

# FESA Spy

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# Agenda

Introduction

Live Demo

Description of the Application & its Functionality

Limitations

Coming Up Next

# Introduction: FESA Spy

- An expert GUI to improve the diagnostics functionality of the old FESA Navigator
- Functionality:
  - Receive real-time diagnostics from FESA instance
  - Display diagnostic messages as logs
  - Oscilloscope view of events
  - Statistics of events, and jitter between events

# Live Demo

Try out the beta at: `/mcr/bin/fesaspy`

# Customizable layout that can be saved

Save Configuration

Save Restore Delete

LastSession

LastSession

Select Fesa Instance

Search FESA server Open ZIP file

HighSpeedNotif\_DU.cfc-ccr-fesa3 Server name

HighSpeedNotif  
GD0000000000000000000000000045931 Device name

Connection Status

Status: Connected

Diagnostic Settings

Filter: Incoming Messages

Trigger Event

Timer - Timer:1::0

Recording

Load Recording Save Recording Export CSV

- Work in progress. Feedback is super helpful. Please message ben.wilop@cern.ch

Logging Profiling

100ns 1µs 10µs 100µs 1ms 10ms 100ms 1s 10s 100s 1000s

Timer - [ ]

Main - [ ]

Notif: High

+

-

Timing differences of double-clicked packages

122.07µs

30.041µs 53.167µs

38.862µs

92.03µs

68.903µs

Message 1

Thread - Event: Timer - Timer:1::

Action: Action.START

Message 2

Thread - Event: Main -

Action: Action.NO\_ACTION

Histogram of difference between message 2 and last occurrence of message 1 in  
mean = 56.474µs

30000

20000

10000

0

1µs 10µs 100µs 1ms 10ms 100ms 1s

# Choose Diagnostics

Select Fesa Instance

+

Connection Status

+

Diagnostic Settings

+

Filter Incoming Messages

+

# Select Fesa instance

1. Enter server name + global device

Select Fesa Instance

Search FESA server      Open ZIP file

HighSpeedNotif\_DU.cfc-ccr-fesa3      Server name

HighSpeedNotif

GD000000000000000000000000045931      Device name

2. Search CCDB

Access CCDA to search for FESA global devices

Server: high

Class:

Version:

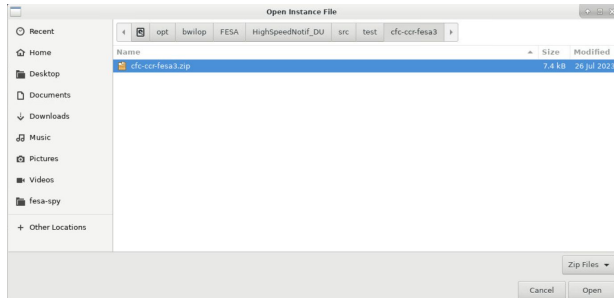
Fec:

Device:

	Server	Class	Version	Fec	Device
1	HighSpeedNotif_DU.cfv-cc...	HighSpeedNotif	0.3.2	cfv-ccr-ctbadm001	HighSpeedNotif.cfv-ccr-...
2	HighSpeedNotif_DU.cfc-cc...	HighSpeedNotif	0.3.2	cfc-ccr-fesa3	GD0000000000000000000000...


Select      Cancel

3. Open FESA-Plugin ZIP file




# Connection status

Connection Status -




Status: Disconnected

Connection Status -




Status: Connecting

Connection Status -



Status: Connected

Connection Status -



Status: Connecting failed (Setting of port failed!)



# Diagnostic settings (server side)

**Diagnostic Settings**

All None Profiling

- SRV\_GET\_ACTION
- SRV\_SET\_ACTION
- RT\_ACTION
- EVENT
- NOTIFICATION

All None Tracing

- SRV\_GET\_ACTION
- SRV\_SET\_ACTION
- RT\_ACTION
- EVENT
- NOTIFICATION
- PERSISTENCY
- TRANSACTION
- SUBSCRIPTION
- SIGNAL\_HANDLER
- LOCAL\_CONNECTION

