NTRIPmonitor

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4th of March 2025

Helsinki

Agency for Climate Data

What is the NTRIPmonitor?

Purpose

- Health and data check on incoming RTK correctional data
- Latency and data gap surveillance of GNSS network
- Monitoring of service availability as ”outsider”

Design idea

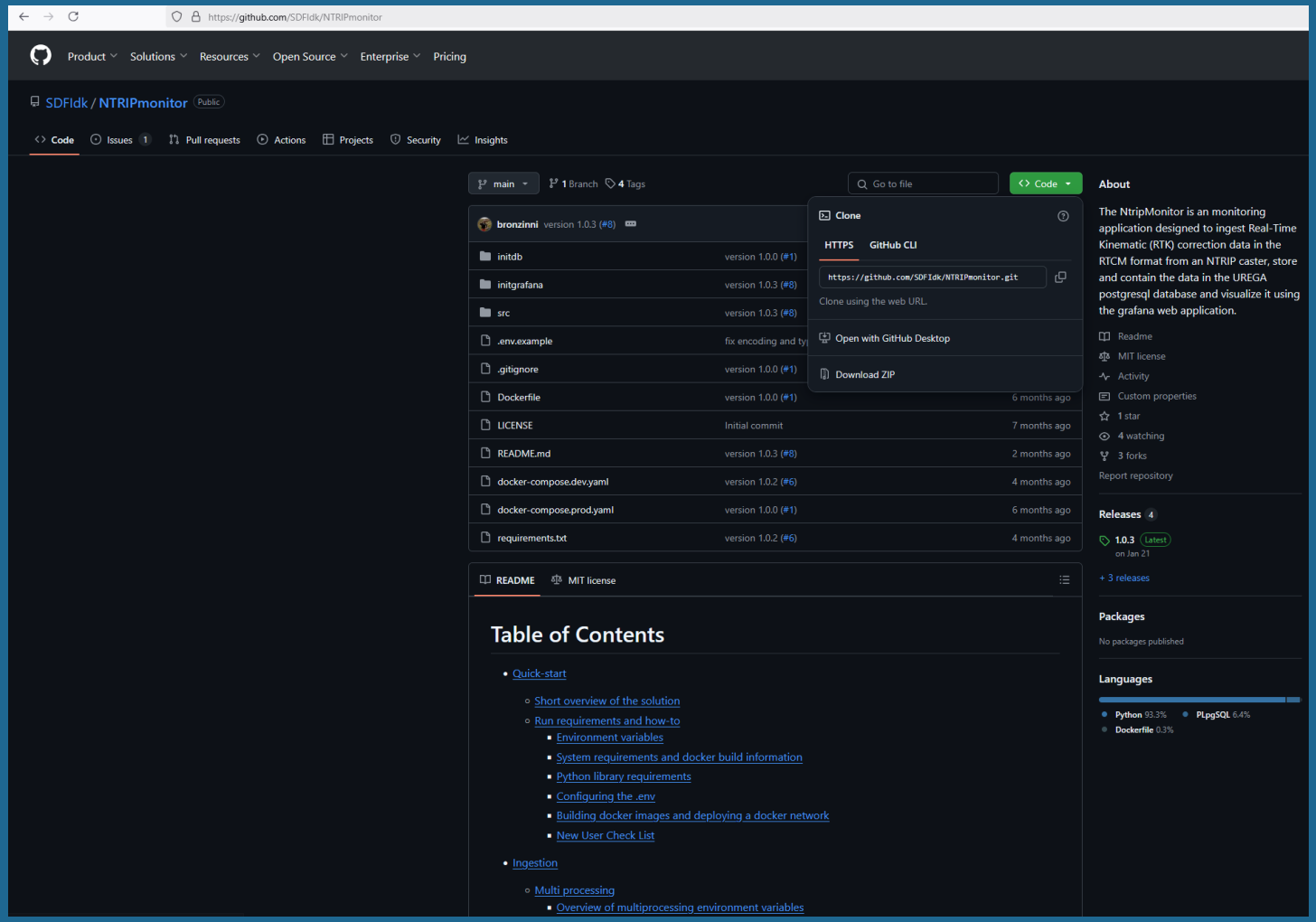
- Open-source as well as free as in free beer
- Customizable and scalable

