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Unified Profile for the Department of Defense Architecture Framework (DoDAF) and the Ministry of Defence Architecture Framework (MODAF)

Version 2.0 - FTF - Beta 1

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http://www.omg.org/spec/UPDM/20100801/updm-profile.xmi

* original file(s): c4i/2010-08-07 (model library and XMI)

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Preface

About the Object Management Group

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 *http://www.omg.org/*.

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As noted, OMG specifications address middleware, modeling and vertical domain frameworks. A Specifications Catalog is available from the OMG website at:

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Specifications within the Catalog are organized by the following categories:

OMG Modeling Specifications

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- Profile specifications

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- CORBA Component Model (CCM)

Platform Specific Model and Interface Specifications

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- OMG Domain specifications
- OMG Embedded Intelligence specifications
- OMG 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:

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

Typographical Conventions

The type styles shown below are used in this document to distinguish programming statements from ordinary English. However, these conventions are not used in tables or section headings where no distinction is necessary.

Times/Times New Roman - 10 pt.: Standard body text

Helvetica/Arial - 10 pt. Bold: OMG Interface Definition Language (OMG IDL) and syntax elements.

`Courier - 10 pt. Bold:` Programming language elements.

Helvetica/Arial - 10 pt: Exceptions

Note – Terms that appear in *italics* are defined in the glossary. Italic text also represents the name of a document, specification, or other publication.

Issues

The reader is encouraged to report any technical or editing issues/problems with this specification to *http://www.omg.org/technology/agreement.htm*.

Part I - Overview of the UML Profile for DoDAF and MODAF

This part contains the following Clauses:

1.Scope

2.Compliance

3.Normative References

4.Terms and Definitions

5.Symbols and Acronyms

6.Additional Information

1 Scope

The authors believe that this specification for a Unified Profile for the Department of Defense Architecture Framework (DoDAF) and the Ministry of Defence Architecture Framework (MODAF) will

- enhance the quality, productivity, and effectiveness associated with enterprise and system of systems architecture modeling,
- promote architecture model reuse and maintainability,
- improve tool interoperability and communications between stakeholders, and
- reduce training impacts due to different tool implementations and semantics.

The purpose of this document is to specify a UML 2, and optional SysML, profile to enable practitioners to express DoDAF and MODAF model elements and organize them in a set of specified viewpoints and views that support the specific needs of stakeholders in the US Department of Defense and the United Kingdom Ministry of Defence. The profile defined in this specification has been imported by at least four tool vendors including Artisan, EmbeddedPlus, No Magic, and Visumpoint, and the implementation is actively under development. They all plan to release a commercially available product supporting this version of UPDM within the next year. Currently, partial implementations are being used actively on projects.

UPDM defines a set of UML and optional SysML stereotypes and model elements and associations to satisfy the requirements of the UPDM RFC. This specification documents the language architecture in terms of the parts of UML 2 that are reused and the extensions to UML 2 and SysML. The specification includes the concrete syntax (notation) for the complete language. The reusable portion of the UML 2 and SysML specification are not included directly in the specification but are included by reference. The specification also provides an example of how the language can be used to represent a UPDM architecture.

The scope of UPDM includes the language extensions to enable the extraction of specified and custom views from an integrated architecture description. These views include a system's viewpoint (DoDAF Systems View) along with associated systems implementation standards (DoDAF/MODAF Technical View) within the context of the business or enterprise viewpoint (DoDAF/MODAF Operational View). The DoDAF/MODAF AllViews is also included. In addition, UPDM allows the architecture model to include representation of an enterprise capability and strategic intent (MODAF Strategic Viewpoint) and the process steps associated with the procurement of conformant systems (MODAF Acquisition Viewpoint). Finally, the MODAF Services View is included to model Service Oriented Architectures. UPDM also includes mechanisms for designing ad hoc custom views and more formal extensions of new views of the model.

UPDM will support 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 down to lower levels of design and implementation.
- Model service oriented architectures support the analysis, specification, design, and verification of complex systems.
- Improve the ability to exchange architecture information among related tools that are UML based and tools that are based on other standards.

The profile provides the modeling of operational capabilities, services, system activities, nodes, system functions, ports, protocols, interfaces, performance, and physical properties and units of measure. In addition, the profile enables the modeling of related architecture concepts such as DoD's doctrine, organization, training material, leadership & education, personnel, and facilities (DOTMLPF) and the equivalent UK Ministry of Defence Lines of Development (DLOD) elements.

UPDM, as illustrated in Figure 1.1, will address DoDAF and MODAF Viewpoints as well as enabling extensions to new architecture perspectives (e.g., Services views, Custom views, Logistics views).

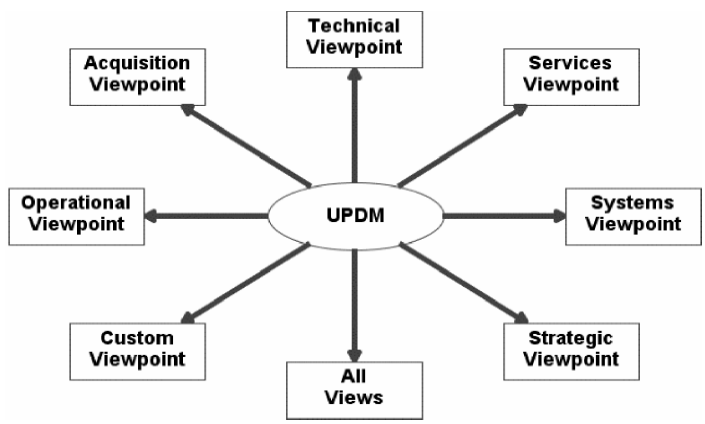


Figure 1.1 - UPDM Viewpoint Support Illustration

2 Compliance

2.1 Compliance Levels

UPDM specifies two compliance levels corresponding to supporting a UML-based profile and a UML+ OMG SysMLTM profile.

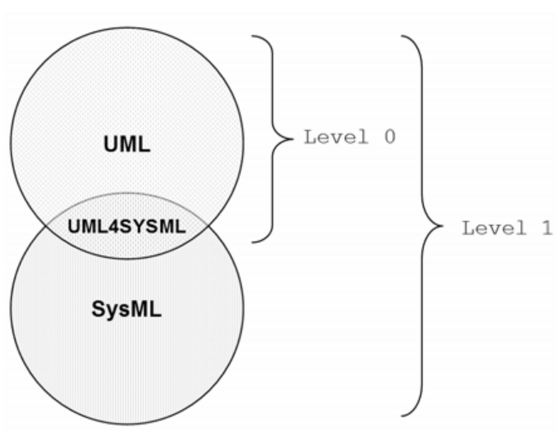


Figure 2.1 - UPDM Compliance Levels 0 and 1

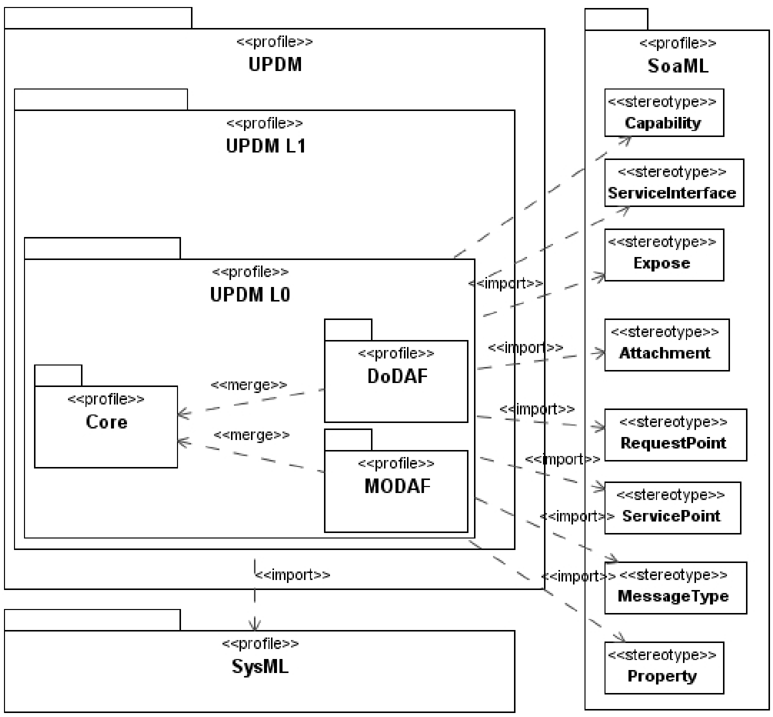


Figure 2.2 - L0 and L1

2.1.1 Level 0 : Based on UML 2 and Partial SoaML Import

Figure 2.2 illustrates that UPDM Compliance Level 0 is an implementation of UPDM extending UML 2 and importing several SoaML stereotypes – namely Expose, Attachment, RequiresPoint, ServicePoint, MessageType, Property. In order for a tool to be considered as compliant with L0, the following must be true:

- All stereotypes, classes, attributes, constraints, associations, and package structures that are scoped to the L0 package (including sub-packages) must exist and be compliant with this specification.
- XMI import and export of the user model and profile must be supported.
- A Level 0 compliant implementation must be able to import and export Level 0 UPDM models with 100% fidelity (i.e., no loss or transforms).
- A Level 0 compliant implementation must be able to import Level 1 UPDM models with only minimal losses.

2.1.2 Level 1 : Based on UML 2 and Full SysML Import

Figure 2.2 illustrates that UPDM Compliance Level 1 includes everything in Level 0, imports the rest of the SysML sub-profiles and defines constraints that pair together the application of SysML and UPDM stereotypes. This provides a UPDM implementation that can be seamlessly taken forward into SysML modeling. For a tool to be considered as compliant with L1, the following must be true:

- All stereotypes, classes, attributes, constraints, associations and package structures that are scoped to the L1 package (including sub-packages) must exist and be compliant with this specification.
- XMI import and export of the user model and profile must be supported.
- A Level 1 compliant implementation must be able to import and export Level 1 UPDM models with 100% fidelity (i.e., no loss or transforms).
- A Level 1 compliant implementation must be able to import Level 0 UPDM models with no loss, and transformations where necessary.

3 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.

- Unified Modeling Language: Superstructure version 2.1.2 (http://www.omg.org/docs/formal/07-11 -02.pdf)
- Unified Modeling Language: Infrastructure version 2.1.2 (http://www.omg.org/docs/formal/07-11-04.pdf)
- MOF 2.0/XMI Mapping Specification, v2.1 (http://www.omg.org/cgi-bin/doc?formal/2005-09-01)
- UML 2.0 OCL Specification (http://www.omg.org/docs/ptc/03-10-14.pdf)
- OMG Systems Modeling language (OMG SysML) V1 .0 (http://www.omg.org/docs/formal/07-09-01.pdf)
- DoD Architecture Framework Version 1.5, Volume I: Definitions and Guidelines, 23 April 2007, DoD Architecture
- Framework Working Group (http://www.defenselink.mil/cio-nii/docs/DoDAF_Volume_I.pdf)
- DoD Architecture Framework Version 1.5, Volume II: Product Descriptions, 23 April 2007, DoD Architecture Framework Working Group (http://www.defenselink.mil/cio-nii/docs/DoDAF_Volume_II.pdf)
- DoD Architecture Framework Version 1.5, Volume III: Product Descriptions, 23 April 2007, DoD Architecture Framework Working Group (http://www.defenselink.mil/cio-nii/docs/DoDAF_Volume_III.pdf)
- MODAF The MOD Architectural Framework Version 1.2.002 August 2008 (http://www.modaf.org.uk http://www.modaf.org.uk/M3)

4 Terms and Definitions

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

5 Symbols and Acronyms

AcV-*	Acquisition View
AV-*	All View
BPMN	Business Process Modeling Notation

C4ISR	Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance
COI	Communities of Interest
DoD	United States Department of Defense
DoDAF	Department of Defense Architecture Framework
DOTMLP	Doctrine, Organization, Training, Material, Leadership, Personnel, Facilities
EIE	Enterprise Information Environment
GIG	Global Information Grid
IDEF	Integrated DEFinition Methods
JCIDS	Joint Capabilities Integration and Development System
JETL	Joint Essential Task List
MOD	United Kingdom Ministry of Defence
MODAF	Ministry of Defence Architecture Framework
NEC	Network Enabled Capability
NCW	NetCentric Warfare
NCAT	NetCentric Assessment Tool
NCOIC	NetCentric Operations Industry Consortium
OV-*	Operational View
POC	Proof of Concept
SoS	System of Systems
SOV	Service Oriented View
StV-*	Strategic View
SV-*	System & Services View
TPPU	Task, Post, Process, and Use
TV-*	Technical View
UPDM	Unified Profile for DoDAF and MODAF

6 Additional Information

6.1 Additional Materials

Accompanying this specification are XMI files and requirements documents, as listed below.

Title	OMG Document Number	Supersedes
UPDM Profile Submission	c4i/2010-08-06	N/A
UPDM Profile Submission - ERRATA	N/A	N/A
UPDM Beta 2 specification without change notes	N/A	N/A
Inventory List	N/A	N/A
Final Report	N/A	N/A
UPDM XMI Document for UML	c4i/2010-08-07	N/A
UPDM Requirements Traceability Document	N/A	N/A
UPDM Requirements Traceability Document - ERRATA	N/A	N/A

6.1.1 Statement of support from the DoD representative

From: Leonard F. Levine DoD/DISA/GE33 1/703-681-2614 Subject: Summary of US DoD Support for UPDM

DoD support for the Unified Profile for DoDAF and MODAF (UPDM) has been strong since 2005 and has not wavered. The DoD promotes the use of international, national, and industry-wide open standards to the extent feasible. It looks forward to a rapid adoption of the UPDM by the Object Management Group (OMG) as an industry standard for architecture tools and to its submission as an international standard.

In the United States, support for the UPDM development comes primarily from the DoD Chief Information Officer (DoD CIO -- formally, The Office of the Assistant Secretary of Defense (Networks and Information Integration) (OASD(NII)), specifically the Directorate of Architecture & Interoperability. Mr. Brian Wilczynski addressed this subject at the UPDM working group in Orlando on 17 April 2008 during the annual DoD Enterprise Architecture Conference, and Mr. Walt Okon similarly apprized the DoD IT Standards Committee (ITSC) on 18 June 2008. Both reconfirmed the DoD CIO's support for the current UPDM development process generally and, in particular, the goal of submitting domain model, profile, and related documentation for UML as required underpinning for a RFC in time for the September 2008 quarterly meeting of the OMG. To bolster this commitment, the DoD CIO has requested that a representative of the DoD Executive Agent for IT Standards work with the UPDM group to assure that it will generate a product conforming to our current DoD Architecture Framework (DoDAF Version 1.5) and coordinating with our continued development of the DoDAF. Also, the DoD CIO has generously made available the time of the chief architect of the developmental version of the architectural framework (DoDAF Version 2.0). The architects on the UPDM working group and the DoDAF have met frequently by electronic collaboration and recently face-to-face in both Orlando and Ottawa to exchange detailed modeling concepts and to promote convergence. The DoD CIO anticipates that the UPDM working group will continue to refine the profile after the September 2008 submission and, as required, will revise the resulting profile during the next calendar year.

The DoD CIO looks forward to the emergence of tools from vendors supporting DoDAF through the standardized UPDM profile including architecture exchanges through the XML Metadata Interchange (XMI), and to UPDM extension to the systems engineering discipline. The mapping of UPDM to the Unified Profile for SysML has also received support of the Office of the Director, Systems and Software Engineering (S SE), Office of the Deputy Under Secretary of Defense (Acquisition and Technology)(DUSD(A&T)). The DoD IT Standards Registry (DISR) currently "mandates" UML 2.0 and

XMI 1.1 for system acquisition, and a request will be submitted this summer recommending the profile as an "emerging" standard as soon as a stable URL is available. In the normal lifecycle of the DISR, a standard such as UPDM must be formally adopted by a recognized body such as OMG before being advanced to "mandated."

Leonard F. Levine
Standards Development Branch (GE33 1)?IT Standards Division
Defense Information Systems Agency?PO Box 4502
Arlington, VA 22204-0502

6.1.2 Statement of support from the MOD representative

Matthew and all,

I am happy to confirm Matthew's statement that UK MOD fully support the work of this UPDM task force.

We appreciate the amount of the effort that the team are putting into this and, notwithstanding Adrian's, Ian's and Fariba's contribution to date, my only regret is that we are unable to allocate more resources to help you.

Kind regards Patrick

Patrick Gorman
Framework Development Manager
Information Exploitation Enterprise Architecture Team?Ministry of Defence
Main Building, G.B.32
Whitehall
LONDON, SW1A 2HB

The people referred to above are the following:

Dr Adrian Pearson
IA8b, Architecture Framework Technical Authority
Systems Engineering and Integration Support Group, MOD

Ms. Fariba Hozhabrafkan
SERCO Consulting, MOD Consultant

Dr Ian Bailey
Model Futures Limited, MOD Consultant

6.2 Overview of this Specification

6.2.1 Intended Audience

This specification will be of interest to end users who expect to use this profile, and to tool vendors interested in developing tool support for the development of enterprise and system of systems architectures, and that can satisfy contract documentation requirements for DoD and MOD customers. Tool vendors will also be able to use this specification to support Model Driven Development of systems based on the architectural descriptions based on this profile. Developers and reviewers of the views will have a clearer understanding of the semantics behind specific views and viewpoints, which will support more precise evaluation and comparison.

6.2.2 Organization of this Specification

DoDAF and MODAF are specifically organized around a set of viewpoints and views that address the concerns of a well defined set of stakeholders. This specification organizes the presentation of the UPDM abstract and concrete syntax around those viewpoints, so that the discussion is well-connected to their domain expertise. (See Section 1.5 for a more detailed description.)

The rest of this document contains the technical content of this specification. As background for this specification, readers may wish to review the UML and OMG SysMLTM specifications that complement this specification. Although the chapters are organized in a logical manner and can be read sequentially, this is a reference specification that can be read in a non-sequential manner.

Part I of the specification describes the details of the specification.

Part II provides the technical details essential to understanding the specification:

The specification of the Profile language. The profile includes both a Compliance Level 0 that extends UML and a Compliance Level 1 that extends UML and OMG SysMLTM. The elements of the profile are organized by the specific viewpoints required by DoDAF and MODAF. Within each of the viewpoint-specific sections (e.g., Operational Views (OVs)), the elements are presented in alphabetical order.

Annex A presents a non-normative view of various diagrams that document the Domain Metamodel (DMM) that document the MoDAF 1.5 and MoDAF 1.2 integrated model. This model was used as a basis for creating the UPDM profile.

Annex B presents the traceability among UPDM stereotypes and DODAF/MODAF elements. Please note that not all DoDAF/MODAF elements have corresponding UPDM stereotype. Those DoDAF/MODAF elements are modeled by UML artifacts directly, which shows in the Metaclass column.

Annex C Sample Problem illustrating UPDM concepts.

Annex D contains the bibliography providing a listing of additional consulted artifacts.

6.3 Acknowledgements

The following individuals submitted parts of this specification and/or have assisted the UPDM team in the development of the specification:

Adaptive Inc	Pete Rivett
Advanced System Management Group	Michael Abrahamson
Atego	Phil Astle
Atego	Matthew Hause
BAE Systems	J. D. Baker
BAE Systems	David C. Putman
Decisive Analytics Corp	Charles Johnson
DOD	Leonard Levine
DOD	Walt Okon
EmbeddedPlus Engineering	Paula Obeid
EmbeddedPlus Engineering	Kumar Marimuthu
Generic AB	Lars-Olof Kihlstrom
General Dynamics	Ron Townsend

International Business Machines	Graham Bleakley
Lockheed Martin	Sanford Friedenthal
Malina Software	Bran Selic
Mega	Antoine Lonjon
Mitre	Fatma Dandashi
MOD	Adrian Pearson
MOD	Patrick Gorman
MOD	John Keefe
Model Futures	Ian Bailey
No Magic, Inc.	Daniel Brookshier
No Magic, Inc.	Jim Rice
No Magic, Inc.	Andrius Strazdauskas
Northrop Grumman	Jeff Wilson
OSD	Dwayne Hardy
Raytheon	Ron Williamson
Raytheon	Wally Lee, PhD
Rolls Royce	Francis Thom
Cisco	Fariba Hozhabrafkan
Silver Bullet	Dave McDaniel
Silver Bullet	Greg Schaefer
Sparx Systems	Sam Mancarella
Swedish Armed Forces	Mikael Hagenbo
Visumpoint	Robert Lario
Visumpoint	Ginna Yost

The team would like to express their thanks to all of the above individuals and many others who are not listed.

Once again, it is important to stress that UPDM is not a new framework. Instead, UPDM is a specification for modeling DoDAF and MODAF architectures using UML and SysML. As such, it could not have been produced without taking concepts, structures and descriptions, etc, from the DoDAF and MODAF documentation and specifications, particularly the M3. The main authors of the M3 were:

- V1.0 – Dave Mawby (PA Consulting), Paul King (Vega/ Detica), and Ian Bailey.
- V1.1 – Adrian Pearson (MOD), Paul King, and Ian Bailey.
- V1.2 – Adrian Pearson (MOD), Patrick Gorman (MOD), and Ian Bailey.

The authors of this UPDM specification are therefore greatly indebted to organizations and authors who have contributed to all the DoDAF and MODAF specifications over the years. Some of these are listed above. To list all of them would not be possible.

Part II - Language Architecture

This part contains the following Clause and subclauses:

7 Language Architecture

7.1 Introduction

The UPDM specification reuses a subset of UML 2 and provides additional extensions needed to address requirements in the UPDM RFC Mandatory Requirements. We have used those requirements as the basis for this specification. This specification documents the language architecture in terms of the parts of UML 2 that are reused and the extensions to UML 2, as well as defining how to implement UPDM in SysML. This chapter explains design principles and how they are applied to define the UPDM language architecture.

7.2 Philosophy

The UPDM was developed using a model-driven approach. A simple description of the work process is:

- The Domain Metamodel (DMM) was created using UML Class models to represent the concepts in DoDAF and MODAF. Concepts common to both DoDAF and MODAF were captured in a Core package.
- The DMM concepts were mapped to corresponding stereotypes in the Profile.
- The Profile was analyzed and refactored to reflect language architecture, tool implementation, and reuse considerations.
- The conformance levels were finalized including mapping to SysML.
- The Profile diagrams, stereotype descriptions, and documentation were added.
- The specification was generated from the profile model.

This approach allowed the team to concentrate on architecture issues rather than documentation production. Consistency was automatically maintained by the UML tool.

The UML tool also enabled traceability to be maintained between the profile and the DMM where every stereotype is linked to the DMM element using UML Abstraction relationship.

7.3 Core Principles

The fundamental design principles for UPDM are:

- **Requirements-driven**: UPDM is intended to satisfy the requirements of the UPDM RFC Mandatory Requirements.
- **Domain meta model (DMM) driven**: The DMM was created first by domain experts and it served as a foundation for profile development.
- **Reuse of existing specifications**: UPDM reuses UML/SysML wherever practical to satisfy the requirements of the UPDM RFC and leverage features from both UML and SysML to provide a robust modeling capability. Consequently, UPDM is intended to be relatively easy to implement for vendors who support UML 2. The UPDM team intended to reuse UPMS. However, since UPMS had not been formally adopted at the time of this specification, a separate service profile in UPDM was developed that used similar concepts, with the intent to replace it with UPMS in the future.
- **Partitioning**: The package is the basic unit of partitioning in this specification. The packages partition the model elements into logical groupings that minimize circular dependencies among them.

- **Compliance levels**: UPDM includes two compliance levels. L0 is a UML only profile and L1 extends L0 to enable seamless integration with SysML modeling and to leverage the features of SysML in UPDM modeling.
- **Interoperability**: UPDM inherits the XMI interchange capability from UML.

7.4 Profile Structure

7.4.1 Top Level

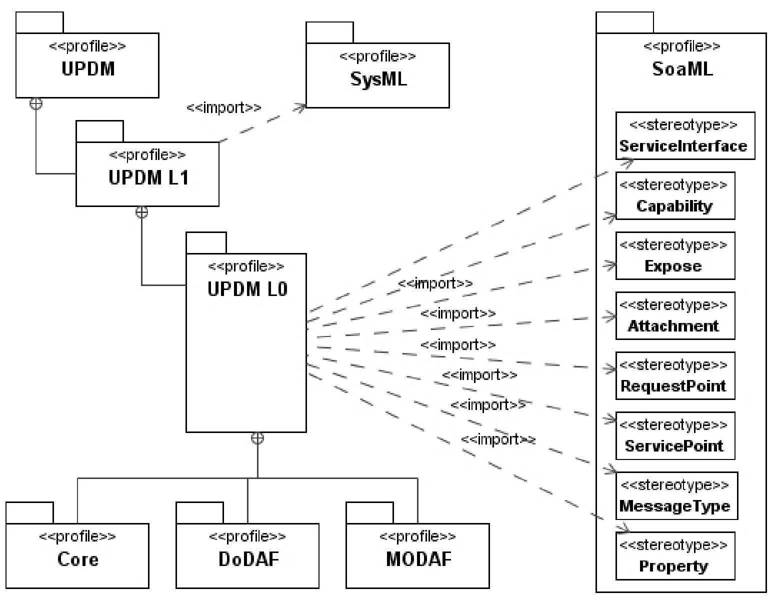


Figure 7.1 - Top Level Profile Structure

All the core elements for UPDM are in the UPDM L0 profile. The UPDM L0 profile has 3 top level profiles:

- **Core -** Elements shared by DoDAF and MODAF
- **DoDAF** - DoDAF specific elements
- **MODAF** - MODAF specific elements

7.4.2 Middle Level

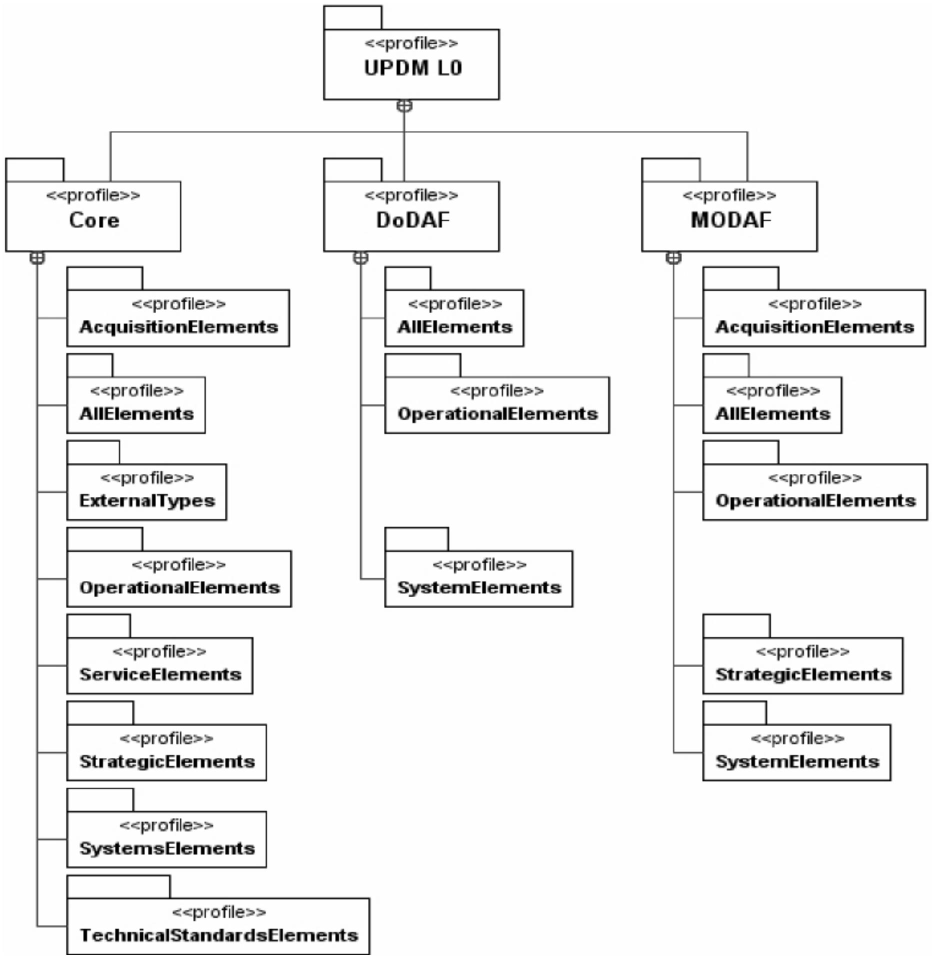


Figure 7.2 - Middle Level Profile Structure

Every top level profile may have the following subprofiles:

- **AllElements** - Cross-cutting elements.
- **AcquisitionElements** - Elements relating to Acquisitions.
- **ExternalTypes** - External types.
- **OperationalElements** - Elements relating to Operational models.
- **ServiceElements** - Elements relating to Service models.
- **StrategicElements** - Elements relating to Strategic models.
- **SystemsElements** - Elements relating to Systems models.
- **TechnicalStandardsElements** - Elements relating to Technical Standards models.

7.4.3 Low Level

Each of these subprofiles may be further decomposed into low-level profiles:

- **Behavior -** Stereotypes for modeling behavior
- **Data -** Stereotypes for modeling data
- **Environment -** Stereotypes for modeling environment
- **Flows -** Stereotypes for modeling flows
- **Measurements -** Stereotypes for modeling measurements
- **Milestone -** Stereotypes for modeling milestones
- **Structure -** Stereotypes for modeling structure
- **Views -** Stereotypes for modeling views

7.5 Representing Stereotype Constraints

The profile uses a non-standard notation to represent stereotype constraints in the profile to improve readability of the profile.

«metaconstraint» dependency

«metaconstraint» is a stereotype that extends the Dependency metaclass. It is used to specify constrained elements within the profile.

A sample of the «metaconstraint» dependency is a diagram for stereotype extending the Dependency metaclass. See the following example:

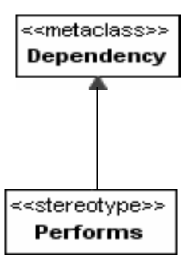


Figure 7.3 - Performs Stereotype

Performs is a stereotype that extends Dependency. The constraint on this stereotype is that its client end must be stereotyped by a Performer and its supplier end must be stereotyped by Activity. But as this constraint is not visible; therefore, the diagram does not communicate the needed information. We are using the “metaconstraint” dependency to visualize the constraint.

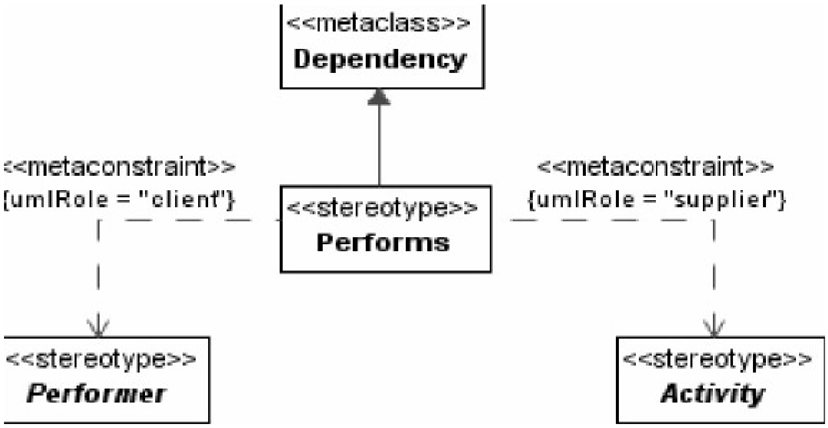


Figure 7.4 - Performs Hierarchy

This diagram should be read as follows:

> Performs is a stereotype extending the Dependency metaclass and is used for modeling a relationship between a Performer (or its specializations) and an Activity (or its specializations). A Dependency stereotyped Performs must have its values for the client property stereotyped as Performer, and its values for the supplier property must be stereotyped Activity.

The «metaconstraint» dependency will appear only in the specification diagrams, but not the profile XMI.

Note – When stereotype extends Connector, the stereotype property umlRole has values “end[0].role” and “end[1].role.”

For example:

This is done because Connector has no direct “linkage” to the connected element; it links to the Connector Ends, which references the linked element. So, end[n] gives the reference to the ConnectorEnd, and role gives the reference to the linked element.

