



Technical Report

ISO/IEC TR 33022

Information technology — Process assessment — Application of ISO/ IEC/IEEE 12207 processes to the ISO/IEC 33020 process capability measurement scale

*Technologies de l'information — Évaluation du processus —
Application des processus ISO/IEC/IEEE 12207 à l'échelle de la
mesure de la capacité de processus de l'ISO/IEC 33020*

**First edition
2024-10**

Reference number
ISO/IEC TR 33022:2024(en)

Full document details: ISO IEC TR 33022-2024

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Published in Switzerland

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Foreword

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Introduction

This document provides a specification for mapping the ISO/IEC/IEEE 12207 life cycle processes to the ISO/IEC 33020 process attributes with the intent of demonstrating support for the levels 1 to 3 of the ISO/IEC 33020 process capability measurement framework.

This document is primarily addressed to developers of process assessment models for the process quality characteristic of process capability. It is also addressed to the lead assessor and other stakeholders, such as the sponsor of the assessment, who need to be assured that the requirements of the ISO/IEC 33020 process measurement framework have been met.

Within this document:

- [Clause 4](#) provides a summary description of the relationship between the ISO/IEC 33020 process attribute outcomes and the ISO/IEC/IEEE 12207 life cycle processes.
- [Annex A](#) extends the summary mapping in [Clause 4](#) by providing details of the relationship between the process attribute outcomes and the life cycle process outcomes. Links to the information items listed in [Annex C](#) are identified. These details are provided for validating by inspection the relationships between the process attribute outcomes of ISO/IEC 33020 and the ISO/IEC/IEEE 12207 life cycle process outcomes.
- [Annex B](#) focuses on the relationships between the generic practices associated with ISO/IEC 33020 and the task descriptions of ISO/IEC/IEEE 12207. These model elements are linked via the information item characteristics listed in [Annex C](#).
- [Annex C](#) provides a listing of the applicable information items and their characteristics.
- [Annex D](#) provides an overview of the key concerns arising from the application of ISO/IEC/IEEE 24774 when attempting to demonstrate objective relationships between process model elements.

Information technology — Process assessment — Application of ISO/IEC/IEEE 12207 processes to the ISO/IEC 33020 process capability measurement scale

1 Scope

This document provides a specification for associating the life cycle processes of ISO/IEC/IEEE 12207 with the process attribute outcomes of ISO/IEC 33020 with the intent of demonstrating support for levels 1 to 3 of the process capability measurement scale defined in ISO/IEC 33020.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 33001, *Information technology — Process assessment — Concepts and terminology*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 33001 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

4 Content of the process capability measurement framework

4.1 General

In ISO/IEC 33020:2019, Clause 5, the relationship between process attributes and process capability levels is described.

Process capability is defined in ISO/IEC 33020:2019, Clause 5 on a six-point ordinal scale that enables process capability to be assessed from the bottom of the scale, 'incomplete', through to the top end of the scale, 'innovating'. The scale represents increasing capability of an implemented process, from failing to achieve the process purpose through to continually improving and able to respond to process change.

The relationship between the process capability levels and the process attributes is shown in [Table 1](#). In addition, a summary view is presented of the relationship of the process attributes to the life cycle processes associated with ISO/IEC/IEEE 12207.

Two processes from ISO/IEC/IEEE 12207 do not appear in the list in [Table 1](#), namely, the acquisition and decision management processes. These outcomes of these processes do not have any discernible relationships to the process attribute outcomes of ISO/IEC 33020.

Certain ISO/IEC/IEEE 12207 processes have been partitioned into sub processes, namely life cycle model management, infrastructure management, human resource management, knowledge management, quality management, measurement and quality assurance. This action has been taken to address outcomes in the basic processes that deal with firstly, establishment concerns, and secondly, performance (or operational)

concerns. The 'establishment' outcomes of these sub processes are mapped to ISO/IEC 33020:2019 PA 3.1 concerns. The 'performance' concerns of the sub processes are mapped to either PA 3.2 or PA 3.3, as appropriate.

As an example, with reference to ISO/IEC/IEEE 12207:2017, 6.2.1, life cycle model management, the basic and sub process outcomes are presented in [Table 1](#).

Table 1 — ISO/IEC/IEEE 12207:2017, 6.2.1, life cycle model management

Basic process outcomes	Sub process: Establish	Sub process: Perform
a) Organizational policies and procedures for the management and deployment of life cycle models and processes are established.	a) Organizational policies and procedures for the management and deployment of life cycle models and processes are established.	
b) Responsibility, accountability, and authority within life cycle policies, processes, models, and procedures are defined.	b) Responsibility, accountability, and authority within life cycle policies, processes, models, and procedures are defined.	
c) Life cycle models and processes for use by the organization are assessed.		c) Life cycle models and processes for use by the organization are assessed.
d) Prioritized process, model, and procedure improvements are implemented.		d) Prioritized process, model, and procedure improvements are implemented.

The list of ISO/IEC/IEEE 12207 processes that have been mapped as sub processes is presented in [Table 2](#).

Table 2 — ISO/IEC/IEEE 12207 processes mapped as sub processes

Basic process reference in ISO/IEC/IEEE 12207:2017	Basic processes	Sub process reference in ISO/IEC/IEEE 12207:2017	Sub processes
6.2.1	Life cycle model management	6.2.1.1	Life cycle model management: Establish
		6.2.1.2	Life cycle model management: Assess and improve
6.2.2	Infrastructure management	6.2.2.1	Infrastructure management: Establish
		6.2.2.2	Infrastructure management: Maintain
6.2.4	Human resource management	6.2.4.1	Human resource management: Establish
		6.2.4.2	Human resource management: Perform
6.2.5	Quality management	6.2.5.1	Quality management: Establish
		6.2.5.2	Quality management: Perform
6.2.6	Knowledge management	6.2.6.1	Knowledge management: Establish
		6.2.6.2	Knowledge management: Share and manage
6.3.7	Measurement	6.3.7.1	Measurement: Establish
		6.3.7.2	Measurement: Perform
6.3.8	Quality assurance	6.3.8.1	Quality assurance: Establish
		6.3.8.2	Quality assurance: Perform

The summary relationship between the ISO/IEC/IEEE 12207 processes and the ISO/IEC 33020 process capability levels is presented in [Table 3](#).

Table 3 — Relationship between the ISO/IEC 33020 process capability levels and process attributes, and the ISO/IEC/IEEE 12207 life cycle processes

Process Capability Level	ISO/IEC 33020:2019 process attribute outcomes	Reference in ISO/IEC/IEEE 12207:2017	ISO/IEC/IEEE 12207:2017 life cycle processes
1	5.2.3.2 PA 1.1 Process performance process attribute	6.4	The processes in this group are typically identified in the assessment scope. The processes ISO/IEC/IEEE 12207:2017, 6.4 are likely candidates.
2	5.2.4.2 PA 2.1 Performance management process attribute	6.3.1	Project planning
		6.3.2	Project assessment and control
		6.3.4	Risk management
2	5.2.4.3 PA 2.2 Documented information management process attribute	6.3.5	Configuration management
		6.3.6	Information management
3	5.2.5.2 PA 3.1 Process definition process attribute	6.2.1.1	Life cycle model management: Establish
		6.2.2.1	Infrastructure management: Establish
		6.2.4.1	Human resource management: Establish
		6.2.5.1	Quality management: Establish
		6.2.6.1	Knowledge management: Establish
		6.3.7.1	Measurement: Establish
		6.3.8.1	Quality assurance: Establish
3	5.2.5.3 PA 3.2 Process deployment process attribute	6.2.1.2	Life cycle model management: Assess and improve
		6.2.2.2	Infrastructure management: Maintain
		6.2.3	Portfolio management
		6.2.4.2	Human resource management: Perform
		6.2.6.2	Knowledge management: Share and manage
3	5.2.5.4 PA 3.3 Process assurance process attribute	6.2.5.2	Quality management: Perform
		6.3.7.2	Measurement: Perform
		6.3.8.2	Quality assurance: Perform

4.2 Relationships between model elements

The rationale for the selection of the ISO/IEC/IEEE 12207 life cycle processes and their associations with the ISO/IEC 33020 process attribute outcomes can be found in [Annexes A](#) and [B](#).

[Annex A](#) elaborates the summary mapping in [Clause 4](#) by providing extended details of the relationship between the ISO/IEC 33020 process attribute outcomes and the ISO/IEC/IEEE 12207 life cycle process outcomes. Links to the information items described in [Annex C](#) are provided in a summary format. The level of detail provides the basis for validation by inspecting the relationships between the ISO/IEC 33020 process attribute outcomes and the ISO/IEC/IEEE 12207 life cycle process outcomes.

[Annex B](#) focuses on the relationships between the ISO/IEC 33020 generic practices and the ISO/IEC/IEEE 12207 activity/task descriptions. These model elements are linked via the information item characteristics, as listed in [Annex C](#).

Annex A
(informative)

Associations between the ISO/IEC 33020 process attribute outcomes, ISO/IEC/IEEE 12207 life cycle process outcomes and information items

A.1 General

This annex describes the relationships between the ISO/IEC 33020 process attribute outcomes and the ISO/IEC/IEEE 12207 life cycle process outcomes. The model outcomes are linked by applicable information item characteristics, as described in [Annex D](#).

