



PVG (EDA260) - lecture 3: Konfigurationshantering

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What is SCM?



Software Configuration Management:
is the discipline of organising, controlling and managing the development and evolution of software systems. (IEEE, ISO,...)

The goal is to maximize productivity by minimizing mistakes. (Babich)

- Citroën C3 fires
- Carlo's lemon marmalade



Building on sand?



CM is a CMM level 2 key process area

Req.

Design

Testing

Coding

QA

Software Configuration Management

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SCM for XP development



Support and help for:

- handling source code
- collective ownership
- simple integration
- painless refactoring
- ease of testing
- effortless releasing
- handling document(ation)

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Goals



- to be able to return to well-defined states
- to have an overview of the development history
- to show what depends on what
- to help people co-ordinate their work

An ounce of [history] is worth a pound of analysis.
Babich



How does a programmer spend his time?



- 50 % interacting with other team members
- 30 % working alone (pair-programming??)
- 20 % non-productive activities

Common heritage is the reason:

- sharing things
- memory/history
- communication
- co-ordination

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Problems of co-ordination



Shared data

Double maintenance

Simultaneous update

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Co-ordination



Working in isolation:

- local dynamicity
- global stability
- problem:
 - multiple maintenance

Working in group:

- global dynamicity
- problems:
 - shared data
 - simultaneous update

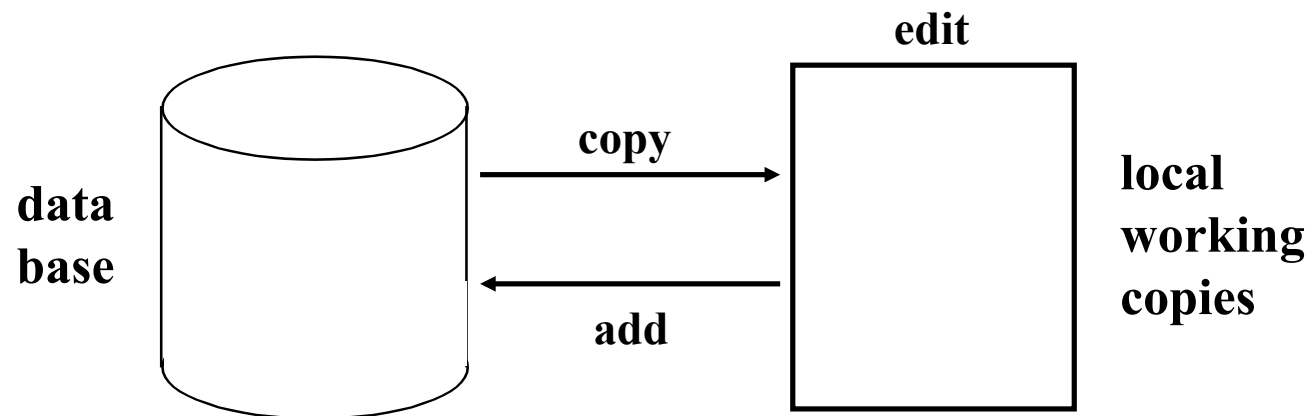
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Immutability principle



