

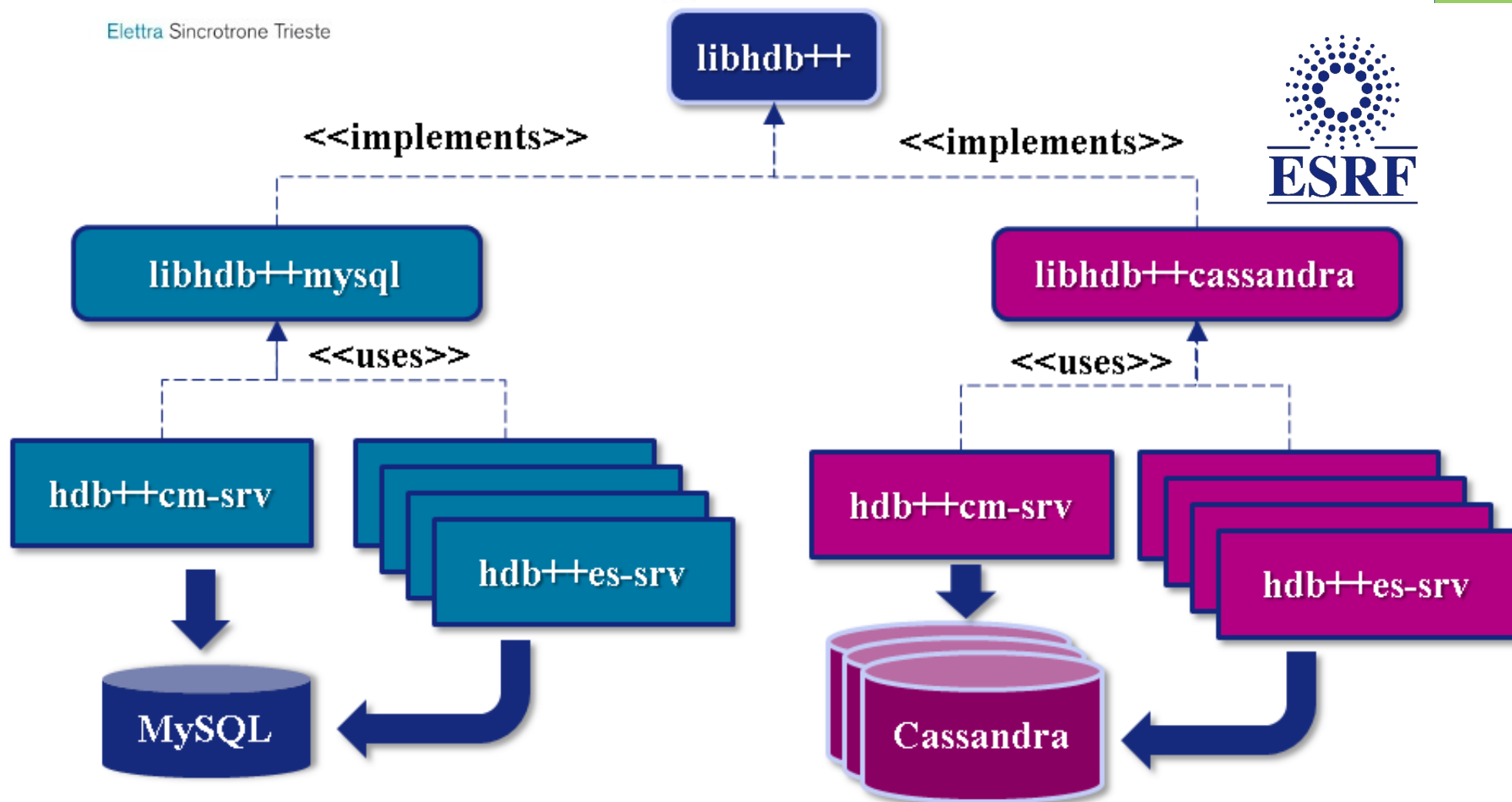


HDB++

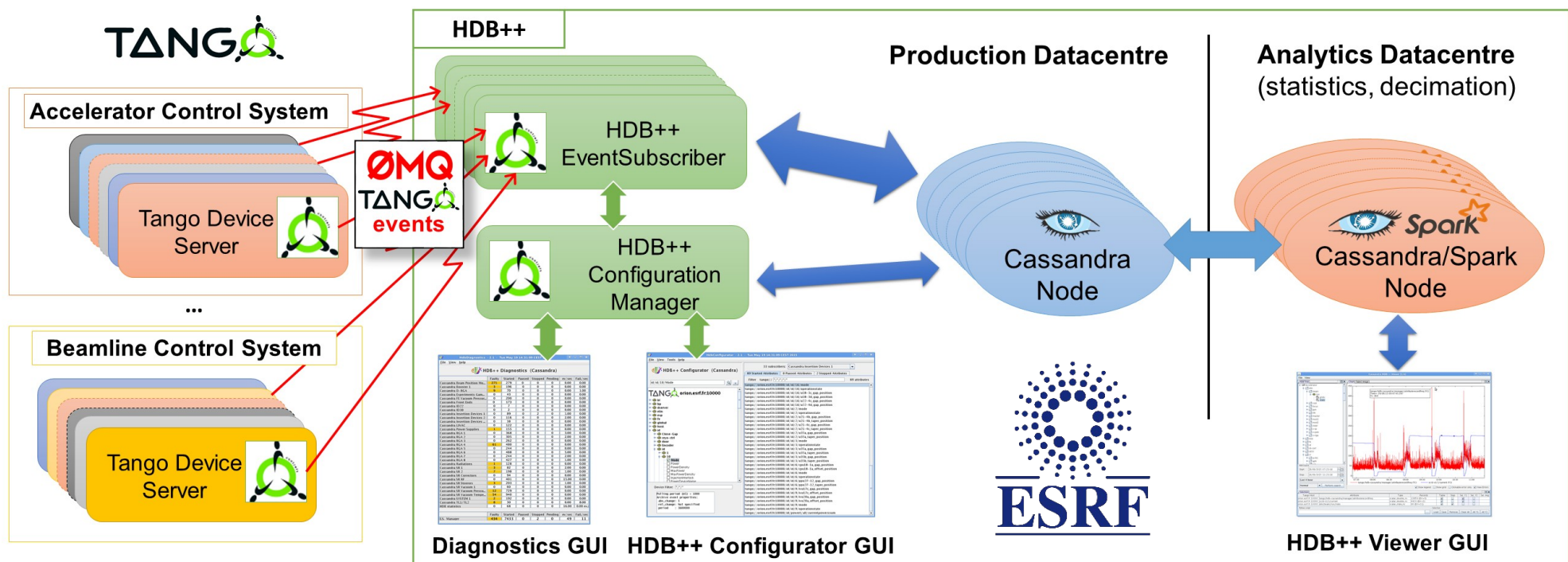
HDB++ Architecture



Elettra Sincrotrone Trieste



HDB++ @ ESRF overview

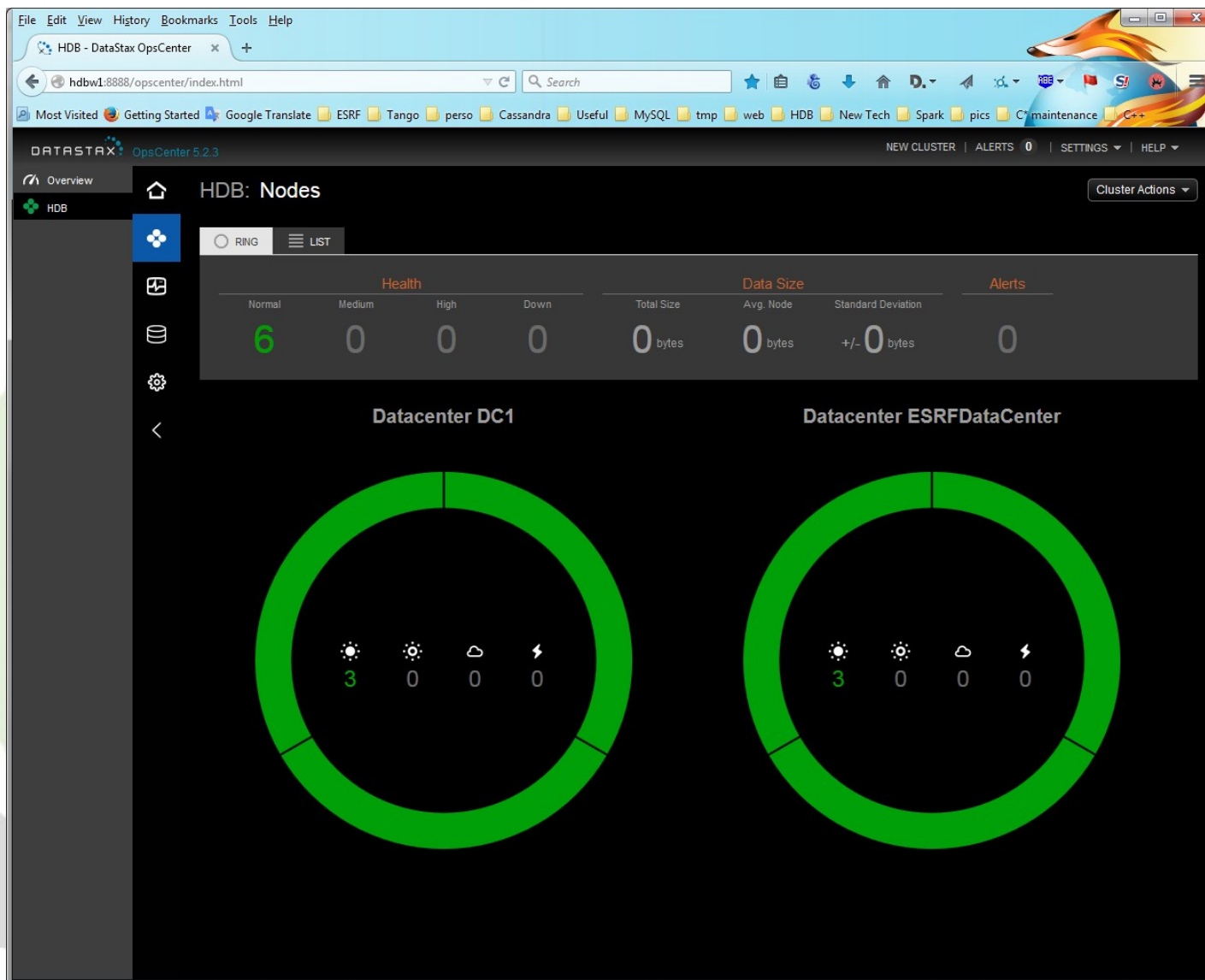


Cassandra main advantages

- Continuous availability with no SPOF
- Linear Scalability
(Need more performances?
more storage? => Add new nodes!)
- Multi Datacenter replication
- Statistics computation on the archived data
thanks to Apache **Spark**

