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Software Engineering

Topic 7

Software Configuration Management

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Acknowledgement

These slides have been adapted from Pressman, R.S. (2015). *Software Engineering : A Practioner's Approach. 8th ed*. McGraw-Hill Companies.Inc, Americas, New York. ISBN : 978 1 259 253157. Chapter 23, 24, 25, 26 and 27

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Learning Objectives

LO 4 : Analyze the software project management and the proposed potential business project

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Contents

- **The Software Configuration**
- **SCM Repository**
- **The SCM Process**
- **Configuration Management for Web and Mobile Apps**

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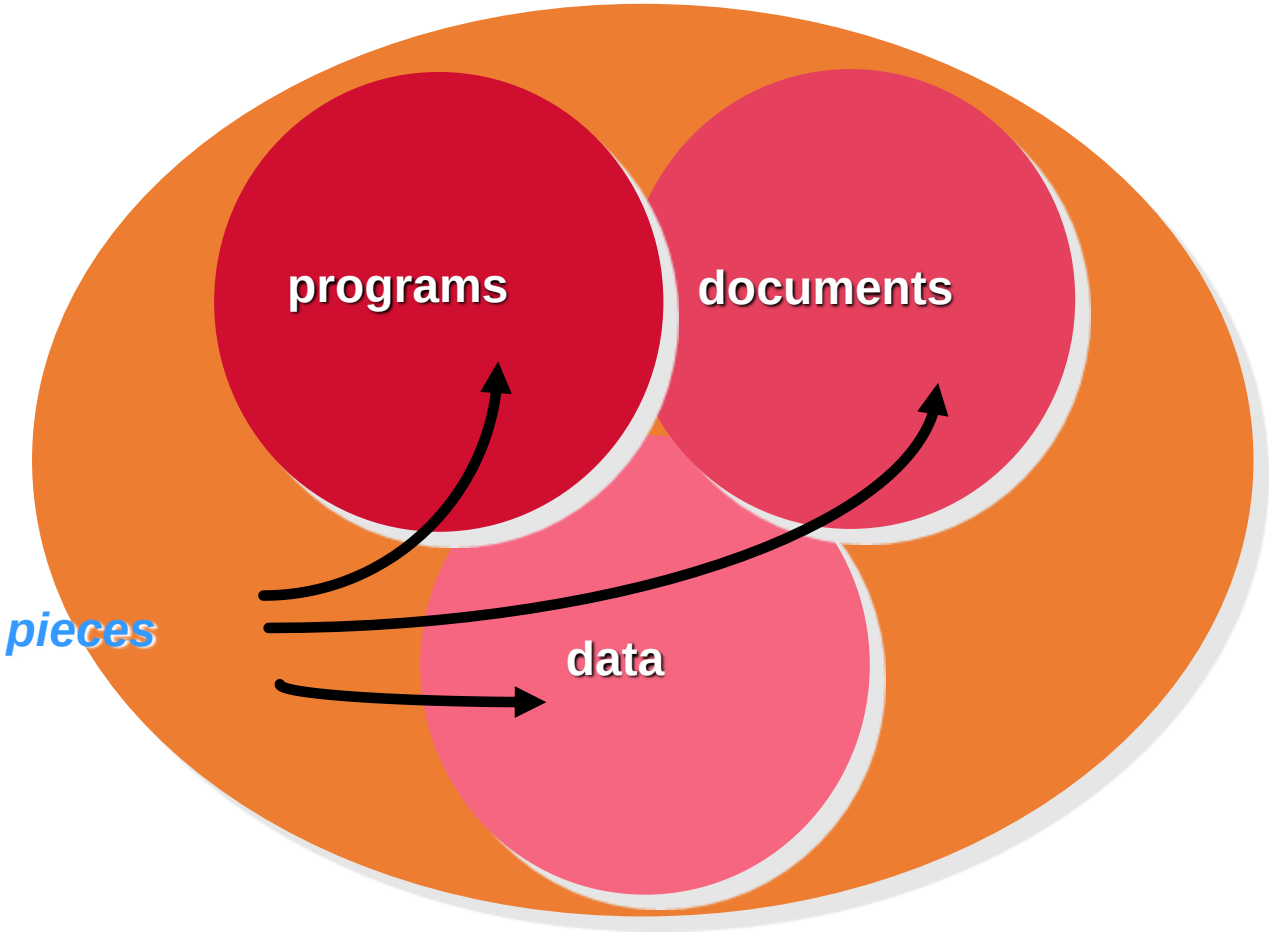
The Software Configuration



The pieces

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The Software Configuration

Baselines

- The IEEE (IEEE Std. No. 610.12-1990) defines a baseline as:
  - A specification or product that has been formally reviewed and agreed upon, that thereafter serves as the basis for further development, and that can be changed only through formal change control procedures.
- a baseline is a milestone in the development of software that is marked by the delivery of one or more software configuration items and the approval of these SCIs that is obtained through a formal technical review

