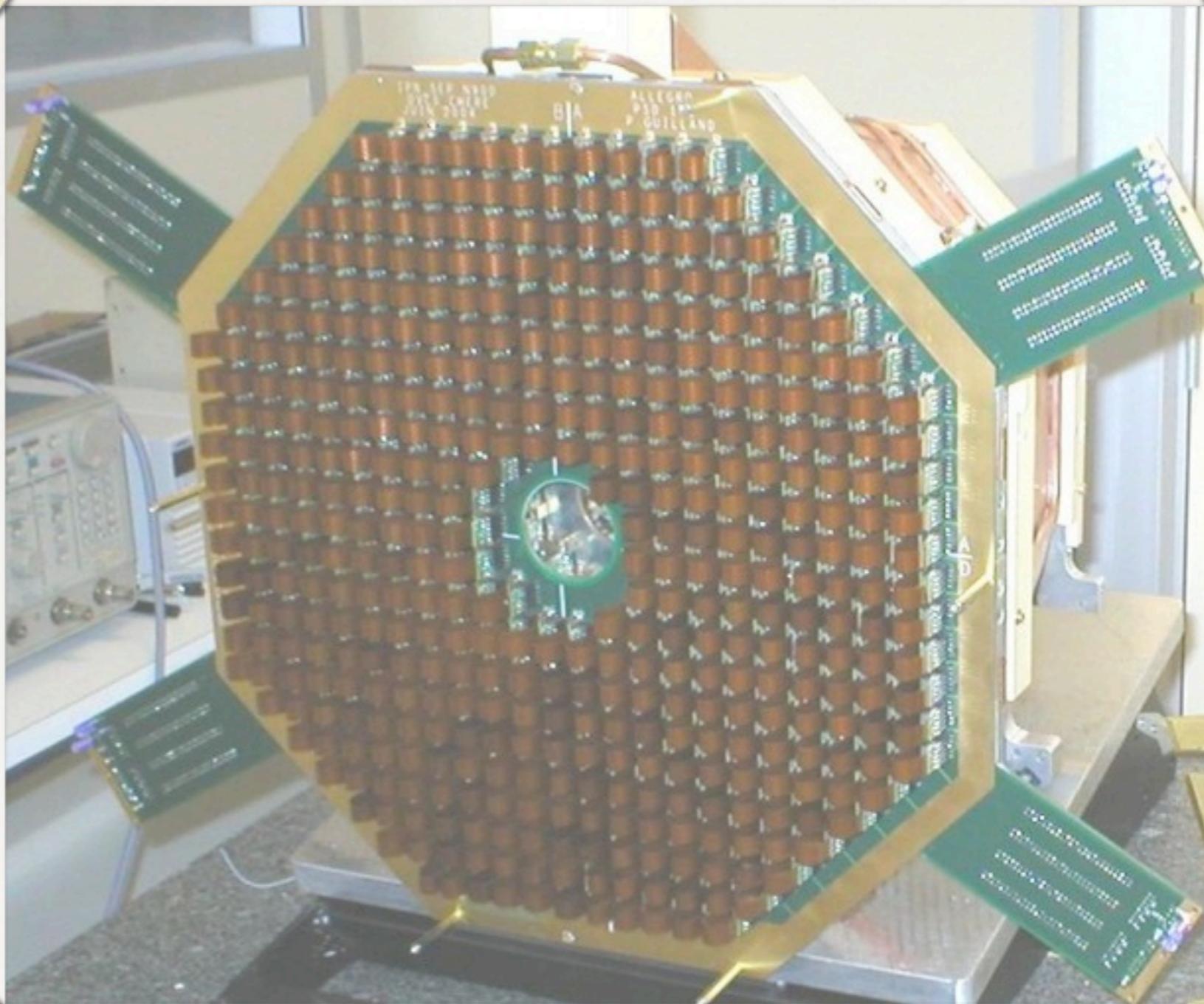


Distributed Version Control

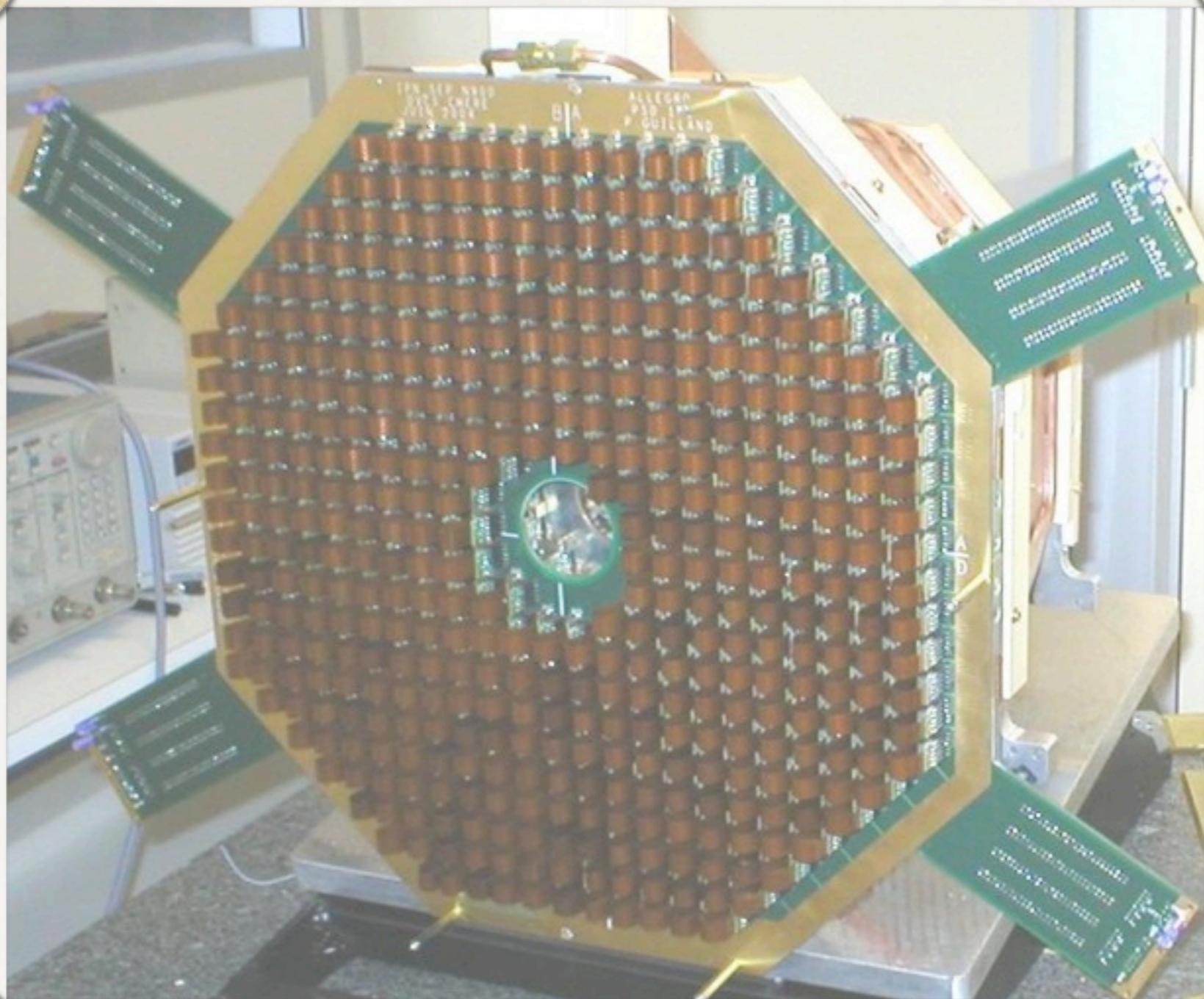
Mihail Stoynov