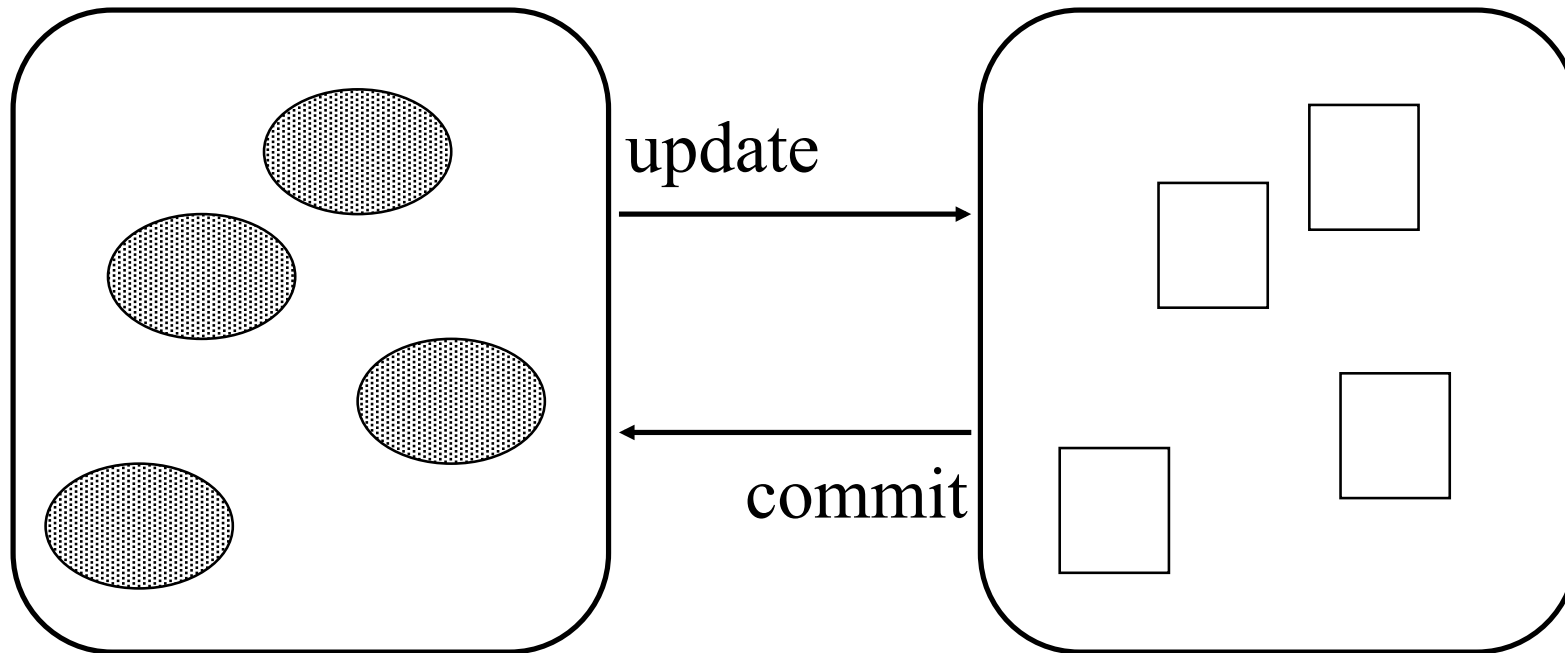
Principle: components are immutable



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Working



Project repository

Private/pair workspace

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Copy/merge work model



Can we *lock* the things we want to work on? NO!

So we **copy** everything to our workspace...

...and everyone else copy to their workspaces...

⇒ double maintenance !!

o

Fortunately "update" has a built-in **merge** facility:

- We first merge *from* the repository *into* the workspace
- Then we check and fix problems
- Finally we commit (add) to the repository

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Quotes from XP'ers



- Overall CVS (and CM) was a HUGE help for the project.
- The version history was a real life saver.
- CVS made it possible for 12 people to work on the same code at the same time.
- CVS rules!
- It would have been impossible to merge different people's work without it.
- CVS sucks!
- Branching made releasing much easier.
- We tagged the releases – it served it's purpose.

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So how is CM used?

