



International
Standard

**ISO/IEC/IEEE
24748-1**

**Systems and software
engineering — Life cycle
management —**

**Part 1:
Guidelines for life cycle
management**

*Ingénierie des systèmes et du logiciel — Gestion du cycle de vie —
Partie 1: Lignes directrices pour la gestion du cycle de vie*

**Second edition
2024-03**



Reference number
ISO/IEC/IEEE 24748-1:2024(en)

© ISO/IEC 2024
© IEEE 2024



Documents

Document Sharing Hub

Authorized licensed use limited to: Tsinghua University. Downloaded on February 25, 2026 at 05:25:02 UTC from IEEE Xplore. Restrictions apply.



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2024

© IEEE 2024

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO or IEEE at the respective address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Institute of Electrical and Electronics Engineers, Inc
3 Park Avenue, New York
NY 10016-5997, USA

Email: stds.ipr@ieee.org
Website: www.ieee.org

© ISO/IEC 2024 – All rights reserved
© IEEE 2024 – All rights reserved

Authorized licensed use limited to: Tsinghua University. Downloaded on February 25, 2026 at 05:25:02 UTC from IEEE Xplore. Restrictions apply.

This is a Redline document produced by Accuris.

Redlines are designed to save time and improve productivity by using the latest software technology to find and highlight document changes from one edition to the next. It includes a full-text version of the new document, plus an indication of changes from the previous version.

Because it may not be technically possible to capture all changes accurately, it is recommended that users consult previous editions as appropriate. In all cases, only the current base version of this publication is to be considered the official document. This Redline is produced solely by Accuris. The publisher has not prepared this Redline and is not responsible for its accuracy.

Contact:

<https://store accuristech.com/pages/contact.html>

Redline Processing Notes:

1. ~~Red Text~~ - Red strikethrough text denotes deletions.
2. Blue Text - Blue underlined text denotes modifications and additions.

Contents

Page

Foreword	v
Introduction	vii
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Life cycle-related concepts	11
4.1 General	11
4.2 System concepts	11
4.2.1 General	11
4.2.2 Systems	12
4.2.3 System structure	12
4.2.4 Enabling systems	13
4.3 Life cycle concepts	15
4.3.1 System life cycle model	15
4.3.2 System life cycle stages	18
4.3.3 Stages in a Sol and its enabling systems	19
5 Life cycle stages	20
5.1 General	20
5.2 Concept stage	21
5.2.1 Overview	21
5.2.2 Purpose	22
5.2.3 Outcomes	22
5.3 Development stage	23
5.3.1 Overview	23
5.3.2 Purpose	23
5.3.3 Outcomes	23
5.4 Production stage	24
5.4.1 Overview	24
5.4.2 Purpose	24
5.4.3 Outcomes	24
5.5 Utilization stage	24
5.5.1 Overview	24
5.5.2 Purpose	25
5.5.3 Outcomes	25
5.6 Support stage	25
5.6.1 Overview	25
5.6.2 Purpose	25
5.6.3 Outcomes	26
5.7 Retirement stage	26
5.7.1 Overview	26
5.7.2 Purpose	26
5.7.3 Outcomes	26
6 Life cycle model adaptation	27
6.1 General	27
6.2 Adaptation sequence	27
6.2.1 General	27
6.2.2 Identification of the project environment and characteristics	27
6.2.3 Solicitation of inputs	28
6.2.4 Selection of appropriate standards	28
6.2.5 Selection of development approach	28
6.2.6 Selection of life cycle model	29
6.2.7 Selection of process model	29
6.2.8 Documentation of decisions and rationale	29

6.3	Life cycle model adaptation guidance.....	29
6.3.1	General.....	29
6.3.2	Scope adaptation.....	30
6.3.3	Stage adaptation.....	30
6.3.4	Life cycle model adaptation for domains, disciplines and specialties.....	30
6.4	Evaluation-related activities.....	33
7	Relationship with detailed process standards.....	34
Annex A (informative)	Process concepts.....	36
Annex B (informative)	Organizational concepts.....	49
Annex C (informative)	Project concepts.....	51
Annex D (informative)	Process views.....	56
Annex E (informative)	Guidance on development approaches and build planning.....	66
Annex F (informative)	Candidate joint stakeholder reviews.....	69
Annex G (informative)	Problem reporting capability.....	72
	Bibliography.....	74
	IEEE notices and abstract.....	77

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives or www.iec.ch/members_experts/refdocs).

IEEE Standards documents are developed within the IEEE Societies and the Standards Coordinating Committees of the IEEE Standards Association (IEEE-SA) Standards Board. The IEEE develops its standards through a consensus development process, approved by the American National Standards Institute, which brings together volunteers representing varied viewpoints and interests to achieve the final product. Volunteers are not necessarily members of the Institute and serve without compensation. While the IEEE administers the process and establishes rules to promote fairness in the consensus development process, the IEEE does not independently evaluate, test, or verify the accuracy of any of the information contained in its standards.

ISO and IEC draw attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO and IEC take no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO and IEC had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents and <https://patents.iec.ch>. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html. In the IEC, see www.iec.ch/understanding-standards.

This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, SC 7, *Software and systems engineering*, in cooperation with the Systems and Software Engineering Standards Committee of the IEEE Computer Society, under the Partner Standards Development Organization cooperation agreement between ISO and IEEE.

This second edition cancels and replaces the first edition (ISO/IEC/IEEE 24748-1:2018), which has been technically revised.

The main changes are as follows:

- added system of systems topics based on ISO/IEC/IEEE 21839, ISO/IEC/IEEE 21840 and ISO/IEC/IEEE 21841;
- added references for interfacing and interoperating systems and general updates from ISO/IEC/IEEE 15288:2023;
- added more recent life cycle models such as DEVOPS.

A list of all parts in the ISO/IEC/IEEE 24748 series can be found on the ISO and IEC websites.

ISO/IEC/IEEE 24748-1:2024(en)

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html and www.iec.ch/national-committees.

Introduction

The purpose of this document is to facilitate the use of the process content of ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 12207, by providing unified and consolidated guidance on life cycle management of systems and software. This is to help ensure consistency in system concepts and life cycle concepts, models, stages, processes, process application, key points of view, adaptation and use in various domains as the two International Standards are used in combination. That in turn helps a project team design a life cycle model for the system-of-interest to facilitate managing the progress of their project. Hence, ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 12207 are the documents that apply the concepts found in this document to specific processes.

NOTE ISO/IEC/IEEE 16326 and ISO/IEC/IEEE 24641 also apply the concepts found in this document, in the process context for project management and model-based approaches respectively.

This document also aids in identifying and planning use of life cycle processes described in ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 12207 that enable the project to be completed successfully, meeting its objectives/requirements for each stage and for the overall project.

There is also increasing recognition of the importance of helping to ensure that all life cycle stages and all aspects within each stage are supported with thorough guidance to enable alignment with any process documents that can be created later that focus on areas besides systems and software, including hardware, humans, data, processes (e.g. review process), procedures (e.g. operator instructions), facilities and naturally occurring entities (e.g. water, organisms, minerals).

By addressing these needs specifically in this document, the users of the process-focused ISO/IEC/IEEE 12207 and ISO/IEC/IEEE 15288 benefit not only from having one complementary document that addresses the management of life cycles of systems that provide products or services, but also from a framework that links life cycle management aspects to more than just the systems or software aspects of products or services. Additional discussion for system of systems can be found in ISO/IEC/IEEE 21839, ISO/IEC/IEEE 21840 and ISO/IEC/IEEE 21841.