How many of you have
used any DVCS?

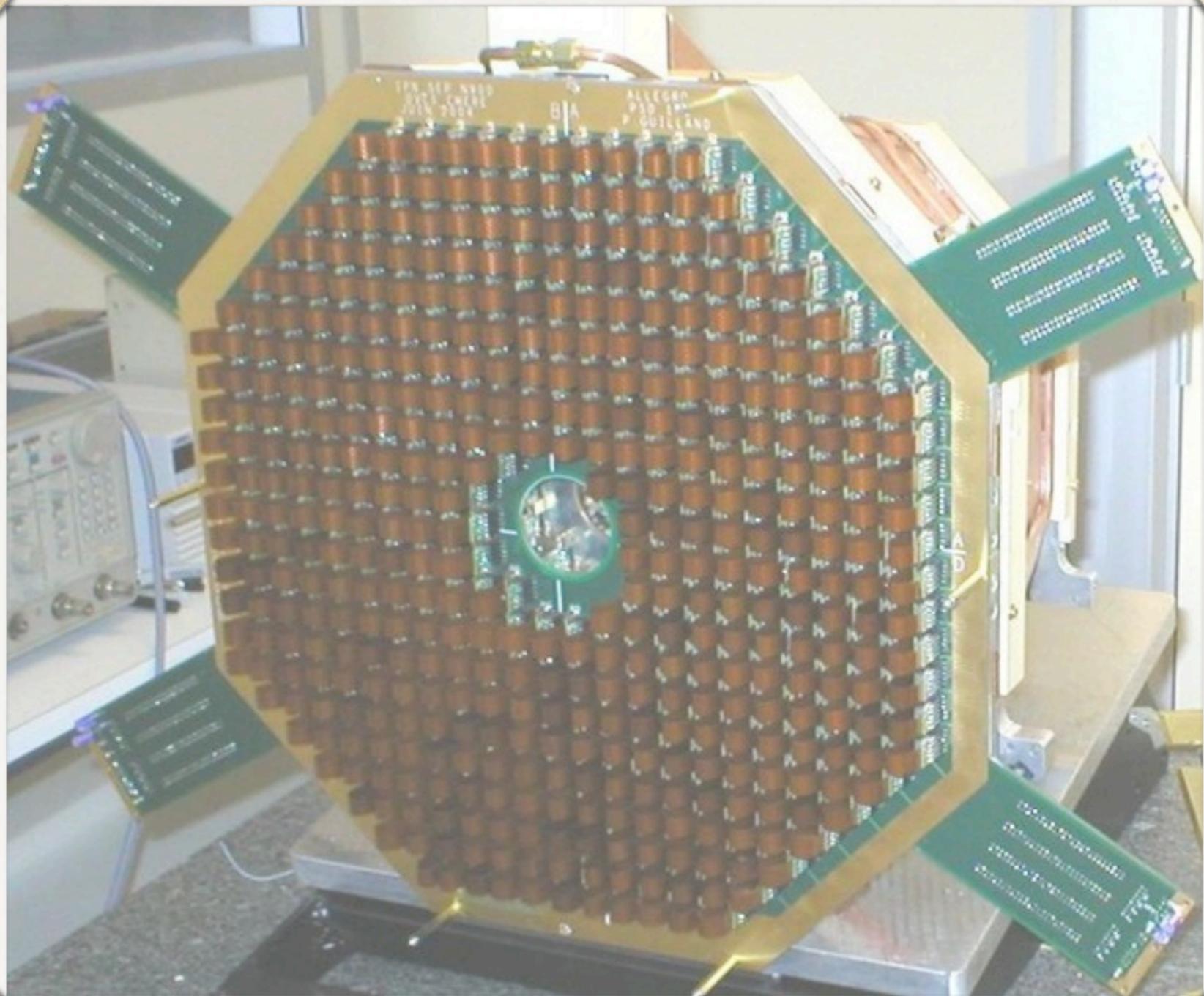
How many of you have used any DVCS?



