The RICH accounts in the Oracle database DB-HADES

Status report, May 2009 by Ilse Koenig

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1 RICH accounts

Directly related to RICH are actually three accounts in Oracle:

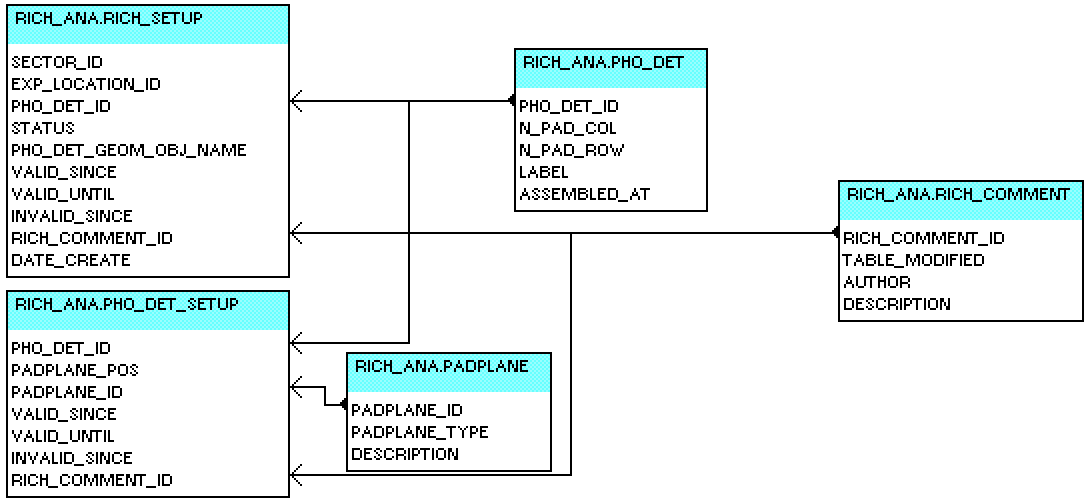
Account name	*Description*
RICH_ANA	Production account This account contains almost all tables, views and code.
RICH_OPER	RICH specific operator account This account has no tables or views, but is purely used to insert data via analysis macros and to manipulate the data via secure and tested applications.
RICH_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 RICH_ANA

2.1 Content

Object type	*Number of objects*	*Miscellaneous Details*
Tables	32	147 columns, 105 constraints, 49 indexes, 7 triggers
Views	20	131 columns
Packages	6	1252 lines of code
Sequences	5	

2.2 RICH Setup



PHO_DET
List of the photon detector modules
The table contains 6 modules 1..6 which labels I..V1 and with 91 number of pad columns and 89 number of pad rows.
Additionally a spare module 7 with label VII is defined, but with N_PAD_COL = NPAD_ROW = -1.

PADPLANE
List of pad-plane modules
The table contains 7x3 pad_planes I1..VII3 with types P1..P3.

PHO_DET_SETUP
Setup of the photon detector modules
This table stores the information which pad-plane is mounted on a photon detector module