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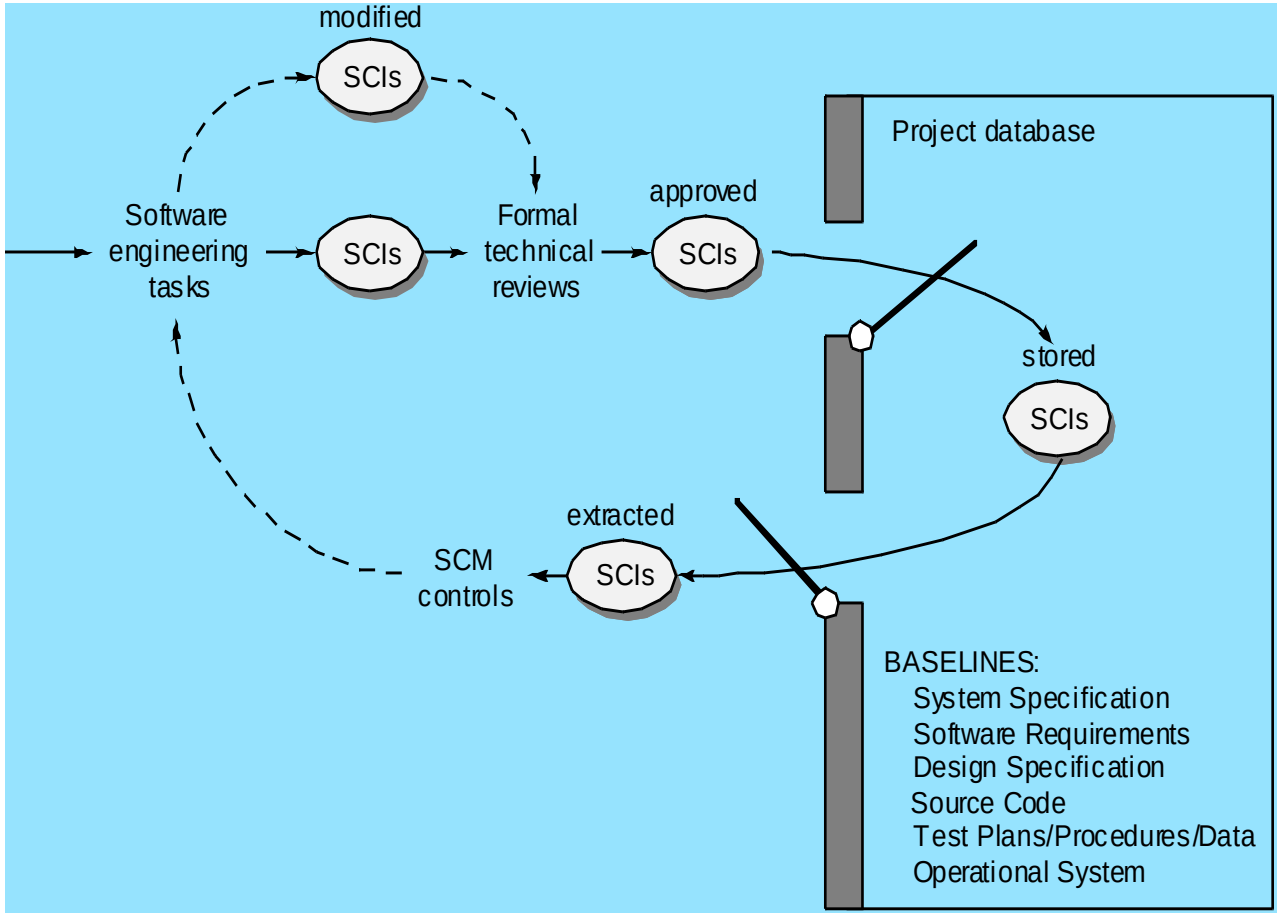
The Software Configuration

Baselines



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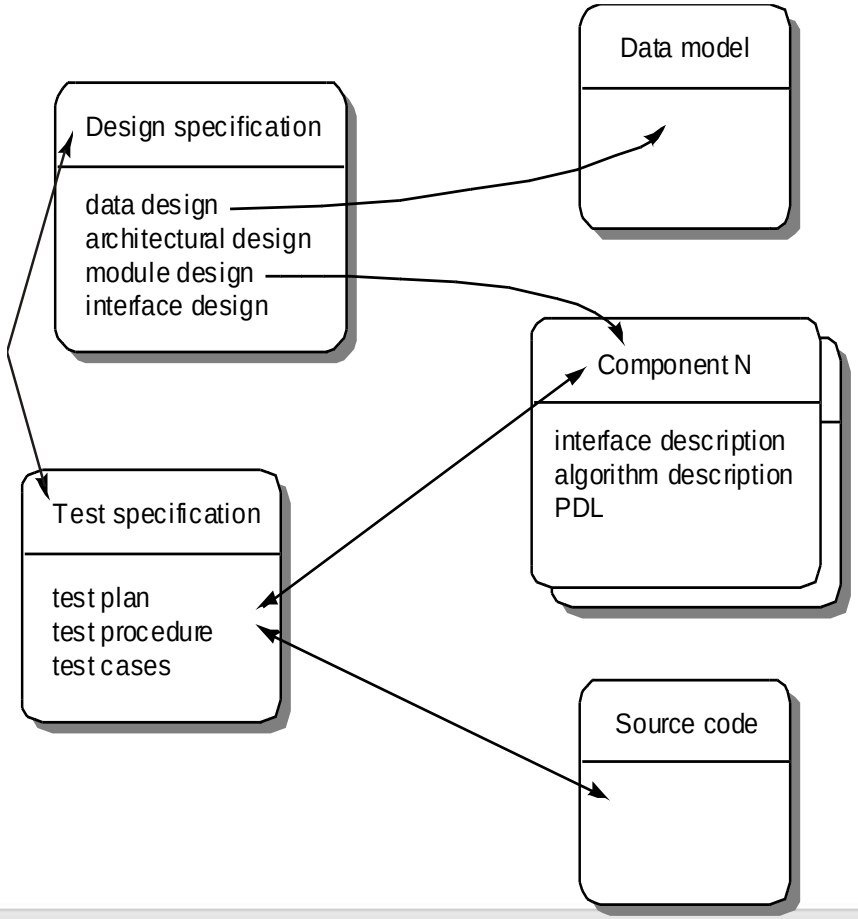
The Software Configuration

