simple lookups, for instance get Field X from DSO Y based on the lookup field Z and write it out in field X of the target.

Rule Details

Description:

Target InfoObject: 0CRED_LIMIT Customer's Credit Limit

Rule Type: Read From DataStore

Aggregation: Overwrite

InfoObj. from DSO: 0FIAR_009

DSO on which Lookup will be performed

Source Fields of Rule:

| Field | Long Description | Type | Ln... | Conv... | IOAssignmnt | Long Description |
|------------|---------------------|------|-------|---------|-------------|---------------------|
| C_CTR_AREA | Credit Control Area | CHAR | 4 | | 0C_CTR_AREA | Credit Control Area |
| DEBITOR | Customer | CHAR | 10 | ALPHA | 0DEBITOR | Customer Number |

DataSource Fields

Manually enter InfoObject Names Should be = key fields of 0FIAR_009

Target Fields of Rule:

| InfoObject | Long Description | Type | Ln... | Conv... |
|-------------|---------------------|------|-------|---------|
| 0CRED_LIMIT | Customer's Credit L | CURR | 9 | |

Check Transfer Values

Time Characteristic



Ad

Sales DSO (ZT_DSO)

| Posi | Key | InfoObject | Ico | Descript. |
|------|-----|-------------|-----|-------------------------------|
| 1 | 🔑 | ODOC_NUM | 🏠 | BW: Document Number |
| 2 | 🔑 | ODOC_ITEM | 🏠 | BW: Document Item Number |
| 3 | | OMATERIAL | 🏠 | Material |
| 4 | | OQUANTITY | 🏠 | Quantity |
| 5 | | OUNIT | 🏠 | Unit of Measure |
| 6 | | ORECORDMODE | 🏠 | BW Delta Process: Update Mode |
| 7 | | ZDOCSALES | 🏠 | Sales Value in Doc Currency |
| 8 | | ODOC_CURRCY | 🏠 | Document currency |
| 9 | | OCOUNTRY | 🏠 | Country key |
| 10 | | ODATE | 🏠 | Date |
| 11 | | ZCUSTMER | 🏠 | Customer |

Rule Group: Standard Group

| Rule | Rule Name | Posi | Key | InfoObject | Ico | Descript. |
|------|-----------|------|-----|------------|-----|---------------|
| = | OMATERIAL | 1 | 🔑 | OMATERIAL | 🏠 | Material |
| [] | OAF_COLOR | 2 | 🔑 | OAF_COLOR | 🏠 | AFS Element |
| 🕒 | OCALDAY | 3 | 🔑 | OCALDAY | 🕒 | Calendar Day |
| 🕒 | OCALMONTH | 4 | 🔑 | OCALMONTH | 🕒 | Calendar Year |
| 🕒 | OCALYEAR | 5 | 🔑 | OCALYEAR | 🕒 | Calendar Year |
| = | OQUANTITY | 6 | | OQUANTITY | 🏠 | Quantity |

Rule Details

Description

Target InfoObject

OCALYEAR

Calendar Year

Rule Type

🕒 Time Characteristic

Time Conv

Source Fields of Rule:

| InfoObject | Ic... | Long Description | Type | Lng... | Conv.R... | IOAs: |
|------------|-------|------------------|------|--------|-----------|-------|
| ODATE | 🏠 | Date | DATS | 8 | | |

Target Fields of Rule:

| InfoObject | Ic... | Long Description | Type | Lng... | Conv.R... |
|------------|-------|------------------|------|--------|-----------|
| OCALYEAR | 🕒 | Calendar Year | NUMC | 4 | |

"Time Characteristic"

Rule Type

e.g. OCALYEAR,
OCALMONTH will be derived
from value of date in ODATE



Transformation Routines

➤The different types of routines that are available within Transformations are listed below:

- The Start Routine
- Routine for updating Key Figures
- Routine for updating Characteristics
- End Routine
- Expert Routine
- Rule Group



Transformation Routines

➤ Routines in a Transformation are executed in the following sequence:

- The Start Routine
- Transformation Rules and routines for updating Characteristics / Key Figures
- End Routine



