



立教大学 M2 奥倉遼太

Online Monitor (HV)

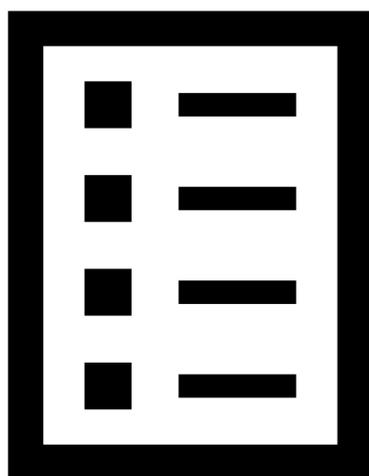


概要

Grafanaを用いてHVを動作確認する

Motivation

SQL(データベース)に記録されているINTTのHVの動作記録をGrafanaを用いて視覚的に
チェックしたい



Grafana

sPHENIXが提供していて、様々な形式のデータを可視化し、特に時系列で監視することに特化したツール



SQL データベースを読み込み、データを時間に沿って表示できる

SQL (Structured Query Language)

データの操作や定義を行うためのデータベース言語

※wiki参照

データベースにデータを挿入したり、検索したりする際に利用する

ユーザーID	名前	生年月日	性別	年齢	職業
human01	イーロン・マスク	1971-06-28	男	52	起業家
human02	Hikakin	1989-04-21	男	35	youtuber
human03	橋本環奈	1999-02-03	女	25	女優

表にまとめられている

SQL (Structured Query Language)

今回はsPHENIXで用意されたPostgreSQLを用いる

```
daq=> \d
```

Schema	List of relations 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)

SQL (Structured Query Language)

今回はsPHENIXで用意されたPostgreSQLを用いる

```
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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
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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
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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
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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
```

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)

SQL (Structured Query Language)

INTTのデータベースの中身を見てみる

mpod_channel

```
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)
```

```
[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



Grafana



Grafanaで試作したHV Online Monitor

表示されるグラフ

直近24時間

Voltage



Time

マクロ

```
1 SELECT
2 cast( mpod_channel as text ),
3 time AT TIME ZONE 'America/New_York' as time,
4 voltage
5 FROM
6 intt_mpodlog
7 WHERE
8     $__timeFilter(time AT TIME ZONE 'America/New_York') AND
9     mpod_channel < 100
10 ORDER BY time ASC;
```

SELECT – 表示するデータ選択

FROM – データベース選択

WHERE – 条件設定

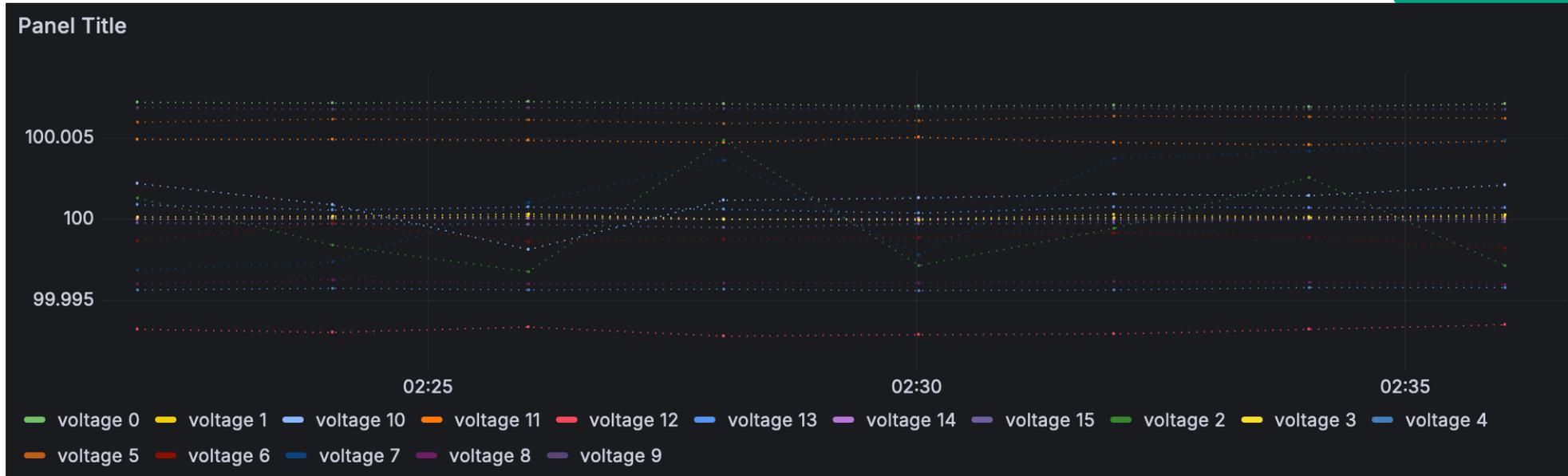
ORDER – 配列設定

Grafanaで試作したHV Online Monitor

直近15分

表示されるグラフ

Voltage



Time

マクロ