In the context of this document, ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 12207, there is a continuum of human-made systems from those that use little to no software to those in which software is the primary interest. When software is the predominant system or element of interest, ISO/IEC/IEEE 12207 should be used. Both documents have the same process model, share most activities and tasks and differ primarily in descriptive notes. The determination of the applicability of ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 12207 should be decided by the nature of the system and its enabling systems. Often, a mixed tailoring of each standard can be appropriate.

ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 12207 also have published guidance documents (ISO/IEC/IEEE 24748-2 and ISO/IEC/IEEE 24748-3), respectively, to support use of the two International Standards individually.

Systems and software engineering — Life cycle management —

Part 1:

Guidelines for life cycle management

1 Scope

This document provides ~~guidelines~~ guidance for the life cycle management of systems and software, complementing the processes described in ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 12207.

This document:

- addresses systems concepts and life cycle concepts, models, stages, processes, process application, key points of view, adaptation and use in various domains and by various disciplines;
- establishes a common framework for describing life cycles, including their individual stages, for the management of projects that ~~to~~ provide, or acquire either products or services;
- defines the concept ~~and terminology~~ of a life cycle;
- supports the use of the life cycle processes within an organization or a project. organizations and projects can use these life cycle concepts when acquiring and supplying either products or services;
- provides guidance on adapting a life cycle model and the content associated with a life cycle or a part of a life cycle;
- describes the relationship between life cycles and their use in applying the processes in ISO/IEC/IEEE 15288 (systems aspects) and ISO/IEC/IEEE 12207 (software systems aspects);
- shows the relationships of life cycle concepts to the hardware, human, services, process, procedure, facility and naturally occurring entity aspects of projects; ~~and~~

- describes how its concepts relate to detailed process standards, for example, in the areas of measurement, project management ~~and~~ risk management [and model-based systems and software engineering](#).

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO, IEC and IEEE maintain [terminology](#) ~~terminological~~ databases for use in standardization at the following addresses:

- IEC Electropedia: available at [https:// http://www.electropedia.org/](https://http://www.electropedia.org/)
- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEEE Standards Dictionary Online: available at <https://dictionary.ieee.org/http://ieeexplore.ieee.org/xpls/dictionary.jsp>

NOTE [Definitions for other system and software engineering terms can be found in ISO/IEC/IEEE 24765, available at \[www.computer.org/sevocab\]\(http://www.computer.org/sevocab\).](#)

3.1

acquirer

stakeholder [\(3.49\)](#) that acquires or procures a *system* [\(3.51\)](#), *product* [\(3.33\)](#) or *service* [\(3.45\)](#) from a *supplier* [\(3.50\)](#)

Note 1 to entry: Other terms commonly used for an acquirer are buyer, *customer* [\(3.13\)](#), owner, purchaser, or internal/organizational sponsor.

[SOURCE: ISO/IEC/IEEE 15288: [2023, 3.1](#) ~~2015~~]

3.2

acquisition

process [\(3.30\)](#) of obtaining a *system* [\(3.51\)](#), *product* [\(3.33\)](#) or *service* [\(3.45\)](#)

[SOURCE: ISO/IEC/IEEE 15288: [2023, 3.2](#) ~~2015~~]

3.3

activity

set of cohesive *tasks* [\(3.56\)](#) of a *process* [\(3.30\)](#)

[SOURCE: ISO/IEC/IEEE 15288: [2023, 3.3](#) ~~2015~~]

3.4

agile ~~development~~

~~software~~ development approach based on iterative development, frequent inspection and adaptation, and incremental deliveries in which *requirements* [\(3.39\)](#) and solutions evolve through collaboration in cross-functional teams and through continual *stakeholder* [\(3.49\)](#) feedback

[SOURCE: ISO/IEC/IEEE 26515: [2018, 3.1, modified](#) — [The defined term has been changed from "agile development" to "agile"; note 1 to entry has been removed.](#)]

3.5

agreement

mutual acknowledgement of terms and conditions under which a working relationship is conducted

EXAMPLE Contract, memorandum of agreement.

[SOURCE: ISO/IEC/IEEE 15288: [2023, 3.4](#) ~~2015~~]

3.6

architecture

~~<system>~~ fundamental concepts or properties of a *system* [\(3.51\)](#) in its *environment* [\(3.18\)](#) ~~embodied in its elements, relationships,~~ and ~~governing in the~~ principles [for the realization of its design](#) and evolution [of this system and its related life cycle \(3.24\) processes \(3.30\)](#)

~~Note 1 to entry: ISO/IEC/IEEE 12207 and ISO/IEC/IEEE 15288 use the word “elements” instead of “components” and this document follows that usage.~~

[SOURCE: ISO/IEC/IEEE [42020:2019, 3.3](#) ~~42010:2011~~, modified — “entity” ~~Note 1 to entry~~ has been replaced with “system”; notes to entry have been removed ~~added~~.]

3.7

artefact

work product (3.33) that is produced and used during a project to capture and convey information

~~architecture framework~~

~~conventions, principles and practices for the description of architectures established within a specific domain of application and/or community of stakeholders~~

EXAMPLE 1 *Generalized Enterprise Reference Architecture and Methodologies (GERAM) (ISO 15704) is an architecture framework.*

EXAMPLE 2 *Reference Model of Open Distributed Processing (RM-ODP)(ISO/IEC 10746) is an architecture framework.*

[SOURCE: ISO [19014-4:2020, 3.9, modified](#) — The definition has been made singular. ~~/IEC/IEEE 42010:2011~~]

~~3.8~~

~~architecture view~~

~~work product expressing the architecture of a system from the perspective of specific system concerns~~

[SOURCE: ISO/IEC/IEEE 42010:2011]

~~3.9~~

~~architecture viewpoint~~

~~work product establishing the conventions for the construction, interpretation and use of architecture views to frame specific system concerns~~

[SOURCE: ISO/IEC/IEEE 42010:2011]

3.8

audit

independent examination of a work *product* (3.33) or set of work products to assess compliance with specifications, standards, contractual *agreements* (3.5), or other criteria

[SOURCE: ISO/IEC/IEEE 15288:2023, 3.7 ~~24765:2017~~]

3.9

baseline

Formally approved version of a *configuration item* (3.12), regardless of media, formally designated and fixed at a specific time during the configuration item's *life cycle* (3.24)

[SOURCE: ISO/IEC/IEEE 15288:2023, 3.8 ~~828:2012~~]

3.10

concept of operations

verbal and ~~for~~ graphic statement, in broad outline, of an *organization's* (3.28) assumptions or intent in regard to an operation or series of operations of new, modified, or existing organizational systems (3.51)

Note 1 to entry: The concept of operations frequently is embodied in long-range strategic plans and annual operational plans. In the latter case, the concept of operations in the plan covers a series of connected operations to be carried out simultaneously or in succession. to achieve an organizational performance objective ~~The concept is designed to give an overall picture of the organization operations.~~ See also *operational concept* (3.26).

Note 2 to entry: The concept of operations ~~It~~ provides the basis for bounding the operating space, system capabilities, *interfaces* (3.22) and operating *environment* (3.18).

