

Specification for

# Open Systems Interconnection: file transfer, access and management —

## Part 1: General introduction

[ISO title: Information processing systems — Open  
Systems Interconnection — File Transfer, Access and  
Management — Part 1: General Introduction]

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# Committees responsible for this British Standard

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# National foreword

This Part of BS 7090 has been prepared under the direction of the Information Systems Technology Standards Policy Committee. It is identical with ISO 8571-1:1988 “*Information processing systems — Open Systems Interconnection — File Transfer, Access and Management — Part 1: General Introduction*”, including Technical Corrigendum 1, Amendment 1 and Amendment 2. The International Standard was prepared and published by the International Organization for Standardization (ISO) with the active participation and approval of the UK. It is a revision of DD 113-1:1987 which is withdrawn.

The other Parts of BS 7090 are as follows:

- *Part 2: Virtual filestore definition;*
- *Part 3: File service definition;*
- *Part 4: File protocol specification;*
- *Part 5: PICS proforma<sup>1)</sup>.*

Up-to-date information on existing and projected British Standards publications for Open Systems Interconnection is included in the “Basic List”, published as part of the BSI Information Technology Services (BITS) initiative. For details contact: Marketing Department, BSI, Linford Wood, Milton Keynes, MK14 6LE.

**Terminology and conventions.** The text of the International Standard has been approved as suitable for publication as a British Standard without deviation. Some terminology and certain conventions are not identical with those used in British Standards; attention is drawn especially to the following.

Wherever the words “International Standard” or “ISO 8571” appear, referring to this standard, they should be read as “British Standard” or “BS 7090” respectively.

## Cross-references

| International Standard | Corresponding British Standard                                                                                                                                             |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ISO 7498:1984          | BS 6568 <i>Reference model of open systems interconnection</i><br>Part 1:1988 <i>Basic reference model (incorporating connectionless-mode transmission)</i><br>(Identical) |
| ISO 8326:1987          | BS 6960:1988 <i>Open Systems Interconnection: basic connection-oriented session service definition</i><br>(Identical)                                                      |
| ISO/TR 8509:1987       | DD 108:1988 <i>Open Systems Interconnection service conventions</i><br>(Identical)<br>BS 7090 <i>Open Systems Interconnection: file transfer, access and management</i>    |
| ISO 8571-2:1988        | Part 2:1989 <i>Virtual filestore definition</i><br>(Identical)                                                                                                             |
| ISO 8571-3:1988        | Part 3:1989 <i>File service definition</i><br>(Identical)                                                                                                                  |
| ISO 8571-4:1988        | Part 4:1989 <i>File protocol specification</i><br>(Identical)                                                                                                              |
| ISO 8649:1988          | BS 7091:1989 <i>Open Systems Interconnection: service definition for the Association Control Service Element</i><br>(Identical)                                            |

<sup>1)</sup> In preparation.

| International Standard | Corresponding British Standard                                                                                                                   |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| ISO 8822:1988          | BS 7093:1989 <i>Open Systems Interconnection: connection-oriented presentation service definition</i><br>(Identical)                             |
| ISO 8824:1987          | BS 6962:1988 <i>Open Systems Interconnection: specification for Abstract Syntax Notation One (ASN.1)</i><br>(Identical)                          |
| ISO 8825:1987          | BS 6963:1988 <i>Open Systems Interconnection. Specification for basic encoding rules for Abstract Syntax Notation One (ASN.1)</i><br>(Identical) |

The Technical Committee has reviewed the provisions of ISO 9804<sup>2)</sup> and ISO 9834-2<sup>2)</sup>, to which reference is made in the text, and has decided that they are acceptable for use in conjunction with this standard.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

**Compliance with a British Standard does not of itself confer immunity from legal obligations.**

### Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, the ISO title page, page ii, pages 1 to 40, an inside back cover and a back cover. This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

<sup>2)</sup> In preparation.



