ATTACK DEFENSE

by PentesterAcademy

Name	Git: Learn Basics with Git CLI
URL	https://attackdefense.com/challengedetails?cid=2022
Type	DevOps: Version Control System

Important Note: This document illustrates all the important steps required to complete this lab. This is by no means a comprehensive step-by-step solution for this exercise. This is only provided as a reference to various commands needed to complete this exercise and for your further research on this topic. Also, note that the IP addresses and domain names might be different in your lab.

Challenge Description

Git is a distributed version control system (VCS) for managing the software source code. Git can be hosted on the cloud or on the local system.

A Kali machine and a Gitlab instance are provided in this lab. Git CLI client is installed on the Kali machine and a repository is hosted on the Gitlab server.

The Gitlab instance is accessible on hostname 'gitlab' and uses the following credentials:

Username	Password
root	welcome123

The user is provided with access to Kali CLI and Gitlab web UI.

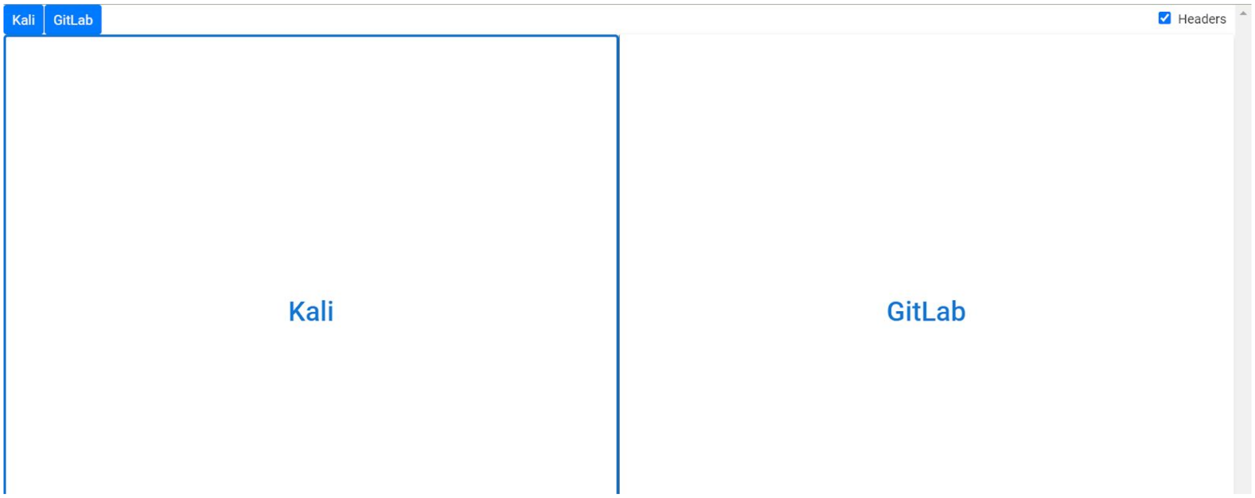
Objective: Follow the manual and learn how to use the Git with Git CLI!

Instructions:

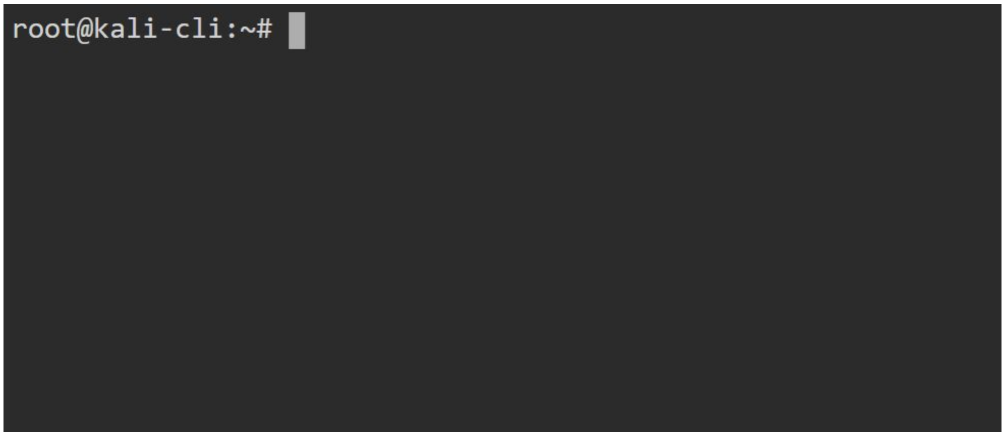
- The Gitlab instance is accessible with the name "gitlab".

Lab Setup

On starting the lab, the following interface will be accessible to the user.

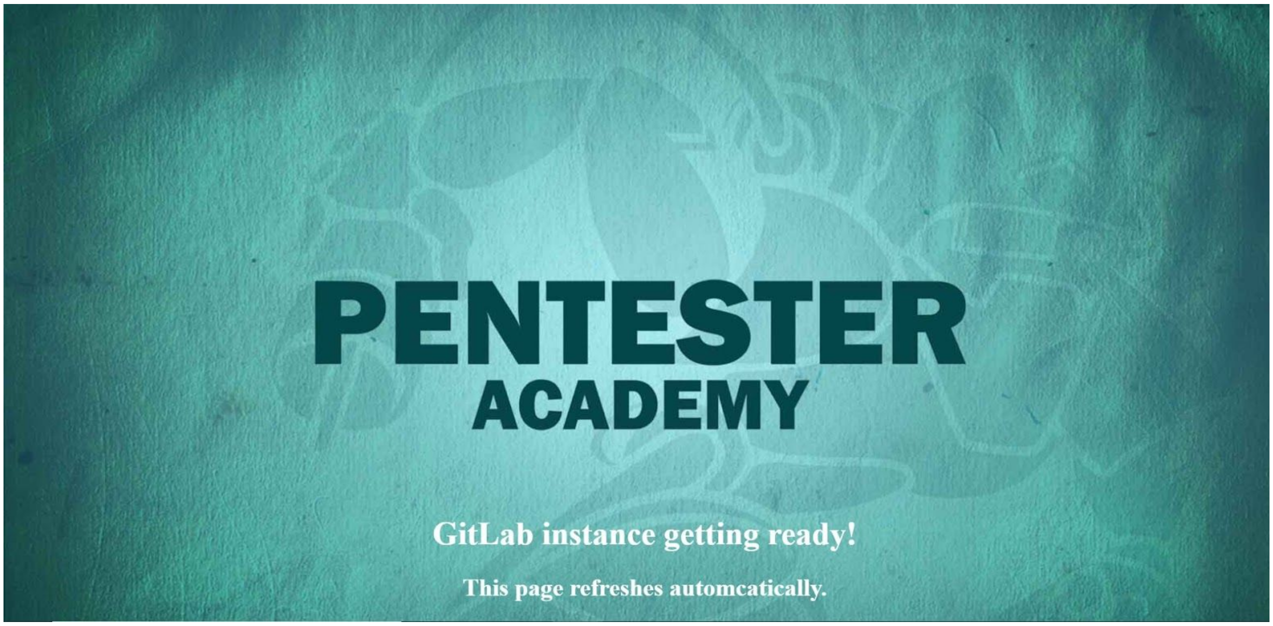


On choosing (clicking the text in the center) left panel, **a Kali CLI instance** will open in a new tab.



```
root@kali-cli:~# 
```

Similarly on selecting the right panel, a web UI of **Gitlab instance** will open in a new tab. However, if the Gitlab instance is not ready then one will see the following page.



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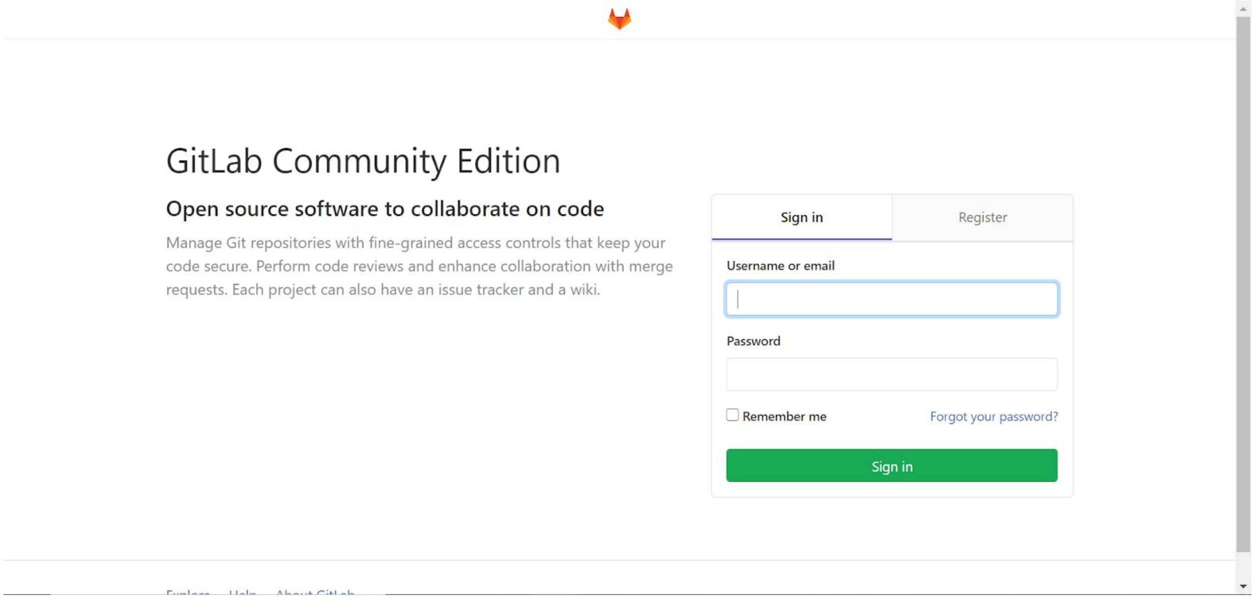
GitLab instance getting ready!

This page refreshes automcatically.

