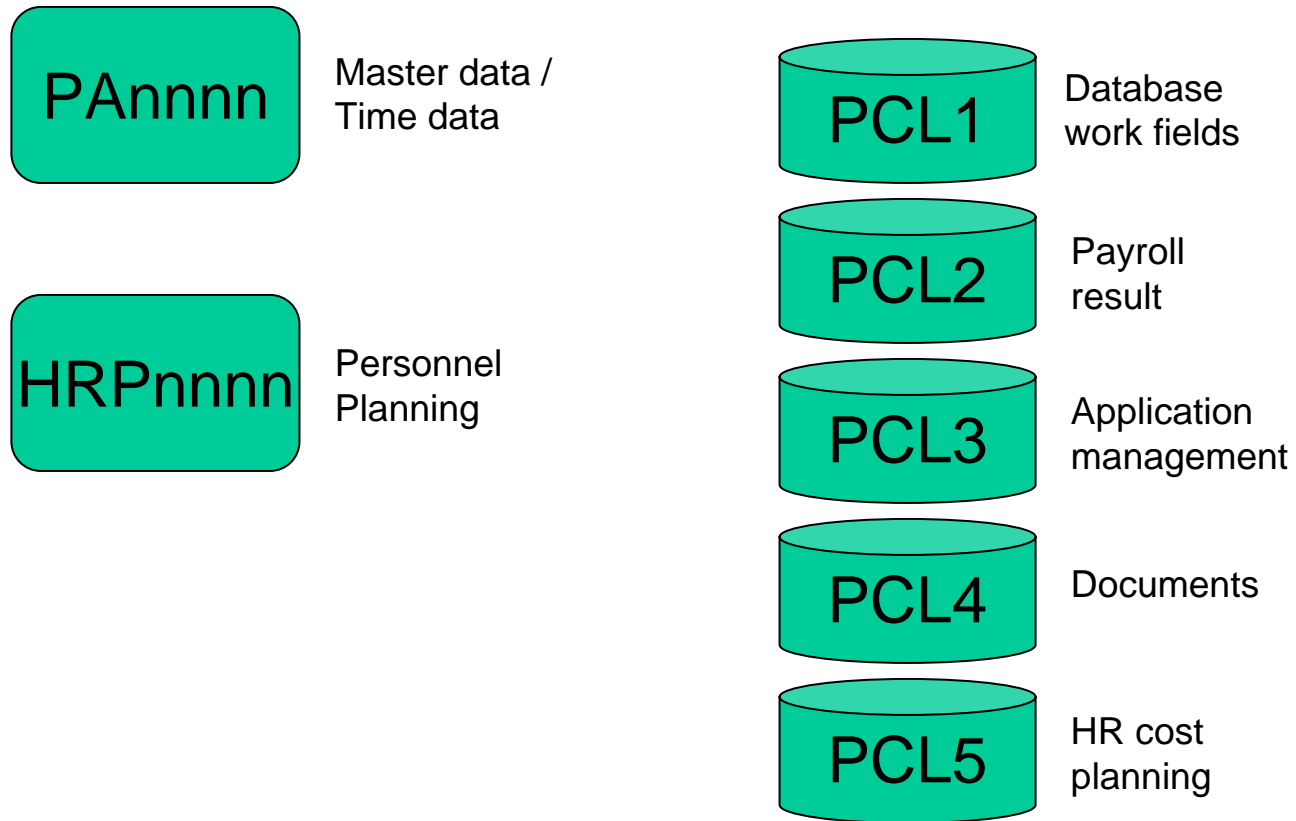


SAP R/3 HR Programming Overview

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HR Data Structure



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)

The screenshot displays the SAP IT0002 - Display Personal Data infotype. The interface includes a menu bar (Infotype, Edit, Goto, Extras, System, Help), a toolbar, and a title bar with the SAP logo. The main content area is titled "Display Personal Data" and contains the following information:

Personnel no.: 261

EE group: 1 Active employee **Pers.area:** 8400 Group

EE subgroup: 04 Staff / Other **Employment status:** 3 Active

Start: 28.01.1980 **To:** 31.12.9999 **Chng:** 25.11.2004 MM10001

Name

Form of addr: Mr

Last name: PRU **Birth name:** Birthname

First name: PSS - AVC **Initials:** INIT

Middle name: **Known as:**

Name format: 0 Mr PSS - AVC PRU

HR data

Nat.ins.no.: AA102344B

Gender: Male Female

Birth date: 28.01.1980

Nationality: British GB

Mar.status: **Since:** **No. child.:** 0

The bottom status bar shows: PA30 puki09 OVR

Example of IT0002 - personnel details infotype (Transaction **PA30**)

