INTERNATIONAL STANDARD

ISO/IEC 29155-1

Second edition
2017-12

Systems and software engineering — Information technology project performance benchmarking framework —

Part 1: Concepts and definitions

Ingénierie des systèmes et du logiciel — Cadre de conduite de tests de performance de projet de technologies de l'information —

Partie 1: Concepts et définitions

Reference number
ISO/IEC 29155-1:2017(E)

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 7, *Software and systems engineering*.

This second edition cancels and replaces the first edition (ISO/IEC 29155-1:2011), of which it constitutes a minor revision. The changes compared to the previous edition are as follows:

— the introduction was restructured and updated to add descriptions for ISO/IEC 29155-2, -3, and -4, which were published after the publication of the first edition;

— Clause 2 (Normative references) was added following the new requirements of ISO/IEC Directives, Part 2 (Seventh edition);

— definitions were added to include major terms and definitions of other parts of ISO/IEC 29155;

— abbreviations of names of benchmarking activities were added;

— minor editorial improvements were made to increase understandability and readability throughout the document; and

— Clause 5 of the first edition was restructured to Clauses 5 to 9.

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Introduction

Benchmarking consists of comparing "objects of interest" to each other, or against a benchmark, to evaluate characteristic(s). In the context of the ISO/IEC 29155 series, the "object of interest" is the performance of information technology (IT) projects, and the characteristic is a particular aspect of an IT project such as productivity.

Benchmarking is one of the fastest-growing techniques in the area of IT project management. Instances of IT project performance benchmarking are initiated and conducted for various reasons. Among the most common reasons are:

— the need to compare project productivity between similar industries;

— the need to compare productivity between different project types and technologies;

— the need to find the most effective targets for IT development process improvement;

— the need to compare productivity between different suppliers;

— the need to improve project management maturity;

— the need to improve project estimation capability.

Much has been written regarding the trials of establishing IT project performance benchmarking, and statistics bear witness to the high failure rate of measurement and benchmarking programs. The most likely causes for failure have been disappointment in the benchmarking outcomes due to a lack of alignment between the selected measurements and business goals, and the misunderstanding of project level measurements in relation to program and portfolio management levels. When there is no alignment between executed measurements and provided outcomes, unnecessary effort is required from the IT project teams collecting the project data. This results in decreased motivation to continue and institutionalize benchmarking.

As is shown in Figure 1, the ISO/IEC 29155 series contains multiple parts:

— Part 1 provides the overall framework model for IT project performance benchmarking. It consists of activities and components that are necessary to successfully identify, define, select, apply, and improve benchmarking. It also provides definitions for IT project performance benchmarking terms;

— Part 2 describes the required tasks in individual benchmarking activities that are necessary to execute various activities to conduct and/or support successful benchmarking in an organization;

— Part 3 provides general requirements and guidance for reporting processes and contents of typical reports;

— Part 4 provides general requirements and guidance for the activities to collect data of IT project to be entered into and maintained in a benchmarking repository.

It is possible that further parts follow in the future.

This document is intended to provide a framework about issues and considerations for data selection and comparison in IT project performance benchmarking.

The starting point for this document and the ISO/IEC 29155 series was the concept outlined by the draft ISBSG (International Software Benchmarking Standards Group) benchmarking standard. IT project performance benchmarking is a combination of several different advanced technologies and practices in the area of quantitative analysis and management. Thus, the framework introduced in this document can be built on the basis of various standardized key technologies such as:

— project management (e.g. PMBOK Guide and ISO 10006);

— systems and software measurements (e.g. ISO/IEC/IEEE 15939);

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— software life cycle process (e.g. ISO/IEC 12207);

— system life cycle process (e.g. ISO/IEC/IEEE 15288);

— functional size measurement (e.g. ISO/IEC 14143 series and related methods);

— systems and software quality evaluations (e.g. the ISO/IEC 25000 family and ISO/IEC 9126 series).

This document is designed to conform to the concepts of ISO/IEC 12207 (Software life cycle processes), ISO/IEC/IEEE 15288 (Systems life cycle processes), the ISO/IEC 14143 series (Functional size measurement), the ISO/IEC 15504 series and the ISO/IEC 33000 family (Process assessment), ISO/IEC/TR 12182 (Categorization of systems and software products), or ISO/IEC 14764 (Software life cycle processes — Maintenance).

