Operationalization of GNSS high-precision analysis

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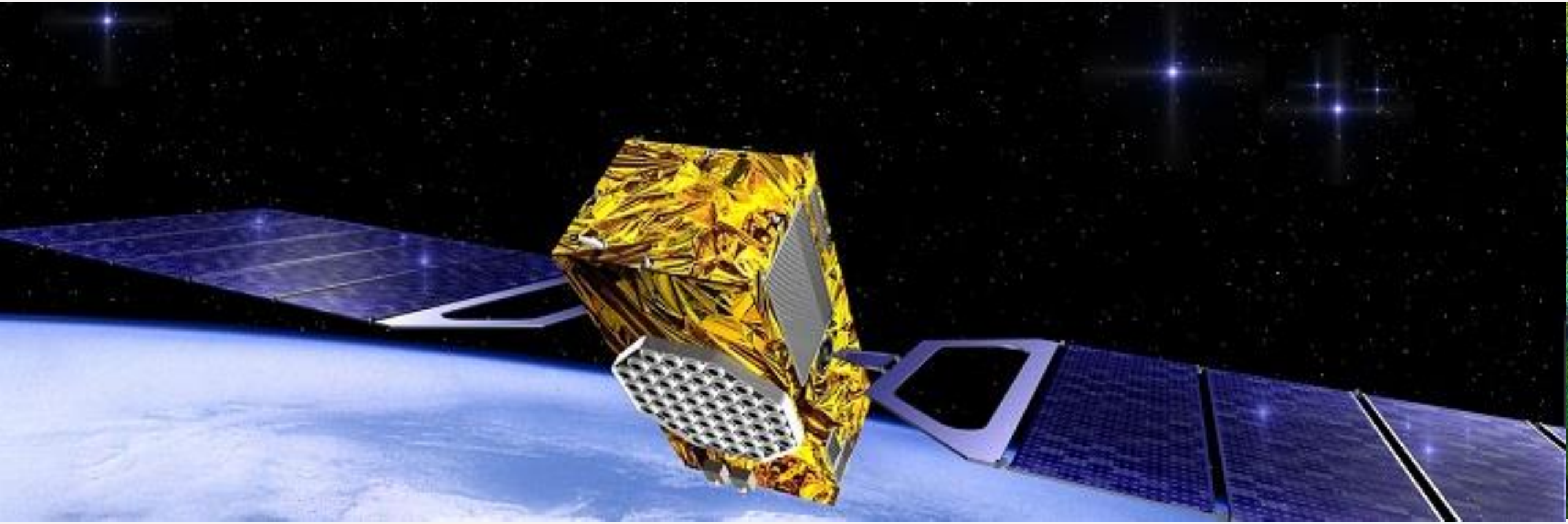
Tallin, 30.03.2023



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Part I

Motivation

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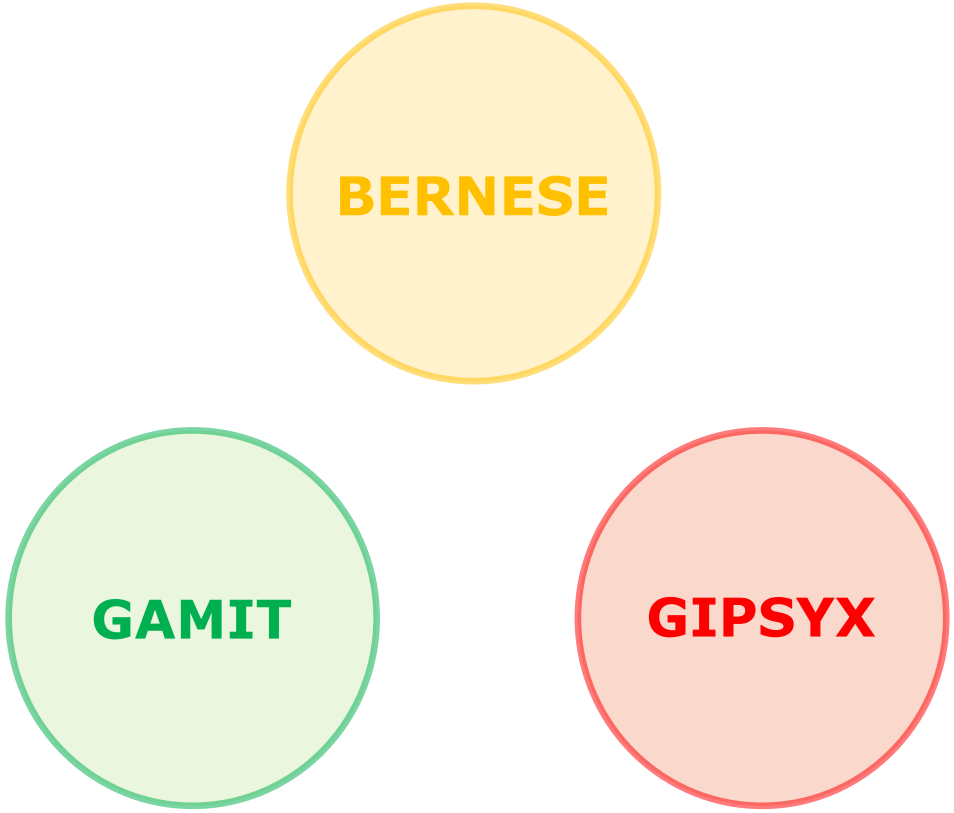
Motivation



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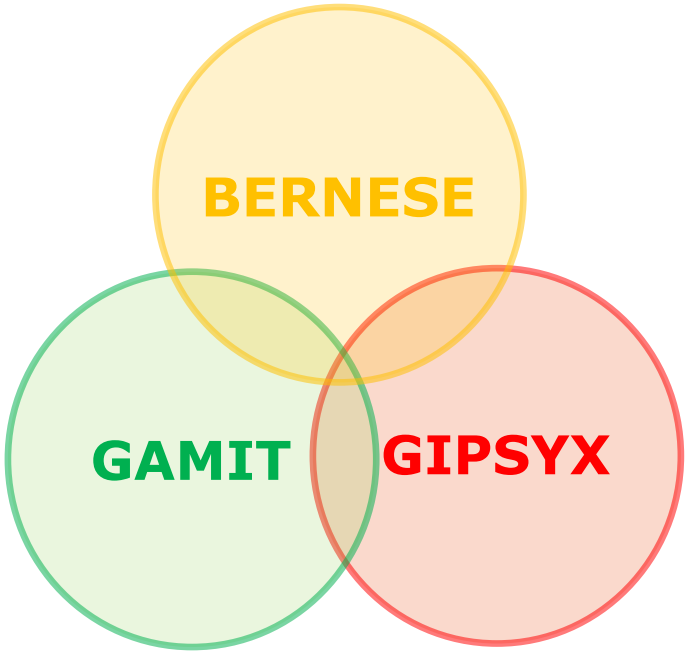
Motivation

- What kind of processes are common?
  - Station information
  - Input files
  - Programs starting the analysis (configuration, failure handling)
  - Result analysis

- How could these processes be integrated in a common program?
- What could be more operationalized?



