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Git-ify Your (digital) Life

Git-based tools to ease your life

January 15, 2014 | Torbjörn Klatt <t.klatt@fz-juelich.de> | JSC Internal Seminar

Overview

Git	*a short review*
etckeeper	*keep your system's configs*
vcsh	*version your $HOME*
mr	*my / multiple repositories*
git-annex	*so meta!*
bup	*backup with Git*
ikiwiki	*Wiki compiler and publisher in a Git repo*
gcrypt	*GPG-encrypted Git repositories*
gitodo	*cmd-based ToDo List Manager in a Git repo*
Tipps	*I can't resist . . .*

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Part I: Git

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Version Control System *Git*

A short overview

- decentralized / distributed

  alike Mercurial/hg or Bazar in contrast to CVS or Subversion
- works on deltas (diffs, patches) instead of whole files
- non-linear history

  branching and *merging* is easy and performant
- cryptological verification of revisions

  each revision (*commit*) has a unique SHA-1 hash computed from diff + meta info
- no need for a server / everything is locally available

  because of first point

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Part II: etckeeper

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etckepper

Keep Your System's Configurations[1]

- creates a Git (or Mercurial/Bazaar/Darcs) repo for `/etc`
- uses additional meta-file for remembering permissions for each file

  DVCS usually don't track file owner info; only executable bit
- ueses *pre-commit* hooks to fix file permissions
- hooks itself into package managers (e.g. *apt*, *zypper*) to auto-commit `/etc` before and after package changes
- manual commits also possible

[1] Windows users: sleep or think of moving to Linux

Example

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Part III: vcsh

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vcsh – Version Control System for (your) $HOME

version `.profile`, `.{bash,zsh,vim}rc`, `...` **— without pollution**

- separate Git repositories for dotfiles

  without polluting $HOME with `.git` directories
- easily migrate your personalized environment to other hosts

  clone your `.vim` repository on new host to have it synchronized
- allows for different branches for different hosts

  e.g. “`tklatt-zamws`”, “`myself-laptop`”, “`su-myserver`”
- *vcsh* is a single Shell script

vcsh – Version Control System for (your) $HOME

Example

One repository for your Vim config, another for Zsh

```
vcsh init vim
vcsh vim add ~/.vimrc ~/.vim
vcsh vim commit -m "Initial commit of my Vim configuration"
vcsh vim remote add origin git@my-server.net:vim-repo
vcsh vim push -u origin master

vcsh init zsh
vcsh zsh add ~/.zsh ~/.zshrc
vcsh zsh commit -m "Initial commit of my Zsh configuration"
vcsh zsh remote add origin git@my-server.net:zsh-repo
vcsh zsh push -u origin master
```

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Part IV: mr

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mr – my / multiple repositories

One command to rule them all

- Problem: a bunch of *vcsh* repos are not very handy
- iterates over list of repos and runs same command on each
- can handle Git, git-svn and vcsh repos equally
- provides *bootstrap* command to setup/clone an environment on new host
- integrates well with *vcsh* (*mr* config directory can be a *vcsh* repo itself)
- a single Perl script

Example

```
vcsh list
> vim zsh git ssh bin
mr update  # runs ‘git pull‘ or ‘git clone‘ for each
# downloads named .mrconfig and clones all repos in there
mr bootstrap https://my-server.net/.mrconfig
```

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Part V: git-annex

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git-annex – Version Files Without Their Contents

So meta! [2]

- saves meta info (i.e. name, size) of files without their contents
- saves actual files read-only in `.git/annex/objects`

  symlinks them to original/real location
- keeps track of which remote has which files

  each remote identified by UUID
- designed for flaky connections

  uses rsync for data transfer

[2] Windows users: Wake up!

git-annex – Version Files Without Their Contents

I mean, so really meta!

- written in Haskell
- allows for special remotes
  - Amazon S3 / Glacier
  - WebDAV
  - rsync
  - the web (`http(s)://`, `ftp://`, archive.org, arxiv.org/[format]/[ID], etc.)
  - podcast feeds
  - XMPP
  - simple directories
- example collection of conference proceedings (slides + video recordings)

  `https://github.com/RichiH/conference_proceedings`

git-annex – Version Files Without Their Contents

Example Szenario: The Archivist

- annex all files
- actual files offline in special remotes on USB drives, tapes, etc.
- having full information about name, size and location of all files in one place at hand

Example

```
git annex whereis
> whereis my_cool_big_file (1 copy)
>     7570b02e-15e9-11e0-adf0-9f3f94cb2eaa  -- backup drive
> whereis other_file (3 copies)
>     0c443de8-e644-11df-acbf-f7cd7ca6210d  -- here (laptop)
> 62b39bbe-4149-11e0-af01-bb89245a1e61  -- usb drive
> 7570b02e-15e9-11e0-adf0-9f3f94cb2eaa  -- backup drive
```

git-annex – Version Files Without Their Contents

Example Szenario: The Nomad

- keep copies of data online (on internet)
- sync several local devices for occasional backup
- add data locally while on the road
- sync data to online remotes while at Internet café or friend's place
- drop local copies, still have them online and knowing exactly where
- perfect for photos while traveling

