

Software Configuration Management



Lecture: Introduction SCM
Chapters: 1, 2 and 3

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Lecture Objectives



- ◆ Learn about SCM and history of SCM
- ◆ Learn the relation between SCM and Software development process

SCM Definition IEEE



- ◆ *“Configuration management is the process of identifying and defining the items in the system, controlling the changes to these items throughout their life cycle, recording and reporting the status of items and change requests, and verifying the completeness and correctness of items”*

A Definition of SCM



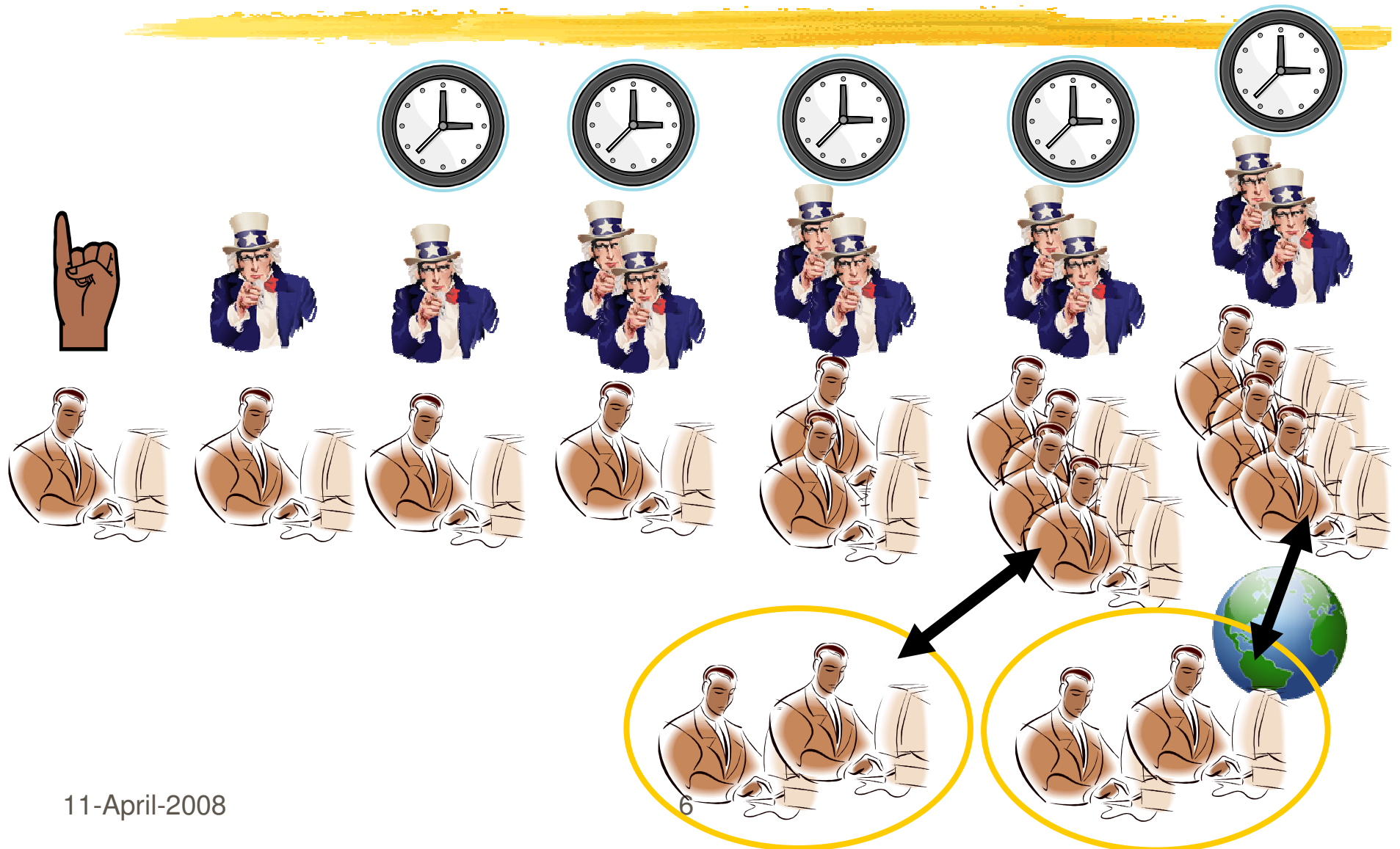
- ◆ Software Configuration Management is a discipline for controlling the evolution of software systems

