TANGO Device Server Design Guidelines

HDB++

Design and implementation

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Summary

The HDB++ is a novel TANGO device server for Historical Data Base (HDB) archiving. It's written in C++ and is fully event-driven.

Keywords

TANGO Device Server, Historical Data Base, HDB, Archiving, C++

Notes

No notes so far.

Contributions

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Revisions

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2013-01-29	1.1	L.Pivetta	Merged suggestions from ESRF
2013-01-31	1.2	L.Pivetta	Cleanup
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2014.01.30	1.4	L.Pivetta	Configuration Manager details + Extraction library
2014.03.07	1.5	L.Pivetta	Database interface
2014.05.05	1.6	L.Pivetta	Cleanup, full ES and CM doc

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1 HDB++ TANGO Device Server

The HDB++ architecture is composed by several TANGO device servers. More in detail, at least one, but actually many, Event Subscriber TANGO device server jointly with one Configuration Manager TANGO device server and one or more Data Extraction TANGO device servers are foreseen.

2 Event Subscriber

The Event Subscriber TANGO device server, also called archiver device server, will subscribe to archive events on request by the Configuration Manager. The Event Subscriber will be able to start archiving all the already configured events even if the Configuration Manager is not running. The Event Subscriber device server must have the following characteristics:

1. the archiving mechanism is event-based, thus the device server tries to subscribe to the event; an error means a fault. A transparent re-subscription to the faulty event is required.

2. one additional thread is in charge of events subscription and call-back execution; the call back, acting as producer, must put the complete data of the received events in a FIFO queue; the thread and the callback must be able to handle an *arbitrary* number of events, possibly limited just by the available memory and/or the required performances; also, a high-mark threshold must be setup on the FIFO in order to alert for an overloaded Event Subscriber

3. one additional thread, acting as consumer of the FIFO, is in charge of pushing the data into the database, preserving the event data time stamp too; the code to access the database engine shall be structured to allow the use of different back-ends (MySQL, Oracle, etc...)

4. the device server methods, commands and attributes, must allow to perform the following per-instance operations:

    - start the archiving for all attributes
    - stop the archiving for all attributes
    - start the archiving for one attribute
    - stop the archiving for one attribute
    - read the number of attributes in charge
    - read the list of attributes in charge
    - read the configuration parameters of each attribute
    - read the number of working attributes
    - read the list of working attributes
    - read the number of faulty attributes
    - read the list of faulty attributes with diagnostics
    - read the size of the FIFO queue
    - read the number of attributes pending in the FIFO
    - read the list of attributes pending in the FIFO

The list of attributes in charge of each Event Subscriber is stored in the TANGO database as property of the Event Subscriber device server. The scaling capability comes transparently with the TANGO architecture itself.

The Event Subscriber device server must be able to run and report on the working/faulty attributes/events by means of the standard API (commands and/or attributes) without the need of a graphical interface.

The diagnostics of faults could also be stored in the general info about each attribute; the diagnostics are used by the HDB++ Device Server itself to detect that some data is not being stored as requested.

Stopping the archiving of an attribute does not persist after a restart, i.e. restarting an Event Subscriber device server instance triggers the archiving of *all* configured attributes. A property can be setup not to start archiving at Event Subscriber startup (see 2.1.3 and 2.1.4).

One NULL value with time stamp is inserted whenever the archiving of an attribute is stopped, due to error or by a specific stop command. Moreover, if an error occurred the corresponding attribute is marked as faulty in the archiving engine. In case the archiving was suspended due to error, it is automatically resumed when good data is available again. One or more alarms could be configured in the TANGO Alarm System to asynchronously inform about the status of the archiving device server.

The Event Subscriber TANGO device server shall also expose some additional figures of merit such as:

- for each instance, total number of records per time
- for each instance, total number of failures per time
- for each attribute, number of records per time
- for each attribute, number of failures per time
- for each attribute, time stamp of last record

The system can sum these numbers in a counter which can be reset every hours/days/weeks to rank each attribute in term of data rate, error rate etc. This allows preventive maintenance and fine tuning, detecting, for instance, when an attribute is too verbose (e.g. variation threshold below the noise level). These statistics are a key element for qualifying the health of the system. All these attributes will be themselves archived to enable a follow-up versus time.

The Event Subscriber TANGO device server must maintain at least the following operating states:

- **ON**: archiving running, everything works
- **ALARM**: one or more attributes faulty or the FIFO size grows above high-mark threshold
- **FAULT**: all attributes faulty
- **OFF**: archiving stopped

2.1 Event Subscriber interface

More in detail the Event Subscriber device server interface is summarized in table 1 and 2.

2.1.1 Commands

AttributeAdd	add an attribute to archiving; the complete FQDN has to be specified otherwise it is completed by the Event Subscriber using getaddrinfo()
AttributeRemove	remove an attribute from archiving; the archived data and the attribute's archive event configuration are left untouched
AttributeStatus	read attribute status
AttributeStart	start archiving specified attribute
AttributeStop	stop archiving specified attribute
Start	start archiving
Stop	stop archiving
ResetStatistics	reset Event Subscriber statistics

Table 1: Event Subscriber Commands.

2.1.2 Attributes

AttributeOkNumber	number of archived attribute not in error
AttributeNokNumber	number of archived attribute in error
AttributePendingNumber	number of attributes waiting to be archived
AttributeNumber	number of attributes configured for archiving
AttributeList	return configured attribute list
AttributeOkList	return the list of attribute not in error
AttributeNokList	return the list of attribute in error
AttributePendingList	list of attributes waiting to be archived
AttributeMaxStoreTime	max storing time
AttributeMinStoreTime	min storing time
AttributeAVGStoreTime	average storing time
AttributeMaxProcessingTime	max processing time
AttributeMinProcessingTime	min processing time
AttributeAVGProcessingTime	average processing time

Table 2: Event Subscriber Attributes.

The class and device properties availabile for configuration are shown in table 3 and 4.

2.1.3 Class properties

SubscribeRetryPeriod	retry period for subscribe event in seconds
DbHost	hostname of host running the database engine
DbUser	database user
DbPassword	database password for DbUser
DbName	database name
DbPort	port number
StartArchivingAtStartup	start archiving at Event Subscriber startup

Table 3: Event Subscriber Class properties.

2.1.4 Device properties

SubscribeRetryPeriod	retry period for subscribe event in seconds
AttributeList	list of configured attributes
DbHost	hostname of host running the database engine
DbUser	database user
DbPassword	database password for DbUser
DbName	database name
DbPort	port number
StartArchivingAtStartup	start archiving at Event Subscriber startup

Table 4: Event Subscriber Device properties.

3 Configuration Manager

In order to address large archiving systems the need to distribute the workload over a large number of threads/processes shows up. A Configuration Manager device server will assist in the operations of adding, editing, moving, deleting an attribute to/from the archiving system. All the configuration parameters, such as polling period, variation thresholds etc., are kept in the TANGO database as properties the archived attribute. In order to be managed by the Configuration Manager device server each Event Subscriber instance has to added to the Configuration Manager pool using the ArchiverAdd command.

The Configuration Manager device server shall be able to perform the following operations on the managed Event Subscriber pool:

1. manage the request of archiving a new attribute
   1.1 create an entry in the HDB++ if not already done
   1.2 setup the attribute's archive event configuration
   1.3 assign the new attribute to one of the Event Subscriber device servers
       - following some rules of load balancing
       - to the specified Event Subscriber device server
2. move an attribute from an Event Subscriber device server to another one
3. keep trace of which attribute is assigned to which Event Subscriber
4. start/stop the archiving of an attribute at runtime
5. remove an attribute from archiving

The load balancing capability of the Configuration Manager, if desired, must be enabled by means of a device property both in the Configuration Manager and the Event Subscriber device servers pool reserved for automatic load balancing. This enables hybrid reserved/balanced archiving engine configuration.

The configuration shall be possible via the Configuration Manager device server API as well as via a dedicated GUI interface; the GUI may just use the provided API.

The Configuration Manager may also expose a certain number of attributes to give the status of what is going on:

- total number of Event Subscriber
- total number of working attributes
- total number of faulty attributes
- total number of calls per second

These attributes could be themselves archived to enable a follow up versus time.

3.1 Configuration Manager interface

More in detail the Configuration Manager device server exposes the following interface.

3.1.1 Commands

The commands availabile in the Configuration Manager are summarized in table 5.

