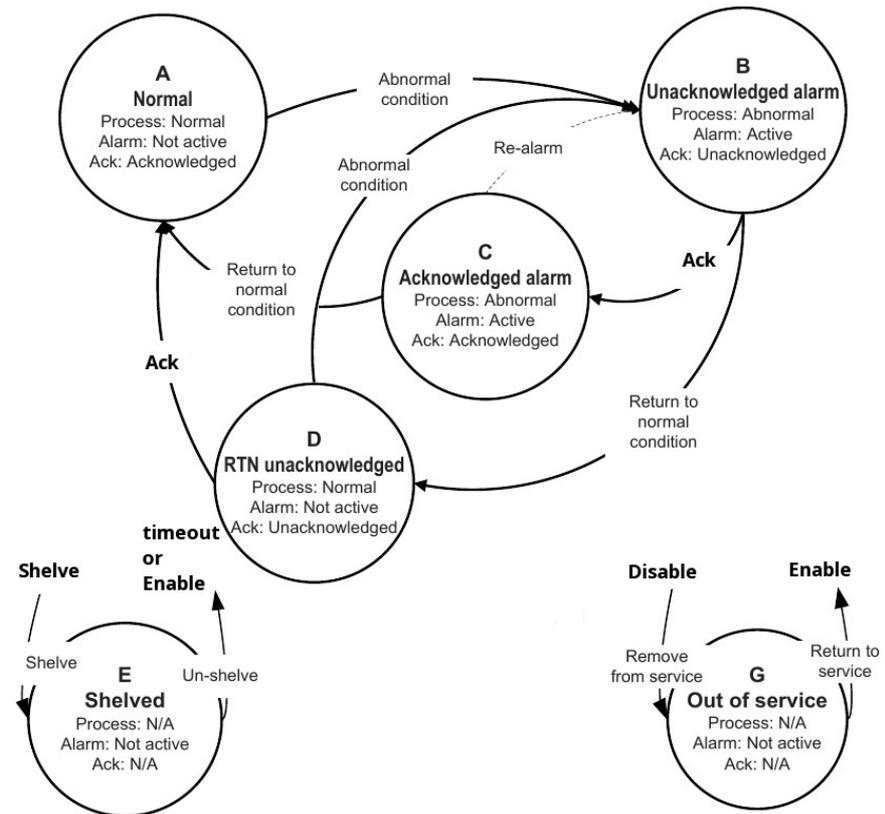


Elettra AlarmHandler

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IEC 62682

- Alarms states definition (NORM, UNACK, ACKED, RTNUN, SHLVD, DSUPR, OOSRV) and transition between states
- Alarm Priority (highest, high,
 - medium, low, lowest)
- Alarm on-delay, off-delay
- Alarm shelving
- Alarm frequency monitoring
- ...



Alarm formula insights:

- quality is supported in formula with 2 syntax:
 - name/of/device/attr.**quality**
 - **quality**(expression involving attributes)
- to ease the use of alarm attributes in another alarm formula the following are supported:
 - name/of/device/attr.**alarm** evaluates true if ==UNACK || ==ACK
 - name/of/device/attr.**normal** evaluates true if ==NORM || ==RTNUN
- added ternary if condition: $(expr1 ? expr2 : expr3)$
- added some functions: **max**(expr1,expr2), **min**(expr1,expr2), **pow**(expr1,expr2)

Tango Errors reporting:

