



A Toroidal LHC Apparatus (ATLAS/CERN)

Tools for offline access and visualization of ATLAS online control and data quality databases.

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ATLAS T/DAQ ↔ Online/Offline Databases

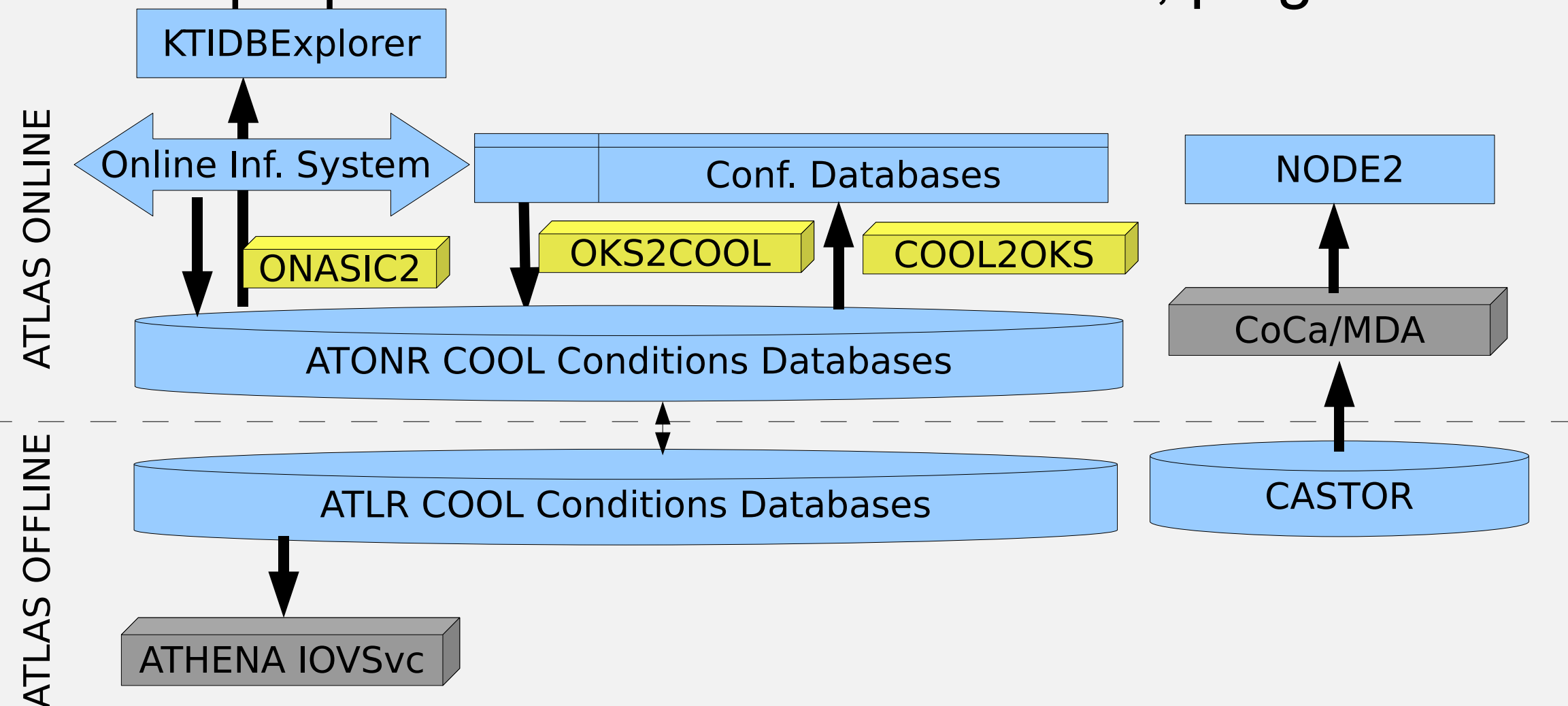
General Conditions Data from ATLAS TDAQ (Detector Description, Online Control, Monitoring data) needed both online/offline.

Online database interfaces perform as global services, which are partition-independent and operate continuously.

The ATLAS Conditions database is currently implemented in LCG/COOL.

