



**ISO/IEC 12207:2008
IEEE Std 12207-2008**

**Systems and Software Engineering —
Software Life Cycle Processes**

Contents

- 1. Background**
- 2. Origin and purpose of 12207**
- 3. Structure of the standard**
- 4. Supporting Guides**

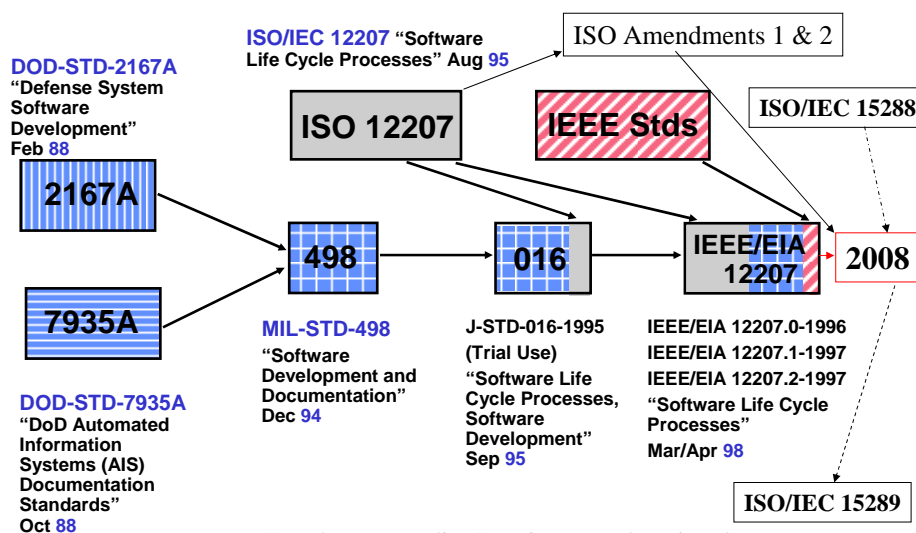
Introduction

- **Published in 1995**
 - First International Standard to provide a comprehensive set of life cycle processes, activities and tasks for software that is part of a larger system, and for stand alone software products and services.
- **In 2002**
 - Publication of ISO/IEC 15288 - System life cycle processes.
 - Software and its design processes should not be considered separately from those systems,
- **Amendments (2002 and 2004)**
 - Added process purpose and outcomes
 - Established a Process Reference Model i.a.w. ISO/IEC 15504.
- **In 2008**
 - Revision of the amended ISO/IEC 12207
 - Harmonization strategy to achieve a fully integrated suite of system and software life cycle processes and guidance for their application.
- Can be used in one or more of the following modes:
 - By an organization — to help establish an environment of desired processes.
 - By a project — to help select, structure and employ the elements of an established set of life cycle processes to provide products and services.
 - By an acquirer and a supplier — to help develop an agreement concerning processes and activities.
 - By organizations and assessors — to perform assessments that may be used to support organizational process improvement.

12/7/2009

3

History of 12207



12/7/2009

ISO/IEC 15288 - Systems life cycle Processes

4

Purpose and Limitations

- **Purpose**
 - To provide a defined [set of processes](#) to [facilitate communication](#) among acquirers, suppliers and other stakeholders in the life cycle of a software product.
 - Is written for [acquirers](#) of systems and software products and services and for [suppliers, developers, operators, maintainers, managers, quality assurance managers, and users](#) of software products.
- **Limitations**
 - [Does not detail](#) the life cycle processes in terms of [methods or procedures](#) required to meet the requirements and outcomes of a process
 - [Does not detail](#) documentation in terms of [name, format, explicit content and recording media](#)
 - ISO/IEC 15289 * addresses the content for life cycle process information items (documentation).
 - [Does not prescribe](#) a specific system or software [life cycle model](#), development [methodology, method, model or technique](#).
 - Is [not intended](#) to be in [conflict](#) with any organization's [policies, procedures, and standards](#) or with any national [laws and regulations](#)

12/7/2009

ISO/IEC 15289 - Content of systems and software life cycle
process information products (Documentation)

5

Conformance

- **Intended Usage**
 - The [requirements](#) in this Standard are contained in
 - Clause 6 - [System Life Cycle Processes](#)
 - Clause 7 - [Software Life Cycle Processes](#)
 - Annex A - [Tailoring Process](#)
 - [Implementation](#) of this Standard typically involves [selecting a set of processes suitable](#) to the organization or project
 - [Two ways](#) that an implementation can be [claimed to conform](#) with the provisions of this Standard *
 - Full conformance
 - Tailored conformance

12/7/2009

6

Conformance

- **Full Conformance**
 - A claim of full conformance declares the set of processes for which conformance is claimed.
 - Full conformance is achieved by demonstrating that all of the requirements of the declared set of processes have been satisfied using the outcomes as evidence.
- **Tailored Conformance**
 - Clauses are selected or modified in accordance with the tailoring process prescribed in Annex A.
 - The tailored text, for which tailored conformance is claimed, is declared.
 - Tailored conformance is achieved by demonstrating that requirements for the processes, as tailored, have been satisfied using the outcomes as evidence.

