35th Tango Community Meeting 2021
14-15 September 2021

Elettra Sincrotrone Trieste

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PUMA

Reliable, secure, scalable and user-oriented design of a multi platform framework based on the most advanced stage of web technologies

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* inspired by an idea of Alessio I. Bogani

Reference: Tango Autumn 2020 Status webinar

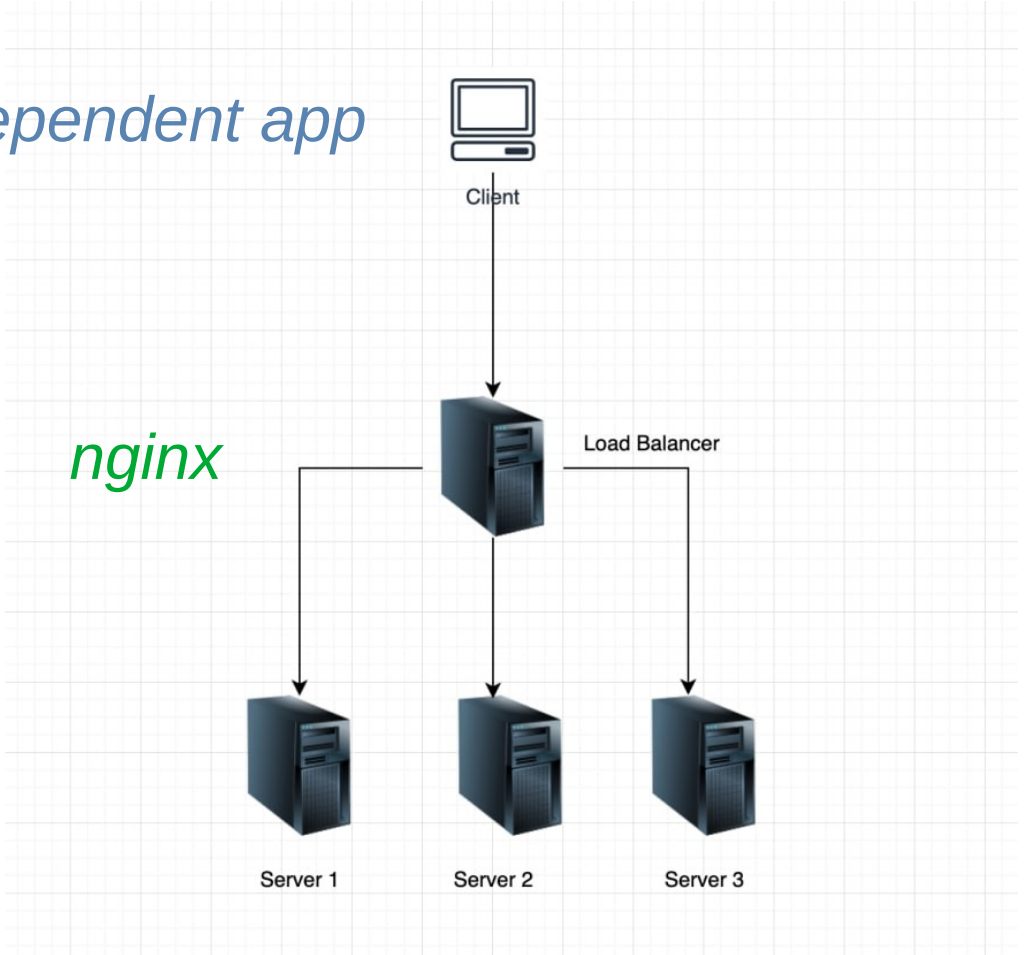
DESIGN RATIONALE

LOAD BALANCING AND FAILOVER

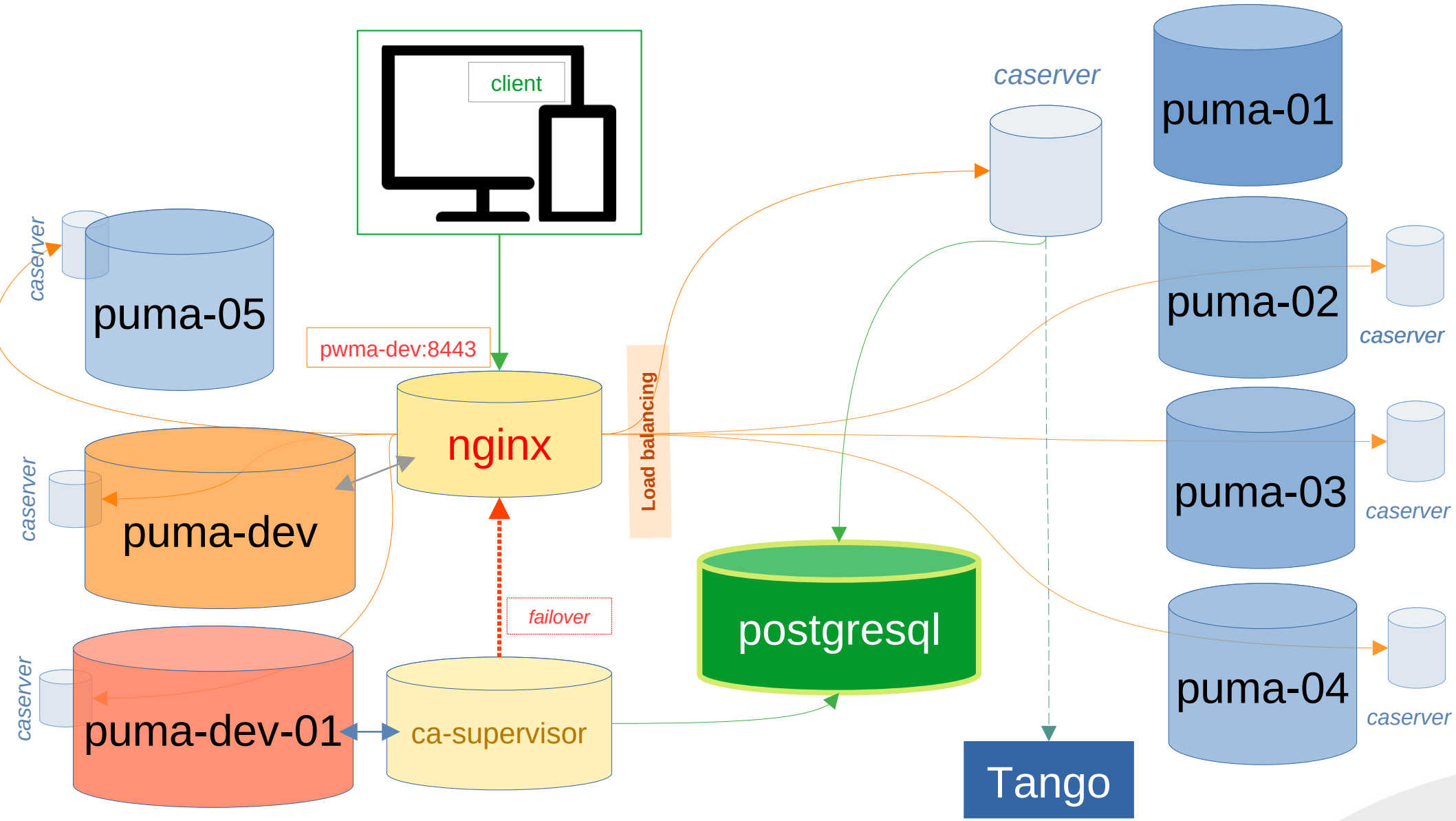
Platform independent app

nginx

PUMA services



DESIGN RATIONALE - DEPLOYMENT



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TEST ENVIRONMENT

LOAD BALANCING

The test environment is the same pictured in the previous slide. A query to the database shows the the distribution of 1255 readings across six services:

id	started	expected	state	addr	count
311	2021-09-13 13:35:18.331211	2021-09-13 14:20:23.492731	ACTIVE	192.168.205.159	212
320	2021-09-13 13:35:17.06742	2021-09-13 14:20:30.02976	ACTIVE	192.168.205.106	222
326	2021-09-13 13:35:17.653089	2021-09-13 14:20:21.798637	ACTIVE	192.168.205.149	235
327	2021-09-13 13:35:17.54277	2021-09-13 14:20:30.455891	ACTIVE	192.168.205.158	215
324	2021-09-13 13:35:16.584578	2021-09-13 14:20:20.77197	ACTIVE	192.168.205.157	161
328	2021-09-13 13:35:18.383527	2021-09-13 14:20:26.159456	ACTIVE	192.168.205.166	210

