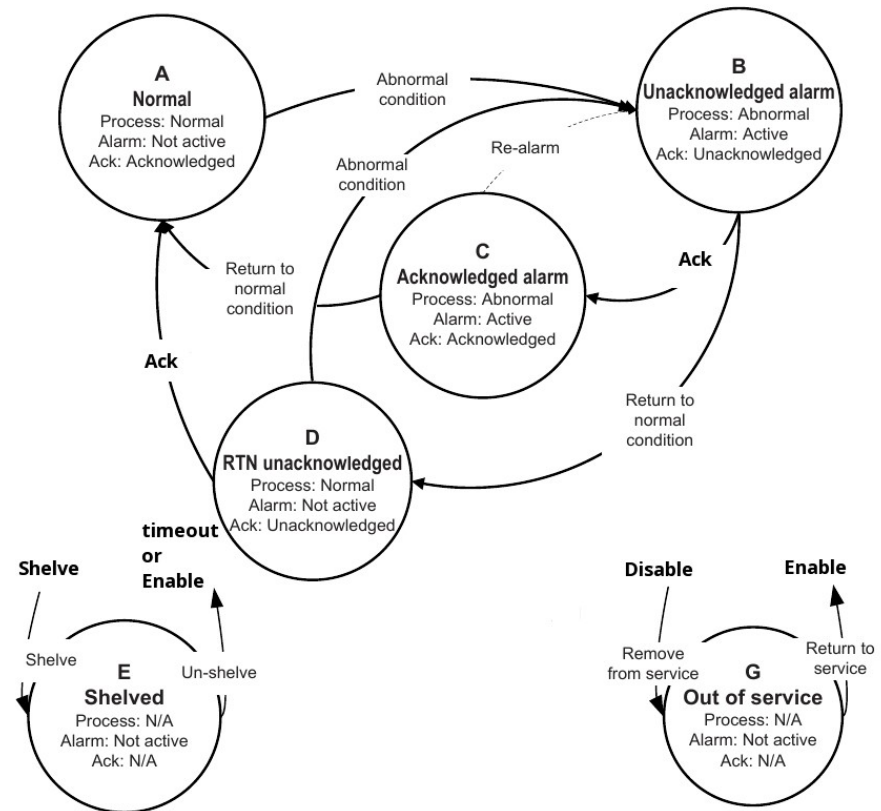


# Elettra AlarmHandler

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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:

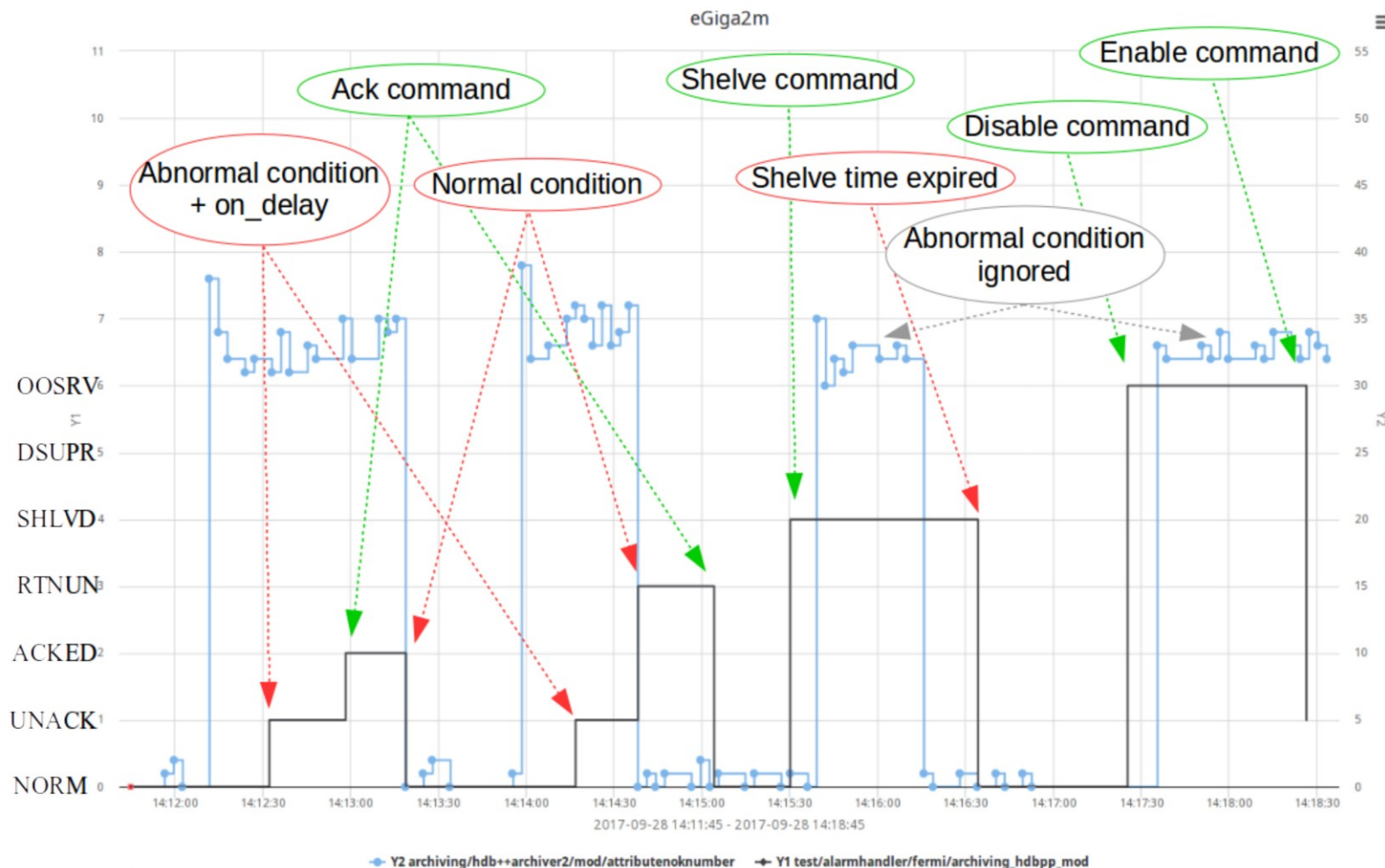
- *each attribute re-throws the exceptions received while evaluating the formula (if more than one attribute in the formula is in error just the first is reported)*
- *quality of the alarm attribute is the result of the combination of attributes in the formula (INVALID if at least one invalid, ALARM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

