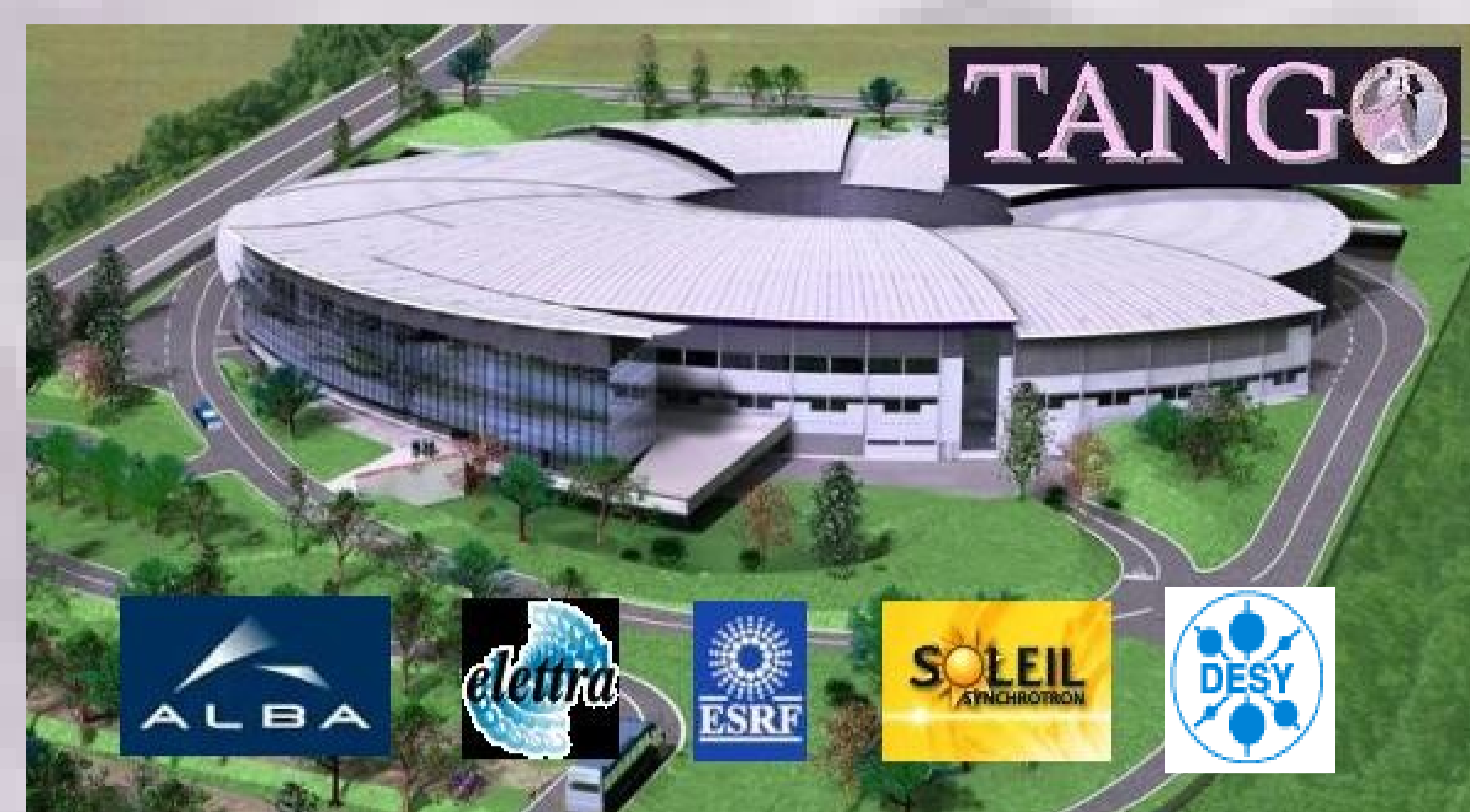


# Validation of a MySQL Archiving System for ALBA

## Introduction

Open Source database engines present several advantages respect to its commercial equivalents. Economic cost of licenses is the most obvious but it must be considered also the higher flexibility in the election of the hardware platform an operating system.

This study tests the MySQL capabilities by evaluating Alba Synchrotron archiving requirements on a MySQL-based Tango Archiving System. This work have been done in tight collaboration with the rest of members of TANGO community: Soleil, ESRF, Elettra and Desy institutes.



