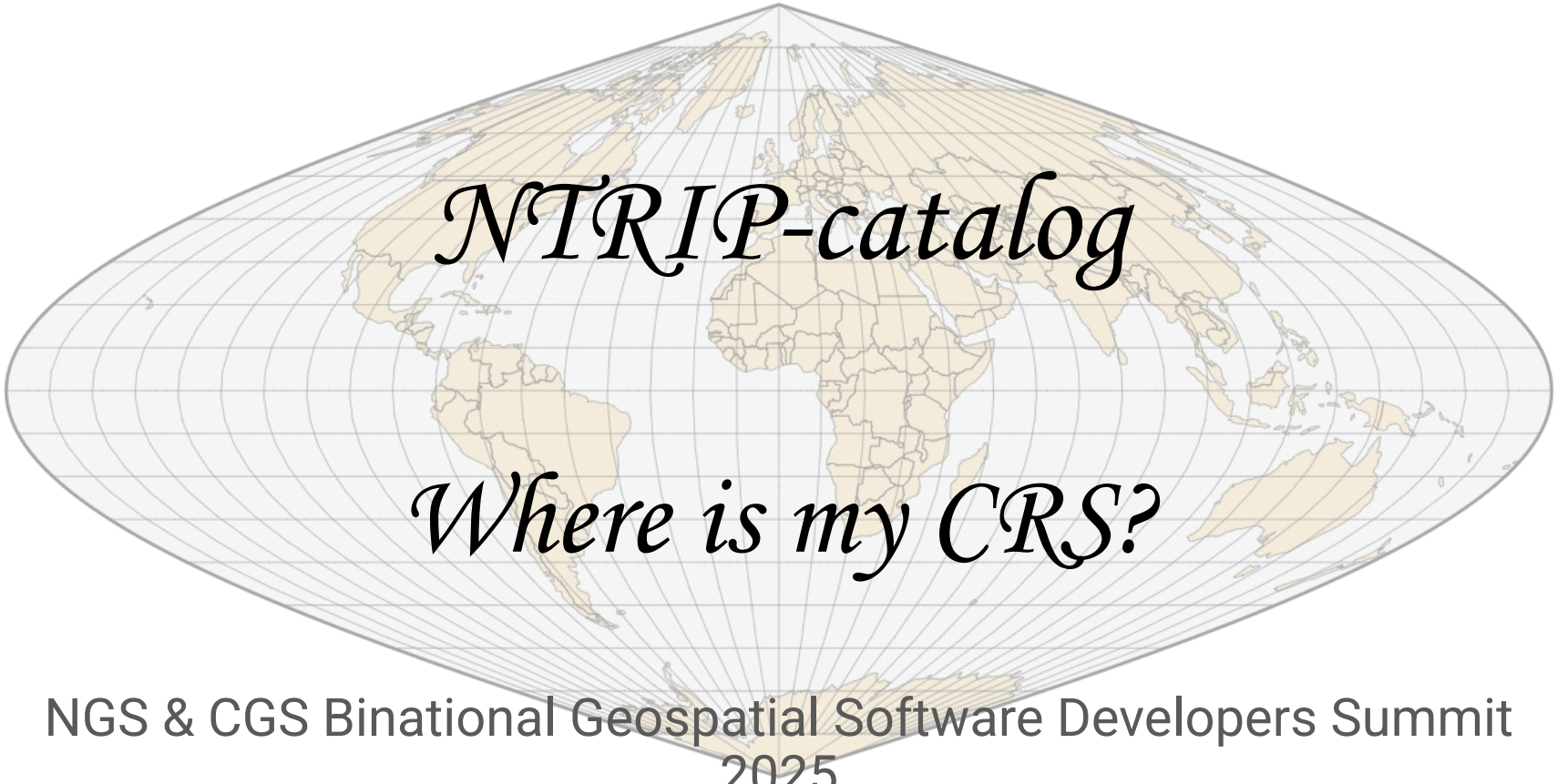


NTRIP-catalog

Where is my CRS?

NGS & CGS Binational Geospatial Software Developers Summit 2025

NTRIP-catalog. Where is my CRS?

