Guidelines for EPN Data Centres & EPN Broadcasters

Prepared by the EPN Coordination Group and the EPN Central Bureau

(Copy bullets for Local Broadcasters and Regional Broadcasters to section 1.1 Components)

4. Requirements for Local and Regional Broadcasters

As described in section 1.1 of the "Guidelines for EPN Stations and Operational Centres" (http://www.epncb.oma.be/_documentation/guidelines/guidelines_station_operationalcentre.pdf) there are two different broadcasters available in the EPN, **Local Broadcasters (LBs),** receiving the real-time data streams from the stations in a local network and disseminating them, and **Regional Broadcasters (RBs)** , receiving all the EPN real-time data streams and disseminating them, without changing them, on request to clients. As long as it is not indicated the descriptions and requirements given in the following are valid for both of them.

In the following, we will use the wording "Broadcaster" for both the LB and RB.

A general description about real-time data streaming, processing and products is given in the concept on "Real-Time GNSS in Routine EPN Operations" (http://www.epncb.oma.be/_documentation/guidelines/EPNRT_WhitePaper.pdf).

4.1 Broadcaster Sourcetable

Within the EPN the "Networked Transport of RTCM via Internet Protocol" (Ntrip) is used. Since 2007, Ntrip is a recommended DGNSS standard of Special Committee 104 of the "Radio Technical Commission for Maritime services" (RTCM). Current version Ntrip 2.0 is described in RTCM Paper 111-2009-SC104-STD (see http://www.rtcm.org, not freely available).
The Ntrip broadcaster receives streams from the stations or from other sources and disseminates them to clients on request. Clients may be users, data centres, analysis centres or monitoring tools. The broadcaster does not change the content of the streams. The broadcaster maintains a so-called sourcetable containing meta data. The sourcetable is made available on request, e.g. using an HTTP command. (...).
A general description of the content of a sourcetable can be found on http://software.rtcm-ntrip.org/wiki/Sourcetable.
An Ntrip sourcetable consists of three types of records which are listed in Table 1. All three record types may appear more than once in a sourcetable. Although caster and network record are not necessary to build a valid sourcetable for the EPN we require

[REQ-01]: An EPN sourcetable (RBs and LBs) must contain all three record types CAS, NET, and STR.

Each data field is separated by a semicolon: ";". In principle, some data fields could be left empty (i.e., two semicolons behind each other). However, for the EUREF broadcasters we require

[REQ-02]: None of the data fields of the record types CAS, NET, and STR is allowed to be empty.

CAS	Caster specification record(s)	11 mandatory data fields
NET	Network specification record(s)	8 mandatory data fields
STR	Stream specification record(s)	18 mandatory data fields

Table 1: Record Types of an Ntrip broadcaster sourcetable

Within each of the record types one optional data field is allowed after the mandatory data fields.

4.1.1 Record type CAS

The record type CAS is the caster specification record. It comprises 11 mandatory and one optional data field.

Data Field #	Record Parameter	Description / Meaning	Format	Content	Example(s)
1	<type>	Indicator of a caster description: the following parameters of this record describe a caster.	Char, exactly 3	CAS	CAS
2	<host>	Caster internet address (domain name or internet address)	Char, max. 128	Host name or IP address	141.74.243.11 euref-ip.bkg.bund.de
3	<port>	Port number	Int	Numeric port number	80 2101
4	<identifier>	Caster identifier: name of caster or caster provider	Char, undefined length	Plain text	Ntrip Caster/0.5.3
5	<operator>	Name of agency, institution, company operating the caster	Char, undefined length	Plain text	ASI BKG ROB
6	<nmea>	Caster accepts NMEA input (1) or not (0)	Int, exactly 1	0 or 1	0 1
7	<country>	ISO 3166 country code	Char, exactly 3		BEL DEU ITA
8	<latitude>	Latitude in degree, north	Real	Floating point latitude	42.12 -10.10
9	<longitude>	Longitude in degree, east	Real	Floating point longitude	6.04 358.96
10	<fallback_host>	Backup caster internet address	Char, max. 128	Host name or IP address	141.74.243.11 euref-ip.bkg.bund.de
11	<fallback_ip>	Backup caster port	Int	Numeric port number	80 2101

Table 2: mandatory data fields in a CAS record

The last data field in the CAS record is an optional data field.

Data Field #	Record Parameter	Description / Meaning	Format	Content	Example(s)
12	<misc>	Miscellaneous information	Char, undefined length	Plain text	... none

Table 3: optional data field in a CAS record

4.1.2 Record type NET

The record type NET is the network specification record. It comprises 8 mandatory and one optional data field.