# INTERNATIONAL STANDARD

**ISO**  
**8571-1**

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**AMENDMENT 2**  
1993-08-15

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## **Information processing systems – Open Systems Interconnection – File Transfer, Access and Management –**

### **Part 1 : General introduction**

### **AMENDMENT 2 : Overlapped access**

*Systèmes de traitement de l'information – Interconnexion de systèmes  
ouverts – Transfert, accès et gestion de fichiers –*

*Partie 1 : Introduction générale*

*AMENDEMENT 2 : Chevauchement d'accès*



Reference number  
ISO 8571-1:1988/Amd.2:1993 (E)

## Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. 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.

Amendment 2 to International Standard ISO 8571-1:1988 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

ISO 8571 consists of the following parts, under the general title *Information processing systems — Open Systems Interconnection — File Transfer, Access and Management*:

- *Part 1: General introduction;*
- *Part 2: Virtual Filestore Definition;*
- *Part 3: File Service Definition;*
- *Part 4: File Protocol Specification;*
- *Part 5: Protocol Implementation Conformance Statement Proforma.*

## 0 Introduction

ISO 8571 is one of a set of International Standards produced to facilitate the interconnection of computer systems. Its relation to other International Standards in the set is defined by the Reference Model for Open Systems Interconnection (ISO 7498). The Reference Model subdivides the area of standardization for interconnection into a series of layers of specification, each of manageable size.

The aim of Open Systems Interconnection is to allow, with a minimum of technical agreement outside the interconnection standards, the interconnection of computer systems:

- a) from different manufacturers,
- b) under different managements,
- c) of different levels of complexity,
- d) of different ages.

ISO 8571 defines services for file transfer, access and management. It also specifies a protocol available within the application layer of the Reference Model. The service defined is of the category Application Service Element (ASE). It is concerned with identifiable bodies of information which can be treated as files, stored and managed within open systems, or passed between application processes.

ISO 8571 defines a basic file service. It provides sufficient facilities to support file transfer, file access, and management of files stored on open systems. ISO 8571 does not specify the interfaces to a file transfer, access or management facility within the local system.

ISO 8571 consists of the following five parts:

- *Part 1: General introduction;*
- *Part 2: Virtual Filestore definition;*
- *Part 3: File Service definition;*
- *Part 4: File Protocol specification;*
- *Part 5: Protocol Implementation Conformance Statement Proforma.*

The definitions in this part of ISO 8571 are used in the subsequent parts of ISO 8571 which specify the virtual filestore, services and protocols.

This part of ISO 8571 contains the following annexes which do not form part of the standard:

- Annex A — Examples of the use of FTAM
- Annex B — Summary of objects identified

### 0.1 General

ISO 8571-1 defines in an abstract way the externally visible file transfer, access and management service.

This amendment extends this service definition to incorporate the services offered by overlapped access.

### 0.2 Rationale

The objective in introducing overlapped access is to allow more efficient access to structured files when a single initiator has a need to perform many reading and updating operations; the serial nature of the current FTAM data transfer services introduces a significant control overhead if the FADUs are small. In this context, an FADU is small if its transmission time is comparable with the time to complete a confirmed service on the association (the association's round trip delay).

### 0.3 Summary

The current design envelope that there should be at most one file selection per association and one file open per file selection is maintained. If access to more than one file is to be overlapped, more than one association is necessary. The overlapped access takes place within a constant set of presentation contexts established as at present when the file is opened, or previously.

Two different degrees of overlap have been identified. Firstly, requests for future accesses may be issued whilst a previously requested BDT action is in progress, allowing the creation of a queue of read and write requests. In general, PCI relating to a given BDT action may be overlapped with other BDT actions, subject to restrictions; this is called consecutive access. Secondly, read and write actions can be performed in parallel, so that both directions of data transfer are exploited at any one time. Requests are then taken from the queue whenever either direction of transfer becomes free. This is called concurrent access.

