Datascience

01 - Introduction

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Schedule

- Technical information for this course
- Datascience and physics

- Basics of programming in python

- Using numpy, scipy and simpy for linear algebra

- Basics of plotting and creating figures

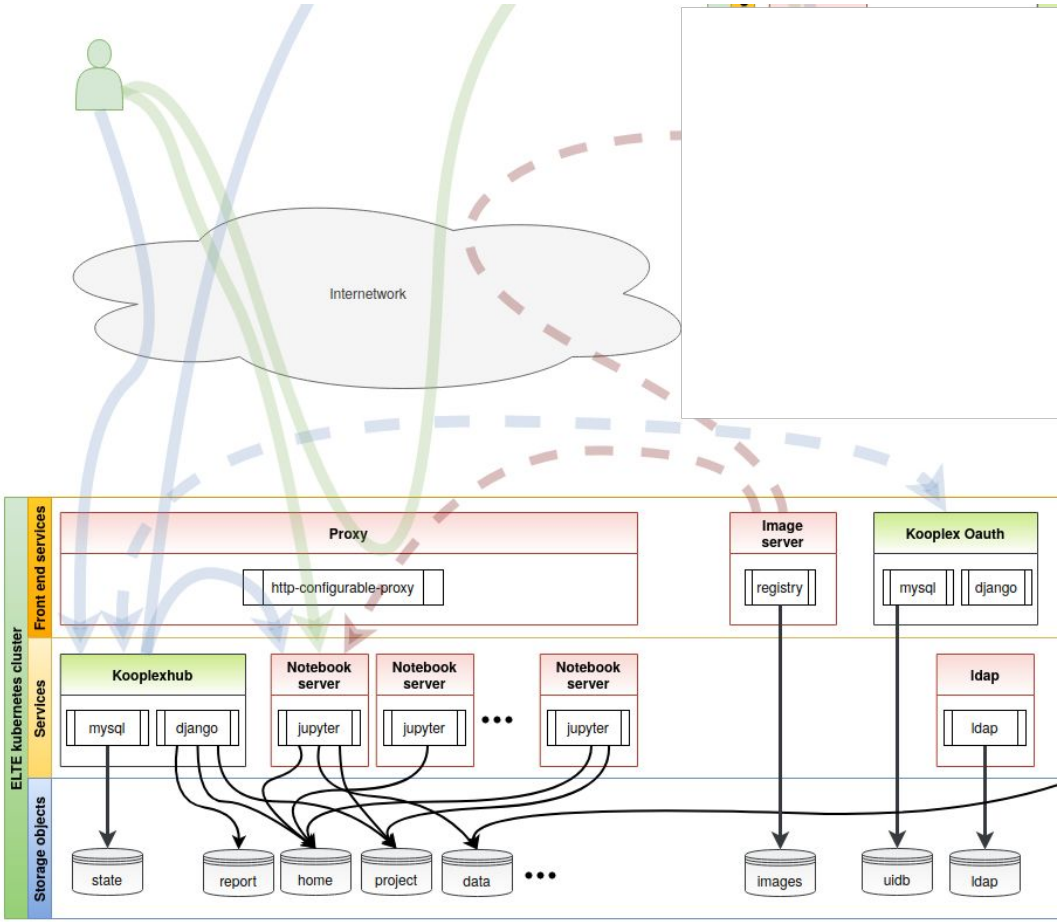
- Working with timeseries

Kooplex

The platform can be accessed at

https://k8plex-edu.elte.hu

Kooplex containers



- **Docker** containers
  Virtualization
- **Docker** images
  e.g. *hub.docker.com*
- **Kubernetes**
  Orchestration

Virtualization engines:

- Docker
- Podman
- Nvidia enroot
- Apptainer
- ...

➜ KISS principle

Datascience and physics

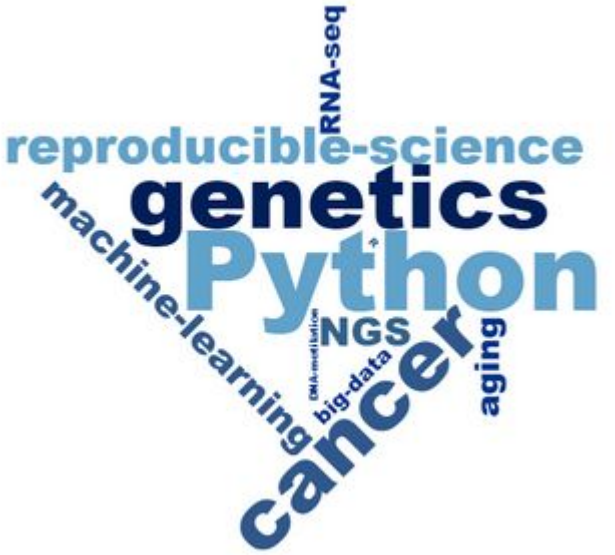
When do we generate data?