A.2 Associations between the ISO/IEC 33020 process attribute outcomes, ISO/IEC/IEEE 12207 life cycle processes and information items

Information item characteristics provide the link between the ISO/IEC 33020 process attribute outcomes and the ISO/IEC/IEEE 12207 life cycle process outcomes. Each linked information item in [Table A.1](#) is indicated by its reference label and name, and the reference number of the characteristic.

[Table A.1](#) provides the basis for a detailed validation by inspection of the associations between the ISO/IEC 33020 process attribute outcomes and ISO/IEC/IEEE 12207 life cycle process outcomes in accordance with ISO/IEC/IEEE 24774:2021, Annex B model mapping considerations.

Table A.1 — Associations between the ISO/IEC 33020 process attribute outcomes, ISO/IEC/IEEE 12207 life cycle process outcomes and information item characteristics

ISO/IEC 33020:2019 process attribute outcomes	Description	ISO/IEC/IEEE 12207:2017	Description	ISO/IEC/IEEE 12207:2017
5.2.3.2	PA 1.1 Process performance process attribute 1) the process achieves its defined process outcomes.	6.1.2	Supply 1) An acquirer for a product or service is identified.	03-23 Request for proposal (RFP) 3) 04-28 Supply strategy 3)
		6.1.2	Supply 2) A response to the acquirer's request is produced.	03-24 Response to RFP 2) 08-65 RFP acquisition requirements review record 2)
		6.1.2	Supply 3) An agreement is established between the acquirer and supplier.	01-2 Supply agreement 5), 6)
		6.1.2	Supply 4) A product or service is provided.	08-07 Agreement performance review record 6) 08-75 Supply Delivery Records (for system, software, product or service) 3)

Table A.1 (continued)

ISO/IEC 33020:2019 process attribute outcomes	Description	ISO/IEC/IEEE 12207:2017	Description	ISO/IEC/IEEE 12207:2017
		6.1.2	Supply 5) Supplier obligations defined in the agreement are satisfied.	08-52 Product acceptance record 8) 08-73 Supplier payment receipt record 2) 11-6 Request for Supply (e.g., Request for Proposal, Request for Tender) 1)
		6.1.2	Supply 6) Responsibility for the acquired product or service, as directed by the agreement, is transferred.	08-52 Product acceptance record 6)
		6.4.1	Business or mission analysis 1) The problem or opportunity space is defined.	03-08 Identify business opportunities 6) 04-02 Business strategy 3) 08-10 Business opportunities review record 3)
		6.4.1	Business or mission analysis 2) The solution space is characterized.	03-08 Identify business opportunities 7)
		6.4.1	Business or mission analysis 3) Preliminary operational concepts and other concepts in the life cycle stages are defined.	03-07 Business opportunity space 7)
		6.4.1	Business or mission analysis 4) Candidate alternative solution classes are identified and analysed.	03-07 Business opportunity space 8)
		6.4.1	Business or mission analysis 5) The preferred candidate alternative solution class(es) are selected.	08-09 Business opportunities evaluation record 6), 7)
		6.4.1	Business or mission analysis 6) Any enabling systems or services needed for business or mission analysis are available.	08-20 Enabling system records: Business or Mission Analysis. 1), 2)
		6.4.2	Stakeholder needs and requirements definition 1) Stakeholders of the system are identified.	02-2 Stakeholders 3) 04-29 System requirements definition strategy 3)
		6.4.2	Stakeholder needs and requirements definition 2) Required characteristics and context of use of capabilities and concepts in the life cycle stages, including operational concepts, are defined.	03-31 Stakeholder Needs 11) 03-32 System operational concept 7), 8)
		6.4.2	Stakeholder needs and requirements definition 3) Constraints on a system are identified.	12-11 System stakeholder requirements 13)
		6.4.2	Stakeholder needs and requirements definition 4) Stakeholder needs are defined.	03-31 Stakeholder Needs 12), 14)
		6.4.2	Stakeholder needs and requirements definition 5) Stakeholder needs are prioritized and transformed into clearly defined stakeholder requirements.	03-02 Analyse stakeholder requirements 8), 9), 11) 03-31 Stakeholder Needs 13)
		6.4.2	Stakeholder needs and requirements definition 6) Critical performance measures are defined.	12-11 System stakeholder requirements 14), 15)

Table A.1 (continued)

ISO/IEC 33020:2019 process attribute outcomes	Description	ISO/IEC/IEEE 12207:2017	Description	ISO/IEC/IEEE 12207:2017
		6.4.2	Stakeholder needs and requirements definition 7) Stakeholder agreement that their needs and expectations are reflected adequately in the requirements is achieved.	03-02 Analyse stakeholder requirements 10) 08-44 Manage stakeholder requirements 3)
		6.4.2	Stakeholder needs and requirements definition 8) Any enabling systems or services needed for stakeholder needs and requirements are available.	08-27 Enabling system records: Stakeholder needs and requirements 1), 2)
		6.4.3	System/software requirements definition 1) The system or element description, including interfaces, functions and boundaries, for a system solution is defined.	03-34 System requirements definition 5), 6) 12-10 System requirements 16)
		6.4.3	System/software requirements definition 2) System/software requirements (functional, performance, process, non-functional, and interface) and design constraints are defined.	12-10 System requirements 18), 19), 20)
		6.4.3	System/software requirements definition 3) Critical performance measures are defined.	12-10 System requirements 17)
		6.4.3	System/software requirements definition 4) The system/software requirements are analysed.	03-33 System requirements analysis 11), 12), 13), 14)
		6.4.3	System/software requirements definition 5) Any enabling systems or services needed for system/software requirements definition are available.	08-29 Enabling system records: System/software requirements 1), 2)
		6.4.3	System/software requirements definition 6) Traceability of system/software requirements to stakeholder requirements is developed.	08-45 Manage system requirements 3)
		6.4.4	Architecture definition 1) Identified stakeholder concerns are addressed by the architecture.	03-03 Architecture definition 10), 11), 12), 13)
		6.4.4	Architecture definition 2) Architecture viewpoints are developed.	03-05 Architecture viewpoints 7), 8), 9), 10)
		6.4.4	Architecture definition 3) Context, boundaries, and external interfaces of the system are defined.	03-06 Architecture views 11)
		6.4.4	Architecture definition 4) Architecture views and models of the system are developed.	03-06 Architecture views 12), 13), 14), 15), 16)
		6.4.4	Architecture definition 5) Concepts, properties, characteristics, behaviours, functions, or constraints that are significant to architecture decisions of the system are allocated to architectural entities.	08-66 Requirements allocation 9), 12), 13)
		6.4.4	Architecture definition 6) System elements and their interfaces are identified.	08-66 Requirements allocation 10)

Table A.1 (continued)

ISO/IEC 33020:2019 process attribute outcomes	Description	ISO/IEC/IEEE 12207:2017	Description	ISO/IEC/IEEE 12207:2017
		6.4.4	Architecture definition 7) Architecture candidates are assessed.	08-08 Architecture assessment result 8), 9), 10)
		6.4.4	Architecture definition 8) An architectural basis for processes throughout the life cycle is achieved.	08-08 Architecture assessment result 11)
		6.4.4	Architecture definition 9) Alignment of the architecture with requirements and design characteristics is achieved.	08-41 Manage architecture 8), 9), 10), 11), 12) 08-66 Requirements allocation 11)
		6.4.4	Architecture definition 10) Any enabling systems or services needed for architecture definition are available.	08-19 Enabling system records: Architecture definition 1), 2)
		6.4.5	Design definition 1) Design characteristics of each system element are defined.	03-28 Software system design definition 5), 6) 03-29 Software system element design 12) 03-30 Software system element evaluation 9)
		6.4.5	Design definition 3) Design enablers necessary for design definition are selected or defined.	03-29 Software system element design 13)
		6.4.5	Design definition 4) Interfaces between system elements composing the system are defined or refined.	03-29 Software system element design 15)
		6.4.5	Design definition 5) Design alternatives for system elements are assessed.	03-29 Software system element design 14) 03-30 Software system element evaluation 10), 11), 12)
		6.4.5	Design definition 6) Design artifacts are developed.	03-29 Software system element design 16) 08-43 Manage software system element design 6)
		6.4.5	Design definition 7) Any enabling systems or services needed for design definition are available.	08-21 Enabling system records: Design definition 1), 2)
		6.4.5	Design definition 8) Traceability of the design characteristics to the architectural entities of the system architecture is established.	08-43 Manage software system element design 7)
		6.4.6	System analysis 1) System analyses needed are identified.	04-30 Systems analysis strategy 9), 10), 11), 12), 13)
		6.4.6	System analysis 2) System analysis assumptions and results are validated.	08-48 Perform systems analysis 8), 9), 10)
		6.4.6	System analysis 3) System analysis results are provided for decisions.	08-48 Perform systems analysis 11), 12)
		6.4.6	System analysis 4) Any enabling systems or services needed for system analysis are available.	08-28 Enabling system records: System analysis 1), 2)

Table A.1 (continued)