(6 rows)

1255

TEST ENVIRONMENT

LOAD BALANCING (II)

Load balancing is accomplished by *nginx.* Take a look at *nginx.conf*:

```
http {
        upstream caserver {
#               hash $http_x_channel consistent;
#
#               A request is sent to the server with the least number of active connections
#               https://docs.nginx.com/nginx/admin-guide/load-balancer/http-load-balancer/#c
                least_conn;

                server puma-01.elettra.trieste.it:9292 fail_timeout=20s;
                server puma-02.elettra.trieste.it:9292 fail_timeout=20s;
                server puma-03.elettra.trieste.it:9292 fail_timeout=20s;
                server puma-04.elettra.trieste.it:9292 fail_timeout=20s;
                server puma-05.elettra.trieste.it:9292 fail_timeout=20s;
                # -dev hosts serve as test nodes
                server pwma-dev.elettra.trieste.it:9292 fail_timeout=20s;
                server puma-dev-01.elettra.trieste.it:9292 fail_timeout=20s;

        }
```

TEST ENVIRONMENT

FAILOVER

1. Simulate a server failure in one of the hosts:

```
puma@puma-04:~$ host puma-04
puma-04.elettra.eu has address 192.168.205.159
puma@puma-04:~$ sudo killall -SEGV caserver
```

2. *casupervisor* logs:

```
[Mon Sep 13 14:44:17 2021] [thread:0x7f7fc717d700] ca-supervisor:  #  ACTIVE     "pwma-dev" 192.168.205.106:9292 | expected:   13s  [Mon Sep 13 15:44:30 2021]|started: Sun Sep 13 13:35:17 2021
[Mon Sep 13 14:44:17 2021] [thread:0x7f7fc717d700] ca-supervisor:  #  ACTIVE     "puma-01" 192.168.205.149:9292 | expected:   15s  [Mon Sep 13 15:44:32 2021]|started: Sun Sep 13 13:35:17 2021
[Mon Sep 13 14:44:17 2021] [thread:0x7f7fc717d700] ca-supervisor:  #  ACTIVE     "puma-02" 192.168.205.157:9292 | expected:   14s  [Mon Sep 13 15:44:31 2021]|started: Sun Sep 13 13:35:16 2021
[Mon Sep 13 14:44:17 2021] [thread:0x7f7fc717d700] ca-supervisor:  #  ACTIVE     "puma-03" 192.168.205.158:9292 | expected:   14s  [Mon Sep 13 15:44:31 2021]|started: Sun Sep 13 13:35:17 2021
[Mon Sep 13 14:44:17 2021] [thread:0x7f7fc717d700] ca-supervisor:  #  ACTIVE     "puma-05" 192.168.205.166:9292 | expected:   19s  [Mon Sep 13 15:44:36 2021]|started: Sun Sep 13 13:35:18 2021
[Mon Sep 13 14:44:17 2021] [thread:0x7f7fc717d700] ca-supervisor:  #  ZOMBIE     "puma-04" 192.168.205.159:9292 | expected: -103s  [Mon Sep 13 15:42:34 2021]|started: Sun Sep 13 13:35:18 2021
```

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TEST ENVIRONMENT

FAILOVER (II)