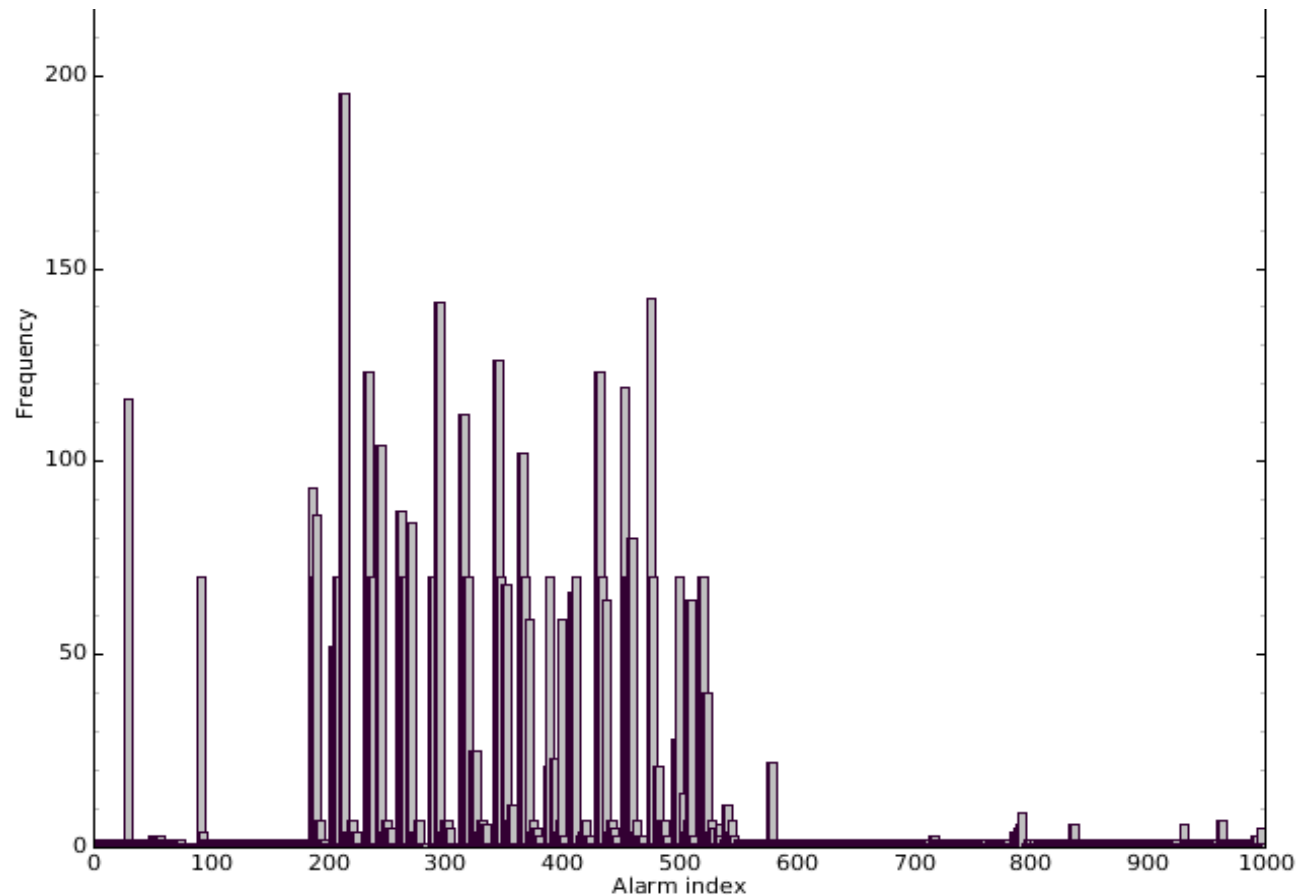
tag=archiving\_hdbb\_mod;formula=(archiving/hdb++archiver/attributenoknumber > 0);on\_delay=20



