

PRACTICE STANDARD FOR SCHEDULING

Second Edition

Library of Congress Cataloging-in-Publication Data

Practice standard for scheduling / Project Management Institute. -- 2nd ed.
p. cm.

Includes bibliographical references and index.

ISBN 978-1-935589-24-2 (pbk. : alk. paper) 1. Project management--Standards. I. Project Management Institute.

HD69.P75P653 2011

658.4'04—dc23

2011020603

Published by:

Project Management Institute, Inc.

14 Campus Boulevard

Newtown Square, Pennsylvania 19073-3299 USA.

Phone: +610-356-4600

Fax: +610-356-4647

E-mail: customercare@pmi.org

Internet: www.PMI.org

©2011 Project Management Institute, Inc. All rights reserved.

"PMI", the PMI logo, "PMP", the PMP logo, "PMBOK", "PgMP", "Project Management Journal", "PM Network", and the PMI Today logo are registered marks of Project Management Institute, Inc. The Quarter Globe Design is a trademark of the Project Management Institute, Inc. For a comprehensive list of PMI marks, contact the PMI Legal Department.

PMI Publications welcomes corrections and comments on its books. Please feel free to send comments on typographical, formatting, or other errors. Simply make a copy of the relevant page of the book, mark the error, and send it to: Book Editor, PMI Publications, 14 Campus Boulevard, Newtown Square, PA 19073-3299 USA.

To inquire about discounts for resale or educational purposes, please contact the PMI Book Service Center.

PMI Book Service Center

P.O. Box 932683, Atlanta, GA 31193-2683 USA

Phone: 1-866-276-4764 (within the U.S. or Canada) or +1-770-280-4129 (globally)

Fax: +1-770-280-4113

E-mail: book.orders@pmi.org

Printed in the United States of America. No part of this work may be reproduced or transmitted in any form or by any means, electronic, manual, photocopying, recording, or by any information storage and retrieval system, without prior written permission of the publisher.

The paper used in this book complies with the Permanent Paper Standard issued by the National Information Standards Organization (Z39.48—1984).

10 9 8 7 6 5 4 3 2 1

NOTICE

The Project Management Institute, Inc. (PMI) standards and guideline publications, of which the document contained herein is one, are developed through a voluntary consensus standards development process. This process brings together volunteers and/or seeks out the views of persons who have an interest in the topic covered by this publication. While PMI administers the process and establishes rules to promote fairness in the development of consensus, it does not write the document and it does not independently test, evaluate, or verify the accuracy or completeness of any information or the soundness of any judgments contained in its standards and guideline publications.

PMI disclaims liability for any personal injury, property or other damages of any nature whatsoever, whether special, indirect, consequential or compensatory, directly or indirectly resulting from the publication, use of application, or reliance on this document. PMI disclaims and makes no guaranty or warranty, expressed or implied, as to the accuracy or completeness of any information published herein, and disclaims and makes no warranty that the information in this document will fulfill any of your particular purposes or needs. PMI does not undertake to guarantee the performance of any individual manufacturer or seller's products or services by virtue of this standard or guide.

In publishing and making this document available, PMI is not undertaking to render professional or other services for or on behalf of any person or entity, nor is PMI undertaking to perform any duty owed by any person or entity to someone else. Anyone using this document should rely on his or her own independent judgment or, as appropriate, seek the advice of a competent professional in determining the exercise of reasonable care in any given circumstances. Information and other standards on the topic covered by this publication may be available from other sources, which the user may wish to consult for additional views or information not covered by this publication.

PMI has no power, nor does it undertake to police or enforce compliance with the contents of this document. PMI does not certify, test, or inspect products, designs, or installations for safety or health purposes. Any certification or other statement of compliance with any health or safety-related information in this document shall not be attributable to PMI and is solely the responsibility of the certifier or maker of the statement.

s is a preview of "PMI PSF-S-2011". Click [here](#) to purchase the full version from the ANSI store.

TABLE OF CONTENTS

PREFACE.....	X
CHAPTER 1 - INTRODUCTION	1
1.1 Project Scheduling	1
1.2 Why Scheduling?	2
1.3 Overview	2
1.4 Purpose	3
1.5 Applicability	5
CHAPTER 2 - THE SCHEDULE MODEL PRINCIPLES AND CONCEPTS	7
2.1 Overview	7
2.2 Scheduling Methods.....	9
2.2.1 Critical Path Method	9
2.2.2 Precedence Diagram Method	12
2.2.3 Critical Chain Method	12
2.3 Scheduling Techniques	15
2.3.1 Rolling Wave Planning	15
2.3.2 Agile Technique.....	16
2.3.3 Program Evaluation and Review Technique	16
2.3.4 Monte Carlo Simulation	16
2.4 The Scheduling Tool	17
2.5 The Schedule Model	18
2.6 The Schedule Model Instances and Presentations	18
CHAPTER 3 - SCHEDULE MODEL GOOD PRACTICES OVERVIEW.....	21
3.1 Schedule Model Management.....	21
3.1.1 Schedule Data Management Plan	22
3.1.2 Schedule Model Management Plan.....	23
.1 Selection of a Scheduling Method	23
.2 Selection of a Scheduling Tool.....	23
.3 Schedule Model Creation Plan.....	23
.4 Schedule Model ID	23
.5 Schedule Model Version.....	23
.6 Calendars and Work Periods.....	23
.7 Project Update Cycle	24

is a preview of "PMI PSF-S-2011". Click [here](#) to purchase the full version from the ANSI store.