```
1 SELECT
2 cast( mpod_channel as text ),
3 time AT TIME ZONE 'America/New_York' as time,
4 voltage
5 FROM
6 intt_mpodlog
7 WHERE
8     $__timeFilter(time AT TIME ZONE 'America/New_York') AND
9     mpod_channel < 100
10 ORDER BY time ASC;
```

SELECT – 表示するデータ選択

FROM – データベース選択

WHERE – 条件設定

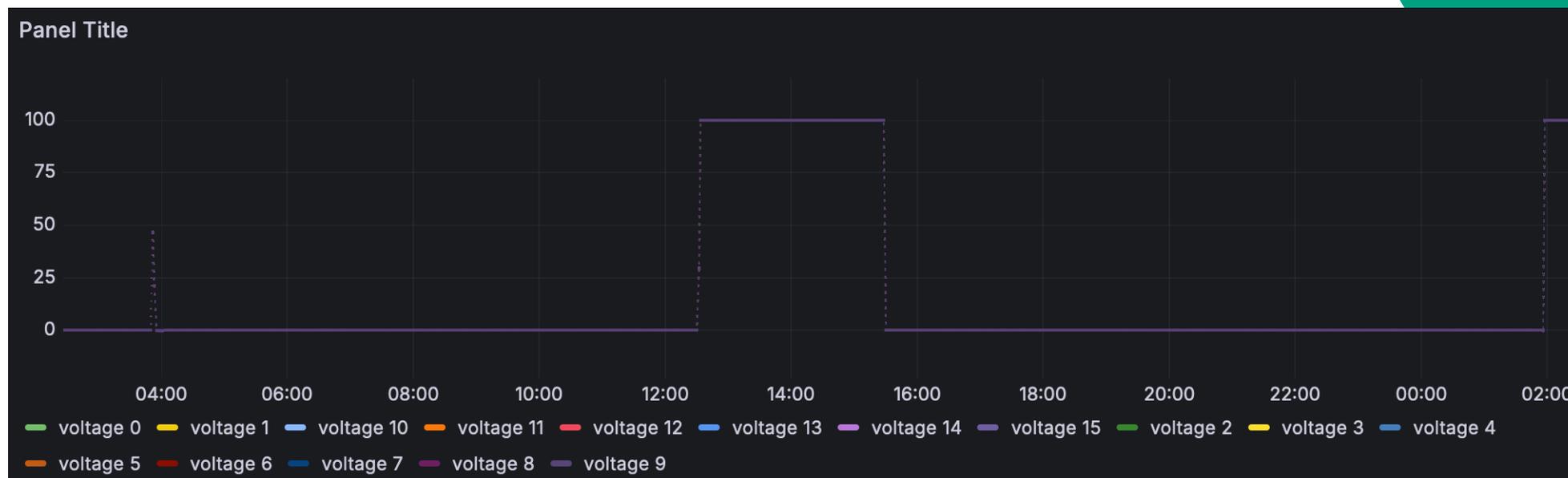
ORDER – 配列設定

Grafanaで試作したHV Online Monitor

直近24時間

表示されるグラフ

Voltage