Master Data (PA)

- Infotypes number ranges

Number range	Reserved for
0000-0999	HR Master Data
1000-1999	Organisational management/personnel planning
2000-2999	Time management
4000-4999	Recruitment
9000-9999	Customer-developed enhancements

- 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)

Table : PA0021
Displayed fields: 7 of 7 Fixed columns: 6 List width 0250

PERNR	SUBTY	OBJPS	ENDDA	BEGDA	FAVOR	FANAM
00000261	1		30.07.2004	01.04.2002	Spouse	PRU
00000261	1		31.12.9999	31.07.2004	New Spouse	PRU
00000261	2	01	31.12.9999	01.01.2003	Child1	PRU
00000261	2	02	31.12.9999	01.04.2004	Child2	PRU

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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 PAnnnn.

Payroll Result Data (PCL2)

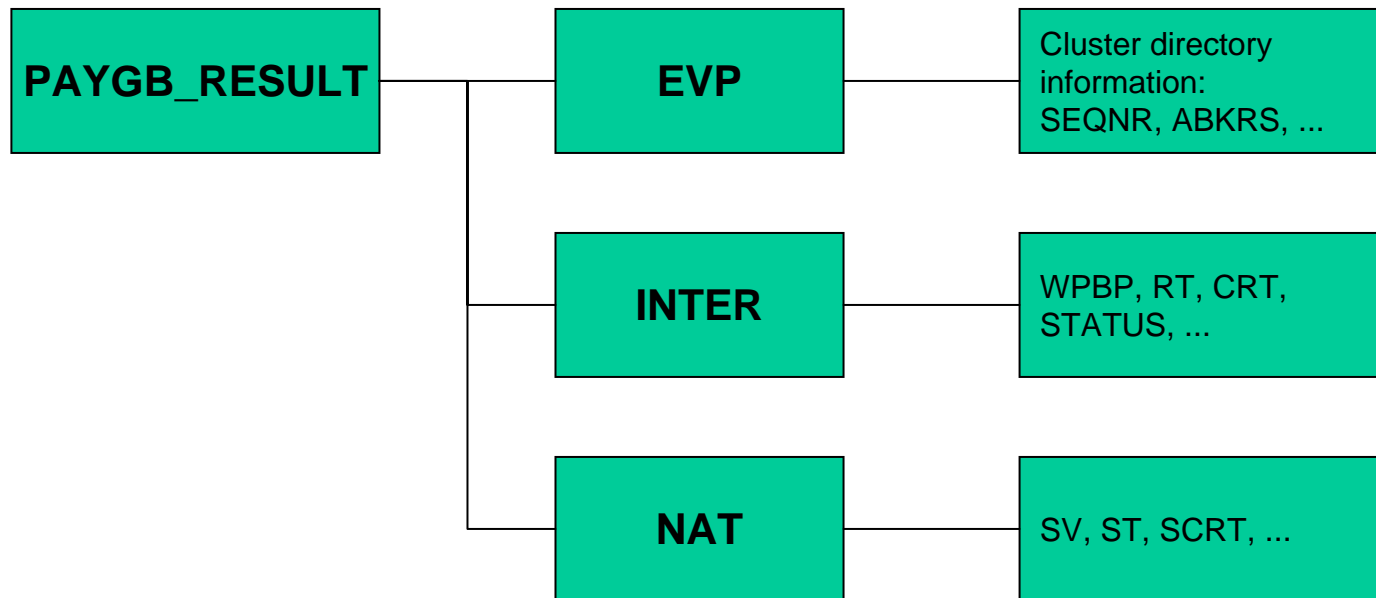
- Stored in the transparent table PCL2.
- Example of some clusters available in PCL2:
 - CU - Cluster directory
 - RG - Payroll results (GB)
 - B2 - Time management results
 - ZL - Personal shift plan
 - PS - Generated schema
 - PT - Texts for generated schema
- Data is stored in CLUSTD field.

