# INTERNATIONAL STANDARD

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# 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*

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# Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 29155-1 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 7, *Software and systems engineering*.

ISO/IEC 29155 consists of the following parts, under the general title *Systems and software engineering — Information technology project performance benchmarking framework*:

— *Part 1: Concepts and definitions*

The following part is under preparation:

— *Part 2: Requirements for benchmarking*

## Introduction

This part of ISO/IEC 29155 identifies a framework which consists of activities and components that are necessary to successfully identify, define, select, apply, and improve benchmarking for information technology (IT) project performance. It also provides definitions for IT project performance benchmarking terms.

This part of ISO/IEC 29155 is intended to provide a framework about issues and considerations for data selection and comparison in information technology (IT) project performance benchmarking.

The starting point for this part of ISO/IEC 29155 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 part of ISO/IEC 29155 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 15939),

— software life cycle processes (e.g. ISO/IEC 12207),

— systems life cycle processes (e.g. ISO/IEC 15288),

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

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

This part of ISO/IEC 29155 is designed to conform to the concepts within ISO/IEC 12207 (software life cycle processes), ISO/IEC 15288 (systems life cycle processes), the ISO/IEC 14143 series (functional size measurement), the ISO/IEC 15504 series (process assessment), ISO/IEC TR 12182 (categorization of software), or ISO/IEC 14764 (maintenance of software life cycle processes).

IT project performance benchmarking instances are initiated and conducted for various reasons. Among the most common reasons are:

a)   need to improve project management maturity,

b)   need to improve project estimation capability,

c)   need to compare productivity between different project types and technologies,

d)   need to compare project productivity between similar industries,

e)   need to find the most effective targets for IT development process improvement.

Much has been written regarding the trials of establishing an IT project benchmarking framework, and statistics bear witness to the high failure rate of measurement programs. The most probable causes for failure have been disappointment in the benchmarking outcome 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.

This part of ISO/IEC 29155 is developed as the first of multiple parts which will complete the IT project performance benchmarking framework as is shown in Figure 1. This part of ISO/IEC 29155 is the concept standard; it contains no mandatory requirements. The requirements for the benchmarking process will be

specified subsequent to the standardization of the concepts and definitions. Then, the guidelines for the quality and quantity of different inputs and benchmarking outputs will be drafted, together with the domain-specific control needs.
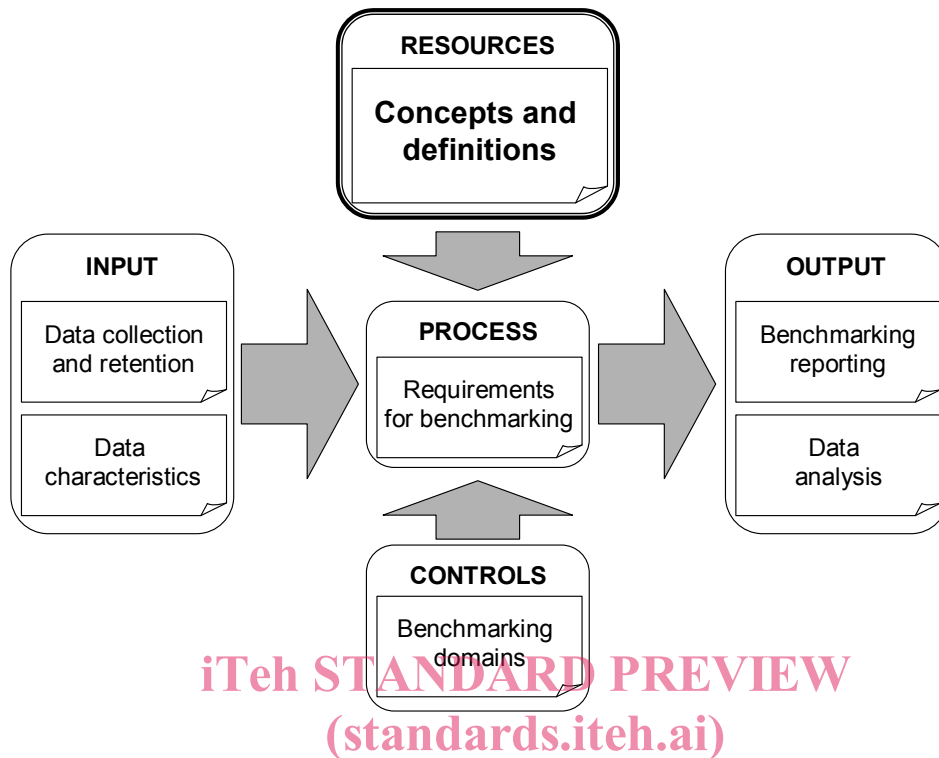


**Figure 1 — IT project performance benchmarking framework overview**

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

## Part 1:
## Concepts and definitions

## 1 Scope

This part of ISO/IEC 29155 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.