Execute the same query as in the first *load balancing* inspection:

```
 id  |          started           |          expected          | state  |      addr       | count
-----+----------------------------+----------------------------+--------+-----------------+-------
 320 | 2021-09-13 13:35:17.06742  | 2021-09-13 14:47:00.696596 | ACTIVE | 192.168.205.106 |   434
 326 | 2021-09-13 13:35:17.653089 | 2021-09-13 14:46:52.57544  | ACTIVE | 192.168.205.149 |   235
 327 | 2021-09-13 13:35:17.54277  | 2021-09-13 14:47:01.1764   | ACTIVE | 192.168.205.158 |   215
 324 | 2021-09-13 13:35:16.584578 | 2021-09-13 14:47:01.49247  | ACTIVE | 192.168.205.157 |   161
 328 | 2021-09-13 13:35:18.383527 | 2021-09-13 14:46:56.885659 | ACTIVE | 192.168.205.166 |   210
(5 rows)
```

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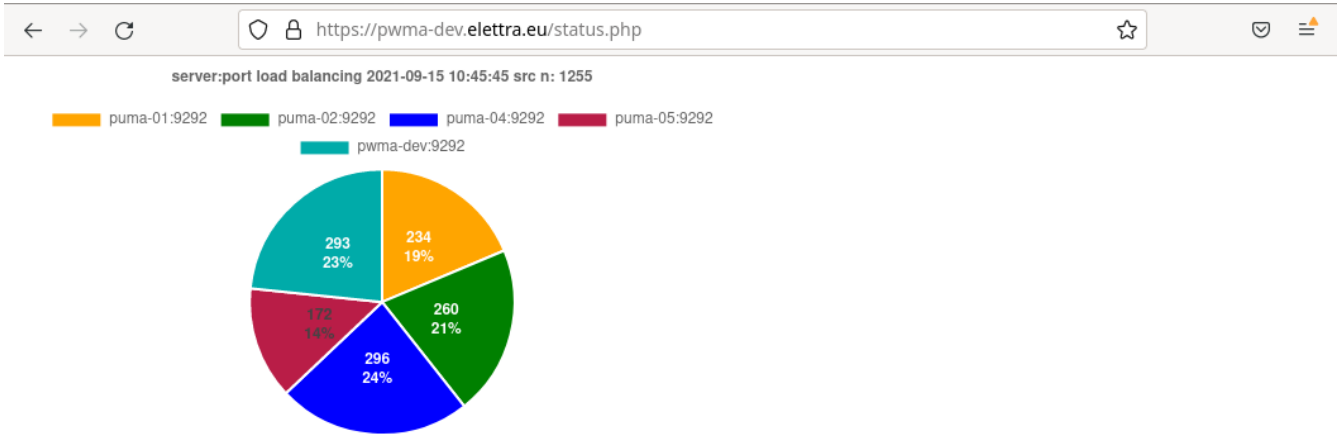
Please note that load redistribution after a failure is always administered by *nginx*