How many of you have used any DVCS?



How many of you have used any DVCS?



The Deep Virtual Compton Scattering (DVCS) is studied at Jefferson Lab using the CEBAF 6 GeV polarized electron beam and the CLAS detector.

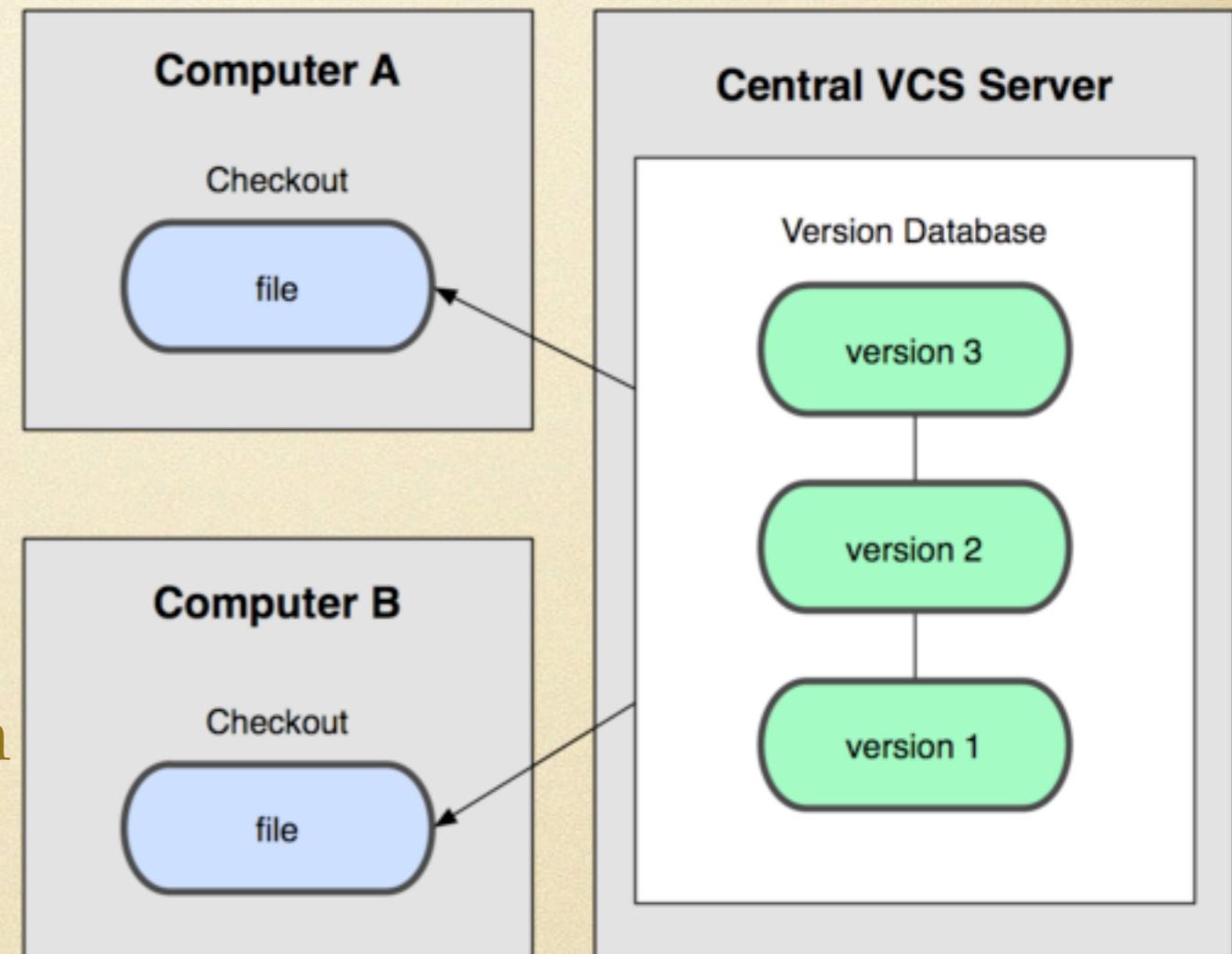
History of VCSS

History of VCSs

- First there was an ad hoc approach (copy dirs)
- Then local version control systems (VCSs)
- Then centralized (means there is a server)
 - CVS, SVN
 - ClearCase, Perforce (proprietary)