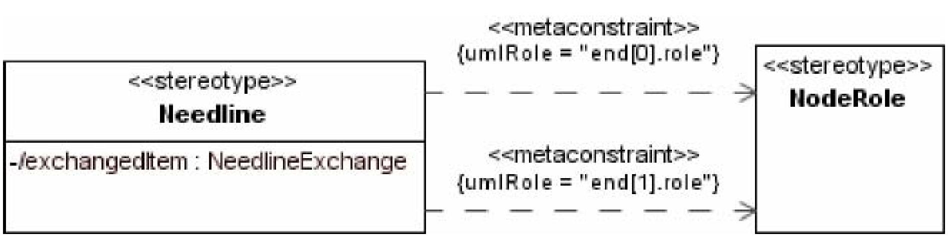


Figure 7.5 - Connector Extension

"metarelationship" dependency

“metarelationship” is a stereotype for dependency, showing that certain domain concepts will be implemented using regular UML relationships.

For example: A Capability may depend on other Capabilities, but this concept cannot be visualized on the diagram:

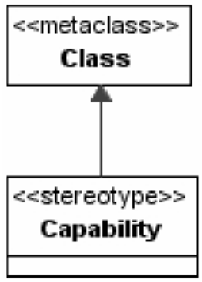


Figure 7.6 - Capabilities Generalization

We are using the “metarelationship” dependency to visualize the dependency concept.

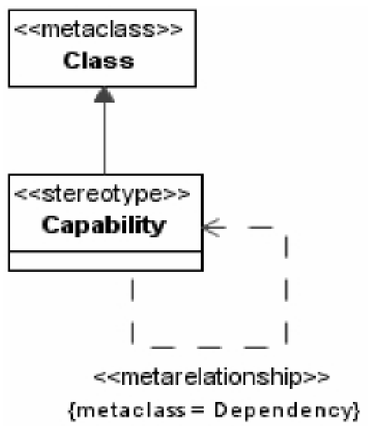


Figure 7.7 - Visualizing «metarelationship»

This diagram should be read as follows:

> Capability may have other Capabilities related to it, using the UML Dependency metaclass.

The “metarelationship” dependency will appear only in the specification diagrams, but not the profile XMI.

"stereotyped relationship" dependency

The “metaconstraint” dependency creates a good way to show the constrained ends of the stereotyped relationship, however, it also creates some overhead when showing the relationship between two stereotypes.

For example, the diagram needs to show that Node may require a Capability.

Figure 7.8 - UML Dependency metaclass

The “stereotyped relationship” dependency is used as follows:

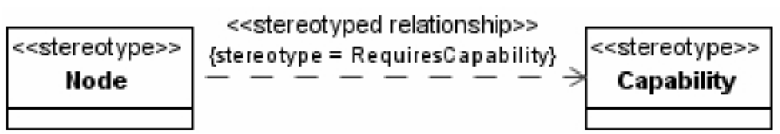


Figure 7.9 - “stereotyped relationship” dependency

The “stereotyped relationship” dependency will appear only in the specification diagrams, but not the profile XMI.

7.6 UML Constraint Representation

The specification uses the Object Constraint Language (OCL), as defined in Clause 6, “Object Constraint Language Specification” of the UML specification, for expressing well-formedness rules. The following conventions are used to promote readability:

- Self - which can be omitted as a reference to the metaclass defining the context of the invariant, has been kept for clarity. UML Infrastructure Specification, v2. 1.2 25
- In expressions where a collection is iterated, an iterator is used for clarity, even when formally unnecessary. The type of the iterator is usually omitted, but included when it adds to understanding.
- The ‘collect’ operation is left implicit where this is practical.
- The context part of an OCL constraint is not included explicitly, as it is well defined in the sub clause where the constraint appears.

The OCL constraints are stored with the profile and can be interchanged via XMI standard. Below is the pattern to represent constraint for stereotyped relationship in OCL as per UML 2.1:

- To constraint the client of the stereotyped relationship that should be a particular stereotyped element:
  self.client->forAll(getAppliedStereotype(CLIENT_STEREOTYPE)-> notEmpty()
- To constraint the supplier of the stereotyped relationship that should be a particular stereotyped element:
  self.supplier->forAll(getAppliedStereotype(SUPPLIER_STEREOTYPE)-> notEmpty()
- The constraint represented in Figure 7.7 can be represented in OCL as follows:
  self.client->forAll(getAppliedStereotype('UPDM: :AllElements: :Behavior : :Performer')-> notEmpty()
  self. supplier->forAll(getAppliedStereotype("UPDM: :AllElements: :Behavior : :Activity')->notEmpty())

7.7 Important Areas of the Architecture

7.7.1 Aliases

Although there are similar concepts in DoDAF and MODAF, they are not named the same. To keep interoperability and to fit the needs of both audiences, the UPDM specification used generalizations as a way to alias concepts.

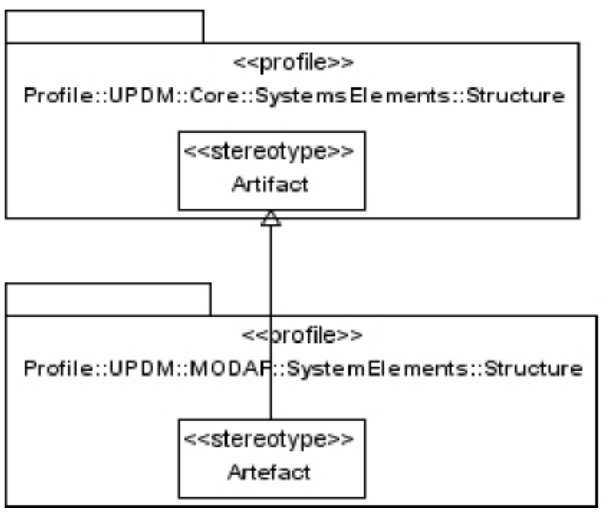


Figure 7.10 - Aliases

7.7.2 DoDAF 2.0 Conformance

Compliance with UPDM 2.0 Profile including metadata should assist the tool vendor in adhering to DoDAF 2.0 because the UPDM 2.0 Core and DoDAF-specific metadata models in UPDM 2.0 adhere to the metadata model inherent in DoDAF 2.0 Conceptual and Logical data models. In developing the UPDM 2.0, domain meta-modelers have also consulted the corresponding Physical data model in DoDAF 2.0 and to resolve questions of general conformance with enterprise-level architectural elements. Nevertheless, tool vendors are advised to consult DoDAF Version 2.0 (especially Volume I, page 2-6; Volume II, page 2-6; and Volume III, page 1-2) before claiming DoDAF 2.0 compliance. While conformance with UPDM 2.0 Core and DoDAF-specifics should greatly facilitate conformance with DoDAF 2.0, each tool vendor is still responsible for the tool's ultimate conformance with the documented architecture framework.

7.7.3 SoaML Reuse in L0

SoaML is quickly becoming the standard modeling choice for capturing and creating service oriented architectures. By importing the SoaML stereotypes, a UPDM model gains access to these powerful features. They can be used and viewed in a UPDM model using the standard SoaML approach and as such have not been further documented.

7.7.4 SysML Reuse in L1

Defining an architectural framework in UPDM provides the highest level abstraction of what will one day become integrated pieces of hardware and software. Being able to trace from the architectural framework to the various levels of implementation is critical for ensuring the initial goals have been reached. By including the full SysML profile inside UPDM, a modeler can have all of the architectural, system, and software design in the same place. This provides huge benefits in analysis, cross abstraction level communication, traceability, and reuse. As in L0, all of the stereotypes contained in SysML can be used and displayed using standard SysML approaches while still being able to be connected to UPDM elements such as Nodes and Artifacts.

7.7.5 SysML Reuse in L1

SOPES IEDM use of UML is becoming a standards based model for specifying and describing the rules governing the aggregation, marshalling, and processing of information across system interfaces. By importing the SOPES stereotypes, a UPDM 2.0 models gains higher fidelity in the specification and design of information exchange requirements. Additional information on the SOPES modeling approach can be found in (document number for version 1 is expected in October 2010).

Part III - UPDM Profile

This part contains the following Clause and sub clauses:

8.1 UPDM L1

8.1.1 UPDM L1::UPDM 1.0

8.1.1.1 UPDM L1::UPDM L0::Core

8.1.1.2 UPDM L1::UPDM L0::DoDAF

8.1.1.3 UPDM L1::UPDM L0::MODAF

8 UPDM Profile

UPDM L1 contains UPDM L0 and imports the entire SysML profile. This compliance level contains a set of constraints that specify which SysML stereotypes are applied to the L0 elements. The use of this compliance level is intended to provide more seamless integration with system modeling using SysML and to be able to fully leverage the capabilities of SysML in UPDM.

8.1 DoDAF Class Library

8.2 UPDM L1

UPDM L1 contains UPDM L0 and imports the entire SysML profile. This compliance level contains a set of constraints that specify which SysML stereotypes are applied to the L0 elements. The use of this compliance level is intended to provide more seamless integration with system modeling using SysML and to be able to fully leverage the capabilities of SysML in UPDM.

ActualLocation

context DataType inv:
UPDM::ActualLocation::allInstances()->exists(n|n.base_Class=self) implies
SysML::ValueType::allInstances()->exists(b| b.base_Class = self)

Artefact

context Class inv:
UPDM::Artefact::allInstances()->exists(n|n.base_Class=self) implies
SysML::Block::allInstances()->exists(b| b.base_Class = self)

Capability

context Class inv:
UPDM::Capability::allInstances()->exists(n|n.base_Class=self) implies
SysML::Block::allInstances()->exists(b| b.base_Class = self)

CapabilityConfiguration

context Class inv:
UPDM::CapabilityConfiguration::allInstances()->exists(n|n.base_Class=self) implies
SysML::Block::allInstances()->exists(b| b.base_Class = self)

Climate

context DataType inv:
UPDM::Climate::allInstances()->exists(n|n.base_Class=self) implies
SysML::ValueType::allInstances()->exists(b| b.base_Class = self)

Commands

context InformationFlow inv:
UPDM::Commands::allInstances()->exists(n|n.base_Class=self) implies
SysML::ItemFlow::allInstances()->exists(b| b.base_Class = self)

Controls

context InformationFlow inv:
UPDM::Controls::allInstances()->exists(n|n.base_Class=self) implies

SysML::ItemFlow::allInstances()->exists(b| b.base_Class = self)

DataExchange
context InformationFlow inv:
UPDM::DataExchange::allInstances()->exists(n|n.base_Class=self) implies
SysML::ItemFlow::allInstances()->exists(b| b.base_Class = self)

Energy
context Class inv:
UPDM::Energy::allInstances()->exists(n|n.base_Class=self) implies
SysML::Block::allInstances()->exists(b| b.base_Class = self)

EnergyExchange
context InformationFlow inv:
UPDM::EnergyExchange::allInstances()->exists(n|n.base_Class=self) implies
SysML::ItemFlow::allInstances()->exists(b| b.base_Class = self)

EnterpriseGoal
context Class inv:
UPDM::EnterpriseGoal::allInstances()->exists(n|n.base_Class=self) implies
SysML::Requirement::allInstances()->exists(b| b.base_Class = self)

EntityItem
context Class inv:
UPDM::EntityItem::allInstances()->exists(n|n.base_Class=self) implies
SysML::Block::allInstances()->exists(b| b.base_Class = self)

Environment
context Class inv:
UPDM::Environment::allInstances()->exists(n|n.base_Class=self) implies
SysML::Block::allInstances()->exists(b| b.base_Class = self)

ExternalType
context Class inv:
UPDM::ExternalType::allInstances()->exists(n|n.base_Class=self) implies
SysML::Block::allInstances()->exists(b| b.base_Class = self)

HighLevelOperationalConcept
context Class inv:
UPDM::HighLevelOperationalConcept::allInstances()->exists(n|n.base_Class=self) implies
SysML::Block::allInstances()->exists(b| b.base_Class = self)

InformationExchange
context InformationFlow inv:
UPDM::InformationExchange::allInstances()->exists(n|n.base_Class=self) implies
SysML::ItemFlow::allInstances()->exists(b| b.base_Class = self)

LightCondition
context DataType inv:
UPDM::LightCondition::allInstances()->exists(n|n.base_Class=self) implies
SysML::ValueType::allInstances()->exists(b| b.base_Class = self)

Location
context DataType inv:

UPDM::Location::allInstances()->exists(n|n.base_Class=self) implies
SysML::ValueType::allInstances()->exists(b| b.base_Class = self)

MaterielExchange
context InformationFlow inv:
UPDM::MaterielExchange::allInstances()->exists(n|n.base_Class=self) implies
SysML::ItemFlow::allInstances()->exists(b| b.base_Class = self)

MeasurementSet
context DataType inv:
UPDM::MeasurementSet::allInstances()->exists(n|n.base_Class=self) implies
SysML::ValueType::allInstances()->exists(b| b.base_Class = self)

Node
context Class inv:
UPDM::Node::allInstances()->exists(n|n.base_Class=self) implies
SysML::Block::allInstances()->exists(b| b.base_Class = self)

NodePort
context Port inv:
UPDM::NodePort::allInstances()->exists(n|n.base_Class=self) implies
SysML::FlowPort::allInstances()->exists(b| b.base_Class = self)

OperationalNode
context Class inv:
UPDM::OperationalNode::allInstances()->exists(n|n.base_Class=self) implies
SysML::Block::allInstances()->exists(b| b.base_Class = self)

OrganizationalExchange
context InformationFlow inv:
UPDM::OrganizationalExchange::allInstances()->exists(n|n.base_Class=self) implies
SysML::ItemFlow::allInstances()->exists(b| b.base_Class = self)

ResourceArtifact
context Class inv:
UPDM::ResourceArtifact::allInstances()->exists(n|n.base_Class=self) implies
SysML::Block::allInstances()->exists(b| b.base_Class = self)

ResourceInteraction
context InformationFlow inv:
UPDM::ResourceInteraction::allInstances()->exists(n|n.base_Class=self) implies
SysML::ItemFlow::allInstances()->exists(b| b.base_Class = self)

ResourcePort
context Port inv:
UPDM::ResourcePort::allInstances()->exists(n|n.base_Class=self) implies
SysML::FlowPort::allInstances()->exists(b| b.base_Class = self)

Software
context Class inv:
UPDM::Software::allInstances()->exists(n|n.base_Class=self) implies
SysML::Block::allInstances()->exists(b| b.base_Class = self)

System

context Class inv:
UPDM::System::allInstances()->exists(n|n.base_Class=self) implies
SysML::Block::allInstances()->exists(b| b.base_Class = self)

8.2.1 UPDM L1::UPDM L0

UPDM L0 contains all the Core, DoDAF and MODAF elements, and imports parts of SysML – Requirements and ModelElements namely. This compliance level is primarily based on UML and reuse of a minimum of SysML elements. This includes Requirements and Views/Viewpoints. As one of the core principles is reuse, cloning/recreating of these existing SysML structures was considered as inappropriate.

8.2.1.1 UPDM L1::UPDM L0::Core

The Core contains most of the elements of UPDM profile. These elements are common to both DoDAF and MODAF or are critical to a complete model of core concepts. The Core is always associated with either the DoDAF or MODAF profiles.

If desired, there is no prohobition of using both MODAF, DoDAF and Core should the end-user desire to use some or all of the concepts represented.

8.2.1.1.1 UPDM L1::UPDM L0::Core::AcquisitionElements

The AcquisitionElements describe project details, including dependencies between projects and capability integration. These Views guide the acquisition and fielding processes.

8.2.1.1.1.1 UPDM L1::UPDM L0::Core::AcquisitionElements::Milestone

Milestone elements from the acquisition section of the profile.

8.2.1.1.1.1.1 ActualProject

MODAF: (MODAF::Project): A time-limited endeavour to create a specific set of products or services.
DoDAF: (DoDAF::Project): A temporary endeavor undertaken to create Resources or Desired Effects.

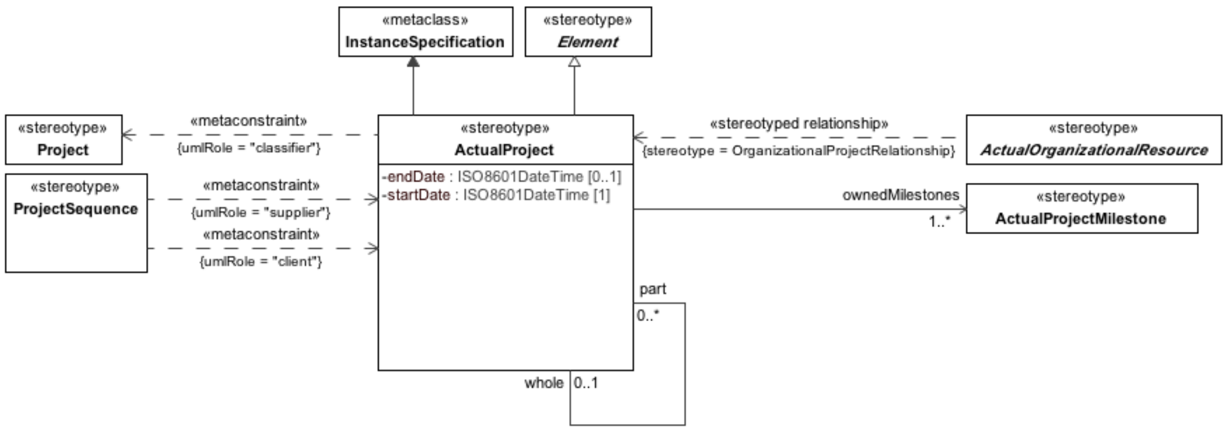


Figure 8.1 - Actual Project Elements related to the Project stereotype

Constraints

The following are constraints for ActualProject:

- ActualProject.classifier - Classifier property value must be stereotyped «Project» or its specializations.

Attribute

The following are attributes for ActualProject:

- endDate : ISO8601DateTime[0..1] - End time for this Project.
- ownedMilestones : ActualProjectMilestone[1..*] - Milestones associates with this project.
- part : ActualProject[0..*] - Sub-projects.
- startDate : ISO8601DateTime[1] - Start time for this Project.
- whole : ActualProject[0..1] - Parent project.

Extensions

The following are extensions for ActualProject:

- InstanceSpecification

Generalizations

The following are generalization relationships for ActualProject:

- Element

8.2.1.1.1.1.2 OrganizationalProjectRelationship

MODAF:A relationship between an ActualOrganisation and a Project.

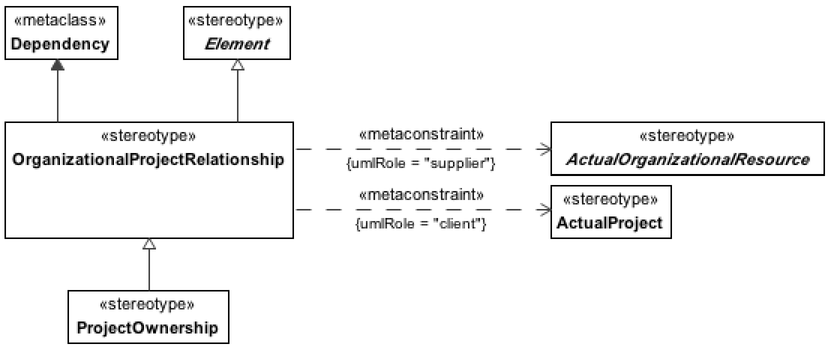


Figure 8.2 - OrganizationalProjectRelationship

Constraints

The following are constraints for OrganizationalProjectRelationship:

- OrganizationalProjectRelationship.client - Value for the client property must be stereotyped «ActualProject» or its specializations.
- OrganizationalProjectRelationship.supplier - Value for the supplier property must be stereotyped a specialization of «ActualOrganizationalResource».

Extensions

The following are extensions for OrganizationalProjectRelationship:

- Dependency

Generalizations

The following are generalization relationships for OrganizationalProjectRelationship:

- Element

8.2.1.1.1.1.3 Project

MODAF: A Project (MODAF::ProjectType) is used to define a category of project: For example, "Programme", "Acquisition Project" or "Training Programme". DoDAF: NA (only Individual Project in DoDAF).

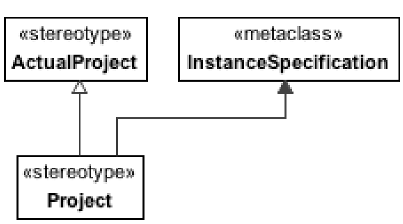


Figure 8.3 - Project

Extensions

The following are extensions for Project:

- Class

Generalizations

The following are generalization relationships for Project:

- Element

8.2.1.1.2 UPDM L1::UPDM L0::Core::AllElements

The AllEllements are elements that are part of the All View. The All-Views (AVs) provide an overarching description of the architecture, its scope, ownership, timeframe and all of the other meta data that is required in order to effectively search and query architectural models. They also provide a place to record any findings arising from the architecting process. The AVs include a dictionary of the terms used in the construction of the architecture – which helps others fully understand it's meaning at a later date. Since the AVs provide critical information for the future access and exploitation of an architectural model their population is essential whenever an architecture is created or modified. The AVs provide a critical input into the processes that provide architectural governance.

8.2.1.1.2.1 Element

UPDM Artifact: Super type for many of the UPDM elements. It provides a means of extending UPDM elements in a common way. With links to the measurement set, it also allows quantitative metrics to be associated with structural and behavioral elements.

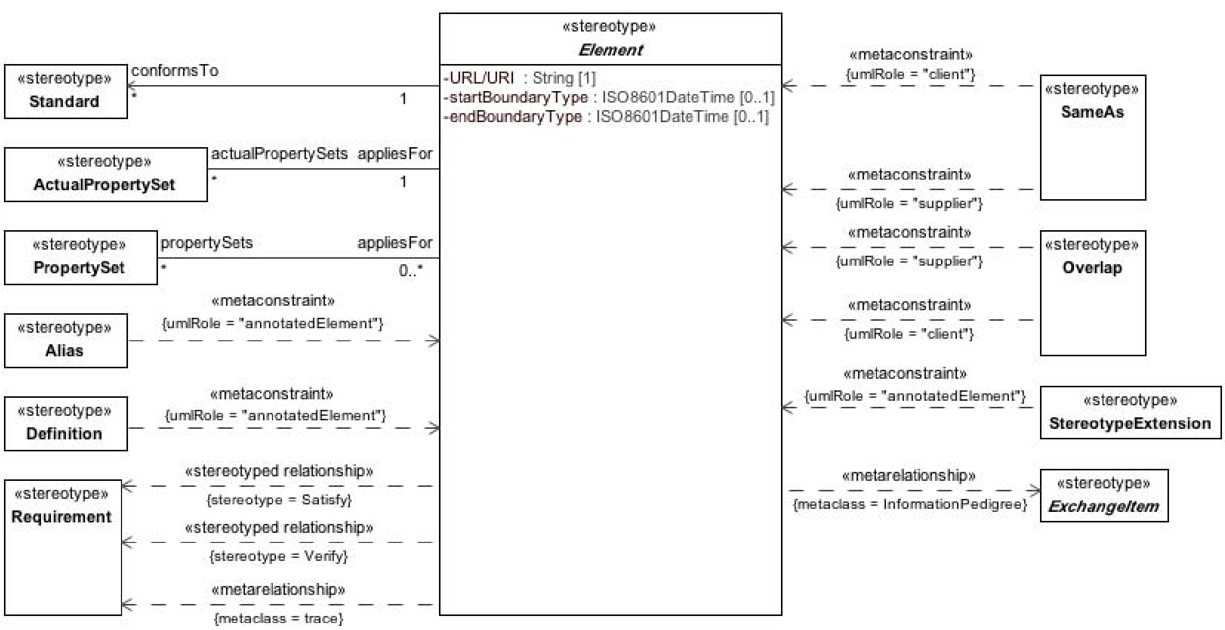


Figure 8.4 Element Standard that this UPDM element is conforming to.

Attribute

The following are attributes for Element:

- actualPropertySets : ActualPropertySet[*] - The actual measurements to which the element must conform.
- conformsTo : Standard[*] - Standard that this UPDM element is conforming to.
- endBoundaryType : ISO8601DateTime[0..1] -
- propertySets : PropertySet[*] - Types of measurements corresponding to the actual measurements.
- startBoundaryType : ISO8601DateTime[0..1] -
- URL/URI : String[1] - Unique identifier for the element.

8.2.1.1.2.2 Exchange

UPDM: Abstract grouping for interactions that exchange messages.
MODAF:NA
DoDAF:NA

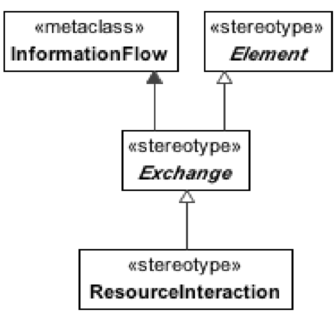


Figure 8.5 - Exchange

Extensions

The following are extensions for Exchange:

- InformationFlow

Generalizations

The following are generalization relationships for Exchange:

- Element

8.2.1.1.2.3 ExchangeItem

UPDM:Abstract grouping for types of information to be exchanged.
MODAF:NA
DoDAF:NA

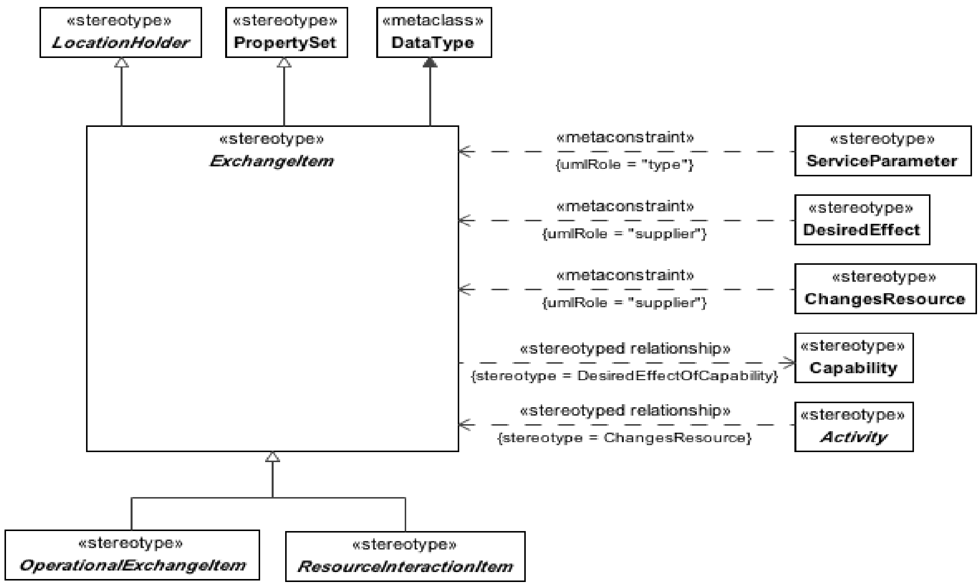


Figure 8.6 - ExchangeItem

Extensions

The following are extensions for ExchangeItem:

- DataType

Generalizations

The following are generalization relationships for ExchangeItem:

- PropertySet
- LocationHolder

8.2.1.1.2.4 UPDM L1::UPDM L0::Core::AllElements::Behavior

The behavioral portion of the AllElements profile.

8.2.1.1.2.4.1 Activity

UPDM: An abstract element that represents a behavior (i.e. a Function or OperationalActivity) that can be performed by a Performer.
MODAF: NA
DoDAF: Work, not specific to a single organization, weapon system or individual that transforms inputs (Resources) into outputs (Resources) or changes their state.

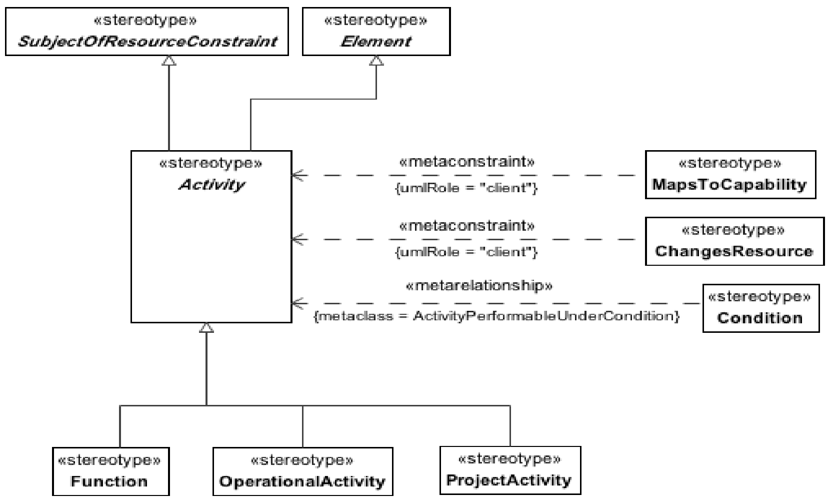


Figure 8.7 - Activity

Extensions

The following are extensions for Activity:

- Activity

Generalizations

The following are generalization relationships for Activity:

- Element
- SubjectOfResourceConstraint

8.2.1.1.2.4.2 CapableElement

UPDM An abstract element that represents a structural element that can perform behaviors (i.e. PerformedActivity). DoDAF: NA

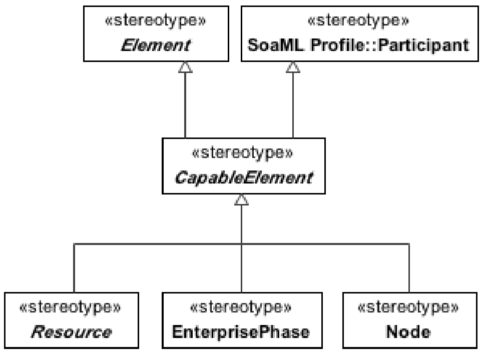


Figure 8.8 - CapableElement

Generalizations

The following are generalization relationships for CapableElement:

- Element
- Participant

8.2.1.1.2.4.3 Performs

UPDM: Links a Performer to the behavior that it can perform.
DoDAF: The Performs (DoDAF::activityPerformedByPerformer) relationship is an overlap between a Performer and a PerformedActivity (DoDAF::Activity) wherein the activity is performed by the Performer.

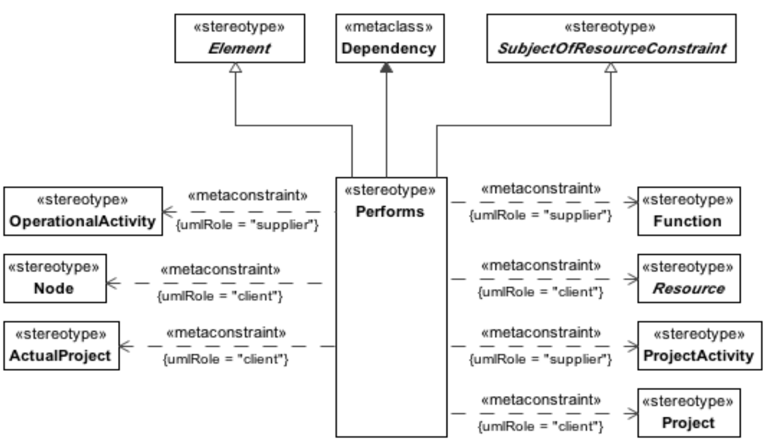


Figure 8.9 - Performs

Constraints

The following are constraints for Performs:

- Performs.client - Values for the client property must be stereotyped «Node», «Resource», «Project», «ActualProject» or their specializations.
- Performs.supplier - Values for the supplier property must be stereotyped «OperationalActivity», «Function»,«ProjectActivity» or their specializations.

Extensions

The following are extensions for Performs:

- Dependency

Generalizations

The following are generalization relationships for Performs:

- Element
- SubjectOfResourceConstraint
- SubjectOfOperationalConstraint

8.2.1.1.2.5 UPDM L1::UPDM L0::Core::AllElements::Environment

The environmental aspects of the AllElements profile.

8.2.1.1.2.5.1 Location

MODAF: A general specification of the surroundings / scenario in which an operation may take place. Examples would be: "desert", "arctic", "at sea", etc.
DoDAF: A point or extent in space that may be referred to physically or logically. Includes concepts such as: Facility, Installation, RealProperty, Site, , and instances of conditions such as underwater (as specified in UJTLs).