TEST ENVIRONMENT

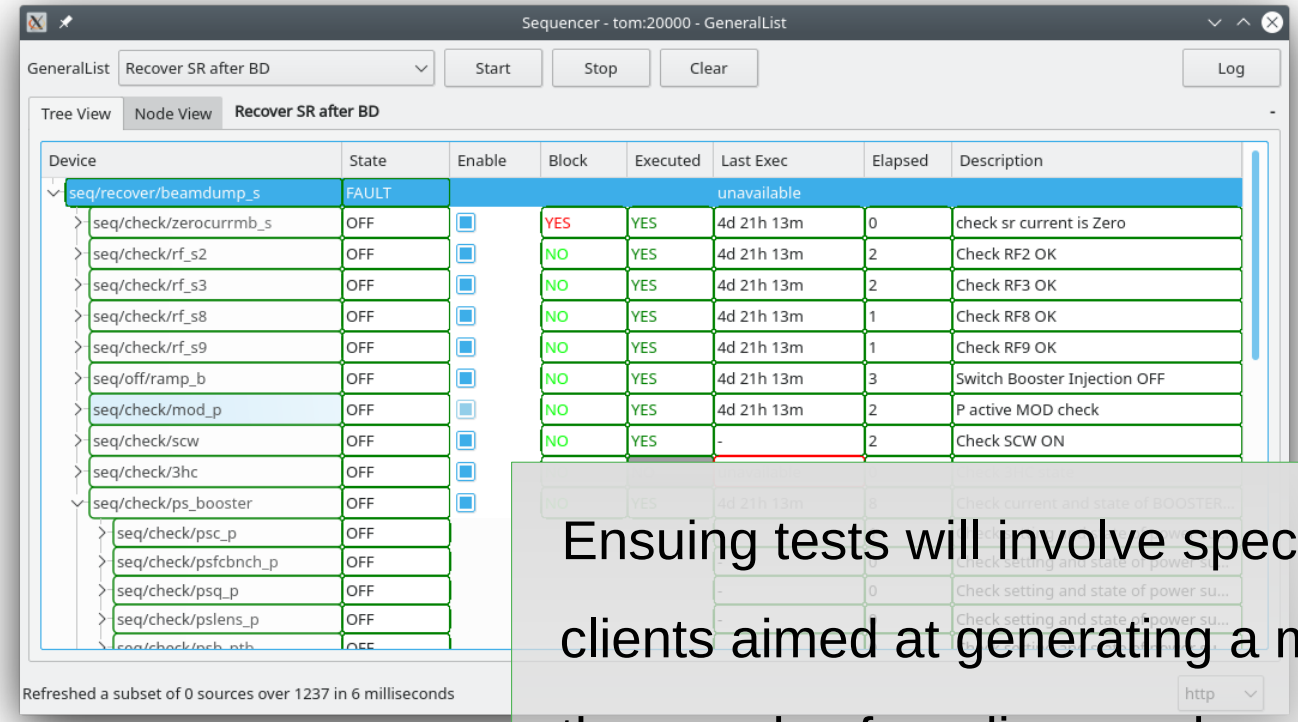
Load balancing and service status: web view



service history activity history

id	started	expected	state	conf_id	srvnam	addr	port
320	2021-09-15 10:44:12.239299	2021-09-15 10:45:08.870399	ACTIVE	1	pwma-dev	192.168.205.106	9292
317	2021-07-20 10:09:22.534603	2021-07-20 12:27:27.964855	INACTIVE	4	pwma-dev	192.168.205.106	19292
326	2021-09-15 10:44:13.767563	2021-09-15 10:45:05.899086	ACTIVE	5	puma-01	192.168.205.149	9292
324	2021-09-15 10:44:12.994295	2021-09-15 10:45:11.993982	ACTIVE	7	puma-02	192.168.205.157	9292
333	2021-09-14 16:23:37.325481	2021-09-14 16:24:48.04815	ACTIVE	9	puma-03	192.168.205.158	9292
332	2021-09-14 16:23:37.907864	2021-09-15 10:45:11.991821	ACTIVE	10	puma-04	192.168.205.159	9292
328	2021-09-14 16:23:38.346319	2021-09-15 10:45:10.384647	ACTIVE	12	puma-05	192.168.205.166	9292
300	2021-07-06 14:53:22.219985	2021-07-06 15:05:30.619484	INACTIVE	18	woody	192.168.1.159	9292

TEST ROADMAP



Ensuing tests will involve specific **native** and **web** clients aimed at generating a massive traffic with thousands of readings and continuous subscribe and unsubscribe operations.

Clients shall log subscription failures as well as other unexpected conditions.

DESIGN RATIONALE

SECTION II

THE CLIENTS

Clients – Web Apps

https://pwma-dev.elettra.eu/lib/fm.php?open_editor=/var/www/html/misc/vlv/OKINTCK_SH_PFE_F02_01.json