Javier Jimenez Shaw

PROJ contributor. P R J

Technical Coordinator of SRS team at Pix4D.

Civil Engineer and Software Developer.

https://github.com/jjimenezshaw/

RTK + NTRIP

~ 2 cm accuracy

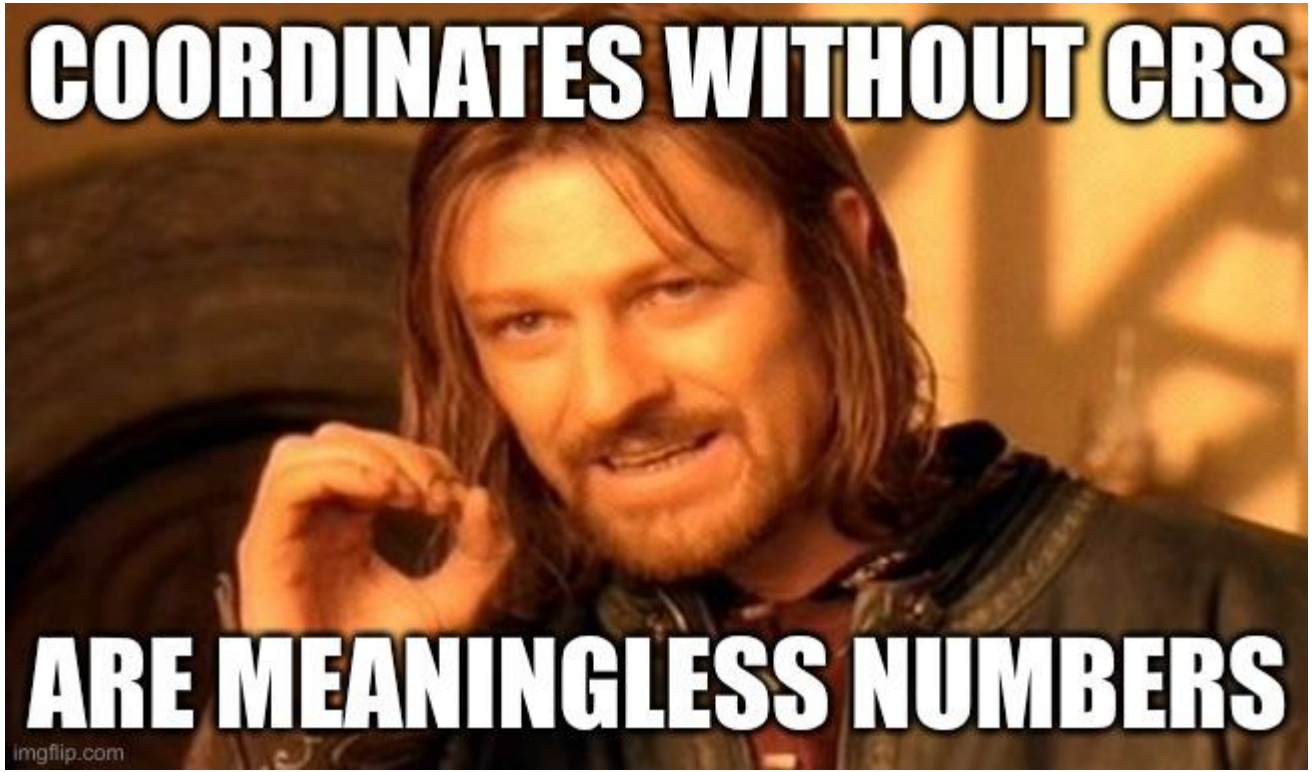
“Quarter” 25 ¢: 24.26 mm (~1 inch)

North American tectonic plate can move faster than 2.5 cm/year

Source: Leeds Radio

RTK corrections

In which Coordinate Reference System ?