# Elettra AlarmHandler

## Performances

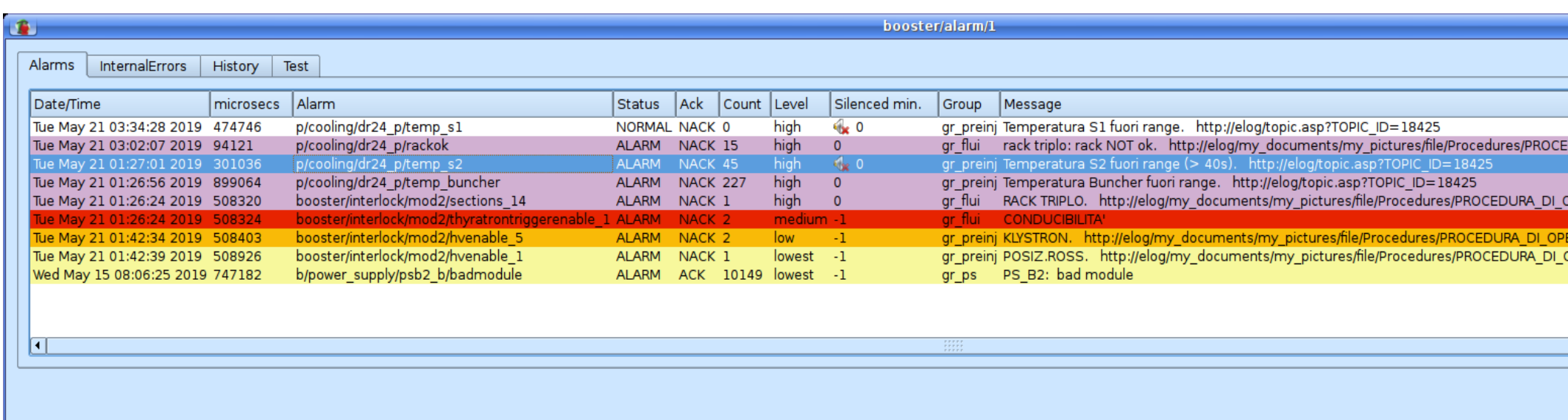
- Typical load on Fermi: ~1000 alarms, ~1000 formula evaluation/minute  
Example: formula evaluation frequency distribution during 10 minutes



- 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



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. <a href="http://elog/topic.asp?TOPIC_ID=18425">http://elog/topic.asp?TOPIC_ID=18425</a>
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. <a href="http://elog/my_documents/my_pictures/file/Procedures/PROCE">http://elog/my_documents/my_pictures/file/Procedures/PROCE</a>
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). <a href="http://elog/topic.asp?TOPIC_ID=18425">http://elog/topic.asp?TOPIC_ID=18425</a>
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. <a href="http://elog/topic.asp?TOPIC_ID=18425">http://elog/topic.asp?TOPIC_ID=18425</a>
Tue May 21 01:26:24 2019	508320	booster/interlock/mod2/sections_14	ALARM	NACK	1	high	0	gr_flui	RACK TRIPOLO. <a href="http://elog/my_documents/my_pictures/file/Procedures/PROCEDURA_DI_C">http://elog/my_documents/my_pictures/file/Procedures/PROCEDURA_DI_C</a>
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. <a href="http://elog/my_documents/my_pictures/file/Procedures/PROCEDURA_DI_OP">http://elog/my_documents/my_pictures/file/Procedures/PROCEDURA_DI_OP</a>
Tue May 21 01:42:39 2019	508926	booster/interlock/mod2/hvenable_1	ALARM	NACK	1	lowest	-1	gr_preinj	POSIZ.ROSS. <a href="http://elog/my_documents/my_pictures/file/Procedures/PROCEDURA_DI_C">http://elog/my_documents/my_pictures/file/Procedures/PROCEDURA_DI_C</a>
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

