The RPC accounts in the Oracle database DB-HADES

Status report, May 2009 by Ilse Koenig

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1 RPC accounts

Directly related to RPC are actually three accounts in Oracle:

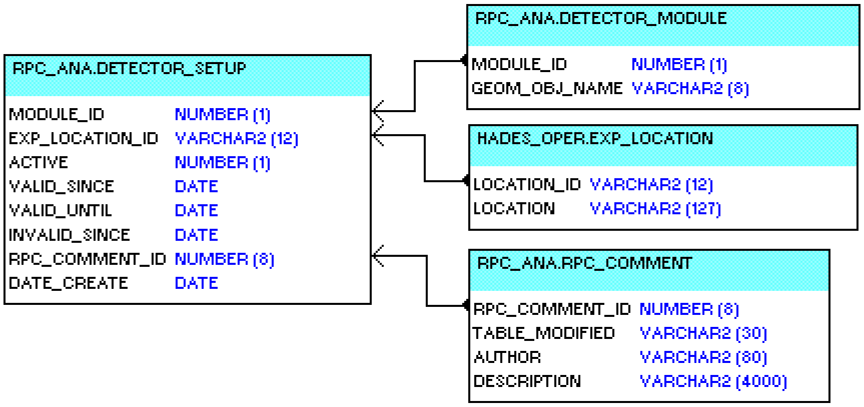
Account name	***Description***
RPC_ANA	Production account This account contains almost all tables, views and code. Only Ilse Koenig knows the password.
RPC_OPER	RPC specific operator account This account has no tables or views, but is purely used to insert data via analysis macros and to manipulate the data via secure and tested applications.
RPC_ANATEST	Test account for new developments (or novice developers) Since 2008 developments and testing is mainly done in the test database db-hades-test. Therefore this account is actually not used.

2 The production account RPC_ANA

2.1 Content

Object type	***Number of objects***	***Miscellaneous Details***
Tables	9	51 columns, 26 constraints, 12 indexes, 3 triggers
Views	5	35 columns
Packages	5	651 lines of code
Sequences	3	

2.2 RPC Setup



RPC_ANA.DETECTOR_SETUP	
MODULE_ID	NUMBER (1)
EXP_LOCATION_ID	VARCHAR2 (12)
ACTIVE	NUMBER (1)
VALID_SINCE	DATE
VALID_UNTIL	DATE
INVALID_SINCE	DATE
RPC_COMMENT_ID	NUMBER (8)
DATE_CREATE	DATE

RPC_ANA.DETECTOR_MODULE	
MODULE_ID	NUMBER (1)
GEOM_OBJ_NAME	VARCHAR2 (8)

HADES_OPER.EXP_LOCATION	
LOCATION_ID	VARCHAR2 (12)
LOCATION	VARCHAR2 (127)

RPC_ANA.RPC_COMMENT	
RPC_COMMENT_ID	NUMBER (8)
TABLE_MODIFIED	VARCHAR2 (30)
AUTHOR	VARCHAR2 (80)
DESCRIPTION	VARCHAR2 (4000)

DETECTOR_MODULE

List of RPC modules

The column MODULE_ID is the module number and identical with the sector number (1..6). GEOM_OBJ_NAME is the name of the corresponding geometry volume (used by the GEANT geometry and the geometry analysis parameter container).

RPC_SETUP

Setup of RPC

This table stores the information, in which sector a RPC module is mounted at a certain date. Additionally to the 4 date columns, the version management distinguishes for the experiment location (for example HADES_CAVE for real data and VIRTUAL for the simulation).
Actually all changes must be done by Ilse Koenig via SQL. A WebDB GUI does not exist. But since this table needs to be changed only when an RPC is mounted or dismounted (well known before a beam time), such a GUI is eventually not needed.

RPC_COMMENT

Comments for changes in RPC tables

All comments in the RPC tables with version management (the RPC setup and the tree-style parameter containers as for example the calibration parameters) are stored in this table.

Related view:

View	*Description*
DETECTOR_SETUP_AT_RUN_HIST	Shows the RPC detector setup valid for a special run or date. This view is used by the analysis interface.