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

The screenshot displays the SAP 'Display payroll results' interface. At the top, the menu bar includes 'Personnel number', 'Edit', 'Goto', 'Tables', 'System', and 'Help'. The title bar shows 'SAP' and window control buttons. Below the menu, the title 'Display payroll results' is visible. The main area is divided into several sections:

- Selection:** A field for 'Personnel number' with the value '281' and a dropdown arrow. Below it, the text 'all results from' is present.
- Personnel numbers selected:** A table with columns 'Pers.no.', 'Name', and 'Res.'. The entry '281 Mr LU86 Datatakeon4' is selected, indicated by a green circle in the 'Res.' column.
- Table of Payroll Results:** A table with columns 'Name', 'Name', and 'No.'. The table lists various payroll components for 'Mr LU86 Datatakeon4 / Sequence number 00002 (01.11.2004 - 30.11.2004)'. The 'RT_' row is highlighted in yellow.

Name	Name	No.
WPBP	Work Center/Basic Pay	1
RT	Results Table	122
RT_	Results table (collapsed display)	122
CRT	Cumulative Results Table	57
BT	Payment Information	1
VO	Variable Assignment	5
VERSION	Information on Creation	1
PCL2	Update information PCL2	1
VERSC	Payroll Status Information	1
COURT	Court Orders	3
PENS	Pensions	7
EXCEP	Exceptions	2
ST	Tax	1
NIPAY	HR-PAY-GB: table type for NIPAY	1
NIC	HR-PAY-GB: table type for NIC	1
CNIC	HR-PAY-GB: table type for CNIC	1
NIRA	HR-PAY-GB: table type for NIRA	2
MODIF	HR-PAY-99: Modifiers	1

At the bottom right of the window, the status bar shows 'PC_PAYRESULT', 'puk109', and 'OVR'.

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

The screenshot displays the SAP ABAP Editor interface. The main window is titled "Report category assignment" and shows the program "ZHRPATRAINING". The "Report category assignment" section is active, displaying the "Name of selected report category:" as "SAP default category if report does not have a category". The "Report selects using:" section has "Master Data (infotypes)" selected. The "Attributes" section shows the program is an "Executable program" with a status of "Test program", application "Human Resources", and logical database "PNP".

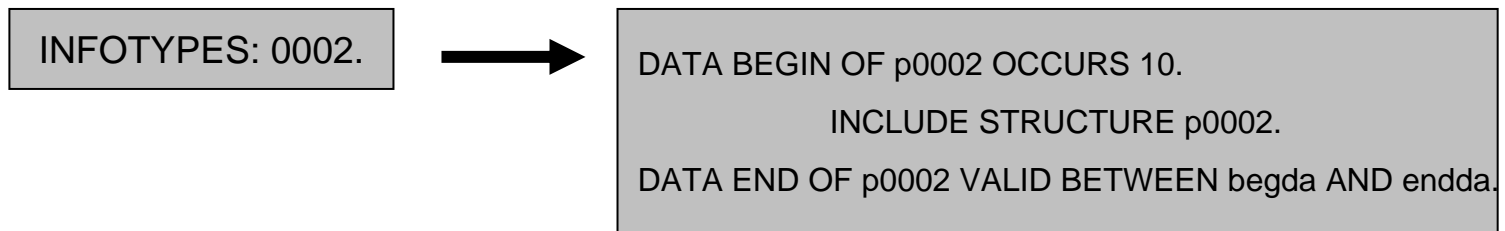
The "Report Category (1) 345 Entries found" window is open, showing a list of report categories and their descriptions:

Rept cat.	Text
HRDEOED2	Germany only
HRDEPSZF	ZFA notifications
HRDETM01	Key date
HRDKFERP	SAP default category if report does not have a category
HRDKPRNR	HR-DK: Only Personnelnumber
HRDKYEN2	HR-DK Year end Variant 2
HRDKYEND	HR-DK Year end
HRDKZTRM	Only period selection allowed.
HRFR0001	No sort, no period; Payroll area, personnel area/subarea
HRFR0002	No sort, no period
HRFR0003	No sort, no period, pers.no. only
HRFR0004	Report category for ADP process models
HRFR0005	Period payr. area, other selections, no sort ; pers.no.
HRFR0006	Sort, Payroll period; Payroll area, Personnel number
HRFR0007	
HRGBNOPD	HR-GB: No period selection
HRGBPAYR	HR-GB: Payroll period, EOY selection
HRGBREPO	HR-GB: Statutory End of Year Reporting
HRGBYEND	HR-GB: Statutory End of Year Reporting
HRIN0000	India - Personnel no and Payroll Area Range
HRIN0001	India - Period, Pernr and Payroll Area Range
HRIN0002	India - Pernr range

The status bar at the bottom shows "DVH (1) (010) puki09 OVR" and the system clock is 09:02.

