github vs. Trac+SVN

For SNO+ RAT

A walkthrough of user and developer workflow
with git and github

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git(hub) vs. SVN

Introduction

git is a distributed version control system. github is an online service that provides repository hosting and a suite of source code management tools for projects that use git.

No version control:

- ✗ Revision tracking: Arcane folder numbering schemes
- ✗ Code sharing: Email, scp, snail mail printout
- ✗ Collaborative development tools: Email/Gchat
- ✗ Bug tracking: Email, sticky notes
- ✗ Repository backup: None, probably

SVN version control:

- ✓− Revision tracking: Snapshots of code numbered sequentially
- ✗ Code sharing: Email, scp, ...
- ✗ Collaborative development tools: email/Gchat
- ✓ Bug tracking: Trac tickets
- ✗ Repository backup: Do it yourself

git version control with github:

- ✓ Revision tracking: changesets numbered, can be exchanged between repositories, picked and chosen individually
- ✓ Code sharing: git push/pull (pull requests)
- ✓ Collaborative development tools: github code commenting system
- ✓ Bug tracking: github Issues
- ✓ Repository backup: automatic with github

In SVN, there is one repository and users have "working copies" between which there is no way to share patches. With git, everything is a repository and code is easily shared between peers. Individual commits can be pushed and pulled from one repository to another.