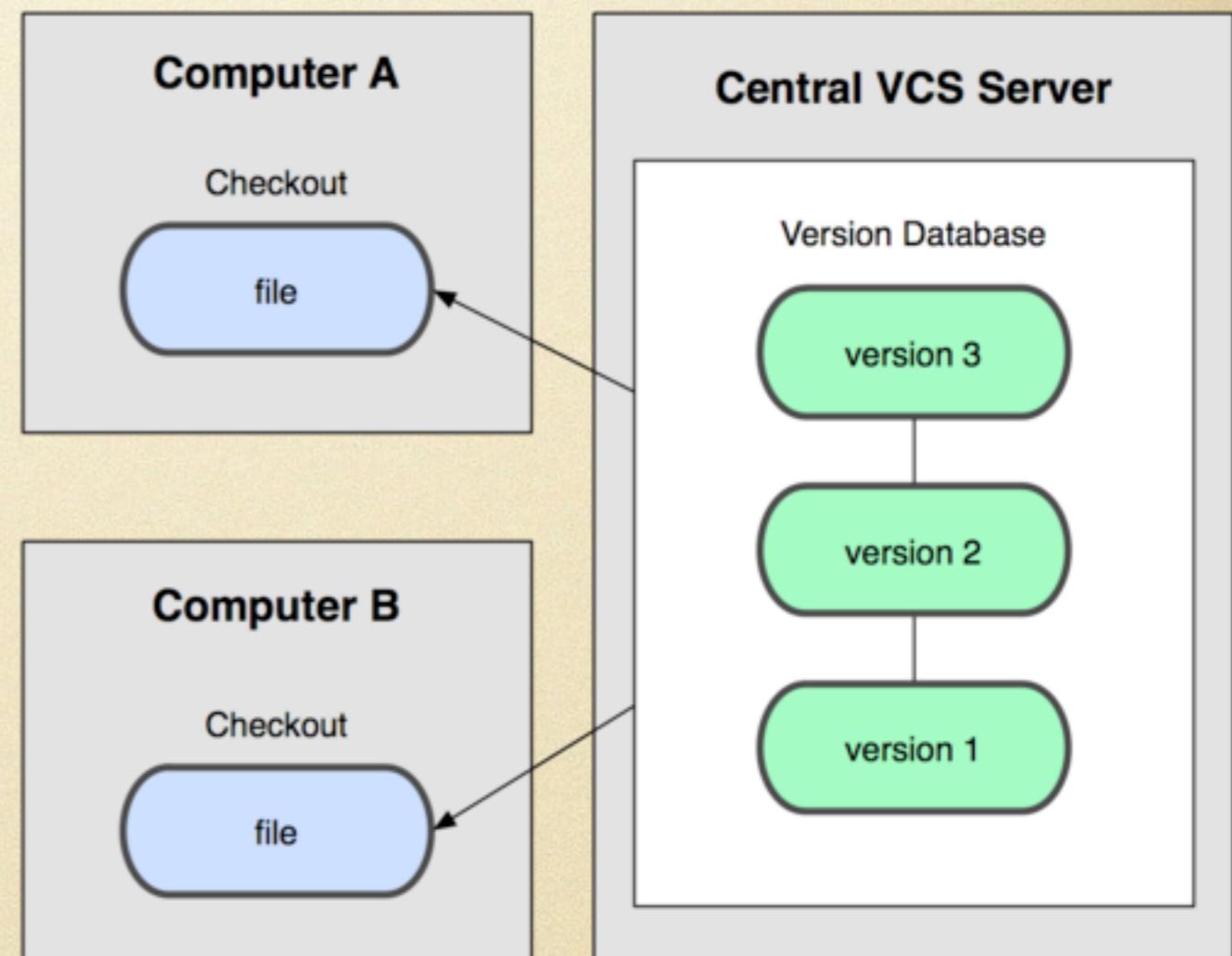
Problems of VCSs (1)

- The VCS server is a single point of failure
- Clients only have a snapshot
- Cannot commit when the server is offline
- No checksums