COORDINATES WITHOUT CRS
ARE MEANINGLESS NUMBERS
imgflip.com

No information available

There is **no CRS information** in **NTRIP** 2.0

There is **no CRS information** in **RTCM** 3.3

There is “**something” in RTCM 3.4**

New features – RTCM support

- support new RTCM 3.4 transformation messages
  - 1300 – Service-CRS: Coordinate Reference System of the RTCM base service
  - 1301 – 15-Parameter Helmert Transformation, Time-Dependent Linear Expression
  - 1302 – RTCM-CRS: additional details for a CRS with standardised link for automated procedure, e.g. EPSG and ISO
  - Outlook: NMEA will use the same approach

A real problem

The **user** usually **does not know** the CRS of the corrections.

Only some webpages are saying it clearly.

Software developer doesn’t have to know it… for every service in every country.

Not always the “official” CRS in the country is used by the NTRIP stations (i.e. CH).

WGS 84 is not the solution.

…

RTK is a commodity

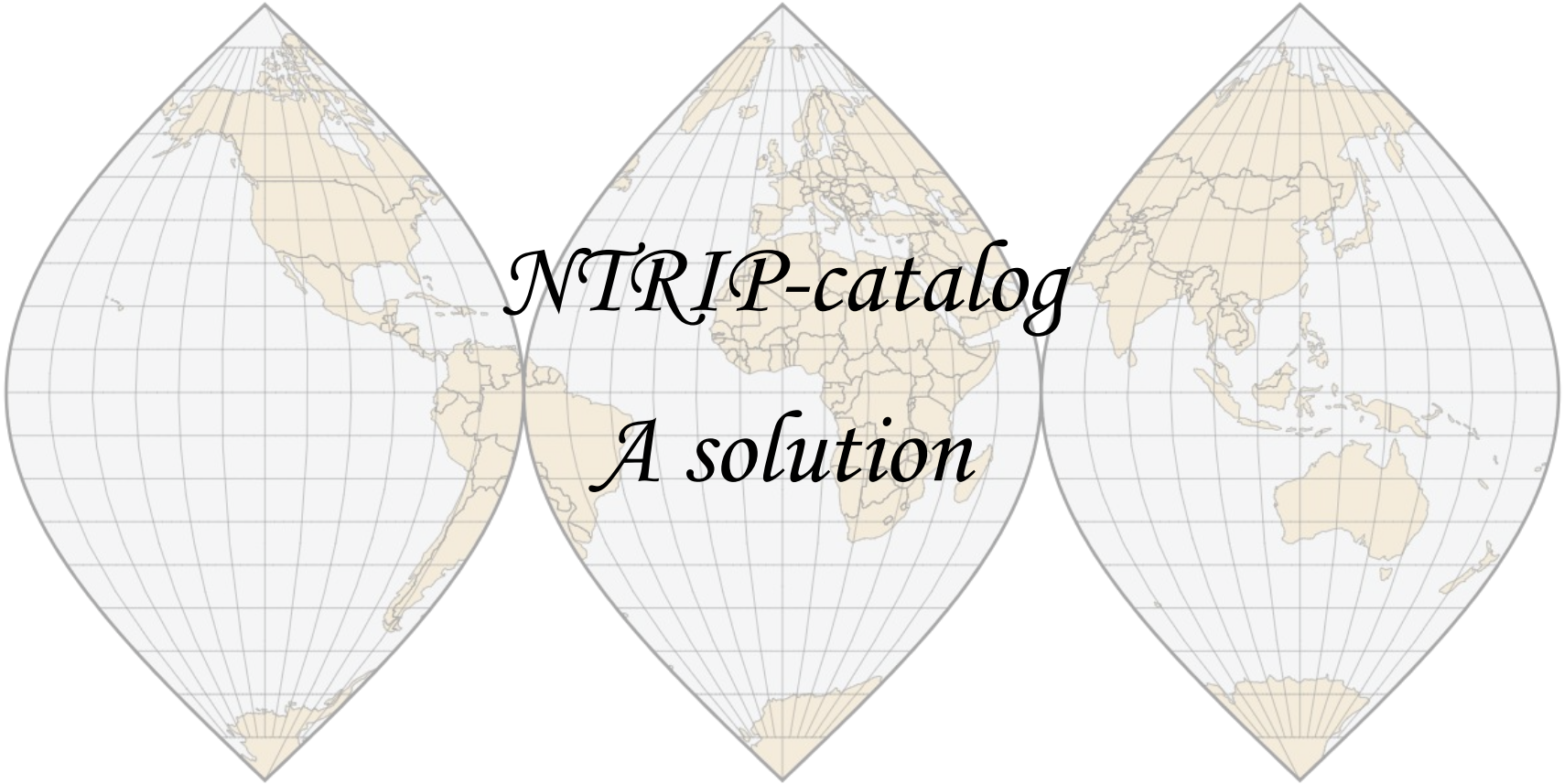
Change of CRS in a country

- Change it from **one day** to another. (Really???)
  - Measurements change suddenly.

