

Introducing the ISBSG proposed Standard for Benchmarking

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Abstract

The Presentation will present the International Software Benchmarking Standards Groups new initiative – a Standard for Benchmarking. The Standard is based upon the ISO 15939 Standard for Software Measurement. The presentation will outline the perceived reasons for such a standard. These reasons are based in the experience of several of the ISBSG board members experiences in conducting benchmarking exercises. As a result of the many lessons learned in from these experiences the ISBSG board felt that it would be beneficial to develop a standard process fro Benchmarking. This presentation will highlight the approach taken and the generic process which has been developed as a specialised instantiation of the measurement standard ISO 15939. Many organisations who have undertaken a benchmark of their IT departments activities, have felt that the results were less useful than expected. In many cases the results have not met the expectation of the sponsors of the benchmark because they have failed to appreciate all of the issues involved in undertaking a benchmark. The notion of comparing like with like is used in a manner which reveals little appreciation of the complexities of making such comparisons between differing IT organisations or departments. In many cases organisations enter into a benchmark with provider organisations with no clear expression of their information needs, as a result the benchmark providers will deliver a fairly standard product which does not adequately meet the needs of the client. The ISBSG standard sets out to help both the sponsors, their organisations and staff as well as providers of benchmark services understand the issues involved. The standard also provides for a common approach and language by which the benchmark may be conducted. This presentation will effectively launch the standard within Europe. However the authors are aware that the standard is at an early stage and many within both industry and academia will have important views on the matters raised within the standard, so we are seeking the widest possible comment to feed into our first review of the standard. Initial comments have already been received from various sources in industry and academia.

1. Introduction

The ISBSG Benchmarking Standard defines a process applicable to all software related engineering and management disciplines. The process is described through a model that defines the activities of the benchmark process that specify the required information, how the measures and analysis results are to be applied, and how to determine if they are valid. The benchmark process is flexible, tailorable, and adaptable to the needs of different users.

Benchmarking can be regarded as a special application of software measurement, in that a benchmark requires some measurement of some aspect(s) of performance. Therefore the ISO standard 15939 has been utilised in the derivation of the ISBSG standard [1].

The Benchmarking of software and software related activities takes one of several forms:

- External Benchmarking - The process of continuously comparing and measuring an organisation with business leaders anywhere in the world to gain information to help the organisation take action to improve its performance
- Peer group benchmarks may also be used within an organisation to allow comparisons between divisions or sites within that organisation
- Year-on-year or Internal Benchmarking is the process of determining a metric baseline for an organisational or functional unit of the purposes of comparison.

1.1. The Mission of ISBSG

Is to improve the management of I.T. resources, by business and government, through improved project estimation, productivity, risk analysis and benchmarking.

2. Scope

2.1. Purpose

This Benchmarking Standard identifies the required activities and tasks that are necessary to successfully identify, define, select, apply, and improve benchmarking for software development within an overall project or organisational benchmark structure. It also provides definitions for benchmarking terms commonly used within the IT industry.

The secondary objective of this Benchmarking Standard is to provide guidance about the selection and comparison of data, data sets, and benchmark providers. It will also assist them in interpreting benchmark results

This Benchmarking Standard does not provide an exhaustive catalogue of benchmark types, nor a recommended set of benchmarks. It provides a process to define the most suitable set of benchmark requirements that address specific information needs.

2.2. Field of Application

This Benchmarking Standard is intended to be used by software suppliers and acquirers. Software suppliers include personnel performing management, technical, and quality management functions in software development, maintenance, integration, and product support organisations. Software acquirers include personnel performing management, technical, and quality management functions in software procurement and user organisations.

The following are examples of how this Benchmarking Standard can be used:

- By a supplier to address specific project or organisational information requirements.
- By an acquirer (or third-party agents) for evaluating the performance of the supplier's processes and services.
- By an organisation to be used internally to answer specific information needs.

2.3. Limitations of the Standard

This Benchmarking Standard does not assume or prescribe an organisational model for benchmarking. The user of this Standard should decide, for example, whether a separate benchmark function is necessary within the organisation, whether the benchmark function should be integrated within an existing function such as software metrics or software quality. However in many organisations, a benchmark process is invoked regularly, eg. annually or biannually, then it may be more economic to rely upon an external data collection and or benchmark agency.

3. Overview of the Benchmarking Process

3.1. Purpose and Outcomes of the Software Benchmarking Process

The purpose of the software benchmarking process defined in this Standard is to collect, analyse, and report data relating to the products developed and processes implemented within the organisational unit, to support effective management of the processes, and to objectively demonstrate the comparative performance of these processes. As a result of a successful benchmark organisational commitment for benchmarking will be established and sustained:

- the information objectives of technical and management processes will be identified;
- an appropriate set of questions, driven by the information needs will be developed;

- benchmark scope will be identified;
- the required performance data will be identified;
- the performance data will be measured, stored, and presented suitably for the benchmark
- the benchmark results will support decisions and provide a basis for communication;
- benchmark activities will be planned;
- opportunities for process improvements will be identified and communicated
- the benchmark process and measures will be evaluated.

3.2. Integration with existing processes

The performance measures defined and utilised during the benchmark process should be integrated with the organisations existing measurement process, which should comply with the Software Measurement Process definition [1].

