SAP R/3 HR Programming Overview

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HR Data Structure

**PA**nnnn
- Master data / Time data

**HRP**nnnnnn
- Personnel Planning

**PCL**1
- Database work fields

**PCL**2
- Payroll result

**PCL**3
- Application management

**PCL**4
- Documents

**PCL**5
- HR cost planning

**Transparent Tables**

**Data Clusters**
Master Data (PA)

- Infotypes:
  - Business definition: grouping of fields with related contents based on business requirement.
  - Technical definition: grouping of attributes (basically, a screen with underlying transparent table).
  - E.g.: IT0002, personnel details infotype which contains person unique characteristics like Forename, Surname, Title, Date of Birth, also specific to the country like NI number etc.
Master Data (PA)

Example of IT0002 - personnel details infotype (Transaction PA30)
Master Data (PA)

- Infotypes number ranges

<table>
<thead>
<tr>
<th>Number range</th>
<th>Reserved for</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000-0999</td>
<td>HR Master Data</td>
</tr>
<tr>
<td>1000-1999</td>
<td>Organisational management/personnel planning</td>
</tr>
<tr>
<td>2000-2999</td>
<td>Time management</td>
</tr>
<tr>
<td>4000-4999</td>
<td>Recruitment</td>
</tr>
<tr>
<td>9000-9999</td>
<td>Customer-developed enhancements</td>
</tr>
</tbody>
</table>

- List of infotypes is available in table V_T582A.
- Infotype can be subdivided into subtype which also controls the actions of the infotype. E.g. Family/Related Person (IT0021).
- Infotype can be subdivided further by object identification. E.g. Family/Related Person (IT0021), subtype Child.
Master Data (PA)

• Time and time constraints in infotypes
  – validity start (BEGDA) and end date (ENDDA) of a record
  – time constraint class 1
    • information that must exist. E.g. the name of an employee. Creation of
      new record will automatically delimits the previous data record.
  – time constraint class 2
    • information that can exist at any time but not required. It may occur
      only once. E.g. spouse information in IT0021.
  – time constraint class 3
    • information that can occur as often as necessary. E.g. child information.
Master Data (PA)

Example of IT0021 for time constraints
Master Data (PA)

• Technical data structure of Infotypes
  – structure PAKEY, contains the primary key of an infotype.
    • PERNR - Personnel number
    • SUBTY - Subtype
    • OBJPS - Object identifier
    • SPRPS - Lock & release record
    • ENDDA - End date of the validity period
    • BEGDA - Start date of the validity period
  – structure PSHD1
    • other basic information for each infotype

• Records of infotype nnnn are stored in the transparent table PAannnn.
Payroll Result Data (PCL2)

- Stored in the transparent table PCL2.
- Example of some clusters available in PCL2:
  - CU - Cluster directory
  - RG - Payroll results (GB)
  - B2 - Time management results
  - ZL - Personal shift plan
  - PS - Generated schema
  - PT - Texts for generated schema
- Data is stored in CLUSTD field.
Payroll Result Data (PCL2)

• Cluster Directory
  – Payroll directory is created for every employee.
  – Specific payroll results from an individual payroll period can only be accessed later via this cluster directory.
  – Structure of cluster directory:
    • SEQNR - contains a sequence number
    • ABKRS - contains the payroll group in which the employee’s wages are calculated.
    • FPPER - for period of the payroll run
    • FPBEG & FPEND - start and end date of the payroll period.
    • IABKRS, IPERM, INPER, IPEND - contain the in period information.
  – To optimise data selection, RGDIR table of cluster CU is replicated into HRPY_RGDIR.
Payroll Result Data (PCL2)

- Deep data structure for reporting. PAYGB_RESULT.
Payroll Result Data

Use transaction **PC_PAYRESULT** to display payroll result
HR Programming - Logical Database

• Why use LDB in HR Programming?
  – To reduce programming efforts - events driven, selection screen and data extraction provided by LDB.
  – Centralised authorisation checking.
  – Improved performance.

