
International Standard



6592

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Information processing — Guidelines for the documentation of computer-based application systems

Traitement de l'information — Principes généraux relatifs à la documentation des systèmes d'application informatisés

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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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 6592 was prepared by Technical Committee ISO/TC 97, *Information processing systems*.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

Information processing — Guidelines for the documentation of computer-based application systems

1 Scope and field of application

This International Standard establishes guidelines for the documentation of computer-based application systems. It also contains checklists with the aim of supporting effective activities throughout the system life cycle.

The guidelines given in this International Standard have been developed with the aim of

- a) obtaining the necessary commitment of the parties involved with the development of the computer-based application system;
- b) contributing to the production of a well-planned, standardized system documentation;
- c) enabling the successive production of system documentation in parallel with system development.

Well-defined rules for documentation during the process of system development will facilitate

- a) the preparation of the documentation itself;
- b) estimation of the time and resources required for the achievement of a project;
- c) exchange of information between the parties concerned, resulting in
 - selection of attainable objectives for a system;
 - a more complete and well-considered functional design;
- d) making decisions and briefing of personnel during work on system development.

The system documentation produced in accordance with these guidelines

- a) enables the management to exercise control over the development process;
- b) enables users of the system to use it efficiently and correctly;
- c) enables computer operators to schedule and run the system;
- d) aids diagnosis and correction of errors or faults;
- e) provides information about the system as support for system maintenance.

This International Standard does not cover the requirements for documenting the hardware design of a computer-based application system.

2 Principles of documentation

2.1 General considerations

Despite the diversity of applications of computer-based systems, there are fundamental similarities, for example, the obvious feature that a computer is always subject to input, processing and output phases. There should always be a need to establish and justify the resources such as personnel, materials and finance necessary to develop and implement a computer project, however large or small, and to document adequately all aspects of the proposed system.

It is in this context that the guidelines established in this International Standard have been formulated; the aim being to establish a basic framework of documentation that would act as a solid base for any project and enable effective development and implementation through proper progress and control machinery, permitting the development to proceed in a planned and authorized manner.

The application of these recommendations will vary according to the type of system being introduced: as an example, methods of operating might assume greater importance in a process control environment than in, for example, a commercial batch processing system.

A particular document or piece of information may have no relevance to one system and yet be important to another. The checklists given in this International Standard should be used to ensure that, if information is omitted from the documentation, the omission is the result of a positive decision and not an oversight.

The gradual change in the level of detail in the development process may necessitate revision of documentation from earlier stages.

2.2 Types of information

Two basic types of information are identified in this International Standard, i.e. administrative and technical.

Administrative information is project control and management information which records what has been authorized and what has been done. This information should be retained but it may not be necessary to update it once implementation is complete.

Technical information includes an up-to-date description of all aspects of the system, including hardware, software, and data. It is essential that it is constantly updated during the system life cycle.

Both types of information may be included in some documents, but these guidelines recommend that they be kept in separate sections so that the technical information may be more easily maintained.

2.3 Relationship between project stages and documentation

The guidelines given in this International Standard are structured to relate project development stages to the documentation which they generate. Generally, each stage is initiated and concluded by a document. Although the main stages take place in sequence, some stages and the preparation of some documents overlap each other, for example preparation of system support manuals should be started during the system design and development stage. The number of stages and the number of documents may vary for different applications; these guidelines list the elements of documentation which would usually appear in the documents generated by each stage of the development process.

3 Feasibility study

3.1 Objectives

The objectives of the feasibility study are

- a) to identify exactly what is needed following a preliminary study;
- b) to work out possible solutions and identify a preferred solution;
- c) to document the requirements and constraints for the new system.

3.2 Feasibility study request

This document authorizes the use of resources to investigate a specific requirement, design aim or problem and to suggest a possible solution. It is produced by or for the user before work commences on the project.

Preparation of this document may entail the assistance of a specialist in determining, for example, the time and cost targets for the feasibility study.

Authorization of this feasibility study request leads to a feasibility study and the writing of a feasibility study report.

3.3 Feasibility study report

3.3.1 Objective

The feasibility study report should enable the user to decide whether or not to continue to the next stage of system design.

