

# Moving ROOT from Subversion to Git

**Fons Rademakers**

CERN PH/SFT

Weekly SFT meeting, 15/4/2013.

# What is Git?

- Git is a free Distributed Version Control System (DVCS)
- Initially created by Linus Torvalds to be able to handle the distributed development model of the Linux kernel
- The development of Git began on 3 April 2005
- The project was announced on 6 April
- Became self-hosting as of 7 April
- The first merge of multiple branches was done on 18 April
- Current version is 1.8.2

# Why Git?

- Strong support for non-linear development
  - Easy branching and merging
- Distributed development
  - Gives each developer a local copy of entire development history
- Compatibility with existing systems/protocols
  - Repositories can be published over https, ssh, rsync, ...
- Efficient handling of large projects
  - Fast and scalable (and often bypassing network due to local copy)
- Cryptographic authentication of history
  - Commits are SHA1 hashes based on complete history
- Periodic explicit object packing
  - Files are stored in delta-compressed packfiles + index file

# Who is Using Git?

- Linux kernel
- Apache
- KDE
- Gnome
- Python
- Samba
- Mono
- Twitter
- ...
- GnuPG
- CUPS
- Boost
- Zope
- Qt
- Google
- Facebook
- Eclipse
- ...

# Converting ROOT from Subversion to Git

```
cd /tmp
mkdir root
cd root
svn2git http://root.cern.ch/svn/root -v -m --authors ~/authors.txt
<takes 25 hours for ROOT's 50000 commits on fast server>
git svn show-ignore > .gitignore
git add .gitignore
git commit -m 'Convert svn:ignore properties to .gitignore.'

<make bare git repo>
git init --bare /tmp/root.git
git remote add remotes /tmp/root.git
git push remotes --all
git push remotes --tags

cd /tmp/root.git
<clean up unwanted branches>
<clean up unwanted tags>
mv /tmp/root.git /home/git/root.git
sudo chown -R apache:apache /home/git/root.git
```

# Git Size and Performance

- Repository size difference:

```
$ du -sk /user/svn/root
1497300 /user/svn/root

$ du -sk /user/git/root.git
494576 /user/git/root.git
```

- Checkout performance:

```
$ time svn co https://root.cern.ch/svn/root/trunk root-svn
real 0m39.744s
$ du -sk root-svn
552652 root-svn

$ time git clone https://root.cern.ch/git/root.git root-git
real 0m25.934s
$ du -sk root-git
655720 root-git
```

# Branch and Checkout Performance

- Switching to patch branch:

```
$ time svn switch https://root.cern.ch/svn/root/branches/v5-34-00-patches  
Updated to revision 49231.  
real 0m31.402s
```

```
$ time git checkout -b v5-34-00-patches  
Switched to branch 'v5-34-00-patches'  
real 0m2.177s
```

# Git Repository Organization

- In Subversion we followed the standard organization of trunk, tags, branches
- We had branches/dev/... writeable for all developers to store their own (private) developments and allow sharing
- In Git there are no hierarchical branches, so we decided to move the branches/dev to an own repository rootdev where all developers can share their code
  - But this can as well be github
- See <http://root.cern.ch/gitweb>



# Git Repository

- In Subversion we follow tags, branches
- We had branches/dev/ their own (private) dev
- In Git there are no hier the branches/dev to a developers can share t
  - But this can as well be
- See <http://root.cern.ch>

The screenshot shows a web browser displaying the summary page of a Git repository. The browser's address bar shows the URL `root.cern.ch/gitweb?p=cern-app.git;a=summary`. The page title is "projects / cern-app.git / summary".

At the top right, there is a search bar with the text "commit" and a search icon. Below the search bar, the repository's description is provided: "General CERN iPhone/iPad app", the owner is "Fons Rademakers <Fons.Rademakers@cern.ch>", the last change is "Sat, 13 Apr 2013 00:17:02 +0200 (00:17 +0200)", and the URL is "http://root.cern.ch/git/cern-app.git".

The "readme" section contains the following text: "The CERN iPhone/iPad app aggregates public CERN content available via many different web sites. There is a category for CERN news (for general public, users, students, staff), CERN bulletin, CERN courier. There is an 'About CERN' category describing CERN's history, accelerators, physics, and experiments. The category called 'LIVE', shows live data from the experiments and the LHC while there is also a category that gathers photos, videos and webcasts. Finally one could look for miscellaneous information like job openings from HR in the last category that appears in the current version of this application."

