Integration of real-time data within the EPN

EPN Central Bureau

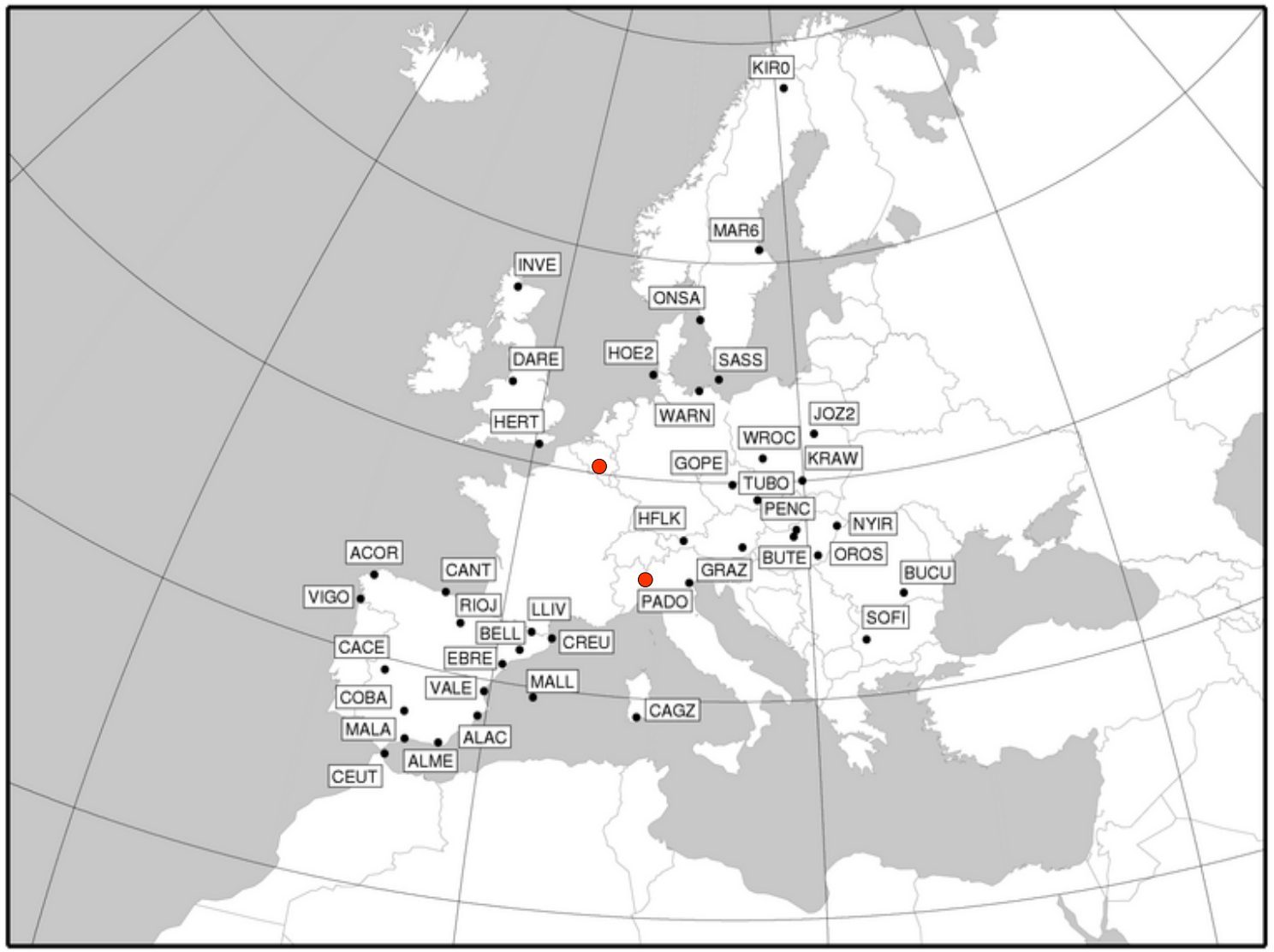
EPN stations providing real-time data

- 42 stations
- EUREF-IP project (40):
  - Real-time data flow using TCP/IP (Ntrip)
- IGS Real-time pilot project (2)

EPN STATIONS PROPOSING REAL-TIME DATA

Ntrip
- DGPS
- RTK
- RAW

IGSRT
- RAW
(sent to BKG)



CHOICES !