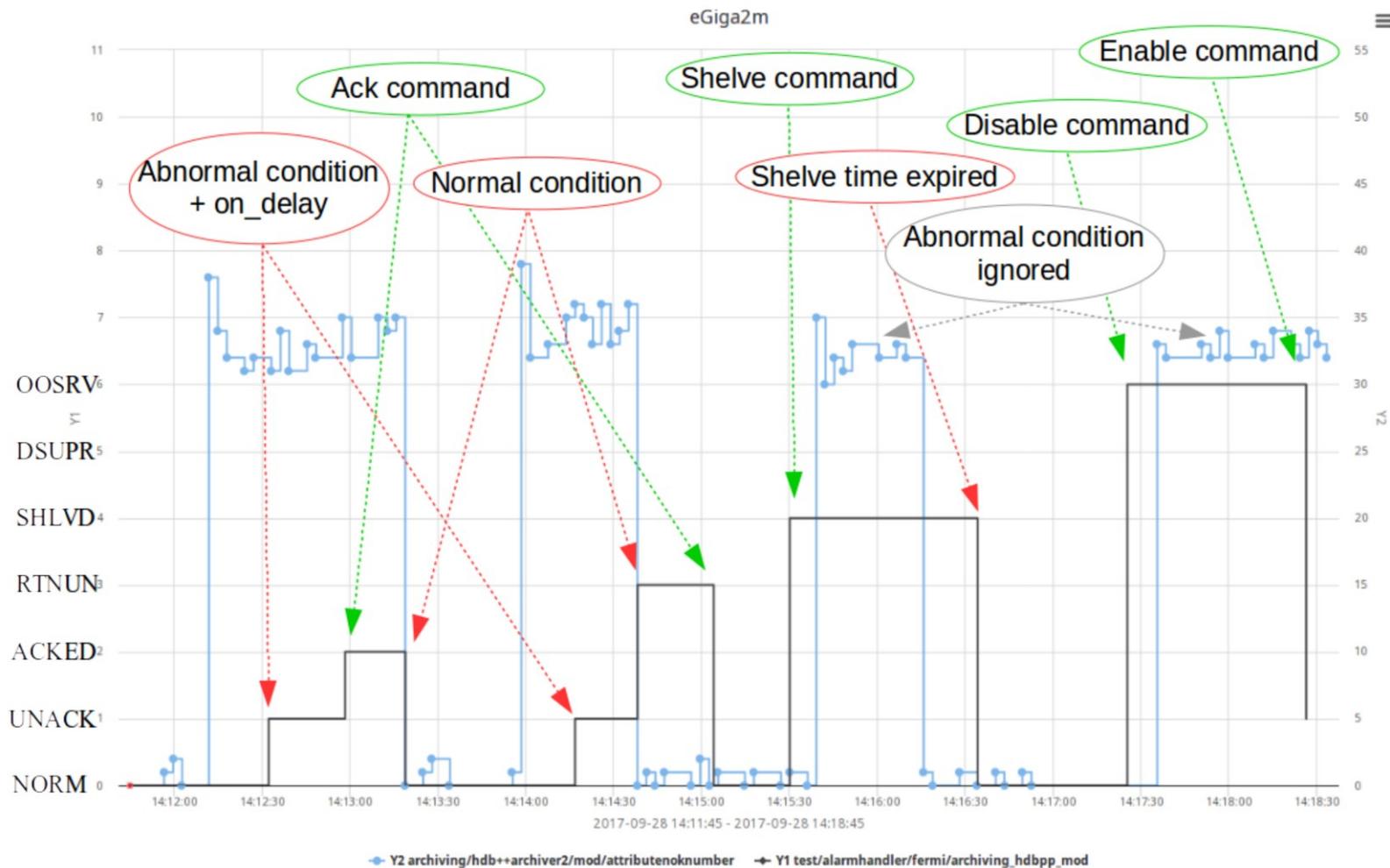
- *each attribute re-throws the exceptions received while evaluating the formula (if more than one attribute in the formula is in error just the first is reported)*
- *quality of the alarm attribute is the result of the combination of attributes in the formula (INVALID if at least one invalid, ALARM if at least one in alarm, WARNING if at least one in warning, CHANGING if at least on in changing, VALID otherwise)*