This page reloads automatically and shows the intended page as soon as the setup is ready. The loaded Gitlab page will look like this:



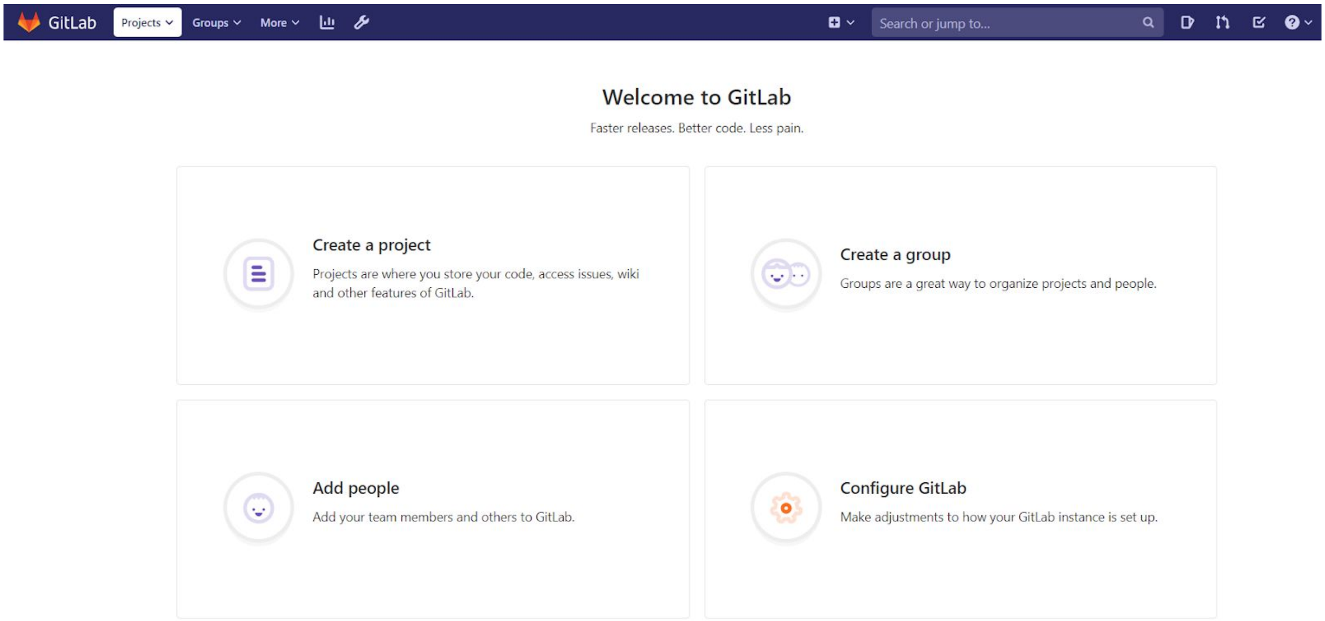
GitLab Community Edition

Open source software to collaborate on code

Manage Git repositories with fine-grained access controls that keep your code secure. Perform code reviews and enhance collaboration with merge requests. Each project can also have an issue tracker and a wiki.

The public projects of the root user can be checked at http://<gitlab-url>/root/

Note: The Gitlab URL will be different for every user.



Welcome to GitLab

Faster releases. Better code. Less pain.

Create a project

Projects are where you store your code, access issues, wiki and other features of GitLab.

Create a group

Groups are a great way to organize projects and people.

Add people

Add your team members and others to GitLab.

Configure GitLab

Make adjustments to how your GitLab instance is set up.

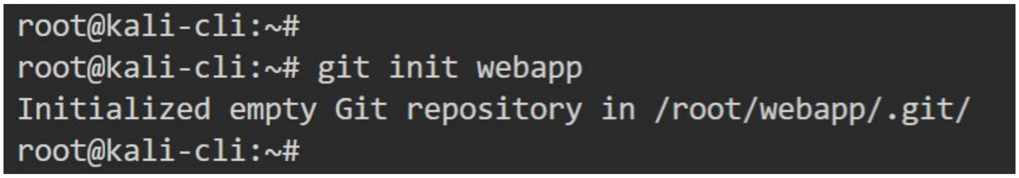
Now, both interfaces are ready and the user can start with the lab.

Solution

Objective: Learn all basic Git commands

1. Create a local repository

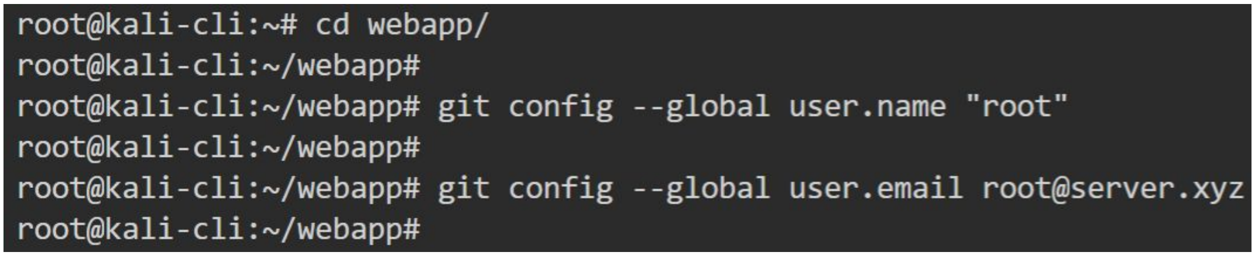
Command: git init webapp



```
root@kali-cli:~#
root@kali-cli:~# git init webapp
Initialized empty Git repository in /root/webapp/.git/
root@kali-cli:~#
```

2. Add the configuration

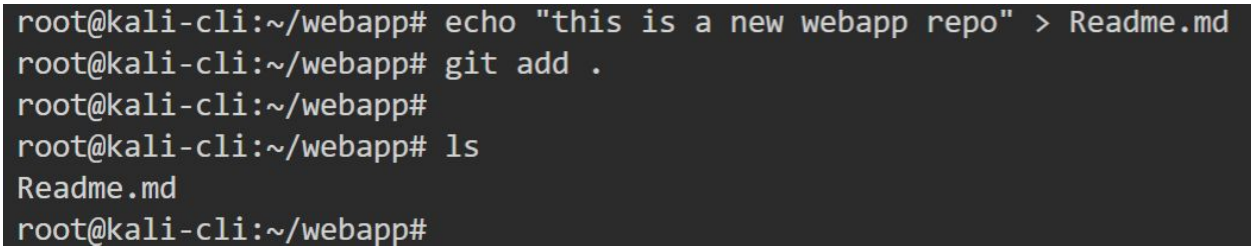
Commands:
cd webapp
git config --global user.name "root"
git config --global user.email root@server.xyz



```
root@kali-cli:~# cd webapp/
root@kali-cli:~/webapp#
root@kali-cli:~/webapp# git config --global user.name "root"
root@kali-cli:~/webapp#
root@kali-cli:~/webapp# git config --global user.email root@server.xyz
root@kali-cli:~/webapp#
```

3. Add a new file in the repository

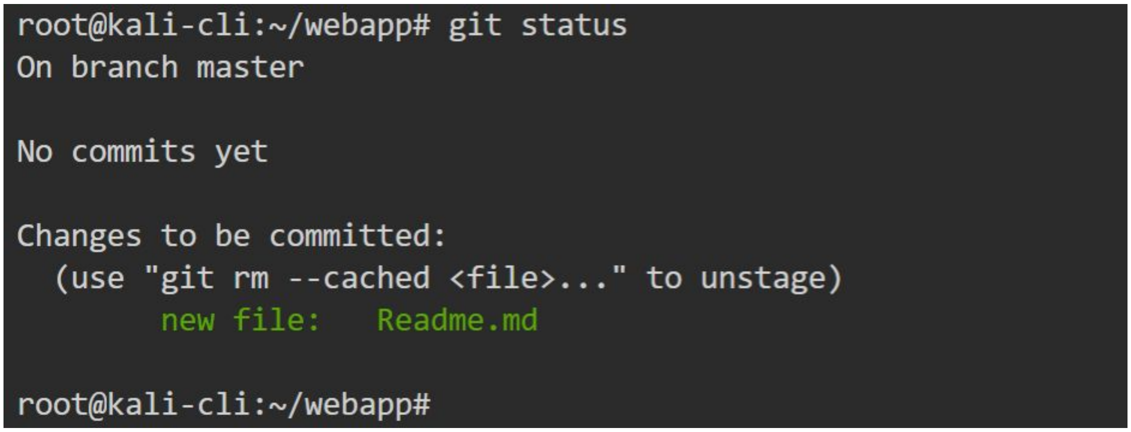
Commands:
echo "this is a new webapp repo" > Readme.md
git add .
ls



```
root@kali-cli:~/webapp# echo "this is a new webapp repo" > Readme.md
root@kali-cli:~/webapp# git add .
root@kali-cli:~/webapp#
root@kali-cli:~/webapp# ls
Readme.md
root@kali-cli:~/webapp#
```

4. Check the status

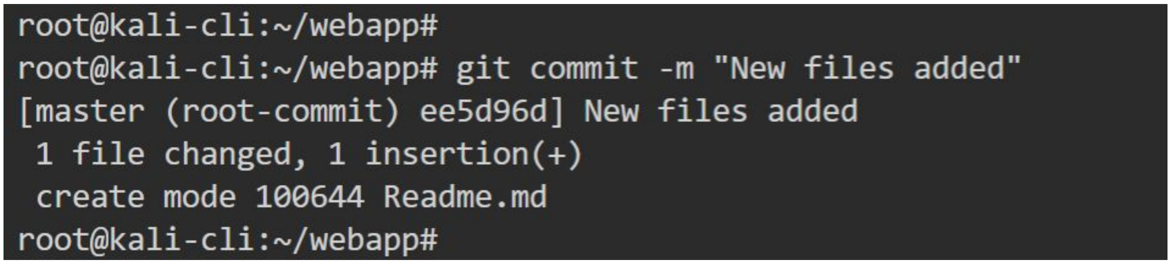
Command: git status



```
root@kali-cli:~/webapp# git status
On branch master

No commits yet

Changes to be committed:
  (use "git rm --cached <file>..." to unstage)
        new file:   Readme.md

root@kali-cli:~/webapp#
```