The target audience of this part of ISO/IEC 29155 are stakeholders of IT project performance benchmarking.

NOTE    The following are examples of how this part of ISO/IEC 29155 can be used:

— by a Benchmarking service provider who wants to align their benchmarking process to be consistent with this part of ISO/IEC 29155;

— 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 part of ISO/IEC 29155 does not prescribe how to organize benchmarking. It is out of the scope of this part of ISO/IEC 29155 to prescribe the name, format, or explicit content of the documentation to be produced from the benchmarking process.

## 2 Terms and definitions

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

**2.1**
**benchmark**
reference point against which comparisons can be made

NOTE    In the context of the ISO/IEC 29155 series, IT project performance(s) is the object of comparison.

**2.2**
**benchmarking**
activity of comparing objects of interest to each other or against a benchmark to evaluate characteristic(s)

NOTE    In the context of the ISO/IEC 29155 series, the object of interest is IT project performance, and the characteristic is a particular aspect of an IT project such as productivity.

**2.3**
**Benchmarking experience base**
information store that contains the evaluation of the information products and the benchmarking activity as well as any lessons learned during benchmarking and analysis

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

**2.4**
**benchmarking method**
logical sequence of general steps to describe the process of comparing one or more attributes against a reference attribute with respect to a specified scale

**2.5**
**Benchmarking user**
person or organization that utilizes the outcome of benchmarking

**2.6**
**instance of benchmarking**
set of operations, described specifically, used in the execution of a particular benchmarking according to a given method

**2.7**
**IT project**
**information technology project**
temporary endeavor undertaken to create or change a unique information technology product, system, or service

NOTE    The PMBOK Guide, Fourth Edition defines "project" as "a temporary endeavor undertaken to create a unique product, service or result". "IT project" is a specified subset of projects.

**2.8**
**project performance**
derived measure that gives an indication of some attribute associated with how well, how quickly, how effectively or how efficiently a project is carried out

**2.9**
**repository**
organized and persistent data storage that allows data retrieval

NOTE    Benchmarking repository is a repository which is designated for use as the source of comparative measures for the purpose of benchmarking.

**2.10**
**repository administrator**
person or organization that maintains and administrates data in a repository

# 3   Abbreviated terms

IT   Information Technology

# 4   Overview of the framework

## 4.1   General

This clause presents an overview of the IT project performance benchmarking framework. The objective is to orient the users of this part of ISO/IEC 29155 so that they can apply benchmarking properly within context.

## 4.2   Concepts of IT project performance benchmarking

### 4.2.1   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:

—   **Core benchmarking activities** category, which illustrates an instance of benchmarking;

—   **Supporting activities** category, which provides Benchmarking information base and instruments for use in an instance of benchmarking;

—   **Benchmarking information base** category, which contains data for use in an instance of benchmarking;

—   **Benchmarking instruments** category, which assists stakeholders to conduct an instance of benchmarking;

—   **External reference base** category, which provides alternative or additional external data (i.e. repository and/or benchmarks) for an instance of benchmarking;