HR Programming - Logical Database

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



- 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

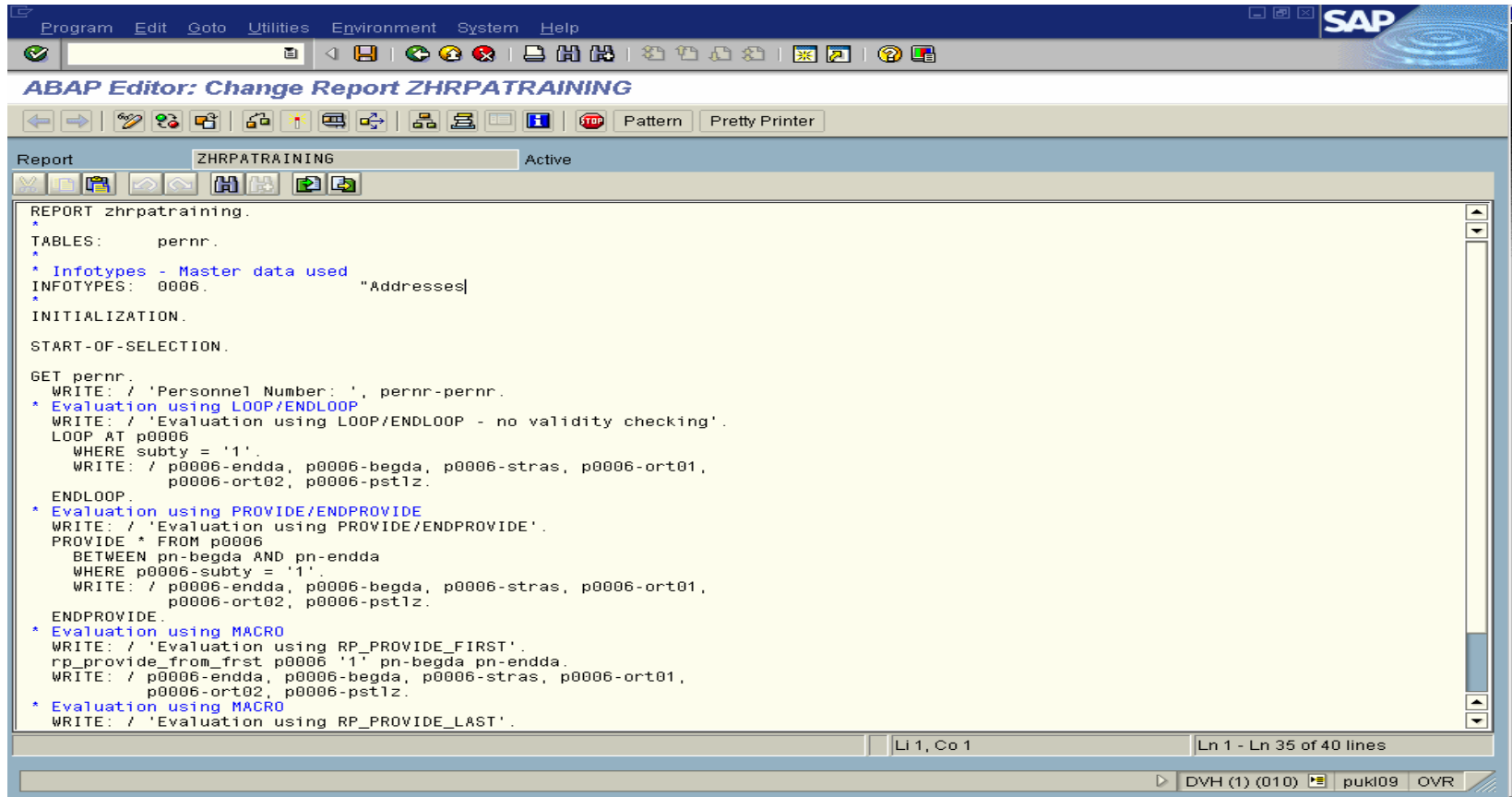
- PROVIDE .. ENDPROVIDE.
 - Evaluates the infotype records which validity interval intersects with the interval given in the data selection period.

```
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.

HR Programming - Logical Database



