

# Databases for HEP experiments

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# Databases in general

- database is a backbone of every system
- in HEP, databases are used for storage of configuration information, meta information for physics data, system logs, user information, etc.
- a good database design can improve reliability and stability of your system
- several simple rules should be followed when designing a database
- primary key constraint (i.e. column or a combination of columns with unique value) should be defined in every table
- indexes should be defined in tables that are used most often

# Relations inside a database

- referential integrity = “every value of one attribute of a relation exists as a value of another attribute”
- referential integrity has to be maintained at all costs
- relations should be specified internally by foreign key constraints
- designs without foreign keys can be faster but maintaining referential integrity could be difficult
- without the integrity a possible outcome is corrupted data (i.e. database contains records that should not exist or vice versa)

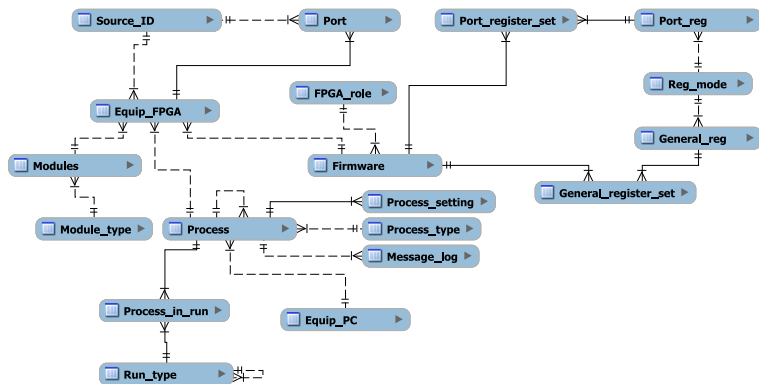
# Database interfaces for users

- an application which accesses the database and can view/add/update/delete records
- an interface should not be able to alter the database structure itself
- for everyone who needs to access/alter database records
- users should not be allowed to query the database directly
  - potential risk of data loss or corruption
  - some problems can be prevented by setting database user privileges

# Current COMPASS databases

- database backups reworked by Vladimír Jarý in 2010
- in a good shape
- regular backups of the most important parts
- master-master replication
- part will be replaced by the new COMPASS DAQ

# New COMPASS DAQ database



# New COMPASS DAQ database

- not the final state
- configuration of all the hardware pieces within the system
- FPGA-PC-process structure
- FPGA registers configuration and default values
- readout and control process configuration
- system log (information, warnings, errors), user data
- library for database access is a part of the system
- web based database interface will be implemented

# COMPASS front-end database

- database structure needs reworking or at least a bit of tweaking
- all the tools accessing FE database would need reworking as well
- more careful approach chosen
- only the front-end database web interface is to be reworked



# New FE database interface

- the old interface was created in 2003 using Perl
- could cause troubles if maintenance and/or bug fixing is needed
- will be reworked using more modern approach to web applications programming
- PHP, Javascript, AJAX, ...
- other web based interfaces can be implemented in a similar fashion (not only for FE database)

# Thank you!

THANK YOU FOR YOUR ATTENTION