DRAFT International Standard

ISO/IEC DIS 26581

Software and systems engineering — Methods and tools for temporal management in feature-based product line engineering

ICS: 35.080

ISO/IEC JTC **1**/SC **7**

Secretariat: **BIS**

Voting begins on:
2026-08-05

Voting terminates on:
2026-10-28

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENTS AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

This document has not been edited by the ISO Central Secretariat.

Reference number
ISO/IEC DIS 26581:2026(en)

© ISO/IEC 2026



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2026

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 at the 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

Contents

Page

Foreword ..... **v**
Introduction ..... **vi**
1 Scope **1**
2 Normative references **2**
3 Terms and definitions **2**
4 Overview of temporal management in feature-based product line engineering **2**
5 Reference model for temporal management in feature-based product line engineering **3**
5.1 General 3
5.2 Key concepts for temporal management in feature-based PLE 4
5.2.1 General 4
5.2.2 Three dimensional concerns of temporal management 4
5.2.3 Temporal management baselines 5
5.2.4 Temporal management branches 7
5.2.5 Temporal Unique ID for member products 9
5.2.6 Composition of multiple temporal management environments 10
6 Technical organization operations for temporal management in feature-based product line engineering **11**
6.1 General 11
6.2 Add/remove shared asset superset or bill-of-features as a configuration item on a temporal management branch 11
6.2.1 Purpose 11
6.2.2 Role 11
6.2.3 Outcomes 12
6.2.4 Inputs 12
6.2.5 Tasks 12
6.2.6 Tool capabilities 13
6.3 Update the temporal management baseline reference for a configuration item on the head of a temporal management branch 13
6.3.1 Purpose 13
6.3.2 Roles 13
6.3.3 Outcomes 13
6.3.4 Inputs 13
6.3.5 Tasks 13
6.3.6 Tool capabilities 14
6.4 Create a temporal management branch from a temporal management baseline 14
6.4.1 Purpose 14
6.4.2 Role 14
6.4.3 Outcomes 14
6.4.4 Inputs 14
6.4.5 Tasks 15
6.4.6 Tool capabilities 15
6.5 Create a temporal management baseline on a temporal management branch 15
6.5.1 Purpose 15
6.5.2 Role 15
6.5.3 Outcomes 16
6.5.4 Inputs 16
6.5.5 Tasks 16
6.5.6 Tool capabilities 17
6.6 Get constituent baseline references from a temporal management baseline 17
6.6.1 Purpose 17
6.6.2 Roles 17
6.6.3 Outcomes 17
6.6.4 Inputs 17

© ISO/IEC 2026 – All rights reserved

6.6.5 Tasks 18
6.6.6 Tool capabilities 18
6.7 Merge a baseline in a nested temporal management branch back to the head of its parent branch 18
6.7.1 Purpose 18
6.7.2 Role 18
6.7.3 Outcomes 18
6.7.4 Inputs 19
6.7.5 Tasks 19
6.7.6 Tool capabilities 19
6.8 Create a temporal unique ID (TUID) for configured product asset instances 20
6.8.1 Purpose 20
6.8.2 Role 20
6.8.3 Outcomes 20
6.8.4 Inputs 20
6.8.5 Tasks 20
6.8.6 Tool capabilities 21
Annex A (informative) **Harmonization with Configuration Management Standards** **22**
Bibliography **25**

© ISO/IEC 2026 – All rights reserved

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents) or the IEC list of patent declarations received (see http://patents.iec.ch).

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.

This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 7, *Software and systems engineering*.

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.