3.3.2 System problem and information analysis:

- a) system problems:
 - 1) definition, including background and present situation;
 - 2) constraints, technical and financial;
- b) system objectives:
 - 1) definition and description;
 - 2) delimitation;
 - 3) summary;
- c) system information:
 - 1) definition and description;
 - 2) relations;
 - 3) specifications;
- d) system processing:
 - 1) description;
 - 2) input, stored data, and output;
 - 3) relations between data;
 - 4) periodicity;
 - 5) volume of data.

3.3.3 Project organization and requirements:

- a) staff requirements;
- b) training and education;
- c) timetable of main activities;
- d) manpower;
- e) hardware;
- f) software;
- g) accommodation.

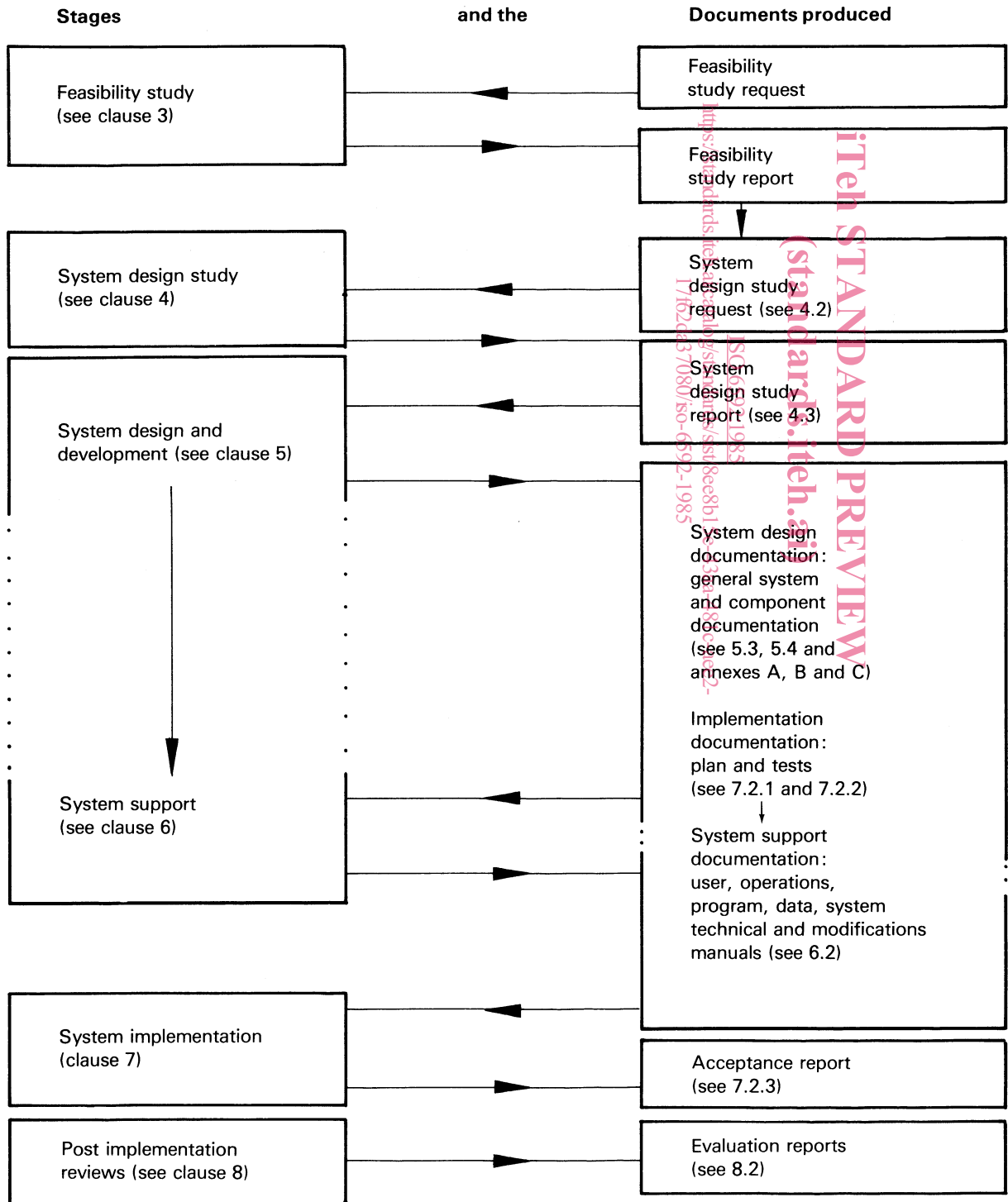
3.3.4 Costs and benefits:

- a) financial costs;
- b) benefits.