All None Custom Topics

Trace Devices

Bypass Action

**Trace Devices**

OK

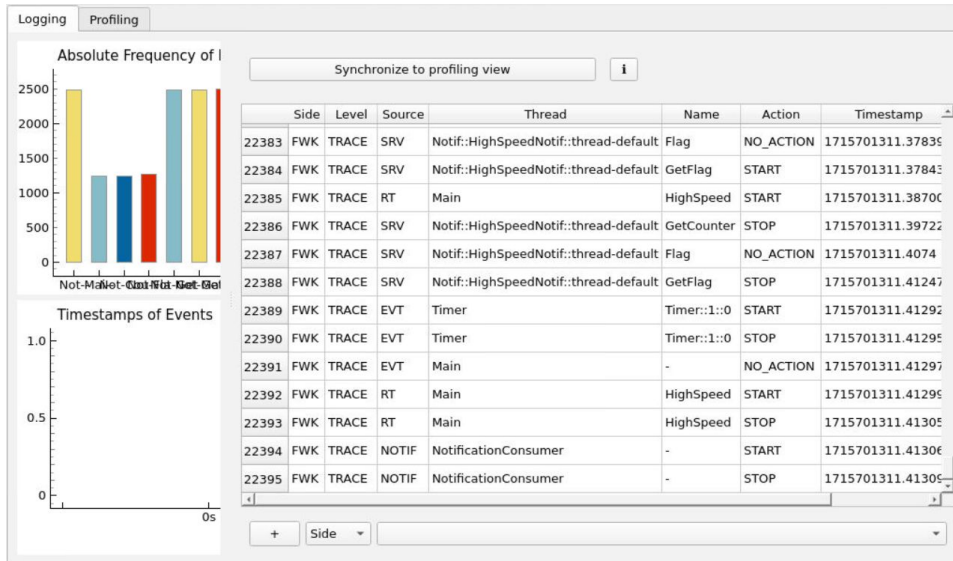
# Filter incoming messages (local)

- Delete all messages that do not match at least one filter (“or” filter)
- Avoids memory problems



