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Unit 2

IEEE/EIA 12207 Software Life Cycle Processes

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January 1998

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Unit 2 - ISO/IEC 12207

- *History*
  - Purpose of 12207
  - History of 12207
- Key concepts
- ISO/IEC 12207 processes

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Purpose of 12207

- To establish a common framework for the life cycle of software
  - Acquire, supply, develop, operate, and maintain software
    - Undertakes broader scope than previous standards
  - Manage, control, and improve the framework
    - Recognizes that software is part of a system and that a project is part of an enterprise
- To establish a basis for world trade in software

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Motivations for 12207

Previous standards ...

- … focused on the single contract or project in isolation
- … described a single monolithic process
- … failed to encourage investment in the discipline and capitalization of processes
- … induced 20-50% added costs in documentation and formal reviews

Adapted from a slide by Perry DeWeese

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Unit 2 - ISO/IEC 12207

- History
- *Key concepts*
- ISO/IEC 12207 processes

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Key concept of ISO/IEC 12207: Process/activity/task hierarchy

- Processes are subdivided into cohesive *activities*.
- Activities are subdivided into *tasks*.
- You may think of tasks as being the *specifications* for the execution of an activity.
- A task may be a self-declaration of intent, a requirement, a recommendation, or a permissible action.

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Key concept of ISO/IEC 12207: Processes and parties

◆ Identification of processes is based on two principles:
  - ◆ *Modularity*: Processes should be cohesive and should have *low coupling* to other.
  - ◆ *Responsibility*: Each process should be executable by a *single party*.
  - ◆ A particular *organization* may become the party responsible for executing a process

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Key concept of ISO/IEC 12207: Continuing responsibilities

◆ The activities and tasks of a 12207 process are *not* steps to be performed.

◆ 12207 does *not* require that the activities and tasks are to be performed in any particular order.

◆ The activities and tasks of 12207 are *continuing responsibilities* whose execution is assigned to the party for the duration of the process.

Key concept of ISO/IEC 12207: Categories of processes

◆ *Primary*:
  - ◆ Acquisition, Supply
  - ◆ Development, Operation, Maintenance
◆ *Supporting*: processes used as "subroutines" by other processes
◆ *Organizational*: processes inherent to the organization and "instantiated" by the project
◆ Also, a special *tailoring* process

Key concept of ISO/IEC 12207: Integral evaluation

◆ Evaluation is *not* a distinct process or activity.

◆ Evaluation is treated as an *internal*, *integral* task of many activities in the standard.

◆ In general, the evaluations have stated purposes and stated criteria.

◆ Other processes may supplement internal evaluations: Verification, Validation, Joint Review, Audit, Quality Assurance, Improvement.

Key concept of ISO/IEC 12207: Temporal issues

◆ The standard does *not* specify a life cycle *model*, e.g. waterfall, spiral, etc.

◆ The standard does not place ordering dependencies or time dependencies on the tasks -- that is the job of the chosen life cycle model and the project plan.

◆ Tasks may be iterated, repeated, recursively invoked, etc.

Key concept of ISO/IEC 12207: Approach to documentation

◆ The standard requires some outputs to be documented.

◆ The standard does *not* prescribe format, media, or content of the documentation.

◆ The Documentation Process permits the user to make these decisions.

Key concept of ISO/IEC 12207: Approach to baselining

◆ Standard differentiates between *items* and *configuration items*. The CM process can handle both, but the latter are handled more rigorously.

◆ A *baseline* is a formally approved version of a CI. Baselines (as clarified by the IEEE/EIA version) are established by the primary processes, *not* by the CM process.

Unit 2 - ISO/IEC 12207

◆ History
◆ Key concepts
◆ *ISO/IEC 12207 processes*

ISO/IEC 12207 processes

◆ Primary
◆ Supporting
◆ Organizational

ISO/IEC 12207 processes: Primary processes

◆ **Primary** processes are executed by parties who initiate or perform major roles in the software life cycle:

  ◆ Acquisition   ◆ Development
  ◆ Supply   ◆ Operation
                         ◆ Maintenance

ISO/IEC 12207 processes: Supporting processes

◆ A **supporting** process supports another process as an integral part with a distinct purpose:

  ◆ Documentation   ◆ Validation
  ◆ Configuration Management   ◆ Joint Review
  ◆ Quality Assurance   ◆ Audit
  ◆ Verification   ◆ Problem Resolution

◆ But *fundamental responsibility* remains integral to the *primary* process.

ISO/IEC 12207 processes: Organizational processes

◆ **Organizational** processes inherently exist outside the scope of the project but *instances* of them are employed by the project:

  ◆ Management
  ◆ Infrastructure
  ◆ Improvement
  ◆ Training

ISO/IEC 12207 processes: Tailoring process

◆ A special case

◆ The tailoring process is used to tailor the standard for usage on a particular project.

◆ Tailoring permits deletion of any process, activity or task.

◆ (Tailoring is discouraged in the IEEE/EIA adaptation of the standard.)