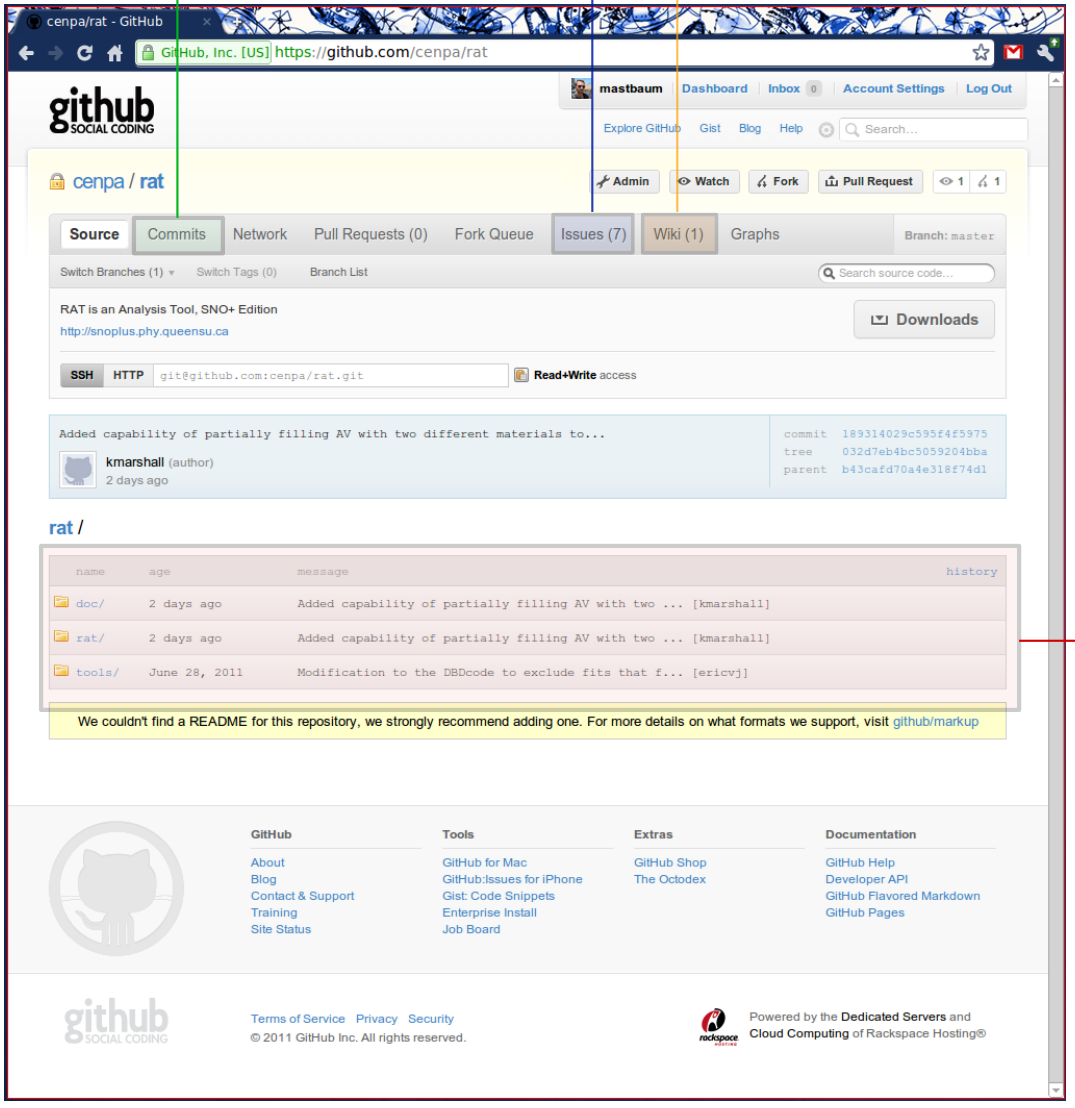
github vs. Trac

Main Page

bug tracking

revision history

wiki



source browser

github Workflow

If you just want to use RAT

(not change it)...

0. Clone the RAT repository

```
$ git clone git@github.com:cenpa/rat.git
remote: Counting objects: 7363, done.
remote: Compressing objects: 100% (2742/2742 (delta 4790)
remote: Total 7563 (delta 4790), reused 7563 (delta 4790)
Receiving objects: 100% (7564/7563), 611.27 MiB | 1.75 MiB/s, done.
