NAME

        cct – Coordinate Conversion and Transformation

SYNOPSIS

        cct [−**cIostvz** [args]] +*opt[=arg]* ... file ...

or

        cct [−**cIostvz** [args]] {object_definition} file ...

Where {object_definition} is one of the possibilities accepted by **proj_create**(), provided it expresses a coordinate operation

- a proj−string,

- a WKT string,

- an object code (like "EPSG:1671" "urn:ogc:def:coordinateOperation:EPSG::1671"),

- an object name. e.g. "ITRF2014 to ETRF2014 (1)". In that case as uniqueness is not guaranteed, heuristics are applied to determine the appropriate best match.

- a OGC URN combining references for concatenated operations (e.g. "*urn:ogc:def:coordinateOperation,coordinateOperation:EPSG::3895,coordinateOperation:EPSG::1618*")

- a PROJJSON string. The jsonschema is at *https://proj.org/schemas/v0.4/projjson.schema.json*

New in version 8.0.0.

    NOTE:

        Before version 8.0.0 only proj−strings could be used to instantiate operations in **cct**.

or

        cct [−**cIostvz** [args]] {object_reference} file ...

where {object_reference} is a filename preceded by the '@' character. The file referenced by the {object_reference} must contain a valid {object_definition}.

        New in version 8.0.0.

DESCRIPTION

        cct is a 4D equivalent to the **proj** projection program, performs transformation coordinate systems on a set of input points. The coordinate system transformation can include translation between projected and geographic coordinates as well as the application of datum shifts.

        The following control parameters can appear in any order:

−c <x,y,z,t>

        Specify input columns for (up to) 4 input parameters. Defaults to 1,2,3,4.

−d <n> New in version 5.2.0.

        Specify the number of decimals in the output.

−I   Do the inverse transformation.

−o <output file name>, −−output=<output file name>

        Specify the name of the output file.

−t <time>, −−time=<time>
> Specify a fixed observation *time* to be used for all input data.

−z <height>, −−height=<height>
> Specify a fixed observation *height* to be used for all input data.

−s <n>, −−skip−lines=<n>
> New in version 5.1.0.
>
>
> Skip the first *n* lines of input. This applies to any kind of input, whether it comes from **STDIN**, a file or interactive user input.

−v, −−verbose
> Write non−essential, but potentially useful, information to stderr. Repeat for additional information (**−vv**, **−vvv**, etc.)

−−version
> Print version number.

The +*opt* arguments are associated with coordinate operation parameters. Usage varies with operation.

cct is an acronym meaning *Coordinate Conversion and Transformation*.

The acronym refers to definitions given in the OGC 08−015r2/ISO−19111 standard "Geographical Information −− Spatial Referencing by Coordinates", which defines two different classes of *coordinate operations*:

Coordinate Conversions, which are coordinate operations where input and output datum are identical (e.g. conversion from geographical to cartesian coordinates) and

Coordinate Transformations, which are coordinate operations where input and output datums differ (e.g. change of reference frame).

USE OF REMOTE GRIDS
> New in version 7.0.0.
>
>
> If the **PROJ_NETWORK** environment variable is set to **ON**, **cct** will attempt to use remote grids stored on CDN (Content Delivery Network) storage, when they are not available locally.
>
> More details are available in the network section.

EXAMPLES
> 1. The operator specs describe the action to be performed by **cct**. So the following script
>
> ```
> echo 12 55 0 0 | cct +proj=utm +zone=32 +ellps=GRS80
> ```
>
> will transform the input geographic coordinates into UTM zone 32 coordinates. Hence, the command
>
> ```
> echo 12 55 | cct −z0 −t0 +proj=utm +zone=32 +ellps=GRS80
> ```
>
> Should give results comparable to the classic **proj** command
>
> ```
> echo 12 55 | proj +proj=utm +zone=32 +ellps=GRS80
> ```
>
> 2. Convert geographical input to UTM zone 32 on the GRS80 ellipsoid:
>
> ```
> cct +proj=utm +ellps=GRS80 +zone=32
> ```

3. Roundtrip accuracy check for the case above:

```
cct +proj=pipeline +proj=utm +ellps=GRS80 +zone=32 +step +step +inv
```

4. As (2) but specify input columns for longitude, latitude, height and time:

```
cct -c 5,2,1,4 +proj=utm +ellps=GRS80 +zone=32
```

5. As (2) but specify fixed height and time, hence needing only 2 cols in input:

```
cct -t 0 -z 0 +proj=utm +ellps=GRS80 +zone=32
```

6. Auxiliary data following the coordinate input is forward to the output stream:

```
$ echo 12 56 100 2018.0 auxiliary data | cct +proj=merc
1335833.8895    7522963.2411       100.0000     2018.0000 auxiliary data
```

7. Coordinate operation referenced through its code

```
$ echo 3541657.3778 948984.2343 5201383.5231 2020.5 | cct EPSG:8366
3541657.9112     948983.7503   5201383.2482     2020.5000
```

8. Coordinate operation referenced through its name

```
$ echo 3541657.3778 948984.2343 5201383.5231 2020.5 | cct "ITRF2014 to ETRF201
3541657.9112     948983.7503   5201383.2482     2020.5000
```

BACKGROUND

cct also refers to Carl Christian Tscherning (1942−−2014), professor of Geodesy at the University of Copenhagen, mentor and advisor for a generation of Danish geodesists, colleague and collaborator for two generations of global geodesists, Secretary General for the International Association of Geodesy, IAG (1995−−2007), fellow of the American Geophysical Union (1991), recipient of the IAG Levallois Medal (2007), the European Geosciences Union Vening Meinesz Medal (2008), and of numerous other honours.

cct, or Christian, as he was known to most of us, was recognized for his good mood, his sharp wit, his tireless work, and his great commitment to the development of geodesy −− both through his scientific contributions, comprising more than 250 publications, and by his mentoring and teaching of the next generations of geodesists.

As Christian was an avid Fortran programmer, and a keen Unix connoisseur, he would have enjoyed to know that his initials would be used to name a modest Unix style transformation filter, hinting at the tireless aspect of his personality, which was certainly one of the reasons he accomplished so much, and meant so much to so many people.

Hence, in honour of *cct* (the geodesist) this is **cct** (the program).

SEE ALSO

proj(1), **cs2cs(1)**, **geod(1)**, **gie(1)**, **projinfo(1)**, **projsync(1)**

BUGS

A list of known bugs can be found at *https://github.com/OSGeo/PROJ/issues* where new bug reports can be submitted to.

HOME PAGE

https://proj.org/

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