Start Routine

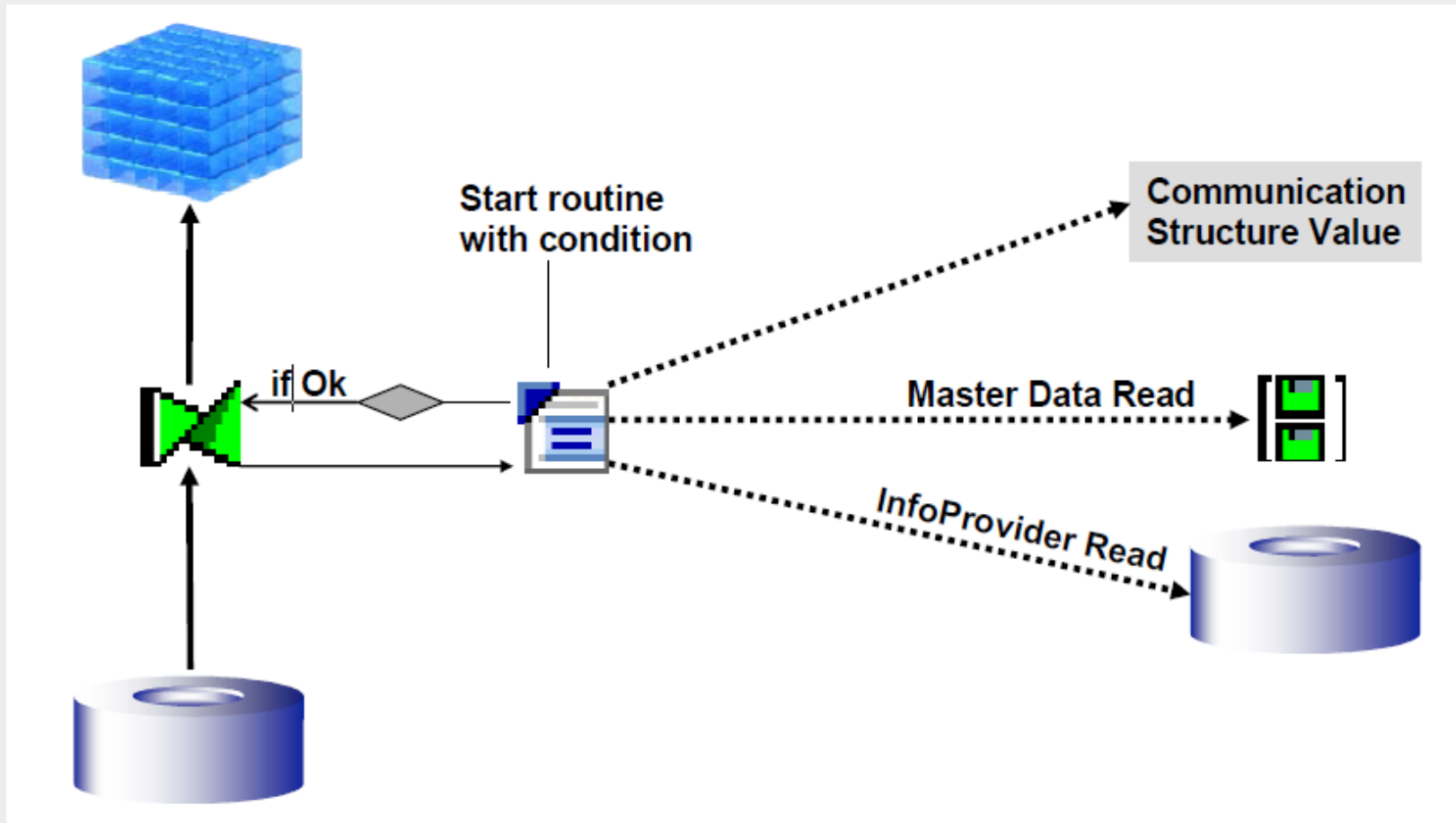
➤ Use

- Preparation of data before transformation
- Package – Based

➤ Example:

- deletion of records that are not required for updating.(helps to avoid processing / transformation of records that are not required to be updated in the target)
- Performance: Buffering Internal tables that can be used for transformation rules (rather than reading the data base tables one by one).

Conditional Update using Start Routine





Transformation (Start Routine)

Transformation Display

Start Routine

Transformation: RSDS ZSALES_DATA PC FILE -> ODSO ZT_DSO

Source: Sales Data (ZSALES_DATA)

Target: Sales DSO (ZT_DSO)

Version: Active

Active Version: Executable

DELETE SOURCE_PACKAGE WHERE
((QUANTITY < 200 AND COUNTRY = 'IN') OR
(QUANTITY < 300 AND COUNTRY = 'UK')).

| Pos | Key | Field | Icon | Descript. |
|-----|-----|----------------|------|----------------------|
| 1 | | DOC_NUM | | BW: Document Number |
| 2 | | DOC_ITEM | | BW: Document Item |
| 3 | | CREATION_DATE | | CREATION_DATE |
| 4 | | MATERIAL | | Material |
| 5 | | COUNTRY | | Country |
| 6 | | QUANTITY | | Quantity |
| 7 | | /BIC/ZDOCSALES | | Sales Value in Doc C |
| 8 | | UNIT | | Unit of Measure |

| Rule | Rule Name | P |
|------|-------------|---|
| = | ODOC_NUM | 1 |
| = | ODOC_ITEM | 2 |
| = | OMATERIAL | 3 |
| = | OQUANTITY | 4 |
| = | OUNIT | 5 |
| = | ZDOCSALES | 7 |
| = | ODOC_CURRCY | 8 |
| = | OCOUNTRY | 9 |

SOURCE_PACKAGE is an internal table having structure of source of the transformation.

It contains data extracted from source of the transformation.



End Routine

- Use
 - Post-preparation of data after transformation
 - Package based
- Example:
 - Deletion of records after transformation that are not required for updating
 - Validation checks of records after updating.
 - E.g. Customer no. is in target but not in source. Records belonging to customer 'CUST10' should not be updated to target.
 - Customer no. will be derived during end routine processing and later the records will be deleted based on that.

