



Federal Agency for
Cartography and Geodesy



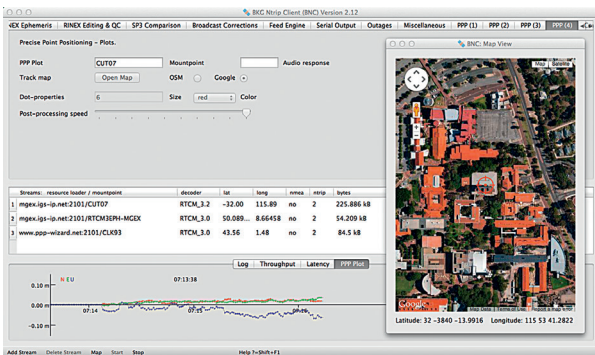
BKG Ntrip Client

Version 2.12

BNC - A General Survey

The BKG Ntrip Client (BNC) is a program for simultaneously retrieving, decoding, converting, processing or analyzing real-time GNSS (Global Navigation Satellite Systems) data streams applying the 'Networked Transport of RTCM via Internet Protocol' (Ntrip) standard. It comes with some postprocessing functionality as well. BNC's application areas are for example:

- Decoding of RTCM or RTNET (BNC's exchange format for State Space Representation (SSR) data) streams
- RINEX (Receiver Independent Exchange Format) and SP3 (Standard Product 3) or ASCII (American Standard Code for Information Interchange) file input and output
- Encoding and upload of SSR and ephemeris messages
- Precise Point Positioning (PPP)
- Combining/merging SSR or ephemeris messages from various real-time sources
- RINEX file based Quality Check



BNC on MAC system for static real-time PPP with Google Maps e.g. for early warning of natural hazards

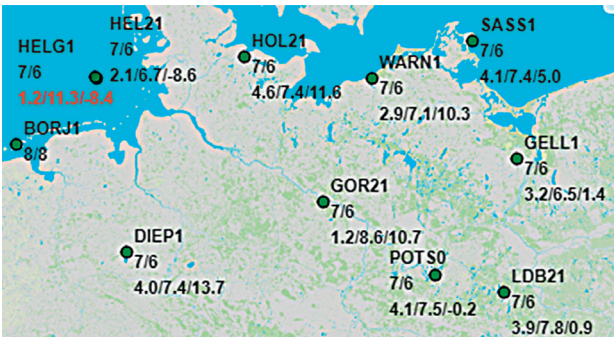
In comparison to earlier versions, BNC 2.12 has several improvements and extensions, e.g.

- Support of new GNSS signals, such as from Beidou Navigation Satellite System (BDS), Galileo and Quasi-Zenith Satellite System (QZSS) and Satellite Based Augmentation Systems (SBAS)
- Simultaneous multi-station PPP
- Comparison of satellite orbit files in SP3 format
- Broadcast ephemeris data check
- Support of all BNC options via Command-line User Interface

Multi-Station Precise Point Positioning

BNC enables multi-station PPP for simultaneous processing of observations from a whole network of receivers. It uses code or code and phase data from one or more GNSS, such as from GPS (Global Positioning System) and GLONASS (Global Navigation Satellite System), Galileo or BDS in ionosphere-free linear combinations together with the respective broadcast ephemeris and SSR information.

Beside coordinate displacements, troposphere parameter can be estimated as well to derive Zenith Total Delay values. Therefore, a site-specific tuning of the Kalman filter parameters is allowed.



Real-time displacement-monitoring of the Integrated Geodetic Reference Network of Germany (IGRF); North, East and Up displacements referring to a XYZ reference coordinate; Number of GPS/GLONASS satellites

Broadcast Ephemeris Check

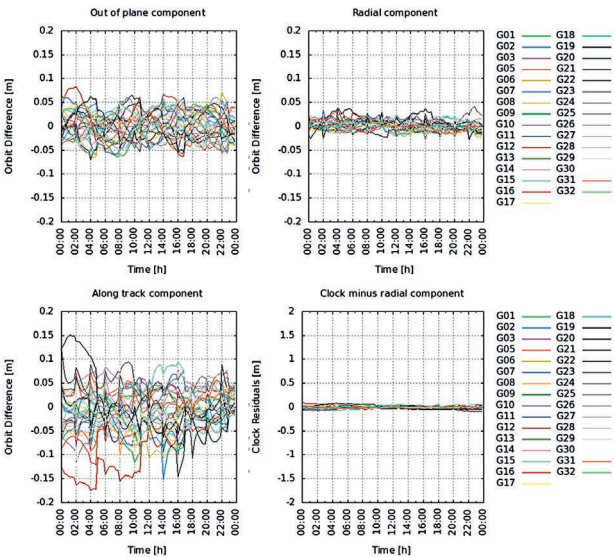
All broadcast ephemeris parameters pass through a plausibility check in BNC, which allows to ignore incorrect or outdated ephemeris data when necessary. Implemented are checks regarding the allowed age of the datasets, the plausibility of satellite radial distance and regarding the consistency with older ephemerides.

Multi-GNSS Support

BNC is permanently completed to finally support all existing GNSS throughout all features of the program. BNC 2.12 supports new GNSS observations and products from the BDS, Galileo and QZSS systems, as well as from modernized GPS and GLONASS satellites and any SBAS.

Comparison of Satellite Orbits and Clocks

BNC allows to compare the contents of two files containing GNSS orbit and clock data in SP3 format. To compare the satellite clocks, BNC first converts the coordinate differences dX , dY , dZ into along track, out-of-plane and radial components. It then corrects the clock differences for the radial components of the coordinate differences.



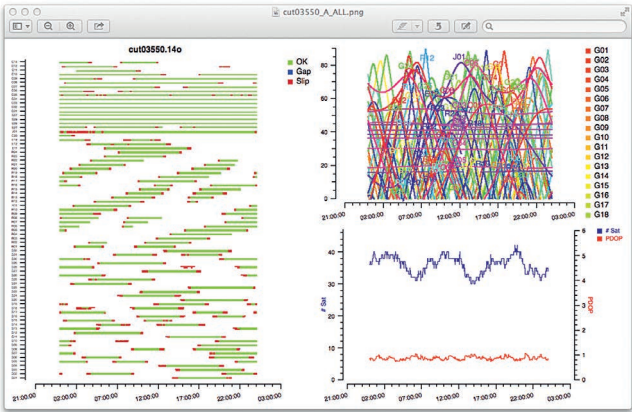
Visualization example of an orbit and clock data comparison: SP3 file generated from BKG's GPS only solution for IGS versus IGS's rapid solution (DOY231, 2018)

RINEX Version 3 Support and RINEX Quality Check

BNC generates RINEX observation and navigation files in RINEX version 3 format, including long file names and is able to convert RINEX Version 2 to RINEX Version 3 and vice versa.

Additionally, BNC allows a quality check of GPS, GLONASS, QZSS, BDS, Galileo and IRNSS observations, based on RINEX 3.x files.

As a result, the user gets visualized information about availability, signal-to-noise ratio and multi-path. The machine readable ASCII output summarizes key numbers for preservation and provides optional a more detailed epoch-wise analysis output.



Example of satellite availability, elevation and PDOP plots as a result of RINEX quality check with BNC

Download and further Specifications

BNC 2.12 can be downloaded at:
<https://igs.bkg.bund.de/ntrip/download>

BNC 2.12 download is coming with a large set of examples for all the different applications, which can be easily adapted introducing a valid user account.

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