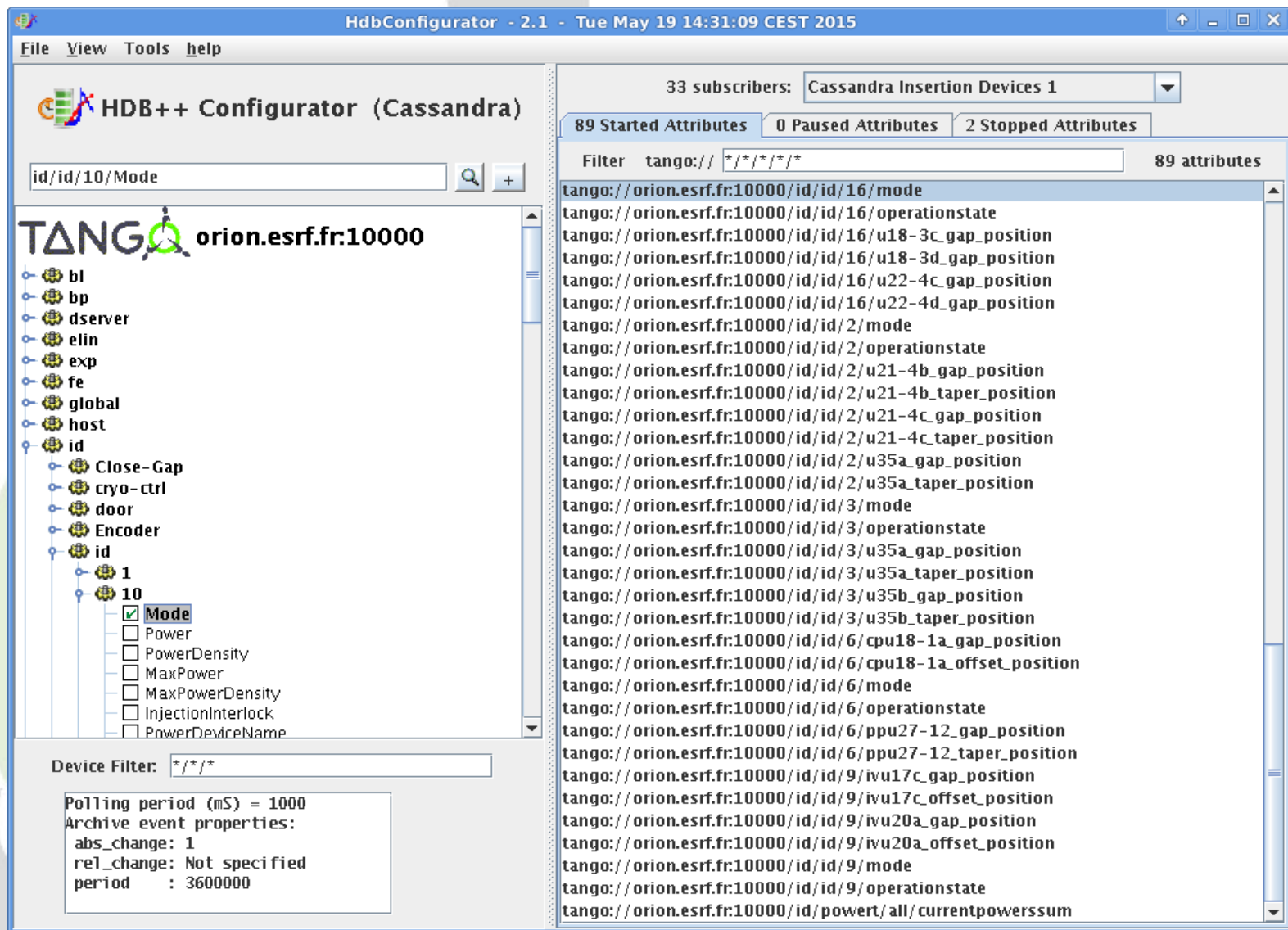
HDB++ @ ESRF overview

6 nodes, 2 datacenters, RF = 3



<http://www.tango.controls.org>

HDB++ Configuration GUI



HDB++ Diagnostics GUI

HdbDiagnostics - 1.3 - Mon Jun 06 08:13:41 CEST 2016

File View help

 HDB++ Diagnostics (Cassandra)

	Faulty	Started	Paused	Stopped	Pending	ev/sec	Fail./sec
Cassandra Beam Position Monitors	0	268	0	0	0	4.00	0.00
Cassandra Booster 1	0	188	0	0	0	5.00	0.00
Cassandra D-RGA	1	63	0	0	0	0.00	0.00
Cassandra Experiments Gamma Monitors	1	43	0	0	0	0.00	1.00
Cassandra FE Vacuum Pressures	0	200	0	0	0	0.00	0.00
Cassandra Front Ends	0	181	0	0	0	0.00	0.00
Cassandra ID22	0	7	0	0	0	0.00	0.00
Cassandra Injext	2	29	0	0	0	2.00	0.00
Cassandra Insertion Devices 1	0	81	0	0	0	0.00	0.00
Cassandra Insertion Devices 2	0	111	0	0	0	0.00	0.00
Cassandra Insertion Devices Corrections	0	29	0	0	0	0.00	0.00
Cassandra LINAC	0	120	0	0	0	0.00	0.00
Cassandra Power Supplies	0	173	0	0	0	1.00	0.00
Cassandra RGA 1	0	368	0	0	0	0.00	0.00
Cassandra RGA 2	0	305	0	0	0	1.00	0.00
Cassandra RGA 3	0	323	0	0	0	2.00	0.00
Cassandra RGA 4	0	489	0	0	0	1.00	0.00
Cassandra RGA 5	0	244	0	0	0	0.00	0.00
Cassandra RGA 6	0	488	0	0	0	1.00	0.00
Cassandra RGA 7	0	244	0	0	0	2.00	0.00
Cassandra RGA 8	0	366	0	0	0	0.00	0.00
Cassandra Radiations	0	193	0	0	0	0.00	0.00
Cassandra SR 1	1	83	0	0	0	8.00	0.00
Cassandra SR 2	0	197	0	0	0	0.00	0.00
Cassandra SR Correctors	0	94	0	0	0	0.00	0.00
Cassandra SR RF	3	430	0	0	0	20.00	1.00
Cassandra SR Steerers	0	201	0	0	0	0.00	0.00
Cassandra SR Vacuum 1	1	61	0	0	0	0.00	0.00
Cassandra SR Vacuum Pressures	0	697	0	0	0	0.00	0.00
Cassandra SR Vacuum Temperatures	0	924	0	0	0	0.00	0.00
Cassandra SY RF	0	102	0	0	0	1.00	0.00
Cassandra SYSTEM 1	1	194	0	0	0	0.00	0.00
Cassandra TL1/TL2	1	40	0	0	0	2.00	0.00
Cassandra Timing Tests	0	0	0	7	0	0.00	0.00
Cassandra fast BPM	0	4	0	0	0	0.00	0.00
HDB statistics	0	68	0	0	0	15.00	0.00
test labs	0	0	0	69	0	0.00	0.00

	Faulty	Started	Paused	Stopped	Pending	ev/sec	Fail./sec
E.S. Manager	10	7608	0	76	0	62	1