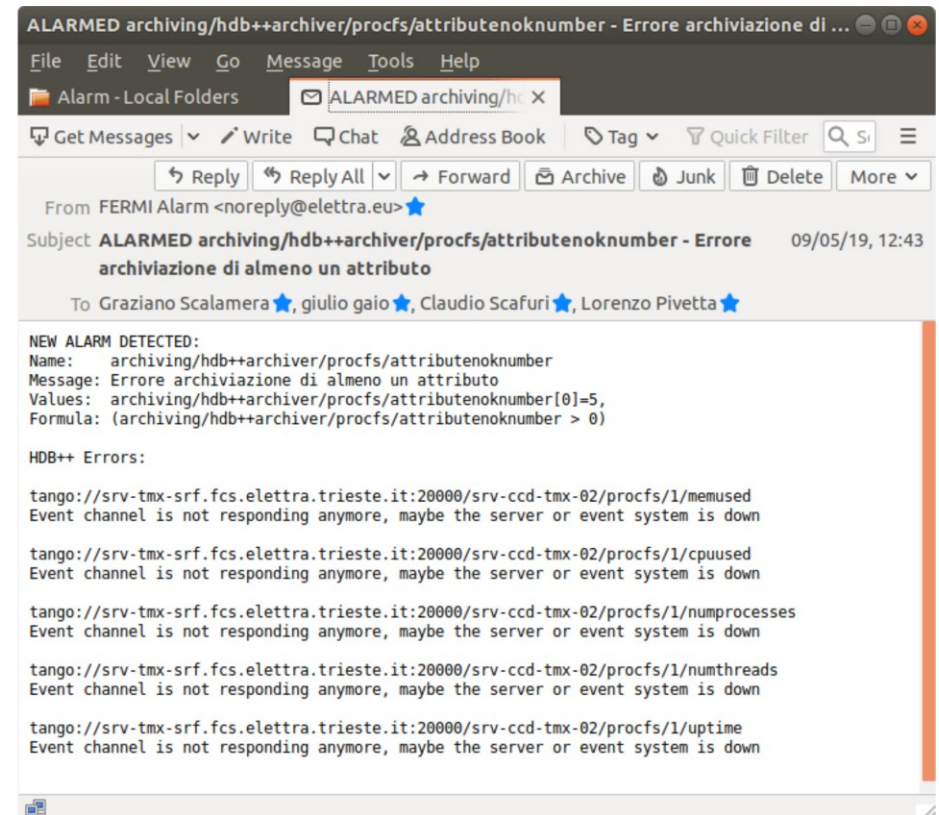
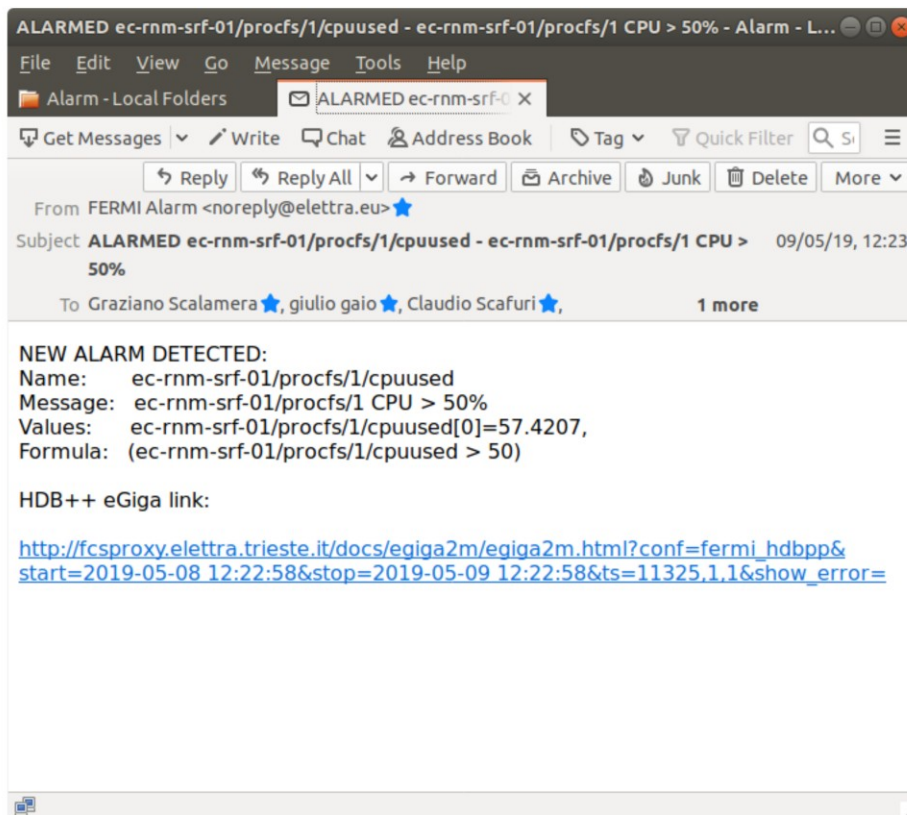
- TODO: GUI still based on legacy Elettra Alarm device server interface  
-> update to take advantage of new AlarmHandler interface and features



