Fast, Flexible and Fun: Revision Control with Mercurial

Martin Geisler
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aragost Trifork Geek Night in Zurich
March 24, 2010

About the Speaker

Martin Geisler:

- core Mercurial developer:
  - reviews patches from the community
  - helps users in our IRC channel
- PhD in Computer Science from Aarhus University, Denmark
- now working at aragost Trifork, Switzerland

Outline

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What is Mercurial?

Main features:

- fast, distributed revision control system
- robust support for branching and merging
- very flexible and extensible

Strong focus on back- and forwards compatibility:

- new clients can read/write all old formats on disk
- old clients can read/write to all new servers

Strong focus on data safety:

- files are not rewritten, only appended
- easier to recover from disk crashes

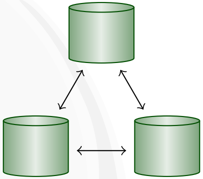
Why Distributed?

Distributed revision control gives you:

- offline commits
- rich set of fast local operations

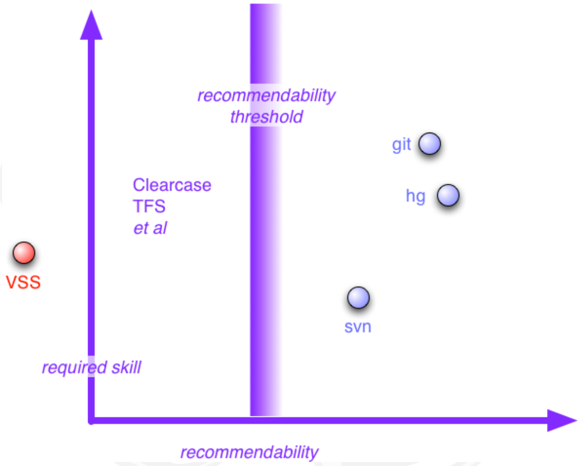
Derived effects:

- fine-grained commits
- searchable history
- branching and merging become a natural task (not something to be feared)
- enables better workflows



Testimonials

Martin Fowler, 2010: http://martinfowler.com/



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Joel Spolsky, 2010: http://www.joelonsoftware.com/

Mercurial is better than Subversion.
It is a better way of working on source code with a team. It is a better way of working on source code by yourself.
It is just better.

Google, 2008: http://code.google.com/

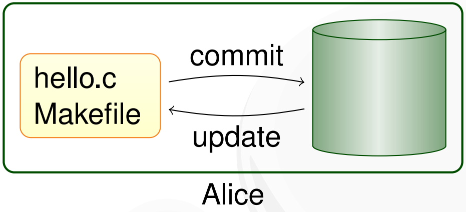
In terms of implementation effort, Mercurial has a clear advantage due to its efficient HTTP transport protocol.
In terms of features, Git is more powerful, but this tends to be offset by it being more complicated to use.

Who is Using it?

Mercurial is used by:

- Oracle for Java, OpenSolaris, NetBeans, OpenOffice, . . .
- Mozilla for Firefox, Thunderbird, . . .
- Google
- many more. . .

Key Concepts



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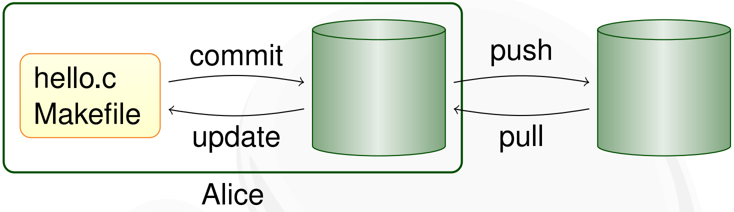

Key Mercurial Commands

Local commands:

- `hg commit`: save a snapshot into the current repository.
- `hg update`: checkout revision into working directory.
- `hg merge`: join different lines of history.

Network commands:

- `hg pull`: retrieve changesets from another repository.
- `hg push`: send your changesets to another repository.