HDB++ Diagnostics GUI

All Subscribers

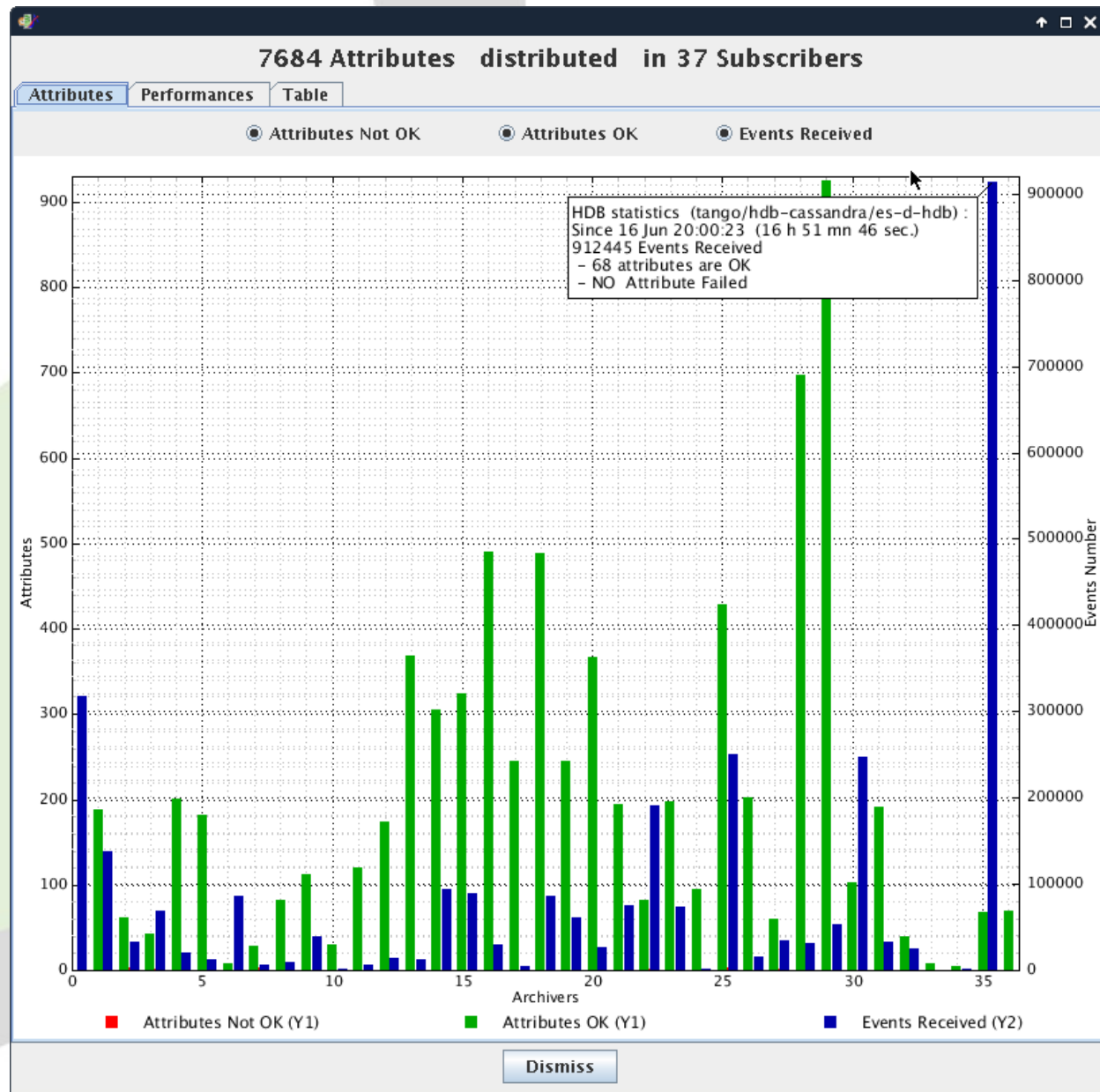
File View

Statistics on 37 subscribers - 7684 Attributes - Reset: 16 Jun 20:00:23

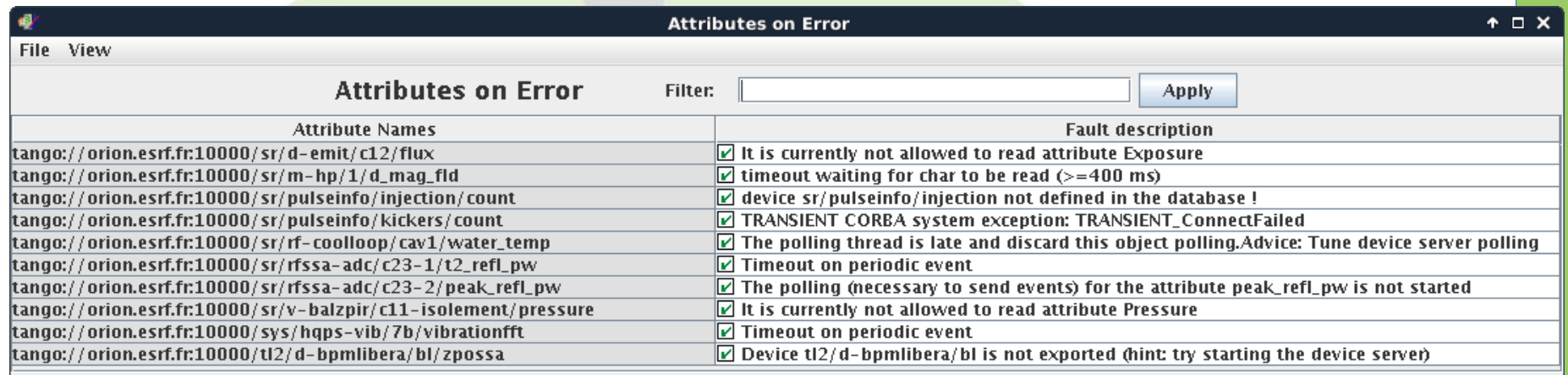
Attribute Names	Ev. since res...	Av.Period.	Ev./1.00 ...	Av.Period.
sy/ms/1/frequency	82188	737.00 ms.	4	250.00 ms.
sr/d-halo/id7/halo	60584	1.00 sec.	1	1.00 sec.
sr/d-halo/id7/beamcore	60584	1.00 sec.	1	1.00 sec.
tango/hdb-cassandra/manager/attributerecordfreq	58092	1.04 sec.	1	1.00 sec.
tango/hdb-cassandra/es-d-hdb/attributerecordfreq	52593	1.15 sec.	0	---
sy/rfssa-adc/tra0-2/ext_input_refl_pw	49484	1.22 sec.	1	1.00 sec.
tango/hdb-cassandra/manager/attributefailurefreq	46057	1.32 sec.	1	1.00 sec.
tango/hdb-cassandra/es-sy-1/attributerecordfreq	44307	1.37 sec.	1	1.00 sec.
tango/hdb-cassandra/es-rga-6/attributerecordfreq	44091	1.37 sec.	1	1.00 sec.
tango/hdb-cassandra/es-rga-2/attributerecordfreq	42601	1.42 sec.	1	1.00 sec.
tango/hdb-cassandra/es-rga-7/attributerecordfreq	38940	1.56 sec.	0	---
tango/hdb-cassandra/es-rga-3/attributerecordfreq	37812	1.60 sec.	0	---
tango/hdb-cassandra/es-sr-1/attributerecordfreq	35971	1.68 sec.	1	1.00 sec.
tango/hdb-cassandra/es-d-bpm/attributerecordfreq	35195	1.72 sec.	1	1.00 sec.
tango/hdb-cassandra/es-sr-2/attributerecordfreq	34588	1.75 sec.	0	---
tango/hdb-cassandra/es-exp/attributefailurefreq	32186	1.88 sec.	0	---
tango/hdb-cassandra/es-rga-4/attributerecordfreq	29736	2.04 sec.	1	1.00 sec.
tango/hdb-cassandra/es-rga-8/attributerecordfreq	27713	2.19 sec.	0	---
sy/rfssa-adc/tra0-4/ext_input_refl_pw	26288	2.30 sec.	0	---
exp/unidos/bm32/dose	25346	2.39 sec.	0	---
tango/hdb-cassandra/es-sr-rf/attributerecordfreq	24560	2.47 sec.	1	1.00 sec.
tango/hdb-cassandra/es-sr-vac/attributerecordfreq	24420	2.48 sec.	0	---
tango/hdb-cassandra/es-sys-1/attributerecordfreq	23020	2.63 sec.	0	---
tango/hdb-cassandra/es-fe-vac/attributerecordfreq	21427	2.83 sec.	0	---
tango/hdb-cassandra/es-tl2/attributerecordfreq	19318	3.14 sec.	1	1.00 sec.
tango/hdb-cassandra/es-rga-1/attributerecordfreq	18640	3.25 sec.	0	---
tango/hdb-cassandra/es-d-rga/attributerecordfreq	18093	3.35 sec.	0	---
tango/hdb-cassandra/es-sr-steer/attributerecordfreq	16001	3.79 sec.	0	---
tango/hdb-cassandra/es-exp/attributerecordfreq	14968	4.05 sec.	1	1.00 sec.
tango/hdb-cassandra/es-radiations/attributerecordfreq	14832	4.08 sec.	0	---
tango/hdb-cassandra/es-d-rga/attributefailurefreq	14099	4.30 sec.	1	1.00 sec.
tango/hdb-cassandra/es-ps/attributerecordfreq	13070	4.64 sec.	0	---
tango/hdb-cassandra/es-sr-vac-th/attributerecordfreq	13024	4.65 sec.	0	---
tango/hdb-cassandra/es-id22/attributerecordfreq	12134	4.99 sec.	1	1.00 sec.
tango/hdb-cassandra/es-id22/attributefailurefreq	12131	4.99 sec.	1	1.00 sec.
id22/wcid22a/tg/s12t	12100	5.01 sec.	0	---
id22/wcid22a/tg/s13t	12100	5.01 sec.	0	---
id22/wcid22a/tg/s14t	12100	5.01 sec.	0	---

