

A black and white architectural rendering of a modern building with a curved, organic form. The building is surrounded by a landscaped area with trees and a paved walkway. The text "Tango Archiving @ ALBA" is overlaid on the image in a large, bold, black font.

# Tango Archiving @ ALBA

status and future needs

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# Introduction

ALBA has been using Soleil's Tango Archiving System since 2006, for all laboratories, accelerators and beamlines.

Some numbers:

12743 attributes in HDB database

7960 being archived actually (45% of our devices have at least 1 attribute archived).

4693 archived at 15s rate (on relative/absolute change)

5515 variables in TDB database

2981 archived at 1s rate



Archiving Status Report at Fri May 24 08:00:04 2013, generated in 10348 seconds

	active	dedicated	archivers	down	idle	up
<b>hdb</b>	7690	6773	503	0	0	503
<b>tdb</b>	5515	3852	299	0	0	299

active, dedicated refers to attributes status  
 up, down, idle refers to archivers status

### Checking HDB configurations

Filters are:

- include {}
- exclude {'type': 'stop'}

	all	rate	ok	diff	late	hung	lost	retried	unavailable	missing	triable	dedicated	polizon
<a href="#">/data/Archiving/Archiving Mopi 20130326.csv</a>	6	1.00	6										0
<a href="#">/data/Archiving/Archiving SRSCR 20130326.csv</a>	4	1.00	4										0
<a href="#">/data/Archiving/BO PC dyepez 20100513 v3.csv</a>	578	<b>0.71</b>	409						169			319	4
<a href="#">/data/Archiving/BO PC EXTRA mpont 20110928.csv</a>	4	1.00	4										14
<a href="#">/data/Archiving/BO RF asalom 20100603 v2x.csv</a>	245	0.98	240	33					5			205	3
<a href="#">/data/Archiving/BO VC srubio 20100928 v5.csv</a>	480	<b>0.63</b>	301	41		1		1	15	163	163	302	136
<a href="#">/data/Archiving/BT PC dyepez 20101006.csv</a>	51	1.00	51	5								51	0
<a href="#">/data/Archiving/BUILDING CT srubio 20120310.csv</a>	123	<b>0.61</b>	75	2	1				47			60	36
<a href="#">/data/Archiving/FE01 TEMPS uiriso 20121025.csv</a>	4	1.00	4										8
<a href="#">/data/Archiving/FE34 uiriso 20120110.csv</a>	5	1.00	5										0
<a href="#">/data/Archiving/FE DI LOCUM jmarcos 20120210.csv</a>	48	1.00	48	2								48	0
<a href="#">/data/Archiving/FE VC jmarcos 20110914.csv</a>	184	1.00	184									184	25
<a href="#">/data/Archiving/IDS 20120207.csv</a>	193	<b>0.81</b>	157	14					36				0
<a href="#">/data/Archiving/LI ACCELEROMETER rmunoz 20120426.csv</a>	4	1.00	4										0
<a href="#">/data/Archiving/LI CT LinacLrtech 20120209.csv</a>	16	1.00	16									16	0

# Beamlines

HDB-TDB(x10) in all beamlines

All servers + mysql run in a virtual server

HDB: ~6GB

TDB: ~3GB

200-500 attributes each per beamline

10-30 archiver devices

Sometimes TDB is more used than HDB  
(all interlocks and motor positions are in TDB)

cells.es/all\_archiving\_status.html

sg Login Citrix XenApp - Logon

```
report.py /homelocal/sicilia/bin/archiving_report.py --output=/tmp/archiving_report_ctb124arch01.html --input=/beamlines/b124/controls/archiving/*.csv --restart
```

Fri May 24 00:00:53 2013, generated in 2795 seconds

archivers	down	idle	up
	0	0	20
	0	0	17

[attributes status](#)

[archivers status](#)

functions

```
report.py /homelocal/sicilia/bin/archiving_report.py --output=/tmp/archiving_report_ctb129arch01.html --input=/beamlines/b129/controls/archiving/*.csv --restart
```

