HDB++ Benchmarks

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HDB++ Benchmarks

Benchmark goals and metrics

Goal	Question	Metrics
Measure insertion throughput	What is the max number of events inserted? Comparison SSD vs HDD? Evolution of pending queue in hdbpp-es?	Nb of rows inserted per second per subscriber, latency
Measure extraction throughput	Behaviour when extracting devDouble scalar data, devDouble arrays? Comparison SSD vs HDD?	Time in seconds to retrieve the data
Measure the disk usage for each supported Tango Data Type	What is the disk usage for a given data set?	Disk usage (before and after insertion)

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hdbppconfig Python

dsconfig Python

DatabaseDS

Tango DB

TimescaleDB

hdb++cm

hdb++es

10x evgen Tango DS

test-insertion Python

MySQL InnoDB

MySQL InnoDB

graphite + grafana

* 2 different configurations: one with TimescaleDB, other with MySQL

* data imported manually to graphite from file

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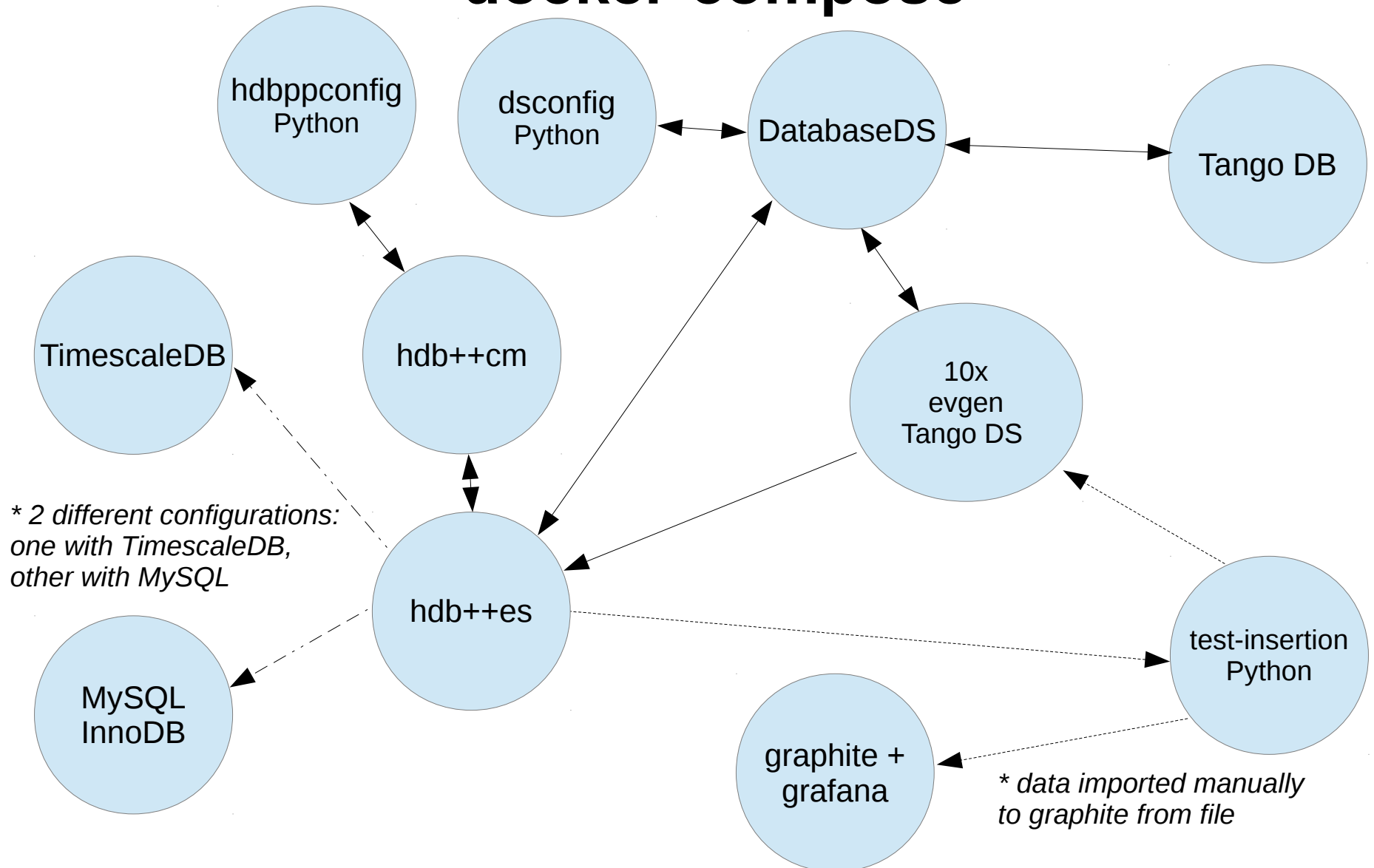
Dockers