© ISO/IEC 2026 – All rights reserved

Introduction

Feature-based Software and Systems Product Line Engineering (feature-based PLE) according to ISO/IEC 26580:2021 is based on a PLE factory construct. The PLE factory provides the tools and methods for creating a product family of similar products using the elements defined in ISO/IEC 26580, (1) formal feature catalogue to describe the distinguishing characteristics among the members of the product line, (2) a formal bill-of-features specification for each member product in the product line, rendered in terms of the specific features from the feature catalogue that are chosen for that member product, (3) a collection of shared asset supersets for the software and systems engineering lifecycle digital artefacts that comprise a part of a delivered member product, represented with variation points so as to include all content needed by any of the member products, and (4) an automated PLE factory configurator that produces (5) product asset instances for a specific member product by processing the bill-of-features for that member product and exercising the shared assets' variation points. ISO/IEC 26580 focused primarily on these PLE factory key elements operating at a fixed point in time.

In practice, the feature catalogue, bill-of-features portfolio, and shared asset supersets evolve over time. For the PLE factory to deliver complete, controlled, consistent, reproduceable, and traceable product asset instances, the versions of all the key elements are perfectly aligned at a point in time. For example, the versions of the feature catalogue and bill-of-features portfolio are aligned with the version of the requirements, which are aligned with the version of the test cases, which are aligned with the versions of the software, mechanical design, electrical design, documentation, architecture, models, and whatever other shared asset supersets are under management by the PLE factory.

This document specifies requirements on the technology, tools, and operations for essential and pragmatic version management in a PLE factory, to help ensure the controlled evolution of the PLE factory elements over time and to support consistency, traceability, and reproducibility of any member product that was previously configured and released by the PLE factory. This includes the PLE factory operating on any of the following:

— the head, or forefront of evolving versions, for the elements in active development;

— a baseline release, or immutable named snapshot of all the elements, from a previous point in time that needs to be revised for maintenance;

— head and baselines on any parallel development, release, or maintenance branch.

Version management of the individual elements in a PLE factory is handled by the associated version management tools and methods, which are elaborated elsewhere and are not repeated in this document. Additionally, feature-based PLE requires an integrated version management solution that composes the different version management solutions from individual PLE factory elements into a single holistic solution, including all the different shared asset types (requirements, models, source code, mechanical design, electrical design, documentation, test cases, calibration data, and so forth), the feature catalogue, and the bills-of-features.

A particular challenge with version management in an automated PLE factory is that some or all of the different shared asset supersets are likely to have version management systems that weren't designed to work together. This International Standard specifies requirements for the technology, tools, and operations that create an overarching Temporal Management (TM) solution that is an alignment-of-systems, aggregating and aligning the constituent version management systems from the PLE factory feature catalogue, bills-of-features, and shared asset supersets. The PLE factory uses baselines from the temporal management solution for its temporal (time-based) alignment and automation.

This document provides a reference model for temporal management, comprising:

— Three-dimensional model for the separation of concerns between (1) variation in time provided by temporal management, (2) variation in product space provided by the PLE factory, and (3) composition of the shared asset supersets and their traceability links;

— Branches, baselines, and versions for the composite collection of configuration items from shared asset supersets, feature catalogue, and bill-of-features in a PLE factory;

© ISO/IEC 2026 – All rights reserved

— Temporal unique ID (TUID) for configured product asset instances for a member product.

A benefit of the feature-based PLE approach as described in ISO/IEC 26580 is a reduction in effort and complexity due to the shift in engineering focus to the singular collection of shared asset supersets versus the general approach to software and systems product line engineering (SSPL) as described in ISO/IEC 26550, where the focus is on the entire collection of application assets for the multitude of individual member products and the reusable domain assets. Temporal management for feature-based PLE as described in this document provides an associated reduction in effort and complexity compared to version management for general SSPL described in ISO/IEC 26563, due to the shift in version management focus to the singular collection of shared asset supersets rather than version management of the entire combinatoric collection of asset versions for the multitude of individual member products.