Edit: /var/www/html/misc/vlv/OKINTCK_SH_PFE_F02_01.json save

```
[
    {"title": "OKINTCK_SH_PFE_F02_01", "attr": "padres", "attr-bit": 1321, "attr-map": [
        {"id": "padres",
    "src": "srv-tango-padres-01.fcs.elettra.trieste.it:20000/padres/interlock/plc_int_ll.03/Stat_system"}
    ]},
    {"operation": "AND", "operands":[
        {"operation": "OR", "operands":[
            {"operation": "AND", "operands":[
                {"title": "OK_ABI_TMP_SH_3", "link": "OK_ABI_TMP_SH_3","attr": "padres", "attr-bit": 2202},
                {"title": "FCOVLV_POS_01", "attr": "padres", "attr-bit": 126},
                {"title": "FCCVLV_PFE_F01_03", "attr": "padres", "attr-bit": 5},
                {"title": "FCCVLV_PFE_F01_10", "attr": "padres", "attr-bit": 115},
                {"title": "FCC_SH_PFE_F01_01", "attr": "padres", "attr-bit": 26}
            ]},
            {"operation": "AND", "operands":[
                {"title": "FCCVLV_POS_MAG_01", "attr": "padres", "attr-bit": 721},
                {"title": "OK_ABI_TMP_SH", "link": "OK_ABI_TMP_SH","attr": "padres", "attr-bit": 2200},
                {"title": "OK_POS_MAG", "attr": "padres", "attr-bit": 2210}
            ]}
        ]},
        {"title": "OKINJ_VLV_PFE_F02_02", "attr": "padres", "attr-bit": 1425},
        {"title": "OKINJ_VLV_PFE_F02_03", "attr": "padres", "attr-bit": 1426},
        {"title": "OKINJ_VLV_PFE_F02_04", "attr": "padres", "attr-bit": 1427},
        {"title": "OKINJ_VLV_PFE_F02_05", "attr": "padres", "attr-bit": 1428},
        padres", "attr-bit": 1429},
        padres", "attr-bit": 1430},
        padres", "attr-bit": 1431},
        padres", "attr-bit": 1432},
        {"title": "OKINJ_VLV_PFE_F02_10", "attr": "padres", "attr-bit": 1433}
        {"title": "OKINJ_VLV_POS_F02_01", "attr": "padres", "attr-bit": 1434},
        {"title": "OKINJ_VLV_POS_F02_02", "attr": "padres", "attr-bit": 1435},
        {"title": "ABI_VAC_SH_FEL2 (from BeamStopper)", "attr": "padres", "attr-bit": 671}
    ]}
]
```

Parse error on line 29:
...attr-bit": 1433} {"title": "OKINJ_VLV
----------^
Expecting 'EOF', '}', ',', ']', got '{'

Logical network are loaded from JSON files

okintck

	AND	OR	AND
OK_ABI_TMP_SH_3	NOK		
FCOVLV_POS_01	OK		
FCCVLV_PFE_F01_03	NOK	NOK	
FCCVLV_PFE_F01_10	NOK		
FCC_SH_PFE_F01_01	NOK		OK
FCCVLV_POS_MAG_01	OK		
OK_ABI_TMP_SH	OK	OK	
OK_POS_MAG	OK		
OKINJ_VLV_PFE_F02_02			NOK
OKINJ_VLV_PFE_F02_03			NOK
OKINJ_VLV_PFE_F02_04			NOK
OKINJ_VLV_PFE_F02_05			NOK
OKINJ_VLV_PFE_F02_06			NOK
OKINJ_VLV_PFE_F02_07			NOK
OKINJ_VLV_PFE_F02_08			NOK
OKINJ_VLV_PFE_F02_09			NOK
OKINJ_VLV_PFE_F02_10			NOK
OKINJ_VLV_POS_F02_01			NOK
OKINJ_VLV_POS_F02_02			NOK
ABI_VAC_SH_FEL2 (from BeamStopper)			NOK
OKINTCK_SH_PFE_F02_01			NOK

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DESIGN RATIONALE

HTML text editor

- web HTML text editor integrated with an instant preview (triggered by keyup event)
- some buttons implement some adaptive components
- there are some links to documentations