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Part II

Goal

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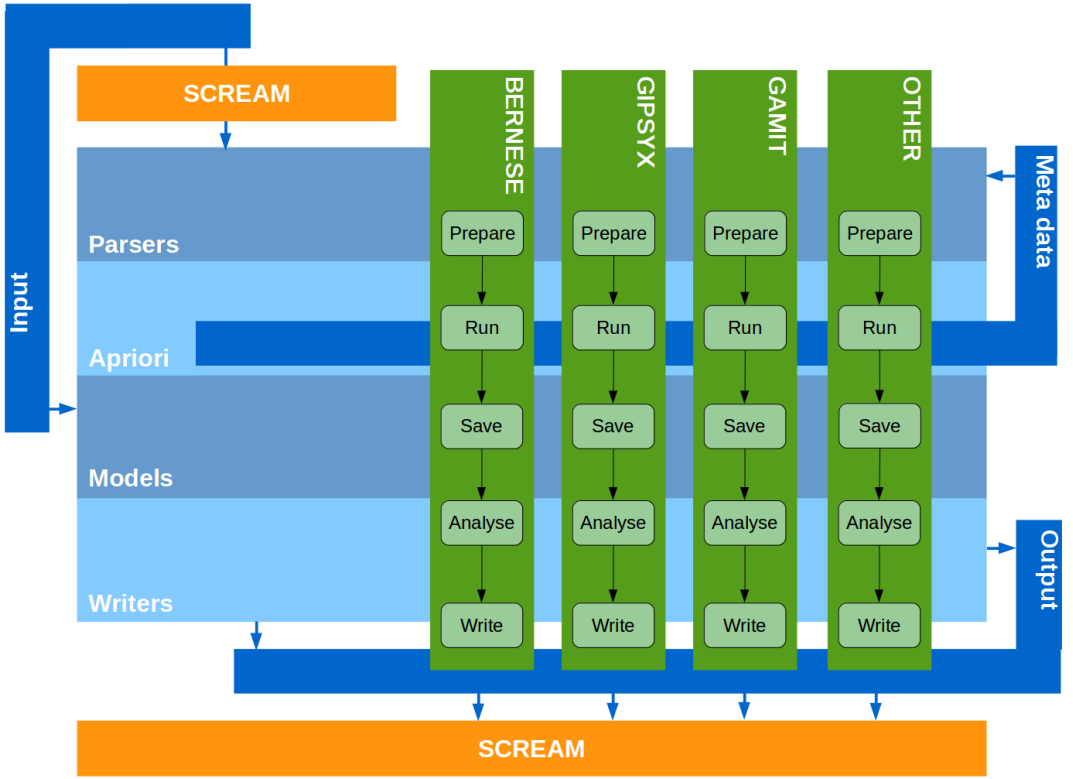
Goal

- Common program which can start processes related to collect station information and input files, to configure and to run programs, to handle failure and to analyze results for the different GNSS production lines.
- Condition: Use of Midgard/Åsgard Python library



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Part III

Realization

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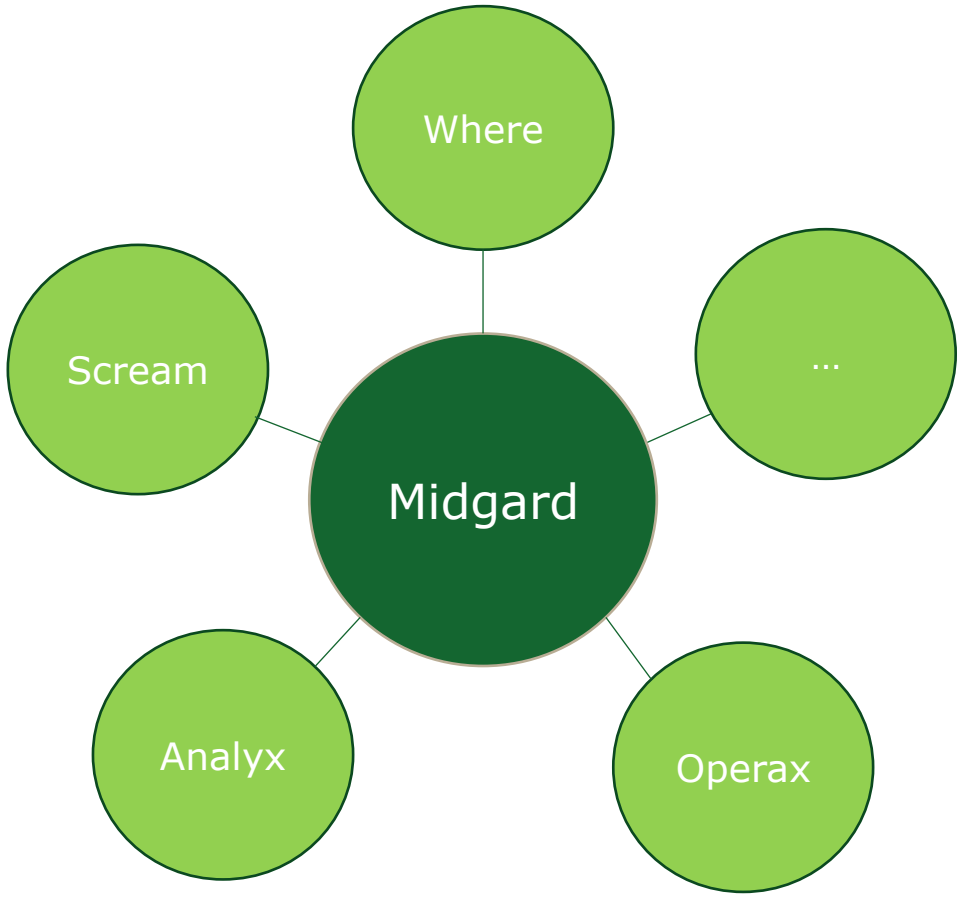
Midgard – a Python geodesy library