# Investigate Diagnostics

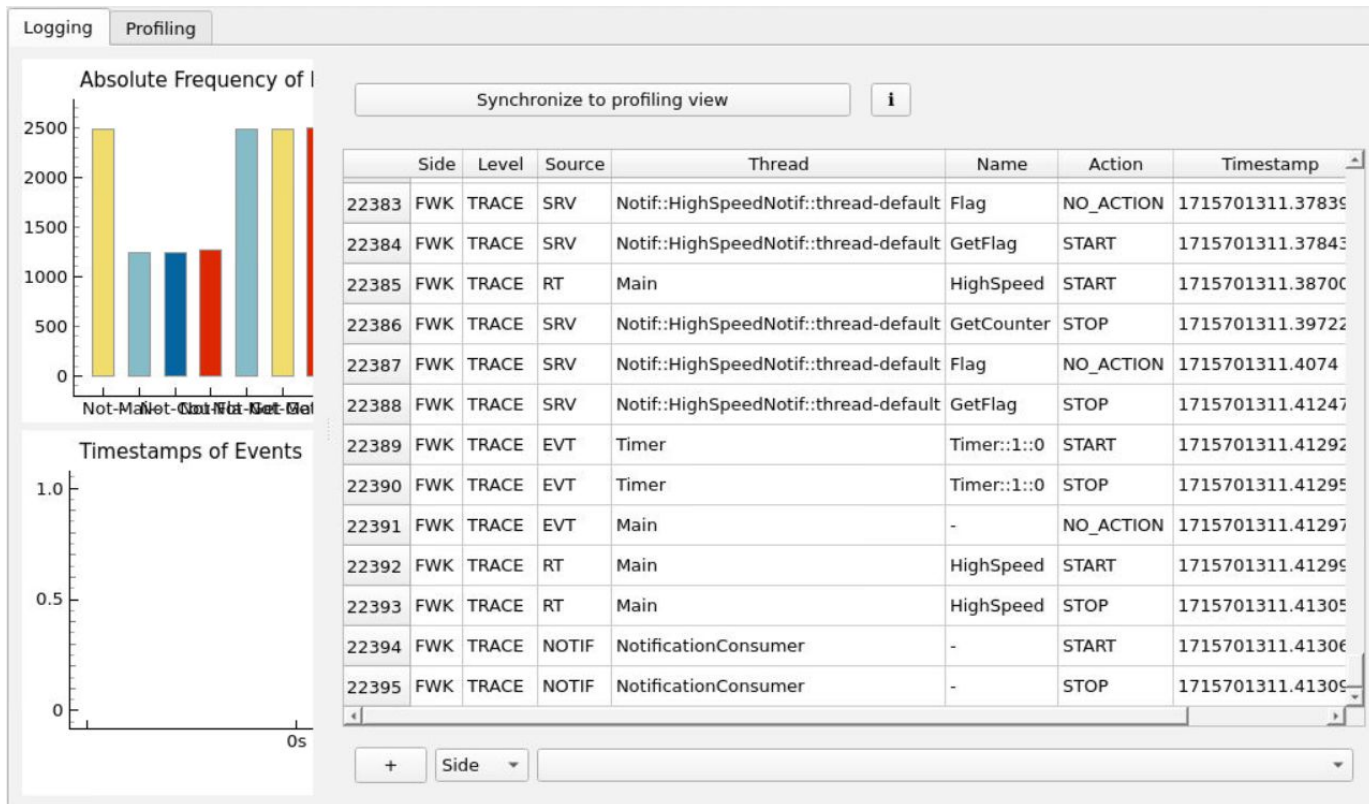
## Logging



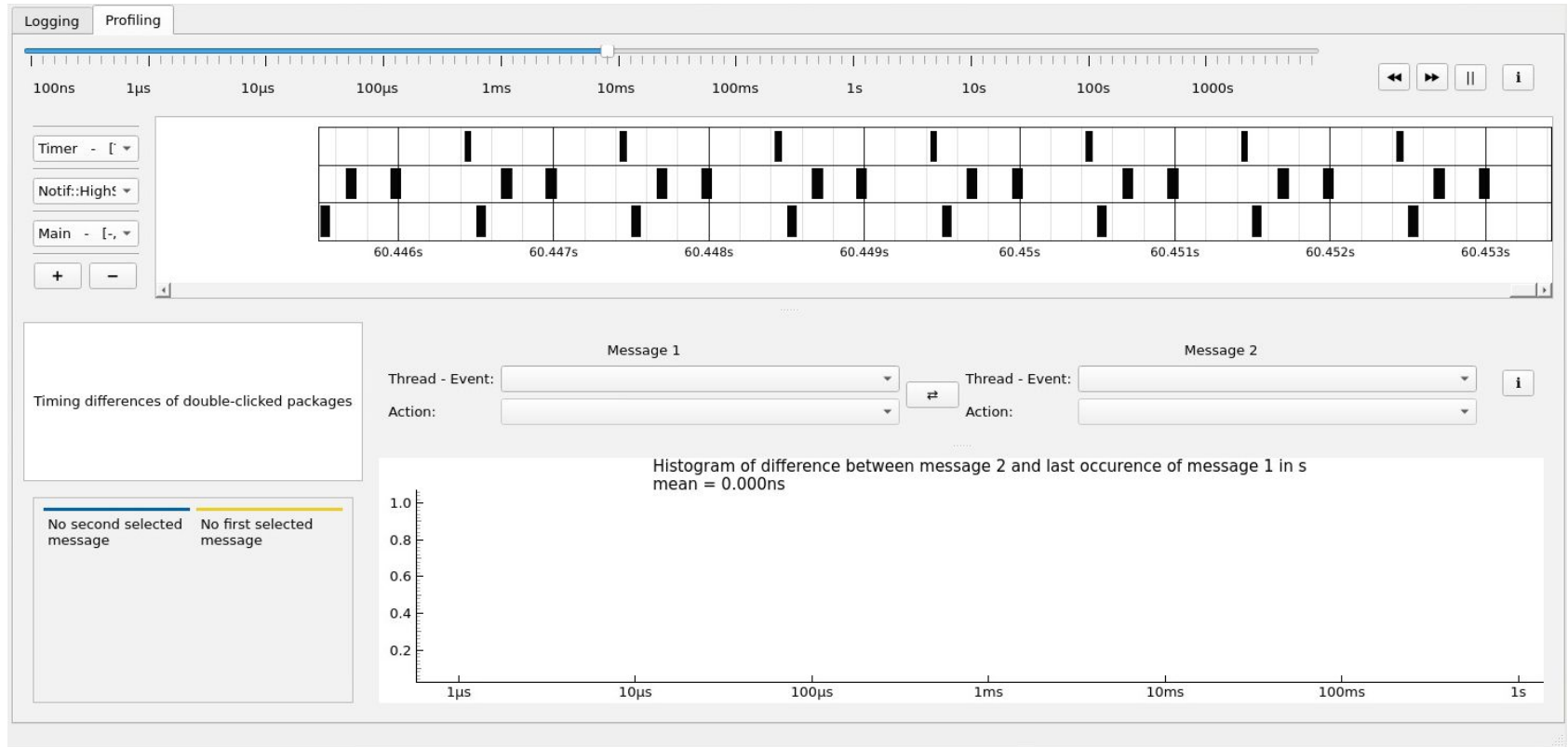