5. Commit the files added

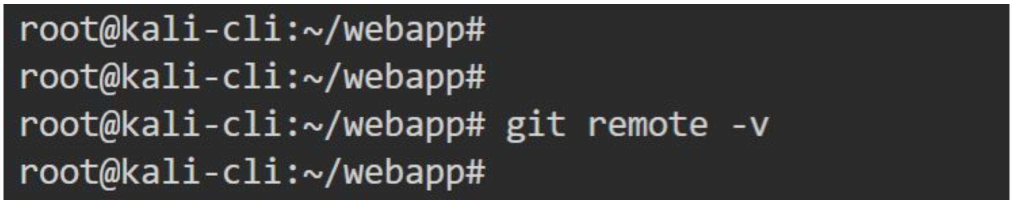
Command: git commit -m "New files added"



```
root@kali-cli:~/webapp#
root@kali-cli:~/webapp# git commit -m "New files added"
[master (root-commit) ee5d96d] New files added
 1 file changed, 1 insertion(+)
 create mode 100644 Readme.md
root@kali-cli:~/webapp#
```

6. Check the available remote repositories

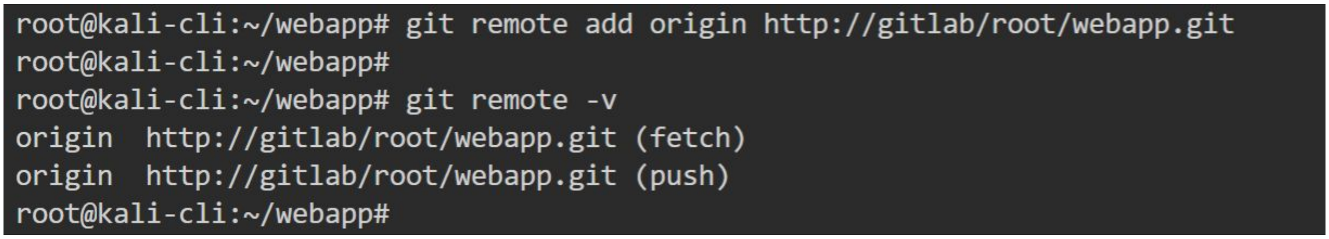
Command: git remote -v



```
root@kali-cli:~/webapp#
root@kali-cli:~/webapp#
root@kali-cli:~/webapp# git remote -v
root@kali-cli:~/webapp#
```

7. Add a remote repository

Commands:
git remote add origin http://gitlab/root/webapp.git
git remote -v



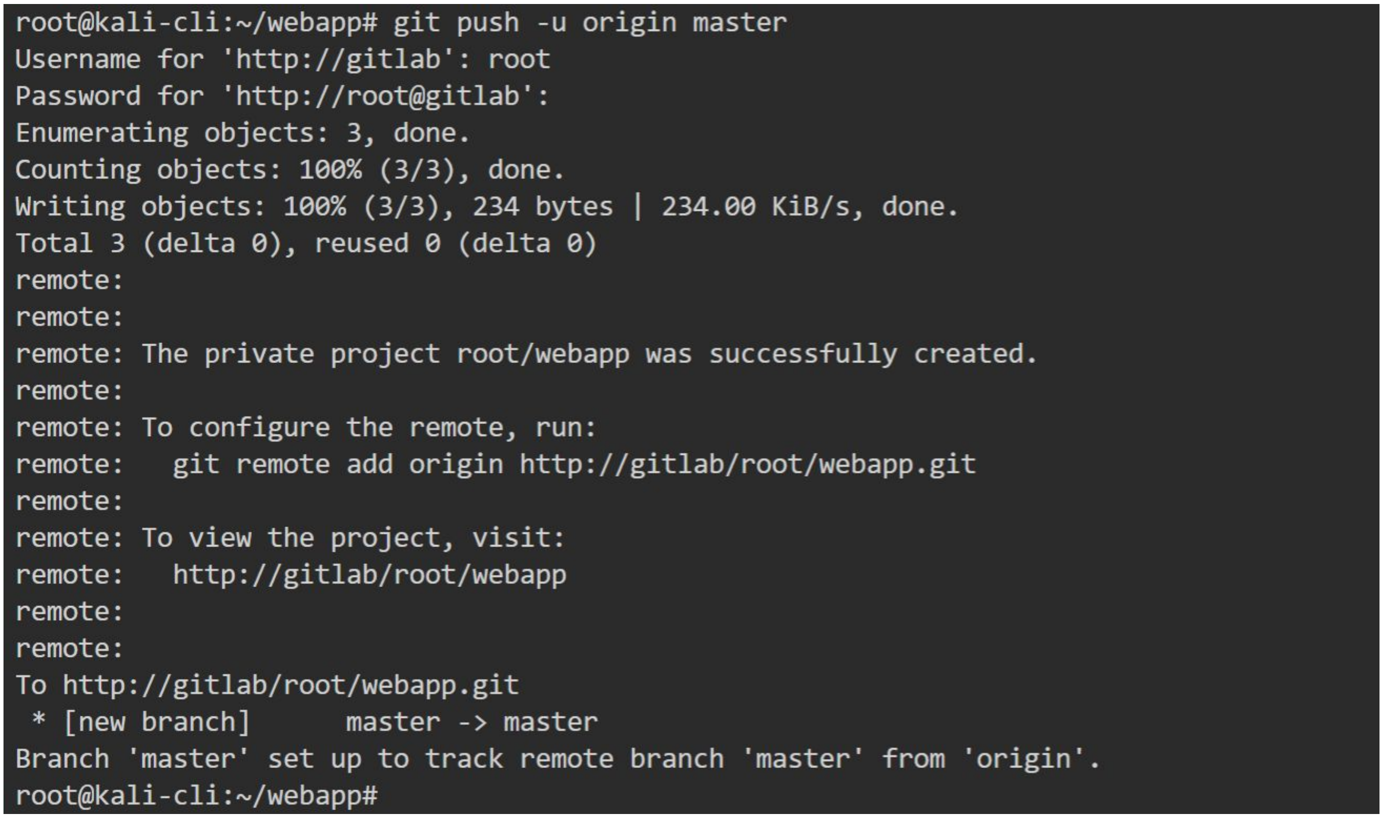
```
root@kali-cli:~/webapp# git remote add origin http://gitlab/root/webapp.git
root@kali-cli:~/webapp#
root@kali-cli:~/webapp# git remote -v
origin  http://gitlab/root/webapp.git (fetch)
origin  http://gitlab/root/webapp.git (push)
root@kali-cli:~/webapp#
```

8. Push changes to the remote repository

Command: git push -u origin master

Credentials:

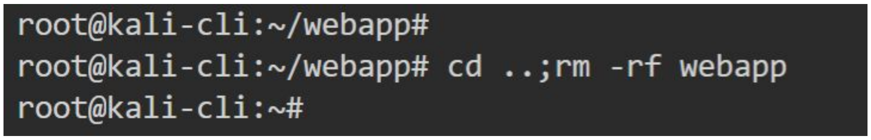
- **Username:** root
- **Password:** welcome123



```
root@kali-cli:~/webapp# git push -u origin master
Username for 'http://gitlab': root
Password for 'http://root@gitlab':
Enumerating objects: 3, done.
Counting objects: 100% (3/3), done.
Writing objects: 100% (3/3), 234 bytes | 234.00 KiB/s, done.
Total 3 (delta 0), reused 0 (delta 0)
remote:
remote:
remote: The private project root/webapp was successfully created.
remote:
remote: To configure the remote, run:
remote:   git remote add origin http://gitlab/root/webapp.git
remote:
remote: To view the project, visit:
remote:   http://gitlab/root/webapp
remote:
remote:
To http://gitlab/root/webapp.git
 * [new branch]      master -> master
Branch 'master' set up to track remote branch 'master' from 'origin'.
root@kali-cli:~/webapp#
```