Fri May 24 00:00:50 2013, generated in 3118 seconds

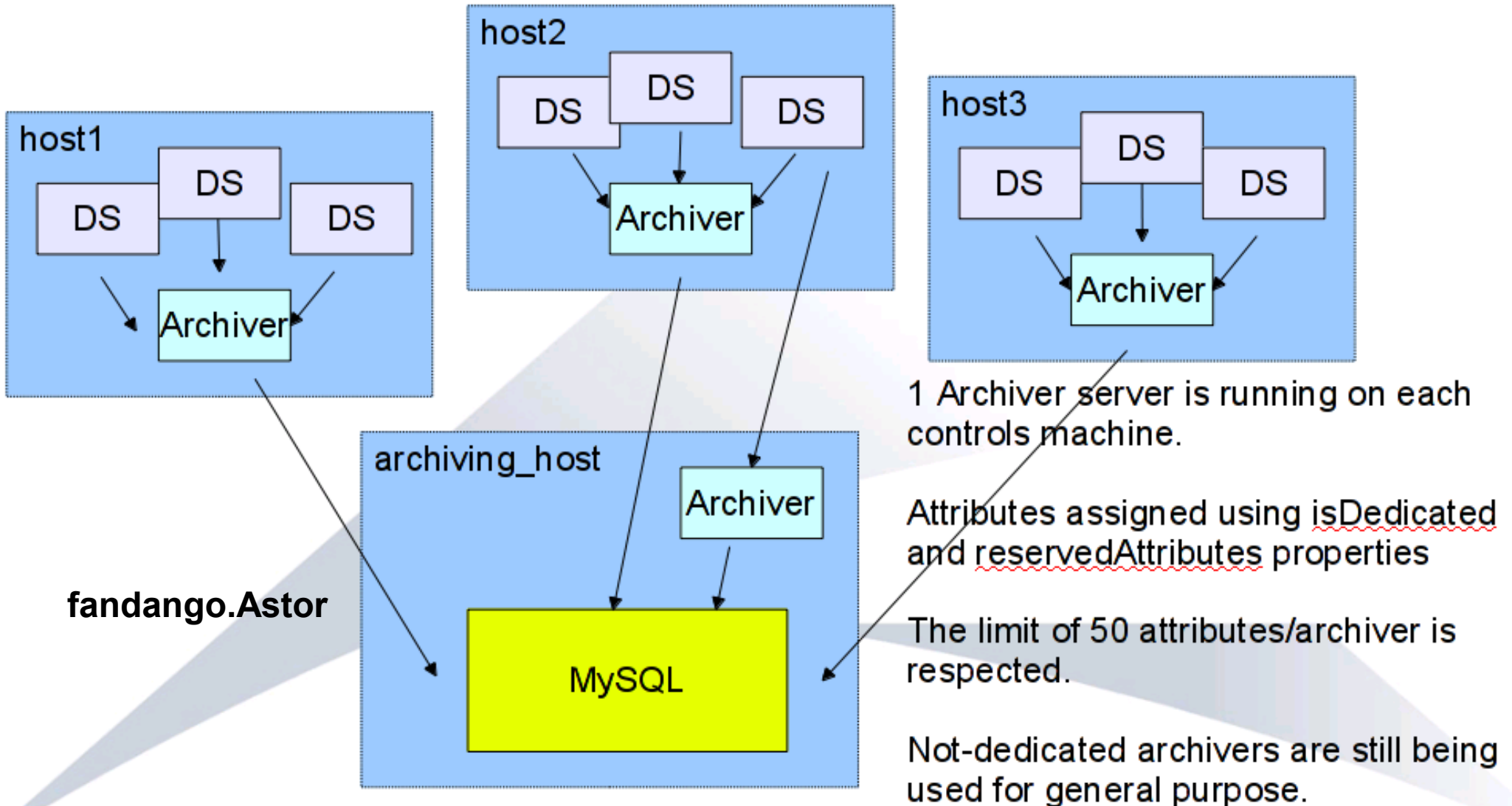
archivers	down	idle	up
	0	0	15
	0	0	15

[attributes status](#)

[archivers status](#)