Software Configuration Objects



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SCM Repository

- The SCM repository is the set of mechanisms and data structures that allow a software team to manage change in an effective manner
- The repository performs or precipitates the following functions [For89]:
  - Data integrity
  - Information sharing
  - Tool integration
  - Data integration
  - Methodology enforcement
  - Document standardization

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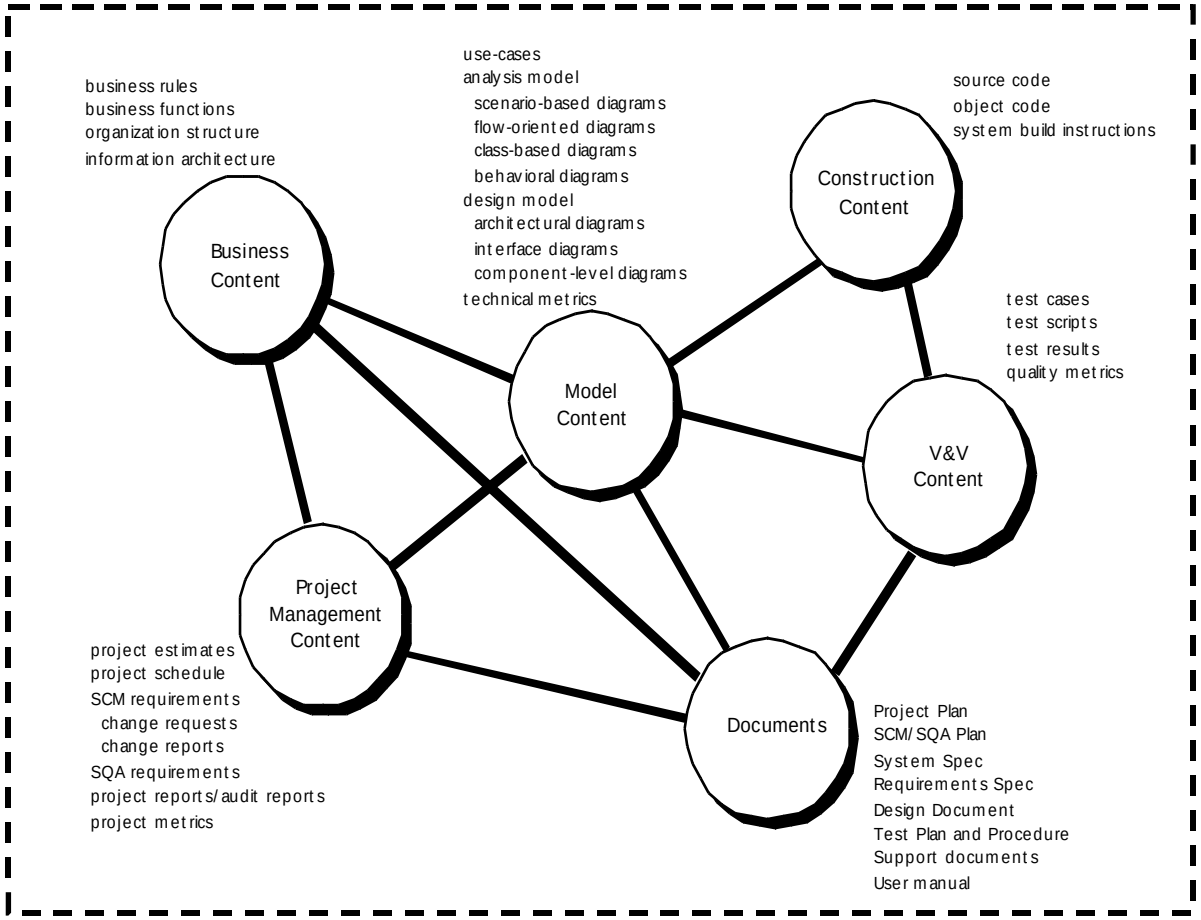
The Software Configuration

Repository Content



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The Software Configuration

Repository Features

- **Versioning.**
  - saves all of these versions to enable effective management of product releases and to permit developers to go back to previous versions
- **Dependency tracking and change management.**
  - The repository manages a wide variety of relationships among the data elements stored in it.
- **Requirements tracing.**
  - Provides the ability to track all the design and construction components and deliverables that result from a specific requirement specification
- **Configuration management.**
  - Keeps track of a series of configurations representing specific project milestones or production releases. Version management provides the needed versions, and link management keeps track of interdependencies.
- **Audit trails.**
  - establishes additional information about when, why, and by whom changes are made.