## Profiling



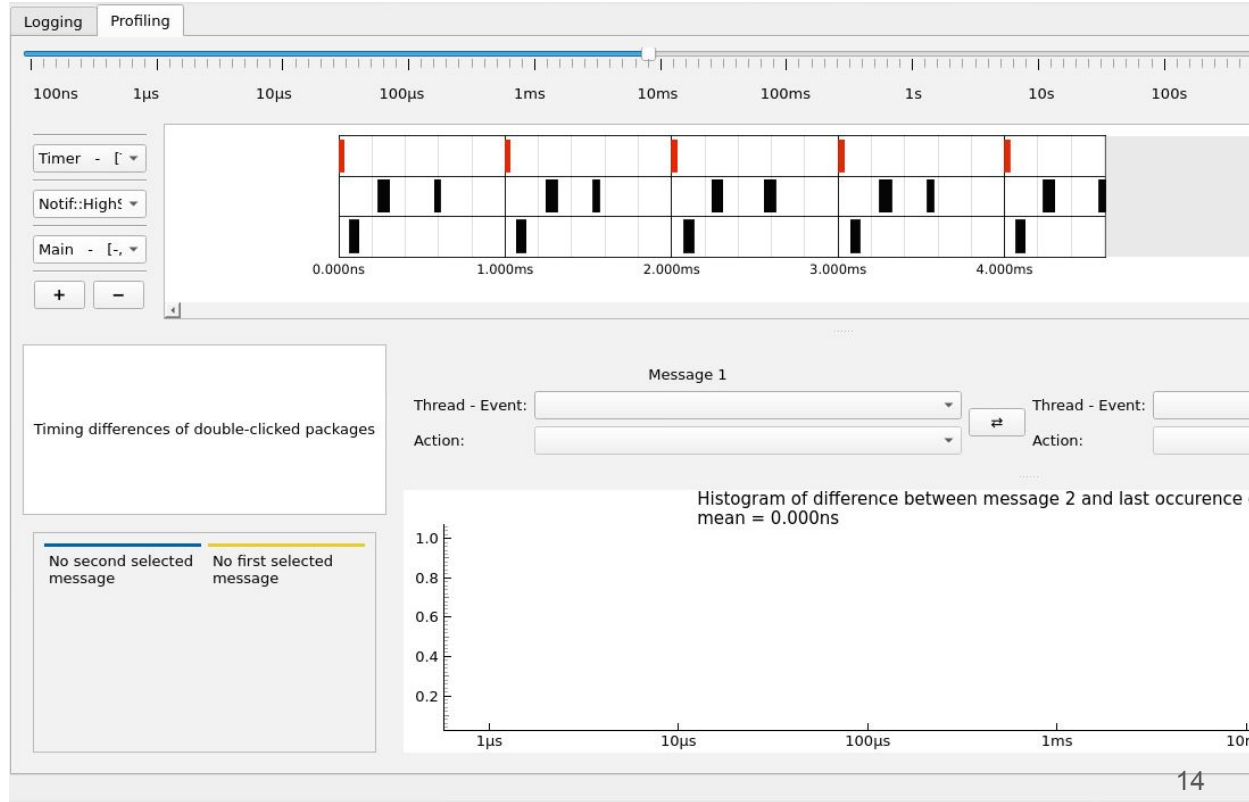
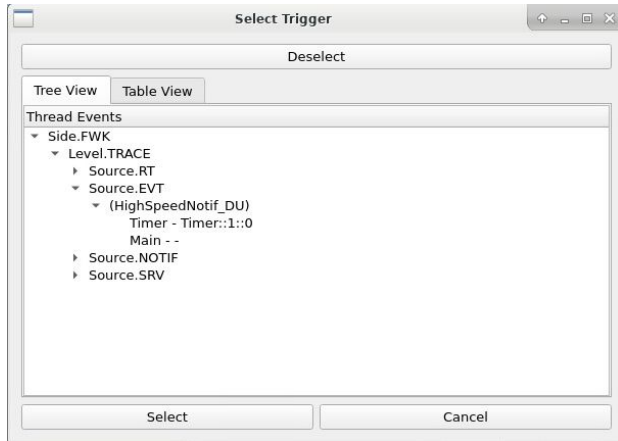
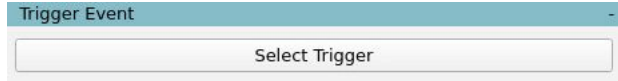
# Logging



