

Gitify your life

web, blog, configs, data, and backups

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Who am I?

- Richard "RichiH" Hartmann
- Backbone and project manager at Globalways AG
- freenode & OFTC staff
- Author of vcsh
- Passionate about FLOSS

What is Git?

- Version control system
- Distributed
 - No need for central repository
 - Allows you to commit while offline
- Stores commits (parent commit reference, commit message, root tree object) and tree objects (blobs and other tree objects)
- Light-weight branches
- pre-/post-action hooks
- Full history in every checkout

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etkeeper

etkeeper is a collection of tools to let /etc be stored in a Git, Mercurial, Darcs, or Bazaar repository

Minimal, quick overview

In a word

- Implemented in POSIX shell
- Auto-commits /etc prior to and after all actions by package manager
- Hooks into apt, yum, pacman-g2, and cron
- Allows manual commits
- Various back-ends
 - Bazaar
 - Darcs
 - Git
 - Mercurial
- Easy way to recover from failures, misconfiguration or to clone machines

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bup

Highly efficient file backup system based on the Git packfile format

In a word...

- Written in Python
- Fast
- Very space-efficient (reduced 120 GiB (rsnapshot) to 45 GiB)
- Built-in de-duplication
- Can be mounted via FUSE
- Can not drop old data (there is a branch that supports this)

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ikiwiki

ikiwiki is a wiki compiler. It converts wiki pages into HTML pages suitable for publishing on a website

What is ikiwiki?

- Written in Perl
- Supported back-ends: Git, Bazaar, Darcs, GNU Arch, Mercurial, monotone, and Subversion
- Parses various markup languages
- Offers different ways of editing content
- Extensive templating and CSS support
- Acts as Wiki, CMS, and blog
- RSS and Atom feed for whole site, per page, per tag, etc
- Supports OpenID

Supported markup languages

- Markdown
 - WikiLink ([[LinkToArticle]])
 - directives, e.g.
 - [[!tag talk/gitify]]
 - [[!author RichiH]]
 - etc
- WikiText
- reStructuredText
- Textile
- plain HTML

How does it work?

- User edits web page or commits and pushes source files
- Partial/full rebuild triggered by cgi or commit hook
- Parses input files
- Compiles into HTML, create new pages, updates RSS, etc
- Commits Markdown source for autogenerated/-changed pages into repository
- User can optionally pull changes to local repository

Common uses

- Public Wiki
- Private notes
- Blog
- CMS

Adding/editing content

- Web-based text editing (useful, but boring)
- Web-based WYSIWYG (via plugins/wmd)
- CLI-based (awesome!)

Advanced usage

- Interface with source files, only
- Maintain wiki and docs in the same repository as your source code
- Separate staging or even preview branches with output into different directories

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git-annex

manage files with Git, without checking their contents in

What is git-annex?

- Based on Git
- Maintains metadata in Git, actual files in the annex
- Still allows you to check files into Git if you want to
- Written with low bandwidth and flaky connections in mind
- Various work-flows (more on that soon)

Internal workings 1/2

- Written in Haskell, so strong typing etc, internally
- Uses rsync to transfer data
- Indirect mode
 - Moves files into `.git/annex/objects`
 - Makes them read-only
 - Replaces them with symlinks
 - Forces you to `git annex unlock` and `git annex add`, leading to conscious decisions about changes
- Can either discard or keep old data, depending on setup

Internal workings 2/2

- Uses UUIDs to identify each repository
- Stores tracking information in `git-annex` branch
- Gives every single repository full information about all files
- Tracking information designed to work with union merge:

```
1361402708.089154s 1 0d39904f-de8d-1638-92af-ecd2cea783cb  
1361402822.110498s 1 d1ffde43-f3d9-107b-aa2d-7e4e1ff88b46
```


Data integrity

- SHA1, SHA2- $\{224,256,384,512\}$ for integrity
- Set minimal number of required copies per suffix, directory, etc
- All remotes and special remotes can be verified
 - remotes verify locally and transmit the result
 - special remotes have to transfer all data to verify
- Verification takes required amount of copies into account
- You can *always* get your data out of a broken annex
 - All data is stored as normal files on disk
 - Symlinks work without git-annex
 - git-annex objects carry their own checksum in their filename

Special remotes 1/2

- Stores data in non-git-annex remotes
- Still tracks all data stored in special remotes
- Supports encryption for storage on untrusted machines/media
- Hook system lets you write to and read from arbitrary remotes

Special remotes 2/2

- Amazon Glacier
- Amazon S3
- bup
- directory
- rsync
- webdav
- web (media.ccc.de, Project Gutenberg, archive.org, etc)
- hook
 - IMAP
 - Tahoe-LAFS

git-annex assistant

- Financed via kickstarter.com
- One year of dedicated programming by Joey Hess
- Daemon that adds data to the repository and syncs it between other repositories
- Web GUI on localhost
- Content notification via XMPP/Jabber
- Advanced ruleset for content distribution
- Direct mode without symlinks; especially useful for Mac OS X and Windows
- Android & Windows ports

The Archivist

- Put data into git-annex
- Distribute data among any number of drives, tapes, remotes, etc
- Store offline media in a safe place
- Maintain full information about number and location of all copies

Media consumption

- Import podcasts, videos, and slides
- Sync or export to consumption devices
- Consume media
- Drop consumed media from annex
- Deletion propagates through all annexes over time

The Nomad

- Keep copies of data on the Internet
- Optionally sync between several local devices for backup
- Add data locally and/or remotely while on the road
- Sync data between local and remote once at an Internet café or similar
- Perfect for photos while travelling

Create different views or sets of the same data

- Sometimes, you disagree with other people about the best way to organize data
- Different repositories can show a different view of the same data
 - Completely delete some files or file types, for example RAW files
 - Rename files and directories
- Maintain a rebasing branch on top of the remote:
`git config branch.master.rebase true`

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vcsh

manage config files in \$HOME via fake bare Git repositories

What is vcsh?