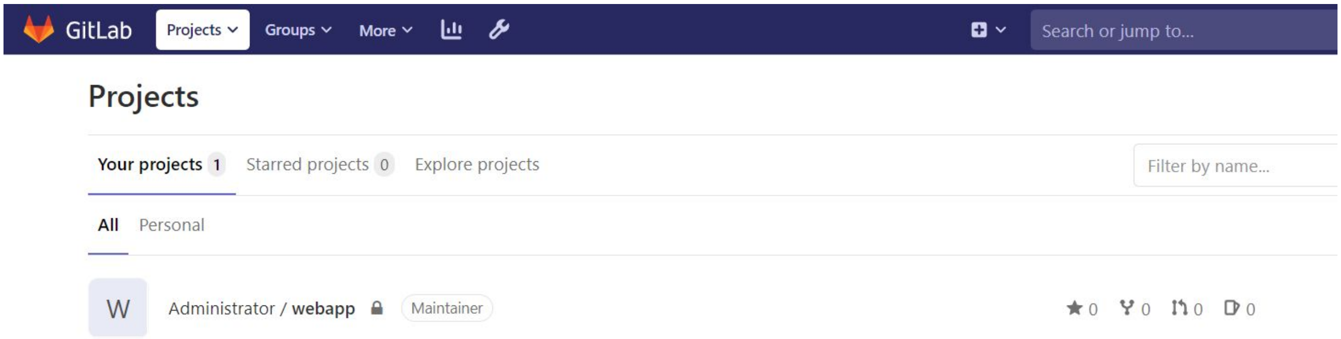
Delete the local webapp repository

Command: cd ..;rm -rf webapp

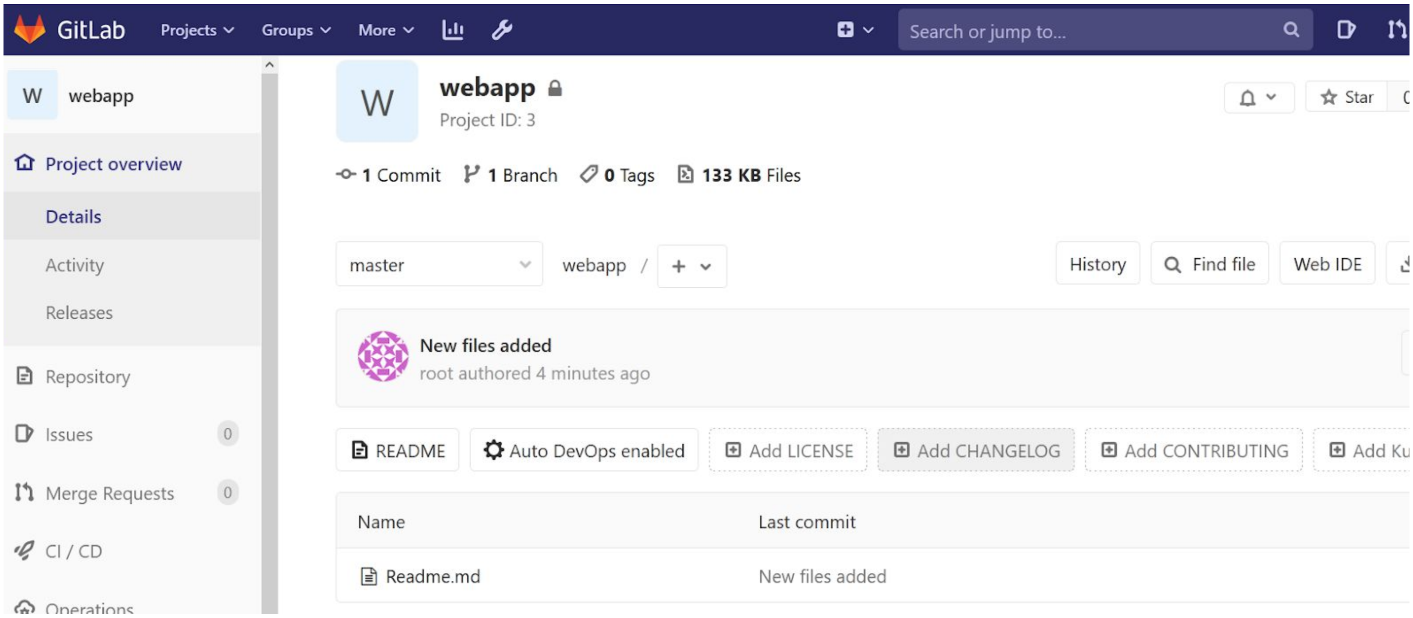


```
root@kali-cli:~/webapp#
root@kali-cli:~/webapp# cd ..;rm -rf webapp
root@kali-cli:~#
```

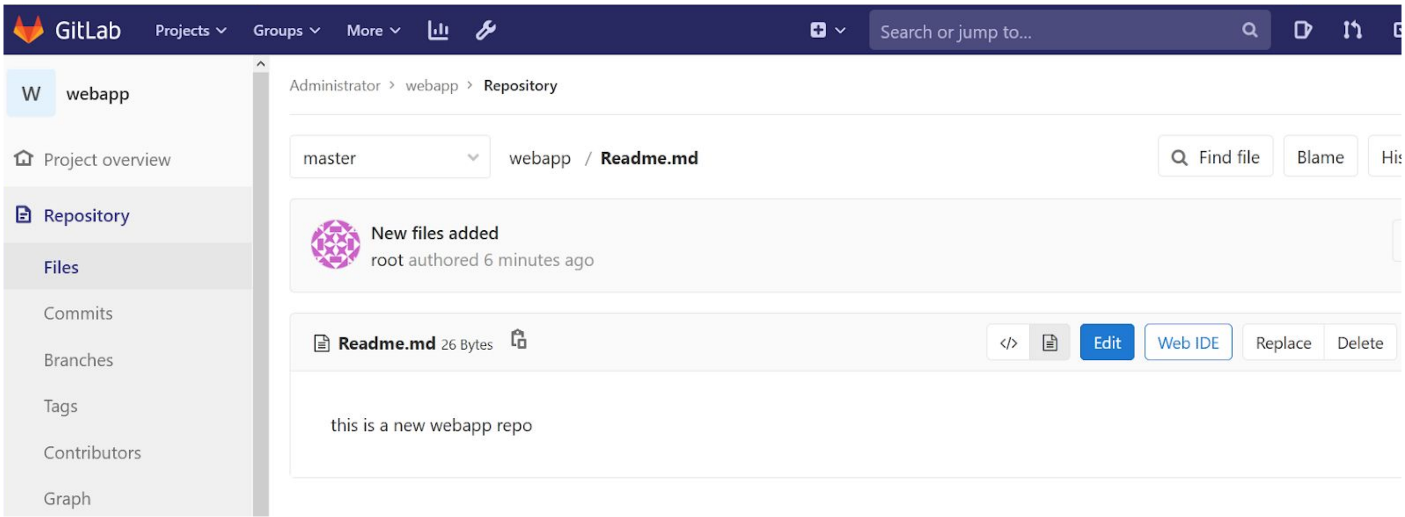
Login into the Gitlab GUI to check the repository created. Use the credentials which have been provided in the challenge description



Click on the webapp repository to check the files.



Click on the Readme.md to check its contents.



New files added
root authored 6 minutes ago

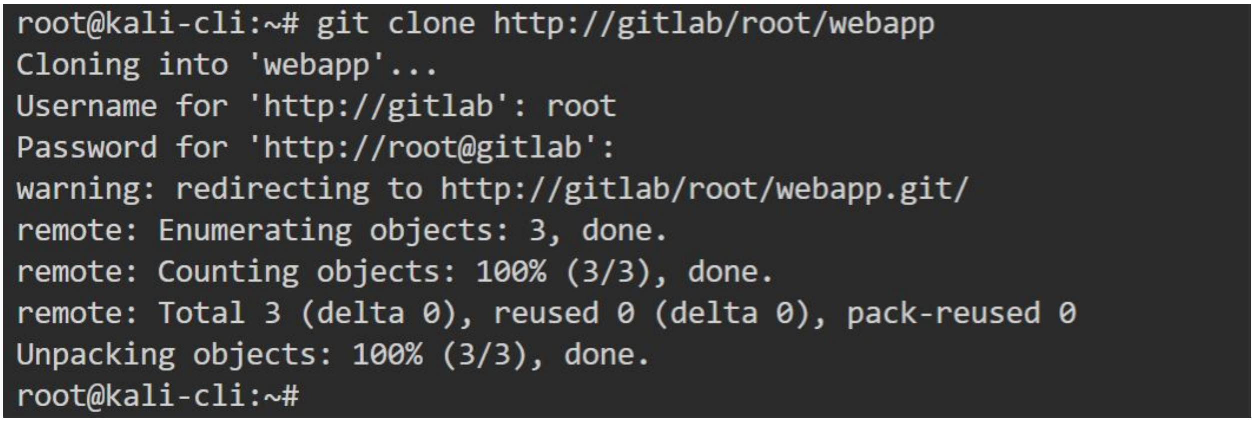
this is a new webapp repo

9. Clone a repository

Command: git clone http://gitlab/root/webapp

Credentials:

- **Username:** root
- **Password:** welcome123

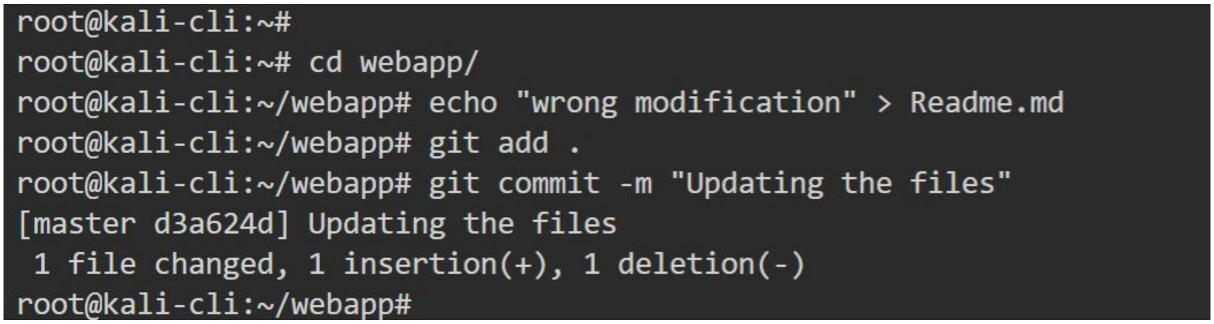


```
root@kali-cli:~# git clone http://gitlab/root/webapp
Cloning into 'webapp'...
Username for 'http://gitlab': root
Password for 'http://root@gitlab':
warning: redirecting to http://gitlab/root/webapp.git/
remote: Enumerating objects: 3, done.
remote: Counting objects: 100% (3/3), done.
remote: Total 3 (delta 0), reused 0 (delta 0), pack-reused 0
Unpacking objects: 100% (3/3), done.
root@kali-cli:~#
```

10. Reset local commit

Create a faulty commit in the local repo

Commands:
cd webapp
echo "wrong modification" > Readme.md
git add .
git commit -m "Updating the files"

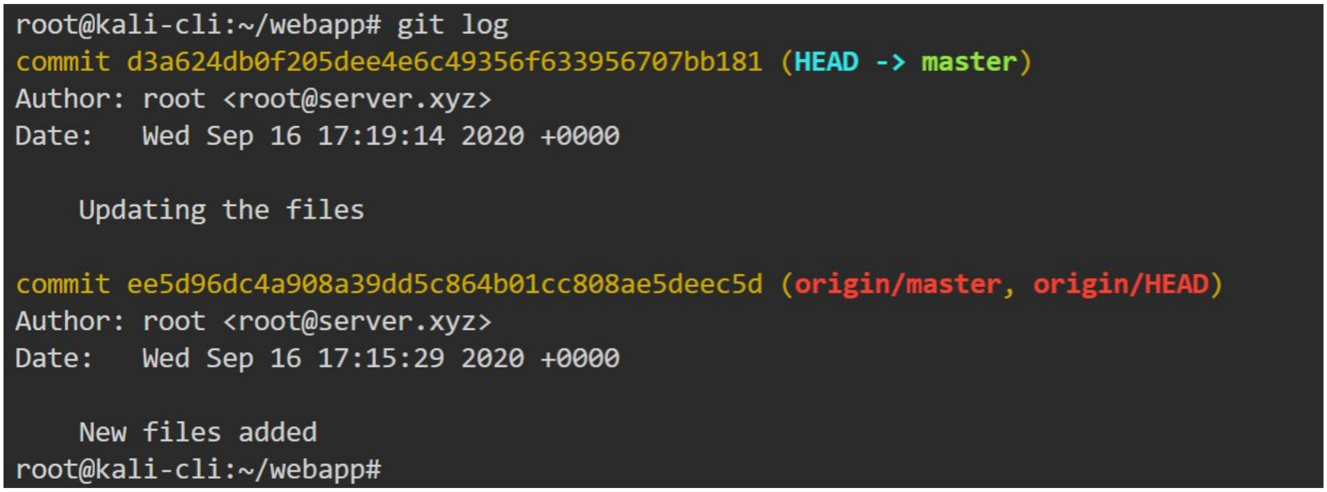


```
root@kali-cli:~#
root@kali-cli:~# cd webapp/
root@kali-cli:~/webapp# echo "wrong modification" > Readme.md
root@kali-cli:~/webapp# git add .
root@kali-cli:~/webapp# git commit -m "Updating the files"
[master d3a624d] Updating the files
 1 file changed, 1 insertion(+), 1 deletion(-)
root@kali-cli:~/webapp#
```

