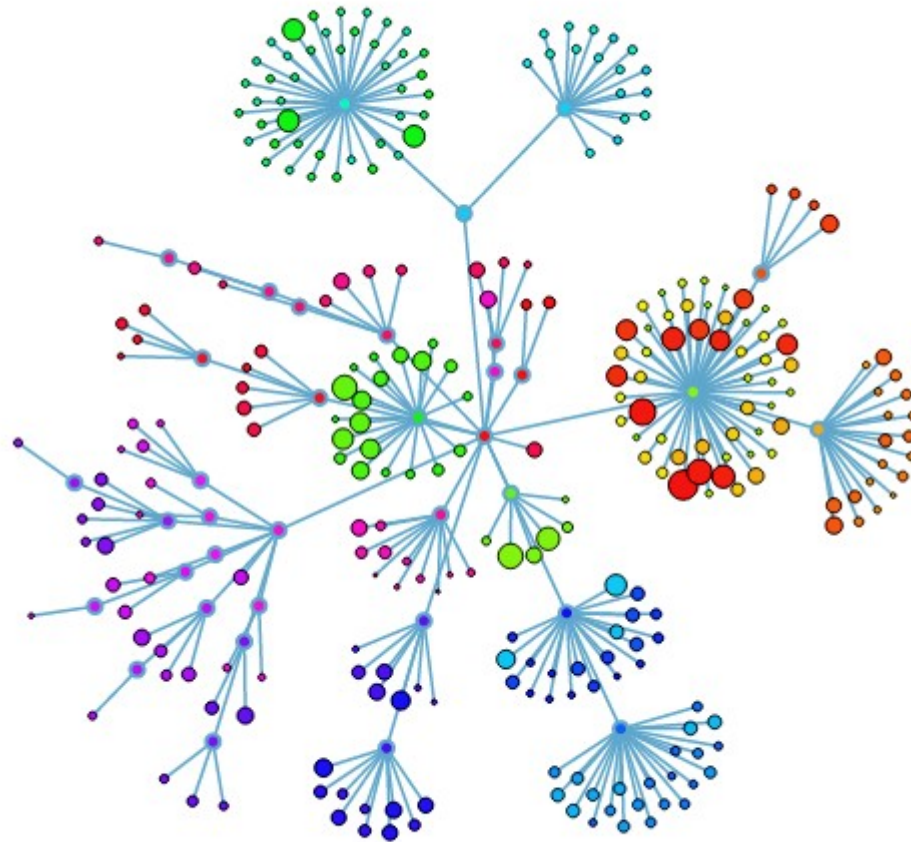


# Source code management: Git



# The Plan

- Source code management
- Using Git for versioning
- Branching
- Working with other people
- Advanced topics