```
REPORT zhrpatraining.
*
* TABLES:      pernr.
*
* Infotypes - Master data used
* INFOTYPES: 0006.      "Addresses
*
* INITIALIZATION.
*
* START-OF-SELECTION.
*
* GET pernr.
* WRITE: / 'Personnel Number: ', pernr-pernr.
* Evaluation using LOOP/ENDLOOP
* WRITE: / 'Evaluation using LOOP/ENDLOOP - no validity checking'.
* LOOP AT p0006
*   WHERE subty = '1'.
*   WRITE: / p0006-endda, p0006-begda, p0006-stras, p0006-ort01,
*           p0006-ort02, p0006-pst1z.
* ENDLOOP.
* Evaluation using PROVIDE/ENDPROVIDE
* WRITE: / 'Evaluation using PROVIDE/ENDPROVIDE'.
* PROVIDE * FROM p0006
*   BETWEEN pn-begda AND pn-endda
*   WHERE p0006-subty = '1'.
*   WRITE: / p0006-endda, p0006-begda, p0006-stras, p0006-ort01,
*           p0006-ort02, p0006-pst1z.
* ENDPROVIDE.
* Evaluation using MACRO
* WRITE: / 'Evaluation using RP_PROVIDE_FIRST'.
* rp_provide_from_frst p0006 '1' pn-begda pn-endda.
* WRITE: / p0006-endda, p0006-begda, p0006-stras, p0006-ort01,
*         p0006-ort02, p0006-pst1z.
* Evaluation using MACRO
* WRITE: / 'Evaluation using RP_PROVIDE_LAST'.
```

Li 1, Co 1 | Ln 1 - Ln 35 of 40 lines

DVH (1) (010) | puki09 OVR

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

The screenshot displays the SAP ABAP Editor interface. The main window is titled "ABAP Editor: Initial Screen" and shows the program "ZHRPYTRAINING". A "Report category assignment" dialog box is open, displaying a list of report categories. The "Report category (1)" dialog shows 8 entries found, with "1PILKINT" selected, which is assigned to "PNP - Payroll Interface".

Program: ZHRPYTRAINING

Report category assignment:

- Report category assignment
- Name of selected report category: PNP - Payroll Interface
- Report selects using:
 - Master Data (Infotypes)
 - Payroll results (Cluster):

Report category (1) - 8 Entries found:

Rept cat.	Text
1PILKINT	PNP - Payroll Interface
PYALL	all
PYHRFORM	Report class HR forms (generated reports)
PYTEST	Test
PY_DEF	SAP default report category for PNP payroll reports
PY_FIPEN	HR Finland. Like PY_PAYPR, but with fewer selection param.
PY_FISTS	Sort, no period, PA, PSA, EG,ESG
PY_FIVAC	SAP default report category for PNP payroll reports

Attributes:

- Type: Executable program
- Status: Test program
- Application: Human Resources
- Authorization groups:
- Development class: \$TMP (Temporary Obj)
- Logical database: PNP (HR Master Dat)
- Selection screen: 900 (Selection scree)
- Editor lock
- Fixed point arithmetic
- Start using variant

Taskbar: Start, Inbox - Micr..., SAP Logon..., ABAP Editor..., Microsoft Po..., SAP Easy A..., Data Brows..., Maintain HR..., Report c..., 09:23

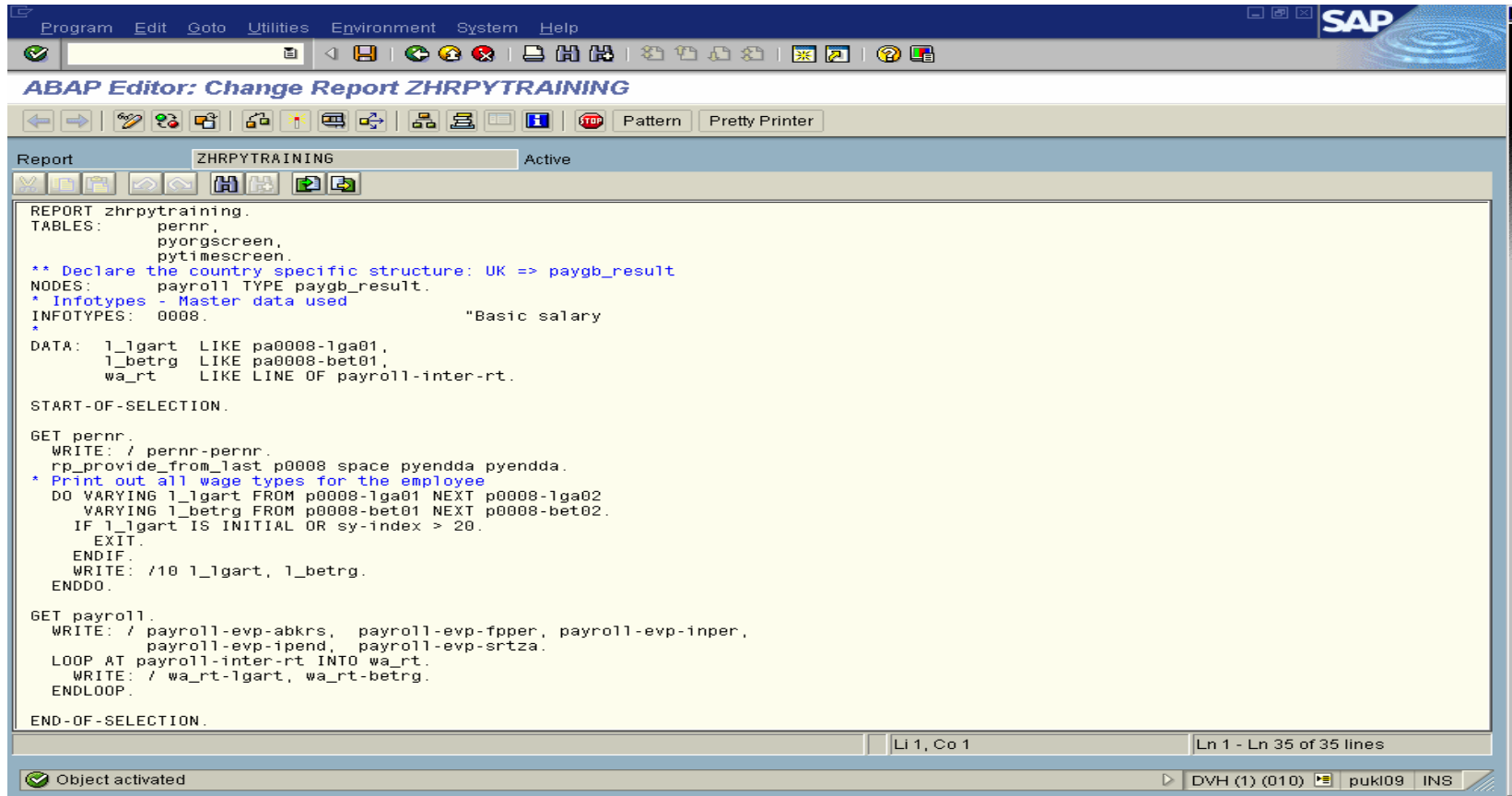
HR Programming - LDB - PY

- 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 contains 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