—   **Benchmarking experience base** category, which contains knowledge and lessons learned during benchmarking.
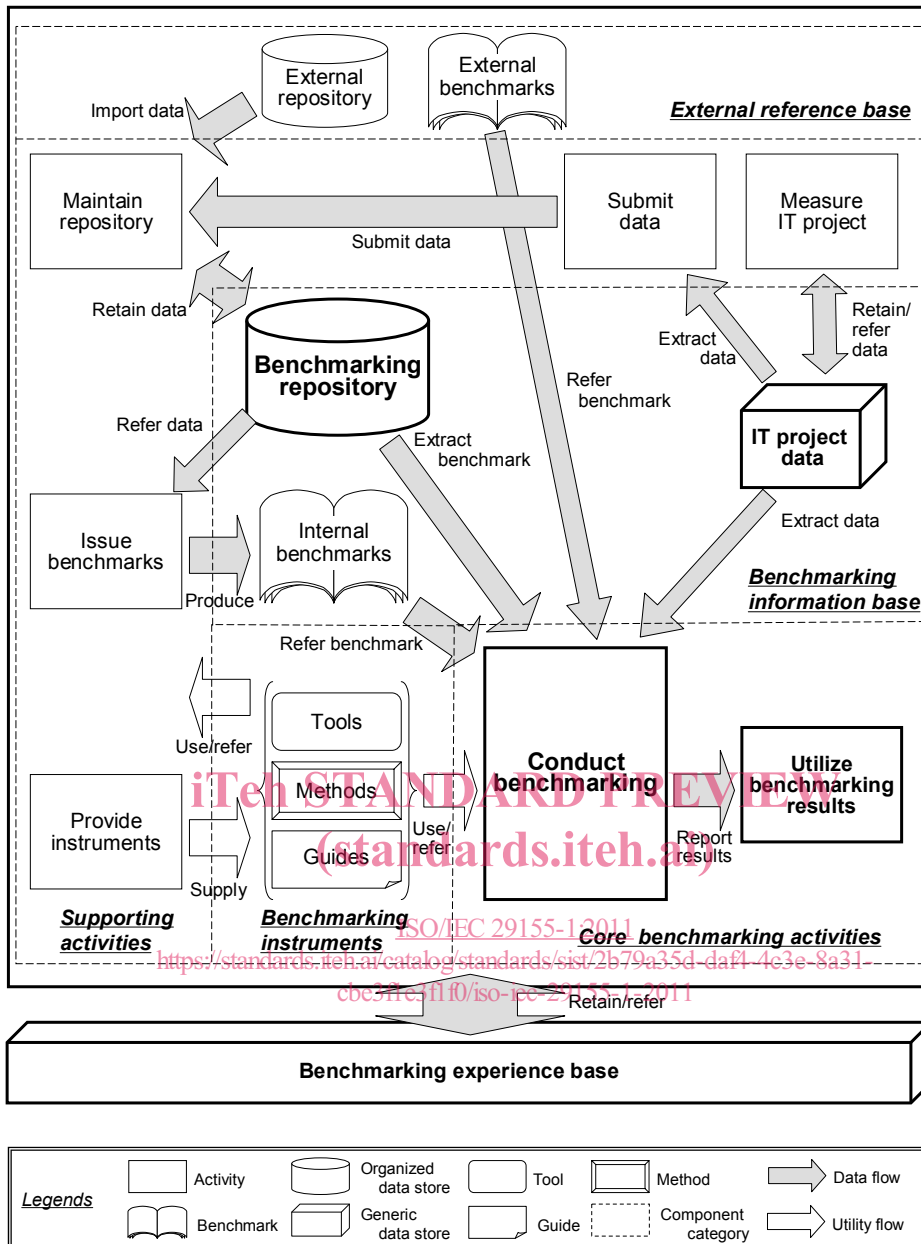
**Figure 2 — IT project performance benchmarking framework**

### 4.2.2 Core benchmarking activities

The Core benchmarking activities mainly address information needs of the Benchmarking users. Each activity has one or more processes to initiate, plan, execute, review and improve the activity. The activities can be grouped as follows:

a) **Conduct benchmarking.** This activity initiates and executes an instance of benchmarking.

b) **Utilize benchmarking results.** This activity indicates use of benchmarking results for various business purposes.

There are two approaches for conducting benchmarking:

— Extract benchmark from Benchmarking repository and compare it to specific IT project data.

— Refer a benchmark (i.e. Internal benchmarks or External benchmarks) and compare it to specific IT project data.

Examples of the usage are estimating, comparing, evaluating and managing performances of a specific IT project.

### 4.2.3 Supporting activities

The supporting activities provide the framework to assist Benchmarking users. Each activity has one or more processes to initiate, plan, execute, review and improve the activity. The activities can be grouped as follows:

a) **Measure IT project.** This activity measures IT project and retains data.

b) **Submit data.** This activity selects and provides IT project data to be included into a Benchmarking repository.

c) **Maintain repository.** This activity accepts, verifies, and then stores IT project data into a Benchmarking repository and manage the repository.

d) **Issue benchmarks.** This activity analyzes IT project data within a Benchmarking repository and provides Internal benchmarks.

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e) **Provide instruments.** This activity develops and provides tools, methods, and guides to support every activity within the benchmarking framework.

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In this framework, the activity of measuring IT project might be planned and conducted as an existing routine task of a project, or be done as an ad hoc task in support of an instance of benchmarking.

The activity of submitting data usually includes tasks to select and to review data before submission.

The management of a Benchmarking repository usually includes a lot of different tasks for different purposes, e.g. to assure data quality, to control data security, to ensure data anonymity (i.e. protect privacy of data submitter), to backup data, and so on.

The activity of issuing Internal benchmarks provides predetermined benchmarks which are authorized and shared by Benchmarking users.

### 4.2.4 Benchmarking information base

Three types of components exist in this category:

a) Benchmarking repository, which retains reliable project data to be referred as a benchmark;

b) IT project data, which retain various IT project data;

c) Internal benchmarks, which provide a group of commonly usable and authorized predetermined benchmarks.

The Benchmarking repository is the organized and persistent data store to retain verified project data. Project data in the Benchmarking repository are extracted in order to derive a benchmark in an instance of benchmarking.

The second component, IT project data, in the Figure 2 is the data store in which various project data are stored. This data store in this framework is a conceptual collection of all available information, and it might be