

Software Engineering 2

Configuration Management & Build process

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Outline

Software Engineering 2

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What it is?

The Goal

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Software Product

- the complete set of computer programs, procedures, related documentation and data intended for delivery to the client/user.

Software Item

- any identifiable part of a software product in a continuous or the final stage of development.

Terminology

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Software Configuration Management

- to ensure full and transparent configuration of software product and related documentation throughout the whole project life-cycle.

Change management

- part of the configuration management (its mechanical handling viewpoint) of a software product
- a different name for the **scope management beyond the originally agreed scope**
- a different name for the model of development during the maintenance stage - **mini-waterfall per change request**

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Ensure rules and order

in configuration of

a software product!

To reach the Goal

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- Ensure that **records** of all software items are kept
- Ensure the **identification** of all software items and of the product as a whole as such
- Ensure that **making changes** to software product **does not harm the product** itself
- Ensure the possibility to **obtain the status** of software product configuration



How the ISO guys see this

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ISO 9000-3:1991

- identification and record of every SW item
- identification and record of the product
- ability to provide data for:
 - generating versions of the product
 - updating the versions of the product
- ability to ensure proper implementation of changes
- ability to report on the status of configuration
- ensuring that more than one person manage the current update of the product



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Versions control

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- identification and record of every SW item
 - the kinds of SW items?
 - which belong to the version control?
 - what to do with the others?
- identification of the product
 - parallel work on more versions?
 - return to a particular version
- technical realization of versions control
 - tools: CVS, SVN, GIT, ...
 - means: **revision number, tag, branch**



Centralization vs. distribution

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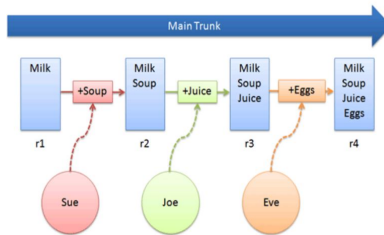
Conclusion

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- centralized repository, local client copies
- each client synchronizes and adds to the main branch
- emphasis on **synchronization, tracking, backup**
- the only way to try something new is a branch \Rightarrow complex

Centralized VCS



Centralization vs. distribution

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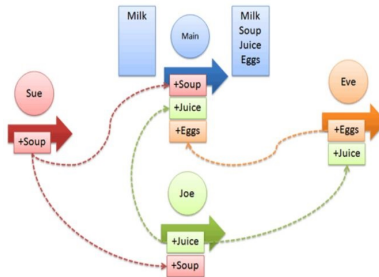
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- each client has a repository
- sharing based on the "web of trust"
- download of a change and its application are two different operations
- the central main branch may not exist
- emphasis on **sharing changes**

Distributed VCS



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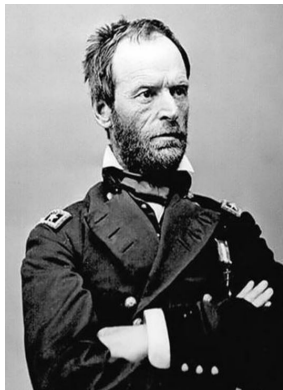
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- identification
 - kinds of changes
 - link to specification
 - link to VCS
- process (see next slide)
- technical realization
 - tools: Bugzilla, JIRA, Trac, ...



The process of changes management

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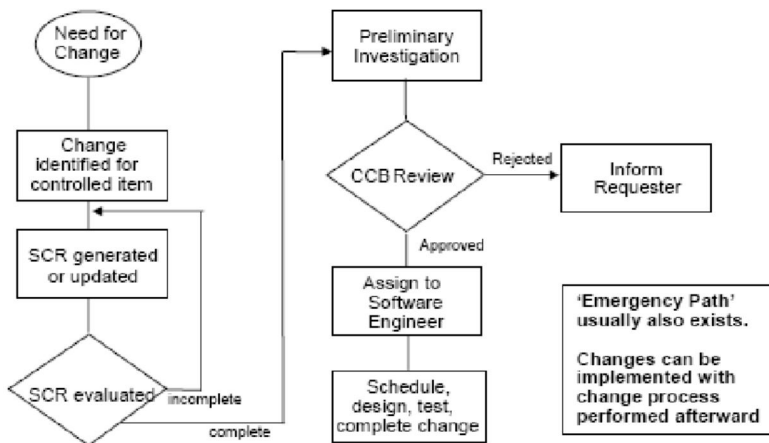
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Configuration Management Plan

how to make it

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At least, the plan should contain

