*Benghazi University*
*Faculty of Information Technology software Engineering Department*

# *SE341*

## *Software Evolution & Maintenance*

**Part .7**

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# Configuration Management CM

CM involves dealing with a large volume of information and many CM tools have been developed to support CM processes.

إدارة التكوين تتضمن التعامل مع كمية كبيرة من المعلومات وقد تم تطوير العديد من أدوات ادارة التكوين لدعم عملياتها .

- Configuration management is concerned with managing evolving software systems and aims to control the costs and effort involved in making changes to a system.

إدارة التكوين تهتم بإدارة التطوير للنظم البرمجية وتهدف إلى التحكم في التكلفة والجهد المبذول نتيجة إجراء تغييرات على النظام

# Configuration Management CM

**CM** policies and processes define how to record and process proposed system changes, how to decide what system components to change, how to manage different versions of the system and its components, and how to distribute changes to customers. **CM** tools are used to keep track of change proposals, store versions of system components, build systems from these components, and track the releases of system versions to customers.

تحدد سياسات وعمليات إعادة التكوين بكيفية تسجيل ومعالجة تغييرات النظام المقترحة ، وكيفية تحديد مكونات النظام التي يجب تغييرها ، وكيفية إدارة الإصدارات المختلفة للنظام لتتبع مقترحات CM ومكوناته ، وكيفية توزيع التغييرات على العملاء. تُستخدم أدوات التغيير ، وتخزين إصدارات مكونات النظام ، وبناء أنظمة من هذه المكونات ، وتتبع إصدارات النظام للعملاء.

# Software Configuration Management SCM

## What is Software Configuration Management?
## ما هي إدارة تكوين البرمجية

Software Configuration Management is a software-engineering discipline comprising the tools and techniques that a company uses to manage change to its software assets. It enhances the reliability and quality of software. Its key activities are configuration management planning and change management.

في هندسة البرمجية، إدارة تكوين البرمجية يشمل الأدوات والتقنيات التي تستخدم في متابعة وإدارة التغيير للمنتجات البرمجية. فهو يعزز جودة واعتمادية البرمجيات. وأهم أنشطته هي تخطيط إدارة التكوين وإدارة التغيير

# Software configuration management/Activities

**Change management**

Keeping track of requests for changes to the software from customers and developers, working out the costs and impact of changes, and deciding whether the changes should be implemented.

**Version management**

Keeping track of the multiple versions of system components and ensuring that changes
made to components by different developers do not interfere with each other.

**System building**

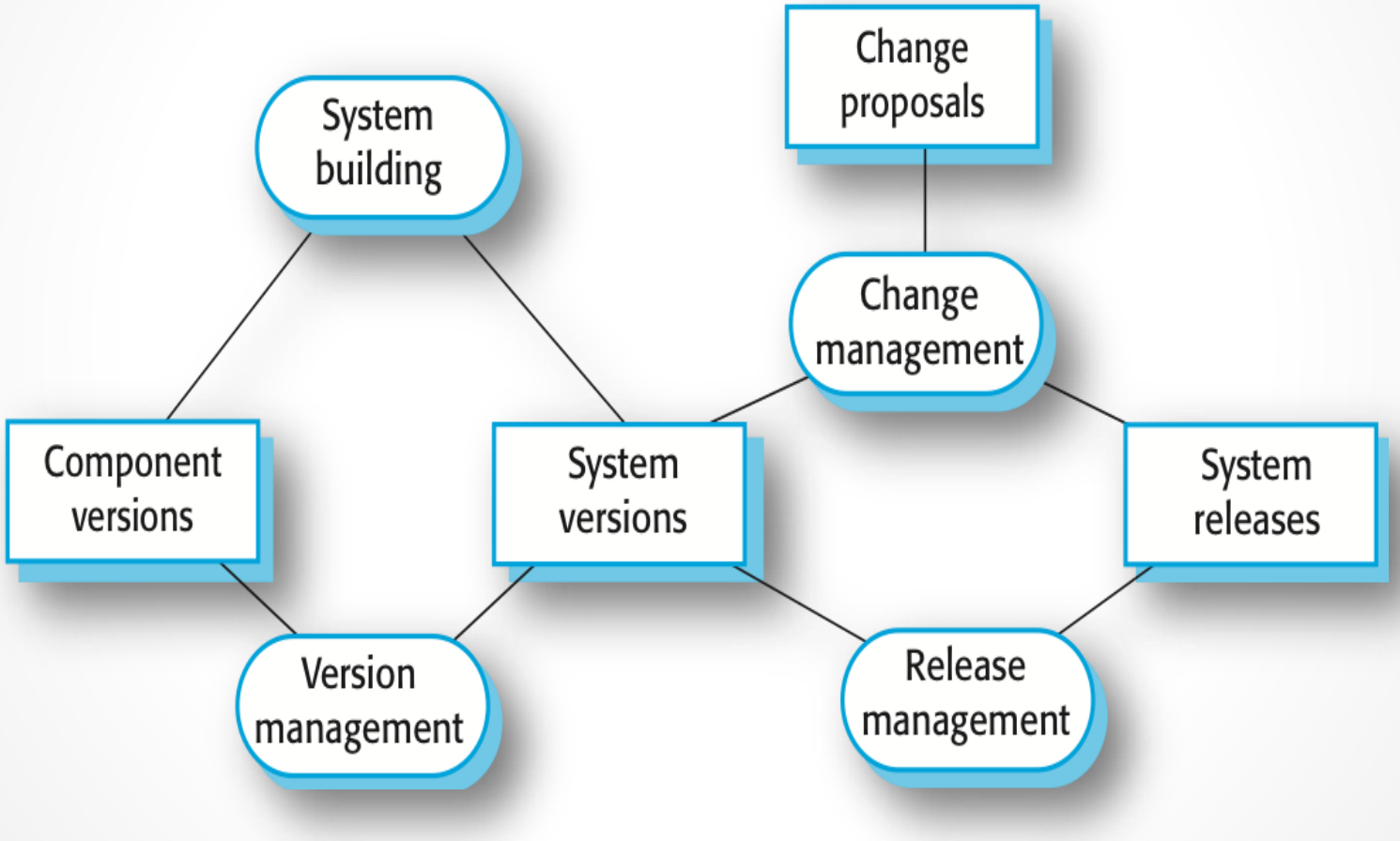
The process of assembling program components, data and libraries, then compiling
these to create an executable system.