The "shortlog" section lists recent commits with columns for time ago, author, commit message, and links for commit, commitdiff, tree, and snapshot. The most recent commit is "Revert the last modification, too many things were..." by Timur Pocheptsov, dated 2 days ago.

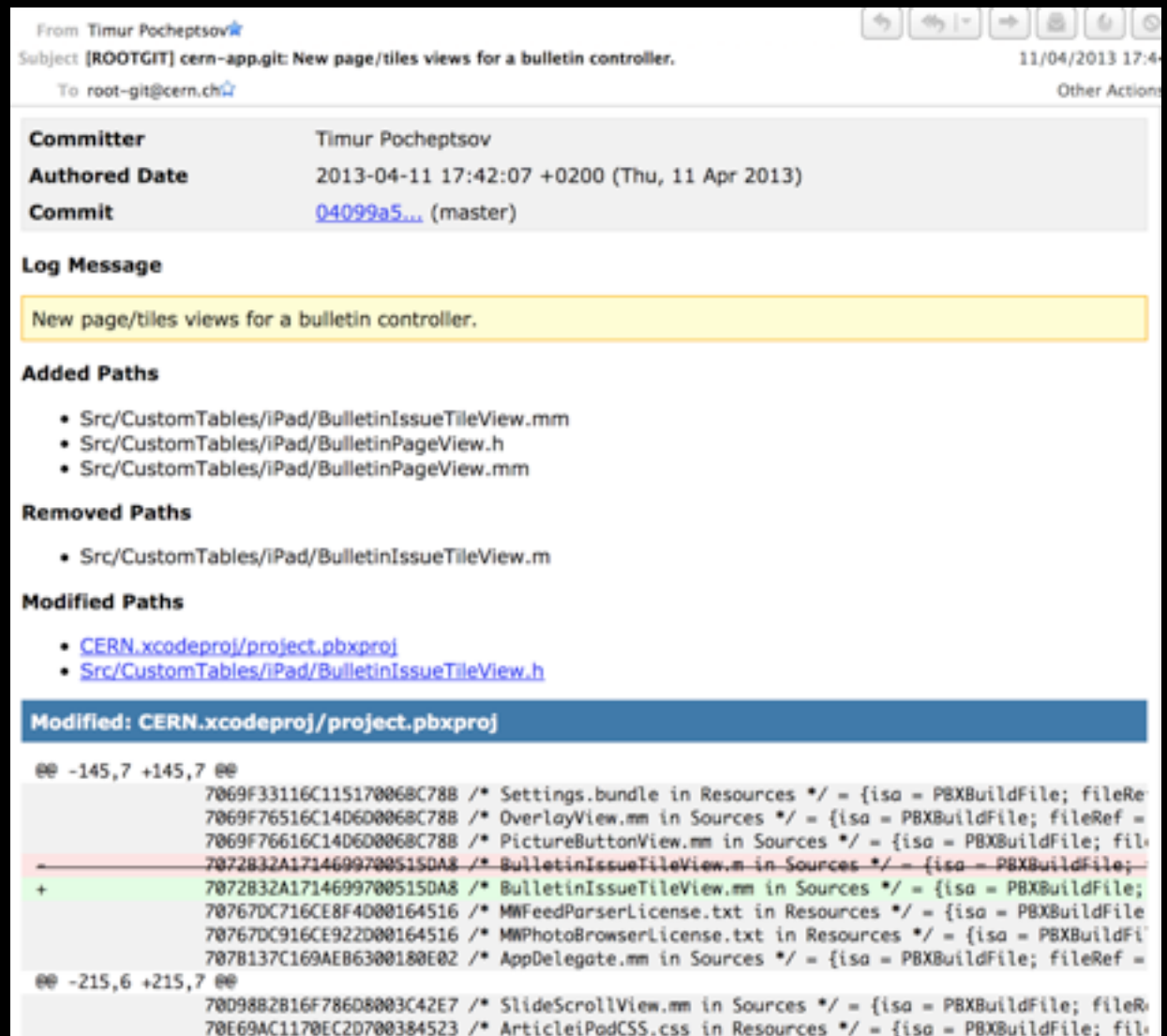
The "tags" section shows two tags: "v1-01-00" (tag version v1.01.00 of the CERN...) and "v1-00-00" (tag version 1.00 of the CERN app).

