LEIDEN UNIVERSITY MEDICAL CENTER

Git and remote repositories

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Remote repositories

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Remote repositories

Distributed Git

Repositories can reference each other:

- A repository can be on a server, your desktop, your coworker's laptop, etc.
- Technically, no repository is 'special'.
- We call a reference to another repository a *remote*.

Remote repositories

Distributed Git

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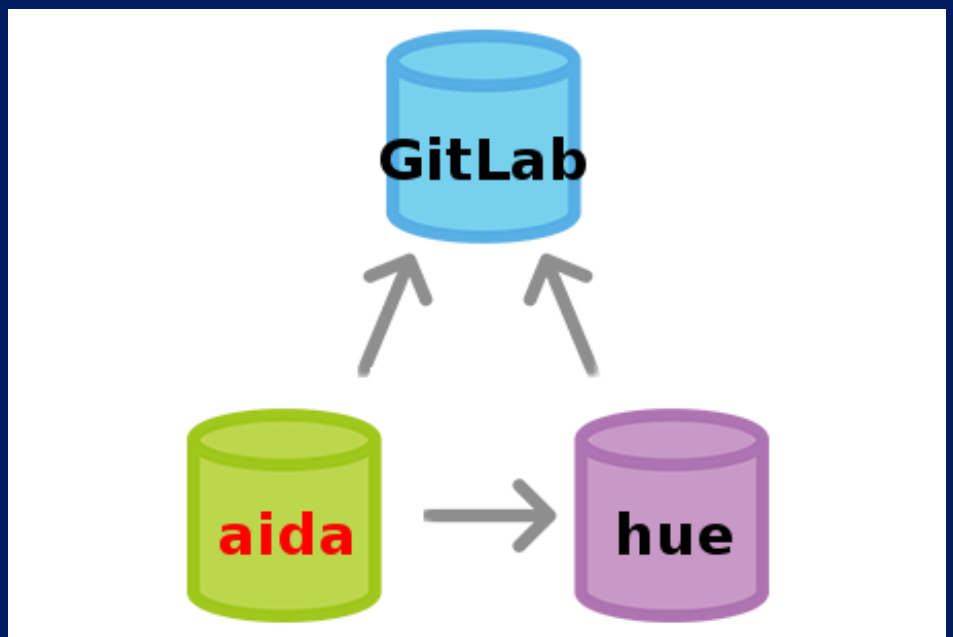

Remote repositories

Listing remotes

```
$ git remote
gitlab
```

We are on **aida** and have one remote, **gitlab**, defined.

Remote repositories

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We are on **aida** and have one remote, **gitlab**, defined.

```
$ git remote -v
gitlab  https://git.lumc.nl/m.vermaat.hg/tv-series.git (fetch)
gitlab  https://git.lumc.nl/m.vermaat.hg/tv-series.git (push)
```

-v: Include remote location.

We see that communication with **gitlab** is over HTTPS.

Remote repositories

Adding a remote: `git remote add`

```
$ git remote add hue 192.168.0.8:projects/tv-series
```

This adds a reference to the remote repository **`hue`** using communication over SSH.

Remote repositories

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hue     192.168.0.8:projects/tv-series (fetch)
hue     192.168.0.8:projects/tv-series (push)
```

Remote repositories

Remote branches

You see code from remotes as *remote branches*:

- Remote branches are just branches prefixed with the remote name.
- Communicate with remotes to update the remote branches.
- You can setup a local branch to *track* a remote branch.

Remote repositories

Remote branches

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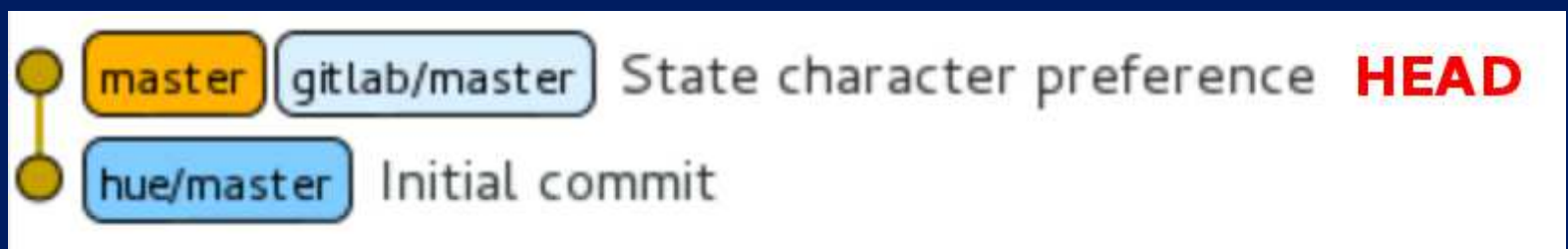

Remote repositories

Listing remote branches: `git branch`

```
$ git branch -v
* master  f1ef19c State character preference
```

This shows only our local branches.

Remote repositories

Listing remote branches: `git branch`

```
$ git branch -v
* master  f1ef19c State character preference
```

This shows only our local branches.