ISO/IEC 33020:2019 process attribute outcomes	Description	ISO/IEC/IEEE 12207:2017	Description	ISO/IEC/IEEE 12207:2017
		6.4.7	Implementation 1) Implementation constraints that influence the requirements, architecture, or design are identified.	04-07 Implementation Plan 6), 7)
		6.4.7	Implementation 2) A system element is realized.	07-8 Software element 9), 10), 11) 08-69 Software code & test evaluation record 5), 6)
		6.4.7	Implementation 3) A system element is packaged or stored.	08-42 Manage software elements 5), 6)
		6.4.7	Implementation 4) Any enabling systems or services needed for implementation are available.	08-23 Enabling system records: Implementation 1), 2)
		6.4.8	Integration 1) Integration constraints that influence system requirements, architecture, or design, including interfaces, are identified.	04-26 Software integration plan 11), 13)
		6.4.8	Integration 2) Approach and checkpoints for the correct operation of the assembled interfaces and system functions are defined.	04-26 Software integration plan 12)
		6.4.8	Integration 3) Any enabling systems or services needed for integration are available.	08-24 Enabling system records: Integration 1), 2)
		6.4.8	Integration 4) A system composed of implemented system elements is integrated.	07-6 Integrated system 9), 10)
		6.4.8	Integration 7) Integration results and anomalies are identified.	08-71 Software integration test results 3)
		6.4.9	Verification 1) Constraints of verification that influence the requirements, architecture, or design are identified.	04-32 Verification strategy 14), 15), 16), 17) 06-3 Verification Procedures 5)
		6.4.9	Verification 2) Any enabling systems or services needed for verification are available.	08-32 Enabling system records: Verification 1), 2)
		6.4.9	Verification 6) Verification results and anomalies are identified.	08-93 Verification problems and non-conformances 6), 7)
		6.4.10	Transition 1) Transition constraints that influence system/software requirements, architecture, or design are identified.	04-27 Software release plan 12), 13), 14), 15), 16)
		6.4.10	Transition 2) Any enabling systems or services needed for transition are available.	08-30 Enabling system records: Transition 1), 2)
		6.4.10	Transition 3) The site is prepared.	08-76 System/ software installation record 17), 18)
		6.4.10	Transition 4) The system, as installed in its operational location, is capable of delivering its specified functions.	08-76 System/ software installation record 19)
		6.4.10	Transition 5) Operators, users and other stakeholders necessary to the system utilization and support are trained.	08-76 System/ software installation record 20)

Table A.1 (continued)

ISO/IEC 33020:2019 process attribute outcomes	Description	ISO/IEC/IEEE 12207:2017	Description	ISO/IEC/IEEE 12207:2017
		6.4.10	Transition 6) Transition results and anomalies are identified.	08-72 Software operation release test results 5), 6)
		6.4.10	Transition 7) The installed system is activated and ready for operation.	08-76 System/ software installation record 21)
		6.4.11	Validation 1) Validation criteria for stakeholder requirements are defined.	04-31 Validation plan 14), 16), 17) 06-2 Validation Procedures 5)
		6.4.11	Validation 2) The availability of services required by stakeholders is confirmed.	08-90 Validation Records 2)
		6.4.11	Validation 3) Constraints of validation that influence the requirements, architecture, or design are identified.	04-31 Validation plan 15)
		6.4.11	Validation 4) The system or system element is validated.	06-2 Validation Procedures 6)
		6.4.11	Validation 5) Any enabling systems or services needed for validation are available.	08-31 Enabling system records: Validation 1), 2)
		6.4.11	Validation 6) Validation results and anomalies are identified.	08-90 Validation Records 4) 08-91 Validation problems and non-conformances 3)
		6.4.11	Validation 7) Objective evidence that the realized system or system element satisfies stakeholder needs is provided.	08-92 Validation test suite confirmation record 2)
		6.4.12	Operation 1) Operation constraints that influence system/software requirements, architecture, or design are identified.	04-15 Operation plan 8), 9), 10)
		6.4.12	Operation 2) Any enabling systems, services, and material needed for operation are available.	08-26 Enabling system records: Operation 1), 2)
		6.4.12	Operation 3) Trained, qualified operators are available.	04-15 Operation plan 11)
		6.4.12	Operation 4) System product services that meet stakeholder requirements are delivered.	08-46 Operation actions 13), 14), 16), 18)
		6.4.12	Operation 5) System product performance during operation is monitored.	08-46 Operation actions 15), 17) 11-4 Operation requests 9)
		6.4.12	Operation 6) Support to the customer is provided.	08-47 Operation records 7), 8) 11-4 Operation requests 7), 8)
		6.4.13	Maintenance 1) Maintenance constraints that influence system requirements, architecture, or design are identified.	04-14 Maintenance Plan 8), 9), 10), 11)
		6.4.13	Maintenance 2) Any enabling systems or services needed for maintenance are available.	08-25 Enabling system records: Maintenance 1), 2)

Table A.1 (continued)

ISO/IEC 33020:2019 process attribute outcomes	Description	ISO/IEC/IEEE 12207:2017	Description	ISO/IEC/IEEE 12207:2017
		6.4.13	Maintenance 3) Replacement, repaired, or revised system elements are made available.	09-07 Maintenance (Logistics) Report 10), 11), 12), 13) 11-3 Maintenance Requests 14), 15), 16), 17)
		6.4.13	Maintenance 4) The need for changes to address corrective, perfective, or adaptive maintenance is reported.	08-40 Maintenance (Logistics) Records 8) 11-3 Maintenance Requests 18), 19)
		6.4.13	Maintenance 5) Failure and lifetime data, including associated costs, is determined.	08-40 Maintenance (Logistics) Records 9), 10)
		6.4.14	Disposal 1) Disposal constraints are provided as inputs to requirements, architecture, design, and implementation.	04-06 Disposal strategy 6), 7), 8), 9)
		6.4.14	Disposal 2) Any enabling systems or services needed for disposal are available.	08-22 Enabling system records: Disposal 1), 2)
		6.4.14	Disposal 3) The system elements or waste products are destroyed, stored, reclaimed or recycled in accordance with requirements, e.g., safety and security requirements.	08-17 Disposal Records 14), 15), 16), 17), 18), 19)
		6.4.14	Disposal 4) The environment is returned to its original or an agreed state.	08-17 Disposal Records 20)
		6.4.14	Disposal 5) Records of disposal actions and analysis are available.	08-17 Disposal Records 21)
5.2.4.2	PA 2.1 Performance management process attribute 1) results to be achieved are determined and communicated;	6.3.1	Project planning 1) Objectives and plans are defined.	03-17 Project goals 6), 7)
5.2.4.2	PA 2.1 Performance management process attribute 2) risks that can affect performance of the process are determined and addressed;	6.3.1	Project planning 1) Objectives and plans are defined.	04-25 Risk Management Plan 6), 7)
		6.3.4	Risk management 1) Risks are identified.	03-26 Risk identification 3) 03-27 Risk management profile 5), 6), 7)
		6.3.4	Risk management 2) Risks are analysed.	03-25 Risk analysis 6), 7), 8)
		6.3.4	Risk management 3) Risk treatment options are identified, prioritized, and selected.	08-67 Risk treatment evaluation 6), 7), 8)
		6.3.4	Risk management 4) Appropriate treatment is implemented.	08-67 Risk treatment evaluation 9)
		6.3.4	Risk management 5) Risks are evaluated to assess changes in status and progress in treatment.	09-16 Risk monitoring report 4), 5), 6)

Table A.1 (continued)

ISO/IEC 33020:2019 process attribute outcomes	Description	ISO/IEC/IEEE 12207:2017	Description	ISO/IEC/IEEE 12207:2017
5.2.4.2	PA 2.1 Performance management process attribute 3) performance of the process is planned, monitored, measured, evaluated and adjusted (as needed);	6.3.1	Project planning 1) Objectives and plans are defined.	04-03 Configuration Management Plan 8), 9) 04-08 Information management plan 11), 13) 04-20 Project budget 3) 04-21 Project plan 14) 04-22 Project schedule 3) 04-33 Work breakdown structure 4)
		6.3.2	Project assessment and control 1) Performance measures or assessment results are available.	04-19 Project assessment strategy 3) 09-13 Project status report 20), 27), 30)
		6.3.2	Project assessment and control 3) Adequacy of resources is assessed.	09-13 Project status report 24)
		6.3.2	Project assessment and control 4) Technical progress reviews are performed.	09-13 Project status report 22), 26)
		6.3.2	Project assessment and control 5) Deviations in project performance from plans are investigated and analysed.	09-13 Project status report 21), 25), 28)
		6.3.2	Project assessment and control 7) Corrective action is defined and directed, when project achievement is not meeting targets.	11-5 Project change request 9), 11)
		6.3.2	Project assessment and control 8) Project replanning is initiated, as necessary.	11-5 Project change request 10)
		6.3.2	Project assessment and control 9) Project action to progress (or not) from one scheduled milestone or event to the next is authorized.	08-55 Project continuation authorization record 1)
5.2.4.2	PA 2.1 Performance management process attribute 4) responsibilities and authorities for performing the process are determined, assigned and communicated;	6.3.1	Project planning 1) Objectives and plans are defined.	04-08 Information management plan 12)
		6.3.1	Project planning 2) Roles, responsibilities, accountabilities, and authorities are defined.	04-21 Project plan 11)
5.2.4.2	PA 2.1 Performance management process attribute 5) resources necessary for performing the process are determined, provided and maintained (as needed);	6.3.1	Project planning 1) Objectives and plans are defined.	04-21 Project plan 12)
		6.3.1	Project planning 3) Resources and services necessary to achieve the objectives are formally requested and committed.	04-21 Project plan 13) 08-59 Project resource request record 3)
		6.3.1	Project planning 4) Plans for the execution of the project are activated.	08-56 Project initiation authorization record 9), 10)
5.2.4.2	PA 2.1 Performance management process attribute 6) person(s) performing the process are competent on the basis of appropriate education, training, or experience;	6.3.2	Project assessment and control 2) Adequacy of roles, responsibilities, accountabilities, and authorities is assessed.	09-13 Project status report 23)