- Stream reading
- Message decoding
- Database insertion

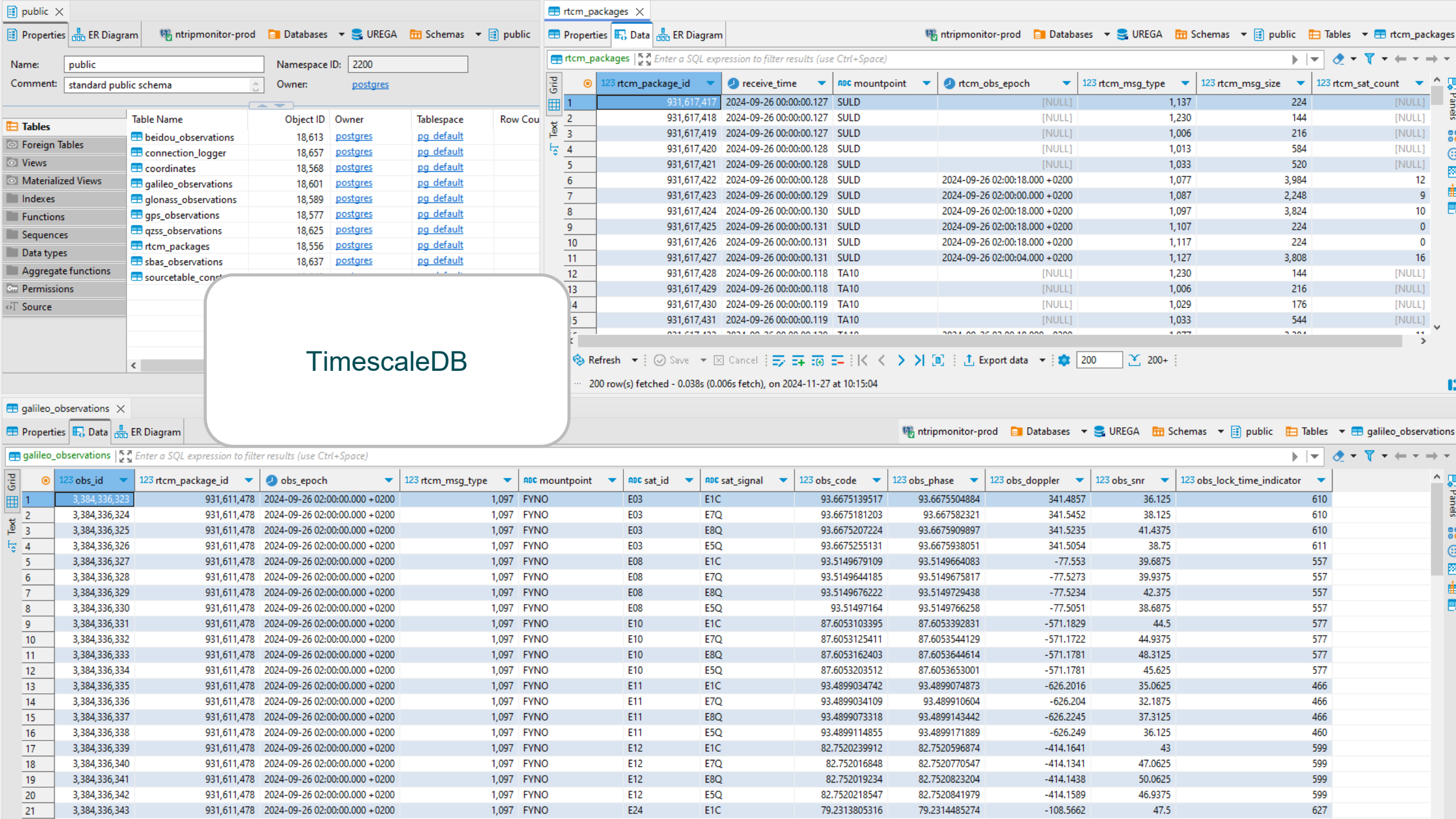
- postgreSQL database
- optimized for time series