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The Software Configuration

SCM Elements

- *Component elements*—a set of tools coupled within a file management system (e.g., a database) that enables access to and management of each software configuration item.
- *Process elements*—a collection of procedures and tasks that define an effective approach to change management (and related activities) for all constituencies involved in the management, engineering and use of computer software.
- *Construction elements*—a set of tools that automate the construction of software by ensuring that the proper set of validated components (i.e., the correct version) have been assembled.
- *Human elements*—to implement effective SCM, the software team uses a set of tools and process features (encompassing other CM elements)

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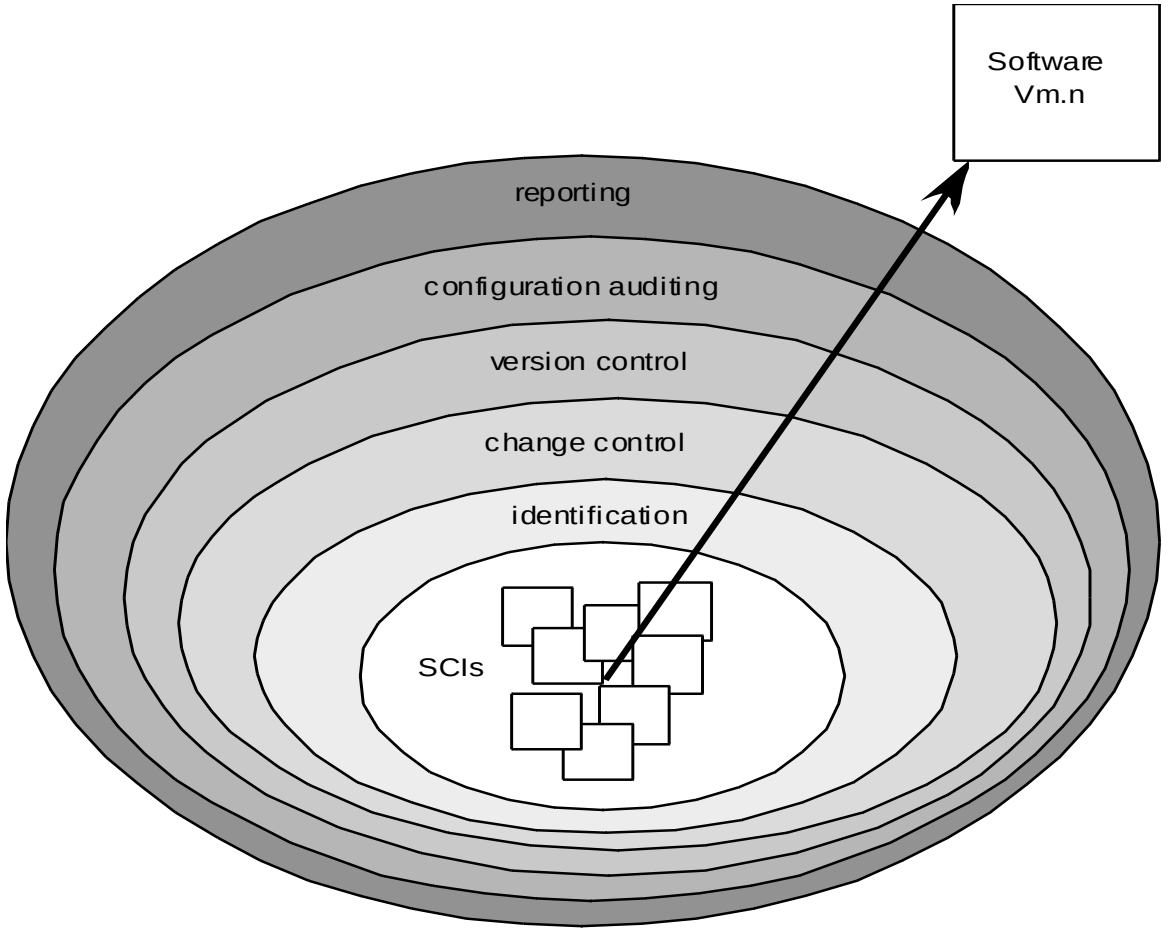
The SCM Process



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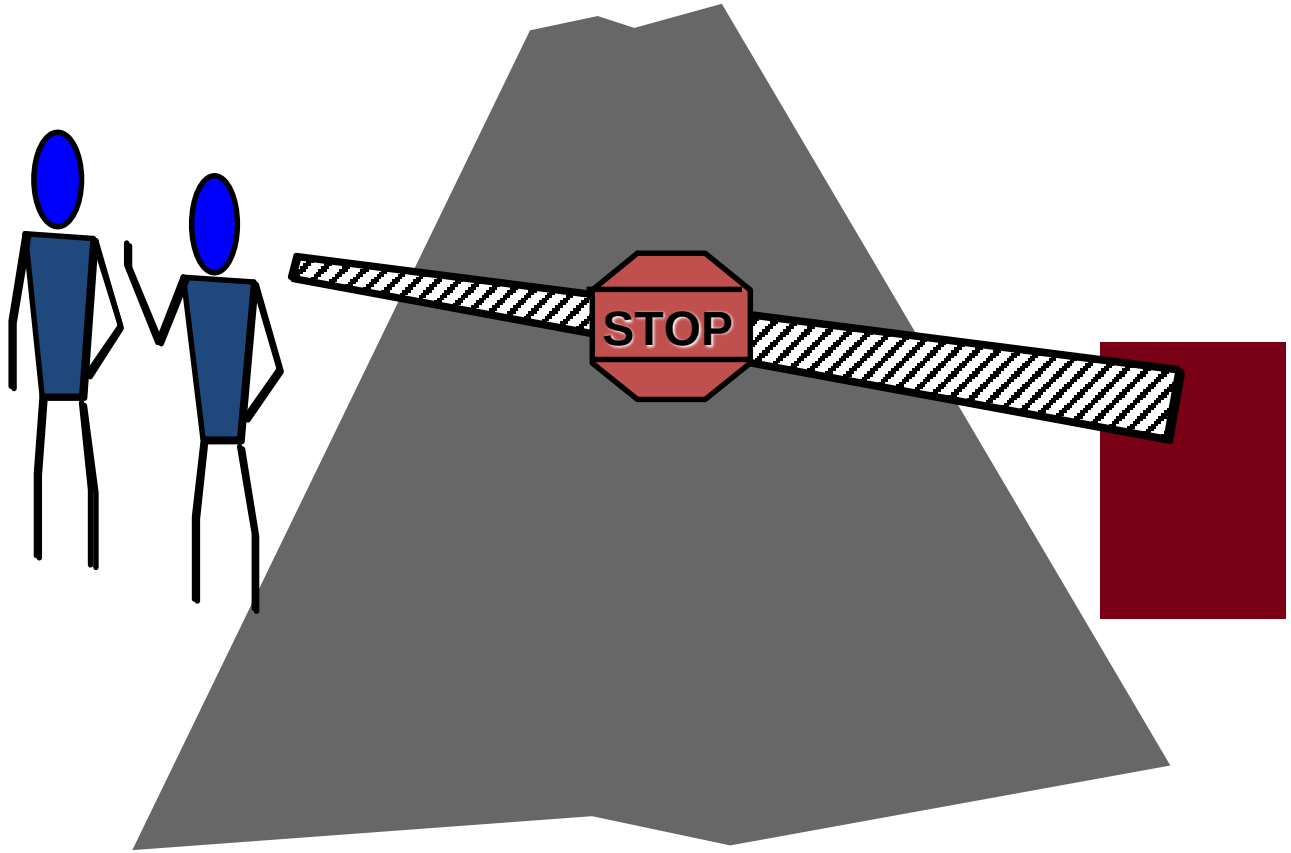
The SCM Process

