
Work breakdown structures for project and programme management

Organigramme des tâches en management de projet et de programme

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

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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. (standards.iteh.ai)

This document was prepared by Technical Committee ISO/TC 258, *Project, programme and portfolio management*.

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Introduction

The purpose of this document is to provide guidance on work breakdown structure for those individuals working in project and programme management, and who are involved in developing and using a work breakdown structure. This document incorporates practices to provide benefits for project or programme planning and control, and provides guidance on work breakdown structure concepts, composition and relationships with other structures.

It complements ISO 21500 and ISO 21504.

The target audience of this document includes, but is not limited to, the following:

- a) managers and those individuals involved in sponsoring projects or programmes;
- b) individuals managing projects or programmes and work breakdown structure practises;
- c) individuals involved in the management of or performance of project management offices of project or programme control staff;
- d) developers of national or organizational standards.

The application of this document may be tailored to meet the needs of any organization or individual, so they may better apply the concepts, requirements and practice of developing and using work breakdown structures.

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Work breakdown structures for project and programme management

1 Scope

This document provides guidance for work breakdown structures for organizations undertaking project or programme management. It is applicable to any type of organization including public or private and any size of organization or sector, as well as any type of project and programme in terms of complexity, size or duration.

This document provides relevant terms and definitions, concepts, characteristics, benefits, uses, integration and relationships related to work breakdown structures. It does not provide guidance on the use of processes, methods or tools in the practice of developing and using a work breakdown structure.

[Annexes A](#) and [B](#) provide examples of work breakdown structures and relationships to other breakdown structures.

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:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1

100 % rule

concept concerning the entire work required to be accomplished to achieve the project or programme scope captured in the *work breakdown structure* ([3.13](#))

Note 1 to entry: The 100 % rule applies to the parent and child elements. The child level of decomposition of a work breakdown structure element represents 100 % of the work applicable to the parent level.

3.2

functional breakdown structure

decomposition of the functions necessary to perform the work elements of a project or programme

3.3

hierarchical decomposition

process of dividing project or programme scope into successively smaller *work breakdown structure elements* ([3.15](#))

3.4

management information system

hardware and software used to support the compilation of information, analysis and reporting of project and programme metrics

3.5 **organizational breakdown structure**

decomposition of the management team of an organization, or decomposition of the management team that performs the work of a project or programme

Note 1 to entry: The organizational breakdown structure can include partnering or subcontracting. It is used to illustrate the relationship between project and programme activities and the organizational units that will manage or perform the work activities.

3.6 **parent element**

work that is decomposed into two or more lower level elements of work

Note 1 to entry: The lower elements of work are called child elements.

3.7 **product breakdown structure**

decomposition of the product into its components

3.8 **progressive elaboration**

iterative process to incorporate increased level of details identified during the life cycle of a project or programme

Note 1 to entry: Also known as progressive decomposition.

3.9 **resource breakdown structure**

decomposition of personnel, equipment, material or other assets

3.10 **responsibility assignment matrix**

documented structure that shows the allocation of delegated work responsibilities designated for delivery of scope or benefits

3.11 **risk breakdown structure**

decomposition of threats and opportunities for project or programme

3.12 **rolling wave planning**

form of *progressive elaboration* (3.8) where planning is accomplished in phases or time periods

3.13 **work breakdown structure**

decomposition of the defined scope of the project or programme into progressively lower levels consisting of elements of work

3.14 **work breakdown structure dictionary**

document that describes each element in the *work breakdown structure* (3.13)

3.15 **work breakdown structure element**

work at a designated level that is either a parent or a child

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4 Work breakdown structure concepts

4.1 General

A work breakdown structure is a decomposition of the entire scope of work that should be completed in order to achieve the project or programme objectives. The work breakdown structure is used throughout the project or programme, to establish the framework for the management of the work. The structure should provide a logical framework for decomposing 100 % of the work defined by the project or programme scope.

NOTE Currently, most work breakdown structures are hierarchical, and this document will focus on this type of structure. New software models are presenting options to the hierarchical decomposition structure. See [Annex C](#).

