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Information technology — Object Management Group Meta Object Facility (MOF) Core

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 19508 was prepared by the Object Management Group (OMG) and was adopted, under the PAS procedure, by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by national bodies of ISO and IEC.

ISO/IEC 19508 is related to:

- ISO/IEC 19505-2:2012 Information technology - Object Management Group Unified Modeling Language (OMG UML), Superstructure
- ISO/IEC 19509:2014 Information technology - Object Management Group XML Metadata Interchange
- ISO/IEC 14769, Information technology -- Open Distributed Processing -- Type Repository Function

ISO/IEC 19508, under the general title *Information technology - Object Management Goup - Meta Object Facility (MOF) Core*, apart from this introductory material, is identical with that for the OMG specification for Meta Object Facility (MOF) Core version 2.4.2.

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Introduction

The Meta-Object Facility (MOF) International Standard defines a language architecture and metamodel (defined using MOF) that can be used to define and manipulate a set of interoperable metamodels and their corresponding models. These interoperable metamodels include the Unified Modeling Language (UML) metamodel (ISO/IEC 19505), the MOF meta-metamodel, as well as standard technologies specified using metamodels. The MOF provides the infrastructure for implementing design and reuse repositories, application development tool frameworks, etc. Mappings from MOF to W3C XML and XSD are specified in the XMI (ISO/IEC 19509) International Standard. Mappings from MOF to Java™ are in the JMI (Java Metadata Interchange) specification defined by the Java Community Process.

This International Standard does *not* deprecate or replace the existing standard ISO/IEC 19502:2005, Information technology - Meta Object Facility (MOF). The specification provided by this International Standard is identical to the OMG specification MOF Core 2.4.2, that is aligned with UML 2.4.1 (ISO/IEC 19505) [UML2Sup] and XMI 2.4.2 (ISO/IEC 19509) [XMI24]. While MOF 2.4.2 [MOF2] is conceptually similar to MOF 1.4 [MOF1], it is not backward compatible, as UML 2.4.1 is not backward compatible with UML 1.4.2 [UML1], and XMI 2.4.2 [XMI24] is not compatible with XMI 2.0 [XMI2].

In order to achieve architectural alignment considerable effort has been expended to base UML and MOF on the same metamodel, the UML metamodel. The MOF metamodel is derived from the UML metamodel by applying a well-defined set of constraints. Two sets of such constraints are defined in this document, yielding in either the Essential MOF (EMOF) or the Complete MOF (CMOF) metamodel. This alignment ensures semantic compatibility between MOF-based and UML models, also allows the MOF to reuse the UML notation for visualizing of MOF metamodels. UML 2.4.1 is defined in ISO/IEC 19505.

While not limited to this context, the MOF International Standard is closely related to work on the standardization of Open Distributed Processing (ODP). In particular, the ODP Type Repository Function (ISO/IEC 14769| Rec.X.960) references the OMG Meta Object Facility, version 1.3. This function specifies how to use the OMG MOF as a repository for ODP types.

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Information technology - Object Management Group Meta Object Facility (MOF) Core

1 Scope

This International Standard provides the basis for metamodel definition in OMG's family of MDA languages and is based on a simplification of UML2's class modeling capabilities. In addition to providing the means for metamodel definition it adds core capabilities for model management in general, including Identifiers, a simple generic Tag capability and Reflective operations that are defined generically and can be applied regardless of metamodel.

MOF 2 Core is built on by other OMG MOF specifications, including the following (in this list 'MOF based model' means any model that instantiates a metamodel defined using MOF, which includes metamodels themselves):

- XMI - for interchanging MOF-based models in XML [XMI24]
- MOF 2 Facility and Object Lifecycle - for connecting to and managing collections of MOF-based model elements [MOFFOL]
- MOF 2 Versioning and Development Lifeycle - for managing versions and configurations of MOF-based models [MOFVD]
- MOF Queries Views and Transformations - for transforming MOF-based models [QVT]
- MOF Models to Text - for generating text, such as programs, from MOF-based models [MOFM2T]
- Object Constraint Language - for specifying constraints on MOF-based models [OCL]

2 Conformance

There are two compliance points:

- Essential MOF (EMOF)
- Complete MOF (CMOF)

Compliant implementations may support EMOF only, see sub clause 12.4 for further detail, or may support CMOF, which includes EMOF. See sub clause 14.4 for detail.

All compliant implementations shall conform to the MOF Platform-Independent Model specified in Clause 15 and support the technology mapping specified in the XML Metadata Interchange (XMI) specification [XMI24].

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3 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Readers of this MOF 2 Core specification are expected to be familiar with the UML specification since UML provides the structures forming MOF metamodels. The structures supported by MOF are at the level of those in the UML 2 Infrastructure: specifically the Basic package for the EMOF compliance level and Constructs for the CMOF compliance level. However, for ease of definition, MOF uses full UML Superstructure models directly, albeit with constraints (defined in the chapters for EMOF and CMOF).

Hence the normative reference is the Classes clause of the following specification:

- [UML2Sup] ISO/IEC 19505-2:2012 “Information technology - Object Management Group Unified Modeling Language (OMG UML), Superstructure” (OMG Unified Modeling Language (OMG UML), Superstructure http://www.omg.org/spec/UML/2.4.1/Superstructure)

The mandatory mapping of MOF to XMI is specified at:

- [XMI24] ISO/IEC 19509:2014 “Information technology - Object Management Group XML Metadata Interchange (XMI)” (XML Metadata Interchange - http://www.omg.org/spec/XMI/2.4.2)

Formal constraints are expressed in OCL, which is specified at:

- [OCL] ISO/IEC 19507:2012 “Information technology - Object Management Group Object Constraint Language (OCL)” (OMG Object Constraint Language (OCL) - http://www.omg.org/spec/OCL/2.3.1)

The following reference is used in MOF1 to MOF2 migration Annex:

- [MOF1] ISO/IEC 19502:2005 “Meta Object Facility (MOF) Specification Version 1.4.1” (OMG Meta Object Facility (MOF) Specification (Version 1.4) - http://www.omg.org/spec/MOF/1.4)

The mandatory mapping of MOF to XMI is specified at:

- [XMI24] ISO/IEC 19509:2014 “Information technology - Object Management Group XML Metadata Interchange (XMI)” (XML Metadata Interchange - http://www.omg.org/spec/XMI/2.4.2)

Formal constraints are expressed in OCL, which is specified at:

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