Table A.1 (continued)

ISO/IEC 33020:2019 process attribute outcomes	Description	ISO/IEC/IEEE 12207:2017	Description	ISO/IEC/IEEE 12207:2017
5.2.4.2	PA 2.1 Performance management process attribute 7) interfaces between the involved parties are managed to ensure both effective communication and the level of control expected.	6.3.1	Project planning 1) Objectives and plans are defined.	04-21 Project plan 15)
		6.3.2	Project assessment and control 6) Affected stakeholders are informed of project status.	09-13 Project status report 29)
5.2.4.3	PA 2.2 Documented information management process attribute 1) requirements for the documented information of the process are determined;	6.3.6	Information management 1) Information to be managed is identified.	04-10 Information management plan: item identification 1)
		6.3.6	Information management 2) Information representations are defined.	04-09 Information management plan: Presentation 1)
5.2.4.3	PA 2.2 Documented information management process attribute 3) documented information is appropriately identified, and controlled according to requirements;	6.3.5	Configuration management 1) Items requiring configuration management are identified and managed.	08-13 Configuration management identification records 10), 11)
		6.3.5	Configuration management 2) Configuration baselines are established.	12-03 Configuration Baseline 6), 7)
		6.3.5	Configuration management 3) Changes to items under configuration management are controlled.	08-06 Agreement impact evaluation record 3)
		6.3.5	Configuration management 4) Configuration status information is available.	09-02 Configuration Status Report 5), 6)
		6.3.6	Information management 1) Information to be managed is identified.	07-1 Information item 10), 11), 12), 13), 14), 15), 16), 18), 19), 20), 21), 22)
		6.3.6	Information management 5) Information is available to designated stakeholders.	07-3 Information item: Publish 1)
5.2.4.3	PA 2.2 Documented information management process attribute 4) documented information is reviewed and approved for suitability and adequacy in accordance with planned arrangements and adjusted as necessary to meet requirements;	6.3.5	Configuration management 3) Changes to items under configuration management are controlled.	08-11 Configuration Management Change Requests 9), 10), 11) 11-1 Agreement Change Request 5), 6)
5.2.4.3	PA 2.2 Documented information management process attribute 5) documented information is determined, maintained and retained to the extent necessary to have confidence that the process has been performed as planned and to demonstrate the conformity of products and/or services to their requirements.	6.3.6	Information management 3) Information is obtained, developed, transformed, stored, validated, presented, [and disposed of].	07-1 Information item 9), 17) 08-04 Agreement amendment record 3), 4) 08-61 Quality Assurance Records 4) 10-1 Information Item Archive 3)
		6.3.6	Information management 4) The status of information is identified.	07-2 Information item: Item status 1)
		6.3.6	Information management 5) Information is available to designated stakeholders.	08-61 Quality Assurance Records 5)
		6.3.6	Information management 6) Information is archived, or disposed of, as required.	08-33 Information item disposal record 3)

Table A.1 (continued)

ISO/IEC 33020:2019 process attribute outcomes	Description	ISO/IEC/IEEE 12207:2017	Description	ISO/IEC/IEEE 12207:2017
5.2.5.2	PA 3.1 Process definition process attribute 1) a standard process, including appropriate tailoring guidelines, is established and maintained that describes the fundamental elements that must be incorporated into a defined process;	6.2.1.1	Life cycle model management: Establish 1) Organizational policies and procedures for the management and deployment of life cycle models and processes are established.	03-10 Life cycle model 22), 23), 24), 25), 26), 27), 28)
		6.2.5.1	Quality management: Establish 1) Organizational quality management policies, objectives, and procedures are defined and implemented.	03-22 Quality management authorities and responsibilities 3) 04-23 Quality Management Plan 4)
		6.2.5.1	Quality management: Establish 2) Quality evaluation criteria and methods are established.	12-09 Quality evaluation criteria and methods 2)
		6.3.7.1	Measurement: Establish 1) Information needs are identified.	03-13 Organizational characteristics 2) 03-14 Organizational information needs 3) 04-11 Information measurement strategy 3), 4)
		6.3.7.1	Measurement: Establish 2) An appropriate set of measures, based on the information needs, is identified or developed.	03-09 Information measures 2)
		6.3.8.1	Quality assurance: Establish 1) Project quality assurance procedures are defined and implemented.	04-24 Quality assurance strategy 6)
		6.3.8.1	Quality assurance: Establish 2) Criteria and methods for quality assurance evaluations are defined.	04-24 Quality assurance strategy 7)
5.2.5.2	PA 3.1 Process definition process attribute 4) roles, competences, responsibilities and authorities for performing the standard process are determined;	6.2.1.1	Life cycle model management: Establish 2) Responsibility, accountability, and authority within life cycle policies, processes, models, and procedures are defined.	03-11 Life cycle model: Responsibilities 1)
		6.2.4.1	Human resource management: Establish 1) Skills required by projects are identified.	03-12 Organization skills identification 2) 03-15 Organizational skill needs 2)
5.2.5.2	PA 3.1 Process definition process attribute 5) resources for performing the standard process are determined;	6.2.2.1	Infrastructure management: Establish 1) The requirements for infrastructure are defined.	12-05 Infrastructure Requirements 5)
		6.2.2.1	Infrastructure management: Establish 2) The infrastructure elements are identified and specified.	04-12 Infrastructure plan 3)
5.2.5.2	PA 3.1 Process definition process attribute 6) knowledge necessary for the operation of the standard process is determined [and maintained].	6.2.1.1	Life cycle model management: Establish 1) Organizational policies and procedures for the management and deployment of life cycle models and processes are established.	04-13 Knowledge Management: Establish 6), 7), 8)
		6.2.6.1	Knowledge management: Establish 1) A taxonomy for the application of knowledge assets is identified.	12-06 Knowledge Management: Taxonomy 6), 7)

Table A.1 (continued)

ISO/IEC 33020:2019 process attribute outcomes	Description	ISO/IEC/IEEE 12207:2017	Description	ISO/IEC/IEEE 12207:2017
5.2.5.3	PA 3.2 Process deployment process attribute 1) a defined process is deployed based upon an appropriately tailored standard process;	6.2.1.2	Life cycle model management: Assess and improve 1) Life cycle models and processes for use by the organization are assessed.	04-17 Process Improvement Opportunity 3) 08-51 Process review result 4), 5)
		6.2.1.2	Life cycle model management: Assess and improve 2) Prioritized process, model, and procedure improvements are implemented.	04-18 Process Improvement plan 4)
		6.2.3	Portfolio management 2) Projects are identified.	03-19 Project portfolio goals 1)
5.2.5.3	PA 3.2 Process deployment process attribute 2) required roles, responsibilities and authorities necessary for performing the defined process are assigned and communicated;	6.2.3	Portfolio management 4) Project management responsibilities, accountability, and authorities are defined.	03-16 Project accountabilities and authorities 2)
5.2.5.3	PA 3.2 Process deployment process attribute 3) required person(s) necessary for performing the defined process are competent on the basis of defined education, training and experience;	6.2.4.2	Human resource management: Perform 1) Necessary human resources are provided to projects.	04-16 Organizational skills development plan 3) 12-08 Project skill needs and provision 6), 7), 8), 9)
		6.2.4.2	Human resource management: Perform 2) Skills of personnel are developed, maintained or enhanced.	07-7 Skills development resources 3) 08-68 Skill development records 3), 4)
		6.2.4.2	Human resource management: Perform 3) Conflicts in multi-project resource demands are resolved.	08-60 Project team interface conflict resolution 3)
5.2.5.3	PA 3.2 Process deployment process attribute 4) required resources necessary for performing the defined process are made available, monitored and measured;	6.2.2.2	Infrastructure management: Maintain 1) Infrastructure elements are developed or acquired.	08-36 Infrastructure provision record 3)
		6.2.2.2	Infrastructure management: Maintain 2) The infrastructure is available.	08-35 Infrastructure evaluation record 2) 11-2 Infrastructure Change Request 2)
		6.2.3	Portfolio management 3) Resources and budgets for each project are allocated.	03-20 Project resource allocation 2)
5.2.5.3	PA 3.2 Process deployment process attribute 5) knowledge necessary for the operation of the standard process is [determined and] maintained.	6.2.6.2	Knowledge management: Share and manage 1) The organizational knowledge, skills, and knowledge assets are developed or acquired.	08-37 Knowledge Asset Records 6), 7), 8)
		6.2.6.2	Knowledge management: Share and manage 2) The organizational knowledge, skills, and knowledge assets are available.	08-38 Knowledge Asset application 4), 5)
		6.2.6.2	Knowledge management: Share and manage 3) Knowledge management usage data is gathered and analysed.	08-39 Knowledge asset review record 3)

Table A.1 (continued)

