Advanced Molecular Detection

Southeast Region Bioinformatics

Git & GitHub

06/26/2023

Outline

- Agenda
- Updates
- Git & GitHub
- Setting Up Git
- Cloning Repositories
- Branching & Merging

Agenda

July 10 – Bacterial Subtyping and Characterization & Bactopia Tools: ABRicate and ArgVATE

July 24 – Bactopia Tools: AMRFinderPlus, BUSCO, and CheckM

Future Trainings

- ONT & FL's Flisochar pipeline
- StaPH-B Toolkit Programs/Pipelines
- GISAID flagged SARS-CoV-2
- R Training Series
- Dryad pipeline
- Generating R figures
- …and more

Updates

- Register for a Nextflow Tower Webinar
  - “Learn the basics of Nextflow Tower Cloud”
  - Tuesday June 27, 2023 – TOMORROW @ 12 EST
  - I sent an email with this link on 6/14, but email bphl-sebioinformatics@flhealth.gov if you would like the link!

Git

- Free and open-source distributed version-controlled system designed to handle everything from small to very large projects with speed and efficiency
- Version-controlled software
  - Track changes to files
  - Collaborative
  - Track who made changes
  - Revert changes

github icon - Bing images

Git

- Manage projects with repositories
- Clone a project to work on a local copy
- Control & track changes with Staging & Committing
- Branch & merge to allow for work on different parts and versions of a project
- Pull the latest version of the project to a local copy
- Push local updates to the main project

Information Storage - Git

- Git projects have two parts: the files and directories that you create and edit directly, and the extra information that Git records about the project's history. The combination of these two things is called a **repository**
- Git stores all the information in a directory called .git located in the root directory of the repository. Git expects this information to be organized in a precise way, so never edit or delete any information in this directory

GitHub

- Internet hosting service for software development and version control using Git
- Provides the distributed version control of Git plus access control, bug tracking, software feature requests, task management, and continuous integration for every project
- Largest host of source code in the world, and has been owned by Microsoft since 2018

Importance of Version Control

- Collaborate
- History of changes
  - Revert changes
  - See what you did
  - Recover deleted bits
- Experiment
  - Easy to try something
- Backup
  - Remote copies

version control git - Bing images

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Setting Up Git

- Git is version control system designed to handle projects of any size
- GitHub is a cloud-based service and platform that uses Git
  - Similar to bitbucket, and gitlab
- To use Git on the command line on your computer, complete the following steps:
  - Download Git
  - Install Git
  - Configure Git
  - OR use Git on HPG