Resolving deltas: 100% (4790/4790), done.
$ cd rat
$ ls
doc rat tools
```

That's it! Build RAT with scons as always.

Tip: you are cloning the entire repository with history, so the initial checkout will take longer than with SVN.

If you find a bug:

To submit a bug report or request a feature, go to

https://github.com/cenpa/rat/issues

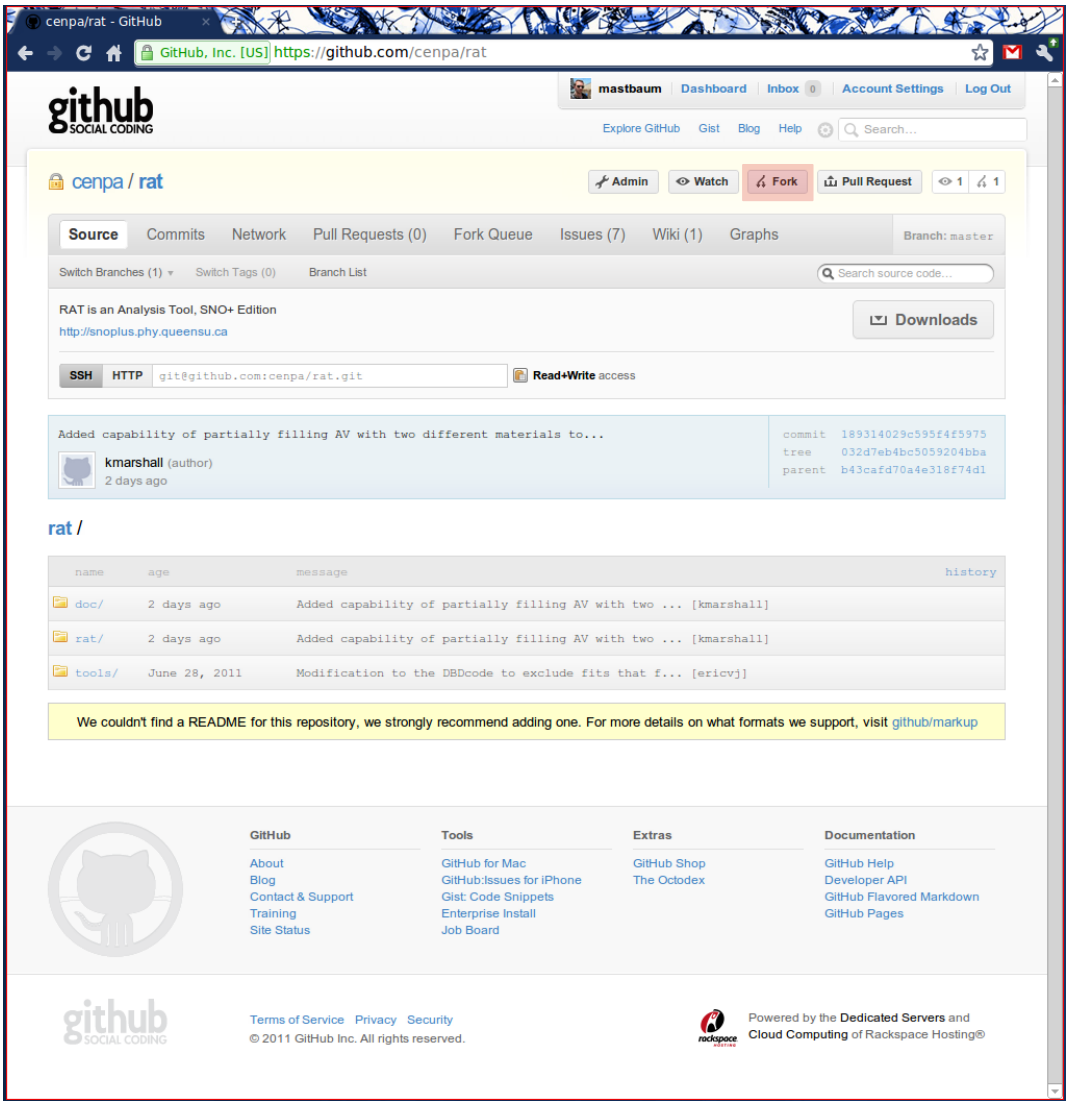
Once you've ensured that your report/request isn't already there, click "New Issue" to add it to the list.