Toolset developed and commissioned:

- Visualization Tools (KTIDBExplorer and NODE2)
- Interface/Service Tools (OKS2COOL/COOL2OKS and ONASIC).
- TIDB2 – Multipurpose Database Interface API, plugin oriented.



Storing and Accessing ATLAS configurations OKS2COOL and COOL2OKS

OKS2COOL

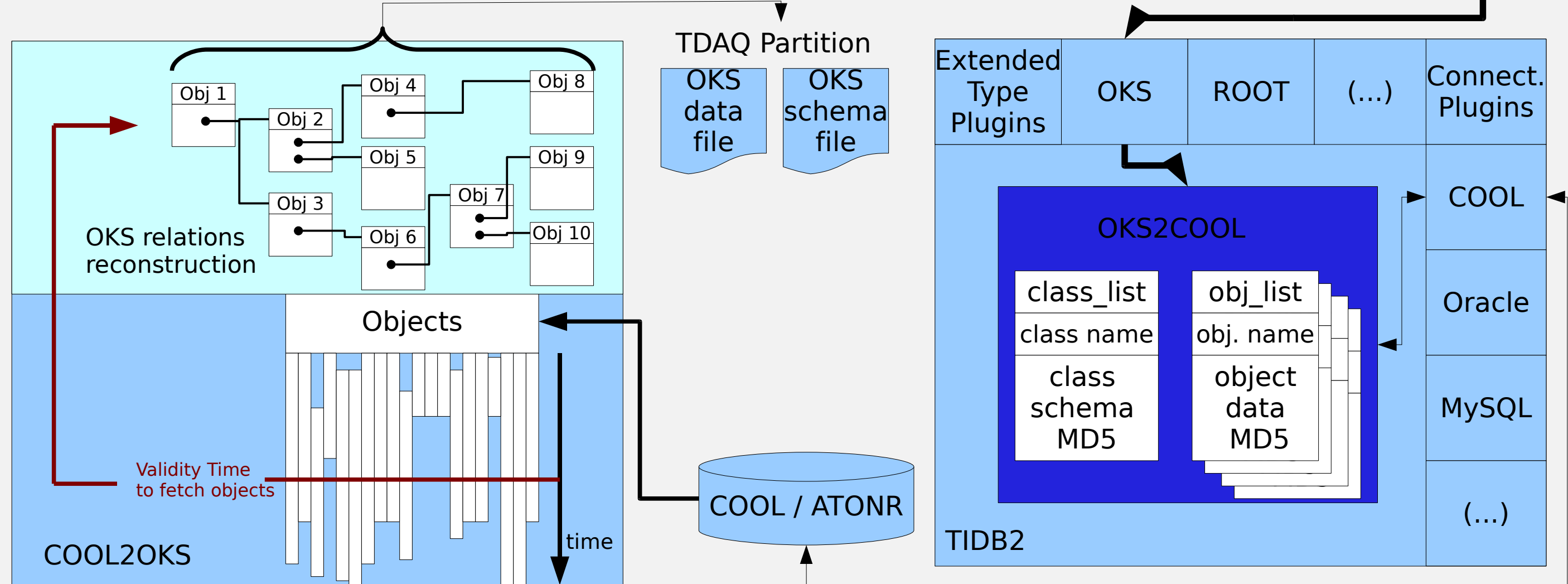
Is the Interface for storage of ATLAS/TDAQ Configurations databases (OKS) in Conditions database. At start-of-run, the new configuration is collected and processed by OKS2COOL.

COOL2OKS

Is the reverse interface; it accesses Conditions database, browses all objects for a validity period and interprets OKS relations between objects and classes, reconstructing the TDAQ Configuration for that period (outputting OKS schema and data files).

