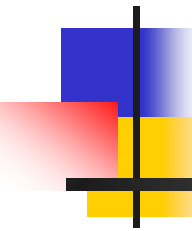

Chapter 7

Software Configuration Management

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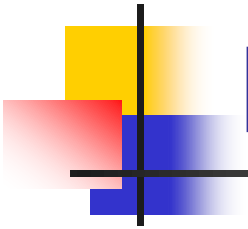

Review

- Software design is situated at the core of the software engineering process and is always applied irrespective of the software process model used.
- The design model comprises of data design, architectural design, interface design and procedural design.
- The information domain model created during analysis is transformed by data design into the data structures necessary to implement the software.
- Interface design describes how software communicates within itself to systems that interoperate within it and with persons who use it.
- Procedural design transforms structural elements of the program architecture into a procedural description of software components.
- Design is an iterative process during which requirements are translated into an outline for constructing the software.

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Review Contd…

- Vital design concepts include:
  - Abstraction
  - Stepwise refinement
  - Modularity
  - Software architecture
  - Control hierarchy
  - Structural partitioning
  - Information Hiding
- Coupling refers to the strength of the relationship between modules in a system, and is determined by the data passes between modules and the interdependence between the modules.
- Cohesion refers to the strength of the relationship between elements of the same module in a system. It represents how tightly bound the internal elements of the module are to one another.
- Standard tools used for design are structure charts, structured English, and structured flowcharts.

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Objectives

- *Describe baseline concepts*
- *Describe various configuration items*
- *Describe the configuration management process*

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Constituents of a Software Configuration

- Source code
  - Programs
  - Executables
- Documents
  - Design and development of related documents
  - Manuals – Technical and User
- Data
  - Internal to programs
  - External to programs

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Software Configuration Management

Definition:

- The process of **identifying** and **defining** the items in the system, **controlling** the change of these items throughout their life cycle, **recording** and **reporting** the status of items and change requests, and **verifying** the completeness and correctness of items.

  - IEEE

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Baseline

Definition:

- A specification or product that has been formally reviewed and agreed upon, that subsequently serves as the basis for further development and that can be changed only through formal change control procedure

  - IEEE

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Software Configuration Items

- System Specification
- Software Project Plan
- Software Requirements Specification
- Preliminary User manual
- Design Specification
- Source code listing
- Test Specification
- Operation and Installation manuals
- Executable program
- Database Description
- User Manual
- Maintenance documents
- Standards and procedures of software engineering

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The SCM Process

- Identification of objects
  - Basic objects
  - Aggregate objects
- Version Control
- Change Control
- Configuration Auditing
  - Formal technical review
  - Software configuration audit
- Reporting

