

# **GUIDE TO SOFTWARE ENGINEERING STANDARDS AND SPECIFICATIONS**

## **PART I**

Software Development and Maintenance  
Standards

# **GUIDE TO SOFTWARE ENGINEERING STANDARDS AND SPECIFICATIONS**

## **PART I**

### **Software Development and Maintenance Standards**

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## PREFACE

There are over 1.5 million people worldwide engaged in the software engineering profession, and the number is growing each day. These engineers are involved with product lines that range from children's games to high safety-critical software systems in the medical, nuclear, military, and transportation sectors. A key element in producing high-quality software at a reasonable cost is a set of best practices of the profession. To meet this need, various industrial and professional standards-making bodies have produced standards, guides, or other specifications to define the "best of practice" for producing software. Typically, these standards are targeted at the expressed needs of an organization's constituents.

The software engineering process standards field is an unregulated and uncoordinated field with many organizations producing sector related standards. There are less than 1000 people worldwide who are actively involved in the development of these standards; most are volunteers who are experts in their respective fields within the vast arena of software engineering. They represent 55 organizations that have produced or are producing software engineering standards. Some of these organizations, such as the International Organization for Standardization (ISO), are very large, operate at the international level, and exert a powerful influence on the software engineering standards world. Others, like the U.S. National Information Standards Organization (NISO) are small, sector-specific, and have little influence.

These organizations have produced over 300 documents in this field, each with a different perspective or addressing a specific niche relative to the software process arena. The amount of overlapping and duplicated information in these standards is significant. Software engineering process is like any other engineering process-driven field—the basic elements are the same. These elements are: *requirements definition, design, fabrication, installation, operation and maintenance, and retirement*. Since the special cases for producing and maintaining software are varied, these are some of the factors that have caused duplication of standards data.

It is becoming more and more difficult for software engineering professionals to be aware of and to access all the knowledge published on the best of practice in the software field. A directory was clearly needed. Hence, the first edition of a book was published in 1994 and contained abstracts of 220 software engineering standards and related specifications. A second edition was published in 1997 that contain 315 standards.

Our customers have frequently requested the ability to access this book on-line. Now, due to new Web technology, it is available on-line. To further reduce cost and simplify the downloading process, the book has been subdivided into three parts. Part I addresses all standards that apply to software development and maintenance, such as requirement definition, integration, etc. Part II contains those standards that address the software development supporting processes such as configuration management and documentation. Part III addresses software engineering tools and technique standards such as metrics, and reliability.

Part I contains the development and maintenance standards, which are *acquisition, requirement definition, design, code & test, integration, and maintenance*. Included are ninety-nine of these documents. Many of the standards listed encompass more than one software engineering process, and are therefore “multidisciplinary”. The index breaks out those standards that are “stand alone” versus those that may be considered “multidisciplinary”.

The purpose of this volume is to assist the reader by providing a clear, concise, and organized way to access the standards information pertaining to software development and maintenance.

Part I provides:

- A directory of software engineering standards and specifications for software development and maintenance.
- A listing of standards by a particular sub-field (i.e., design, integration, maintenance).
- An overview of each standard that will assist the software engineer and organization to select the right document to meet their software development and maintenance needs.

# INTRODUCTION

## PURPOSE AND SCOPE

Part I of this book contains abstracts and relevant information on ninety-nine standards, guides, and technical reports related to software engineering development and maintenance. It provides a carefully researched source of data on existing software engineering standards and includes an abstract of the standard document, its field of application, and how to obtain copies. Each of these documents has been reviewed by the authors.

The information has been presented in a manner that allows the reader to determine which software engineering standards are most appropriate for his or her needs.

Part I contains only those standards and specifications that pertain to software engineering development and maintenance, may be obtained from a commercial source, and are written in the English language.

The publisher and authors also welcome comments on improving this volume.

## LAYOUT

Part I contains two sections and an index. The first section contains a list of standards-developing organizations. Section two contains a page of information for each of the ninety-nine standards and/or specifications contained in the volume. The index of this book is designed to allow the reader to quickly access a standard that is pertinent to the design or maintenance process.

## CONTENTS

Each abstract page contains one standard, guide, handbook, or technical report. Included on the page is the formal title of the standard, an icon that describes the standard's classification, issuing year of the standard, length of standard in pages, scope and field of application, the issuing organization, and where the standard may be purchased in the United States.

The acronym that appears in the upper left hand of each standards page is the accepted abbreviation of the originating organization. The full name of the organization may be found in the listing of standards-making organizations located in the first section of Part I of the book. The number of the standard or guide displayed is the number assigned by the originating organization. If the number contained the year of release, it was not included. This information is provided in the section of each page that follows the icon.