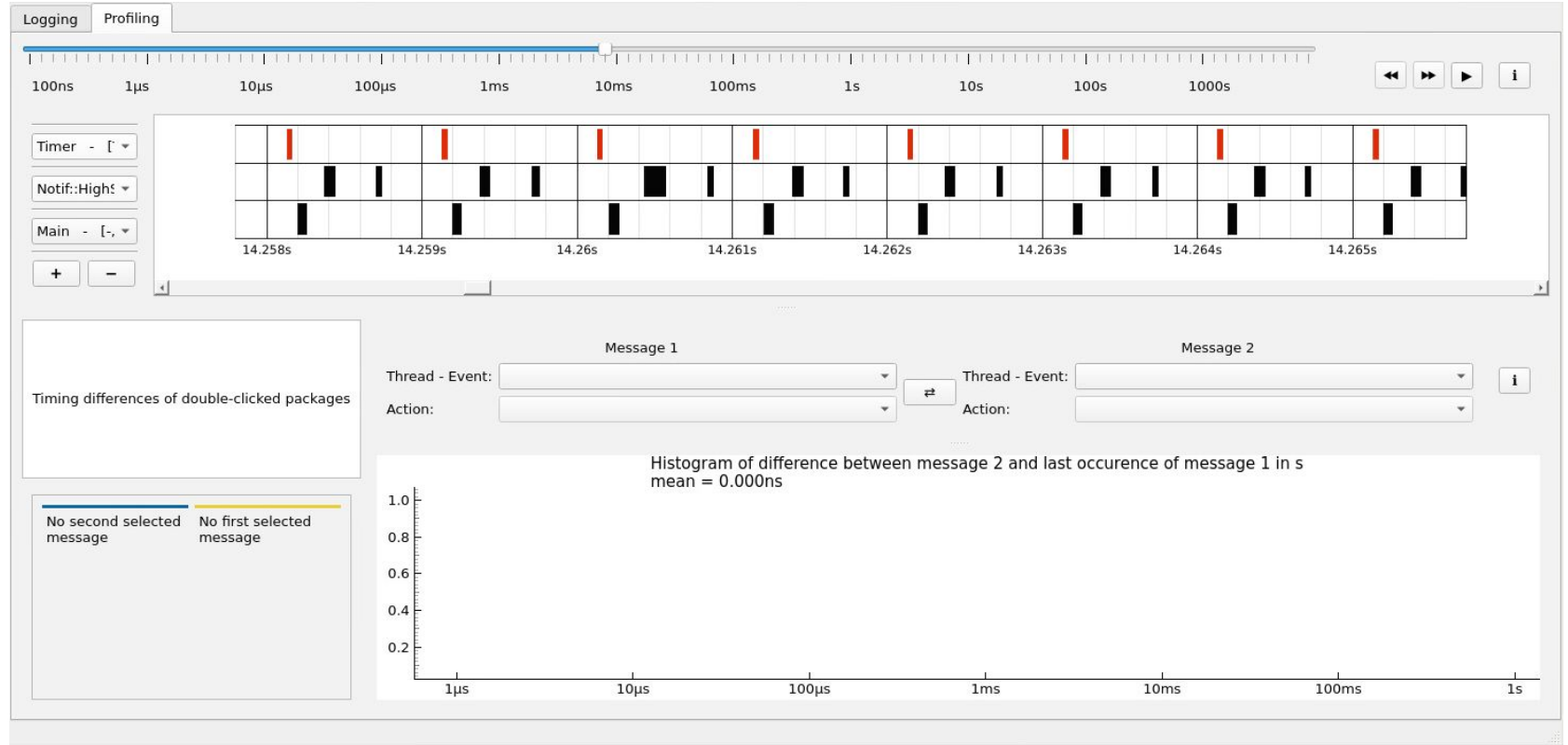
# Profiling: Newest message



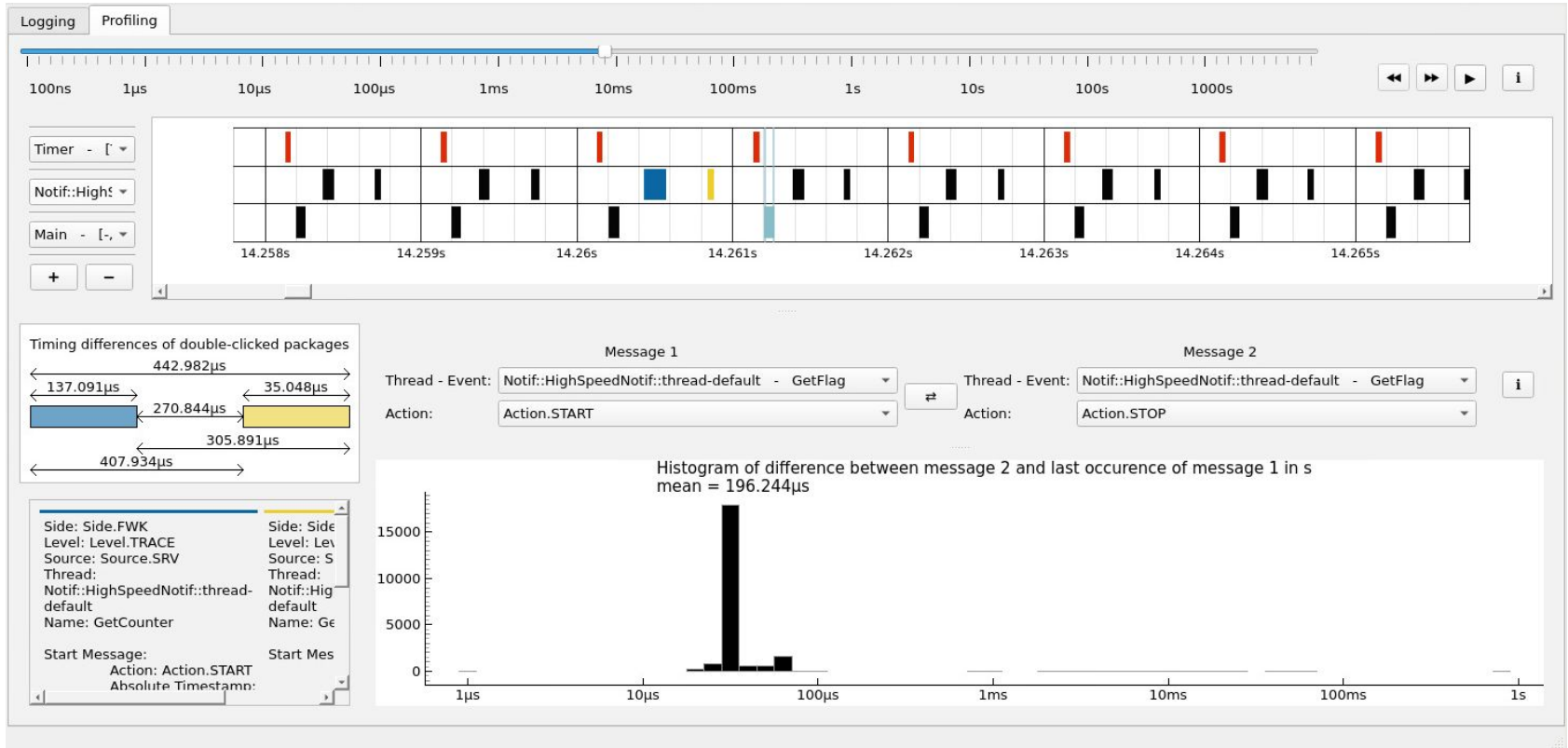
# Profiling: Locked on Trigger



# Profiling: History

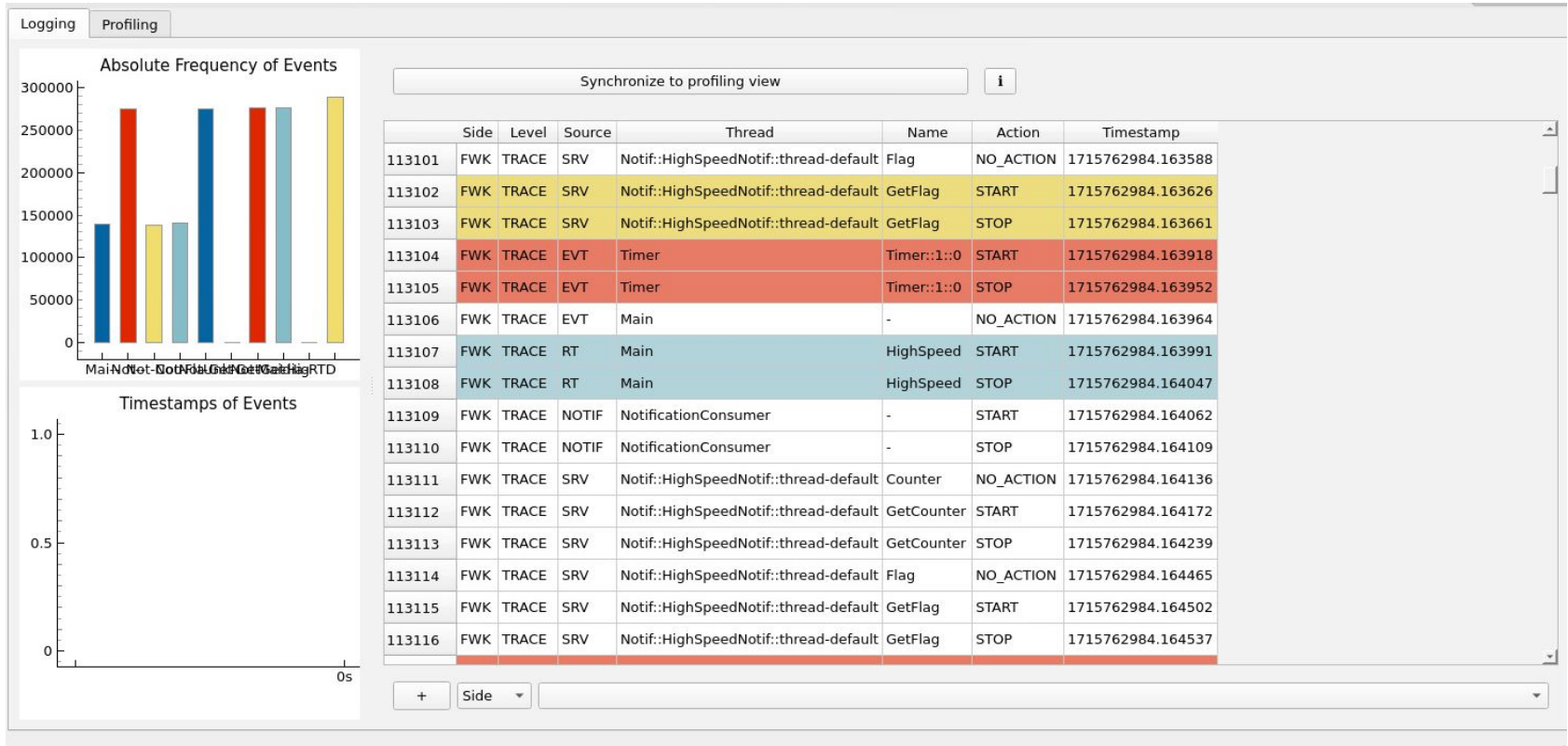


# Profiling: Inspect selected messages





# Connection Logging <---> Profiling



# Save data

Recording

i

opt bwilop fesaspy\_recordings

Name	Size	Modified
temp_recordings		11:00
2024-05-10-13-56.pkl	8.6 MB	Fri
2024-04-26-16-30.pkl	2.7 MB	26 Apr
2024-04-19-15-06.pkl	124.2 MB	19 Apr