© ISO/IEC 2026 – All rights reserved

Software and systems engineering — Methods and tools for temporal management in feature-based product line engineering

1 Scope

This document provides a temporal management reference model for feature-based software and systems product line engineering (feature-based PLE) as defined in ISO/IEC 26580:2021, expanding on the basic configuration management operations, tasks, and methods specified there. Because a PLE factory in ISO/IEC 26580 aggregates shared assets across multiple lifecycle stages and tools, such as requirements, models, source code, mechanical design, electrical design, documentation, test cases, calibration data, and so forth, the version management capabilities of the different lifecycle disciplines, as well as the feature catalogue and bill-of-features portfolio, need to be integrated into a holistic solution. We refer to this integrated PLE factory solution as Temporal Management (TM).

As the name implies, the scope of temporal management is product line variation in time, in the context of feature-based PLE as prescribed in ISO/IEC 26580. The reference model for temporal management specifies an alignment-of-systems, where the temporal management system is an aggregation of the constituent version management systems for each of the individual elements in a PLE factory, including shared assets across all lifecycle stages, the feature catalogue, and the bills-of-features.

Version management for each of the individual elements in the PLE factory is handled by the version management tools and methods associated with each of the elements, which are elaborated elsewhere and not repeated in this document.[2][3][4][5][6][7][8][10][11] Appendix A provides harmonization with this document and these representative version management methods, in the context of broader systems and software configuration management standards.

Organizations may incorporate an overall temporal management approach for their temporal management solution that best matches their engineering processes, such as ASME Y14.35[5] and ASME Y14.100[6] for organizations primarily focused on mechanical engineering processes or IEEE Std 828[4] for organizations primarily focused on systems and software engineering processes.

The intended audience for this document comprises:

— technology providers who wish to provide temporal management for their feature-based PLE factory;

— champions within an organization who wish to introduce feature-based PLE into their organization;

— IT staff within a PLE organization who introduce and maintain the necessary technology to support temporal management in feature-based PLE;

— practitioner stakeholders who use the temporal management tools and methods to practice feature-based PLE;

— technical and business managers who sponsor and direct the methods necessary to practice temporal management in feature-based PLE;

— university professors, researchers, corporate trainers, and other educators who create and share pedagogical materials and benefits regarding temporal management in feature-based PLE.

© ISO/IEC 2026 – All rights reserved

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 26580:2021, *Software and systems engineering — Methods and tools for the feature-based approach to software and systems product line engineering*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC/IEEE 12207, ISO/IEC/IEEE 15288, IEEE Std 828, ISO/IEC/IEEE 24765, and the following apply, except where noted. This document applies to the approach and terms described in the normative reference ISO/IEC 26580.

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

— IEC Electropedia: available at https://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp/ui

3.1
temporal management
aggregation and alignment of the constituent version, baseline, and branch management for the PLE factory feature catalogue, bills-of-features, and each of the shared asset supersets

3.2
temporal management configuration item
constituent element in a PLE factory: feature catalogue, each bill-of-features in the bill-of-features portfolio, and each shared asset superset

3.3
temporal management branch
version sequence for each of the temporal management configuration items, providing an independent parallel stream of evolution

3.4
temporal management baseline
persistent and immutable baseline-of-baselines comprising version baseline snapshots at a particular point in time for each of the temporal management configuration items

3.5
temporal management branch head
mutable baseline-of-baselines at the forefront of a temporal management branch, comprising baseline versions for each of the temporal management configuration items

Note 1 to entry: Adaptation of the term “head” in ISO/IEC/IEEE 24765; “the forefront of a branch, which contains the evolving versions of the source tree”

3.6
temporal unique ID (TUID)
unique identifier attribute applied to PLE factory product asset instances that is comprised of (a) the identifier for the temporal management baseline and (b) the identifier for the bill-of-features used by the PLE factory configurator to produce the product asset instances

4 Overview of temporal management in feature-based product line engineering

Based on version management principles applied to any system, the role of temporal management in a feature-based PLE factory is to help ensure an orderly, consistent, traced, reproduceable, and managed evolution of the digital artefacts for the entire production line – shared asset supersets, feature catalogue,

© ISO/IEC 2026 – All rights reserved