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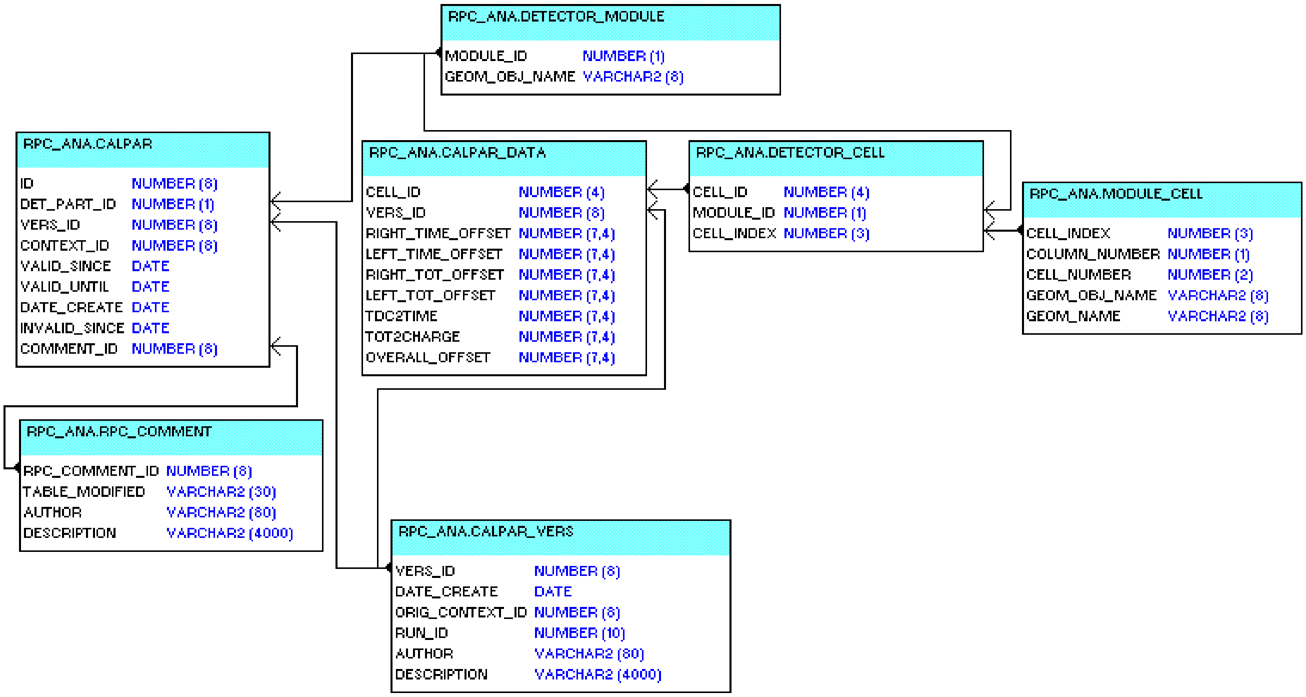
2.3 The analysis parameters



RPC_ANA.DETECTOR_MODULE	
MODULE_ID	NUMBER (1)
GEOM_OBJ_NAME	VARCHAR2 (8)

RPC_ANA.CALPAR	
ID	NUMBER (8)
DET_PART_ID	NUMBER (1)
VERS_ID	NUMBER (8)
CONTEXT_ID	NUMBER (8)
VALID_SINCE	DATE
VALID_UNTIL	DATE
DATE_CREATE	DATE
INVALID_SINCE	DATE
COMMENT_ID	NUMBER (8)

RPC_ANA.CALPAR_DATA	
CELL_ID	NUMBER (4)
VERS_ID	NUMBER (8)
RIGHT_TIME_OFFSET	NUMBER (7,4)
LEFT_TIME_OFFSET	NUMBER (7,4)
RIGHT_TOT_OFFSET	NUMBER (7,4)
LEFT_TOT_OFFSET	NUMBER (7,4)
TDC2TIME	NUMBER (7,4)
TOT2CHARGE	NUMBER (7,4)
OVERALL_OFFSET	NUMBER (7,4)

RPC_ANA.DETECTOR_CELL	
CELL_ID	NUMBER (4)
MODULE_ID	NUMBER (1)
CELL_INDEX	NUMBER (3)

RPC_ANA.MODULE_CELL	
CELL_INDEX	NUMBER (3)
COLUMN_NUMBER	NUMBER (1)
CELL_NUMBER	NUMBER (2)
GEOM_OBJ_NAME	VARCHAR2 (8)
GEOM_NAME	VARCHAR2 (8)