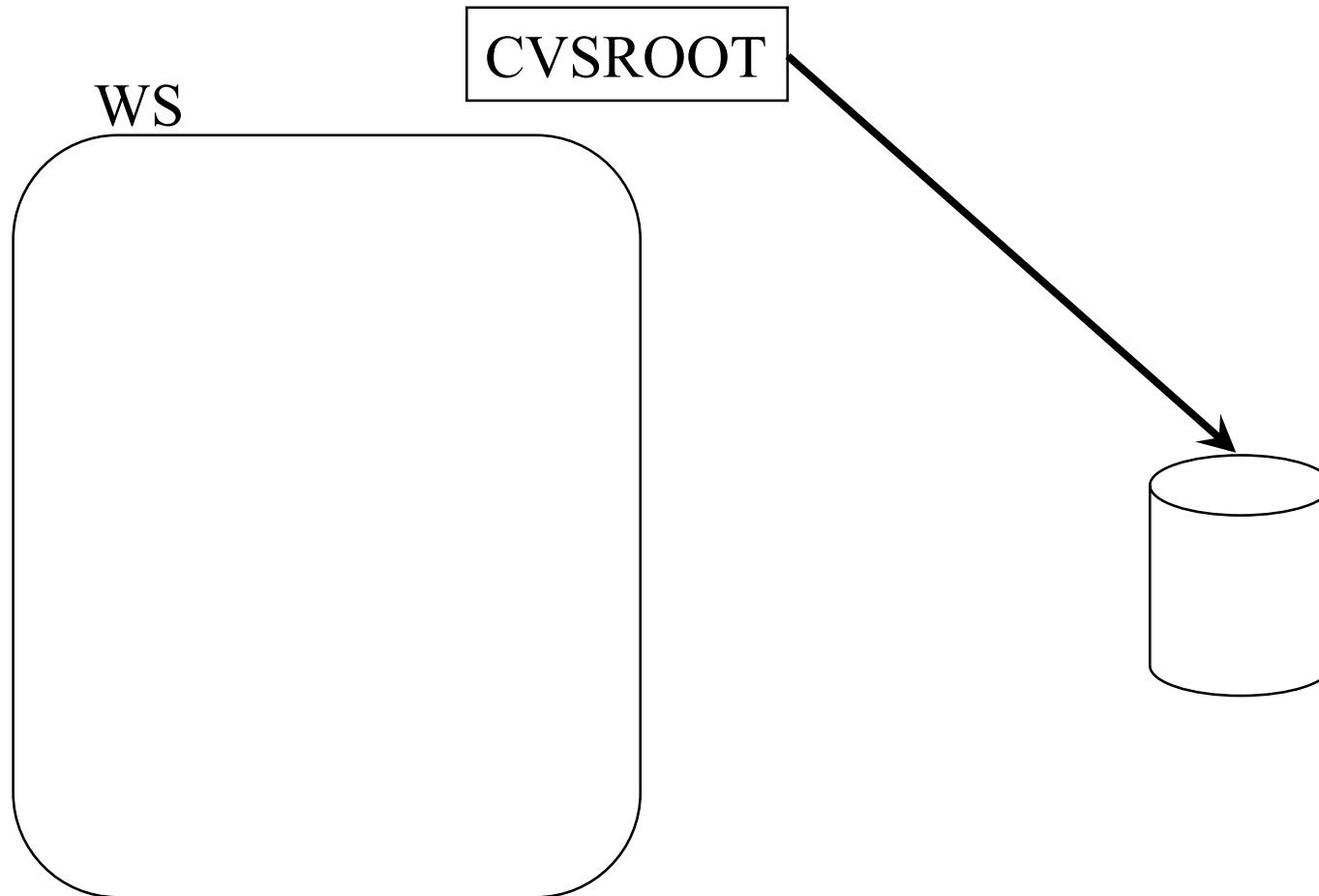


- update-commit
- merge – merge – merge
- no versioning, diff, tag, ...
- change log only to identify people