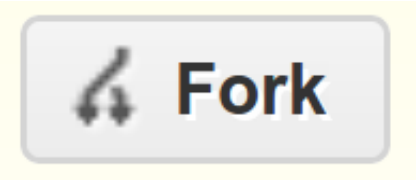
If your bug/feature is already reported, make a note of your failure mode/use case in the comments!

github
Workflow

If you are contributing code to RAT....

1. Fork the main RAT repository

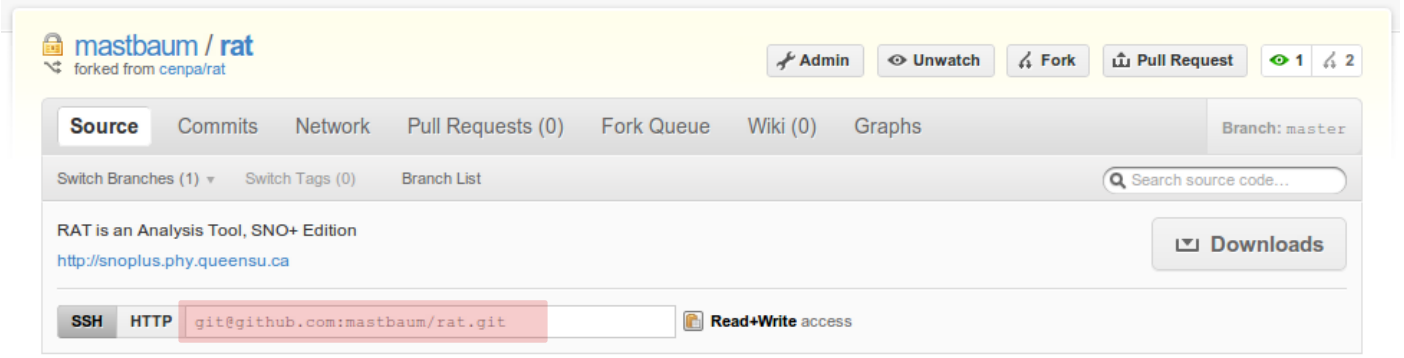




For more information about forks, see http://help.github.com/fork-a-repo/

github
Workflow

You now have your
own clone of RAT:



2. Clone your fork locally

```
$ git clone git@github.com:mastbaum/rat.git
remote: Counting objects: 7363, done.
remote: Compressing objects: 100% (2742/2742 (delta 4790)
remote: Total 7563 (delta 4790), reused 7563 (delta 4790)
Receiving objects: 100% (7564/7563), 611.27 MiB | 1.75 MiB/s, done.
Resolving deltas: 100% (4790/4790), done.
$ cd rat
$ ls
doc rat tools
```