Git on HPG

- Git is available as a module on HPG
- To load Git type

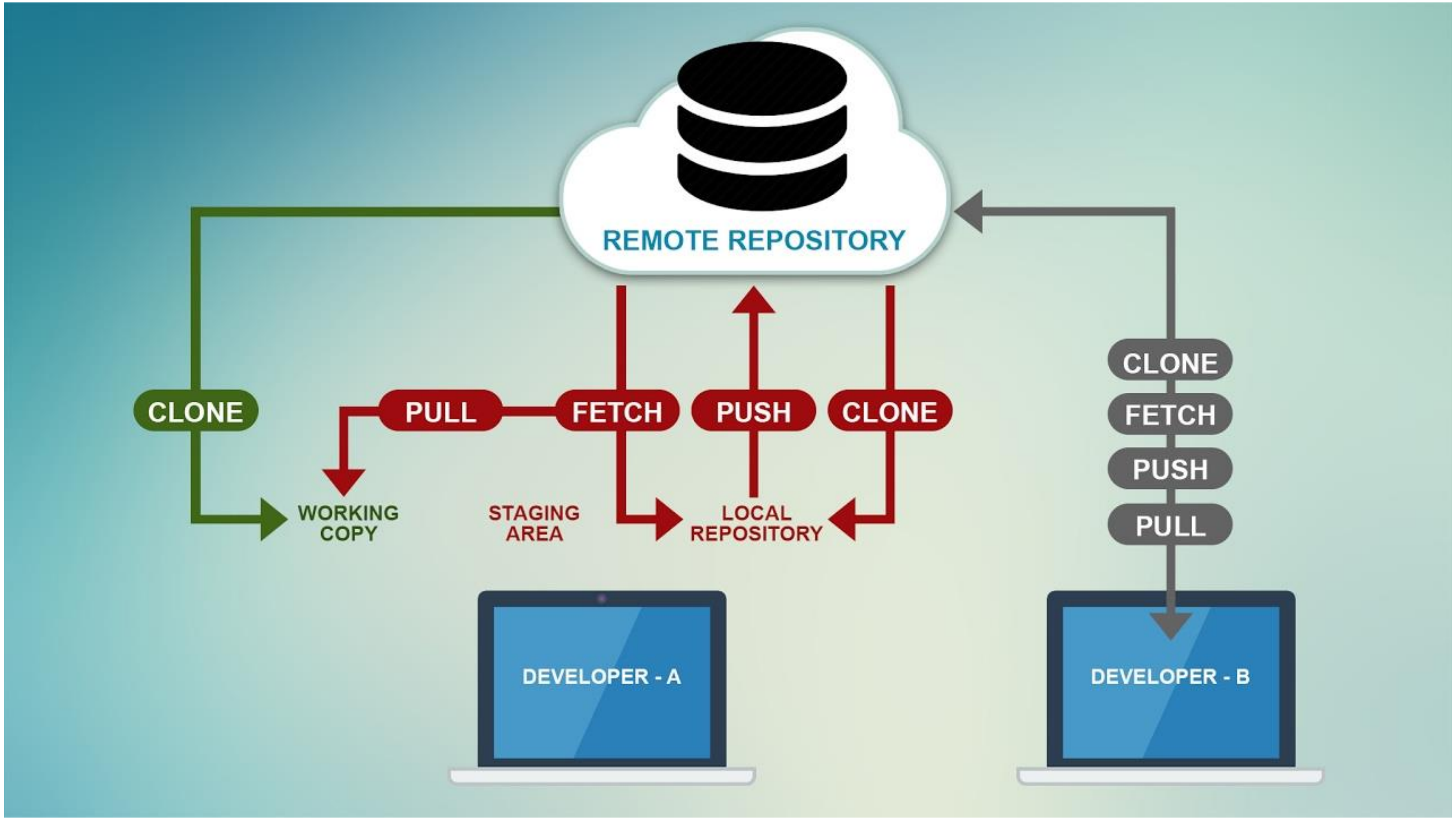
```
$ module load git
```

- If you’d like to install git on another system, use the directions on the following slides

Setting Up Git

- Download and install the latest version of Git
  - Git - Downloads (git-scm.com)
- Set your username in Git
- Set your commit email address in Git
- Authenticate with GitHub from Git
  - When you connect to a GitHub repository from Git, you will need to authenticate with GitHub using either of the following:
    - HTTPS - cache your GitHub credentials in Git using a credential helper
    - SSH – generate SSH keys on each computer you use to push or pull from GitHub

Repositories



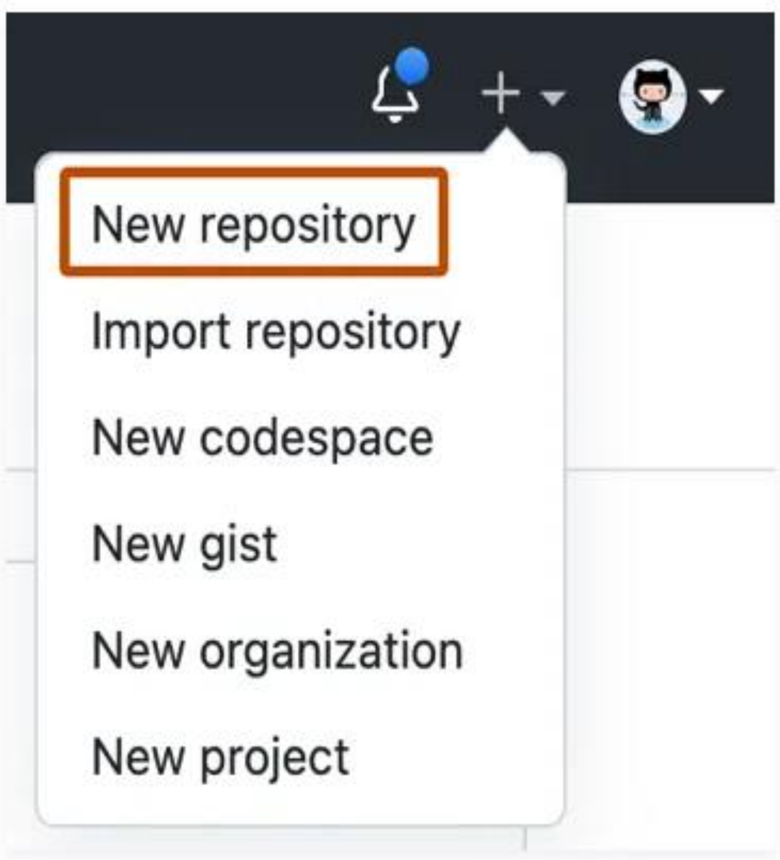
[repositories image github - Bing images]