Filter: Apply

HDB++ Diagnostics GUI

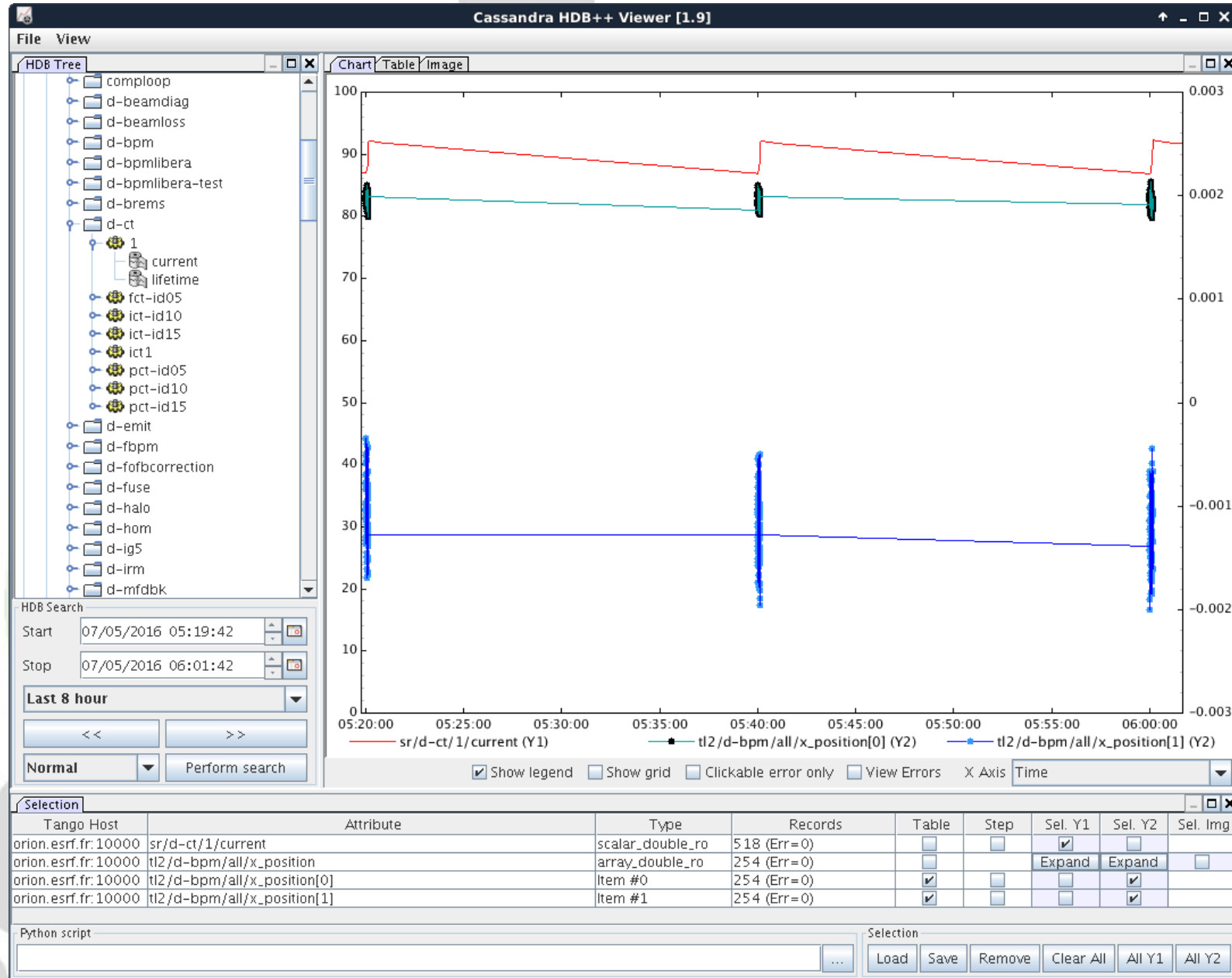


HDB++ Diagnostics GUI

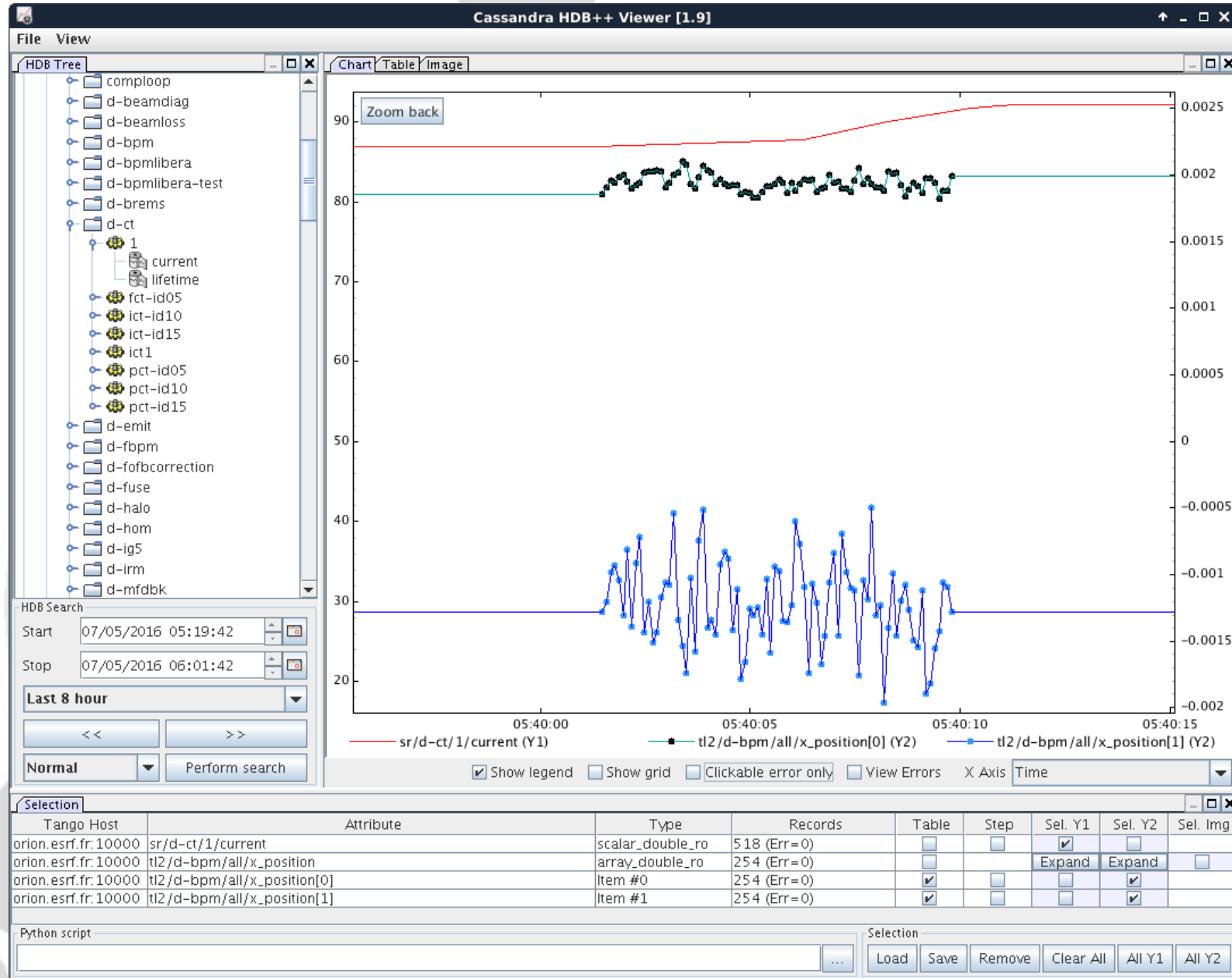


Attribute Names	Fault description
tango://orion.esrf.fr:10000/sr/d-emit/c12/flux	☒ It is currently not allowed to read attribute Exposure
tango://orion.esrf.fr:10000/sr/m-hp/1/d_mag fld	☒ timeout waiting for char to be read (>=400 ms)
tango://orion.esrf.fr:10000/sr/pulseinfo/injection/count	☒ device sr/pulseinfo/injection not defined in the database !
tango://orion.esrf.fr:10000/sr/pulseinfo/kickers/count	☒ TRANSIENT CORBA system exception: TRANSIENT_ConnectFailed
tango://orion.esrf.fr:10000/sr/coolloop/cav1/water_temp	☒ The polling thread is late and discard this object polling.Advice: Tune device server polling
tango://orion.esrf.fr:10000/sr/rfssa-adc/c23-1/t2_refl_pw	☒ Timeout on periodic event
tango://orion.esrf.fr:10000/sr/rfssa-adc/c23-2/peak_refl_pw	☒ The polling (necessary to send events) for the attribute peak_refl_pw is not started
tango://orion.esrf.fr:10000/sr/v-balzpir/c11-isolement/pressure	☒ It is currently not allowed to read attribute Pressure
tango://orion.esrf.fr:10000/sys/hqps-vib/7b/vibrationfft	☒ Timeout on periodic event
tango://orion.esrf.fr:10000/tl2/d-bpmlibera/bl/zpossa	☒ Device tl2/d-bpmlibera/bl is not exported (hint: try starting the device server)

HDB++ Viewer



HDB++ Viewer



HDB++ Viewer

Cassandra HDB++ Viewer [1.9]

File View

HDB Tree

- complloop
- d-beamdiag
- d-beamloss
- d-bpm
- d-bpmlibera
- d-bpmlibera-test
- d-brems
- d-ct
 - 1
 - current
 - lifetime
 - fct-id05
 - ict-id10
 - ict-id15
 - ict1
 - pct-id05
 - pct-id10
 - pct-id15
- d-emit
- d-fbpm
- d-forbcorrection
- d-fuse
- d-halo
- d-hom
- d-ig5
- d-irm
- d-mfdbk

HDB Search

Start: 07/05/2016 05:19:42

Stop: 07/05/2016 06:01:42

Last 8 hour

<< >>

Normal Perform search

Time	tl2/d-bpm/all/x_position[0] (m)	tl2/d-bpm/all/x_position[1] (m)
07/05/2016 05:40:02.592323	0.0020215929888663243	-0.0012044014606181284
07/05/2016 05:40:02.694066	0.002019144425546039	-0.001515623476831743
07/05/2016 05:40:02.796041	0.002029166609428976	-0.0014405558493698163
07/05/2016 05:40:02.894897	0.00201928041036427	-0.0011712953954977944
07/05/2016 05:40:02.994076	0.0019044356249796998	-0.0010591793352234646
07/05/2016 05:40:03.094869	0.0019407611392216295	-0.0010808483285547567
07/05/2016 05:40:03.195791	0.001998517190541438	-5.472233418624766E-4
07/05/2016 05:40:03.295175	0.002013140147087497	-0.0013405249771821673
07/05/2016 05:40:03.395884	0.0020950727008572164	-0.001542993816519102
07/05/2016 05:40:03.493561	0.0020712613112178592	-0.001746793445907243
07/05/2016 05:40:03.595448	0.0019253586010653484	-0.0010302390951191056
07/05/2016 05:40:03.697072	0.0018975795051067344	-0.0015823498698310254
07/05/2016 05:40:03.792504	0.001979491710622127	-7.510425941250528E-4
07/05/2016 05:40:03.893417	0.0020656750112807844	-5.17650106542138E-4
07/05/2016 05:40:03.994251	0.002032518145298025	-0.001403524607509104
07/05/2016 05:40:04.095066	0.0020157864205137734	-0.001347832655935675
07/05/2016 05:40:04.195752	0.0019259856534266549	-0.0014542586524915763
07/05/2016 05:40:04.296596	0.0019605306953770596	-9.261560045076557E-4
07/05/2016 05:40:04.397408	0.001927440471757335	-8.310025882142032E-4
07/05/2016 05:40:04.496951	0.001911322048523792	-8.804441394171058E-4
07/05/2016 05:40:04.598696	0.0019169551214516022	-0.0014206620826633031
07/05/2016 05:40:04.698166	0.0019162140928412855	-0.0011152842080501297
07/05/2016 05:40:04.797707	0.0018479934556681155	-0.0017876609715059427
07/05/2016 05:40:04.898572	0.0018699362857520236	-0.0016630290659137754
07/05/2016 05:40:04.996468	0.0018623445130034084	-0.0012593668011290987
07/05/2016 05:40:05.097155	0.0018244175302208605	-0.0013098419665692202
07/05/2016 05:40:05.198173	0.0018301498217808871	-0.0012530818543236182
07/05/2016 05:40:05.299271	0.001870845506280265	-0.001456341698543169
07/05/2016 05:40:05.398203	0.0019098819380826755	-0.0010411593274327175
07/05/2016 05:40:05.500155	0.0019153059123941025	-0.0015888760092655056
07/05/2016 05:40:05.599294	0.0019298699489816138	-9.471079399834766E-4
07/05/2016 05:40:05.700210	0.001961192335914401	-9.817544215691676E-4
07/05/2016 05:40:05.794920	0.0019330607448175712	-0.0013488959227871571
07/05/2016 05:40:05.895965	0.0018588957525655714	-0.0013649574470964046
07/05/2016 05:40:05.996929	0.0019378023307841383	-0.0012296235296829939
07/05/2016 05:40:06.097907	0.0018813113966265878	-6.027751624435178E-4

