gnunet-git – GNUnet support for git

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June 17, 2014

Contents

Motivation

1. Centralised code storage is bad
   - Prone to governmental interference
   - Anonymity is hard to achieve
   - Hard to track interesting modifications
   - We don't like GitHub
2. Consider this:
   - You're anonymously developing a harddrive encryption tool
   - The NSA has deanonymised you
   - You're being national-security'd to include a backdoor

Related work

1. Git **(duh!)**
2. Gittorrent
   - In a nutshell: BitTorrent transport for git
   - No working implementation
   - Project was abandoned in 2009

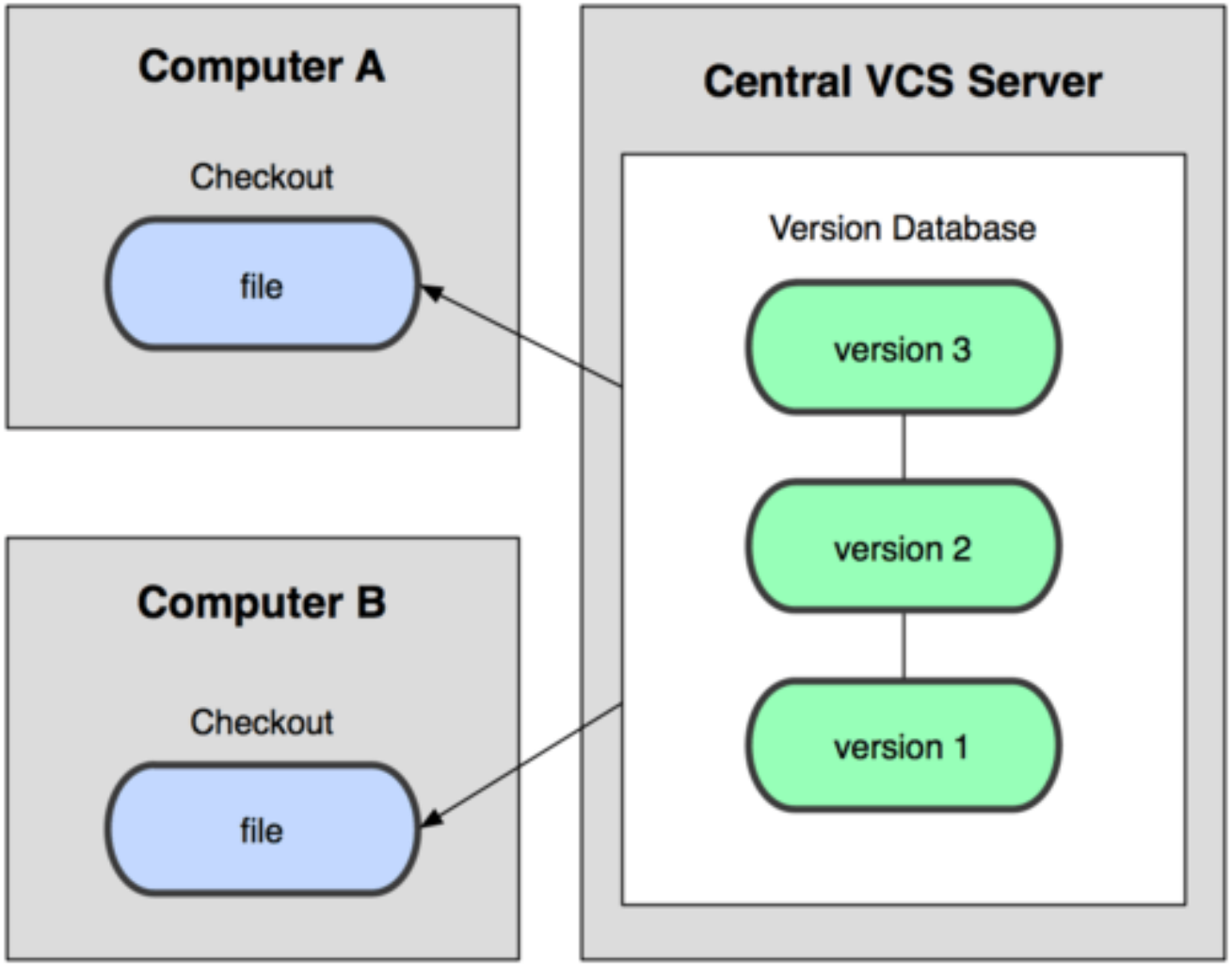
   → Not too useful for us

A git primer

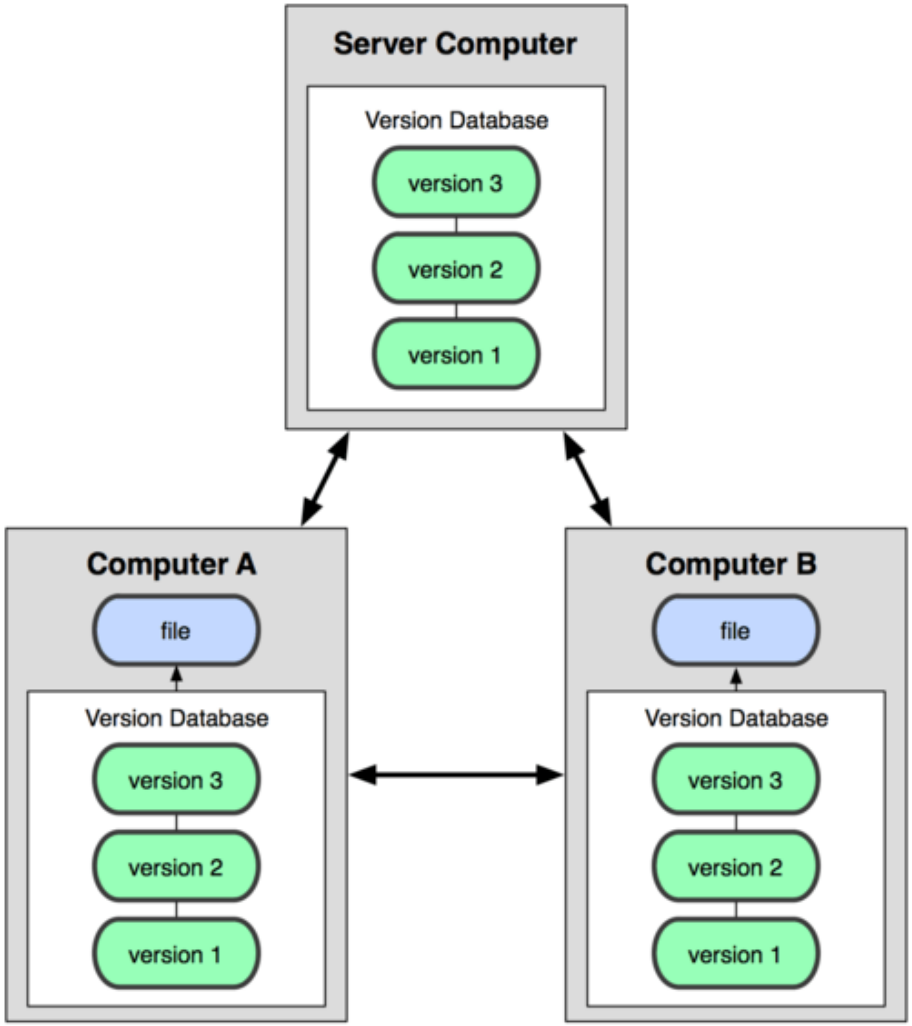
Git is a decentralised version control system, originally developed by Linus Torvalds to facilitate Linux kernel development

- Doesn't force you towards centralisation or decentralisation
- Very lightweight, tuned towards high performance
- Committing, branching, merging, etc. similar to SVN
- Any clone of a repository includes the full revision history, everything
- Decentralised structure mostly affects the workflow