Choice 1:

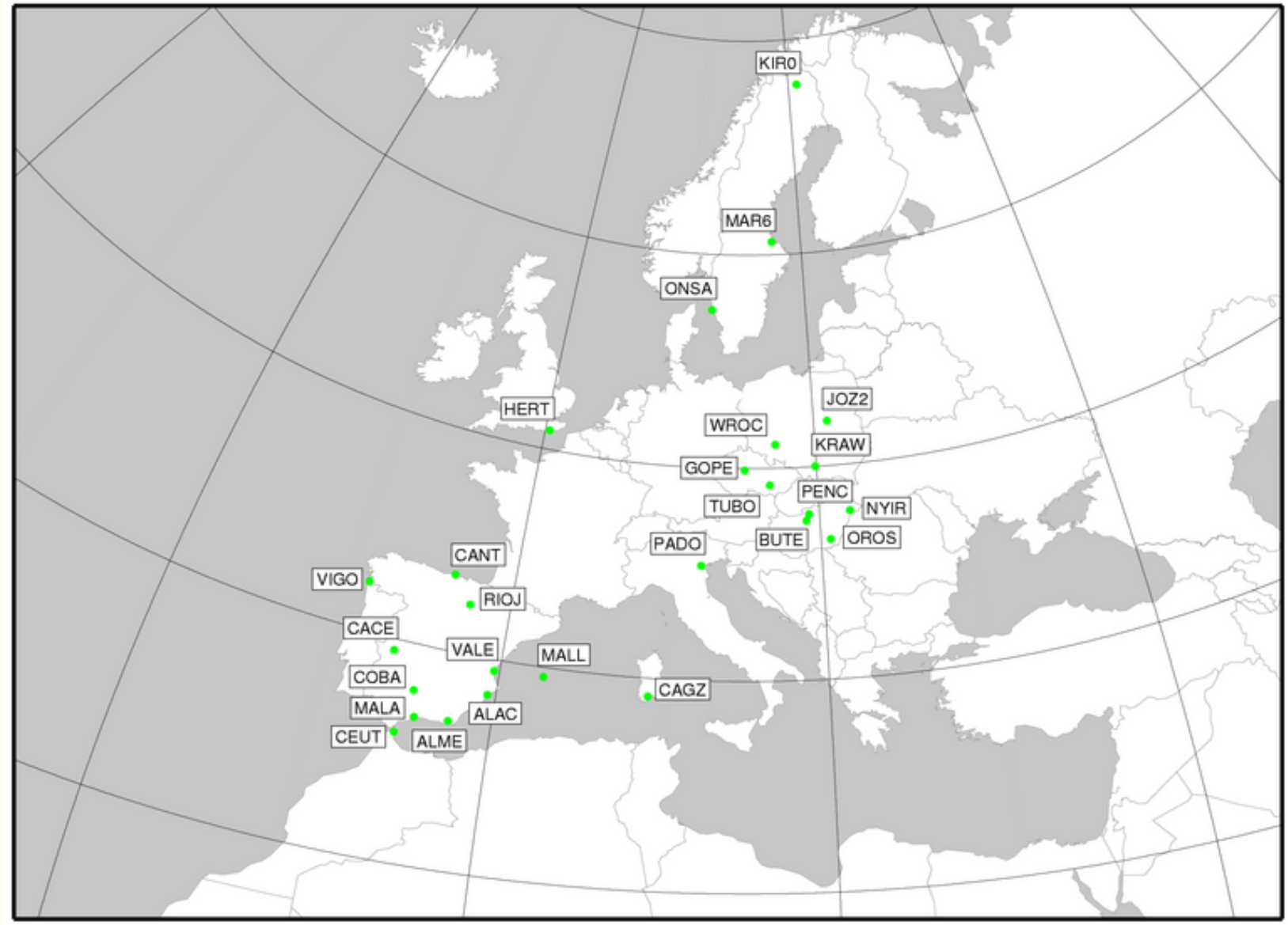
What is the minimal requirement for an EPN station to be considered real-time EPN station?