The purposes for doing the comparison may be for:

- Comparing other divisions or sites within your organisation
- Comparison with your closest competitors
- Comparable benchmarking against industry performance averages
- Year-on-year comparisons of the organisations performance for process improvements
- Obtaining performance measures from completed projects for input into project estimates

3.3. The activities of the Benchmarking Process

This Benchmarking Standard defines the activities and tasks necessary to implement a benchmarking process. An activity is a set of related tasks that contributes towards achieving the purpose and outcomes of the process. Each activity is comprised of one or more tasks. The Standard does not specify how to perform the tasks included in the activities.

The activities of the benchmarking process are illustrated in the process model in Figure 1. They are sequenced in an iterative cycle allowing for continuous feedback and improvement of the benchmark process. Within activities, the tasks are in practice also iterative.

3.4. The Core Processes

Three activities are considered to be the Core Benchmark Process: Obtain the Metrics; Perform the Benchmark Process and Evaluate & Present Benchmark Results. These activities mainly address the concerns of the benchmark user. The other activities provide a foundation for the Core Benchmark Process, and provide feedback; they also establish and sustain commitment to the process of benchmarking. It is also important to note that the benchmarking process itself should be evaluated; benchmarks should be evaluated in terms of the added value they provide for the organisation, and only deployed where the benefit can be identified. These latter two areas address the concerns of the benchmark process owner.

Figure 1 shows that the Core Benchmark Process is driven by the information needs of the organisation. For each information need, the Core Benchmark Process produces an information product that satisfies the information need. The information product is presented to the organisation as a basis for decision-making.

4. The benchmarking Process Detail

4.1. Initiate the Benchmark Exercise

4.1.1. Assign responsibility and resources

The sponsor of benchmark should assign this responsibility. It should be ensured that competent individuals are assigned this responsibility. Competent individuals may be acquired through transfer, coaching, training, sub-contracting and/or hiring professional benchmarking organisations. Competence includes knowledge of the principles of benchmark, how to collect data, perform data analysis, and communicate the information products. At a minimum, competent individuals should be assigned the responsibility for the following typical roles:

- the benchmark user
- the benchmark analyst
- the benchmark librarian

The number of roles shown above does not imply the specific number of people needed to perform the roles. These roles could be performed by as few as one person for a small project.

4.1.2. Identify the information needs

Information needs are obtained from the various stakeholders. These needs will determine the benchmark goals, constraints, risks and scope. The information needs may be derived from the business, organisational, regulatory, product or project objectives

Before approaching benchmarking organisations it is important that not only should an organisation decide which aspects of performance are of importance, but also to define what is meant by the various terms described. For example, when measuring cost is it simply the cost to develop a system or should cost to maintain the system be included?

4.1.3. The identified Information Needs Shall be prioritised

This prioritisation is normally accomplished by, or in conjunction with, the stakeholders. Only a subset of the initial information needs may be pursued further. This is particularly relevant if benchmark is being tried for the first time within an organisational unit, where it is preferable to start small.

The purpose for which a benchmark is undertaken relates directly to the types of questions set out above, for which answers are sought. However it must be recognised that the list of questions is not exhaustive and the answers to many other questions may be needed, it is nevertheless important to decide exactly what questions need to be addressed before undertaking a benchmark exercise, and hence defining the purpose of the benchmark. Possible reasons for undertaking a benchmark are:

- set competitive range for metrics baseline.
- demonstrate continuing competitiveness and improvement in pricing & service levels
- identify Process Improvement opportunities
- identify best practices
- decision making re-outsourcing
- establish market position

4.1.4. Information needs shall be selected and communicated

From the prioritised information needs, a subset is selected to be addressed during the process. This selection will be a trade-off among resource constraints, and criticality/urgency of information needs.

In large development efforts, information that is needed later may be identified, but not fully defined nor implemented until required by the benchmark users.

No assumptions are made about the type of documentation. It can be on paper or electronic, for example. It is only necessary that the documentation is retrievable.

The selected information needs should be communicated to all stakeholders. This is to ensure that they understand why certain data are to be collected and how they are to be used.

4.2 Determine the questions to be answered

The information needs previously identified shall be used in determining the questions, which need to be answered. For example if the information need is to establish the relative productivity of an organisational unit, the questions which need to be answered would be:

- What is the productivity of the unit?
- How does it compare with other organisational units?

5. Establish Benchmark Parameters

5.1. The type of Benchmark Shall be determined

5.1.1. Internal Benchmarking

Is an internal benchmark sufficient to answer the questions posed? If so is it to be undertaken as an annual comparison? Will sufficient data be available in a single year to meet the business objectives? A sample of one or two measurements is unlikely to be a sound basis for comparison; 2-4 years of data may be required for comparison.

Is the benchmark to compare divisions or sites? Do they develop the same type of software? E-business and traditional legacy development should have different performance.

5.1.2. External Benchmarking

If an external benchmark is to be conducted, then ensure that the scope of the systems being measured is representative of the scope of the comparison data set. Comparing a help desk in the first year of introduction of a radically new system against industry 'standards', where most systems will be mature, is unlikely to reveal worthwhile insights.

The period over which measurements are taken must be comparable to the period of work, forming the bulk of the benchmark data repository. Comparing three months maintenance and support effort against a data base reflecting a whole year's work may be misleading.

5.2. The Scope of the Benchmark Shall be identified

The scope of benchmark is an organisational unit. This may be a single project, a functional area, the whole enterprise, a single site, or a multi-site organisation. This may consist of software projects or supporting processes, or both. All subsequent benchmark tasks should be within the defined scope.

For example an organisational unit may be the Applications Development Function Benchmarking this unit is often referred to as an AD/M benchmark the applications development function usually includes enhancement projects over a certain size, maintenance activity will carry out minor enhancements usually of small duration (e.g., less than ten days).