

# git-annex : a short introduction

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# Overview



1. Context
2. Possible solutions
3. Installation and usage



Context

# Context



- ▶ HPC often requires large datasets (meshes, post-processing data, etc.).
- ▶ Git is not designed for large files and gets very slow.

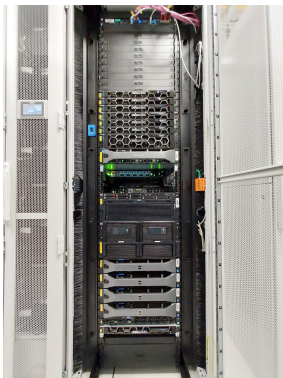


Figure 1: Gaya HPC cluster



Figure 2: Git logo

The background of the slide is composed of two large, overlapping geometric shapes. A teal-colored shape occupies the top-left corner, while a light gray shape occupies the bottom-left corner. The rest of the slide is white. The text "Possible solutions" is centered in the white area.

Possible solutions

# Keep the data locally



Works but not ideal, especially for:

- ▶ **Collaboration** (multiple users).
- ▶ **Reproducibility** (multiple runs).
- ▶ **Continuous integration** (CI).
- ▶ **Versioning** (multiple versions).
- ▶ **Backup** (multiple copies).



**Figure 3:** Laptop to keep the data locally

# Avoidance



- ▶ **File generation** on demand or at execution time.
- ▶ **Data reduction:** e.g. only store the most meaningful data.
- ▶ **User specifies** which statistics/visualization to generate at each execution.
- ▶ *etc.*



# Cloud storage



**For everyday user:** Google Drive, Dropbox, OneDrive, etc.

**Targeted at scientific collaboration:** Zenodo, Figshare, Dryad, OSF, etc.

## Problematics:

- ▶ **Requires lots of scripting** to integrate in the HPC workflow.
- ▶ **Requires special security measures** to protect sensitive data.
- ▶ **How to detect and manage errors?**
- ▶ **Compatibility issues.**





# Git LFS



Open source extension to Git.



**Git Large File Storage**

- ▶ Replaces large files with text **pointers** inside Git, while storing the file contents on a remote server.
- ▶ **No need for custom scripting.**
- ▶ **Consistent** between local and remote.

## Suboptimal usage of local storage:

- ▶ **Uses locally twice the space** (files are duplicated in `.git/lfs`).
- ▶ **Large files** are **automatically downloaded** when cloning a repository.
- ▶ End users have **nearly no permission/control** on the remote server.

# Git-annex

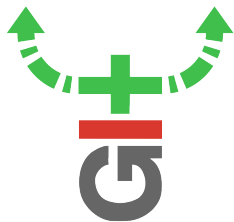


## Open source extension to Git.

- ▶ Allows managing large files with Git without checking the file contents into Git.
- ▶ Uses **symlinks** to optimize local storage.
- ▶ **No duplication** of files.
- ▶ No intrinsic limit on file size or bandwidth.

## More controls, the user can:

- ▶ decide at anytime which files to keep locally.
- ▶ use special command to **download** or **drop** files.



> `git annex`

# Git-annex




Supports the **download of large files** content from either:

- ▶ some **other git-annex repository** on another machine (if an ssh connection is possible).
- ▶ a **cloud storage provider** (e.g. Amazon S3, Google Drive, Dropbox, etc.)

**Main drawback:**

- ▶ **Non natively supported** by GitHub, GitLab, etc. (files needs to be managed with command lines).
- ▶ **Learning curve.**
- ▶ **Not as common** as Git LFS, support may be harder to find.

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# Installation and usage

# Installation



- ▶ `sudo apt-get install git-annex` (Debian/Ubuntu)
- ▶ `sudo pacman -Syu git-annex` (Arch)
- ▶ `brew install git-annex` (MacOS)

# Usage



**Initialize and add a large file (single quotes are important):**

```
git annex init 'PA laptop'  
git annex addurl --file=large_file.zip download_url_link  
# no need to git add  
git commit -m "Add large_file.zip"  
git push origin main git-annex  
git annex list  
git annex whereis large_file.zip
```



# Usage

## Retrieve a file from another repository:

```
git annex init 'Alice laptop'  
git annex get .
```

## Annex a newer version:

```
git annex drop large_file.zip  
git rm large_file.zip  
git annex addurl --file=large_file.zip download_url_link  
git commit -m "Update large_file.zip"  
git annex sync
```



# Usage

**If another user wants to retrieve the newer version:**

```
git annex sync  
# Initialize the download :  
git annex get .
```

**Check for old orphan symlinks files and their references number:**

```
git annex unused  
git annex dropunused NUMBER
```



The end



**Thank you for your attention!**



**Any questions?**

*Contact Information:*

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