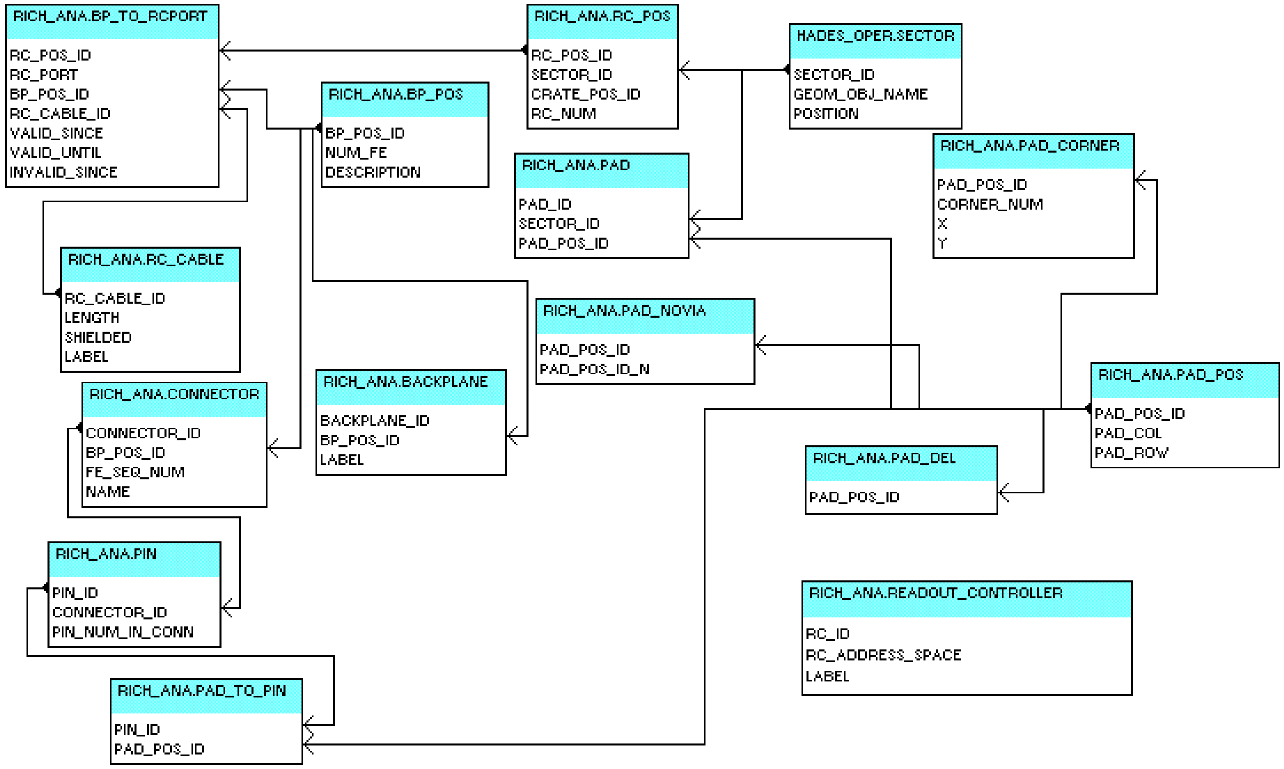
RICH_SETUP
Setup of RICH
This table stores the information, in which sector a photon detector is mounted at a certain date and location (real data and simulation).

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

Related view:

View	*Description*
SETUP_AT_RUN	Shows the RICH detector setup valid for a special run or date. This view is used by the analysis interface. **This view shows only the valid setups and does not take into account the history.**

2.3 Cabling and the lookup table for unpacking



PAD_POS
Local position of the pads of the RICH photon detector in one module

PAD
All the pads of the RICH photon detector

PAD_DEL
Pad positions of small pads at the border of the pad plane that were deleted from the initial design

PAD_NOVIA
Pad positions of small pads at the border of the pad plane that contain no via and are connected to a neighboring pad
PAD_POS_ID_N is the identifier for the neighboring connected pad that is read-out.

PAD_CORNER
***Positions of pad corners relative to the beam axis** (with the y-axis as the symmetry axis of the sector)*
The area reduction due to the 0.3mm spacing between the pads is ignored.

BP_POS
All positions of backplanes above one sector
The position BP_POS_ID is between 0 and 15 and the number of frontends NUM_FE between 4 and 5.

BACKPLANE
All backplanes for the RICH detector

CONNECTOR
List of all connectors on the backplanes in one sector
The frontends are daisy-chained within one backplane. This sequence number FE_SEQ_NUM tells when data are written to or read from the frontend within one backplane action.

PIN
All the pins of the RICH photon detector in one sector

PAD_TO_PIN
Connections between pads and connector pins in one module
As some pins have two pads, some have none and some pads have no connection to, this n:m relation is necessary.