11. Check the commit logs

The command will display all the commits created in this repository

Command: git log



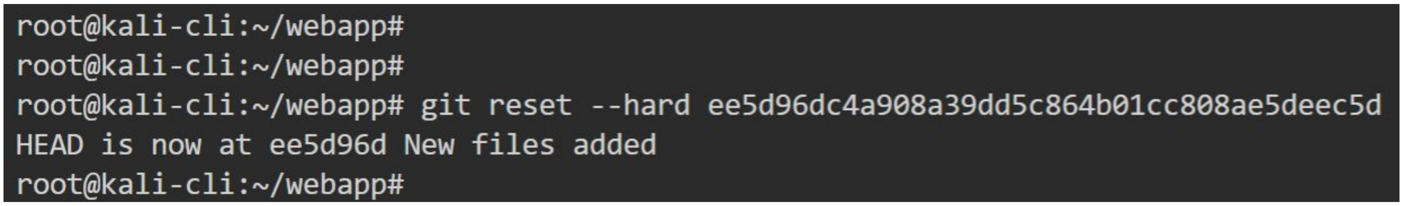
```
root@kali-cli:~/webapp# git log
commit d3a624db0f205dee4e6c49356f633956707bb181 (HEAD -> master)
Author: root <root@server.xyz>
Date:   Wed Sep 16 17:19:14 2020 +0000

    Updating the files

commit ee5d96dc4a908a39dd5c864b01cc808ae5deec5d (origin/master, origin/HEAD)
Author: root <root@server.xyz>
Date:   Wed Sep 16 17:15:29 2020 +0000

    New files added
root@kali-cli:~/webapp#
```

12. Hard reset the repository

Hard Reset means to set the HEAD of the local repository to a specified commit while discarding the changes happened after that commit.

Note: git reset requires the commit hash which has been acquired from the previous step.

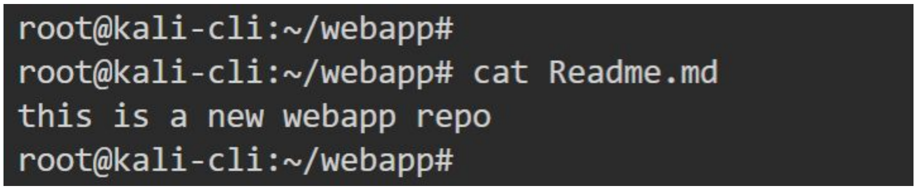
Command: git reset --hard ee5d96dc4a908a39dd5c864b01cc808ae5deec5d



```
root@kali-cli:~/webapp#
root@kali-cli:~/webapp#
root@kali-cli:~/webapp# git reset --hard ee5d96dc4a908a39dd5c864b01cc808ae5deec5d
HEAD is now at ee5d96d New files added
root@kali-cli:~/webapp#
```

Check the content of the Readme.md

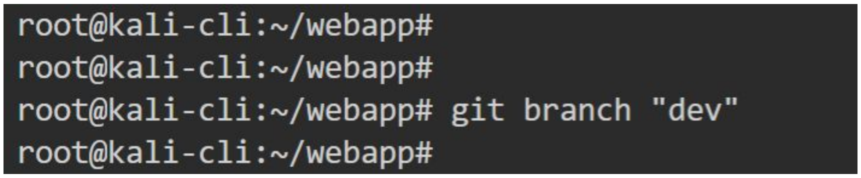
Command: cat Readme.md



```
root@kali-cli:~/webapp#
root@kali-cli:~/webapp# cat Readme.md
this is a new webapp repo
root@kali-cli:~/webapp#
```

13. Create a new branch

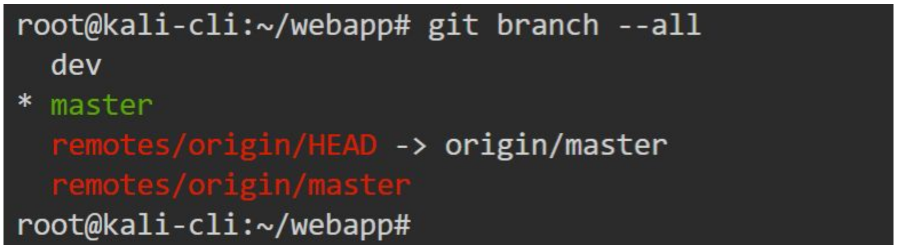
Command: git branch "dev"



```
root@kali-cli:~/webapp#
root@kali-cli:~/webapp#
root@kali-cli:~/webapp# git branch "dev"
root@kali-cli:~/webapp#
```

14. Check the names of the branches

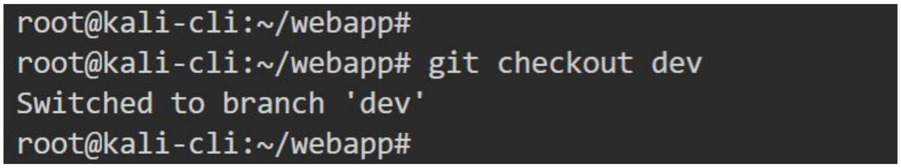
Command: git branch --all



```
root@kali-cli:~/webapp# git branch --all
  dev
* master
  remotes/origin/HEAD -> origin/master
  remotes/origin/master
root@kali-cli:~/webapp#
```

15. Switch Branch to dev

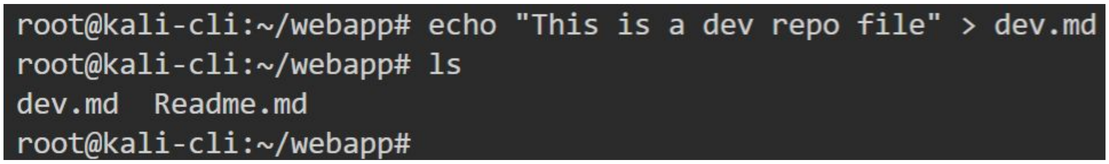
Command: git checkout dev



```
root@kali-cli:~/webapp#
root@kali-cli:~/webapp# git checkout dev
Switched to branch 'dev'
root@kali-cli:~/webapp#
```

16. Create a new file in the dev branch

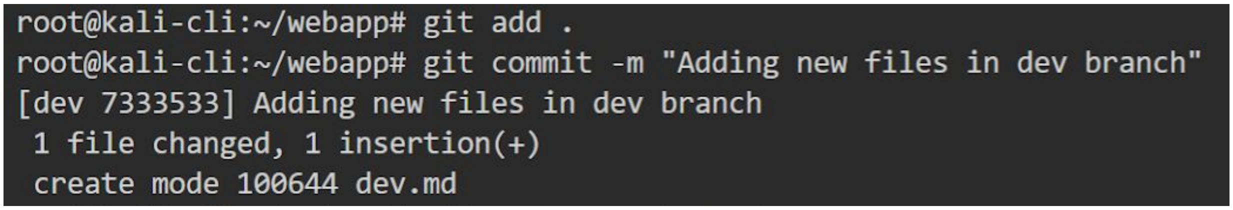
Commands:
echo "This is a dev repo file" > dev.md
ls



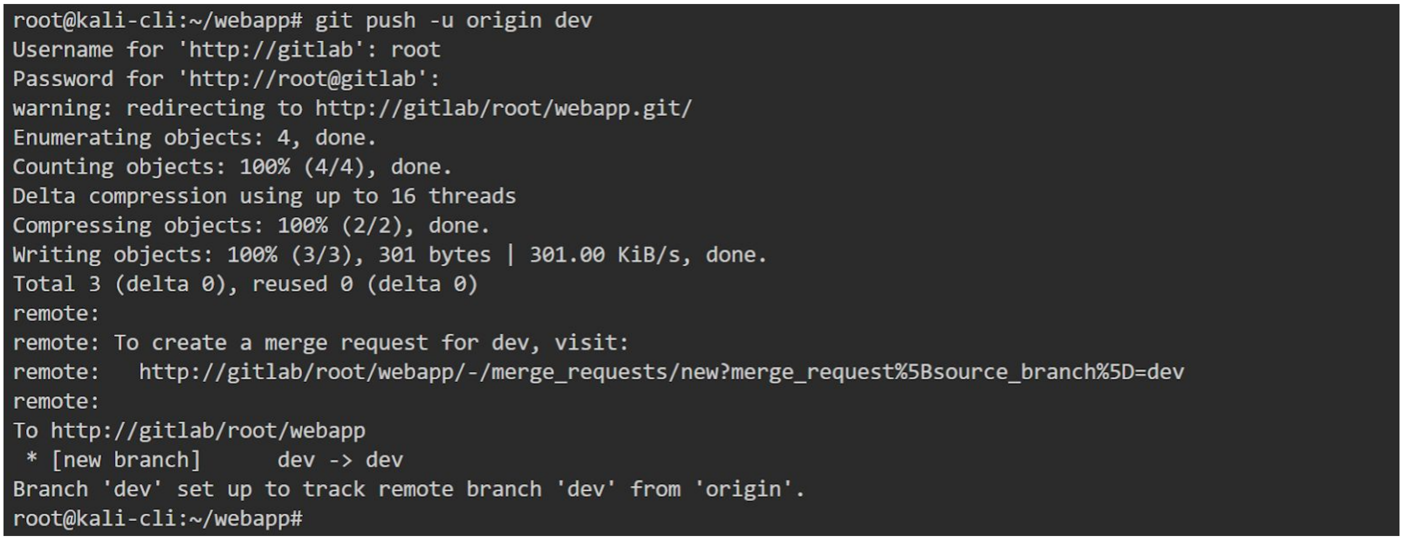
```
root@kali-cli:~/webapp# echo "This is a dev repo file" > dev.md
root@kali-cli:~/webapp# ls
dev.md  Readme.md
root@kali-cli:~/webapp#
```

