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Software and Systems Engineering — Lifecycle Processes — Framework for Product Quality Achievement

Ingénierie du logiciel et des systèmes — Processus du cycle de vie — Cadre pour la réalisation de la qualité du produit

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Contents

Page

Foreword ..... **v**

Introduction ..... **vi**

1 Scope **1**
1.1 Application 1
1.2 Audience 2
1.3 Limitations 2

2 Motivation **2**

3 Terms, definitions and abbreviated terms **3**

4 Quality achievement concepts **4**
4.1 Overview of quality achievement 4
4.2 Guiding principles and approach 5
4.3 Localization of quality responsibility 6
4.3.1 Establishing system element requirements 6
4.3.2 Identification of process instances 8
4.4 Creation of process instance descriptions 8
4.4.1 Establishment of success criteria 8
4.4.2 Identification of detailed activities and tasks 9
4.4.3 Process instance descriptions 10
4.5 Consistency with institutional knowledge 11
4.6 Maintenance of content consistency 12

5 Required background concepts **13**
5.1 System and Software Concepts 13
5.2 Life cycle concepts 13
5.3 Process concepts 14
5.4 Organizational concepts 14
5.5 Information Item Concepts 14
5.6 Notion of technical management 14

6 Context of application **14**
6.1 Relationship to other standards 14
6.2 Organizational context 16
6.3 Stakeholder context 16
6.4 Stage context 16
6.5 Process context 16
6.6 Information item context 17

7 Potential process augmentations **17**
7.1 Project planning process 17
7.2 Project assessment and control process 17

8 Guidelines for process augmentations **17**
8.1 Project planning process 17
8.2 Project assessment and control process 18

9 Potential information item augmentations **18**
9.1 Process Instance Descriptions 18
9.2 Consistency tracker 18

10 Guidelines for information item augmentations **19**
10.1 Process instance descriptions 19
10.2 Consistency tracker 19

Annex A (informative) **Example: Establishing System Element Requirements** **20**

Annex B (informative) **Example: Creation of Process Instance Descriptions** **23**

Annex C (informative) **Example: Consistency Tracker** **27**

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Annex D (informative) **Example: Process View for Specific Requirement** **28**
Annex E (informative) **Theoretical Foundations** **34**
Annex F (informative) **Example Set of Mutual Consistency Relationships** **37**
Bibliography **38**

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Foreword

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The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, SC 7, *Software and Systems Engineering*.

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Introduction

This Technical Specification provides guidance on the application of ISO/IEC/IEEE 15288:2008[1] life cycle processes with specific reference to addressing quality in projects that deliver systems and software products and services. It focuses on a systematic approach to achieving quality, involving the development of certain information items, the inter-relationships between these information items and the maintenance and mutual consistency management of these information items. In particular, it describes how to develop detailed specifications of the collection of process instances needed to produce a specific product or system and achieve its quality goals. It describes how the guidance in life cycle process standards may be applied in conjunction with other standards (such as the ISO/IEC 25000[12] SQuaRE series of standards that address the specification, measurement and evaluation of product quality) to achieve quality during the development of a specific system.

Application of life cycle processes to develop a system involves the production of, among others, a collection of information items such as stakeholder requirements, system requirements, designs, plans, and technical strategies, as well as a collection of artefacts including the various system elements and enabling systems. The guidance in this Technical Specification is based on the following principles:

— **Localization of quality responsibility**: Requirements should be established for each system element and enabling system, derived from the overall system requirements; the set of process instances needed to develop each system element or enabling system should be identified; their responsibilities towards quality are demarcated by the outcomes defined for the corresponding life cycle process in ISO/IEC/IEEE 15288;

— **Creation of process instance descriptions**: For each process instance, success criteria should be established based on the outcomes defined for the corresponding life cycle process, the characteristics and requirements of the particular system element, and requirements and constraints arising from product decisions made in other process instances; the set of specific tasks and associated competencies needed to achieve these success criteria should be identified, particularly for system elements with significant quality risk;

— **Consistency with institutional knowledge:** Achievement of quality ultimately depends on correct technical decisions. Relevant institutional knowledge should be systematically identified and deployed for making product and process decisions, and the resulting information items and artefacts should be checked for consistency with the applicable bodies of institutional knowledge;

— **Maintenance of content consistency**: All the information items, including the process instance specifications themselves, may evolve concurrently throughout the development life cycle. Content consistency relationships among the various information items and artefacts should be tracked and managed as these information items and artefacts evolve concurrently.

The Technical Specification is applicable to any project involving the development, enhancement or re-engineering of systems with hardware, software and human elements. It is particularly useful to project organizations that operate in multiple application domains where the set of critical quality characteristics varies widely across projects, requiring a more systematic and detailed approach to planning the achievement of quality during the development stage of the system life cycle.

This Technical Specification is intended to provide guidance for two-party situations and may be equally applied where the two parties are from the same organization. This Technical Specification can also be used by a single party as self-imposed tasks. This Technical Specification can also serve as guidance in multi-party situations, where high risks are inherent in the supply and integration of complex systems, and procurement can involve several suppliers, organizations or contracting parties.

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Software and Systems Engineering — Lifecycle Processes — Framework for Product Quality Achievement

1 Scope

1.1 Application

This Technical Specification provides guidance on

— applying processes from ISO/IEC/IEEE 15288:2008[1] in conjunction with other standards to contribute to achieving quality of systems and software products and services during the development stage of the life cycle (6.4),

— the information items that should be produced through the implementation of the relevant processes (6.5), and

— the new information items (Clauses 9 and 10).

The scope of this Technical Specification is to indicate how to apply the life cycle processes in ISO/IEC/IEEE 15288:2008 to achieve quality in the context of a specific product. It is independent of any tailoring that may be made to modify the generic process descriptions to suit the needs of a particular context. Even after any applicable tailoring, there is a need to apply the resulting process guidance and determine the specific detailed activities, tasks and associated success criteria for each of the process instances needed to deliver the target system. That is the focus of the framework described in this Technical Specification.

This Technical Specification is applicable to

— those who use or plan to use ISO/IEC/IEEE 15288:2008 on projects dealing with man-made systems, software-intensive systems, software products, and services related to those systems and products, regardless of project scope, product(s), service(s), methodology, size or complexity,

— those who use or plan to use ISO/IEC/IEEE 15289[5] on projects dealing with man-made systems, software-intensive systems, software products, and services related to those systems and products, regardless of project scope, product(s), methodology, size or complexity,

— anyone performing technical processes and tasks,

— those who are responsible for the technical management of projects concerned with the development of systems,

— those responsible for performing ISO/IEC/IEEE 15288:2008 life cycle processes at a project level,

— organizations and individuals subcontracting a project management effort,

— anyone developing systems engineering management documentation to complete technical planning aspects of their project processes,

— anyone performing systems engineering activities,

— project managers responsible for staffing projects and identifying competency development needs,

— anyone developing information items during the application of project and technical processes, and

— anyone performing project and technical processes to aid in ensuring that the information items developed during these processes conform to ISO/IEC/IEEE 15289.

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