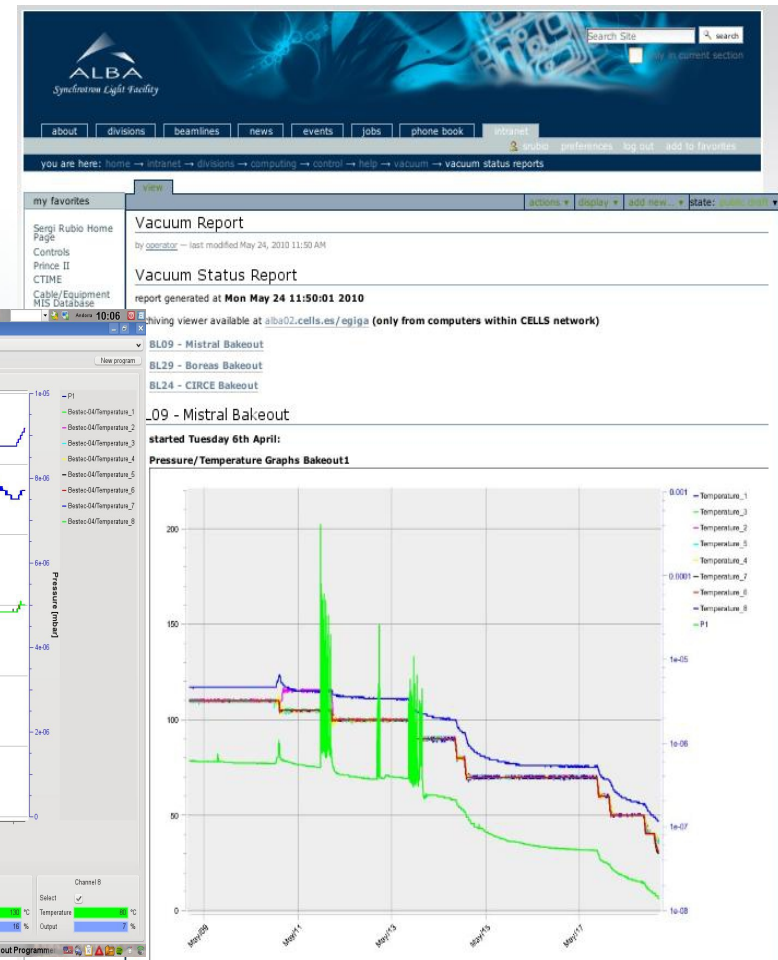
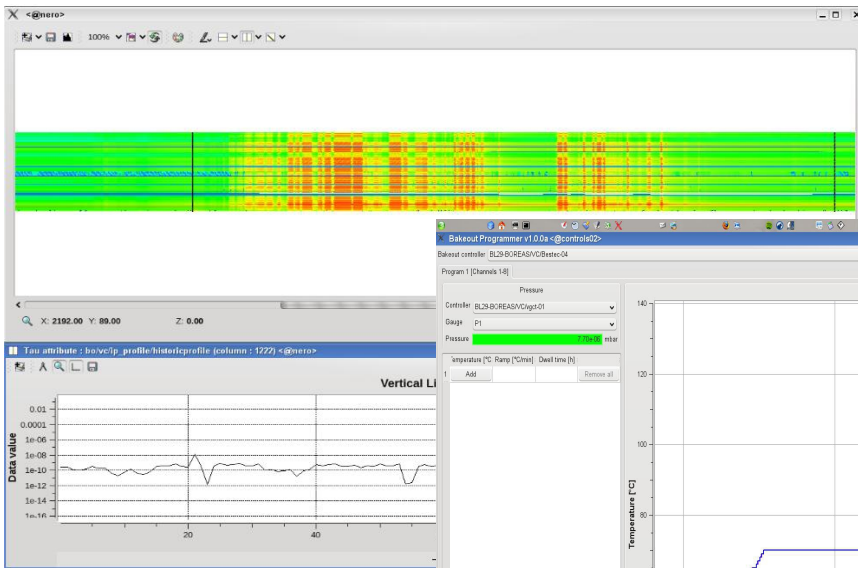
functions