SCM Definition (DoD)



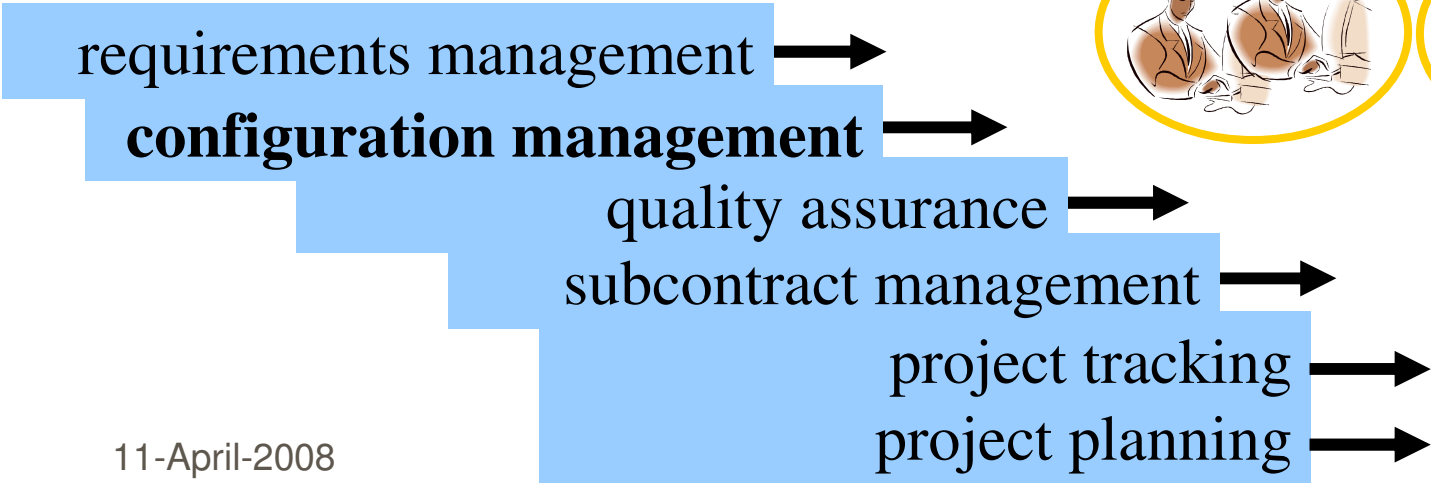
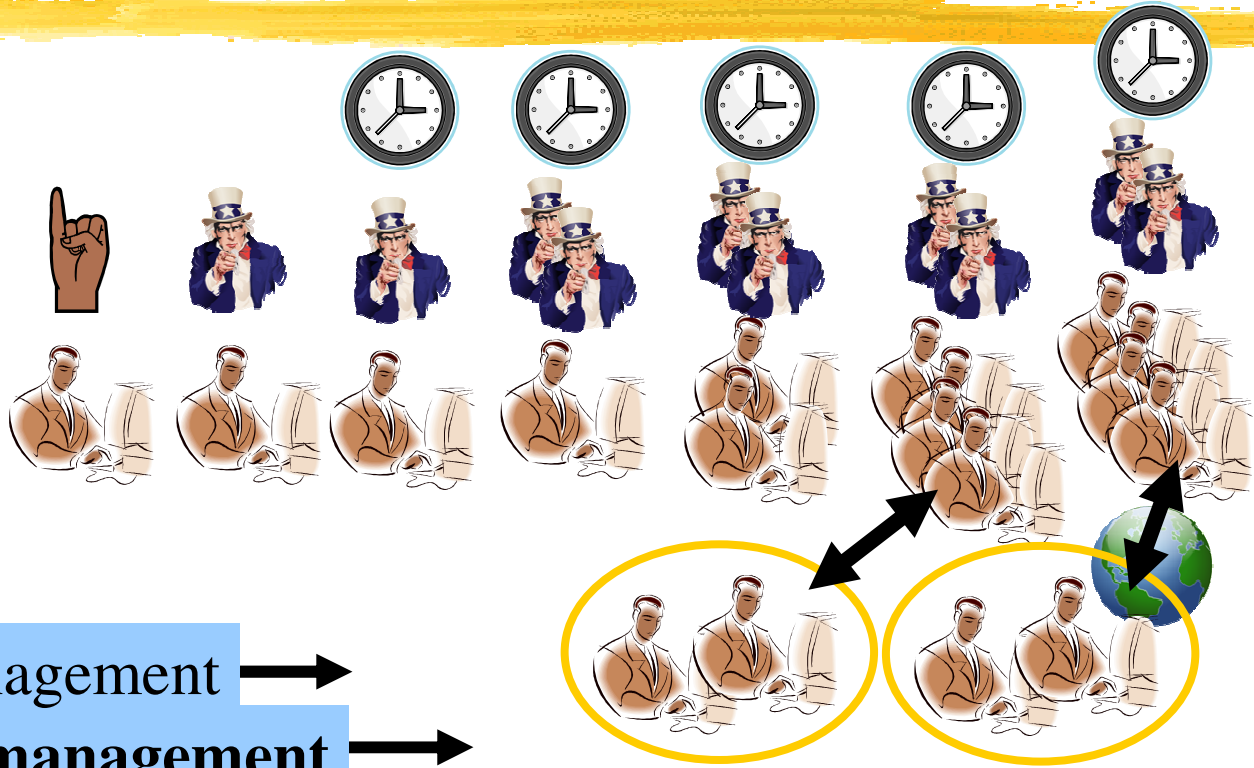
- ◆ Configuration Management (CM) is a discipline that applies technical and administrative direction and surveillance over the lifecycle of items to:
 - ◆ **Identify** (and document) configuration items
 - ◆ **Control** changes to configuration items
 - ◆ Record and report information needed to manage configuration items (**status accounting**)
 - ◆ **Audit** configuration items to verify conformance to specifications