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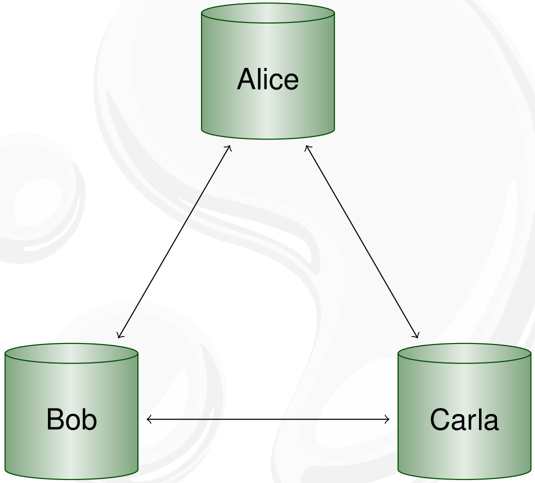
Distributed Revision Control

Mercurial duplicates the history on many servers:



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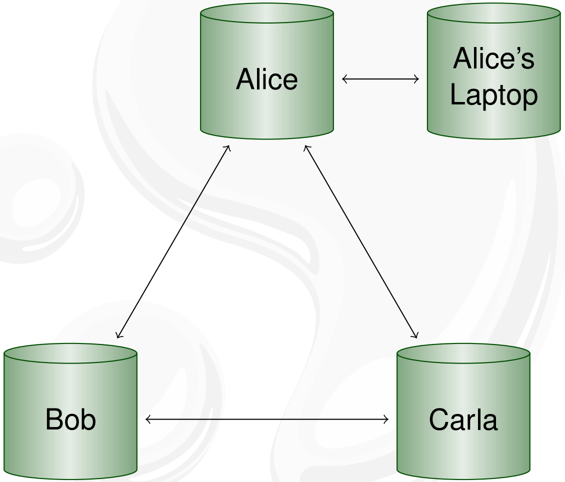

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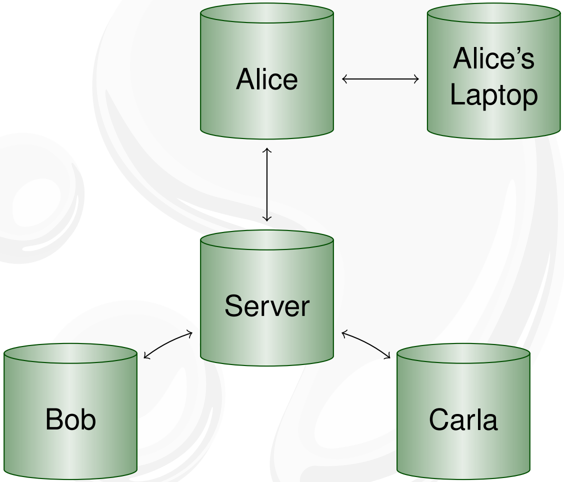

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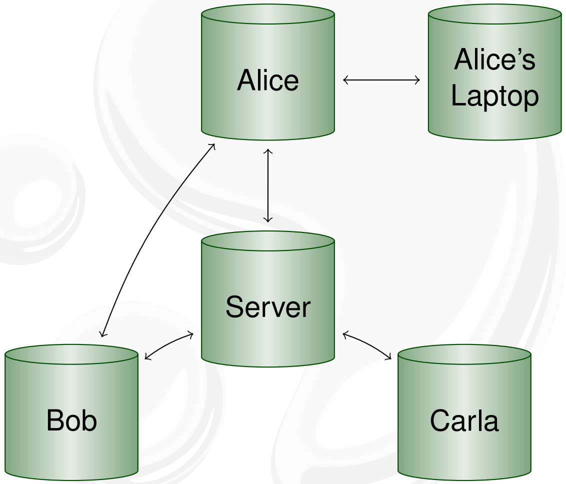
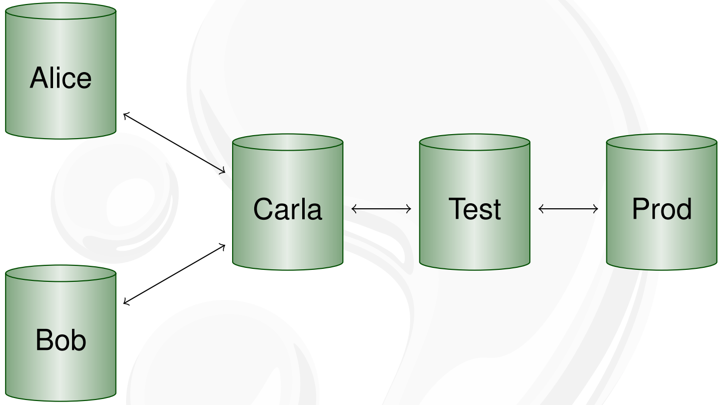