# The problem

```
~/recoveredHardDisk/home/charlie/squeezeFilm
ls
[charlie@yukawa:~/recoveredHardDisk/home/charlie/squeezeFilm]$ ls
color2.ps          overQ_partialAnnRep.eps      squeezeFilm2.lyx.emergency
color3.ps          overQ_partialAnnRep.gpl      squeezeFilm2.tex
color.ps           overQ_partial.eps           squeezeFilm3d.lyx
FlexureFoilAssembly.pdf overQ_partial.gpl           squeezeFilm3d.lyx~
FlexureFoilAssembly.ps overQ_partial.gpl.old       squeezeFilm3e.lyx
freeGas            overQ_partialLTACheck.eps    squeezeFilm3e.lyx~
freeGas.zip        overQ_partialLTACheck.gpl    squeezeFilm3j.lyx
ISL2.ps            overQ_partial.ps            squeezeFilm3j.lyx~
ISLchop4.ps        overQ_partialTrento.gpl      squeezeFilm3k.lyx
ISLchop.ps         physLetBAngDistOfH2fromMetalSurfaces.pdf squeezeFilm3l.lyx
ISLDiagram4.pdf    pressBins.m                 squeezeFilm3l.lyx~
ISLDiagram4.ps     Qdata_charge_cleantabs.dat  squeezeFilm3l.tex
ISLDiagram4small.eps Qdata_charge.dat            squeezeFilm3.lyx
ISL.eps            Qdata_cleantabs.dat         squeezeFilm3.lyx~
ISL_good.ps        Qdata.dat                   squeezeFilm3m.lyx
ISL.ps             Qdata_high_cleantabs.dat    squeezeFilm3m.lyx~
levyNTA.dat         Qdata_high.dat              squeezeFilm3n.aux
levyNTA.eps         Qdata_medium2_cleantabs.dat squeezeFilm3n.dvi
levyNTA.gpl         Qdata_medium2.dat           squeezeFilm3n.log
#levypar.lyx#       Qdata_medium_cleantabs.dat  squeezeFilm3n.lyx
levypar.lyx         Qdata_medium.dat            squeezeFilm3n.tex
levypar.tex         raiPaper                    squeezeFilm3o.lyx
LevyPos_100.dat     run1923pcuts.eps            squeezeFilm3o.lyx~
LevyPos.eps         run1923pcuts.gpl            squeezeFilm3o.tex
LevyPos.eps.eps     run1923PDamping.eps         squeezeFilm4
LevyPos.gpl         run1923play.gpl             squeezeFilm4a.lyx~
levySteps.dat       run1923qdataNoLeak.dat      squeezeFilm4.zip
levySteps.eps       run1923twoDCombined.eps     squeezeFilm.lyx
levySteps.gpl       run1923twoDCombined.gpl     squeezeFilm.lyx~
lisa_setup_nogun.eps run1923twoD.eps             submit
lisa_setup_nogun.pdf run1923twoD.gpl             surfScienceReportsDynamicalParamsOfDesorbingMoleculesBIGREVIEW.pdf
lisa_setup_nogun.ps run1923twoPlotsBW2.ArchivedBackup.eps surfScienceReportsStickingAndDesorptionAREview.pdf
LTA2_high.dat       run1923twoPlotsBW2.eps      trento2.awk
LTA_high.dat        run1923twoPlotsBW2.gpl      trentoStrip1.dat
LTA_low.dat         run1923twoPlotsBW3.eps      trentoStrip2.dat
LTA_medium2.dat     run1923twoPlotsBW3.gpl      trentoStrip.dat
LTA_medium.dat      run1923twoPlotsBW.eps       UWbetaplot
LTAOutline.dat      run1923twoPlotsBW.gpl       UWbetaplot2.eps
moreNTA.dat         run1923twoPlotsBWhand.eps   UWbetaplot2.gpl
```

# Historical context

- CVS/Subversion – centralized, versions well
  - One server, one person at a time
- Bitkeeper
  - Distributed – everyone has a copy of everything
- Git / Mercurial – modern paradigm
  - Merges well, fast, common usage

# Git

# Git

- git init
- git Status
- git Stage
- git Commit
- git Log
- git diff

# Good commit practices



	COMMENT	DATE
○	CREATED MAIN LOOP & TIMING CONTROL	14 HOURS AGO
○	ENABLED CONFIG FILE PARSING	9 HOURS AGO
○	MISC BUGFIXES	5 HOURS AGO
○	CODE ADDITIONS/EDITS	4 HOURS AGO
○	MORE CODE	4 HOURS AGO
○	HERE HAVE CODE	4 HOURS AGO
○	AAAAAAAAA	3 HOURS AGO
○	ADKFJSLKDFJSDKLFJ	3 HOURS AGO
○	MY HANDS ARE TYPING WORDS	2 HOURS AGO
○	HAAAAAAAAAANDS	2 HOURS AGO

AS A PROJECT DRAGS ON, MY GIT COMMIT MESSAGES GET LESS AND LESS INFORMATIVE.