.8 Milestone and Activity Coding Structure	24
.9 Resource Planning	25
.10 Performance Indicators	25
.11 Master Schedule Model	25
3.2 Schedule Model Creation	26
3.2.1 Develop Schedule Model Baseline	27
.1 Define Milestones.....	27
.2 Design the Project's Activities.....	27
.3 Sequence Activities.....	28
.4 Determine Resources for Each Activity.....	30
.5 Determine the Duration for Each Activity.....	30
.6 Analyze the Schedule Output.....	31
.7 Approve the Schedule	32
.8 Baseline the Schedule Model.....	32
3.3 Schedule Model Maintenance.....	33
3.3.1 Collect Actuals and Remaining Work.....	33
3.3.2 Update and Progress the Schedule Model According to the Actuals	33
3.3.3 Compare and Resolve Any Deviation	34
3.3.4 Update the Schedule Model with Approved Changes	34
3.3.5 Update the Baseline Schedule Model	34
3.3.6 Communicate.....	34
3.3.7 Maintain the Records	34
3.4 Schedule Model Analysis	35
3.4.1 Critical Path and Critical Activities	35
.1 Critical Path	35
.2 Critical Activities	35
3.4.2 Total Float and Free Float	35
3.4.3 Level of Effort Activities (LOE).....	36
3.4.4 Probabilistic Distribution of Activity Durations.....	36
3.4.5 Schedule Risk	37
3.4.6 Date Constraints	37
3.4.7 Open-Ended Activities	37
3.4.8 Out of Sequence (OOS) Logic	37
3.4.9 Leads and Lags.....	38

3.4.10 Start-to-Finish Relationship	38
3.4.11 Links to/from Summary Activities	38
3.5 Communication and Reporting	39
CHAPTER - 4 SCHEDULING COMPONENTS.....	41
4.1 How to Use the Components List	41
4.1.1 Component Name	42
4.1.2 Required, Conditional or Optional Use	42
4.1.3 Manual or Calculated	42
4.1.4 Data Format	42
4.1.5 Behavior	42
4.1.6 Good Practices.....	43
4.1.7 Conditional Note/Associated Component.....	43
4.1.8 Definition.....	43
4.2 List of Components by Category	43
4.3 Detailed Components List	45
CHAPTER 5 - CONFORMANCE INDEX.....	77
5.1 Conformance Overview	77
5.1.1 Categories of Components	77
5.1.2 Utilization of Schedule Components	78
5.1.3 Conformance Assessment.....	79
5.2 Conformance Assessment Process	79
REFERENCES	83
APPENDIX A - GUIDELINES FOR A PROJECT MANAGEMENT INSTITUTE PRACTICE STANDARD	85
A.1 Introduction	85
APPENDIX B - EVOLUTION OF PMI'S PRACTICE STANDARD FOR SCHEDULING.....	87
B.1 Pre-Project.....	87
B.2 Preliminary Work.....	88
B.2.1 Qualifications.....	88
B.2.2 Geographic.....	88
B.2.3 Market.....	88
B.2.4 Applications	88
B.3 Exposure and Consensus	90

s is a preview of "PMI PSF-S-2011". Click [here](#) to purchase the full version from the ANSI store.

APPENDIX C - CONTRIBUTORS AND REVIEWERS OF THE PRACTICE STANDARD FOR SCHEDULING—SECOND EDITION	91
C.1 Core Committee	91
C.2 Significant Contributors	91
C.3 Exposure Draft Reviewers and Contributors	92
C.4 Other Contributors	93
C.5 PMI Standards Program Member Advisory Group (MAG)	93
C.6 Production Staff	93
APPENDIX D - CONFORMANCE ASSESSMENT SCORING TABLE	95
APPENDIX E - CONFORMANCE ASSESSMENT WORKSHEETS	101
GLOSSARY	107
Common Acronyms and Terms	107
Terms and Definitions	110

LIST OF TABLES AND FIGURES

Figure 1-1.	Scheduling	4
Figure 2-1.	Schedule Creation.....	8
Figure 2-2(a).	Flow Diagram for the Schedule Model.....	10
Figure 2-2(b).	Process Component Mapping Table.....	11
Figure 2-3.	Example of CPM/PDM Diagram.....	13
Figure 2-4.	Example of Critical Chain	14
Figure 2-5.	Example of Rolling Wave Planning	15
Figure 2-6.	Example Duration Probability Distribution for a Single Activity	17
Figure 2-7.	Schedule Model Instance Presentations	19
Figure 3-1.	Illustrations of Relationship Types in CPM Methodology.....	29
Table 3-1.	Levels of Schedule Model Instance Presentations.....	39
Table 4-1.	List of Components by Category	44
Table 5-1.	Number of Components by Category	80
Table D-1.	Sample Conformance Assessment Scoring Table.....	95
Figure E-1	Base Worksheet.....	102
Figure E-2	Resource Required Example Worksheet.....	103
Figure E-3	Resource, EVM and Risk Required Example Worksheet	104
Figure E-4	Resource and Risk Required Example Worksheet	105
Figure E-5	Non Scored Example Worksheet	106