3.3.5 Proposed system:

- a) functional description;
- b) controls to ensure accuracy;
- c) security;
- d) interfaces;
- e) data flow;

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* Alternative starting points in cases where a separate feasibility study is not required.

Figure – Summary of the relationship between project development

- f) allowance for growth: volume of data, new functions;
- g) scheduling/timing;
- h) non-computer functions;
- j) manpower;
- k) hardware;
- m) software;
- n) accomodation.

3.3.6 Implementation, quality and acceptance considerations:

- a) system testing;
- b) file creation/conversion;
- c) integration with existing systems;
- d) user education and training;
- e) emulation;
- f) proposed changeover methods;
- g) modifications to service;
- h) quality assurance requirements;
- j) product liability requirements;
- k) system acceptance criteria.

3.3.7 Support facilities:

- a) recovery from failure;
- b) maintenance;
- c) availability of spares.

3.3.8 Glossary: explanation of new or unusual terms.

3.3.9 Conclusions and recommendations:

- a) system requirements:
 - 1) needs of the user;
 - 2) how they will be met.
- b) alternatives:
 - 1) describe alternatives considered;
 - 2) state reasons for rejection.

4 System design study

4.1 Objective

The objective of this stage is to define, in detail, the chosen design.

4.2 System design study request

This document states the action that the initiator requires to be taken after considering the feasibility study report. In its simplest form, it will merely accept the recommendations in this report and authorize the system design study.

4.3 System design study report

4.3.1 Objectives

The system design study report should be sufficiently detailed in order that

- a) the user has a clear description of what the system will do (input, processing, output information stored, timing, etc.);
- b) the user knows exactly what to do to operate the system;
- c) the organizational changes or adaptations necessary to implement the system and operate it are defined, and can be commenced as separate tasks;
- d) the functional requirements for the system are sufficiently unambiguous for the system design documentation to be worked out in the next phase.

4.3.2 Plans:

- a) organization;
- b) timetable;
- c) major resource requirements;
- d) quality assurance;
- e) standards to be used.

4.3.3 Costs and benefits:

- a) development costs;
- b) installation costs;
- c) training and education costs;
- d) running costs;
- e) benefits, tangible and intangible.

4.3.4 System description:

- a) functional overview of the application of the system;
- b) hardware requirements;
- c) communication requirements, for example terminals, lines, modems, concentrators;
- d) software requirements for languages, data base, operating system, etc.;
- e) data description;

- f) data flow, including the normal and maximum volume of data;
- g) allowance for change in data volume;
- h) controls to ensure the accuracy of the data;
- j) security, system integrity, data protection, physical security, availability;
- k) environmental and power requirements (including any stand-by arrangements);
- m) interfaces with other systems, either existing or proposed;
- n) scheduling requirements;
- p) allowance for additional functions;
- q) non-computer procedures.

4.3.5 Implementation, quality and acceptance plans:

- a) user education/training;
- b) file creation/conversion;
- c) system testing and performance assessments;
- d) emulation;
- e) modifications to service;
- f) integration with existing systems;
- g) changeover methods;
- h) quality assurance requirements;
- j) extent of product liability;
- k) system acceptance criteria.

4.3.6 Support facilities:

- a) recovery from failures;
- b) responsibility and liability for maintenance;
- c) availability of spares and back-up.

4.3.7 Summary of application system:

- a) problem definition and solution;
- b) recommendation;
- c) system operation;
 - 1) manpower;
 - 2) hardware;
 - 3) software;
 - 4) accommodation;

- 5) financial estimates;
- 6) security;
- 7) scheduling/timing;
- d) glossary of new or unusual terms used.

4.3.8 Summary for management:

- a) manpower;
- b) hardware;
- c) quality assurance requirements;
- d) accommodation requirements;
- e) cost estimates;
 - 1) next stage of project;
 - 2) total project;
- f) benefit estimates;
- g) timetable.

5 System design and development

5.1 Objectives

The objectives are as follows:

- a) specify, in detail, automated and manual processing procedures and establish their boundaries;
- b) produce documentation to enable the writing of programs;
- c) provide the information necessary to carry out work on testing and implementation of the new system;
- d) make a detailed plan of all activities to be performed in the implementation stage;
- e) give consideration to the preparation of system support manuals.