Typical growth in Software Development



11-April-2008

Software Development and Configuration Management



Development Process

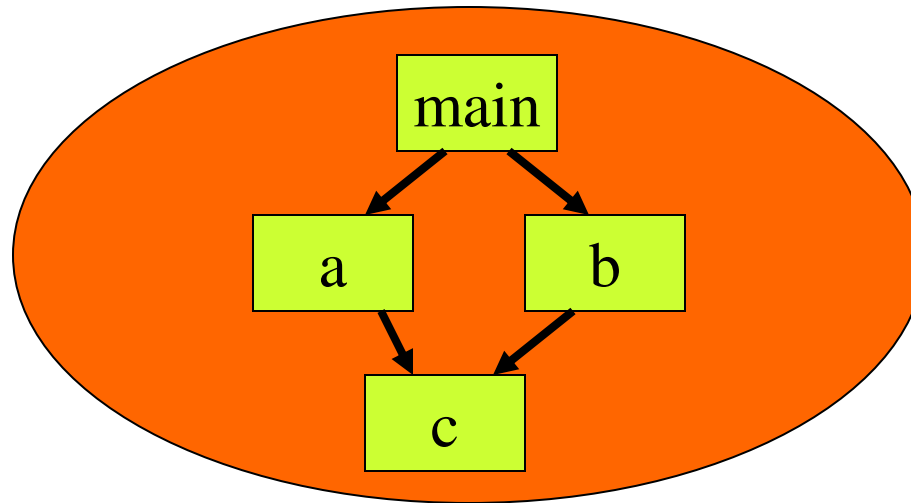
Phases	⇒	Output	⇒	People
Project Start-Up	⇒	Project Plan, SCM Plan, Standards	⇒	Project Leader, SCM Manager, QA
Requirements Analysis	⇒	Requirements Definition Doc.	⇒	System Analysts Users
System Analysis	⇒	System Analysis Document	⇒	System Analysts
System Design	⇒	HLD, STS, STP, LLD, UTS, UTP	⇒	System Designers
Coding & Unit Testing	⇒	Programs, Doc. Test Results	⇒	Programmers, Testers, QA Team
System Testing	⇒	Test Results, Defect Logs, etc	⇒	Testers, QA Team, Development team
Acceptance Testing	⇒	Test Reports	⇒	Client, Testers, QA Team, Dev. team
Operation and Maintenance	⇒	Maintenance	⇒	Maintenance and Technical Support