Transformation (End Routine)



End Routine

Transformation Display

Transformation: RSDS ZSALES_DATA PC_FILE -> ODSO ZT_DSO

Source: Sales Data (ZSALES_DATA)

Target: Sales DSO (ZT_DSO)

Version: Active

Active Version: Executable Edited Version

100%

Rule Group

Sales Data (ZSALES_DATA)

| Pos | Key | Field | Icon | Descript. |
|-----|-----|----------------|------|----------------------|
| 1 | Key | DOC_NUM | | BW: Document Number |
| 2 | | DOC_ITEM | | BW: Document Item |
| 3 | | CREATION_DATE | | CREATION_DATE |
| 4 | | MATERIAL | | Material |
| 5 | | COUNTRY | | Country |
| 6 | | QUANTITY | | Quantity |
| 7 | | /BIC/ZDOCSALES | | Sales Value in Doc C |
| 8 | | UNIT | | Unit of Measure |

Rule Group: Standard Group

| Rule | Rule Name | Pos | Key | InfoObject | Icon |
|------|-------------|-----|-----|-------------|----------------|
| = | ODOC_NUM | 1 | Key | ODOC_NUM | Green triangle |
| = | ODOC_ITEM | 2 | Key | ODOC_ITEM | Green triangle |
| = | OMATERIAL | 3 | | OMATERIAL | Green triangle |
| = | OQUANTITY | 4 | | OQUANTITY | Green triangle |
| = | OUNIT | 5 | | OUNIT | Green triangle |
| = | ZDOCSALES | 7 | | ZDOCSALES | Green triangle |
| = | ODOC_CURRCY | 8 | | ODOC_CURRCY | Green triangle |
| = | OCOUNTRY | 9 | | OCOUNTRY | Green triangle |



End Routine

```
IF RESULT_PACKAGE[] IS NOT INITIAL .

    SELECT DOC_NUM
           /BIC/ZCUSTMER
    FROM /BIC/AZSAL_CUS00
    INTO TABLE IT_CUST
    FOR ALL ENTRIES IN RESULT_PACKAGE
    WHERE DOC_NUM = RESULT_PACKAGE-DOC_NUM .

ENDIF .

SORT IT_CUST ASCENDING BY DOC_NUM.

LOOP AT RESULT_PACKAGE INTO WA_RESULT_PACKAGE .

    lv_tabix = sy-tabix.
    READ TABLE IT_CUST INTO wa_cust WITH KEY
        DOC_NUM = WA_RESULT_PACKAGE-DOC_NUM BINARY SEARCH .
    WA_RESULT_PACKAGE-/BIC/ZCUSTMER = wa_cust-ZCUSTMER .
    MODIFY RESULT_PACKAGE FROM WA_RESULT_PACKAGE INDEX LV_TABIX .

ENDLOOP .

DELETE RESULT_PACKAGE WHERE /BIC/ZCUSTMER = 'CUST10' .
```

RESULT_PACKAGE is an internal table having structure of target of the transformation.

It has to contain the records that are to be updated to target.

1.First populate the field that is not in the source but added in the target (Customer in this example) through cross reference from other infoprovider DSO ZSAL_CUS in this example.

2.Delete the records that are not required to be updated based on selection criteria of that field.



Expert Routine

➤ Use

- Transformations that cannot be expressed declaratively for the functional or performance reason

➤ Example:-

- Performance: reading several database tables can be implemented faster when knowing the application logic.
- Pivoting: transpose a wide data record into several smaller records -> can be easily implemented using the expert routine.



DTP



Data Transfer Process

➤Purpose: To transfer data within BI from a persistent object to another object in accordance with certain transformations and filters.

- In this respect, it replaces the data mart interface and the Info Package. As of SAP Net Weaver 2004s, the Info Package only loads data to the entry layer of BI (PSA).

➤Features:

- Processing more transparent.
- Optimized parallel processing improves the performance of the transfer process
- Separate delta processes for different targets and
- different filter options between the persistent objects on various levels.
 - For example, you can use filters between a Data Store object and an Info Cube.