Display microseconds Display errors Save file Copy Selection

Selection

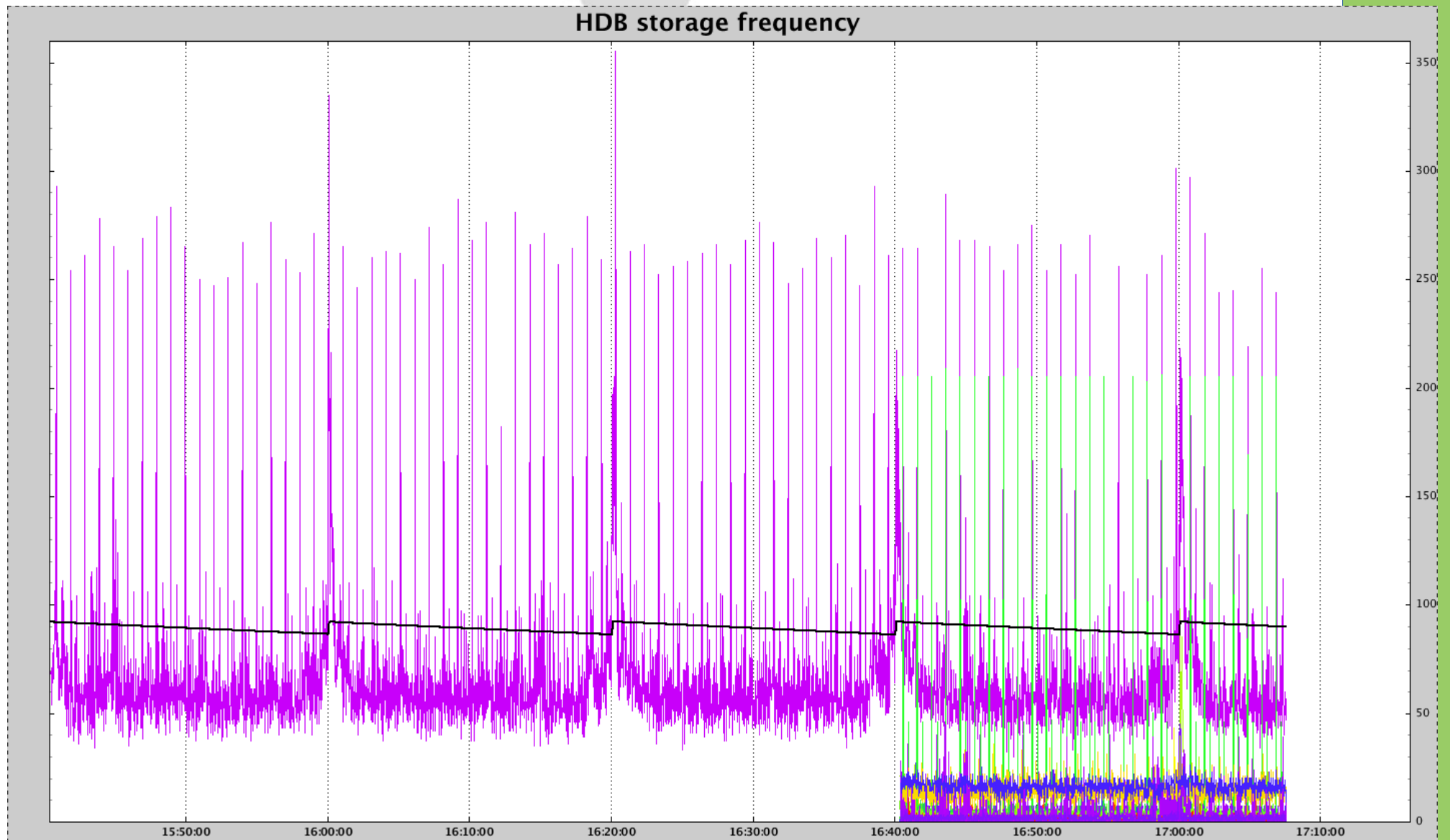
Tango Host	Attribute	Type	Records	Table	Step	Sel. Y1	Sel. Y2	Sel. Img
orion.esrf.fr:10000	sr/d-ct/1/current	scalar_double_ro	518 (Err=0)			☒	☐	
orion.esrf.fr:10000	tl2/d-bpm/all/x_position	array_double_ro	254 (Err=0)			☒	☒	☐
orion.esrf.fr:10000	tl2/d-bpm/all/x_position[0]	Item #0	254 (Err=0)	☒	☐	☒	☒	
orion.esrf.fr:10000	tl2/d-bpm/all/x_position[1]	Item #1	254 (Err=0)	☒	☐	☐	☒	

Python script

Selection

Load Save Remove Clear All All Y1 All Y2

HDB++ Viewer



HDB++ Java extraction API

```
Hdb hdb = new Hdb();

try {

    // Connect to HDB ++ using system variables
    hdb.connect();

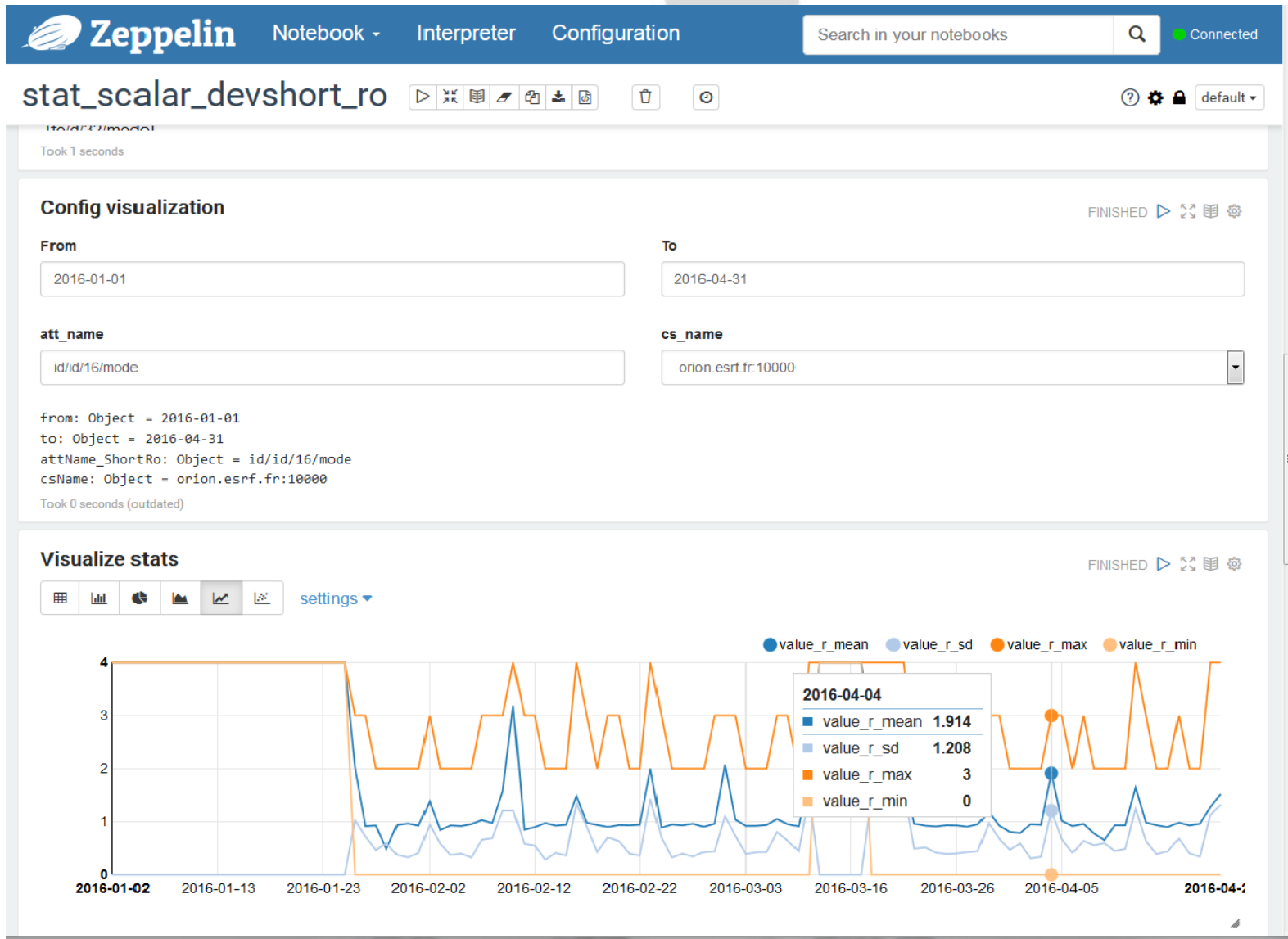
    // Get list of archived attributes
    String[] attList = hdb.getReader().getAttributeList();

    // Fetch data
    HdbDataSet data = hdb.getReader().getData(attList[0], "09/07/2015
12:00:00", "10/07/2015 12:00:00");

    // Display data
    for(int i=0;i<data.size();i++) {
        HdbData d = data.get(i);
        long ms = d.getDataTime()/1000;
        System.out.println("  Rec #" + i + " : " + Hdb.hdbDateFormat.format(ms) + "
" + d.getValueAsDouble());
    }

} catch (HdbFailed e) {
    System.out.println(e.getMessage());
}
```

Analytics & Decimation



Samuel
working on
this subject
until
September

www.tango-controls.org

HDB++ @ ESRF

- MySQL with HDB++ schema no longer in operation but could be used for tests
- The old ESRF HDB is still the official one due to some servers needing HDB++ auto-configuration
=> HdbConfiguratorServer (java DS) was created
- Some attributes are stored only in HDB++
- HDB++ Cassandra in “operation” since October 2014
- Cassandra disk usage: ~325 GB per node
- Cluster running with new machines since January 2016:
 - 1 with 8 CPU cores - 64 GB RAM – rotational drives (~3.3 TB)
 - 2 with 16 CPU cores - 64 GB RAM – rotational drives (~1.8 TB)
 - 3 with 32 CPU cores - 128 GB RAM – SSD drives (~3 TB)
- Cluster running Cassandra 2.2.4.