- Both tools use TIDB2 as a middle layer, handling OKS objects and COOL connections with TIDB2's extended type and connection plugins.
- The toolset can be deployed under the multiple backends (COOL by default, Oracle, MySQL) supported by TIDB2
- Implements ATLAS Configurations time persistence, complying with offline database organization rules for later browsing or access by offline computing.
- OKS2COOL is a reliable interface, continuously running, partition independent, able to process and store multiple simultaneously running partitions.
- Manages a continuously-updated record of all previously-stored Configuration objects and classes, storing only new and/or changed objects (both data and schema).
- Significantly reduces database client-server communication **bandwidth**: the number of changed/new objects is a lot less than the complete set of objects per partition or configuration.
- Supports **schema evolution** of objects, managing **BLOB** copies of all objects stored.
- Enables Configuration to change schema and still be archived in the same

FolderSet/Folder hierarchy in Conditions database

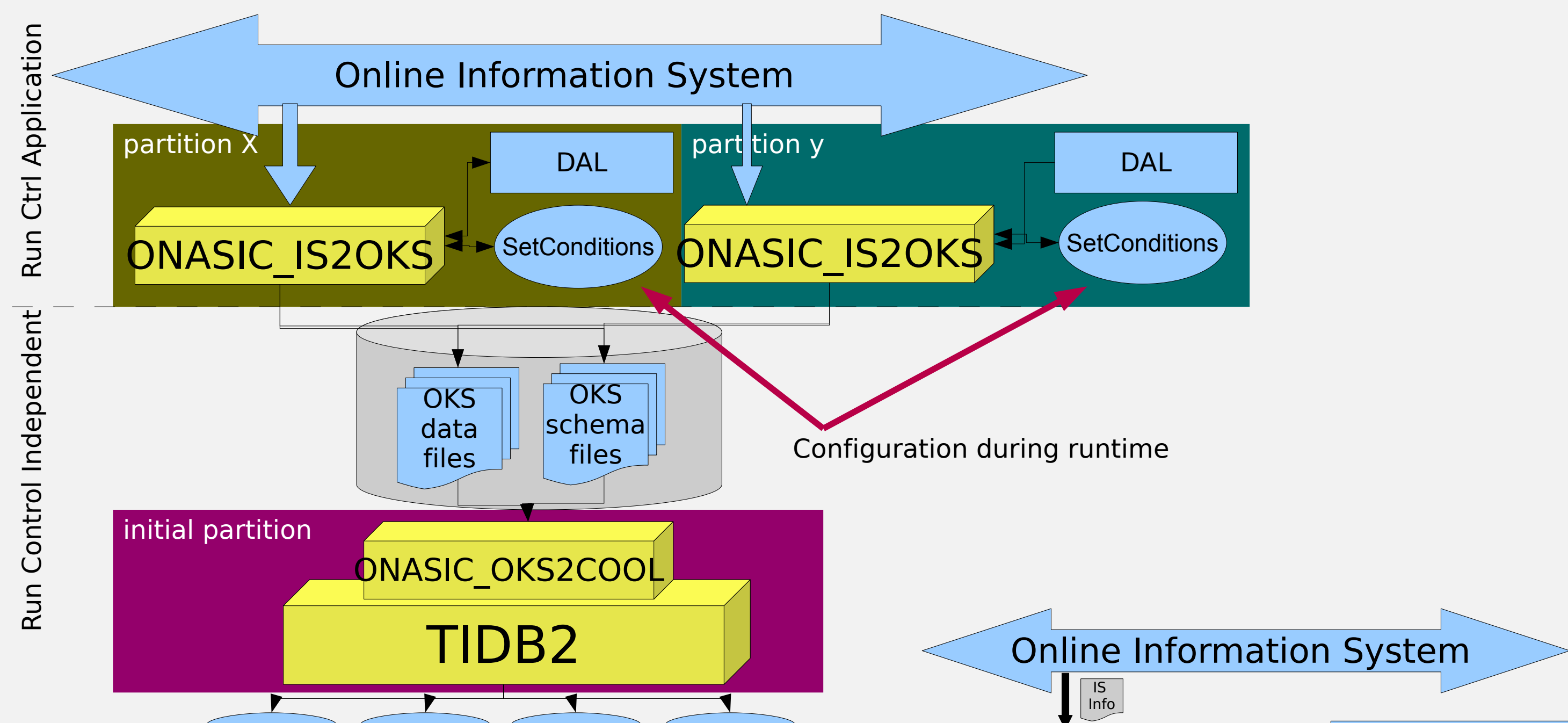


Storing ATLAS/TDAQ Online data

ONASIC is the asynchronous interface for TDAQ Information Service data and the Conditions database. It is split into 2 components: RunControl Application, and a partition independent storage service. The communication between both components is managed with an OKS file cache running in a local file system.