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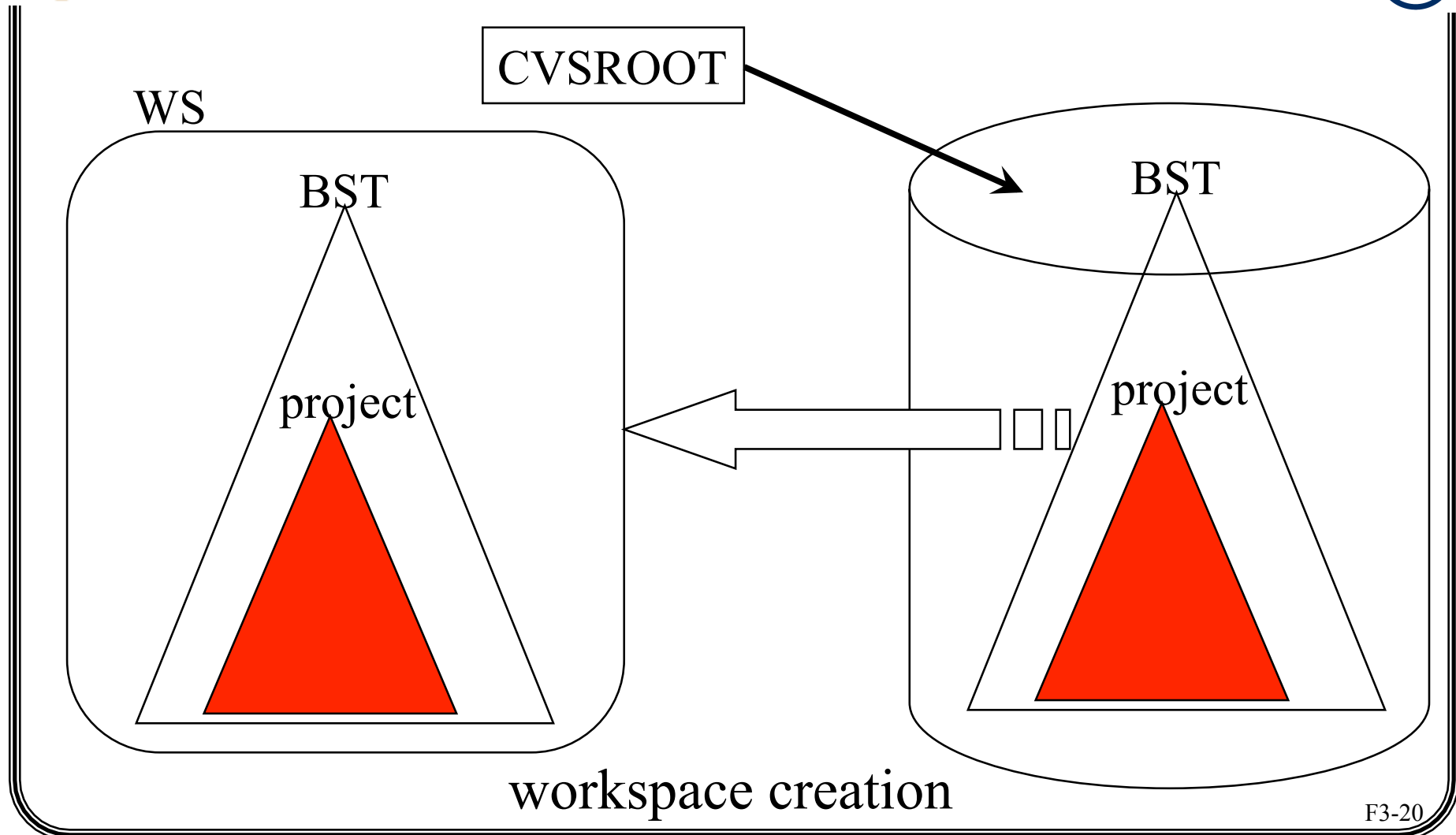
mkdir WS; export CVSROOT=....



