Rikkyo University M2 Ryota Shishikura

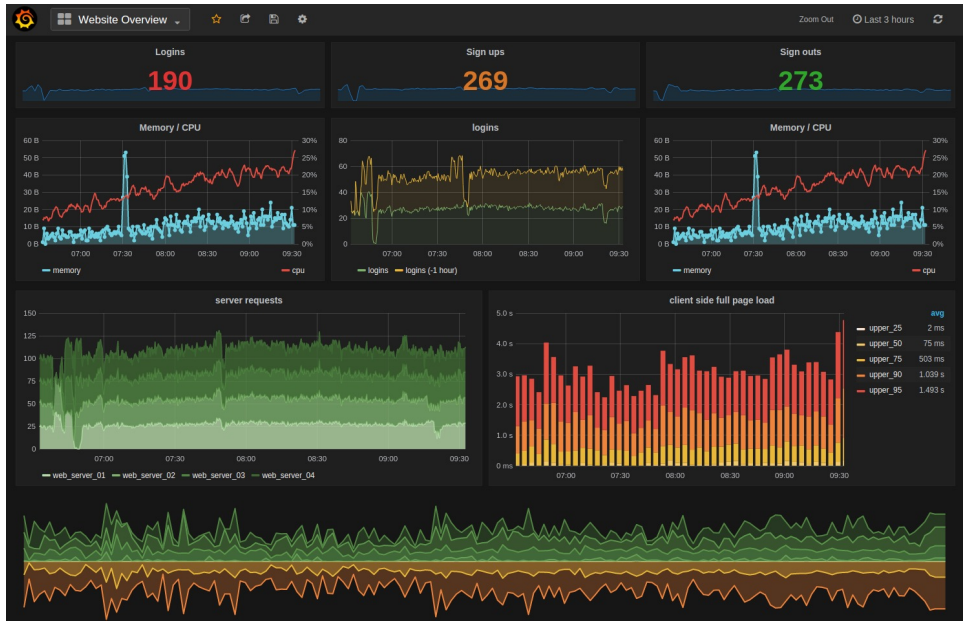
# HV Online monitor

# Outline



- I made **HV online monitor** using **Grafana** provided by sPHENIX
- I provided plots of **current** and **voltage** in grafana

**Example of grafana**




**Grafana - Display data in time using SQL database**

If you want to check plots, check this url in which you can know how to access Grafana

https://wiki.sphenix.bnl.gov/index.php?title=Operation_Analytics_Site_(Grafana)