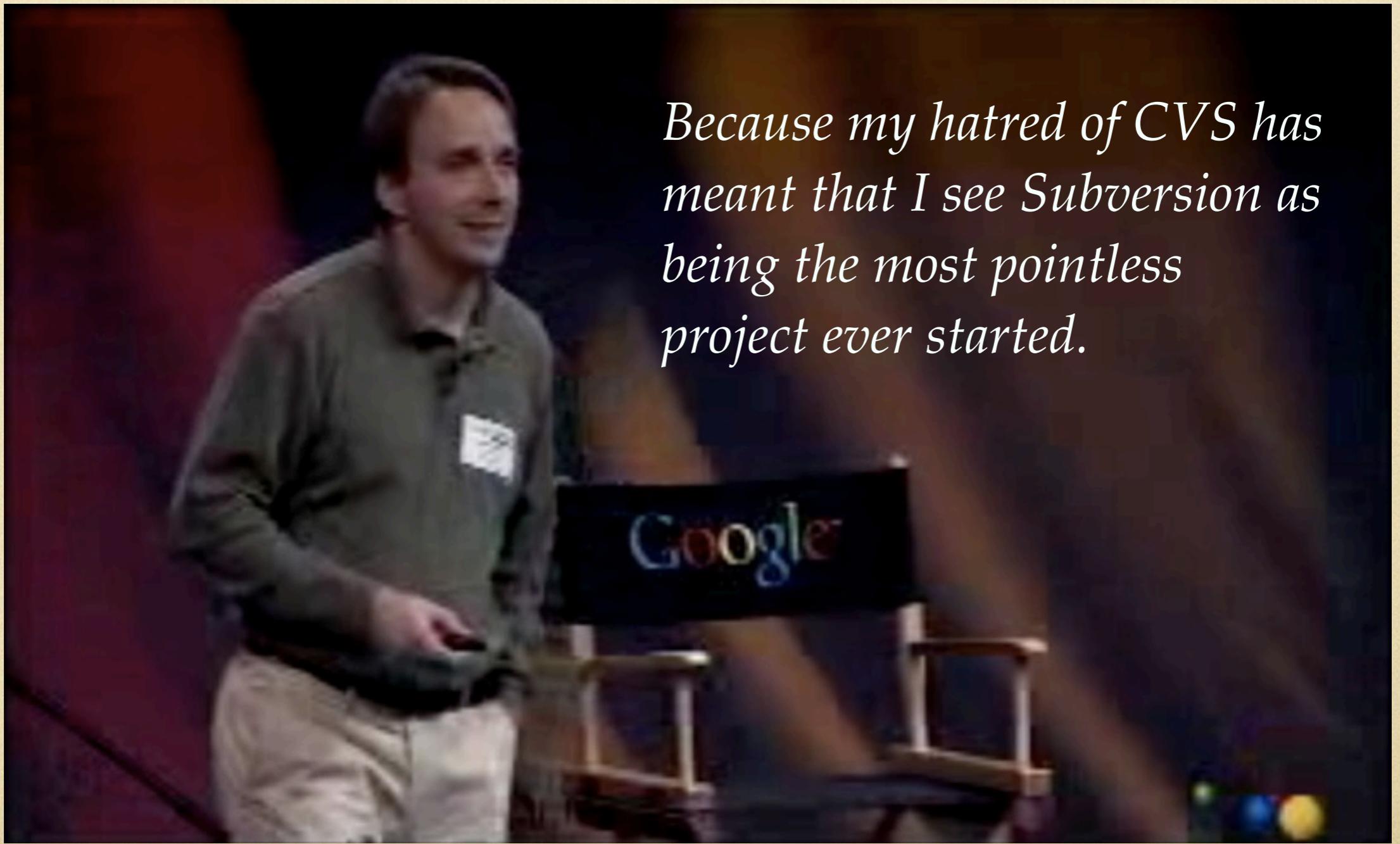


Problems of VCSs (2)

- no distinction between saving a change and making it available
- Getting history, doing diffs requires the server
 - So there is some latency



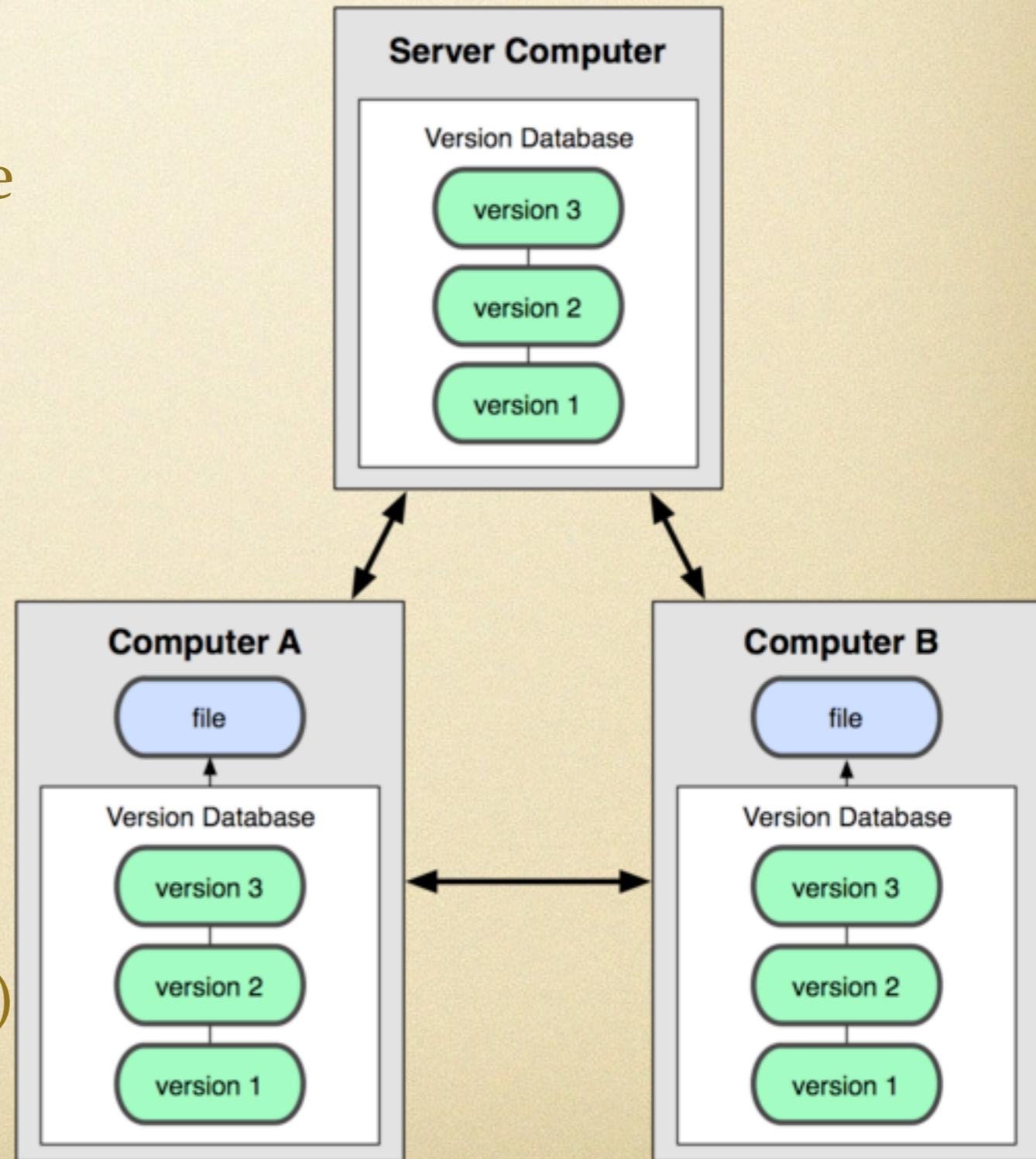
Linus on CVS/SVN



*Because my hatred of CVS has
meant that I see Subversion as
being the most pointless
project ever started.*

VCSs vs. DVCSs

- Clients have the whole repository
- There may be many servers
- Micro commits possible (two step commit)
- No latency (all is local)



List of DVCSes

- Git (inspired by BitKeeper)
- Mercurial (Hg) (inspired by BitKeeper)
- BitKeeper (proprietary)
- Bazaar
- Darcs