Functional Baseline

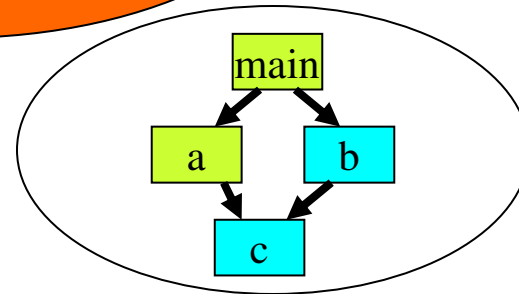
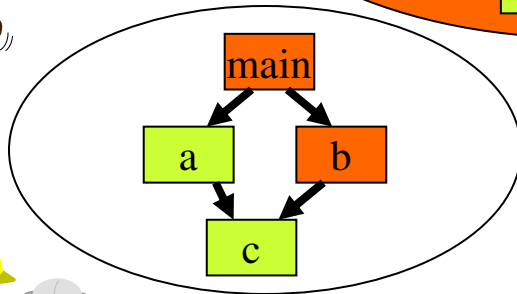
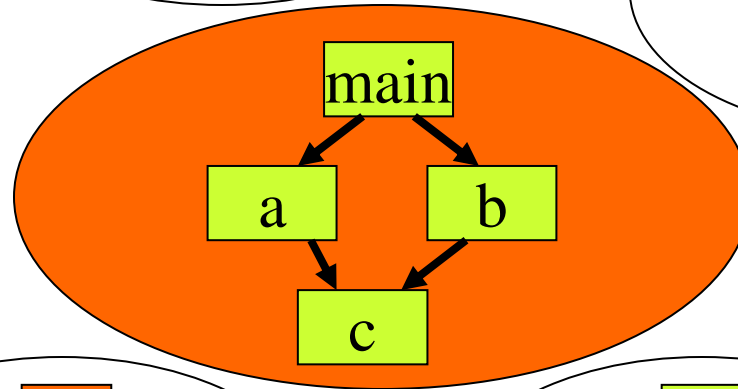
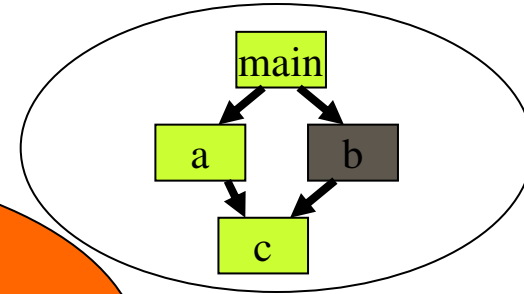
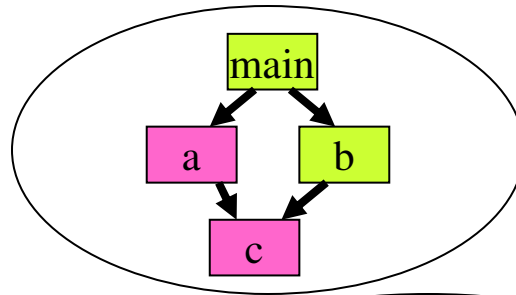
Design Baseline