AttributeAdd	add an attribute to archiving
AttributeRemove	remove an attribute from archiving; the archived data and the attribute's archive event configuration are left untouched
AttributeStart	start archiving an attribute
AttributeStop	stop archiving an attribute
AttributeAssign	assign attribute to Event Subscriber
AttributeGetArchiver	return Event Subscriber in charge of attribute
AttributeStatus	read attribute archiving status
AttributeSearch	return list of attributes containing input pattern
ArchiverAdd	add a new Event Subscriber instance to the archivers list; the instance must have been already created and configured via jive/astor and the device shall be running; as per HDB++ Configuration Manager release CM adding an Event Subscriber device to an existing istance is not supported
ArchiverRemove	remove an Event Subscriber instance from the Configuration Manager list; neither the TANGO device instance nor the attributes configured are removed from the TANGO database
ResetStatistics	reset statistics of Configuration Manager and all Event Subscribers

Table 5: Configuration Manager Commands.

Note that the list of managed Event Subscribers is stored into the ArchiverList device property (see 3.1.3) that is maintained via the AttributeAdd, AttributeRemove and AttributeSetArchiver commands. Therefore in the HDB++ archiving system the Event Subscriber device server instances can also be configured by hand, if required, an run independently.

3.1.2 Attributes

The attributes of the Configuration Manager are summarized in table 6.

AttributeOkNumber	total number of archived attribute not in error
AttributeNokNumber	total number of archived attribute in error
AttributePendingNumber	total number of attributes waiting to be archived
AttributeNumber	total number of attributes configured for archiving
ArchiverList	return list of attributes in charge to archiver
ArchiverStatus	return archiver status information
SetAttributeName	support attribute for setup
SetPollingPeriod	support attribute for setup
SetAbsoluteEvent	support attribute for setup
SetRelativeEvent	support attribute for setup
SetPeriodEvent	support attribute for setup
SetCodePushedEvent	support attribute for setup
SetArchiver	support attribute for setup
AttributeMaxStoreTime	max storing time (all archivers)
AttributeMinStoreTime	min storing time (all archivers)
AttributeMaxProcessingTime	max processing time (all archivers)
AttributeMinProcessingTime	min processing time (all archivers)

Table 6: Configuration Manager Attributes.

The SetXxxYyy attributes are used for archive event and archiver instance configuration setup and must be filled before calling the AttributeAdd command. The AttributeAdd checks the consistency of the desired event configuration and then adds the new attribute to the archiver instance specified with SetArchiver. Then the AttributeAdd command creates the required entries into the historical database.

3.1.3 Device properties

ArchiverList	list of existing archivers
MaxSearchSize	max size for AttributeSearch result

Table 7: Configuration Manager device properties.

4 Diagnostic tools

With all the statistics kept in the Event Subscriber device servers and the Configuration Manager device server, the diagnostic tool can be straightforward to develop as a simple QTango or ATK GUI. This GUI will also give read access to the configuration data stored as attribute properties in the TANGO database to display the attribute polling frequency of the involved device servers, whenever available, and the archive event configuration.

5 Database interface

A C++ API will be developed to address the writing and reading operations on the database and made availabile as a library. This library will provide the *essential* methods for accessing the database. The Event Subscriber, the Configuration Manager, the Data Extraction device servers, library and tools will eventually take advantage of the library. Actually a number of libraries are already available to encapsulate database access decouple the back-end:

libhdb++	:	HDB++ abstraction layer
libhdb++mysql	:	HDB++ table support, MySQL back-end
libhdbmysql	:	legacy HDB table support, MySQL back-end

Table 8: Available database libraries.

Additional libraries are foreseen to support different database engines, such as Oracle, Postgres or possibly noSQL implementations.

5.1 HDB++ database structure

The structure of the legacy HDB is based on three tables, (*adt*, *amt*, *apt*) shown in appendix A. In addition, one table, named att_xxxxx is created for each attribute or command to be archived. Many of the columns in the lagacy tables are used for HDB archiving engine and archiving parameters configuration and are no more required.

The new database structure, whose tables have been designed for the HDB++ archiver, provides just the necessary columns and takes advantage of μs resolution support for daytime.

The *att_conf* table associates the attribute name with a unique id and selects the data type; it's worth notice that the *att_name* raw always contains the complete FQDN, e.g. with the hostname and the domainname. The *att_history* table stores the timestamps relevant for archiving diagnostics.

In addition a number of different data types, listed in table 9, are natively supported for archiving. As an example the table *att_scalar_int8_rw*, for archiving one byte-size read/write values, is also shown below. Three timestamp rows are currently supported: the attribute event timestamp, the reception timestamp and the database insertion timestamp.

```
mysql> desc att_conf;
+-------------+-------------------------------+------+-----+---------+----------------+
| Field       | Type                          | Null | Key | Default | Extra          |
+-------------+-------------------------------+------+-----+---------+----------------+
| att_conf_id | int(10) unsigned              |  NO  | PRI | NULL    | auto_increment |
| att_name    | varchar(255)                  |  NO  | UNI | NULL    |                |
| data_type   | enum('scalar_double_ro',      |      |     |         |                |
|             |      'scalar_double_rw',      |      |     |         |                |
|             |      'array_double_ro',       |      |     |         |                |
|             |      'array_double_rw',       |      |     |         |                |
|             |      'scalar_int64_ro',       |      |     |         |                |
|             |      'scalar_int64_rw',       |      |     |         |                |
|             |      'array_int64_ro',        |      |     |         |                |
```

```
|             |      'array_int64_rw',        |      |     |         |                |
|             |      'scalar_int8_ro',        |      |     |         |                |
|             |      'scalar_int8_rw',        |      |     |         |                |
|             |      'array_int8_ro',         |      |     |         |                |
|             |      'array_int8_rw',         |      |     |         |                |
|             |      'scalar_string_ro',      |      |     |         |                |
|             |      'scalar_string_rw',      |      |     |         |                |
|             |      'array_string_ro',       |      |     |         |                |
|             |      'array_string_rw')       | NO   |     | NULL    |                |
+-------------+-------------------------------+------+-----+---------+----------------+
```

```
mysql> desc att_history;
+-------------+-------------------------------------+------+-----+---------+-------+
| Field       | Type                                | Null | Key | Default | Extra |
+-------------+-------------------------------------+------+-----+---------+-------+
| att_conf_id | int(10) unsigned                    | NO   | MUL | NULL    |       |
| time        | datetime(6)                         | NO   |     | NULL    |       |
| event       | enum('add','remove','start','stop') | NO   |     | NULL    |       |
+-------------+-------------------------------------+------+-----+---------+-------+
```

```
mysql> desc att_scalar_int8_rw;
+-------------+------------------+------+-----+---------+-------+
| Field       | Type             | Null | Key | Default | Extra |
+-------------+------------------+------+-----+---------+-------+
| att_conf_id | int(10) unsigned | NO   | MUL | NULL    |       |
| event_time  | datetime(6)      | NO   | MUL | NULL    |       |
| recv_time   | datetime(6)      | NO   |     | NULL    |       |
| insert_time | datetime(6)      | NO   |     | NULL    |       |
| value_r     | tinyint(1)       | YES  |     | NULL    |       |
| value_w     | tinyint(1)       | YES  |     | NULL    |       |
+-------------+------------------+------+-----+---------+-------+
```

att_scalar_int8_ro, att_scalar_int8_rw	byte size, e.g. state
att_scalar_int64_ro, att_scalar_int64_rw	short to long int
att_scalar_double_ro, att_scalar_double_rw	float and double
att_scalar_string_ro, att_scalar_string_rw	string
att_array_int8_ro, att_array_int8_rw	byte size, e.g. state
att_array_int64_ro, att_array_int64_rw	short to long int
att_array_double_ro, att_array_double_rw	float and double
att_array_string_ro, att_array_string_rw	string

Table 9: Supported data types for archiving.