Change Control



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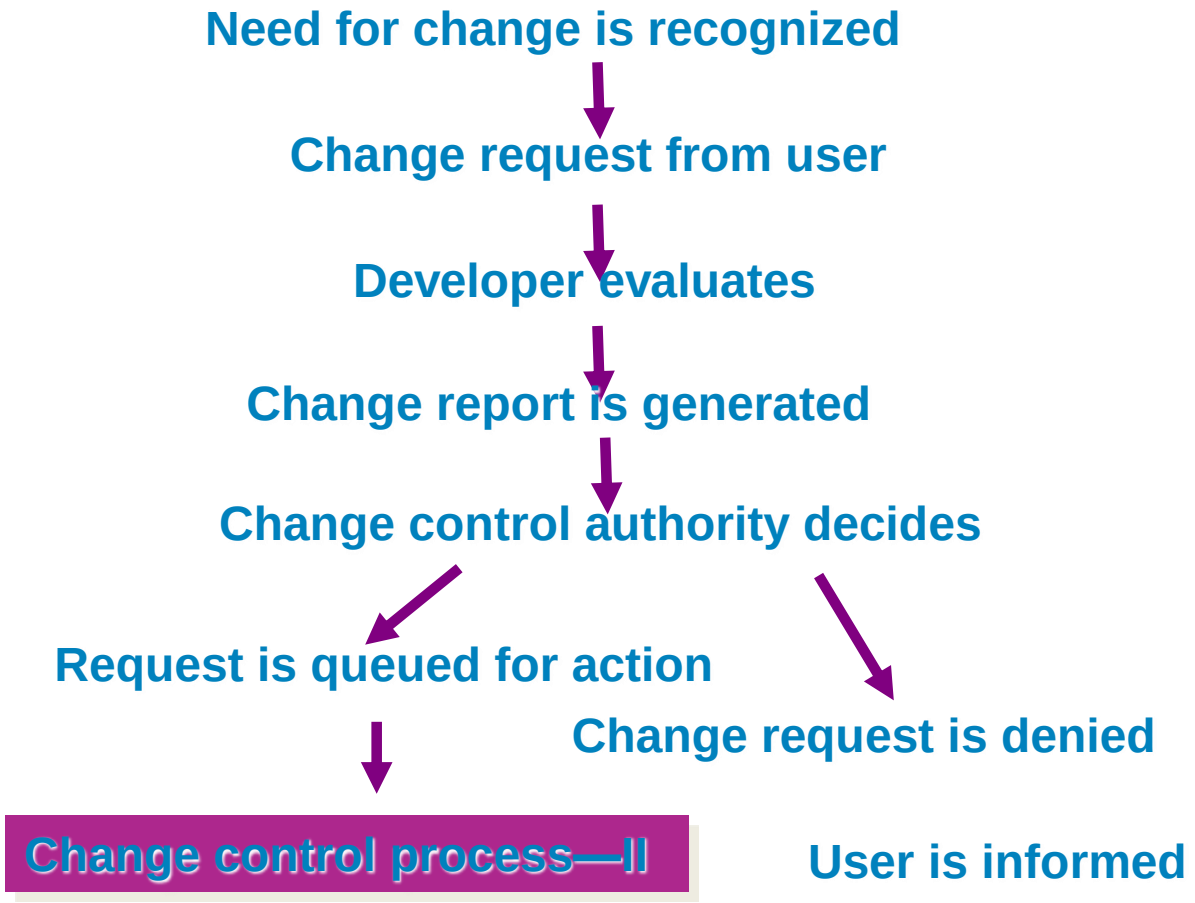
The SCM Process