DGPS

9 EPN stations

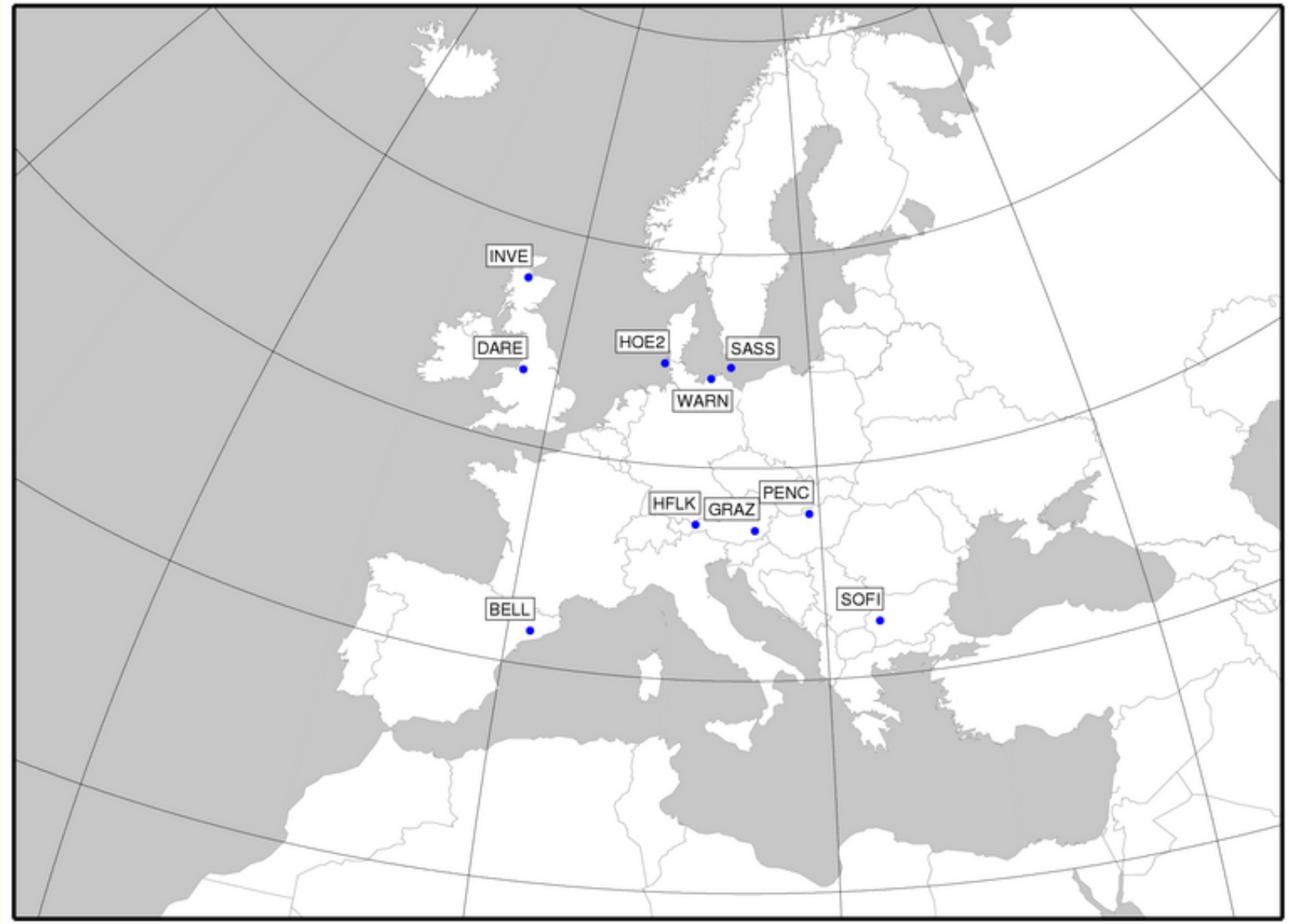
RTK

26 EPN stations



Raw data

10 EPN stations



CHOICES !

Choice 1:

What is the minimal requirement for an EPN station to be considered real-time EPN station?

(in addition to daily data!)

DGPS, RTK ?

RAW data?

Let's accept all ; the data provision itself is the service that EUREF offers.

Choice 2:

Does the EPN accept real-time data directly from IGSRT?

EUREF should go for one method of distributing the real-time data : Ntrip broadcasters

IGSRT stations can be accessed through Ntrip broadcaster

Choice 3:

What is the minimal requirement for an Ntrip broadcaster to be accepted as an EPN broadcaster?