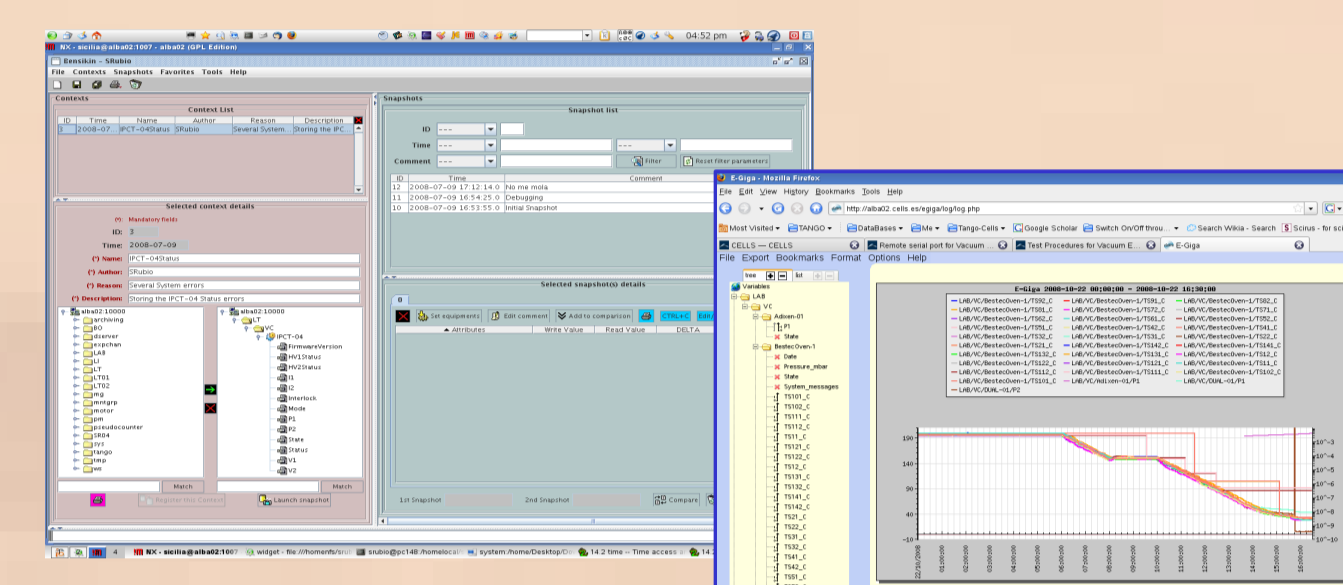
## ALBA Archiving System Requirements

These are the requirements for ALBA Archiving System, based on a survey on other Light Sources experience (ESRF, Soleil) [3]:

- **Number of attributes to be archived:**
  - 6,000 for 2010 commissioning;
  - 20,000 in 2012.
- **Historic archiving:**
  - 10 seconds between values, all variables stored permanently.
- **Temporary archiving:**
  - 1 second between values, 5 days round buffer.
- **Online backup and export between databases must be available.**

ALBA is a new Synchrotron Light Facility in Barcelona, Spain. The commissioning of Alba booster accelerator will start before the end of 2009.

