PUSHING THE LIMITS OF TANGO ARCHIVING SYSTEM USING POSTGRESQL AND TIME SERIES DATABASES

R. Bourtembourg, S. James, J-L. Pons, P. Verdier, ESRF, Grenoble, France
G. Cuni, S. Rubio-Manrique, ALBA-CELLS Synchrotron, Cerdanyola del Vallès, Spain
G. A. Fatkin, A. Senchenko, V. Sitnov, BINP SB RAS, Novosibirsk; NSU, Novosibirsk, Russia
L. Pivetta, C. Scafuri, G. Scalamera, G. Strangolino, L. Zambon, Elettra-Sincrotrone Trieste S.C.p.A., Basovizza, Italy
M. Di Carlo, INAF - Osservatorio Astronomico d'Abruzzo, Teramo, Italy

The HDB++ Tango archiving system relies on the Tango archive events feature to collect Tango attributes values coming from one or several Tango Control Systems and then store these values in the Database back-end of your choice.

The following back-ends are currently supported: MySQL/MariaDB, Cassandra, PostgreSQL, TimescaleDB (a PostgreSQL extension) and Elasticsearch.

This list could be easily extended, thanks to the layered design of the HDB++ architecture.
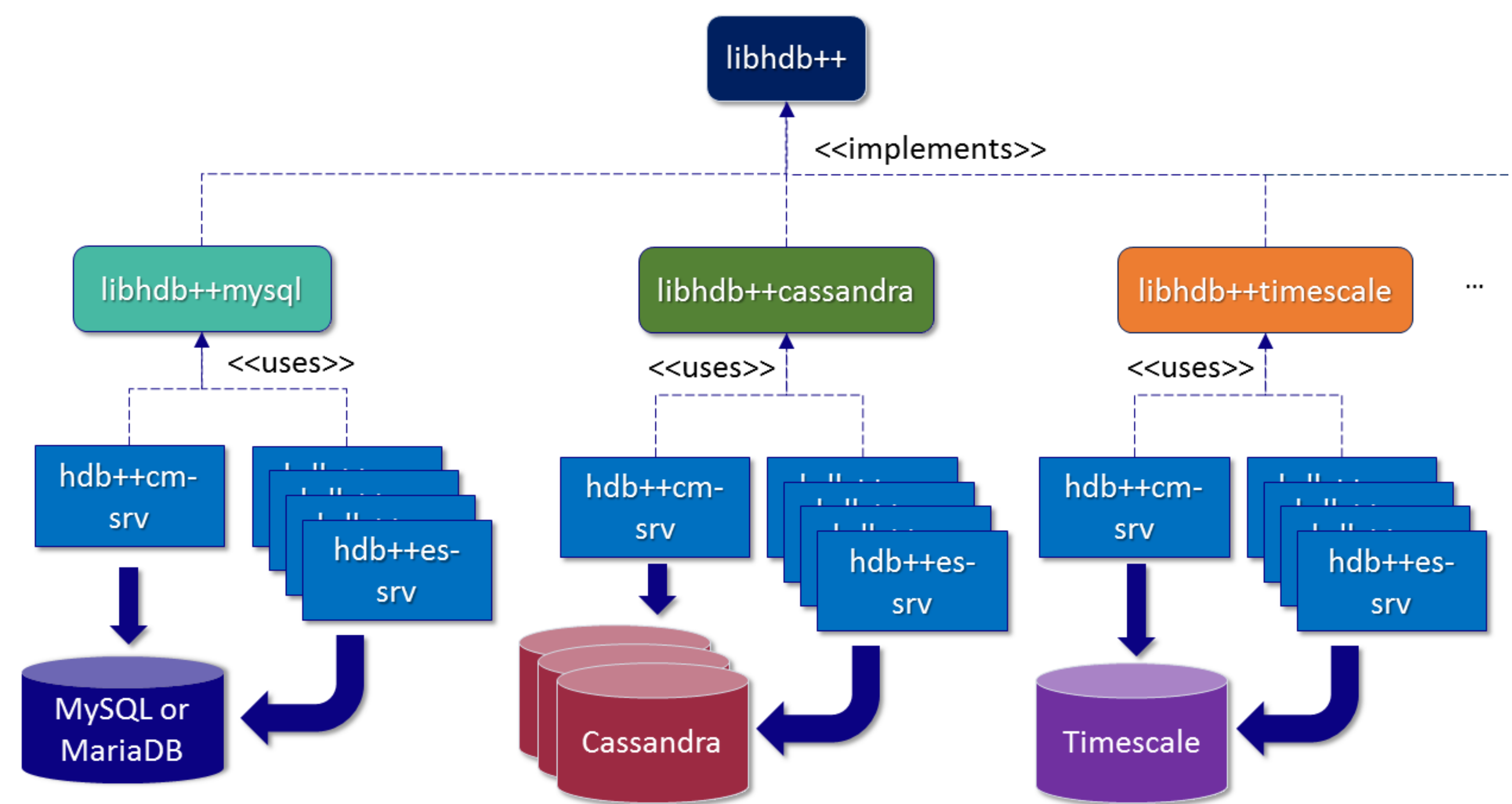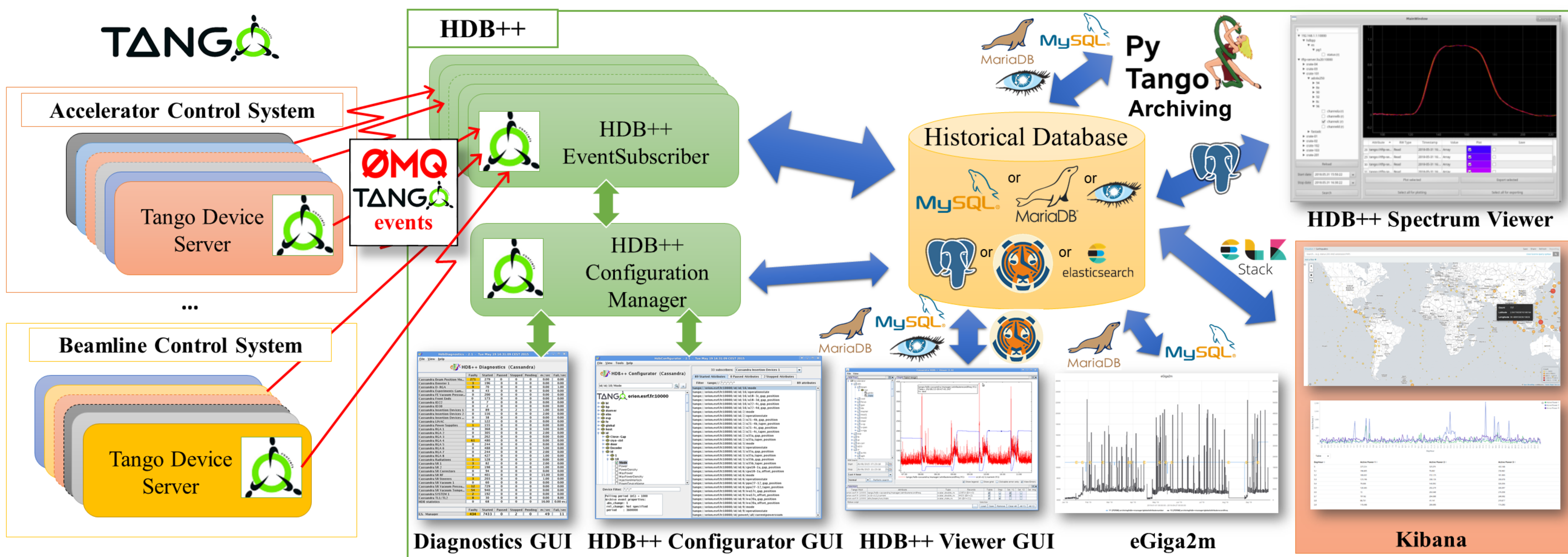

Figure 1: HDB++ Archiving Design

Figure 2: HDB++ Overview

DB Backend	Pros	Cons
MariaDB / MySQL	Good for small DB ProxySQL can be used to redirect queries to master|slave or other MySQL/MariaDB DBs Legacy DB schema compatible with old TANGO HDB tools	Not optimized for arrays Bad performance if DB is too big
Cassandra	High Availability for write datacenter Cassandra HDB++ backend could be used in theory with ScyllaDB	Not good with arrays Big queries could bring down several nodes because of Java Garbage Collector
PostgreSQL	Native support for arrays, so good performance of queries involving arrays Ability to query individual elements of an array	Bad performance if DB is too big
TIMESCALE	Same as PostgreSQL + optimized for time series, scalable, automatic hypertables creation, extended API for time series, automatic continuous aggregation, gap filling	Chunk level data reordering operation MUST be run regularly to guarantee good query performance
elasticsearch	Advantages of ELK stack (Kibana viewers,...) Flexible schema	Requires a lot of memory No security

Table1: Comparison of the different supported HDB++ backends