Resen:
The Reproducible Software Environment

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Integrated Geoscience Observatory (InGeO)

InGeO: An EarthCube project supported by the NSF Cyberinfrastructure for Sustained Scientific Innovation program with 2 main goals:

1. **Provide tools that make it easy** for Geospace researchers to collaborate, share work, **reproduce results**, and build on tools that have already been developed.
2. Educate the Geospace community on best practices for software development and data archiving to ensure data and the tools needed to work with it are available to a broad range of researchers in the community with minimal barriers to entry.

`https://ingeo.datatransport.org`

Reproducible Software Environment: Resen

What is it?

- A tool to enable **reproducibility** and **collaboration** in the **geospace sciences**

Why?

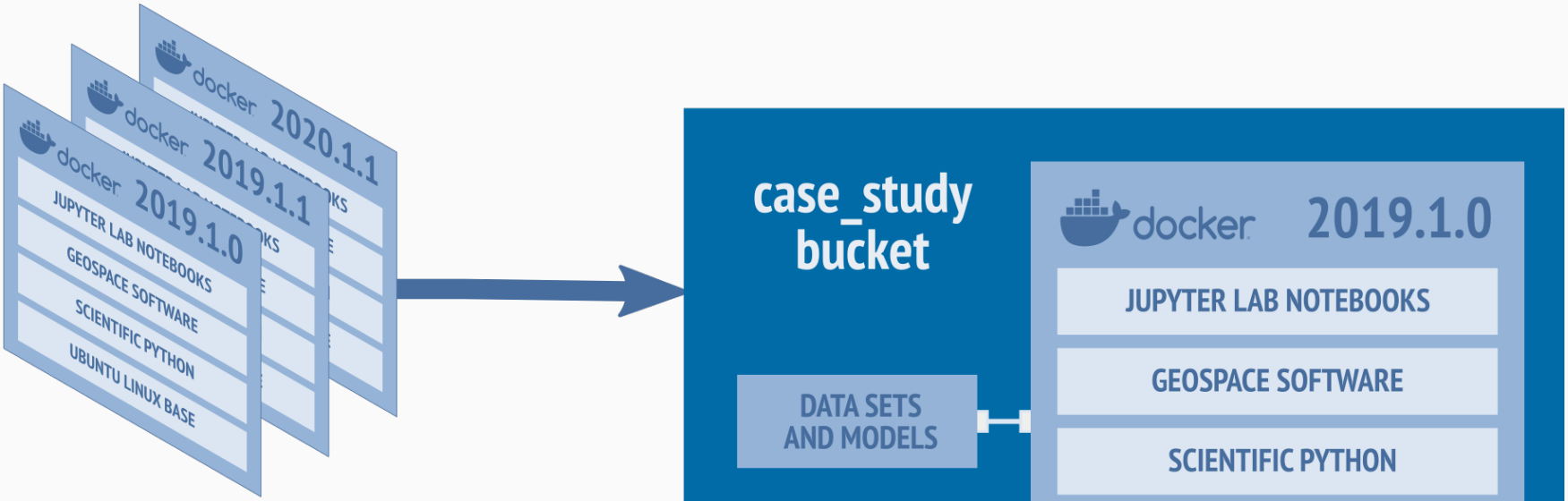
- Reproducibility is a fundamental pillar of the scientific method
- Computational reproducibility of results is hard

How?

- An easy to use Python tool for managing Docker containers
- Docker encapsulates the entire computational environment: software, dependencies, data, etc.

Resen 101: Buckets and Cores

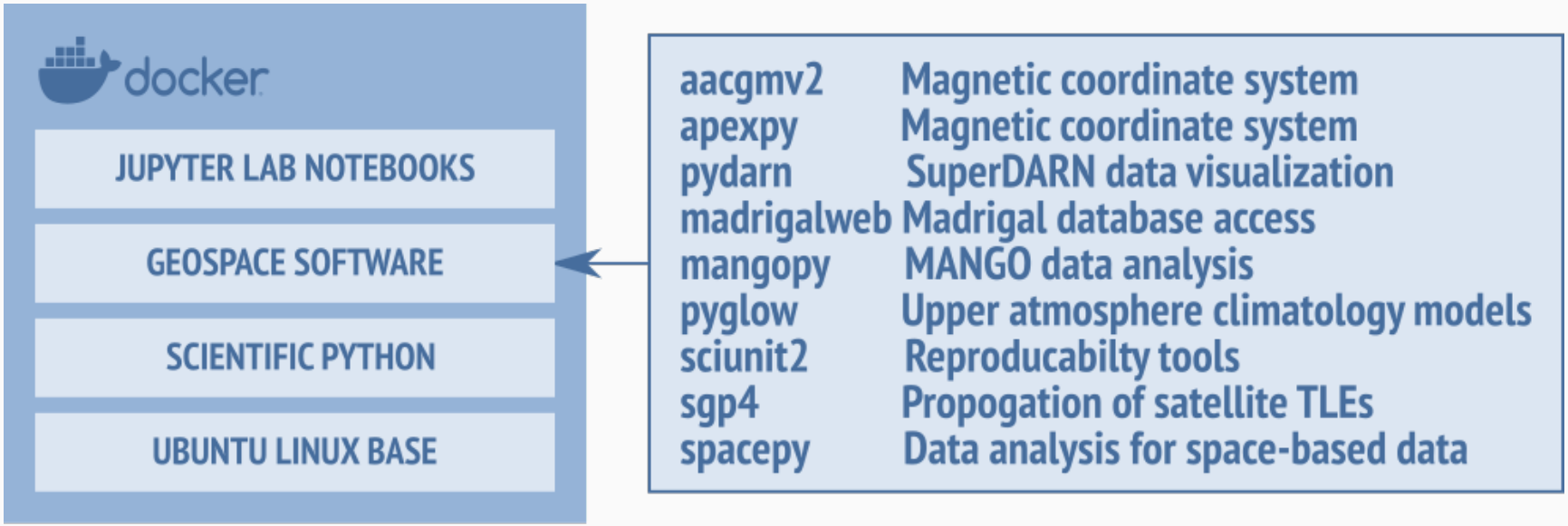
A “bucket” is a bundle of software, data, and platform




```
[resen] >>> create
Enter bucket name: case_study
Select a verson: 2019.1.0
Mount storage? yes
```