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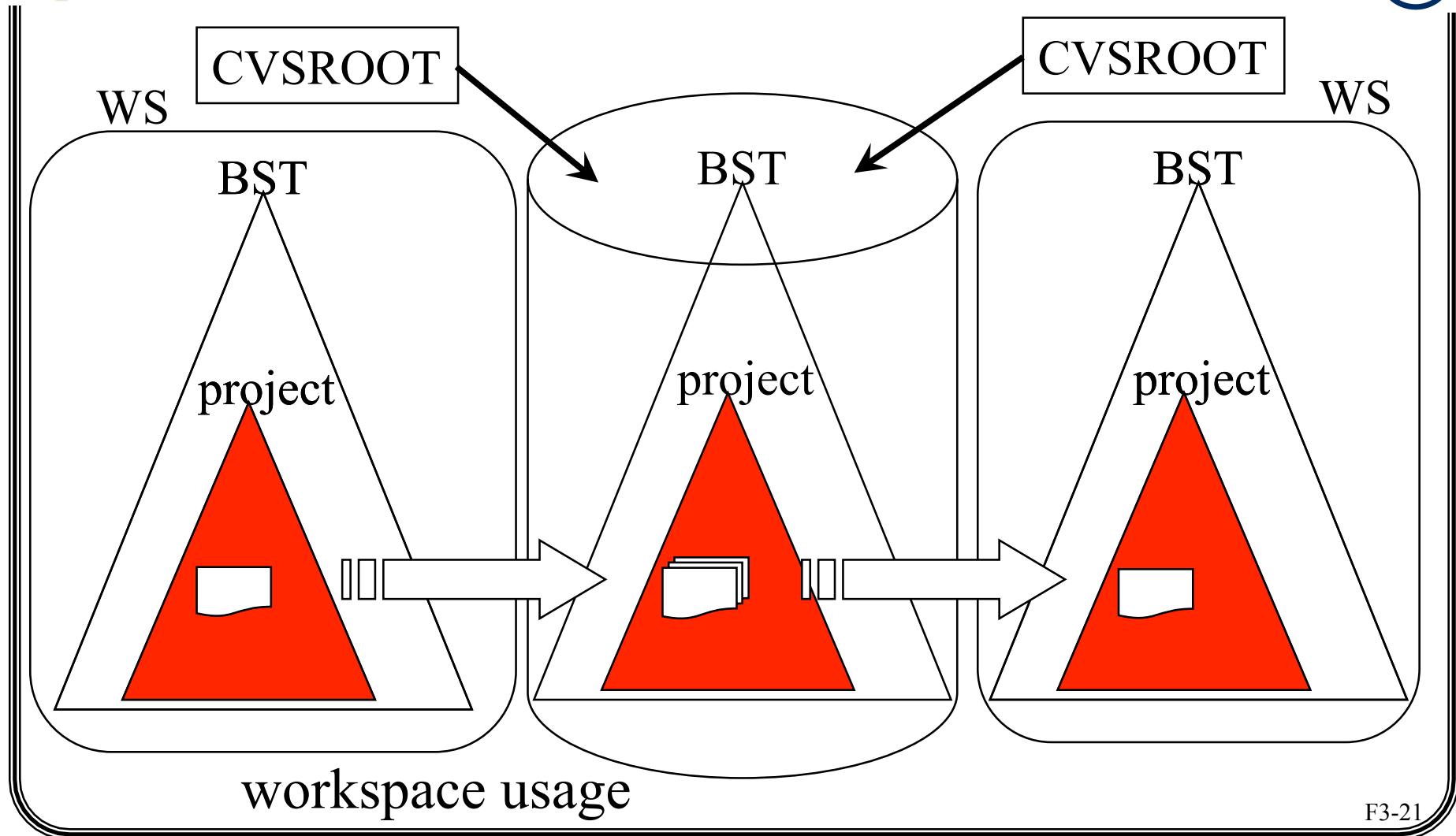