The complete SQL source for all the tables is reported in appendix B. The main differences can be summarized as:

- μs timestamp resolution
- no per-attribute additional tables; the number of tables used is fixed and does not depend on the number of archived attributes
- specific data type support

5.2 Performance figures

Some tests have been carried out to compare the performance of the existing database structure to the proposed one. The machine hosting the MySQL database engine is equipped with:

- chipset Intel x58 Express ICH10R
- one Intel(R) Core(TM) i7 CPU 980, 6C/12T, 3.3 GHz 4.8 GT/s, 12MB cache
- 24GB DDR3 1333 MHz
- two 120 GB SSD drive OCZ Vertex III MAX IOPS
- one 1 TB SATA II drive

5.2.1 MySQL engine

The main differences between the two availabile engines for MySQL are summarized below:

- MyISAM
  - supports table-level Locking
  - designed for speed
  - does not support foreign keys (MySQL+MyISAM = DBMS)
  - stores its tables, data and indexes in diskspace using three separate different files
  - does not supports transactions; no rollback
  - supports fulltext search
- InnoDB
  - supports row-level Locking
  - designed for maximum performance when processing high volume of data
  - supports foreign keys (MySQL+InnoDB = RDBMS)
  - stores its tables and indexes in a tablespace
  - supports transaction; you can commit and rollback

5.2.2 Legacy HDB

```
select ID from hdb.adt where full_name='inj/vacuum/sip55_inj.01/Pressure';
+-------+
| ID    |
+-------+
| 00012 |
+-------+
select value, time from hdb.att_00012 where time > '2013-03-03 12:00:00' and time < '2013-03-03
    13:00:00';
```

```
...
180 rows in set (0.05 sec)

select ID from hdb.adt where full_name='inj/vacuum/sip55_inj.01/Pressure' or full_name='inj/
    vacuum/sip75_inj.01/Pressure';
+-------+
| ID    |
+-------+
| 00012 |
| 00014 |
+-------+
2 rows in set (0.03 sec)

select value, time from hdb.att_00014 where time > '2013-03-03 12:00:00' and time < '2013-03-03
    13:00:00';
...
180 rows in set (0.02 sec)

select value, time from hdb.att_00014 where time > '2013-03-03 12:00:00' and time < '2013-03-04
    13:00:00';
...
4500 rows in set (0.03 sec)

select value, time from hdb.att_00014 where time > '2013-03-03 12:00:00' and time < '2013-04-03
    13:00:00';
...
129645 rows in set (0.19 sec)
```

5.2.3 HDB++ - MyISAM engine

```
select att_conf_id from hdbpp.att_conf where att_name = 'tango://srv-tango-srf.fcs.elettra.
    trieste.it:20000/inj/vacuum/sip55_inj.01/Pressure';
+-------------+
| att_conf_id |
+-------------+
|           1 |
+-------------+
1 row in set (0.07 sec)

select value_r, event_time from hdbpp.att_scalar_double_ro where att_conf_id=1 and event_time >
    '2013-03-03 12:00:00' and event_time < '2013-03-03 13:00:00';
...
180 rows in set (3.57 sec)

select att_conf_id from hdbpp.att_conf where att_name = 'tango://srv-tango-srf.fcs.elettra.
    trieste.it:20000/inj/vacuum/sip75_inj.01/Pressure';
+-------------+
| att_conf_id |
+-------------+
|           3 |
+-------------+
1 row in set (0.07 sec)

select value_r, event_time from hdbpp.att_scalar_double_ro where att_conf_id=3 and event_time >
    '2013-03-03 12:00:00' and event_time < '2013-03-03 13:00:00';
...
180 rows in set (0.06 sec)

select value_r, event_time from hdbpp.att_scalar_double_ro where att_conf_id=3 and event_time >
    '2013-03-03 12:00:00' and event_time < '2013-03-04 13:00:00';
...
4500 rows in set (0.03 sec)
```

```
select value_r, event_time from hdbpp.att_scalar_double_ro where att_conf_id=3 and event_time >
    '2013-03-03 12:00:00' and event_time < '2013-04-03 13:00:00';
...
129645 rows in set (0.30 sec)

select value_r, event_time from hdbpp.att_scalar_double_ro where att_conf_id=2 and event_time >
    '2013-03-03 12:00:00' and event_time < '2013-03-04 13:00:00';
...
4499 rows in set (0.12 sec)
```

5.2.4 HDB++ - InnoDB engine

```
select att_conf_id from hdbppi.att_conf where att_name = 'tango://srv-tango-srf.fcs.elettra.
    trieste.it:20000/inj/vacuum/sip55_inj.01/Pressure';
+-------------+
| att_conf_id |
+-------------+
|       3331 |
+-------------+
select value_r, event_time from hdbpp.att_scalar_double_ro where att_conf_id=3331 and event_time
    > '2013-03-03 12:00:00' and event_time < '2013-03-03 13:00:00';
...
180 rows in set (0.61 sec)

select att_conf_id from hdbppi.att_conf where att_name = 'tango://srv-tango-srf.fcs.elettra.
    trieste.it:20000/inj/vacuum/sip75_inj.01/Pressure';
+-------------+
| att_conf_id |
+-------------+
|       3333 |
+-------------+
1 row in set (0.00 sec)

select value_r, event_time from hdbppi.att_scalar_double_ro where att_conf_id=3333 and event_time
     > '2013-03-03 12:00:00' and event_time < '2013-03-03 13:00:00';
...
180 rows in set (0.08 sec)

select value_r, event_time from hdbppi.att_scalar_double_ro where att_conf_id=3333 and event_time
     > '2013-03-03 12:00:00' and event_time < '2013-03-04 13:00:00';
...
4500 rows in set (0.04 sec)

select value_r, event_time from hdbppi.att_scalar_double_ro where att_conf_id=3333 and event_time
     > '2013-03-03 12:00:00' and event_time < '2013-04-03 13:00:00';
...
129645 rows in set (0.32 sec)
```

6 Data Extraction

A native tool, available to be run locally, as well as a reworked web interface (E-Giga) are foreseen. A specific library with a dedicated API could be developed to address the extraction and the be used into whatever tool may be provided: a TANGO device server, a web interface, a native graphical panel, etc. The Data Extraction library shall be able to deal with event based archived data. The eventual lack of data inside the requested time window shall be properly managed:

- returning some *no-data-available* error: in this case the reply contains no data and a *no-data-available* error is triggered. Care must be taken whenever the requirement of getting multiple data is foreseen.
- enlarging the time window itself to comprehend some archived data: the requested time interval is enlarged in order to comprehend some archived data. A mechanism shall be provided to notify the client of the modified data set. No fake samples have to be introduced to fill the values in correspondence of the requested timestamps.
- returning the value of the last archived data anyhow: the requested time interval is kept and the last available data sample is returned. The validity of the data is guaranteed when the archiving mechanism is based on archive event on change; care must be taken when using the data in case of periodic event.

Moreover, whenever extracting multiple rows, the Data Extraction library shall allow to select one of the following behaviours:

- return variable length data arrays for each row
- return equal length data arrays for all rows, filling the gaps with the previous data value

The extraction library shall be able to manage a query and data cache locally on the host. This allows to enforce some advantages:

- avoid repeating queries on the historical database
- allow issuing small queries just to supplement the cached data
- speed-up the execution of the client

The extraction library shall guarantee the consistency of the local cache with respect to the query and to the archive data. A configuration parameter can be setup to invalidate the local cache after a predefined period of time (e.g. 1 hour, 1 day...). The behaviour of the extraction library, as well as the maximum size of the local cache and every other parameter, shall be configurable via the following mechanisms, ordered by increasing priority:

- system-wide configuration file
- per-client/per-user configuration file
- environment variables

7 General remarks

Care must be taken to avoid introducing dependencies from libraries not already needed by the TANGO core.

