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IEEE Recommended Practice for the Evaluation and Selection of CASE Tools

Sponsor

**Software Engineering Standards Subcommittee
of the
Technical Committee on Software Engineering
of the
IEEE Computer Society**

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Abstract: The evaluation and selection of CASE tools supporting software engineering processes, including project management processes, predevelopment processes, development processes, postdevelopment processes, and integral processes, are addressed. The evaluation and selection processes recommended are based upon the perspective of a CASE tool user. Therefore, the evaluation and selection criteria address only program characteristics visible to the user, such as program inputs and outputs, program function, user interfaces, and documented external program interfaces.

Keywords: CASE, criteria, CASE tool evaluation, CASE tool selection, user needs

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Introduction

(This introduction is not part of IEEE Std 1209-1992, IEEE Recommended Practice for the Evaluation and Selection of CASE Tools.)

This standard provides a recommended practice for the evaluation and selection of computer-aided software engineering (CASE) tools. The focus of this standard does not intend to minimize the complexity and challenge of a successful introduction and deployment of CASE tools within an organization. In that respect, it should be emphasized that:

- CASE tools are support mechanisms of techniques and methods and, as such, represent only the automation components of software engineering technology-improvement strategies.
- Evaluation and selection of CASE tools need to be understood in the context of a global technology implementation process that includes activities such as assessment of needs, technology awareness, deployment, and usage.

This recommended practice was developed primarily to provide guidance for the evaluation and selection of specific tools used to support software engineering activities, as opposed to general purpose tools (for example, word processors, spreadsheets) that may be used as incidentals in support of software engineering activities.

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IEEE Recommended Practice for the Evaluation and Selection of CASE Tools

1. Overview

This recommended practice provides guidance to individuals and organizations engaged in the evaluation and selection of computer-aided software engineering (CASE) tools. It provides organized and comprehensive evaluation and selection processes.

This recommended practice is divided into seven clauses. Clause 1 provides the scope of this recommended practice. Clause 2 lists references to other standards. Clause 3 provides definitions of terms that are used in the recommended practice, but are listed here as a quick reference. Clause 4 describes the overall approach of this recommended practice. First, a process model is given showing the evaluation and selection processes as individual processes. Next, several possible relationships between evaluation and selection are discussed. Then tailoring of criteria and the process are discussed and the various participants in the process are identified. Clause 5, defines a process for evaluating CASE tools. The process begins with the development of an evaluation task definition and continues through to the development of an evaluation report. Clause 6 defines a process for selecting CASE tools that is similar to the evaluation process defined in clause 5. Clause 7 discusses the criteria to be used in the evaluation and selection processes. The criteria themselves are defined.

1.1 Scope

This recommended practice addresses the evaluation and selection of CASE tools supporting software engineering processes including project management processes, predevelopment processes, development processes, postdevelopment processes, and integral processes (see IEEE Std 1074-1991¹). It is not intended to address systems engineering, integrated software engineering environments, or general purpose tools such as spreadsheets or word processors.

This recommended practice assumes that evaluation/selection activities are initiated by a person or group with the authority to commit the resources necessary to perform the activities. It assumes that recommendations resulting from these activities are provided to the initiator and/or to some other decision maker external to the process. It does not address activities leading up to the evaluation/selection process initiation, nor activities following a decision recommendation, such as acquisition-related activities, or qualification activities such as use in pilot projects.

This recommended practice assumes that its user understands the job the CASE tool is to perform and the environmental constraints that would affect the use of the CASE tool. It does not address process maturity, technological readiness, or implementation of CASE tools.

The evaluation and selection processes recommended in this recommended practice are based upon the perspective of a CASE tool user. Thus, the evaluation and selection criteria address only program characteristics visible to the user, such as program inputs and outputs, program function, user interfaces, and

¹Information on references can be found in clause 2.

documented external program interfaces. Not addressed are the aspects of the CASE tool's programs or the process by which they were developed.

This recommended practice neither dictates nor advocates particular or specific development standards, design methods, methodologies, techniques, programming languages, or life cycle paradigms.

The existence of this recommended practice should not be construed to prohibit additional efforts in the evaluation and selection processes.

2. References

This recommended practice shall be used in conjunction with the following publications:

IEEE Std 610.12-1990, IEEE Standard Glossary of Software Engineering Terminology (ANSI).²

IEEE Std 1074-1991, IEEE Standard for Developing Software Life Cycle Processes (ANSI).

ISO/IEC 9126 : 1991, Information technology—Software product evaluation—Quality characteristics and guidelines for their use.³

²IEEE publications are available from the Institute of Electrical and Electronics Engineers, Service Center, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331, USA.

³ISO and ISO/IEC publications are available from the ISO Central Secretariat, 1 rue de Varembé, Case Postale 56, CH-1211, Genève 20, Switzerland/Suisse. In the US, they are available from the Sales Department, American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036, USA.

3. Definitions

This clause contains key terms as they are used in this recommended practice. Other software terms are listed in IEEE Std 610.12-1990.

3.1 assumptions: Conditions and/or resource requirements that are mandatory for process completion.

3.2 CASE: An acronym that stands for computer-aided software engineering.

3.3 CASE tool: A software tool that aids in software engineering activities, including but not limited to requirements analysis and tracing, software design, code production, testing, document generation, quality assurance, configuration management, and project management.

3.4 CASE tool evaluation: A process wherein various aspects of a CASE tool are measured against defined criteria and the results are recorded for future use.

3.5 CASE tool selection: A process wherein the data from one or more CASE tool evaluations are weighted and compared against defined criteria to determine whether one or more of the CASE tools can be recommended for selection.

3.6 constraints: Conditions and/or resource requirement limitations affecting the process.

3.7 criteria: Parameters against which the CASE tool is evaluated, and upon which selection decisions are made.

3.8 evaluators: Those who execute the evaluation portion of the process described in this recommended practice. They may also act in other roles (for example, selector).

3.9 objectives: The desired goals and results of the evaluation/ selection process in terms relevant to the organization(s) involved.

3.10 selectors: Those who execute the selection process described in this recommended practice. They may also act in other roles (for example, users).

3.11 software engineering: The application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software; that is, the application of engineering to software (from IEEE Std 610.12-1990).

3.12 suppliers: Those who build and/or sell the CASE tools, or intermediate distributors of the CASE tools.

3.13 users: Those who use the CASE tools. They are not necessarily those who will execute this evaluation and selection process.

3.14 user needs: The user's set of qualitative and quantitative requirements in a particular problem domain.