# Software configuration management/Activities

**Release management**

- Preparing software for external release and keeping track of the system versions that have been released for customer use.
- A system release is a version of a software system that is distributed to customers.
- For mass market software, it is usually possible to identify two types of release: major releases which deliver significant new functionality, and minor releases, which repair bugs and fix customer problems that have been reported.

# Software configuration management/Activities



# Software Maintenance Standard

- IEEE and ISO have both addressed s/w maintenance processes.
- IEEE/EIA 1219 and ISO/IEC 14764 as a part of ISO/IEC12207 (life cycle process).
- IEEE/EIA 1219 organizes the maintenance process in seven phases:
  - problem identification, analysis, design, implementation, system test, acceptance test and delivery.
- ISO/IEC 14764 describes s/w maintenance as an iterative process for managing and executing software maintenance activities.
- The activities which comprise the maintenance process are:
  - process implementation, problem and modification analysis, modification implementation, maintenance review/acceptance, migration and retirement.
- Each of these maintenance activity is made up of tasks. Each task describes a specific action with inputs and outputs.

# IEEE/EIA 1219 Maintenance Process

The standard focuses on a seven-phases:

- Problem Identification.
- Analysis.
- Design.
- Implementation.
- System Test.
- Acceptance Test.
- Delivery.

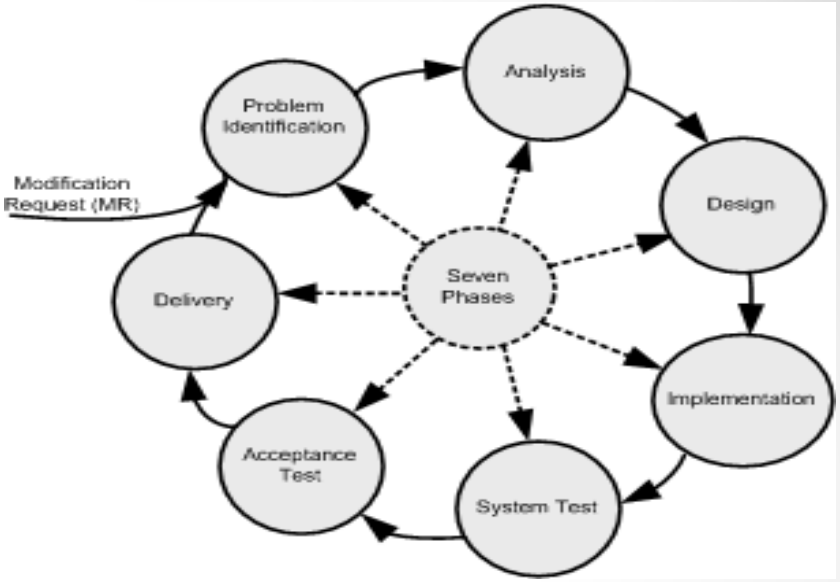



**Figure 3.9 Seven phases of IEEE maintenance process ©IEEE, 2004**

Each of the seven activities has five associated attributes as follows:

- **Activity definition:** This refers to the implementation process of the activity.
- **Input:** This refers to the items that are required as input to the activity.
- **Output:** This refers to the items that are produced by the activity.
- **Control:** This refers to those items that provide control over the activity.
- **Metrics:** This refers to the items that are measured during the execution of the activity.