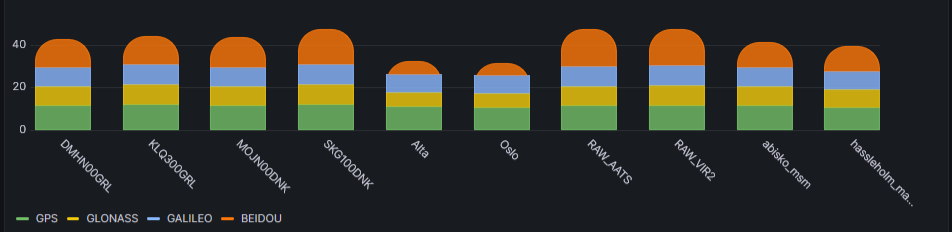
- Visualization by SQL queries to database

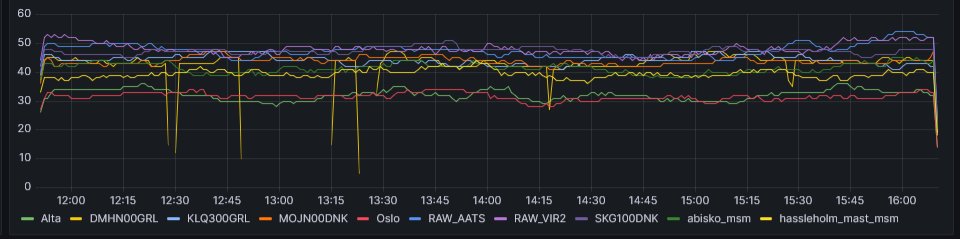
Ingestion

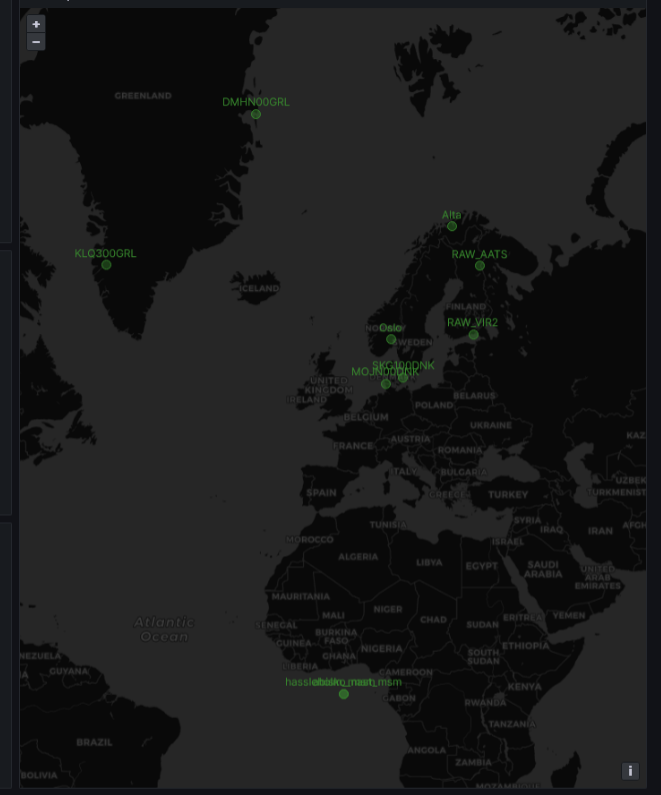


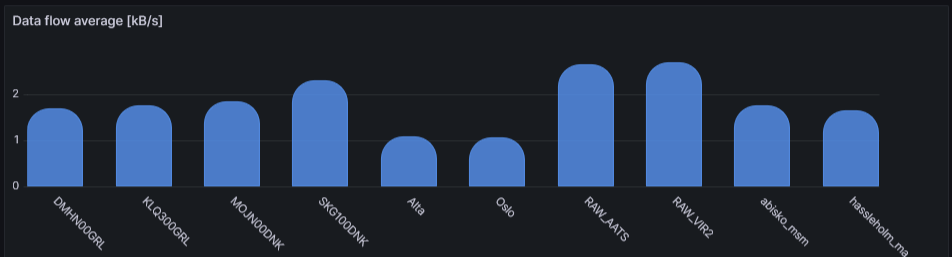
- python source code
  – available at github
- multiprocessing
- Docker containers
  – infrastructure independent
- easy and safe configuration