ISO/IEC 33020:2019 process attribute outcomes	Description	ISO/IEC/IEEE 12207:2017	Description	ISO/IEC/IEEE 12207:2017
5.2.5.4	PA 3.3 Process assurance process attribute 1) appropriate data and information are collected and analysed from monitoring and measurement of the process to evaluate the effectiveness and risks of the process, and to identify needs and opportunities for improvement;	6.2.5.2	Quality management: Perform 2) Quality assurance evaluation results are gathered and analysed.	09-04 Corrective and preventive actions status report 4)
		6.3.7.2	Measurement: Perform 1) Required data is collected, verified, and stored.	07-4 Information measurement data item 2)
		6.3.7.2	Measurement: Perform 2) The data is analysed and the results interpreted.	07-5 Information product 2)
		6.3.8.2	Quality assurance: Perform 1) Evaluations of the project's products, services, and processes are performed, consistent with quality management policies, procedures, and requirements.	09-06 Incident Report 4)
		6.3.8.2	Quality assurance: Perform 3) Incidents are resolved.	09-06 Incident Report 5)
5.2.5.4	PA 3.3 Process assurance process attribute 3) conformity of the defined process (and associated activities, outputs and documented information) is objectively assured;	6.2.5.2	Quality management: Perform 2) Quality assurance evaluation results are gathered and analysed.	09-05 Customer satisfaction analysis report 3) 09-14 Quality assurance evaluation results 2)
		6.3.8.2	Quality assurance: Perform 1) Evaluations of the project's products, services, and processes are performed, consistent with quality management policies, procedures, and requirements.	08-70 Software code & test evaluation: Evaluation 1)
		6.3.8.2	Quality assurance: Perform 2) Results of evaluations are provided to relevant stakeholders.	08-70 Software code & test evaluation: Evaluation 2)
5.2.5.4	PA 3.3 Process assurance process attribute 4) action is taken on any nonconformity, based on its nature and effect, and tracked to closure;	6.2.5.2	Quality management: Perform 2) Quality assurance evaluation results are gathered and analysed.	09-15 Quality improvements status report 2)
		6.3.8.2	Quality assurance: Perform 2) Results of evaluations are provided to relevant stakeholders.	08-50 Problem status communication record 2)
5.2.5.4	PA 3.3 Process assurance process attribute 5) the standard process is continually improved based on identified needs and opportunities.	6.2.5.2	Quality management: Perform 1) Resources and information are provided to projects to support the operation and monitoring of project quality assurance activities.	08-63 Quality management resources 2)
		6.2.5.2	Quality management: Perform 3) Quality management policies and procedures are improved based upon project and organizational results.	04-04 Corrective and preventive actions plan 3), 4) 08-62 Quality assurance review records 3)

A.3 Generic information items – exceptions list

There are no exceptions in the mapping between process attribute outcomes and the selected life cycle process outcomes.

Annex B

(informative)

Associations between the ISO/IEC 33020 generic practices, ISO/IEC/IEEE 12207 life cycle process activities, tasks and information item characteristics

B.1 General

This clause presents a detailed perspective of the relationship between the ISO/IEC 33020 generic practices, the ISO/IEC/IEEE 12207 life cycle process activities and tasks, and the information item characteristics. See [Table B.1](#).

Table B.1 — Associations between the ISO/IEC 33020 generic practices, ISO/IEC/IEEE 12207 activities and tasks and associated information item characteristics

ISO/IEC 33020:2019 Annex B Generic Practices	Description	ISO/IEC/IEEE 12207:2017	Description	ISO/IEC/IEEE 12207:2017
B3.1 PA.1.1.GP1	Achieve the process outcomes 2) Relevant information items to evidence achievement of the process outcomes are identified.	6.1.2.3 a)	Prepare for the supply 1) Determine the existence and identity of an acquirer who has a need for a product or service.	03-23 Request for proposal (RFP) 3)
		6.1.2.3 a)	Prepare for the supply 2) Define a supply strategy.	04-28 Supply strategy 3)
		6.1.2.3 b)	Respond to a request for supply of products or services 1) Evaluate a request for the supply of a product or service to determine feasibility and how to respond.	08-65 RFP acquisition requirements review record 2)
		6.1.2.3 b)	Respond to a request for supply of products or services 2) Prepare a response that satisfies the solicitation.	03-24 Response to RFP 2)
		6.1.2.3 c)	Establish and maintain an agreement 1) Negotiate an agreement with the acquirer that includes acceptance criteria.	01-2 Supply agreement 5)
		6.1.2.3 c)	Establish and maintain an agreement 2) Identify necessary changes to the agreement.	11-7 Supply agreement change request 3)
		6.1.2.3 c)	Establish and maintain an agreement 3) Evaluate impact of changes on the agreement.	08-06 Agreement impact evaluation record 3)
		6.1.2.3 c)	Establish and maintain an agreement 4) Negotiate the agreement with the acquirer, as necessary.	01-2 Supply agreement 6)
		6.1.2.3 c)	Establish and maintain an agreement 5) Update the agreement with the acquirer, as necessary.	08-04 Agreement amendment record 4)
		6.1.2.3 d)	Execute the agreement 1) Execute the agreement according to the established project plans.	08-07 Agreement performance review record 6)

Table B.1 (continued)

ISO/IEC 33020:2019 Annex B Generic Practices	Description	ISO/IEC/IEEE 12207:2017	Description	ISO/IEC/IEEE 12207:2017
		6.1.2.3 d)	Execute the agreement 2) Assess the execution of the agreement.	08-07 Agreement performance review record 7)
		6.1.2.3 e)	Deliver and support the product or service 1) Deliver the product or service in accordance with the agreement criteria.	08-75 Supply Delivery Records (for system, software, product or service) 3)
		6.1.2.3 e)	Deliver and support the product or service 3) Accept and acknowledge payment or other agreed consideration.	08-73 Supplier payment receipt record 2)
		6.1.2.3 e)	Deliver and support the product or service 4) Transfer the product or service to the acquirer, or other party, as directed by the agreement.	08-52 Product acceptance record 6)
		6.1.2.3 e)	Deliver and support the product or service 5) Close the agreement.	08-52 Product acceptance record 7)
		6.4.1.3 a)	Prepare for Business or Mission Analysis 1) Review identified problems and opportunities in the organization strategy with respect to desired organization goals or objectives.	08-10 Business opportunities review record 3)
		6.4.1.3 a)	Prepare for Business or Mission Analysis 2) Define the business or mission analysis strategy.	04-02 Business strategy 3)
		6.4.1.3 a)	Prepare for Business or Mission Analysis 3) Identify and plan for the necessary enabling systems or services needed to support business or mission analysis.	08-20 Enabling system records: Business or Mission Analysis. 1)
		6.4.1.3 a)	Prepare for Business or Mission Analysis 4) Obtain or acquire access to the enabling systems or services to be used.	08-20 Enabling system records: Business or Mission Analysis. 2)
		6.4.1.3 b)	Define the problem or opportunity space 1) Analyse customer complaints, problems and opportunities in the context of relevant trade-space factors.	03-08 Identify business opportunities 6)
		6.4.1.3 b)	Define the problem or opportunity space 2) Define the mission, business, or operational problem or opportunity.	03-08 Identify business opportunities 7)
		6.4.1.3 c)	Characterize the solution space 1) Define preliminary operational concepts and other concepts in life cycle stages.	03-07 Business opportunity space 7)
		6.4.1.3 c)	Characterize the solution space 2) Identify candidate alternative solution classes that span the potential solution space.	03-07 Business opportunity space 8)
		6.4.1.3 d)	Evaluate alternative solution classes 1) Assess each alternative solution class.	08-09 Business opportunities evaluation record 6)
		6.4.1.3 d)	Evaluate alternative solution classes 2) Select the preferred alternative solution class(es).	08-09 Business opportunities evaluation record 7)

Table B.1 (continued)

ISO/IEC 33020:2019 Annex B Generic Practices	Description	ISO/IEC/IEEE 12207:2017	Description	ISO/IEC/IEEE 12207:2017
		6.4.1.3 e)	Manage the business or mission analysis 2) Provide key artifacts and information items that have been selected for baselines.	07-1 Information item 10)
		6.4.2.3 a)	Prepare for Stakeholder Needs and Requirements Definition 1) Identify the stakeholders who have an interest in the software system throughout its life cycle.	02-2 Stakeholders 3)
		6.4.2.3 a)	Prepare for Stakeholder Needs and Requirements Definition 2) Define the stakeholder needs and requirements definition strategy.	04-29 System re-requirements definition strategy 3)
		6.4.2.3 a)	Prepare for Stakeholder Needs and Requirements Definition 3) Identify and plan for the necessary enabling systems or services needed to support stakeholder needs and requirements definition.	08-27 Enabling system records: Stakeholder needs and requirements 1)
		6.4.2.3 a)	Prepare for Stakeholder Needs and Requirements Definition 4) Obtain or acquire access to the enabling systems or services to be used.	08-27 Enabling system records: Stakeholder needs and requirements 2)
		6.4.2.3 b)	Define stakeholder needs 1) Define context of use within the concept of operations and the preliminary life cycle concepts.	03-31 Stakeholder Needs 11)
		6.4.2.3 b)	Define stakeholder needs 2) Identify stakeholder needs.	03-31 Stakeholder Needs 12)
		6.4.2.3 b)	Define stakeholder needs 3) Prioritize and down-select needs.	03-31 Stakeholder Needs 13)
		6.4.2.3 b)	Define stakeholder needs 4) Define the stakeholder needs and rationale.	03-31 Stakeholder Needs 14)
		6.4.2.3 c)	Develop the operational concept and other life cycle concepts 1) Define a representative set of scenarios to identify the required capabilities that correspond to anticipated operational and other life cycle concepts.	03-32 System operational concept 7)
		6.4.2.3 c)	Develop the operational concept and other life cycle concepts 2) Identify the factors affecting interactions between users and the system. i) Anticipated physical, mental, and learned capabilities of the users; ii) Workplace, environment and facilities, including other equipment in the context of use; iii) Normal, unusual, and emergency conditions; and iv) Operator and user recruitment, training and culture.	03-32 System operational concept 8)
		6.4.2.3 d)	Transform stakeholder needs into stakeholder requirements 1) Identify the constraints on a system solution.	12-11 System stakeholder requirements 13)
		6.4.2.3 d)	Transform stakeholder needs into stakeholder requirements 2) Identify the stakeholder requirements and functions that relate to critical quality characteristics, such as assurance, safety, security, environment, or health.	12-11 System stakeholder requirements 14)