➤Data transfer processes are used for

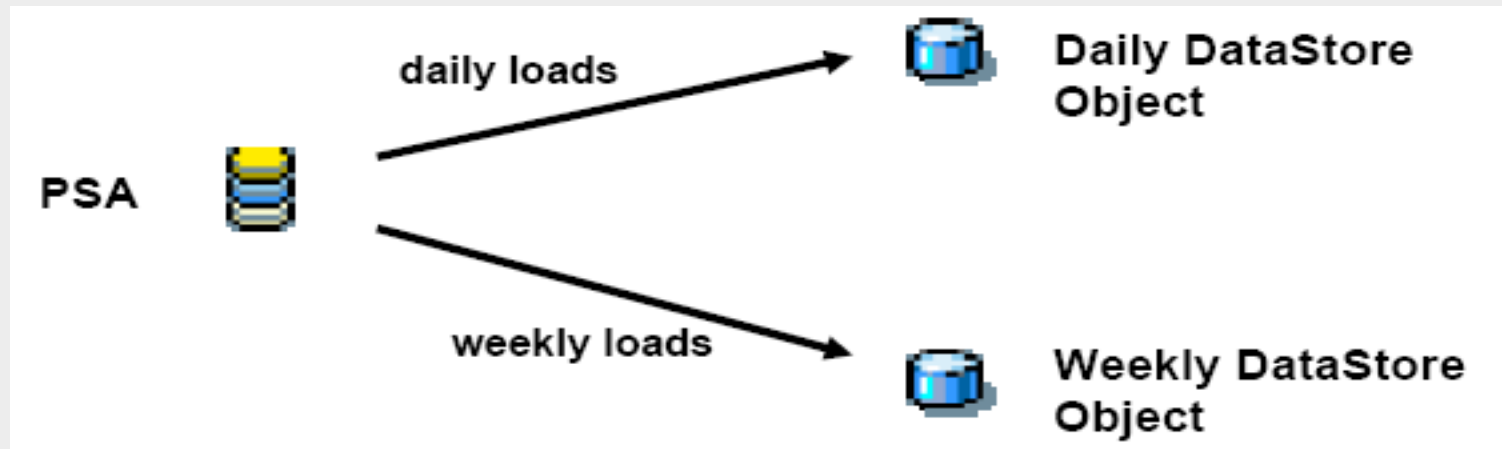
- Standard data transfer,
- Real-time data acquisition and
- Accessing data directly.(Used for Virtual Providers.)



Data Transfer Process

➤ The most important advantage of DTP is delta logic can be separately handled for separate data targets

- Example for separation for delta logic
- Delta logic is a part of DTP
 - One Source PSA
 - Two targets : One DSO keeping daily data and other one keeping weekly data

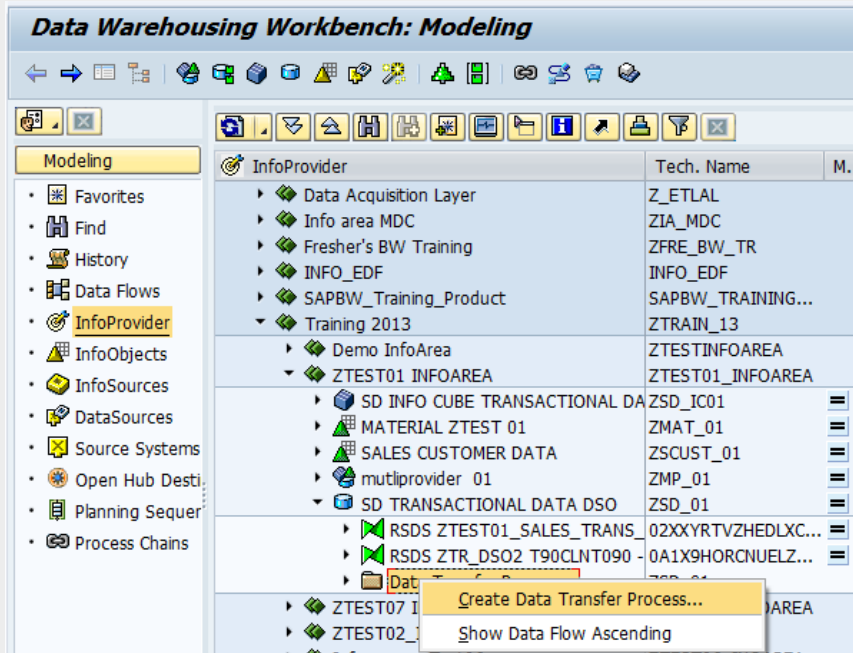




Benefits of Data Transfer Process

- Loading data from one layer to others except Info sources.
- Separation of delta mechanism for different data targets.
- Enhanced filtering in dataflow.
- Improved transparency of staging processes across data warehouse layers.
- Improved performance : optimized parallelization
- Enhanced error handling in the form of error stack
- Enables real-time data acquisition.