Tip: you are cloning the entire repository with history, so the initial checkout will take longer than with SVN.

github
Workflow

3. Make changes to the code

```
HACK HACK HACK
```

Summary of your changes:

```
$ git status
# On branch master
# Changed but not updated:
#   (use "git add <file>..." to update what will be committed)
#   (use "git checkout -- <file>..." to discard changes in the working directory)
#
#       modified:   rat/rat.cc
#
no changes added to commit (use "git add" and/or "git commit -a")
```

diff:

```
$ git diff
diff --git a/rat/rat.cc b/rat/rat.cc
index fd4bf25..7025af9 100644
--- a/rat/rat.cc
+++ b/rat/rat.cc
@@ -67,7 +67,7 @@ int main (int argc, char** argv)

   parse_command_line(argc, argv);

-  info << "This is SNO+ RAT, version " << RATVERSIONSTR << "." << RATREVISIONSTR <<newline;
+  info << "This is SNOT RAT, version " << RATVERSIONSTR << "." << RATREVISIONSTR <<newline;

   //Hostname and machine probing.
   struct utsname nameinfo;
```

Tip: git is far more powerful than SVN. For more information on the many git features and subcommands, see http://help.github.com/git-cheat-sheets/

github
Workflow

3. Commit your changes to the local repository

```
$ git commit -a -m "reimplemented joke"
[master 189bd92] reimplemented joke
 1 files changed, 1 insertions(+), 1 deletions(-)
```

! At this point, your change is only committed to the local repository on your computer (unlike SVN, where there was no local repository).

Tip: you can commit lots of changes locally (say you're on a plane), and they will be queued and applied individually when you synchronize later

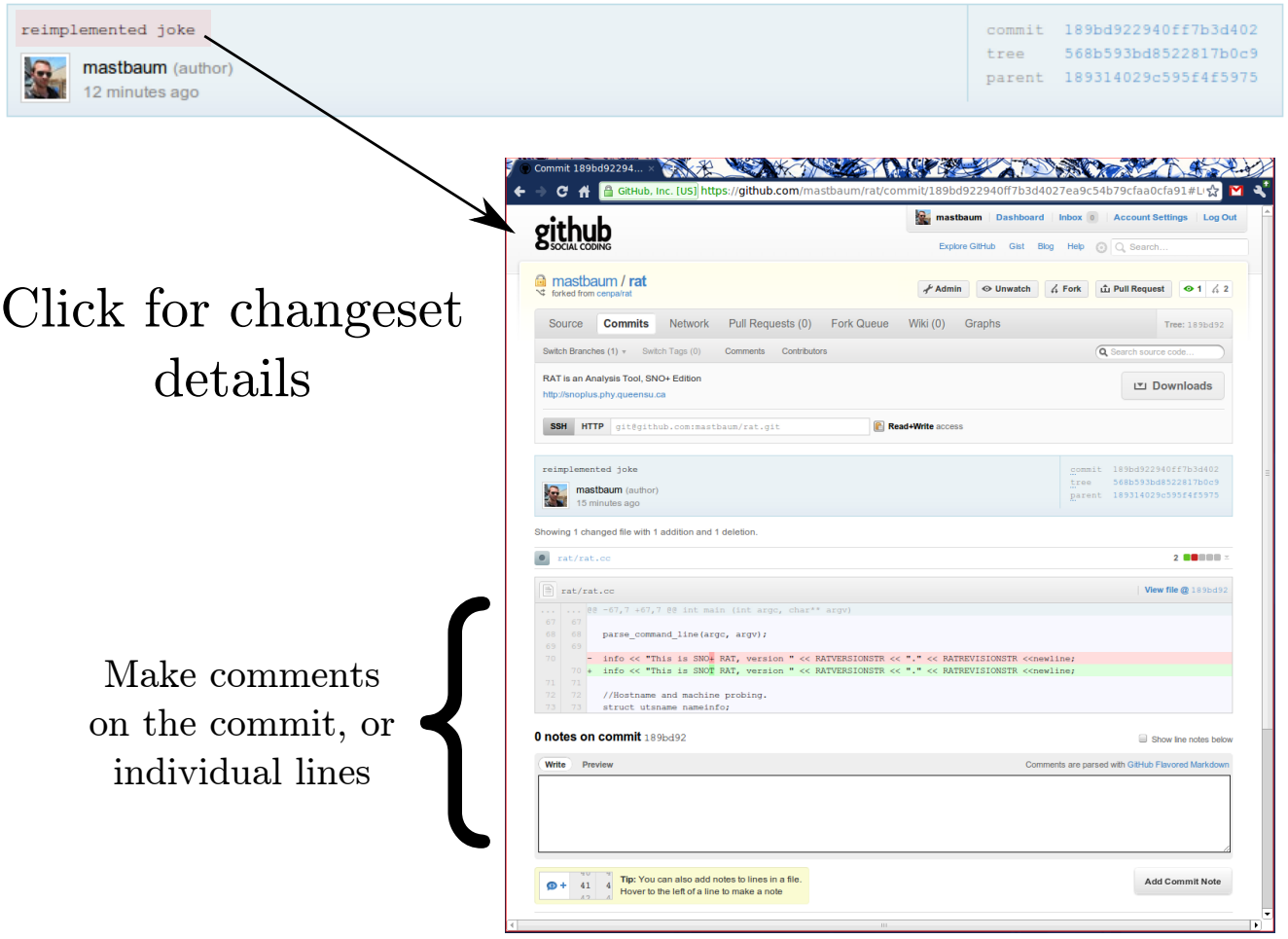
4. Synchronize with the remote repository

```
$ git push
Counting objects: 7, done.
Delta compression using up to 2 threads.
Compressing objects: 100% (4/4), done.
Writing objects: 100% (4/4), 390 bytes, done.
Total 4 (delta 2), reused 0 (delta 0)
To git@github.com:mastbaum/rat.git
   1893140..189bd92  master -> master
```