```
REPORT zhrpytraining.
TABLES:
    pernr,
    pyorgscreen,
    pytimescreen.
** Declare the country specific structure: UK => paygb_result
NODES:
    payroll TYPE paygb_result.
* Infotypes - Master data used
INFOTYPES: 0008.                "Basic salary
*
DATA:  l_1gart    LIKE pa0008-1ga01,
       l_betrg   LIKE pa0008-bet01,
       wa_rt     LIKE LINE OF payroll-inter-rt.

START-OF-SELECTION.

GET pernr.
WRITE: / pernr-pernr.
rp_provide_from_last p0008 space pyendda pyendda.
* Print out all wage types for the employee
DO VARYING l_1gart FROM p0008-1ga01 NEXT p0008-1ga02
   VARYING l_betrg FROM p0008-bet01 NEXT p0008-bet02.
   IF l_1gart IS INITIAL OR sy-index > 20.
       EXIT.
   ENDIF.
   WRITE: /10 l_1gart, l_betrg.
ENDDO.

GET payroll.
WRITE: / payroll-evp-abkrs, payroll-evp-fpper, payroll-evp-inper,
       payroll-evp-ipend, payroll-evp-srtza.
LOOP AT payroll-inter-rt INTO wa_rt.
   WRITE: / wa_rt-1gart, wa_rt-betrg.
ENDLOOP.

END-OF-SELECTION.
```

Li 1, Co 1 | Ln 1 - Ln 35 of 35 lines

Object activated | DVH (1) (010) | puki09 INS

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.

HR Programming - Using macros

- 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.