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A Small Git CMSSW Tutorial

Introduction

This tutorial should give a small introduction to Git in the CMS environment. It is **not complete** or contains all available information. It is a summary of Giulio's tutorial. The aim is to explain how package are obtained using Git and how you track your custom changes of official code/packages in CMSSW_5_3_11.

Preparations

Obtaining GIT account and link it with CERN:

- Frist you have to obtain a GIT account, see here[?]. Topic Collector registration is no longer needed.

Setup personal information

- Login on lxplus/CERN
- Run following commands:
 - ◆ `git config --global user.name "First name Last name"`
 - ◆ `git config --global user.email <Your-Email-Address>`
 - ◆ `git config --global user.github <Your-Just-Created-GitHub-Account-Username>`

Easy access of GitHub (optional)

- If you have no ssh key: Follow generating-ssh-keys[?] on GitHub to create a ssh key.
- If you have already an ssh key: Login to GitHub -> settings -> SSH keys (<https://github.com/settings/ssh>[?]) and add your key. I.e. copy paste the content of yourKey.pub
- To use your key you have to execute following commands after each login:
 - ◆ `eval $(ssh-agent); ssh-add /path/to/your/key`
- Test your configuration: `ssh -T git@github.com`
 - ◆ You should see: *Hi XYZ! You've successfully authenticated, but GitHub does not provide shell access.*

Checkout a CMSSW package

- Setup a CMSSW environmet (using a SL 5 machine)

```
cmsrel CMSSW_5_3_11
cd CMSSW_5_3_11/src
cmsenv
```

- Checkout a package, e.g. PhysicsTools/PatExamples

```
git cms-addpkg PhysicsTools/PatExamples
```

```
No release tags specified, using default CMSSW_5_3_11.
Release older than CMSSW_6_2_0_pre8, using cmssw-old.git instead of cmssw.git
You are on branch CMSSW_5_3_X
...
Branch from-CMSSW_5_3_11 set up to track remote branch CMSSW_5_3_X from official-cmssw.
Switched to a new branch 'from-CMSSW_5_3_11'
HEAD is now at cc0f159 CMSSW_5_3_11
```

- Create your own development branch e.g. `mydev`

```
git checkout -b mydev
```

```
Switched to a new branch 'mydev'
```

- Check which branches are available

```
git branch
```

```
  from-CMSSW_5_3_11
* mydev
```

- Apply modifications

```
echo '#modification' >> PhysicsTools/PatExamples/BuildFile.xml #this adds a line containing #modification
```

- Check if modification is recognized

```
git status
```

```
# On branch mydev
# Changes not staged for commit:
#   (use "git add" to track new files, or "git rm --cached" to untrack files)
#       modified:   PhysicsTools/PatExamples/BuildFile.xml
```

- Add and commit your changes

```
git add PhysicsTools/PatExamples/BuildFile.xml
git commit -m "test message"
```

```
[mydev 6812826] test message
1 files changed, 1 insertions(+), 0 deletions(-)
```

Your modifications were committed to your **local** git repository. * In order to push your new branch `mydev` to your private git repository at GitHub you should create it before. This is done by forking the official CMSSW repository: Visit <https://github.com/cms-sw/cmssw/fork>. After the forking is done you see you have a new repository `cmssw`, <https://github.com/<your-username>/cmssw>. Since we are using `CMSSW_5_3_11` which is in <https://github.com/cms-sw/cmssw-old> also fork this repository by clicking at the upper right fork button. Now you are able to push your new branch `mydev` to your GitHub account.

```
git push my-cmssw mydev
```

If obtain this message:

```
ERROR: Repository not found.
fatal: The remote end hung up unexpectedly
```

git wasn't able to find the `my-cmssw` repository in your GitHub account. Check if you forked the <https://github.com/cms-sw/cmssw-old> repository. If the push is successful you see:

```
Counting objects: 9, done.
Delta compression using up to 16 threads.
Compressing objects: 100% (5/5), done.
Writing objects: 100% (5/5), 436 bytes, done.
Total 5 (delta 4), reused 0 (delta 0)
To git@github.com:fhoele/cmssw-old.git
 * [new branch]      mydev -> mydev
```

You visit your account at GitHub and click on the branches drop-down menu you see your new branch mydev. Inspect the PhysicsTools folder and you see that PatExamples were changed recently with a message *test message*.

The tutorial ends here. It showed you are checkout done of specific packages and how you are able to save your local changes at your private GitHub account. Git has a lot more feature which help and support you in developing and keeping track of your code. These a out of scope of this tutorial, please visit github.com for more detailed information on branches, merging them, tags, Thanks a lot to Giulio and his tutorials and talks. This small tutorial was a summary of material provided by him.

Additional Information

- <http://cms-sw.github.io/cmssw/index.html> 
- ◆ <http://cms-sw.github.io/cmssw/tutorial.html> 
- ◆ <http://cms-sw.github.io/cmssw/faq.html> 
- ◆ <http://cms-sw.github.io/cmssw/advanced-usage.html> 

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