PREFACE

The *Practice Standard for Scheduling*—Second Edition has been developed as a complement to *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)*—Fourth Edition in the Knowledge Area of Project Time Management. This second edition of the practice standard builds upon the foundation established by the first edition describing the methods related to scheduling that are generally recognized as good practice for *most projects most of the time*. Good practice means that there is general agreement that the correct application of these skills, tools, and techniques can enhance the chances of success over a wide range of different projects. Good practice does not mean that the knowledge described should always be applied uniformly on all projects; *the project management team is responsible for determining what is appropriate for any given project*.

The project management community has strongly voiced the need for a standard to promote the development of sound schedules. In addition, the community asked for the capability to assess the adequacy of their schedules.

This practice standard is designed to provide project management practitioners, who are familiar with the *PMBOK® Guide*—Fourth Edition, with a summary of the benefits and advantages of a well-developed and maintained schedule model. This practice standard describes the hallmarks of a sound and effective project scheduling methodology, as well as providing quantifiable means for assessing the application of the provisions of this standard to a schedule model.

One of the most significant developments in the creation of the first edition of the *Practice Standard for Scheduling* centered upon the clarification of the term *schedule*. It became apparent through the discussion process and the community feedback that there was significant support for the clarification of this terminology. The *Practice Standard for Scheduling*—Second Edition clarified this distinction between the project schedule and schedule model.

Schedule development flows from the selection of an appropriate *scheduling method* followed by selection and use of a *scheduling tool*. Next, project-specific data is entered into the *scheduling tool* to produce the *schedule model*. From there, instances of the *schedule model* are saved for use as what-if platforms, targets, and for formal approval as a baseline. From these instances, various *presentations* are produced for a wide range of uses. With these discrete terms, project management practitioners have the ability to trace the processes from the *PMBOK® Guide*—Fourth Edition to the finished product and answer, in a specific and unambiguous way, the question of what is being requested when you are asked for a schedule.

The *Practice Standard for Scheduling*—Second Edition focused on adding more clarity to the issues and concepts of the previous edition:

- Chapter 2 was reorganized to align more closely with the *PMBOK® Guide*—Fourth Edition with specific emphasis on schedule model management and providing additional clarity on the various schedule methods and techniques.

- Chapter 3 was reorganized to emphasize good practices in the areas of model management, model creation, maintenance, analysis, and communication and reporting.
- Chapter 4 remains focused on the various components of a schedule model. The update introduces the concept of four *required* component groups in addition to two *optional* components groups. This refinement was developed to address areas of concern raised from the 2007 edition, broadening the scope of coverage to earned value, risk, and the application of resources.
- Chapter 5 was rewritten to continue to allow for the assessment of a schedule model within the more complex guidelines of multiple required and optional components. It also addressed a concern expressed from the previous edition concerning the assessment process.

This practice standard is consistent with the *PMBOK® Guide*—Fourth Edition. It also includes information from accepted project management practices from many industries. The Project Management Institute standards program will continue to periodically update this standard as part of the overall planned evolution of PMI standards documents. Comments from project management practitioners are both requested and welcome.

s is a preview of "PMI PSF-S-2011". Click [here](#) to purchase the full version from the ANSI store.

CHAPTER 1

INTRODUCTION

This chapter is designed to provide an overview of the content of this practice standard. This chapter is divided into the following sections:

1.1 Project Scheduling

1.2 Why Scheduling

1.3 Overview

1.4 Purpose

1.5 Applicability

Each section provides additional information on the content and terminology used in this practice standard.

1.1 Project Scheduling

Project scheduling is the application of skills, techniques, and intuition acquired through knowledge and experience to develop effective schedule models. The schedule model integrates and logically organizes various project components, such as activities, resources, and logical relationships, to enhance the likelihood of successful project completion within the baseline duration.

The terms schedule model, schedule model instance, and presentations are defined in the glossary of the standard. These terms are described below:

Schedule model is a dynamic representation of the plan for executing the project activities developed by the project stakeholders, applying a selected scheduling method to a scheduling tool using project-specific data. The schedule model can be processed by a scheduling tool to produce various schedule model instances.

Schedule model instance is a copy of the schedule model, that has been processed by a schedule tool and has reacted to inputs and adjustments made to the project specific data within the scheduling tool (completed update cycle), that is saved for record and reference, such as data date version, target schedule models, and the baseline schedule model. The instances produce various schedule presentations such as critical paths, resource profiles, activity assignments, record of accomplishments, etc., and can provide time-based forecasts throughout the project's life cycle. When used together, the instances support analysis, such as variance analysis.

Presentation is an output from schedule model instances, used to communicate project-specific data for reporting, analysis, and decision making.