Elettra AlarmHandler

Alarm history -> HDB++

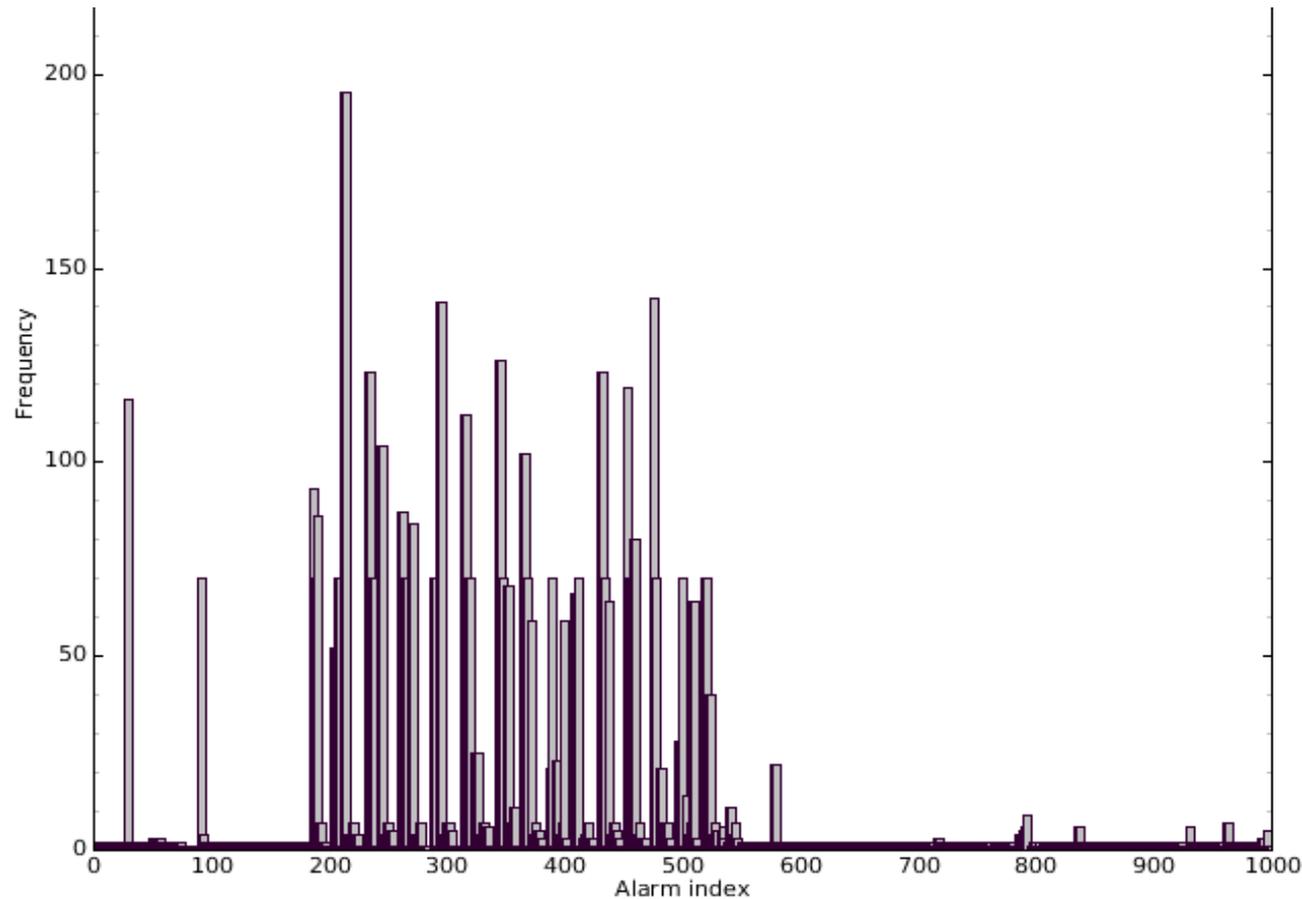
- Every alarm is implemented as a dynamic attribute pushing events at each state transition, so its history can be easily archived with HDB++

```
tag=archiving_hdbb_mod;formula=(archiving/hdb++archiver/attributenoknumber > 0);on_delay=20
```



Elettra AlarmHandler Performances

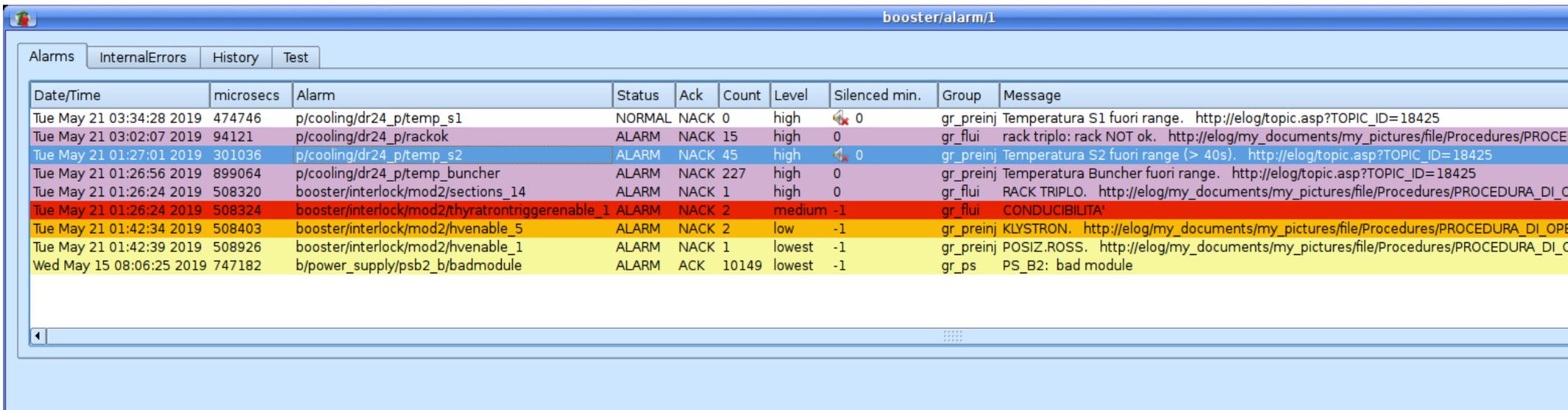
- Typical load on Fermi: ~1000 alarms, ~1000 formula evaluation/minute
Example: formula evaluation frequency distribution during 10 minutes