# Distributed/Dedicated Archiver



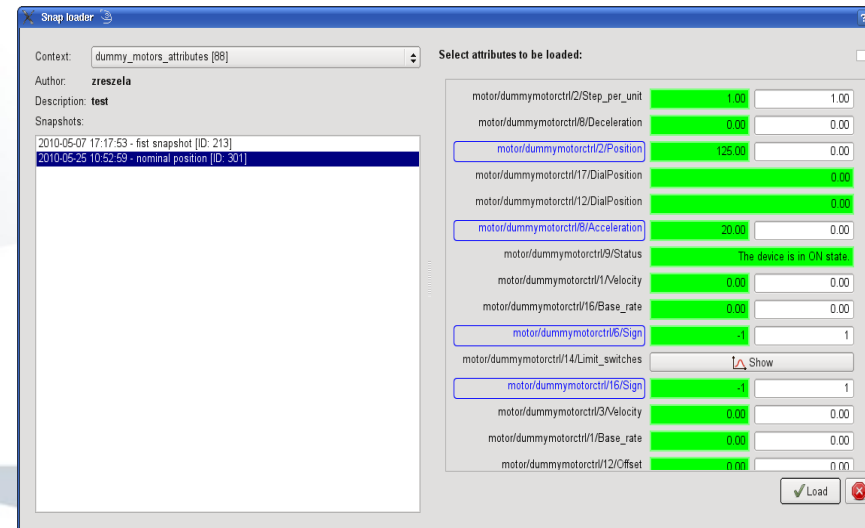
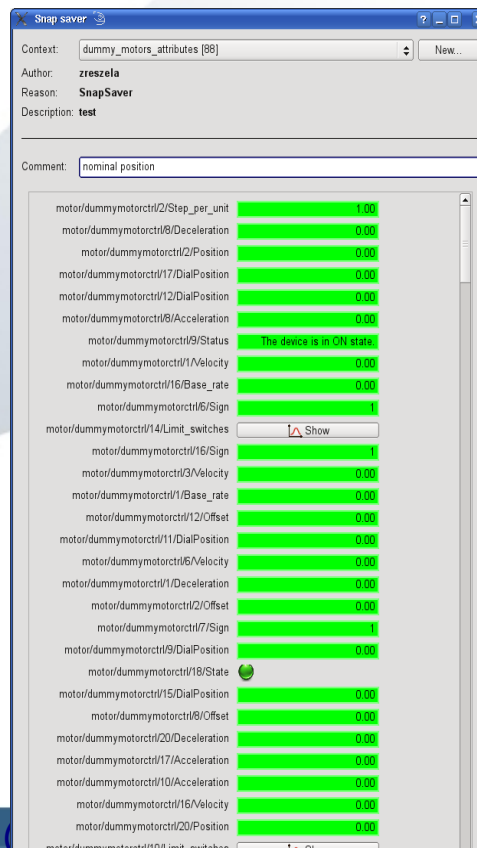
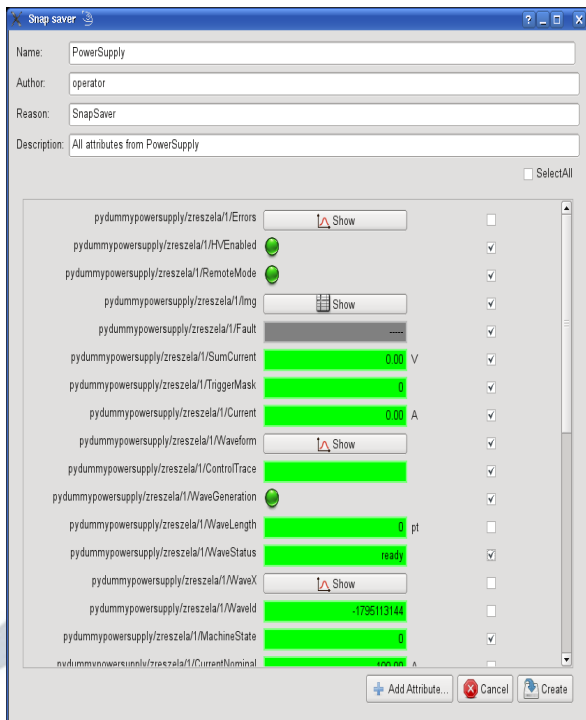
# Archiving Visualization

Trends, html reports (jquery or virtual X screenshots) and time profiles with Qub.