Change Control Process—I



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Change Control Process-II

The SCM Process

Request is queued for action

↓

Assign individuals to configuration objects

↓

"Check-out" configuration objects

↓

Make the change

↓

Review (audit)the change

↓

"Check in" the configuration items that have been changed

↓

Establish a baseline for testing

↓

change control process—III

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The SCM Process

Change Control Process-III

Perform quality assurance and testing activities

↓

"Promote" changes for inclusion in next release (revision)

↓

Rebuild appropriate version of software

↓

Review (audit) the change to all configuration items

↓

Include changes in new version

↓

Distribute the new version

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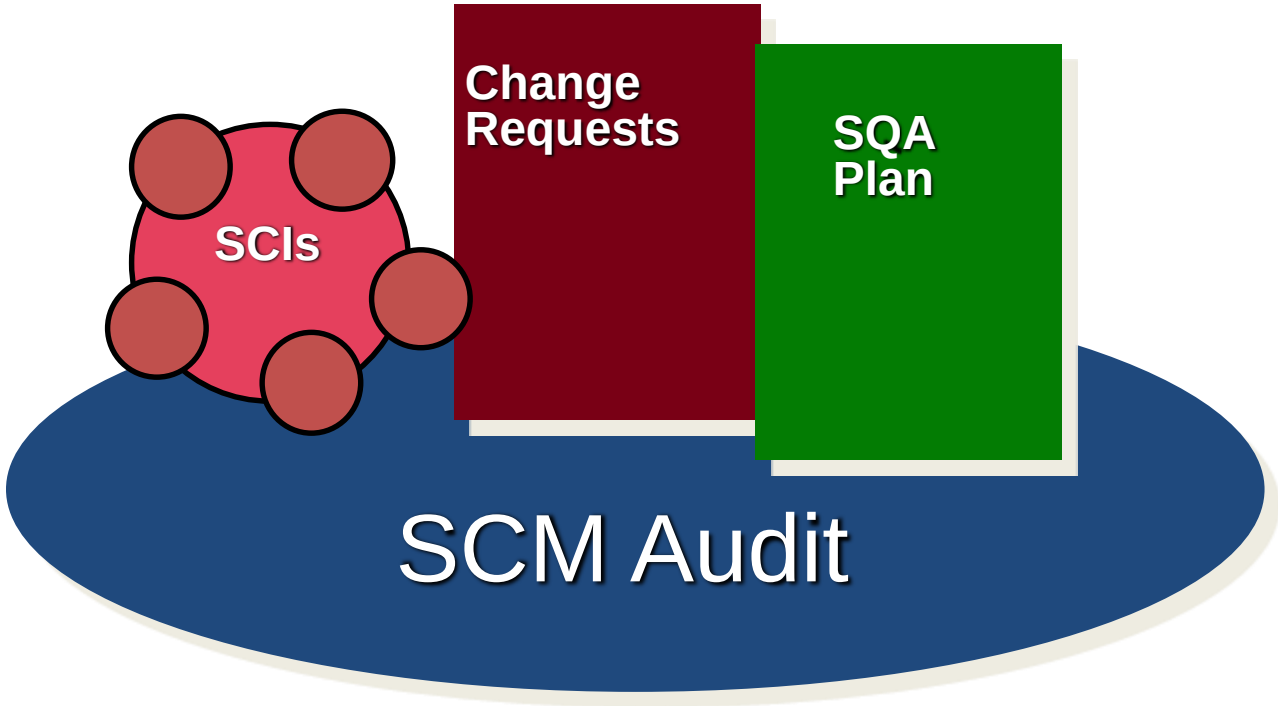
The SCM Process

Auditing



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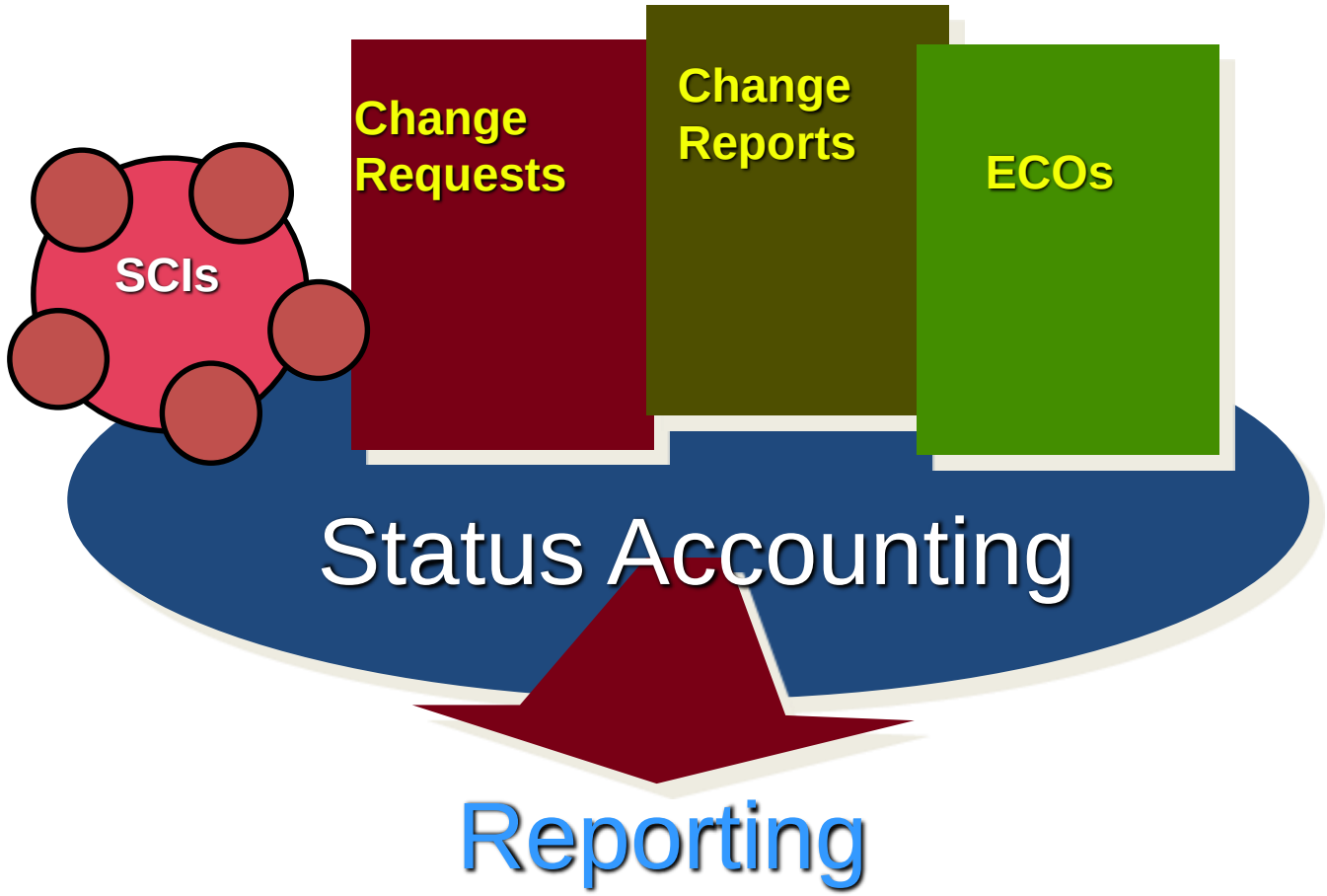
The SCM Process

