INTERNATIONAL STANDARD

ISO/IEC 14478-4

First edition
1998-12-15

Information technology — Computer graphics and image processing — Presentation Environment for Multimedia Objects (PREMO) —

Part 4:
Modelling, rendering and interaction component

Technologies de l'information — Infographie et traitement d'images — Environnement de présentation d'objets multimédia (PREMO) —

Partie 4: Composant pour la modélisation, le rendu et l'interaction

Reference number
ISO/IEC 14478-4:1998(E)

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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, government 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 JTC1. Draft International Standards adopted by the joint technical committees are circulated to the national bodies for voting. Publication as an International Standard requires approval by at least 75% of the national bodies casting a vote.

ISO/IEC 14478-4 was prepared by Joint Technical Committee ISO/IEC JTC1, *Information technology*, Subcommittee SC24, *Computer graphics and image processing*.

ISO/IEC 14478 consists of the following parts under the general title *Information technology — Computer graphics and image processing — Presentation Environment for Multimedia Objects (PREMO):*

- *Part 1: Fundamentals of PREMO*
- *Part 2: Foundation component*
- *Part 3: Multimedia systems services*
- *Part 4: Modelling, rendering, and interaction component*

Annex A forms an integral part of this part of ISO/IEC 14478. Annexes B to D are for information only.

Introduction

The Modelling, Rendering and Interaction component of PREMO describes facilities for the modelling and presentation of, and interaction with, multidimensional data that utilises multiple media in an integrated way. That is, the data may be composed of entities that can be rendered using graphics, sound, video or other media, and which may be interrelated through both spatial coordinates and time.

The objective of this component is to provide developers and users of modelling and rendering applications with a framework for supporting the definition and use of interoperable devices within a distributed setting. It achieves this by:

a) providing an extensible framework of primitives for use in modelling, rendering and interaction which encompass multiple media, and which can be organized into larger structures and embedded into scenes.

b) extending the resource and device hierarchies of the PREMO Part 3 (Multimedia Systems Services) Component to allow modelling, rendering and interaction to be uniformally integrated into a network of objects for managing the production and utilization of multimedia data.

c) utilizing the property and capability management services of PREMO Part 3 to characterize the behaviour of modelling, rendering and interaction devices, allowing an application to be configured from such devices such that constraints on performance and functionality are satisfied.

d) building on the object model and foundation objects of PREMO Part 1 and Part 2 to allow subsequent components to realize and extend specific modelling, rendering and interaction functionality.

This component follows PREMO Part3 in describing the external interface of object types and other entities involved in modelling, presentation and interaction, but not the internal structures needed to implement these. That is, it is not the purpose of this component to provide a set of building blocks that can be assembled into a modeller or a renderer. Rather, the component provides facilities to enable devices, built with various applications or performance trade-offs in mind, to interoperate in a heterogenous presentation environment.

Information technology — Computer graphics and image processing — Presentation Environment for Multimedia Objects (PREMO) — Part 4: Modelling, Rendering, and Interaction Component

1 Scope

This part of ISO/IEC 14478 describes a set of object types and non-object types to provide the construction of, presentation of, and the interaction with Multimedia information. The multimedia information can be graphics, video, audio, or other types of presentable media. This information can be enhanced by time aspects. Throughout this document this part of ISO/IEC 14478 will also be referred to as "Modelling, Rendering and Interaction", and abbreviated as MRI.

The Modelling, Rendering and Interaction Component constitutes a framework of 'Middleware', system software components lying between the generic operating system and computing environment, and a specific application operating as a client of the services and type definitions provided by this component. It provides a framework over the foundation objects and multimedia systems services defined in other Parts of the international standard for the development of a distributed and heterogeneous network of devices for creating multimedia models, rendering these models, and interacting with this process.

The Modelling, Rendering and Interaction Component encompasses the following characteristics:

a) provision of a hierarchy of multimedia primitives as an abstract framework for describing the capabilities of modelling and rendering devices, and for enabling their interoperation;

b) within the primitive hierarchy, specific provision for describing the temporal structure of multimedia data through the stepwise construction of structured primitives from component data;

c) provision of abstract types for modellers, renderers and other supporting devices, enabling the integration of such devices or any future subtypes representing real software or hardware, into a processing network of such devices;

d) provision of an object type to map synchronization requirements expressed within multimedia primitives into control of the stream and synchronization mechanisms provided by ISO/IEC 14478-2 and ISO/IEC 14478-3.

The Modelling, Rendering and Interaction Component relies on the object types and services defined in PREMO Part 2: Foundation Components (ISO/IEC 14478-2), and PREMO Part 3: Multimedia Systems Services (ISO/IEC 14478-3).

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 14478. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO/IEC 14478 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.

ISO/IEC 11072:1992, *Information technology — Computer graphics — Computer Graphics Reference Model (CGRM).*

ISO/IEC 7942-1:1994, *Information technology — Computer graphics and image processing — Graphical Kernal System (GKS) — Part 1: Functional description.*

ISO/IEC 9592:1997, *Information technology — Computer graphics and image processing — Programmer's Hierarchical Interactive Graphics System (PHIGS).*

ISO/IEC 14478–1:1998, *Information technology — Computer graphics and image processing — Presentation Environment for Multimedia Objects (PREMO) — Part 1: Fundamentals of PREMO*

ISO/IEC 14478–2:1998, *Information technology — Computer graphics and image processing — Presentation Environment for Multimedia Objects (PREMO) — Part 2: Foundation component*

ISO/IEC 14478–3:1998, *Information technology — Computer graphics and image processing — Presentation Environment for Multimedia Objects (PREMO) — Part 3: Multimedia systems services*