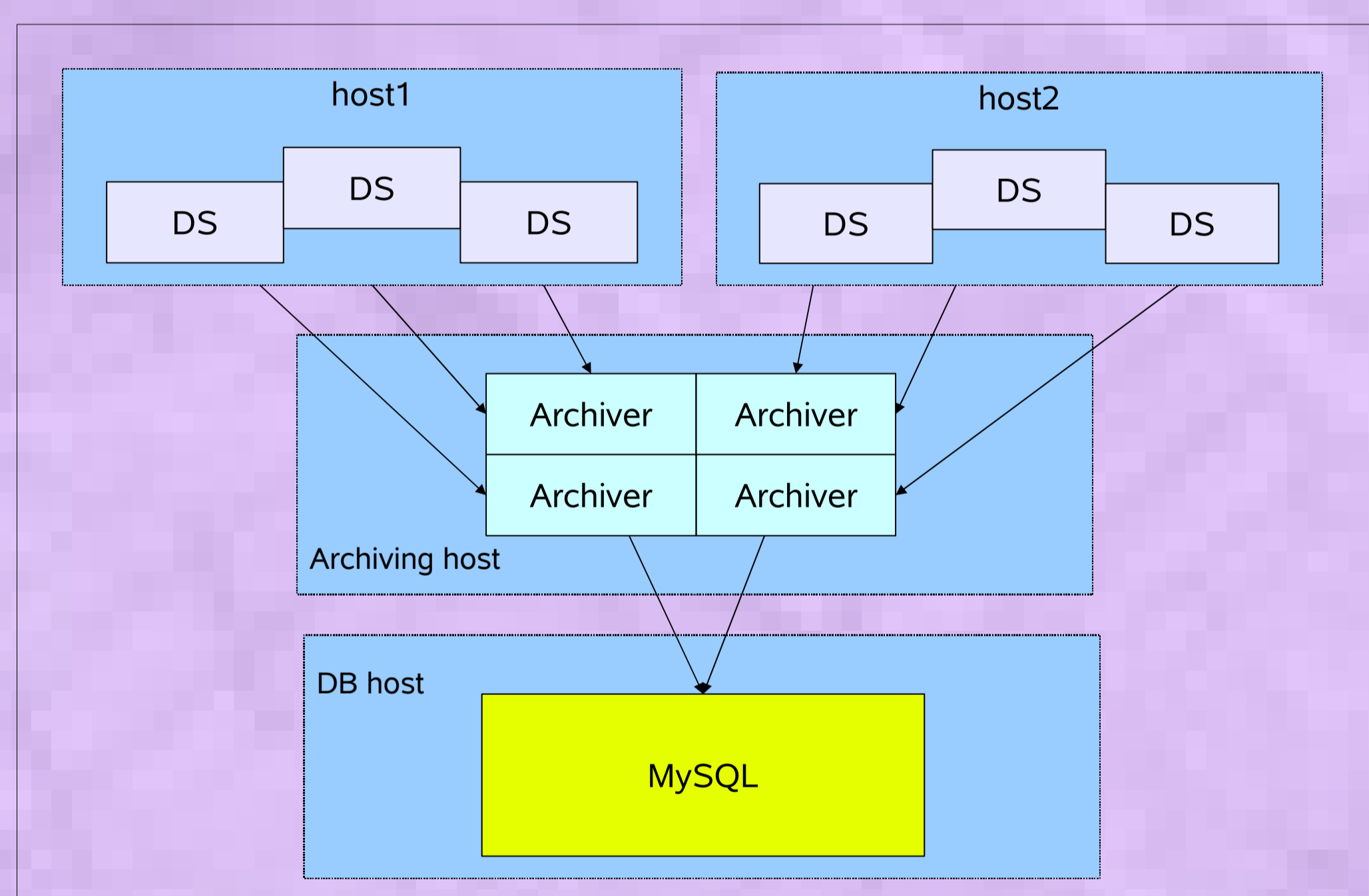
ALBA Synchrotron collaborates with SOLEIL and ELETTRA institutes in the improvement of the Archiving System for Tango Control System, originally developed at Soleil Synchrotron Institute (Paris, France).



Packages include a complete set of Java tools, small python and php apis and support for Oracle and MySQL databases.