A Legacy HDB tables structure

```
mysql> describe adt;
+-------------+--------------------------------+------+-----+---------+----------------+
| Field       | Type                           | Null | Key | Default | Extra          |
+-------------+--------------------------------+------+-----+---------+----------------+
| ID          | smallint(5) unsigned zerofill | NO   | PRI | NULL    | auto_increment |
| time        | datetime                       | YES  |     | NULL    |                |
| full_name   | varchar(200)                   | NO   | PRI |         |                |
| device      | varchar(150)                   | NO   |     |         |                |
| domain      | varchar(35)                    | NO   |     |         |                |
| family      | varchar(35)                    | NO   |     |         |                |
| member      | varchar(35)                    | NO   |     |         |                |
| att_name    | varchar(50)                    | NO   |     |         |                |
| data_type   | tinyint(1)                     | NO   |     | 0       |                |
| data_format | tinyint(1)                     | NO   |     | 0       |                |
| writable    | tinyint(1)                     | NO   |     | 0       |                |
| max_dim_x   | smallint(6) unsigned           | NO   |     | 0       |                |
| max_dim_y   | smallint(6) unsigned           | NO   |     | 0       |                |
| levelg      | tinyint(1)                     | NO   |     | 0       |                |
| facility    | varchar(45)                    | NO   |     |         |                |
| archivable  | tinyint(1)                     | NO   |     | 0       |                |
| substitute  | smallint(9)                    | NO   |     | 0       |                |
+-------------+--------------------------------+------+-----+---------+----------------+
```

```
mysql> describe amt;
+------------------+--------------------------------+------+-----+---------+-------+
| Field            | Type                           | Null | Key | Default | Extra |
+------------------+--------------------------------+------+-----+---------+-------+
| ID               | smallint(5) unsigned zerofill | NO   |     | 00000   |       |
| archiver         | varchar(255)                   | NO   |     |         |       |
| start_date       | datetime                       | YES  |     | NULL    |       |
| stop_date        | datetime                       | YES  |     | NULL    |       |
| per_mod          | int(1)                         | NO   |     | 0       |       |
| per_per_mod      | int(5)                         | YES  |     | NULL    |       |
| abs_mod          | int(1)                         | NO   |     | 0       |       |
| per_abs_mod      | int(5)                         | YES  |     | NULL    |       |
| dec_del_abs_mod  | double                         | YES  |     | NULL    |       |
| gro_del_abs_mod  | double                         | YES  |     | NULL    |       |
| rel_mod          | int(1)                         | NO   |     | 0       |       |
| per_rel_mod      | int(5)                         | YES  |     | NULL    |       |
| n_percent_rel_mod | double                         | YES  |     | NULL    |       |
| p_percent_rel_mod | double                         | YES  |     | NULL    |       |
| thr_mod          | int(1)                         | NO   |     | 0       |       |
| per_thr_mod      | int(5)                         | YES  |     | NULL    |       |
| min_val_thr_mod  | double                         | YES  |     | NULL    |       |
| max_val_thr_mod  | double                         | YES  |     | NULL    |       |
| cal_mod          | int(1)                         | NO   |     | 0       |       |
| per_cal_mod      | int(5)                         | YES  |     | NULL    |       |
| val_cal_mod      | int(3)                         | YES  |     | NULL    |       |
| type_cal_mod     | int(2)                         | YES  |     | NULL    |       |
| algo_cal_mod     | varchar(20)                    | YES  |     | NULL    |       |
| dif_mod          | int(1)                         | NO   |     | 0       |       |
| per_dif_mod      | int(5)                         | YES  |     | NULL    |       |
```

```
| ext_mod           | int(1)                        | NO   |     | 0       |       |
| refresh_mode      | tinyint(4)                    | YES  |     | 0       |       |
+-------------------+-------------------------------+------+-----+---------+-------+
```

```
mysql> describe apt;
+---------------+--------------------------+------+-----+---------+-------+
| Field         | Type                     | Null | Key | Default | Extra |
+---------------+--------------------------+------+-----+---------+-------+
| ID            | int(5) unsigned zerofill | NO   | PRI | 00000   |       |
| time          | datetime                 | YES  |     | NULL    |       |
| description   | varchar(255)             | NO   |     |         |       |
| label         | varchar(64)              | NO   |     |         |       |
| unit          | varchar(64)              | NO   |     | 1       |       |
| standard_unit | varchar(64)              | NO   |     | 1       |       |
| display_unit  | varchar(64)              | NO   |     |         |       |
| format        | varchar(64)              | NO   |     |         |       |
| min_value     | varchar(64)              | NO   |     | 0       |       |
| max_value     | varchar(64)              | NO   |     | 0       |       |
| min_alarm     | varchar(64)              | NO   |     | 0       |       |
| max_alarm     | varchar(64)              | NO   |     | 0       |       |
+---------------+--------------------------+------+-----+---------+-------+
```