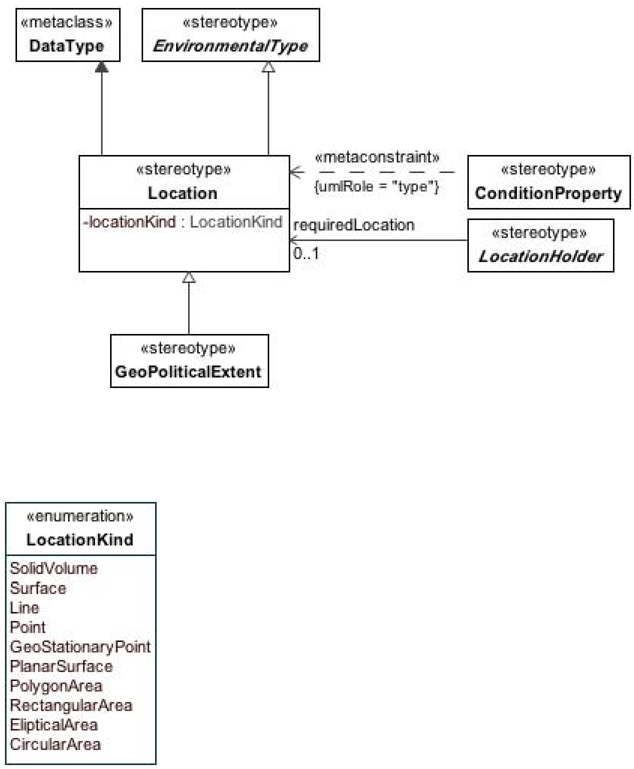


Figure 8.10 - Location

Attribute

The following are attributes for Location:

- locationKind : LocationKind[] - Kind of location taken from the DOD UJTLs.

Extensions

The following are extensions for Location:

- DataType

Generalizations

The following are generalization relationships for Location:

- EnvironmentalType
- ConceptItem

8.2.1.1.2.5.2 LocationHolder

UPDM:Abstract grouping to capture elements that can have a location.

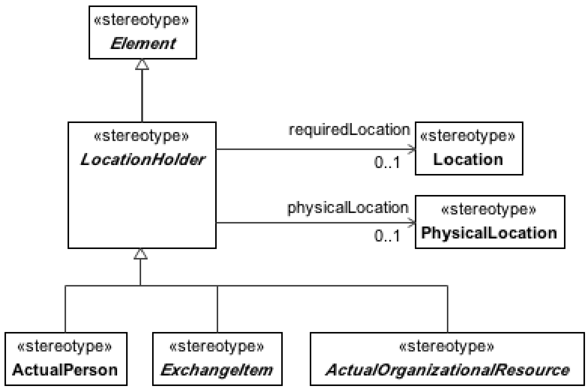


Figure 8.11 - LocationHolder

Attribute

The following are attributes for LocationHolder:

- physicalLocation : PhysicalLocation[0..1] -
- requiredLocation : Location[0..1] -

Extensions

The following are extensions for LocationHolder:

- Element

Generalizations

The following are generalization relationships for LocationHolder:

- Element

8.2.1.1.2.5.3 PhysicalLocation

MODAF: A PhysicalLocation (MODAF::ActualLocation) is a location anywhere on the earth. The means of describing the location is a string (locationDescription). The information contained in that string is governed by the taxonomy reference - e.g. if the PhysicalLocation is a "GPS reference", the string will contain the GPS coordinates. NOTE: this has been extended in UPDM to include non-earth locations.
DoDAF: All subtypes of << IndividualType>> Location, such as Facility, Site, etc.

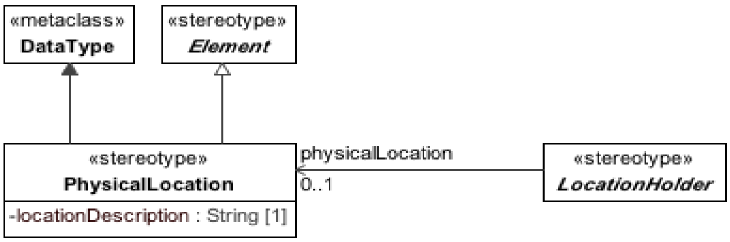


Figure 8.12 - PhysicalLocation

Attribute

The following are attributes for PhysicalLocation:

- locationDescription : String[1] - The description of the ActualLocation.

Extensions

The following are extensions for PhysicalLocation:

- DataType

Generalizations

The following are generalization relationships for PhysicalLocation:

- Element

8.2.1.1.2.6 UPDM L1::UPDM L0::Core::AllElements::Measurements

The measurement portion of the AllElements profile.

8.2.1.1.2.6.1 ActualMeasurement

UPDM: An actual value of the Measurement.
MODAF: NA
DoDAF: NA

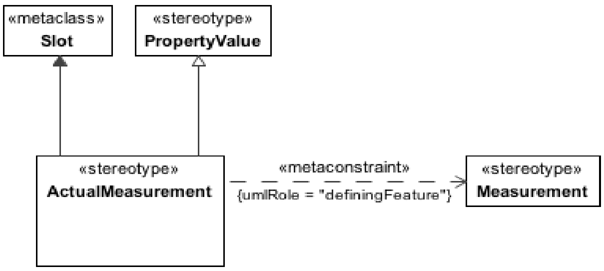


Figure 8.13 - ActualMeasurement

Constraints

The following are constraints for ActualMeasurement:

- ActualMeasurement.definingFeature - Value for definingFeature property must be stereotyped «Measurement» or its specializations.

Extensions

The following are extensions for ActualMeasurement:

- Slot

Generalizations

The following are generalization relationships for ActualMeasurement:

- PropertyValue

8.2.1.1.2.6.2 ActualPropertySet

UPDM: A set or collection of ActualMeasurement(s). A date of measurement can be set. An intent of ActualMeasurementSet can be “Result”, “Required”, or “Estimate”
MODAF: NA
DoDAF: NA

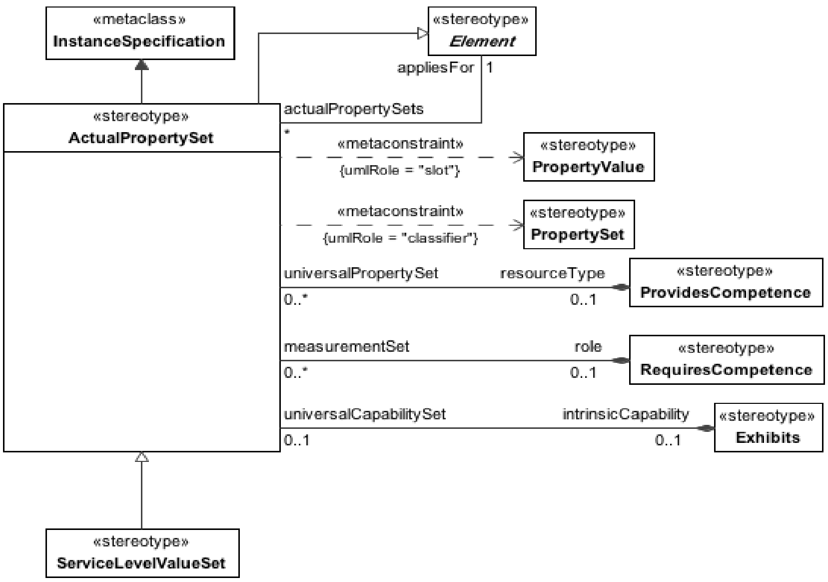


Figure 8.14 - ActualPropertySet

Constraints

The following are constraints for ActualPropertySet:

- ActualPropertySet.classifier - Value for the classifier property must be stereotyped «PropertySet» or its specializations.
- ActualPropertySet.slot - Value for the slot property must be stereotyped «PropertyValue» or its specializations.

Attribute

The following are attributes for ActualPropertySet:

- appliesFor : Element[1] - Measured element.
- intrinsicCapability : Exhibits[0..1] -
- requiredMOE : DesiredEffect[0..1] -
- resourceType : ProvidesCompetence[0..1] -
- role : RequiresCompetence[0..1] -

Extensions

The following are extensions for ActualPropertySet:

- InstanceSpecification

Generalizations

The following are generalization relationships for ActualPropertySet:

- Element

8.2.1.1.2.6.3 Measurement

MODAF: MeasurableProperty: A property of something in the physical world, expressed in amounts of a unit of measure. The property may have a required value - either specified by the [defaultValue] from UML::property attribute, or the [minValue] and [maxValue] to specify a required range.
DoDAF: Measure: A Measurement (DoDAF::Measure) is the magnitude of some attribute of an individual.

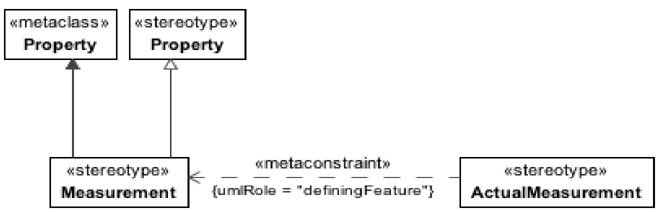


Figure 8.15 - Measurement

Extensions

The following are extensions for Measurement:

- Property

Generalizations

The following are generalization relationships for Measurement:

- Property

8.2.1.1.2.6.4 Property

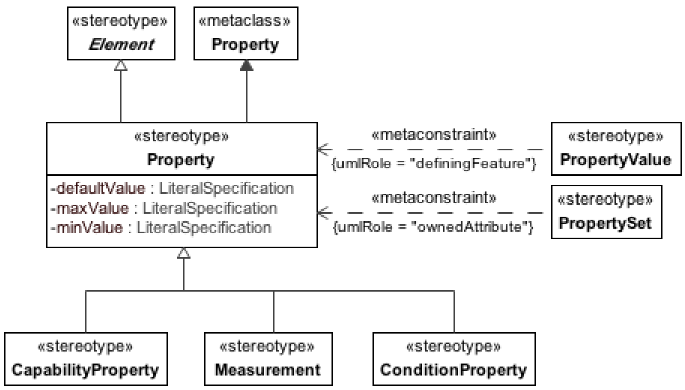


Figure 8.16 - Property

Attribute

The following are attributes for Property:

- defaultValue : LiteralSpecification[] -
- maxValue : LiteralSpecification[] -
- minValue : LiteralSpecification[] -

Extensions

The following are extensions for Property:

- Property

Generalizations

The following are generalization relationships for Property:

- Element

8.2.1.1.2.6.5 PropertySet

UPDM: A set or collection of Measurement(s).
MODAF: NA
DoDAF: NA

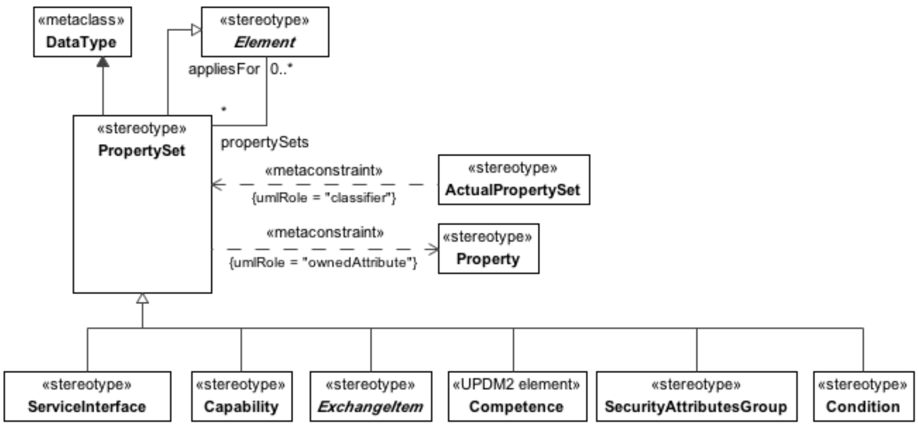


Figure 8.17 - PropertySet

Constraints

The following are constraints for PropertySet:

- PropertySet.ownedAttribute - Values for the ownedAttribute property must be stereotyped «Property» or its specializations.

Attribute

The following are attributes for PropertySet:

- appliesFor : Element[0..*] - Measured element.

Extensions

The following are extensions for PropertySet:

- DataType

Generalizations

The following are generalization relationships for PropertySet:

- Element

8.2.1.1.2.6.6 PropertyValue

UPDM:The value of a Measure.
MODAF:NA
DoDAF:NA

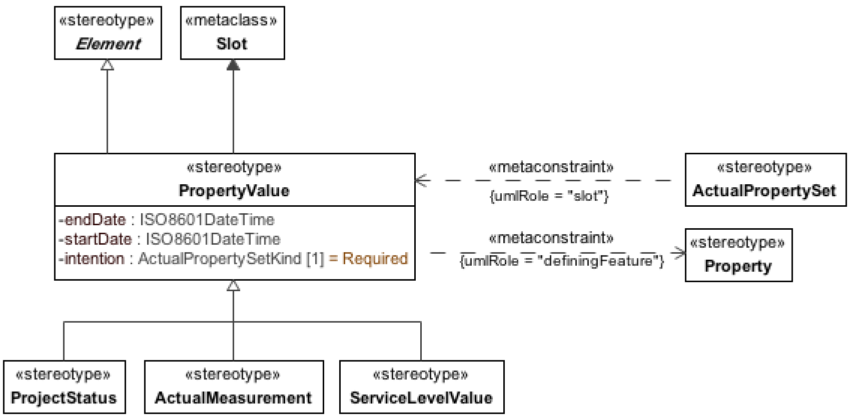


Figure 8.18 - PropertyValue

Constraints

The following are constraints for PropertyValue:

- PropertyValue.definingFeature - Value for definingFeature property must be stereotyped «Property» or its specializations.

Attribute

The following are attributes for PropertyValue:

- endDate : ISO8601DateTime[] -
- intention : ActualPropertySetKind[1] -
- startDate : ISO8601DateTime[] -

Extensions

The following are extensions for PropertyValue:

- Slot

Generalizations

The following are generalization relationships for PropertyValue:

- Element

8.2.1.1.2.7 UPDM L1::UPDM L0::Core::AllElements::Structure

8.2.1.1.2.7.1 Rule

MODAF: An abstract Class that is extended by OperationalConstraint (A rule governing an operational behaviour or property.) and ResourceConstraint (A rule governing the structural or functional aspects of an implementation - this may also include constraints on OrganisationalResources that are part of an implementation).
DoDAF: Rule: A principle or condition that governs behavior; a prescribed guide for conduct or action. Subtype: Constraint: The range of permissible states for an object.

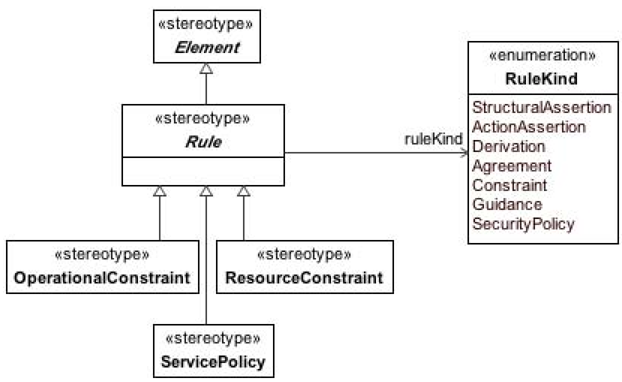


Figure 8.19 - Rule

Attribute

The following are attributes for Rule:

- ruleKind : RuleKind[] -

Generalizations

The following are generalization relationships for Rule:

- Element

8.2.1.1.2.8 UPDM L1::UPDM L0::Core::AllElements::Views

The views section of the AllElements profile.

8.2.1.1.2.8.1 ArchitecturalDescription

MODAF: A specification of a system of systems at a technical level which also provides the business context for the system of systems.
DoDAF: Information describing an architecture such as an OV-5 Activity Model document.

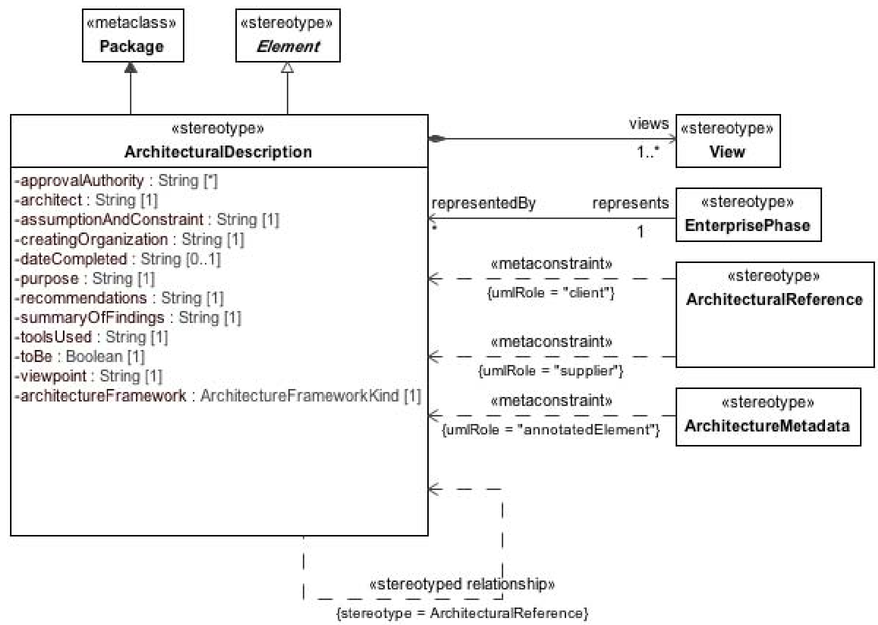


Figure 8.20 - ArchitecturalDescription

Constraints

The following are constraints for ArchitecturalDescription:

- ArchitecturalDescription.architectureFramework - If the property is set to DoDAF, only aliases scoped under the DoDAF profile can be used – if set to MODAF then only MODAF aliases can be used. Should the property be set to nothing, none of the aliases can be used.

Attribute

The following are attributes for ArchitecturalDescription:

- approvalAuthority : String[*] - References the actual organizational resource that has the authority to approve the architectural description.
- architect : String[1] - The name of the architect responsible for the ArchitecturalDescription.
- architectureFramework : ArchitectureFrameworkKind[1] - Indicates the type of framework used.
- assumptionAndConstraint : String[1] - Any assumptions, constraints, and limitations contained in the ArchitecturalDescription, including those affecting deployment, communications performance, information assurance environments, etc.
- creatingOrganization : String[1] - Describes the ActualOrganizationalResource creating the ArchitecturalDescription.
- dateCompleted : String[0..1] - Date that the Architectural Description was completed.

- purpose : String[1] - Explains the need for the Architecture, what it will demonstrate, the types of analyses that will be applied to it, who is expected to perform the analyses, what decisions are expected to be made on the basis of each form of analysis, who is expected to make those decisions, and what actions are expected to result.
- recommendations : String[1] - States the recommendations that have been developed based on the architecture effort. Examples include recommended system implementations, and opportunities for technology insertion.
- summaryOfFindings : String[1] - Summarizes the findings that have been developed so far. This may be updated several times during the development of the ArchitecturalDescription.
- toBe : Boolean[1] - Indicates whether the ArchitecturalDescription is existing or future.
- toolsUsed : String[1] - Identifies any tools used to develop the ArchitecturalDescription as well as file names and formats if appropriate.
- viewpoint : String[1] - Indicates which viewpoints are used in the architecture.
- views : View[1..*] - Indicates which views are used in the architecture.

Extensions

The following are extensions for ArchitecturalDescription:

- Package

Generalizations

The following are generalization relationships for ArchitecturalDescription:

- Element

8.2.1.1.2.8.2 ArchitecturalReference

MODAF: Asserts that one architectural description (referrer) refers to another (referred).
DoDAF: NA

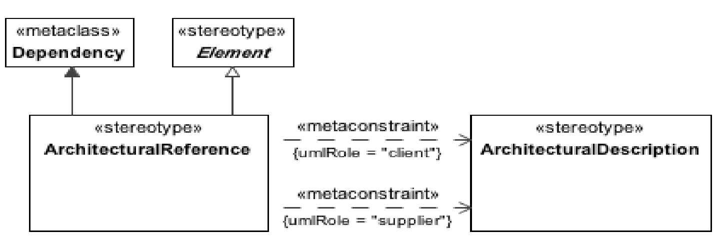


Figure 8.21 - ArchitecturalReference

Constraints

The following are constraints for ArchitecturalReference:

- ArchitecturalReference.client - Value for the client property must be stereotyped «ArchitecturalDescription» or its specializations.

- ArchitecturalReference.supplier - Value for the supplier property must be stereotyped «ArchitecturalDescription» or its specializations.

Extensions

The following are extensions for ArchitecturalReference:

- Dependency

Generalizations

The following are generalization relationships for ArchitecturalReference:

- Element

8.2.1.1.2.8.3 ArchitectureMetadata

UPDM: Information on ArchitecturalDescription. It states things like what methodology was used, notation, etc.
MODAF: A Metadata element that applies to the whole architecture.
DoDAF: NA

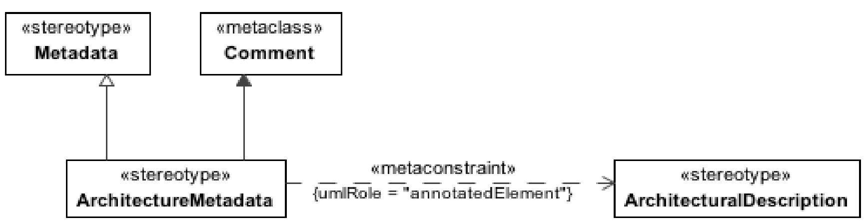


Figure 8.22 - ArchitectureMetadata

Constraints

The following are constraints for ArchitectureMetadata:

- ArchitectureMetadata.annotatedElement - Value for the annotatedElement property must be stereotyped «ArchitecturalDescription» or its specializations.

Extensions

The following are extensions for ArchitectureMetadata:

- Comment

Generalizations

The following are generalization relationships for ArchitectureMetadata:

- Metadata

8.2.1.1.2.8.4 Metadata

MODAF: Annotation that can be applied to any element in the architecture.
DoDAF: NA

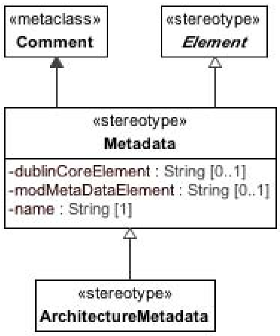


Figure 8.23 - Metadata

Attribute

The following are attributes for Metadata:

- dublinCoreElement : String[0..1] - If the meta data corresponds to the Dublin Core Meta-Data Standard, then the meta-data element name should be listed here
- modMetaDataElement : String[0..1] - If the meta data corresponds to the MOD Meta-Data Standard, then the meta-data element name should be listed here.
- name : String[1] - The name of the Metadata.

Extensions

The following are extensions for Metadata:

- Comment

Generalizations

The following are generalization relationships for Metadata:

- Element

8.2.1.1.2.8.5 View

MODAF:A specification of a way to present an aspect of the architecture. Views are defined with one or more purposes in mind - e.g. showing the logical topology of the enterprise, describing a process model, defining a data model, etc.
DoDAF:NA

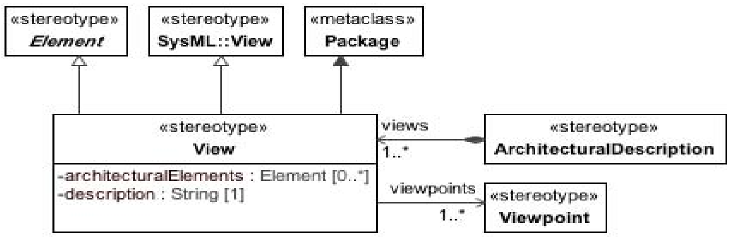


Figure 8.24 - View

Attribute

The following are attributes for View:

- architecturalElements : Element[0..*] -
- description : String[1] -
- viewpoints : Viewpoint[1..*] -

Extensions

The following are extensions for View:

- Package

Generalizations

The following are generalization relationships for View:

- View
- Element

8.2.1.1.2.8.6 Viewpoint

MODAF:An instance of the specified View.
DoDAF:NA

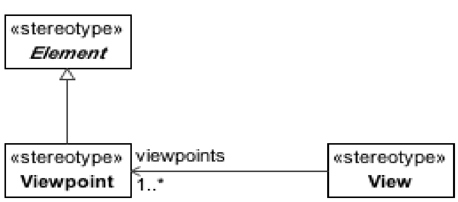


Figure 8.25 - Viewpoint

Attribute

The following are attributes for Viewpoint:

- concerns : String[*] -
- languages : String[*] -
- methods : String[*] -
- purpose : String[0..1] -
- stakeholders : String[*] -

Extensions

The following are extensions for Viewpoint:

- Package

Generalizations

The following are generalization relationships for Viewpoint:

- Element

8.2.1.1.3 UPDM L1::UPDM L0::Core::ExternalTypes

A type defined by an external ontology. This may be higher-order - i.e. a type of a type.

8.2.1.1.3.1 ISO8601DateTime

MODAF: A date and time specified in the ISO8601 date-time format including timezone designator (TZD): YYYY-MM-DDThh:mm:ssTZD.
DoDAF: NA

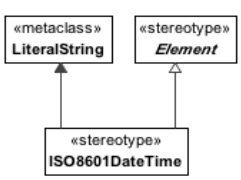


Figure 8.26 - ISO8601DateTime

MODAF: A date and time specified in the ISO8601 date-time format including timezone designator (TZD): YYYY-MM-DDThh:mm:ssTZD.
DoDAF: NA

Extensions

The following are extensions for ISO8601DateTime:

- LiteralString

Generalizations

The following are generalization relationships for ISO8601DateTime:

- Element

8.2.1.1.4 UPDM L1::UPDM L0::Core::OperationalElements

OperationalElements group elements used to model product for Operational View. An Operational View (OV) describes the tasks and activities, operational elements, and information exchanges required to conduct operations. A pure OV is materiel independent. However, operations and their relationships may be influenced by new technologies such as collaboration technology, where process improvements are in practice before policy can reflect the new procedures. There may be some cases, as well, in which it is necessary to document the way processes are performed given the restrictions of current systems, in order to examine ways in which new systems could facilitate streamlining the processes. In such cases, an OV may have materiel constraints and requirements that must be addressed. For this reason, it may be necessary to include some high- level Systems View (SV) architecture data as overlays or augmenting information onto the OV products.

8.2.1.1.4.1 UPDM L1::UPDM L0::Core::OperationalElements::Behavior

Behavioral section of the OperationalElements Profile.

8.2.1.1.4.1.1 NodeOperation

UPDM:A partial or full realization of an OperationalActivity.
MODAF:NA
DoDAF:NA

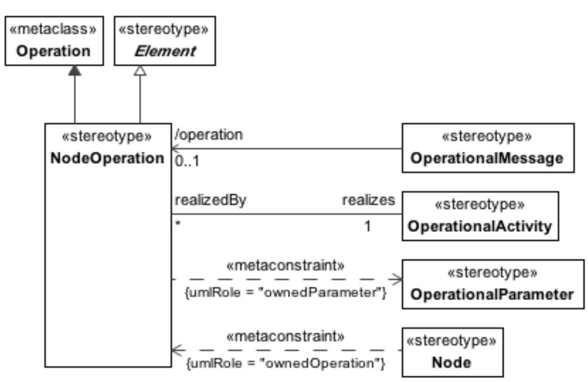


Figure 8.27 - NodeOperation

Constraints

The following are constraints for NodeOperation:

- NodeOperation.ownedParameter - The values for the ownedParameter property must be stereotyped «OperationalParameter» or its specializations.

Attribute

The following are attributes for NodeOperation:

- realizes : OperationalActivity[1] -

Extensions

The following are extensions for NodeOperation:

- Operation

Generalizations

The following are generalization relationships for NodeOperation:

- Element

8.2.1.1.4.1.2 OperationalActivity

MODAF: A logical process, specified independently of how the process is carried out.DoDAF: An activity is an action performed in conducting the business of an enterprise. It is a general term that does not imply a placement in a hierarchy (e.g., it could be a process or a task as defined in other documents and it could be at any level of the hierarchy of the OV-5). It is used to portray operational actions not hardware/software system functions. NOTE: This is also a specialization of Activity.
DoDAF:NA

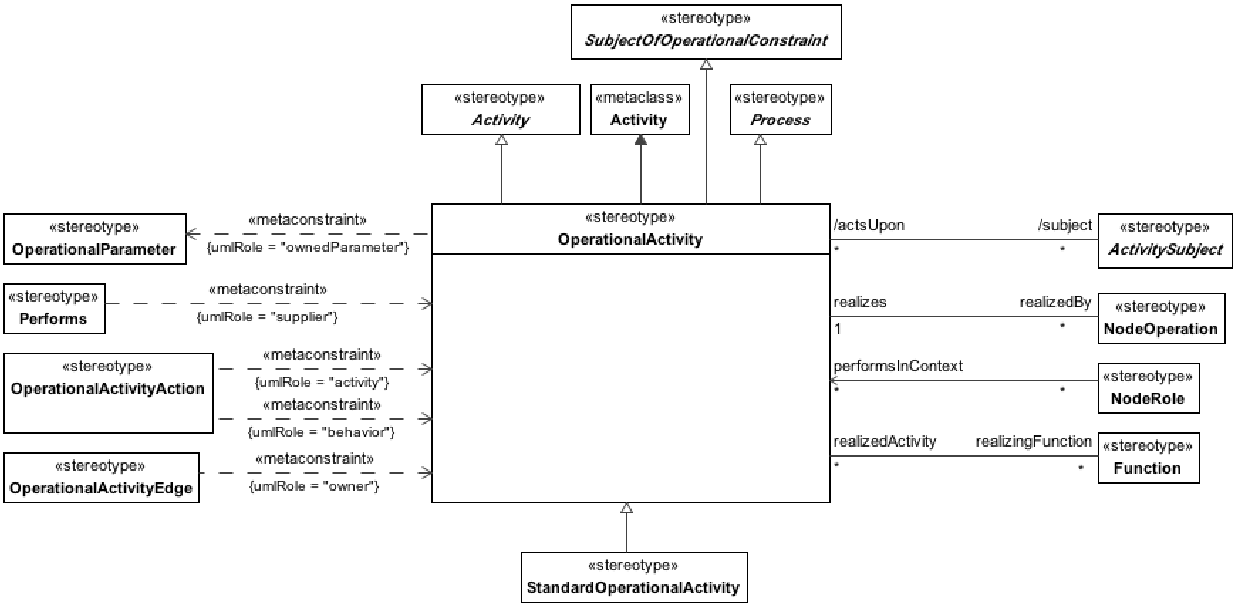


Figure 8.28 - OperationalActivity

Constraints

The following are constraints for OperationalActivity:

- OperationalActivity.ownedParameter - The values for the ownedParameter property must be stereotyped «OperationalParameter» or its specializations.

Attribute

The following are attributes for OperationalActivity:

- realizedBy : NodeOperation[*] -
- realizingFunction : Function[*] -
- subject : ActivitySubject[*] - Object acting upon this OperationalActivity.

Extensions

The following are extensions for OperationalActivity:

- Activity

Generalizations

The following are generalization relationships for OperationalActivity:

- Activity

- SubjectOfOperationalConstraint
- Process

8.2.1.1.4.1.3 OperationalActivityAction

UPDM: The OperationalActivityAction is defined as a call behavior action that invokes the activity that needs to be preformed.
MODAF: Used to relate an OperationalActivity to its sub-activities.
DoDAF:NA

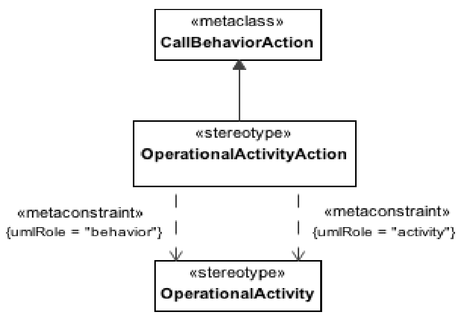


Figure 8.29 - OperationalActivityAction

Constraints

The following are constraints for OperationalActivityAction:

- OperationalActivityAction.activity - Value for behavior property must be stereotyped «OperationalActivity» or its specializations.
- OperationalActivityAction.behavior - Value for activity property must be stereotyped «OperationalActivity» or its specializations.