The transfer of a single FADU, specified in a single F-READ request has the same interpretation as in ISO 8571. The resultant effect on the virtual filestore of a set of overlapped requests using consecutive access shall be the same as that of the equivalent set of requests issued in series; the service provided is serializable. If concurrent access is used then the resultant effect of a set of write actions on the virtual filestore, is also serializable. However, due to the non-determinism introduced by the use of concurrent access, it is also possible that in some uses of the service, the data transferred as a result of a read action is not consistent with the current state of the file.

## 1 Scope and field of application

This part of ISO 8571 provides a general introduction to the concepts and mechanisms specified in parts 2 to 5 of ISO 8571.

## 2 References

ISO 7498, *Information Processing Systems — Open Systems Interconnection — Basic Reference Model*.

ISO 8326, *Information Processing Systems — Open Systems Interconnection — Basic Connection Oriented Session Service Definition*.

ISO/TR 8509, *Information Processing Systems — Open Systems Interconnection — Service Conventions*.

ISO 8571, *Information Processing Systems — Open Systems Interconnection — File transfer, access and management — Part 2: Virtual Filestore definition — Part 3: File Service definition — Part 4: File Protocol specification — Part 5: Protocol Implementation Conformance Statement Proforma*.

ISO 8649, *Information Processing Systems — Open Systems Interconnection — Service definition for the Association Control Service Element*.

ISO 8822, *Information Processing Systems — Open Systems Interconnection — Connection-oriented Presentation Service Definition*.

ISO 8824, *Information Processing Systems — Open Systems Interconnection — Specification of Abstract Syntax Notation One (ASN.1)*.

ISO 8825, *Information Processing Systems — Open Systems Interconnection — Specification of Basic encoding rules for Abstract Syntax Notation One (ASN.1)*.

ISO/IEC 9804, *Information technology — Open Systems Interconnection — Service definition for the Commitment, Concurrency and Recovery service element*.

ISO 9834-2, *Information Processing Systems — Procedures for specific OSI registration authorities — Part 2: Registration of Document Types<sup>3)</sup>*.

## 3 Reference model definitions

ISO 8571 is based on the concepts developed in ISO 7498 and makes use of the following terms defined in it:

- a) application-entity;
- b) application process;
- c) application service element;
- d) (N)-connection;
- e) open system;
- f) (N)-protocol;
- g) (N)-protocol-control-information;
- h) (N)-protocol-data-unit;
- i) (N)-service-access-point;

- j) (N)-service-access-point-address;
- k) (N)-service-data-unit;
- l) sublayer;
- m) (N)-user-data;
- n) user element

## 4 Service conventions definitions

ISO 8571 makes use of the following terms defined in ISO/TR 8509 as they apply to the file service:

- a) confirm;
- b) indication;
- c) primitive;
- d) request;
- e) response;
- f) service provider;
- g) service user.

## 5 FTAM definitions

Unless otherwise stated, all terms apply to the view of a system presented for the purpose of open interconnection. This implies that the terms relate to a virtual filestore rather than to any real filestore (see clause 7).

The definitions are grouped into major categories, and ordered alphabetically within each category.

For the purpose of ISO 8571, the following definitions apply:

### 5.1 General

#### 5.1.1 empty file

a file whose file contents consist of only a root node with no associated data unit, and no node name

#### 5.1.2 file access

the inspection, modification, replacement or erasure of part of a file's contents

#### 5.1.3 file contents

the data units, node names and structuring information contained in the file, which may be manipulated during the file open regime; the file attributes do not form part of the file's contents

#### 5.1.4 file management

the creation and deletion of files, and the inspection or manipulation of the file attributes

<sup>3)</sup> At present at the stage of draft; publication anticipated in due course.

