Transformation pipelines for PROJ.4

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FIG WORKING WEEK 2017
Surveying the world of tomorrow -
Helsinki Finland 29 May - 2 June 2017
From digitalisation to augmented reality

PROJ.4?
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PROJ.4?

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Datum shifts in PROJ.4 (and GIS in general) today

- System A
  - Inverse projection
  - Inverse grid shift
  - 7 param. Helmert
  - WGS84
  - Grid shift
  - Projection
  - System B

- 7 param. Helmert
Datum shifts in PROJ.4 (and GIS in general) today

System A → Inverse projection → Inverse grid shift → 7 param. Helmert

WGS84

7 param. Helmert → Grid shift → Projection → System B

We can do better!
Introducing Transformation Pipelines

- A flexible framework that allows for complex transformations
- Transformations are constructed as a set of daisy-chained basic building blocks
- Not limited to spatial transformations – pipelines are fully time-aware
- More than two geodetic techniques available
  - 14-parameter shift
  - Velocity and deformation models
  - Molodensky transform
  - Polynomial mappings
  - Affine transformation
  - ...
proj = pipeline
proj = horner
proj = utm
ev = int1
zone = 32
proj = cart
ev = int1
proj = helmert
proj = cart
ev = int1
proj = utm
ev = GRS80
zone = 33
ETRS89 / UTM
32N
"A lot of luck to whoever want to put together the computational part of the datum shift software."

- Gerald I. Evenden, 2000