- TODO: stress test to find upper limit

Legacy GUI development

- Alarm priority: highest, high, medium, low, lowest displayed with different colors (from purple to light yellow)
- Support for http addresses in the message: right-click to open in the browser



The screenshot shows a web browser window titled "booster/alarm/1". The interface has tabs for "Alarms", "InternalErrors", "History", and "Test". The "Alarms" tab is active, displaying a table of alarm events. The table has columns for Date/Time, microseconds, Alarm, Status, Ack, Count, Level, Silenced min., Group, and Message. The rows are color-coded by priority: purple for normal, blue for high, red for medium, orange for low, and yellow for lowest.

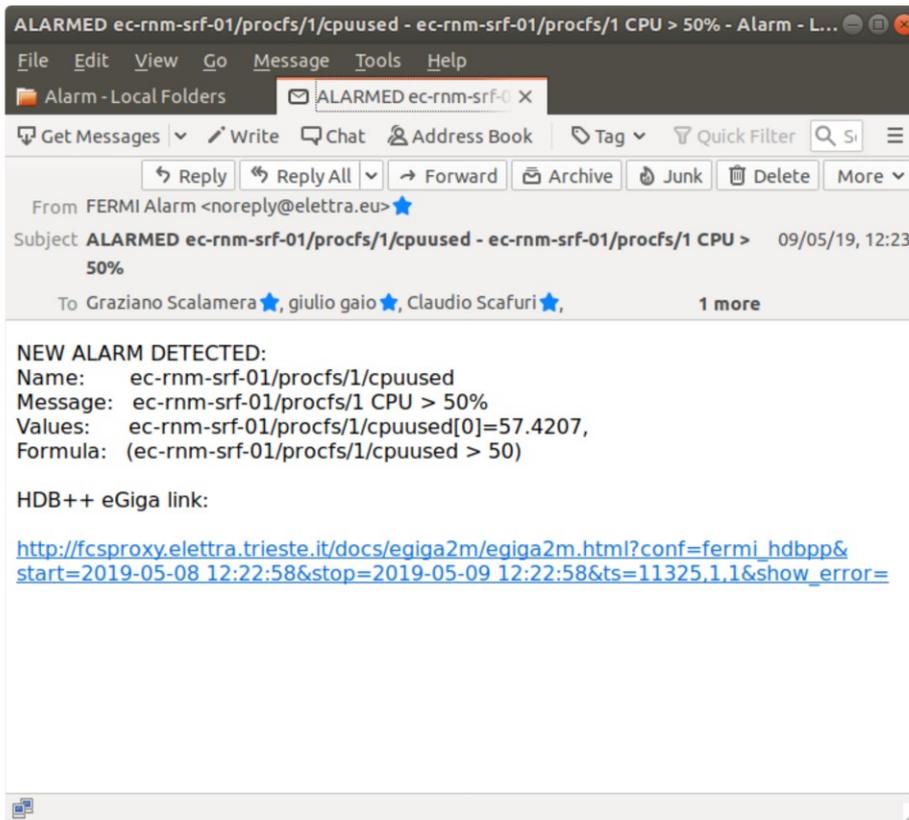
Date/Time	microsecs	Alarm	Status	Ack	Count	Level	Silenced min.	Group	Message
Tue May 21 03:34:28 2019	474746	p/cooling/dr24_p/temp_s1	NORMAL	NACK	0	high	0	gr_preinj	Temperatura S1 fuori range. http://elog/topic.asp?TOPIC_ID=18425
Tue May 21 03:02:07 2019	94121	p/cooling/dr24_p/rackok	ALARM	NACK	15	high	0	gr_flui	rack triplo: rack NOT ok. http://elog/my_documents/my_pictures/file/Procedures/PROCE
Tue May 21 01:27:01 2019	301036	p/cooling/dr24_p/temp_s2	ALARM	NACK	45	high	0	gr_preinj	Temperatura S2 fuori range (> 40s). http://elog/topic.asp?TOPIC_ID=18425
Tue May 21 01:26:56 2019	899064	p/cooling/dr24_p/temp_buncher	ALARM	NACK	227	high	0	gr_preinj	Temperatura Buncher fuori range. http://elog/topic.asp?TOPIC_ID=18425
Tue May 21 01:26:24 2019	508320	booster/interlock/mod2/sections_14	ALARM	NACK	1	high	0	gr_flui	RACK TRIPLO. http://elog/my_documents/my_pictures/file/Procedures/PROCEDURA_DI_C
Tue May 21 01:26:24 2019	508324	booster/interlock/mod2/thyratrontriggerenable_1	ALARM	NACK	2	medium	-1	gr_flui	CONDUCIBILITA'
Tue May 21 01:42:34 2019	508403	booster/interlock/mod2/hvenable_5	ALARM	NACK	2	low	-1	gr_preinj	KLYSTRON. http://elog/my_documents/my_pictures/file/Procedures/PROCEDURA_DI_OPE
Tue May 21 01:42:39 2019	508926	booster/interlock/mod2/hvenable_1	ALARM	NACK	1	lowest	-1	gr_preinj	POSIZ.ROSS. http://elog/my_documents/my_pictures/file/Procedures/PROCEDURA_DI_C
Wed May 15 08:06:25 2019	747182	b/power_supply/psb2_b/badmodule	ALARM	ACK	10149	lowest	-1	gr_ps	PS_B2: bad module