# SQL(Structured Query Language)



## PostgreSQL prepared by sPHENIX is used.

```
daq=> \d
                  List of relations
 Schema |              Name               |   Type   | Owner
--------+---------------------------------+----------+--------
 public | bg_counts                       | table    | phnxrc
 public | current_log                     | table    | phnxrc
 public | emcal_heartbeat                 | table    | phnxrc
 public | emcal_iblog                     | table    | phnxrc
 public | emcal_iblog_id_seq              | sequence | phnxrc
 public | emcal_iface                     | table    | phnxrc
 public | emcal_iface_id_seq              | sequence | phnxrc
 public | emcal_mpodlog                   | table    | phnxrc
 public | emcal_mpodlog_id_seq            | sequence | phnxrc
 public | emcal_tower_mapping             | table    | phnxrc
 public | event_numbers                   | table    | phnxrc
 public | filelist                        | table    | phnxrc
 public | gl1                             | table    | phnxrc
 public | gl1_inputs                      | table    | phnxrc
 public | gl1_lut                         | table    | phnxrc
 public | gl1_lutinputs                   | table    | phnxrc
 public | gl1_main_keys                   | table    | phnxrc
 public | gl1_main_keys_main_key_seq      | sequence | phnxrc
 public | gl1_outputs                     | table    | phnxrc
 public | gl1_prescales                   | table    | phnxrc
 public | gl1_prescales_scaledown_key_seq | sequence | phnxrc
 public | gl1_pscalers                    | table    | phnxrc
 public | gl1_scaledown                   | table    | phnxrc
 public | gl1_scalers                     | table    | phnxrc
 public | gl1_switchyard                  | table    | phnxrc
 public | gl1_triggerdelay                | table    | phnxrc
 public | gl1_triggernames                | table    | phnxrc
 public | gl1p_switchyard                 | table    | phnxrc
```

```
 public | gtm                             | table    | phnxrc
 public | gtm_scheduler                   | table    | phnxrc
 public | hcal_daq_info                   | table    | phnxrc
 public | hcal_heartbeat                  | table    | phnxrc
 public | hcal_led                        | table    | phnxrc
 public | hcal_nominal_vmod               | table    | phnxrc
 public | hcal_pedestal                   | table    | phnxrc
 public | hcal_tower_mapping              | table    | phnxrc
 public | hcalmpodlog                     | table    | phnxrc
 public | hostinfo                        | table    | phnxrc
 public | intt_mpodlog                    | table    | phnxrc
 public | led_run_view                    | view     | phnxrc
 public | l11                             | table    | phnxrc
 public | magnet_info                     | table    | phnxrc
 public | mbd_hvlog                       | table    | phnxrc
 public | mbd_hvlog_id_seq                | sequence | phnxrc
 public | mbd_trigluts                    | table    | phnxrc
 public | mpodlog                         | table    | phnxrc
 public | mpodlog_id_seq                  | sequence | phnxrc
 public | mv2                             | table    | phnxrc
 public | mvtx_strobe                     | table    | phnxrc
 public | old_hcal_heartbeat              | table    | phnxrc
 public | rc_db                           | table    | phnxrc
 public | rc_db_id_seq                    | sequence | phnxrc
 public | run                             | table    | phnxrc
 public | run_timeseries_db_summary_rate  | table    | phnxrc
 public | runnumber                       | sequence | phnxrc
 public | test                            | table    | phnxrc
 public | tpc_hv_channels                 | table    | phnxrc
 public | tpc_hv_channels_Id_seq          | sequence | phnxrc
 public | tpc_sampa_disena                | table    | phnxrc
 public | tpc_sampa_success_fail          | table    | phnxrc
 public | zdc_coinc                       | table    | phnxrc
 public | zero_suppression                | table    | phnxrc
(62 rows)
```

```
daq=> \d intt_mpodlog
                    Table "public.intt_mpodlog"
    Column    |            Type             | Collation | Nullable | Default
--------------+-----------------------------+-----------+----------+---------
 time         | timestamp without time zone |           | not null |
 ip           | character varying(32)       |           | not null |
 mpod_channel | smallint                    |           | not null |
 status       | character varying(12)       |           |          |
 voltage      | real                        |           |          |
 current      | real                        |           |          |
Indexes:
    "pkey" PRIMARY KEY, btree ("time", ip, mpod_channel)
```

**Ip - North or South**

**mpod_channel - Ladder and type of sensor number**

| North /South | | ROC | | Ladder | | TypeA/B |
|---|---|---|---|---|---|---|
| 2 | × | 8 | × | 7+1 | × | 2 |

**Total number of channel = 256**

# SQL(Structured Query Language)



## Table detail

```
daq=> \d intt_mpodlog
                    Table "public.intt_mpodlog"
    Column    |            Type             | Collation | Nullable | Default
--------------+-----------------------------+-----------+----------+---------
 time         | timestamp without time zone |           | not null |
 ip           | character varying(32)       |           | not null |
 mpod_channel | smallint                    |           | not null |
 status       | character varying(12)       |           |          |
 voltage      | real                        |           |          |
 current      | real                        |           |          |
Indexes:
    "pkey" PRIMARY KEY, btree ("time", ip, mpod_channel)
```

## Table

```
daq=> SELECT*FROM intt_mpodlog LIMIT 10;
           time            |      ip      | mpod_channel | status | voltage  | current
---------------------------+--------------+--------------+--------+----------+---------
 2024-05-09 17:58:02.04443 | 10.20.34.151 |          511 | 00 01  | 0.041092 |       0
 2024-05-09 17:58:02.04443 | 10.20.34.151 |          512 | 00 01  | 0.238066 |       0
 2024-05-09 17:58:02.04443 | 10.20.34.151 |          513 | 00 01  | 0.234433 |       0
 2024-05-09 17:58:02.04443 | 10.20.34.151 |          514 | 00 01  | 0.102066 |       0
 2024-05-09 17:58:02.04443 | 10.20.34.151 |          515 | 00 01  | 0.105791 |       0
 2024-05-09 17:58:02.04443 | 10.20.34.151 |          600 | 00 01  | 0.045119 |       0
 2024-05-09 17:58:02.04443 | 10.20.34.151 |          601 | 00 01  | 0.042518 |       0
 2024-05-09 17:58:02.04443 | 10.20.34.151 |          602 | 00 01  | 0.045129 |       0
 2024-05-09 17:58:02.04443 | 10.20.34.151 |          603 | 00 01  | 0.046687 |       0
 2024-05-09 17:58:02.04443 | 10.20.34.151 |          604 | 00 01  | 0.048815 |       0
(10 rows)
```

## SQL

| time | voltage | Current |
|---|---|---|
| | | |
| | | |

## Grafana

# HV Online monitor in grafana



You can see current value of voltage and current of all channel.