- Used existing ska-docker:
  - nexus.engageska-portugal.pt/ska-docker/tango-db
  - nexus.engageska-portugal.pt/ska-docker/tango-cpp → DatabaseDS
  - nexus.engageska-portugal.pt/ska-docker/tango-dsconfig

- Extended existing ska-docker:
  - nexus.engageska-portugal.pt/ska-docker/tango-pytango → test-insertion, hdbppconfig
  - nexus.engageska-portugal.pt/ska-docker/tango-libtango → hdbppcm, hdbppes, evgen

- Other dockers:
  - timescale/timescaledb → hdbpp-timescale
  - mysql/mysql-server → hdbpp-mysql-innodb
 - graphite

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Considerations

- Test results are reproducible

- Easy to extend to more DB (MariaDB, …)

- Easy to test DB parameters, e.g.:
    - TimescaleDB → synchronous_commit=off → 3x throughput
    - InnoDB → innodb_flush_log_at_trx_commit=2 + innodb_doublewrite=0 + … → 5x throughput

Issues

- Issues with synchronization between dockers: wait-for-it.sh is not enough, need to add some sleeps

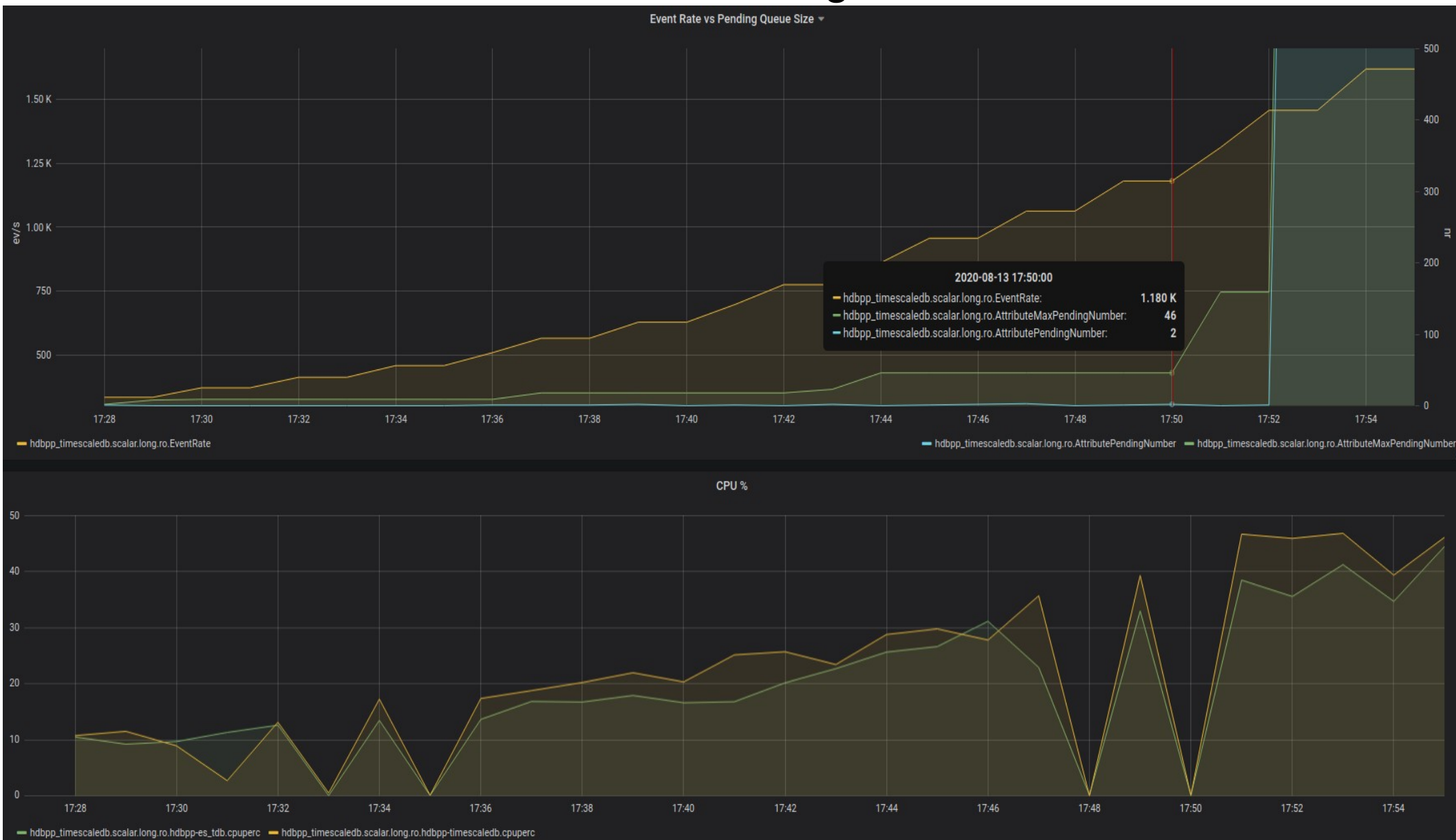- docker installed on Ubuntu from snap has limitations: cannot mount volumes from arbitrary path on host