HDB++ on FERMI

1 virtual host for HDB++
Ubuntu 10.04.4 LTS x86_64
MySQL backend, HDB++ schema

TANGO 9.2.2
36 archiver instances (EventSubscriber)
1 ConfigurationManager
7582 attributes archiving
~7600 events/min mean archiving frequency

HDB++ on Elettra

1 host for HDB++ and HDB
Ubuntu 10.04.4 LTS x86_64
MySQL backend, legacy HDB schema

TANGO 8.1.2.c
8 archiver instances (EventSubscriber)
1 ConfigurationManager
1269 attributes archiving
~800 events/min mean archiving frequency

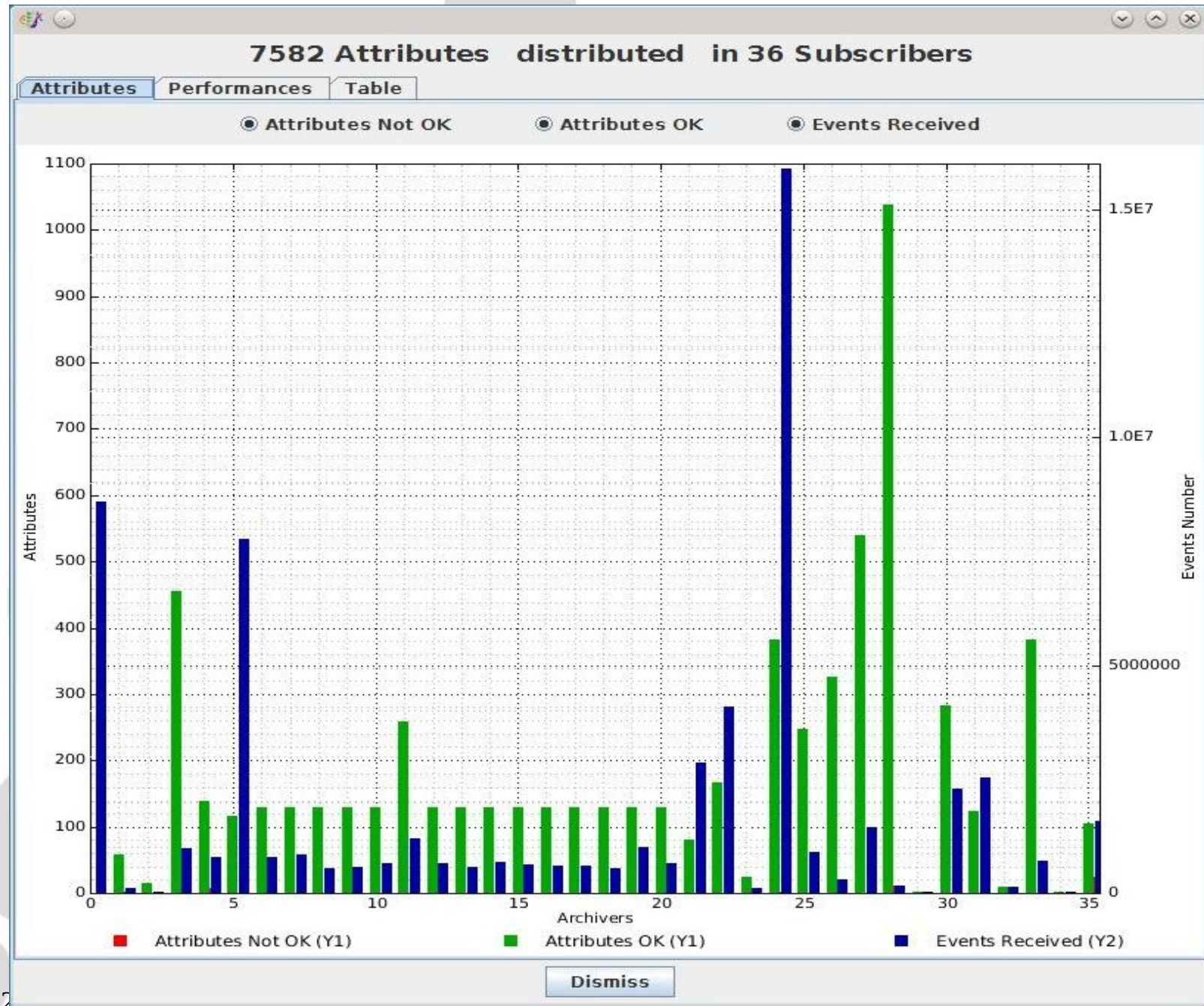
HDB++ on FERMI

The screenshot shows the Jive 4.31 [srv-tango-srf:20001] interface. The left pane displays a list of servers under the 'Server' tab. The right pane is empty. Red arrows point to specific entries in the list with the following text:

- One ConfigurationManager (points to `hdb++cm2-srv`)
- HDB++ statistics archiver, events pushed (points to `hdb++`)
- Llrf-kgXX – 129 **archived** attributes each (250 total), 182 events **pushed**, up to 50Hz
Upper bound 6450 ev/s – real use case @ 50HZ ~100 ev/s (points to `llrf-kg01`)
- Many server events based on polling (points to `pdu`)

The server list includes: `gigecam-srv`, `gpib_st-srv`, `hdb++cm2-srv`, `0`, `hdb++es2-srv`, `blm`, `climate`, `eos`, `hdb++`, `id`, `lhl`, `llrf-kg01`, `llrf-kg02`, `llrf-kg03`, `llrf-kg04`, `llrf-kg05`, `llrf-kg06`, `llrf-kg07`, `llrf-kg08`, `llrf-kg09`, `llrf-kg10`, `llrf-kg11`, `llrf-kg12`, `llrf-kg13`, `llrf-kg14`, `llrf-kg15`, `llrf-kgsp`, `mod`, `pdu`, `pil`, `procs`, `ps`, `radfet`, `sl`, `stat`, `tertiary`, `timing`, `vacuum-nip`, `vacuum-sip`, `vacuum-valves`, `vacuum-vg`.

HDB++ distribution



7582 Attributes distributed in 36 Subscribers						
Attributes Performances Table						
Subscriber	Attributes	Nb Events	Max Store	Max Pen...	Reset Time	Duration
tango://srv-tango-srf.fcs....	995	8584393	4.83 sec.	995	08 Jun 19:18:25	7 days 16 h 32 mn 27 sec.
tango://srv-tango-srf.fcs....	58	91051	1.21 sec.	58	08 Jun 19:21:12	7 days 16 h 29 mn 40 sec.
tango://srv-tango-srf.fcs....	14	17139	2.18 sec.	14	08 Jun 19:21:20	7 days 16 h 29 mn 32 sec.
tango://srv-tango-srf.fcs....	455	957520	5.20 sec.	455	08 Jun 19:57:42	7 days 15 h 53 mn 10 sec.
tango://srv-tango-srf.fcs....	144	786167	4.40 sec.	144	08 Jun 19:25:50	7 days 16 h 25 mn 02 sec.
tango://srv-tango-srf.fcs....	115	7779145	5.30 sec.	150	08 Jun 19:27:26	7 days 16 h 23 mn 26 sec.
tango://srv-tango-srf.fcs....	129	790091	12.68 sec.	129	08 Jun 19:27:36	7 days 16 h 23 mn 16 sec.
tango://srv-tango-srf.fcs....	129	841516	3.94 sec.	129	08 Jun 19:27:47	7 days 16 h 23 mn 05 sec.
tango://srv-tango-srf.fcs....	129	542084	4.98 sec.	129	08 Jun 19:27:57	7 days 16 h 22 mn 55 sec.
tango://srv-tango-srf.fcs....	129	560001	6.57 sec.	129	08 Jun 19:28:08	7 days 16 h 22 mn 44 sec.
tango://srv-tango-srf.fcs....	129	640751	4.82 sec.	129	08 Jun 19:28:18	7 days 16 h 22 mn 34 sec.
tango://srv-tango-srf.fcs....	258	1202865	4.04 sec.	258	08 Jun 19:28:38	7 days 16 h 22 mn 14 sec.
tango://srv-tango-srf.fcs....	129	644561	4.77 sec.	129	08 Jun 19:28:48	7 days 16 h 22 mn 04 sec.
tango://srv-tango-srf.fcs....	129	566933	4.82 sec.	129	08 Jun 19:28:59	7 days 16 h 21 mn 53 sec.
tango://srv-tango-srf.fcs....	129	681722	10.04 sec.	129	08 Jun 19:29:09	7 days 16 h 21 mn 43 sec.
tango://srv-tango-srf.fcs....	129	625934	4.96 sec.	129	08 Jun 19:29:20	7 days 16 h 21 mn 32 sec.
tango://srv-tango-srf.fcs....	129	592567	4.36 sec.	129	08 Jun 19:29:31	7 days 16 h 21 mn 21 sec.
tango://srv-tango-srf.fcs....	129	600339	4.38 sec.	129	08 Jun 19:29:41	7 days 16 h 21 mn 11 sec.
tango://srv-tango-srf.fcs....	129	545756	3.89 sec.	129	08 Jun 19:29:52	7 days 16 h 21 mn 00 sec.
tango://srv-tango-srf.fcs....	129	985070	11.31 sec.	129	08 Jun 19:30:02	7 days 16 h 20 mn 50 sec.
tango://srv-tango-srf.fcs....	129	634609	10.27 sec.	129	08 Jun 19:30:13	7 days 16 h 20 mn 39 sec.
tango://srv-tango-srf.fcs....	80	2838126	5.17 sec.	80	08 Jun 19:30:20	7 days 16 h 20 mn 32 sec.
tango://srv-tango-srf.fcs....	166	4087398	4.40 sec.	166	08 Jun 19:30:34	7 days 16 h 20 mn 18 sec.
tango://srv-tango-srf.fcs....	24	103119	3.93 sec.	24	08 Jun 19:30:38	7 days 16 h 20 mn 14 sec.
tango://srv-tango-srf.fcs....	383	15923830	9.04 sec.	383	08 Jun 19:31:09	7 days 16 h 19 mn 43 sec.
tango://srv-tango-srf.fcs....	246	901390	5.41 sec.	246	08 Jun 19:31:28	7 days 16 h 19 mn 24 sec.
tango://srv-tango-srf.fcs....	328	294534	196.54 ms.	328	08 Jun 19:31:55	7 days 16 h 18 mn 57 sec.
tango://srv-tango-srf.fcs....	539	1431816	4.36 sec.	535	08 Jun 19:22:08	7 days 16 h 28 mn 44 sec.
tango://srv-tango-srf.fcs....	1048	239622	79.35 ms.	1048	16 Jun 10:36:24	1 h 14 mn 28 sec.
tango://srv-tango-srf.fcs....	1	1	633.96 us	1	08 Jun 19:32:02	7 days 16 h 18 mn 50 sec.
tango://srv-tango-srf.fcs....	282	2283112	4.90 sec.	282	08 Jun 19:32:25	7 days 16 h 18 mn 27 sec.
tango://srv-tango-srf.fcs....	122	2530483	5.31 sec.	122	08 Jun 19:32:36	7 days 16 h 18 mn 16 sec.
tango://srv-tango-srf.fcs....	8	110056	3.57 sec.	8	08 Jun 19:32:38	7 days 16 h 18 mn 14 sec.
tango://srv-tango-srf.fcs....	381	700100	4.80 sec.	381	08 Jun 19:33:10	7 days 16 h 17 mn 42 sec.
tango://srv-tango-srf.fcs....	1	186	1240.97 us	1	08 Jun 19:33:12	7 days 16 h 17 mn 40 sec.
tango://srv-tango-srf.fcs....	128	1584411	5.12 sec.	128	08 Jun 19:33:25	7 days 16 h 17 mn 27 sec.