- Midgard is an open source library available under GitHub (https://github.com/kartverket/Midgard) developed by NMA
- Midgard is used by different kind of NMA applications
- Midgard has following functionality:
  - Time format conversion (JD, MJD, GPS week, datetime, …)
  - Coordinate conversion (XYZ, LLH, ENU, …)
  - File reading (ANTEX, COST, RINEX, SINEX, SSC, BERNESE, GIPSYX, …)
  - Development tools
    - → Data structure
    - → Text file configuration
    - → Logging
  - Mathematical functions
    - → Plate motion
    - → Interpolation
    - → Linear regression
    - → Unit handling
    - → …



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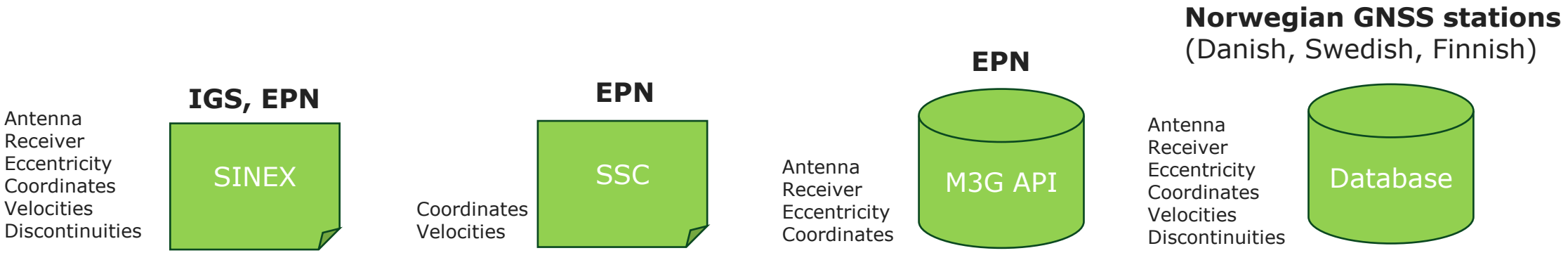
Station information



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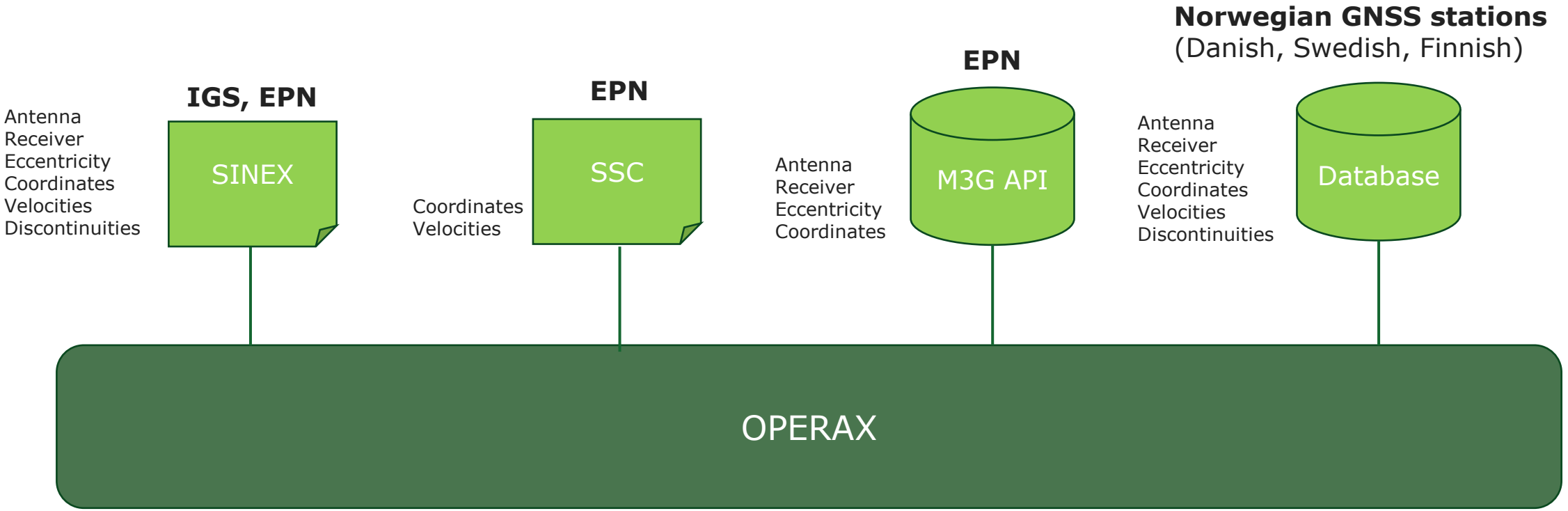
Station information