A git primer - Centralised SCM



A git primer - Decentalised SCM



A git primer

git – The git commandline client

- Communicates with local and remote repositories
  - Supports *http*, *ssh*, *git*, *rsync*, *file* transports
  - Pushing only with *ssh*, *rsync* transports
- Used for any operations
  - Committing changes
  - Branching, merging
  - Pulling, pushing commits

A git primer

git – The git commandline client

Git commands you'll need the most:

- clone – fetch a repository, similar to svn co
- pull – update a previously cloned repository, like svn co
- add – mark file for inclusion in the next commit
- commit – save a set of changes to the repository
- branch – create and delete branches
- merge – merge branches

A git primer

git-daemon – The git server

- Listens on port 9418 by default
- Services requests using the git protocol
  - For example *$ git clone git://example.org/project*
- Exports all or marked repositories in its base path
  - Something like */var/lib/git/* (on Debian)

Design overview – Some terminology

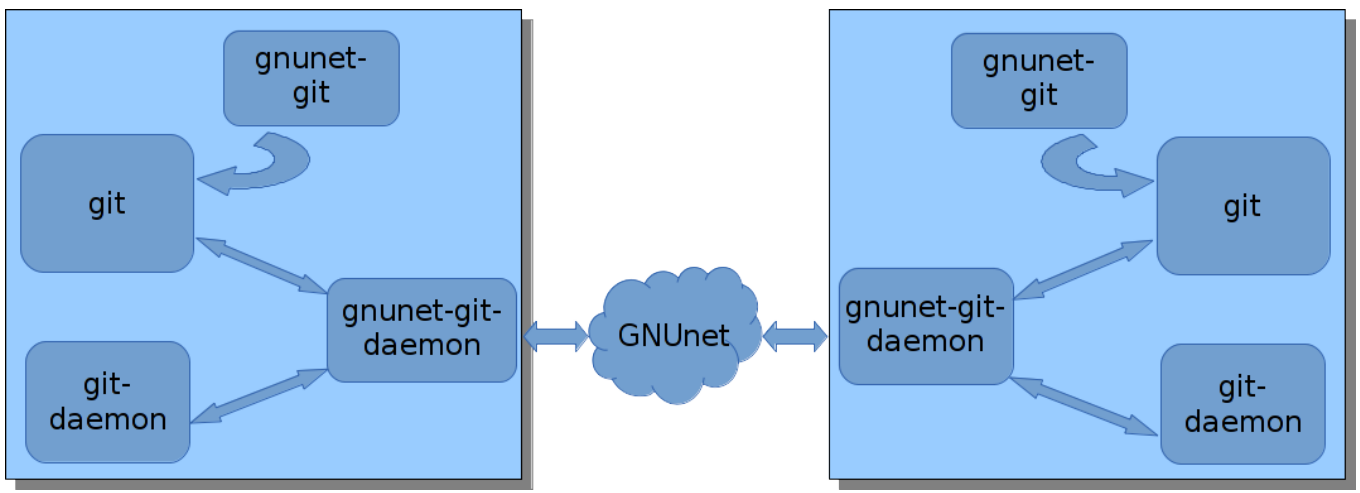
- **Local repository**: A repository that is hosted by the local git-daemon
- **Remote repository**: A repository that is hosted by the git-daemon on another machine
- **Local request**: A request for a local or remote repository that originates on the local machine
- **Remote request**: A request for a local or remote repository that originates on another machine