B HDB++ tables SQL

```
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,
data_type
ENUM('scalar_double_ro','scalar_double_rw','array_double_ro','array_double_rw',
'scalar_int64_ro','scalar_int64_rw','array_int64_ro','array_int64_rw',
'scalar_int8_ro','scalar_int8_rw','array_int8_ro','array_int8_rw',
'scalar_string_ro','scalar_string_rw','array_string_ro','array_string_rw')
NOT NULL,
INDEX(att_name)
) ENGINE=MyISAM COMMENT='Attribute Configuration Table';


CREATE TABLE IF NOT EXISTS att_history
(
att_conf_id INT UNSIGNED NOT NULL,
time DATETIME(6) NOT NULL,
event ENUM('add','remove','start','stop') NOT NULL,
INDEX(att_conf_id)
) ENGINE=MyISAM COMMENT='Attribute Configuration Events History Table';


CREATE TABLE IF NOT EXISTS att_scalar_double_ro
(
att_conf_id INT UNSIGNED NOT NULL,
event_time DATETIME(6) NOT NULL,
recv_time DATETIME(6) NOT NULL,
insert_time DATETIME(6) NOT NULL,
value_r DOUBLE DEFAULT NULL,
INDEX(event_time),
INDEX(att_conf_id)
) ENGINE=MyISAM COMMENT='Scalar Double ReadOnly Values Table'
PARTITION BY KEY(att_conf_id)
PARTITIONS 1000;


CREATE TABLE IF NOT EXISTS att_scalar_double_rw
(
att_conf_id INT UNSIGNED NOT NULL,
event_time DATETIME(6) NOT NULL,
recv_time DATETIME(6) NOT NULL,
insert_time DATETIME(6) NOT NULL,
value_r DOUBLE DEFAULT NULL,
value_w DOUBLE DEFAULT NULL,
INDEX(event_time),
INDEX(att_conf_id)
) ENGINE=MyISAM COMMENT='Scalar Double ReadWrite Values Table'
PARTITION BY KEY(att_conf_id)
PARTITIONS 100;
```

```
CREATE TABLE IF NOT EXISTS att_array_double_ro
(
att_conf_id INT UNSIGNED NOT NULL,
event_time DATETIME(6) NOT NULL,
recv_time DATETIME(6) NOT NULL,
insert_time DATETIME(6) NOT NULL,
idx INT UNSIGNED NOT NULL,
dim_x INT UNSIGNED NOT NULL,
dim_y INT UNSIGNED NOT NULL DEFAULT 0,
value_r DOUBLE DEFAULT NULL,
INDEX(event_time),
INDEX(att_conf_id)
) ENGINE=MyISAM COMMENT='Array Double ReadOnly Values Table'
PARTITION BY KEY(att_conf_id)
PARTITIONS 100;


CREATE TABLE IF NOT EXISTS att_array_double_rw
(
att_conf_id INT UNSIGNED NOT NULL,
event_time DATETIME(6) NOT NULL,
recv_time DATETIME(6) NOT NULL,
insert_time DATETIME(6) NOT NULL,
idx INT UNSIGNED NOT NULL,
dim_x INT UNSIGNED NOT NULL,
dim_y INT UNSIGNED NOT NULL DEFAULT 0,
value_r DOUBLE DEFAULT NULL,
value_w DOUBLE DEFAULT NULL,
INDEX(event_time),
INDEX(att_conf_id)
) ENGINE=MyISAM COMMENT='Array Double ReadWrite Values Table'
PARTITION BY KEY(att_conf_id)
PARTITIONS 100;


CREATE TABLE IF NOT EXISTS att_scalar_int64_ro
(
att_conf_id INT UNSIGNED NOT NULL,
event_time DATETIME(6) NOT NULL,
recv_time DATETIME(6) NOT NULL,
insert_time DATETIME(6) NOT NULL,
value_r BIGINT DEFAULT NULL,
INDEX(event_time),
INDEX(att_conf_id)
) ENGINE=MyISAM COMMENT='Scalar Int up to 64 bit ReadOnly Values Table';


CREATE TABLE IF NOT EXISTS att_scalar_int64_rw
(
att_conf_id INT UNSIGNED NOT NULL,
event_time DATETIME(6) NOT NULL,
recv_time DATETIME(6) NOT NULL,
insert_time DATETIME(6) NOT NULL,
value_r BIGINT DEFAULT NULL,
```

```
value_w BIGINT DEFAULT NULL,
INDEX(event_time),
INDEX(att_conf_id)
) ENGINE=MyISAM COMMENT='Scalar Int up to 64 bit ReadWrite Values Table';


CREATE TABLE IF NOT EXISTS att_array_int64_ro
(
att_conf_id INT UNSIGNED NOT NULL,
event_time DATETIME(6) NOT NULL,
recv_time DATETIME(6) NOT NULL,
insert_time DATETIME(6) NOT NULL,
idx INT UNSIGNED NOT NULL,
dim_x INT UNSIGNED NOT NULL,
dim_y INT UNSIGNED NOT NULL DEFAULT 0,
value_r BIGINT DEFAULT NULL,
INDEX(event_time),
INDEX(att_conf_id)
) ENGINE=MyISAM COMMENT='Array Int up to 64 bit ReadOnly Values Table';


CREATE TABLE IF NOT EXISTS att_array_int64_rw
(
att_conf_id INT UNSIGNED NOT NULL,
event_time DATETIME(6) NOT NULL,
recv_time DATETIME(6) NOT NULL,
insert_time DATETIME(6) NOT NULL,
idx INT UNSIGNED NOT NULL,
dim_x INT UNSIGNED NOT NULL,
dim_y INT UNSIGNED NOT NULL DEFAULT 0,
value_r BIGINT DEFAULT NULL,
value_w BIGINT DEFAULT NULL,
INDEX(event_time),
INDEX(att_conf_id)
) ENGINE=MyISAM COMMENT='Array Int up to 64 bit ReadWrite Values Table';


CREATE TABLE IF NOT EXISTS att_scalar_int8_ro
(
att_conf_id INT UNSIGNED NOT NULL,
event_time DATETIME(6) NOT NULL,
recv_time DATETIME(6) NOT NULL,
insert_time DATETIME(6) NOT NULL,
value_r TINYINT(1) DEFAULT NULL,
INDEX(event_time),
INDEX(att_conf_id)
) ENGINE=MyISAM COMMENT='Scalar Int up to 8 bit ReadOnly Values Table';


CREATE TABLE IF NOT EXISTS att_scalar_int8_rw
(
att_conf_id INT UNSIGNED NOT NULL,
event_time DATETIME(6) NOT NULL,
recv_time DATETIME(6) NOT NULL,
```

```
insert_time DATETIME(6) NOT NULL,
value_r TINYINT(1) DEFAULT NULL,
value_w TINYINT(1) DEFAULT NULL,
INDEX(event_time),
INDEX(att_conf_id)
) ENGINE=MyISAM COMMENT='Scalar Int up to 8 bit ReadWrite Values Table';


CREATE TABLE IF NOT EXISTS att_array_int8_ro
(
att_conf_id INT UNSIGNED NOT NULL,
event_time DATETIME(6) NOT NULL,
recv_time DATETIME(6) NOT NULL,
insert_time DATETIME(6) NOT NULL,
idx INT UNSIGNED NOT NULL,
dim_x INT UNSIGNED NOT NULL,
dim_y INT UNSIGNED NOT NULL DEFAULT 0,
value_r TINYINT(1) DEFAULT NULL,
INDEX(event_time),
INDEX(att_conf_id)
) ENGINE=MyISAM COMMENT='Array Int up to 8 bit ReadOnly Values Table';


CREATE TABLE IF NOT EXISTS att_array_int8_rw
(
att_conf_id INT UNSIGNED NOT NULL,
event_time DATETIME(6) NOT NULL,
recv_time DATETIME(6) NOT NULL,
insert_time DATETIME(6) NOT NULL,
idx INT UNSIGNED NOT NULL,
dim_x INT UNSIGNED NOT NULL,
dim_y INT UNSIGNED NOT NULL DEFAULT 0,
value_r TINYINT(1) DEFAULT NULL,
value_w TINYINT(1) DEFAULT NULL,
INDEX(event_time),
INDEX(att_conf_id)
) ENGINE=MyISAM COMMENT='Array Int up to 8 bit ReadWrite Values Table';


CREATE TABLE IF NOT EXISTS att_scalar_string_ro
(
att_conf_id INT UNSIGNED NOT NULL,
event_time DATETIME(6) NOT NULL,
recv_time DATETIME(6) NOT NULL,
insert_time DATETIME(6) NOT NULL,
value_r VARCHAR(16384) DEFAULT NULL,
INDEX(event_time),
INDEX(att_conf_id)
) ENGINE=MyISAM COMMENT='Scalar String ReadOnly Values Table';


CREATE TABLE IF NOT EXISTS att_scalar_string_rw
(
att_conf_id INT UNSIGNED NOT NULL,
```

```
event_time DATETIME(6) NOT NULL,
recv_time DATETIME(6) NOT NULL,
insert_time DATETIME(6) NOT NULL,
value_r VARCHAR(16384) DEFAULT NULL,
value_w VARCHAR(16384) DEFAULT NULL,
INDEX(event_time),
INDEX(att_conf_id)
) ENGINE=MyISAM COMMENT='Scalar String ReadWrite Values Table';

CREATE TABLE IF NOT EXISTS att_array_string_ro
(
att_conf_id INT UNSIGNED NOT NULL,
event_time DATETIME(6) NOT NULL,
recv_time DATETIME(6) NOT NULL,
insert_time DATETIME(6) NOT NULL,
idx INT UNSIGNED NOT NULL,
dim_x INT UNSIGNED NOT NULL,
dim_y INT UNSIGNED NOT NULL DEFAULT 0,
value_r VARCHAR(16384) DEFAULT NULL,
INDEX(event_time),
INDEX(att_conf_id)
) ENGINE=MyISAM COMMENT='Array String ReadOnly Values Table';


CREATE TABLE IF NOT EXISTS att_array_string_rw
(
att_conf_id INT UNSIGNED NOT NULL,
event_time DATETIME(6) NOT NULL,
recv_time DATETIME(6) NOT NULL,
insert_time DATETIME(6) NOT NULL,
idx INT UNSIGNED NOT NULL,
dim_x INT UNSIGNED NOT NULL,
dim_y INT UNSIGNED NOT NULL DEFAULT 0,
value_r VARCHAR(16384) DEFAULT NULL,
value_w VARCHAR(16384) DEFAULT NULL,
INDEX(event_time),
INDEX(att_conf_id)
) ENGINE=MyISAM COMMENT='Array String ReadWrite Values Table';
```

C Event Subscriber full documentation

HdbEventSubscriber Tango Cpp Class

Contents :

HdbEventSubscriber Class Identification :

Contact	: at elettra.eu - graziano.scalamera
Class Family	: Miscellaneous
Platform	: Unix Like
Bus	: Not Applicable

HdbEventSubscriber Class Inheritance :

- Tango::DeviceImpl
  - HdbEventSubscriber

Manufacturer : none
Manufacturer ref. :

HdbEventSubscriber Class Description :

This class is able to subscribe on archive events and store value in Historical DB

HdbEventSubscriber Properties :

Class Properties			
Name	**Description**	**Ty**	**Default V**
SubscribeRetryPeriod	Subscribe event retrying period in seconds.	int	0
DbHost		String	no
DbUser			none
DbPassword		Stri	one
DbName		S ng	e
DbPort		s	none
StartArchivingAtStartup	Start archi g at st	boolean	none

vice Properti s			
Name	**cription**	**Type**	**Default Value**
SubscribeRetryPeriod	Subscribe event re period in seconds.	int	60
AttributeList	List of configured attributes.	String[]	none
DbHost		String	none
DbUser		String	none
DbPassword		String	none
DbName		String	none
DbPort		short	none
StartArchivingAtStartup	Start archiving at startup	boolean	none

---

HdbEventSubscriber Class Commands				
Name	**Input type**	**Output type**	**Level**	**Description**
State	DEV_VOID	DEV_STATE	OPERATOR	This command gets the device state (stored in its *device_state* data member) and returns it to the caller.
Status	DEV_VOID	CONST_DEV_STRING	OPERATOR	This command gets the device status (stored in its *device_status* data member) and returns it to the caller.
AttributeAdd	DEV_STRING	DEV_VOID	OPERATOR	Add a new attribute to archive in HDB.
AttributeRemove	DEV_STRING	DEV_VOID	OPERATOR	Remove attribute from configuration.
AttributeStatus	DEV_STRING	DEV_STRING	OPERATOR	Read a attribute status.
Start	DEV_VOID	DEV_VOID	OPERATOR	Start archiving
Stop	DEV_VOID	DEV_VOID	OPERATOR	Stop archiving
AttributeStart	DEV_STRING	DEV_VOID	OPERATOR	Start archiving single attribute
AttributeStop	DEV_STRING	DEV_VOID	OPERATOR	Stop archiving single attribute
ResetStatistics	DEV_VOID	DEV_VOID	OPERATOR	Reset statistics counter

---

Command State :

This command gets the device state (stored in its *device_state* data member) and returns it to the caller.

State Definition		
Input Argument	Tango::DEV_VOID	none
Output Argument	Tango::DEV_STATE	State Code
DisplayLevel	OPERATOR	..
Inherited	true	..
Abstract	true	..
Polling Period	Not polled	..
Command allowed for	All states	..

Command Status :

This command gets the device status (stored in its *device_status* data member) and returns it to the caller.