Pickle Files

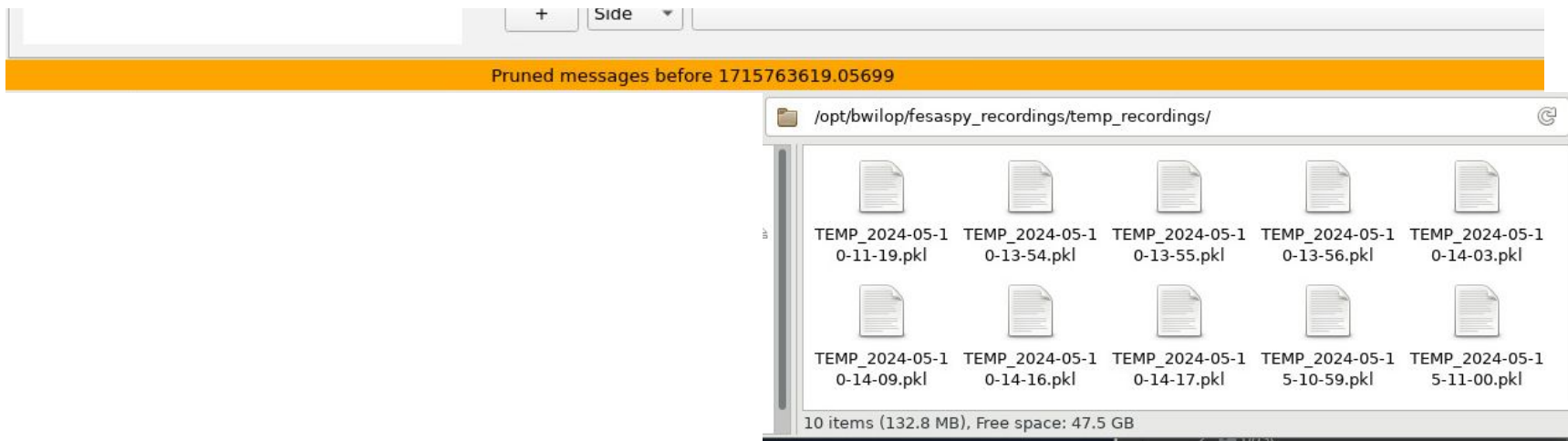
Cancel Save

2024-04-24-13-17.csv - LibreOffice Calc

A1	formatted_timestamp	...
1	2024-04-24T13:17:00.000000	...
2	2024-04-24T13:17:00.000000	...
3	2024-04-24T13:17:00.000000	...
4	2024-04-24T13:17:00.000000	...
5	2024-04-24T13:17:00.000000	...
6	2024-04-24T13:17:00.000000	...
7	2024-04-24T13:17:00.000000	...
8	2024-04-24T13:17:00.000000	...
9	2024-04-24T13:17:00.000000	...
10	2024-04-24T13:17:00.000000	...
11	2024-04-24T13:17:00.000000	...
12	2024-04-24T13:17:00.000000	...
13	2024-04-24T13:17:00.000000	...
14	2024-04-24T13:17:00.000000	...
15	2024-04-24T13:17:00.000000	...
16	2024-04-24T13:17:00.000000	...
17	2024-04-24T13:17:00.000000	...
18	2024-04-24T13:17:00.000000	...
19	2024-04-24T13:17:00.000000	...
20	2024-04-24T13:17:00.000000	...
21	2024-04-24T13:17:00.000000	...
22	2024-04-24T13:17:00.000000	...
23	2024-04-24T13:17:00.000000	...
24	2024-04-24T13:17:00.000000	...
25	2024-04-24T13:17:00.000000	...
26	2024-04-24T13:17:00.000000	...
27	2024-04-24T13:17:00.000000	...
28	2024-04-24T13:17:00.000000	...
29	2024-04-24T13:17:00.000000	...
30	2024-04-24T13:17:00.000000	...
31	2024-04-24T13:17:00.000000	...
32	2024-04-24T13:17:00.000000	...
33	2024-04-24T13:17:00.000000	...
34	2024-04-24T13:17:00.000000	...
35	2024-04-24T13:17:00.000000	...
36	2024-04-24T13:17:00.000000	...
37	2024-04-24T13:17:00.000000	...
38	2024-04-24T13:17:00.000000	...
39	2024-04-24T13:17:00.000000	...
40	2024-04-24T13:17:00.000000	...
41	2024-04-24T13:17:00.000000	...
42	2024-04-24T13:17:00.000000	...