Create Data Transfer Process



RSA1

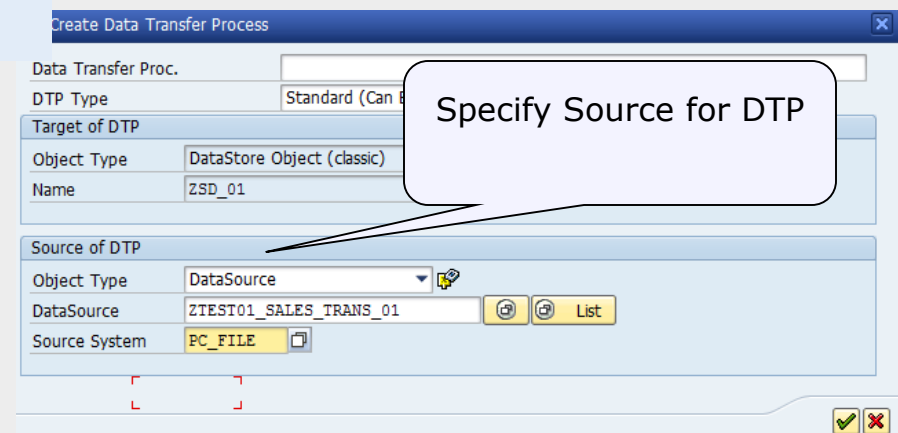
Modelling →

InfoProvider→

Context Menu of Data Transfer Process

→

Create Data Transfer Process





Maintain Data Transfer Process

Data Transfer Proc. ZTEST01_SALES_TRANS_01 / PC_FILE -> ZSD_01

ID DTP_0002TL80DLZ5S77KCJF11OLMQ

DTP Type Standard (Can Be Scheduled)

Version Active Saved

Extraction Update Execute

Source Object DataSource

ZTEST01_SALES_TRANS_01 PC_FILE

ZTEST01 SALES TRANSACTION DATA

Extraction Mode Delta

Delta Status Full
Delta

Request Selection

☐ Delta Init Without Data

☐ Get All New Data Request By Request

☐ Only Get Delta Once

Parallel Extraction ☒

Package Size 0 records

Specify Filter
Condition if required

Filter

Semantic Groups

Extraction Mode :

Full : All the requests available in the source will be loaded

Delta : Only unloaded requests will be loaded

Filter

Change Selection Show Technical Names

| | | | | | |
|---------------------|------|----|------|--|--|
| MATERIAL ZTEST 01 | | to | | | |
| PLANT | | to | | | |
| SALES AMOUNT | 0,00 | to | 0,00 | | |
| SALES CUSTOMER D... | | to | | | |
| SALES DOCUMENT ... | | to | | | |
| SALES DOC INTER ... | | to | | | |

DTP: Filtering Data



The screenshot shows the SAP Data Transfer Process (DTP) configuration interface. At the top, the 'Data Transfer Proc.' is set to 'ZTEST01_SALES_TRANS_01 / PC_FILE -> ZSD_01'. The 'ID' is 'DTP_0002TL80DLZ5S77KCJF11OLMQ'. The 'DTP Type' is 'Standard (Can Be Scheduled)'. The 'Version' is 'Active' (highlighted with a red box) and 'Saved'. Below this are tabs for 'Extraction', 'Update', and 'Execute'. The 'Extraction' tab is active, showing 'Data Source' as 'DataSource' and 'Extraction Mode' as 'Delta'. The 'Delta Status' is 'Active'. Under 'Request Selection', there are three checkboxes: 'Delta Init Without Data', 'Get All New Data Request By Request', and 'Only Get Delta Once'. To the right, there are buttons for 'Filter' and 'Semantic Groups'. An arrow points from the 'Filter' button to a separate dialog box at the bottom right.

**Extraction
Mode : Delta or
Full**

This option specifies whether the first request of delta DTP should be transferred without any data. This is same as "Initialization without data transfer" in Delta Info Package.

With Filter it is possible to load set of data to the target instead of the complete volume of data. Different data selections can be made via different data transfer processes for the same or for different targets

The 'Filter' dialog box is shown, titled 'Filter'. It has two tabs: 'Change Selection' and 'Show Technical Names'. The 'Change Selection' tab is active, displaying a table with columns for 'MATERIAL ZTEST 01', 'PLANT', 'SALES AMOUNT', 'SALES CUSTOMER', 'SALES DOCUMENT', and 'SALES DOCUMENT'. The table has several rows of data. To the right of the table, there are buttons for 'to', 'from', and 'to' (with arrows). Below the table, there is a text box with the text 'Enter values for the filter in this dialogue box.'




Maintain Data Transfer Process


Data Transfer Proc. ZTEST01_SALES_TRANS_01 / PC_FILE -> ZSD_01

ID DTP_0002TL80DLZ5S77KCJF11OLMQ

DTP Type Standard (Can Be Scheduled)

Version  Active Saved

Extraction Update Execute

Target Object  DataStore Object (classic)

ZSD_01

SD TRANSACTIONAL DATA DSO

Error Handling Cancel Request, Track First Incorrect Record, No Update

Create Error DTPs

Object (classic)

Data Targets

☒ Further Processing Without Master Data

☐ No Further Processing Without Master Data

Error Handling

Cancel Request, Track First Incorrect Record, No Update

Cancel Request, Do Not Track Records, No Update

Cancel Request, Track First Incorrect Record, No Update

Request Red, Write Error Stack, Update Valid Records

Request Green, Write Error Stack, Update Valid Records

Select Error Handling
Options

Create Error DTP to
update Erroneous
Records



Maintain Data Transfer Process

The screenshot shows the SAP DTP configuration interface. At the top are tabs for 'Extraction', 'Update', and 'Execute'. Below these are several configuration options:

- Technical Request Status:** A dropdown menu with the text 'Request status is set to 'green' if warnings occur'.
- Overall Status of Request:** A dropdown menu with the option 'Set Overall Status Automatically'.
- ☐ Automatically Repeat Red Requests in Process Chains
- Processing Mode:** A dropdown menu currently set to 'Parallel Extraction and Processing'. A red box highlights this dropdown, and a callout points to it.
- Execute:** A yellow button with a green checkmark icon.
- Program Flow:** A tree view showing the process steps: 'ZTEST01_SALE', 'Start Main Background Process', 'Prepare for Extraction', 'Data Package Loop', and 'Start Parallel Background Process'.
- Breakpoints:** A table with one row for 'ZTEST01_SALES_TRANSACTION' and a 'Change Breakpoints' button.