• LDB for master data and payroll reporting
  – Master data (PA) reporting - PNP
  – Payroll reporting - PNP / selection screen: 900

• Report categories
  – Determines which function keys are available, which selection parameters appear and the properties of the selection parameters.
HR Programming - Logical Database
HR Programming - Logical Database

• INFOTYPES statement
  – Creates internal tables which are populated at the GET PERNR event. E.g:

    INFOTYPES: 0002.
    DATA BEGIN OF p0002 OCCURS 10.
    INCLUDE STRUCTURE p0002.
    DATA END OF p0002 VALID BETWEEN begda AND endda.

• GET PERNR.
  – Populates PERNR structure and all infotypes declared in the INFOTYPES statement.
  – Infotypes declared with MODE N will not be populated during this event.
HR Programming - Logical Database

• PROVIDE .. ENDPROVIDE.
  – Evaluates the infotype records which validity interval intersects with the interval given in the data selection period.

```
PROVIDE * FROM P0006
  BETWEEN PN-BEGDA AND PN-ENDDA
  WHERE P0006-SUBTY = ‘1’.
* additional processing
ENDPROVIDE.
```
HR Programming - Logical Database

• PNP LDB - important variables to remember:
  – PN-BEGDA / PN-ENDDA - end/start of DATA selection period.
  – PN-BEGPS / PN-ENDPS - end/start of PERSON selection period and used to determine the selection of personnel numbers to be processed.
  – Table PERNR needs to be declared.
  – After GET PERNR event, structure PERNR contains the most important information (IT0000 and IT0001).
  – Example program available in Development client 010/020 = ZHRPATRAINING.
REPORT zhrpatraining.

TABLES:  pernr.

* Infotypes - Master data used
INFOTYPES:  0056.

* Addresses
INITIALIZATION.

START-OF-SELECTION.

GET pernr.
WRITE / 'Personnel Number: ', pernr.

* Evaluation using LOOP/ENDLOOP
  WRITE / 'Evaluation using LOOP/ENDLOOP - no validity checking'.
  LOOP AT 0000B
    WHERE subby = 'I'.
    WRITE / p0000-endda, p0000-begda, p0006-stras, p0006-ort01,
           p0005-ort02, p0005-psl12.
  ENDL00P.

* Evaluation using PROVIDE/ENDPROVIDE
  WRITE / 'Evaluation using PROVIDE/ENDPROVIDE'.
  PROVIDE = FROM p0005
  BETWEEN p0005-begda AND p0005-endda
    WHERE p0005-subby = 'I'.
    WRITE / p0005-endda, p0005-begda, p0006-stras, p0006-ort01,
           p0005-ort02, p0005-psl12.
  ENDP00VIDE.

* Evaluation using MACRO
  WRITE / 'Evaluation using RP_PROVIDE_FIRST'.
  rp_provide_from_first p0006 'IT' p0005-begda p0005-endda
  WRITE / p0006-endda, p0006-begda, p0006-stras, p0006-ort01,
           p0006-ort02, p0006-psl12.

* Evaluation using MACRO
  WRITE / 'Evaluation using RP_PROVIDE_LAST'.

L11, C01  Ln 1 - Ln 35 of 40 lines

<table>
<thead>
<tr>
<th>ABAP Editor: Change Report ZHRPATRAINING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Report ZHRPATRAINING</td>
</tr>
<tr>
<td>Active</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
HR Programming - LDB - PY

• Using LDB for HR-PY programming:
  – Available from SAP R/3 4.6c and above.
  – Screen 900 is assigned as the selection-screen at the program attribute.
  – PYORGSCREEN and PYTIMESCREEN need to be declared in TABLES statement for the extra payroll related selection-screen.
  – PAYROLL node to be declared in the NODE statement with reference type to PAYGB_RESULT for UK or PAY99_RESULT for international.
  – HR report category can be changed to use Payroll Results (Cluster) for selection screen customisation.
HR Programming - LDB - PY
HR Programming - LDB - PY