cvs checkout BST





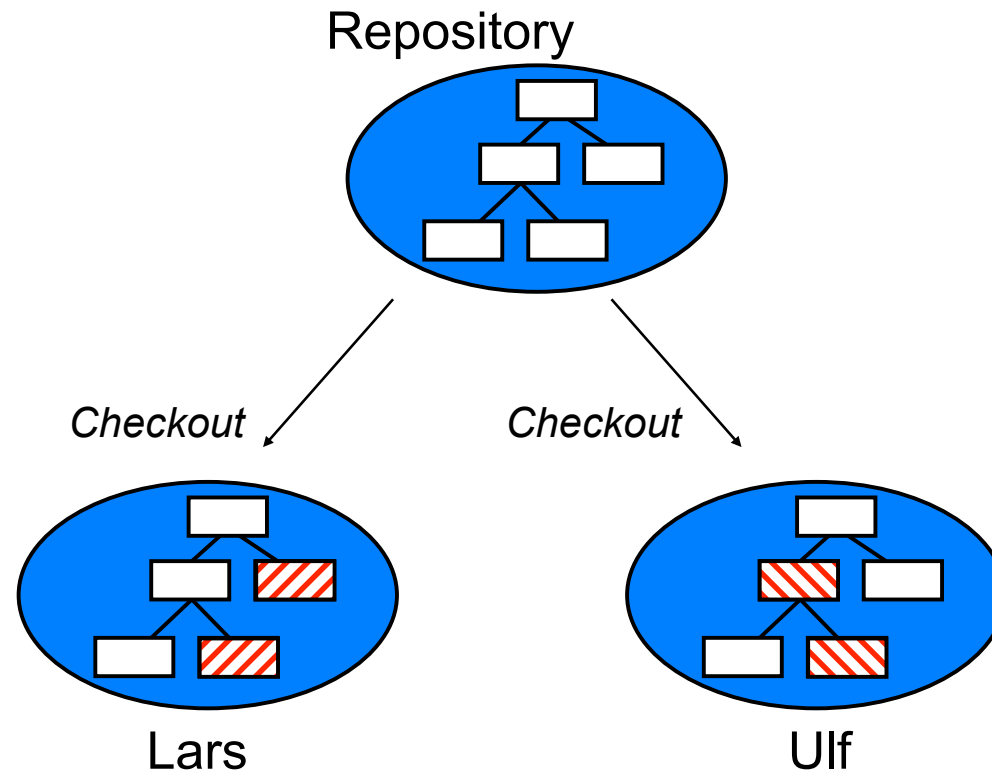
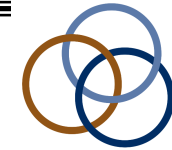
cvstatus; cvs commit; cvs update;



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Long transactions I

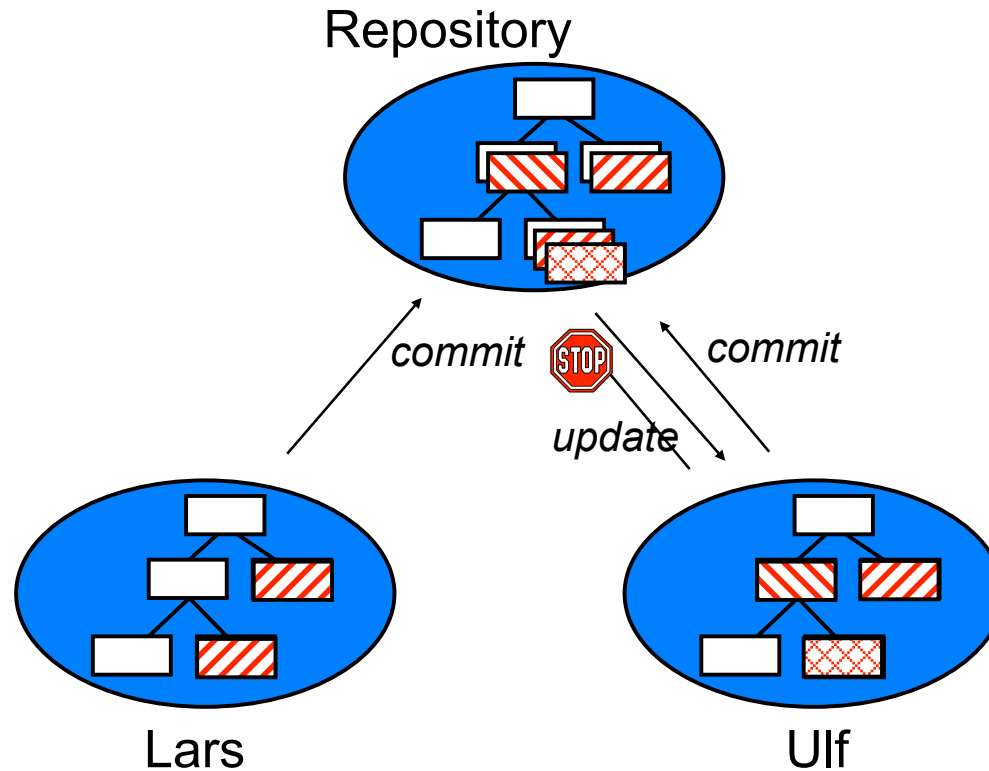


workspace creation

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Long transactions II



workspace usage (termination)