[SOURCE: [ISO/IEC/IEEE 15288:2023, 3.9](#) ~~ANSI/AIAA G-043A-2012e~~]

3.11

concern

[matter of](#) ~~<system>~~ interest [or importance](#) ~~in a system relevant~~ to [a stakeholder\(3.49\)](#) ~~one or more of its stakeholders~~

Note 1 to entry: A concern pertains to any influence on a *system* [\(3.51\)](#) in its *environment*, [\(3.18\)](#) including developmental, technological, business, operational, organizational, political, economic, legal, regulatory, [ethical](#), ecological and social influences.

[SOURCE: ISO/IEC/IEEE [42020:2019, 3.8](#), modified — EXAMPLE has been removed; note 1 to entry has been added. ~~42010:2011~~]

3.12

configuration item

item or aggregation of hardware, software, or both, that is designated for configuration management and treated as a single entity in the configuration management *process* [\(3.30\)](#)

[SOURCE: ISO/IEC/IEEE [15288:2023, 3.11](#) ~~24765:2017~~]

3.13

customer

organization [\(3.28\)](#) or person that receives a *product* [\(3.33\)](#) or *service* [\(3.45\)](#)

EXAMPLE Consumer, client, *user*, [\(3.60\)](#), *acquirer* [\(3.1\)](#) buyer, or purchaser.

Note 1 to entry: A customer can be internal or external to the organization.

[SOURCE: ISO [/IEC/IEEE 15288:2023, 3.12](#) ~~9000:2015, modified—added “service”.~~]

3.16

~~design, verb~~

~~<process> to define the architecture, system elements, interfaces, and other characteristics of a system or system element~~

~~[SOURCE: ISO/IEC/IEEE 24765:2017]~~

3.14

design, noun

~~result of the process in 3.16~~

~~Note 1 to entry: Information, including~~ specification of *system elements* [\(3.52\)](#) and their relationships, that is sufficiently complete to support a compliant implementation of the *architecture* [\(3.6\)](#)

Note ~~1~~ [2](#) to entry: Design provides the detailed implementation-level physical structure, behaviour, temporal relationships and other attributes of system elements.

[SOURCE: ISO/IEC/IEEE [15288:2023, 24765:2017](#)]

3.15

design characteristic

design attributes or distinguishing features that pertain to a measurable description of a *product* [\(3.33\)](#) or *service* [\(3.45\)](#)

[SOURCE: ISO/IEC/IEEE [15288:2023, 3.14](#) ~~24765:2017~~]

3.16

DevOps

development and operations

set of principles and practices which enable better communication and collaboration between relevant *stakeholders* (3.49) for the purpose of specifying, developing, and operating software and systems (3.51), products (3.33) and services (3.45), and continuous improvements in all aspects of the life cycle (3.24)

Note 1 to entry: Extensions include DevSecOps which addresses *concerns* (3.11) related to development and operations.

[SOURCE: ISO/IEC/IEEE 32675:2022, 3.1, modified — Note 1 to entry has been added.]

3 17

enabling system

system (3.51) that supports a *system-of-interest* (3.53) during its *life cycle* (3.24) *stages* (3.48) but does not necessarily contribute directly to its function during operation

EXAMPLE Production-enabling system, which is required when a system-of-interest enters the ~~Production Stage, a~~ production stage ~~enabling system is required.~~

Note 1 to entry: Each enabling system has a life cycle of its own. ~~This document is applicable to each enabling system when, in its own right, it is treated as a system-of-interest.~~

[SOURCE: ISO/IEC/IEEE 15288: 2023, 3.15, modified — The second sentence of note 1 to entry has been removed. ~~2015~~]

3.18

environment

<system> context determining the setting and circumstances of all influences upon a *system*
[SOURCE: ISO/IEC/IEEE [15288:2023, 3.16](#) ~~42010:2011~~]

~~3.21~~

~~facility~~

~~physical means or equipment for facilitating the performance of an action, e.g. buildings, instruments, tools~~

[SOURCE: ISO/IEC/IEEE 15288: [2023, 3. 16](#) ~~22 2015~~]

3 19

incident

anomalous or unexpected event, set of events, condition, or situation at any time during the *life cycle* [\(3.34\)](#) of a project, product, [\(3.33\)](#) *service*, [\(3.45\)](#) or *system* [\(3.51\)](#)

Note 1 to entry: An incident is elevated and treated as a *problem* [\(3.29\)](#) when the cause of the incident needs to be analysed and corrected to prevent reoccurrence to avoid or minimise loss of life, or damage of property or natural resources.

[SOURCE: ISO/IEC/IEEE 15288: [2023, 3.17](#) ~~2015~~]

information item

separately identifiable body of information that is produced, stored, and delivered for human use

[SOURCE: ISO/IEC/IEEE 15289: 2019, 3.1.12, modified — The preferred term “information product” has been removed; notes to entry have been removed.]

3.21**iteration**

<process> repeating the application of the same *process* (3.30) or set of processes on the same level of the *system* (3.51) structure

[SOURCE: ISO/IEC/IEEE 15288:2023, 3.28]

3.22**interface**

point at which two or more logical, physical, or both, *system elements* (3.52) or software system elements meet and act on or communicate with each other

[SOURCE: ISO/IEC/IEEE 24748-6:2023, 3.1.3]

3.23**interoperating system**

system (3.51) that exchanges information with the *system-of-interest* (3.53) and uses the information that has been exchanged

[SOURCE: ISO/IEC/IEEE 15288:2023, 3.20]

3.24

life cycle

evolution of a *system* (3.51), *product* (3.33), *service* (3.45), *project* (3.34) or other human-made entity from conception through *retirement* (3.41)

[SOURCE: ISO/IEC/IEEE 15288: 2023, 3.21 2015]

3.25

life cycle model

framework of *processes* (3.30) and *activities* (3.3) concerned with the *life cycle* (3.48), acting ~~that may be organized into stages, which also acts~~ as a common reference for communication and understanding

[SOURCE: ISO/IEC/IEEE 15288: 2023, 3.22 2015]

3.26

operational concept

verbal and graphic statement of an *into stages* (3.24) *which can be organized* organization's (3.28) assumptions or intent in regard to an operation or series of operations of a *specific system* (3.51) or a related set of *new, existing or modified* systems

Note 1 to entry: The operational concept is designed to give an overall picture of the operations using one or more specific systems, or set of related systems, in the organization's operational environment (3.18) from the users' (3.60) and operators' (3.27) perspective. See also *concept of operations* (3.10) (3.12).

Note 2 to entry: The operational concept is about systems, while a concept of operations typically refers to organizations.

[SOURCE: [ISO/IEC/IEEE 15288:2023, 3.23](#) ~~ANSI/AIAA G-043A-2012e~~]

3.27

operator

individual or *organization* [\(3.28\)](#) that performs the operations of a *system* [\(3.51\)](#)

Note 1 to entry: The role of operator and the role of *user* [\(3.60\)](#) may be vested, simultaneously, or sequentially, in the same individual or organization.

Note 2 to entry: An individual operator combined with knowledge, skills and procedures ~~can~~ ~~may~~ be considered as an element of the system.

Note 3 to entry: An operator may perform operations on a system that is operated, or of a system that is operated, depending on whether or not operating instructions are placed within the system boundary.