12/7/2009

7

Description of Processes

- The processes of this standard are described in a manner that is similar to ISO/IEC 15288 in order to facilitate the use of both standards in a single organization or project.
- Each process is described in terms of the following attributes:
 1. Title conveys the scope of the process as a whole
 2. Purpose describes the goals of performing the process
 3. Outcomes express the observable results expected from the successful performance of the process
 4. Activities are a set of cohesive tasks of a process
 5. Tasks are requirements, recommendations, or permissible actions intended to support the achievement of the outcomes.

12/7/2009

8

Tasks

- **Task**
 - Verbs used to differentiate between the distinct forms of a task:
 - **SHALL**
 - Express a provision required for conformance
 - **SHOULD**
 - Express a recommendation among other possibilities
 - **MAY**
 - To indicate a course of action permissible within the limits of this standard

12/7/2009

9

Life Cycle Process groups

- **Two major sub-divisions of process**
 - Processes dealing with a standalone software product or service or a software system.
 - Software-specific processes for use in implementing a software product or service that is an element of a larger system.

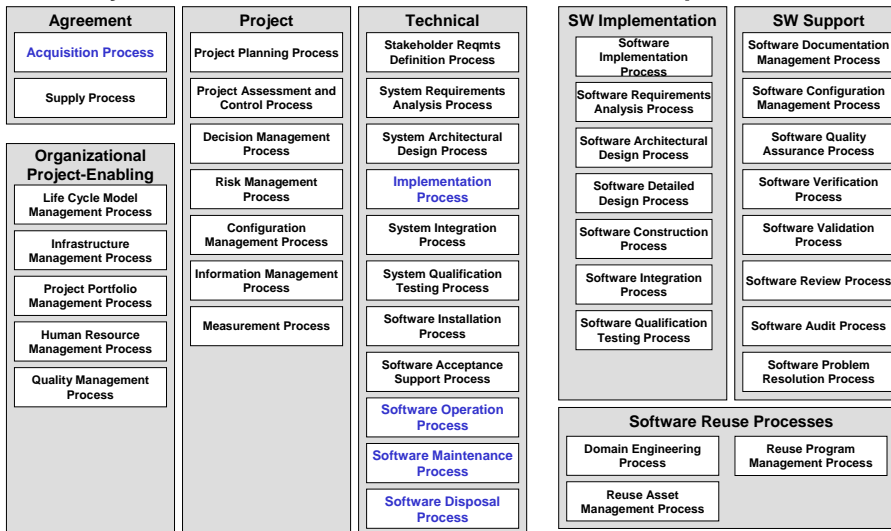
12/7/2009

10

The Life Cycle Processes – From Cradle to Grave

System Context Processes

Software Specific Processes *

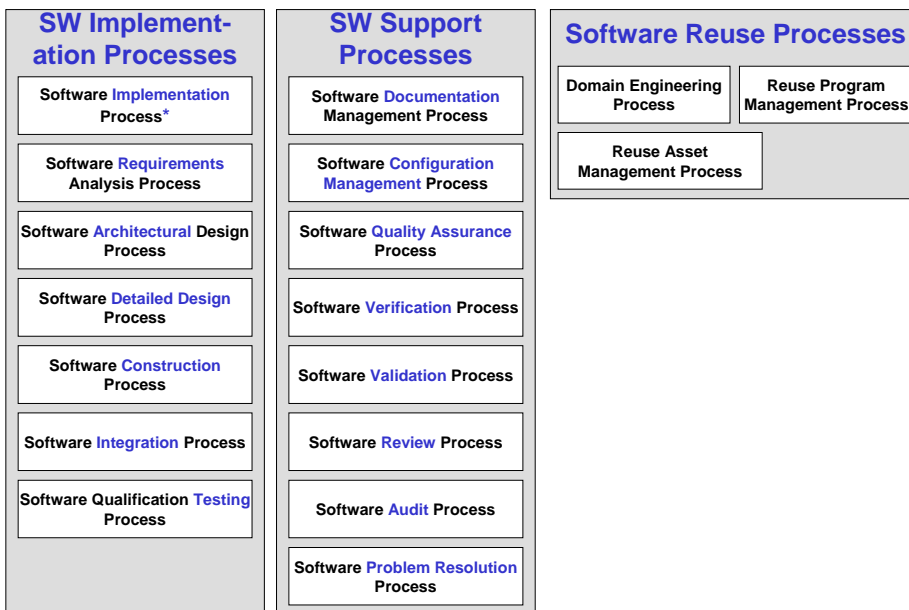


* Software-specific processes for use in implementing a software product or service that is an [element of a larger system](#).