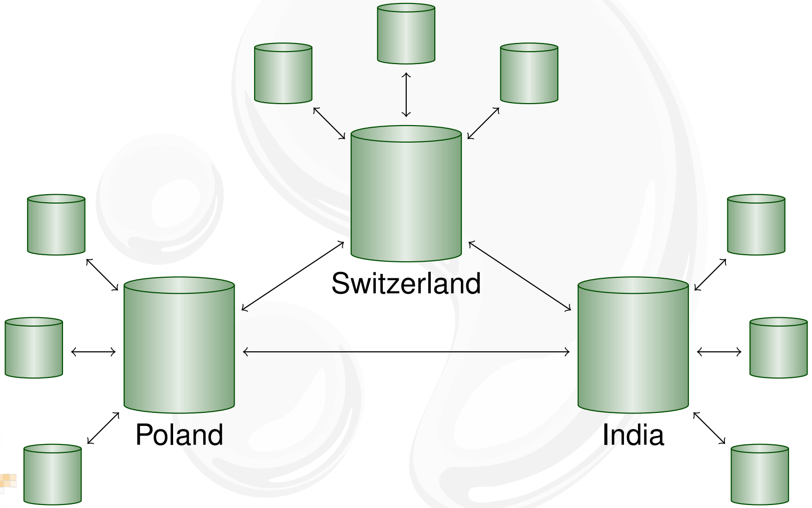
Workflow in a Team

Mercurial scales from a single team. . . :



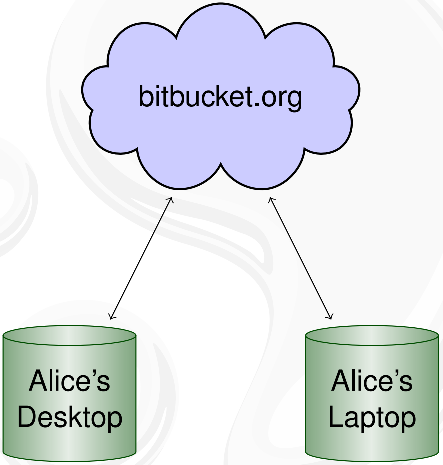
Workflow Between Company Divisions

...to enterprise-wide development...:



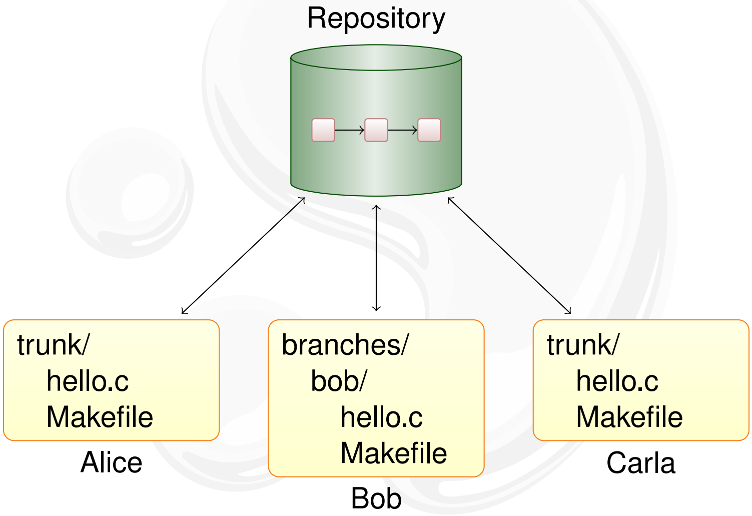
Workflow Between Two Computers

…to working with yourself:



Centralized Revision Control

Subversion uses a single server:



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Branches

A key concept:

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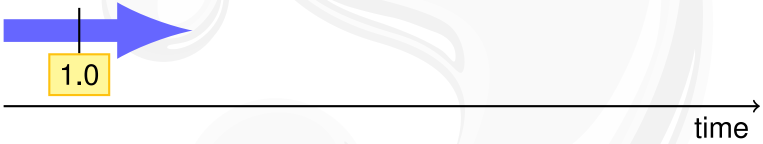

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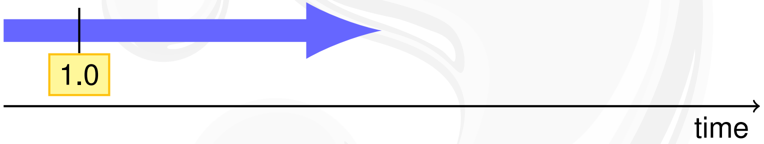

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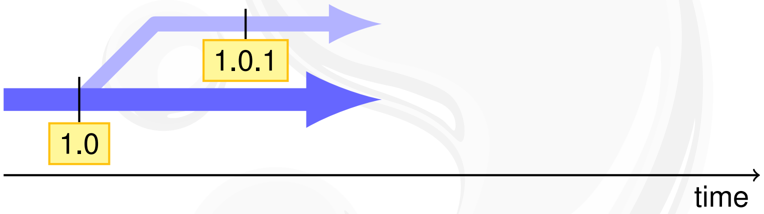

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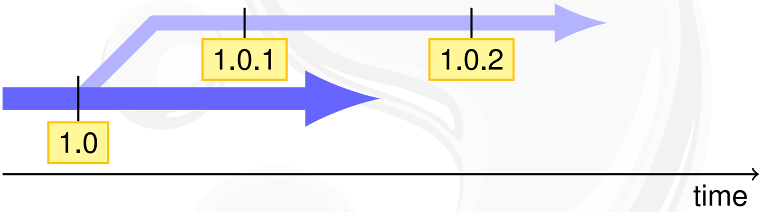
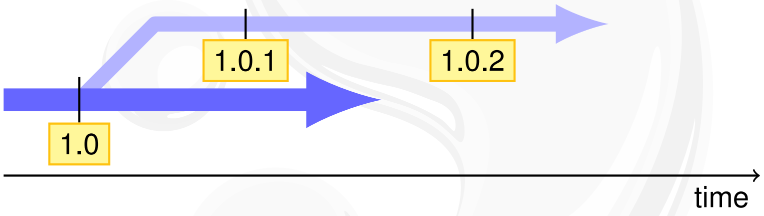


Merging

The opposite of branching:

- combines two branches
- used to merge back bugfixes
- used to integrate feature branches



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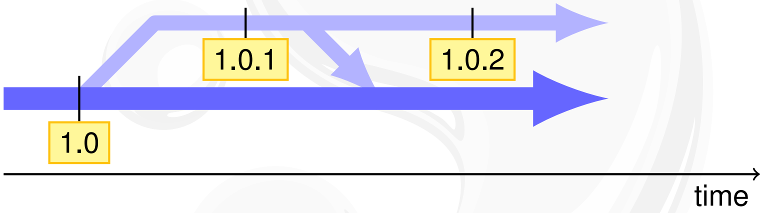