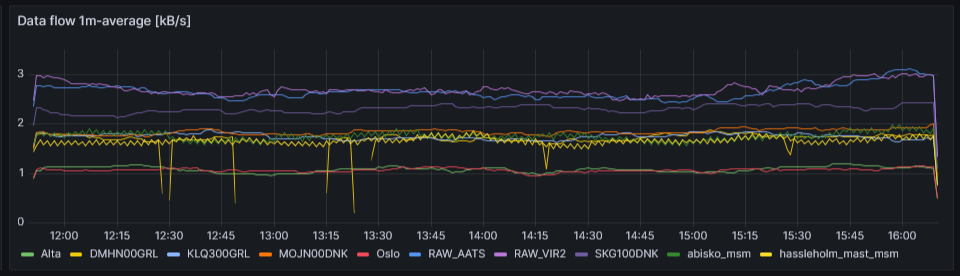

public
Properties
ER Diagram
ntripmonitor-prod
Databases
UREGA
Schemas
public
Name: public
Namespace ID: 2200
Comment: standard public schema
Owner: postgres
Tables
Foreign Tables
Views
Materialized Views
Indexes
Functions
Sequences
Data types
Aggregate functions
Permissions
Source
Table Name
Object ID
Owner
Tablespace
Row Cou
beidou_observations 18,613 postgres pg_default
connection_logger 18,657 postgres pg_default
coordinates 18,568 postgres pg_default
galileo_observations 18,601 postgres pg_default
glonass_observations 18,589 postgres pg_default
gps_observations 18,577 postgres pg_default
qzss_observations 18,625 postgres pg_default
rtcm_packages 18,556 postgres pg_default
sbas_observations 18,637 postgres pg_default
sourcetable_const
TimescaleDB
rtcm_packages
Properties
Data
ER Diagram
ntripmonitor-prod
Databases
UREGA
Schemas
public
Tables
rtcm_packages
rtcm_packages
Enter a SQL expression to filter results (use Ctrl+Space)
Grid
Text
123 rtcm_package_id
receive_time
ABC mountpoint
rtcm_obs_epoch
123 rtcm_msg_type
123 rtcm_msg_size
123 rtcm_sat_count
1 931,617,417 2024-09-26 00:00:00.127 SULD [NULL] 1,137 224 [NULL]
2 931,617,418 2024-09-26 00:00:00.127 SULD [NULL] 1,230 144 [NULL]
3 931,617,419 2024-09-26 00:00:00.127 SULD [NULL] 1,006 216 [NULL]
4 931,617,420 2024-09-26 00:00:00.128 SULD [NULL] 1,013 584 [NULL]
5 931,617,421 2024-09-26 00:00:00.128 SULD [NULL] 1,033 520 [NULL]
6 931,617,422 2024-09-26 00:00:00.128 SULD 2024-09-26 02:00:18.000 +0200 1,077 3,984 12
7 931,617,423 2024-09-26 00:00:00.129 SULD 2024-09-26 02:00:00.000 +0200 1,087 2,248 9
8 931,617,424 2024-09-26 00:00:00.130 SULD 2024-09-26 02:00:18.000 +0200 1,097 3,824 10
9 931,617,425 2024-09-26 00:00:00.131 SULD 2024-09-26 02:00:18.000 +0200 1,107 224 0
10 931,617,426 2024-09-26 00:00:00.131 SULD 2024-09-26 02:00:18.000 +0200 1,117 224 0
11 931,617,427 2024-09-26 00:00:00.131 SULD 2024-09-26 02:00:04.000 +0200 1,127 3,808 16
12 931,617,428 2024-09-26 00:00:00.118 TA10 [NULL] 1,230 144 [NULL]
13 931,617,429 2024-09-26 00:00:00.118 TA10 [NULL] 1,006 216 [NULL]
4 931,617,430 2024-09-26 00:00:00.119 TA10 [NULL] 1,029 176 [NULL]
5 931,617,431 2024-09-26 00:00:00.119 TA10 [NULL] 1,033 544 [NULL]
Refresh
Save
Cancel
Export data
200
200+
200 row(s) fetched - 0.038s (0.006s fetch), on 2024-11-27 at 10:15:04
galileo_observations
Properties
Data
ER Diagram
ntripmonitor-prod
Databases
UREGA
Schemas
public
Tables
galileo_observations
galileo_observations
Enter a SQL expression to filter results (use Ctrl+Space)
Grid
Text
123 obs_id
123 rtcm_package_id
obs_epoch
123 rtcm_msg_type
ABC mountpoint
ABC sat_id
ABC sat_signal
123 obs_code
123 obs_phase