# Snap Widgets

Used for magnet power supplies, alarm recording and beamline settings, but still not mature.





# Data Extraction

The Reader object provides an straight-forward interface for acquiring values from the archiver database.

Integration with Taurus allowed to visualize archived data in Taurus user applications and other python-based tools like automatic html reports.

It can work using HdbExtractor devices or direct MySQL access, being transparent to the client application and returning the same data format.

```
import PyTangoArchiving
list1 = ['B002/VC/SPBX-01/I%d'%i for i in range(8)]
list2 = ['B002/VC/SPBX-01/P%d'%i for i in range(8)]

rd_db = PyTangoArchiving.Reader(db='hdb',config='.....')
rd_extractor = PyTangoArchiving.Reader()

now = time.time()
weekago = now-3600*24*7
def get_weekago(reader,values):
    start = time.time()
    print 'Getting 1 week of values for %s'%values
    results = [reader.get_attribute_values(v,weekago,now) for v in values]
    print '%d values obtained in %f seconds' % (sum(len(r) for r in results),time.time()-start)
```

# PyTangoArchiving.ArchivingAPI

Features of the *ArchivingAPI* object are:

- reads all attributes configuration, archiver and host.
- starts/stop archiving
- assigns dedicated archivers to each host
- provides fast access to ArchivingManager, Archiver, Extractor and Watcher devices.
- includes method for debugging and error check.

But, an *ArchivingAPI* object has to be created separately for TDB or HDB archiving.

# Scalability

249 GB of HDB data archived (6GB/month is the actual growth rate).

24GB used for TDB (10 days)

3 archiver servers:

- archiving01 – HDB, mysql + 50 archiver instances
- archiving02 – HDB backup / recovery / data mining
- archiving03 – TDB, mysql + all tdb archivers

During 2012 we started to suffer some performance issues, many related to high cpu usage during backups (a full backup required nearly 6h).

Compression of backups was moved to a separate server but performance of clients was still very bad during night shifts an early morning, so clearly the size of the database started to be a problem.

# Scalability

We opted to apply a table-split solution, but instead of using MySQL tools we did a “manual” partition. The HDB database where data is inserted contains only the last 18 months of data (97GB); while the full history of data is kept in the recovery machine.

Why splitting manually instead of automated? We wanted to isolate the cause of the problems and adding more complexity into the system didn't help.

To access data older than 18 months we use two methods, from mambo a TANGO\_HOST=archiving02 switch is used ; from Taurus an Extractor Class property is used to switch databases by timestamp.

All reported performance issues disappeared, and the load of the system is very low. Therefore we consider that we have now an scalable solution in the medium term.

# Indexing

- Most performance problems aroused from the compressing of daily backup, that saturated CPU for long periods.
- We studied the usage of indexes to speed-up queries. But this increased the size of tables (>50%), something we want to avoid due to backup issues.
- So we use indexes only for special cases, when importing files into archiving from external sources or for those most-used attributes (e.g. machine current).

# Import / Export

We have continuous request for data export from archiving, for using data in Matlab or other data analysis tools.

We had to add export and correlation tools.

Import needs occurred for two reasons:

- Need to keep TDB data of an specific incident
- Need to use existing tools with data coming from “alien” sources.