# ISO/IEC 14764 Maintenance Process

- ISO/IEC 14764 is an international standard for software maintenance.
- It describes maintenance using the same concepts as IEEE/EIA 1219 except that they are depicted slightly differently.
- The basic structure of an ISO process is made up of activities, and an activity is made up of tasks.
- Upon an activation of the maintenance process, plans and procedures are developed and resources are allocated to carry out maintenance.
- In response to a change request, code is modified in conjunction with the relevant documentation.
- Modification of the running software without losing the system's integrity is considered to be the overall objective of maintenance.

# ISO/IEC 14764 Maintenance Process

The maintenance process comprises the following high level activities:

1. Process Implementation.
2. Problem and Modification Analysis.
3. Modification Implementation.
4. Maintenance Review and Acceptance.
5. Migration.
6. Retirement.

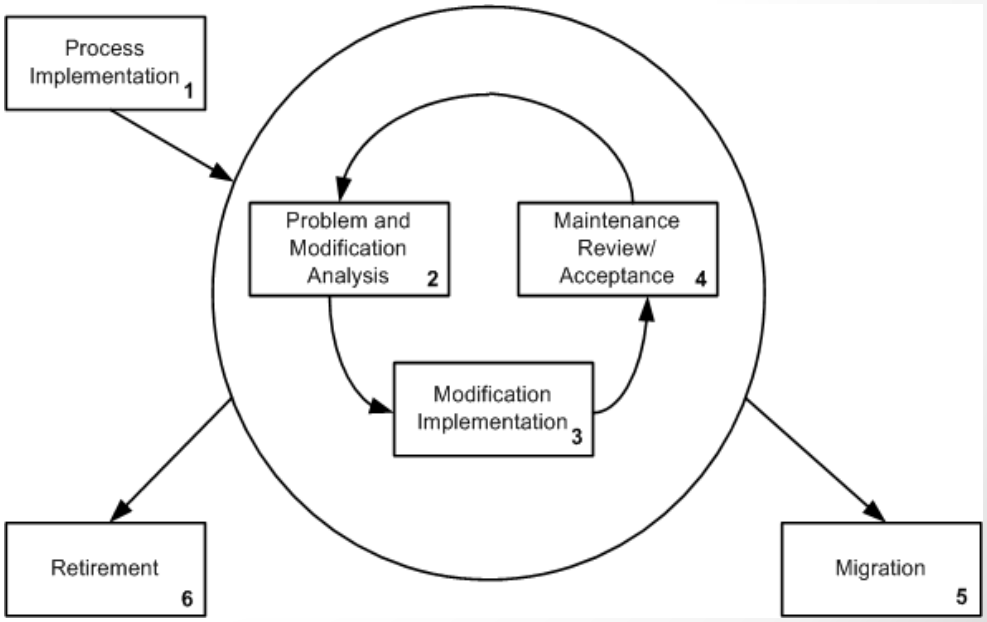



**Figure 3.17 ISO/IEC 14764 iterative maintenance process ©IEEE, 2004**

# Course summary and Key points

# Course summary and Key points

- Software development and evolution can be thought of as an integrated, iterative process that can be represented using a spiral model.
- For custom systems, the costs of software maintenance usually exceed the software development costs.
- The process of software evolution is driven by requests for changes and includes change impact analysis, release planning and change implementation.
- There are 3 types of software maintenance, namely bug fixing, modifying software to work in a new environment, and implementing new or changed requirements.
- Program comprehension on the software maintenance Process, and Understand the concept of software reverse engineering.
- Software re-engineering is concerned with re-structuring and re- documenting software to make it easier to understand and change.
- Refactoring, making program changes that preserve functionality, is a form of preventative maintenance.
- The business value of a legacy system and the quality of the application should be assessed to help decide if a system should be replaced, transformed or maintained.

# Course summary and Key points

- Configuration management is the management of an evolving software system. When maintaining a system, a CM team is put in place to ensure that changes are incorporated into the system in a controlled way and that records are maintained with details of the changes that have been implemented.
- The main configuration management processes are change management, version management, system building and release management.
- System releases include executable code, data files, configuration files and documentation. Release management involves making decisions on system release dates, preparing all information for distribution and documenting each system release.
- A study of the IEEE/EIA 1219 and ISO/IEC 14764 standards for the maintenance process in software development, and the stages that each standard goes through individually during the maintenance of software systems.

***Thank you for your Attention……,***

*Your teacher / Mr.M-Sultan*