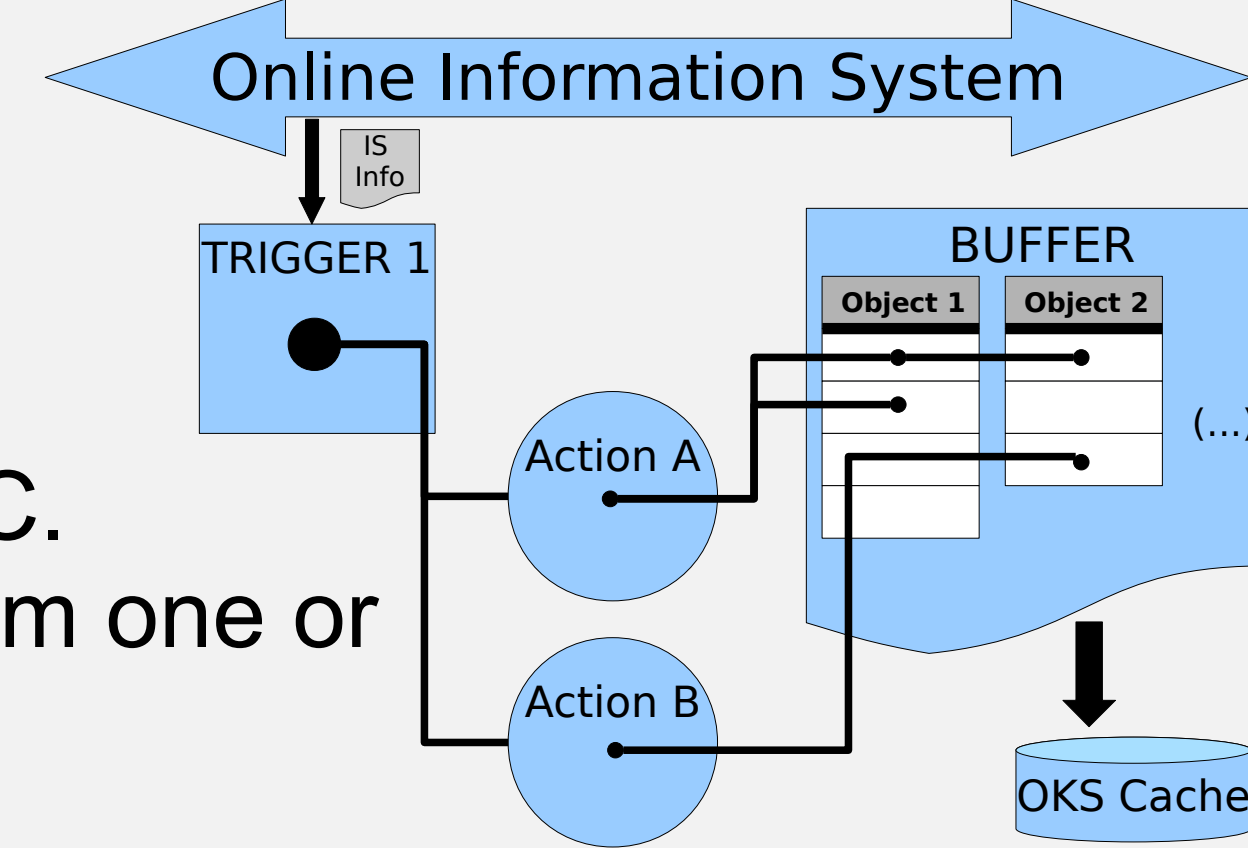
Considerably reduces back pressure applied on the Information System Bus, because database communications are independent from the front end interface.

Configurable on-the-fly (SetConditions tool) or by Configurations database, using OKS Direct Access Library.



New design: Trigger/Buffer configuration of ONASIC.