# Finding instead of Searching

**Tango Attribute Search <@tiberius>**

Type a part of device name and a part of attribute name, separated by commas, use "\*" or "." as wildcards:

building plc / flow Update

Label/Value	Device	Attribute	Alias	Archiving
SR01_FLOW <span style="background-color: green; color: black; padding: 2px;">0.00</span>	I/min BUILDING/CT/PLC-LINAC	SR01_FLOW		<span style="border: 1px solid gray; padding: 2px;">Export</span>
SR01_FLOW_mA <span style="background-color: green; color: black; padding: 2px;">0.000</span>	mA BUILDING/CT/PLC-LINAC	SR01_FLOW_mA		<span style="border: 1px solid gray; padding: 2px;">Export</span>
FLOW_GLOBAL <span style="background-color: green; color: black; padding: 2px;">647.54</span>	I/min BUILDING/CT/PLC-PUMPS-1	FLOW_GLOBAL		<span style="border: 1px solid gray; padding: 2px;">Export</span>
FLOW_GLOBAL_mA <span style="background-color: green; color: black; padding: 2px;">11.30</span>	mA BUILDING/CT/PLC-PUMPS-1	FLOW_GLOBAL_mA		<span style="border: 1px solid gray; padding: 2px;">Export</span>

Drag any attribute from the first column into the trend or any taurus widget you want:

— SR01\_FLOW

— FLOW\_GLOBAL

Pdf Q1 Pdf Q2 Pdf Q3 Pdf Q4 Archiving Viewer Show New Trend

**<@tiberius>**

	TIME	EPOCH	VALUE
1	2013-05-23 18:35:08	1369326908.0	646.037173271
2	2013-05-23 18:35:23	1369326923.0	646.037173271
3	2013-05-23 18:35:38	1369326938.0	642.301607132
4	2013-05-23 18:35:53	1369326953.0	640.434002876
5	2013-05-23 18:36:08	1369326968.0	646.037173271
6	2013-05-23 18:36:23	1369326983.0	643.034100533
7	2013-05-23 18:36:38	1369326998.0	649.772667885
8	2013-05-23 18:36:53	1369327013.0	637.430858612
9	2013-05-23 18:37:08	1369327028.0	644.132804871
10	2013-05-23 18:37:23	1369327043.0	644.572257996
11	2013-05-23 18:37:39	1369327059.0	645.304751396
12	2013-05-23 18:37:54	1369327074.0	640.434002876
13	2013-05-23 18:38:09	1369327089.0	638.932394981
14	2013-05-23 18:38:24	1369327104.0	640.800213814
15	2013-05-23 18:38:39	1369327119.0	640.434002876
16	2013-05-23 18:38:54	1369327134.0	646.806144714
17	2013-05-23 18:39:09	1369327149.0	638.199973106
18	2013-05-23 18:39:24	1369327164.0	637.430858612
19	2013-05-23 18:39:39	1369327179.0	640.067720413
20	2013-05-23 18:39:53	1369327193.0	643.034100533

Save to file

# Fast searches

Tango Attribute Search <@tiberius>







Type a part of device name and a part of attribute name, separated by commas, use "\*" or "" as wildcards:

idm (taper|gap) / position Update

Label/Value	Device	Attribute	Alias	Archiving
Position <span style="background-color: green; color: black;">289998.9</span> <input type="text" value="0.0"/>	um	PM/IDMPW_PSEUDOMOTOR/1 Position	idmpw_motor_gap	---
Position <span style="background-color: green; color: black;">40081.5</span> <input type="text" value="0.0"/>	um	PM/IDMPW_PSEUDOMOTOR/2 Position	idmpw_motor_taper	<span>Export</span>

Drag any attribute from the first column into the trend or any taurus widget you want:

---

 Pdf Q1
  Pdf Q2
  Pdf Q3
  Pdf Q4
  Archiving Viewer
  Show New Trend



# Pending things

- Which is the status of Tango Archiving Collaboration?
- ALBA had problems to keep pace, we couldn't install last Soleil releases yet.
- RAM consumption of both Java and Python devices is too high. This seems to be an actual problem with our virtual servers.

# Pending things

We think that a more efficient implementation of the archiving servers is needed.

The actual structure of the Archiving system allows to replace the servers one by one instead of rewriting the whole system.

We had a PyExtractor device for both TDB and HDB, but we cannot keep same Command definition than HdbExtractor due to the lack of polling buffer access from python; and RAM usage is still a issue.

# Questions??



Does anybody use our python  
API??

**Thank you for your attention**