Status Definition		
Input Argument	Tango::DEV_VOID	none.
Output Argument	Tango::CONST_DEV_STRING	Status description
DisplayLevel	OPERATOR	..
Inherited	true	..
Abstract	true	..
Polling Period	Not polled	..
Command allowed for	All states	..

Command AttributeAdd :

Add a new attribute to archive in HDB.

AttributeAdd Definition		
Input Argument	ngo::DEV_STRING	ttribute name
Output Argument	Ta :DEV_VOID	
DisplayLevel	OPERA OR	..
Inherited	false	..
Abstract	false	..
Polling Period	Not polled	..
Command allowed for	All states	..

Command AttributeRemove :

Remove attribute from configuration.

AttributeRemove Definition		
Input Argument	Tango::DEV_STRING	Attribute name
Output Argument	Tango::DEV_VOID	
DisplayLevel	OPERATOR	..
Inherited	false	..
Abstract	false	..
Polling Period	Not polled	..
Command allowed for	All states	..

Command AttributeStatus :

Read a attribute status.

AttributeStatus Definition		
Input Argument	Tango::DEV_STRING	e attribute name
Output Argument	Tango::DEV_STRING	Tribute status.
DisplayLevel	OPERATOR	..
Inherited	e	..
Abstract	fals	..
Polling Period	Not po	..
Command allowed for	All states	..

Command Start :

Start archiving

Start Definition		

Input Argument	Tango::DEV_VOID	
Output Argument	Tango::DEV_VOID	
DisplayLevel	OPERATOR	..
Inherited	false	..
Abstract	false	..
Polling Period	Not polled	..
----------	----------	--
Command allowed for	All states	..

Command Stop :

Stop archiving

Stop Definition		
Input Argument	Tango::DEV_VOID	
Output Argument	Tango::DEV_VOID	
DisplayLevel	OPERATOR	..
Inherited	false	..
Abstract	false	..
Polling Period	Not p[illegible]d	..
----------	----------	--
Command allowed for	All states	..

Command AttributeStart :

Start archiving single attribute

AttributeStart Definition		
Input Argument	Tango::DEV_STRING	Attribute name
Output Argument	Tango::DEV_VOID	
DisplayLevel	OPERATOR	..

Inherited	false	..
Abstract	false	..
Polling Period	Not polled	..
Command allowed for	All states	..

Command AttributeStop :

Stop archiving single attribute

AttributeStop Definition		
Input Argument	Tango::DEV_STRING	Attribute name
Output Argument	Tango::DEV_VOID	
DisplayLevel	OPERATOR	..
Inherited	false	..
Abstract	false	..
Polling Period	Not polled	
Command allowed for	All states	..

Command ResetStatistics :

Reset statistic counters

ResetStatistics Definition		
Input Argument	Tango::DEV_VOID	
Output Argument	Tango::DEV_VOID	
DisplayLevel	OPERATOR	..
Inherited	false	..
Abstract	false	..
Polling Period	Not polled	..

Command allowed for	All states	..

HdbEventSubscriber Class Attributes							
Name	**Inherited**	**Abstract**	**Attr. type**	**R/W type**	**Data type**	**Level**	**Description**
AttributeOkNumber	false	false	Scalar	READ	Tango::DEV_LONG	OPERATOR	Number of archived attributes not in error
AttributeNokNumber	false	false	Scalar	READ	Tango::DEV_LONG	OPERATOR	Number of archived attributes in error
AttributePendingNumber	false	false	Scalar	READ	Tango::DEV_LONG	OPERATOR	Number of attributes waiting to be archived
AttributeNumber	false	false	Scalar	READ	Tango::DEV_LONG	OPERATOR	Number of configured attributes
AttributeMaxStoreTime	false	false	Scalar	READ	Tango::DEV_DOUBLE	OPERATOR	Maximum storing time
AttributeMinStoreTime	false	false	Scalar	READ	Tango::DEV_DOUBLE	OPERATOR	Minimum storing time
AttributeAVGStoreTime	false	false	Scalar	READ	Tango::DEV_DOUBLE	OPERATOR	Average storing time
AttributeMaxProcessingTime	false	false	Scalar	READ	Tango::DEV_DOUBLE	OPERATOR	Maximum processing (from event reception to storage) time
AttributeMinProcessingTime	false	false	Scalar	READ	Tango::DEV_DOUBLE	OPERATOR	Minimum processing (from event reception to storage) time
AttributeAVGProcessingTime	false	false	Scalar	READ	Tango::DEV_DOUBLE	OPERATOR	Average processing (from event reception to storage)

							time
AttributeList	false	false	Spectrum	READ	Tango::DEV_STRING	OPERATOR	Returns the configured attribute list
AttributeOkList	false	false	Spectrum	READ	Tango::DEV_STRING	OPERATOR	Returns the attributes not on error list
AttributeNokList	false	false	Spectrum	READ	Tango::DEV_STRING	OPERATOR	Returns the attributes on error list
AttributePendingList	false	false	Spectrum	READ	Tango::DEV_STRING	OPERATOR	Returns the attributes waiting to be archived

---

There is no dynamic attribute defined.

Attribute AttributeOkNumber :

Number of archived attribute[illegible]ot in error

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_LONG
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

Attribute Properties
label
unit
standard unit
display unit
format
max_value
min_value
max_alarm
min_alarm
max_warning
min_warning

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set

delta_time	
delta_val	

Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

Attribute AttributeNokNumber :

Number of archived attributes in error

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_LONG
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not [illegible]
Memorized	Not se[illegible]
Read allowed for	All states

Attribute Properties
label
unit
standard unit
display [illegible]nit
form[illegible]
max_va[illegible]
[illegible]_value
ma[illegible]alarm
mi[illegible]alarm
[illegible]x_warning
min_warning
delta_time
delta_val

Attribute Event Criteria	
[illegible]iodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

Attribute AttributePendingNumber :

Number of attributes waiting to be archived

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_LONG
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

Attribute Properties	
label	
unit	
standard unit	
display unit	
format	
max_value	
min_value	
max_alarm	
min_alarm	
max_warning	
min_warning	
delta_time	
delta_val	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

Attribute AttributeNumber :

Number of configured attributes

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_LONG
Display Level	OPERATOR
Inherited	false
Abstract	false

Attribute Properties	
label	
unit	
standard unit	
display unit	
format	
max_value	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
	Not

Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

min_value
max_alarm
min_alarm
max_warning
min_warning
delta_time
delta_val

Archive Periodic	set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

Attribute AttributeMaxStoreTime :

Maximum storing time

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DE OUBLE
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

ttribute perties
bel
t
s dard unit
splay unit
format
max_value
min_value
max_alarm
min_alarm
max_warning
min_warning
delta_time
delta_val

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

Attribute AttributeMinStoreTime :

Minimum storing time

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_DOUBLE
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All state

Attribute Properties
label
unit
standard unit
display unit
format
max_value
min_value
max_alarm
min_alarm
max_warning
min_warning
data_time
data_val

Attribute Event Criteria	
	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

Attribute AttributeAVGStoreTime :

Average storing time

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_DOUBLE
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

Attribute Properties	
label	
unit	
standard unit	
display unit	
format	
max_value	
min_value	
max_alarm	
min_alarm	
max_warning	
min_warning	
delta_time	
delta_val	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

Attribute AttributeMaxProcessingTime :

Maximum processing (from event reception to storage) time

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_DOUBLE
Display Level	OPERATOR
Inherited	false
Abstract	false

Attribute Properties	
label	
unit	
standard unit	
display unit	
format	
max_value	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not

Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

min_value
max_alarm
min_alarm
max_warning
min_warning
delta_time
delta_val

	set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

Attribute AttributeMinProcessingTime :

Minimum processing (from event reception to storage) time

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_DOUBLE
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

Attribute Properties
label
unit
standard unit
display unit
format
max_value
min_value
max_alarm
min_alarm
max_warning
min_warning
delta_time
delta_val

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false

Push DataReady event by user code	false

Attribute AttributeAVGProcessingTime :

Average processing (from event reception to storage) time

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_DOUBLE
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All st

Attribute Properties
label
unit
standard unit
display unit
format
max_ lue
m lue
max_ rm
min_ala
x_warning
_warning
ta_time
delta_val

Attri ute Event Criteria	
P	Not set
Relative C	Not set
A ute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

Attribute AttributeList :

Returns the configured attribute list

Attribute Definition	
Attribute Type	Spectrum (10000)
R/W Type	READ
Data Type	Tango::DEV_STRING
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

Attribute Properties	
label	
unit	
standard unit	
display unit	
format	
max_value	
min_value	
max_alarm	
min_alarm	
max_warning	
min_warning	
delta_time	
delta_val	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