Callouts provide additional context:

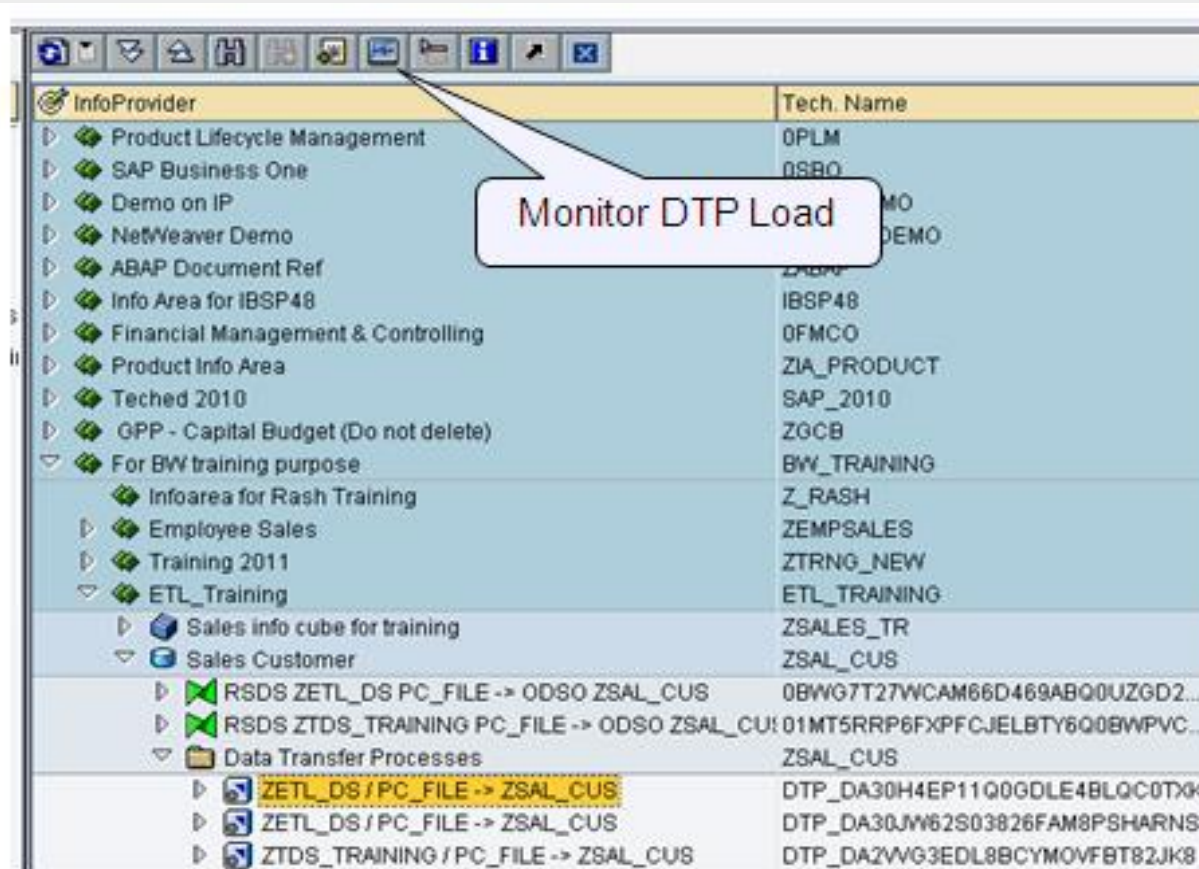
- A callout points to the 'Automatically Repeat Red Requests in Process Chains' checkbox, stating: 'Automatically repeat red requests in Process Chains. Can be used in cases where DTP fails due to RFC connection or due to DB connection issues.'
- A callout points to the 'Execute' button, stating: 'Start Data Load from source to target'.
- A callout points to the 'Parallel Extraction and Processing' dropdown, stating: 'Select Option to load / simulate data load for debugging'.
- A callout points to the 'Serially in the Dialog Process (for Debugging)' option in the dropdown, stating: 'To Debug routines : Select "Serially in the Dialog Process (for Debugging)"'

Start Data Load from source to target

Execute: To start data load from source to target

To Debug routines : Select "Serially in the Dialog Process (for Debugging)"

Monitor DTP Load



The screenshot shows the SAP InfoProvider list. A callout bubble with the text "Monitor DTP Load" points to the "Monitor" icon in the toolbar. The table below lists the InfoProviders and their technical names.