Commit the new changes on dev branch and push the changes to remote repository

Commands:
git add .
git commit -m "Adding new files in dev branch"
git push -u origin dev



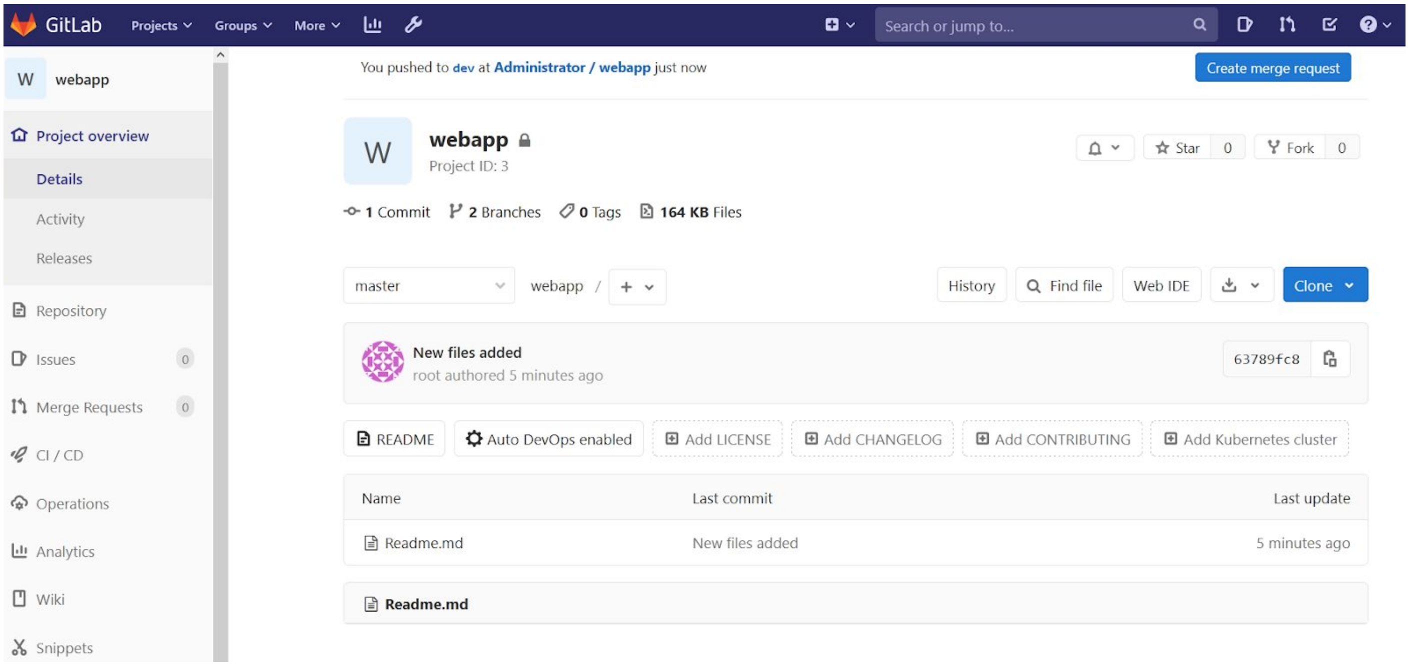
```
root@kali-cli:~/webapp# git add .
root@kali-cli:~/webapp# git commit -m "Adding new files in dev branch"
[dev 7333533] Adding new files in dev branch
 1 file changed, 1 insertion(+)
 create mode 100644 dev.md
```



```
root@kali-cli:~/webapp# git push -u origin dev
Username for 'http://gitlab': root
Password for 'http://root@gitlab':
warning: redirecting to http://gitlab/root/webapp.git/
Enumerating objects: 4, done.
Counting objects: 100% (4/4), done.
Delta compression using up to 16 threads
Compressing objects: 100% (2/2), done.
Writing objects: 100% (3/3), 301 bytes | 301.00 KiB/s, done.
Total 3 (delta 0), reused 0 (delta 0)
remote:
remote: To create a merge request for dev, visit:
remote:   http://gitlab/root/webapp/-/merge_requests/new?merge_request%5Bsource_branch%5D=dev
remote:
To http://gitlab/root/webapp
 * [new branch]      dev -> dev
Branch 'dev' set up to track remote branch 'dev' from 'origin'.
root@kali-cli:~/webapp#
```

Navigate to the Gitlab Instance to check the changes in the remote repository.