[SOURCE: ISO/IEC/IEEE 15288: [2023, 3.24](#) ~~2015~~]

3.28

organization

~~person or~~ group of people [that has its own functions](#) ~~and facilities~~ with ~~an arrangement of~~ responsibilities, authorities and relationships [to achieve its objectives](#)

EXAMPLE Company, corporation, firm, enterprise, [manufacturer](#), institution, charity, sole trader, association, or parts or combination thereof.

~~Note 1 to entry: An identified part of an organization (even as small as a single individual) or an identified group of organizations can be regarded as an *organization* if it has responsibilities, authorities and relationships. A body of persons organized for some specific purpose, such as a club, union, corporation, or society, is an organization.~~

[SOURCE: ISO 9000:2015, [3.2.1](#), modified — [Notes](#) ~~Note 1~~ to entry [have been removed](#); [EXAMPLE](#) has been added.]

~~3.29~~

~~party~~

~~organization entering into an agreement~~

~~Note 1 to entry: In this document, the agreeing parties are called the acquirer and the supplier.~~

~~[SOURCE: ISO/IEC/IEEE 15288:2015]~~

3.29

problem

difficulty, uncertainty, or otherwise realized and undesirable event, set of events, condition, or situation that requires investigation and corrective action

[SOURCE: ISO/IEC/IEEE 15288: [2023, 3.26](#) ~~2015~~]

3 [30](#) ~~31~~

process

set of interrelated or interacting *activities* ([3.3](#)) that transforms inputs into outputs

[SOURCE: ISO/IEC/IEEE 15288: [2023, 3.27](#) ~~2015~~]

3 31

process outcome

observable result of the successful achievement of the *process purpose* (3.32)

[SOURCE: ISO/IEC/IEEE 15288:2023, 3.30 ~~12207:2017~~]

3 32

process purpose

high-level objective of performing the *process* (3.30) and the likely outcomes of effective implementation of the process

Note 1 to entry: The purpose of implementing the process is to provide benefits to the *stakeholders* (3.49).

[SOURCE: ISO/IEC/IEEE 15288: 2023, 3.29, modified — The term "high-level" has been hyphenated, 2015]

3 33

product

output of an *organization* (3.28) that can be produced without any transaction taking place between the organization and the *customer* (3.13)

~~result of a process~~

Note 1 to entry: The dominant element of a product is that it is generally tangible. ~~There are four agreed generic product categories: hardware (e.g. engine mechanical part), software (e.g. computer program), services (e.g. transport), and processed materials (e.g. lubricant). Hardware and processed materials are generally tangible products, while software or services are generally intangible.~~

[SOURCE: ISO [/IEC/IEEE 15288:2023, 3.32](#) ~~9000:2015~~]

3.34

project

endeavour with defined start and finish criteria undertaken to create a *product* [\(3.33\)](#) or *service* [\(3.45\)](#) in accordance with specified *resources* [\(3.40\)](#) and *requirements* [\(3.39\)](#)

Note 1 to entry: A project is sometimes viewed as a unique *process* [\(3.30\)](#) comprising co-ordinated and controlled *activities* [\(3.3\)](#) and composed of activities from the *technical management* [\(3.58\)](#) ~~Project Processes~~ and Technical Processes defined in [ISO/IEC/IEEE 12207](#) and [ISO/IEC/IEEE 15288](#) ~~the referenced International Standards~~.

Note 2 to entry: Continuous development approaches such as *agile* (3.4) and *DevOps* (3.16) can use different terminology for the creation of product and services.

[SOURCE: ISO/IEC/IEEE 15288: [2023, 3.33](#), modified — Note 1 to entry has been updated to reference [ISO/IEC/IEEE 12207](#) and [ISO/IEC/IEEE 15288](#). ~~2015~~]

3.35

qualification

process [\(3.30\)](#) of demonstrating whether an entity is capable of fulfilling specified *requirements* [\(3.39\)](#)

[SOURCE: ISO/IEC/IEEE 12207:2017 [3.1.39](#)]

~~3.37~~

~~quality assurance~~

~~part of quality management focused on providing confidence that quality requirements will be fulfilled~~

~~[SOURCE: ISO 9000:2015]~~

3.36

quality characteristic

inherent characteristic of [a product \(3.33\)](#), [service \(3.45\)](#), [process \(3.30\)](#), or [system \(3.51\)](#) ~~an object~~ related to a *requirement* [\(3.39\)](#)

[SOURCE: ISO 9000:2015 [3.10.2](#), modified — "an object" has been replaced with "a product, service, process, or system"; notes to entry have been removed.]

3.37

quality management

coordinated activities to direct and control an *organization* [\(3.28\)](#) with regard to quality

[SOURCE: ISO/[IEC/IEEE 12207:2017](#), [3.1.42](#) ~~9000:2015~~]

3.38

recursion

<process> repeating the application of the same *process* [\(3.30\)](#)

3.39

requirement

statement that translates or expresses a need and its associated constraints and conditions

[SOURCE: ISO/IEC/IEEE 29148: [2018, 3.1.19, modified](#) — [Notes to entry have been removed.](#)]

3.40

resource

asset that is [utilised](#) ~~utilized~~ or consumed during the execution of a *process* [\(3.30\)](#)

Note 1 to entry: [Resource](#) includes diverse entities, such as funding, personnel, facilities, capital equipment, tools and utilities, such as power, water, fuel and communication infrastructures.

Note 2 to entry: Resources include those that are reusable, renewable, or consumable.

[SOURCE: ISO/IEC/IEEE 15288: [2023, 3.37](#) ~~2015~~]

3.41

retirement

[<system>](#) withdrawal of active support by the operation and maintenance *organization* [\(3.28\)](#), partial or total replacement by a new *system*, [\(3.51\)](#), installation of an upgraded system [or final decommissioning and disposal](#)

[SOURCE: ISO/IEC/IEEE 15288: [2023, 3.38](#) ~~2015~~]

3.42

risk

effect of uncertainty on objectives

Note 1 to entry: An effect is a deviation from the expected ± positive or negative. A positive effect is also known as an opportunity.

Note 2 to entry: Objectives can have different aspects [(such as financial, health and *safety* (3.43), and environmental goals)] and can apply at different levels (such as strategic, organization-wide, project, product and process).

Note 3 to entry: Risk is often characterized by reference to potential events and consequences, or a combination of these.

Note 4 to entry: Risk is often expressed in terms of a combination of the consequences of an event (including changes in circumstances) and the associated likelihood of occurrence.

Note 5 to entry: Uncertainty is the state, even partial, of deficiency of information related to understanding or knowledge of an event, its consequence, or likelihood.

[SOURCE: ISO Guide 73:2009, 1.1, modified — The last sentence in note 1 to entry has been added.]

3.43

safety

expectation that a *system* (3.51) does not, under defined conditions, lead to a state in which human life, health, property, or the *environment* (3.18) is endangered

Note 1 to entry: The term is alternately defined as freedom from *risks* (3.42) that are not tolerable.

[SOURCE: ISO/IEC/IEEE 12207:2017, 3.1.48, modified — Note 1 to entry has been added.]

3.44

security

protection against intentional subversion or forced failure, containing a composite of four attributes: confidentiality, integrity, availability, and accountability, plus aspects of a fifth, usability, all of which have the related issue of their assurance

Note 1 to entry: Security includes authenticity, accountability, confidentiality, integrity, availability, non-repudiation, and reliability, all of which have the related issue of their assurance.

[SOURCE: ISO/IEC/IEEE 12207:2017, 3.1.49, modified — Note 1 to entry has been added.]

