

Databases for Big Science

Database-centric Design, Implementation and Support

Service Description

Introduction

In large experimental physics facilities, database-centric solutions play many roles from construction to operation. Examples include:

- storing data about the equipment: what inventory is installed where, and when was it last serviced?
- history of process variables or alarm states
- equipment parameter settings during experiment, and results of experiments
- log outputs of the control system's distributed processes
- operator log book"



Challenges

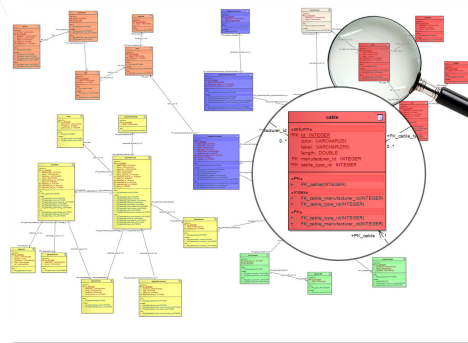


Illustration: Schema of the BLED database

To use databases efficiently, many aspects need to be considered:

- what is the expected size of the data, including future trends
- what are the expected data retrieval times
- do modifications to the data need to be audited or version controlled
- is data structure known upfront, or does it need to be flexible

DBMS Technologies

Depending on how exactly the data is used, Cosylab can help you choose the proper technology to store and manage your data:

- relational database (RDBMS): PostgreSQL, MySQL, Microsoft SQL Server, Access, Oracle
- custom, application-specific storage format (e.g., EPICS channel archiver)
- loosely constrained (NoSQL) and distributed databases (Apache Hadoop, Apache Cassandra)
- file-based databases (XML, HDF5, MDSplus)

What we offer

As turnkey control systems provider, Cosylab can offer a unique insight into the data management questions. Together with the customer we explore all the Control System central services and their data management needs.

We help you decide what you really need and what is optional. Whatever level of integration of services you decide on, we make sure that the resulting database configuration is balanced and functional.

We advise on how to fill the databases with quality data (early freezing of a naming convention, use of semi-automated excel based tools, review process, ...)

For the user interfaces we offer a pragmatic approach: some DBMS UI's (logbook) will last the lifetime of the machine and deserve a polished, web-based (HTML5) UI. Other parts need to be tuned to existing formats (physics modeling) and need scripting flexibility instead of rigid UI's.

Cosylab, September 2013
Service Description version 1.0

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When to involve us?

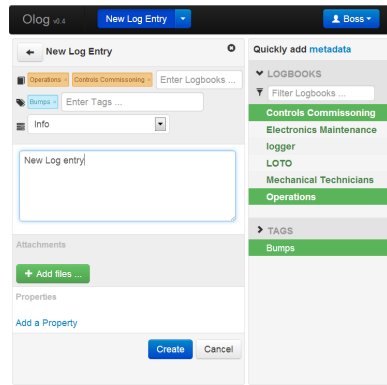
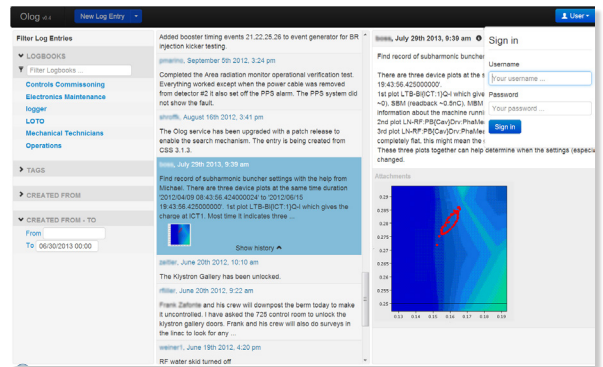
We are ready to jump in at **any stage** of your **database project**. When thinking databases for big science, think about us. Our work can range from setting up the **Oracle, MySQL**, or any other database infrastructure, over performance optimization and schema design, all the way to the dedicated GUI applications, web-based in **HTML5** or **Python/Django**, or platform independent **Java VM**.

Recent Example

oLOG, web-based logging application for BNL & FRIB, USA

Brookhaven National Laboratory and the Facility for Rare Isotope Beams set up a collaboration to improve an aging php based logging application.

They asked Cosylab to contribute with our expertise with REST-full distributed web architectures and user-friendly and responsive client applications, all using open-source frameworks.



The solution is built on a **MySQL** database and **Apache Jackrabbit** Content Repository. The log-book webservice is based on the **GlassFish** open source application server. The web application is built on **Twitter Bootstrap** in combination with **jQuery**, **getJSON**.

This solution allows for fresh-looking, responsive and user-friendly UI's while keeping the benefits of easy deployment, accessibility and scalability of a web-based, multi-user application.

How to make it happen

Simply by contacting us; either by e-mail (see left) or by contacting someone you already know at Cosylab.

You can provide us with any form of specifications you already have, or tell us the wish-list of improvements for your current systems. If we need to know more before we can start with the work, we typically propose a 3-day site visit to produce a requirements specification document.

We quote all effort and expenses upfront. Invoicing after acceptance of deliverables.

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