Extensions

The following are extensions for OperationalActivityAction:

- CallBehaviorAction

Generalizations

The following are generalization relationships for OperationalActivityAction:

- Element

8.2.1.1.4.1.4 OperationalActivityEdge

UPDM An extension of <<ActivityEdge>> that is used to model the flow of control/objects through an OperationalActivity.
MODAF: An OperationalActivityEdge (MODAF::OperationalActivityFlow) is a flow of information, energy or materiel from one activity to another.
DoDAF:NA

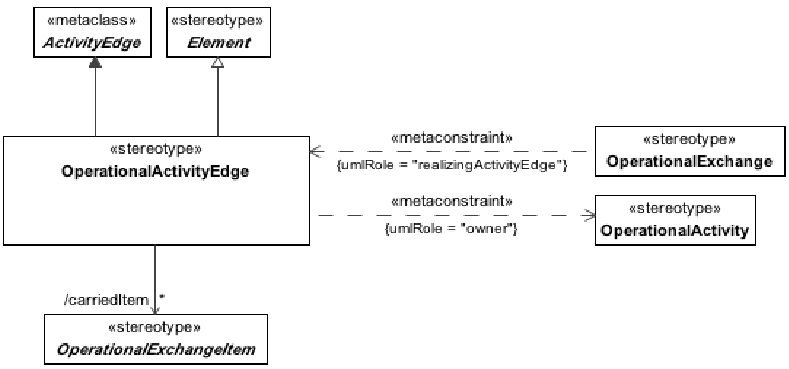


Figure 8.30 - OperationalActivityEdge

Constraints

The following are constraints for OperationalActivityEdge:

- OperationalActivityEdge.owner - «OperationalActivityEdge» must be owned directly or indirectly by «OperationalActivity».

Attribute

The following are attributes for OperationalActivityEdge:

- carriedItem : OperationalExchangeItem[*] -

Extensions

The following are extensions for OperationalActivityEdge:

- ActivityEdge

Generalizations

The following are generalization relationships for OperationalActivityEdge:

- Element

8.2.1.1.4.1.5 OperationalEventTrace

MODAF: An OperationalEventTrace (MODAF::OperationalInteractionSpecification) is a specification of the interactions between nodes in an operational architecture.
DoDAF: The Operational Event-Trace Description (OV-6c) DoDAF-described View provides a time ordered examination of the resource flows as a result of a particular scenario. Each event-trace diagram will have an accompanying description that defines the particular scenario or situation.

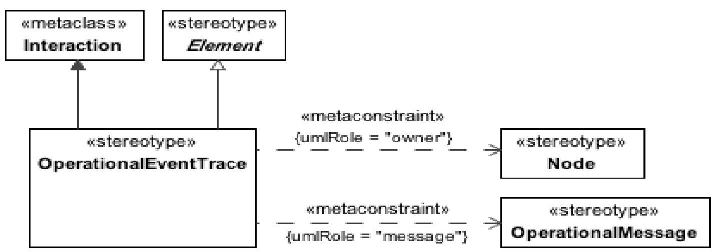


Figure 8.31 - OperationalEventTrace

Constraints

The following are constraints for OperationalEventTrace:

- OperationalEventTrace.message - Values for the message property must be stereotyped with «OperationalMessage» or its specializations.
- OperationalEventTrace.owner - Values for the owner property must be stereotyped with «Node» or its specializations.

Extensions

The following are extensions for OperationalEventTrace:

- Interaction

Generalizations

The following are generalization relationships for OperationalEventTrace:

- Element

8.2.1.1.4.1.6 OperationalMessage

UPDM: Message for use in an Operational Event-Trace which carries any of the subtypes of OperationalExchange. This is used to provide additional information about OperationalMessages for display on an OV-6c.

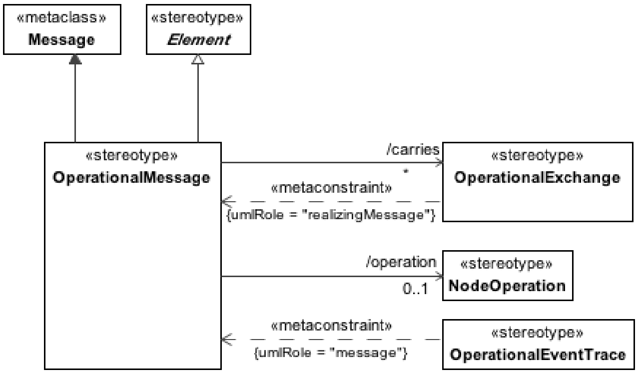


Figure 8.32 - OperationalMessage

Attribute

The following are attributes for OperationalMessage:

- carries : OperationalExchange[*] - Carried OperationalExchange.
- operation : NodeOperation[0..1] -

Extensions

The following are extensions for OperationalMessage:

- Message

Generalizations

The following are generalization relationships for OperationalMessage:

- Element

8.2.1.1.4.1.7 OperationalParameter

UPDM Represents inputs and outputs of an OperationalActivity. It is typed by OperationalExchangeItem.

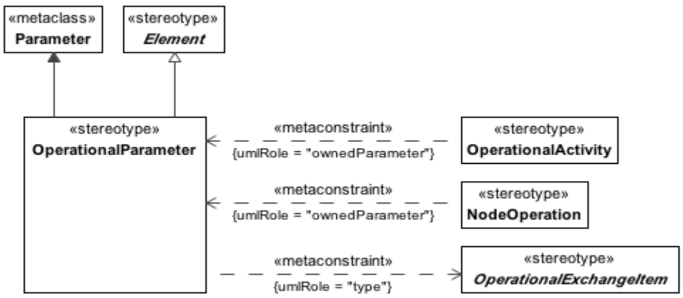


Figure 8.33 - OperationalParameter

Constraints

The following are constraints for OperationalParameter:

- OperationalParameter.type - Value for the type property must be stereotyped by specialization of «OperationalExchangeItem».

Extensions

The following are extensions for OperationalParameter:

- Parameter

Generalizations

The following are generalization relationships for OperationalParameter:

- Element

8.2.1.1.4.1.8 OperationalStateDescription

UPDM: A state machine describing an operational behavior or property.
MODAF: An OperationalStateMachine (MODAF::OperationalStateDescription) is a rule governing an operational behaviour or property.
DoDAF: The Operational State Transition Description (OV-6b) DoDAF-described View is a graphical method of describing how an Operational Activity responds to various events by changing its state. The diagram represents the sets of events to which the Architecture will respond (by taking an action to move to a new state) as a function of its current state. Each transition specifies an event and an action.

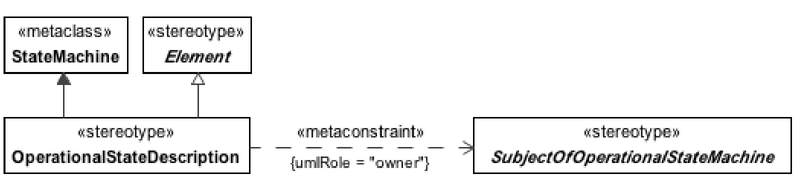


Figure 8.34 - OperationalStateDescription

Constraints

The following are constraints for OperationalStateDescription:

- OperationalStateDescription.owner - Values for the owner property must be stereotyped with specializations of «SubjectOfOperationalStateMachine» .

Extensions

The following are extensions for OperationalStateDescription:

- StateMachine

Generalizations

The following are generalization relationships for OperationalStateDescription:

- Element

8.2.1.1.4.1.9 SubjectOfOperationalStateMachine

UPDM Abstract Element: The element being described by the state machine.

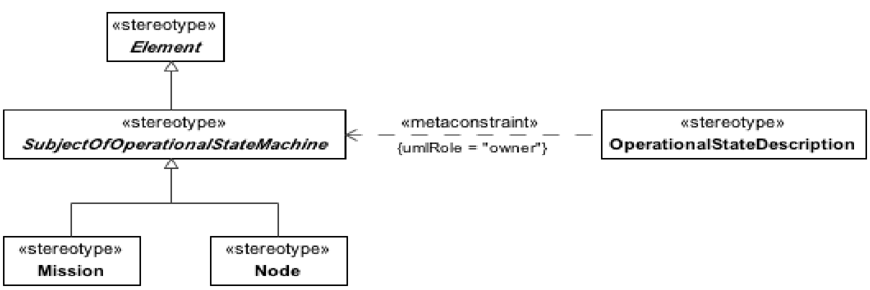


Figure 8.35 - SubjectOfOperationalStateMachine

Constraints

The following are constraints for SubjectOfOperationalStateMachine:

- SubjectOfOperationalStateMachine.ownedBehavior - If elements, that have applied stereotypes that are specializations of «SubjectOfOperationalStateMachine» have StateMachines as owned behaviors, then those behaviors must be stereotyped «OperationalStateMachine» or its specializations.

Generalizations

The following are generalization relationships for SubjectOfOperationalStateMachine:

- Element

8.2.1.1.4.2 UPDM L1::UPDM L0::Core::OperationalElements::Data

The Data Profile is used to document the business information requirements and structural business process rules of the architecture. It describes the information that is associated with the information exchanges of the architecture. Included are information items, their attributes or characteristics, and their inter-relationships.

8.2.1.1.4.2.1 ConceptualDataModel

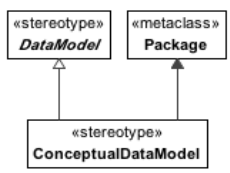


Figure 8.36 - ConceptualDataModel

Extensions

The following are extensions for ConceptualDataModel:

- Package

Generalizations

The following are generalization relationships for ConceptualDataModel:

- DataModel

8.2.1.1.4.2.2 InformationElement

MODAF: A relationship specifying the need to exchange information between nodes.
DoDAF: NA - this is a specialization of OperationalExchange (DoDAF::Interface).

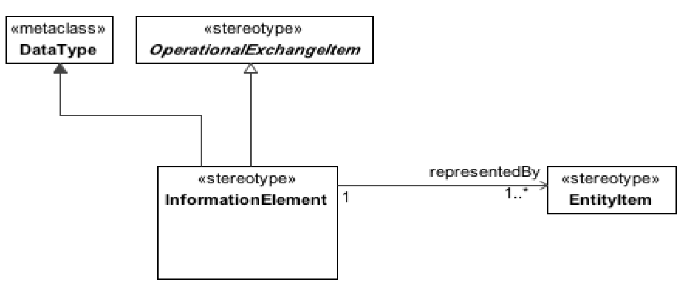


Figure 8.37 - InformationElement

Attribute

The following are attributes for InformationElement:

- representedBy : EntityItem[1..*] - The list of EntityItems that are represented by the InformationElement

Extensions

The following are extensions for InformationElement:

- DataType

Generalizations

The following are generalization relationships for InformationElement:

- OperationalExchangeItem

8.2.1.1.4.2.3 LogicalDataModel

MODAF: A LogicalDataModel is a specification of business information requirements as a formal data structure, where relationships and classes (entities) are used to specify the logic which underpins the information.
DoDAF: A Logical Data Model allows analysis of an architecture's data definition aspect, without consideration of implementation specific or product specific issues.

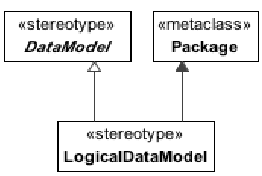


Figure 8.38 - LogicalDataModel

Extensions

The following are extensions for LogicalDataModel:

- Package

Generalizations

The following are generalization relationships for LogicalDataModel:

- DataModel

8.2.1.1.4.3 UPDM L1::UPDM L0::Core::OperationalElements::Flows

Section of the OperationalElements profile that describe flows exists or are required between Nodes such as flows of information, people, materiel, or energy.

8.2.1.1.4.3.1 Command

MODAF: Asserts that one OrganisationalResource (source) commands another (target)
DoDAF: NA

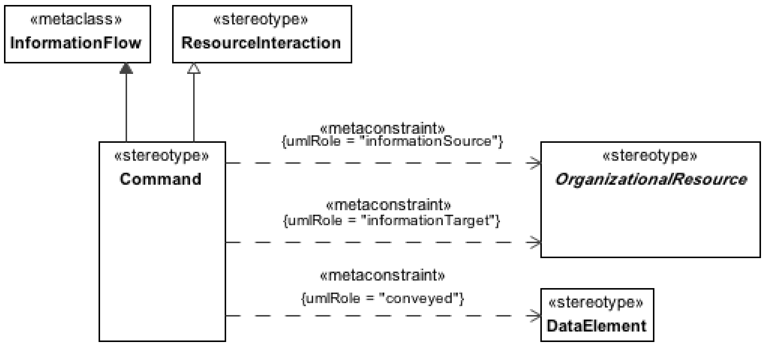


Figure 8.39 - Command

Constraints

The following are constraints for Command:

- Command.conveyed - Value for the conveyed property must be stereotyped «DataElement» or its specializations.
- Command.informationSource - Value for the informationSource property must be stereotyped «OrganizationalResource» or its specializations.
- Command.informationTarget - Value for the informationTarget property must be stereotyped «OrganizationalResource» or its specializations.

Extensions

The following are extensions for Command:

- InformationFlow

Generalizations

The following are generalization relationships for Command:

- ResourceInteraction

8.2.1.1.4.3.2 OperationalExchange

UPDM: An utility element used as common flow for:

- InformationExchange
- OrganizationalExchange
- EnergyExchange
- MaterielExchange
- ConfigurationExchange
- GeoPoliticalExtent

An operational exchange is formed when an activity of one operational node consumes items produced by another activity of a different operational node.

An operational exchange describes the characteristics of the exchanged item, such as the content, format (voice, imagery, text and message format, etc.), throughput requirements, security or classification level, timeliness requirement, and the degree of interoperability.

MODAF: An OperationalExchange (MODAF::LogicalFlow) asserts that a flow exists or is required between Nodes (e.g. flows of information, people, materiel, or energy).

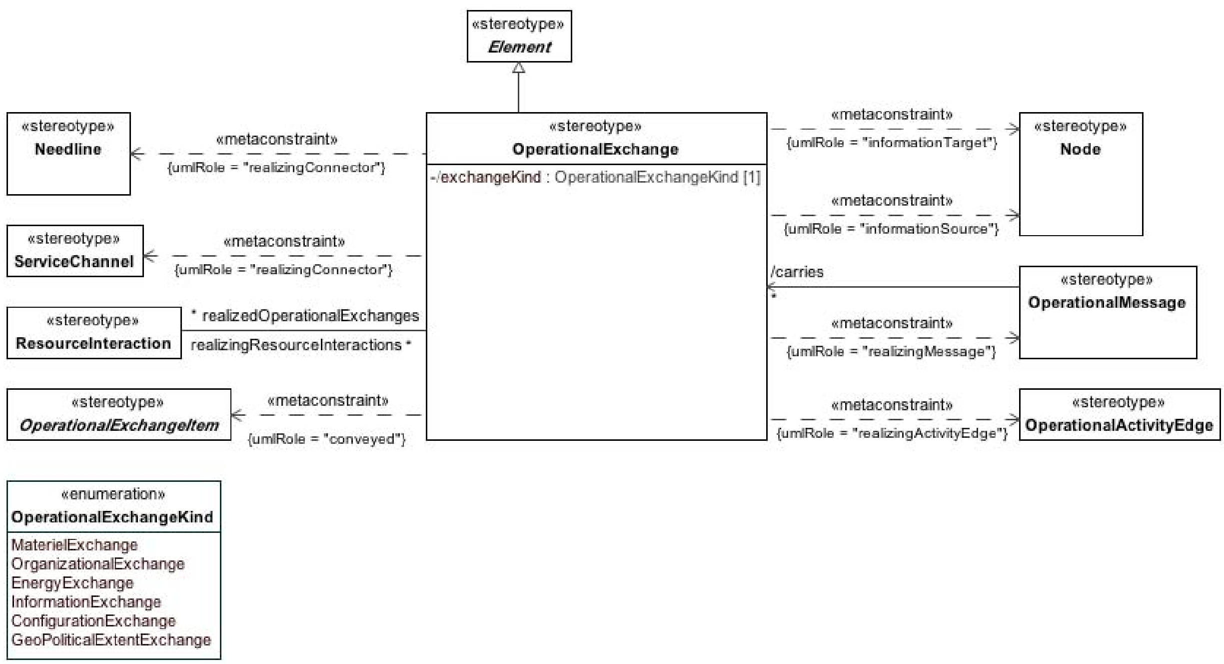


Figure 8.40 - OperationalExchange

Constraints

The following are constraints for OperationalExchange:

- OperationalExchange.conveyed - In case of OperationalExchange.operationalExchangeKind:
  = InformationExchange, the conveyed element must be stereotyped «InformationElement» or its specializations,
  = MaterielExchange, the conveyed element must be stereotyped «ResourceArtifact» or its specializations,
  = EnergyExchange, the conveyed element must be stereotyped «Energy» or its specializations,
  = OrganizationalExchange, the conveyed element must be stereotyped «OrganizationalResource» or its specializations,
  = ConfigurationExchange, the conveyed element must be stereotyped «CapabilityConfiguration» or its specializations,or
  = GeoPoliticalExtentExchange, the conveyed element must be stereotyped «GeoPoliticalExtent» or its specializations.

- OperationalExchange.informationSource - Value for informationSource property has to be stereotyped «Node» or its specializations.

- OperationalExchange.informationTarget - Value for informationTarget property has to be stereotyped «Node» or its specializations.

- OperationalExchange.realization/realizingConnector - Value for realization or realizingConnector property has to be stereotyped «Needline», «ServiceChannel», or their specializations.
- OperationalExchange.realizingActivityEdge - Value for realizingActivityEdge property has to be stereotyped «OperationalActivityEdge» or its specializations.
- OperationalExchange.realizingMessage - Value for realizingMessage property has to be stereotyped «OperationalMessage» or its specializations.

Attribute

The following are attributes for OperationalExchange:

- exchangeKind : OperationalExchangeKind[1] -
- realizingResourceInteractions : ResourceInteraction[*] -

Extensions

The following are extensions for OperationalExchange:

- InformationFlow

Generalizations

The following are generalization relationships for OperationalExchange:

- Element

8.2.1.1.4.3.3 OperationalExchangeItem

UPDM An abstract utility element used as common ancestor for:

- InformationElement - ResourceArtifact
- Energy
- OrganizationalResource
- CapabilityConfiguration
- GeoPoliticalExtent

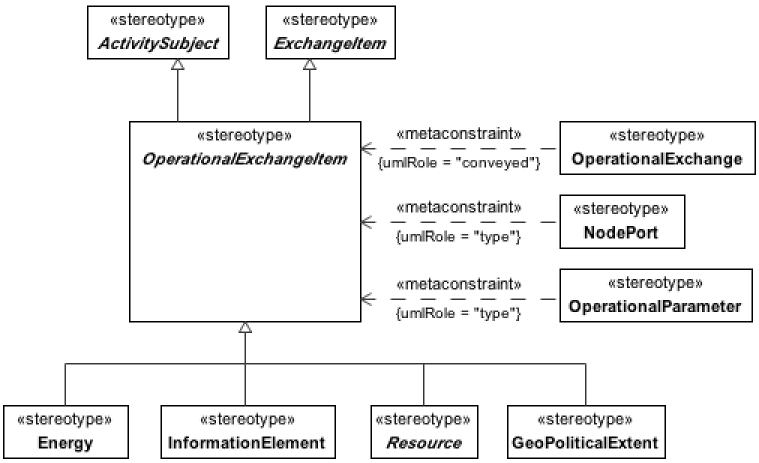


Figure 8.41 - OperationalExchangeItem

Generalizations

The following are generalization relationships for OperationalExchangeItem:

- ActivitySubject
- ExchangeItem

8.2.1.1.4.4 UPDM L1::UPDM L0::Core::OperationalElements::Structure

Section of the OperationalElements profile that describe stuctural concepts.

8.2.1.1.4.4.1 ArbitraryConnector

UPDM: Represents a visual indication of a connection used in high level operational concept diagrams. The connections are purely visual and cannot be related to any architectural semantics.
MODAF: NA
DoDAF:NA

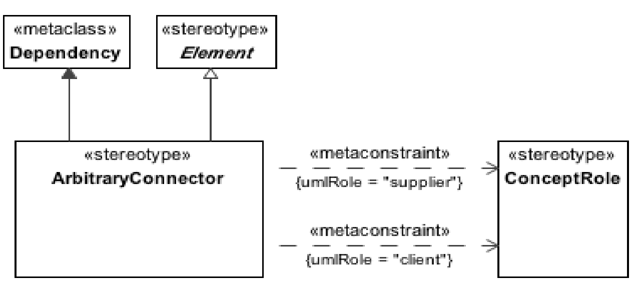


Figure 8.42 - ArbitraryConnector

Constraints

The following are constraints for ArbitraryConnector:

- ArbitraryConnector.client - The value for client property has to be stereotyped «ConceptRole» or its specializations.
- ArbitraryConnector.supplier - The value for supplier property has to be stereotyped «ConceptRole» or its specializations.

Extensions

The following are extensions for ArbitraryConnector:

- Dependency

Generalizations

The following are generalization relationships for ArbitraryConnector:

- Element

8.2.1.1.4.4.2 Competence

MODAF: A specific set of abilities defined by knowledge, skills and attitude.
DoDAF: (DoDAF::Skill): The ability, coming from one's knowledge, practice, aptitude, etc., to do something well.

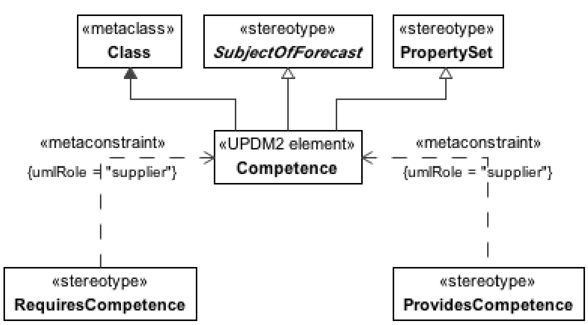


Figure 8.43 - Competence

Extensions

The following are extensions for Competence:

- Class

Generalizations

The following are generalization relationships for Competence:

- SubjectOfForecast
- PropertySet

8.2.1.1.4.4.3 ConceptItem

UPDM: Abstract, an item which may feature in a high level operational concept.
DoDAF:NA

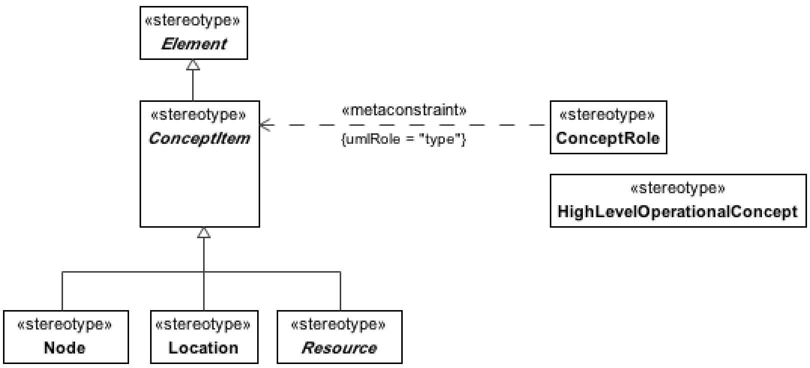


Figure 8.44 - ConceptItem

Generalizations

The following are generalization relationships for ConceptItem:

- Element

8.2.1.1.4.4.4 ConceptRole

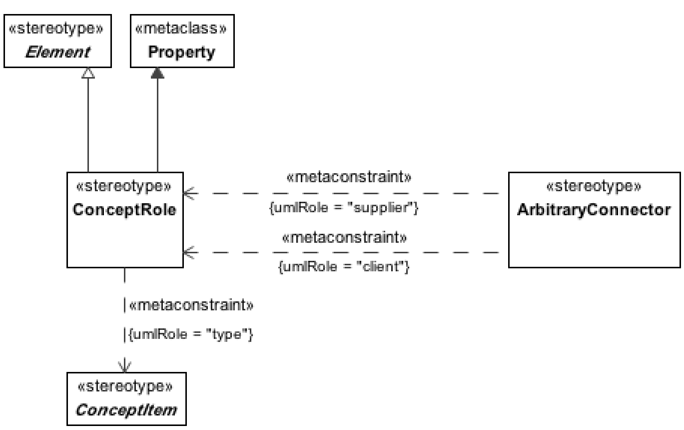


Figure 8.45 - ConceptRole

Constraints

The following are constraints for ConceptRole:

- ConceptRole.type - Value for the type property must be stereotyped a specialization of «ConceptItem».

Extensions

The following are extensions for ConceptRole:

- Property

Generalizations

The following are generalization relationships for ConceptRole:

- Element

8.2.1.1.4.4.5 HighLevelOperationalConcept

MODAF: A generalized model for operations.
DoDAF: NA

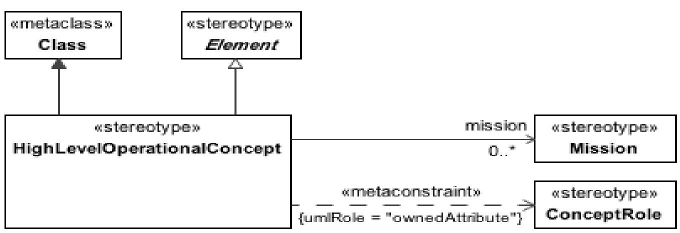


Figure 8.46 - HighLevelOperationalConcept

Constraints

The following are constraints for HighLevelOperationalConcept:

- HighLevelOperationalConcept.ownedAttribute - The values for the ownedAttribute properties must be stereotyped with specializations of the «ConceptRole».

Attribute

The following are attributes for HighLevelOperationalConcept:

- mission : Mission[0..*] - Mission that is described by this HighLevelOperationalConcept.

Extensions

The following are extensions for HighLevelOperationalConcept:

- Class

Generalizations

The following are generalization relationships for HighLevelOperationalConcept:

- Element

8.2.1.1.4.4.6 KnownResource

MODAF: Asserts that a known Resource plays a part in the architecture.
DoDAF: NA – covered by the more general temporalWholePart element.

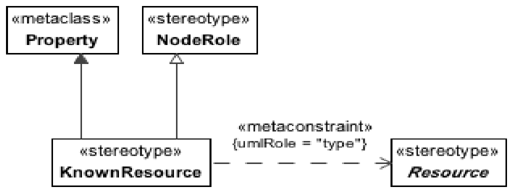


Figure 8.47 - KnownResource

Constraints

The following are constraints for KnownResource:

- KnownResource.type - Values for type property have to be stereotyped «Resource» or its specializations.

Extensions

The following are extensions for KnownResource:

- Property

Generalizations

The following are generalization relationships for KnownResource:

- NodeRole

8.2.1.1.4.4.7 LogicalArchitecture

MODAF: A CompositeStructureModel whose parts are either NodeRoles (MODAF::Node), ProblemDomains, or KnownResources.
DoDAF: NA

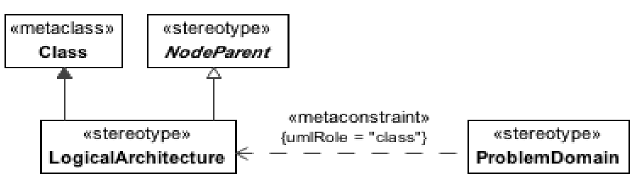


Figure 8.48 - LogicalArchitecture

Extensions

The following are extensions for LogicalArchitecture:

- Class

Generalizations

The following are generalization relationships for LogicalArchitecture:

- NodeParent

8.2.1.1.4.4.8 Mission

MODAF: A purpose to which a person, organization or autonomous system is tasked.
DoDAF: The task, together with the purpose, that clearly indicates the action to be taken.

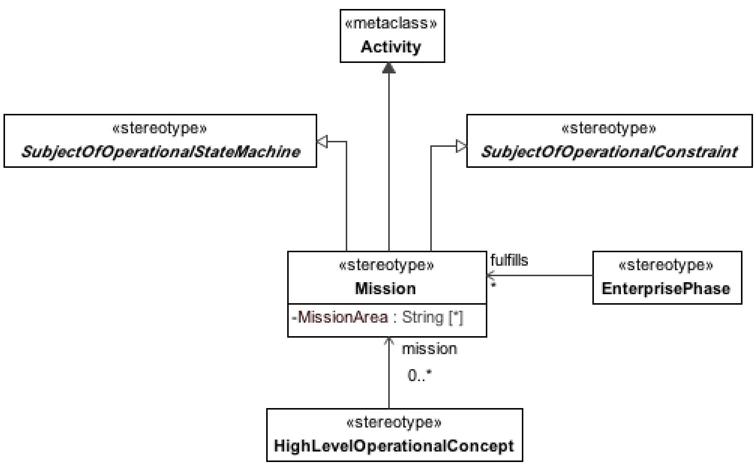


Figure 8.49 - Mission

Attribute

The following are attributes for Mission:

- MissionArea : String[*] - The area in which the Mission will take place.

Extensions

The following are extensions for Mission:

- Activity

Generalizations

The following are generalization relationships for Mission:

- SubjectOfOperationalConstraint
- SubjectOfOperationalStateMachine

8.2.1.1.4.4.9 Needline

MODAF: A relationship between Nodes representing a bundle of InformationExchanges.
DoDAF: A needline documents the requirement to exchange information between nodes. The needline does not indicate how the information transfer is implemented.

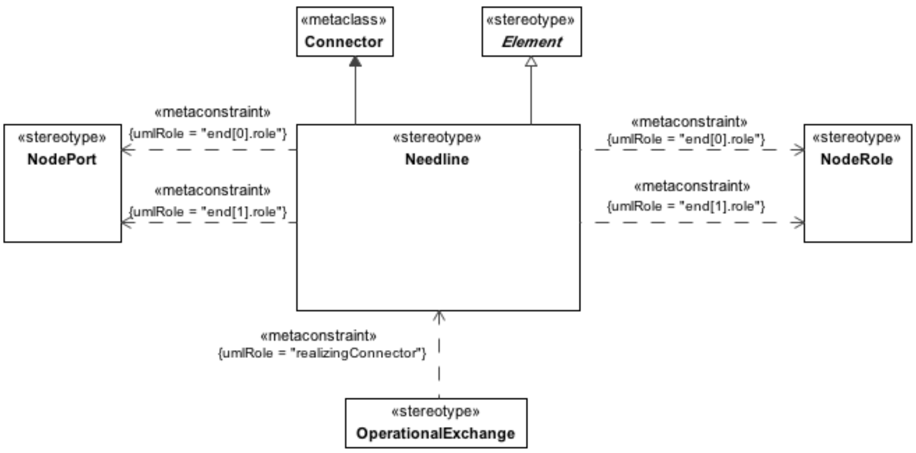


Figure 8.50 - Needline

Constraints

The following are constraints for Needline:

- Needline.end - The value for the role property for the owned ConnectorEnd must be stereotype «NodeChild»/«NodePort» or its specializations.

Extensions

The following are extensions for Needline:

- Connector

Generalizations

The following are generalization relationships for Needline:

- Element

8.2.1.1.4.4.10 Node

MODAF: A Node (MODAF::NodeType) is a logical entity that performs operational activities. Note: nodes are specified independently of any physical realization.
DoDAF: A Node (DoDAF::OperationalNode) is an element of the operational architecture that produces, consumes, or processes information. NOTE: This is also a specialization of Performer.