Dismiss



HDB++ diagnostics

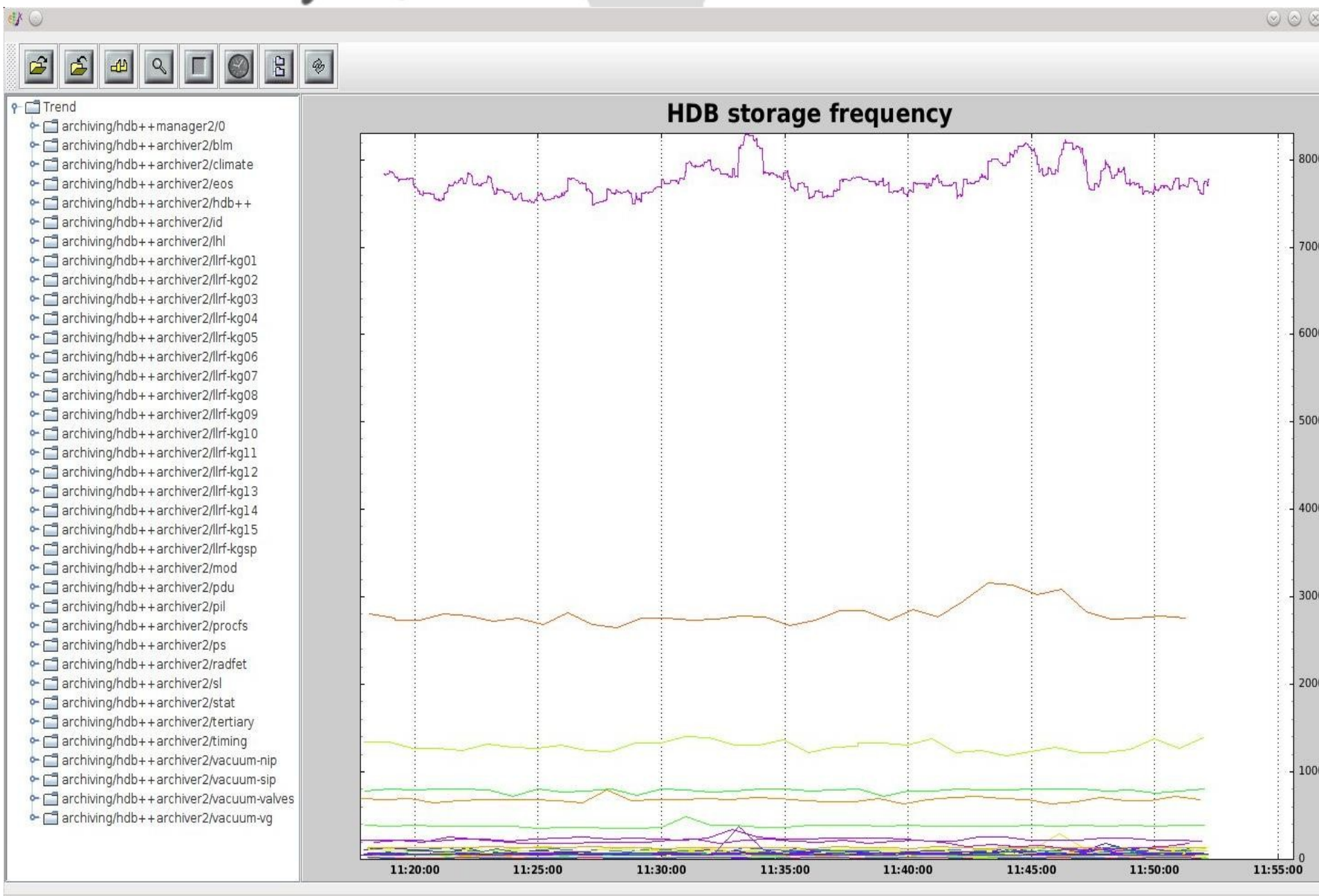
HdbDiagnostics - 1.0 - Thu May 12 16:12:18 CEST 2016

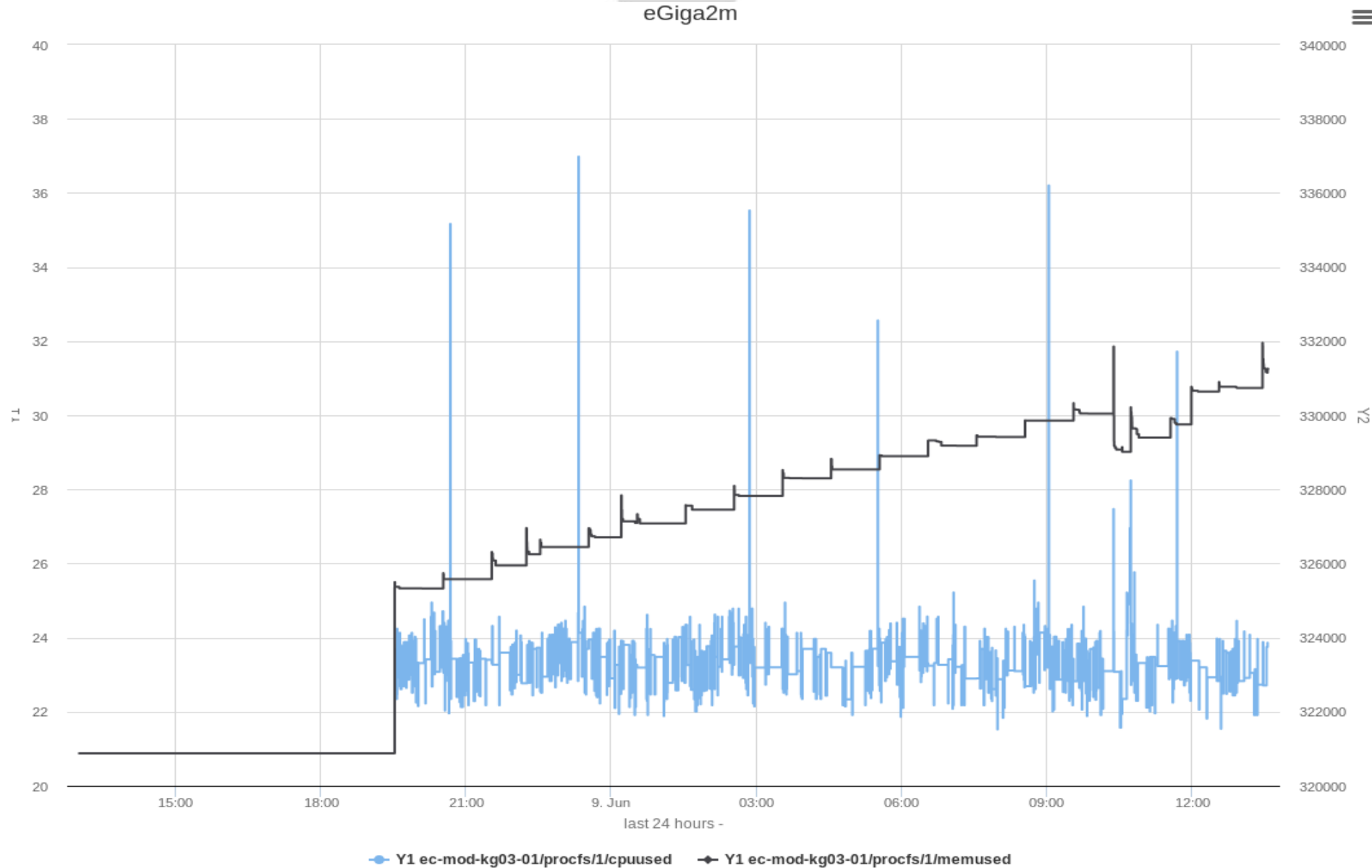


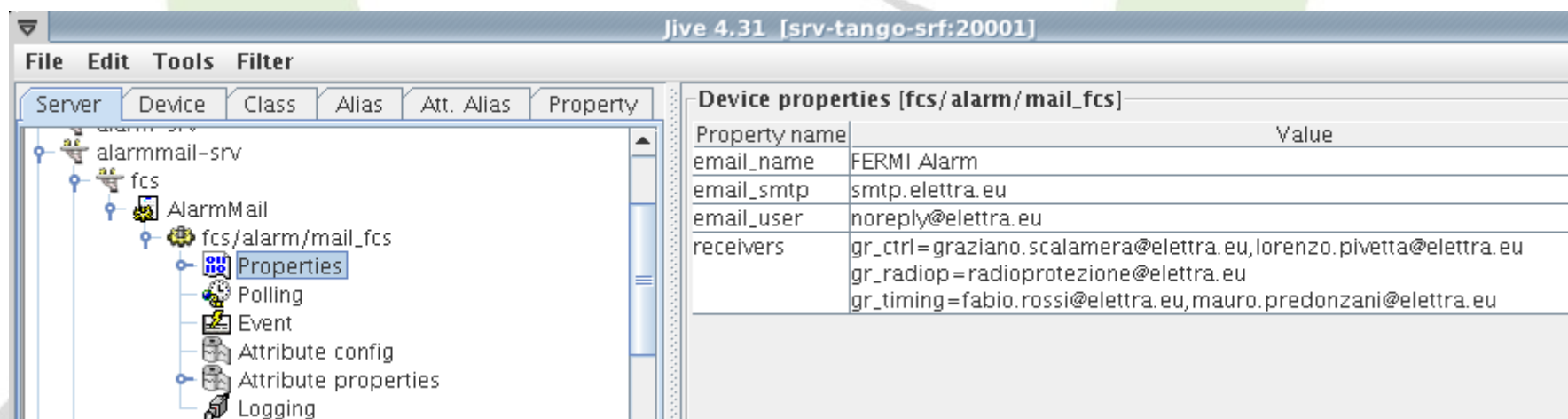
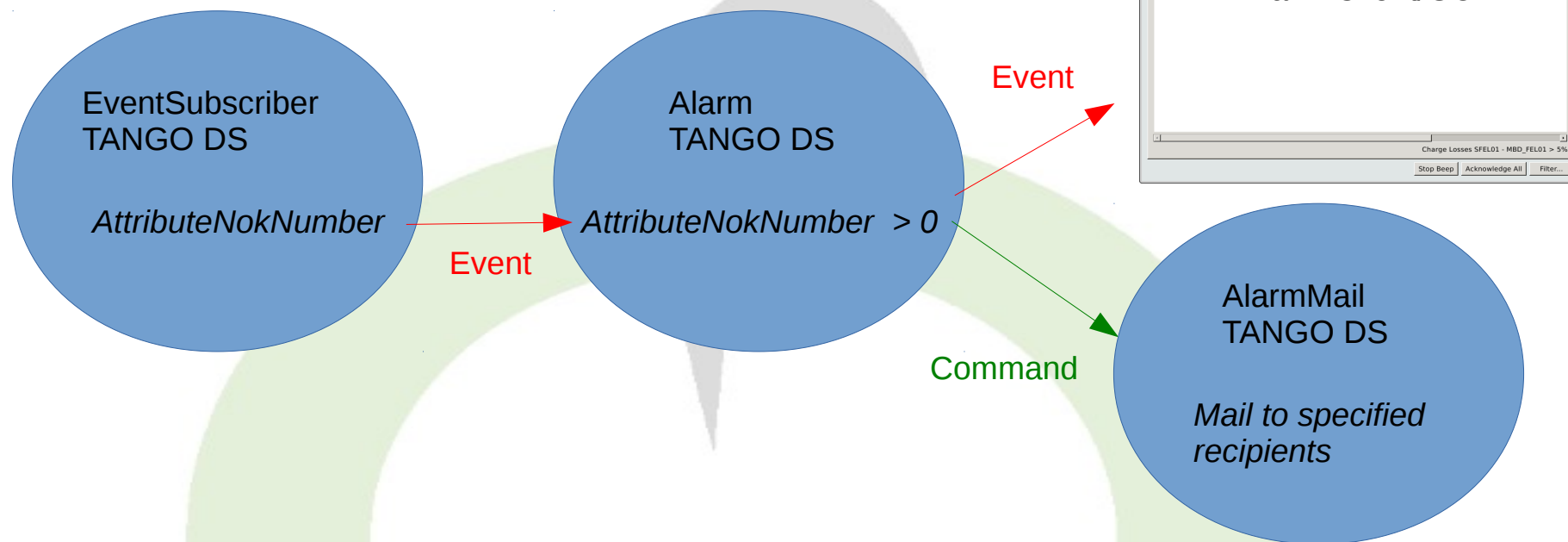
HDB++ Diagnostics

