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Information technology — Distributed Transaction Processing — The XA Specification

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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 14834 was prepared by X/Open Company Ltd. (as XO/CAE/91/300) and was adopted, under a special "fast-track procedure", by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by national bodies of ISO and IEC.

Appendix A forms an integral part of this International Standard. Appendices B to F are for information only.

Introduction

(This introduction is not a normative part of ISO/IEC 14834, Information technology—Distributed Transaction Processing—The XA Specification, but is included for information only.)

This International Standard specifies the bidirectional interface between a transaction manager and resource manager (the XA interface) in an X/Open Distributed Transaction Processing (DTP) environment. It is based on X/Open CAE Specification, Distributed Transaction Processing: The XA Specification (December 1991). This International Standard is technically identical to the X/Open version. For informative purposes, this International Standard also contains the text of the X/Open DTP Reference Model Version 3 which X/Open has published as a separate Guide.

Typographical Conventions

The following typographical conventions are used throughout this document:

- `Constant width` strings are code examples or literals and are to be typed just as they appear.
- *Italic* strings are used for emphasis or to identify the first instance of a word requiring definition. Italics also denote:
  - — variable names
  - — commands or utilities
  - — functions; these are shown as follows: *name*( ).
- The notation **"file.h"** indicates a header.
- The notation [ABCD] is the name of a return value.
- Ellipses (. . .) are used to show that additional arguments are optional.

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Information technology — Distributed Transaction Processing — The XA Specification

Chapter 1: General

1.1 Scope

This International Standard specifies the *XA interface*: the bidirectional interface between a transaction manager and a resource manager in an X/Open Distributed Transaction Processing (DTP) environment. The XA interface is not an ordinary Application Programming Interface (API); it is a system-level interface between DTP software components.

This International Standard is technically identical to X/Open CAE Specification, Distributed Transaction Processing: The XA Specification (December 1991). Like that specification, this International Standard does not define the full aspects of the DTP model that pertain to communication.

1.2 X/Open DTP Model

The X/Open Distributed Transaction Processing (DTP) model is a software architecture that allows multiple application programs to share resources provided by multiple resource managers, and allows their work to be coordinated into global transactions.

The full X/Open DTP model comprises five basic functional components:

- an Application Program (AP), which defines transaction boundaries and specifies actions that constitute a transaction
- Resource Managers (RMs) such as databases or file access systems, which provide access to resources
- a Transaction Manager (TM), which assigns identifiers to transactions, monitors their progress, and takes responsibility for transaction completion and for coordinating failure recovery.

- Communication Resource Managers (CRMs), which control communication between distributed applications within or across TM domains.
- a communication protocol, which provides the underlying communication services used by distributed applications and supported by CRMs.

1.3 Document Structure

Relevant definitions and other important concepts that pertain to this International Standard are discussed in Chapter 2. That chapter also defines the AP, TM, and RM in more detail, and describes their interaction. Chapter 3 is an overview of the XA interface, describing the situations in which each of the services is used. Chapter 4 discusses the data structures that are part of the XA interface. Reference manual pages for each routine in the XA interface are presented in Chapter 5; state tables follow in Chapter 6. Chapter 7 summarises the implications of this International Standard on the implementors of RMs and TMs; it also identifies features that are optional. Appendix A presents the contents of an **"xa.h"** header file in both ANSI C and Common Usage C. Appendix F contains a bibliography.

For informative purposes, this International Standard also contains the text of the X/Open DTP Reference Model Version 2 (November 1993) which X/Open publishes as a separate Guide. (See Appendix B, Appendix C, Appendix D, and Appendix E.)

1.4 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 indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

1. ISO/IEC 8824:1990, *Information technology—Open Systems Interconnection—Specification of Abstract Syntax Notation One (ASN.1).*
2. ISO/IEC 8825:1990, *Information technology—Open Systems Interconnection—Specification of Basic Encoding Rules for Abstract Syntax Notation One (ASN.1).*
3. ISO/IEC 9804:1994, *Information technology—Open Systems Interconnection—Service definition for the commitment, concurrency and recovery service element.*
4. ISO/IEC 9805-1:1994, *Information technology—Open Systems Interconnection—Protocol for the Commitment, Concurrency and Recovery service element: Protocol Specification.*
5. ISO/IEC 9899:1990, *Programming languages—C.*
6. ISO/IEC 10026-1:1992, *Information technology—Open Systems Interconnection—Distributed Transaction Processing—Part 1: OSI TP Model.*
7. ISO/IEC 10026-2:1996, *Information technology—Open Systems Interconnection—Distributed Transaction Processing—Part 2: OSI TP Service.*
8. ISO/IEC 10026-3:1996, *Information technology—Open Systems Interconnection—Distributed Transaction Processing—Part 3: Protocol Specification.*

See Appendix F for bibliographic references.