Repositories

- A repository contains all your project’s files and each file’s revision history
- Project works can be discussed and managed within the repository
- Creating a repository for your project allows you to store code in GitHub
  - Provides a backup
  - Share work with other developers
- Repositories on GitHub can be owned by a person or an organization. You can interact with the people, repositories, and organizations by connecting and following them

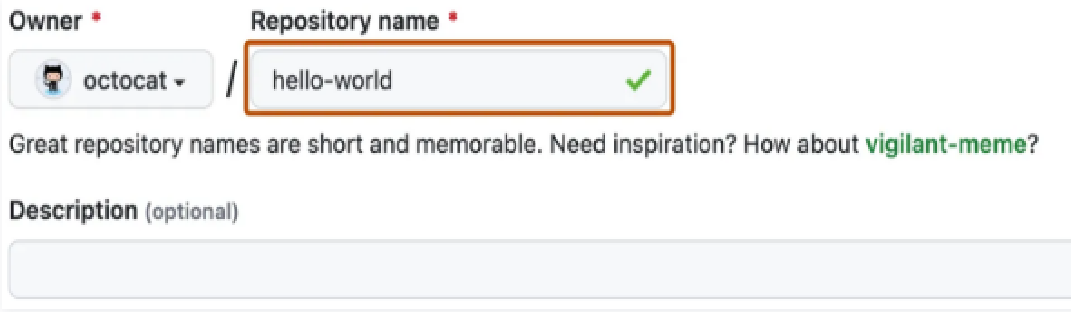
Creating a Repository

- In the upper right corner of any page, use the **+** drop-down menu, and select **New repository**
- Type a short, memorable name for your repository. For example, “hello-world”



Creating a Repository

- Additionally, add a description of your repository. For example, "**My first repository on GitHub**"
- Choose the visibility of the repository
- Select **Initialize** this repository with a README
- Click **Create Repository**



Owner *

octocat / Repository name *

hello-world ✓

Great repository names are short and memorable. Need inspiration? How about vigilant-meme?

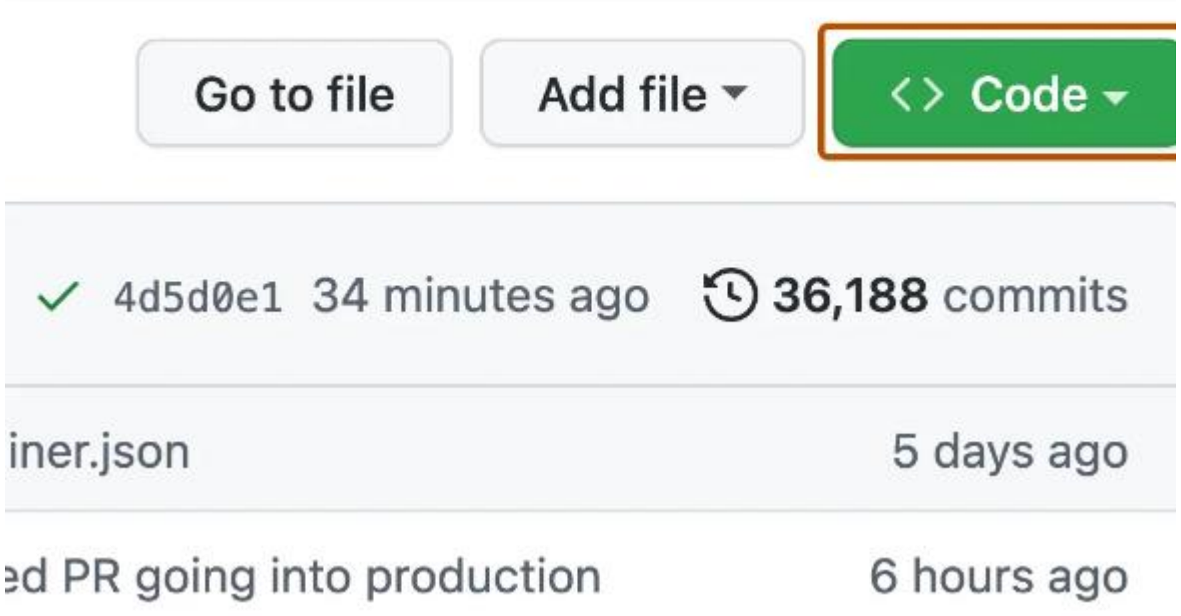
Description (optional)

