
Version Control Systems

Some of the pictures in the slides are taken from Collabnet inc



Why Versioning?

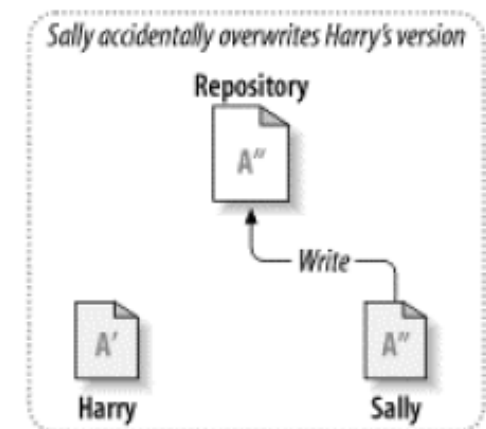
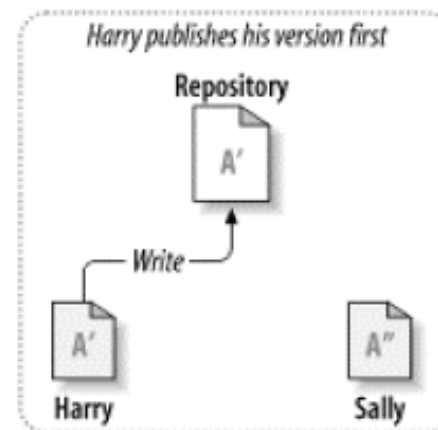
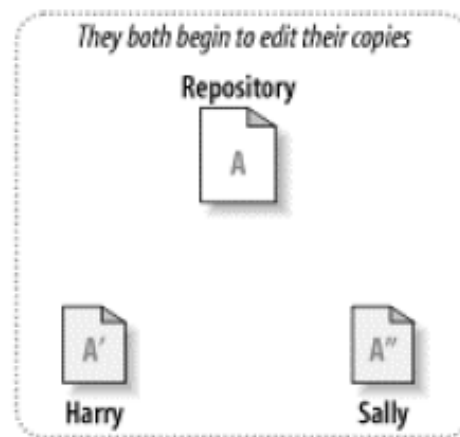
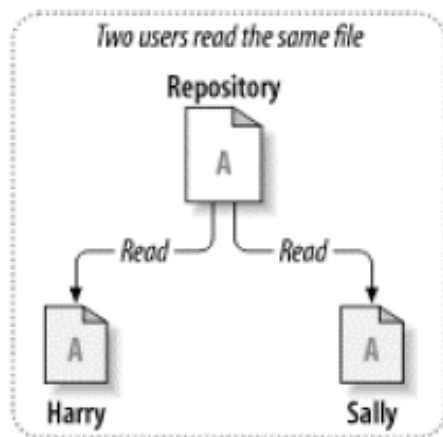
Members of a software development group need to:

- have access to the group source code (file sharing)
- work at the same time on the same files (concurrent editing)
- keep track of different versions of the same file (history)

A Version Control System is a special file server, designed for concurrent editing and to store history information.

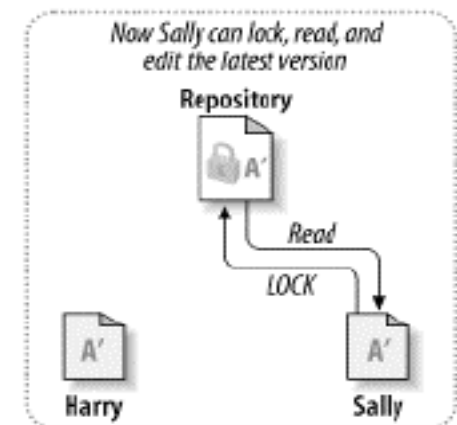
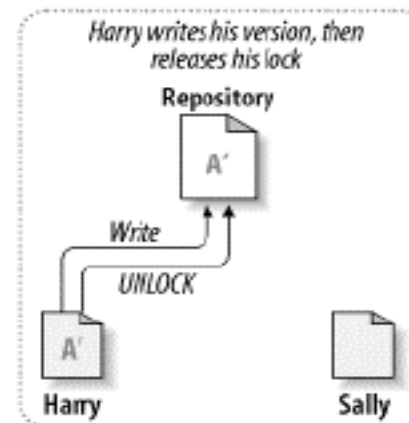
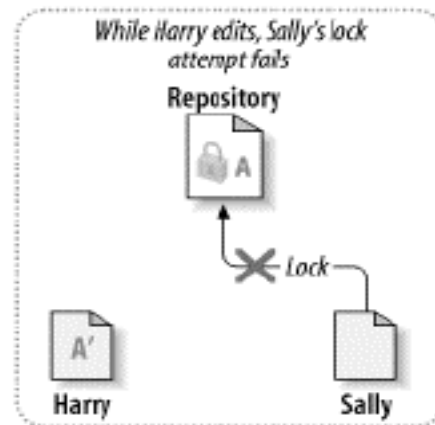
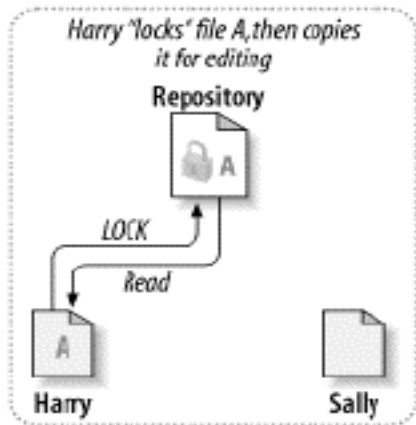