~~[SOURCE: NATO AEP-67]~~

3.45

service

output of an organization (3.28) with at least one activity (3.3) necessarily performed between the (3.13)

~~performance of activities, work, or duties~~

Note 1 to entry: The dominant elements of a service are generally intangible. ~~is self-contained, coherent, discrete and can be composed of other services.~~

Note 2 to entry: A service is coherent, discrete and can be composed of other services. ~~generally an intangible product.~~

[SOURCE: ISO/IEC/IEEE 15288:2023, 3.42 ~~12207:2017~~]

3.46

software item

source code, object code, control code, control data, or a collection of these items

Note 1 to entry: A software item can be viewed as a *system element* [organization and the customer](#) [ISO/IEC/IEEE 15288. Software items are typically configuration items \(3.12\).](#) ~~of the referenced International Standard and of ISO/IEC/IEEE 15288:2015.~~

[SOURCE: ISO/IEC/IEEE 12207:2017 [3.1.53](#), modified — Note 1 to entry has been updated to reference ISO/IEC/IEEE 12207 and ISO/IEC/IEEE 15288.]

3.48

software product

set of computer programs, procedures, and possibly associated documentation and data

Note 1 to entry: A software product is a software *system process* [\(3.30\)](#).

~~[SOURCE: ISO/IEC/IEEE 12207:2017]~~

3.49

software unit

~~atomic level software component of the software architecture that can be subjected to stand-alone testing~~

~~[SOURCE: ISO 26262-1:2018]~~

3.48

stage

period within the life cycle [\(3.24\)](#) of an entity that relates to the state of its description or realization

Note 1 to entry: As used in this document, stages relate to major progress and achievement milestones of the entity through its life cycle.

Note 2 to entry: Stages often overlap.

[SOURCE: ISO/IEC/IEEE 15288: [2023, 3.43](#) ~~2015~~]

3.49

stakeholder

individual or *organization* [\(3.28\)](#) having a right, share, claim, or interest in a *system* [\(3.51\)](#) or in its possession of characteristics that meet their needs and expectations

EXAMPLE End *users* [\(3.60\)](#), end user organizations, supporters, developers, *customers* [\(3.13\)](#), producers, trainers, maintainers, disposers, *acquirers*, [\(3.1\)](#), *suppliers* [\(3.50\)](#) ~~supplier organizations~~ ~~and~~ regulatory bodies, ~~and people influenced positively or negatively by a system.~~

Note 1 to entry: Some stakeholders can have interests that oppose each other or oppose the system.

[SOURCE: ISO/IEC/IEEE 15288: [2023, 3.44](#) ~~2015~~]

3.50 52

supplier

organization (3.28) or an individual that enters into an *agreement* (3.5) with the *acquirer* (3.1) for the supply of a *product* (3.33) or *service* (3.45)

Note 1 to entry: Other terms commonly used for supplier are contractor, producer, seller, or vendor.

Note 2 to entry: The acquirer and the supplier sometimes are part of the same organization.

[SOURCE: ISO/IEC/IEEE 15288: 2023, 3.45 2015]

3.51

system

~~arrangement combination~~ of ~~parts or interacting~~ elements ~~that together exhibit a organized to achieve one or more~~ stated ~~behaviour or meaning that the individual constituents do not purposes~~

Note 1 to entry: A system is sometimes considered as a *product* (3.33) or as the *services* (3.45) it provides.

Note 2 to entry: In practice, the interpretation of its meaning is frequently clarified by the use of an associative noun, e.g. aircraft system. Alternatively, the word “system” is substituted simply by a context-dependent synonym, e.g. aircraft, though this potentially obscures a system principles perspective.

Note 3 to entry: A complete system includes all of the associated equipment, facilities, material, computer programs, firmware, technical documentation, services and personnel required for operations and support to the degree necessary for self-sufficient use in its intended *Environment* (3.18).

[SOURCE: ISO/IEC/IEEE 15288: [2023, 3.46](#) ~~2015~~]

3.52

system element

discrete part of a (3.51) that can be implemented to fulfil specified requirements (3.39) ~~member of a set of elements that constitutes a system~~

EXAMPLE Hardware, software, data, humans, *processes* [\(3.30\)](#) [e.g. processes for providing *service* [\(3.45\)](#) [\(3.60\)](#)], ~~to users~~, procedures [~~(e.g. operator~~ [\(3.27\)](#) instructions] ~~)~~ facilities, materials and naturally occurring entities, or any [\(3.45\)](#) to *users* combination.

~~Note 1 to entry: A *system* element is a discrete part of a system that can be implemented to fulfil specified requirements.~~

[SOURCE: ISO/IEC/IEEE 15288: [2023, 3.47](#) ~~2015~~]

3.53

system-of-interest

SoI

System [\(3.51\)](#) whose *life cycle* [\(3.24\)](#) is under consideration ~~in the context of this document~~

[SOURCE: ISO/IEC/IEEE 15288: [2023, 3.48](#) ~~2015~~]

3.54

System of ~~systems~~

~~(SoS)~~

set of *systems* (3.51) or *system elements* (3.52) that interact ~~integrate or interoperate~~ to provide a unique capability that none of the constituent systems can accomplish on its own

Note 1 to entry: System elements can be necessary to facilitate the interaction of the ~~Each~~ constituent systems in the system of systems. ~~is a useful system by itself, having its own management, goals, and resources, but coordinates within the SoS to provide the unique capability of the SoS.~~

[SOURCE: ISO/IEC/IEEE 15288: 2023, 3.50 ~~2015~~]

3.55

systems engineering

transdisciplinary and integrative approach to enable the successful realization, use, and retirement (3.41) of engineered systems (3.51) using systems principles and concepts and scientific, technological and management methods

~~interdisciplinary approach governing the total technical and managerial effort required to transform a set of stakeholder needs, expectations, and constraints into a solution and to support that solution throughout its life~~

[SOURCE: ISO/IEC/IEEE 15288: 2023, 3.50 ~~24765:2017~~]

3.56

task

required, recommended, or permissible action, intended to contribute to the achievement of one or more outcomes of a *process* [\(3.30\)](#)

[SOURCE: ISO/IEC/IEEE 15288:2015]

[3.57](#)

technical debt

deferred cost of work not performed at an earlier point in the product *life cycle* [\(3.24\)](#)

[SOURCE: *Software Extension to the PMBOK® Guide Fifth Edition*]

3.58

technical management

application of technical and administrative *resources* [\(3.40\)](#) to plan, organize and control engineering functions

[SOURCE: ISO/IEC/IEEE 12207:2017, [3.1.67](#)]

[3.59](#)

traceability

discernible association among two or more logical entities, such as [\(3.40\)](#) *requirements* [\(3.39\)](#), *system elements* [\(3.52\)](#), *verifications* [\(3.62\)](#), or *tasks* [\(3.56\)](#)

[\[SOURCE: ISO/IEC TR 29110-1:2016, 3.71, modified — "discernible" has been added; EXAMPLE has been removed.\]](#)

3.60

~~trade-off~~

~~decision-making actions that select from various requirements and alternative solutions on the basis of net benefit to the stakeholders~~

~~[SOURCE: ISO/IEC/IEEE 15288:2015]~~

3.60

user

individual or group that interacts with a *system* [\(3.51\)](#) or benefits from a system during its utilization

Note 1 to entry: The role of user and the role of *operator* [\(3.27\)](#) are sometimes vested, simultaneously or sequentially, in the same individual or *organization* [\(3.28\)](#).