12/7/2009

11

Software Life Cycle Processes

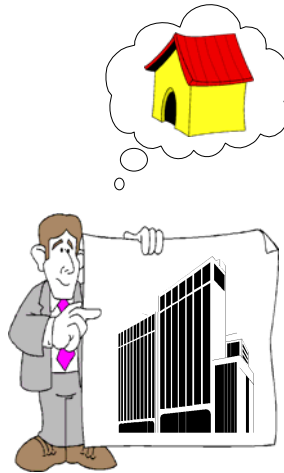


12/7/2009

* Software-specific processes for use in implementing a software product or service that is an [element of a larger system](#).

12

Can you Tailor 12207 ?



12/7/2009

13

Annex A (normative) Tailoring Process

- **Purpose of the Tailoring Process**
 - To adapt the processes of this Standard to satisfy particular circumstances or factors that:
 - surround an organization that is employing this International Standard in an agreement.
 - influence a project that is required to meet an agreement in which this International Standard is referenced.
 - reflect the needs of an organization in order to supply products or services.
- **Tailoring Process outcomes**
 - As a result of the successful implementation of the Tailoring Process:
 - a) **Modified life cycle processes are defined to achieve the purposes and outcomes of a life cycle model**

12/7/2009

14

Tailoring Process Activities

- Identify and document the circumstances that influence tailoring.
 - e.g. risks, novelty, size and complexity, integrity issues such as safety, security, privacy, usability, availability, emerging technology opportunities, the need to conform to other standards.
- In the case of properties critical to the system
 - take due account of the life cycle structures recommended or mandated by standards relevant to the dimension of the criticality.
- Obtain input from all parties affected by the tailoring decisions.
- Make tailoring decisions in accordance with the Decision Management Process to achieve the purposes and outcomes of the selected life cycle model.
- Select the life cycle processes that require tailoring and delete selected outcomes, activities, or tasks.

12/7/2009

15

Software Quality Assurance Process

- **Purpose**
 - To provide assurance that work products and processes comply with predefined provisions and plans
- **Outcomes**
 - As a result of successful implementation of the Software Quality assurance process:
 - a strategy for conducting quality assurance is developed;
 - evidence of Software quality assurance is produced and maintained;
 - problems and/or non-conformance with requirements are identified and recorded; and
 - adherence of products, processes and activities to the applicable standards, procedures and requirements are verified.

12/7/2009

16

Software Quality Assurance Process

- **Activities and Tasks**

- The project shall implement the following activities in accordance with applicable organization policies and procedures with respect to the Software Quality Assurance Process.
- **Process Implementation.**
 - This activity consists of the following tasks:
 - A quality assurance process suited to the project shall be established.
 - The quality assurance process should be coordinated with the related Software Verification, Software Validation, Software Review, and Software Audit Processes.
 - A plan for conducting the quality assurance process activities and tasks shall be developed, documented, implemented, and maintained for the life of the contract.
 - Scheduled and on-going quality assurance activities and tasks shall be executed
 - Records of quality assurance activities and tasks shall be made available to the acquirer as specified in the contract.
 - It shall be assured that persons responsible for assuring compliance with the contract requirements have the organizational freedom, resources, and authority to permit objective evaluations and to initiate, effect, resolve, and verify problem resolutions.

12/7/2009

17

Software Quality Assurance Process

- **Activities and Tasks**

- **Product Assurance.**
 - This activity consists of the following tasks:
 - It shall be assured that all the plans required by the contract are documented, comply with the contract, are mutually consistent, and are being executed as required.
 - It shall be assured that software products and related documentation comply with the contract and adhere to the plans.
 - In preparation for the delivery of the software products, it shall be assured that they have fully satisfied their contractual requirements and are acceptable to the acquirer.
- **Assurance of Quality Systems.**
 - This activity consists of the following task:
 - Additional quality management activities may be assured in accordance with the clauses of ISO 9001.

