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Information technology — Open Systems Interconnection — Job transfer and manipulation concepts and services

Technologies de l'information — Interconnexion de systèmes ouverts — Concepts et services pour le transfert et manipulation de travaux

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Contents

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.

International Standard ISO/IEC 8831 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

This second edition cancels and replaces the first edition (ISO 8831:1989). The text of this second edition of ISO/IEC 8831 includes changes resulting from alignment with ISO/IEC 9804 (CCR) and the full protocol amendment to ISO/IEC 8832.

Annexes A and B form an integral part of this International Standard. Annexes C and D are for information only.

Introduction

The purpose of the job transfer and manipulation (JTM) standard is to provide a set of communication-related services which can be used to perform work in a network of interconnected open systems. This work can include both the running of traditional background jobs and other forms of information processing.

Background jobs have, in the past, been submitted either directly on the host system where they ran, or else at a remote job entry station connected to that system. Data files, program and "JCL" would be already available on the host, or would form part of the submitted "job deck". Output would be delivered on the host system, or alternatively on a printer attached to the remote job entry station. In a network of open systems, such jobs can be submitted at any open system supporting JTM to be run on another open system, using files collected from any other open systems, with output directed to peripherals or files held on any other open systems.

The JTM protocol covers not only the movement of job-related data (input and output) between open systems, but also provides for the movement of data concerned with monitoring job-related activity, and for controlling and manipulating the progress of this activity.

This International Standard does not specify individual implementations or products, nor does it constrain the implementation of entities and interfaces within a computer system. There is, therefore, no conformance to this International Standard.

Annex A is part of this International Standard, and describes the notation used for JTM service definition. This differs from that used by lower layers of OSI only because JTM is concerned with concurrent and related activity on more than two open systems. It is a superset of the notation used in the lower layers.

Annex B is part of this International Standard, and defines the requirements of JTM for a Document Type Registration Authority. These requirements of JTM apply to private, enterprise-specific, Registration Authorities; they are, however, also expected to be satisfied by any International Standard covering this area.

Annex C is tutorial material, and is not part of this International Standard. It gives a broad introduction to JTM, and should be read first by readers unfamiliar with the JTM work.

Annex D is not part of this International Standard, and contains an alphabetic glossary of the definitions appearing in the body of this International Standard.

Information technology – Open Systems Interconnection – Job transfer and manipulation concepts and services

Section 1 : General

1.1 Scope

This International Standard is an application layer standard within the Open Systems Interconnection framework set up by ISO 7498.

It defines the concepts and services for job transfer and manipulation.

This International Standard requires that the user of JTM

— specifies the open systems where work is to be done;

— knows the local functions and facilities of the open systems where work is to be done;

— knows the control languages used to specify local work on the open systems where work is to be done.

This International Standard provides the means to

— to specify work to be done on one or more open systems. The work done at one open system can result in new work to be done at other open systems;

— monitor the execution of work previously specified;

— modify work previously specified.

This International Standard does not address the standardisation of control languages, but is also applicable to the use of a standardised control language. This International Standard does not address the standardisation of user interfaces.

1.2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 646:1991, *Information technology – ISO 7-bit coded character set for information interchange.*

ISO 2022:1986, *Information processing – ISO 7-bit and 8-bit coded character sets - Code extension techniques.*

ISO 2375:1985, *Data processing – Procedure for registration of escape sequences.*

ISO 7498:1984, *Information processing systems – Open Systems Interconnection – Basic Reference Model.*

ISO/TR 8509:1987, *Information processing systems – Open Systems Interconnection – Service Conventions.*

ISO 8571-3:1988, *Information processing systems – Open Systems Interconnection – File Transfer, Access and Management – Part 3 : File Service definition.*

ISO 8649:1988, *Information processing systems – Open Systems Interconnection – Service definition for the Association Control Service Element.*

ISO 8822:1988, *Information processing systems - Open Systems Interconnection - Connection oriented Presentation Service Definition.*

ISO/IEC 8824:1990, *Information technology – Open Systems Interconnection - Specification of Abstract Syntax Notation One (ASN.1).*

ISO/IEC 8832:1992, *Information technology – Open Systems Interconnection – Specification of the Basic Class and Full Protocol for Job Transfer and Manipulation.*

ISO/IEC 9804:1990, *Information technology – Open Systems Interconnection – Service definition for the Commitment , Concurrency and Recovery service element.*

1.3 Definitions

1.3.1 CCR service definitions

This International Standard makes use of the following terms defined in ISO/IEC 9804:

a) atomic action

b) master

c) superior

d) subordinate

e) commitment

f) rollback

1.3.2 JTM service definitions

The definitions are grouped into major categories, corresponding to the subclauses of clause 2.1.