This pushes all changes committed to the local repository on to your repository on github (your fork of RAT)

github
Workflow

The changes, now on github:

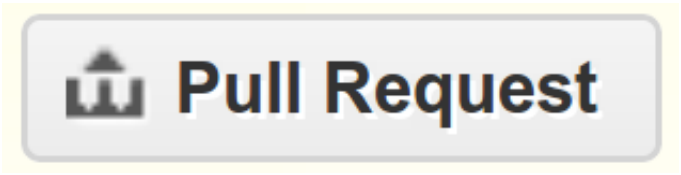


Remember that your fork is a perfectly legitimate RAT repository. This means that:

1. Others can fork your fork for collaborative development
2. You can pull changes in from other repositories (share patches)
3. You can submit a "pull request" to have your changes merged into another repository
3. You can create your own issue tickets, milestones, etc.

github
Workflow

5. Submit a pull request to have your changes merged into the main RAT

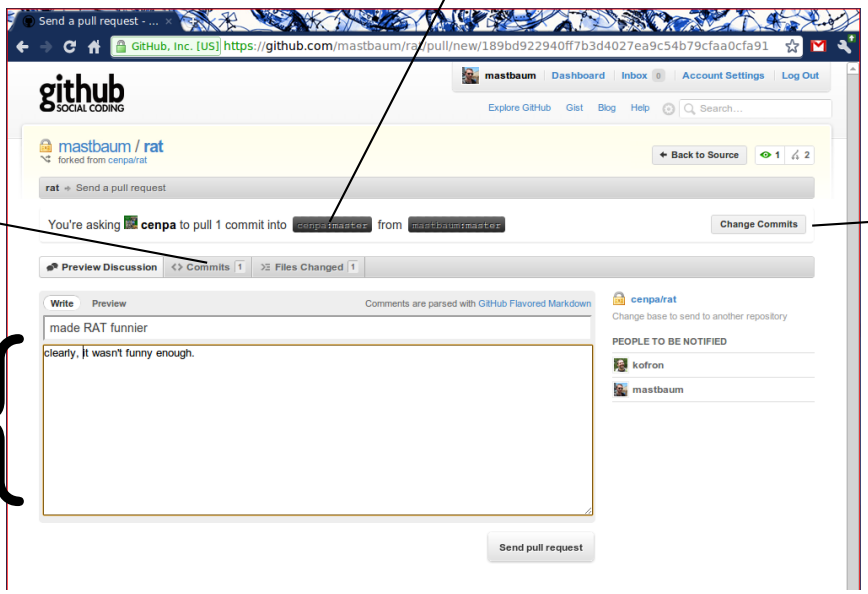


Send to another RAT repository to share patches with collaborators

Preview included changes

Choose which commits are included

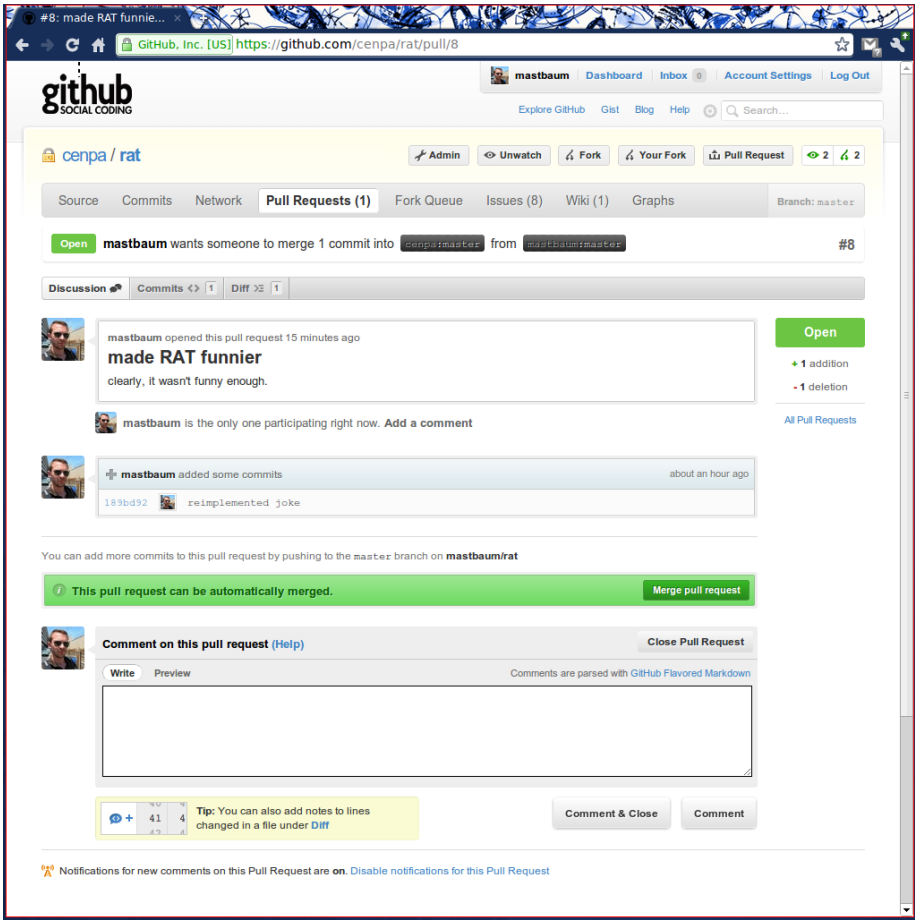
Explain why changes were made



See http://help.github.com/send-pull-requests/ for more information on pull requests

github Workflow

The CIC will review changes and merge code into the main RAT repository



If a pull request is rejected, the reviewer will provide comments on the reasons and make suggestions for improvement.

github
Workflow

? Synchronizing your fork with the main RAT repository

What to do:

```
1 $ git remote add upstream git://github.com/cenpa/rat.git
2 $ git fetch upstream
3 $ git checkout master
4 $ git merge upstream master
```

What it does:

1. Add main RAT as another "remote" repository called "upstream"
2. Download differences between your repository and the main one
3. Check out changes from local repository to current working copy
4. Merge in the changes you just checked out. You may need to resolve conflicts at this point if your changes are incompatible with recent changes to the main repository

As always, this is applied to the local repository.
Changes will appear on github when you "git push" them.

