Federal Agency for
Cartography and Geodesy
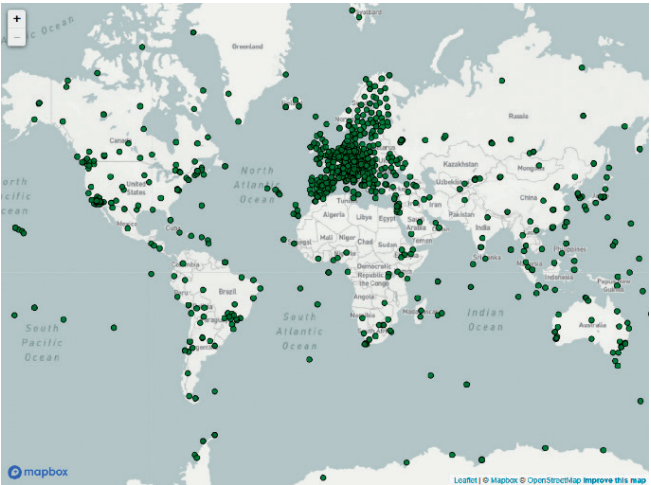

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BKG **G**NSS **D**ata **C**enter

The GNSS archive for federal institutions

Introduction

Since 25 years, Federal Agency for Cartography and Geodesy (BKG) is contributing to the International GNSS (Global Navigation Satellite Systems) Service (IGS) data center infrastructure operating a regional GNSS Data Center (GDC). BKG GDC is also serving as a data center for the regional infrastructure of EUREF (European Reference Frame), the European Sub-Commission of the International Association of Geodesy (IAG) reference frame.

Snapshot from web portal showing map of all stations at BKG GDC

As a second pillar, since 2004, BKG is operating various entities for the global, regional and national real-time GNSS infrastructure. The development of the basic real-time components has been done independently from the existing file-based data center. The techniques behind, the user access etc. are completely different from the existing file-based structure.

Operation of a real-time GNSS service demands a much higher level of monitoring than necessary in the post-processing world, where for example RINEX (Receiver Independent Exchange Format) files can be reprocessed the next day in case of an error. However, there are several common features and interfaces like site log and high-rate files. Therefore, the goal is the public outreach as one GDC and to simplify user access to both infrastructures, e.g. via one web interface.

GNSS data and products

BKG GDC contains all the regular GNSS data, as there are navigational data, meteorological data, observational data, both RINEX 2 and RINEX 3, daily, hourly and high-rate (i.e. 1 Hz) data.
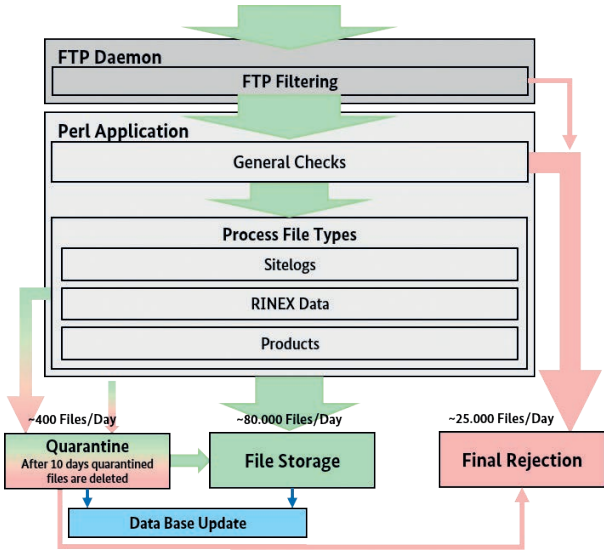
GNSS data	File type	Update rate	Sampling
Navigation	.rnx/.n	1h, 24h	2h*
Meteorology	.m	1h, 24h	5-15min
Observation	.crx/.d	15min, 1h, 24h	1-10s, 30s, 30s
Site log	.log	After changes	
Skeleton	.skl	After changes	
GNSS products	**File type**	**Update rate**	**Sampling**
Orbits	.sp3	6h, 24h, 7d	15min
Clocks	.clk	6h, 24h, 7d	15min, 5min, 30s
ERP	.erp	6h, 24h, 7d	6h, 24h, 24h
Sinex	.snx	24h, 7d	24h, 7d
Coordinates	.crd	1h, 24h, 7d	1h, 24h, 7d
Tropospheric parameters	.tro	7d	1h
Ionospheric parameters	.ion	24h	1h