## Mail notification

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

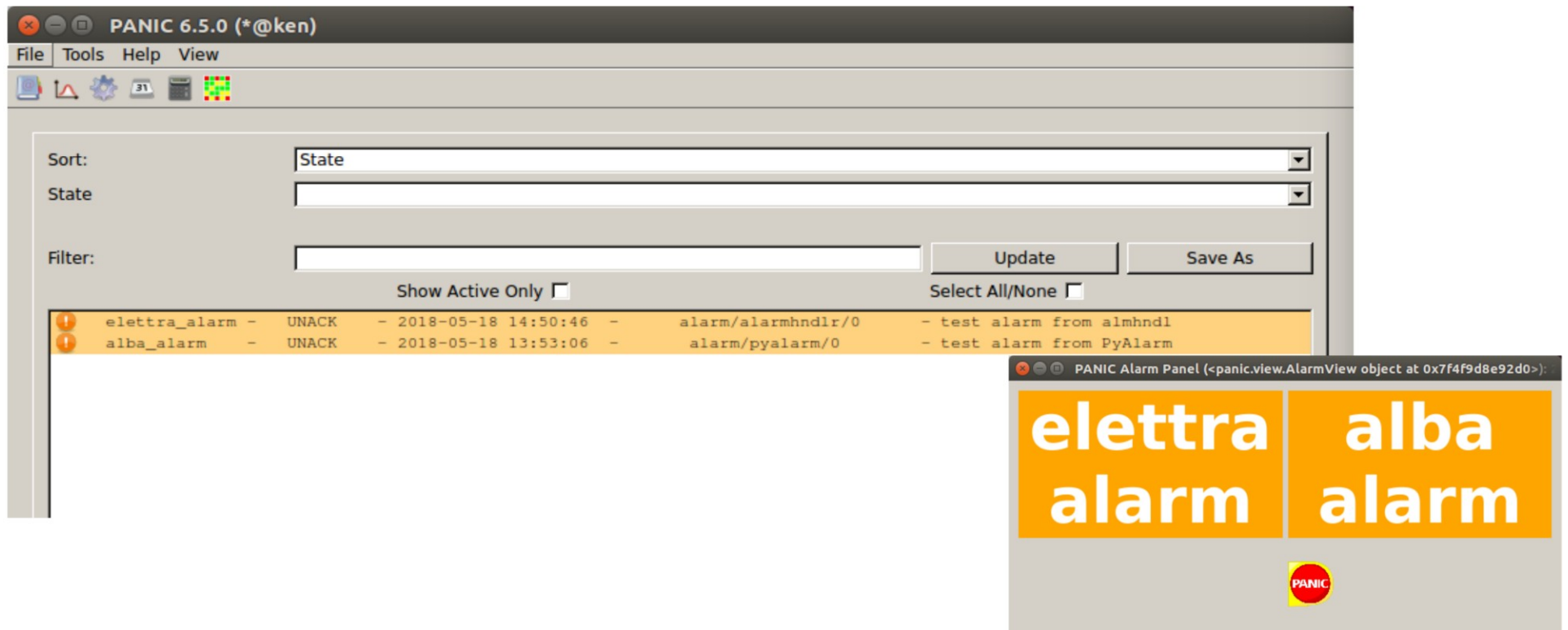
- An email notification can display the EGiga link to the history of the attribute involved
- Or if it's an HDB++ alarm the list of attributes in error



## 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)







## 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: + 39123 123 1
shlvd_time	-1
tag	kg02__climate__frogprobe_kg02.01__alarm

Refresh Apply New property Copy Delete