? Additional resources

github Introduction:

http://help.github.com/

git Cheat Sheets:

http://help.github.com/git-cheat-sheets/

Complete git command reference:

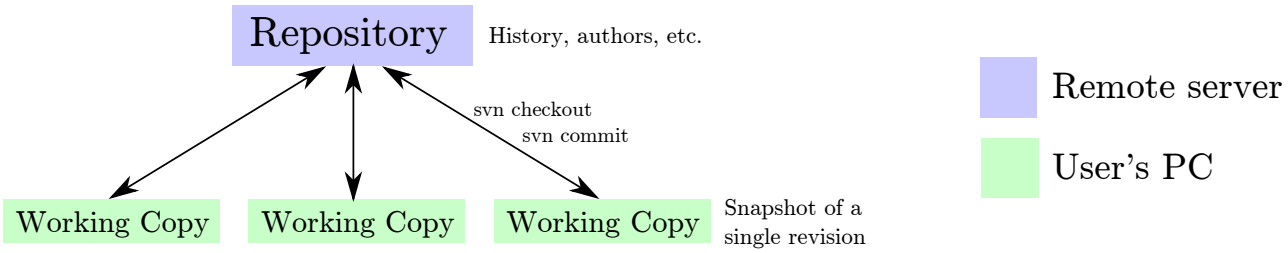
http://gitref.org/

git(hub) vs. SVN
Repository Structure

No version control:

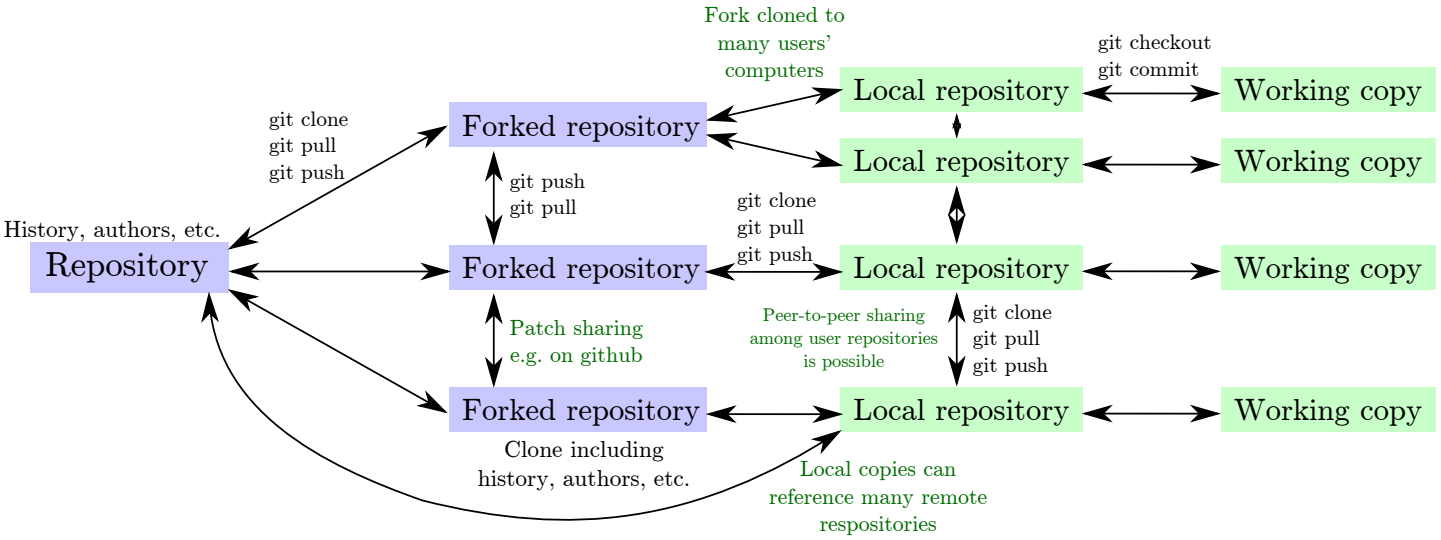
```
me@mycomputer ~$ ls
mycode            mycode_2          mycode_2.1
myrealcode        mycode_2a         myproject4
myrealcode2       therealcode       a
temp              mycode_temp       mycode_test
mycode080511      mycode_r423       mycode_real
to_do_list1       todo              notes
notes_old         todo_list1_old_a
```

SVN version control:



No sharing between working copies

git version control (example):



Everything is a repository, allowing patch-sharing and source code management impossible in SVN. git and github's tools make the actual workflow very simple, as shown in this walktrhough.