- Use a different **URL / port**
  - User must know it.

- Use a different **MOUNTPOINT**
  - User can select the new one, but can be many.

- Don’t do anything
  - Nothing is broken nor fixed.



NTRIP-catalog

A solution

We need a solution

We cannot wait until RTCM 3.4 is widely used

… and messages 1300 are sent (they are optional)

NTRIP-catalog:

- Information about the CRS of different NTRIP providers.
- Open source / open data (CC0 license).
- Simple **JSON** file with all the information.
- Human and computer readable.
- Very easy to add new providers.

https://ntrip-catalog.org

ntrip-catalog Public

Edit Pins | Unwatch 9 | Fork 3 | Star 5

master | 3 Branches | 0 Tags | Go to file t | Add file | Code

bscholer Add GitHub Actions to run scripts and tests on CI (#11) ✓ 97a3c3f · yesterday 3 Commits

.github/workflows	Add GitHub Actions to run scripts and tests on CI (#11)	yesterday
data/World	Add first beta v0.1 with some data, schemas, documenta...	last month
dist	Add first beta v0.1 with some data, schemas, documenta...	last month
schemas/v0.1	Add first beta v0.1 with some data, schemas, documenta...	last month
scripts	Add first beta v0.1 with some data, schemas, documenta...	last month
tests	Add first beta v0.1 with some data, schemas, documenta...	last month
.flake8	Add first beta v0.1 with some data, schemas, documenta...	last month
.gitignore	Add first beta v0.1 with some data, schemas, documenta...	last month
.pre-commit-config.yaml	Add GitHub Actions to run scripts and tests on CI (#11)	yesterday
CONTRIBUTING.md	Add first beta v0.1 with some data, schemas, documenta...	last month
DISCLAIMER.md	Add first beta v0.1 with some data, schemas, documenta...	last month
LICENSE	Add first beta v0.1 with some data, schemas, documenta...	last month
README.md	Add first beta v0.1 with some data, schemas, documenta...	last month
requirements.test.txt	Add first beta v0.1 with some data, schemas, documenta...	last month
requirements.txt	Add first beta v0.1 with some data, schemas, documenta...	last month

README | CC0-1.0 license

NTRIP-catalog

Catalog of NTRIP[1] providers with CRS[2] information.

About

Catalog of NTRIP providers with CRS information

ntrip-catalog.org

geospatial | production | gis | srs | rtk | crs | ntrip | owner-spatial-reference-systems

Readme
CC0-1.0 license
Activity
Custom properties
5 stars
9 watching
3 forks
Report repository

Releases

No releases published
Create a new release

Packages

No packages published
Publish your first package

Contributors 2

javier-jimenez-shaw-pix4d Javier Ji...
bscholer Ben Scholer

Deployments 2


```
{
    "$schema": "https://ntrip-catalog.org/schemas/v0.1/ntrip-catalog.schema.json",
    "release": 0,
    "comment": "This file has been automatically generated by a script. Update the 'data' folder if any change is needed.",
    "entries": [
        {
            "name": "AUSCORS",
            "description": "Geoscience Australia AUSCORS NTRIP Broadcaster",
            "urls": [
                "https://ntrip.data.gnss.ga.gov.au:443",
                "http://ntrip.data.gnss.ga.gov.au:2101"
            ],
            "reference": {
                "url": "https://gnss.ga.gov.au/stream",
                "comments": "Also provides base stations outside of Australia, but the precise CRS is not known"
            },
            "last_update": "2025-01-13",
            "streams": [
                {
                    "filter": {
                        "countries": [
                            "AUS"
                        ]
                    },
                    "crss": [
                        {
                            "id": "EPSG:7843",
                            "name": "GDA2020"
                        }
                    ],
                    "comments": "Broadcast Coordinates: Stations within Australia - GDA2020"
                }
            ]
        },
        {
            "name": "FPRN",
            "description": "Florida Primary Reference Network",
            "urls": [
                "http://40.121.5.206:10000",
                "http://ntrip.myfloridagps.com:10000"
            ],
            "reference": {
                "url": "https://www.fdot.gov/Geospatial/fprnfaq.shtm"
            },
```