For the purposes of this International Standard, the following definitions apply.

1.3.2.1 General

1.3.2.1.1 agency: An abstract description of those functions of a real open system which are needed to support the JTM service.

1.3.2.1.2 work specification: A conceptual data structure within the JTM service provider which specifies in a defined way the work which is to be done.

1.3.2.1.3 document: A collection of data which forms part of a work specification, and which forms a unit of interaction between the JTM service provider and an agency.

1.3.2.1.4 initiation agency: That agency which causes a work specification to be created.

1.3.2.2 Proformas and spawning

1.3.2.2.1 proforma: Part of a work specification which specifies further work and is used to form a new work specification as part of the processing of earlier work.

1.3.2.2.2 spawning: The process of taking the data from a proforma and using it to produce a new work specification.

1.3.2.2.3 spawning control data: Data contained in a proforma which controls the circumstances in which spawning takes place from that proforma.

1.3.2.2.4 top level proforma: A proforma which is not contained within any other proforma.

NOTE — A proforma which is not a top-level proforma can become a top-level proforma as a result of spawning from its parent.

1.3.2.3 Source, sink and execution agencies

1.3.2.3.1 source agency: Any part of an open system which can provide documents for inclusion in a work specification when required by the JTM service provider as a result of processing the work specification.

1.3.2.3.2 sink agency: Any part of an open system to which documents can be passed by the JTM service provider as a result of processing a work specification.

NOTE — Source and sink agencies can obtain and dispose of documents locally, or by use of non-standard protocols, or by use of FTAM.

1.3.2.3.3 execution agency: Any part of an open system which initially acts as a sink for documents, but which subsequently acts as a source of related documents produced as a result of processing the earlier documents.

1.3.2.3.4 activity (in an agency): Work performed by an agency, initiated by a service primitive issued to the agency by the JTM service provider; the completion of the activity is indicated by a service primitive issued to the JTM service provider by the agency.

1.3.2.4 OSI jobs

1.3.2.4.1 initial work specification: A work specification created as a result of the issue of an initiation service primitive by an initiation agency.

1.3.2.4.2 OSI job: The total work on all open systems arising directly or indirectly from an initial work specification.

1.3.2.4.3 OSI subjob (subjob): The total work arising from the processing of a single work specification, including the spawning of further work specifications, but excluding work arising from the processing of these further work specifications.

1.3.2.4.4 OSI job submission: The use of the initiation service primitive by an initiation agency for the creation of an initial work specification.

1.3.2.4.5 OSI job submission system: The open system on which OSI job submission occurs.

1.3.2.5 Reporting and the monitor function

1.3.2.5.1 JTM report: Encoded information recording the progress or failure of an OSI job, generated by the JTM service provider, possibly as the result of interaction with an agency.

1.3.2.5.2 OSI job monitors: Open systems to which JTM reports about a particular OSI job are sent.

1.3.2.5.3 report work specification: The type of work specification created by the JTM service provider to move JTM reports; the target open system for these work specifications is one of the OSI job monitors.

1.3.2.6 Commitment, concurrency and recovery

1.3.2.6.1 level of commitment: A parameter which determines whether operations requested in an atomic action are completed at the time of the atomic action, or are noted (as secure data) for later performance.

1.3.2.6.2 warning diagnostic: Information carried by the CCR service on an offer of commitment which reports (usually for a human being) any variations on the expected action or unexpected consequences of the action.

1.3.2.6.3 retry-later diagnostic: Information carried by the CCR service on a rollback when an action cannot be completed for reasons which can be transient.