```
$ git branch -v -a
* master                  f1ef19c State character preference
  remotes/gitlab/master f1ef19c State character preference
```

`-a`: Include remote branches.

Remote repositories

Updating remote branches: `git fetch`

```
$ git fetch hue
remote: Counting objects: 5, done.
remote: Compressing objects: 100% (2/2), done.
remote: Total 3 (delta 0), reused 0 (delta 0)
Unpacking objects: 100% (3/3), done.
From 192.168.0.8:projects/tv-series
 * [new branch]      master     -> hue/master
 * [new branch]      simpsons   -> hue/simpsons
```

Remote repositories

Updating remote branches: `git fetch`

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remote: Counting objects: 5, done.
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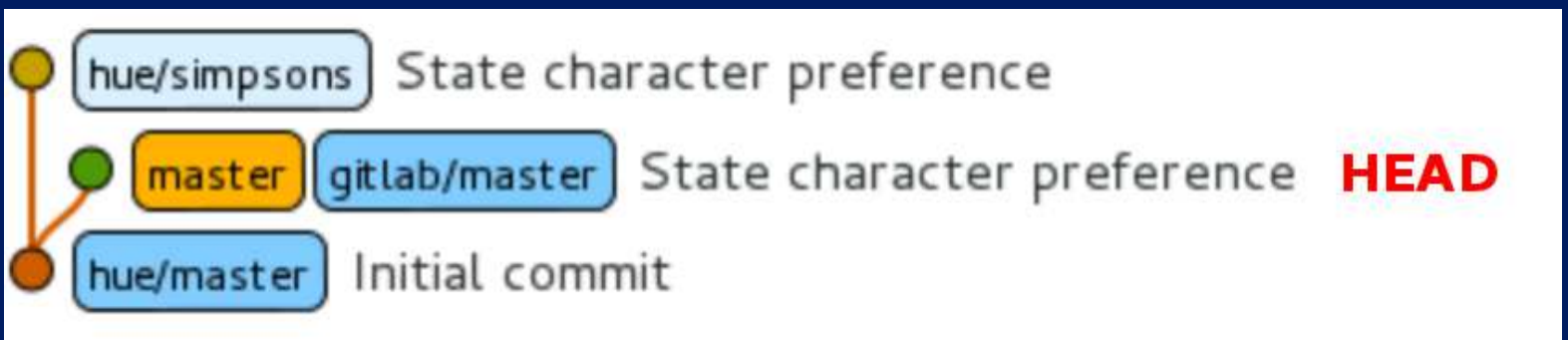


Remote repositories

Merging remote branches: `git merge`

We can merge remote branches just like normal branches.

```
$ git merge hue/simpsons
...
```

Remote repositories

Merging remote branches: `git merge`

We can merge remote branches just like normal branches.

```
$ git merge hue/simpsons
...
```

Alternatively, we could continue the work of a remote branch.

Remote repositories

Creating a local tracking branch: `git checkout`

Remote branches are 'read-only':

- We cannot directly continue work on a remote branch.
- But we can setup a local *tracking branch*.