	Faulty	Started	Paused	Stopp...	Pendi...	ev/1 m...	Fail./1 ...
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/blm	0	995	0	0	0	743.00	0.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/climate	1	58	0	0	0	8.00	0.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/eos	0	14	0	0	0	1.00	0.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/hdb++	0	455	0	0	0	82.00	0.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/id	6	144	0	0	0	0.00	0.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/lhl	0	115	0	0	0	662.00	0.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/llrf-kq01	0	129	0	0	0	56.00	0.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/llrf-kq02	0	129	0	0	0	68.00	0.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/llrf-kq03	0	129	0	0	0	46.00	0.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/llrf-kq04	0	129	0	0	0	46.00	0.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/llrf-kq05	0	129	0	0	0	54.00	0.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/llrf-kq06	0	258	0	0	0	109.00	0.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/llrf-kq07	0	129	0	0	0	47.00	0.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/llrf-kq08	0	129	0	0	0	53.00	0.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/llrf-kq09	0	129	0	0	0	57.00	0.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/llrf-kq10	0	129	0	0	0	53.00	0.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/llrf-kq11	0	129	0	0	0	44.00	0.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/llrf-kq12	0	129	0	0	0	94.00	0.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/llrf-kq13	0	129	0	0	0	46.00	0.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/llrf-kq14	0	129	0	0	0	66.00	0.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/llrf-kq15	0	129	0	0	0	48.00	0.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/llrf-kqsp	0	80	0	0	0	16.00	0.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/mod	0	166	0	0	0	379.00	0.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/pdu	0	24	0	0	0	12.00	0.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/pil	1	383	0	0	0	1303.00	1.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/procfs	0	246	0	0	0	103.00	0.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/ps	2	328	0	0	0	10.00	1.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/radfet	0	456	0	83	0	135.00	0.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/sl	11	962	0	86	0	2755.00	43.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/stat	0	1	0	0	0	0.00	0.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/tertiary	0	282	0	0	0	161.00	0.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/timing	0	122	0	0	0	241.00	0.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/vacuum-nip	0	8	0	0	0	16.00	0.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/vacuum-sip	0	381	0	0	0	51.00	1.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/vacuum-valves	0	1	0	0	0	0.00	0.00
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/archiving/hdb++archiver2/vacuum-vq	20	128	0	0	0	48.00	78.00

	Faulty	Started	Paused	Stopped	Pending	ev/1 mn 00 sec.	Fail./1 mn 00 sec.
E.S. Manager	41	7413	0	169	0	7613.00	124.00







From: "FERMI Alarm" <noreply@elettra.eu>
To: graziano.scalamera@elettra.eu, lorenzo.pivetta@elettra.eu
Subject: ALARMED archiving/hdb++archiver2/id/attributenoknumber - Errore archiviazione di almeno un attributo
Date: Thu, 5 May 2016 07:58:12 +0000 (GMT)

NEW ALARM DETECTED:

Name: archiving/hdb++archiver2/id/attributenoknumber
 Message: Errore archiviazione di almeno un attributo
 Values: archiving/hdb++archiver2/id/attributenoknumber[0]=5,
 Formula: (archiving/hdb++archiver2/id/attributenoknumber > 0)

HDB++ Errors:

tango://srv-tango-srf.fcs.elettra.trieste.it:20000/fel02/insertion_device/id_fel02.03/gap
 Timeout on periodic event

tango://srv-tango-srf.fcs.elettra.trieste.it:20000/fel02/insertion_device/id_fel02.03/phase
 Timeout on periodic event

tango://srv-tango-srf.fcs.elettra.trieste.it:20000/fel02/insertion_device/id_fel02.03/tapering
 Timeout on periodic event

tango://srv-tango-srf.fcs.elettra.trieste.it:20000/fel02/insertion_device/id_fel02.03/tiltmeterlowerval
 Timeout on periodic event

tango://srv-tango-srf.fcs.elettra.trieste.it:20000/fel02/insertion_device/id_fel02.03/tiltmeterupperval
 Timeout on periodic event

ALARM

NORMAL

From: "FERMI Alarm" <noreply@elettra.eu>
To: graziano.scalamera@elettra.eu, lorenzo.pivetta@elettra.eu
Subject: RESTORED archiving/hdb++archiver2/id/attributenoknumber - Errore archiviazione di almeno un attributo
Date: Thu, 5 May 2016 08:04:34 +0000 (GMT)

RESTORED TO NORMAL CONDITION:

Name: archiving/hdb++archiver2/id/attributenoknumber
 Message: Errore archiviazione di almeno un attributo
 Values: archiving/hdb++archiver2/id/attributenoknumber[0]=0,
 Formula: (archiving/hdb++archiver2/id/attributenoknumber > 0)

Last HDB++ meeting at Elettra, 10-11.05.2016

4 institutes represented: Alba, Elettra, ESRF, Soleil + SKA South Africa via teleconf

ALBA tests with HDB++: worried about:

- Larger attribute tables size (→ larger disk usage)
 - → Diagnostic timestamps moved on a separate table and made optional
 - → Error description moved on a separate table
- Rules for partitioning still to be defined
- Not compatible with Mambo
- HDB++ dedicated archiving approach, not suitable for dynamic data

Run/Shutdown management

Need to support several operating modes, or strategies, in the archiving engine on a per-attribute basis.

→ Modify AttributeList device property to support a name=value approach for the Context

```
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/eos/climate/18b20_eos.01/state; \
context=RUN|SHUTDOWN
```

```
tango://srv-tango-srf.fcs.elettra.trieste.it:20000/eos/climate/18b20_eos.01/temperature; \
context=RUN|SHUTDOWN
```

The labels for the strategy, implemented as enum, are defined in a free property, and/or in the class property and/or in the device property, with increasing priority. The defaults values, as well as the default context, are pre-defined but can be modified by the user. The default values are:

ALWAYS	0
RUN	1
SHUTDOWN	2
SERVICE	3

A Context r/w memorized attribute, set by higher layer logic, tells the archiver the required Context transition

Different polling periods for cache and event subsystems

The polling period affects several aspects of TANGO device server behaviour; relevant to clients and archiving system are:

- the rate at which the cache is updated
- the time at which change/archive/periodic event[s] are checked and possibly sent

Sometimes a *fast* rate for updating the cache is needed (short polling period) but on the opposite checking and sending change/archive/periodic events at that rate is inconvenient; event thresholds may help but not always solve.

One idea is to add *scale factors*, with default value equal 1, to define change/archive/periodic event check time with respect to the attribute polling period on a per-attribute basis; in pseudocode:

```
change_event_check_period = attribute_polling_period * change_event_polling_factor  
archive_event_check_period = attribute_polling_period * archive_event_polling_factor  
periodic_event_check_period = attribute_polling_period * periodic_event_polling_factor
```

Temporary storage of historical data

To support temporary storage of historical data one new column has to be added to the att_conf table:

```
CREATE TABLE IF NOT EXISTS att_conf(
  att_conf_id INT UNSIGNED NOT NULL AUTO_INCREMENT PRIMARY KEY,
  att_name VARCHAR(255) UNIQUE NOT NULL,
  att_conf_data_type_id INT UNSIGNED NOT NULL,
  ttl INT UNSIGNED NULL DEFAULT 0,
  facility VARCHAR(255) NOT NULL DEFAULT "",
  domain VARCHAR(255) NOT NULL DEFAULT "",
  family VARCHAR(255) NOT NULL DEFAULT "",
  member VARCHAR(255) NOT NULL DEFAULT "",
  name VARCHAR(255) NOT NULL DEFAULT "",
  INDEX(att_conf_data_type_id)
) ENGINE=MyISAM COMMENT='Attribute Configuration Table';
```

The ttl column defines the time-to-live in hours on a per-attribute basis. Furthermore, to support configuration of this new field from the Configuration Manager interface should be updated:

```
int configure_Attr(
  string name,
  int type,          /* DEV_DOUBLE, DEV_STRING,... */
  int format,        /* SCALAR, SPECTRUM,... */
  int write_type,    /* READ, READ_WRITE,... */
  unsigned int ttl   /* hours, 0 = forever */
);
```

Deleting expired data is delegated to the SQL backend.