Design overview

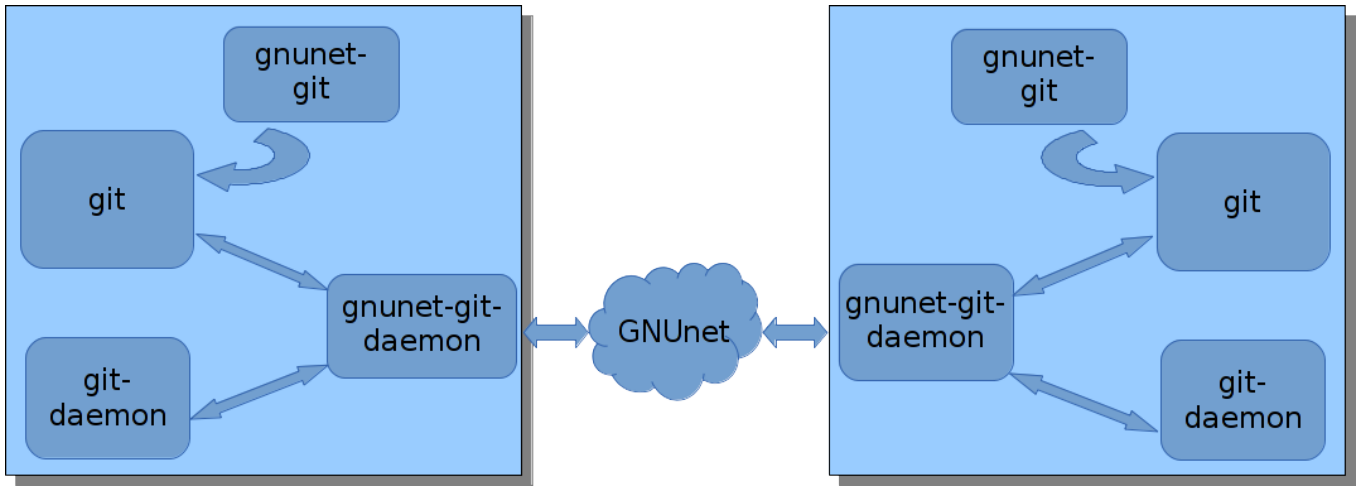
The entire thing consists of two parts:

- gnunet-git – The commandline client
- gnunet-git-daemon – The backend, GNUnet service

Furthermore, *git* and *git-daemon* are used.



Design overview



- *gnunet-git* acts as a wrapper around *git*
- *gnunet-git-daemon* listens on localhost:9418, GNUnet
  - Host lookup using GNS
  - CADET is used to communicate via GNUnet