```
$ git checkout simpsons
Branch simpsons set up to track remote branch
simpsons from hue.
Switched to a new branch 'simpsons'
```

What happened here?

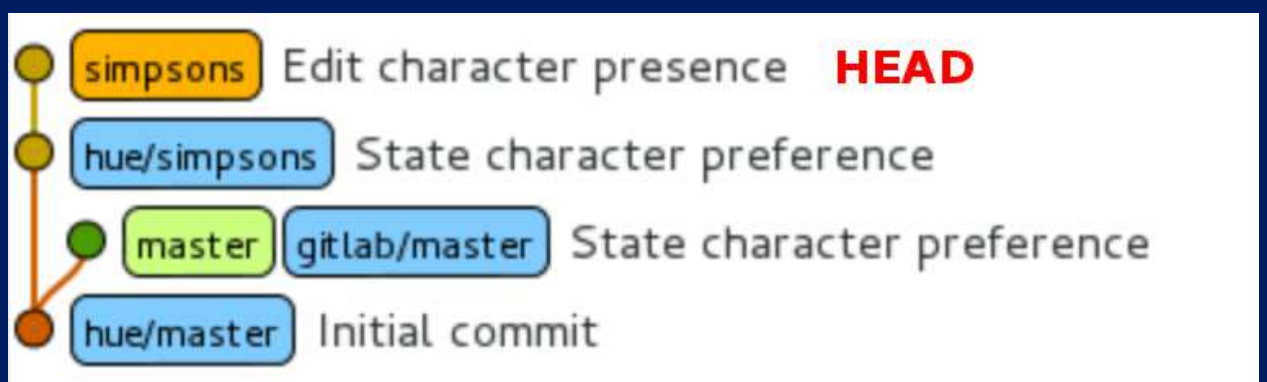
- There was no branch **`simpsons`**.
- But there was a remote branch of the same name.
- So Git creates a new branch based on that (and switches to it).

Remote repositories

Working on a tracking branch

Let's continue working on branch **`simpsons`**.

```
$ emacs FACTS.md
$ git add FACTS.md
$ git commit -m 'Edit character presence'
[simpsons 0676334] Edit character presence
 1 file changed, 1 insertion(+), 1 deletion(-)
$ git status
# On branch simpsons
# Your branch is ahead of 'hue/simpsons' by 1 commit.
#
nothing to commit (working directory clean)
```



Remote repositories

Pushing changes to a remote: `git push`

```
$ git push hue simpsons
Counting objects: 5, done.
Delta compression using up to 4 threads.
Compressing objects: 100% (2/2), done.
Writing objects: 100% (3/3), 303 bytes, done.
Total 3 (delta 1), reused 0 (delta 0)
To hue.remote:projects/tv-series
   0535b7e..0676334  simpsons -> simpsons
```

Our work on branch **`simpsons`** is now available on remote **`hue`** too.

Remote repositories

Cloning an existing repository

Instead of creating repositories using **`git init`**, you can create a local *clone* of an existing (remote) repository.

```
$ git clone https://git.lumc.nl/m.vermaat.hg/tv-series.git
Cloning into 'tv-series'...
remote: Counting objects: 6, done.
remote: Compressing objects: 100% (4/4), done.
remote: Total 6 (delta 1), reused 0 (delta 0)
Unpacking objects: 100% (6/6), done.
```

Remote repositories

Cloning an existing repository

Instead of creating repositories using **`git init`**, you can create a local *clone* of an existing (remote) repository.

```
$ git clone https://git.lumc.nl/m.vermaat.hg/tv-series.git
Cloning into 'tv-series'...
remote: Counting objects: 6, done.
remote: Compressing objects: 100% (4/4), done.
remote: Total 6 (delta 1), reused 0 (delta 0)
Unpacking objects: 100% (6/6), done.
```

A remote called **`origin`** is added for the original repository and branch **`master`** is setup to track the original **`master`**.

```
$ cd tv-series/
$ git remote -v
origin  https://git.lumc.nl/m.vermaat.hg/tv-series.git (fetch)
origin  https://git.lumc.nl/m.vermaat.hg/tv-series.git (push)
```

Remote repositories

Shortcuts for tracking branches

If a local branch is setup to track a remote branch, there are shortcuts for synchronizing them.

Remote repositories

Shortcuts for tracking branches

If a local branch is setup to track a remote branch, there are shortcuts for synchronizing them.

For example, say **`HEAD`** is on **`simpsons`** which is tracking **`origin/simpsons`**.

```
$ git push    ==>    $ git push origin simpsons

$ git pull    ==>    $ git fetch origin
                     $ git merge origin/simpsons
```

Working with GitLab

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Working with GitLab

Using a central server

Git can be used by a team completely decentralized.

However, often a central server is used:

- It can be easier to communicate via the server.
- It can be convenient to have a canonical repository.
- Services such as *GitLab* and *GitHub* add many features on top of Git.

Working with GitLab

GitLab

Our GitLab server is at `https://git.lumc.nl/`

- Coupled to your LUMC account.
- All users can create projects.
- Browse repositories and edit files online.
- Control access for other users.
- Track bugs/issues/tickets.
- Create merge requests and do code reviews.

Questions?

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Questions?

Acknowledgements:

Jeroen Laros
Zuotian Tatum

http://git-scm.com/book

https://www.atlassian.com/git