Make available free of charge to the EUREF community real-time data streams (DGPS, RTK or raw data) from one or more real-time EPN stations

Long-term commitment

Potential EPN Ntrip broadcasters :

- BKG, www.euref-ip.de, Germany
- ICC, Institut Cartografic de Catalunya, Spain
- IGNE, Instituto Geográfico Nacional de España, Spain
- SGO, FOMI Satellite Geodetic Observatory, Hungary
- UPA, University Padova, Italy

Choice 4:

Do we want one EPN broadcaster or several ?

Go for multiple broadcasters

Choice 5:

If we consider DGPS and RTK data streams with the EPN label, is EUREF then responsible for the correctness of the coordinates used to generate the DGPS/RTK data ?

Yes, which means that we need to have the means to verify these coordinates (task for EPN CB)

using appropriate message types in RTCM format

Choice 6:

If we (EUREF) decide to verify the coordinates in used to generate the DGPS and RTK data, then in what system should these coordinates be?

ETRS89

- How precise? Use the new coordinates web-page from EPN CB

Choice 7:

Do we (EUREF) check the quality of the DGPS/RTK or raw data from the real-time EPN stations?

All EPN stations make available daily RINEX data files. The data quality is verified daily at the EPN CB based on these files. That is enough guarantee.

The quality of the corrections depends mainly on the software generating them.

EPN CB Action 1

EPN broadcasters

EUREF makes guidelines for the EPN casters

Make available standardized

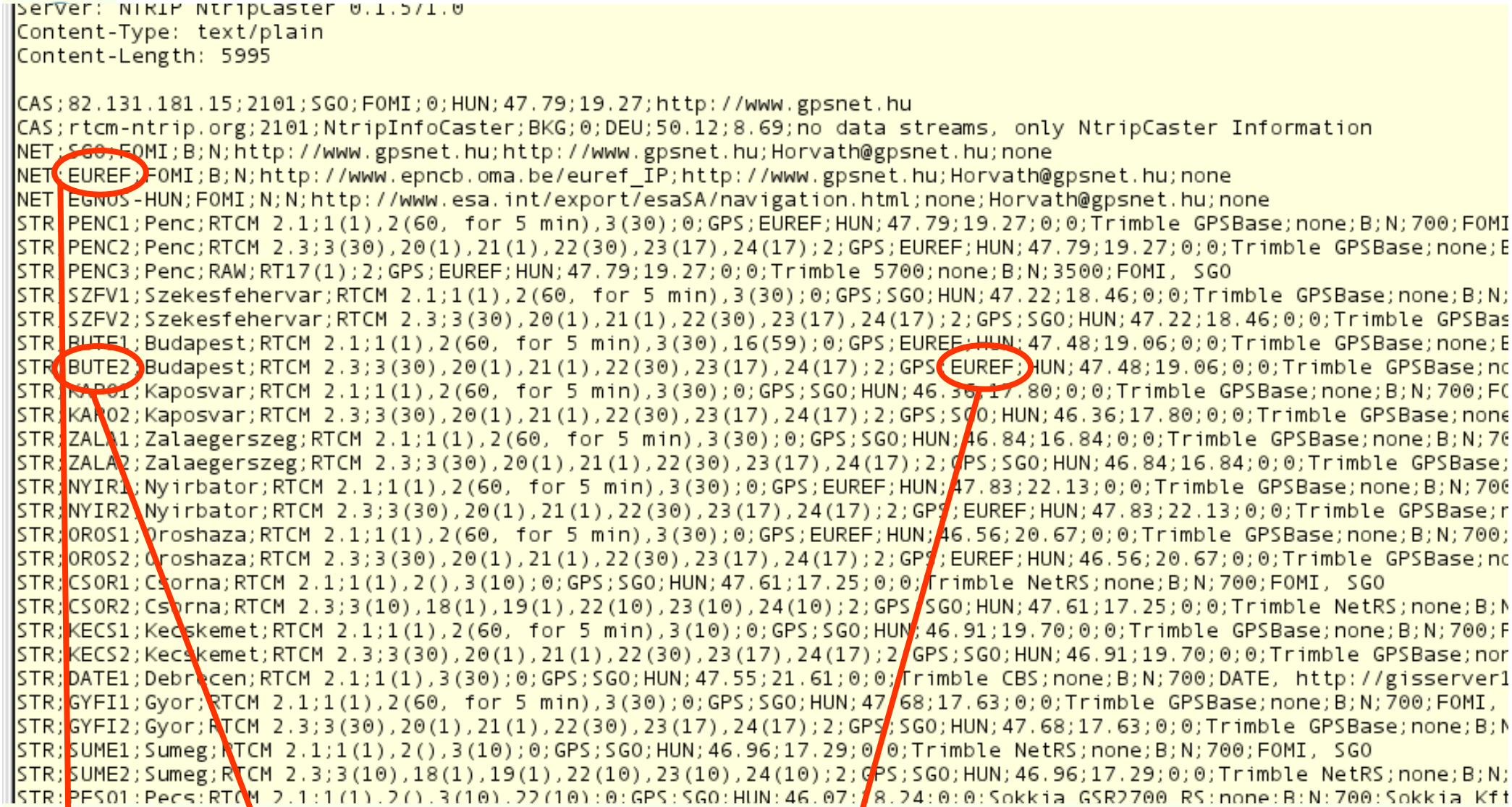
- Up to date information about EPN data streams available at each caster
- User registrations