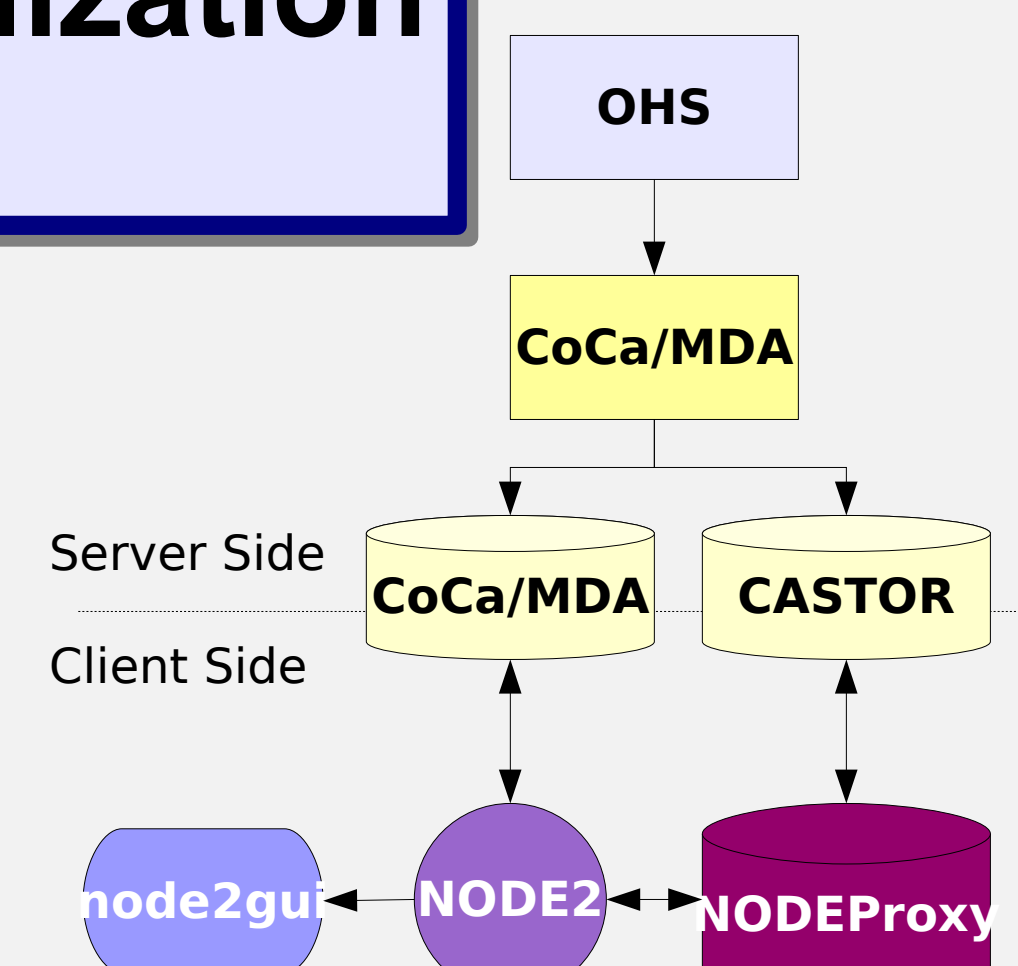
Allows to re-compose objects to store from one or more incoming objects. Multiple triggers maybe applied.



Data quality histograms visualization NODE/NODE2

NODE2 / NODEProxy

The NODE2/NODEProxy is an easy and intuitive tool for browsing and view monitoring histograms from the several components of the detector.