Status Accounting



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Configuration Management for Web and MobileApps

- **Content.**
  - A typical WebApp contains a vast array of content—text, graphics, applets, scripts, audio/video files, forms, active page elements, tables, streaming data, and many others.
  - The challenge is to organize this sea of content into a rational set of configuration objects and then establish appropriate configuration control mechanisms for these objects.
- **People.**
  - Because a significant percentage of WebApp development continues to be conducted in an ad hoc manner, any person involved in the WebApp can (and often does) create content.

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Configuration Management for Web and MobileApps

- **Scalability.**
  - As size and complexity grow, small changes can have far-reaching and unintended affects that can be problematic. Therefore, the rigor of configuration control mechanisms should be directly proportional to application scale.
- **Politics.**
  - Who ‘owns’ a WebApp?
  - Who assumes responsibility for the accuracy of the information on the Web site?
  - Who assures that quality control processes have been followed before information is published to the site?
  - Who is responsible for making changes?
  - Who assumes the cost of change?

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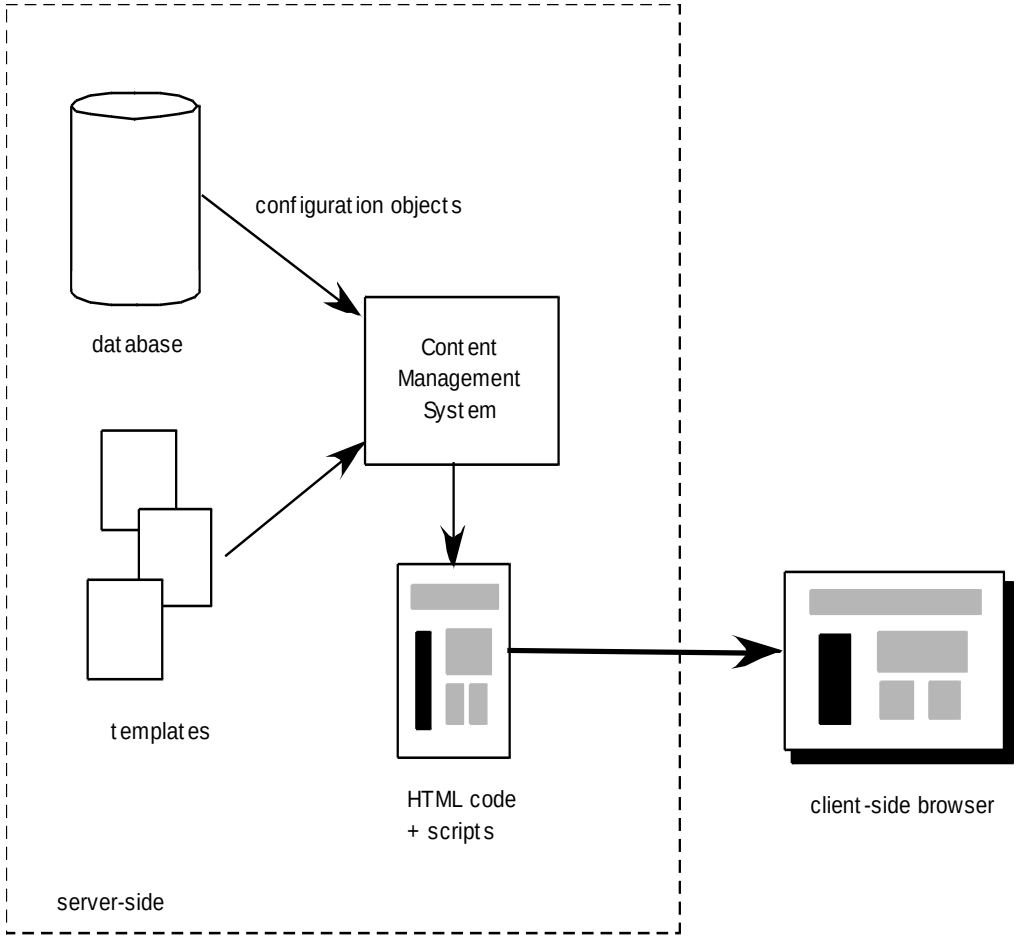
Configuration Management for Web and MobileApps