5.2 System design documentation

The purpose of this documentation is to provide a complete design record of the system based on the following principles:

- a) that every part of the system has a function which should be described;
- b) that all the functions of a complete system can be fully described by breaking the system down into its subordinate parts and also by describing these and their interactions and relationships.

The documentation should normally contain at least two levels of detail, namely:

- general system documentation (see 5.3);
- and component documentation (see 5.4).

5.3 General system documentation

In the general documentation, the level of detail of which the system should be described depends on the requirements of the system. This documentation may be required to form the basis for system support manuals.

The general system documentation should detail

- a) project title;
- b) objectives;
- c) description (both textual and diagrammatic);
 - identification of subsystems;
 - interfaces with other systems;
- d) security;
- e) controls (including audit requirements);
- f) operating environment;
- g) recovery from failure;
- h) support facilities necessary to operate the system;
- j) data requirements;
- k) test procedures;
- m) change procedures.

5.4 Component documentation

This documentation should give detailed specifications of programs, files and manual operations. It may be required to form the basis for system support manuals.

5.4.1 Program specification

See annex A.

5.4.2 File and database specification

See annex B.

5.4.3 Manual routines specification

See annex C.

6 System support

6.1 Objective

The objective of this stage is to support the system once it has been accepted by the user. It embraces the following aspects:

- a) normal use of the system;
- b) detection and correction of errors;
- c) possible modifications and enhancements.

It should be understood that this activity may not be carried out by the same staff who developed the system.

6.2 System support documentation

Support documentation should be formed from documents produced during the system design and development stage. Any changes made to the documents produced during that stage should be reflected in the documents for system support.

What is actually provided will depend on the particular system requirements, maintenance policy and documentation standards. However, in order to meet the system support objective it is recommended that the documentation be provided under the following headings:

a) User manual

This should describe in a clear and concise way, the rights and responsibilities of both the user and the supplier of the system.

The following are examples of what these rights and responsibilities may be:

- 1) The rights of the user may include:
 - the right to information about the usage of the system;
 - the right to information about the system results and the correction of errors in data.
- 2) The responsibilities of the user may include:
 - the correct preparation of input data;
 - informing the supplier of any errors detected in the system.
- 3) The rights of the supplier may include:
 - the right to revise the system, as supplied;
 - the right to perform continuous testing to ensure that the system continues to function correctly.
- 4) The responsibilities of the supplier may include:
 - the maintenance of accurate and up-to-date documentation;
 - the distribution of accumulated user experience with the system.

All these rights and responsibilities will be subject to agreement between the supplier and the customer and may be influenced by national and international legislation and/or standards. Information applicable to legislation on aspects of quality assurance and product liability should be included in this manual.

b) Operations manual

This should describe how to operate the system using the computer and associated equipment in all its operational modes.

c) **Program manuals**

These should describe the purpose of each program and provide information such as mathematical formulae and algorithms used, error handling facilities and timing. They should include listings of the program, with comments, useful for modifications and enhancements, test data and results.

d) **Data manual**

This should describe the system data structure down to the level of detail specified by system requirements.

e) **System technical manual**

This should enable technical staff to understand the way the system works, assist them in error detection and correction and in making modifications and enhancements. Where appropriate, it should make reference to hardware descriptions.

f) **System change record**

This should record what, when, how, why and by whom changes were made and authorized to any part of the system.

7 System implementation

7.1 Objective

The objective of this stage is to carry out full acceptance tests of the system under all aspects of its operational environment and demonstrate that all the specified requirements have been met.

7.2 Documentation requirements

The input documentation to this stage should consist of an implementation plan and the acceptance tests for the system. The output documentation from this stage should be an acceptance report.

7.2.1 Implementation plan

Although implementation takes place at the end of project development, planning should begin at an early stage and the plan should be updated as necessary during the development of the system.

The plan should detail, for example:

- a) accommodation and environment;
- b) staff organization;
- c) user education and training;
- d) file set up;
- e) update, assembly and distribution of documents;
- f) verification of maintenance procedures;
- g) timing and method of implementation;
- h) system changeover procedures;
- j) recovery procedures.

7.2.2 Acceptance tests

The documentation should specify how the tests will be conducted within the defined operational environments. It should also provide a check list of the results to be expected and give tolerances where necessary.