[SOURCE: ISO/IEC 25010:2011, [4.3.16](#), modified — [The original note 1 to entry has been replaced by new one.](#)]

3. 61

validation

confirmation, through the provision of objective evidence, that the *requirements* [\(3.39\)](#) for a specific intended use or application have been fulfilled

Note 1 to entry: In a *life cycle* (3.24) context, validation involves the set of *activities* (3.3) for gaining confidence that a *system* (3.51). A ~~system~~ is able to accomplish its intended use, goals and objectives in an *environment* (3.18) like the ~~(i.e. meet stakeholder requirements) in the intended~~ operational environment. The right system was built.

~~Note 2 to entry: In a life cycle context, validation involves the set of activities for gaining confidence that a system is able to accomplish its intended use, goals and objectives in an environment like the operational environment.~~

[SOURCE: ISO 9000:2015, [3.8.13](#), modified — Notes ~~Note 1~~ to ~~3~~ entry and ~~Note 2~~ to entry have been removed; a new note 1 to entry has been added.]

3.62

verification

confirmation, through the provision of objective evidence, that specified *requirements* [\(3.39\)](#) have been fulfilled

Note 1 to entry: Verification is a set of *activities* [\(3.3\)](#) that compares a *system* [\(3.51\)](#) or *system element* [\(3.52\)](#) against the required characteristics. This includes, but is not limited to, specified requirements, design description and the system itself. The system was built right.

[SOURCE: ISO 9000:2015, [3.8.12](#), modified — Notes 1 to 3 to entry have been removed; a new note ~~Note 1~~ to entry has been added.]

[3.63](#)

[view](#)

representation of a *system* (3.51) from the perspective of a related set of *concerns* (3.11)

Note 1 to entry: A view can be an operational, functional or architectural representation of a *system*.

[\[SOURCE: ISO/IEC/IEEE 24774:2021, 3.21, modified — Removed the word "whole" before "system" from the definition; the original note 1 to entry has been replaced by a new one.\]](#)

3.64

viewpoint

[specification of the conventions for constructing and using a *view* \(3.63\)](#)

[\[SOURCE: ISO/IEC/IEEE 24774:2021, 3.22, modified — Notes 1 to 3 to entry have been removed.\]](#)

4 Life cycle-related concepts

4.1 General

This clause addresses system and life cycle concepts. For completeness, process, organizational and project concepts are covered in Annexes A, B and C, respectively [to provide guidance when they are considered further](#).

4.2 System concepts

4.2.1 General

This subclause is included to highlight and explain essential concepts on which this document is based. These concepts are directly applicable to software [systems](#), as addressed in ISO/IEC/IEEE 12207, [and](#) systems, as addressed in ISO/IEC/IEEE 15288, [See Annex A for additional information on process concepts. Additional discussion for essential concepts related and to system of systems \(SoS\) can be found in ISO/IEC/IEEE 21839, ISO/IEC/IEEE 21840 ~~hardware, facilities, services, humans, processes~~ and ISO/IEC/IEEE 21841 ~~procedures, data and naturally occurring entities~~](#).

4.2.2 Systems

A system is an arrangement of parts or elements that together exhibit behaviour or meaning that the individual constituents do not. The systems considered in this document are ~~man~~ made by humans and utilised ~~utilized~~ to provide products or services in defined environments for the benefit of users and other stakeholders. These systems can ~~may~~ be configured with one or more of the following: hardware, software, services, humans, data, processes (e.g. processes for providing services to users), procedures (e.g. operator instructions), facilities and naturally occurring entities (e.g. water, organisms, minerals).

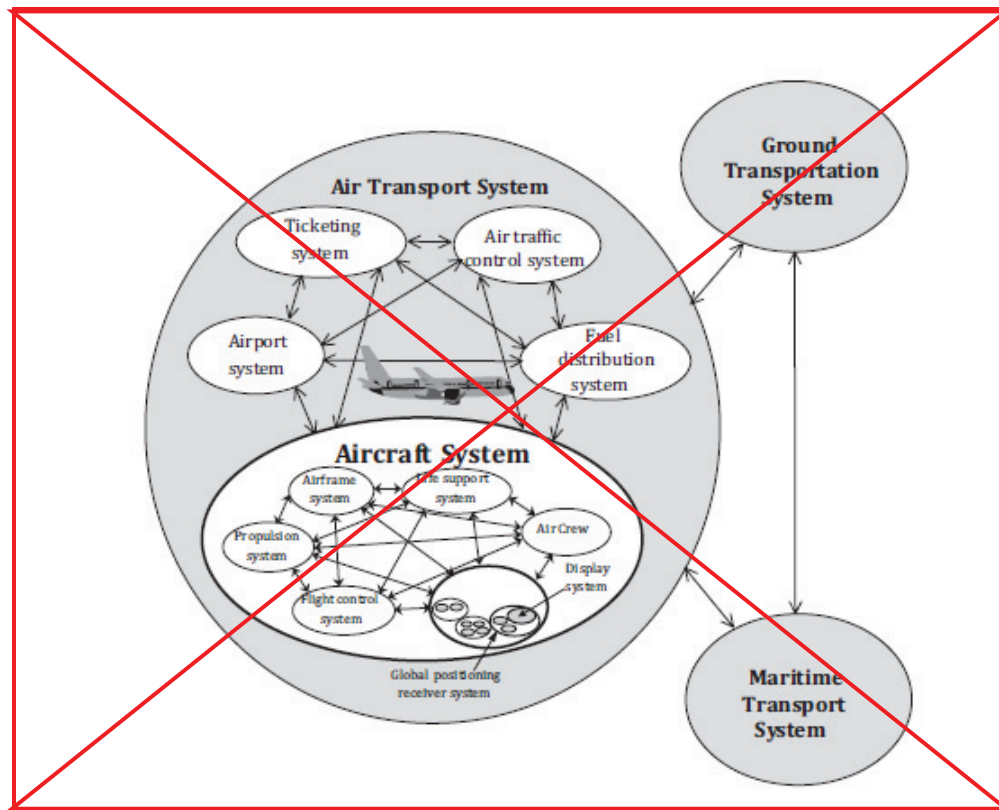
The perception and definition of a particular system, its architecture and its system elements depend on an observer's interests and responsibilities. One person's SoI ~~system-of-interest~~ can be viewed as a system element in another person's SoI ~~system-of-interest~~. Conversely, it can be viewed as being part of the environment of operation for yet another person's SoI ~~system-of-interest~~.

The following are key points regarding the characteristics of the SoI:

- a) defined boundaries encapsulate meaningful needs and practical solutions;
- b) there is a hierarchical or other relationship between system elements;
- c) an entity at any level in the SoI can be viewed as a system;
- d) a system comprises an integrated, defined set of subordinate system elements;
- e) humans can be viewed as both users external to a system and as system elements (e.g. operators) within a system;
- f) a system can be viewed in isolation as an entity, (e.g. a product), or as a collection of functions capable of interacting with its surrounding environment, (e.g. a set of services).