Content Management



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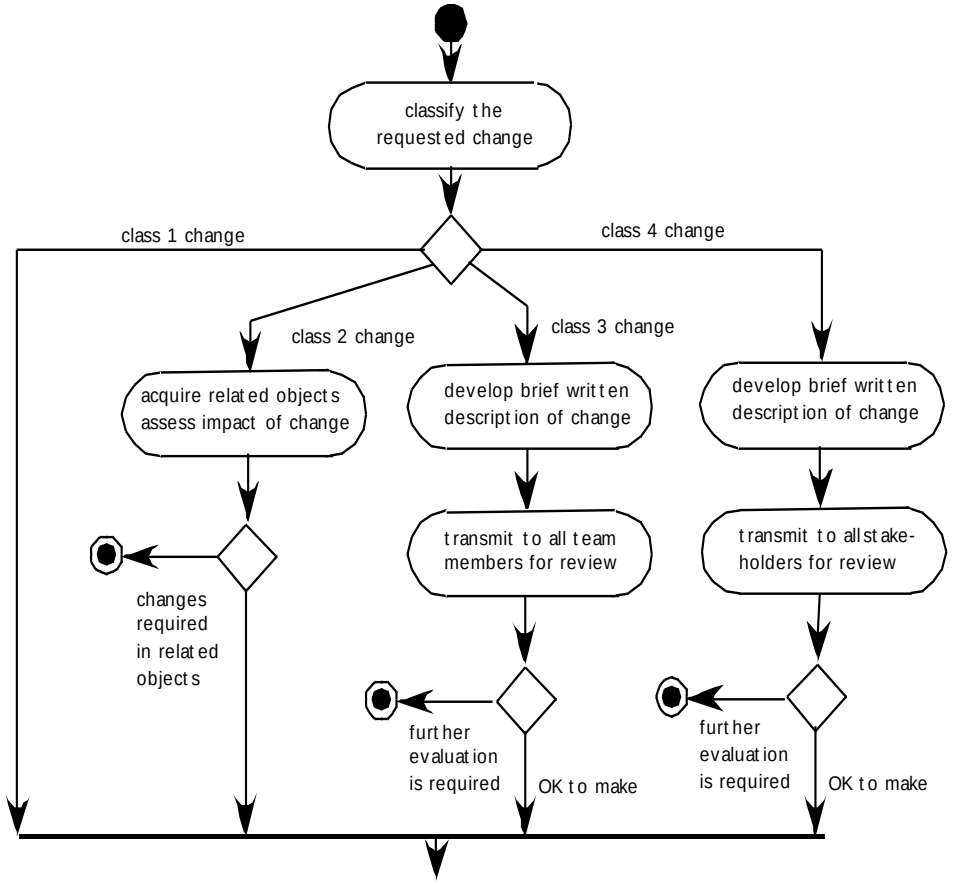
Configuration Management for Web and MobileApps

Change Management for WebApps-I



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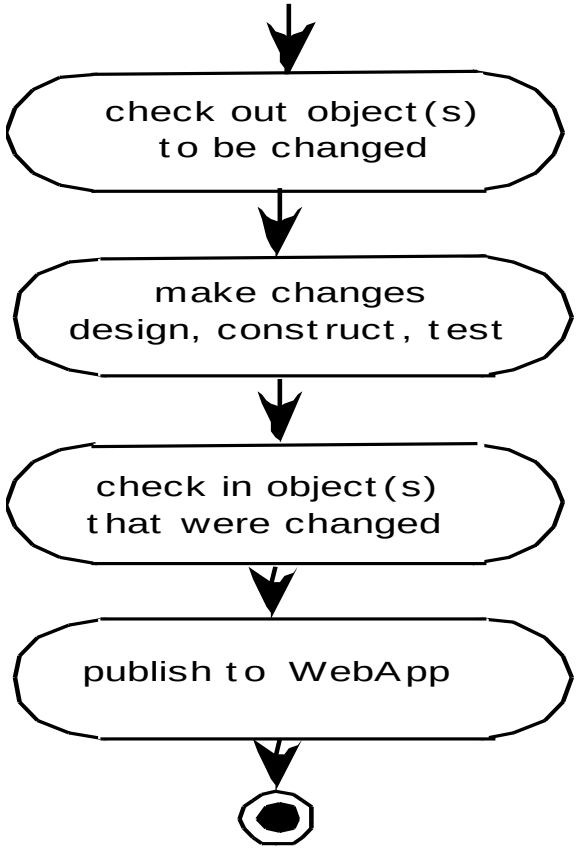
Configuration Management for Web and MobileApps

Change Management for WebApps-II



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Case Study (1)

- Software configuration process is also part of the ITSM (IT Software Management). The popular methodology is ITIL (IT Infrastructure Library)
- In the practical development and operation, the team usually apply the integrated software development tools

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Case Study (2)

- The most popular tools is JIRA, which have the following features:
  - Plan
  - Track
  - Release
  - Report
- In the release software, we can define the release version, status, progress, start date and release date.

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Q & A

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Thank You