Git

- Developed by Torvalds for the Linux kernel
 - When the BitKeeper license was revoked
 - The controversy with Andrew Tridgell
- Written in a collection of Perl, C, shell scripts
- Free public repository at github.com (300mb)
- <http://progit.org/book/>

git clone linux-2.6

```
git clone git://git.kernel.org/pub/scm/linux/kernel/  
git/torvalds/linux-2.6.git
```

Cloning into linux-2.6...

remote: Counting objects: 1986551, done.

remote: **Compressing** objects: 100%

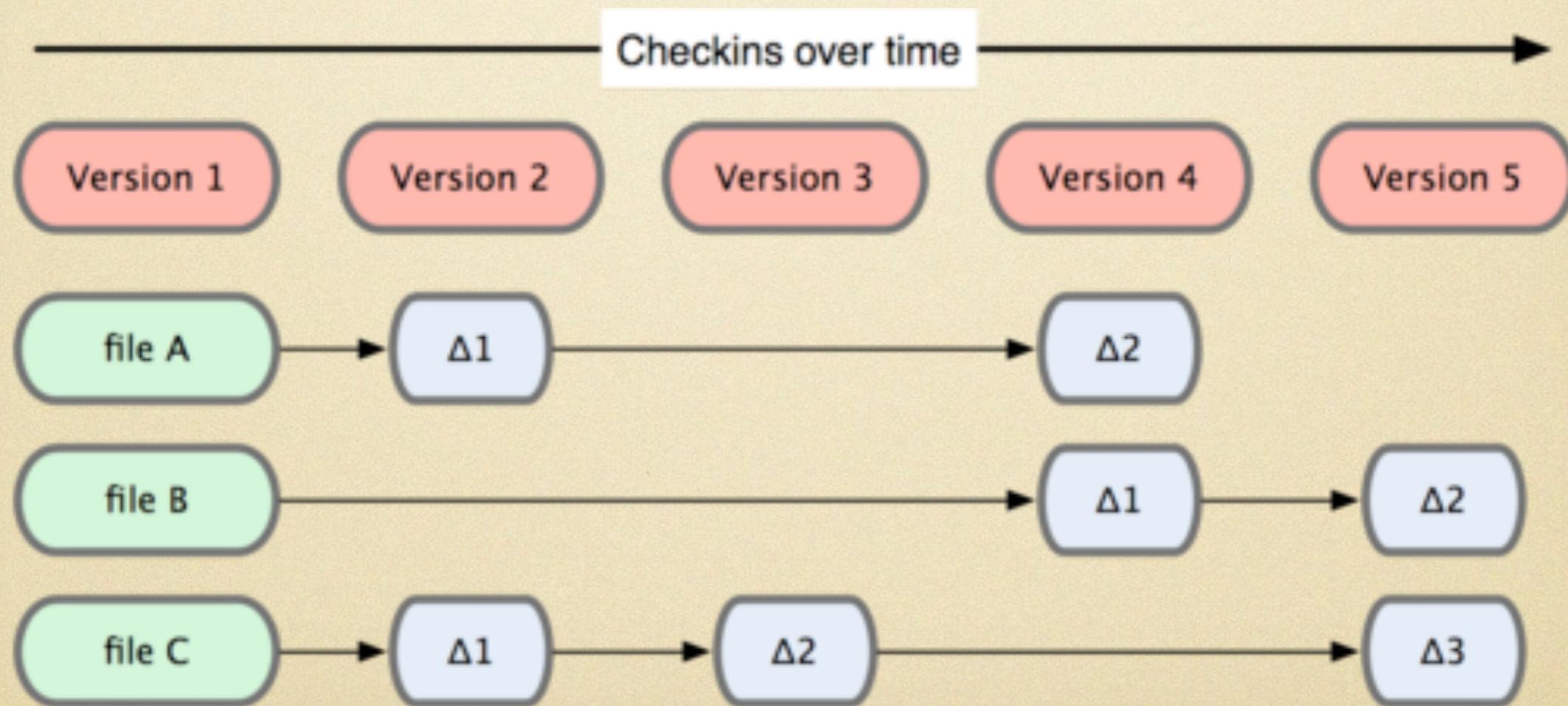
remote: Total 1986551 (delta 1653124), reused 1984179
(delta 1651063)

Receiving objects: 100% (1986551/1986551), **412.33 MiB** |
309 KiB/s, done.

Resolving deltas: 100% (1653124/1653124), done.