Data Field #	Record Parameter	Description / Meaning	Format	Content	Example(s)
1	<type>	Indicator of a network description: the following parameters of this record describe a network.	Char, exactly 3	NET	NET
2	<identifier>	Network identifier: name of a network of cGNSS	Char, undefined length	Plain text	EUREF IGS
3	<operator>	Name of agency, institution, company operating the caster	Char, undefined length	Plain text	ASI BKG ROB
4	<authentication>	Access protection for data streams of the network	Char, exactly 1	N-None, B-Basic, D-Digest	N B D N,B
5	<fee>	User fee for receiving data streams	Char, exactly 1	N-no fee Y-fee	N Y
6	<web-net>	Web address for network information	Char, undefined length	URL	http://www.bkg.bund.de none
7	<web-str>	Web address for stream information	Char, undefined length	URL	http://www.epncb.oma.be none
8	<web-reg>	Web address or email for registration	Char, undefined length	URL	euref-ip@bkg.bund.de none

Table 4: mandatory data fields in a NET record

The last data field in the NET record is an optional data field.

Data Field #	Record Parameter	Description / Meaning	Format	Content	Example(s)
9	<misc>	Miscellaneous information	Char, undefined length	Plain text	... none

Table 5: optional data field in a NET record

4.1.3 Record type STR

The record type STR is the stream specification record. It comprises 18 mandatory and one optional data field.

Data Field #	Record Parameter	Description / Meaning	Format	Content	Example(s)
1	<type>	Indicator of a stream description: the following parameters of this record describe a data stream.	Char, exactly 3	STR	STR
2	<mountpoint>	Stream mountpoint	Char, max. 100	Restricted to “A-Z”, “a-z”, “0-9”, “-“, “_”, and “.”	ALAC0 HELG1 EUREF01
3	<identifier>	Source identifier, eg. Name of city next to source location	Char, undefined length	E.g. location as in sitelog	RTCM 2.3 RTCM 3 CMR
4	<format>	Data format	Char, undefined length		
5	<format-details>	RTCM message types or RAW data format etc.	Char, undefined length	Update periods in seconds in parenthesis	1004(1), 1012(1)
6	<carrier>	Data stream contains carrier phase information	Int	0-No 1-Yes, L1 2-Yes, L1&L2	0 1 2
7	<nav-system>	Navigation system(s)	Char, undefined length	3 char for each system	GPS GPS+GLO+GAL
8	<network>	Network identifier: name of a network of cGNSS	Char, undefined length	Plain text	EUREF IGS Misc
9	<country>	ISO 3166 country code	Char, exactly 3		BEL DEU ITA
10	<latitude>	Latitude in degree, north	Real	Floating point latitude	42.12 -10.10
11	<longitude>	Longitude in degree, east	Real	Floating point longitude	6.04 358.96
12	<nmea>	Caster requires NMEA input (1) or not (0)	Int, exactly 1	0-client must not send NMEA message 1-client must send NMEA GGA message	0 1
13	<solution>	Stream generated from single reference station (0) or from networked reference stations (1)	Int, exactly 1	0-single base 1-network	0 1
14	<generator>	Hard- or software generating stream	Char, undefined length	Plain text	PANDA LEICA GR10
15	<compr-encryp>	Compression / encryption algorithm	Char, undefined length	Plain text	none

Table 6: mandatory data fields in a STR record

The last data field in the STR record is an optional data field.

Data Field #	Record Parameter	Description / Meaning	Format	Content	Example(s)
19	<misc>	Miscellaneous information	Char, undefined length	Plain text	EUREF-FIN www.euref-ip.net/ALAC0(1) ESOC combination none

Table 7: optional data field in a STR record

Although the <mountpoint> data field could contain almost any series of characters, for the EPN RBs short and unique mountpoint names should be envisaged.

[REQ-03]: The datastream mountpoint names of the EPN RBs should be restricted to five characters. The first four characters are identical to the site name, plus one integer number.

Moreover,

[REQ-04]: Existing datastream mountpoints of an EPN station must be available at all EPN RBs.
[REQ-05]: The datastream mountpoint for one EPN station must be identical at all EPN RBs.

There are two ways a data stream could be received at a broadcaster:

- uploading it to the broadcaster, e.g. by an Ntrip Server or any other software,
- pulling it, e.g. from another broadcaster or from a receiver.

This information is available, e.g. for the administrator, in the “sources” page.
Within the EPN, the miscellaneous data field in the STR record has been used for the identification of the source of a data stream and the method coming to the respective broadcaster. Therefore,

[REQ-06]: If a real-time data stream is pulled from another broadcaster this must be reflected in the STR record data field#19 (<misc>). The information must contain the name or IP of the broadcaster, the original mountpoint name and the number of pullings in brackets.

[REQ-07]: If a real-time data stream is actively streamed to a broadcaster the STR record data field#19 (<misc>) should contain the name of the organisation uploading the stream.

Data field #14 <generator> of the STR record allows naming of the hard- or software generating the data stream. For observational data this could be for example a GNSS receiver or network software. For product data stream this could be the software used for processing. For the EPN observational data we propose

[REQ-08]: Data field #14 <generator> for a real-time observation data stream should contain the GNSS receiver using the IGS naming conventions.