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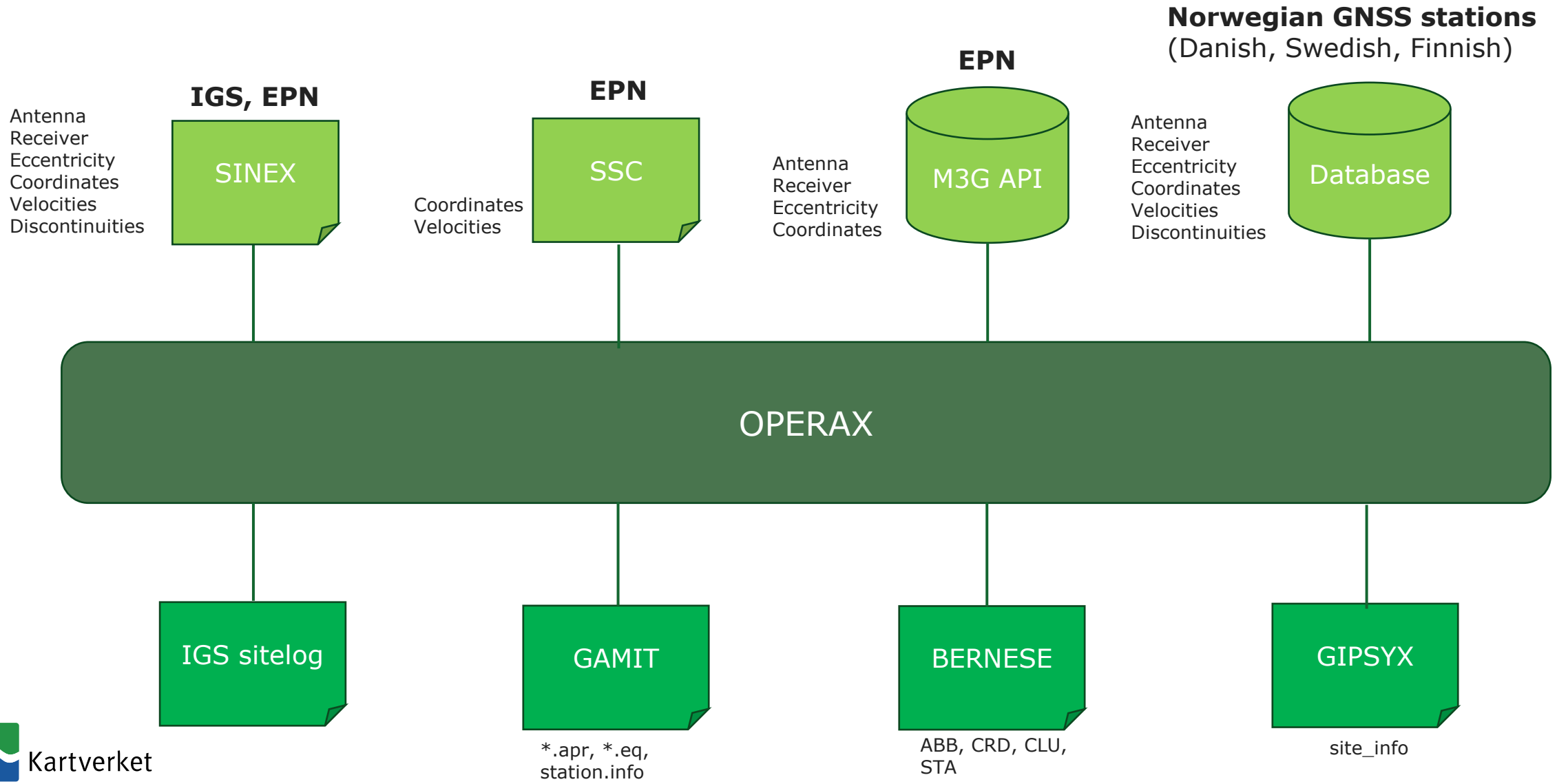
Station information



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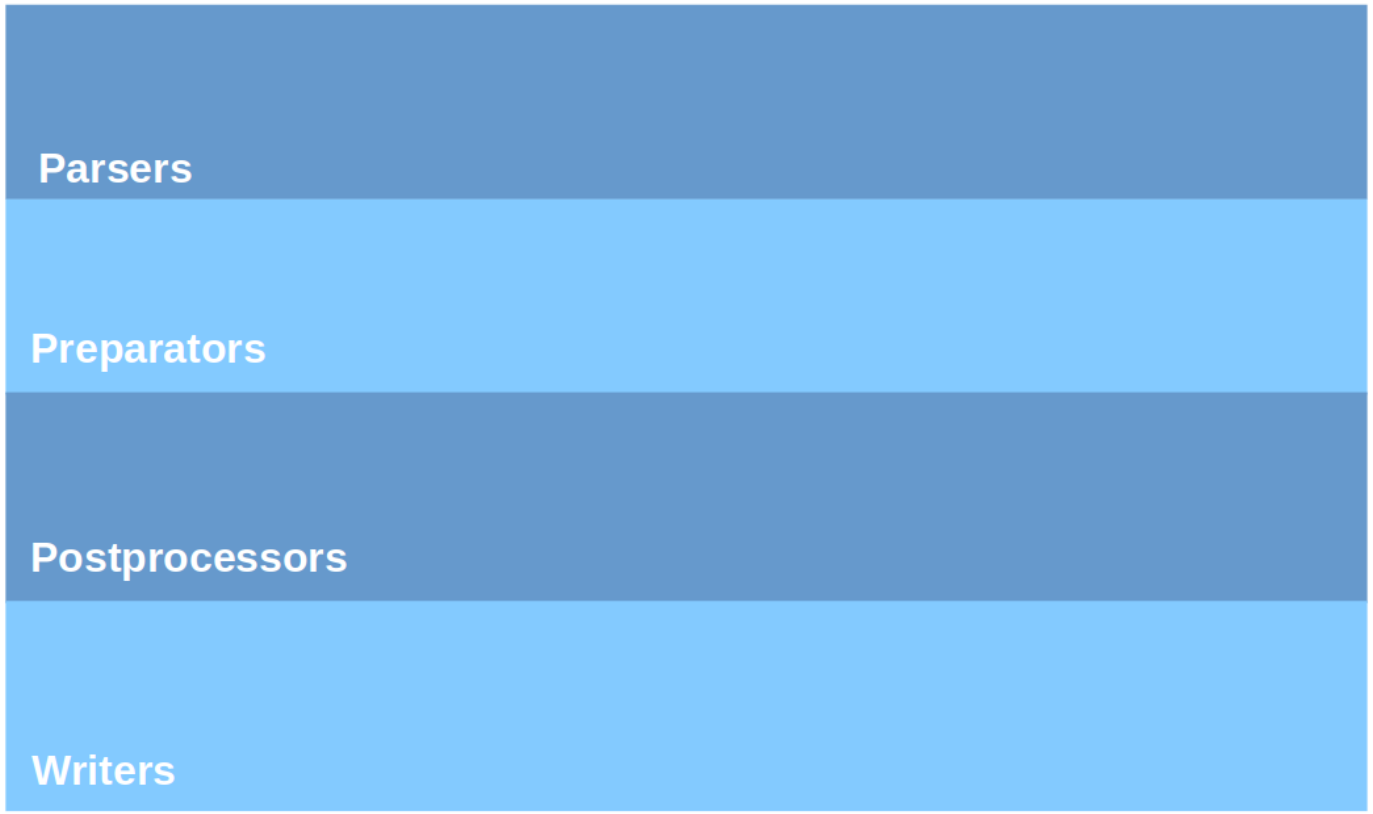
Operationalization of processes with Operax