READOUT_CONTROLLER
All readout controllers for the RICH detector

RC_POS
Logical id for all readout controllers in the sectors

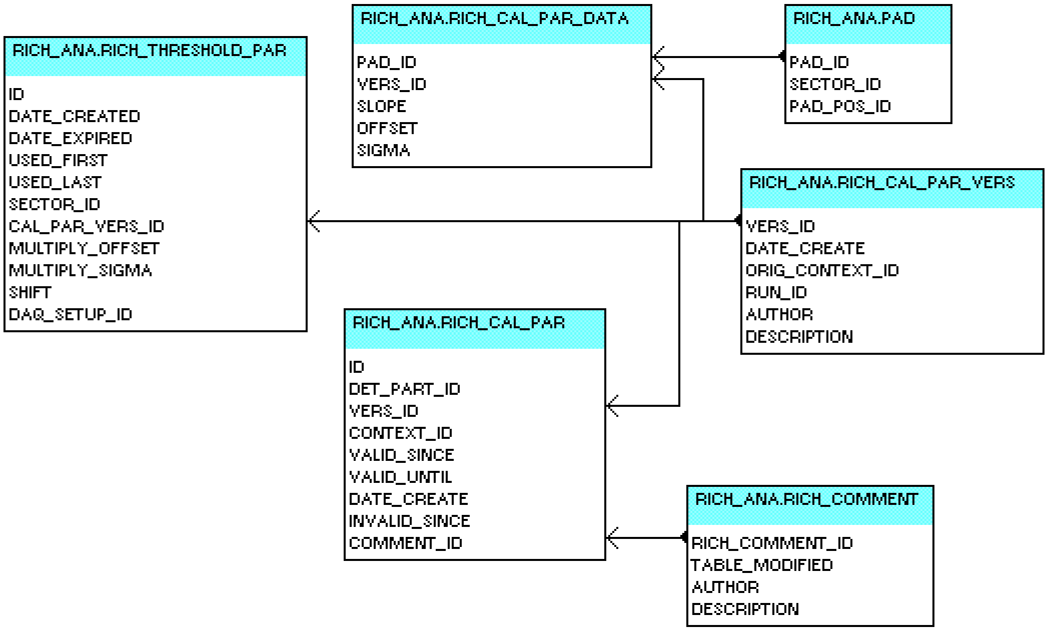
BP_TO_RCPORT
Connection between backplanes in one sector and the logical id of the readout controllers

RC_CABLE
All cables between RICH backplanes and RICH readout controllers

Related views:

PIN_TO_PAD_POS	Connection between front-end connector pin and the pad position
BP_TO_RCPORT_AT_DATE	Mapping of readout controller ports to backplanes at a certain run
PAD_TO_HW_ADDRESS	Actual mapping of pads to front-end addresses
READOUT_LOOKUP_AT_DATE	Mapping of pads to front-end addresses at a certain run (including not connected pads)
UPI_AT_DATE	Lookup table for unpacker, contains only connected pads (used by the analysis interface)
UNCONN_PADS_AT_DATE	Unconnected channels at a certain run

2.4 Calibration parameters and thresholds



The calibration parameters are implemented as a tree-style parameter container consisting of three tables:

1. **RICH_CAL_PAR_VERS** defining the versions,
2. **RICH_CAL_PAR_DATA** containing the data of all versions and
3. **RICH_CAL_PAR**, the version management table defining the validity.