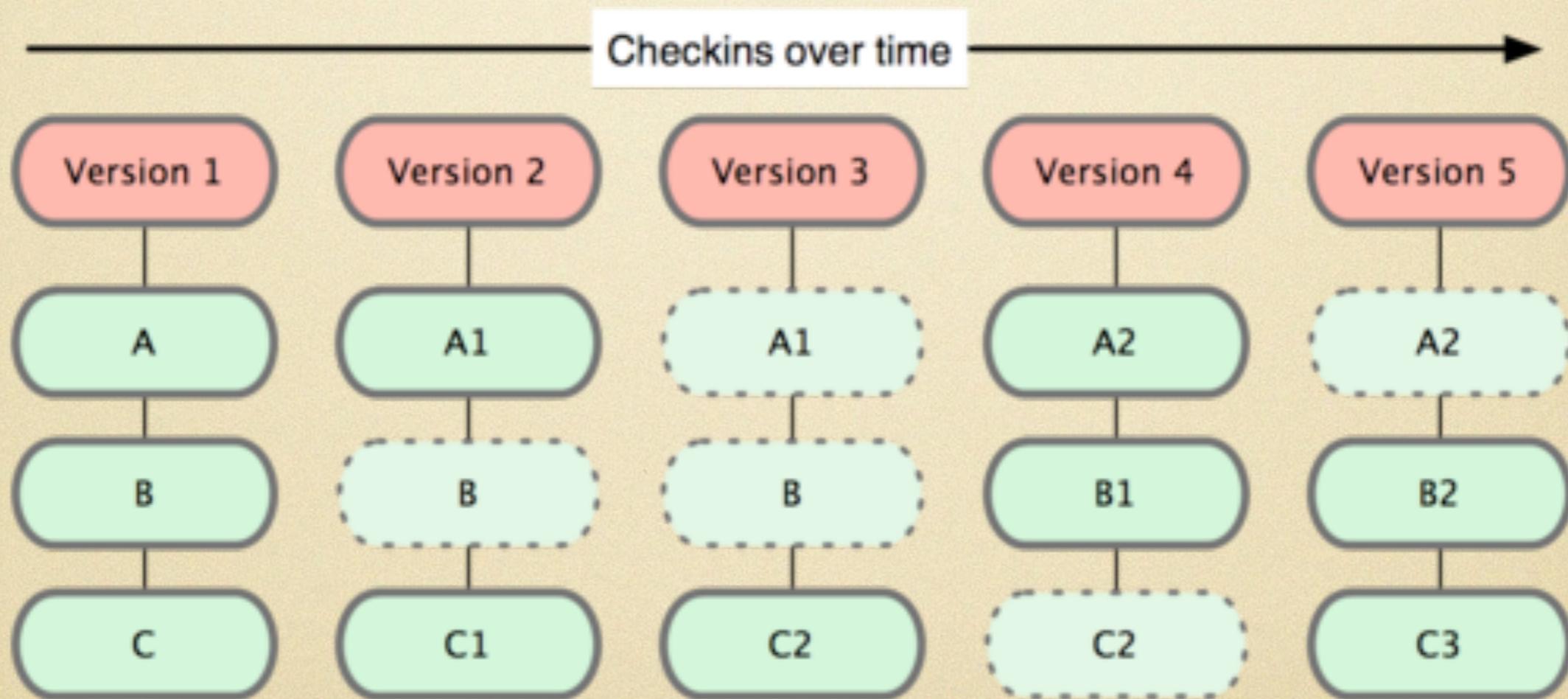
SVN mechanics

- SVN stores information as a list of file-based changes



Git mechanics

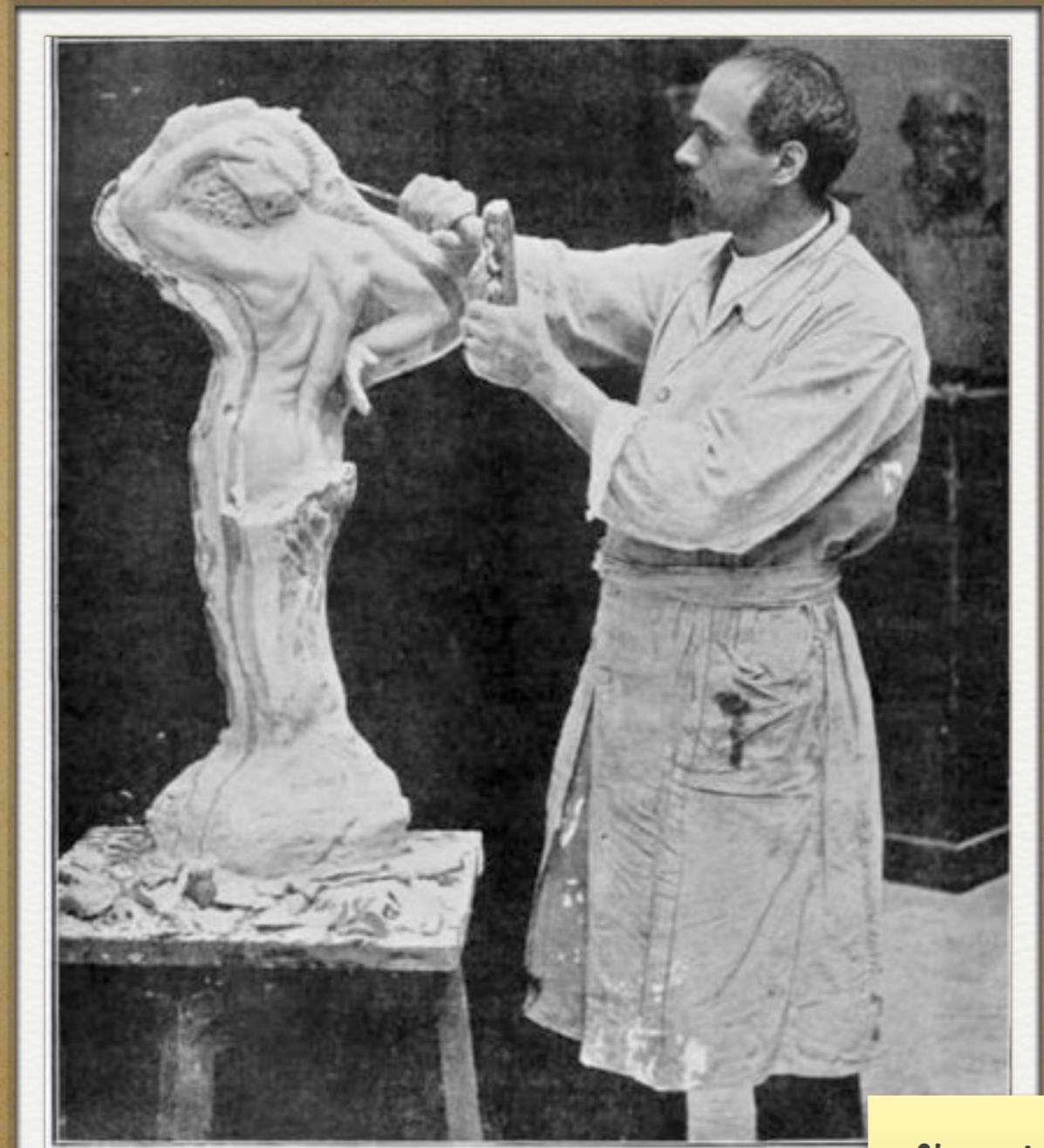
- Git thinks of its data more like a set of snapshots of a mini filesystem