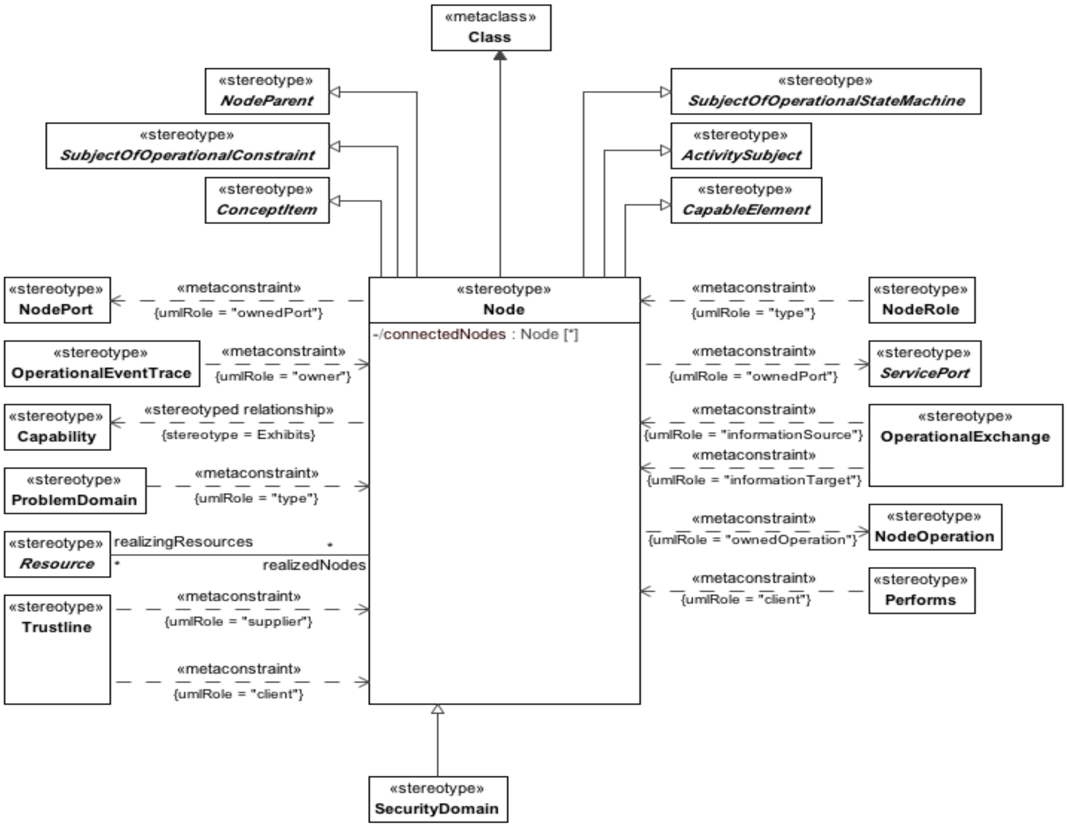


Figure 8.51 - Node

Constraints

The following are constraints for Node:

- Node.ownedOperation - Values for the ownedOperation property must be stereotyped «NodeOperation» or its specializations.
- Node.ownedPort - Values for the ownedPort property must be stereotyped «NodePort», «ServicePort», or their specializations.
- Node.performs - Can perform only «OperationalActivity» elements or its specializations.

Attribute

The following are attributes for Node:

- connectedNodes : Node[*] -
- realizingResources : Resource[*] -

Extensions

The following are extensions for Node:

- Class

Generalizations

The following are generalization relationships for Node:

- CapableElement
- ActivitySubject
- ConceptItem
- SubjectOfOperationalConstraint
- NodeParent
- SubjectOfOperationalStateMachine

8.2.1.1.4.4.11 NodeParent

UPDM: An abstract element representing the owners/context of composite structure at the operational level.
MODAF:The abstract supertype of all elements that can have child Nodes (LogicalArchitecture, ProblemDomain & NodeType)
DoDAF:NA

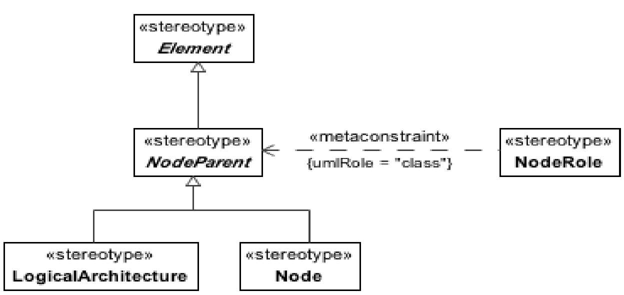


Figure 8.52 - NodeParent

Generalizations

The following are generalization relationships for NodeParent:

- Element

8.2.1.1.4.4.12 NodePort

UPDM: A port is a property of a Node that specifies a distinct interaction point between the node and its environment or between the (behavior of the) node and its internal parts. It is the “entry/exit” point where resources (e.g., energy, information/data and people, etc) flow in and out of a node.

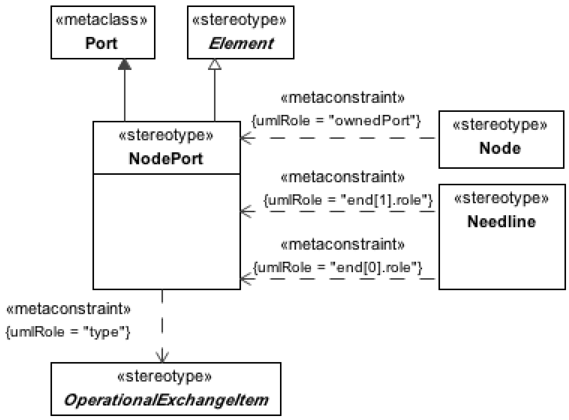


Figure 8.53 - NodePort

Constraints

The following are constraints for NodePort:

- NodePort.type - Value for the type property must be stereotyped specialization of «OperationalExchangeItem».

Extensions

The following are extensions for NodePort:

- Port

Generalizations

The following are generalization relationships for NodePort:

- Element

8.2.1.1.4.4.13 NodeRole

MODAF: A NodeRole (MODAF::Node) is used to link a parent Node to its sub-nodes.
DoDAF: NA

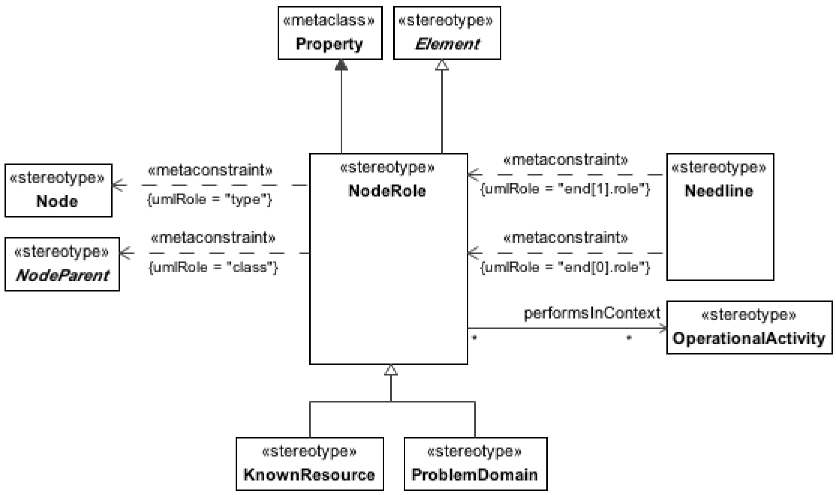


Figure 8.54 - NodeRole

Constraints

The following are constraints for NodeRole:

- NodeRole.class - Value for class meta property must be stereotyped a specialization of «NodeParent».
- NodeRole.type - Value for type meta property must be stereotyped «Node» or its specializations.

Attribute

The following are attributes for NodeRole:

- performsInContext : OperationalActivity[*] -

Extensions

The following are extensions for NodeRole:

- Property

Generalizations

The following are generalization relationships for NodeRole:

- Element

8.2.1.1.4.4.14 OperationalConstraint

UPDM: An abstract Class that is extended by OperationalConstraint (A rule governing an operational behaviour or property.) and ResourceConstraint.
MODAF:A rule governing an operational behaviour or property.
DoDAF:A principle or condition that governs behavior; a prescribed guide for conduct or action (Rule).

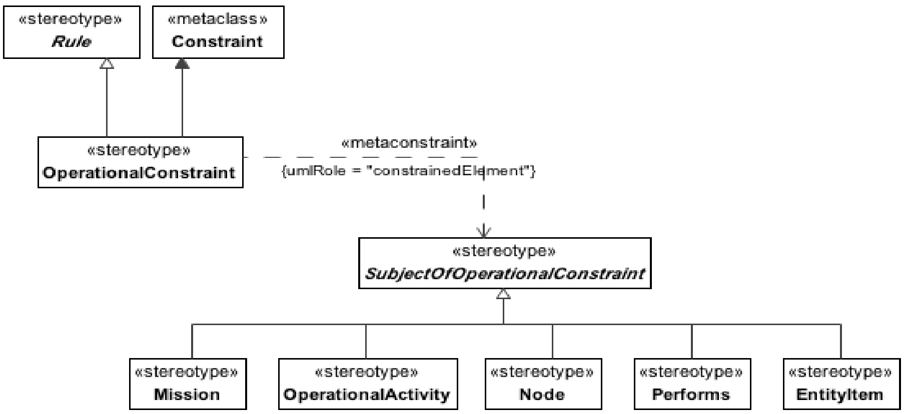


Figure 8.55 - OperationalConstraint

Constraints

The following are constraints for OperationalConstraint:

- OperationalConstraint.constrainedElement - Value for the constrainedElement property must be stereotyped by any specialization of «SubjectOfOperationalConstraint».

Extensions

The following are extensions for OperationalConstraint:

- Constraint

Generalizations

The following are generalization relationships for OperationalConstraint:

- Element
- Rule

8.2.1.1.4.4.15 SecurityDomain

MODAF:NA
DoDAF: A NodeType whose members (other Nodes, KnownResources) all share a common security policy.

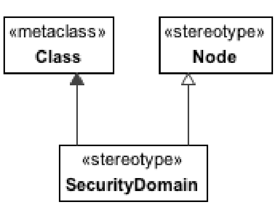


Figure 8.56 - SecurityDomain

Extensions

The following are extensions for SecurityDomain:

- Class

Generalizations

The following are generalization relationships for SecurityDomain:

- Node

8.2.1.1.4.4.16 SubjectOfOperationalConstraint

MODAF: Abstract. An element of the architecture that may be subject to an OperationalConstraint or OperationalStateDescription.

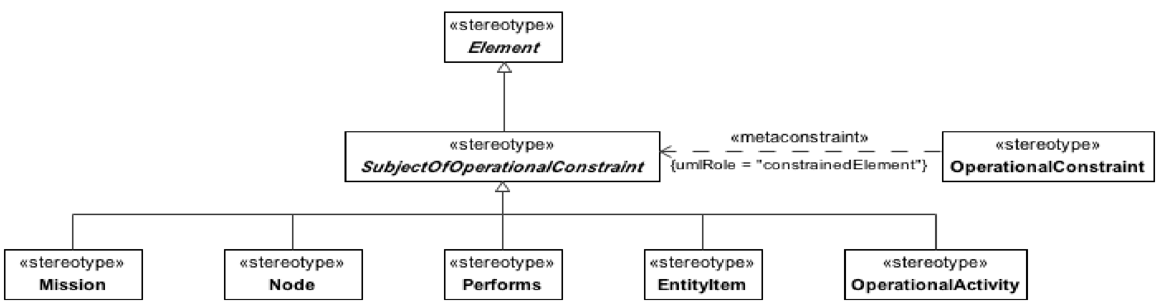


Figure 8.57 - SubjectOfOperationalConstraint

Generalizations

The following are generalization relationships for SubjectOfOperationalConstraint:

- Element

8.2.1.1.4.4.17 UPDM L1::UPDM L0::Core::OperationalElements::Structure::Organizational

The organizational elements of the operational structure.

8.2.1.1.4.4.17.1 UPDM L1::UPDM L0::Core::OperationalElements::Structure::Organizational::Actual

Actual elements in the organizational part of the structural part of the Operational profile.

8.2.1.1.4.4.17.1.1 ActualOrganization

MODAF: An actual specific organisation, an instance of an organisation class - e.g. "The US Department of Defense" DoDAF: [DoDAF::Organization]: A specific real-world assemblage of people and other resources organized for an on-going purpose.

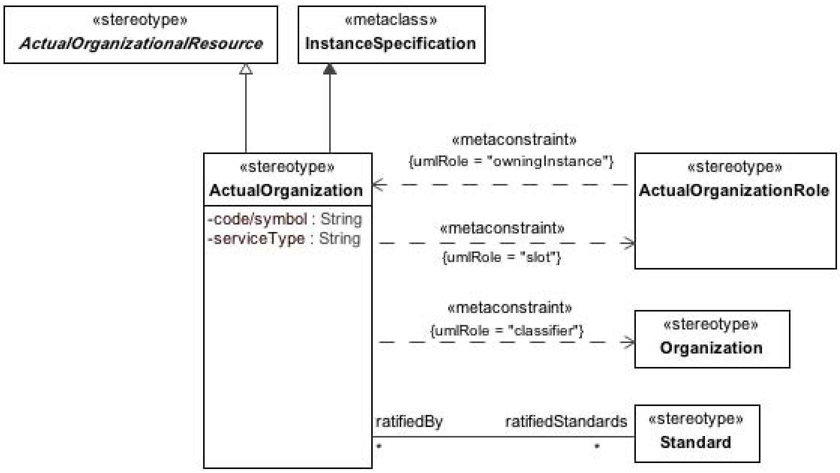


Figure 8.58 - ActualOrganization

Constraints

The following are constraints for ActualOrganization:

- ActualOrganization.classifier - Classifier property value must be stereotyped «Organization» or its specializations.
- ActualOrganization.slot - Slot property value must be stereotyped «ActualOrganizationRole» or its specializations.

Attribute

The following are attributes for ActualOrganization:

- code/symbol : String[] - Army, Navy, Air Force, Marine Corps, Joint
- ratifiedStandards : Standard[*] - Standards that were ratified by this ActualOrganization.
- serviceType : String[] - Service office code or symbol

Extensions

The following are extensions for ActualOrganization:

- InstanceSpecification

Generalizations

The following are generalization relationships for ActualOrganization:

- ActualOrganizationalResource

8.2.1.1.4.4.17.1.2 ActualOrganizationalResource

UPDM: An ActualOrganization or an ActualPost.
MODAF: An instance of either an actual organisation or an actual post.
DoDAF: A specific real-world assemblage of people and other resources organized for an on-going purpose.

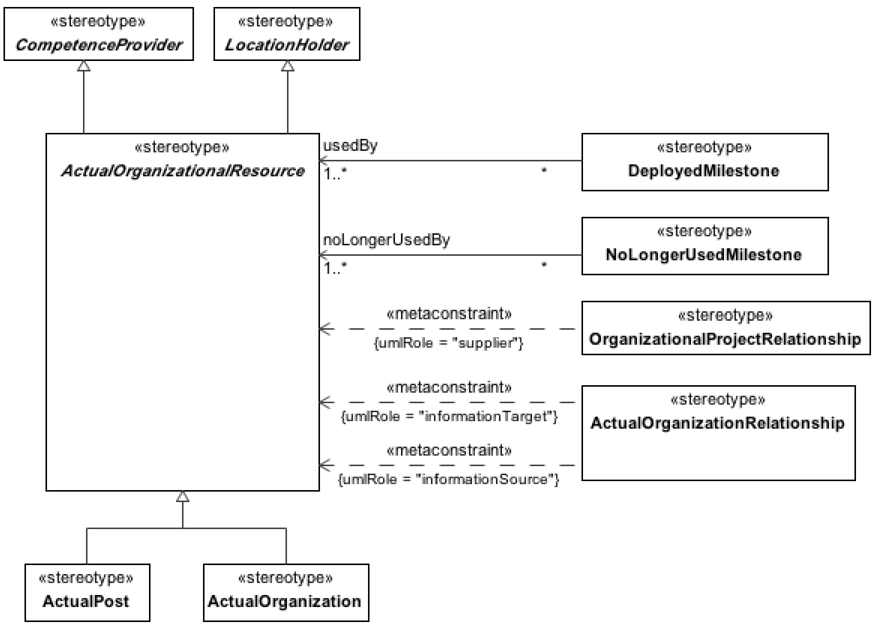


Figure 8.59 - ActualOrganizationalResource

Extensions

The following are extensions for ActualOrganizationalResource:

- InstanceSpecification

Generalizations

The following are generalization relationships for ActualOrganizationalResource:

- LocationHolder
- CompetenceProvider

8.2.1.1.4.4.17.1.3 ActualOrganizationRelationship

UPDM: A relationship between two ActualOrganizationResources.
MODAF: A relationship between two actual specific organisations or parts of an organisation.
DoDAF: NA

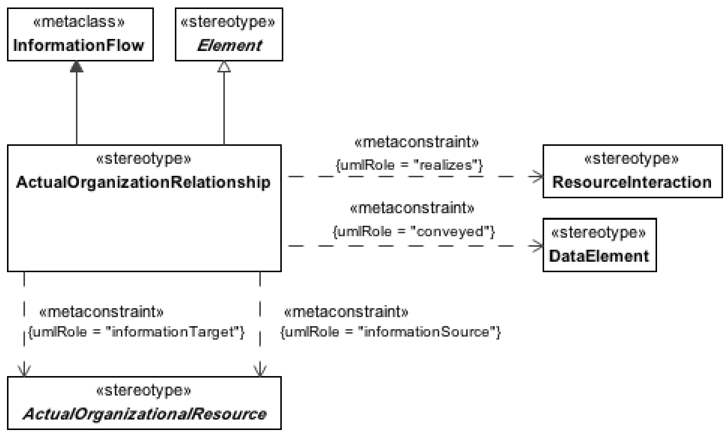


Figure 8.60 - ActualOrganizationRelationship

Constraints

The following are constraints for ActualOrganizationRelationship:

- ActualOrganizationRelationship.conveyed - Value for conveyed metaproperty must be stereotyped «DataElement» or its specializations.
- ActualOrganizationRelationship.source - Value for source metaproperty must be stereotyped «ActualOrganizationalResource» or its specializations.
- ActualOrganizationRelationship.target - Value for realizes metaproperty must be stereotyped «ResourceInteraction» or its specializations.

Extensions

The following are extensions for ActualOrganizationRelationship:

- InformationFlow

Generalizations

The following are generalization relationships for ActualOrganizationRelationship:

- Element

8.2.1.1.4.4.17.1.4 ActualOrganizationRole

UPDM: Relates an actual specific organization to an actual specific organizational resource that fulfils a role in that organization.
MODAF: NA
DoDAF: NA

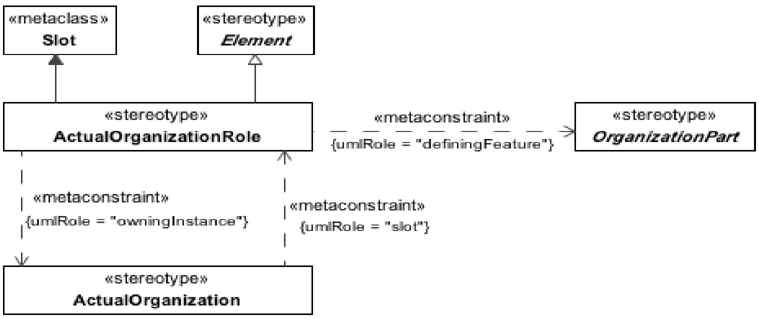


Figure 8.61 - ActualOrganizationRole

Constraints

The following are constraints for ActualOrganizationRole:

- ActualOrganizationPart.definingFeature - Value for definingFeature property has to be stereotyped «OrganizationPart» or its specializations.
- ActualOrganizationPart.owningInstance - Value for owningInstance property has to be stereotyped «ActualOrganization» or its specializations.

Extensions

The following are extensions for ActualOrganizationRole:

- Slot

Generalizations

The following are generalization relationships for ActualOrganizationRole:

- Element

8.2.1.1.4.4.17.1.5 ActualPerson

UPDM: Named individual that fulfills an ActualPost. An individual human being (vs Person which is a type), that is recognized by law as the subject of rights and duties.
MODAF: NA
DoDAF: An individual person

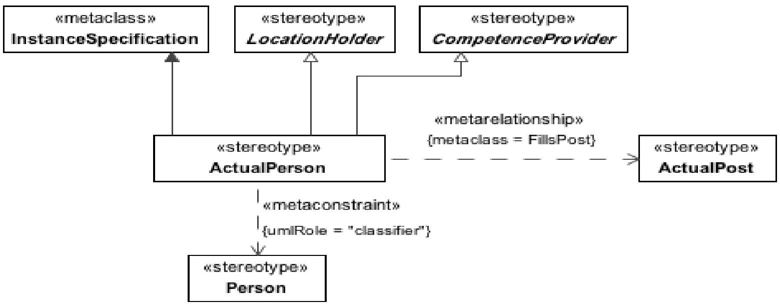


Figure 8.62 - ActualPerson

Constraints

The following are constraints for ActualPerson:

- ActualPerson.classifier - Value for the classifierproperty has to be stereotyped «Person» or its specializations.

Extensions

The following are extensions for ActualPerson:

- InstanceSpecification

Generalizations

The following are generalization relationships for ActualPerson:

- LocationHolder
- CompetenceProvider

8.2.1.1.4.4.17.1.6 ActualPost

UPDM: An actual, specific post, an instance of a PostType class - e.g. "President of the United States of America."
MODAF: NA
DoDAF: NA

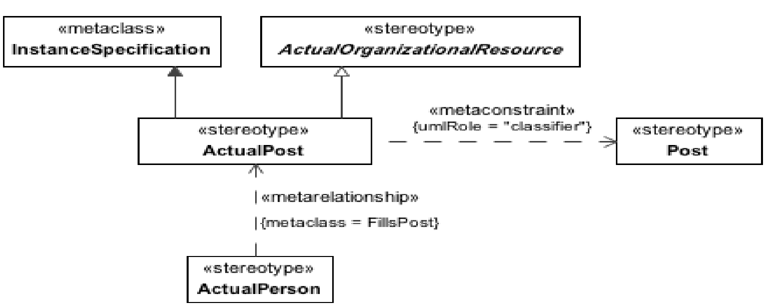


Figure 8.63 - ActualPost

Constraints

The following are constraints for ActualPost:

- ActualPost.classifier - Classifier property value must be stereotyped «Post» or its specializations.

Extensions

The following are extensions for ActualPost:

- InstanceSpecification

Generalizations

The following are generalization relationships for ActualPost:

- ActualOrganizationalResource

8.2.1.1.4.4.17.1.7 CompetenceProvider

UPDM:Abstract element used to group ActualPersons and ActualOrganisationalResources.
MODAF:NA
DoDAF:NA

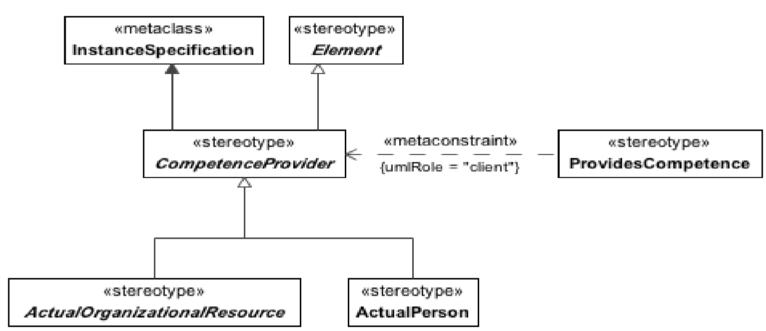


Figure 8.64 - CompetenceProvider

Extensions

The following are extensions for CompetenceProvider:

- InstanceSpecification

Generalizations

The following are generalization relationships for CompetenceProvider:

- Element

8.2.1.1.4.4.17.1.8 FillsPost

UPDM: Asserts that ActualPerson fills an ActualPost.
MODAF: NA
DoDAF: NA

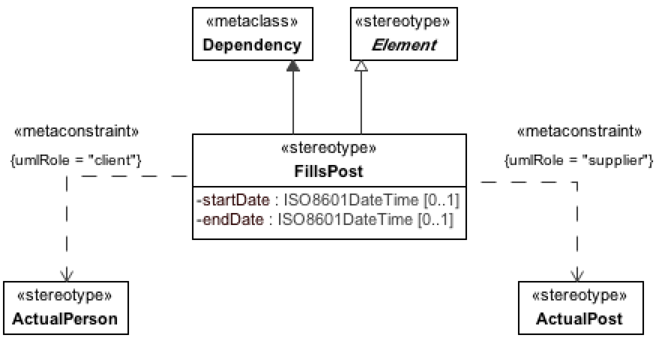


Figure 8.65 - FillsPost

Constraints

The following are constraints for FillsPost:

- FillsPost.client - Value for the client property must be stereotyped by "ActualPerson" or its specializations.
- FillsPost.supplier - Value for the supplier property must be stereotyped by "ActualPost" or its specializations.

Attribute

The following are attributes for FillsPost:

- endDate : ISO8601DateTime[0..1] - End date
- startDate : ISO8601DateTime[0..1] - Start date

Extensions

The following are extensions for FillsPost:

- Dependency

Generalizations

The following are generalization relationships for FillsPost:

- Element

8.2.1.1.4.4.17.1.9 PostRole

MODAF: A PostRole (MODAF::Post) asserts that a post exists in an Organization (MODAF::OrganizationType) of the type specified by the related Post (MODAF::PostType).

DoDAF: NA - covered by the more general temporalWholePart element.

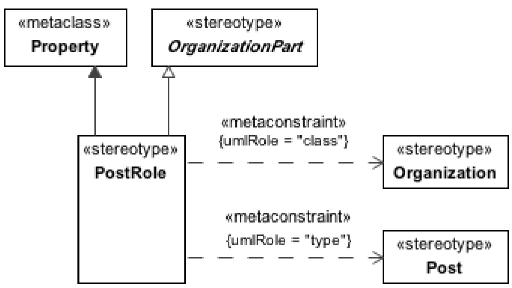


Figure 8.66 - PostRole

Constraints

The following are constraints for PostRole:

- PostRole.class - Value for the class property must be stereotyped «Organization» or its specializations.
- PostRole.type - Value for the type property must be stereotyped «Post» or its specializations.

Extensions

The following are extensions for PostRole:

- Property

Generalizations

The following are generalization relationships for PostRole:

- OrganizationPart

8.2.1.1.4.4.17.1.10 ResponsibilityRole

UPDM: A ResponsibilityRole asserts that a responsibility exists in an Organization or Post.
MODAF: Role.

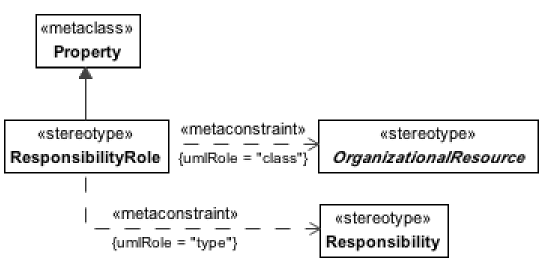


Figure 8.67 - ResponsibilityRole

Constraints

The following are constraints for ResponsibilityRole:

- ResponsibilityRole.class - Value for the class property must be stereotyped «OrganizationalResource» or its specializations.
- ResponsibilityRole.type - Value for the type property must be stereotyped «Responsibility» or its specializations.

Extensions

The following are extensions for ResponsibilityRole:

- Property

8.2.1.1.4.4.17.1.11 SubOrganization

MODAF: Asserts that one type of organisation is typically the parent of another - e.g. a squadron may be part of a batallion. DoDAF: NA

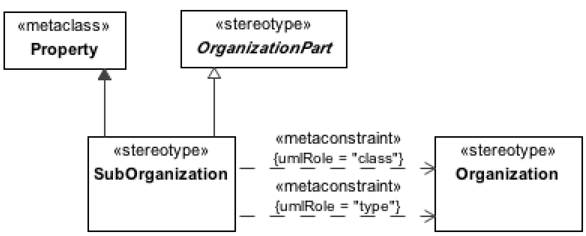


Figure 8.68 - SubOrganization

Constraints

The following are constraints for SubOrganization:

- SubOrganization.class - Value for the class property must be stereotyped «Organization» or its specializations.
- SubOrganization.type - Value for the type property must be stereotyped «Organization» or its specializations.

Extensions

The following are extensions for SubOrganization:

- Property

Generalizations

The following are generalization relationships for SubOrganization:

- OrganizationPart

8.2.1.1.4.4.17.2 UPDM L1::UPDM L0::Core::OperationalElements::Structure::Organizational::Typical

Typical elements in the organizational part of the structural part of the Operational profile.

8.2.1.1.4.4.17.2.1 CompetenceRequirer

UPDM:Abstract element used to group Organizations, Post and Responsibilities.
MODAF:NA
DoDAF:NA

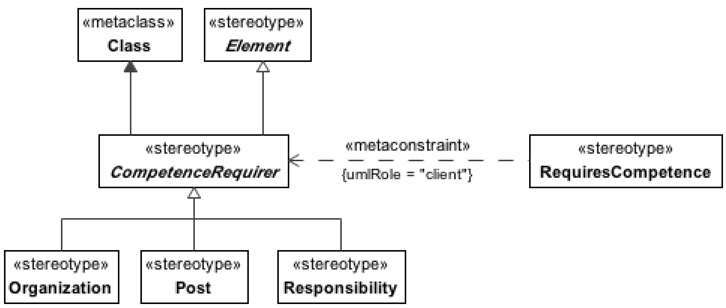


Figure 8.69 - CompetenceRequirer

Extensions

The following are extensions for CompetenceRequirer:

- Class

Generalizations

The following are generalization relationships for CompetenceRequirer:

- Element

8.2.1.1.4.4.17.2.2 Organization

MODAF: A group of persons, associated for a particular purpose.
DoDAF: A type of Organization.

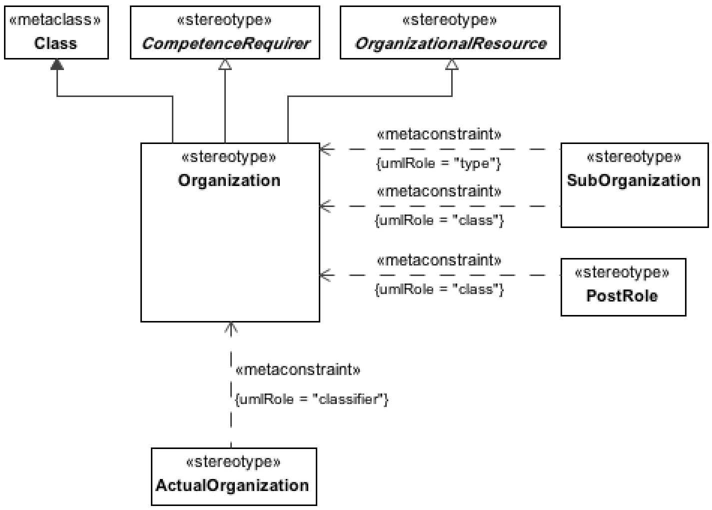


Figure 8.70 - Organization

Extensions

The following are extensions for Organization:

- Class

Generalizations

The following are generalization relationships for Organization:

- OrganizationalResource
- CompetenceRequirer

8.2.1.1.4.4.17.2.3 OrganizationalResource

UPDM An abstract element that represents Organizations and Posts.
MODAF: Either an organization, or a post.

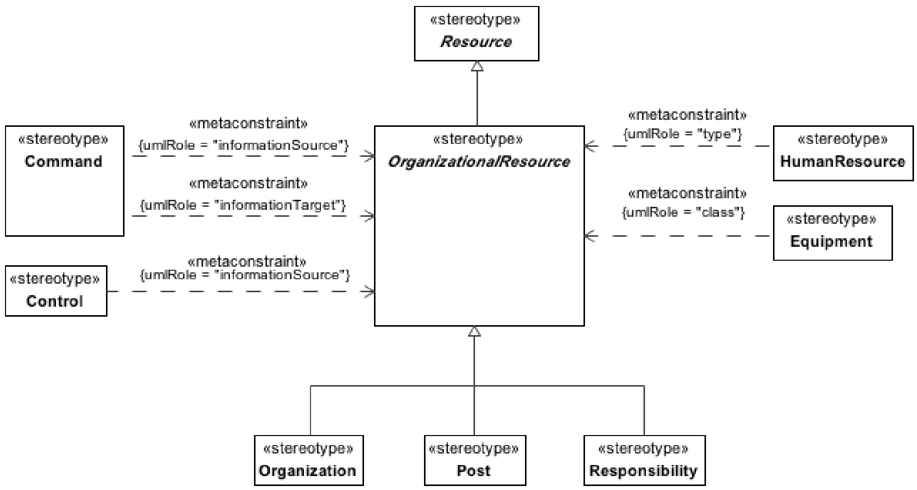


Figure 8.71 - OrganizationalResource

Generalizations

The following are generalization relationships for OrganizationalResource:

- Resource

8.2.1.1.4.4.17.2.4 OrganizationPart

UPDM: An abstract element that's used to represent properties in an Organization that are typed by another Organization or a Post.