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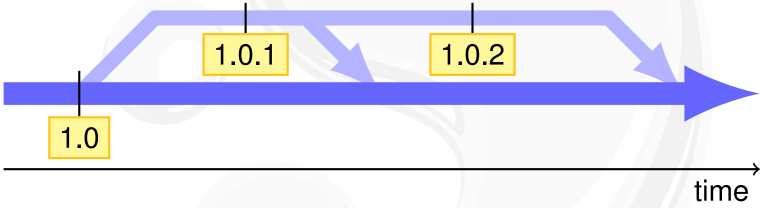

Branches in SVN

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- but SVN has a cheap copy mechanism
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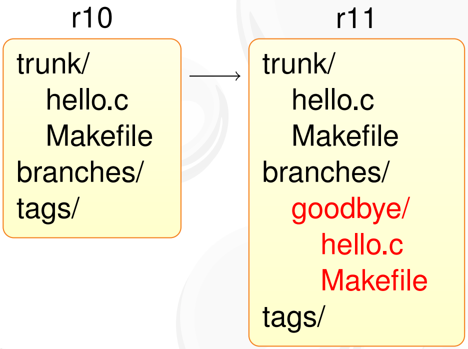

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$\longrightarrow$

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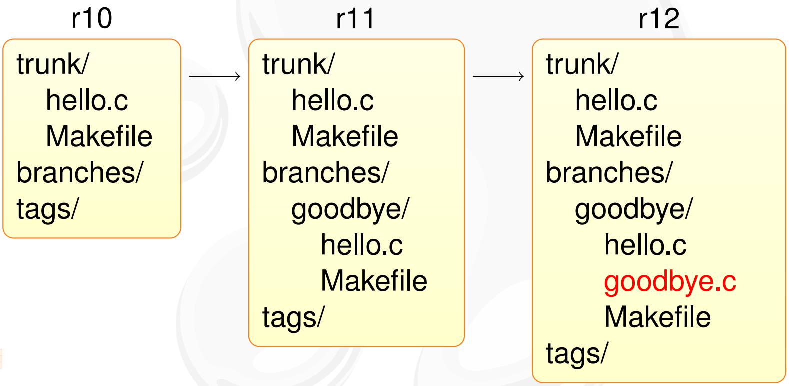

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Merging Branches in SVN

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> The bottom line is that Subversion's merge-tracking feature has an extremely complex internal implementation, and the `svn:mergeinfo` property is the only window the user has into the machinery. Because the feature is relatively new, a numbers of edge cases and possible unexpected behaviors may pop up. —*Version Control with Subversion*

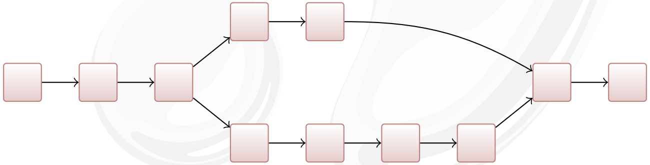
(Mercurial has robust built-in support for merging branches.)

Outline

The Underlying Model

A Mercurial changeset conceptually consist of:

- 0–2 parent changeset IDs:
  - root changeset has no parents
  - normal changesets have one parent
  - merge changesets have two parents
- date, username, commit message
- difference from first parent changeset
- changeset ID is computed as SHA-1 hash of the above
- makes it impossible to inject malicious code on server



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Browsing the History of a File

The `hg annotate` command is invaluable:

- you see when each line was introduced
- you can quickly jump back to earlier versions

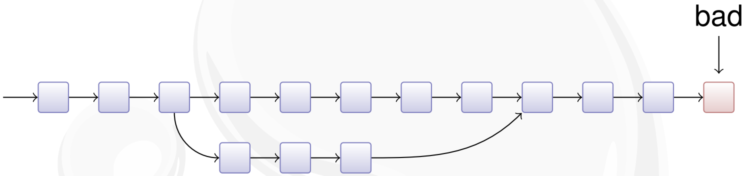
Searching File Content

Ever wondered when a function was introduced?