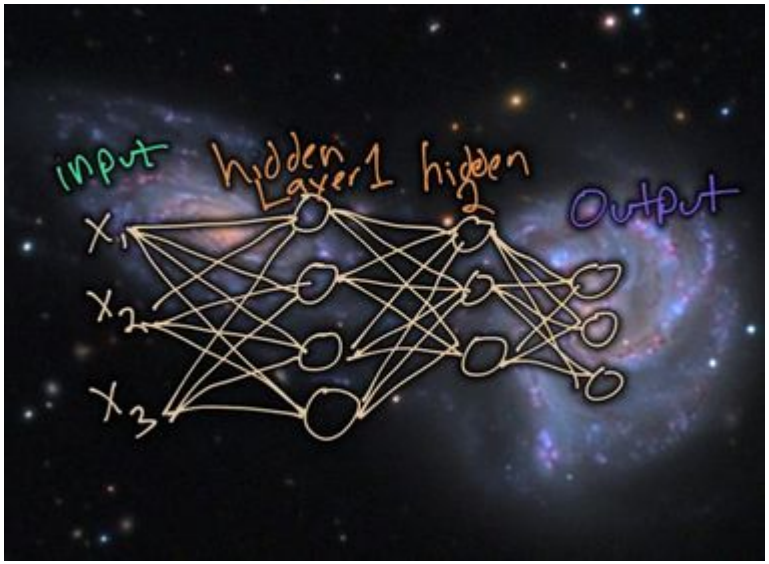
- In experiments (raw data, analysed data)
- In simulations (output of softwares)

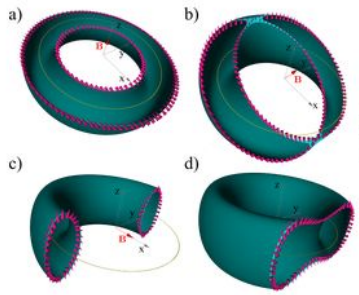
What do we do with data?

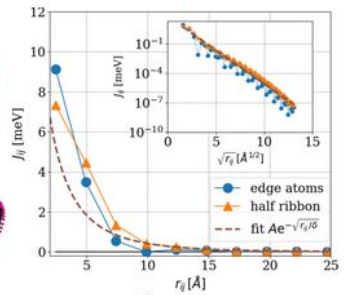
- Store it (database, file format)
- Analyse it (clean, filter, transform, reduce)
- Share it to collaborators (structure, logic)
- Support published results with data (provenance)

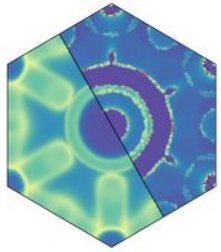
Datascience and physics

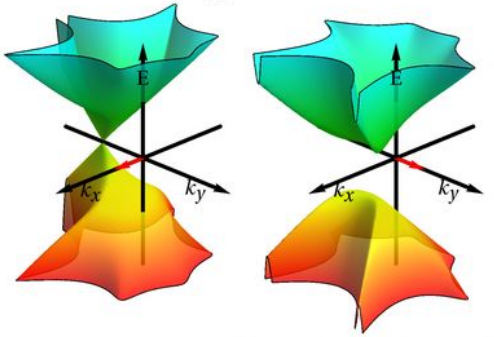


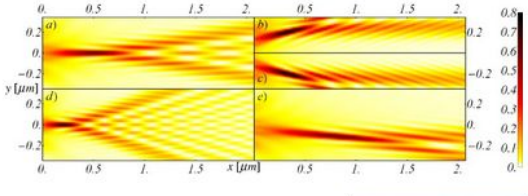


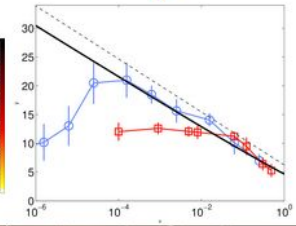


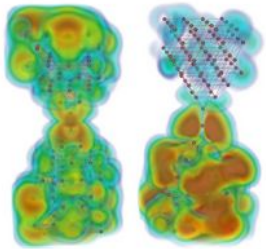


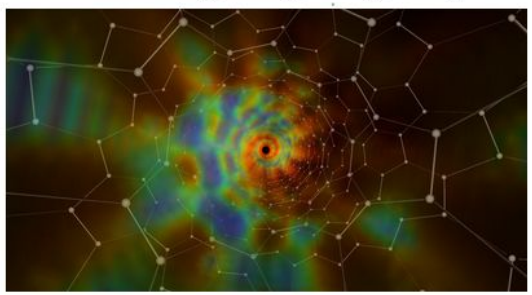












Datasets, Data sharing, Databases

Public datasharing sites

- https://osf.io/
- https://datadryad.org/stash
- https://figshare.com/
- https://www.re3data.org/

Basics of plotting and creating figures

- Matplotlib - creates images, not scalable, but still very popular

Javascript based libraries:

- Bokeh - https://docs.bokeh.org/en/latest/
- Plotly - https://plot.ly/

Higher level plotting

- Holoviews - http://holoviews.org/

Working with timeseries

First task: /workdir/01-timeseries-waterlevel

[1] https://waterdata.usgs.gov/nwis