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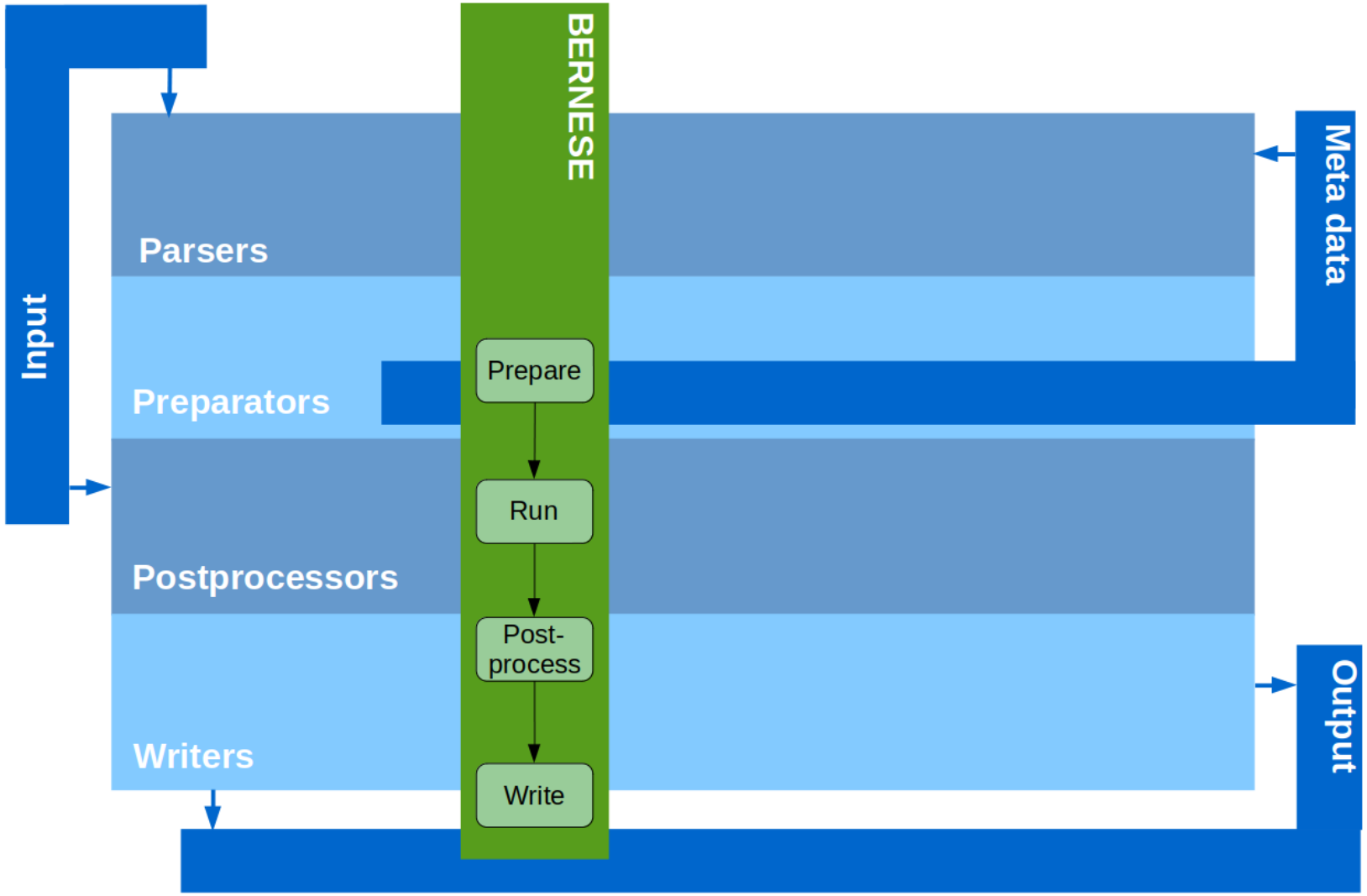

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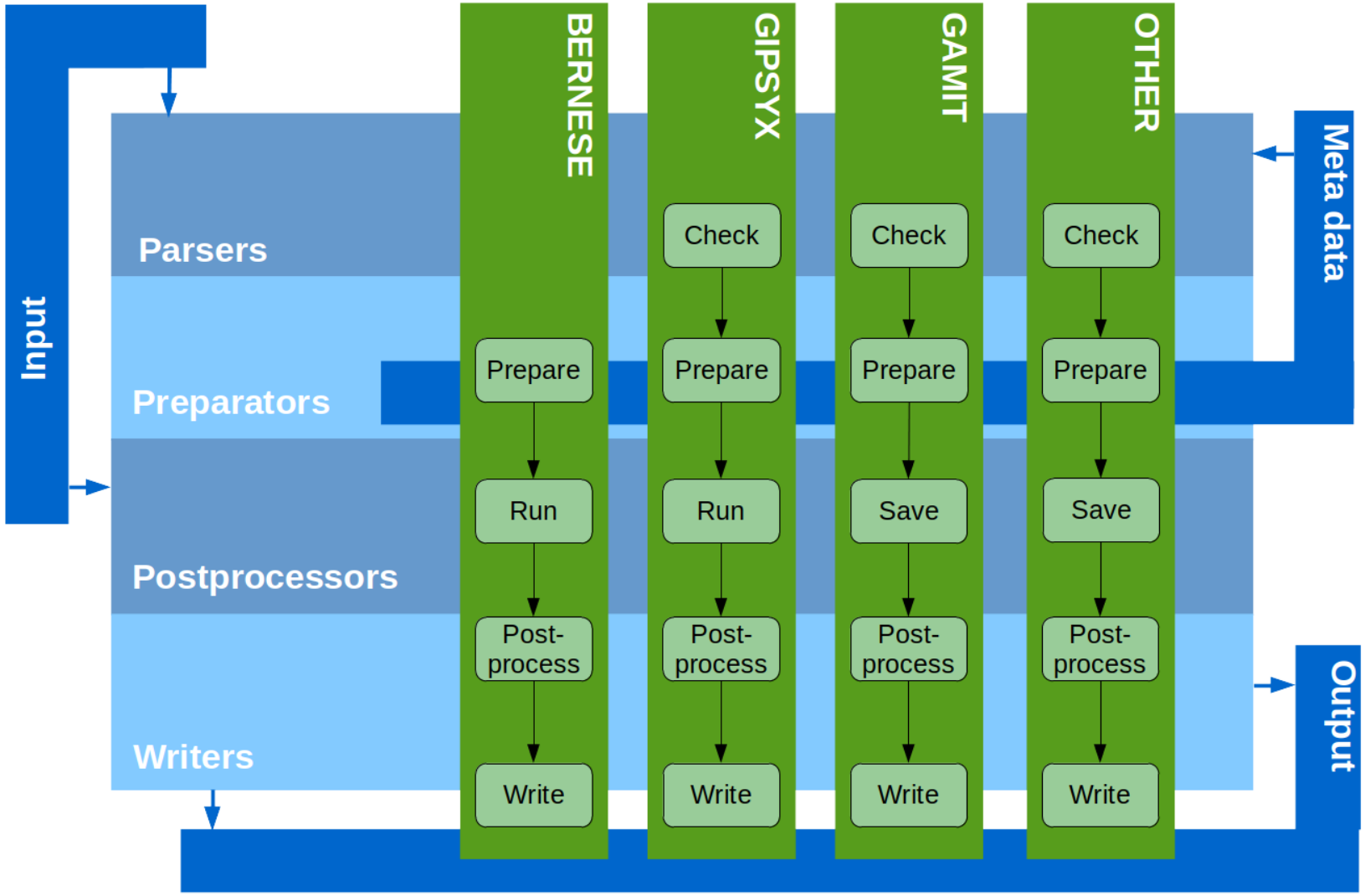
Operationalization of processes with Operax