Easy

```
{
    "name": "FPRN",
    "description": "Florida Primary Reference Network",
    "urls": [
        "http://40.121.5.206:10000",
        "http://ntrip.myfloridagps.com:10000"
    ],
    "reference": {
        "url": "https://www.fdot.gov/Geospatial/fprnfaq.shtm"
    },
    "last_update": "2024-12-09",
    "streams": [
        {
            "filter": "all",
            "crss": [
                {
                    "id": "EPSG:6319",
                    "name": "NAD83(2011)"
                }
            ]
        }
    ]
},
```

Complicated


```
{
    "name": "Point One Nav",
    "description": "Point One Navigation world service",
    "urls": [
        "http://truertk.pointonenav.com:2101",
        "http://virtualrtk.pointonenav.com:2101",
        "http://truertk-us.pointonenav.com:2101",
        "http://truertk-eu.pointonenav.com:2101",
        "http://truertk-apac.pointonenav.com:2101",
        "https://truertk.pointonenav.com:2102",
        "https://virtualrtk.pointonenav.com:2102",
        "https://truertk-us.pointonenav.com:2102",
        "https://truertk-eu.pointonenav.com:2102",
        "https://truertk-apac.pointonenav.com:2102"
    ],
    "reference": {
        "url": "https://support.pointonenav.com/connect-to-polaris-rtk"
    },
    "last_update": "2025-01-29",
    "streams": [
        {
            "filter": {
                "mountpoints": [
                    "POLARIS"
                ]
            },
            "crss": [
                {
                    "id": "EPSG:7912",
                    "name": "ITRF2014",
                    "epoch": "now"
                }
            ]
        },
```

```
{
    "filter": {
        "mountpoints": [
            "POLARIS_LOCAL"
        ]
    },
    "crss": [
        {
            "id": "EPSG:6667",
            "name": "JGD2011",
            "rover_countries": [
                "JPN"
            ],
            "description": "Japan"
        },
        {
            "id": "EPSG:4927",
            "name": "KGD2002",
            "rover_countries": [
                "KOR"
            ],
            "description": "South Korea"
        },
        {
            "id": "EPSG:7929",
            "name": "ETRF97",
            "epoch": 2009.756,
            "rover_countries": [
                "GBR"
            ],
            "description": "United Kingdom"
        },
        {
            "id": "EPSG:8254",
            "name": "NAD83(CSRS)v7",
            "rover_countries": [
                "CAN"
            ],
            "description": "Canada"
        },
        {
            "id": "EPSG:6324",
            "name": "NAD83(MA11)",
            "rover_bbox": [
                129.48,
                1.64,
                149.55,
                23.9
            ],
            "description": "Guam"
        },
        {
            "id": "EPSG:6321",
            "name": "NAD83(PA11)",
            "rover_bbox": [
                157.47,
                -17.56,
                -151.27,
                31.8
            ],
            "description": "Hawaii"
        },
        {
            "id": "EPSG:6319",
            "name": "NAD83(2011)",
            "epoch": 2010.0,
            "rover_countries": [
                "USA"
            ],
            "description": "Continental USA, after Guam and Hawaii"
        },
```

Contribute!

It’s open source / open data. 👍

Win-win for:

- **Providers**: clear tagging of the coordinates. **Happy users**.
- **Users**: no need to configure or know the CRS. **All works**.
- **Developers**: implement once, use always.

Via Pull-Request, or just send an email.

Thank you!

Javier Jimenez Shaw

https://ntrip-catalog.org