The "heads" section shows two branches: "master" (2 days ago) and "v1-00-00-patches" (3 months ago).

At the bottom of the page, there is a footer with the text "General CERN iPhone/iPad app" and "Atom | RSS" links.

# Hooks

- In post-receive hook:
  - gitmailer
- In update hook:
  - log format
  - acl's



From Timur Pocheptsov  
Subject [ROOTGIT] cern-app.git: New page/tiles views for a bulletin controller.  
To root-git@cern.ch

11/04/2013 17:4  
Other Actions

<b>Committer</b>	Timur Pocheptsov
<b>Authored Date</b>	2013-04-11 17:42:07 +0200 (Thu, 11 Apr 2013)
<b>Commit</b>	<a href="#">04099a5...</a> (master)

**Log Message**

New page/tiles views for a bulletin controller.

**Added Paths**

- Src/CustomTables/iPad/BulletinIssueTileView.mm
- Src/CustomTables/iPad/BulletinPageView.h
- Src/CustomTables/iPad/BulletinPageView.mm

**Removed Paths**

- Src/CustomTables/iPad/BulletinIssueTileView.m

**Modified Paths**

- [CERN.xcodeproj/project.pbxproj](#)
- [Src/CustomTables/iPad/BulletinIssueTileView.h](#)

**Modified: CERN.xcodeproj/project.pbxproj**

```
@@ -145,7 +145,7 @@
7069F33116C115170068C78B /* Settings.bundle in Resources */ = {isa = PBXBuildFile; fileRe
7069F76516C14D600068C78B /* OverlayView.mm in Sources */ = {isa = PBXBuildFile; fileRef =
7069F76616C14D600068C78B /* PictureButtonView.mm in Sources */ = {isa = PBXBuildFile; fil
- 7072B32A1714699700515DA8 /* BulletinIssueTileView.m in Sources */ = {isa = PBXBuildFile;
+ 7072B32A1714699700515DA8 /* BulletinIssueTileView.mm in Sources */ = {isa = PBXBuildFile;
70767DC716CE8F4000164516 /* MWFeedParserLicense.txt in Resources */ = {isa = PBXBuildFile
70767DC916CE922D000164516 /* MWPhotoBrowserLicense.txt in Resources */ = {isa = PBXBuildFi
707B137C169AEB6300180E02 /* AppDelegate.mm in Sources */ = {isa = PBXBuildFile; fileRef =

@@ -215,6 +215,7 @@
70D9882B16F786D8003C42E7 /* UIScrollView.mm in Sources */ = {isa = PBXBuildFile; fileRe
70E69AC1170EC2D700384523 /* ArticleiPadCSS.css in Resources */ = {isa = PBXBuildFile; fil
```

# Getting the Git Client

- By default installed on all modern Unixes, Linuxes and OSX
- For Windows see <http://msysgit.github.io>

# Impact on the Developers

- Easy transition foreseen, developers already exposed to Git in many other projects
- They love easy branching and merging, the offline repo and the speed

# Impact on the Users

- “Please, provide ROOT in Git” was one of the clear messages from the ROOT Users Workshop
- For users that were using ROOT from svn:

```
svn co http://root.cern.ch/svn/root/trunk root
```

- Becomes:

```
git clone http://root.cern.ch/git/root.git
```

- A writable version is obtained by cloning via https

# Migration Strategy

- After initial 25 hour import, "git svn --rebase" is being used to keep the ROOT Git version in sync with the svn version
- Prepare announcement and documentation
- On the migration date we just switch repositories
- The cern-app and roottest repositories have already been migrated to Git

# Some Git Resources

- The web is overflowing with resources about Git
- Nice article:
  - [Why You Should Switch from Subversion to Git](#)
- Nice talk:
  - [Introduction to Git](#)
- Nice free book:
  - [Pro Git](#)

# Conclusions

- A pilot project has shown that moving from Subversion to Git is a fairly easy project
- The benefits of moving to Git are many
- We will be using a DVCS that is actively being developed
- The ROOT developers are all enthusiasts
- The ROOT users are all enthusiasts