TeRAbytes

Data Science and Data Management in Geophysics and Geosciences

In Geophysics, physical methods are applied to the earth's subsurface and related objects of investigation on both laboratory and field scale.
The data resulting from measurements and synthetic modeling are acquired mostly digitally or are at least managed in digital data structures in order to be analysed both quantitatively and qualitatively.
Therefore, the digital infrastructure for data science and data management in Geophysics and Geosciences needs to methodologically support the storage, handling and processing of multiple large data sets.

From the perspective of Data Science and Data Management in geophysical and geoscientific research, teaching and administrative work, there are multiple points that need to be considered: From the user's perspective as a data scientist or manager, the speed and straightforwardness of the access are as important as the security. Data and software should be available and accessible independent of platform and user location. In addition, data structure and metadata are obligatory factors of a working data science and management workflow. While it has always been important from the technical and administrative standpoint, the question of resources becomes also interesting for the end user.

The importance of the challenges arising from these points combined with the infrastructure of hard- and software that are needed in geophysical and geoscientific work are showcased. Besides few commercial (geo)physics specialised data analysis software mostly python-based self-developed and subject-specific software are used.
Based on these needs and challenges in geophysical and related geoscientific work, a few approaches that are pursued regarding metadata management and centralisation of hard- and software services will be presented, for example the *Helmholtz Metadata Collaboration* and the *FAIR Guiding Principles* and a few other strategies and projects, that will be partwise offered by the Hochschulrechenzentrum of the University in the future.

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