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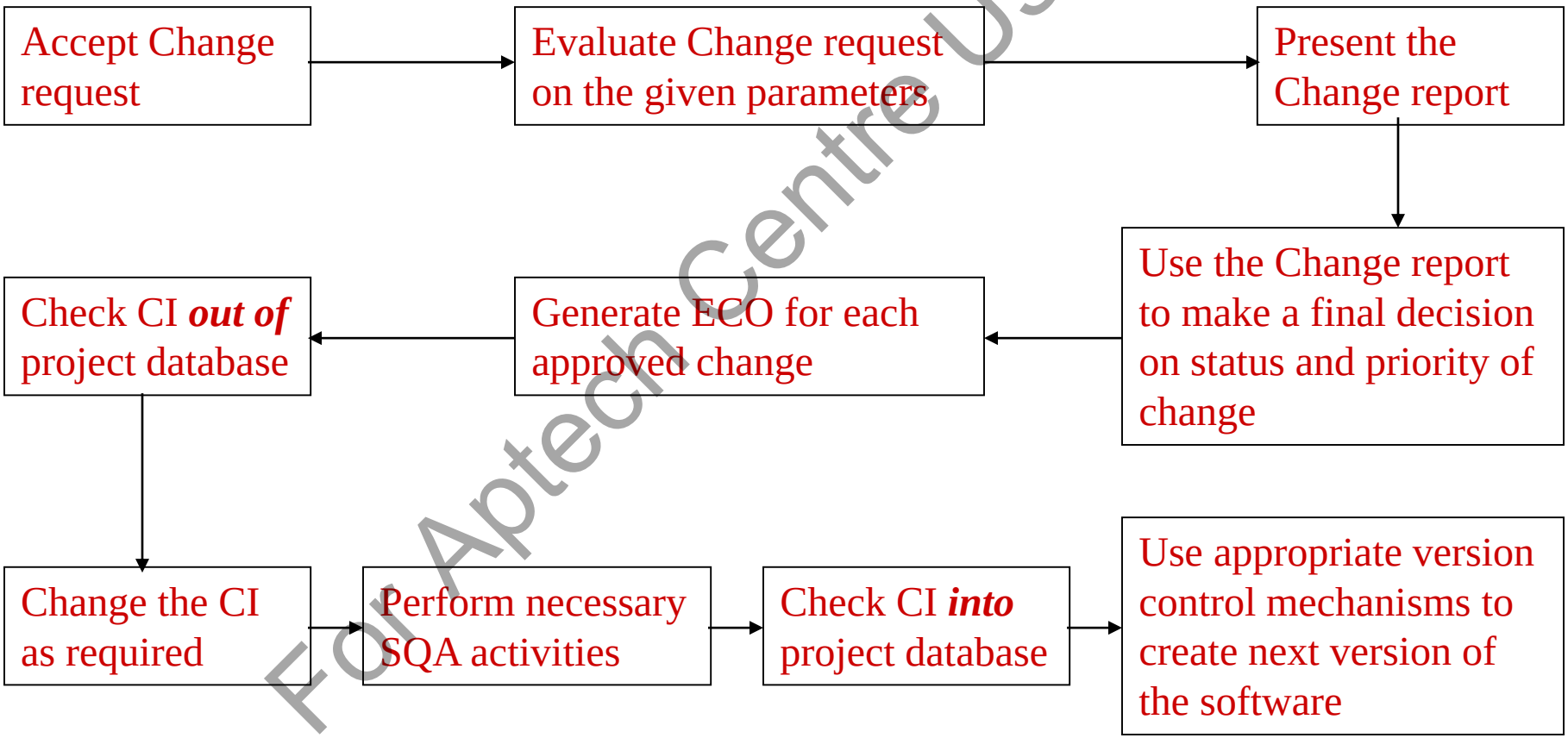
Change Control



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SCM Repository

- Stores all the project objects, each version of every object and the metadata that describes each version of the objects.

- Key requirements for an SCM repository are:
  - Reliability
  - Scalability
  - Availability
  - Transparency

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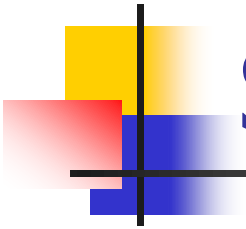

SCM Tools

- Configuration Management Assistant
- Adele

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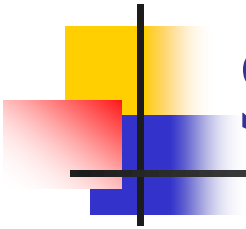

Summary

- Software configuration management is the discipline for systematically monitoring and controlling the changes that take place during the development process within an organization.
- Software configuration management is a discipline that controls the evolution of software systems.
- The primary goal of SCM is to recognize and regulate changes, and ensure that the changes are being properly implemented and reported to those interested.
- Software configuration management begins right after the project is begun and ends when the software is being taken out of operation.
- The items that comprise all information produced as part of the software process are collectively called a software configuration and each individual item is called a software configuration item.
- A baseline is a software configuration management concept that helps us to control change, without seriously impending justifiable change.

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Summary Contd…

- Once a baseline is made, changes can be made only following a formal procedure.
- 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 are obtained through a formal technical review.
- Five tasks that are very important to SCM are Identification, Version Control, Change control, Configuration Auditing, and Reporting
- The SCM repository is the heart of any SCM system. It stores all the project objects, each version of each object, and the meta-data that describes each version of each object.
- Key requirements for any SCM repository are:
  - Reliability
  - Scalability
  - Transparency
  - Availability

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