1.3.2.6.4 no-retry diagnostic: Information carried by the CCR service on a rollback when an action cannot be completed, and a later retry is not proposed.

1.3.2.7 Transfer control

1.3.2.7.1 work specification transfer: An atomic action by which a work specification is created at the receiving open system and destroyed at the sending open system.

1.3.2.7.2 transfer control record: A conceptual data structure held by an open system to control the transfer of work specifications and the issue of service primitives.

1.3.2.8 Report manipulation

1.3.2.8.1 report manipulation operations: Operations requiring deletion or display of reports held by an open system nominated as a monitor point by some work specification.

1.3.2.8.2 report manipulation work specification: A work specification containing report manipulation operations.

1.3.2.9 Work manipulation

1.3.2.9.1 work manipulation operations: Operations which select one or more work specifications or proformas and request displaying, killing, stopping or modification.

1.3.2.9.2 work manipulation work specification: A work specification containing work manipulation operations.

1.3.2.9.3 selector: Data which is used to select zero, one, or more work specifications.

1.3.2.9.4 update: Data which is used to modify a selected work specification or proforma.

1.3.2.10 Transfer manipulation

1.3.2.10.1 transfer manipulation operations: Operations requiring setting, displaying or checking transfer control records.

1.3.2.10.2 transfer manipulation work specification: A manipulation work specification containing transfer manipulation operations.

1.3.2.11 Authorisation and accounting

1.3.2.11.1 identification authority: A naming authority which issues identifications; these identifications can be used to determine the capabilities to be made available to a particular authenticated identification (authorisation), or can be used to levy charges (accounting), or both.

1.3.2.11.2 authenticated identification: Data which is known to correctly identify the user or management who requested the work to be performed, either by the use of a password check, or by some other checking mechanism.

1.3.2.11.3 user identification: Data which can be used in a particular context to identify the user on whose behalf work is being requested.

1.3.2.11.4 account identification: Data which can be used in a particular context to identify the account to be debited with any charges which are levied.

NOTE — User and account identifications consist of the name of an identification authority together with one of the identifications it issues.

1.3.2.11.5 open system management identification: The name of an open system which, when authenticated, authorises JTM activities or charging related to the management of that open system.

NOTE — Examples of such activities are the holding of work specifications about to be transferred to it, or the setting of transfer control records.

1.3.2.11.6 identification authority management identification: The name of an identification authority which, when authenticated, authorises JTM activities related to control of activity initiated by user identifications issued by that authority.

1.3.2.12 Work specification identification

1.3.2.12.1 OSI job local reference: A reference for an OSI job which is unambiguous within the OSI job submission system, assigned by that open system.

1.3.2.12.2 initiating identification: An identification provided by the JTM user at submission time to identify the initiator of the OSI job.

1.3.2.12.3 OSI job name: A string provided by an initiation agency when submitting an OSI job.

1.3.2.12.4 work specification identifier: A unique reference for a work specification which includes the name of the OSI job submission system, the identification of the initiating user, the OSI job local reference and the OSI job name; where a work specification was created by spawning, the identifier also contains one or more proforma names.

1.4 Abbreviations

OSI	open systems interconnection
JTM	job transfer and manipulation
FTAM	*file transfer, access and management*
CCR	commitment, concurrency and recovery

1.5 Conventions

The conventions used in this service definition are contained in annex A.

Section 2 : Overview

2.1 Overview and general description

In order to define JTM services, a model of the elements involved in the services is required. This JTM model is derived from the definitions given in ISO 7498 by adding further detail to encompass the services.

2.1.1 Overview

The JTM model recognizes the existence of a number of independent application entities on different open systems which co-operate to provide the JTM service and together form the JTM service provider. The JTM model also recognizes the existence of a number of agencies which are the users of the JTM service. The conceptual interactions between the JTM service provider and an agency are defined by service primitives. The JTM service provider receives from an initiation agency enough information to create a work specification.

The work which is requested is performed by

a) standardized functions of the JTM service provider;

b) functions of the local system environment accessed by the movement of documents between the JTM service provider and agencies.

