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TGenBase - general purpose database engine for HEP

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TGenBase is a virtual database engine which allows to communicate with and store data in different underlying database management systems such as PostgreSQL, MySQL, SQLite, based on the configuration. It is universally applicable for any data storage task, such as parameter handling, detector component description, logistics, etc. In addition to usual CRUD (create, read, update, delete), it supports a special versioned insert-only logic, meaning that there is no need to update single records and the whole history of the records is available. The historical versions of the data can be queried with certain date as parameter.

The core of the TGenBase is the data definition interface with template-based generation engine realized as a web-based application. It allows the end-user to define what and in which form they want the data to be stored and define relations between different data classes. Based on this definition, the database layout, server and client-side code is generated from templates and easily deployed. The server provides standard RESTful API, a middleware layer for user and access management, fast caching, etc. Data querying, visualization and modification are available in C++, Web, Python and LabVIEW "thin"-clients with minimum dependencies. The Web client provides full-fledged content management system with data access and administrative interface. For HEP, the C++ client is of high relevance, it can use ROOT framework to import and export data. Furthermore, STL containers and ROOT objects, such as complete histograms, can be stored in the DB along with primitive types.

In this contribution we give an overview of the TGenBase functionality on an example of component quality control and logistics database for the Silicon Tracking System detector of the CBM experiment at FAIR.

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