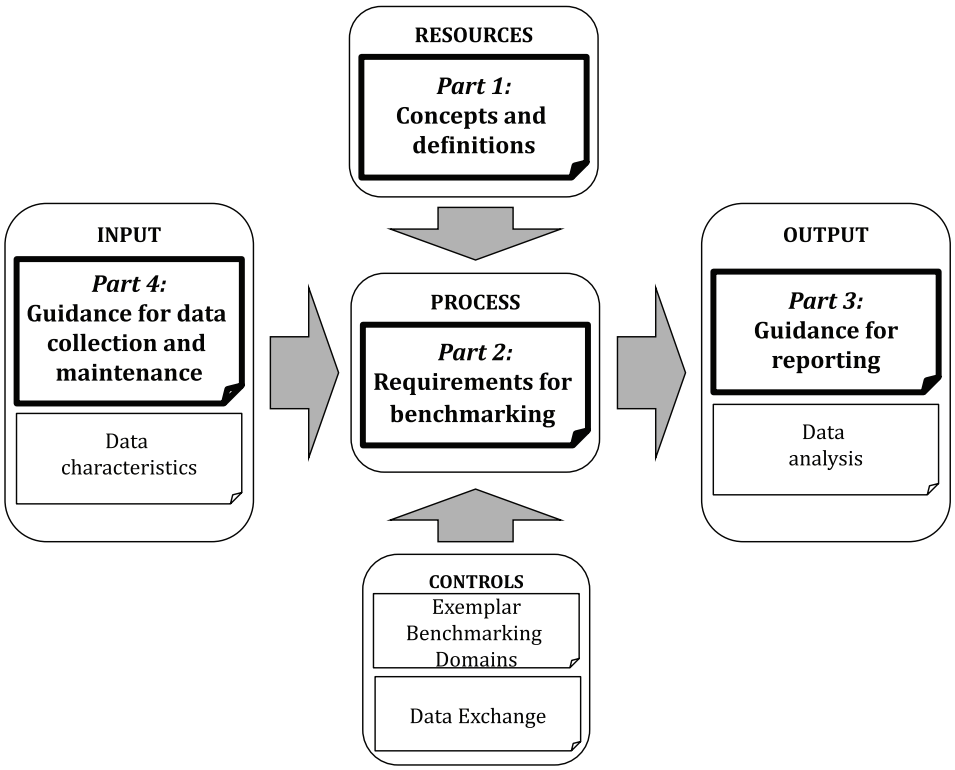


Figure 1 — IT project performance benchmarking framework overview

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Systems and software engineering — Information technology project performance benchmarking framework —

Part 1: Concepts and definitions

1 Scope

This document identifies a framework for information technology (IT) project performance benchmarking (e.g. development or maintenance productivity) and related aspects (e.g. data collection and software classification).

The framework consists of activities and components that are necessary to successfully identify, define, select, apply, and improve benchmarking for IT project performance. It also provides definitions for IT project performance benchmarking terms, which are also applicable to other parts of the ISO/IEC 29155 series.

The target audience of this document are stakeholders of IT project performance benchmarking.

NOTE The following are examples of how this document can be used:

— by a benchmarking service provider who wants to align their benchmarking process to be consistent with this document;

— by a benchmarking user (or third-party agents) for evaluating the performance of an IT project;

— by an organization internally to answer specific information needs.

This document does not cover how to organize benchmarking. It is out of the scope of this document to prescribe the name, format, or explicit content of the documentation to be produced from the benchmarking process.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
attribute
property or characteristic of an entity that can be distinguished quantitatively or qualitatively by human or automated means

[SOURCE: ISO/IEC/IEEE 15939:2017, 3.2]

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3.2
benchmark
reference point against which comparisons can be made

Note 1 to entry: In the context of the ISO/IEC 29155 (all parts), IT project performance(s) is the object of comparison.

3.3
benchmarking
activity of comparing objects of interest to each other or against a *benchmark* (3.2) to evaluate characteristic(s)

Note 1 to entry: In the context of the ISO/IEC 29155 (all parts), the object of interest is IT project performance, and the characteristic is a particular aspect of an IT project such as productivity.

3.4
benchmarking analyst
person or organization that conducts *benchmarking* (3.3) activities

3.5
benchmarking experience base
information store that contains the evaluation of the information products and the *benchmarking* (3.3) activity as well as any lessons learned during *benchmarking* and analysis

Note 1 to entry: ISO/IEC/IEEE 15939:2007 defines "information product" as "one or more indicators and their associated interpretations that address an information need". For example, information product can include templates, graphs, statistical algorithms, and interpretation guidelines.