Cloning a Repository

- When you create a repository on GitHub, it exists as a remote repository
- Repository can be cloned to create a local copy on your computer and sync between the two locations
- Cloning a repository pulls down a full copy of all the repository data, including all versions of every file and folder for the project

Cloning a Repository

- On GitHub, navigate to the main page of the repository
- Above the list of files, click **<> Code**
- Copy the URL for the repository which can be HTTPS, SSH, or GitHub CLI



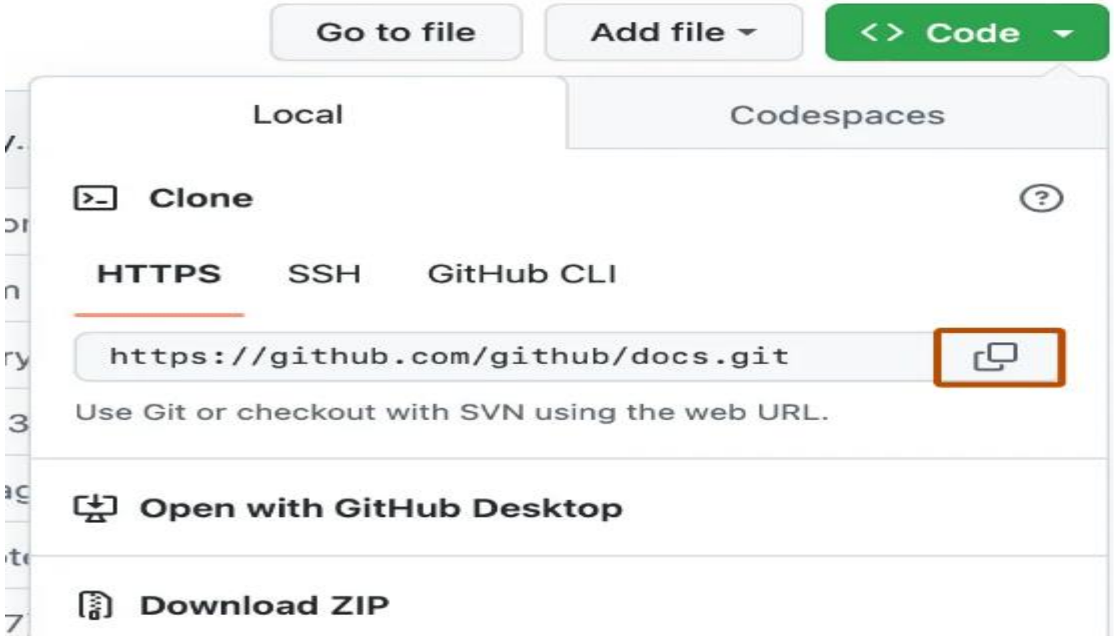
✓ 4d5d0e1 34 minutes ago 36,188 commits

iner.json 5 days ago

ed PR going into production 6 hours ago

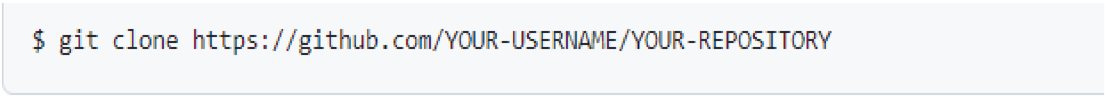
Cloning a Repository

- Open terminal
- Change the current working directory to the location where you want the cloned directory
- Type **git clone**, then paste the URL you copied earlier
- Press enter to create your local clone



```
https://github.com/github/docs.git
```