Table B.1 (continued)

ISO/IEC 33020:2019 Annex B Generic Practices	Description	ISO/IEC/IEEE 12207:2017	Description	ISO/IEC/IEEE 12207:2017
		6.4.2.3 d)	Transform stakeholder needs into stakeholder requirements 3) Define stakeholder requirements, consistent with life cycle concepts, scenarios, interactions, constraints, and critical quality characteristics.	12-11 System stakeholder requirements 15)
		6.4.2.3 e)	Analyse stakeholder requirements 1) Analyse the complete set of stakeholder requirements.	03-02 Analyse stakeholder requirements 8)
		6.4.2.3 e)	Analyse stakeholder requirements 2) Define critical performance measures that enable the assessment of technical achievement.	03-02 Analyse stakeholder requirements 9)
		6.4.2.3 e)	Analyse stakeholder requirements 3) Feed back the analysed requirements to applicable stakeholders to validate that their needs and expectations have been adequately captured and expressed.	03-02 Analyse stakeholder requirements 10)
		6.4.2.3 e)	Analyse stakeholder requirements 4) Resolve stakeholder requirements issues.	03-02 Analyse stakeholder requirements 11)
		6.4.2.3 f)	Manage the stakeholder needs and requirements definition 1) Obtain explicit agreement with designated stakeholders on the stakeholder requirements.	08-44 Manage stakeholder requirements 3)
		6.4.3.3 a)	Prepare for System/Software Requirements Definition 1) Define the functional boundary of the software system or element in terms of the behavior and properties provided.	03-34 System requirements definition 5)
		6.4.3.3 a)	Prepare for System/Software Requirements Definition 2) Define the system/software requirements definition strategy.	03-34 System requirements definition 6)
		6.4.3.3 a)	Prepare for System/Software Requirements Definition 3) Identify and plan for the necessary enabling systems or services needed to support system/software requirements definition.	08-29 Enabling system records: System/software requirements 1)
		6.4.3.3 a)	Prepare for System/Software Requirements Definition 4) Obtain or acquire access to the enabling systems or services to be used.	08-29 Enabling system records: System/software requirements 2)
		6.4.3.3 b)	Define system/software requirements 1) Define each function that the software system or element is required to perform.	12-10 System requirements 16)
		6.4.3.3 b)	Define system/software requirements 2) Identify required states or modes of operation of the software system.	12-10 System requirements 17)
		6.4.3.3 b)	Define system/software requirements 3) Define necessary implementation constraints.	12-10 System requirements 18)
		6.4.3.3 b)	Define system/software requirements 4) Identify requirements that relate to risks, criticality of the software system, or critical quality characteristics.	12-10 System requirements 19)

Table B.1 (continued)

ISO/IEC 33020:2019 Annex B Generic Practices	Description	ISO/IEC/IEEE 12207:2017	Description	ISO/IEC/IEEE 12207:2017
		6.4.3.3 b)	Define system/software requirements 5) Define system/software requirements and requirements attributes, including the following: i) Data elements, data structures and formats, and database or data retention requirements; ii) User interfaces and user documentation (information for users) and user training; iii) Interfaces with other systems and services; iv) Functions and non-functional characteristics, including critical quality characteristics and cost targets; v) Transition of operational processes and data from existing automated and manual systems, migration approach and schedule, software installation and acceptance of the product; and vi) Requirement attributes, such as rationale; priority; traceability to software system elements, test cases, and information items; methods of verification; inclusion in approved baselines; and evaluated risk.	12-10 System requirements 20)
		6.4.3.3 c)	Analyse system/software requirements 1) Analyse the complete set of system/software requirements.	03-33 System requirements analysis 11)
		6.4.3.3 c)	Analyse system/software requirements 2) Define critical performance measures that enable the assessment of technical achievement.	03-33 System requirements analysis 12)
		6.4.3.3 c)	Analyse system/software requirements 3) Feed back the analysed requirements to applicable stakeholders for review.	03-33 System requirements analysis 13)
		6.4.3.3 c)	Analyse system/software requirements 4) Identify and resolve issues, deficiencies, conflicts, and weaknesses within the complete set of requirements.	03-33 System requirements analysis 14)
		6.4.3.3 d)	Manage system/software requirements 1) Obtain explicit agreement on the system/software requirements.	08-45 Manage system requirements 3)
		6.4.3.3 d)	Manage system/software requirements 3) Provide key artifacts and information items that have been selected for baselines.	07-1 Information item 12)
		6.4.4.3 a)	Prepare for architecture definition 1) Review pertinent information and identify key drivers of the architecture.	03-03 Architecture definition 10)
		6.4.4.3 a)	Prepare for architecture definition 2) Identify stakeholder concerns.	03-03 Architecture definition 11)
		6.4.4.3 a)	Prepare for architecture definition 3) Define the Architecture Definition roadmap, approach, and strategy.	03-03 Architecture definition 12)
		6.4.4.3 a)	Prepare for architecture definition 4) Define architecture evaluation criteria based on stakeholder concerns and key requirements.	03-03 Architecture definition 13)

Table B.1 (continued)

ISO/IEC 33020:2019 Annex B Generic Practices	Description	ISO/IEC/IEEE 12207:2017	Description	ISO/IEC/IEEE 12207:2017
		6.4.4.3 a)	Prepare for architecture definition 5) Identify and plan for the necessary enabling systems or services needed to support the Architecture Definition process.	08-19 Enabling system records: Architecture definition 1)
		6.4.4.3 a)	Prepare for architecture definition 6) Obtain or acquire access to the enabling systems or services to be used.	08-19 Enabling system records: Architecture definition 2)
		6.4.4.3 b)	Develop architecture viewpoints 1) Select, adapt, or develop viewpoints and model kinds based on stakeholder concerns.	03-05 Architecture viewpoints 7)
		6.4.4.3 b)	Develop architecture viewpoints 2) establish or identify potential architecture framework(s) to be used in developing models and views.	03-05 Architecture viewpoints 8)
		6.4.4.3 b)	Develop architecture viewpoints 3) Capture rationale for selection of framework(s), viewpoints and model kinds.	03-05 Architecture viewpoints 9)
		6.4.4.3 b)	Develop architecture viewpoints 4) Select or develop supporting modeling techniques and tools.	03-05 Architecture viewpoints 10)
		6.4.4.3 c)	Develop models and views of candidate architectures 1) Define the software system context and boundaries in terms of interfaces and interactions with external entities.	03-06 Architecture views 11)
		6.4.4.3 c)	Develop models and views of candidate architectures 2) Identify architectural entities and relationships between entities that address key stakeholder concerns and critical software system requirements.	03-06 Architecture views 12)
		6.4.4.3 c)	Develop models and views of candidate architectures 3) Allocate concepts, properties, characteristics, behaviors, functions, or constraints that are significant to architecture decisions of the software system to architectural entities.	03-06 Architecture views 13)
		6.4.4.3 c)	Develop models and views of candidate architectures 4) Select, adapt, or develop models of the candidate architectures of the software system.	03-06 Architecture views 14)
		6.4.4.3 c)	Develop models and views of candidate architectures 5) Compose views from the models in accordance with identified viewpoints to express how the architecture addresses stakeholder concerns and meets stakeholder and system/software requirements.	03-06 Architecture views 15)
		6.4.4.3 c)	Develop models and views of candidate architectures 6) Harmonize the architecture models and views with each other.	03-06 Architecture views 16)
		6.4.4.3 d)	Relate the architecture to design 1) Identify software system elements that relate to architectural entities and the nature of these relationships.	08-66 Requirements allocation 9)

Table B.1 (continued)