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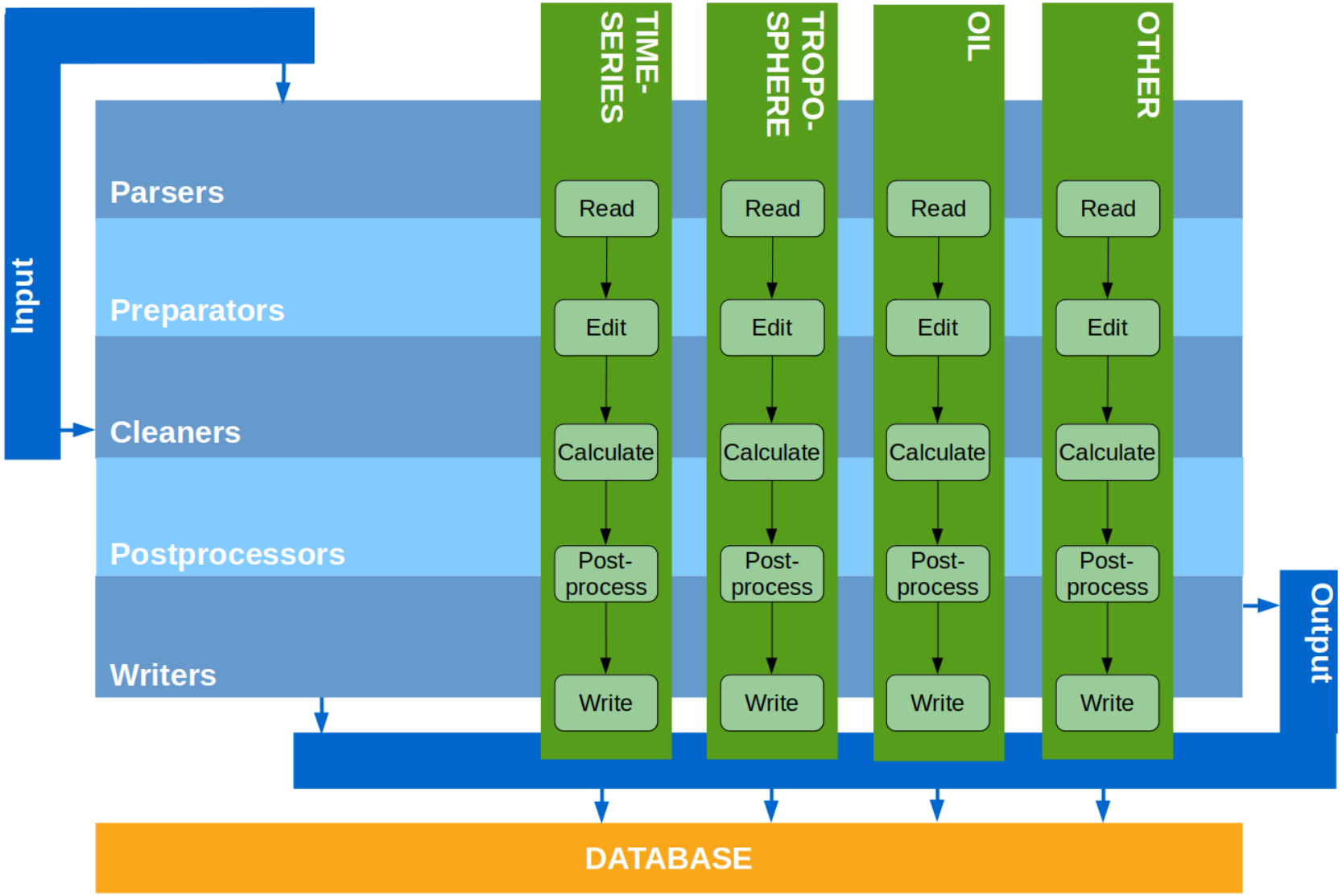
Result analysis with Analyx