| InfoProvider | Tech. Name |
|---|---------------------------------|
| Product Lifecycle Management | 0PLM |
| SAP Business One | 0SBO |
| Demo on IP | MO |
| NetWeaver Demo | DEMO |
| ABAP Document Ref | ZABW |
| Info Area for IBSP48 | IBSP48 |
| Financial Management & Controlling | 0FMCO |
| Product Info Area | ZIA_PRODUCT |
| Teched 2010 | SAP_2010 |
| GPP - Capital Budget (Do not delete) | ZGCB |
| For BW training purpose | BW_TRAINING |
| Infoarea for Rash Training | Z_RASH |
| Employee Sales | ZEMPSALES |
| Training 2011 | ZTRNG_NEW |
| ETL_Training | ETL_TRAINING |
| Sales info cube for training | ZSALES_TR |
| Sales Customer | ZSAL_CUS |
| RSDS ZETL_DS PC_FILE -> ODSO ZSAL_CUS | 0BWG7T27WCAM66D469ABQ0UZGD2... |
| RSDS ZTDS_TRAINING PC_FILE -> ODSO ZSAL_CUS | 01MT5RRP6FXPFCJELBTY6Q0BWPVC... |
| Data Transfer Processes | ZSAL_CUS |
| ZETL_DS / PC_FILE -> ZSAL_CUS | DTP_DA30H4EP11Q0GDLE4BLQC0TXK |
| ZETL_DS / PC_FILE -> ZSAL_CUS | DTP_DA30JW62S03826FAM8PSHARNS |
| ZTDS_TRAINING / PC_FILE -> ZSAL_CUS | DTP_DA2VVG3EDL8BCYMOVFBT82JK8 |

Select DTP and press
Monitor

Monitor DTP Load



Monitor: Data Transfer Process 59.591

Debugging
 Job Overview
 Error Stack

Request ID: 59.591
 Start Time: 14.02.2013 14:51:18
 Finish Time: 14.02.2013 14:51:24

☒ Header
 ☐ Details

| Request Processing | M.. | D.. | Time Stamp | Duration |
|---|-----|-----|---------------------|----------|
| <div> Request 59591 <ul style="list-style-type: none"> Generate Request Set Status to 'Executable' Process Request Prepare for Extraction <div> Data Package 1 (10 Data Records) <ul style="list-style-type: none"> Extraction DataSource ZTEST01_SALES_TRANS_01 : 10 Filter Out New Records with the Same Key : 10 -> 10 Dat RSDS ZTEST01_SALES_TRANS_01 PC_FILE -> ODSO ZSD Update to DataStore Object ZSD_01 : 10 -> 10 Data Rec </div> End of Main Process Set Technical Status to Green Set Overall Status to Green </div> | | | 14.02.2013 14:51:18 | 6 Sec. |
| | | | 14.02.2013 14:51:18 | 4 Sec. |
| | | | 14.02.2013 14:51:22 | 1 Sec. |
| | | | 14.02.2013 14:51:23 | |
| | | | 14.02.2013 14:51:23 | |
| | | | 14.02.2013 14:51:23 | 1 Sec. |
| | | | 14.02.2013 14:51:24 | |
| | | | 14.02.2013 14:51:24 | |
| | | | 14.02.2013 14:51:24 | |
| | | | 14.02.2013 14:51:23 | 1 Sec. |
| | | | 14.02.2013 14:51:24 | |
| | | | 14.02.2013 14:51:24 | 34 Sec. |

Date: Time: 00:00:00 Description:

Green : Load
Successful

Yellow: Dataload
Running

Red: Data Load
Failed



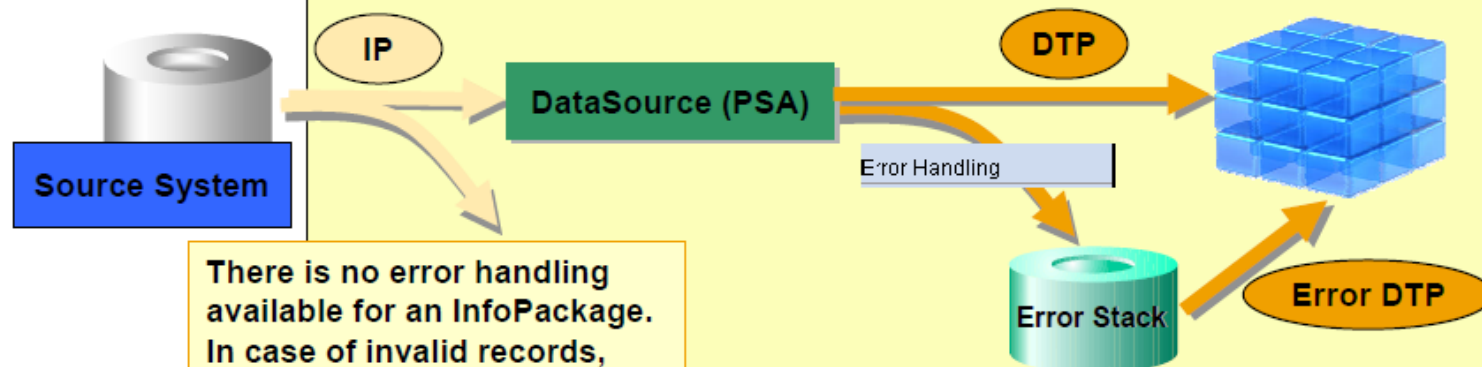
Handling Data Records With Errors

- Using the error handling settings on the Update tab page in the data transfer process, when data is transferred from a DTP source to a DTP target, you can specify how the system is to react if errors occur in the data records.
- These settings were previously made in the Info Package. When using data transfer processes, Info Packages write to the PSA only. Error handling settings are therefore no longer made in the Info Package, but in the data transfer process



Error Handling Overview

Process chain can automate the loading process



There is no error handling available for an InfoPackage. In case of invalid records, data needs to be reloaded from the source system.

The screenshot shows the 'Error Stack' application window with a menu bar (List, Edit, Goto, Settings, System, Help) and a toolbar. The main area is titled 'Error Stack' and contains a table of data records to be edited.

| Status | Data Packet | Data Rec. | CUSTOMERID | ORDERID | ORDERDATE | PRODUCTID | QUANTITY |
|--------|-------------|-----------|------------|---------|------------|-----------|----------|
| ✓ | 1 | 55 | COMM | 10290 | 27.06.1996 | 49 | 15,000 |
| ✓ | 1 | 156 | HANAR | 10253 | 10.07.1996 | 49 | 40,000 |
| ✓ | 1 | 438 | TORTU | 10304 | 12.09.1996 | 49 | 30,000 |

Invalid records can be corrected in the error stack and updated into the data target



Error Handling Features

- Possibility to choose in the scheduler to
 - Abort process when errors occur
 - Process the correct records but do not allow reporting on them
 - Process the correct records and allow reporting on them
- Number of wrong records which lead to a wrong request
- Invalid records can be written into an error stack
- Keys should be defined for error stack to enable the error handling of data store object
- Temporary data storage can be switched on/off for each sub step of the loading process
- Invalid records can be updated into data records after their correction



Error Stack

➤ Stores erroneous records

- Keeps the right sequence of records → for consistent data store handling.
- Key of error stack defines which data should be detained from the update after the erroneous data record.
- After Correction, Error-DTP updates data from error stack to data target.
- Note: Once the request in the source object is deleted, the related data records in error stack area automatically deleted.



Error Stack

- Key of Error Stack = Semantic Groups.
- Subset of the key of the target object.
- Max. 16 fields
- Defines which data should be detained from
- the update of erroneous data record (for data store object)
- The bigger the key, the fewer records will be written to the error stack.

Error Stack



Display Process

← → [Icon] [Icon] [Icon] [Icon] Process Chain Maintenance Change to Real-Time DTP

Data Transfer Proc. ZTEST01_SALES_TRANS_01 / PC_FILE -> ZSD_01

ID DTP_0002TL80DLZ5S77KCJF110LMQ

DTP Type Standard (Can Be Scheduled)

Version Active Saved

Extraction Update Execute

Source Object DataSource

ZTEST01_SALES_TRANS_01 PC_FILE

ZTEST01 SALES TRANSACTION DATA

Extraction Mode Delta

Delta Status Active

Request Selection ☐ Delta Init Without Data
☐ Get All New Data Request By Request
☐ Only Get Delta Once

Parallel Extraction ☒

Package Size 0 records

Filter

Semantic Groups

Error Stack

Semantic Groups determine the Key Fields of Error Stack



Temporary Data Storage

- In order to analyze the data at various stages you can activate the temporary storage in the DTP
- This allows you to determine the reasons of error

The screenshot shows the SAP Data Transfer Process (DTP) interface. The 'Display Data Transfer' window is open, showing the 'Extraction' tab. The 'Source Object' is 'DataSource', and the 'Extraction Mode' is 'Delta'. The 'Delta Status' is 'Active'. The 'Settings for DTP Temporary Storage' dialog box is open, showing the 'Delete Temporary Storage' section with the following settings:

- ☒ With Request Status 'Green'
- ☐ With Request Status 'Deleted'
- ☒ After 1 Days

The 'Level of Detail' is set to 'Trace of Erroneous Records'. The 'Fill Temporary Storage After Following Substeps' table is also visible:

| Temporary Stor. | Icon | Substep |
|--------------------------|------|--|
| <input type="checkbox"/> | | Extraction DataSource ZTEST01 SALES TRANSACTION DATA |
| <input type="checkbox"/> | | Filter |
| <input type="checkbox"/> | | Filter Out New Records with the Same Key |
| <input type="checkbox"/> | | RSDS ZTEST01_SALES_TRANS_01 PC_FILE -> ODSO ZSD_01 |

A callout box points to the 'Active' status of the 'Delta Status' and the 'Settings for DTP Temporary Storage' dialog box, indicating that the temporary data storage is switched on for data loading steps.

Switch on/off the temporary data storage for data loading steps