Concurrent Editing



A normal file server (ex. NFS) can provide file sharing but maintains only one version of each file

Lock – Modify – Unlock



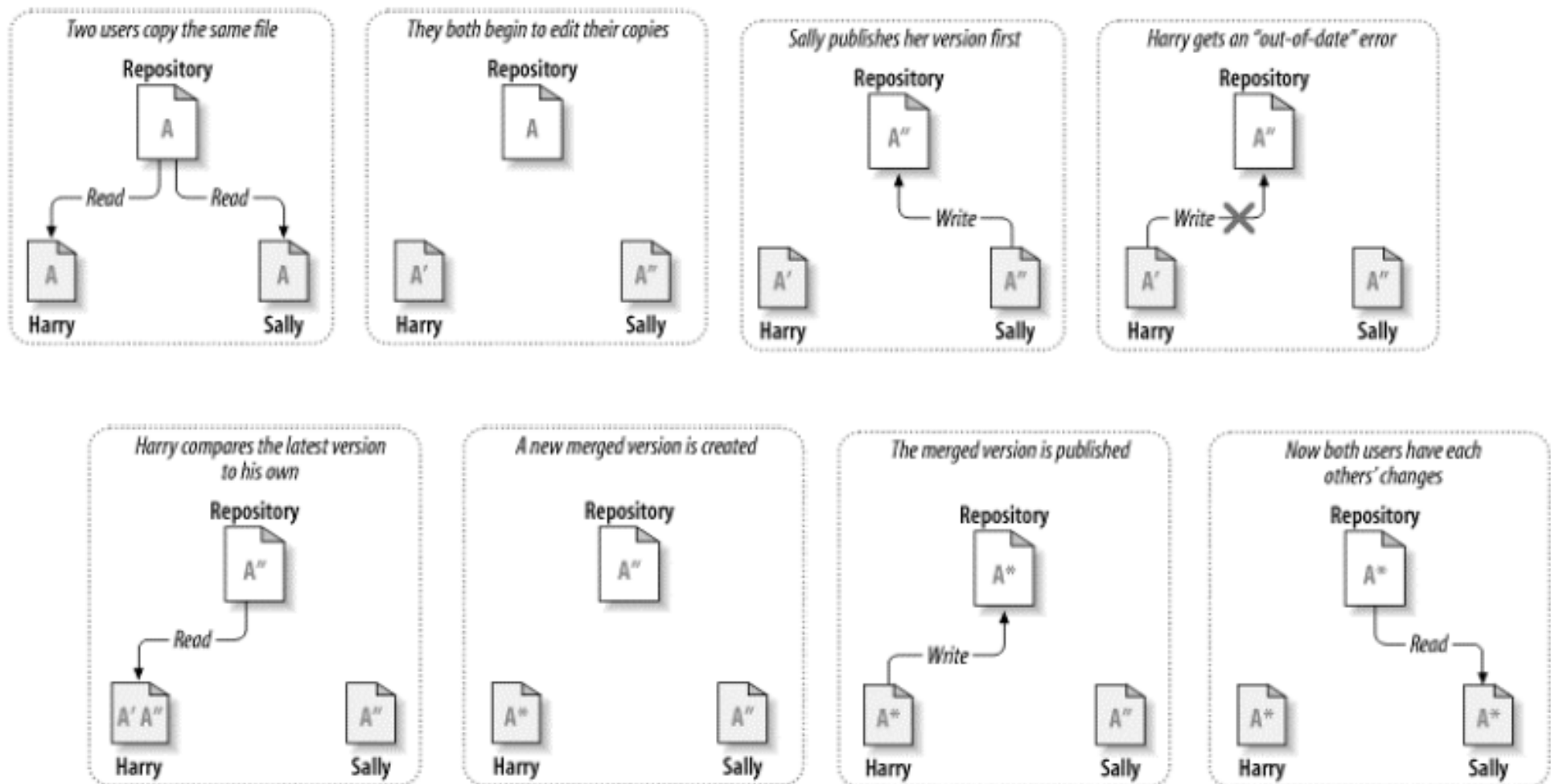
A simple mechanism to support concurrent editing

Lock – Modify – Unlock

- ▶ Disadvantages of this scheme:
 - ▶ delays: locking a file prevents concurrent editing
 - ▶ administrative overhead: if a user forgets to release the files he has locked, an administrator has to manually remove the lock before another user can edit the files.
 - ▶ false sense of security: locking a single file is not sufficient if there are other files depending on it

Copy – Modify – Merge

► A better mechanism



Copy – Modify – Merge

- ▶ When merging, two types of changes to a file can occur
 - ▶ *changes that do not overlap* : in this case merging is trivial - just take the sum of changes
 - ▶ *changes that overlap* : in this case there is a conflict and merging can be difficult - users must communicate to decide which changes to propagate to the new version.
- ▶ Merging is a manual process by the user
(No AI available yet to decide which changes to take).
- ▶ The amount of time it takes to resolve conflicts is far less than the time lost by a locking system.

Available Version Control systems

- ▶ CVS
- ▶ SVN
- ▶ BitKeeper
- ▶ Git
- ▶ Mercurial
- ▶ Others...

Centralized Vs Distributed Versioning

- ▶ Client-server Vs Peer-Peer
- ▶ Single “central” repository Vs Many “central” repositories
- ▶ Many different ways to merge/branch have been proposed
- ▶ There are many other differences...