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Part VI: bup

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bup – Git for LARGE Files

- recap: Git is designed for plaintext files
  binary files are just a huge blob for Git; no diff possible
- uses Git object trees and replaces hashing and packing algorithms
- designed for space-saving incremental backups
- backups can be FUSE mounted
- can be a special remote for *git-annex*
- `bup web`: browse backup trees in web browser
- written in Python

bup – Git for LARGE Files

Example

```
bup init
> Initialized empty Git repository in /root/.bup/
bup index /etc
bup save --name zamws-etc /etc
> Reading index: 6340, done.
> Saving: 100.00% (31381/31381k, 6340/6340 files), done.
bup index /home                                    # took a few seconds
bup save --name zamws-home /home                   # took about 3min
> Reading index: 203502, done.
> Saving: 100.00% (14743111/14743111k, 203502/203502 files), done.
du -sh /etc /home $BUP_DIR
> 49M     /etc
> 15G     /home
> 9.2G    /root/.bup
```

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Part VII: ikiwiki

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ikiwiki – Wiki Compiler and Publisher in a Git Repo

Example

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Part VIII: gcrypt

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gcrypt – GPG-encrypted Git remotes

- implements a git-remote-handler to deal with `gcrypt::` remotes
  transport via rsync, sftp or git
- remote repository is GPG-encrypted for one or multiple participants
- each pack is encrypted with a symetric key stored in a asymetric encrypted manifest file
- can be a special remote for *git-annex*
- Hint: use it as a remote for your *etckeeper*'s repo
- Remark: You might want to use Joey "joeyh" Hess' fork of gcrypt [3]

[3] `https://github.com/joeyh/git-remote-gcrypt`

gcrypt – GPG-encrypted Git remotes

Example

```
git init
git add my_secret_file
git commit -m "secret file"
git remote add secret-server gcrypt::git@my-server.net:secret-repo
git push secret-server master
git clone git@my-server.net:secret-repo
ls -lA secret-repo
> -rw------- 1 t.klatt users  303 Jan 15 09:24 0153f2b0...ea5f861d
> -rw------- 1 t.klatt users 1.4K Jan 15 09:24 91bd0c09...4881aa0a
> drwx------ 1 t.klatt users  138 Jan 15 09:25 .git
gpg -d 91bd0c09...4881aa0a
> fc564bef...94c3ff80 refs/heads/master
> pack :SHA256:0153f2b0...ea5f861d w+bxes2v...1MCkGi8+
> repo :id:3lmzxTGoXJVmHPtfaOTf
```

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Part IX: gitodo

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gitodo – ToDo List Manager with Git

- simple commandline-based ToDo list management
- ToDos are managed in a single Git repository
- items are stored in spearate text files (in YAML format)
- supports prioritization, deadlines and *highcal* export
- single portable Ruby script (was a Shell script some time ago)

gitodo – ToDo List Manager with Git

Example

```
gitodo new  # --> $EDITOR opens for writing a new ToDo item
cat $GITODO_DATA/i0010
> what: Still awake?
> dead: 2013-12-10 23:59
> warn: 1
>
> Go to sleep! Now!
gitodo
>  S   Pri      Deadline          ID    Subject
> ---+-----+------------------+------+-----------------------------------
>    |  -3 |                  |    2 | Christmas presents
>  D |   0 |            22:00 |    9 | Remove garbage from your bed
>  C |   0 |            23:30 |    8 | Go to sleep -- yes, it's important
>    |   0 | 2013-12-10 23:59 |   10 | Still awake?
>    |   0 | 2013-12-24       |    7 | Remove SVN from all computers
```

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Part X: Tipps

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Tipps

I can't resist . . .

- portable GUI for Git (browsing and actions): *git-cola*[4]
- Zsh
  - very powerful built-in completion for most programs (Git: incl. selecting branches/tags)
  - prompt-integrated info about current VCS working copy
  - highly customizable prompt (left and right)
  - can mimic Bash, Ksh, tcsh (never tried it myself)
- Finally:

You cannot time travel in real-life.
But you can in your digital life, selectively!

[4] `https://github.com/git-cola/git-cola`

Project Links

etckeeper	`https://joeyh.name/code/etckeeper/`
vcsh	`https://github.com/RichiH/vcsh`
mr	`https://github.com/joeyh/myrepos`
git-annex	`https://git-annex.branchable.com/`
bup	`https://github.com/bup/bup`
ikiwiki	`https://ikiwiki.info/`
gcrypt	`https://github.com/blake2-ppc/git-remote-gcrypt`
gitodo	`https://github.com/vain/gitodo`

Sources

- This talk is heavily inspired by Richard “RichiH” Hartman’s talk at *Linuxtag 2013* [5]
- official and unofficial documentation of named tools
- (long-term) experiments with named tools

[5] http://www.linuxtag.org/2013/de/program/mittwoch-22-mai-2013.html?eventid=147

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Thank you for your interest!

Questions?

(now or later)

PGP-Key 0xXXX Fingerprint ???