Resen 101: Buckets and Cores

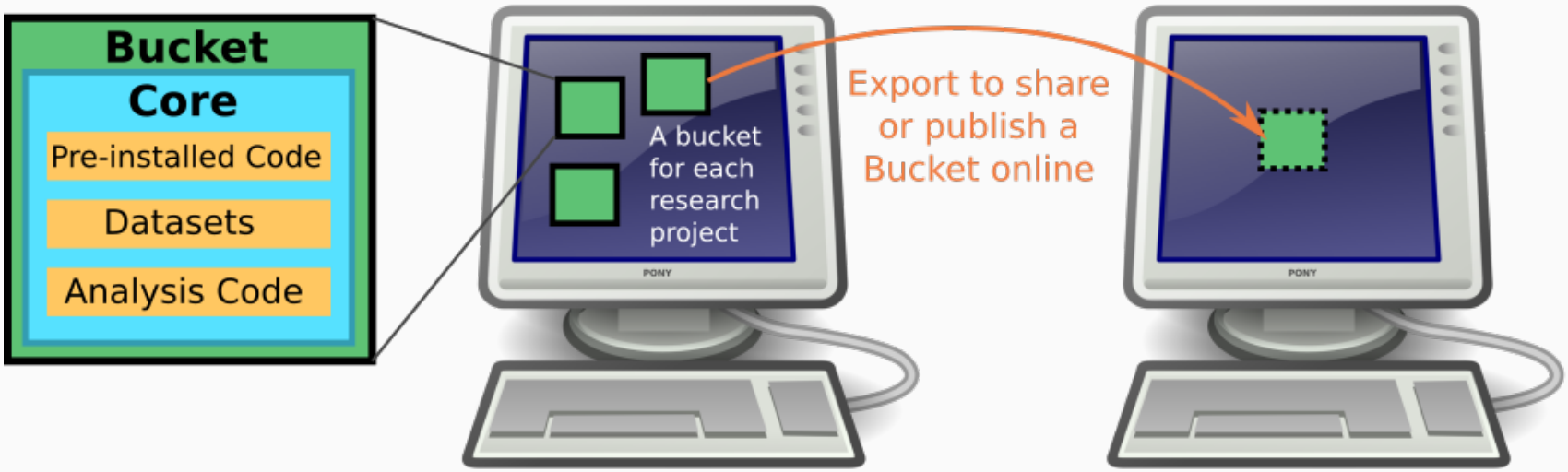
A “core” is a Docker image with pre-installed software and community tools



DockerHub: earthcubeingeo/resen-core

Resen 101: The Workflow

1. Create a bucket
2. Perform scientific analysis
3. Share/publish the bucket



Online Demo System and Resen Tool

Resen: Current Status

Resen: 2020.1.0

- Simple command line tool to create, remove, import, and export buckets

resen-core: 2020.1.0

- Standard python packages like numpy, matplotlib, scipy, pandas, etc.
- Community tools such as: apexpy, pydarn, madrigalweb, spacepy, etc.

Documentation available: `https://resen.readthedocs.io/`

Try it online: `https://ingeo.datatransport.org/v3/login`

Source code: `https://github.com/EarthCubeIngeo`

What's Next?

YouTube Tutorials:

`https://www.youtube.com/channel/UCqS6q_1IP3rGFOEPB9t090g`

Ongoing work:

- Compliance with PyHC Standards
- New tutorials: e.g. ICON Tutorial, Swarm Tutorial
- Custom cores: e.g. IPWM (see Model Systems Engineering Session)

Feedback? Questions? Ideas? Want to work with us?

- Email us: `ingeo-team@ingeo.datatransport.org`
- Post an issue on GitHub:
  `https://github.com/EarthCubeInGeo/resen`