Integrity

- Git uses SHA1 checksums to protect content against errors
- The checksum also includes the parent's checksum
- This is also true for Mercurial





Demo

[Show github.org](#)
[Show the certificate to login](#)
[show eclipse properties -> ssh2](#)
[show .ssh/id_rsa](#)
[show commit and push](#)

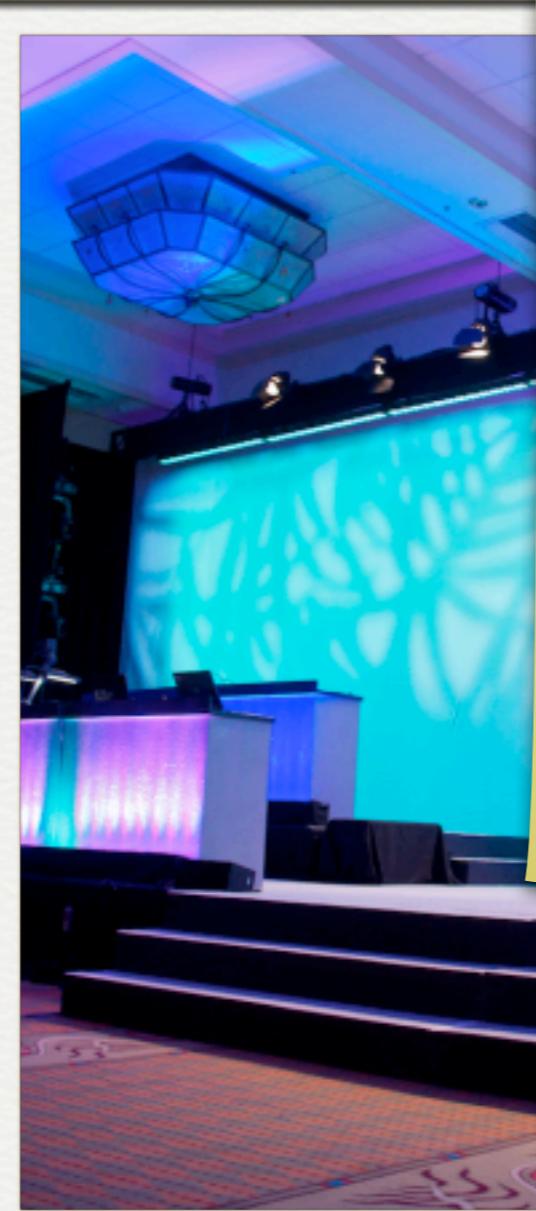


Mercurial (Hg)

- Started by Matt Mackall a month after Git
 - because of the same incident with BitKeeper
 - unfortunately the linux guys chose Git :(
 - it got popular anyway
- hginit.com - tutorial by Joel Spolsky

Command-line

- hg init
- hg add
- hg commit
- hg log
- hg status
- hg serve
- hg clone
- hg push
- hg diff
- hg update
- hg pull
-



X

Create a repository on bitbucket
Create a project and push to the repository
hg clone the project on a temp dir

```
add to .hg/hgrc  
[web]  
allow_push = *  
push_ssl = false
```

Pull from a second eclipse.
Add a class on eclipse1 and push to localhost:8000
Add the same class on eclipse2 and push.
Merge.
Get all the changes to eclipse1 and commit to bitbucket

Demo

Git is
MacGyver



Mercurial
is Bond



Git vs. Mercurial

- flexible
- scattered
- mutable history
- hierarchical history
- Rejects CVS/SVN
- straightforward
- monolithic
- immutable history
- linear history
- Can integrate w/ SVN

Impact on small projects (1)

- Have you ever used a remote repository?
- Have you had an idiot colleague that constantly broke something?
- Doing diff, getting history is a pain!

Impact on small projects (2)

- Have you been working on a feature that is quite big and at the end of the day you wanted to commit even though it is not finished?
- Have you ever wrapped your half-done feature so that it wouldn't impact the whole project?

http:// hg.openjdk.java.net

- The previous repository was TeamWare (home-brewed DSCM as they call it)
- Since b24 openjdk7 has been on Mercurial
- It is a hg-forest (means multiple repositories)
- There are push and pull gates, so in the “official” repository there aren’t many changes



Q&A

Resources

- http://www.theregister.co.uk/2005/04/14/torvalds_attacks_tridgell/
- <http://progit.org/book/ch1-3.html>
- <https://github.com/mihailstoynov/GithubProject>
- <http://hginit.com>

Resources

- [http://en.wikipedia.org/wiki/Mercurial_\(software\)](http://en.wikipedia.org/wiki/Mercurial_(software))
- [http://en.wikipedia.org/wiki/Git_\(software\)](http://en.wikipedia.org/wiki/Git_(software))

Resources

- Git vs. Mercurial
 - <http://importantshock.wordpress.com/2008/08/07/git-vs-mercurial/>
 - <http://www.rockstarprogrammer.org/post/2008/apr/06/differences-between-mercurial-and-git/>