URL: http://<gitlab-url>/root/webapp



You pushed to dev at Administrator / webapp just now

webapp
Project ID: 3

1 Commit 2 Branches 0 Tags 164 KB Files

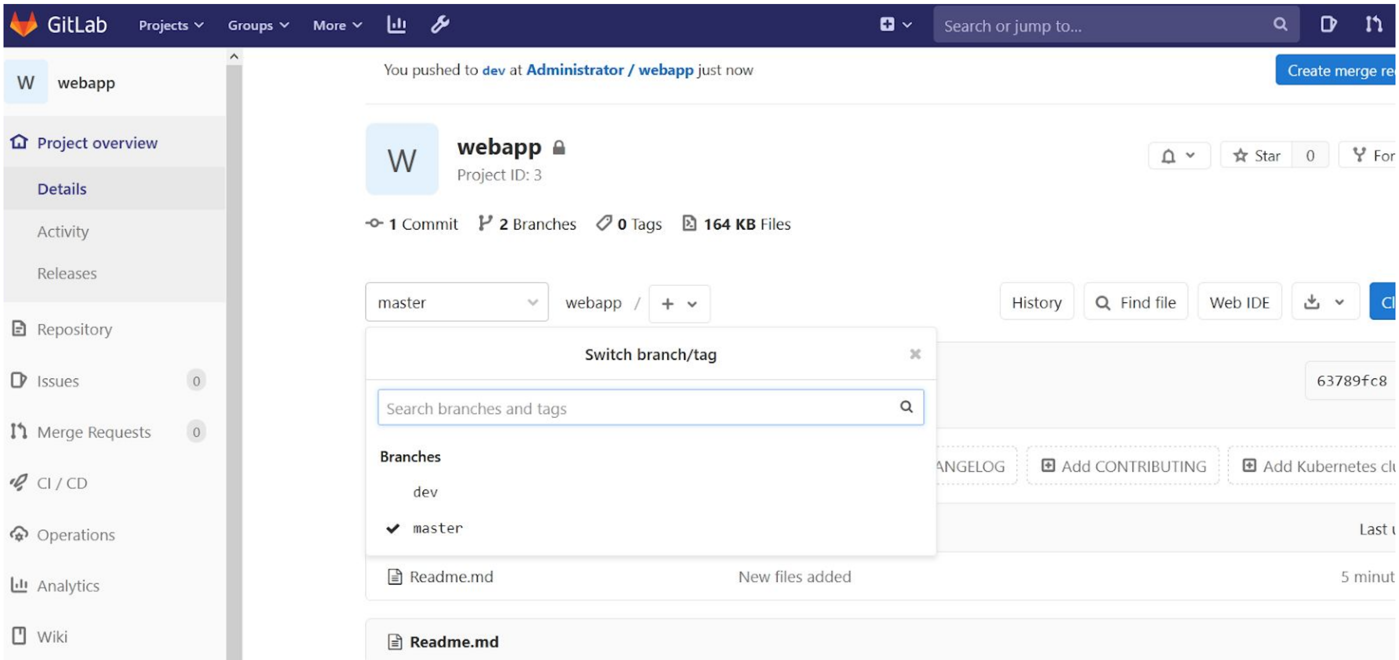
master webapp / +

New files added
root authored 5 minutes ago
63789fc8

Name	Last commit	Last update
Readme.md	New files added	5 minutes ago

Readme.md

There are 2 branches present in the Git Repository, Click on Switch drop-down



You pushed to dev at Administrator / webapp just now

webapp
Project ID: 3

1 Commit 2 Branches 0 Tags 164 KB Files

master webapp / +

Switch branch/tag

Search branches and tags

Branches
dev
✓ master

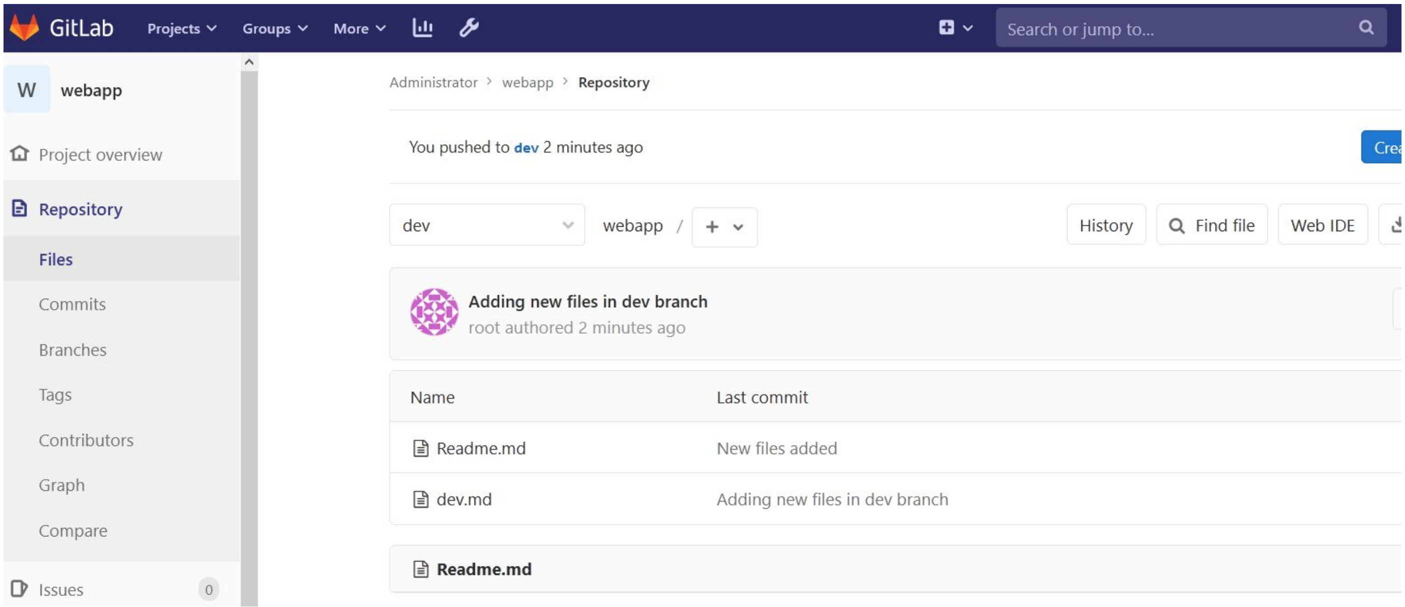
63789fc8

Last u

Readme.md	New files added	5 minut

Readme.md

Select the dev branch



You pushed to dev 2 minutes ago

Adding new files in dev branch
root authored 2 minutes ago

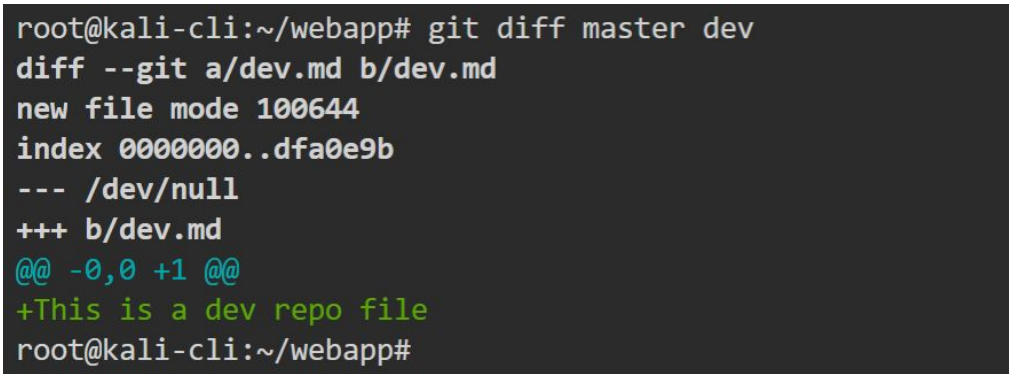
Name	Last commit
Readme.md	New files added
dev.md	Adding new files in dev branch

Readme.md

The dev.md file is present in the dev branch.

17. Check the differences in two branches

Command: git diff master dev

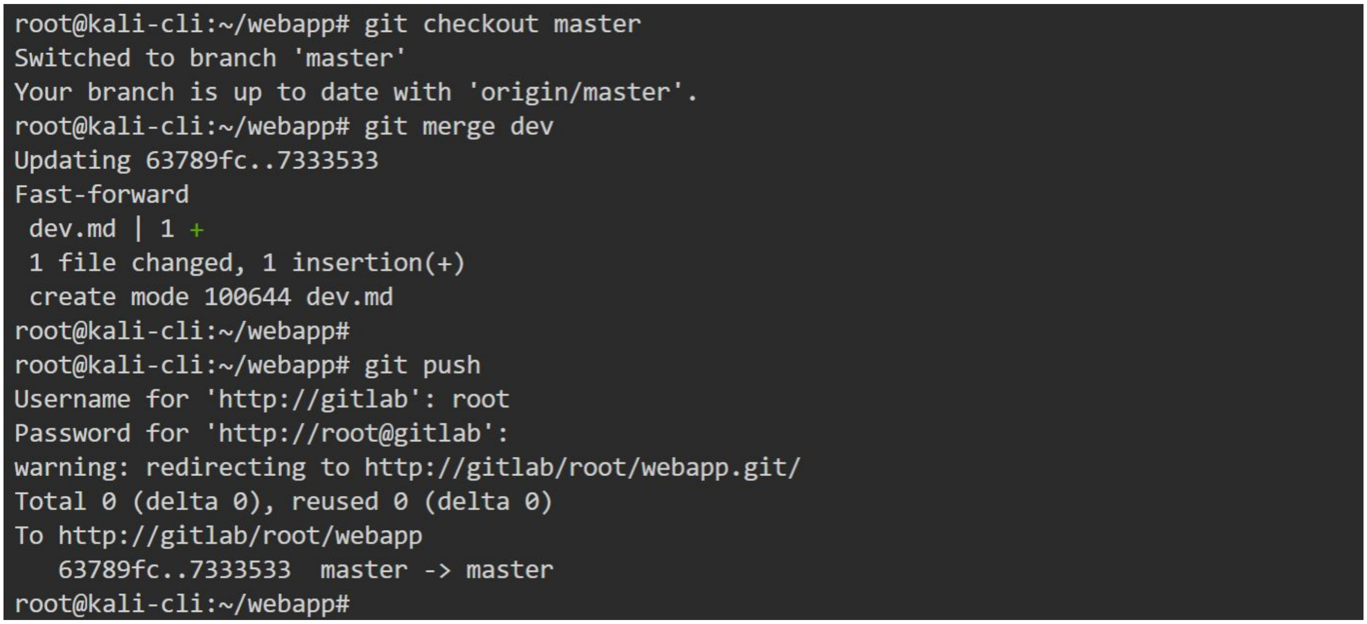


```
root@kali-cli:~/webapp# git diff master dev
diff --git a/dev.md b/dev.md
new file mode 100644
index 0000000..dfa0e9b
--- /dev/null
+++ b/dev.md
@@ -0,0 +1 @@
+This is a dev repo file
root@kali-cli:~/webapp#
```

18. Merge the branches

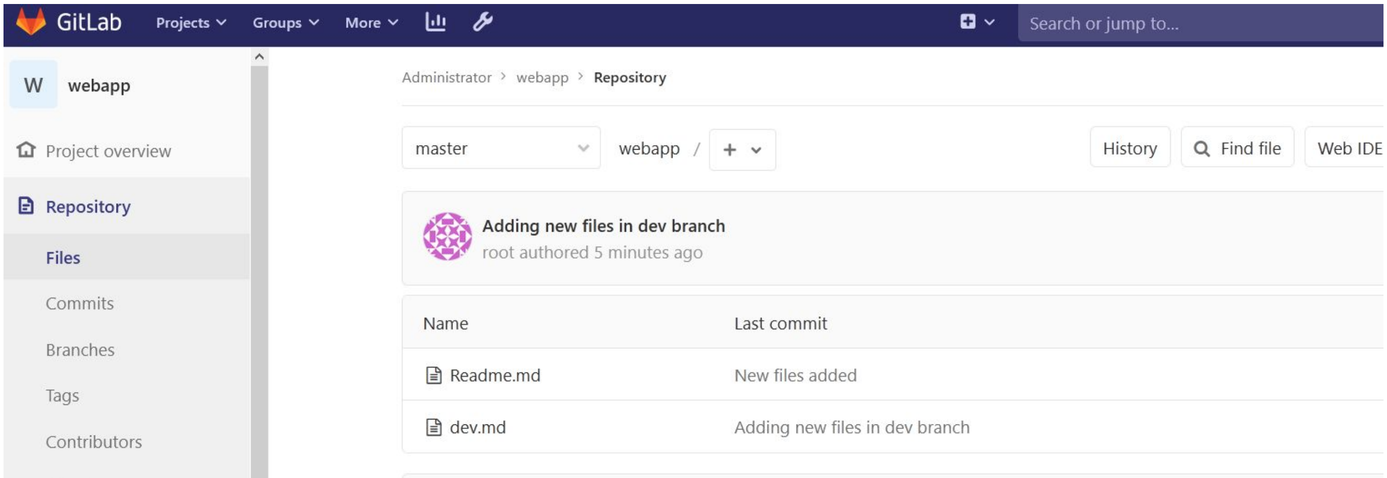
Commands:

git checkout master
git merge dev
git push



```
root@kali-cli:~/webapp# git checkout master
Switched to branch 'master'
Your branch is up to date with 'origin/master'.
root@kali-cli:~/webapp# git merge dev
Updating 63789fc..7333533
Fast-forward
 dev.md | 1 +
 1 file changed, 1 insertion(+)
 create mode 100644 dev.md
root@kali-cli:~/webapp#
root@kali-cli:~/webapp# git push
Username for 'http://gitlab': root
Password for 'http://root@gitlab':
warning: redirecting to http://gitlab/root/webapp.git/
Total 0 (delta 0), reused 0 (delta 0)
To http://gitlab/root/webapp
   63789fc..7333533  master -> master
root@kali-cli:~/webapp#
```

Navigate to the Gitlab website and switch to the master repository to check the changes.



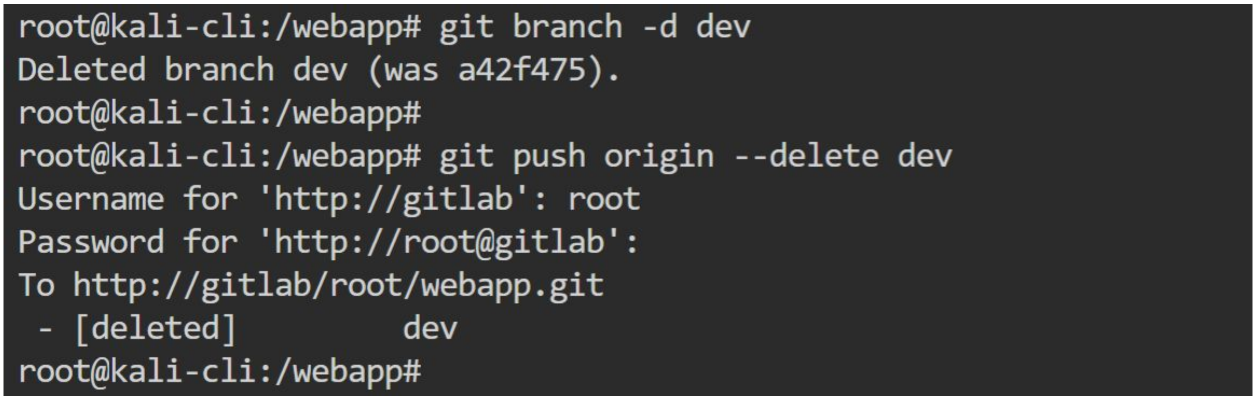
Adding new files in dev branch
root authored 5 minutes ago

Name	Last commit
Readme.md	New files added
dev.md	Adding new files in dev branch

The contents of the dev branch is now merged within the master branch.