Product Baseline

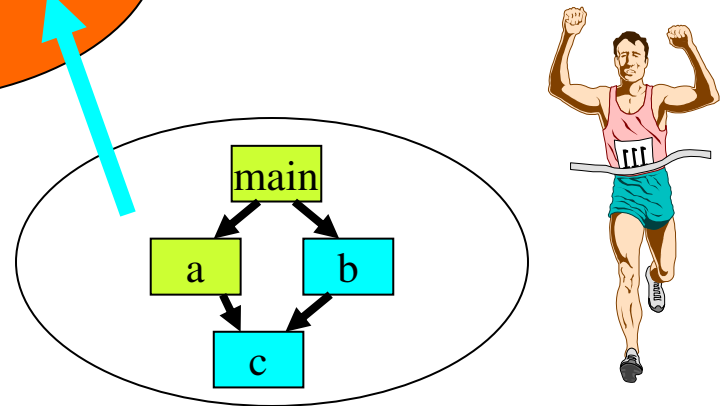
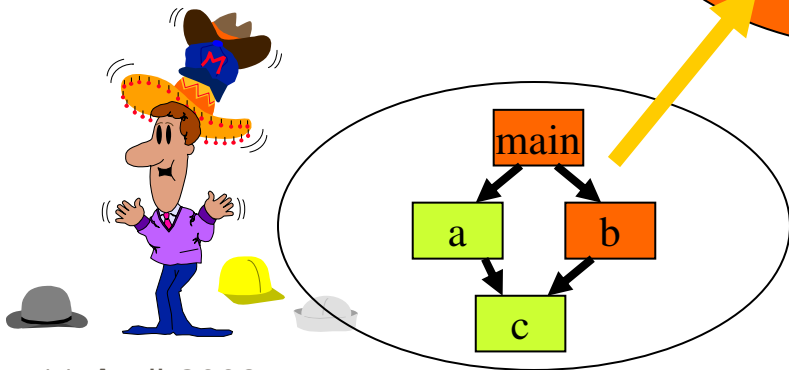
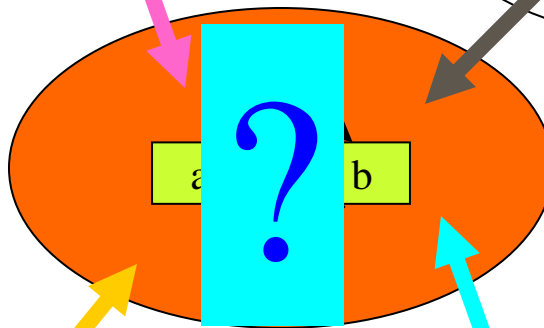
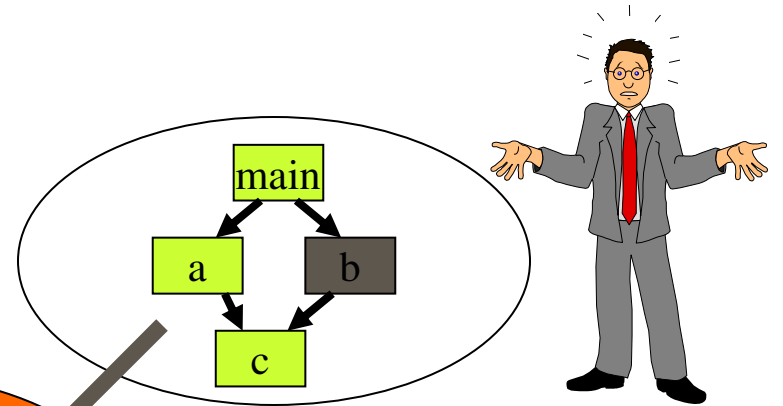
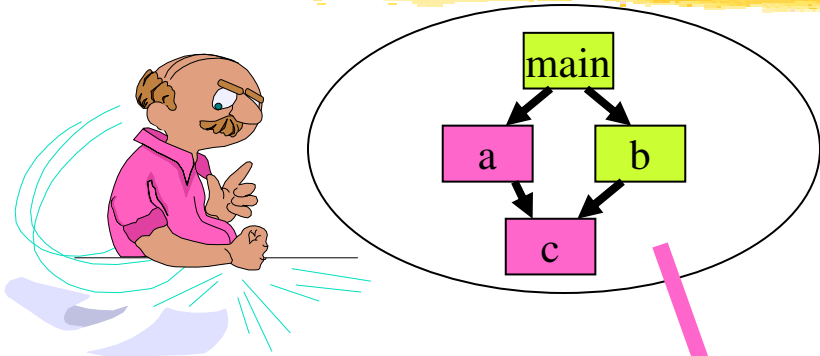
Sharing Data in a Team



Communication Problem



Confusing Situation



Configuration Item



- ◆ Source Code (C, C++, Java, C#, ...)
- ◆ Documentation
 - ◆ Requirements Specification
 - ◆ Design Specification
 - ◆ User Documentation
- ◆ Build Files
 - ◆ Make files
 - ◆ Scripts
- ◆ Configuration Items
- ◆ Etc.

