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Systems and software engineering — Life cycle processes — Project management

Ingénierie du logiciel — Processus de cycle de vie — Gestion de projet

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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. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of ISO/IEC JTC 1 is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

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ISO/IEC/IEEE 16326 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 7, *Software and systems engineering*, in cooperation with the Software and Systems Engineering Standards Committee of the IEEE, under the Partner Standards Development Organization cooperation agreement between ISO and IEEE.

This first edition of ISO/IEC/IEEE 16326 cancels and replaces ISO/IEC TR 16326, which has been technically revised and merged with content from IEEE Std 1058-1998.

Introduction

This International Standard provides normative content specifications for project management plans covering software projects, and software-intensive system projects.

This International Standard also provides detailed discussion and advice on applying a set of project processes that are common to both the software and system life cycle as covered by ISO/IEC 12207:2008 (IEEE Std 12207-2008), *Systems and software engineering – Software life cycle processes* [15], and ISO/IEC 15288:2008 (IEEE Std 15288-2008), *Systems and software engineering – System life cycle processes* [16], respectively. The discussion and advice are intended to aid in the preparation of the normative content of project management plans.

This International Standard is the result of the harmonization of ISO/IEC TR 16326:1999 and IEEE Std 1058-1998.

Systems and software engineering — Life cycle processes — Project management

1 Scope

1.1 Purpose

This International Standard is intended to aid project managers in managing to successful conclusion those projects concerned with software-intensive systems and software products.

This International Standard specifies the required content of the project management plan (PMP). This International Standard also quotes the extracted purpose and outcome statements from the project processes of ISO/IEC 12207:2008 (IEEE Std 12207-2008) and ISO/IEC 15288:2008 (IEEE Std 15288-2008), and adds detailed guidance for managing projects that use these processes for software products and software-intensive systems.

1.2 Field of application

This International Standard is written for those who use or plan to use ISO/IEC 15288:2008 (IEEE Std 15288-2008) and ISO/IEC 12207:2008 (IEEE Std 12207-2008) on projects dealing with software-intensive systems and software products, regardless of project scope, product, methodology, size or complexity. The field of application of this International Standard spans the whole software or system life cycle, and addresses everybody who plays a role in project management – project managers and others, specifically:

- those responsible for establishing and continuously improving ISO/IEC 12207:2008 (IEEE Std 12207-2008) software life cycle processes and ISO/IEC 15288:2008 (IEEE Std 15288-2008) system life cycle processes;
- those responsible for executing any ISO/IEC 12207:2008 (IEEE Std 12207-2008) software life cycle process or ISO/IEC 15288:2008 (IEEE Std 15288-2008) system life cycle process at a project level;
- organizations or individuals subcontracting a project management effort.

In many organizations, the various responsibilities of project management are assigned to more than one person. Where the term "project manager" is used in this International Standard, the guidance, advice or normative requirement applies to the applicable role within the organization.

This International Standard is intended to provide guidance for two-party situations and may be equally applied where the two parties are from the same organization. This International Standard can also be used by a single party as self-imposed tasks.

This International Standard can also serve as guidance in multi-party situations, where high risks are inherent in the supply and integration of complex software-based systems, and procurement can involve several vendors, organizations or contracting parties.

1.3 Limitations

The normative content specifications for project management plans and the guidance for management of the project processes are limited to projects dealing with software-intensive systems and software products.

2 Conformance

This International Standard provides normative definition of the content of the project management plan (PMP), and provides guidance for the execution of the project processes of ISO/IEC 15288:2008 (IEEE Std 15288-2008) and ISO/IEC 12207:2008 (IEEE Std 12207-2008). Users of this International Standard can claim conformance to the normative documentation content, to the process provisions, or both.

2.1 Conformance to normative documentation content

A claim of conformance to the documentation provisions of this International Standard means that the user demonstrates that the content of a PMP conforms to the content requirements specified in clause 5 of this International Standard.

2.2 Conformance to processes

A claim of conformance to the process provisions of this International Standard is equivalent to claiming conformance to the project processes from ISO/IEC 15288:2008 (IEEE Std 15288-2008) and ISO/IEC 12207:2008 (IEEE Std 12207-2008) cited in clause 6 of this International Standard.

2.3 Full conformance

A claim of full conformance to this International Standard is equivalent to claiming conformance to the PMP content requirements cited in clause 5 and the project processes of ISO/IEC 15288:2008 (IEEE Std 15288-2008) and ISO/IEC 12207:2008 (IEEE Std 12207-2008) cited in clause 6 of this International Standard.

3 Symbols and abbreviations

The following symbols and abbreviations are used in this International Standard:

ANSI	American National Standards Institute
CCB	Configuration/Change Control Board
CDRL	Contract Data Requirements List
GATES	Stage-Gate methodology
IBM	International Business Machines
ICWG	Interface Control Working Group
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
ISO	International Organization for Standardization
OGC	Office of Government Commerce (UK)
PERT	Program Evaluation Review Technique
PM	Project Management (or Project Manager)
PMBOK®	Project Management Body of Knowledge

PMI	Project Management Institute
PMP	Project Management Plan
PPL	Product Parts List
PRINCE2	Projects In Controlled Environments (version 2)
RUP	Rational Unified Process® (registered trademark of IBM)
SDP	Software Development Plan
SE	Software Engineering
SEE	Software Engineering Environment
SEMP	Systems Engineering Management Plan
SWEBOK	Software Engineering Body of Knowledge
UK	United Kingdom
USA	United States of America
WBS	Work Breakdown Structure

4 Application of this International Standard

This International Standard specifies the required content of a Project Management Plan (PMP) such that the overall content of the plan, when executed successfully, fulfils the purposes and desired outcomes which are specified by the project processes of ISO/IEC 15288:2008 (IEEE Std 15288-2008) and ISO/IEC 12207:2008 (IEEE Std 12207-2008).