12/7/2009

18

Software Quality Assurance Process

- **Activities and Tasks**
 - **Process Assurance.**
 - This activity consists of the following tasks:
 - It shall be assured that those software life cycle processes (supply, development, operation, maintenance, and support processes including quality assurance) employed for the project comply with the contract and adhere to the plans.
 - It shall be assured that the internal software engineering practices, development environment, test environment, and libraries comply with the contract.
 - It shall be assured that applicable prime-contract requirements are passed down to the subcontractor, and that the subcontractor's software products satisfy prime-contract requirements.
 - It shall be assured that the acquirer and other parties are provided the required support and cooperation in accordance with the contract, negotiations, and plans.
 - It should be assured that software product and process measurements are in accordance with established standards and procedures.
 - It shall be assured that the staff assigned have the skill and knowledge needed to meet the requirements of the project and receive any necessary training.

12/7/2009

19

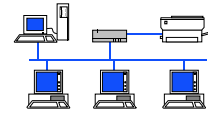
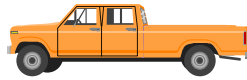
Annex G (informative) Relationship to other IEEE standards

Category	Clause	Process	Relevant IEEE Std	Notes
7.2 Software Support Processes	7.2.1	Software Documentation Management Process	1063 12207.1 (15289)	IEEE Std 1063 provides requirements for the structure, content and format of user documentation. IEEE Std 12207.1 provides guidance on recording data resulting from executing the life cycle processes of ISO/IEC 12207. It is expected to be replaced by an IEEE adoption of ISO/IEC 15289.
	7.2.2	Software Configuration Management Process	828	This standard specifies the content of a software configuration management plan along with requirements for specific planning activities.
	7.2.3	Software Quality Assurance Process	730 ← 1061 1465 (25051)	IEEE Std 730 specifies the format and content of a software quality assurance plan. IEEE Std 1061 describes a methodology—spanning the life cycle—for establishing quality requirements and for identifying, implementing, and validating the corresponding measures. IEEE Std 1465 describes quality requirements specifically suitable for software "packages". It is expected to be replaced by an IEEE adoption of ISO/IEC 25051.
	7.2.4	Software Verification Process	1012 ←	This standard describes software verification and validation activities.

12/7/2009

20

Examples of Life Cycle Roles

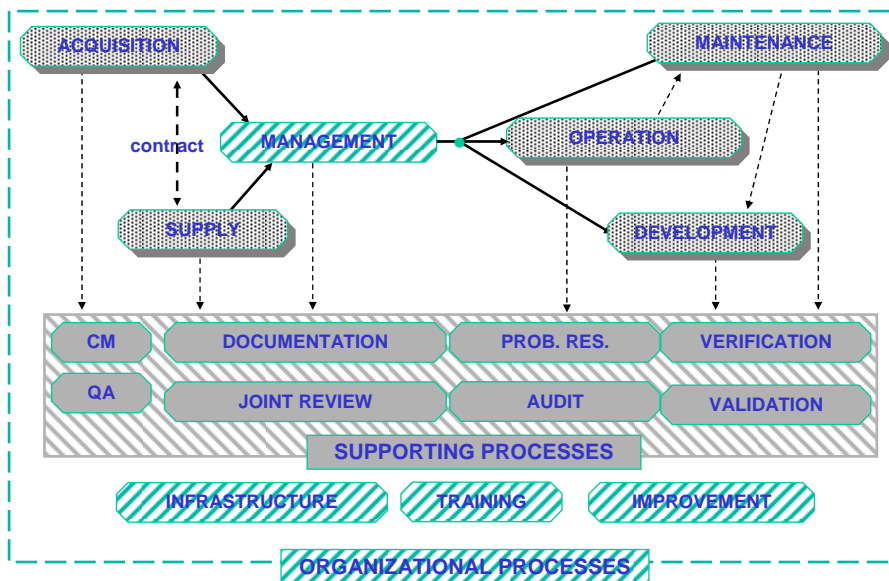


<u>Role</u>	<u>Teens' Truck</u>	<u>Navy System</u>
1. Acquirer ("Buyer")	Mom and Dad	Systems Command, PD-xx
2. Supplier ("Vendor")	Ed's Car Lot	Systems Center D555
3. Developer	Ford Motor	Cool Coders Corp.
4. Maintainer	Terry's Tune-up Shop	Systems Center D999
5. Operator	Family's Teenagers	Pacific Fleet
6. User	A teenager	Ship's watch team

12/7/2009

21

How The Life Cycle Processes Interact



12/7/2009 Singh, R., 'An Introduction to International Standard ISO/IEC 12207 Software Life Cycle Processes', 1998. 22



Summary

- 1. Background**
- 2. Origin and purpose of 12207**
- 3. Structure of the standard**
- 4. Supporting Guides**