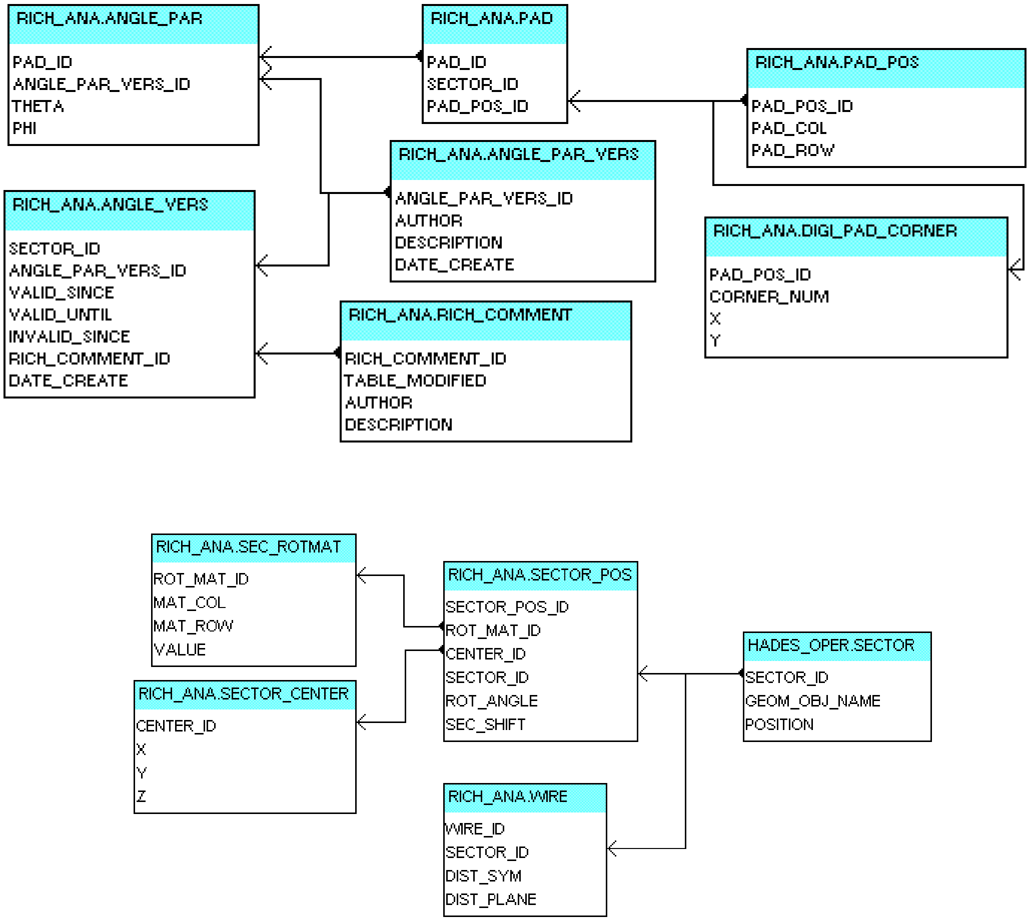
RICH_THRESHOLD_PAR contains the thresholds based on the version of the calibration parameters for each sector. The time range of validity is defined by the 2 date columns USED_FIRST and USED_LAST.
The thresholds are stored and validated in Oracle via a WebDB GUI. The corresponding calibration

parameter version is then automatically validated for the same time range.

Related views:

View	*Description*
RICH_CAL_PAR_VERS_AT_DATE	Calibration parameter versions for a certain run and history date (used by the analysis interface)
RICH_CAL_PAR_ALL	Calibration parameters
HWPG_RICH_CAL_PAR_PARTS HWPG_RICH_CAL_PAR_ALL	Used by the WebDB GUI
RICH_THRESHOLD_VERS_AT_DATE	Threshold versions for a certain run and history date
RICH_THRESHOLD_PAR_AT_RUN	Thresholds for a certain run (with validity time range, used by the analysis interface)

2.5 Geometry tables



The RICH pad center parameters (theta a phi of each pad) are **not** implemented as a tree-style parameter container, but use an oder design, also consisting of three tables:

1. **ANGLE_PAR_VERS** defining the versions (actually 3),
2. **ANGLE_PAR** containing the data of all versions and
3. **ANGLE_VERS**, the version management table defining the validity.

This version management table is empty. The analysis uses the the version 2 (hard-coded).

WIRE
All the wires of the RICH photon detector
DIST_SYM defines the distance of a wire from the symmetry axis of a module (y-axis) and DIST_PLANE the distance of a wire from the pad plane (all in mm).

In the analysis the RICH digitizer uses its own coordinate system. The data are not extracted from the geometry tables, but stored independently in the following tables.

SECTOR_POS
RICH module positions for digitization
ROT_ANGLE defines the polar rotation angle for one module of the RICH, SEC_SHIFT the shift of the padplane in one sector relative to the target in **cm(!).**

SECTOR_CENTER
Origin of a RICH module in the coordinate system of the simulation

SECTOR_ROTMAT
Rotation matrix for a RICH module

2.6 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***
RICH_UTIL	Utility package
RICH_CAL_PAR_MTN	GUI to show and remove calibration parameter versions never validated
THRESHOLD_CREATION_GUI	GUI to create and validate thresholds and the corresponding calibration parameters
RICH_ANA_DOC	WebDB documentation of the production account RICH_ANA

Packages used by the analysis interface:

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