Guidelines for broadcasters

Each caster keeps up to date sourcetable

- contains information on the data streams
- format defined as part of Ntrip protocol

Ask EPN broadcasters to follow a few additional EPN rules when generating the sourcetable


Server: NTRIP NtripCaster 0.1.5?1.0
Content-Type: text/plain
Content-Length: 5995
CAS;82.131.181.15;2101;SGO;FOMI;0;HUN;47.79;19.27;http://www.gpsnet.hu
CAS;rtcm-ntrip.org;2101;NtripInfoCaster;BKG;0;DEU;50.12;8.69;no data streams, only NtripCaster Information
NET;SGO;FOMI;B;N;http://www.gpsnet.hu;http://www.gpsnet.hu;Horvath@gpsnet.hu;none
NET;EUREF;FOMI;B;N;http://www.epncb.oma.be/euref_IP;http://www.gpsnet.hu;Horvath@gpsnet.hu;none
NET;EGNOS-HUN;FOMI;N;N;http://www.esa.int/export/esaSA/navigation.html;none;Horvath@gpsnet.hu;none
STR;PENC1;Penc;RTCM 2.1;1(1),2(60, for 5 min),3(30);0;GPS;EUREF;HUN;47.79;19.27;0;0;Trimble GPSBase;none;B;N;700;FOMI
STR;PENC2;Penc;RTCM 2.3;3(30),20(1),21(1),22(30),23(17),24(17);2;GPS;EUREF;HUN;47.79;19.27;0;0;Trimble GPSBase;none;B
STR;PENC3;Penc;RAW;RT17(1);2;GPS;EUREF;HUN;47.79;19.27;0;0;Trimble 5700;none;B;N;3500;FOMI, SGO
STR;SZFV1;Szekesfehervar;RTCM 2.1;1(1),2(60, for 5 min),3(30);0;GPS;SGO;HUN;47.22;18.46;0;0;Trimble GPSBase;none;B;N;
STR;SZFV2;Szekesfehervar;RTCM 2.3;3(30),20(1),21(1),22(30),23(17),24(17);2;GPS;SGO;HUN;47.22;18.46;0;0;Trimble GPSBas
STR;BUTE1;Budapest;RTCM 2.1;1(1),2(60, for 5 min),3(30),16(59);0;GPS;EUREF;HUN;47.48;19.06;0;0;Trimble GPSBase;none;B
STR;BUTE2;Budapest;RTCM 2.3;3(30),20(1),21(1),22(30),23(17),24(17);2;GPS;EUREF;HUN;47.48;19.06;0;0;Trimble GPSBase;no
STR;KAPO1;Kaposvar;RTCM 2.1;1(1),2(60, for 5 min),3(30);0;GPS;SGO;HUN;46.36;17.80;0;0;Trimble GPSBase;none;B;N;700;FO
STR;KAPO2;Kaposvar;RTCM 2.3;3(30),20(1),21(1),22(30),23(17),24(17);2;GPS;SGO;HUN;46.36;17.80;0;0;Trimble GPSBase;none
STR;ZALA1;Zalaegerszeg;RTCM 2.1;1(1),2(60, for 5 min),3(30);0;GPS;SGO;HUN;46.84;16.84;0;0;Trimble GPSBase;none;B;N;70
STR;ZALA2;Zalaegerszeg;RTCM 2.3;3(30),20(1),21(1),22(30),23(17),24(17);2;GPS;SGO;HUN;46.84;16.84;0;0;Trimble GPSBase;
STR;NYIR1;Nyirbator;RTCM 2.1;1(1),2(60, for 5 min),3(30);0;GPS;EUREF;HUN;47.83;22.13;0;0;Trimble GPSBase;none;B;N;700
STR;NYIR2;Nyirbator;RTCM 2.3;3(30),20(1),21(1),22(30),23(17),24(17);2;GPS;EUREF;HUN;47.83;22.13;0;0;Trimble GPSBase;n