*Table of GNSS data and products at BKG GDC, *varies between different GNSS*

The directory structure applied by BKG is project-driven, i.e. within the "Data Access" a user will see IGS, EUREF, GREF (Integrated Geodetic Reference Network Germany), MGEX (Multi-GNSS Experiment) directories plus some other or historic projects.

File-based processing workflow

To provide a viable basis of data for analysis centers and other clients BKG GDC routinely performs data-checks for all incoming files (referring to filename, file type, size and content, see flow-chart below). Files are filtered through several steps before being stored, quarantined or totally excluded.

Flowchart of data processing at BKG GDC

Infrastructure

Currently BKG GDC is running on a server integrated in a virtual machine environment placed at BKG's premises. It consist of a file server, a database server and a server dedicated to data process-ing and web access. All relevant parts of BKG GDC are backed-up on a daily basis and stored on tape for at least a month before being over written. The virtualization has proven to be reliable, and downtimes due to system maintenance haven't been neces-sary. A disaster recovery system for the GDC is not installed and not scheduled currently.

Access

The aim of BKG GDC is to provide reliable and non-restricted access to GNSS observational and navigational data. Access is possible

- via FTP (80.000 uploads, 600.000 downloads daily),
- via HTTP (approx. 450 visitors per day) or
- via web interface.

The web interface allows the following activities:

- Full 'Station List' with many filtering options and links to meta data (see below)
- File browser
- Search forms for RINEX files as well as for any file
- Availability of daily and hourly RINEX files
- Interactive map allowing condensed information about each station

Data & Products

Station List

Station: ☑ Designator ☐ Name ☑ Country ☑ Agency ☑ Project
Status: ☑ Active ☐ Idle

Equipment: ☐ Rec. Type ☐ Rec. # ☐ Firmware ☑ Constellation ☐ Ant. Type ☐ Ant. #

RINEX2 Data: ☑ Last Daily ☑ Availability ☑ RNX Quality ☑ Last 24 Hours ☑ Hourly Avail. ☑ Hourly Lat.

RINEX3 Data: ☑ Last Daily ☑ Availability ☑ RNX Quality ☐ Last 24 Hours ☐ Hourly Avail. ☐ Hourly Lat.

Show 10 ▾ entries   Search:

Station Designator	Country	Agency	Primary Project	Constellation	Latest Daily RNX2	Daily RNX2 Avail	Daily Rnx2Check	Latest RNX2 24	Hourly RNX2 Avail	Hourly RNX2 Lat	Latest Daily RNX3
AUBG00DEU	Germany	BKG	EUREF	GPS GLO GAL BDS SBAS	Rnx2: 2018-07-18	100%	OK	24/24	99%	99%	Rnx3: 2018-07-18
BADH00DEU	Germany	BKG	EUREF	GPS GLO GAL SBAS	Rnx2: 2018-07-18	93%	OK	24/24	100%	0%	Rnx3: 2018-07-18
BORJ00DEU	Germany	BKG	EUREF	GPS GLO GAL BDS SBAS	Rnx2: 2018-07-18	100%	OK	24/24	99%	99%	Rnx3: 2018-07-18
BUCU00ROU	Romania	BKG	IGS	GPS GLO	Rnx2: 2018-07-18	100%	OK	24/24	99%	29%	Rnx3:

Example for metadata accessible in menu 'Station List'

A processing monitor informs about the average time needed to process a single RINEX file and the amount of RINEX files stored daily or hourly. Changes in the processing software or system hardware are indicated as well.

The FTP (File Transfer Protocol) commands allow easy access for anonymous download of many files and for implementation in download scripts.

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