Each descending level of the work breakdown structure should provide a more detailed definition of the work. Work may be product-oriented, deliverable-oriented or result-oriented; and, additionally, may be focused on project or programme phases, disciplines or locations. The entire scope of work of the project or programme should include work to be done by the project or programme management team or team members; subcontractors; and other stakeholders.

4.2 Purpose

The purpose of using a work breakdown structure should be to enhance and support the management of a project or a programme by enabling, but not limited to, the following:

- a) planning of the project or programme;
- b) decomposition of the scope of the project or programme into smaller elements of work to enable the management and control of the project or programme scope, resources and time;
- c) enhancement of project or programme communication by providing a common framework for stakeholders to use when describing and analysing the scope and performance of the project or programme;
- d) communication on the benefits resulting from various project or programme elements;
- e) summarization of project performance data for strategic level reporting;
- f) performance analysis across projects or programmes for particular work breakdown structure elements with common identifiable characteristics, such as codes, to allow identification of areas of concern and opportunities for improvement; and,
- g) alignment of tasks and activities of the schedule to the work breakdown structure elements.

NOTE A work breakdown structure can in some cases be referred to as product breakdown structure, which can have additional restrictions in its use. A product breakdown structure generally describes the resulting output of a project, but can also refer to an existing product and its hierarchical breakdown of elements. The use of the term can vary from one organization to another organization.

4.3 Context

The work breakdown structure is a flexible concept, and its design and overall structure should be adapted to the requirements of the project or programme. The work breakdown structure should be dependent on the industry, type of project or programme, and other factors such as project phases, major deliverables, scope, organization performing the work, and location of resources. The work breakdown structure should be flexible enough to accommodate alternative ways of organizing and representing the work.

4.4 Hierarchical decomposition

The work breakdown structure should provide a hierarchical decomposition of elements to the level necessary to plan and manage the work to meet the project or programme objectives.

The hierarchical decomposition should include 100 % of the work contained in the scope of the project or programme. Where an element is decomposed to child elements, the aggregate of work defined by the lower level elements should represent 100 % of the work contained in the parent element. The parent-child convention describes a relationship with a hierarchy in which a single element may simultaneously be the parent of a number of child elements and the child of a higher-level element.

Within a programme, the projects, other programmes and other related work should be decomposed in a similar manner. The programme becomes the highest level of the work breakdown structure. The same parent-child convention should apply to the logical relationships in the hierarchy. Each project, programme or other related work element under a programme may develop a stand-alone work breakdown structure that may be represented as a separate work breakdown structure or as part of the combined programme work breakdown structure.

Some projects or programmes may not have a fixed scope; therefore, any unknown or undefined scope will not be included in the work breakdown structure. These projects may use agile, progressive elaboration, or rolling wave planning techniques, where the scope is defined as the project progresses. In this case, the work breakdown structure represents 100 % of the scope of work known at the time of development of the work breakdown structure. As changes of scope are identified during the life of the project or programme, the identified scope should be taken into account within the work breakdown structure, while maintaining the logic flow of the levels of the work breakdown structure and the parent-child relationship.

4.5 Parent-child relationships

There are various options to create parent-child relationships, depending on the type of project or programme and the work breakdown structure developed. There are different ways of representing scope, which means that there are various options for developing the structure of the work breakdown structure. The following is a non-exclusive list of parent-child relationships.

- a) Child elements belong to the parent element. The relationship reflects the final segment of the output, product or result of the project or programme that may be physical or conceptual.
- b) Child elements belong to a category defined by the parent. Categories may be based on time, phase, relationship, location, priority or discipline.
- c) Child elements are part of the same state described by the parent. States may be interim versions of the product, such as drafts, preliminary, prototype, mock up or final versions.
- d) Child elements are products or services needed to complete the parent. These products or services may include tools, prerequisite products or services, or documentation on procurement, contracts, engineering, construction, commissioning, and project or programme management.
- e) Child elements are objectives needed to complete the parent. These child elements may refer to the project or programme objectives, change of behaviours or impact of organizational change.

These parent-child relationships may be combined to create a comprehensive decomposition of the scope of the project or programme into the work breakdown structure.

4.6 Progressive elaboration

Progressive elaboration is especially useful when the detailed scope is unknown, undefined or subject to change. Such progressive addition of detail to the work breakdown structure should produce a more accurate work breakdown structure and enhance the use of the structure to manage the project or programme. Progressive elaboration may entail one, concurrent or successive modifications to the work breakdown structure. Rolling wave planning is a form of progressive elaboration that is time-based.

