

IEEE Standard for Information Technology—Systems Design—Software Design Descriptions

IEEE Computer Society

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Software & Systems Engineering Standards Committee

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Approved 19 March 2009

IEEE-SA Standards Board

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Abstract: The required information content and organization for software design descriptions (SDDs) are described. An SDD is a representation of a software design to be used for communicating design information to its stakeholders. The requirements for the design languages (notations and other representational schemes) to be used for conformant SDDs are specified. This standard is applicable to automated databases and design description languages but can be used for paper documents and other means of descriptions.
Keywords: design concern, design subject, design view, design viewpoint, diagram, software design, software design description

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Introduction

This introduction is not part of IEEE Std 1016-2009, IEEE Standard for Information Technology—Systems Design—Software Design Descriptions.

This standard specifies requirements on the information content and organization for software design descriptions (SDDs). An SDD is a representation of a software design that is to be used for recording design information, addressing various design concerns, and communicating that information to the design's stakeholders.

SDDs play a pivotal role in the development and maintenance of software systems. During its lifetime, an SDD is used by acquirers, project managers, quality assurance staff, configuration managers, software designers, programmers, testers, and maintainers. Each of these stakeholders has unique needs, both in terms of required design information and optimal organization of that information. Hence, a design description contains the design information needed by those stakeholders.

The standard also specifies requirements on the design languages to be used when producing SDDs conforming to these requirements on content and organization.

The standard specifies that an SDD be organized into a number of design views. Each view addresses a specific set of design concerns of the stakeholders. Each design view is prescribed by a design viewpoint. A viewpoint identifies the design concerns to be focused upon within its view and selects the design languages used to record that design view. The standard establishes a common set of viewpoints for design views, as a starting point for the preparation of an SDD, and a generic capability for defining new design viewpoints thereby expanding the expressiveness of an SDD for its stakeholders.

This standard is intended for use in design situations in which an explicit SDD is to be prepared. These situations include traditional software design and construction activities leading to an implementation as well as "reverse engineering" situations where a design description is to be recovered from an existing implementation.

This standard can be applied to commercial, scientific, military, and other types of software. Applicability is not restricted by size, complexity, or criticality of the software. This standard considers both the software and its system context, including the developmental and operational environment. It can be used where software comprises the system or where software is part of a larger system characterized by hardware, software, and human components and their interfaces.

This standard is applicable whether the SDD is captured using paper documents, automated databases, software development tools, or other media. This standard does not explicitly support, nor is it limited to, use with any particular software design methodology or particular design languages, although it establishes minimum requirements on the selection of those design languages.

This standard can be used with IEEE Std 12207™-2008 [B21];[a] it can also be used in other life cycle contexts.

This standard consists of five clauses, as follows:

Clause 1 defines the scope and purpose of the standard.

Clause 2 provides definitions of terms used within the context of the standard.

[a] The numbers in brackets correspond to those of the Bibliography in Annex A.

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Clause 3 provides a framework for understanding SDDs in the context of their preparation and use.

Clause 4 describes the required content and organization of an SDD.

Clause 5 defines several design viewpoints for use in producing SDDs.

Annex A provides a bibliography.

Annex B defines how a design language to be used in an SDD is to be described in a uniform manner.

Annex C contains a template for organizing an SDD conforming to the requirements of this standard.

This standard follows the *IEEE Standards Style Manual*.[b] In particular, the word *shall* identifies requirements that must be satisfied in order to claim conformance with this standard. The verb *should* identifies recommendations, and the verb *may* is used to denote that particular courses of action are permissible.

This revision of the standard is modeled after IEEE Std 1471™-2000 [B20], extending the concepts of view, viewpoint, stakeholder, and concern from that standard to support high-level and detailed design and construction for software. The demarcation between architecture, high-level and detailed design varies from system to system and is beyond the scope of this standard.

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1. Overview

1.1 Scope

This standard describes software designs and establishes the information content and organization of a software design description (SDD). An SDD is a representation of a software design to be used for recording design information and communicating that design information to key design stakeholders. This standard is intended for use in design situations in which an explicit SDD is to be prepared. These situations include traditional software construction activities, when design leads to code, and "reverse engineering" situations when a design description is recovered from an existing implementation.

This standard can be applied to commercial, scientific, or military software that runs on digital computers. Applicability is not restricted by the size, complexity, or criticality of the software. This standard can be applied to the description of high-level and detailed designs.

This standard does not prescribe specific methodologies for design, configuration management, or quality assurance. This standard does not require the use of any particular design languages, but establishes requirements on the selection of design languages for use in an SDD. This standard can be applied to the preparation of SDDs captured as paper documents, automated databases, software development tools, or other media.

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