  → Authentication and confidentiality
- *git-daemon* listens on localhost:9419

Design overview – *gnunet-git*

gnunet-git – The commandline client

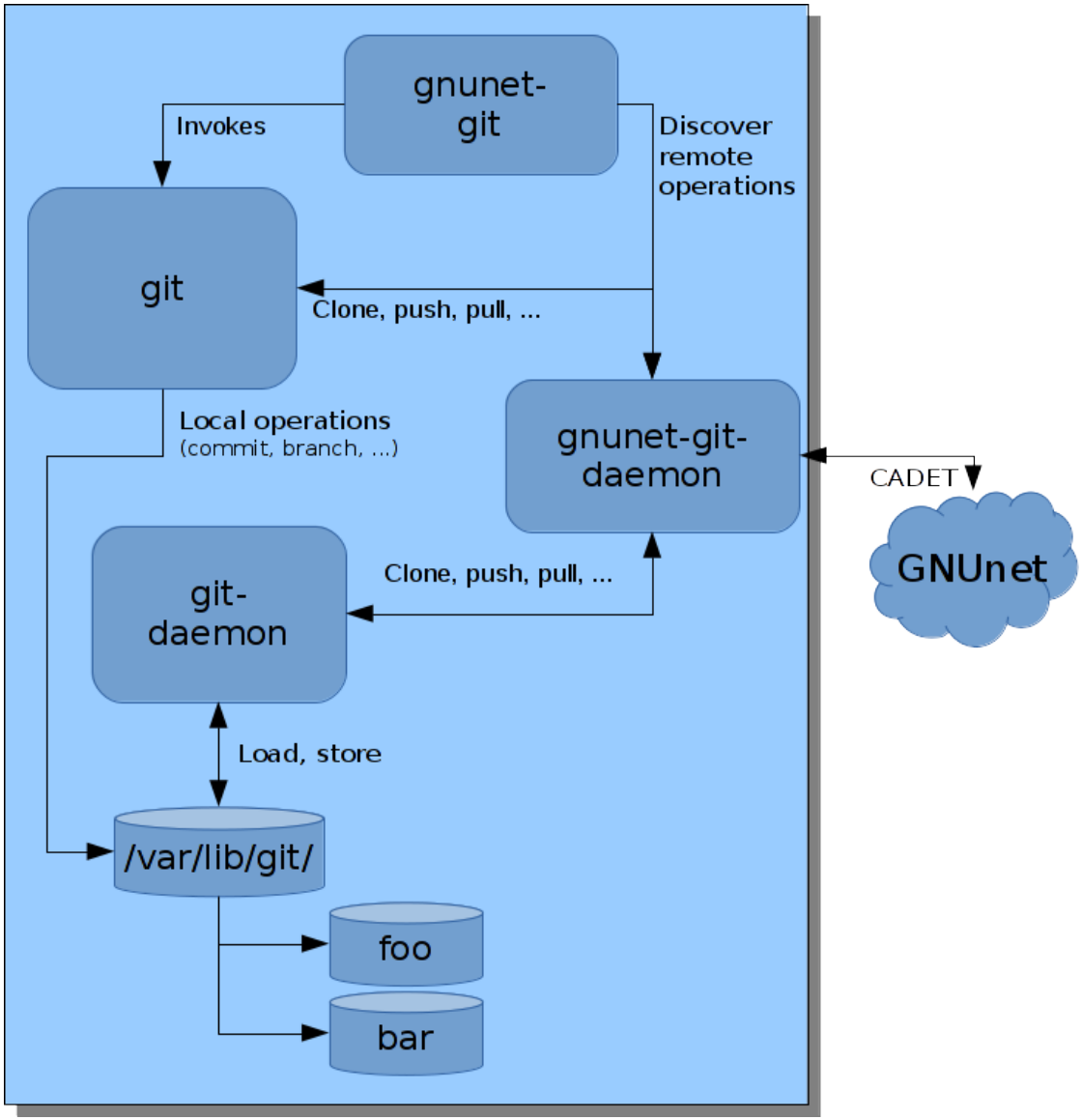
- It's (for most parts) a wrapper around *git*
- Looks at the destination URL given by the user
- Translates it to a URL that is understood by *git* and *gnunet-git-daemon*
- Used to query meta information from *gnunet-git-daemon*

Design overview – *gnunet-git-daemon*

gnunet-git-daemon – The glue between GNUnet, sockets, and git

- Listens on localhost:9418 for local requests
- Listens on a GNUnet port for remote requests
- Connects to the local *git-daemon*
- Forwards remote requests from GNUnet to the local *git-daemon*
- Forwards local requests for remote repositories to the respective GNUnet peer
- Synchronises repository statuses with familiar gnunet-git-daemons

Design overview



An illustrative example - Cloning

Example: cloning a remote repository from GNUnet

- **Alice** invokes gnunet-git:
  $ gnunet-git clone gngit://bob.gnu/project
- gnunet-git invokes git:
  $ git clone git://localhost/bob.gnu/project
- gnunet-git-daemon connects to the gnunet-git-daemon at **bob.gnu**
- The gnunet-git-daemon at **bob.gnu** relays the request to localhost:9419, its local *git-daemon*
- **Alice's** gnunet-git-daemon clones the repository into the base path of the local *git-daemon*

An illustrative example - Cloning (cont'd)

- **Bob's** gnunet-git-daemon remembers that **Alice** cloned
- **Alice** automatically shares her clone of the repository
  - **Bob** can pull interesting changes from **Alice**
  - **Bob** can decide to automatically merge changes from **Alice**

So what?

What's the advantage over plain git or tunneling git through TOR?

- GNUnet's pet name system and authentication
- NAT traversal
- Anonymity with onion-routing in CADET
- Signalling between gnunet-git-daemons
- Arguably more user-friendly

Questions? Comments?