- `hg grep` can help you!
- local access makes searching feasible

Revision Graph Bisection

You’ve found a bug! When was it first introduced?
Use `hg bisect` to mark good and bad revisions:



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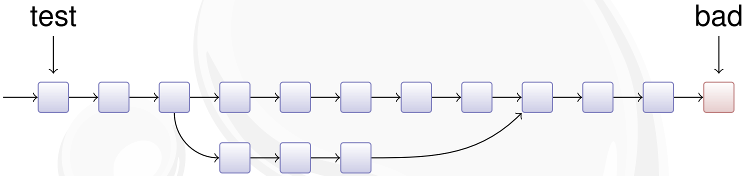

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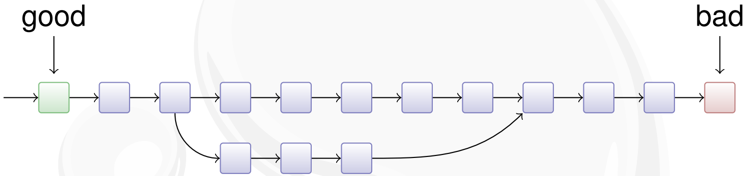

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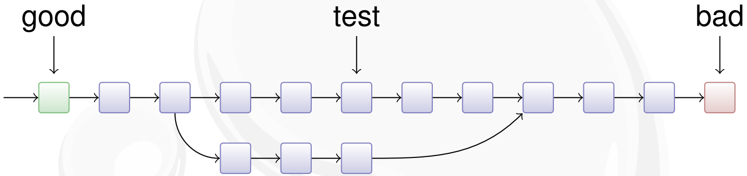

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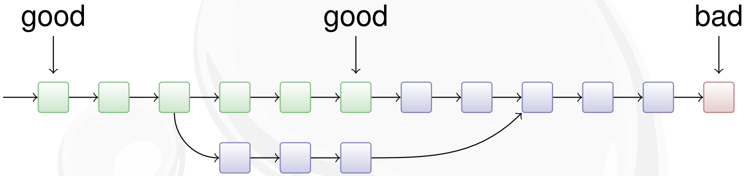

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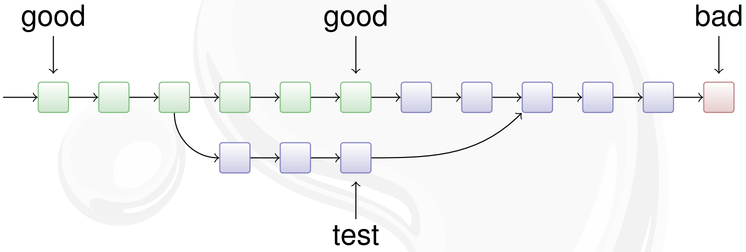

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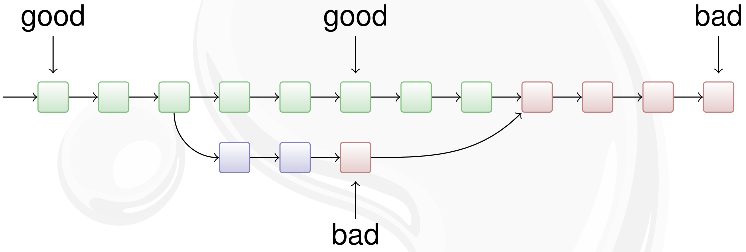

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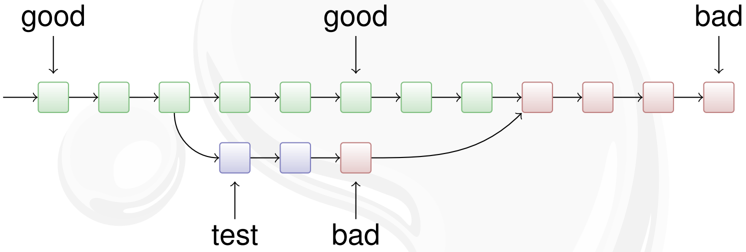