5 Work breakdown structure characteristics, development and relationships to other structures

5.1 Characteristics of a work breakdown structure

The characteristics of a work breakdown structure should be related to the scope of the project or programme for which it is being composed. The following are typical characteristics of a work breakdown structure.

- a) A work breakdown structure may be represented by a variety of formats. The most common formats for a work breakdown structure are graphical, outline and tabular.
- b) Not all elements of the work breakdown structure need to be decomposed to the same level, but should be decomposed to the level needed to manage the project or programme component.
- c) Each work breakdown structure element may be assigned to one person, entity or function to be responsible.
- d) A work breakdown structure should reflect the technical complexity, size and other information, as deemed necessary for the scope.
- e) A work breakdown structure defines the structure of the work and not the processes involved in accomplishing the work.
- f) A work breakdown structure should provide a hierarchical decomposition of elements, applying the 100 % rule, to the level necessary to plan and manage the work to satisfy the project or programme objectives.
- g) The content of the elements into which the scope is decomposed may be related to, but not limited to, considerations such as industry standards, organizational procedures, or contract terms and conditions.
- h) Each element on the work breakdown structure should be assigned a unique identifier to distinguish one element from another.

The 100 % rule should provide that if one can associate a work breakdown structure child element with its parent element, it should be included with the associated parent element in the work breakdown structure. Each parent element may have zero child elements or at least two child elements.

The work breakdown structure should represent collective inputs of the project or programme team and relevant stakeholders. The work breakdown structure should be an agreed upon decomposition of the work to be performed by the project or programme management team. Each change made to the work breakdown structure should also be reviewed with the project or programme management team and the identified performing organization and performers within that organization and relevant stakeholders.

Examples of work breakdown structures can be found in [Annexes A](#) and [B](#).

5.2 Development

5.2.1 General

The work breakdown structure should be developed early in a project or programme. Depending upon the project or programme, a conceptual work breakdown structure may be created during the business case process, which may be re-evaluated or further decomposed once the project or programme is authorized. Once developed, the work breakdown structure:

- a) may provide a basis for gathering cost data across projects and programmes and may correlate with the cost management system,

- b) should serve to maintain the breakdown of the scope,
- c) should allow for project and programme status to be continuously visible and integrated,
- d) should serve to facilitate communication among project or programme team members, as well as with both internal and external stakeholders,
- e) may be used for allocation of resources accordingly to the work breakdown structure elements identified, and
- f) should be maintained and updated, as needed, until the final deliverables have been completed, delivered or transitioned to the customer.

5.2.2 Creation

The work breakdown structure should be based on approved requirements of the expected deliverables of the project or programme or the benefits of the programme.

Certain work breakdown structure elements may be defined to a lower level than others under conditions such as: high-cost, high-risk, high-visibility, or when involving multiple stakeholders.

The creation of a work breakdown structure may be accomplished by using one of three approaches in conjunction with the appropriate organizational procedure governing work breakdown structures:

- a) top-down identification of the end deliverable, followed by successive subdivision of the work breakdown structure elements into detailed and manageable units;
- b) bottom-up identification of elements of scope and merging, categorizing and ordering those elements in a hierarchy;
- c) a combination of top-down and bottom-up approach.

The level of detail provided by the initial work breakdown structure may vary. When using progressive elaboration, a review of the work breakdown structure may be conducted to check that each element represents sufficient detail.

A prior work breakdown structure can be helpful in identifying the scope of work for a new project or programme, where similar work has been done in the past.

5.2.3 Description of the project or programme work breakdown structure elements

Work breakdown structure elements can become the project or programme control points and can be further defined by one or more individual activities or tasks. The development of project or programme control points in an appropriate level of detail should enable the following:

- a) definition of activities in the schedule;
- b) elimination of overlaps by providing that a deliverable is represented in only one work breakdown structure element;
- c) identification of the person responsible and their direct manager;
- d) identification of the person to facilitate or initiate communication about the work breakdown structure element;
- e) allocation of work to the project or programme team by dividing work breakdown structure elements to provide for accountability and control.