123 obs_doppler
123 obs_snr
123 obs_lock_time_indicator
1 3,384,336,323 931,611,478 2024-09-26 02:00:00.000 +0200 1,097 FYNO E03 E1C 93.6675139517 93.6675504884 341.4857 36.125 610
2 3,384,336,324 931,611,478 2024-09-26 02:00:00.000 +0200 1,097 FYNO E03 E7Q 93.6675181203 93.667582321 341.5452 38.125 610
3 3,384,336,325 931,611,478 2024-09-26 02:00:00.000 +0200 1,097 FYNO E03 E8Q 93.6675207224 93.6675909897 341.5235 41.4375 610
4 3,384,336,326 931,611,478 2024-09-26 02:00:00.000 +0200 1,097 FYNO E03 E5Q 93.6675255131 93.6675938051 341.5054 38.75 611
5 3,384,336,327 931,611,478 2024-09-26 02:00:00.000 +0200 1,097 FYNO E08 E1C 93.5149679109 93.5149664083 -77.553 39.6875 557
6 3,384,336,328 931,611,478 2024-09-26 02:00:00.000 +0200 1,097 FYNO E08 E7Q 93.5149644185 93.5149675817 -77.5273 39.9375 557
7 3,384,336,329 931,611,478 2024-09-26 02:00:00.000 +0200 1,097 FYNO E08 E8Q 93.5149676222 93.5149729438 -77.5234 42.375 557
8 3,384,336,330 931,611,478 2024-09-26 02:00:00.000 +0200 1,097 FYNO E08 E5Q 93.51497164 93.5149766258 -77.5051 38.6875 557
9 3,384,336,331 931,611,478 2024-09-26 02:00:00.000 +0200 1,097 FYNO E10 E1C 87.6053103395 87.6053392831 -571.1829 44.5 577
10 3,384,336,332 931,611,478 2024-09-26 02:00:00.000 +0200 1,097 FYNO E10 E7Q 87.6053125411 87.6053544129 -571.1722 44.9375 577
11 3,384,336,333 931,611,478 2024-09-26 02:00:00.000 +0200 1,097 FYNO E10 E8Q 87.6053162403 87.6053644614 -571.1781 48.3125 577
12 3,384,336,334 931,611,478 2024-09-26 02:00:00.000 +0200 1,097 FYNO E10 E5Q 87.6053203512 87.6053653001 -571.1781 45.625 577
13 3,384,336,335 931,611,478 2024-09-26 02:00:00.000 +0200 1,097 FYNO E11 E1C 93.4899034742 93.4899074873 -626.2016 35.0625 466
14 3,384,336,336 931,611,478 2024-09-26 02:00:00.000 +0200 1,097 FYNO E11 E7Q 93.4899034109 93.489910604 -626.204 32.1875 466
15 3,384,336,337 931,611,478 2024-09-26 02:00:00.000 +0200 1,097 FYNO E11 E8Q 93.4899073318 93.4899143442 -626.2245 37.3125 466
16 3,384,336,338 931,611,478 2024-09-26 02:00:00.000 +0200 1,097 FYNO E11 E5Q 93.4899114855 93.4899171889 -626.249 36.125 460
17 3,384,336,339 931,611,478 2024-09-26 02:00:00.000 +0200 1,097 FYNO E12 E1C 82.7520239912 82.7520596874 -414.1641 43 599
18 3,384,336,340 931,611,478 2024-09-26 02:00:00.000 +0200 1,097 FYNO E12 E7Q 82.752016848 82.7520770547 -414.1341 47.0625 599
19 3,384,336,341 931,611,478 2024-09-26 02:00:00.000 +0200 1,097 FYNO E12 E8Q 82.752019234 82.7520823204 -414.1438 50.0625 599
20 3,384,336,342 931,611,478 2024-09-26 02:00:00.000 +0200 1,097 FYNO E12 E5Q 82.7520218547 82.7520841979 -414.1589 46.9375 599
21 3,384,336,343 931,611,478 2024-09-26 02:00:00.000 +0200 1,097 FYNO E24 E1C 79.2313805316 79.2314485274 -108.5662 47.5 627