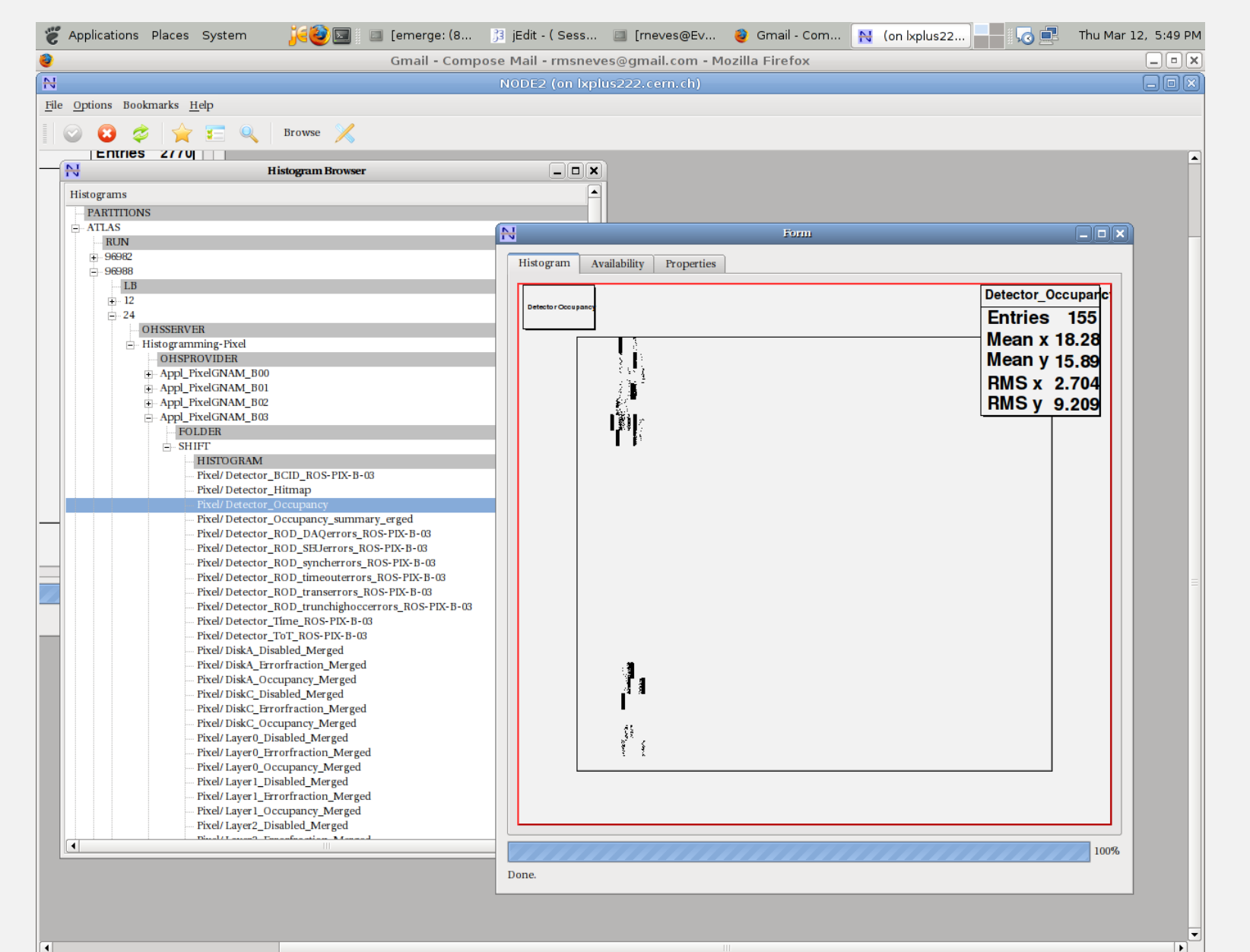
The CoCa/MDA services collects and stores monitoring histograms published via Online Histogram Service; histogram references are stored in CoCa/MDA databases while the histograms themselves are packed and stored in CASTOR.

NODE2 allow the end user to browse through the available histograms consulting the CoCa/MDA databases. Then, the archive containing such histogram is requested whether directly or via NODEProxy.

NODEProxy has the advantage of managing a cache with the most requested archives. Whenever the histogram is cached, it may be accessed later on via rootd. NODE2Proxy is deployed as a Java Tomcat servlet.

