



## Chapter 8

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# **Software Maintenance**



# Review

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- 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.



# Review Contd...

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- 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



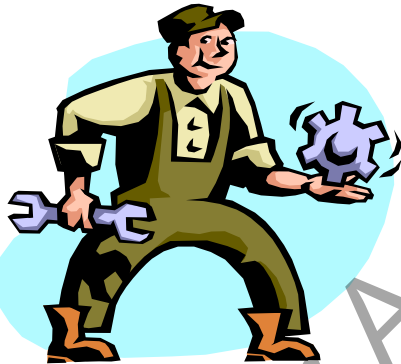
# Objectives

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- *Describe different types of maintenance*
- *Describe various maintenance issues*
- *Explain the maintenance metrics*
- *Describe the working of a typical maintenance organization*
- *Describe various factors affecting maintenance*

# An Introduction

- Do you have a malfunction on your hands?
- Do you need to add?
- Do you need to improve or enhance?





# Software Maintenance

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## Definition:

- Maintenance activities involve **making enhancements** to software products developed in earlier stages of the lifecycle, **adapting products** to new environments and **correcting problems**.



# Types of Maintenance

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- Corrective Maintenance
- Adaptive Maintenance
- Perfective Maintenance
- Adaptive Maintenance



# Maintenance Request Categories

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- Emergency Fix
- Urgent Fix
- Nice to have Fix





# Maintenance Issues

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- Dynamic personnel
- Motivation and morale
- Lack of documentation
- Patchy code
- Outdated or obsolete technology
- Round-the-clock operations

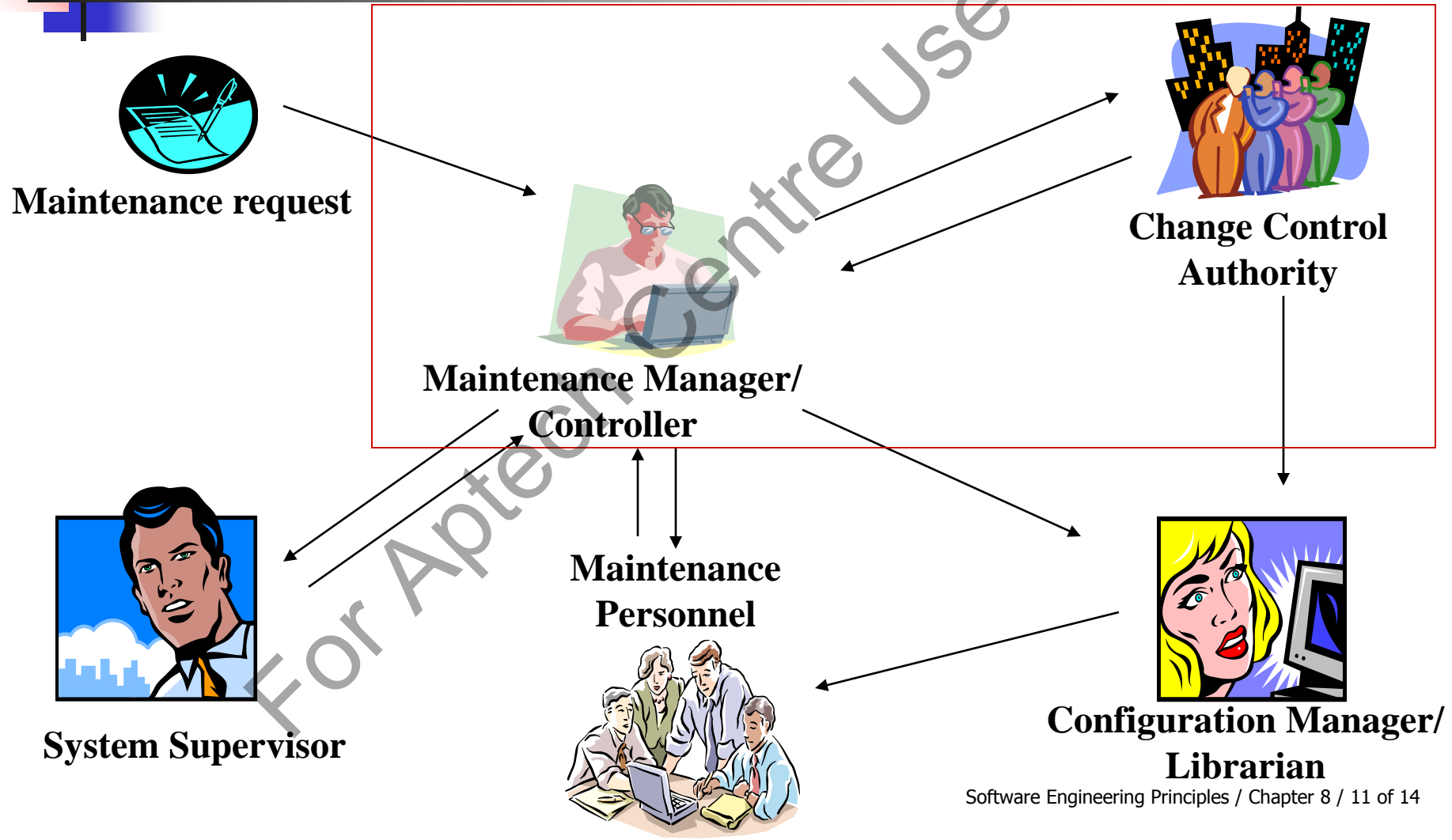


# Maintenance Metrics

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- System availability
- Maintenance turnaround
- Productivity

# A Typical Maintenance Organization





# Key Factors affecting Maintenance

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- Enhancements, performances, improvements and updates to new revision
- Time spent in understanding the system by new personnel
- Non-availability of proper documentation
- Every new maintenance activity increases the chance of errors



# Summary

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- Maintenance activities involve making enhancements to the software products developed in the earlier stages of the life cycle, adapting products to new environments and correcting problems.
- Maintenance activities account for a large portion of the system life cycle costs, even as much as 60-70 percent of the total costs set aside for the project.
- Corrective maintenance involves testing and diagnosis, then designing and making changes to get the system to do what it was expected to do.
- Perfective maintenance involves designing and enhancing the system to perform better than it was originally expected to do.
- Adaptive maintenance is a subset of perfective maintenance and comes into picture when we wish to take advantage of the latest technological advancements.



# Summary Contd...

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- Preventive maintenance is also called reengineering.
- Issues related to software maintenance include:
  - ◆ Lack of documentation
  - ◆ Dynamic personnel
  - ◆ Motivation or morale
  - ◆ Patchy code
  - ◆ Outdated technology
  - ◆ Round-the-clock operations
- Maintenance metrics can be calculated based on the following factors:
  - ◆ System availability
  - ◆ Maintenance turnaround
  - ◆ Productivity