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Extreme programming



SCM-related practices:

- collective ownership (developer)
- continuous integration (developer)
- refactoring (coding)
- small releases (business)
- planning game (business/developer)
- test-driven development (developer)



Collective code ownership



Goal: to spread the responsibility for the code to the team

How/why:

- from individual (pair) to team ownership
- reinforces code review (and readability)
- enables refactoring

Requires:

- team spirit
- frequent integration

SCM dangers:

- huge merge conflicts

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Integrate continually I



Goal: to reduce the impact of adding new features

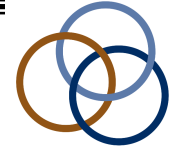
How/why:

- "download" & "upload" integration
- run tests; update (merge); re-run tests; commit
- ***all*** components must be in repository
- integration machine/responsibility/how often?
- keeps everyone in synchronisation
- keeps the project releasable all the time

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Integrate continually II



Requires:

- collective source code repository
- short tasks

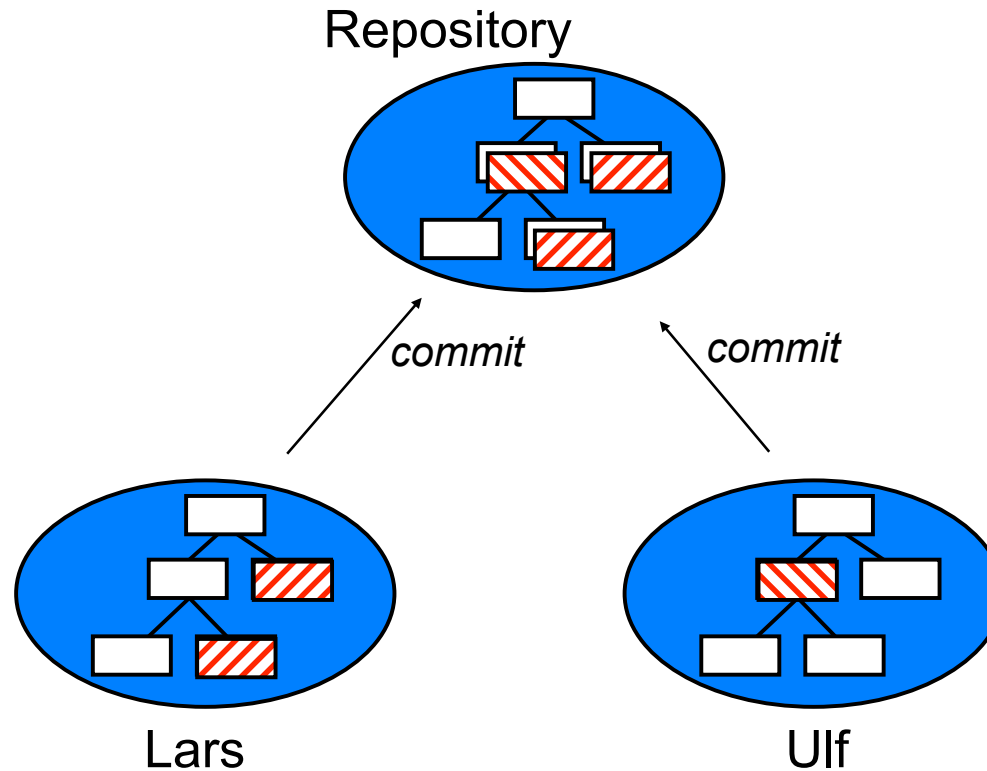
SCM dangers:

- huge merge conflicts
- false positives

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Unfortunately :-)



NO *strict* long transactions - so...