RPC_ANA.RPC_COMMENT	
RPC_COMMENT_ID	NUMBER (8)
TABLE_MODIFIED	VARCHAR2 (30)
AUTHOR	VARCHAR2 (80)
DESCRIPTION	VARCHAR2 (4000)

RPC_ANA.CALPAR_VERS	
VERS_ID	NUMBER (8)
DATE_CREATE	DATE
ORIG_CONTEXT_ID	NUMBER (8)
RUN_ID	NUMBER (10)
AUTHOR	VARCHAR2 (80)
DESCRIPTION	VARCHAR2 (4000)

MODULE_CELL

List of RPC cells in a single module including spare ones

cell_index	Index for the cell (column_number*100 + cell_number)
column_number	Column number (-1..5)
cell_number	Cell number in the column (-1..30)
geom_obj_name	Name of corresponding GEANT geometry object
geom_name	Geometric name of the cell (Coimbra name)

The table contains additionally entries with cell_index
31..70, 131..170, 231..270, 331..370, 431..470, 531..570
and column_number = cell_number = -1 and without names. These cells may be connected to a TRB channel, but not connected to a detector cell.

DETECTOR_CELL

List of all RPC detector cells including spare ones

cell_id	Identifier for the cell (module_id*1000 + cell_index)
module_id	Module number (1..6)
cell_index	Index of the cell in a single module references module_cell.cell_index

CALPAR_VERS
List of versions for the RPC calibration parameters

CALPAR_DATA
Calibration parameters for RPC identified by the version number and the cell identifier

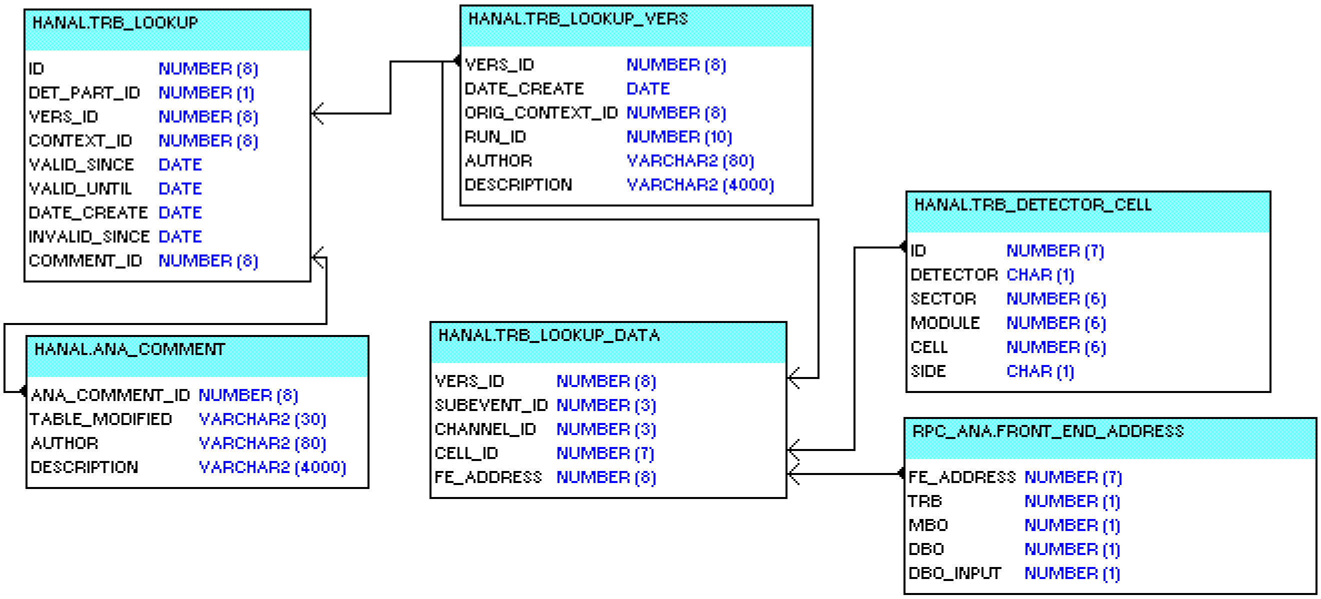
CALPAR
Validity of calibration parameter versions for an RPC module

Related views:

CALPAR_VERS_AT_DATE	Calibration parameter versions for a certain run and history date (used by the analysis interface)
HWPG_CALPAR_PARTS HWPG_CALPAR_DATA	Used by the WebDB GUI for tree-style parameter containers

2.4 The TRB lookup table for unpacking

The TRB lookup table for unpacking contains not only the data for the RPC, but for all detectors using the TRB as TDC/ADC. This allows to add constraints on the data to guarantee, that at each point in time a TRB channel is connected to only one detector channel and vice versa. The layout must be generic to allow for the different detector geometries.
It is implemented as a tree-style parameter container on the Oracle account HANAL: a table defining the version, a table with the data of these versions and a version management table defining the validity time ranges.
The data are inserted into Oracle with a analysis macro and validated with a WebDB GUI.



HANAL.TRB_LOOKUP_VERS

List of versions for the TRB lookup table used by the TRB unpackers

This table is filled by the analysis macro.

vers_id	Identifier for the version
date_create	Creation date of this version
orig_context_id	Identifier for the parameter context (here only real runs, no simulation)
run_id	Run Id used for initialization in the analysis before write (defines the maximum setup)
author	Author of the parameter set
description	Comment

HANAL.TRB_LOOKUP_DATA

TRB lookup table used by the TRB unpackers

This table is filled by the analysis macro.

vers_id	Identifier for the version of the parameter set
subevent_id	Subevent id (800..999)
channel_id	Channel id (0..127)
cell_id	Identifier for the detector cell
fe_address	Front end address

HANAL_TRB_LOOKUP

Version management table of the TRB lookup table used by the TRB Unpackers

This table is filled during validation with the WebDB GUI.

id	identifier for the entry
det_part_id	here not used
vers_id	Version of the parameters
context_id	Id of parameter context
valid_since	Date (Run start) when this parameter set gets valid
valid_until	Date (Run stop) when this parameter set gets invalid
date_create	Date when the entry was made
invalid_since	Date when this parameter set was (will be) replaced
comment_id	Identifier for the comment

HANAL.ANA_COMMENT
Comments for changes in tables with version management in the account HANAL.
All comments in the RPC tables with version management on the account HANAL are stored in this table.

HANAL.TRB_DETECTOR_CELL
Table of all possible detector cells referenced in TRB lookup table

id	Identifier of the cell
detector	Detector identifier (T=Tof, F=Tofino, S=Start, H=Hodo, W=ForwardWall, R=RPC)
sector	Sector number (-1, 0..5 as in the analysis)
module	Module number (starting with 0 as in the analysis)
cell	Cell number (starting with 0 as in the analysis)
side	Side of cell (null or l=left, r=right, m=middle/meantimer, u=upper, d=down/lower)

This table defines all detector cells, which might be connected to a TRB channel.
The RPC cells (defined in the RPC tables DETECTOR_CELL and MODULE_CELL) are a subset in this table. **If a cell is missing it is not possible to store a new lookup version containing this cell.**

RPC_ANA.FRONT_END_ADDRESS
List of frond end addresses in one module

fe_address	Address (trb*1000000 + mbo*10000 + dbo*100 + dbo_input)
trb	TRB number (0..3)
mbo	MBO number (0..3)
dbo	DBO number (0..7)
dbo_input	DBO input (0..3)

The table contains also the fe_address -1 to allow for unconnected channels (all columns -1).
Because actually only the RPC stores also the front end addresses in the data, this table is directly referenced without an additional table containing the addresses also for other detectors. This might change in the future. **If a front address is missing it is not possible to store a new lookup version**

containing this address.

Related view:

View	*Description*
ADDRESS_MAPPING	Shows the mapping of the front-end addresses, the detector cells and the geometry names. Mainly used for WebDB GUI

2.5 Packages

Packages used for triggers:

Package	*Description*
VERSMGM	Contains generic procedures to ensure the version management and is used by triggers

Packages used for the WebDB GUI:

Package	*Description*
RPC_UTIL	Utility package
MAPPING_GUI	GUI to map the readout channels to the detector cells and the geometry names
RPC_ANA_DOC	WebDB documentation of the production account RPC_ANA

Packages used by the analysis interface:

Package	*Description*
RPC_PAR_QUERY	Public interface for the analysis to create a new parameter version and to map addresses to the corresponding identifiers