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Information technology — Object Management Group Unified Architecture Framework (OMG UAF) —

Part 1: Domain Metamodel (DMM)

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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.

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html. In the IEC, see www.iec.ch/understanding-standards.

This document was prepared by the Object Management Group (OMG) (as Unified Architecture Framework [UAF] Domain Metamodel, Version 1.1) and drafted in accordance with its editorial rules. It was adopted, under the JTC 1 PAS procedure, by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

A list of all parts in the ISO/IEC 19540 series can be found on the ISO and IEC websites.

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Preface

OMG

Founded in 1989, the Object Management Group, Inc. (OMG) is an open membership, not-for-profit computer industry standards consortium that produces and maintains computer industry specifications for interoperable, portable and reusable enterprise applications in distributed, heterogeneous environments. Membership includes Information Technology vendors, end users, government agencies and academia. OMG member companies write, adopt, and maintain its specifications following a mature, open process. OMG's specifications implement the Model Driven Architecture® (MDA®), maximizing ROI through a full-lifecycle approach to enterprise integration that covers multiple operating systems, programming languages, middleware and networking infrastructures, and software development environments. OMG's specifications include: UML® (Unified Modeling Language™); CORBA® (Common Object Request Broker Architecture); CWM™ (Common Warehouse Metamodel); and industry-specific standards for dozens of vertical markets. More information on the OMG is available at *https://www.omg.org/*.

OMG Specifications

As noted, OMG specifications address middleware, modeling and vertical domain frameworks. All OMG Specifications are available from this URL: *https://www.omg.org/spec*

Specifications are organized by the following categories:

Business Modeling Specifications

Middleware Specifications

- CORBA/IIOP
- Data Distribution Services
- Specialized CORBA IDL/Language Mapping Specifications

Modeling and Metadata Specifications

- UML, MOF, CWM, XMI
- UML Profile Specifications

Platform Independent Model (PIM) - Platform Specific Model (PSM) - Interface Specifications

- CORBAServices
- CORBAFacilities
- OMG Domain Specifications
- CORBA Embedded Intelligence Specifications
- CORBA Security Specifications

All of OMG's formal specifications may be downloaded without charge from our website. (Products implementing OMG specifications are available from individual suppliers.) Copies of specifications, available in PostScript and PDF format, may be obtained from the Specifications Catalog cited above or by contacting the Object Management Group, Inc. at: OMG Headquarters 109 Highland Avenue, Needham, MA 02494 USA Tel: +1- 781-444-0404 Fax: +1-781-444-0320 Email: *pubs@omg.org*

Certain OMG specifications are also available as ISO standards. Please consult *http://www.iso.org*

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Information technology — Object Management Group Unified Architecture Framework (OMG UAF) —

Part 1: Domain Metamodel (DMM)

1 Scope

1.1 Introduction

There are four parts to this specification, two are normative and two informative. The normative parts are:

1. The UAF Domain Metamodel (DMM) (this document) that provides the definition of concepts, relationships and viewpoints for the framework. The UAF DMM is the basis for any implementation of UAF including non-UML/SysML implementations.

2. The UAF Profile (UAFP) (see document dtc/19-06-15) is a UML/SysML implementation of the UAF DMM

The informative parts are:

3. The UAF Traceability, Annex A (see document dtc/19-06-17), which details the mappings between the UAF and the various frameworks and languages that contribute to the UAF.

4. The UAF Example Model, Annex B (see document dtc/19-06-18), which illustrates a practical usage of UAF.

1.2 UAF Background

UAF evolved from the Unified Profile for DoDAF and MODAF (UPDM), version 2.1. UAF extends the scope of UPDM and generalizes it to make it applicable to commercial as well as military architectures. The intent of UAF is to provide a standard representation for describing enterprise architectures using a Model Based Systems Engineering (MBSE) approach.

The core concepts in the UAF are based upon the DoDAF 2.0.2 Domain Metamodel (DM2) and the MODAF ontological data exchange mechanism (MODEM), Security Views from Canada's Department of National Defense Architecture Framework (DNDAF) and the North Atlantic Treaty Organization (NATO) Architecture Framework (NAF) v 4.

UAF models describe a system[1] from a set of stakeholders' concerns such as security or information through a set of predefined viewpoints. Developed models can also reflect custom viewpoints or users can develop more formal extensions for new viewpoints.

[1] The term system is used from: "Systems and software engineering -- Architecture description," http://www.iso.org/iso/catalogue_detail.htm?csnumber=50508

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The UAFP can be used to develop architectures compliant with:

- Department of Defense Architecture Framework (DoDAF) version 2.02
- Ministry of Defence Architecture Framework (MODAF) version 1.3
- North Atlantic Treaty Organization (NATO) Architecture Framework (NAF) version 3.1
- North Atlantic Treaty Organization (NATO) Architecture Framework (NAF) version 4

UAF v 1.1 supports the capability to:

- model architectures for a broad range of complex systems, which may include hardware, software, data, personnel, and facility elements,
- model consistent architectures for system-of-systems (SoS) down to lower levels of design and implementation,
- support the analysis, specification, design, and verification of complex systems; and
- improve the ability to exchange architecture information among related tools that are SysML based.

1.3 Intended Usage

The UAF enables the modeling of strategic capabilities, operational scenarios, services, resources, personnel, security, projects, standards, measures and requirements; which supports best practices through, separation of concerns and abstractions. In addition, the UAF enables the modeling of related architecture concepts such as:

- System of Systems (SoS),
- information exchanges consistent with the National Information Exchange Model (NIEM),
- DoD's doctrine, organization, training material, leadership & education, personnel, and facilities (DOTMLPF)
- UK Ministry of Defence Lines of Development (DLOD) elements,
- Human Computer Interfaces (HCI).