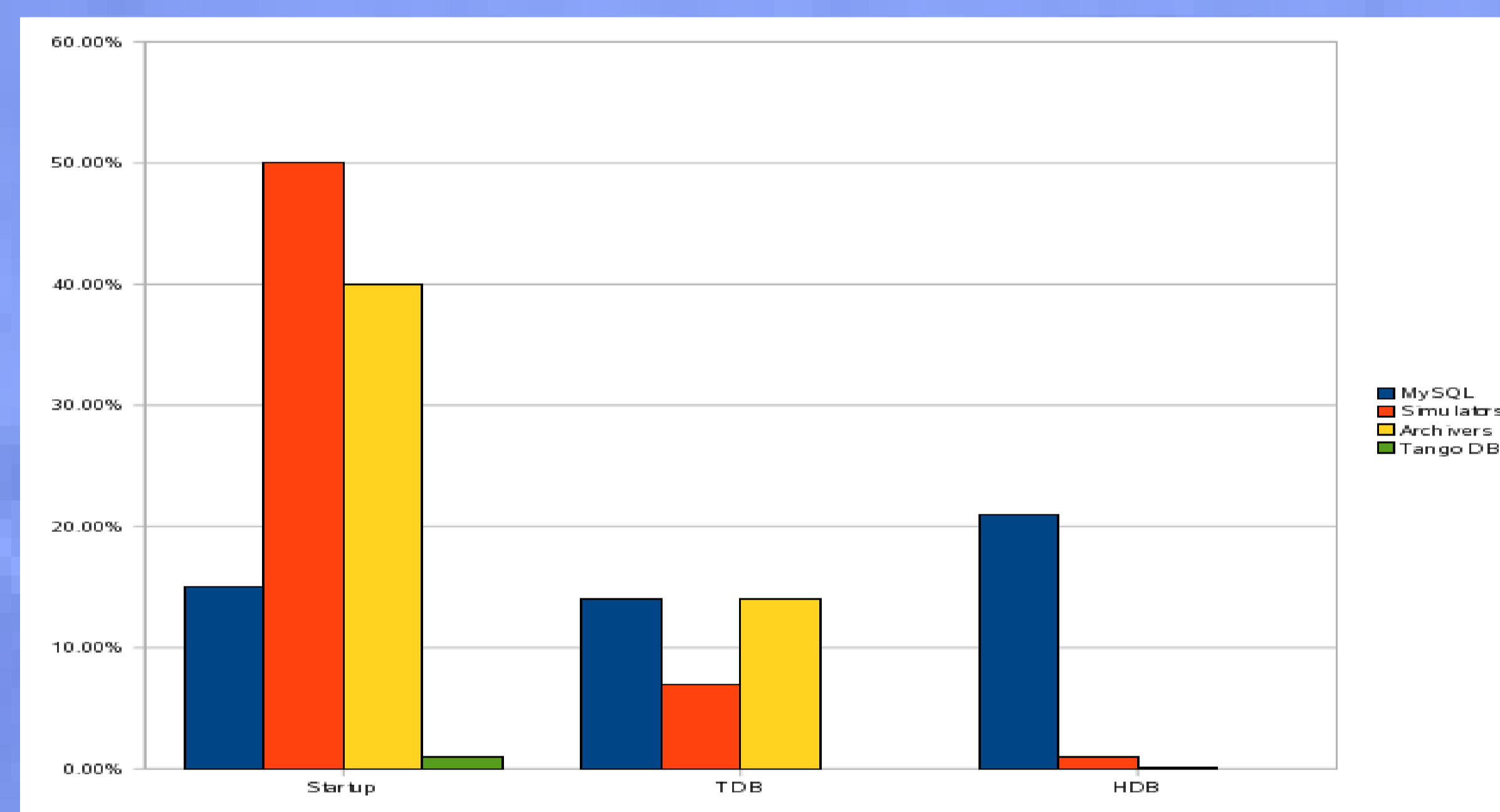
## Tango Archiving System Architecture

There are three types of Archiver implementations depending of the mode of archiving. The modes evaluated in this report are Historical (HDB) and Temporary (TDB). A third mode (Snapshot) exists for save and restore operations and keeping archiving configurations.



Each archiver process is on charge of reading periodically or on demand an specific set of attribute values from Tango Device Servers (DS). This values will be stored in the database depending of filters previously specified using the configuration tools.

