Microservice infrastructure for continuous validation, processing and indexing of research data on an open platform

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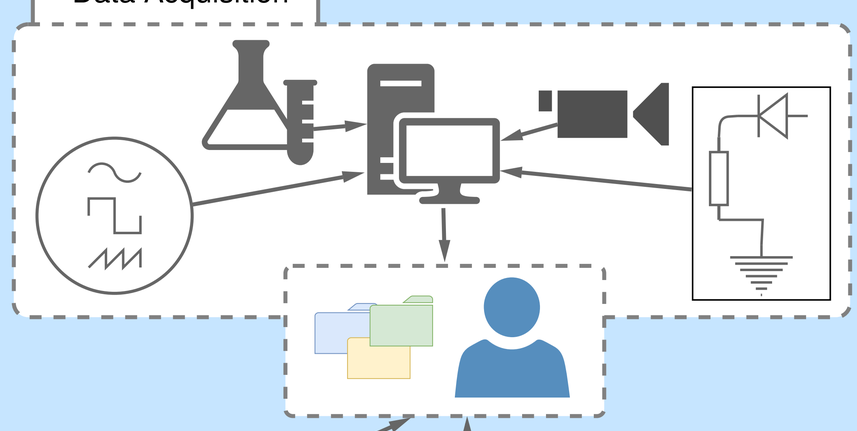
Research requires data to continuously be processed, analyzed and visualized; data needs to be quality checked, verified and backed up. Data and metadata need to be made publicly available in a manner that is easy to find and use. Many of these tasks can be automated, which usually leads to fewer errors and a higher results quality. To facilitate these tasks, we introduce a suite of microservices for the G-Node data infrastructure (GIN), an open platform for collaboration and sharing of research data and code.

GIN Microservices for Data Storage, Processing, Validation and Data Publication



GIN Core Features
- Access data from any location
- Backup
- Built-in versioning
- Platform independent
- Secure access
- Public and private repositories

Microservice Architecture

Microservices are small, self contained services that are easy to deploy and easy to maintain. Services can be added, maintained or moved without disrupting core functionality and other loosely coupled services.

With the GIN microservices we aim to help improve data quality in the Neuroscientific community while keeping the main data hosting service pure and simple.

automatic versioning

Coordination and Collaboration

Self Hosted Option

Workflow
- Manual access via web and command line
- Script automation

Command line client

Web Browser

Collaborators

Your Repository Server

Intranet

Command line client

- User management
- User access levels
- On and offsite collaboration
- Online issues help coordination
- Ensure repository integrity with versioning and "Pull requests".

GIN or Local Hosting
- GIN is open source
- use the free online GIN service
- use your own self hosted instance

GIN Repository Server

gin.g-node.org

Data Publication and Searchability

Automation and Validation Tools

gin-valid

Data validation service

valid.gin.g-node.org

gin-proc

Data processing service

proc.gin.g-node.org

gin-dex

Data search service

gin.g-node.org/explore/data

gin-doi

DOI service

doid.gin.g-node.org

Persistent Identifiers
- Any public GIN repository can be registered
- Make your code and data citable
- DOIs for:
  - Data related to publications
  - Research software
  - Whole data sets

Automated Data Validation
- Automatically runs validation on selected repositories
- Supported validation formats:
  - BIDS
  - odML
  - NIX
- Easily extensible to more formats
- Format validation contributions are welcome

Automated Data Processing
- Automatically runs pre-defined processing pipelines
- Triggered on repository changes
- Automatically returns specified results
- Based on SnakeMake and DroneCI

Findable Data via GIN
- GIN provides automatic indexing of all text based files
- Online search for repository content
- Interactive rendering of
  - Markdown
  - YAML
  - JSON
  - XML

Resources and References

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GIN (RRID:SCR_015864): https://gin.g-node.org
BIDS (RRID:SCR_016124): http://bids.neuroimaging.io
NIX (RRID:SCR_016196): http://www.g-node.org/nix
odML (RRID:SCR_001376): http://www.g-node.org/odml
SnakeMake (RRID:SCR_003475): https://doi.org/10.1093/bioinformatics/bts480
DroneCI: https://drone.io/ https://drone.io/

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