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DESIGN RATIONALE

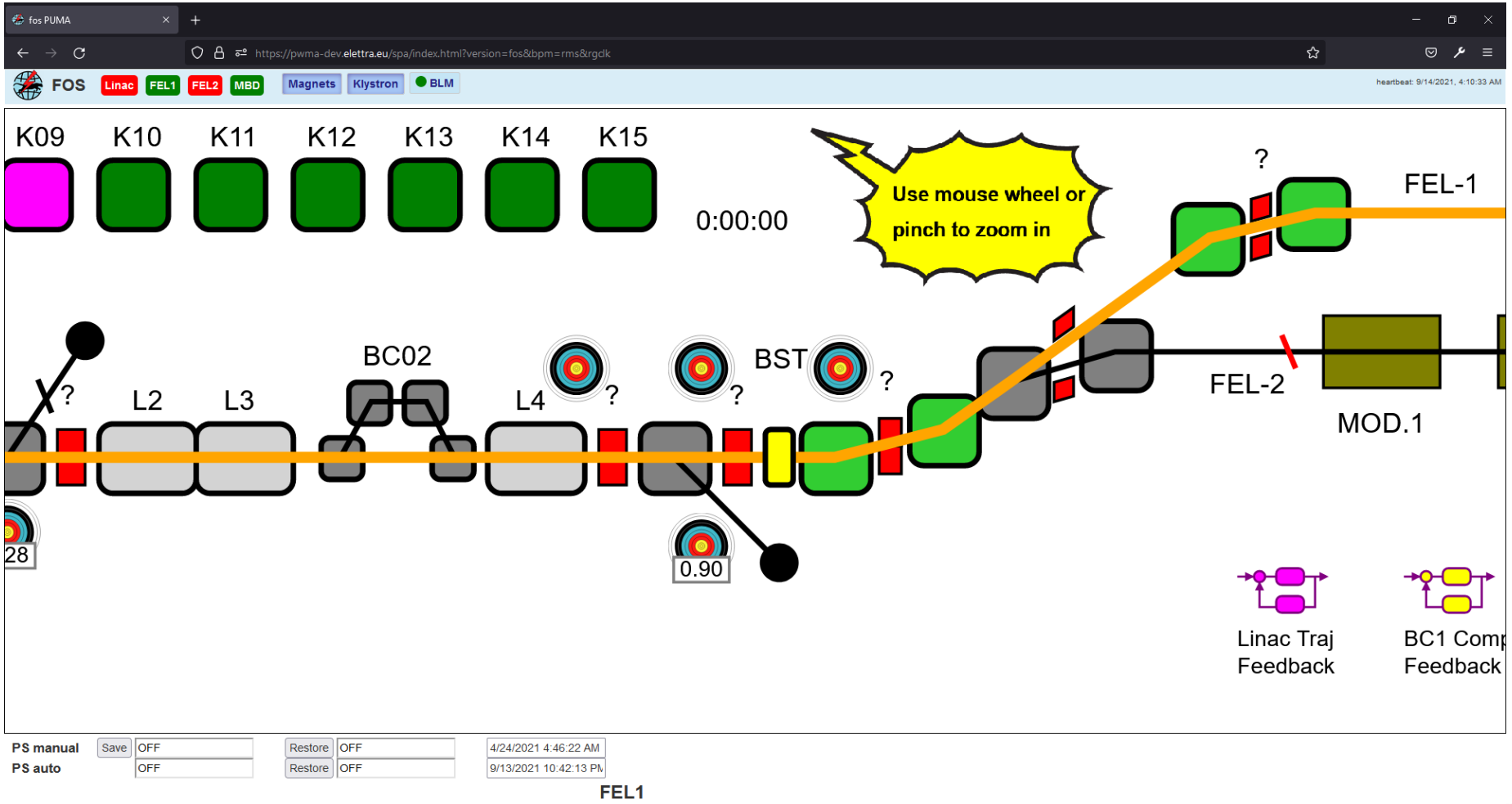
DESIGN RATIONALE

INTERACTIVITY

The system must interact with user

- Zoom in and out using mouse wheel on desktop and pinch on mobile
- Depending on zoom level new contents are shown
- Depending on panning and zooming some variable are subscribed/unsubscribed; only the visible area is kept updated

DESIGN RATIONALE



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Thank you!

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