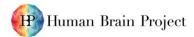
The HBP Collaboratory

a solution to facilitate collaboration in neuroscience

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Collaboration enablers

- 1. Identifying people you want to collaborate with
- 2. Locating a controlled workspace for exchange
- 3. Documenting goals, ideas, processes, progress
- 4. Sharing data
- 5. Being able to try out different ideas interactively
- 6. Knowing that what was done is reproducible
- 7. Sharing results and workflows



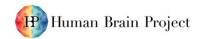


The Collaboratory is evolving

- During the first years of HBP, we developed Collaboratory 1.0
 - Today it counts several thousand users

Since the beginning of HBP, cloud technology has evolved significantly

- We are currently rolling out Collaboratory 2.0
 - Based on open source tools with a wide base of users/developers
 - More user friendly, more features
 - Adapts to policies of the EBRAINS research infrastructure produced by HBP





Identifying people you want to collaborate with

- Collaboratory provides a Single Sign-On (SSO) solution to access HBP services
 - One account, one username, one password
- Based on industry standard OpenID Connect (OIDC) protocol
 - Collaboratory 2.0 uses KeyCloak, an open source tool, supported by RedHat/IBM
- Extending to Single Sign On over a very large network of institutions with eduGain (provided by GEANT, also known for eduroam)
- Serving a community of users. We are adding a directory of users.





A controlled workspace for exchange

The Collaboratory is self-hosted by EBRAINS

- We target deployment at the FENIX Research Infrastructure sites:
 - CSCS, Swiss National Supercomputing Center (Lugano, Switzerland)



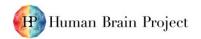
- BSC, Barcelona Supercomputing Center (Barcelona, Spain)
- CEA, Alternative Energies and Atomic Energy Commission (Paris, France)
- CINECA (Bologna, Italy)
- JSC, Jülich Supercomputing Center (Jülich, Germany)



A controlled workspace for exchange

- Any group of users can create a workspace = a collab
- A collab is either completely public (crawlable by Google) or private to a group of users

- Permissions are defined for each collab individually
 - Admin, edit, and read permissions
 - For individual users and/or other groups





Documenting goals, ideas, processes, progress

The Collaboratory encourages 2 modes of documentation:

Wiki pages to create web pages for simple access

- Collaborative edition of Office documents: Word, Excel, Powerpoint
 - Compatible with MS-Office formats
 - Collaborative edition a la Google Docs provided by OnlyOffice
- Any other format is also supported in the storage of the collab.





Sharing data

- Each collab comes with its own storage space...
- ... but data can be shared across collabs too (given the user has the permissions)
- All the data is version controlled for easy access to the change history
- EBRAINS policies will define storage quotas.
- Note: EBRAINS policies forbid uploading non-anonymized human data





Interactive and reproducible workflows

- Based on Jupyter Notebooks, a Python programming environment
- With access to a very large set of Python scientific libraries
- Users can try out code snippets interactively
- Collaboratory 2.0 builds on JupyterLab with support for more complex workflows
- Notebooks can access storage & computing resources at the supercomputing sites.





Extending the Collaboratory

• The Collaboratory is an extensible framework

- Developers can add Community apps to offer specialized services
- Apps are supported by Collaboratory services:
 - identification, drive, collabs, permissions
- Community apps can be integrated inside wiki pages

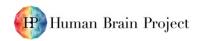




Sharing results and workflows

- Open science, open data, open source ...
- ... but you choose when to open access to others

- The Collaboratory is a great solution for:
 - Collaborative research in a remote team setting
 - Education: can be used for MOOCs
 - Live papers: give readers of your publication direct access to the data you used and let them reproduce your workflows





Collaboratory: under the hood

- User identification & authentication (IAM): KeyCloak
- Wiki pages: XWiki
- File storage (Drive): SeaFile
- Collaborative edition of Office documents: OnlyOffice
- Reproducible workflows: JupyterLab

Runs on OpenStack (SWIFT) & Kubernetes





Thank you for your attention

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