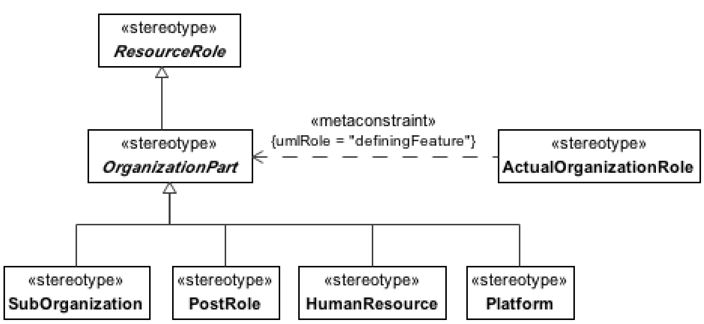


Figure 8.72 - OrganizationPart

Generalizations

The following are generalization relationships for OrganizationPart:

- ResourceRole

8.2.1.1.4.4.17.2.5 Person

UPDM: A type of a human being that is recognized by law as the subject of rights and duties. This is used to define the characteristics that require capturing for ActualPersons (e.g. properties such as address, rank, telephone number, etc).
MODAF: NA
DoDAF: NA

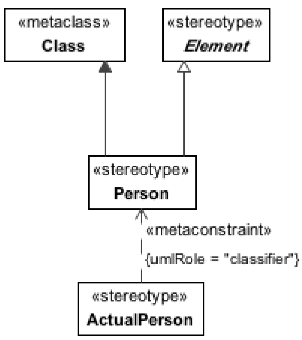


Figure 8.73 - Person

Extensions

The following are extensions for Person:

- Class

Generalizations

The following are generalization relationships for Person:

- Element

8.2.1.1.4.4.17.2.6 Post

MODAF: A Post (MODAF::PostType) is a type of point of contact or responsible person. Note that this is the type of post - e.g. Desk Officer, Commander Land Component, etc.
DoDAF: A Post (DoDAF:: PersonType) is a category of persons defined by the role or roles they share that are relevant to an architecture.

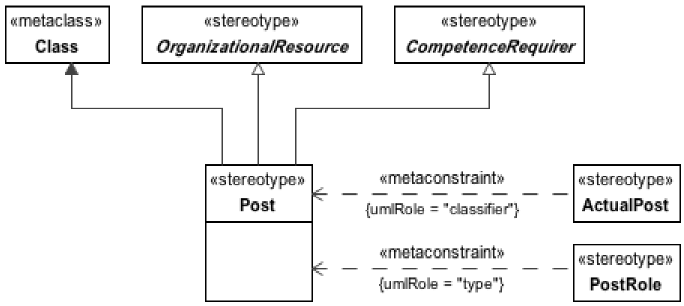


Figure 8.74 - Post

Extensions

The following are extensions for Post:

- Class

Generalizations

The following are generalization relationships for Post:

- OrganizationalResource
- CompetenceRequirer

8.2.1.1.4.4.17.2.7 ProvidesCompetence

UPDM: Asserts that a Resource type provides a competence.
MODAF: Asserts that a Role requires a Competence (MODAF::CompetenceForRole).
DoDAF: An overlap between a Personnel Type and the Skills it entails (DoDAF:: skillPartOfPersonType)

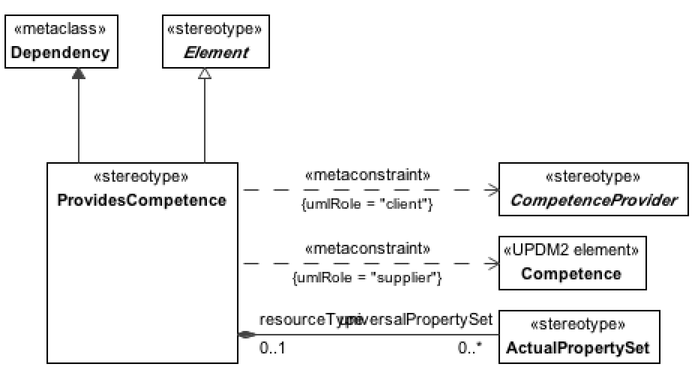


Figure 8.75 - ProvidesCompetence

Constraints

The following are constraints for ProvidesCompetence:

- ProvidesCompetence.client - Value for the client property must be stereotyped by a specialization of «CompetenceProvider».
- ProvidesCompetence.supplier - Value for the client property must be stereotyped «Competence» or its specializations.

Attribute

The following are attributes for ProvidesCompetence:

- universalPropertySet : ActualPropertySet[0..*] -

Extensions

The following are extensions for ProvidesCompetence:

- Dependency

Generalizations

The following are generalization relationships for ProvidesCompetence:

- Element

8.2.1.1.4.4.17.2.8 RequiresCompetence

MODAF:: Asserts that an Role requires a Competence (MODAF::CompetenceForRole).
DoDAF: An overlap between a Personnel Type and the Skills it entails (DoDAF:: SkillPartOfPersonType).

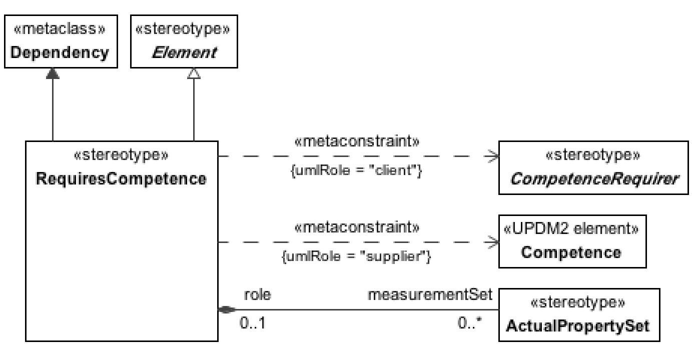


Figure 8.76 - RequiresCompetence

Constraints

The following are constraints for RequiresCompetence:

- RequiresCompetence.client - Value for the client property must be stereotyped a specialization of «CompetenceRequirer».

- RequiresCompetence.supplier - Value for the client property must be stereotyped «Competence» or its specializations.

Attribute

The following are attributes for RequiresCompetence:

- measurementSet : ActualPropertySet[0..*] -

Extensions

The following are extensions for RequiresCompetence:

- Dependency

Generalizations

The following are generalization relationships for RequiresCompetence:

- Element

8.2.1.1.4.4.17.2.9 Responsibility

UPDM:Asserts that a Post or Organization has specific responsibilities.
MODAF:NA
DoDAF:NA

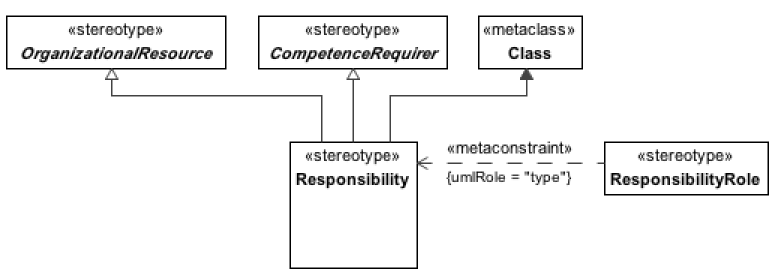


Figure 8.77 - Responsibility

Extensions

The following are extensions for Responsibility:

- Class

Generalizations

The following are generalization relationships for Responsibility:

- CompetenceRequirer
- OrganizationalResource

8.2.1.1.5 UPDM L1::UPDM L0::Core::ServiceElements

The Service-Orientated View (SOV) is a description of services needed to directly support the operational domain as described in the Operational View. A service should be understood in its broadest sense, as a unit of work through which a provider provides a useful result to a consumer. This could be anything from web-based services to delivering an effect to transporting troops.

8.2.1.1.5.1 UPDM L1::UPDM L0::Core::ServiceElements::Behavior

Behavior elements of the service oriented view.

8.2.1.1.5.1.1 ServiceFeature

UPDM:Abstract grouping used to ServiceFunctions to Serviceoperations and ServiceMessageHandlers.

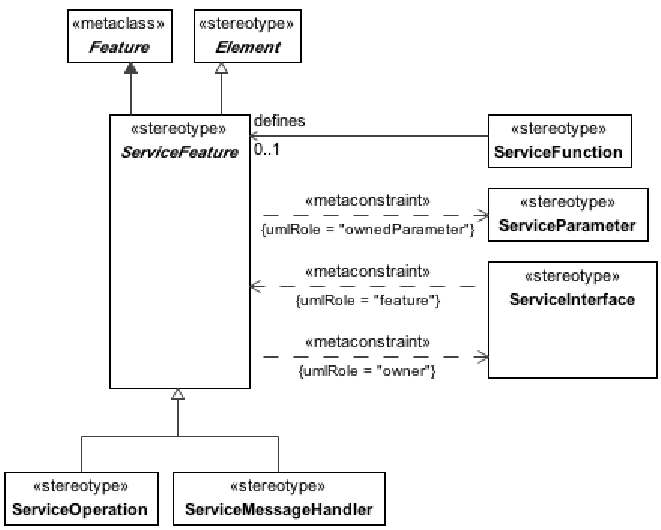


Figure 8.78 - ServiceFeature

Constraints

The following are constraints for ServiceFeature:

- ServiceFeature.ownedParameter - The values for the ownedParameter property must be stereotyped «ServiceParameter».
- ServiceFeature.owner - The values for the owner property must be stereotyped «ServiceInterface».

Extensions

The following are extensions for ServiceFeature:

- Feature

Generalizations

The following are generalization relationships for ServiceFeature:

- Element

8.2.1.1.5.1.2 ServiceFunction

UPDM: A ServiceFunction describes the abstract behavior of ServiceOperations, regardless of the actual implementation.
MODAF: A type of activity describing the functionality of a service.
DoDAF: Information necessary to interact with the service in such terms as the service inputs, outputs, and associated semantics. The service description also conveys what is accomplished when the service is invoked and the conditions for using the service.

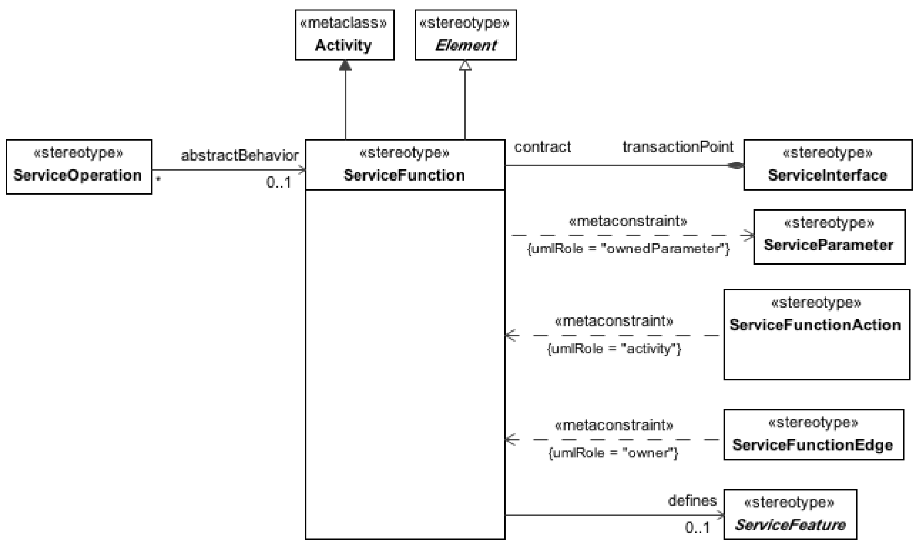


Figure 8.79 - ServiceFunction

UPDM: "An action that represents a ServiceFunction invoking another ServiceFunction."

Constraints

The following are constraints for ServiceFunction:

- ServiceFunction.ownedParameter - The values for the ownedParameter property must be stereotyped «ServiceParameter».

Attribute

The following are attributes for ServiceFunction:

- defines : ServiceFeature[0..1] -
- transactionPoint : ServiceInterface[] -

Extensions

The following are extensions for ServiceFunction:

- Activity

Generalizations

The following are generalization relationships for ServiceFunction:

- Element

8.2.1.1.5.1.3 ServiceFunctionAction

UPDM: A call behavior action that invokes the ServiceFunction that needs to be preformed. --This concept is required for mapping the architecture with UML and does not have a DoDAF or MODAF equivalent.

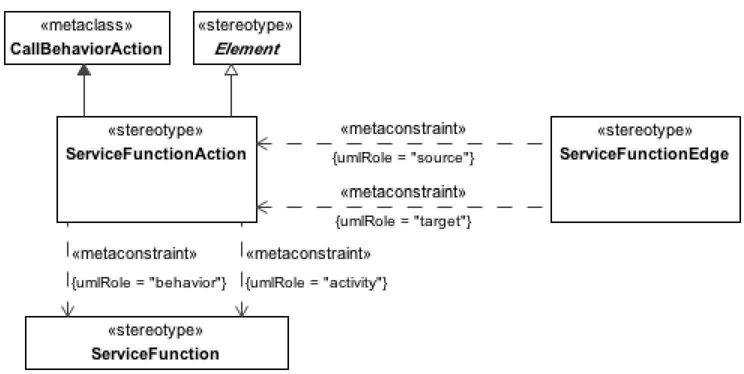


Figure 8.80 - ServiceFunctionAction

Constraints

The following are constraints for ServiceFunctionAction:

- ServiceFunctionAction.activity - Value for the behavior property must be stereotyped «ServiceFunction» or its specializations.
- ServiceFunctionAction.behavior - Value for the activity property must be stereotyped «ServiceFunction» or its specializations.

Extensions

The following are extensions for ServiceFunctionAction:

- CallBehaviorAction

Generalizations

The following are generalization relationships for ServiceFunctionAction:

- Element

8.2.1.1.5.1.4 ServiceFunctionEdge

UPDM: An extension of <<ActivityEdge>> that is used to model the flow of control/objects through a ServiceFunction.

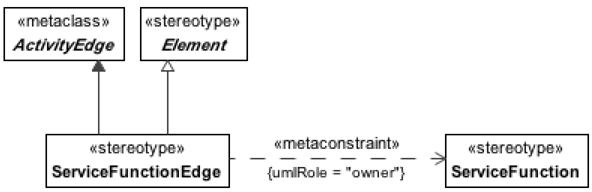


Figure 8.81 - ServiceInteraction

Constraints

The following are constraints for ServiceInteraction:

- ServiceInteraction.message - Values for the message property must be stereotyped with «ServiceMessage» or its specializations.
- ServiceInteraction.owner - Value for the target property must be stereotyped «ServiceInterface» or its specializations.

Extensions

The following are extensions for ServiceInteraction:

- Interaction

Generalizations

The following are generalization relationships for ServiceInteraction:

- Element

8.2.1.1.5.1.5 ServiceMessage

UPDM: Message for use in a Service Interaction Specification, implements a resourceInteraction or any of the subtypes.

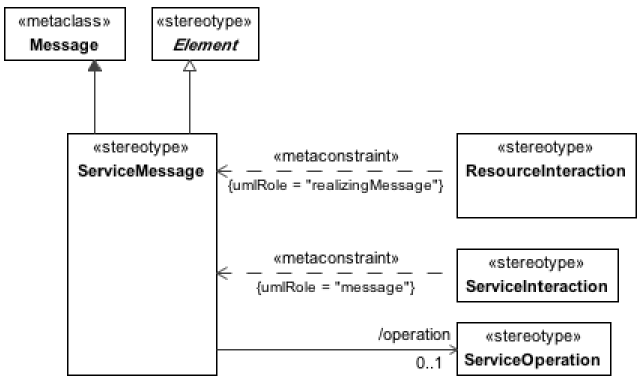


Figure 8.82 - ServiceMessage

Attribute

The following are attributes for ServiceMessage:

- carries : Exchange[*] - Carried ResourceInteraction.
- operation : ServiceOperation[0..1] -

Extensions

The following are extensions for ServiceMessage:

- Message

Generalizations

The following are generalization relationships for ServiceMessage:

- Element

8.2.1.1.5.1.6 ServiceMessageHandler

UPDM:An instance of an AsynchronousMessage, applied in the service domain.

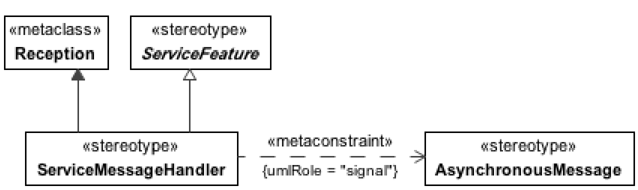


Figure 8.83 - ServiceMessageHandler

Constraints

The following are constraints for ServiceMessageHandler:

- ServiceMessageHandler.signal - Values for the signal property must be stereotyped with «AsynchronousMessage» or its specializations.

Extensions

The following are extensions for ServiceMessageHandler:

- Reception

Generalizations

The following are generalization relationships for ServiceMessageHandler:

- ServiceFeature

8.2.1.1.5.1.7 ServiceOperation

UPDM: A ServiceOperation provides the access point for invoking the behavior of a provided service. The ServiceOperations are defined on ServiceInterfaces and mirrored on the providing Resource to handle calls forwarded on by the interface.
MODAF: a function or procedure which enables programmatic communication with a Service via a ServiceInterface (MODAF:: ServiceInterfaceOpration).

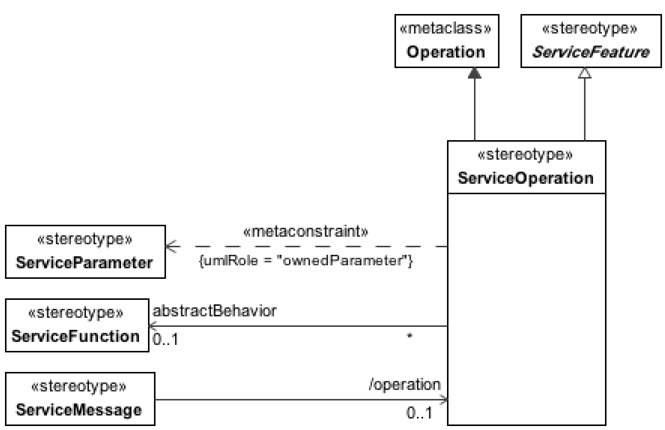


Figure 8.84 - ServiceOperation

Constraints

The following are constraints for ServiceOperation:

- ServiceOperation.ownedParameter - The values for the ownedParameter property must be stereotyped «ServiceParameter» or its specializations.

Attribute

The following are attributes for ServiceOperation:

- abstractBehavior : ServiceFunction[0..1] - Links a ServiceOperation to the abstract description of its behavior, as provided by a ServiceFunction.

Extensions

The following are extensions for ServiceOperation:

- Operation

Generalizations

The following are generalization relationships for ServiceOperation:

- ServiceFeature

8.2.1.1.5.1.8 ServiceParameter

UPDM: Represents inputs and outputs of Service. It is typed by ResourceInteractionItem.
MODAF: A constant or variable passed into or out of a ServiceInterface as part of the execution of a ServiceInterfaceOperation (MODAF:: ServiceInterfaceParameter).
DoDAF: NA

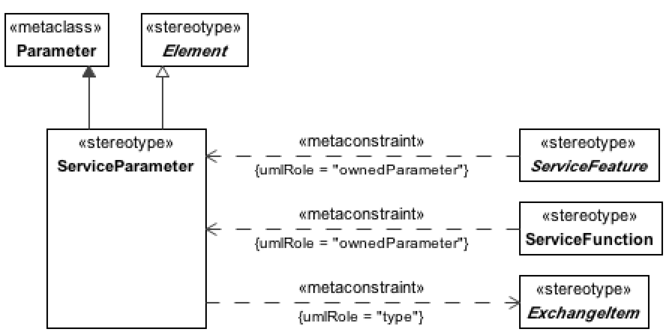


Figure 8.85 - ServiceParameter

Constraints

The following are constraints for ServiceParameter:

- ServiceParameter.type - The values for the type property must be stereotyped a specialization of «ExchangeItem».

Extensions

The following are extensions for ServiceParameter:

- Parameter

Generalizations

The following are generalization relationships for ServiceParameter:

- Element

8.2.1.1.5.1.9 ServiceStateMachine

UPDM Artifact that extends a UML StateMachine.

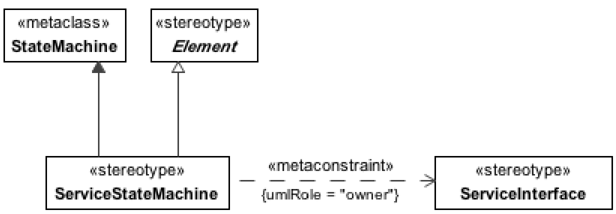


Figure 8.86 - ServiceStateMachine

Constraints

The following are constraints for ServiceStateMachine:

- ServiceStateMachine.owner - Values for the owner property must be stereotyped «ServiceInterface» or its specializations.

Extensions

The following are extensions for ServiceStateMachine:

- StateMachine

Generalizations

The following are generalization relationships for ServiceStateMachine:

- Element

8.2.1.1.5.2 UPDM L1::UPDM L0::Core::ServiceElements::Structure

Structure elements of the service oriented view.

8.2.1.1.5.2.1 AsynchronousMessage

MODAF:A signal which is transmitted irregularly with respect to time.
DoDAF: NA

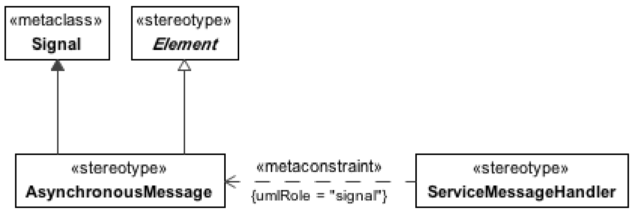


Figure 8.87 - AsynchronousMessage

Extensions

The following are extensions for AsynchronousMessage:

- Signal

Generalizations

The following are generalization relationships for AsynchronousMessage:

- Element

8.2.1.1.5.2.2 Request

UPDM:From SOAML A Request represents a feature of a Participant that is the consumption of a service by one participant provided by others using well-defined terms, conditions and interfaces. A
Request designates ports that define the connection point through which a Participant
meets its needs through the consumption of services provided by others.
MODAF:Simil to requires, Asserts that a Resource requires a Service to be provided in order to function correctly.
DoDAF: Similar to ServicePort, A part of a Performer that specifics a distinct interaction point through which the Performer interacts with other Performers. This isolates dependencies between performers to particular interaction points rather than to the performer as a whole.

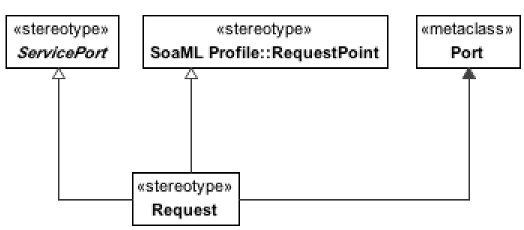


Figure 8.88 - Request

Extensions

The following are extensions for Request:

- Port

Generalizations

The following are generalization relationships for Request:

- RequestPoint
- ServicePort

8.2.1.1.5.2.3 Service

MODAF:A type of delivered functionality, specified independently of the resources that provide it.
DoDAF: mechanism to enable access to a set of one or more capabilities , where the access is provided using a prescribed interface and is exercised consistent with constraints and policies as specified by the service description. The mechanism is a Performer. The "capabilities" accessed are Resources -- Information, Data, Materiel, Performers, and Geo-political Extents.

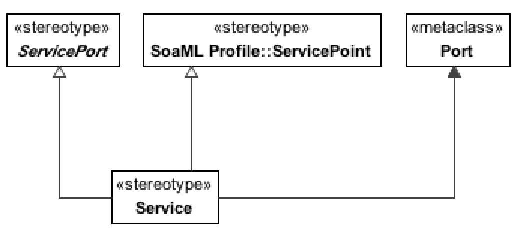


Figure 8.89 - Service

Extensions

The following are extensions for Service:

- Port

Generalizations

The following are generalization relationships for Service:

- ServicePoint
- ServicePort

8.2.1.1.5.2.4 ServiceAttribute

MODAF: A property of Service.
DoDAF: NA

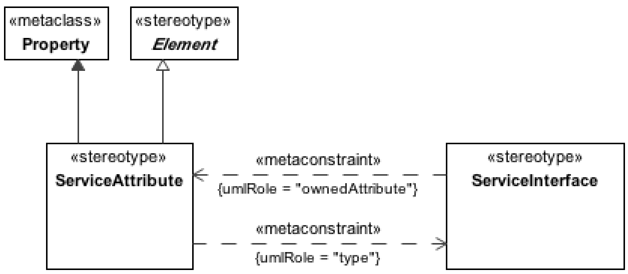


Figure 8.90 - ServiceAttribute

Constraints

The following are constraints for ServiceAttribute:

- ServiceAttribute.type - The values for the type property must be stereotyped «ServiceInterface» or its specialization.

Extensions

The following are extensions for ServiceAttribute:

- Property

Generalizations

The following are generalization relationships for ServiceAttribute:

- Element

8.2.1.1.5.2.5 ServiceInterface

UPDM: A contractual agreement between two resources that implement protocols through which the source service interacts to the destination resource.
A physical connection between two resources that implements protocols through which the source resource can transmit items to the destination resource.
MODAF: The mechanism by which a Service communicates.
DoDAF: An overlap between Performers for the purpose of producing a Resource that is consumed by the other. (DoDAF::Interface).
SOAML: Defines the interface to a Service Point or Request Point and is the type of a role in a service contract.

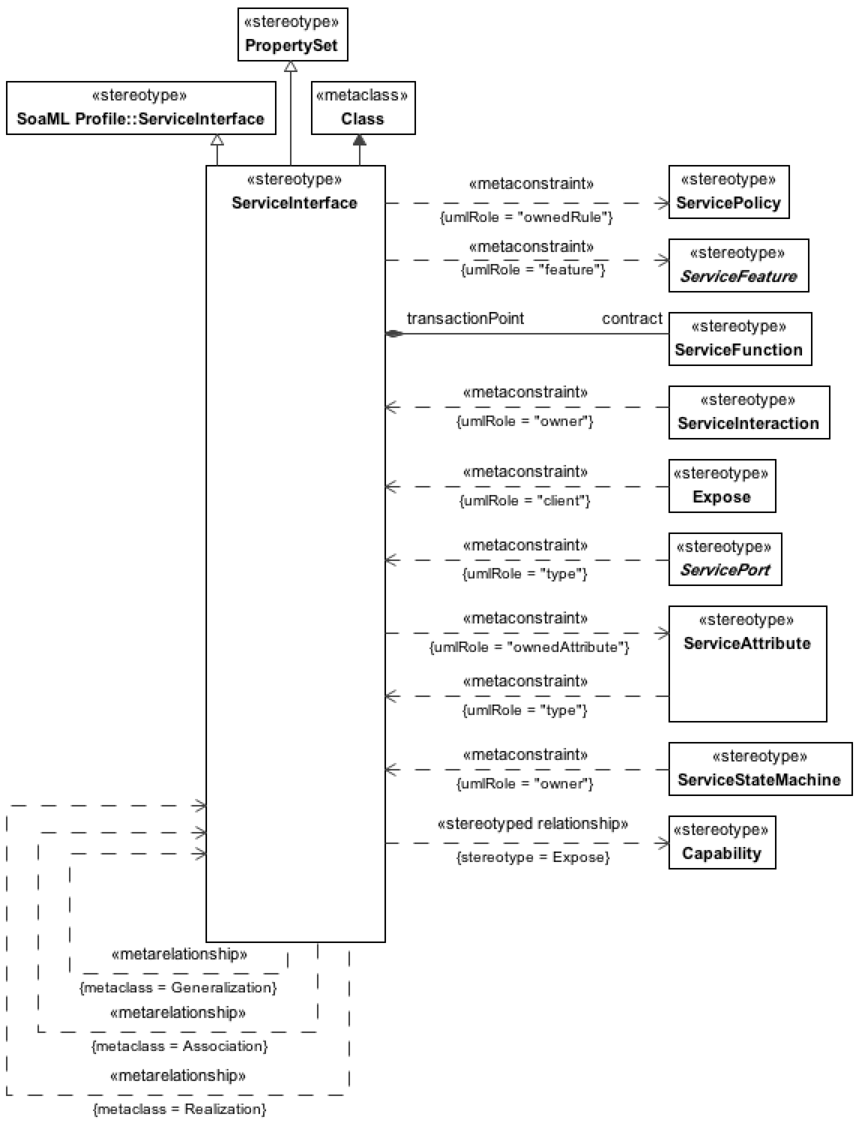


Figure 8.91 - ServiceInterface

Constraints

The following are constraints for ServiceInterface:

- ServiceInterface.feature - Value for the feature property must be stereotyped «ServiceFeature» or its specializations.
- ServiceInterface.ownedAttribute - Values for ownedAttribute property must be stereotyped «ServiceAttribute» or its specializations.
- ServiceInterface.ownedRule - Value for the ownedRule property must be stereotyped «ServicePolicy» or its specializations.

Attribute

The following are attributes for ServiceInterface:

- contract : ServiceFunction[] -

Extensions

The following are extensions for ServiceInterface:

- Class

Generalizations

The following are generalization relationships for ServiceInterface:

- ServiceInterface
- PropertySet

8.2.1.1.5.2.6 ServiceLevelValue

MODAF:A ServiceAttributes indicating the level to which a Resource delivers a Service, in a particular environment.
DoDAF:NA

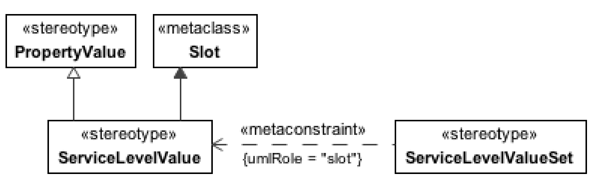


Figure 8.92 - ServiceLevelValue

Extensions

The following are extensions for ServiceLevelValue:

- Slot

Generalizations

The following are generalization relationships for ServiceLevelValue:

- PropertyValue

8.2.1.1.5.2.7 ServiceLevelValueSet

MODAF:A value specification for a set of ServiceAttributes indicating the level to which a Resource delivers a Service, in a particular environment.
DoDAF:NA

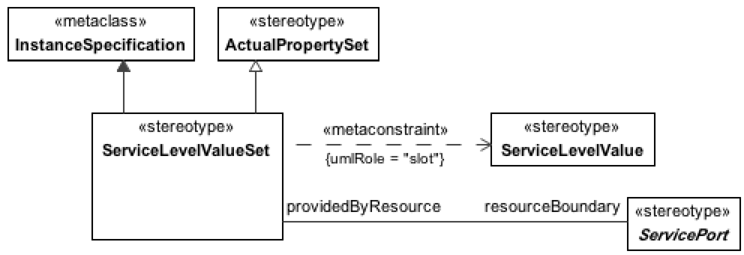


Figure 8.93 - ServiceLevelValueSet

Constraints

The following are constraints for ServiceLevelValueSet:

- ServiceLevelValueSet.slot - Slot property value must be stereotyped «ServiceLevelValue» or its specializations.

Attribute

The following are attributes for ServiceLevelValueSet:

- resourceBoundary : ServicePort[] -

Extensions

The following are extensions for ServiceLevelValueSet:

- InstanceSpecification

Generalizations

The following are generalization relationships for ServiceLevelValueSet:

- ActualPropertySet

8.2.1.1.5.2.8 ServicePolicy

UPDM: A constraint governing the consumers and providers of services
MODAF: A constraint governing one or more Services.
DoDAF: Agreement: A consent among parties regarding the terms and conditions of activities that said parties participate in.

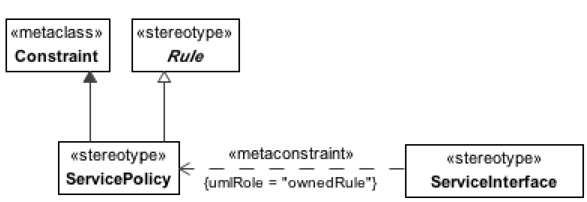


Figure 8.94 - ServicePolicy

Extensions

The following are extensions for ServicePolicy:

- Constraint

Generalizations

The following are generalization relationships for ServicePolicy:

- Element
- Rule

8.2.1.1.5.2.9 ServicePort

MODAF:ServiceInterface,The mechanism by which a Service communicates.
DoDAF:A part of a Performer that specifics a distinct interaction point through which the Performer interacts with other Performers. This isolates dependencies between performers to particular interaction points rather than to the performer as a whole.