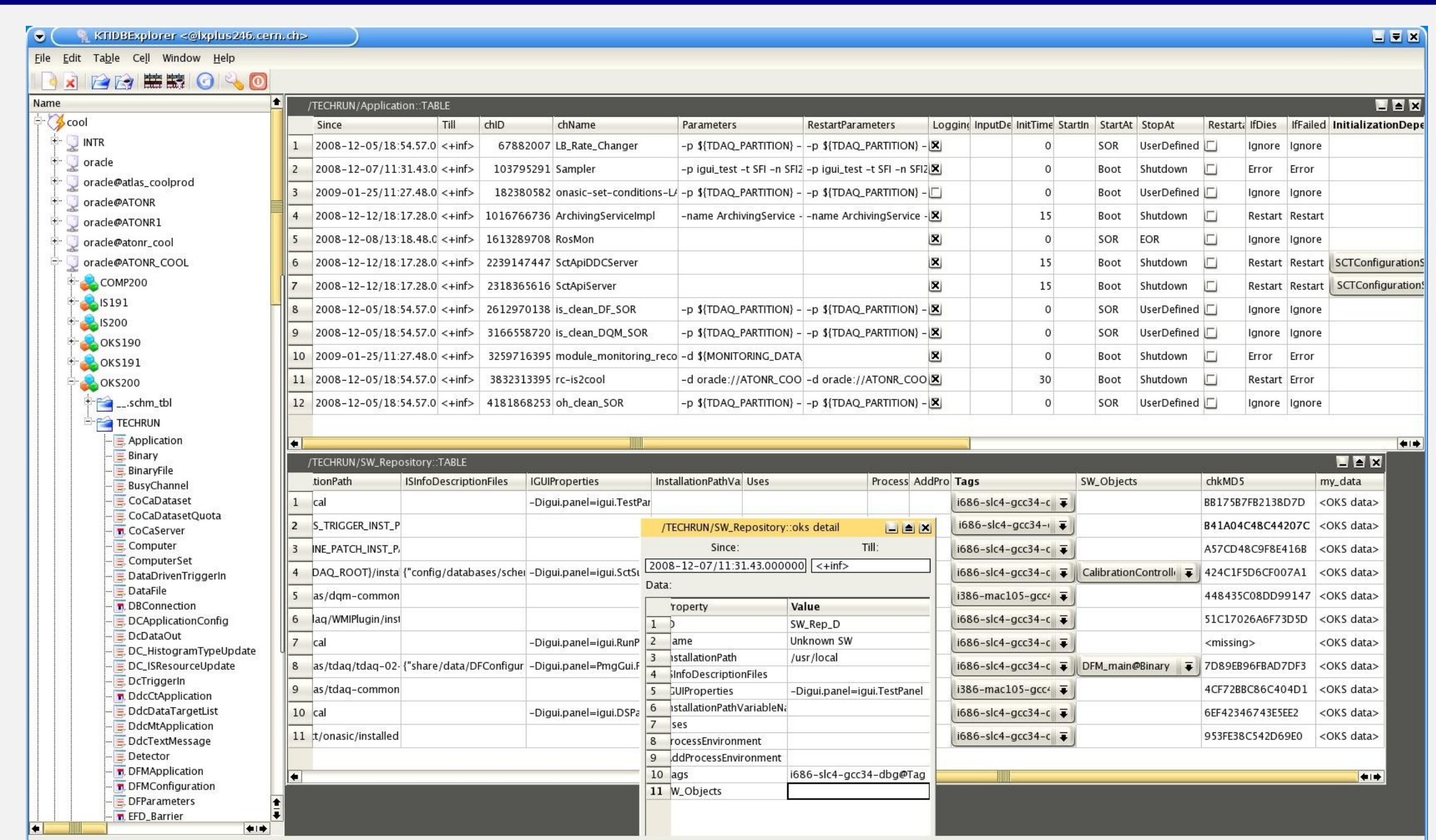
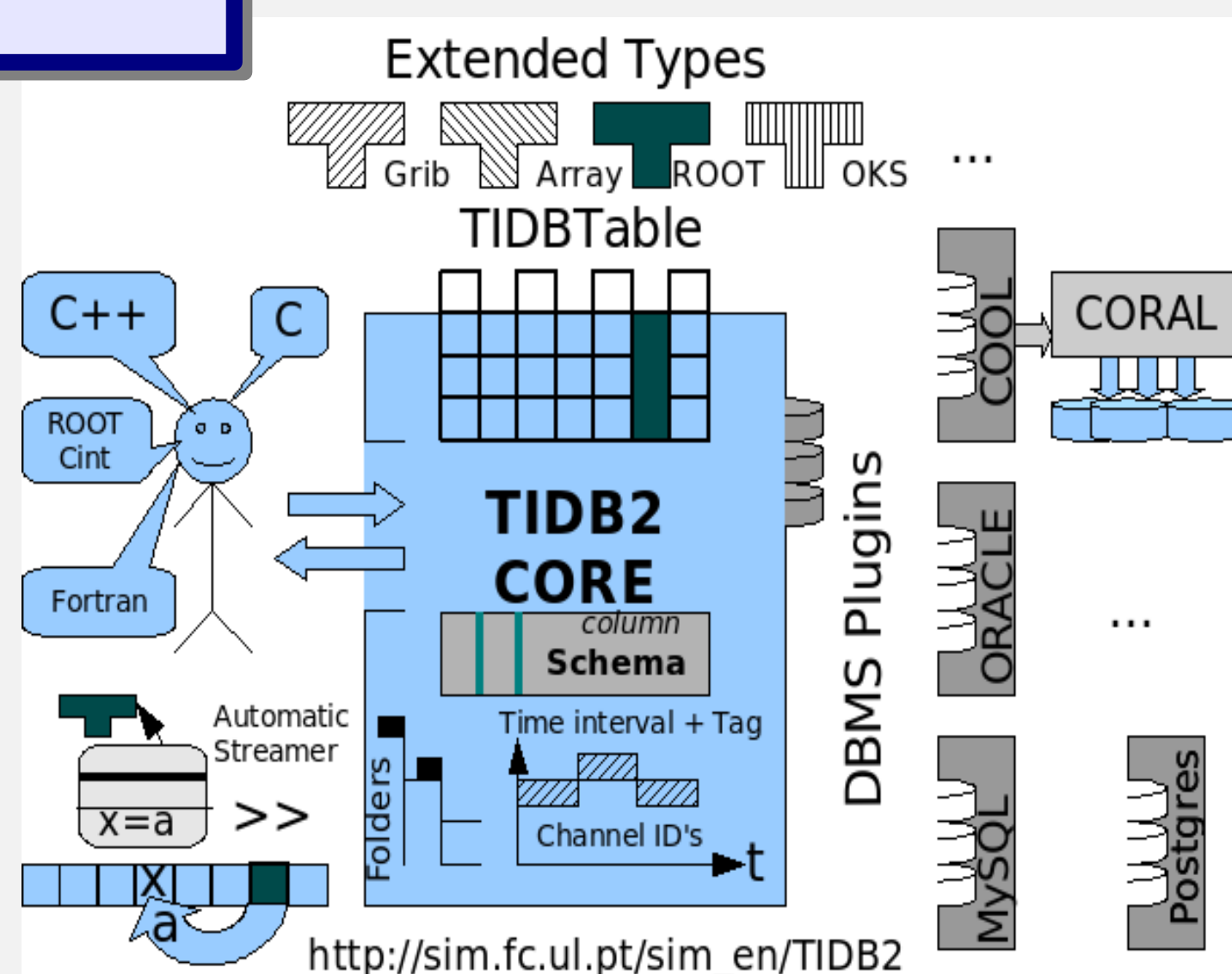
The machine hosting the NODEProxy must provide an open port for http requests and another for the root daemon.

node2gui offers a graphical (Qt) fronted for browsing and displaying the histograms.



Temporal Instrumental DataBase - TIDB2

- Lightweight C++ API for time-oriented databases.
- Runtime plugin approach (shared libraries loaded at runtime.)
- RDBMS independent (supported MySQL, COOL, Oracle, PostgreSQL...).
- Oriented to store any kind of scientific objects (OKS, ROOT, GRIB, BUFR...).
- Also provides C, Fortran and ROOT APIs
- Wide range of shell tools and examples.



KTIDBExplorer screenshot