2.1.2 Work specification contents

A work specification contains fields which provide data for

a) identification of the work;

b) authorisation of the work;

c) defining where reports on the work are to be sent;

d) selecting the reports which are required;

e) identifying the type of the work specification;

f) identifying the open systems which are to perform the work;

g) specifying the urgency of the work;

h) holding parts of the work until specified events occur;

i) specifying the actions to be performed by the JTM service provider to carry out the initial work;

j) specifying further work to be carried out when the initial work is completed.

A work specification refers to documents in the local system, or to documents which are obtained by the use of ISO 8571-3; these documents are subsequently passed by the JTM service provider to the same or to some other open system for storage locally, or for disposal using ISO 8571-3. When an open system has completed the work specified by a work specification (possibly including the generation of one or more new work specifications), the work specification ceases to exist. The JTM protocol transfers work specifications between open systems in order to progress the work.

The contents of a work specification relate to the following features supported by the JTM service, and are completely defined in clause 3.4.

The **identification** field of a work specification provides a universal and unique name by which the work can be referenced for subsequent reporting and manipulation. The work specification identifier is allocated when the work specification is created following submission by the initiation agency, or when it is created as the result of processing an earlier work specification. In the latter case, the identifier will reflect the parentage of the work specification.

The **initiating identification** field, and the **time of submission** field are generated when a work specification is created as a result of submission by the initiation agency. These fields are copied when new work specifications are created by JTM as a result of processing earlier work specifications.

The **authorisation** and **accounting** fields provide data which enables open systems to allow the performance of the requested work. When a work specification references files for obtaining or disposing of documents, additional authorisations and accounts can be included for the access to the files.

OSI job monitors can be specified; these are open systems to which any selected reports are to be sent.

The **report selector** field determines (for each OSI job monitor) which categories of event are to be reported to that monitor.

Different **types** of work specification are defined, corresponding to the different types of initial work to be performed. The most important type is the *document movement work specification which provides for the movement of user documents between* open systems. Other types provide for the movement of reports and manipulations: they are introduced later.

The **target** open system is that open system which carries out the final processing of the initial work, and which can generate new work specifications for further work. **Relays** can be specified for use as store-and-forward sites on the way to the target.

The **urgency** for the performance of the desired work and the **holding** of it can be specified.

JTM **actions** specify – in relation to the various types of work specification – what specific actions the JTM service provider has to perform. They determine the interactions between the JTM service provider and its local system environment, and determine the actions to be taken by it on its own data, or with regard to the reporting of events.

The **further work** field provides data in a form which allows the creation of new work specifications by a target.

2.1.3 Proformas and spawning

A proforma can contain further proformas nested to any depth. The JTM service provider spawns work specifications using top level proformas and the spawning control data in the proformas. The new work specifications are formed using both data in the proformas, and also data in other fields of the original work specification. An important feature of spawning is the addition to the new work specifications of documents which have become available as a result of earlier activity. The spawning process is initiated by an execution agency (see 2.1.4), or as the result of completion of activity on a sink or execution agency (see 1.3.2.3.4).

2.1.4 Source, sink and execution agencies.

The model recognizes that the JTM service provider, when processing a work specification, can – according to information in the work specification – interact with source, sink and execution agencies.

There are service primitives for interactions between a JTM service provider and agencies. Following these interactions with a source, the activity is complete. Following these interactions with a sink or execution agency the activity can either be complete or the agency can indicate only acceptance, that is, that the request for some activity has been secured. In the latter case, completion of the activity will be signalled by the agency at some later time, using another set of service primitive interactions.

An execution agency can, on completion of an activity, indicate that a number of documents are available for collection by a work specification resulting from spawning. It can also, at any time prior to completion, and if required by the activity, use service primitives to demand spawning using specified proformas; the resulting work specifications can collect documents which have become available before the end of the activity.

At any time prior to the completion of an activity in a sink or execution agency, the following events can occur:

a) the JTM service provider can, as a result of processing a request for work manipulation (see 2.1.11), require that the activity be killed or stopped or held or released;

b) the JTM service provider can ask for status information about the activity;

c) the agency, if required by the activity, can cause the JTM service provider to generate a report about some significant event in the life of the activity;

d) the agency, if required by the activity, can ask the JTM service provider to spawn from specified proformas.