Figure 1 exemplifies the multitude of perceivable systems of interest in an aircraft and its environment of operation. First, Figure 1 in its entirety comprises a transportation system with air, ground and water elements, which can be a system of interest. Next, any one element of the transportation system can be viewed as a system of interest, such as the Air Transport System. The example can be continued through the levels so that, for example, the display can be an element of the navigation system, which is in turn an element of the aircraft system within the air transport system. However, from an equally valid perspective, such as that of display manufacturers, the display will be their system of interest and they will then determine the elements within their display system. On a deeper level, Figure 1 also illustrates the following:

- the importance of that defined boundaries encapsulate meaningful needs and practical solutions;
- the perception of system structure (in this case, the physical structure, hierarchical in this instance);
- that an entity at any level in the SoI can be viewed as a system;
- that a system comprises an integrated, defined set of subordinate system
- that characteristic properties at a system's boundary arise from the interactions between subordinate systems;
- that humans can be viewed as both users external to a system and as system elements (e.g. operators) within a system; (e.g. air crew and aircraft);
- that a system can be viewed as an isolated entity (e.g. a product), or as a collection of functions capable of interacting with its surrounding environment (e.g. a set of services).
- that a system can be viewed as part of a larger system of systems and that a system of systems can be viewed as a system.



(Deleted)

Figure 1—Typical system view of an aircraft in its environment of use

Whatever the boundaries chosen to define the system, the concepts and models in this document are generic and permit a practitioner to correlate or adapt individual instances of life cycles to its system concepts and principles.

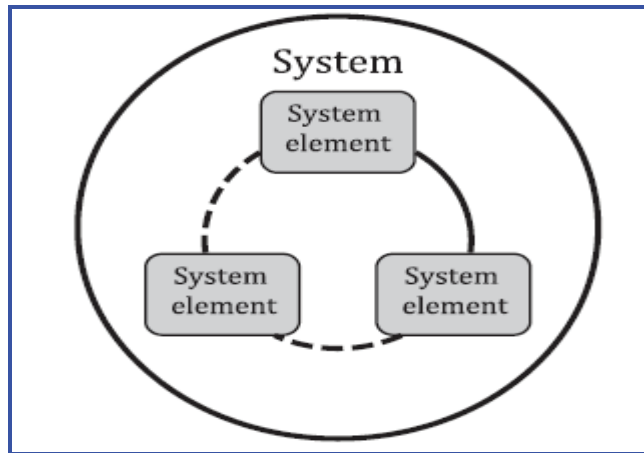
In this document, humans are considered both as users and as elements of a system. In the first case, the human user is a beneficiary of the operation of the system. In the second case, the human is an operator carrying out specified system functions, such as those involved in providing a service. An individual can be, simultaneously or sequentially, a user and an element of a system, for example, the pilot of a private aircraft in the civil aviation system [performs as an operator of the aircraft while also benefitting from the transportation service provided by the aircraft.](#)

Humans contribute to the performance and characteristics of many systems for numerous reasons, e.g. their special skills, the need for flexibility and for legal reasons. Whether they are users or operators, humans are highly complex, with behaviour that is frequently difficult to predict, and they need protection from harm. This requires that the system life cycle processes address human element factors in the areas of: human factors engineering, system safety, health hazard assessment, ~~workforce manpower~~, personnel ~~and~~ training ethical and cultural values. These issues are addressed by particular activities and iterations in the life cycle, and are described in more detail in ISO 9241-210:2010 and ISO 9241-220 /TR 18529:2000.

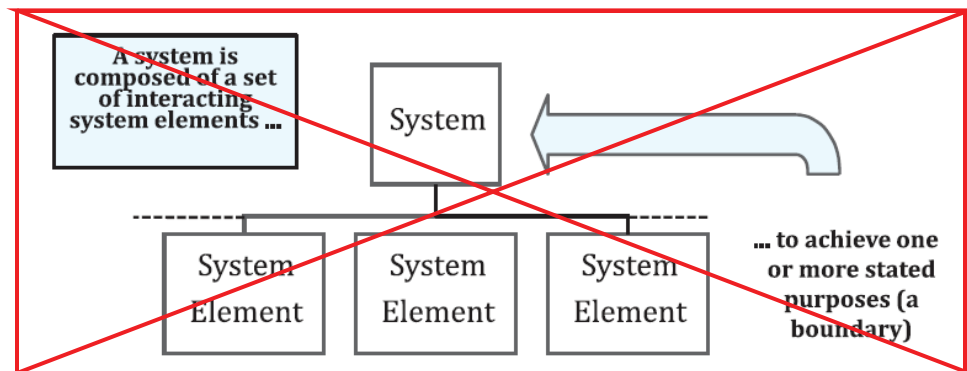
~~NOTE- ISO/TR 18529 is being superseded by ISO/IEC 9241-220 which is under development.~~

4.2.3 System structure

The system life cycle processes ~~in this document~~ are described in relation to a system that is composed of a set of interacting physical, logical and ~~or~~ other system elements, depicted in Figure 1 ~~2~~, each of which can be implemented to fulfil its respective specified requirements. Responsibility for the implementation of any system element can ~~may~~ therefore be delegated to another party through an agreement.



(New)

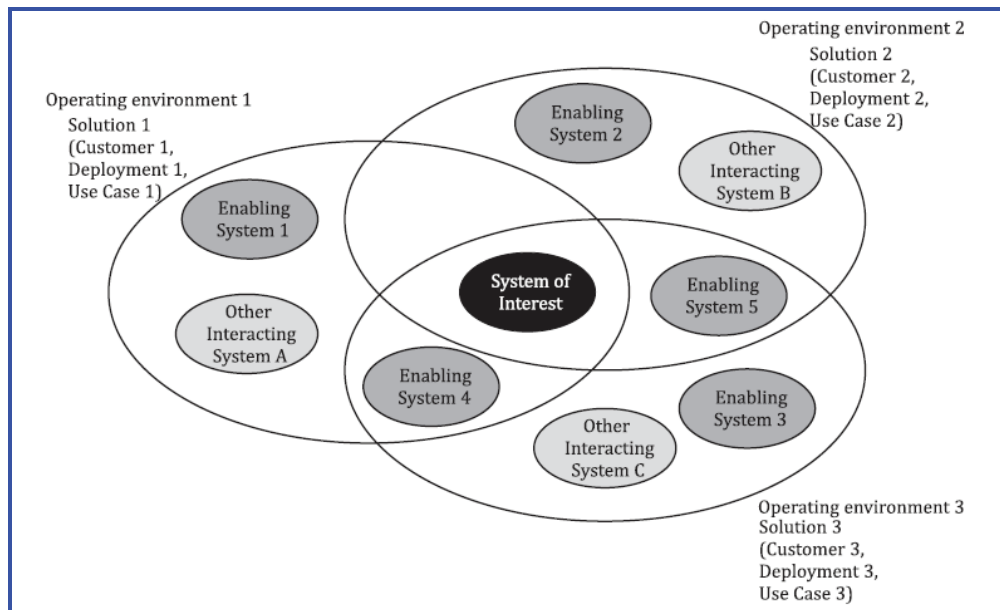


(Deleted)