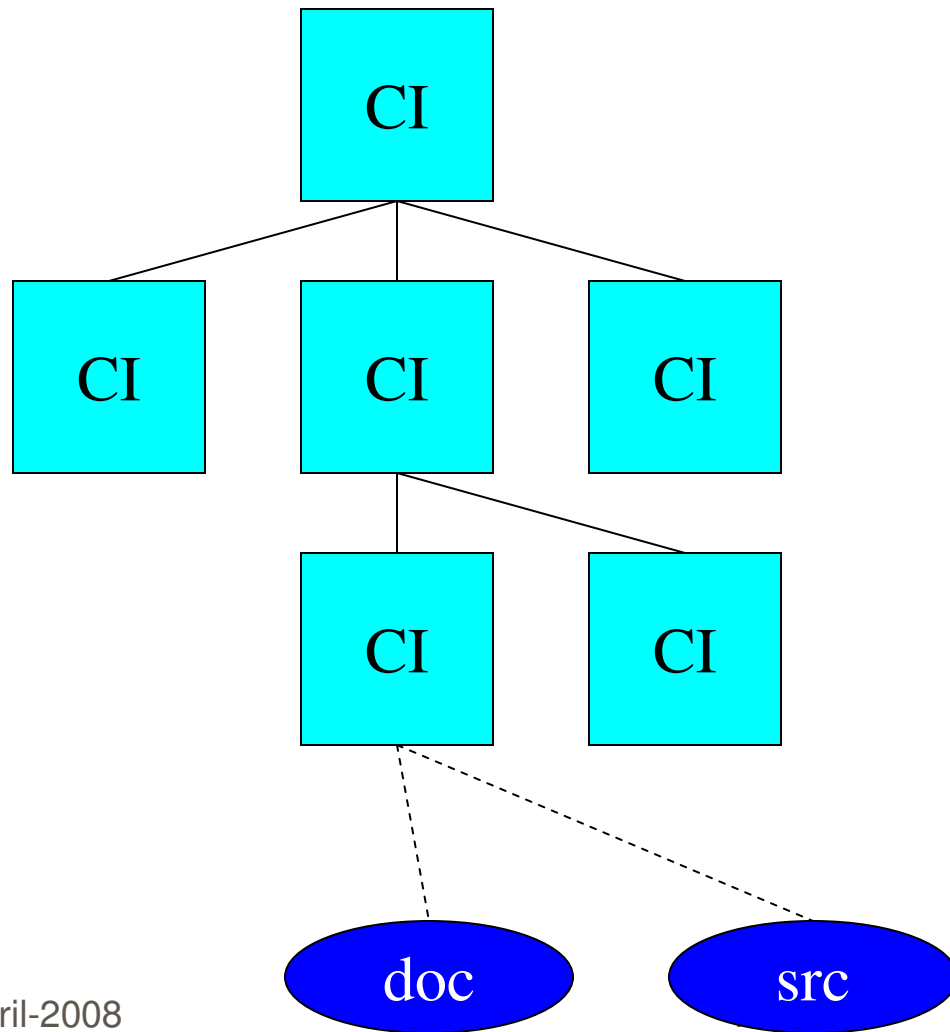
SCM Pillars



- ◆ Identification
- ◆ Control
- ◆ Status Accounting
- ◆ Status Auditing

of Configuration Items

Hierarchy of CI's



Typical Problems related to SCM



- ◆ I thought I fixed that
- ◆ At my PC it works
- ◆ You can not use that version on your system
- ◆ Somebody must have changed my code
- ◆ **This** can not be the source of **that**
- ◆ What did **you** type wrong to get it to crash?
- ◆ It worked ... once ...
- ◆ Debugger information and source code do not match
- ◆ You must have a virus, please clean up
- ◆ Configuration Management, we can do it ourselves

History of SCM



- ◆ '60's: No SCM
- ◆ '70's-'80's: Complex Software
 - ◆ programming in the large
- ◆ '90's: Complex Software with Teams
 - ◆ programming in the many
- ◆ `00's: Geographical Distributed
 - ◆ programming in the wide
 - ◆ *Ivica Crnkovic et al. Chapter 3, Historical Overview, 2003*

Software Configuration Management ('80's)



- ◆ Product Integrity

- ◆ Trace-ability within Product Life Cycle
- ◆ User Functionality
- ◆ Non Functionality
- ◆ Cost
- ◆ Time