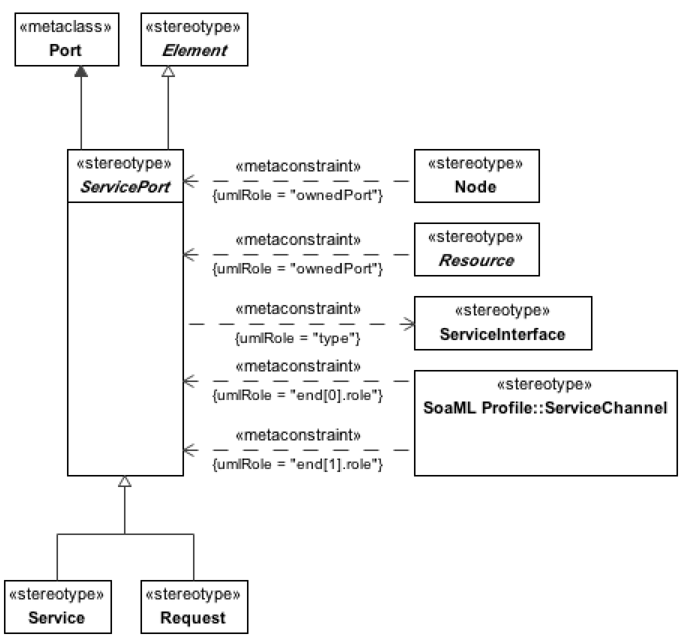


Figure 8.95 - ServicePort

Constraints

The following are constraints for ServicePort:

- ServicePort.actualPropertySets - Values for actualPropertySets property must be stereotyped «ServiceLevelValueSet» or its specializations.

- ServicePort.type - Values for type property must be stereotyped «ServiceInterface» or its specializations.

Attribute

The following are attributes for ServicePort:

- providedByResource : ServiceLevelValueSet[] -

Extensions

The following are extensions for ServicePort:

- Port

Generalizations

The following are generalization relationships for ServicePort:

- Element

8.2.1.1.6 UPDM L1::UPDM L0::Core::StrategicElements

The Strategic Elements are used in the Strategic View which provides an overall Enterprise Architecture assessment of the Capabilities and their relationships facilitating Capability Management (e.g. capability introduction, integration, re-alignment and removal). While an Enterprise will have a number of UPDM Architecture Descriptions that have the Operational, System, Technical Standards, and All Views, only one Strategic View will exist across a number of Architecture Descriptions.

8.2.1.1.6.1 UPDM L1::UPDM L0::Core::StrategicElements::Structure

Structural section of the StrategicElements profile.

8.2.1.1.6.1.1 Capability

MODAF: A high level specification of the enterprise's ability.
DoDAF: The ability to achieve a desired effect under specified [performance] standards and conditions through combinations of ways and means [activities and resources] to perform a set of activities.

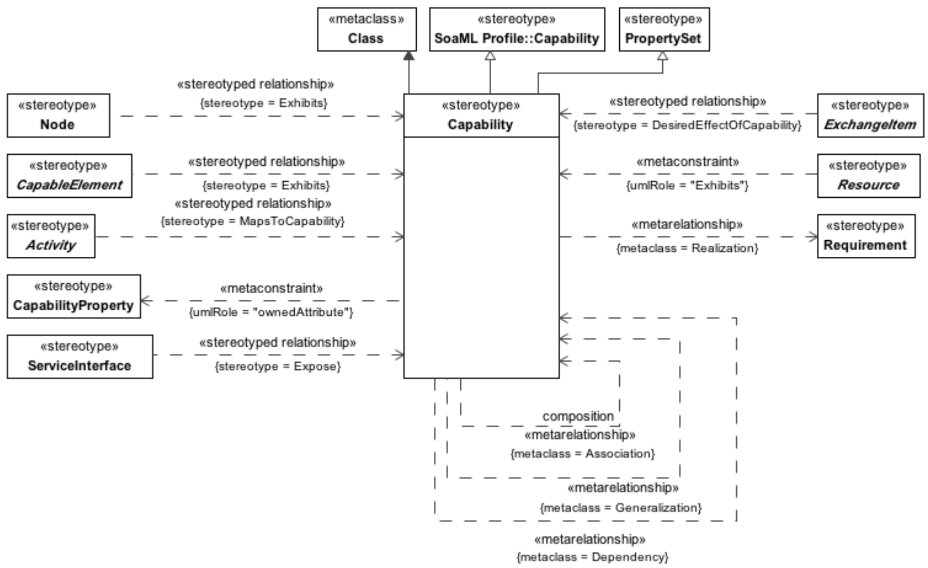


Figure 8.96 - Capability

Constraints

The following are constraints for Capability:

- Capability.ownedAttribute - Values for ownedAttribute property must be stereotyped «CapabilityProperty» or its specializations.

Extensions

The following are extensions for Capability:

- Class

Generalizations

The following are generalization relationships for Capability:

- Capability
- PropertySet

8.2.1.1.6.1.2 CapabilityProperty

UPDM: A property of a capability.
MODAF: NA
DoDAF: NA

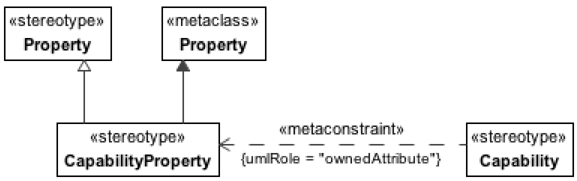


Figure 8.97 - CapabilityProperty

Extensions

The following are extensions for CapabilityProperty:

- Property

Generalizations

The following are generalization relationships for CapabilityProperty:

- Property

8.2.1.1.6.1.3 EnterpriseGoal

MODAF: A specific, required objective of the enterprise that the architecture represents.
DoDAF: NA

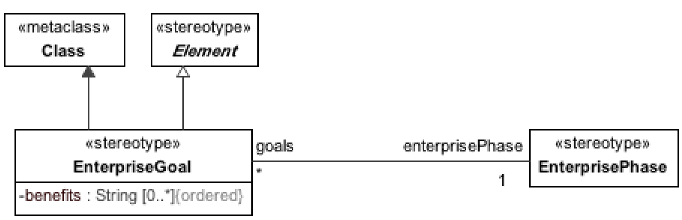


Figure 8.98 - EnterpriseGoal

Attribute

The following are attributes for EnterpriseGoal:

- benefits : String[0..*] - A description of the usefulness of the Goal in terms of why the state or condition of the Enterprise is worth attaining.
- enterprisePhase : EnterprisePhase[1] - Phase of the goal.

Extensions

The following are extensions for EnterpriseGoal:

- Class

Generalizations

The following are generalization relationships for EnterpriseGoal:

- Element

8.2.1.1.6.1.4 EnterprisePhase

MODAF: A specific, required objective of the enterprise that the architecture represents.
DoDAF: NA

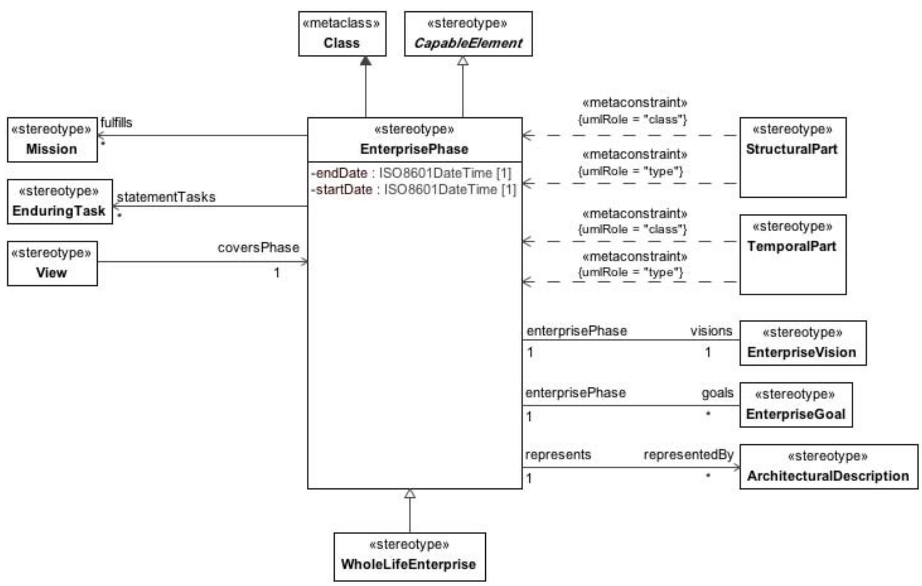


Figure 8.99 - EnterprisePhase

Constraints

The following are constraints for EnterprisePhase:

- Enterprise from/to - Must fall within the Enterprise to and from time, the complete lifecycle.
- EnterprisePhase.useCase - Values for the useCase property must be stereotyped «Mission».

Attribute

The following are attributes for EnterprisePhase:

- endDate : ISO8601DateTime[1] - The time and date at which the Phase ends.
- fulfills : Mission[*] -
- goals : EnterpriseGoal[*] - The Goal towards which this Phase is directed and is in support of.
- representedBy : ArchitecturalDescription[*] -

- startDate : ISO8601DateTime[1] - The time and date at which the Phase starts.
- statementTasks : EnduringTask[*] - Collection of statement tasks.
- visions : EnterpriseVision[1] - The Vision towards which this Phase is directed and is in support of.

Extensions

The following are extensions for EnterprisePhase:

- Class

Generalizations

The following are generalization relationships for EnterprisePhase:

- Element
- CapableElement

8.2.1.1.6.1.5 EnterpriseVision

MODAF: The overall aims of an enterprise over a given period of time.
DoDAF: (DoDAF::Vision): An end that describes the future state of the enterprise, without regard to how it is to be achieved; a mental image of what the future will or could be like.

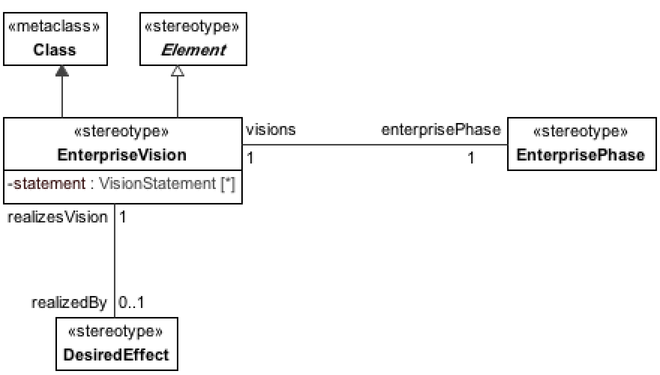


Figure 8.100 - EnterpriseVision

Attribute

The following are attributes for EnterpriseVision:

- enterprisePhase : EnterprisePhase[1] - The phase which temporally locates the Vision.
- realizedBy : DesiredEffect[0..1] - The elements that achieve the desired effect.
- statement : VisionStatement[*] - A description of the Vision.

Extensions

The following are extensions for EnterpriseVision:

- Class

Generalizations

The following are generalization relationships for EnterpriseVision:

- Element

8.2.1.1.6.1.6 Exhibits

UPDM: Relationship between a Node and a capability the node provides.
MODAF: (MODAF::CapabilityForNode): An assertion that a Node is required to have a Capability.
DoDAF: A couple that represents the capability that a performer manifests.

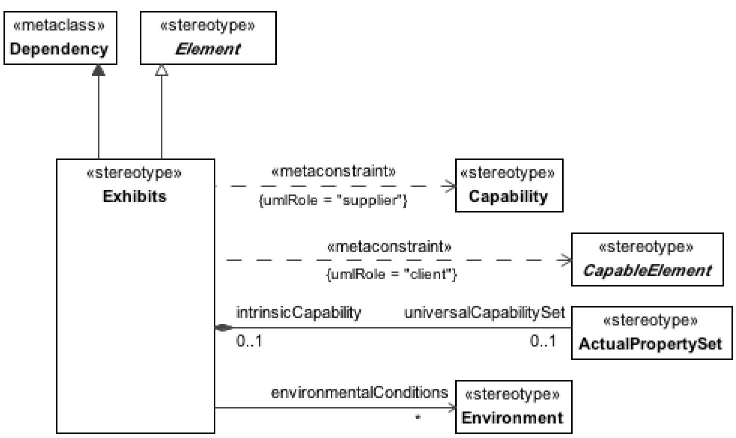


Figure 8.101 - Exhibits

Constraints

The following are constraints for Exhibits:

- ExhibitsCapability.client - Value for the client property must be stereotyped a specialization of «CapableElement».
- ExhibitsCapability.supplier - Value for the supplier property must be stereotyped «Capability».

Attribute

The following are attributes for Exhibits:

- environmentalConditions : Environment[*] - Asserts that a Capability's capabilityMetric (MeasureableProperty) is valid for a particular environment.
- universalCapabilitySet : ActualPropertySet[0..1] -

Extensions

The following are extensions for Exhibits:

- Dependency

Generalizations

The following are generalization relationships for Exhibits:

- Element

8.2.1.1.6.1.7 MapsToCapability

MODAF: Asserts that a StandardOperationalActivity is in some way part of a capability.
DoDAF: MapsToCapability (DoDAF::ActivityPartOfCapability) is a disposition to manifest an Activity. An Activity to be performed to achieve a desired effect under specified [performance] standards and conditions through combinations of ways and means.

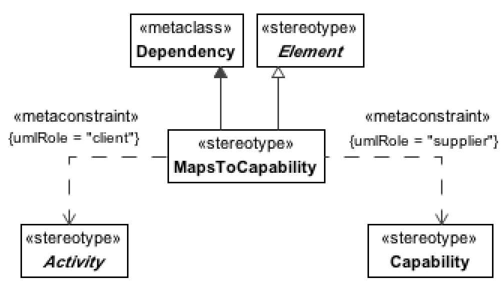


Figure 8.102 - MapsToCapability

Constraints

The following are constraints for MapsToCapability:

- MapsToCapability.client - Value for the client property must be stereotyped a specialization of «Activity».
- MapsToCapability.supplier - Value for the supplier property must be stereotyped «Capability».

Extensions

The following are extensions for MapsToCapability:

- Dependency

Generalizations

The following are generalization relationships for MapsToCapability:

- Element

8.2.1.1.6.1.8 StructuralPart

UPDM: An EnterprisePhase can be sub-divided into structural and temporal parts. StructuralPart describes the EnterprisePhase elements that describe the structure.
MODAF: Asserts that one EnterprisePhase is a spatial part of another, (MODAF::EnterpriseStructure) Note:- This is a topological structuring relationship, hence the EnterprisePhase may be physically disjoint.

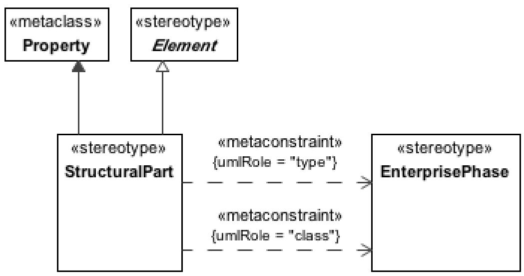


Figure 8.103 - StructuralPart

Constraints

The following are constraints for StructuralPart:

- StructuralPart.class - Value for class metaproperty must be stereotyped «EnterprisePhase» or its specializations.
- StructuralPart.type - Value for type metaproperty must be stereotyped «EnterprisePhase» or its specializations.

Extensions

The following are extensions for StructuralPart:

- Property

Generalizations

The following are generalization relationships for StructuralPart:

- Element

8.2.1.1.6.1.9 TemporalPart

UPDM Artifact: An EnterprisePhase can be sub-divided into structural and temporal parts. TemporalPart describes the EnterprisePhase elements that have a time based nature.
MODAF: Asserts that one EnterprisePhase is a temporal part of another. Note: This means that both EnterprisePhases have the same spatial extent - i..e this is only a temporal structure (MODAF:: EnterpriseTemporalPart).

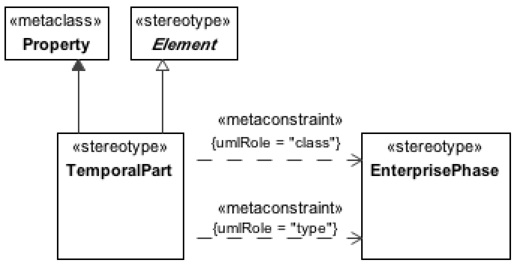


Figure 8.104 - TemporalPart

Constraints

The following are constraints for TemporalPart:

- TemporalPart.class - Value for class metaproperty must be stereotyped «EnterprisePhase» or its specializations.
- TemporalPart.type - Value for type metaproperty must be stereotyped «EnterprisePhase» or its specializations.

Extensions

The following are extensions for TemporalPart:

- Property

Generalizations

The following are generalization relationships for TemporalPart:

- Element

8.2.1.1.6.1.10 VisionStatement

MODAF: A high-level textual description of an EnterpriseVision.
DoDAF: An end that describes the future state of the enterprise, without regard to how it is to be achieved; a mental image of what the future will or could be like (DODAF::Vision).

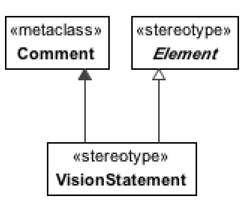


Figure 8.105 - VisionStatement

Extensions

The following are extensions for VisionStatement:

- Comment

Generalizations

The following are generalization relationships for VisionStatement:

- Element

Expose.client
Value for the client property must be stereotyped «ServiceInterface» or its specializations.

Expose.supplier
Value for the supplier property must be stereotyped «Capability».

8.2.1.1.7 UPDM L1::UPDM L0::Core::SystemsElements

Models in the System Viewpoint represent alternate realizations in terms of equipment capability of the operational capabilities expressed through models in the Operational Viewpoint and in the User Requirements. The System Viewpoint primarily addresses the specification of the system capability needed (rather than implementation details). Significant changes originally made in MODAF improved the ability for modelers to represent configuration of capability that include people as well as systems and platforms.

8.2.1.1.7.1 UPDM L1::UPDM L0::Core::SystemsElements::Behavior

The Behavior section of the SystemsElements profile.

8.2.1.1.7.1.1 Function

MODAF: An activity which is specified in context of the resource (human or machine) that performs it.
DoDAF: Activity: Work, not specific to a single organization, weapon system or individual that transforms inputs (Resources) into outputs (Resources) or changes their state.

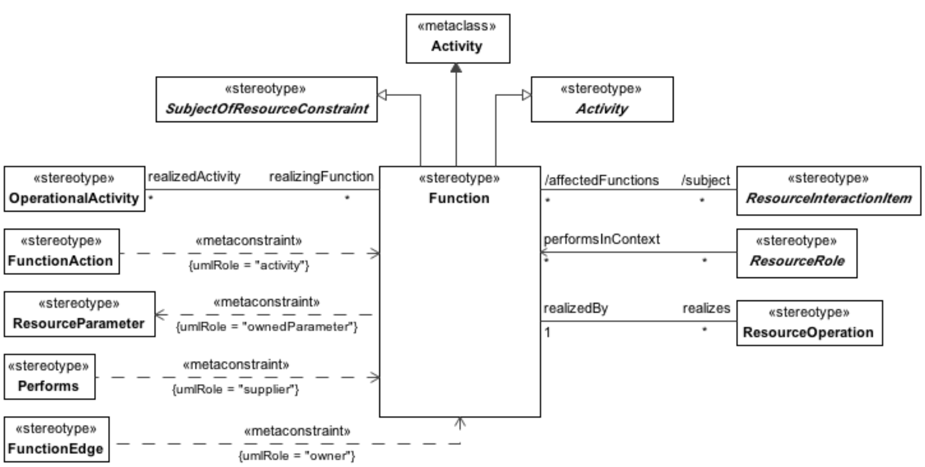


Figure 8.106 - Function

Constraints

The following are constraints for Function:

- Function.ownedParameter - The values for the ownedParameter property must be stereotyped «ResourceParameter».

Attribute

The following are attributes for Function:

- realizedActivity : OperationalActivity[*] - The OperationalActivity that the Function realizes.
- realizes : ResourceOperation[*] -
- subject : ResourceInteractionItem[*] - The ResourceInteractionItem that is the subject of the Function.

Extensions

The following are extensions for Function:

- Activity

Generalizations

The following are generalization relationships for Function:

- Activity
- SubjectOfResourceConstraint

8.2.1.1.7.1.2 FunctionAction

UPDM Artifact: The FunctionAction is defined as a call behavior action that invokes the function that needs to be performed. --This concept is required for mapping the architecture with UML and does not have a DoDAF or MODAF equivalent.

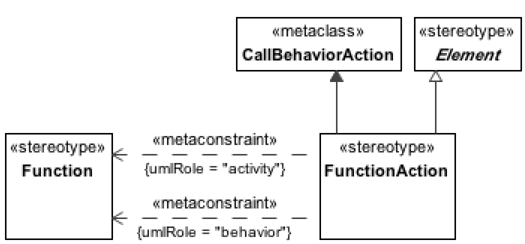


Figure 8.107 - FunctionAction

Constraints

The following are constraints for FunctionAction:

- FunctionAction.activity - Value for the activity property must be stereotyped «Function».

- FunctionAction.behavior - Value for the behavior property must be stereotyped «Function».

Extensions

The following are extensions for FunctionAction:

- CallBehaviorAction

Generalizations

The following are generalization relationships for FunctionAction:

- Element

8.2.1.1.7.1.3 FunctionEdge

UPDM: An extension of <<ActivityEdge>> that is used to model the flow of control/objects through a Function.
MODAF: A FunctionEdge (MODAF::FunctionFlow) is a UML::ObjectFlow between Functions. NOTE: this has been extended in UPDM to additionally include UML::ControlFlows.

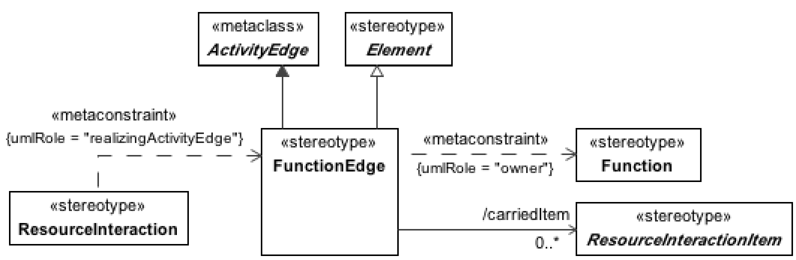


Figure 8.108 - FunctionEdge

Constraints

The following are constraints for FunctionEdge:

- FunctionEdge.owner - «FunctionEdge» must be owned directly or indirectly by «Function».

Attribute

The following are attributes for FunctionEdge:

- carriedItem : ResourceInteractionItem[0..*] - The ResourceInteractionItem that is conveyed.

Extensions

The following are extensions for FunctionEdge:

- ActivityEdge

Generalizations

The following are generalization relationships for FunctionEdge:

- Element

8.2.1.1.7.1.4 ResourceEventTrace

UPDM: A UPDM artifact that extends a UML Interaction.

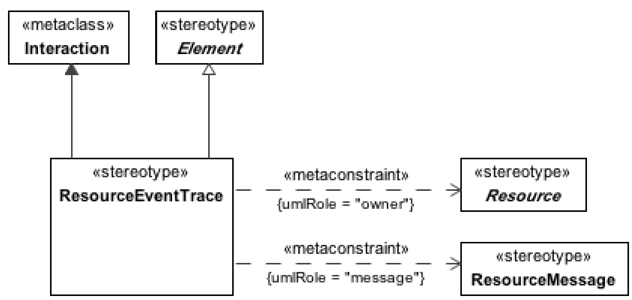


Figure 8.109 - ResourceEventTrace

Constraints

The following are constraints for ResourceEventTrace:

- ResourceEventTrace.message - Values for the message property must be stereotyped with «ResourceMessage» or its specializations.
- ResourceEventTrace.owner - Values for the owner property must be stereotyped with «Resource» or its specializations.

Extensions

The following are extensions for ResourceEventTrace:

- Interaction

Generalizations

The following are generalization relationships for ResourceEventTrace:

- Element

8.2.1.1.7.1.5 ResourceMessage

UPDM: Message for use in a Resource Event-Trace, implements a ResourceInteraction.
MODAF: A specification of the interactions between aspects of a Resources architecture (MODAF::ResourceInteractionSpecification).
DoDAF: An overlap of an Activity with a Resource, in particular a consuming or producing Activity that expresses an input, output, consumption, or production Activity of the Resource (DoDAF::activityResourceOverlap).

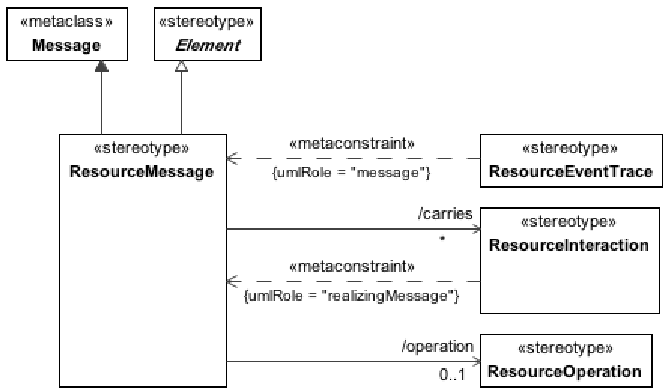


Figure 8.110 - ResourceMessage

Attribute

The following are attributes for ResourceMessage:

- carries : ResourceInteraction[*] - Carried ResourceInteraction
- operation : ResourceOperation[0..1] -

Extensions

The following are extensions for ResourceMessage:

- Message

Generalizations

The following are generalization relationships for ResourceMessage:

- Element

8.2.1.1.7.1.6 ResourceOperation

UPDM:A partial or full realization of Function.
MODAF:NA
DoDAF:NA

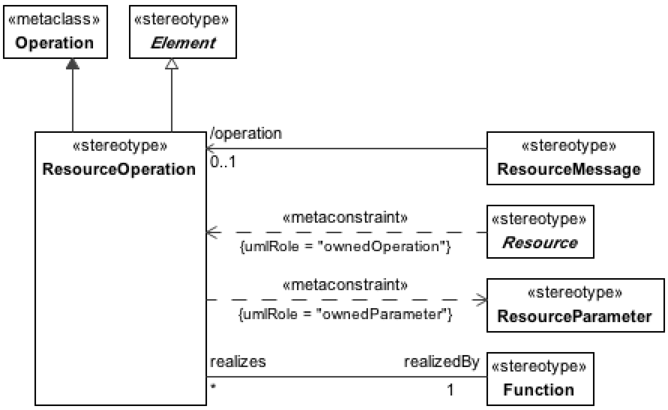


Figure 8.111 - ResourceOperation

Constraints

The following are constraints for ResourceOperation:

- ResourceOperation.ownedParameter - The values for the ownedParameter property must be stereotyped «ResourceParameter».

Attribute

The following are attributes for ResourceOperation:

- realizedBy : Function[1] -

Extensions

The following are extensions for ResourceOperation:

- Operation

Generalizations

The following are generalization relationships for ResourceOperation:

- Element

8.2.1.1.7.1.7 ResourceParameter

UPDM: Represents inputs and outputs of Function. It is typed by ResourceInteractionItem.

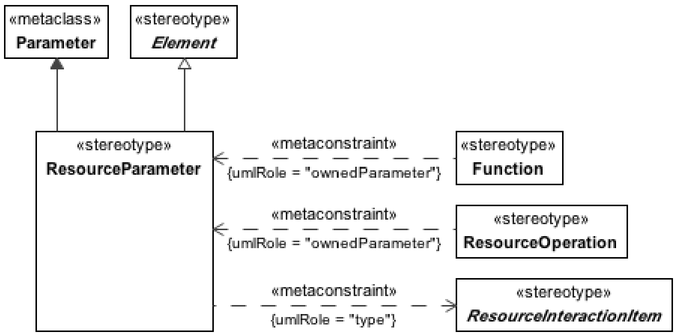


Figure 8.112 - ResourceParameter

Constraints

The following are constraints for ResourceParameter:

- ResourceParameter.type - Value for the type property must be stereotyped with specialization of «ResourceInteractionItem».

Extensions

The following are extensions for ResourceParameter:

- Parameter

Generalizations

The following are generalization relationships for ResourceParameter:

- Element

8.2.1.1.7.1.8 ResourceStateMachine

UPDM Artifact that extends a UML StateMachine allied to Resources.

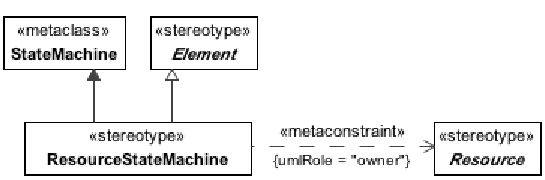


Figure 8.113 - ResourceStateMachine

Constraints

The following are constraints for ResourceStateMachine:

- ResourceStateMachine.owner - Values for the owner property must be stereotyped with «Resource» or its specializations.

Extensions

The following are extensions for ResourceStateMachine:

- StateMachine

Generalizations

The following are generalization relationships for ResourceStateMachine:

- Element

8.2.1.1.7.2 UPDM L1::UPDM L0::Core::SystemsElements::Data

The Data section of the SystemsElements profile.

8.2.1.1.7.2.1 DataElement

MODAF: A formalised representation of data which is managed by or exchanged between systems.
DoDAF: (DoDAF::Data): Representation of information in a formalized manner suitable for communication, interpretation, or processing by humans or by automatic means.

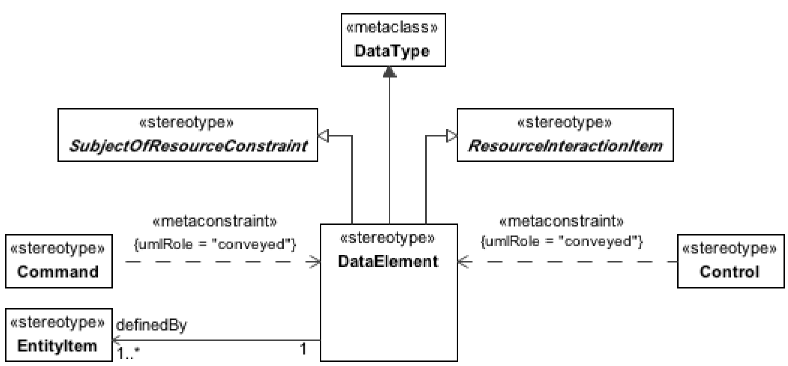


Figure 8.114 - DataElement

Attribute

The following are attributes for DataElement:

- definedBy : EntityItem[1..*] - The list of EntityItems that are defined by the DataElement.

Extensions

The following are extensions for DataElement:

- DataType

Generalizations

The following are generalization relationships for DataElement:

- SubjectOfResourceConstraint
- ResourceInteractionItem

8.2.1.1.7.2.2 DataModel

MODAF: A structural specification of data, showing classifications of data elements and relationships between them.
DoDAF: NA

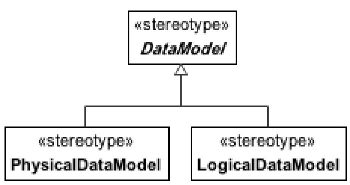


Figure 8.115 - DataModel

Constraints

The following are constraints for DataModel:

- DataModel.ownedElement - All classifiers owned by PhysicalDataModel must be stereotyped «EntityItem».

Generalizations

The following are generalization relationships for DataModel:

- Element

8.2.1.1.7.2.3 PhysicalDataModel

MODAF: A PhysicalDataModel is an implementable specification of a data structure. A PhysicalDataModel realises a LogicalDataModel, taking into account implementation restrictions and performance issues whilst still enforcing the constraints, relationships and typing of the logical model.
DoDAF: A Physical Data Model defines the structure of the various kinds of system or service data that are utilized by the systems or services in the Architecture.

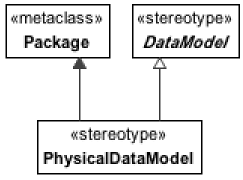


Figure 8.116 - PhysicalDataModel

Extensions

The following are extensions for PhysicalDataModel:

- Package

Generalizations

The following are generalization relationships for PhysicalDataModel:

- DataModel

8.2.1.1.7.3 UPDM L1::UPDM L0::Core::SystemsElements::Flows

The Flows section of the SystemsElements profile.