Attribute AttributeOkList :

Returns the attributes not on error list

Attribute Definition	
Attribute Type	Spectrum (10000)
R/W Type	READ
Data Type	Tango::DEV_STRING
Display Level	OPERATOR
Inherited	false

Attribute Properties	
label	
unit	
standard unit	
display unit	
format	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set

Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

max_value
min_value
max_alarm
min_alarm
max_warning
min_warning
delta_time
delta_val

Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

Attribute AttributeNokList :

Returns the attributes on error list

Attribute Definition	
Attribute Type	Specu (10000)
R/W Type	READ
Data Type	Tango::DEV_ RING
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

ribute Prop ties
l l
u
ndard unit
display unit
format
max_value
min_value
max_alarm
min_alarm
max_warning
min_warning
delta_time
delta_val

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false

Push DataReady event by user code	false

Attribute AttributePendingList :

Returns the attributes waiting to be archived

Attribute Definition	
Attribute Type	Spectrum (10000)
R/W Type	READ
Data Type	Tango::DEV_STRING
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All s[illegible]s

Attribute Properties
label
unit
standard unit
display unit
format
max_v[illegible]lue
mi[illegible]lue
max_[illegible]rm
[illegible]in_alar[illegible]
[illegible]x_warning
m[illegible]_warning
d[illegible]a_time
[illegible]elta_val

Attribute Event Criteria	
P[illegible]	Not set
Relative C[illegible]	Not set
A[illegible]ute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

HdbEventSubscriber Class States

Name	Description
ON	Archiving running and everything is OK.
ALARM	One or more attributes faulty or FIFO size above threshold
OFF	Archiving stopped
FAULT	All attributes faulty

D Configuration Manager full documentation

HdbConfigurationManager Tango Cpp Class

Contents :

HdbConfigurationManager Class Identification :

Contact	: at elettra.eu - graziano.scalamera
Class Family	: Miscellaneous
Platform	: Unix Like

HdbConfigurationManager Class Inheritance :

- Tango::DeviceImpl
  - HdbConfigurationManager

Bus : Not Applicable
Manufacturer : none
Manufacturer ref. :

HdbConfigurationManager Class Description :

HdbConfigurationManager Properties :

Class Properties			
Name	**Description**	**Type**	**Default Value**
DbHost		String	none
DbUser		String	none
DbPassword		String	none
DbName		String	none
DbPort		short	none
MaxSearchSize		int	none

Device Properties			
Name	**Description**	**Type**	**Default Value**
ArchiverList		String[]	none
MaxSearchSize	Max size of search result	int	1000
DbHost		String	none
DbUser		String	none
DbPassword		String	none
DbName		String	none
DbPort		short	none

HdbConfigurationManager Class Commands				
Name	**Input type**	**Output type**	**Level**	**Description**
State	DEV_VOID	DEV_STATE	OPERATOR	This command gets the device state (stored in its device_state data member) and returns it to the

				caller.
Status	DEV_VOID	CONST_DEV_STRING	OPERATOR	This command gets the device status (stored in its device_status data member) and returns it to the caller.
AttributeAdd	DEV_VOID	DEV_VOID	OPERATOR	Add a new attribute to archive in HDB.
AttributeRemove	DEV_STRING	DEV_VOID	OPERATOR	Remove attribute from configuration.
AttributeStart	DEV_STRING	DEV_VOID	OPERATOR	Start archiving single attribute
AttributeStop	DEV_STRING	DEV_VOID	OPERATOR	Stop archiving single attribute
ArchiverAdd	DEV_STRING	DEV_VOID	OPERATOR	Add a new archiver to archive in HDB.
AttributeAssign	DEVVAR_STRINGARRAY	DEV_VOID	OPERATOR	Assigne attribute to archiver
AttributeStatus	DEV_STRING	DEV_STRING	OPERATOR	Read an attribute status
AttributeGetArchiver	DEV_STRING	DEV_STRING	OPERATOR	Return archiver associated to attribute.
AttributeSearch	DEV_STRING	DEVVAR_STRINGARRAY	OPERATOR	Return list of attributes containing input argument
ArchiverRemove	DEV_STRING	DEV_VOID	OPERATOR	...e archiver instance.
ResetStatistics	DEV_VOID	DEV_VOID	OPERATOR	Reset statistic counters

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Command State :

This command gets the device state (stored in its device_state data member) and returns it to the caller.

State Definition		
Input Argument	Tango::DEV_VOID	..
Output Argument	Tango::DEV_STATE	Device state
DisplayLevel	OPERATOR	..
Inherited	true	..
Abstract	true	..
Polling Period	Not polled	..
Command allowed for	All states	..

Command Status :

This command gets the device status (stored in its device_status data member) and returns it to the caller.

Status Definition		
Input Argument	Tango::DEV_VOID	none
Output Argument	Tango::CONST_DEV_STRING	Device status
DisplayLevel	OPERATOR	..
Inherited	true	..
Abstract	true	..
Polling Period	Not polled	..
Command allowed for	All states	..

Command AttributeAdd :

Add a new attribute to archive in HDB.

AttributeAdd Definition		
Input Argument	Tango::D	
Output Argument	Tan .DEV_VOID	
DisplayLevel	RATOR	..
Inherited	fals	..
Abstract	false	..
Polling Period	Not polled	..
Command allowed for	All states	..

Command AttributeRemove :

Remove attribute from configuration.

AttributeRemove Definition		
Input Argument	Tango::DEV_STRING	Attribute name

Output Argument	Tango::DEV_VOID	
DisplayLevel	OPERATOR	..
Inherited	false	..
Abstract	false	..
Polling Period	Not polled	..
Command allowed for	All states	..

Command AttributeStart :

Start archiving single attribute

AttributeStart Definition		
Input Argument	Tango::DEV_STRING	Attribute name
Output Argument	Tango::DEV_VOID	
DisplayLevel	OPERATOR	..
Inherited	false	..
Abstract	false	..
Polling Period	Not polled	..
Command allowed for	All states	..

Command AttributeStop :

Stop archiving single attribute

AttributeStop Definition		
Input Argument	Tango::DEV_STRING	Attribute name
Output Argument	Tango::DEV_VOID	
DisplayLevel	OPERATOR	..
Inherited	false	..
Abstract	false	..
Polling Period	Not polled	..

Command allowed for	All states	..

Command ArchiverAdd :

Add a new archiver to archive in HDB.

ArchiverAdd Definition		
Input Argument	Tango::DEV_STRING	Archiver name
Output Argument	Tango::DEV_VOID	
DisplayLevel	OPERATOR	..
Inherited	false	..
Abstract	false	..
Polling Period	Not polled	..
Command allowed for	All states	..

Command AttributeAssign :

Assigne attribute to archiv

AttributeAssign Definition		
Input Argument	Tango::DEVVAR_STRINGARRAY	[0]: Attribute name [1]: Archiver name
Output Argument	Tango::DEV_VOID	
DisplayLevel	OPERATOR	..
Inherited	false	..
Abstract	false	..
Polling Period	Not polled	..
Command allowed for	All states	..

Command AttributeStatus :

Read an attribute status

AttributeStatus Definition		
Input Argument	Tango::DEV_STRING	The attribute name
Output Argument	Tango::DEV_STRING	The attribute status. TODO: DevString OK?
DisplayLevel	OPERATOR	..
Inherited	false	..
Abstract	false	..
Polling Period	Not polled	..
Command allowed for	All states	..

Command AttributeGetArchiver :

Return archiver associated to attribute.

AttributeGetArchiver Definition		
Input Argument	Tango::DEV_STRING	Attribute name
Output Argument	Tango::DEV_STRING	Archiver name
DisplayLevel	OPERATOR	..
Inherited	false	..
Abstract	false	..
Polling Period	Not polled	..
Command allowed for	All states	..

Command AttributeSearch :

Return list of attributes containing input argument

AttributeSearch Definition		
Input Argument	Tango::DEV_STRING	Attribute name or part of it
Output Argument	Tango::DEVVAR_STRINGARRAY	Attribute list
DisplayLevel	OPERATOR	..
Inherited	false	..
Abstract	false	..
Polling Period	Not polled	..
Command allowed for	All states	..

Command ArchiverRemove :

Remove archiver instance.

ArchiverRemove Definition		
Input Argument	Tango::DEV_STRING	Archiver name
Output Argument	Tango::DEV_VOID	
DisplayLevel	OPERATOR	..
Inherited	false	
Abstract	false	..
Polling Period	Not polled	..
Command allowed for	All states	

Command ResetStatistics :

Reset statistic counters

ResetStatistics Definition		
Input Argument	Tango::DEV_VOID	
Output Argument	Tango::DEV_VOID	
DisplayLevel	OPERATOR	..
Inherited	false	..
Abstract	false	..