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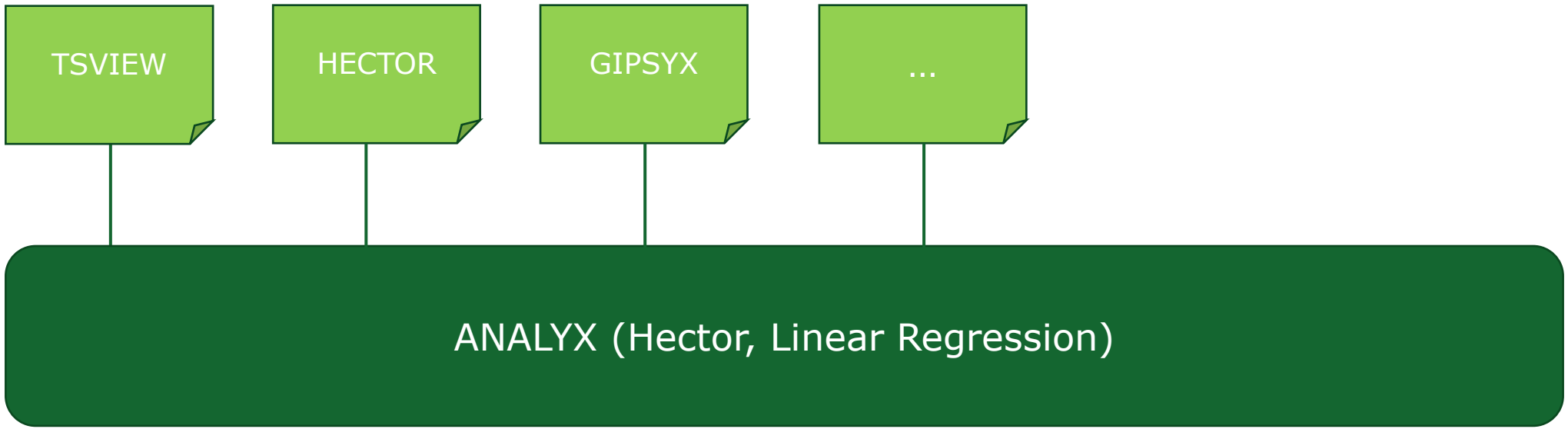
Time series analysis



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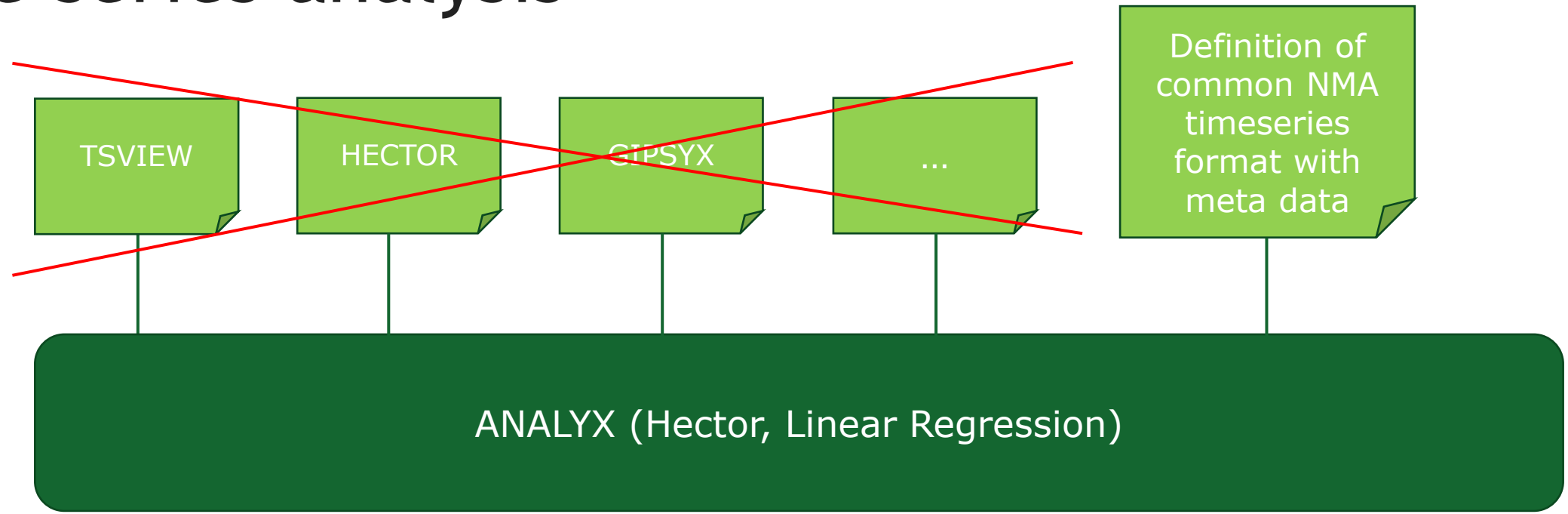
Time series analysis



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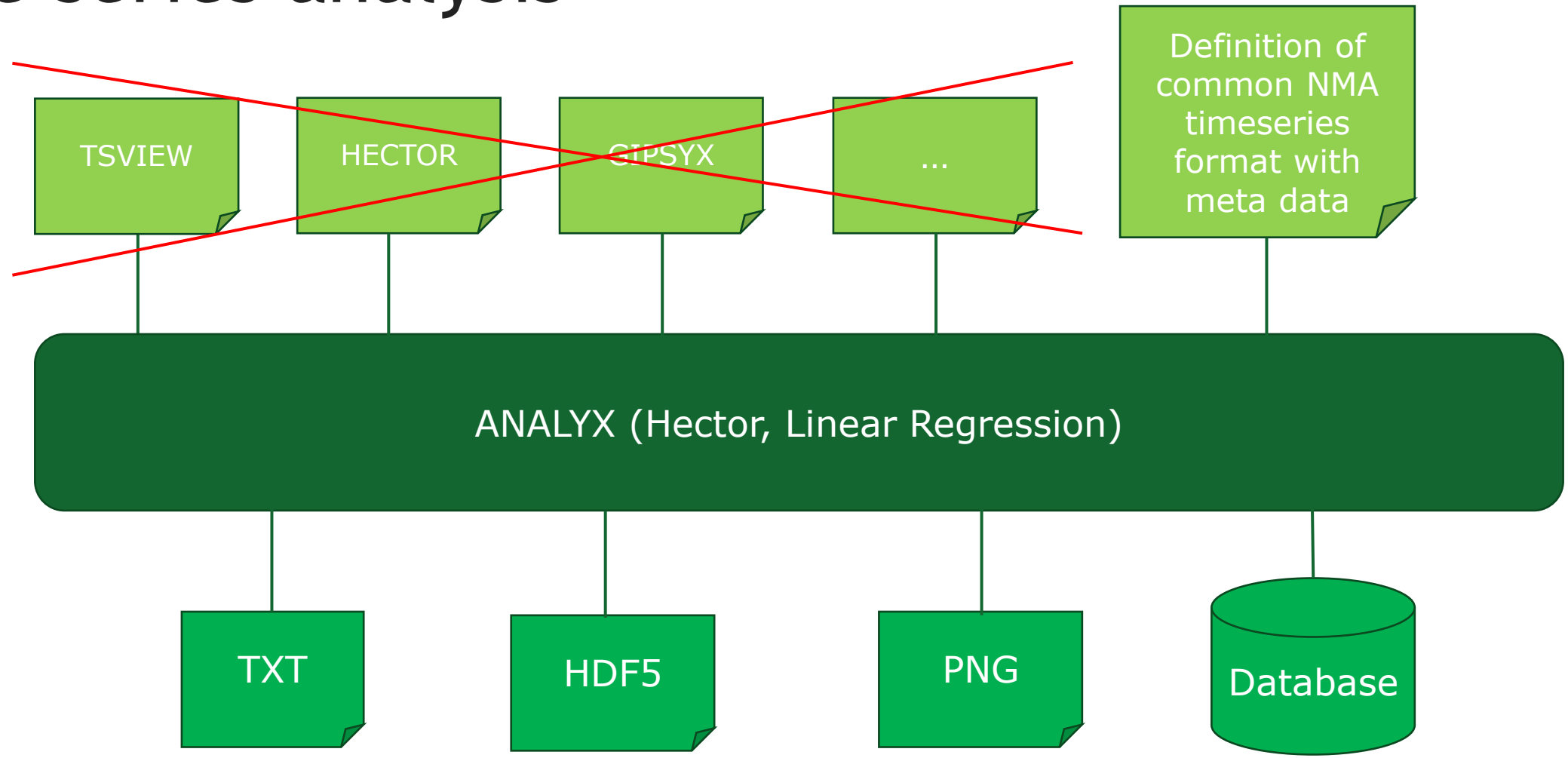
Time series analysis