- Commit early, commit often
- Make small commits

<https://xkcd.com/1296/>

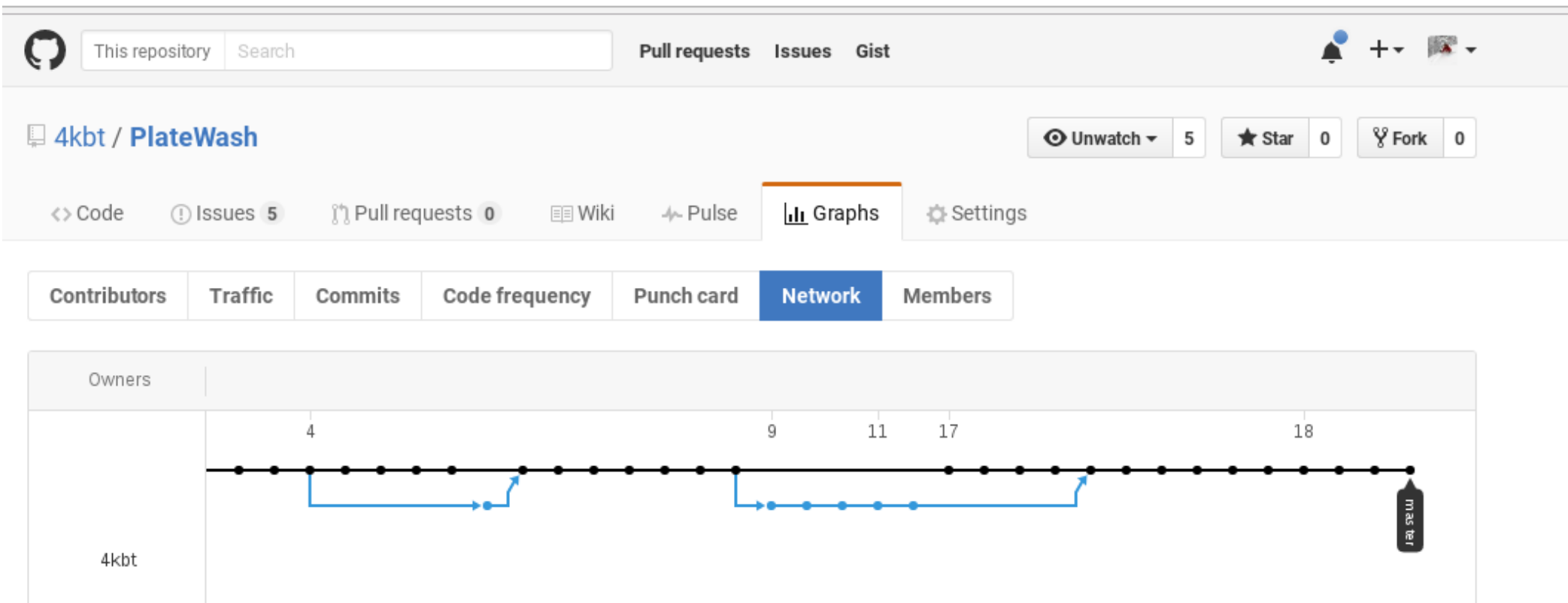
# More tools

- `Git rm`
- `Git mv`
- `.gitignore`



# How does Git work?

- Linked list of changes
- Tracks SHA hash of changes
- Tracks changes, not files
- Not optimal for binary files.



# Branching

# Branching

- `git checkout -b NewBranch`
  - `git branch`
- 
- You can try out new ideas safely!
  - Branch often, merge often

# Working with others

# Working with others

- git clone
- git push
- git pull
- You have your own complete copy
- CENPA has its a git repository with RepositoryHosting, but GitHub is prettier/easier to use.

# Add your names to the awesome list

- git clone  
<https://github.com/4kbt/CENPAGitDemo.git>
- Edit PeopleWhoAreAwesome.txt
- Commit the change
- Push! (must have GitHub permissions)

Extra credit: Add your name to this slide.

# Advanced topics

# Advanced Topics

- git revert
- Branching from an old commit
  - git branch OldBranch 7a64d1f44b
- ‘everything is just git rebase’
- Submodules



# “How do I make things better when things break?”



# “How do I make things better when things break?”

- Push to remote often
- Understand simple commands and git's datastructure
- Slow down, think.
- Google.