- **GET PAYROLL.**
  - PAYROLL structure will be populated. If more than one payroll period is specified at the selection screen, this event will be executed for each period.
  - Payroll results internal table may contain more than one result depending on the ‘status of result’ selection.
  - To evaluate payroll result, LOOP through the PAYROLL-INTER-RT internal table.
HR Programming - LDB - PY

- Things to remember when doing HR-PY programming:
  - PYBEGDA / PYENDDA - end/start of PAYROLL DATA selection period.
  - Data evaluation will be based on HRPY_RGDIR (Payroll directory information) rather than from HR-PA master data.
  - Example program available in Development client 010/020 - ZHRPYTRAINING.
HR Programming - LDB - PY

```abap
REPORT zhrpytraining.
TABLES:
  pypgscreen,
  pytxmscreen.
* Declare the country specific structure: UK => paygb_result.
TYPES:
  paygb_result.
  * Infotypes - Master data used
INFOTYPES: 0888.  "Basic salary"
DATA:
  l_sart LIKE pa0008-1g001,
  l_betrg LIKE pa0008-bet01,
  ws_rt LIKE LINE OF payroll-intert-rt.
START-OF-SELECTION.
GET pernr.
  WRITE / pernr-pernr.
  rp_provide_from_last p0008 space pyenda pyenda.
  * Print out all wage types for the employee
DO VARYING l_sart FROM p0008-1g001 NEXT p0008-1g002
  VARYING l_betrg FROM p0008-bet01 NEXT p0008-bet02.
  IF l_sart IS INITIAL OR sy-index = 20.
    EXIT.
  ENDIF.
  WRITE: / 10 1_l_sart, 1_l_betrg.
ENDDO.
GET payroll.
  WRITE: / payroll-exp-abkrs, payroll-exp-tpser, payroll-exp-imper,
        payroll-exp-tpend, payroll-exp-belz.
  LOOP AT payroll-intert-rt INTO ws_rt.
  WRITE: / ws_rt-l_sart, ws_rt-l_betrg.
ENDLOOP.
END-OF-SELECTION.
```
HR Programming - Using macros

- Macros are widely used in HR programming.
- Methods:
  - Using RMAC macros declared in TRMAC table (older method)
  - Using macros in the include program DBPNPCOM (for PNP LDB - newer method)
- Some important macros:
  - RP-LOWDATE-HIGHDATE (TRMAC)
    - defines the constants LOW-DATE (01/01/1800) and HIGH-DATE (31/12/9999)
  - RP-SEL-EIN-AUS-INIT (TRMAC)
    - exclude employee with employment status NE 0.
Some important macros:

- **RP_PROVIDE_FROM_FRST (PNP)**
  - reads the first record of an internal table in the specified selection period. The infotype table must be sorted in ascending order.

  Example:
  ```
  rp_provide_from_frst p0002 SPACE pn-begda pn-endda.
  ```

- **RP_PROVIDE_FROM_LAST (PNP)**
  - reads the last valid record of an internal table in the specified selection period.

  Example:
  ```
  rp_provide_from_last p0002 SPACE pn-begda pn-endda.
  ```
HR Programming w/o LDB

- All master data infotypes are available with a PA prefix. E.g. IT0000 is directly assessable from transparent table PA0000.
- If authorisation checks are important, SAP provides two other methods of accessing the infotypes:
  - Using function module ‘HR_READ_INFOTYPES’
  - Using macro ‘RP_READ_INFOTYPE’ (include DBPNPCOM in the program)
HR Programming w/o LDB

- Payroll results can be extracted using the following methods:
  - If there is a need to do processing at individual steps:
    - Read cluster directory using ‘CU_READ_RGDIR’
    - Read valid period from cluster directory using ‘CU_READ_LAST’
    - Read payroll results using ‘PYXX_READ_PAYROLL_RESULT’ using SEQNO returned by ‘CU_READ_LAST’.
  - Otherwise:
    - Using function module ‘PYXX_GET_EVALUATION_PERIODS’ or
    - Using function module ‘HR_GET_PAYROLL_RESULTS’ to import current payroll results.
  - Examples:
    - RPMUST01 - Model report for monthly payroll results
    - RPMUST02 - Model report for monthly payroll results - more than one period.