19. Delete the Dev branch

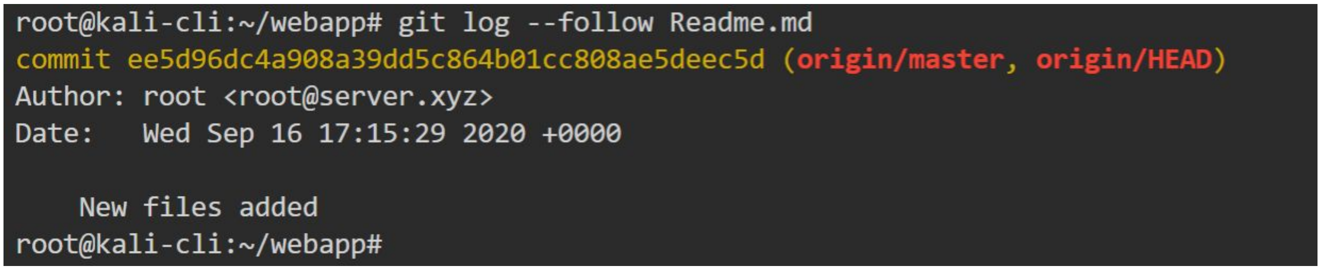
Commands:
git branch -d dev
git push origin --delete dev



```
root@kali-cli:/webapp# git branch -d dev
Deleted branch dev (was a42f475).
root@kali-cli:/webapp#
root@kali-cli:/webapp# git push origin --delete dev
Username for 'http://gitlab': root
Password for 'http://root@gitlab':
To http://gitlab/root/webapp.git
 - [deleted]         dev
root@kali-cli:/webapp#
```

20. Get version history for Readme.md

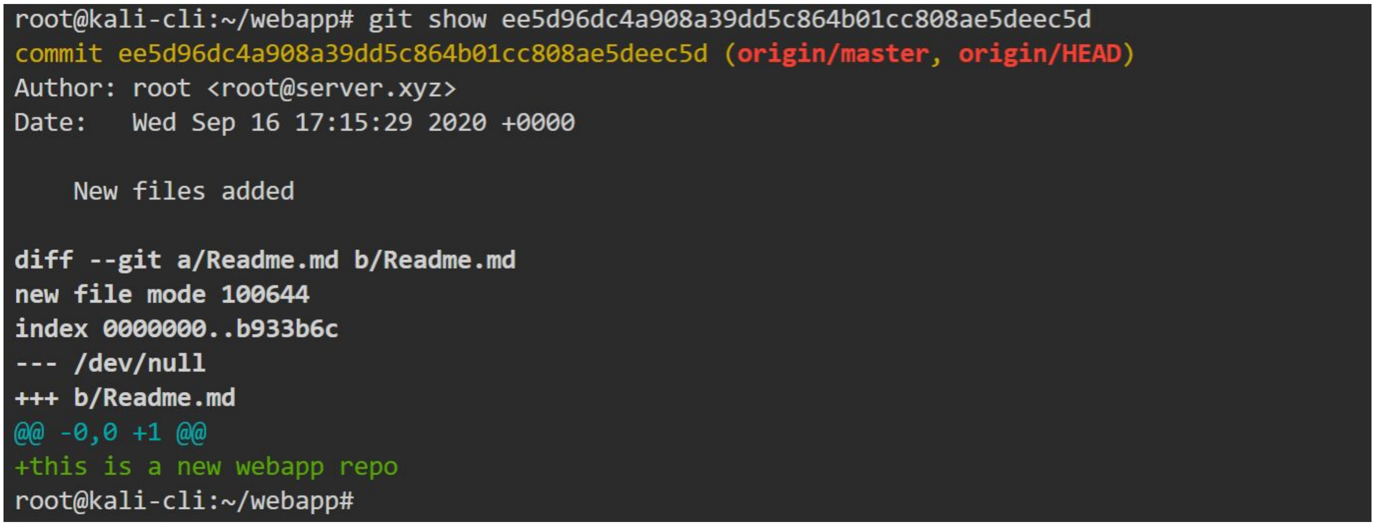
Command: git log --follow Readme.md



```
root@kali-cli:~/webapp# git log --follow Readme.md
commit ee5d96dc4a908a39dd5c864b01cc808ae5deec5d (origin/master, origin/HEAD)
Author: root <root@server.xyz>
Date:   Wed Sep 16 17:15:29 2020 +0000

    New files added
root@kali-cli:~/webapp#
```

21. Show the files and metadata for the first commit

Command: git show ee5d96dc4a908a39dd5c864b01cc808ae5deec5d

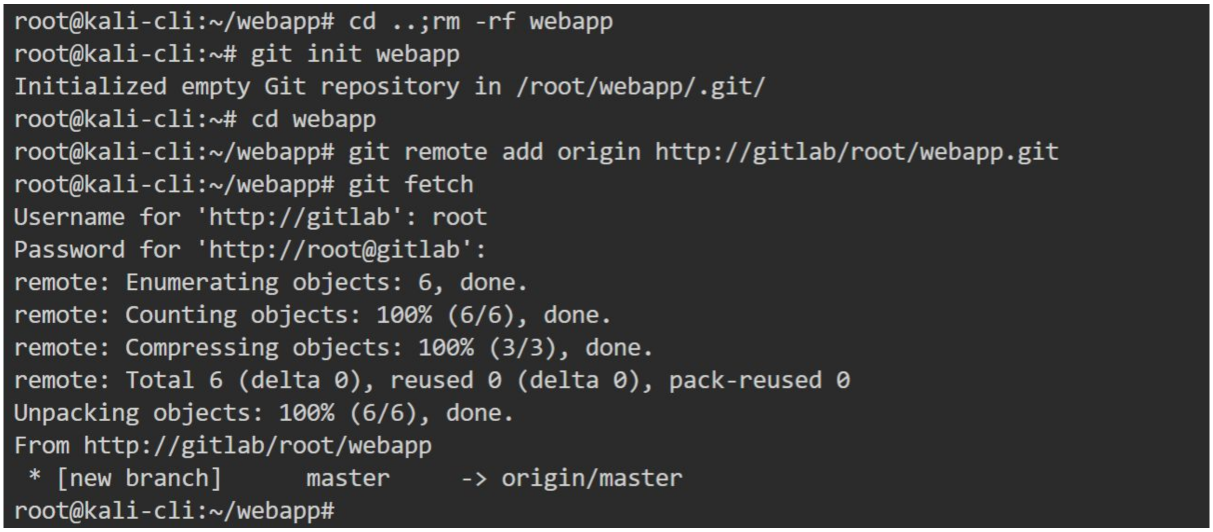


```
root@kali-cli:~/webapp# git show ee5d96dc4a908a39dd5c864b01cc808ae5deec5d
commit ee5d96dc4a908a39dd5c864b01cc808ae5deec5d (origin/master, origin/HEAD)
Author: root <root@server.xyz>
Date:   Wed Sep 16 17:15:29 2020 +0000

    New files added

diff --git a/Readme.md b/Readme.md
new file mode 100644
index 0000000..b933b6c
--- /dev/null
+++ b/Readme.md
@@ -0,0 +1 @@
+this is a new webapp repo
root@kali-cli:~/webapp#
```

22. Create a local repository and check the changes from Remote

Commands:

cd ..;rm -rf webapp
git init webapp
cd webapp
git remote add origin http://gitlab/root/webapp.git
git fetch



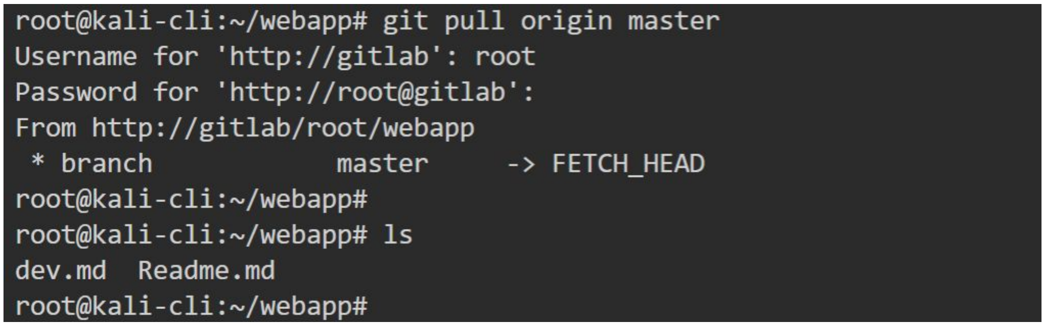
```
root@kali-cli:~/webapp# cd ..;rm -rf webapp
root@kali-cli:~# git init webapp
Initialized empty Git repository in /root/webapp/.git/
root@kali-cli:~# cd webapp
root@kali-cli:~/webapp# git remote add origin http://gitlab/root/webapp.git
root@kali-cli:~/webapp# git fetch
Username for 'http://gitlab': root
Password for 'http://root@gitlab':
remote: Enumerating objects: 6, done.
remote: Counting objects: 100% (6/6), done.
remote: Compressing objects: 100% (3/3), done.
remote: Total 6 (delta 0), reused 0 (delta 0), pack-reused 0
Unpacking objects: 100% (6/6), done.
From http://gitlab/root/webapp
 * [new branch]      master     -> origin/master
root@kali-cli:~/webapp#
```

The git fetch command is used to measure the changes from the remote repository

23. Pull the changes from remote

Command: git pull origin master

Git pull command finds all the changes from the remote repository and download the files to the local repository.



```
root@kali-cli:~/webapp# git pull origin master
Username for 'http://gitlab': root
Password for 'http://root@gitlab':
From http://gitlab/root/webapp
 * branch            master     -> FETCH_HEAD
root@kali-cli:~/webapp#
root@kali-cli:~/webapp# ls
dev.md  Readme.md
root@kali-cli:~/webapp#
```

Learning

- Interacting with Git VCS using Git client.

References:

1. Git Manual (https://git-scm.com/docs)