- TODO: GUI still based on legacy Elettra Alarm device server interface
-> update to take advantage of new AlarmHandler interface and features

Mail notification

Through an Email Notification device server developed in Python (can do SMS)

- An email notification can display the EGiga link to the history of the attribute involved
- Or if it's an HDB++ alarm the list of attributes in error



ALARMED ec-rnm-srf-01/procfs/1/cpused - ec-rnm-srf-01/procfs/1 CPU > 50% - Alarm - L...

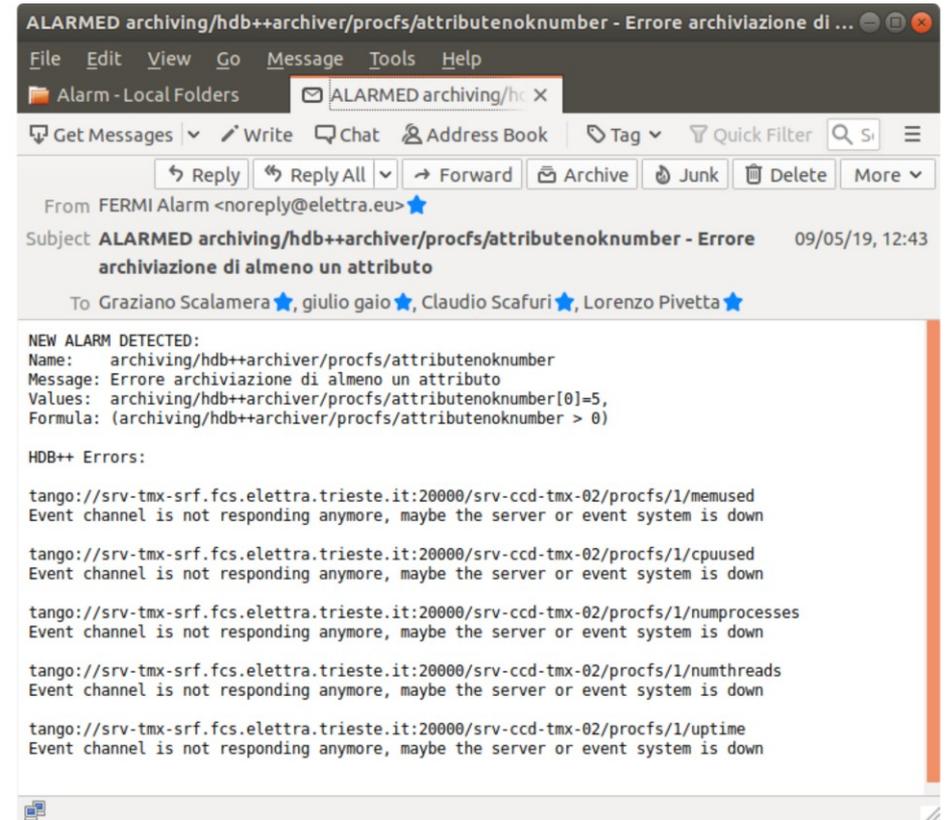
From FERMI Alarm <noreply@elettra.eu>★

Subject **ALARMED ec-rnm-srf-01/procfs/1/cpused - ec-rnm-srf-01/procfs/1 CPU > 50%** 09/05/19, 12:23

To Graziano Scalamera★, giulio gaio★, Claudio Scafuri★, 1 more

NEW ALARM DETECTED:
Name: ec-rnm-srf-01/procfs/1/cpused
Message: ec-rnm-srf-01/procfs/1 CPU > 50%
Values: ec-rnm-srf-01/procfs/1/cpused[0]=57.4207,