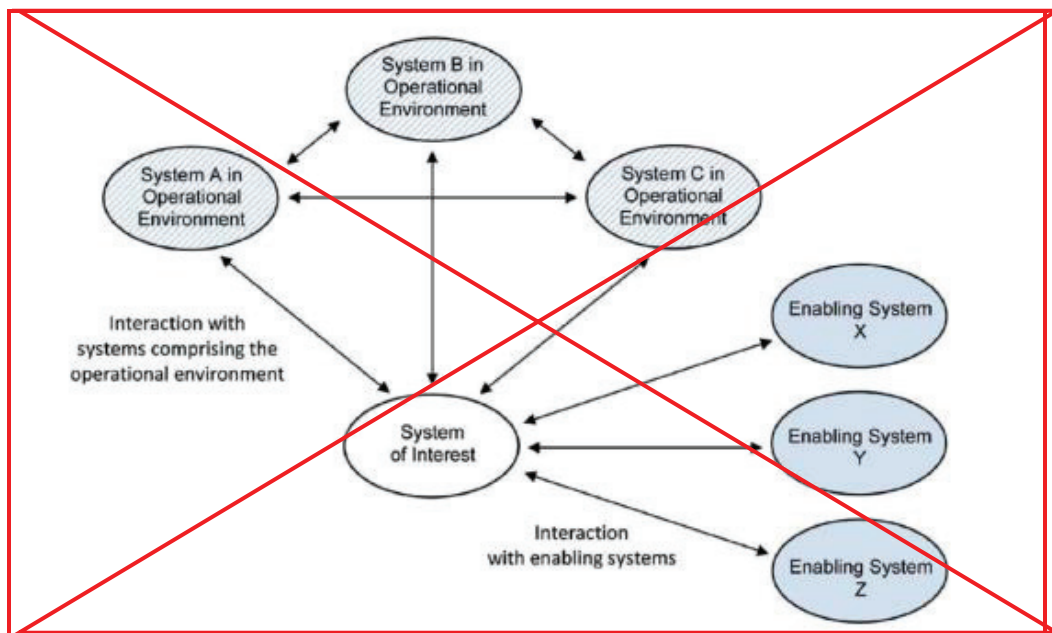
Figure 1 2 — System and system element relationship

4.2.4 Enabling systems

Throughout the life cycle of a SoI ~~system-of-interest~~, essential services are required from systems that are not directly a part of the operational environment of the SoI ~~system-of-interest~~, e.g. new product development, mass-production system, training system, maintenance system. Each of these systems enables a part, for example, a stage, or stages, of the life cycle of the SoI ~~system-of-interest~~ to be conducted. Termed “enabling systems”, they facilitate progression of the SoI ~~system-of-interest~~ through its life cycle. The relationship between the services delivered to the operational environment by the SoI and the services delivered by the enabling systems to the SoI are shown in Figure 3 4 Enabling systems can be seen to contribute indirectly to the services provided by the SoI. Enabling systems can have their own customers, deployment approaches and use cases that can overlap other enabling systems. ~~system-of-interest~~. The interrelationships between the SoI ~~system-of-interest~~ and the enabling systems can be bi-directional or a one-way relationship at each stage in which the SoI ~~system-of-interest~~ and specific enabling systems interrelate. In addition to interacting with enabling systems, the SoI ~~can~~ ~~system-of-interest~~ ~~may~~ also interact with other systems in the operating environment, shown as Other Interacting Systems A, B, and C, and Enabling Systems 1, 2, 3, 4 and 5. Requirements for interfaces with enabling systems and other systems in the operational environment should ~~will-need-to~~ be included in the requirements for the SoI ~~system-of-interest~~.



(New)



(Deleted)

Figure 3— Services delivered by ~~4—System of interest, its operational~~
~~environment and~~ enabling systems to the system-of-interest

During each stage in the system life cycle, the relevant enabling systems and the [SoI](#) ~~system-of-interest~~ are considered together. Since they are interdependent, they can also be viewed as a system. When a suitable enabling system does not already exist, the project that is responsible for the [SoI](#) ~~system-of-interest~~ can also be directly responsible for creating and using the enabling system. Creating the enabling systems can be viewed as a separate project and subsequently another [SoI](#). ~~A system-of-interest. Note that a~~ given enabling system [can](#) ~~could~~ be used more than once (i.e. several times during a given stage, or in multiple stages, or both) during a system's life cycle, and that such use can have discontinuities. The enabling system [can](#) ~~may~~ also be used concurrently in multiple life cycle stages. Thus, it is necessary to consider the full life cycle, [maturity](#) and concurrency requirements for the enabling systems. For example, a specific fixture [can](#) ~~might~~ be used for ~~development~~ retirement, for which there [can](#) ~~could~~ be a significant time delay. Or the fixture [can](#) ~~could~~ be needed for development, operations and maintenance, and have activities requiring the fixture concurrently. As another example, a training aid [can](#) ~~could~~ be developed as part of the concept stage, then refined and reused in development, operation and maintenance stages.

[See ISO/IEC/IEEE 24748-2:2024, Annex B for additional information about interfacing, enabling and interoperating systems.](#)

4.3 Life cycle concepts

4.3.1 System life cycle model

Every system, whatever the kind or size, inherently evolves, from its initial conceptualization through its eventual retirement ~~as defined in 3.43~~. It is generally useful to build a [life cycle](#) model of this progression, showing each stage in the evolution, to help manage the evolution of the system. Models built for this purpose are termed life cycle models. Movement from one stage to another represents a decision point with specific criteria [intended](#) to be satisfied [guiding before movement to the next](#) stage [entry and completion is allowed](#). These criteria usually are directly based either on the completion of specific tasks and demonstration of successful [process](#) outcomes, or readiness to start specific tasks in order to achieve required [process](#) outcomes ~~from sets of processes, such as are in ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 12207~~. A life cycle model, then, is a decision-linked conceptual segmentation of the definition of the need for the system, its realization as a product or service or some mix of both, and its utilization, evolution and disposal. ~~The Note that~~ actual progression of a system through the parts of the model, however done, is the system's life cycle. While the system has a life cycle, it is only by applying model(s) that subdivide the life cycle that the concept of stages becomes relevant. Models have stages, and any SoI can be regarded from the perspective of one or more models. Some models permit concurrency of stages while some do not. Which stage(s) a system is in depends on the models. A system can be in multiple life cycle stages at the same time.

NOTE ~~Life cycle, life cycle model and stage are 3.24, 3.25 and 3.50, respectively.~~

A system life cycle model is segmented by stages because it facilitates planning, provisioning, operating and supporting the SoI. ~~system-of-interest~~. This segmentation by stages provides an orderly progression of a system through established decision-making gates to reduce risk and to enable satisfactory progress. This segmentation also allows the establishment of different development environments identifying processes, procedures, methods, techniques and tools appropriate to each stage. However, it does not negate using the same development environment for multiple stages. It can ~~As stated before, it is the need to make a decision to specific criteria, usually process outcome based, before a system can progress to subsequent stages that is the most important reason for using a life cycle model.~~ Note that it may be useful to develop one or more specific process views from the viewpoint of stage transition decision making, following the information given in ISO/IEC/IEEE 24774:2021 Clause 6 ~~15288:2015, Annex E and ISO/IEC/IEEE 12207:2017, Annex E.~~

A secondary aspect of using a life cycle model is that it can help an organization think of its work and its processes within a larger framework, which can ~~may~~ have useful business overtones. See, for example, the discussion of a services life cycle model in 6.3.4.1.

Several factors make system life cycle planning, provisioning and operation difficult to manage. Economics and market forces, as well as novelty, complexity and operational stability affect the length of a system's life cycle. Some systems have life cycles that are decades long (e.g. ~~for example,~~ aircraft, satellites, ships) and some are very short (e.g. ~~for example,~~ instruments and consumer electronics).