The project processes of ISO/IEC 15288:2008 (IEEE Std 15288-2008) and of ISO/IEC 12207:2008 (IEEE Std 12207-2008) contain the generic activities and tasks, which may be employed by any party that has to manage a project dealing with software-intensive systems or software products. This International Standard provides additional detailed guidance in clause 5 to assist managers of these projects as they produce the PMP for a specific project.

ANSI/PMI 99-001-2004, *A Guide to the Project Management Body of Knowledge* [1] provides important information about managing projects, and ISO 10006:2003, Quality management systems - Guidelines for quality management in projects [2] provides guidance on the application of quality management in projects. Managers of projects dealing with software products or software-intensive systems may find the contents of the *PMBOK®*[1] *Guide* [1] and ISO 10006:2003 [2] helpful, along with the guidance in this International Standard, in managing their projects to a successful conclusion.

Project managers should also apply the guidance in this International Standard in an iterative manner to consider any systemic impact when undertaking an action, e.g., an action, or failure to act, in one area can affect other areas.

[1] *PMBOK®* is a registered trademark of the Project Management Institute, Incorporated. This information is given for the convenience of users of this standard and does not constitute an endorsement by ISO/IEC or the IEEE of these products. Equivalent products may be used if they can be shown to lead to the same results.

5 Elements of the project management plan

This clause specifies each of the elements of a PMP, as shown in Figure 1.

Title page
Signature page
Change history
Preface
Table of contents
List of figures
List of tables
1. Project overview
    Project summary
        Purpose, scope and objectives
        Assumptions and constraints
        Project deliverables
        Schedule and budget summary
    Evolution of the plan
2. References
3. Definitions
4. Project context
    Process model
    Process improvement plan
    Infrastructure plan
    Methods, tools and techniques
    Product acceptance plan
    Project organization
        External interfaces
        Internal interfaces
        Authorities and responsibilities
5. Project planning
    Project initiation
        Estimation plan
        Staffing plan
        Resource acquisition plan
        Project staff training plan
    Project work plans
        Work activities
        Schedule allocation
        Resource allocation
        Budget allocation
        Procurement plan
6. Project assessment and control
    Requirements management plan
    Scope change control plan
    Schedule control plan
    Budget control plan
    Quality assurance plan
    Subcontractor management plan
    Project closeout plan
7. Product delivery
8. Supporting process plans
    Project supervision and work environment
    Decision management
    Risk management
    Configuration management
    Information management
        Documentation
        Communication and publicity
    Quality assurance
    Measurement
    Reviews and audits
    Verification and validation
9. Additional plans
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Figure 1 – Format of a project management plan

The PMP shall contain all the items in Figure 1, ordered as shown in Figure 1. The order of the items is intended for ease of reading, for standardization of presentation, and use, and not as a guide to the order of preparation of the various elements of the PMP. The various clauses and subclauses of the PMP may be included by direct incorporation or by reference to other plans and documents.

Detailed descriptions of each clause and subclause in a PMP are presented in 6.1 through 6.8 of this standard. Additional plans are often required to satisfy product requirements and contractual terms. Additional plans are specified in 6.9.

Project managers should produce the contents of the plans specified below such that they fulfil the purpose and desired outcomes which are specified by ISO/IEC 12207:2008 (IEEE Std 12207-2008) and ISO/IEC 15288:2008 (IEEE Std 15288-2008), and which are cited in Clause 5 of this International Standard. Since the application and use of software products and services must by necessity be done in the larger context of systems in which they reside, project managers should, when producing these plans, strive when possible to harmonize the desired project outcomes cited for both ISO/IEC 12207:2008 (IEEE Std 12207-2008) and ISO/IEC 15288:2008 (IEEE Std 15288-2008).

The PMP shall be a living document that is continuously updated throughout the life of the project. A change history log shall be used to document PMP changes.

Each version of a PMP based on this standard shall contain front matter which includes:

- a title page, which shall contain the project name, the date of issue, a unique identifier (draft number, baseline version number), and identification of the issuing organization.
- a signature page, which shall contain the signature(s) of the person(s) responsible for reviewing and approving the PMP.
- a change history, which shall include the project name, revision status of the plan, date of release, a list of pages that have been changed in the current revision of the plan, a brief statement describing the nature of changes incorporated into this revision of the plan, and a list of all previous revisions of the plan which includes an identification of each revision and its release date.
- a preface, which shall describe the scope and context of the PMP and identify the intended audience for the PMP.
- a table of contents.
- a list of figures that appear in the PMP.
- a list of tables that appear in the PMP.

5.1 Project overview (Clause 1 of the PMP)

5.1.1 Project summary (Subclause 1.1 of the PMP)

5.1.1.1 Purpose, scope and objectives (Subclause 1.1.1 of the PMP)

This subclause of the PMP shall state the purpose, scope, and objectives of the project and the products to be delivered. The statement of scope shall be consistent with similar statements in the project agreement and other relevant system-level or business-level documents.

This subclause of the PMP shall also provide a brief statement of the business or system needs to be satisfied by the project, with a concise summary of the project objectives, the products to be delivered to satisfy those objectives, and the methods by which satisfaction will be determined. The project statement of purpose shall