◆ *Elements of SCM, E.H. Bersoff, 1984*

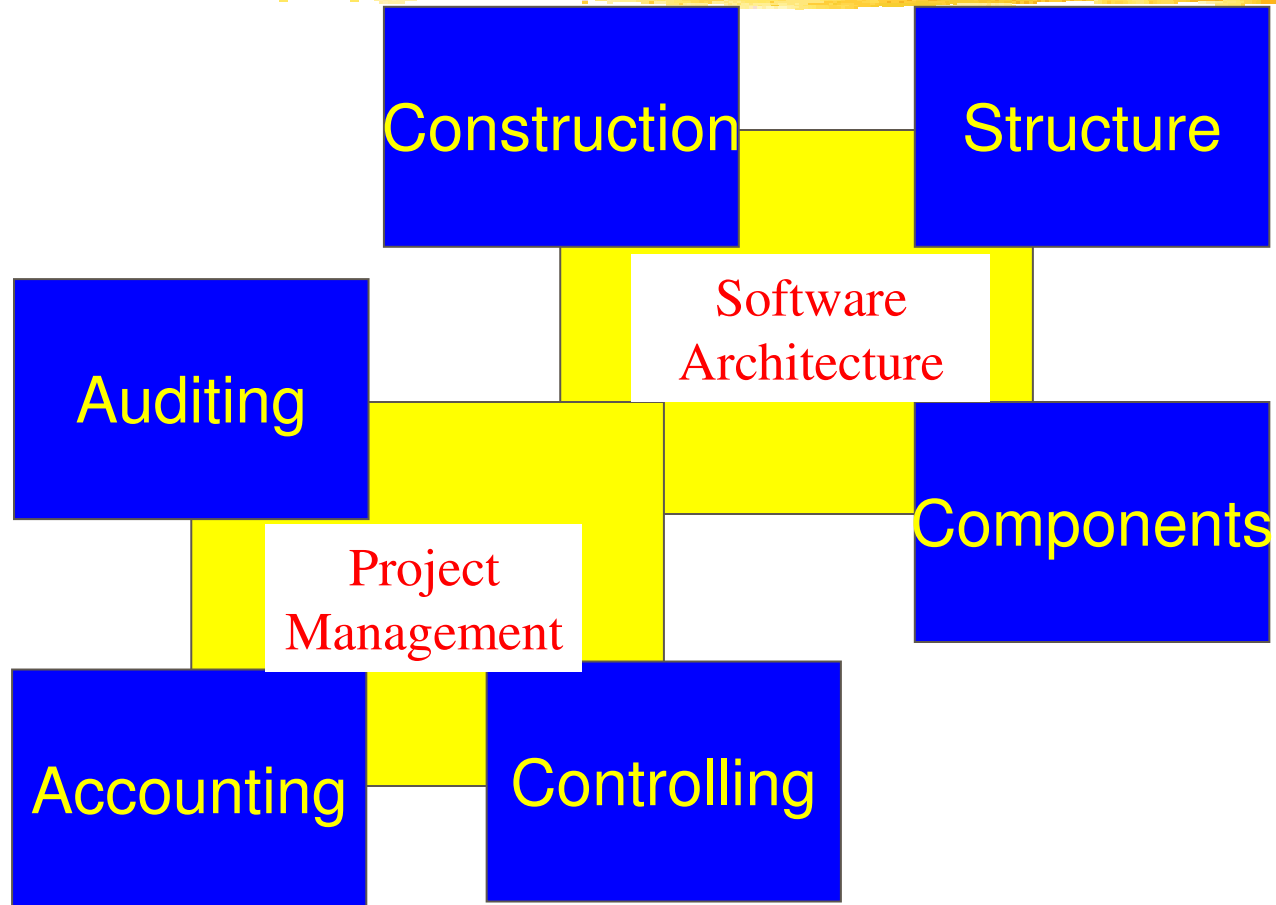
Software Configuration Management ('80's)



- ◆ Team Productivity
 - ◆ Minimize Confusion in Team
 - ◆ Art of identifying, organizing and controlling modifications to the software being built by a team
 - ◆ Maximize Productivity by Minimizing Mistakes

◆ *SCM Coordination for Team Productivity, W. Babich, 1986*

SCM Functionality Areas ('90's)



Concepts in CM systems, Susan Dart, 1991

Summary



- ◆ SW development vs SCM
- ◆ History
- ◆ Pitfalls vs. Sharing data problem
- ◆ SCM Pillars = Id+Co+Ac+Au

Homework



- ◆ Historical information
 - ◆ Bersoff, SCM: Product Integrity
 - ◆ Babich, SCM: Team Coordination
 - ◆ Dart, Concepts in CM systems
- ◆ Book:
 - ◆ Chapters 1, 2 and 3 (this week)
 - ◆ Chapters 4, 5 and 6 (next week)