## CPU Usage

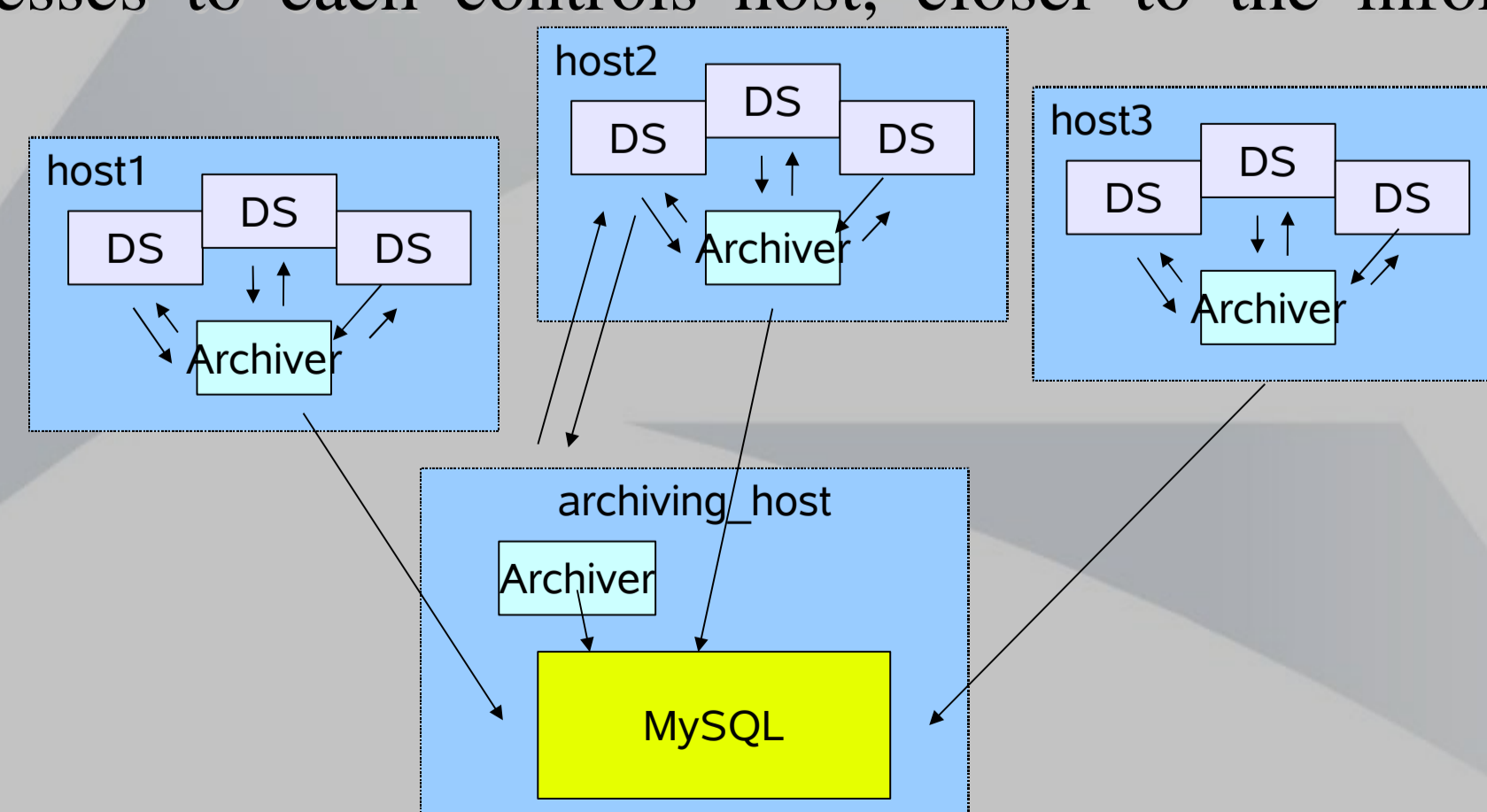


With high loads (>3000 attributes) the Historical Archiving performed worse than TDB due to the big number of MySQL connections being continuously open and closed. To solve this problem a bulk upload system used by TDB must be implemented.

Processor	2 Dual XEON, 2.33 GHz
RAM	16GB, 667 MHz
Hard Disk	6146 GB; 10,000 rpm
OS	OpenSuSE Linux, 10.2, 64 bits
MySQL (/var)	335 GB

## Moving to Distributed Data Collection

The process of startup of devices and Archivers is an slow and complex process that stressed too much the control system. To solve all problems referred to CPU usage the CPU load will be distributed through the system, separating both databases and moving data collection processes to each controls host, closer to the information sources.



This less centralized architecture is actually under test at ALBA.

## Test Results

The Temporary Archiving system has been tested storing 4000 tango attribute values per second. To store all this information 20 Archiver processes have been used, with 5 collector threads each. A 7 days round buffer required a 43GB database and 100GB of cache files.

The Historical Archiving system has been tested storing 6000 tango attributes in a 10 seconds period. 20 Archiver processes have been used with 5 collector threads each. The disk space used by MySQL tables is incremented in 750Mb/Day.

In both cases more than 99% of the generated data have been successfully archived; same number of attributes archived on an Oracle implementation of the archiving system required two separate servers for data collection and database.

The lack of millisecond resolution in timestamps and the difficulties for online backup are still a disadvantage of MySQL.

## References

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