7.2.3 Acceptance report

This should be a document embodying the results of the acceptance tests signed by and duplicated to all relevant authorities.

If acceptance is to be qualified in any way, an official statement of deficiencies and suggested remedies, if possible, should be provided.

8 Post implementation reviews

8.1 Objectives

The objectives of this stage are periodically to

- a) investigate the system's fulfilment of objectives;
- b) follow up the distribution of resources and the cost estimates;
- c) specify the intangible positive and negative effects of the system;
- d) analyse and record the experience gained during work on the systems development.

8.2 Evaluation reports

Evaluation reports

- a) assess whether the original system objectives were correct and how far they have been met in practice;
- b) pinpoint matters capable of improvements;
- c) endorse good practices;
- d) identify and assess operational problems encountered, if any;
- e) state whether the claimed benefits have been achieved;
- f) document the experiences which will assist future systems development projects.

9 Management of documents

9.1 Production and handling of documents

An important aspect of all work on documentation is the creation of documents to fulfil the needs of the user of the documents. It is essential that such needs be clearly defined and that the content of a document be presented in a manner which makes it easy for the reader to access and understand.

Each individual document created in conjunction with a stage in the system development shall be allocated a unique identification number or code to facilitate its storage and subsequent retrieval. The identifying number or code shall clearly show the system or project and category of documentation to which the document belongs. The principles governing the identification of systems and subsystems may vary from organization to organization but should be described in the individual company's own instructions.

It is vital for ease of reference and control of amendments or updates that a clear and unambiguous method of page referencing be adopted.

Experience shows that there is positive advantage in introducing a documentation system that ensures that

- a) each page is uniquely identified to the system, section, page within section, issue number and date of origination;
- b) each section is identified as complete;
- c) insertions and deletions are clearly identified.

It is recommended that a loose-leaf format is adopted.

Procedures to be followed for amendments to the system documentation should be agreed and clearly defined. It is essential that all project staff and users be acquainted with the correct procedures.

9.2 Principles of central documentation

The central documentation should contain all the information relating to the activities throughout the system life cycle.

This information is permanently valid as it is updated when each decision, achievement, modification, etc, is approved.

To facilitate this updating, each item of information should normally only appear once.

9.3 Advice on documentation distribution

It is important to distinguish clearly between the total documentation collection, normally stored centrally, and the assembled subsets required by different departments and personnel.

Subsets usually contain documents copied and compiled from different sections of the total documentation collection. A circulation list, based on an individual organization's requirements, should be drawn up for each document, noting the name or departmental code of the recipient of the documentation.

Annex A

Program documentation guidelines

(This annex forms part of the standard.)

A.1 Introduction

This annex gives guidance on the level of documentation required for program documentation.

The level of detail required for component documentation is greater than that necessary for the other items in the body of this International Standard. The requirements have, therefore, been published in the form of an annex.

A.2 Identification

A.2.1 Program name

Provide the title or name which identifies the program and a subtitle which briefly indicates its function.

A.2.2 Variants

Describe the names used for identifying any co-existing variants of the program.

A.2.3 Version

In addition to the program name and variant names, provide identification for the version that requires identifying among the several program versions that evolved after being modified over a period of time. The documentation shall reflect changes in the current version, and be kept up-to-date.

A.2.4 Date

Provide the date of release of the original and the current version of the program.

A.2.5 History

For every modification, specify

- variant name;
- version name;
- reference to the reason for and contents of modification;
- date of release;
- date of first use.

A.3 General items

A.3.1 Responsibilities

Provide addresses of organizations or persons responsible for

- development;
- operation;
- maintenance;
- further development of the program.

A.3.2 Contractual items

Provide sufficient information about contractual items, including costs as applicable, for example

- legal conditions such as copyright, privacy, security, etc.;
- modules supplied and corresponding purchase/rental price;
- installation;
- training;
- maintenance;
- quality assurance.

A.3.3 Scope and field of application

A.3.3.1 Describe briefly the objectives which can be achieved by use of the program.

A.3.3.2 Describe the functions of the program in a way that enables the user to decide whether, and within what limits, the program can be used.

A.3.3.3 Describe the design philosophy and method, outstanding and distinguishing features of the program, planned future revisions, etc.

A.3.4 Program specifications

A.3.4.1 Problem

A.3.4.1.1 Problem description

Present the problem to be solved by means of the program in a generally comprehensible form.