- Introduction
 - purpose, scope, method and conditions of use
- SCM Management
 - organization, responsibilities, authority
 - policies, regulations, procedures
- SCM Activities
 - versions control
 - changes control
- SCM Schedules
 - coordination with other project activities
- SCM Resources
 - tools and their use
 - physical and human resources

SCM = Software configuration management

- identification and record of SW items
 - the kinds of SW items?
 - which belong to the version control?
 - what to do with the others?
- identification of the product

- identification
 - kinds of changes
 - link to specification
 - link to CVS
- process of changes management

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Build process

... what it needs to know

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- **produce** a delivery
- **install** a delivery
- prepare a delivery for **customer installation**
- deliver the system **as a whole**
- **repair** of little bugs
 - quickly and economically
- deal with **different types of environment**
 - application server, and database replication server, operating system, ...

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Terms

- delivery
 - big - release of a build
 - small - a build fix (patch)

The Practice

- the most **accurate environment** for: development, testing, acceptance, ...
- daily build
- delivery process
 - simple
 - **automated**
- control of
 - backup logs
 - reports from automated testing

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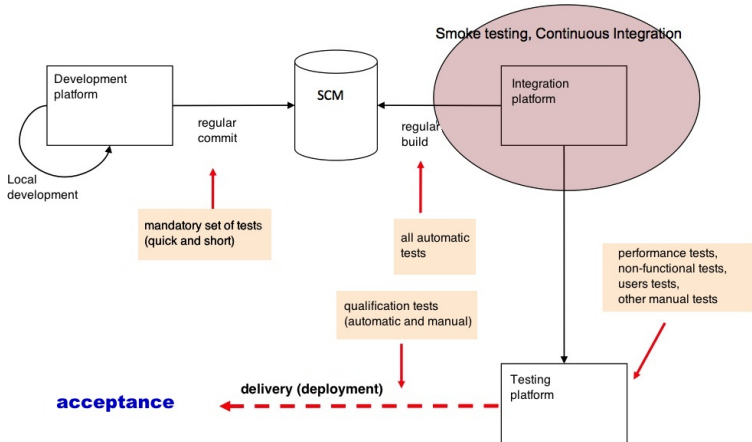
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How to achieve CI

- Maintain a code repository
- Automate the build
- Make the build self-testing
- Everyone commits to the baseline every day
- Every commit (to baseline) should be built
- Keep the build fast
- Test in a clone of the production environment
- Make it easy to get the latest deliverables
- Everyone can see the results of the latest build
- Automate deployment

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Automate builds
made by

Build tools



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Agile

Continuous Integration

Continuous Delivery

Continuous Deployment

DevOps

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DevOps Tools Market Map

Source Code Management



Continuous Integration



Testing



Containers



Configuration Management



Deployment



Nagios Monitoring



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Have a clear and understandable
Software Configuration Management Process
+
Choose your tools carefully

CI approach leads to significantly reduced
integration problems and
allows a team to develop cohesive software
more rapidly

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For Further Reading I



Duvall, Paul M.

Continuous Integration. Improving Software Quality and Reducing Risk..

Addison-Wesley. ISBN 0-321-33638-0. 2007.

- Little Book of Configuration Management
<http://www.profinet.eu/fileadmin/Content/profinet.eu/Academy/sweng-materialy/configuration-management/reading/LittleBookOfCM.pdf>
- NASA Software Configuration Management Guidebook
http://www.profinet.eu/fileadmin/Content/profinet.eu/Academy/sweng-materialy/configuration-management/reading/NASA_SwCMGuidebook.pdf