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Refactor mercilessly



Goal: to find the code's optimal design

How:

- before & after a task, think about refactoring
- changes the structure, but *not* the behaviour
- break out code; remove duplications; ...

Requires:

- collective code ownership
- coding standards

SCM dangers:

- big-bang refactorings

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Release regularly



Goal: to return the customer's investment often

Why/when/how:

- two-way feedback
- at the end of each iteration (daily?)
- clean machine principle
- automating and optimising the release

Requires:

- continuous integration

SCM dangers:

- a happy customer ;-)
- a broken release :-)

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Play the Planning Game



Goal: to schedule the most important work

Why/how:

- to maximize the value of features produced
- divides planning responsibilities (what/how)
- developers estimate user stories
- developers split stories up into tasks

Requires:

- active customer
- mutual respect

SCM dangers:

- sloppy estimates and work break-down

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XP process



1. Always start with all of the “released” code.
2. Write tests that correspond to your tasks.
3. Run all unit tests.
4. Fix any unit tests that are broken.
5. When all unit tests run, your local changes become release candidates.
6. Release candidate changes are integrated with the currently released code.
7. If the released code was modified, compare the differences and integrate them with your changes.
8. Rerun tests, fix, rerun tests, fix, rerun
9. When the unit tests run, release all of your code, making a new official version.

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Diffing and merging

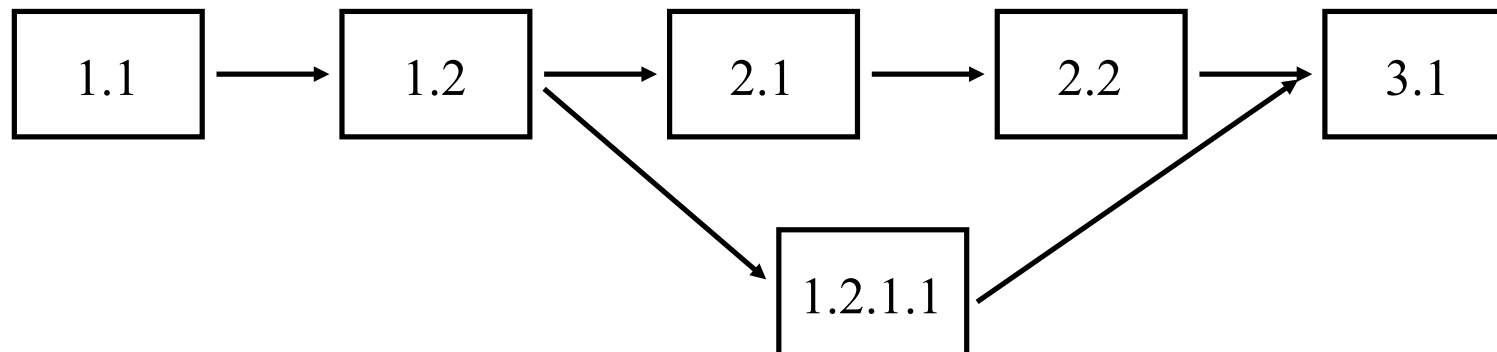


Visualisation of differences:

- diff

Merging of branches:

- merge
- always control manually that things went well



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Code management tools



1. Identify local changes.
2. Differentiate between local changes and released code.
3. Identify who released a change and when they released it.
4. Merge changes and released code.
5. Revert to previously released code.



Troubleshooting



Slow merges

- "release" frequently
- don't worry - be happy

Lost changes

- incorrectly merging
- editor buffers
- intentional reversion
- wont stay lost for long



Distributed version control?



- co-located projects
- continuous integration

- simple needs
- “simple” tool

- like buying a Ferrari Testarossa to drive 300 m.
to church on Sundays

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Distributed version control!



- distributed projects
- different “lines” of development
- complex needs of “interaction”
- high discipline
- mature insight in VC/CM
- Enduro is not Linux
- You are not Linus Torvalds
- there are more important things on EDA260

<http://www.cs.lth.se/EDAN10/>

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