## Plot color setting

Voltage(V)

- Red - High 101~
- Green - Good 80~101
- Blue - Low ~80

Current(μV)

- Red - High 7~
- Green - Good 1~7
- Blue - Low ~1

**You can check this plot**

http://localhost:3000/d/isBT031Iz/intt-monitor?orgId=1

# HV Voltage

Last 3 hours


Voltage

Time

## Code

Ip = ’10.20.34.150’

```
SELECT
cast( mpod_channel as text ),
time AT TIME ZONE 'America/New_York' as time,
voltage
FROM
intt_mpodlog
WHERE
  $__timeFilter(time AT TIME ZONE 'America/New_York')
  AND ip = '10.20.34.150'
  /*AND voltage >101*/
ORDER BY time ASC; /*ASC - In ascending order*/
```

Ip = ’10.20.34.151’

```
SELECT
cast( mpod_channel as text ),
time AT TIME ZONE 'America/New_York' as time,
voltage
FROM
intt_mpodlog
WHERE
  $__timeFilter(time AT TIME ZONE 'America/New_York')

  AND ip = '10.20.34.151'
  /*AND voltage >101*/
ORDER BY time ASC;
```

SELECT – Data selection to be displayed

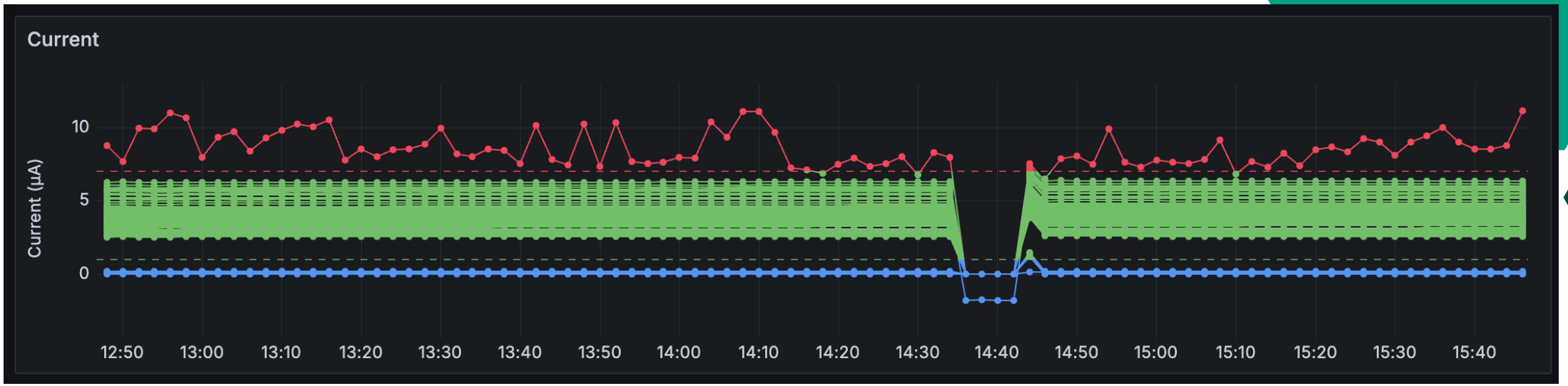
FROM –Database Selection

WHERE – Cutting

ORDER – Sequence setting

# HV Current

Last 3 hours




Current

Time

Code

Ip = ’10.20.34.150’

```
SELECT
  cast(mpod_channel as text),
  time AT TIME ZONE 'America/New_York' as time,
  current
FROM
  intt_mpodlog
WHERE
  $__timeFilter(time AT TIME ZONE 'America/New_York')
  AND ip = '10.20.34.150'
  /* AND mpod_channel < 100*/
ORDER BY
  time ASC;
```

Ip = ’10.20.34.151’

```
SELECT
  cast(mpod_channel as text),
  time AT TIME ZONE 'America/New_York' as time,
  current
FROM
  intt_mpodlog
WHERE
  $__timeFilter(time AT TIME ZONE 'America/New_York')
  AND ip = '10.20.34.151'
  /* AND mpod_channel < 100*/
ORDER BY
  time ASC;
```

SELECT – Data selection to be displayed

FROM –Database Selection

WHERE – Cutting

ORDER – Sequence setting

# HV Online Monitor

Now, I and Yui Ishigaki modify the HV plot channel by channel made by Genki


If you have idea of the plot setting and design, let me know.
ex) color, graph style...etc.

# Discussion



**Current of mpod_channel=209 of ip = '10.20.34.150' is very high and unstable.**