- Implemented in POSIX shell
- "version control shell" or "version control system \$HOME"
- Based on Git, but...
 - Git is unable to maintain several working copies in one directory
 - Sucks if you want to keep your configs in Git
- vcsh uses fake bare Git repositories to work around this
- Powerful and extensible hook system
- Think of it as an extension to Git



fake bare.. what?

- Normal Git repository:
 - working copy in `$GIT_WORK_TREE`
 - Git data in `$GIT_WORK_TREE/.git` aka `$GIT_DIR`
- Bare Git repository:
 - Git data in `$GIT_DIR`
 - no `$GIT_WORK_TREE`
- Fake bare Git repository:
 - working copy in `$GIT_WORK_TREE`
 - Git data in `$GIT_DIR`
 - `$GIT_WORK_TREE == $HOME`
 - `$GIT_DIR == $XDG_CONFIG_HOME/vcsh/repo.d/$repo.vcsh`
 - `core.bare = false`

Problems with fake bare Git repos

- Fake bare repositories are messy to set up and use, and very easy to get wrong
- Reason why Git disallows shared `$GIT_WORK_TREE`: complexity due to context-dependency
- Mistakes lead to confusion and/or data loss; imagine `$GIT_WORK_TREE` set and
 - `git add`
 - `git reset --hard HEAD~1`
 - `git checkout -- *`
 - `git clean -f`

Solution: vcsh

- Wraps around Git
- Hides complexity and does sanity checks
- Several Git repositories checked out into \$HOME at once
 - One repository for Zsh, Vim, mplayer, etc
 - Allows specific subsets of repositories per host
- Manages complete repository life-cycle

Using vcsh

Create new repository

```
# Create new repository
vcsh init vim
# Add files to it
vcsh run vim git add .vim .vimrc
# Commit using shorthand form
vcsh vim commit
# Push using longhand form
vcsh run vim git push
```

Made-up life-cycle

```
# Clone repository into new name zsh
vcsh clone git://github.com/RichiH/zshrc.git zsh
# Display all files managed by this repository
vcsh run zsh git ls-files
# Rename repository just because
vcsh rename zsh zshrc
# Delete repository
vcsh delete zshrc
```


Using vcsh

run vs enter

```
# Do everything from outside
vcsh run zsh git add .zshrc
vcsh run zsh git commit
vcsh run zsh git push
# The same commands, but from within
vcsh enter zsh
git add .zshrc
git commit
git push
exit
```

Advanced usage

- Have your prompt display vcsh information
- git-annex within vcsh to manage non-configuration files in \$HOME
- Floating backups in arbitrary working copies
 - .git/
 - Working copy
 - Complete repository, including objects, etc
- Use Git on top of or in parallel to other VCSs

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mr

Multiple Repository management tool

Too many repos...?

Tying it all together

- Written in Perl
- Run bulk pull, push, and custom commands all, some, or one of your repositories
- Supports Git, vcsh, Bazaar, CVS, Darcs, fossil, git-svn, Mercurial, Subversion, unison, and veracity
- Trivial to extend to support more VCSs
- If you want to try all this, why not `vcsh clone my mr repository template` and run `mr up` to pull my Zsh config via vcsh?

Too many repos...?

Suggested mr layout

```
% cat ~/.mrconfig
include = cat ~/.config/mr/config.d/*
% ls .config/mr/available.d
mr.vcsh
zsh.vcsh
...
% ls -l .config/mr/config.d
mr.vcsh -> ../available.d/mr.vcsh
zsh.vcsh -> ../available.d/zsh.vcsh
...
%
```

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Zsh

Best shell available. Period.

Why is this in a Git talk?

Not based on Git, but makes your life easier

- Extremely powerful tab completion for the tools in this talk (and others!)
- Versatile left *and right* prompts
- `vcs_info`
 - Displays information about the current VCS working copy in prompt
 - Lots of customization options
 - Supports Git, vcsh, Bazaar, codeville, CVS, Darcs, fossil, GNU Arch, Mercurial, monotone, Perforce, Subversion, and svk
- Can mimic Bash, Ksh, tcsh, etc.
- Too many other reasons to list (literally...)

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The final pitch...

I need literally less than five minutes of Internet access to sync my entire digital life while on the road.

Project websites

Most of these are packaged for the major distributions

- etckeeper: <http://joey.kitenet.net/code/etckeeper/>
- bup: <https://github.com/bup/bup>
- ikiwiki: <http://ikiwiki.info/>
- git-annex: <http://git-annex.branchable.com/>
- vcsh: <https://github.com/RichiH/vcsh>
- mr: <http://kitenet.net/~joey/code/mr/>
- Wiki around this topic:
<http://vcs-home.branchable.com/>

Previous talks

Previous talks, available as video download:

- vcsh:

<http://fosdem.org/2012/schedule/event/vcsh>

- git-annex:

<http://fosdem.org/2012/schedule/event/gitannex>

The End!

Thanks!

Thank you for listening!

Questions? Ask now or catch me after this talk, both is fine.

See slide footer for further contact information.

`http://richardhartmann.de/talks/`

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