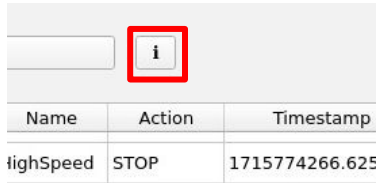
# Limitations

- The functionality of the FESA Spy is based on the information available from the FESA process.
- Data management:
  - We save 4M messages, then truncate to 2M
  - Deleted messages automatically saved as recording (rolling buffer of 10)



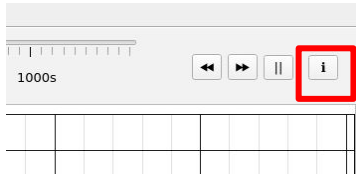
# Support

- Info buttons

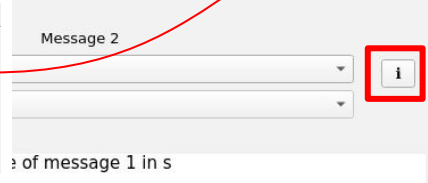


Name	Action	Timestamp
highSpeed	STOP	1715774266.625

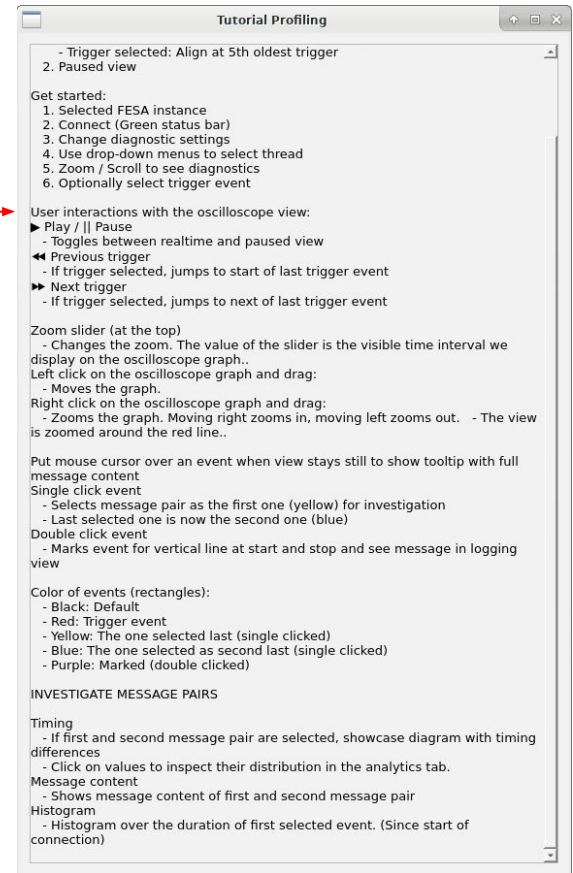
Logging



Profiling



Analytics



**Tutorial Profiling**

- Trigger selected: Align at 5th oldest trigger
- 2. Paused view

Get started:

1. Selected FESA instance
2. Connect (Green status bar)
3. Change diagnostic settings
4. Use drop-down menus to select thread
5. Zoom / Scroll to see diagnostics
6. Optionally select trigger event

User interactions with the oscilloscope view:

- ▶ Play / || Pause
  - Toggles between realtime and paused view
- ◀◀ Previous trigger
  - If trigger selected, jumps to start of last trigger event
- ▶▶ Next trigger
  - If trigger selected, jumps to next of last trigger event

Zoom slider (at the top)

- Changes the zoom. The value of the slider is the visible time interval we display on the oscilloscope graph..

Left click on the oscilloscope graph and drag:

- Moves the graph.

Right click on the oscilloscope graph and drag:

- Zooms the graph. Moving right zooms in, moving left zooms out. - The view is zoomed around the red line..

Put mouse cursor over an event when view stays still to show tooltip with full message content

Single click event

- Selects message pair as the first one (yellow) for investigation
- Last selected one is now the second one (blue)

Double click event

- Marks event for vertical line at start and stop and see message in logging view

Color of events (rectangles):

- Black: Default
- Red: Trigger event
- Yellow: The one selected last (single clicked)
- Blue: The one selected as second last (single clicked)
- Purple: Marked (double clicked)

**INVESTIGATE MESSAGE PAIRS**

Timing

- If first and second message pair are selected, showcase diagram with timing differences
- Click on values to inspect their distribution in the analytics tab.

Message content

- Shows message content of first and second message pair

Histogram

- Histogram over the duration of first selected event. (Since start of connection)

- User manual:

<https://acc-py.web.cern.ch/gitlab/acc-co/fesa/extra/fesa-spy/docs/master/>

- Questions, remarks, issues, feature requests: [fesa-support@cern.ch](mailto:fesa-support@cern.ch)

# Coming Up Next

Integration to the FESA Eclipse Plugin: very soon

Feature refinements & bugfixes

Inspect memory of the device fields (no release date yet)

# Thank You for Your Attention!

Try it out (beta version) at: `/mcr/bin/fesaspy`

Feedback welcome: [fesa-support@cern.ch](mailto:fesa-support@cern.ch)

## Questions?