ISO/IEC 33020:2019 Annex B Generic Practices	Description	ISO/IEC/IEEE 12207:2017	Description	ISO/IEC/IEEE 12207:2017
		6.4.4.3 d)	Relate the architecture to design 2) Define the interfaces and interactions among the software system elements and external entities.	08-66 Requirements allocation 10)
		6.4.4.3 d)	Relate the architecture to design 3) Partition, align and allocate requirements to architectural entities and system elements.	08-66 Requirements allocation 11)
		6.4.4.3 d)	Relate the architecture to design 4) Map software system elements and architectural entities to design characteristics.	08-66 Requirements allocation 12)
		6.4.4.3 d)	Relate the architecture to design 5) Define principles for the software system design and evolution.	08-66 Requirements allocation 13)
		6.4.4.3 e)	Assess architecture candidates 1) Assess each candidate architecture against constraints and requirements.	08-08 Architecture assessment result 8)
		6.4.4.3 e)	Assess architecture candidates 2) Assess each candidate architecture against stakeholder concerns using evaluation criteria.	08-08 Architecture assessment result 9)
		6.4.4.3 e)	Assess architecture candidates 3) Select the preferred architecture(s) and capture key decisions and rationale.	08-08 Architecture assessment result 10)
		6.4.4.3 e)	Assess architecture candidates 4) Establish the architecture baseline of the selected architecture.	08-08 Architecture assessment result 11)
		6.4.4.3 f)	Manage the selected architecture 1) Formalize the architecture governance approach and specify governance-related roles and responsibilities, accountabilities, and authorities related to design, quality, security, and safety.	08-41 Manage architecture 8)
		6.4.4.3 f)	Manage the selected architecture 2) Obtain explicit acceptance of the architecture by stakeholders.	08-41 Manage architecture 9)
		6.4.4.3 f)	Manage the selected architecture 3) Maintain concordance and completeness of the architectural entities and their architectural characteristics.	08-41 Manage architecture 10)
		6.4.4.3 f)	Manage the selected architecture 4) Organize, assess and control evolution of the architecture models and views to help ensure that the architectural intent is met and the architectural vision and key concepts are correctly implemented.	08-41 Manage architecture 11)
		6.4.4.3 f)	Manage the selected architecture 5) Maintain the architecture definition and evaluation strategy.	08-41 Manage architecture 12)
		6.4.4.3 f)	Manage the selected architecture 7) Provide key artifacts and information items that have been selected for baselines.	07-1 Information item 13)
		6.4.5.3 a)	Prepare for software system design definition 1) Define the design definition strategy, consistent with the selected life cycle model and anticipated design artifacts.	03-28 Software system design definition 5)

Table B.1 (continued)

ISO/IEC 33020:2019 Annex B Generic Practices	Description	ISO/IEC/IEEE 12207:2017	Description	ISO/IEC/IEEE 12207:2017
		6.4.5.3 a)	Prepare for software system design definition 2) Select and prioritize design principles and design characteristics.	03-28 Software system design definition 6)
		6.4.5.3 a)	Prepare for software system design definition 3) Identify and plan for the necessary enabling systems or services needed to support design definition.	08-21 Enabling system records: Design definition 1)
		6.4.5.3 a)	Prepare for software system design definition 4) Obtain or acquire access to the enabling systems or services to be used.	08-21 Enabling system records: Design definition 2)
		6.4.5.3 b)	Establish designs related to each software system element 1) Transform architectural and design characteristics into the design of software system elements.	03-29 Software system element design 12)
		6.4.5.3 b)	Establish designs related to each software system element 2) Define and prepare or obtain the necessary design enablers.	03-29 Software system element design 13)
		6.4.5.3 b)	Establish designs related to each software system element 3) Examine design alternatives and feasibility of implementation.	03-29 Software system element design 14)
		6.4.5.3 b)	Establish designs related to each software system element 4) Refine or define the interfaces among the software system elements and with external entities.	03-29 Software system element design 15)
		6.4.5.3 b)	Establish designs related to each software system element 5) Establish the design artifacts.	03-29 Software system element design 16)
		6.4.5.3 c)	Assess alternatives for obtaining software system elements 1) Determine technologies required for each element composing the software system.	03-30 Software system element evaluation 9)
		6.4.5.3 c)	Assess alternatives for obtaining software system elements 2) Identify candidate alternatives for the software system elements.	03-30 Software system element evaluation 10)
		6.4.5.3 c)	Assess alternatives for obtaining software system elements 3) Assess each candidate alternative against criteria developed from expected design characteristics and element requirements to determine suitability for the intended application.	03-30 Software system element evaluation 11)
		6.4.5.3 c)	Assess alternatives for obtaining software system elements 4) Choose the preferred alternatives among candidate design solutions for the software system elements.	03-30 Software system element evaluation 12)
		6.4.5.3 d)	Manage the design 1) Capture the design and rationale.	08-43 Manage software system element design 6)
		6.4.5.3 d)	Manage the design 3) Determine the status of the software system and element design.	08-43 Manage software system element design 7)
		6.4.5.3 d)	Manage the design 4) Provide key artifacts and information items that have been selected for baselines.	07-1 Information item 14)

Table B.1 (continued)

ISO/IEC 33020:2019 Annex B Generic Practices	Description	ISO/IEC/IEEE 12207:2017	Description	ISO/IEC/IEEE 12207:2017
		6.4.6.3 a)	Define the system analysis strategy and prepare for system analysis 1) Identify the problem or question that requires analysis.	04-30 Systems analysis strategy 9)
		6.4.6.3 a)	Define the system analysis strategy and prepare for system analysis 2) Identify the stakeholders of the analysis.	04-30 Systems analysis strategy 10)
		6.4.6.3 a)	Define the system analysis strategy and prepare for system analysis 3) Define the scope, objectives, and level of fidelity of the analysis.	04-30 Systems analysis strategy 11)
		6.4.6.3 a)	Define the system analysis strategy and prepare for system analysis 4) Select the methods to support the analysis.	04-30 Systems analysis strategy 12)
		6.4.6.3 a)	Define the system analysis strategy and prepare for system analysis 5) Identify and plan for the necessary enabling systems or services needed to support the analysis.	08-28 Enabling system records: System analysis 1)
		6.4.6.3 a)	Define the system analysis strategy and prepare for system analysis 6) Obtain or acquire access to the enabling systems or services to be used.	08-28 Enabling system records: System analysis 2)
		6.4.6.3 a)	Define the system analysis strategy and prepare for system analysis 7) Collect the data and inputs needed for the analysis.	04-30 Systems analysis strategy 13)
		6.4.6.3 b)	Perform system analysis 1) Identify and validate contexts and assumptions.	08-48 Perform systems analysis 8)
		6.4.6.3 b)	Perform system analysis 2) Apply the selected analysis methods to perform the required analysis.	08-48 Perform systems analysis 9)
		6.4.6.3 b)	Perform system analysis 3) Review the analysis results for quality and validity.	08-48 Perform systems analysis 10)
		6.4.6.3 b)	Perform system analysis 4) Establish conclusions and recommendations.	08-48 Perform systems analysis 11)
		6.4.6.3 b)	Perform system analysis 5) Record the results of the system analysis,	08-48 Perform systems analysis 12)
		6.4.6.3 c)	Manage the system analysis 2) Provide key artifacts and information items that have been selected for baselines.	07-1 Information item 15)

Table B.1 (continued)

ISO/IEC 33020:2019 Annex B Generic Practices	Description	ISO/IEC/IEEE 12207:2017	Description	ISO/IEC/IEEE 12207:2017
		6.4.7.3 a)	Prepare for implementation 1) Refine an implementation strategy, with consideration of the following: i) development policies and standards, including standards that govern applicable safety, security, privacy and environmental practices; programming or coding standards; unit test policies; and language-specific standards for implementing security features; ii) For reused or adapted software, methods to determine the level, source, and suitability of the reused system elements and security of the supply chain; iii) procedures and methods for software development (construction) and development of unit tests; and the use of peer reviews, unit tests, and walkthroughs during implementation; iv) use of CM control during software construction; v) change management considerations for manual processes; vi) implementation priorities to support data and software migration and transition, along with retirement of legacy systems; vii) creation of manual or automated test procedures to verify that a software unit meets its requirements before creation of the software unit (test-driven development); and viii) comprehensive or specialized life cycle development and support environments for realizing and managing requirements, models and prototypes, deliverable system or software elements, and test specifications and test cases.	04-07 Implementation Plan 6)
		6.4.7.3 a)	Prepare for implementation 2) Identify constraints from the implementation strategy and implementation technology on the system/software requirements, architecture characteristics, design characteristics, or implementation techniques.	04-07 Implementation Plan 7)
		6.4.7.3 b)	Perform implementation. 1) Realize or adapt software elements, according to the strategy, constraints, and defined implementation procedures.	07-8 Software element 9)
		6.4.7.3 b)	Perform implementation. 2) Realize or adapt hardware elements of software systems.	07-8 Software element 10)
		6.4.7.3 b)	Perform implementation. 3) Realize or adapt service elements of software systems.	07-8 Software element 11)
		6.4.7.3 b)	Perform implementation. 4) Evaluate software unit and affiliated data or other information according to the implementation strategy and criteria.	08-69 Software code & test evaluation record 5)
		6.4.7.3 b)	Perform implementation. 5) Package and store the software system element.	08-42 Manage software elements 5)
		6.4.7.3 b)	Perform implementation. 6) Record objective evidence that the software system element meets requirements.	08-42 Manage software elements 6)

Table B.1 (continued)