STR;OROS1;Oroshaza;RTCM 2.1;1(1),2(60, for 5 min),3(30);0;GPS;EUREF;HUN;46.56;20.67;0;0;Trimble GPSBase;none;B;N;700;
STR;OROS2;Oroshaza;RTCM 2.3;3(30),20(1),21(1),22(30),23(17),24(17);2;GPS;EUREF;HUN;46.56;20.67;0;0;Trimble GPSBase;no
STR;CSOR1;Csorna;RTCM 2.1;1(1),2(),3(10);0;GPS;SGO;HUN;47.61;17.25;0;0;Trimble NetRS;none;B;N;700;FOMI, SGO
STR;CSOR2;Csorna;RTCM 2.3;3(10),18(1),19(1),22(10),23(10),24(10);2;GPS;SGO;HUN;47.61;17.25;0;0;Trimble NetRS;none;B;N
STR;KECS1;Kecskemet;RTCM 2.1;1(1),2(60, for 5 min),3(10);0;GPS;SGO;HUN;46.91;19.70;0;0;Trimble GPSBase;none;B;N;700;F
STR;KECS2;Kecskemet;RTCM 2.3;3(30),20(1),21(1),22(30),23(17),24(17);2;GPS;SGO;HUN;46.91;19.70;0;0;Trimble GPSBase;nor
STR;DATE1;Debrecen;RTCM 2.1;1(1),3(30);0;GPS;SGO;HUN;47.55;21.61;0;0;Trimble CBS;none;B;N;700;DATE, http://gisserver1
STR;GYFI1;Gyor;RTCM 2.1;1(1),2(60, for 5 min),3(30);0;GPS;SGO;HUN;47.68;17.63;0;0;Trimble GPSBase;none;B;N;700;FOMI,
STR;GYFI2;Gyor;RTCM 2.3;3(30),20(1),21(1),22(30),23(17),24(17);2;GPS;SGO;HUN;47.68;17.63;0;0;Trimble GPSBase;none;B;N
STR;SUME1;Sumeg;RTCM 2.1;1(1),2(),3(10);0;GPS;SGO;HUN;46.96;17.29;0;0;Trimble NetRS;none;B;N;700;FOMI, SGO
STR;SUME2;Sumeg;RTCM 2.3;3(10),18(1),19(1),22(10),23(10),24(10);2;GPS;SGO;HUN;46.96;17.29;0;0;Trimble NetRS;none;B;N;
STR;PECS0;Pecs;RTCM 2.1;1(1),2(),3(10),22(10);0;GPS;SGO;HUN;46.07;18.24;0;0;Sokkia GSR2700 RS;none;B;N;700;Sokkia Kft
Mountpoint: first 4-char = 4-char abbreviation of EPN station
Define network named : EPN
Put « EPN » as network, if open data policy

To access real-time data stream, users have to register:

- BKG : web-form (in English)
- ICC: web-page (in Spanish)
- IGE: word-file (in Spanish)
- FOMI: mail
- UniPd: mail

Propose unified way of requesting access to EPN data streams.

EPN CB Action 2

EPN real-time stations

Set up guidelines for the EPN real-time stations

To assure correct site coordinates & antenna height
(in case corrections are streamed)

RTCM 3.0 (mess. type 1006 – rec. pos. + ant. h.)

EPN CB Action 3

Call for Participation

After approval of EPN real-time station and broadcaster guidelines by TWG

Issue Call for Participation for EPN real-time stations and broadcasters

EUREF Symposium in Riga