**5.1.5****file transfer**

a function which moves a part or the whole of a file's contents between open systems

**5.1.6****hierarchical file model**

a model of the internal structure of a file which takes the form of a tree of nameable file access data units

**5.1.7****real file**

the named collection of information and its attributes which reside in a real system and to which the references to virtual files made in the OSIE are mapped

**5.1.8****real filestore**

an organized collection of files, including their attributes and names, which reside in a real system and to which the virtual file references in the OSIE are mapped

**5.1.9****virtual file; file**

an unambiguously named collection of structured information having a common set of attributes

**5.1.10****virtual filestore**

an abstract model for describing files and filestores, and the possible actions on them. Where no ambiguity exists, the term is shortened in ISO 8571 to "filestore"

**5.2 Architectural****5.2.1****accounting regime**

the period during which a particular set of accounting information applies

**5.2.2****commitment unit**

a set of filestore actions which either succeeds, the effect then being made visible to other processes, or fails completely with no effect visible to other processes

NOTE Nullification of the actions in a commitment unit is possible at any time up to the completion of the commitment unit.

**5.2.3****docket**

that collection of information which can be associated with a file service regime and which must be preserved if error recovery is to be possible

**5.2.4****external file service**

file Transfer, Access and Management as seen by the file service user

**5.2.5****file service user**

that portion of the application entity which conceptually invokes the FTAM service

**5.2.6****initiator**

that file service user which requests FTAM regime establishment

**5.2.7****internal file service**

the service used by the file error recovery protocol machine to transmit both file error recovery protocol control information and normal file protocol control information

**5.2.8****open systems interconnection environment**

the set of definitions of the standardized services, protocols and data structures which enable the interconnection of systems

**5.2.9****phase**

the period of time in which protocol exchanges have a particular purpose, such as establishing or releasing an application context; for each phase a set of valid messages is defined in terms of state transitions or LOTOS events. If overlapped access is allowed then (during the open regime) there may be more than one phase valid at any time i.e. there may be a number of protocol exchanges in progress

NOTE An entity is in one phase at any time.

**5.2.10****presentation data value**

the unit of information, specified at the abstract syntax level, which is transferred by the presentation service

**5.2.11****real system environment**

the implementation aspects which support an application process within a real system

**5.2.12****receiving entity; receiver**

the entity which receives part or all of the file's contents during the file data transfer regime

**5.2.13****regime**

the period during which the entity is in a subset of its possible states for which particular actions are permitted

NOTE Regimes may be nested.

#### **5.2.14 responder**

that file service user which accepts an FTAM regime establishment requested by the initiator

#### **5.2.15 rollback**

the nullification of uncommitted actions

#### **5.2.16 sending entity; sender**

the entity which sends part or all of the file's contents during the file data transfer regime

#### **5.2.17 service element**

a unit of standardization specifying a complete group of functions

#### **5.2.18 service primitive**

the smallest defined interaction between the user and the provider of a communication service

#### **5.2.19 symbiotic service element**

a service element which will support the operation of some second service by adopting its semantics and including parts of its abstract syntax at defined points in the abstract syntax of the first service's protocol control information

### **5.3 Filestore schema**

#### **5.3.1 activity attributes**

the attributes describing the activity of using the file service. The attributes are local to one FTAM regime (and any regime nested within it)

#### **5.3.2 attribute**

a piece of information stating a property of something, taking one of a set of defined values, each value having a defined meaning

#### **5.3.3 file attributes**

the name and other identifiable properties of a file

NOTE The same value of a file attribute is observed at a particular time by any user of the file service, even when more than one user is active at that time.

### **5.4 Filestore access**

#### **5.4.1 access context**

the specification of an algorithm defining a subset of the structuring information and user information in a file's contents, when reading the file for transfer or access

#### **5.4.2 concurrent access**

a restricted overlapped access sequence in which the user data or protocol control information of a read action may be in the process of transmission at the same time as the user data or protocol control information of a write action

#### **5.4.3 consecutive access**

a restricted overlapped access sequence in which the protocol control information of one access action may be in the process of transmission at the same time as the protocol control information or user data of another access action

NOTE consecutive access is a restricted form of concurrent access.