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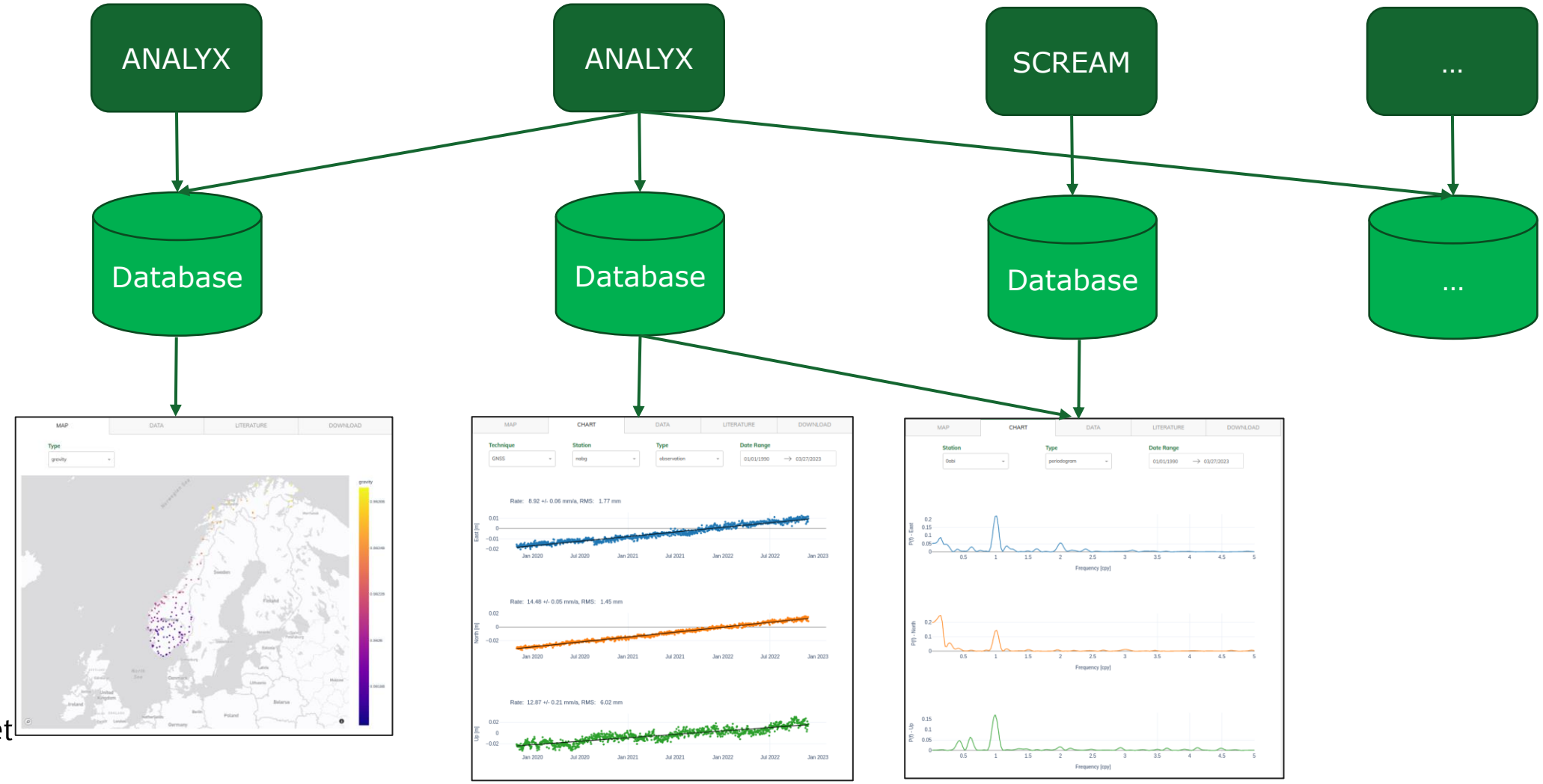
Outlook

- The operationalization of GNSS high-precision analysis is not finished. We will proceed.

- **NKG interests?**
  - Could it be of interest for you to share Operax and/or Analyx source code?
  - What about definition of a common timeseries format (with included meta data)?
  - Could sharing of station information in a standardized way be improved?

- **What could be the next steps?**
  - Use of cloud-native technology for computation (flexible, scalable)
  - Save analysis data in databases and use it e.g. for visualization in webapplications

Analyse – Archive - Visualize



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Questions?

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