ISO/IEC 33020:2019 Annex B Generic Practices	Description	ISO/IEC/IEEE 12207:2017	Description	ISO/IEC/IEEE 12207:2017
		6.4.7.3 c)	Manage results of implementation 3) Provide key artifacts and information items that have been selected for baselines.	07-1 Information item 16)
		6.4.8.3 a)	Prepare for integration 1) Define the integration strategy.	04-26 Software integration plan 11)
		6.4.8.3 a)	Prepare for integration 2) Identify and define criteria for integration and points at which the correct operation and integrity of the interfaces and the selected software system functions will be verified.	04-26 Software integration plan 12)
		6.4.8.3 a)	Prepare for integration 3) Identify and plan for the necessary enabling systems or services needed to support integration.	08-24 Enabling system records: Integration 1)
		6.4.8.3 a)	Prepare for integration 4) Obtain or acquire access to the enabling systems or services to be used to support integration.	08-24 Enabling system records: Integration 2)
		6.4.8.3 a)	Prepare for integration 5) Identify constraints for integration to be incorporated in the system/ software requirements, architecture or design.	04-26 Software integration plan 13)
		6.4.8.3 b)	Perform integration 1) Obtain implemented software system elements in accordance with agreed schedules.	07-6 Integrated system 9)
		6.4.8.3 b)	Perform integration 2) Integrate the implemented elements.	07-6 Integrated system 10)
		6.4.8.3 b)	Perform integration 3) Check that the integrated software interfaces or functions run from initiation to an expected termination within an expected range of data values.	07-6 Integrated system 11)
		6.4.8.3 c)	Manage results of integration 1) Record integration results and anomalies encountered.	08-71 Software integration test results 3)
		6.4.8.3 c)	Manage results of integration 3) Provide key artifacts and information items that have been selected for baselines.	07-1 Information item 17)
		6.4.9.3 a)	Prepare for verification 1) Refine the verification strategy, which includes the following: i) Identify the verification scope, including the software system, element, or artifact, the properties to be verified, and the expected results. ii) Identify the constraints that potentially limit the feasibility of verification actions. iii) Identify verification priorities.	04-32 Verification strategy 14)
		6.4.9.3 a)	Prepare for verification 2) Identify constraints from the verification strategy to be incorporated in the system/software requirements, architecture, or design.	04-32 Verification strategy 15)
		6.4.9.3 a)	Prepare for verification 3) Define the purpose, conditions and conformance criteria for each verification action.	04-32 Verification strategy 16)

Table B.1 (continued)

ISO/IEC 33020:2019 Annex B Generic Practices	Description	ISO/IEC/IEEE 12207:2017	Description	ISO/IEC/IEEE 12207:2017
		6.4.9.3 a)	Prepare for verification 4) Select appropriate verification methods or techniques and associated criteria for verification actions, such as inspection, analysis, demonstration, or testing.	04-32 Verification strategy 17)
		6.4.9.3 a)	Prepare for verification 5) Identify and plan for the necessary enabling systems or services needed to support verification.	08-32 Enabling system records: Verification 1)
		6.4.9.3 a)	Prepare for verification 6) Obtain or acquire access to the enabling systems or services to be used to support verification.	08-32 Enabling system records: Verification 2)
		6.4.9.3 b)	Perform verification 1) Define the verification procedures, each supporting one or a set of verification actions.	06-3 Verification Procedures 5)
		6.4.9.3 b)	Perform verification 2) Perform the verification procedures.	06-3 Verification Procedures 6)
		6.4.9.3 c)	Manage results of verification 1) Review verification results and anomalies encountered and identify follow-up actions.	08-93 Verification problems and non-conformances 6)
		6.4.9.3 c)	Manage results of verification 2) Record incidents and problems during verification and track their resolution.	08-93 Verification problems and non-conformances 7)
		6.4.9.3 c)	Manage results of verification 3) Obtain stakeholder agreement that the software system or element meets the specified requirements.	08-52 Product acceptance record 8)
		6.4.9.3 c)	Manage results of verification 5) Provide key artifacts and information items that have been selected for baselines.	07-1 Information item 18)
		6.4.10.3 a)	Prepare for the software system transition 1) Refine a strategy for managing software releases and other software system transitions, including the following considerations: i) establishing the type of transition and transition success criteria; ii) determining the frequency of recurring transitions, such as updates and upgrades to development, test, and operational software systems; iii) minimizing security risks, disruption, and downtime during transition; iv) archiving, destroying, or converting and validating data from previous systems to the new system; including data received through external interfaces; v) contingency planning for problem resolution, backup and return to the last working system version; vi) scheduling transitions consistent with ongoing business processing, with phased or synchronized transition of systems vii) change management for stakeholders, including interface partners, human operators, system administrators, and software system or service users;	04-27 Software release plan 12)

Table B.1 (continued)

ISO/IEC 33020:2019 Annex B Generic Practices	Description	ISO/IEC/IEEE 12207:2017	Description	ISO/IEC/IEEE 12207:2017
		6.4.10.3 a)	Prepare for the software system transition 2) Identify and define facility, site, communications network, or target environment changes needed for software system installation or transition.	04-27 Software release plan 13)
		6.4.10.3 a)	Prepare for the software system transition 3) Identify information needs and arrange for user documentation and training of operators, users, and other stakeholders necessary for system utilization and support.	04-27 Software release plan 14)
		6.4.10.3 a)	Prepare for the software system transition 4) Prepare detailed transition information, such as plans, schedules, and procedures.	04-27 Software release plan 15)
		6.4.10.3 a)	Prepare for the software system transition 5) Identify system constraints from transition to be incorporated in the software system requirements, architecture or design.	04-27 Software release plan 16)
		6.4.10.3 a)	Prepare for the software system transition 6) Identify and plan for the necessary enabling systems or services needed to support transition.	08-30 Enabling system records: Transition 1)
		6.4.10.3 a)	Prepare for the software system transition 7) Obtain or acquire access to the enabling systems or services to be used.	08-30 Enabling system records: Transition 2)
		6.4.10.3 b)	Perform the transition 1) Prepare the site of operation or virtual environment in accordance with installation requirements.	08-76 System/ software installation record 17)
		6.4.10.3 b)	Perform the transition 2) Deliver the software system or element for installation at the correct location and time.	08-76 System/ software installation record 18)
		6.4.10.3 b)	Perform the transition 3) Install the product in its physical or virtual operational location and interface to its environment.	08-76 System/ software installation record 19)
		6.4.10.3 b)	Perform the transition 4) Provide user documentation and training for the operators, users, and other stakeholders necessary for product utilization and support.	08-76 System/ software installation record 20)
		6.4.10.3 b)	Perform the transition 5) Perform activation and check-out, including the following as agreed: i) Demonstrate proper installation of the software system. ii) Demonstrate the installed or transitioned product is capable of delivering its required functions. iii) Demonstrate the functions provided by the system are sustainable by the enabling systems. iv) Review the software system for operational readiness. v) Commission the software system for operations.	08-76 System/ software installation record 21)
		6.4.10.3 c)	Manage results of transition 1) Record transition results and anomalies encountered.	08-72 Software operation release test results 5)

Table B.1 (continued)

ISO/IEC 33020:2019 Annex B Generic Practices	Description	ISO/IEC/IEEE 12207:2017	Description	ISO/IEC/IEEE 12207:2017
		6.4.10.3 c)	Manage results of transition 2) Record transition incidents and problems and track their resolution.	08-72 Software operation release test results 6)
		6.4.10.3 c)	Manage results of transition 4) Provide key artifacts and information items that have been selected for baselines.	07-1 Information item 19)
		6.4.11.3 a)	Prepare for validation 1) Refine the validation strategy, which includes the following: i) Identify the validation scope, including the characteristics of the software system, element, or artifact to be validated, and the expected results of validation. ii) Identify the constraints that potentially limit the feasibility of validation actions. iii) Identify validation priorities.	04-31 Validation plan 14)
		6.4.11.3 a)	Prepare for validation 2) Identify system constraints from the validation strategy to be incorporated in the stakeholder requirements.	04-31 Validation plan 15)
		6.4.11.3 a)	Prepare for validation 3) Define the purpose, conditions and conformance criteria for each validation action.	04-31 Validation plan 16)
		6.4.11.3 a)	Prepare for validation 4) Select appropriate validation methods or techniques and associated criteria for each validation action.	04-31 Validation plan 17)
		6.4.11.3 a)	Prepare for validation 5) Identify and plan for the necessary enabling systems or services needed to support validation.	08-31 Enabling system records: Validation 1)
		6.4.11.3 a)	Prepare for validation 6) Obtain or acquire access to the enabling systems or services to be used to support validation.	08-31 Enabling system records: Validation 2)
		6.4.11.3 b)	Perform validation 1) Define the validation procedures, each supporting one or a set of validation actions.	06-2 Validation Procedures 5)
		6.4.11.3 b)	Perform validation 2) Perform the validation procedures in the defined environment.	06-2 Validation Procedures 6)
		6.4.11.3 c)	Manage results of validation 1) Review validation results and anomalies encountered and identify follow-up actions.	08-90 Validation Records 2)
		6.4.11.3 c)	Manage results of validation 2) Record incidents and problems during validation and track their resolution.	08-91 Validation problems and non-conformances 3)
		6.4.11.3 c)	Manage results of validation 3) Obtain stakeholder agreement that the software system or element meets the stakeholder needs.	08-92 Validation test suite confirmation record 2)
		6.4.11.3 c)	Manage results of validation 5) Provide key artifacts and information items that have been selected for baselines.	07-1 Information item 20)