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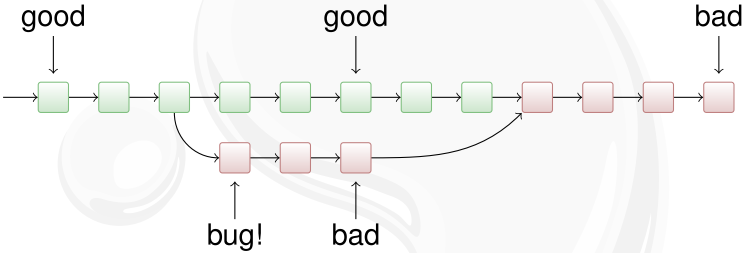

Outline

Mercurial is Extensible

You can add new functionality to Mercurial:

- ships with 30+ extensions
- wiki lists 75+ extensions
- extensions can change basically everything
- helps to keep the core small and focused

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Moving Changesets Around

Tired of all those merges? Use the `rebase` extension!

- Revision graph:

$$\begin{tikzcd} \boxed{A} \arrow[r] & \boxed{B} \arrow[r] & \boxed{C} \end{tikzcd}$$

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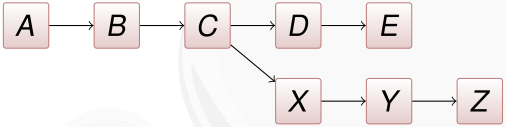

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- Beware: public changes should never be rebased.

Editing History

Inspired by `git rebase -i`, `histedit` lets you

- reorder changesets:

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- edit changesets:

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Migrating History

The `convert` extension can import history:

- CVS, SVN, Git, Bazaar, Darcs, ...
- incremental conversion
- many options for fiddling with branches, authors, ...

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Interestingly, convert can import from Mercurial:

- `--filemap` lets you exclude and rename files
- `--branchmap` lets you rename branches

Interfacing with Subversion

The `hgsubversion` extension let's you:

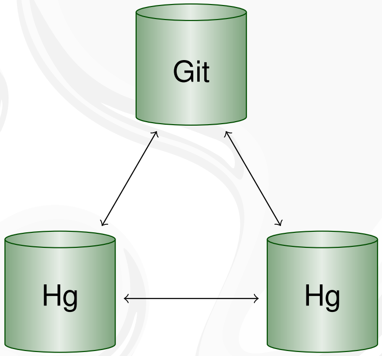
- use `hg clone` on a SVN URL
- use `hg pull` to convert new SVN revisions
- use `hg push` to commit changesets to SVN server

Goal: make `hg` a better Subversion client than `svn`!

Interfacing with Git

Need to work on a Git repository? Try `hg-git`!

- Mercurial extension: you get the nice `hg` command line
- round-tripping: changeset hashes are preserved



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Third-Party Tools

Tools with Mercurial support:

- Shell integration: TortoiseHg (Windows, Mac, Linux)
- IDEs: Eclipse, NetBeans, IntelliJ, Visual Studio, Emacs…
- Project Support: Trac, JIRA, Maven, Hudson, BuildBot…

Outline

Live Demo!

Outline

Mercurial in a Nutshell

Mercurial changes the way you develop:

- simple yet strong model for both branching and merging
- power tool instead of necessary evil
- light-weight and snappy

More Information

- Mercurial homepage:
  http://mercurial.selenic.com/
- *Mercurial: The Definitive Guide*:
  http://hgbook.red-bean.com/
- Getting Started:
  http://mercurial.ch/
  http://hginit.com/
- Some free Mercurial hosting sites:
  http://bitbucket.org/
  http://code.google.com/
  http://sourceforge.net/
  http://www.codeplex.com/ (Microsoft)

Contact

Please get in touch if you have more questions or have considered using Mercurial in your organization:

- Email: `mg@aragost.com`
- IRC: `mg` in `#mercurial` on `irc.freenode.net`

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Thank you!