The originating committee name for the standard is the current name of the committee. Some organizations have changed names since the first edition of this book.

In this volume, the term *standard* implies that the document contains a set of mandatory requirements and a method to determine compliance. The term *guide* implies the document gives a suggested set of requirements and a formal method to determine compliance or gives suggestions for implementing a standard. The terms *handbooks*, and *technical reports*, denote a document containing in-depth information on a software-engineering sub-field. In some instances, through ongoing use and acceptance, some guides, handbooks, and technical reports have become de-facto standards.

## ICON

The standards are categorized in three classifications. The first classification is by the type of process that is the major focus of the standard. The processes identified are: **acquisition, requirements definition, design, code and test, integration, maintenance & operation, configuration management, documentation, project management, quality assurance, and verification & validation**. The second classification is the type of technique or tools to which the standard applies. These include: **CASE tools, languages & notations, metrics, privacy, process improvement, reliability, safety, security, software reuse, vocabulary and “other”**. The third classification refers to sector applicability. These sectors are: **all sectors, defense, financial, medical, nuclear, process control, scientific, shrink-wrap, and transportation**. If the standard is applicable to all sectors, the classification “**all sectors**” is denoted.

The icons (standards) found in this volume will always pertain to **acquisition, requirements definition, design, code and test, integration, or maintenance**.

Following is a sample icon:

PROCESS	TECHNIQUE—TOOLS	APPLICABILITY
Acquisition	CASE Tools	All Sectors
Requirements Definition	Languages & Notations	Defense
Design	Metrics	Financial
Code & Test	Privacy	Medical
Integration	Process Improvement	Nuclear
Maintenance & Operations	Reliability	Process Control
Configuration Management	Safety	Scientific
Documentation	Security	Shrink-wrap
Project Management	Software Reuse	Transportation
Quality Assurance	Vocabulary	
Verification & Validation	Other	

**OBTAINING THESE STANDARDS:**

The standards listed in this book may be purchased from the cited organizations or from Techstreet, 1327 Jones Drive, Ann Arbor, MI. 48105 USA. Telephone: (800) 699-9277. For orders outside the USA and Canada, call (734) 302-7801. Fax: (734) 302-7811. Internet: <http://www.techstreet.com>.

# SECTION I

## STANDARDS DEVELOPING ORGANIZATIONS

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**AECL**

Atomic Energy of Canada Limited  
C/O Ontario Hydro H12 D27  
700 University Ave.  
Toronto, Ontario  
Canada M5G 1X6  
Tel: +1-416-592-7235

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**AIAA**

American Institute of Aeronautics and Astronautics  
1801 Alexander Bell Drive  
Reston, VA 20191  
Tel: 1-703-264-7500  
FAX: 1-703-264-7551  
WWW: <http://www.aiaa.org>

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**ANS**

American Nuclear Society  
555 North Kensington Avenue  
La Grange Park, IL 60525  
Tel: 1-708-352-6611  
WWW: <http://www.ans.org>

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**ANSI**

American National Standards Institute  
11 W. 42nd Street, 13th Floor  
New York., NY 10036  
Tel: 1-212-642-4900  
FAX: 1-212-398-0023  
e-mail: [info@ansi.org](mailto:info@ansi.org)  
WWW: <http://www.ansi.org>

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**APWA**

American Public Works Association  
1313 E. 60th Street  
Chicago, IL 60637  
Tel: 1-816-472-6100

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**ARINC**

Aeronautical Radio Research, Inc.  
2551 Riva Road  
Annapolis, MD 21401  
Tel: 1-410-266-4000  
FAX: 1-410-266-4040

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**AS**

Standards Australia  
1 The Crescent,  
Homebush, NSW 2135  
Australia  
Tel: +61-2-9746-4700  
FAX: +61-2-9746-8450  
e-mail: sic@saa.aa.telememo.au

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**ASME**

American Society of Mechanical Engineers  
345 East 47th Street  
New York, NY 10017  
Tel: 1-212-705-7722  
FAX: 1-201-882-1717  
e-mail: infocentral@asme.org  
WWW: <http://www.asme.org>

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**ASTM**

American Society for Testing and Materials  
100 Bar Harbor Drive  
West Conshohocken, PA 19428-2959  
Tel: 1-610-832-9500  
FAX: 1-610-832-9555  
e-mail: service@local.astm.org

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**ATA**

Air Transport Association of America  
1709 New York Ave. NW  
Washington, DC 20006-5206  
Tel: 1-202-626-4000, or 1-301-490-7951  
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PO Box 511  
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