Polling Period	Not polled	..
Command allowed for	All states	..

HdbConfigurationManager Class Attributes							
Name	**Inherited**	**Abstract**	**Attr. type**	**R/W type**	**Data type**	**Level**	**Description**
AttributeOKNumber	false	false	Scalar	READ	Tango::DEV_LONG	OPERATOR	Number of archived attributes not in error
AttributeNokNumber	false	false	Scalar	READ	Tango::D ONG	OPERATOR	Number of archived attributes in error
AttributePendingNumber	false	false	Scalar	READ	Tango:: _LONG	OPERATOR	Number of attributes waiting to be archived
AttributeNumber	false	false	Scalar	R AD	Tan DEV_LONG	OPERATOR	Number of configured attributes
SetAttributeName	false	fals	Scalar	EAD_WRI	ango::DEV_STRING	OPERATOR	
SetPollingPeriod	false	false	lar	R D_WRITE	Tango::DEV_LONG	OPERATOR	
SetAbsoluteEvent	fal	false	Sca	REA VRITE	Tango::DEV_DOUBLE	OPERATOR	
SetRelativeEvent	fa	false	Scala	READ_WRITE	Tango::DEV_DOUBLE	OPERATOR	
SetPeriodEvent	false	false	Scalar	READ_WRITE	Tango::DEV_LONG	OPERATOR	
SetCodePushedEvent	false		Scala	READ_WRITE	Tango::DEV_BOOLEAN	OPERATOR	
SetArchiver	false	fals	S ar	READ_WRITE	Tango::DEV_STRING	OPERATOR	
AttributeMaxStoreTime	false	false	Scalar	READ	Tango::DEV_DOUBLE	OPERATOR	Maximum storing time
AttributeMinStoreTime	false	false	Scalar	READ	Tango::DEV_DOUBLE	OPERATOR	Minimum storing time
AttributeMaxProcessingTime	false	false	Scalar	READ	Tango::DEV_DOUBLE	OPERATOR	Maximum processing (from event reception to storage) time
AttributeMinProcessingTime	false	false	Scalar	READ	Tango::DEV_DOUBLE	OPERATOR	Minimum processing (from event reception to storage) time

ArchiverList	false	false	Spectrum	READ	Tango::DEV_STRING	OPERATOR	
ArchiverStatus	false	false	Spectrum	READ	Tango::DEV_STRING	OPERATOR	

There is no dynamic attribute defined.

Attribute AttributeOKNumber :

Number of archived attributes not in error

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_LONG
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All

Attribute Properti
label
unit
standard unit
display unit
format
max_va e
min_
ax_alar
alarm
ma varning
min arning
de _time
elta_val

Attr e Event Criteria	
Periodic	Not set
tive Change	Not set
Abs Change	Not set
chive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

Attribute AttributeNokNumber :

Number of archived attributes in error

Attribute Definition	
Attribute Type	Scalar

Attribute Properties
label

Attribute Event Criteria	
Periodic	Not set

R/W Type	READ
Data Type	Tango::DEV_LONG
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

unit
standard unit
display unit
format
max_value
min_value
max_alarm
min_alarm
max_warning
min_warning
delta_time
delta_val

Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

Attribute AttributePendingNumber :

Number of attributes waiting to be archived

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_LONG
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

Attribute Properties
label
unit
standard unit
display unit
format
max_value
min_value
max_alarm
min_alarm
max_warning
min_warning
delta_time
delta_val

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

Attribute AttributeNumber :

Number of configured attributes

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_LONG
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

Attribute Properties
label
unit
standard unit
display unit
format
max_value
min_value
max_alarm
min_alarm
max_warning
min_warning
delta_time
delta_val

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

Attribute SetAttributeName :

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ_WRITE
Data Type	Tango::DEV_STRING
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states
Write allowed for	All states

Attribute Properties
label
unit
standard unit
display unit
format
max_value
min_value
max_alarm
min_alarm
max_warning
min_warning
delta_time

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

delta_val

Attribute SetPollingPeriod :

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ_WRITE
Data Type	Tango::DEV_LONG
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states
Write allowed for	All states

Attribute Properties
label
unit
standard unit
display unit
format
max_value
min_value
max_alarm
min_alarm
max_warning
min_warning
delta_time
delta_val

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

Attribute SetAbsoluteEvent :

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ_WRITE
Data Type	Tango::DEV_DOUBLE
Display Level	OPERATOR
Inherited	false
Abstract	false

Attribute Properties
label
unit
standard unit
display unit
format
max_value
min_value

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set

Polling Period	Not polled
Memorized	Not set
Read allowed for	All states
Write allowed for	All states

max_alarm
min_alarm
max_warning
min_warning
delta_time
delta_val

Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

Attribute SetRelativeEvent :

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ_WRITE
Data Type	Tango::DEV_DOUBLE
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states
Write allowed for	All states

Attribute Properties
label
unit
standard unit
display unit
format
min_value
min_alarm
min_warning
delta_time
delta_val

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

Attribute SetPeriodEvent :

Attribute Definition	
Attribute Type	Scalar

Attribute Properties
label
unit

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set

R/W Type	READ_WRITE
Data Type	Tango::DEV_LONG
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states
Write allowed for	All states

standard unit
display unit
format
max_value
min_value
max_alarm
min_alarm
max_warning
min_warning
delta_time
delta_val

Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

Attribute SetCodePushedEvent :

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ_W E
Data Type	Tango EV_BOOLEAN
Display Level	OPE OR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states
Write allowed for	All states

Attribute ropertie
la
unit
tandard u
play unit
mat
ax_value
min_value
max_alarm
min_alarm
max_warning
min_warning
delta_time
delta_val

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

Attribute SetArchiver :

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ_WRITE
Data Type	Tango::DEV_STRING
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states
Write allowed for	All states

Attribute Properties
label
unit
standard unit
display unit
format
max_value
min_value
max_alarm
min_alarm
max_warning
min_warning
delta_time
delta_val

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

Attribute AttributeMaxStoringTime :

Maximum storing time

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_DOUBLE
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

Attribute Properties
label
unit
standard unit
display unit
format
max_value
min_value
max_alarm
min_alarm
max_warning

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false

min_warning
delta_time
delta_val

Push DataReady event by user code	false

Attribute AttributeMinStoreTime :

Minimum storing time

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_DOUBLE
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All st[illegible]s

Attribute Properties
label
unit
standard unit
display unit
format
max_value
min_[illegible]ue
ma[illegible]rm
min_al[illegible]
[illegible]x_warni[illegible]
[illegible]_warning
d[illegible]_time
[illegible]ta_val

Attribute Event Criteria	
Pe[illegible]	Not set
Relative [illegible]nge	Not set
Absolute Ch[illegible]	Not set
Arc[illegible] Periodic	Not set
Archive Relative Change	Not set
[illegible]rchive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

Attribute AttributeMaxProcessingTime :

Maximum processing (from event reception to storage) time

Attribute Definition	
Attribute Type	Scalar

Attribute Properties
label

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set

R/W Type	READ
Data Type	Tango::DEV_DOUBLE
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

unit
standard unit
display unit
format
max_value
min_value
max_alarm
min_alarm
max_warning
min_warning
delta_time
delta_val

Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

Attribute AttributeMinProcessingTime :

Minimum processing (from event reception to storage) time

Attribute Definition	
Attribute Type	Scala
R/W Type	REA
Data Type	Tango::D DOUBLE
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

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u
st dard unit
play unit
format
max_value
min_value
max_alarm
min_alarm
max_warning
min_warning
delta_time
delta_val

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

Attribute ArchiverList :

Attribute Definition	
Attribute Type	Spectrum (1000)
R/W Type	READ
Data Type	Tango::DEV_STRING
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

Attribute Properties
label
unit
standard unit
display unit
format
max_value
min_value
max_alarm
min_alarm
max_warning
min_warning
delta_time
delta_val

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

Attribute ArchiverStatus :

Attribute Definition	
Attribute Type	Spectrum (1000)
R/W Type	READ
Data Type	Tango::DEV_STRING
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states

Attribute Properties
label
unit
standard unit
display unit
format
max_value
min_value
max_alarm
min_alarm
max_warning
min_warning
delta_time

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

delta_val

HdbConfigurationManager Class States	
Name	**Description**
ON	
ALARM	At least one archiver is in ALARM