Further, The UAF conforms to terms defined in the ISO/IEC/IEEE 42010 standard for architecture description, where the terms: architecture, architecture description (AD), architecture framework, architecture view, architecture viewpoint, concern, environment, model kind, stakeholder [ISO/IEC/IEEE 42010:2011] form correspondence rules specified as constraints on UAF.

1.4 Related Documents

The specification includes a metatmodel and description as separate documents. Other appendices are also provided as separate documents. The table below provides a listing of these documents:

Table 1:1 - Table of Related Documents

dtc/19-06-16	The UAF Domain MetaModel (DMM)
dtc/19-06-15	The UAF Profile (UAFP)
dtc/19-06-17	Appendix A that contains a separate traceability subsection from UAFP to each of the frameworks listed in Section 1.2 of this specification
dtc/19-06-18	Appendix B: An example of how the language can be used to represent a UAFP architecture
dtc/19-06-19	UAF XMI file
dtc/19-06-20	UAF XMI Measurements library
dtc/19-05-14	Attachments

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2 Conformance

UAF specifies four types of conformance.

Type 1 Conformance: - UAF View specification conformance. A tool demonstrating view specification conformance shall implement a version of all the view specifications defined in the UAF Grid, with the exception of the view specifications in the Metadata Domain. Optionally the tool vendor can implement other donor framework viewpoints, for instance DoDAF, MODAF or NAF based upon the mapping between them and UAF provided in Appendix A (dtc/19-06-17)

Type 2 Conformance: - UAF Conceptual Syntax Conformance. A tool demonstrating conceptual syntax conformance is consistent with the concepts, relationships and constraints defined in the UAF DMM (this document). UAF Conceptual Syntax Conformance implies Type 1 Conformance.

Type 3 Conformance: - UAF Formal Syntax Conformance. A tool demonstrating formal syntax conformance:

- enables instances of concrete UAFP stereotypes defined in the UAFP (dtc/19-06-15)
- complies with the constraints defined in the UAFP (dtc/19-06-15)
- complies with the SysML version 1.5 Concrete Syntax Conformance (formal/17-05-01)

UAF Formal Syntax Conformance implies Type 2 Conformance.

Type 4 Conformance: - UAF Model interchange conformance. A tool demonstrating model interchange conformance can import and export conformant XMI for all valid UAFP models. Model interchange conformance implies Type 3 Conformance.

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3 References

3.1 Normative References

The following normative documents contain provisions which, through reference in this text, constitute provisions of this specification. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply.

3.2 OMG Documents (Normative References)

- Unified Modeling Language (UML), 2.5.1, December 2017, https://www.omg.org/spec/UML
- Object Constraint Language (OCL), 2.4, February 2014, https://www.omg.org/spec/OCL
- System Modeling Language (SysML) ,1.5, May 2017, https://www.omg.org/spec/SysML
- Diagram Definition (DD), 1.1, June 2015, https://www.omg.org/spec/DD
- UML Profile for the National Information Exchange Model (NIEM UML), 3.0, April 2017, https://www.omg.org/spec/NIEM-UML
- Unified Profile for DoDAF and MODAF (UPDM), 2.1, August 2013, https://www.omg.org/spec/UPDM
- UML Profile for BPMN Processes, 1.0, July 2014, https://www.omg.org/spec/BPMNProfile
- Ontology Definition Metamodel (ODM), 1.1, September 2014, https://www.omg.org/spec/ODM
- Information Exchange Packaging Policy Vocabulary (IEPPV) 1.0, May 2015, https://www.omg.org/spec/IEPPV

3.3 Other Normative References

- Department of Defense Architecture Framework (DoDAF), Version 2.02, August 2010, http://dodcio.defense.gov/Library/DoDArchitectureFramework.aspx
- DM2 - DoDAF Meta-Model,
- The DM2 Conceptual Data Model, http://dodcio.defense.gov/Library/DoDArchitectureFramework/dodaf20_conceptual.aspx
- DM2 Logical Data Model, http://dodcio.defense.gov/Library/DoDArchitectureFramework/dodaf20_logical.aspx
- DM2 Formal Ontology. http://dodcio.defense.gov/Library/DoDArchitectureFramework/dodaf20_ontology1.aspx
- Department National Defence and Canadian Forces (DND/ CF) Architecture Framework (DNDAF), Version 1.8.1, 25 January 2013
- International Defence Enterprise Architecture Specification for Exchange (IDEAS) Group, http://www.ideasgroup.org/
- IDEAS Foundation, http://www.ideasgroup.org/foundation/
- IDEAS Foundation v1.0 as XMI File (zipped), http://www.ideasgroup.org/7Documents/
- ISO/IEC/IEEE 42010:2011, Systems and software engineering – Architecture Description, http://www.iso.org/iso/catalogue_detail.htm?csnumber=50508
- Ministry of Defence Architecture Framework (MODAF), https://www.gov.uk/mod-architecture-framework
- MODAF Ontological Data Exchange Mechanism (MODEM)
- https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/63980/20130117_MODAF_MODEM.pdf

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- NATO Architecture Framework (NAF),
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4 Terms and Definitions

No new terms and definitions have been required to create this specification. All terms are available in the normative references or bibliographic citations for detailed explanation.

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