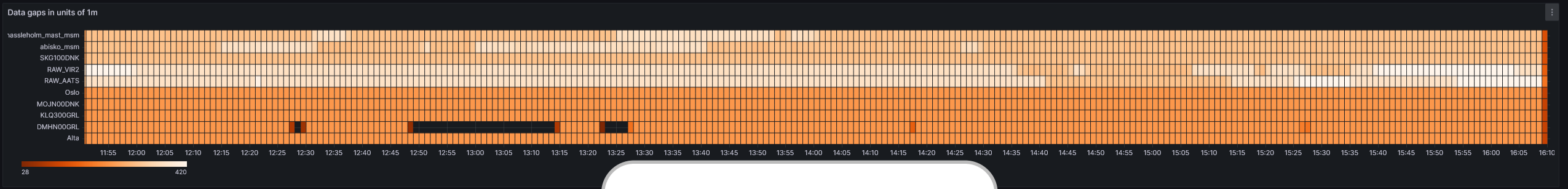


Disconnected mountpoints

Mountpoint	Disconnected at	Reconnected at	Duration
DMHN00GRL	2024-12-10 15:28:06	2024-12-10 15:28:12	00:00:05
DMHN00GRL	2024-12-10 14:18:25	2024-12-10 14:18:40	00:00:15
DMHN00GRL	2024-12-10 13:23:22	2024-12-10 13:28:14	00:04:51
DMHN00GRL	2024-12-10 12:49:29	2024-12-10 13:15:38	00:26:09
DMHN00GRL	2024-12-10 12:28:37	2024-12-10 12:30:42	00:02:04

Coordinates [m]

Mountpoint	Caster	X	Y	Z	Antenna height
DMHN00GRL	KDS	1387317.881	-468385.052	6187028.161	0.000
KLQ300GRL	KDS	1586032.885	-1932258.357	5848546.987	0.257
MOJN00DNK	KDS	3628428.018	562059.110	5197872.369	0.188
SKG100DNK	KDS	3515280.139	783454.937	5246435.102	0.000
Alta	Kartverket	2011819.992	866267.819	5970245.069	
Oslo	Kartverket	3169984.853	579957.102	5485941.221	



Grafana

What's new?

- Version 1.0.3 out since January
- Connected to casters in Denmark, Finland, Norway and Sweden
- Improved connection stability
- Improved visualisations

.env

```
1_CASTER_ID=KDS
1_CASTER_URL=http://load218.kmsext.dk:12101
1_CASTER_USER=sdfe1
1_CASTER_PASSWORD=
1_CASTER_MOUNTPOINT=MOJN,SKG1,DMHN00GRL,KLQ300GRL
2_CASTER_ID=Kartverket
2_CASTER_URL=http://159.162.103.96:2101
2_CASTER_USER=KDS
2_CASTER_PASSWORD=
2_CASTER_MOUNTPOIN‌=Alta,Oslo
3_CASTER_ID=NLS
3_CASTER_URL=http://opencaster.nls.fi:2103
3_CASTER_USER=sdfi-ntripmon
3_CASTER_PASSWORD=
3_CASTER_MOUNTPOINT=RAW_VIR2,RAW_AATS
4_CASTER_ID=SWEPOS
4_CASTER_URL=http://ntripdist-swepos.lm.se:8502
4_CASTER_USER=sdfe01
4_CASTER_PASSWORD=
4_CASTER_MOUNTPOINT=hassleholm_mast_msm,abisko_msm
```

docker-compose.dev.yaml

```
grafana:
    image: grafana/grafana-oss:9.5.19
    env_file:
        - .env
    environment:
        - GF_SECURITY_ADMIN_USER=${GRAFANA_USER}
        - GF_SECURITY_ADMIN_PASSWORD=${GRAFANA_PASSWORD}
        - GF_USERS_ALLOW_SIGN_UP=false
        - GF_SMTP_ENABLED=true
        - GF_SMTP_HOST=smtp.statens-it.dk:25
        - GF_SMTP_SKIP_VERIFY=true
    depends_on:
        - timescaledb
    ports:
```