#### **5.4.4 data element**

the smallest piece of data whose identity is necessarily preserved when transferred by the Presentation Service. A data element can convey file contents information, file structuring information or protocol control information

#### **5.4.5 data unit**

the smallest unit of a file's contents which the filestore actions can manipulate. Each data unit is associated with a node of the file access structure. A data unit is a series of data elements

#### **5.4.6 file access data unit**

a unit of the file access structure on which the actions of transfer, deletion, extension, replacement or insertion can be performed. A file access data unit contains zero or more data units

#### **5.4.7 filestore action**

one of the actions specified as part of the definition of the virtual filestore

#### **5.4.8 file access structure**

the data structure of a file that relates the file access data units, allowing their identification, description and manipulation

#### **5.4.9 overlapped access**

an access procedure in which protocol control information or user data relating to more than one access action can be in the process of transmission at the same time

## 5.5 File structure

### 5.5.1

#### **arc**

a directed link between two nodes

### 5.5.2

#### **arc length**

a positive integer expressing the difference in levels between a child node and its parent node

### 5.5.3

#### **child (of a node)**

a node at which an outbound arc of the node concerned terminates

### 5.5.4

#### **leaf**

a node of a tree that has no outbound arcs

### 5.5.5

#### **level (of a node)**

the sum of the arc lengths from the root to the node concerned

### 5.5.6

#### **long arc**

an arc with an arc length greater than one

### 5.5.7

#### **node**

the elementary component from which a tree is built up

### 5.5.8

#### **ordered tree**

a tree in which there is a defined ordering of the children of each node in the tree

### 5.5.9

#### **parent (of a node)**

the node from which the inbound arc of the node concerned originates

### 5.5.10

#### **path**

a sequence of arcs which links one node to another node in such a way that each arc is traversed in its defined direction

### 5.5.11

#### **root**

the unique node of a tree that has no inbound arcs; it is at level 0

### 5.5.12

#### **sister (of a node)**

a node which shares the same parent node as the node concerned

### 5.5.13

#### **subtree**

a part of a tree comprising an arbitrary node as the subtree root node and all the other nodes which can be reached by a path from the subtree root node

### 5.5.14

#### **traversal sequence**

an ordering of the nodes in a tree such that each node occurs once and only once, and which is determined by an algorithm applicable to all possible trees

NOTE In general, many different trees may generate the same traversal sequence.

### 5.5.15

#### **tree**

a connected structure in which each node is linked to other nodes by directed arcs in such a way that one node has no inbound arcs and all other nodes have exactly one inbound arc

## 5.6 Constraint set

### 5.6.1

#### **constraint set**

a set of restrictions and refinements of a general file model which specifies a less general model tailored to the needs of a particular class of applications

### 5.6.2

#### **file model**

a model of the access structure of a file's contents

### 5.6.3

#### **flat (constraint set)**

a constraint set which, when applied to the general hierarchical file model, generates an access structure that consists of two levels, at the levels zero and one, and that may have data units at only the leaf nodes and has no data unit at the root node

### 5.6.4

#### **general hierarchical file model**

a model in which the file access data units are organized in a hierarchical tree

### 5.6.5

#### **hierarchical (constraint set)**

a constraint set which, when applied to the general hierarchical file model, generates an access structure which is still hierarchical, but in which the form of the node descriptions and data units is restricted

### 5.6.6

#### **unstructured (constraint set)**

a constraint set which, when applied to the general hierarchical file model, generates an access structure that consists only of the root node with one data unit

## 5.7 Document types

### 5.7.1

#### **concatenation (of documents)**

the combination of two documents to form a single resultant document

### 5.7.2

#### **document**

a collection of information with known abstract syntaxes and partially known semantics, and a known set of possible transfer syntaxes