3.6
benchmarking method
logical sequence of general steps to describe the process of comparing one or more *attributes* (3.1) against a reference *attribute* with respect to a specified scale

3.7
benchmarking report
document showing the results of an *instance of benchmarking* (3.15)

Note 1 to entry: Document usually consists of various formats (e.g. textual descriptions, numeric values, statistical charts and tables), and is exchanged via various media (e.g. electronic documents, electronic dataset, printed documents, and embedded data within specific computer software).

3.8
benchmarking repository
organized and persistent data storage which is designated for *benchmarking* (3.3)

3.9
benchmarking user
person or organization that utilizes the outcome of *benchmarking* (3.3)

3.10
core report
document for providing descriptions of the process and outcomes of the *benchmarking* (3.3) activity

Note 1 to entry: Two kinds of core reports (executive summary and detailed report) are often produced for reporting results of an instance of benchmarking activity.

3.11
data element
smallest unit of data of an IT project

Note 1 to entry: Data element is usually implemented to be a data cell in a benchmarking repository and/or an "IT project data",

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Note 2 to entry: Data element is defined by a responsible person who plans data collection or benchmarking.

3.12
data record
defined group of related data elements, in which all the necessary data elements are included to represent *attributes* (3.1) of interest

Note 1 to entry: One data record usually corresponds to a specific IT project with in IT project performance benchmarking framework.

3.13
data submitter
person or organization that provides *IT project* (3.16) data to be included into a *benchmarking repository* (3.8)

3.14
explanatory report
document attached to a product and which provides complementary information in order to assist understanding and avoid inappropriate usage of the product

Note 1 to entry: Examples of an explanatory report are data element definitions, data demographics, data source information which are attached to benchmarking repositories or benchmarks.

Note 2 to entry: Examples of the product are benchmarking repository, benchmark(s), or software tools to support benchmarking activities.

3.15
instance of benchmarking
set of operations, described specifically, used in the execution of a particular *benchmarking* (3.3) according to a given method

3.16
IT project
information technology project
temporary endeavor undertaken to create or change a unique information technology product, system, or service

Note 1 to entry: The PMBOK Guide defines “project” as “a temporary endeavor undertaken to create a unique product, service or result”. “IT project” is a specified subset of projects.

3.17
IT project dataset
classified group of data records, into which collected data records are selected by pre-defined criteria

Note 1 to entry: Classification criteria for an IT project dataset can be based on the information needs of the owner and/or users of data.

3.18
project performance
derived measure that gives an indication of some *attribute* (3.1) associated with how well, how quickly, how effectively or how efficiently a project is carried out

3.19
repository owner
person or organization that owns and maintains a benchmarking repository

Note 1 to entry: Also called repository administrator.

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3.20
task
smallest unit of work subject to management accountability; a well-defined work assignment for one or more project members

Note 1 to entry: Related tasks are usually grouped to form activities.

[SOURCE: IEEE 829-2008 IEEE Standard for Software and System Test Documentation, 3.1.38]

4 Abbreviated terms

CBa	"conduct benchmarking" activity
IBa	"issue benchmarks" activity
IT	information technology
MBLa	"manage benchmarking business level" activity
MPa	"measure IT project" activity
MPLa	"manage benchmarking program level" activity
MRa	"maintain repository" activity
PIa	"provide instruments" activity
SDa	"submit data" activity
URa	"utilize benchmarking results" activity

5 Overview of the framework

5.1 General

This clause presents an overview of the IT project performance benchmarking framework. The objective is to orient the users of this document so that they can apply benchmarking properly within context.

5.2 Concepts of IT project performance benchmarking

5.2.1 Overall framework

This clause outlines the overall framework of IT project performance benchmarking.

As shown in Figure 2, the framework consists of the following categories of components:

— [C1] "Core benchmarking activities", which collectively illustrate an instance of benchmarking;

— [C2] "Supporting activities", which provides the base and instruments for benchmarking information for use in an instance of benchmarking;

— [C3] "Benchmarking instruments", used by stakeholders to conduct an instance of benchmarking;

— [C4] "Benchmarking information base", which contains data for use during an instance of benchmarking;

— [C5] "External reference base", which provides alternative or additional external data (e.g. repository and/or benchmarks) for an instance of benchmarking;

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