Formula: (ec-rnm-srf-01/procfs/1/cpused > 50)

HDB++ eGiga link:
http://fcsproxy.elettra.trieste.it/docs/egiga2m/egiga2m.html?conf=fermi_hdbpp&start=2019-05-08 12:22:58&stop=2019-05-09 12:22:58&ts=11325.1.1&show_error=



ALARMED archiving/hdb++archiver/procfs/attributenoknumber - Errore archiviazione di ...

From FERMI Alarm <noreply@elettra.eu>★

Subject **ALARMED archiving/hdb++archiver/procfs/attributenoknumber - Errore archiviazione di almeno un attributo** 09/05/19, 12:43

To Graziano Scalamera★, giulio gaio★, Claudio Scafuri★, Lorenzo Pivetta★

NEW ALARM DETECTED:
Name: archiving/hdb++archiver/procfs/attributenoknumber
Message: Errore archiviazione di almeno un attributo
Values: archiving/hdb++archiver/procfs/attributenoknumber[0]=5,
Formula: (archiving/hdb++archiver/procfs/attributenoknumber > 0)

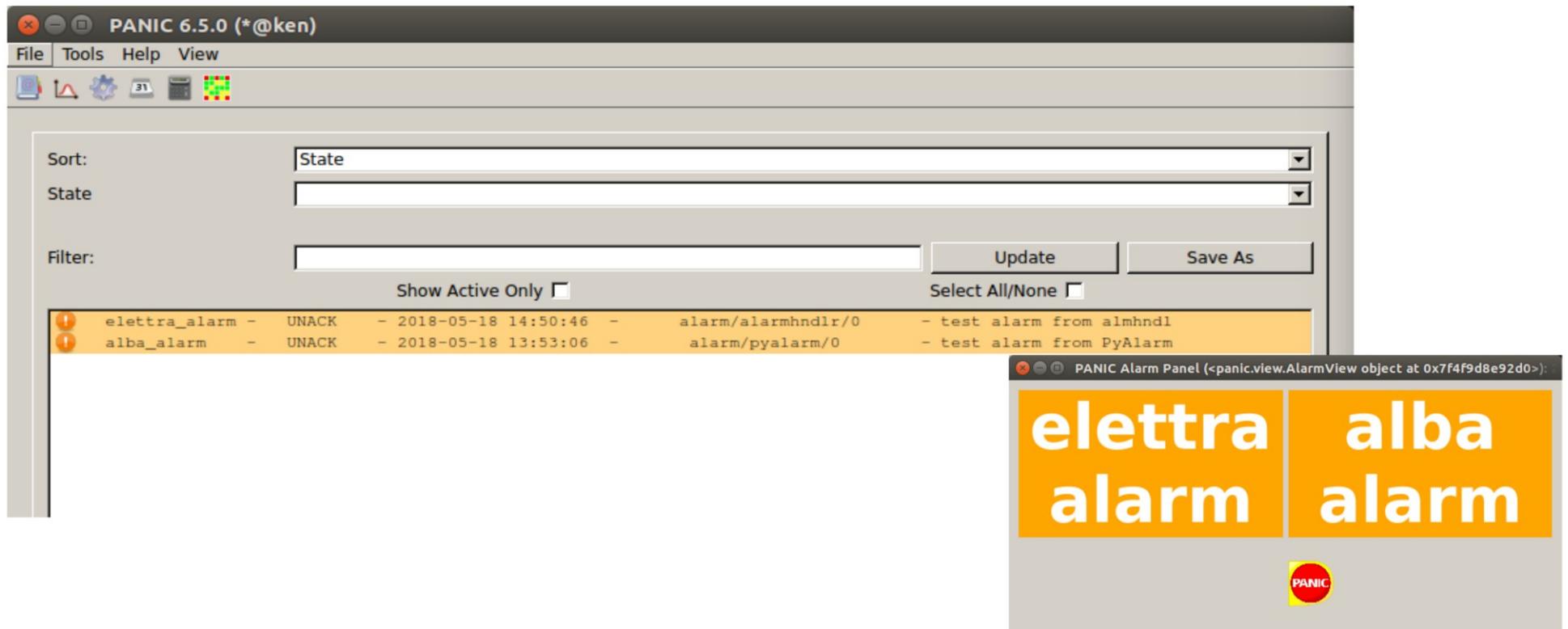
HDB++ Errors:

- tango://srv-tmx-srf.fcs.elettra.trieste.it:20000/srv-ccd-tmx-02/procfs/1/memused
Event channel is not responding anymore, maybe the server or event system is down
- tango://srv-tmx-srf.fcs.elettra.trieste.it:20000/srv-ccd-tmx-02/procfs/1/cpused
Event channel is not responding anymore, maybe the server or event system is down
- tango://srv-tmx-srf.fcs.elettra.trieste.it:20000/srv-ccd-tmx-02/procfs/1/numprocesses
Event channel is not responding anymore, maybe the server or event system is down
- tango://srv-tmx-srf.fcs.elettra.trieste.it:20000/srv-ccd-tmx-02/procfs/1/numthreads
Event channel is not responding anymore, maybe the server or event system is down
- tango://srv-tmx-srf.fcs.elettra.trieste.it:20000/srv-ccd-tmx-02/procfs/1/uptime
Event channel is not responding anymore, maybe the server or event system is down

ALBA PANIC Integration

DONE:

- Common alarm state definition and transition between states
- Common attributes and commands used by the GUI to display alarms -> PANIC GUI can display AlarmHandler alarms (some issues still to be fixed)



The screenshot displays the PANIC 6.5.0 software interface. The main window shows a table of active alarms with the following data:

Alarm Name	State	Timestamp	Source	Description
elettra_alarm	UNACK	2018-05-18 14:50:46	alarm/alarmhndlr/0	test alarm from almhndl
alba_alarm	UNACK	2018-05-18 13:53:06	alarm/pyalarm/0	test alarm from PyAlarm

Below the table, a 'PANIC Alarm Panel' is visible, featuring two large orange buttons labeled 'elettra alarm' and 'alba alarm', and a red 'PANIC' indicator light.



ALBA PANIC Integration

TODO:

- Alarm Groups: PANIC doesn't support group specification per alarm, instead it configures alarms belonging to the same group in the same PyAlarm. Is it needed to be compatible or can remain a different behavior?
- Alarms Configuration: AlarmHandler stores the configuration of each alarm in the attribute properties, PANIC in the PyAlarm device properties. Could both be supported? Which approach is better?
- Alarm actions: AlarmHandler supports specifying 2 commands (on_command, off_command). PANIC, can configure much more in the AlarmReceivers property (commands, writing of attributes, emails, SMS, ...). AlarmHandler should support the Receivers per alarm attribute property with possibly the same syntax as PANIC.

AlarmHandler Configuration

Jive 7.10 [srv-tango-srf:20000] (on srv-admin-srf)

File Edit Tools Filter

Server: /alarmhandler-srv/test/AlarmHandler/test/alarmhandler/fermi/Attribute properties/kg02__climate__frogprobe_kg02.01__a

Property name	Value
enabled	1
formula	(kg02/climate/frogprobe_kg02.01/state == ALARM)
group	gr_climate
message	Frogprobe ALARM
off_command	
off_delay	0
on_command	
on_delay	0
priority	medium
receivers	climate@elettra.eu,SMS:+391231231
shlvd_time	-1
tag	kg02__climate__frogprobe_kg02.01__alarm

Refresh Apply New property Copy Delete