### 5.7.3

#### **document type**

the specification of a class of documents, which states their necessary semantics, abstract syntaxes, transfer syntaxes and dynamics

### 5.7.4

#### **dynamics (of a document)**

the concatenation and simplification properties of a document

### 5.7.5

#### **relaxation (of a document)**

the process of deriving one document from another by making the parameters describing it less restrictive

### 5.7.6

#### **simplification (of a document)**

the process of deriving one document from another of a different type by discarding structural information

## 5.8 Filestore Management

### 5.8.1

#### **object**

a file, file-directory, or reference

### 5.8.2

#### **file-directory**

an object that provides a mechanism for the logical grouping of files, references, and file-directories

### 5.8.3

#### **reference**

an object that provides a mechanism for the logical linkage of an apparent location in the filestore structure with a file or a file-directory in the filestore structure

### 5.8.4

#### **parenthood**

an ordered relation between a file-directory object and another object. The file-directory object is the superior object in the relation, and the other object is the inferior object

### 5.8.5

#### **childhood**

the dual relation to the parent relation

### 5.8.6

#### **linkage**

an ordered relation between a reference object and a single file or file-directory object. The reference object is the superior object in the relation, and the other object is the inferior object. Every reference object has exactly one inferior object in the linkage relation. A file or file-directory object may have zero or more superiors in the linkage relation

a reference maintaining a linkage relation to an object is said to “refer” to the object. The object being referred to is called the referent of the relation

### 5.8.7

#### **parent file-directory**

the superior object of two objects related by parenthood, if no other object lies strictly between the two objects under parenthood

### 5.8.8

#### **child object**

the inferior object of two objects related by parenthood, if no other object lies strictly between the two objects under childhood

### 5.8.9

#### **filestore structure**

the structure imposed on the organization of objects in a filestore by the relations of parenthood and linkage

### 5.8.10

#### **filestore tree**

the tree structure imposed on the organization of objects in a filestore by the relation of parenthood

### 5.8.11

#### **filestore root**

the unique object in a filestore tree that is superior to all other objects in that tree

### 5.8.12

#### **pathname**

a sequence of object names identifying a path from an assumed starting file-directory object through zero or more file-directories or references to file-directories, to a target object

### 5.8.13

#### **valid pathname**

a pathname such that for any two adjacent names the object identified or referenced by the first relates to the object identified by the second by parenthood

**5.8.14****complete pathname**

a pathname whose assumed starting file-directory is the filestore root

**5.8.15****incomplete pathname**

a pathname whose assumed starting directory is not necessarily the filestore root. See clause **5.8.10**

**5.8.16****primary pathname**

the single complete pathname of an object where each adjacent pair of objects whose names appear in the pathname are related solely by parenthood

**5.8.17****attribute value assertion**

a logical conjunction, disjunction, or negation of assertions about the values of individual attributes

**NOTE** The admissible forms of assertion about each attribute are given under its definition in ISO 8571-2.

**6 Abbreviations**

The following abbreviations are used in parts 2 to 4 of ISO 8571:

|       |                                          |
|-------|------------------------------------------|
| ACSE  | association control service element      |
| ASE   | application service element              |
| CCR   | commitment, concurrency and recovery     |
| DU    | data unit                                |
| EFS   | external file service                    |
| FADU  | file access data unit                    |
| FERPM | file error recovery protocol machine     |
| FPDU  | file protocol data unit                  |
| FPM   | file protocol machine                    |
| FTAM  | file transfer, access and management     |
| Id    | identifier                               |
| IFS   | internal file service                    |
| OSI   | open systems interconnection             |
| OSIE  | open systems interconnection environment |
| PCI   | protocol control information             |
| PDU   | protocol data unit                       |
| PDV   | presentation data value                  |
| PSDU  | presentation service data unit           |
| RSE   | real system environment                  |