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InnoDB Figures
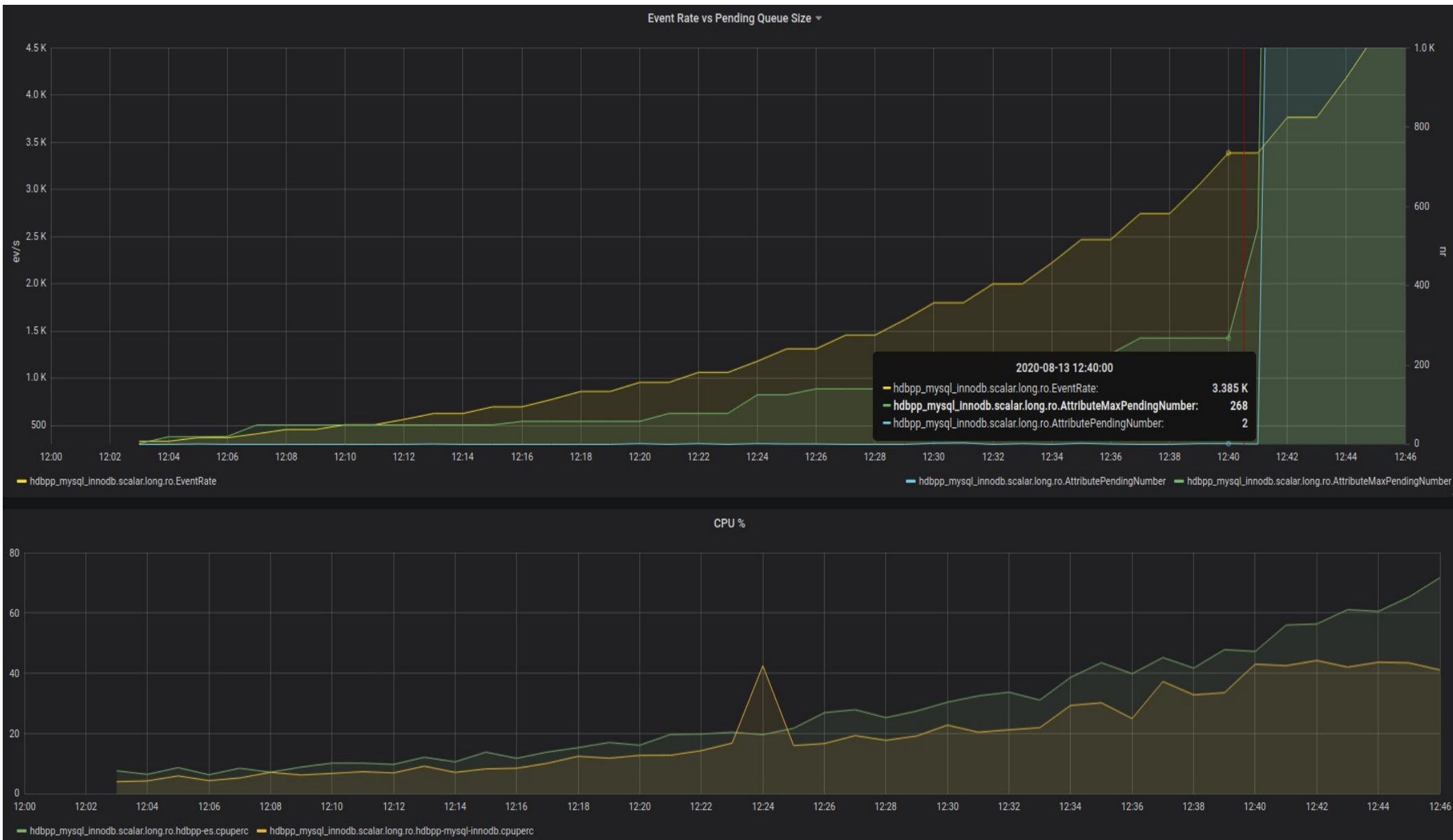
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TimescaleDB Figures

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Numbers

- With InnoDB slightly tuned for insertion and TimescaleDB not (default parameters + synchronous_commit=off), tested with 1 hdbpp-es, 10 evgen pushing scalar, DevLong, ro attributes

- TimescaleDB
  - Max event rate [**1619**,1780] ev/s
  - Number of events archived **1341288**
  - Disk increase of DB partition **425** MB
  - Test Duration **1700** seconds

- InnoDB
  - Max event rate [**3760**,4136] ev/s
  - Number of events archived **3463359**
  - Disk increase of DB partition **164** MB
  - Test Duration **2500** seconds

- To be investigated ...

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What's missing

- Documentation!

- Makefile to build all needed dockers

- Move to https://github.com/tango-controls-hdbpp

- Test with different attribute types (just need to launch with different parameter)

- Test with batch insertion as soon as it is implemented

- Test with MariaDB + MyIsam

- Many more tests ...

Questions / Any suggestion?