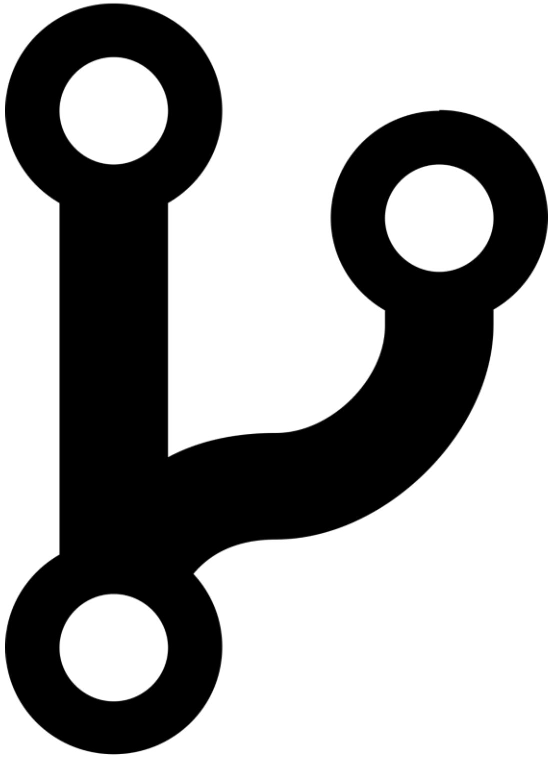
Use Git or checkout with SVN using the web URL.



```
$ git clone https://github.com/YOUR-USERNAME/YOUR-REPOSITORY
```

Branching

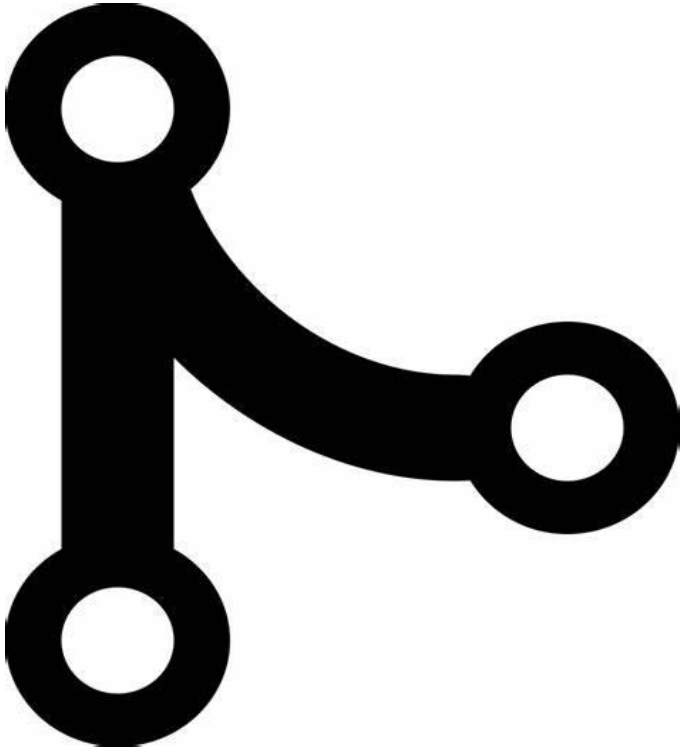
- Diverge from the main line
  - Keep main files unchanged
- Test new ideas
- Fix bugs
- Develop new features



github branch icon - Bing images

Merging

- Bring the changes from a branch back into main branch
- May need to resolve conflict
  - Changes made to a file in both branches



[github merge icon - Bing images](#)

References

- Repositories documentation - GitHub Docs
- Viewing branches in your repository - GitHub Docs
- Git and Github.com: Slides (ufresearchcomputing.github.io)
- Git (git-scm.com)

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Questions?

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