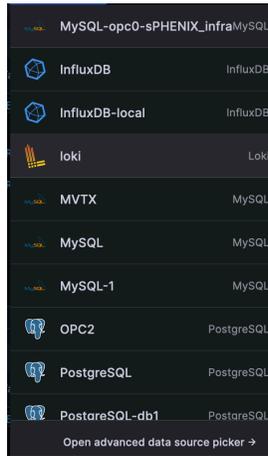
Time

改善点

長い時間スケールだと点が重なってしまい見づらい。

sPHENIX Grafana へのアクセス

変更したら保存しなければいけない

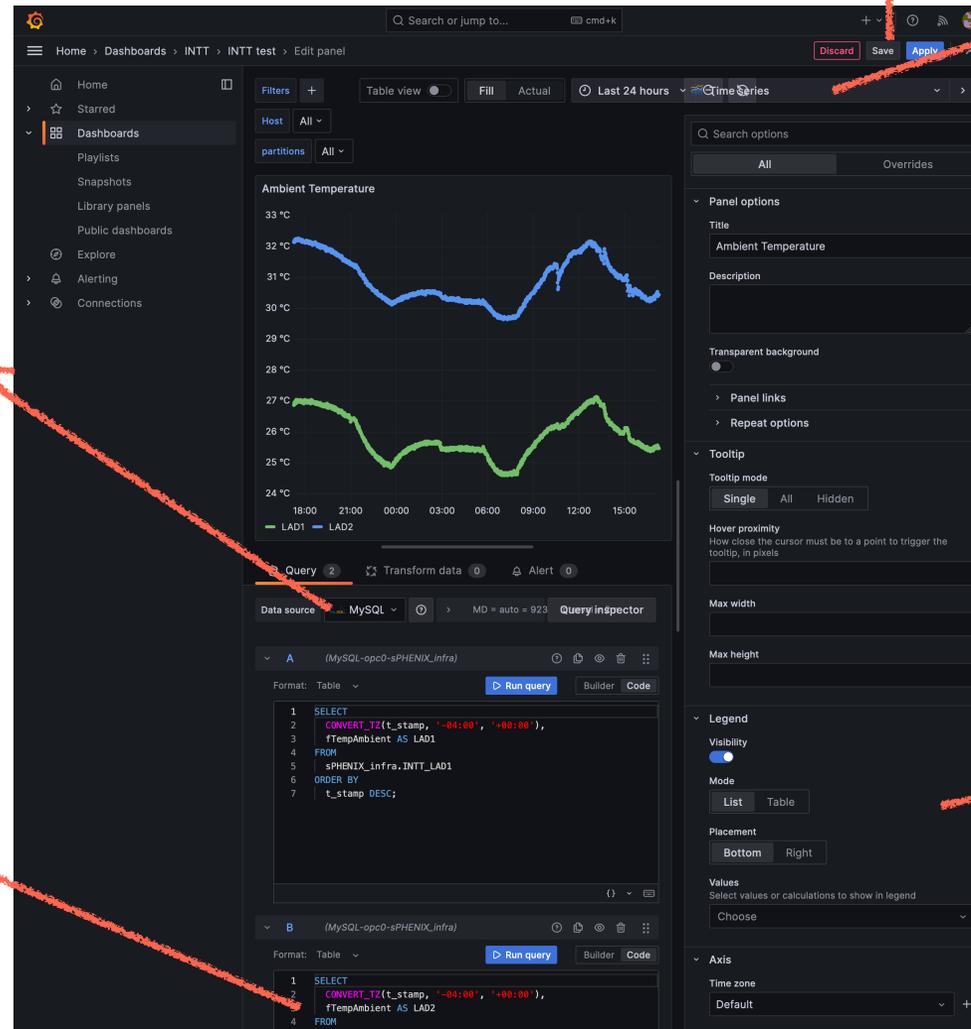


使用するデータベース
の選択

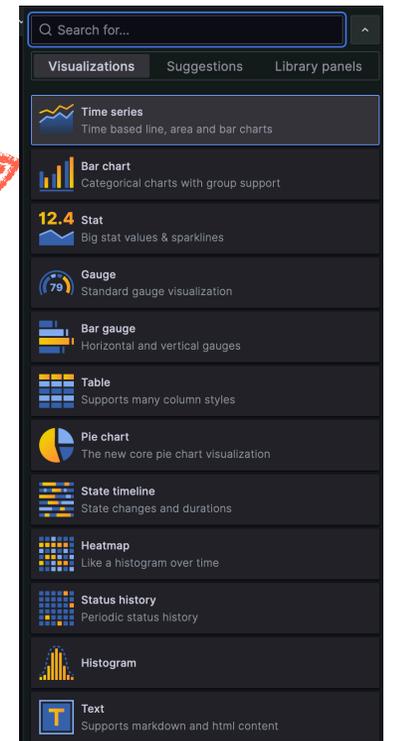
```
1 SELECT
2   CONVERT_TZ(t_stamp, '-04:00', '+00:00'),
3   fTempAmbient AS LAD2
4 FROM
5   sPHENIX_infra.INTT_LAD2
6 ORDER BY
7   t_stamp DESC;
```

実行する SQL 文が書いてある

LAD2 グラフ生成のための
データベース操作



描画の細々とした設定



糠塚様より