8.2.1.1.7.3.1 ResourceInteraction

UPDM: ResourceInteraction represents data that is exchanged between the resources
MODAF: An assertion that two FunctionalResources interact. Examples : data exchange between systems, conversations between people, people using systems.
DoDAF: NA

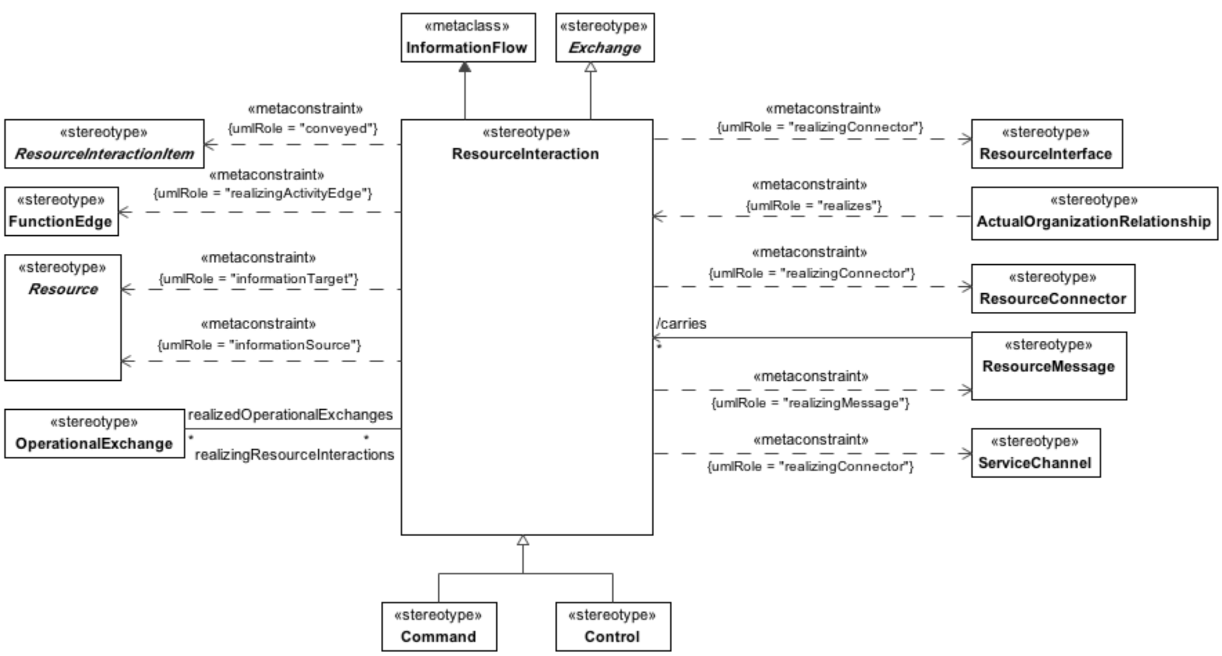


Figure 8.117 - ResourceInteraction

Constraints

The following are constraints for ResourceInteraction:

- ResourceInteraction.conveyedElement - Value for the conveyedElement property must be stereotyped «ResourceInteractionItem» or its specializations.
- ResourceInteraction.informationSource - Value for the informationSource property must be stereotyped «Resource» or its specializations.
- ResourceInteraction.informationTarget - Value for the informationTarget property must be stereotyped «Resource» or its specializations.
- ResourceInteraction.realization - Value for the realization property must be stereotyped «ResourceInterface», «ActualOrganizationReationship», or their specializations.
- ResourceInteraction.realizingActivityEdge - Value for the realizingActivityEdge property must be stereotyped «FunctionEdge» or its specializations.
- ResourceInteraction.realizingConnector - Value for the realizingConnector property must be stereotyped «ResourceInterface», «ResourceConnector», «ServiceChannel» or their specializations.

Attribute

The following are attributes for ResourceInteraction:

- realizedOperationalExchanges : OperationalExchange[*] -

Extensions

The following are extensions for ResourceInteraction:

- InformationFlow

Generalizations

The following are generalization relationships for ResourceInteraction:

- Exchange

8.2.1.1.7.3.2 ResourceInteractionItem

UPDM Abstract: Represents the item(s) exchanged between the resources through a ResourceInteraction.
MODAF: Formalised representation of data which is managed by or exchanged between systems (MODAF::DataElement).
DoDAF: Representation of information in a formalized manner suitable for communication, interpretation, or processing by humans or by automatic means (DoDAF::Data).

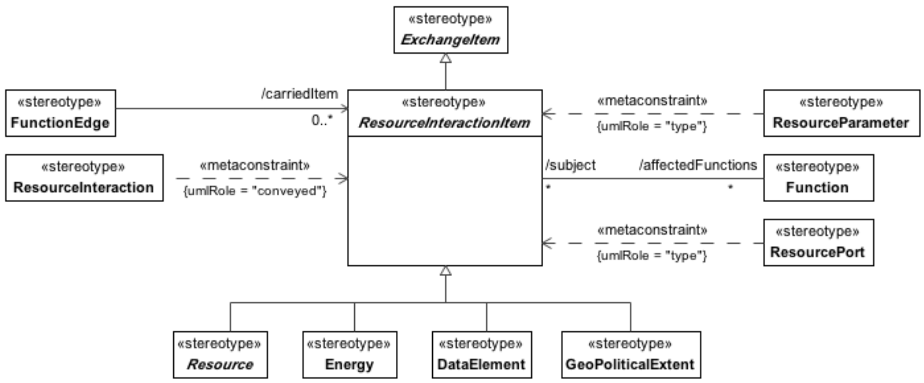


Figure 8.118 - ResourceInteractionItem

Attribute

The following are attributes for ResourceInteractionItem:

- affectedFunctions : Function[*] - The Functions affected by the ResourceInteractionItem.

Generalizations

The following are generalization relationships for ResourceInteractionItem:

- ExchangeItem

8.2.1.1.7.4 UPDM L1::UPDM L0::Core::SystemsElements::Structure

The Structure section of the SystemsElements profile.

8.2.1.1.7.4.1 CapabilityConfiguration

MODAF: A composite structure representing the physical and human resources (and their interactions) in an enterprise.--A CapabilityConfiguration is a set of artefacts or an organisation configured to provide a capability, and should be guided by [doctrine] which may take the form of Standard or OperationalConstraint stereotypes.
DoDAF: Any entity - human, automated, or any aggregation of human and/or automated - that performs an activity and provides a capability (Performer).

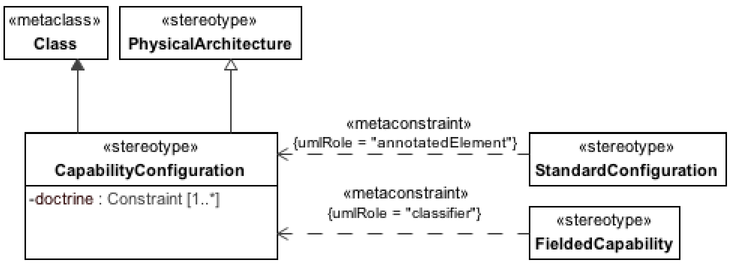


Figure 8.119 - CapabilityConfiguration

Attribute

The following are attributes for CapabilityConfiguration:

- doctrine : Constraint[1..*] - Represents the doctrinal line of development of the capability.

Extensions

The following are extensions for CapabilityConfiguration:

- Class

Generalizations

The following are generalization relationships for CapabilityConfiguration:

- PhysicalArchitecture

8.2.1.1.7.4.2 Component

UPDM: A well defined resource that is used by a CapabilityConfiguration to accomplish a capability.
MODAF: Usage of an Artefact as a component of a ResourceConfiguration (MODAF::PhysicalAsset).

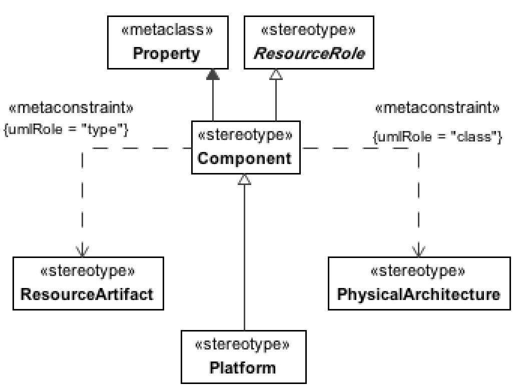


Figure 8.120 - Component

Constraints

The following are constraints for Component:

- ResourceComponent.class - Value for the class property must be stereotyped «PhysicalArchitecture» or its specializations.
- ResourceComponent.type - Value for the type property must be stereotyped «ResourceArtifact» or its specializations.

Extensions

The following are extensions for Component:

- Property

Generalizations

The following are generalization relationships for Component:

- ResourceRole

8.2.1.1.7.4.3 Equipment

UPDM: Equipment is a physical resource that is used to accomplish a task or function in a system or an environment.
MODAF: (MODAF::PhysicalAsset): Usage of an ResourceArtifact (MODAF::Artefact) as a component of a ResourceConfiguration.
DoDAF: NA

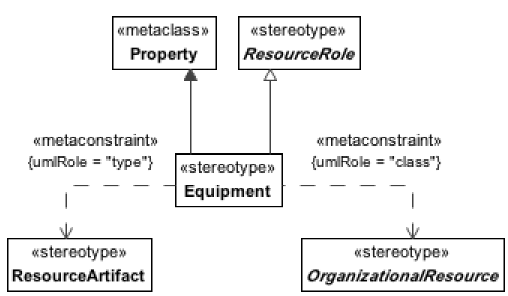


Figure 8.121 - Equipment

Constraints

The following are constraints for Equipment:

- Equipment.class - Value for the class property must be stereotyped «OrganizationalResource» or its specializations.
- Equipment.type - Value for the type property must be stereotyped «ResourceArtifact» or its specializations.

Extensions

The following are extensions for Equipment:

- Property

Generalizations

The following are generalization relationships for Equipment:

- ResourceRole

8.2.1.1.7.4.4 FieldedCapability

MODAF: An actual, fully-realised capability. A FieldedCapability must indicate its configuration CapabilityConfiguration.
DoDAF: NA

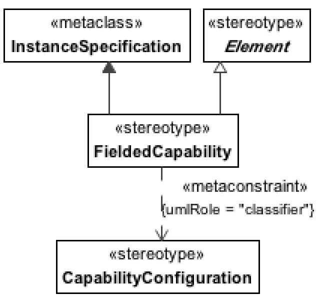


Figure 8.122 - FieldedCapability

Constraints

The following are constraints for FieldedCapability:

- FieldedCapability.classifier - Value for the classifier property must be stereotyped «CapabilityConfiguration» or its specializations.

Extensions

The following are extensions for FieldedCapability:

- InstanceSpecification

Generalizations

The following are generalization relationships for FieldedCapability:

- Element

8.2.1.1.7.4.5 Forecast

MODAF: A statement about the future state of one or more types of system or standard.
DoDAF: NA

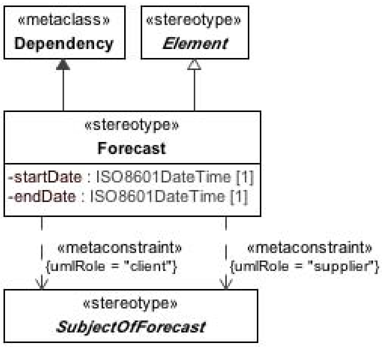


Figure 8.123 - Forecast

Constraints

The following are constraints for Forecast:

- Forecast.client - Value for the client property must be stereotyped «SubjectOfForecast» or its specializations.
- Forecast.pair - The client and supplier must be stereotyped by the same specialization of «SubjectOfForecast» (e.g. «Software» to «Software», «Standard» to «Standard», etc).
- Forecast.supplier - Value for the supplier property must be stereotyped «SubjectOfForecast» or its specializations.

Attribute

The following are attributes for Forecast:

- endDate : ISO8601DateTime[1] - End date of the forecast
- startDate : ISO8601DateTime[1] - Start date of the forecast.

Extensions

The following are extensions for Forecast:

- Dependency

Generalizations

The following are generalization relationships for Forecast:

- Element

8.2.1.1.7.4.6 HostedSoftware

MODAF: Asserts that Software is hosted on a ResourceArtifact (MODAF::Artefact) (which means the artefact is some kind of computer system)
DoDAF: NA – covered by the more general temporalWholePart element.

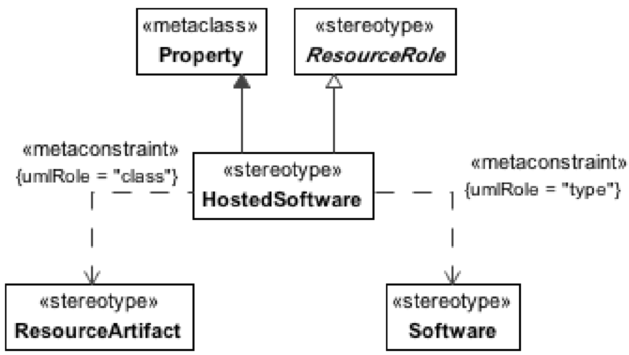


Figure 8.124 - HostedSoftware

Constraints

The following are constraints for HostedSoftware:

- HostedSoftware.class - Value for the class property must be stereotyped «ResourceArtifact» or its specializations.
- HostedSoftware.type - Value for the type property must be stereotyped «Software» or its specializations.

Extensions

The following are extensions for HostedSoftware:

- Property

Generalizations

The following are generalization relationships for HostedSoftware:

- ResourceRole

8.2.1.1.7.4.7 HumanResource

MODAF: The role of a Post (MODAF::PostType) or Organization (MODAF::OrganisationType) in a CapabilityConfiguration.
DoDAF: NA – covered by the more general temporalWholePart element.

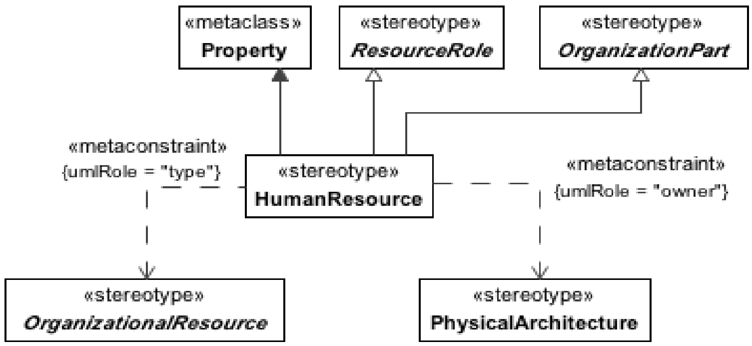


Figure 8.125 - HumanResource

Constraints

The following are constraints for HumanResource:

- HumanResource.class - Value for the class property must be stereotyped «PhysicalArchitecture» or its specializations.
- HumanResource.type - Value for the type property must be stereotyped «OrganizationalResource» or its specializations.

Extensions

The following are extensions for HumanResource:

- Property

Generalizations

The following are generalization relationships for HumanResource:

- ResourceRole
- OrganizationPart

8.2.1.1.7.4.8 Part

MODAF: Usage of a ResourceArtifact (UPDM::Artefact) as a part of another ResourceArtifact.
DoDAF: NA – covered by the more general temporalWholePart element.

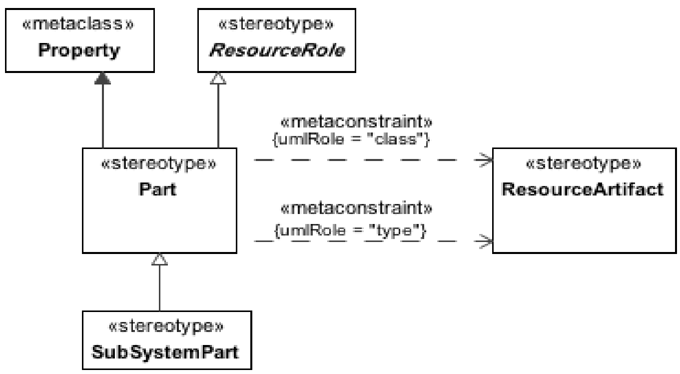


Figure 8.126 - Part

Constraints

The following are constraints for Part:

- Part.class - Value for the class property must be stereotyped «ResourceArtifact» or its specializations.
- Part.type - Value for the type property must be stereotyped «ResourceArtifact» or its specializations.

Extensions

The following are extensions for Part:

- Property

Generalizations

The following are generalization relationships for Part:

- ResourceRole

8.2.1.1.7.4.9 PhysicalArchitecture

MODAF:A configuration of Resources for a purpose.
DoDAF:NA

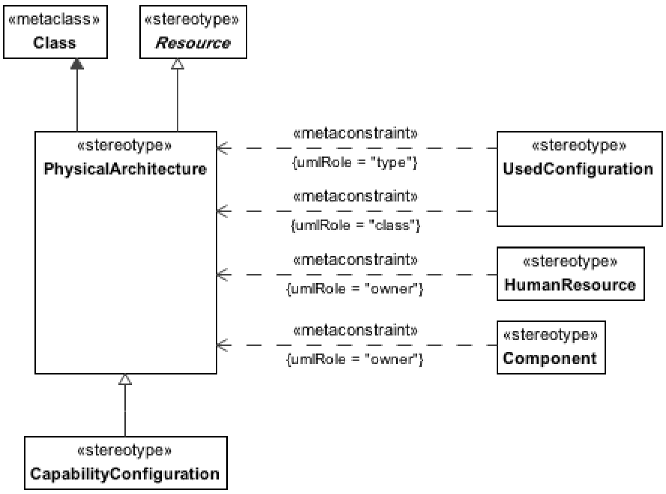


Figure 8.127 - PhysicalArchitecture

Extensions

The following are extensions for PhysicalArchitecture:

- DataType
- Class

Generalizations

The following are generalization relationships for PhysicalArchitecture:

- Resource

8.2.1.1.7.4.10 Platform

MODAF: Usage of an Artefact as a platform (e.g. vessel, aircraft, etc.) in a particular ResourceConfiguration.
DoDAF: NA – covered by the more general temporalWholePart element.

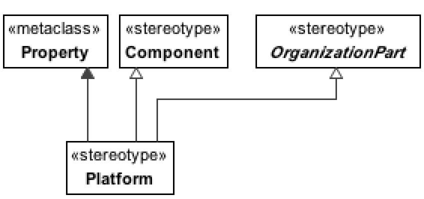


Figure 8.128 - Platform

Extensions

The following are extensions for Platform:

- Property

Generalizations

The following are generalization relationships for Platform:

- Component
- OrganizationPart

8.2.1.1.7.4.11 Resource

UPDM: Abstract supertype for physical resources such as OrganizationalResource.
MODAF: A PhysicalAsset, OrganisationalResource or FunctionalResource that can contribute towards fulfilling a capability (MODAF::ResourceType).

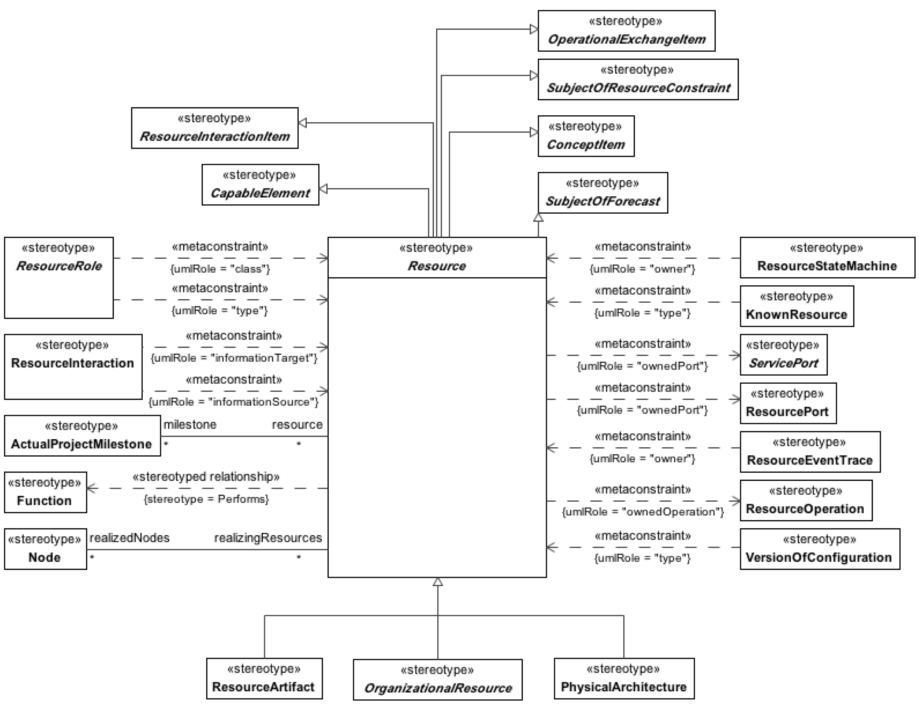


Figure 8.129 - Resource

Constraints

The following are constraints for Resource:

- Resource.ownedOperation - Values for the ownedOperation property must be stereotyped with «ResourceOperation» or its specializations.
- Resource.ownedPort - Values for the ownedPort property must be stereotyped with «ResourcePort»/«ServicePort» or its specializations.

- Resource.performs - Can perform only «Functions».

Attribute

The following are attributes for Resource:

- milestone : ActualProjectMilestone[*] - A Linked milestone.
- realizedNodes : Node[*] -

Extensions

The following are extensions for Resource:

- Class

Generalizations

The following are generalization relationships for Resource:

- SubjectOfResourceConstraint
- SubjectOfForecast
- ResourceInteractionItem
- CapableElement
- ConceptItem
- Element
- OperationalExchangeItem

8.2.1.1.7.4.12 ResourceArtifact

UPDM: A combination of physical element, energy, and data that are combined used to accomplish a task or function. MODAF: A type of man-made object. Examples are "car", "radio", "fuel", etc. (MODAF:: Artefact).

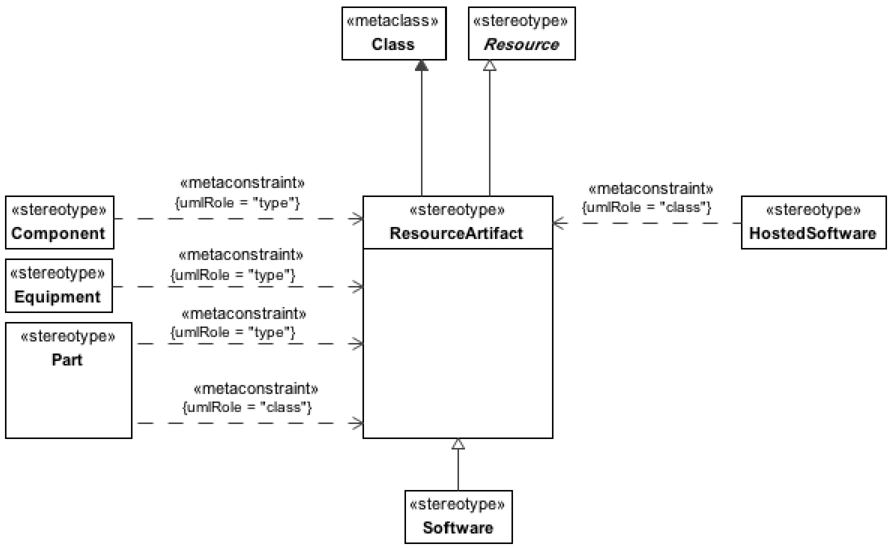


Figure 8.130 - ResourceArtifact

Extensions

The following are extensions for ResourceArtifact:

- Class

Generalizations

The following are generalization relationships for ResourceArtifact:

- Resource

8.2.1.1.7.4.13 ResourceConnector

UPDM: A physical connection between two resources that implements protocols through which the source resource can transmit items to the destination resource.
MODAF: Asserts that a connection exists between two ports belonging to parts in a system composite structure model (MODAF::SystemPortConnector).
DoDAF: NA

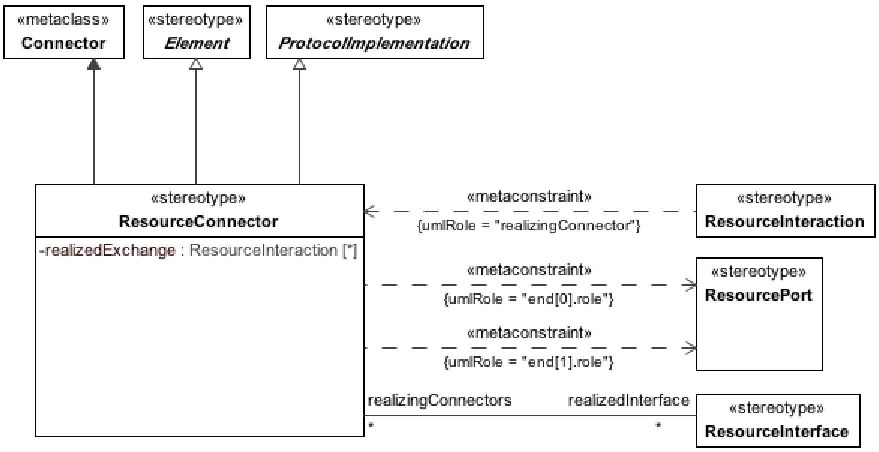


Figure 8.131 - ResourceConnector

Constraints

The following are constraints for ResourceConnector:

- ResourceConnector.end - The value for the role property for the owned ConnectorEnd must be stereotype «ResourcePort» or its specializations.

Attribute

The following are attributes for ResourceConnector:

- realizedExchange : ResourceInteraction[*] - A list of ResourceInteractions (or specializations) that realized by the ResourceInterface/ResourceConnector. This is derived by navigating from the ResourceInteraction to the ResourceInterfaces/ResourceConnectors using the inverse of the realization/realizingConnector roles.
- realizedInterface : ResourceInterface[*] - Realized ResourceInterfaces.

Extensions

The following are extensions for ResourceConnector:

- Connector

Generalizations

The following are generalization relationships for ResourceConnector:

- ProtocolImplementation
- Element

8.2.1.1.7.4.14 ResourceConstraint

MODAF: A rule governing the structural or functional aspects of an implementation - this may also include constraints on OrganisationalResources that are part of an implementation.
DoDAF: The range of permissible states for an object (DoDAF::Constraint).

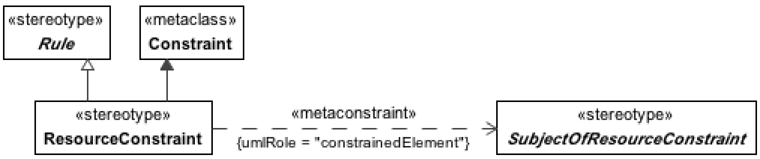


Figure 8.132 - ResourceConstraint

Constraints

The following are constraints for ResourceConstraint:

- ResourceConstraint.constrainedElement - Value for the constrainedElement property must be stereotyped «SubjectOfResourceConstraint» or its specializations.

Extensions

The following are extensions for ResourceConstraint:

- Constraint

Generalizations

The following are generalization relationships for ResourceConstraint:

- Rule

8.2.1.1.7.4.15 ResourceInterface

UPDM: ResourceInterface is a contractual agreement between two resources that implement protocols through which the source resource to the destination resource.
MODAF: NA
DoDAF: An overlap between Performers for the purpose of producing a Resource that is consumed by the other (DoDAF:: Interface).

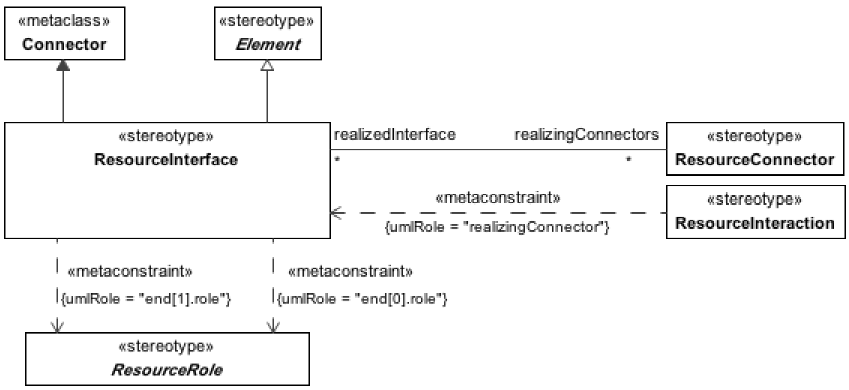


Figure 8.133 - ResourceInterface

Constraints

The following are constraints for ResourceInterface:

- ResourceInterface.end - the value for the role property for the owned ConnectorEnd must be stereotype «ResourceRole» or its specializations.

Attribute

The following are attributes for ResourceInterface:

- realizingConnectors : ResourceConnector[*] - Realizing ResourceConnectors.

Extensions

The following are extensions for ResourceInterface:

- Connector

Generalizations

The following are generalization relationships for ResourceInterface:

- Element

8.2.1.1.7.4.16 ResourcePort

UPDM: Port is an interaction point for a resource through which it can interact with the outside environment.
MODAF: An interface (logical or physical) provided by a System. A SystemPort may implement a PortType though there is no requirement for SystemPorts to be typed (MODAF:: SystemPort).
DoDAF: An interface (logical or physical) provided by a System (DoDAF::Port).

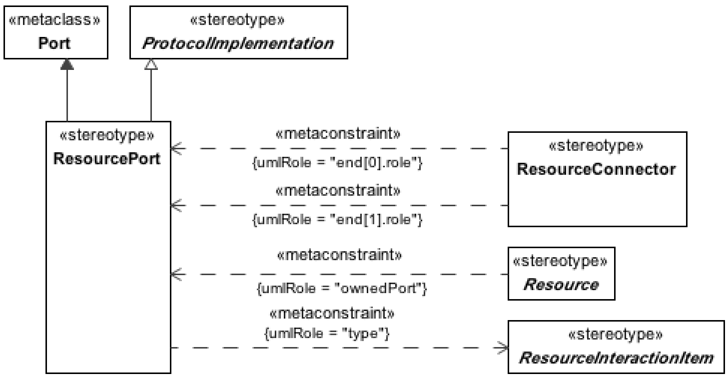


Figure 8.134 - ResourcePort

Constraints

The following are constraints for ResourcePort:

- ResourcePort.type - Value for the type property must be stereotyped "ResourceInteractionItem" or its specializations.

Extensions

The following are extensions for ResourcePort:

- Port

Generalizations

The following are generalization relationships for ResourcePort:

- ProtocolImplementation

8.2.1.1.7.4.17 ResourceRole

UPDM: abstract element.

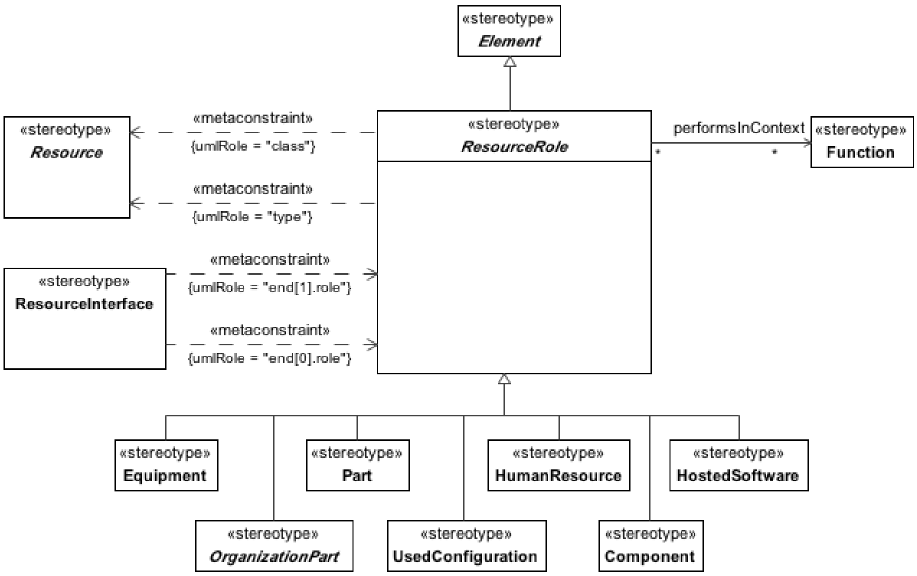


Figure 8.135 - ResourceRole

Constraints

The following are constraints for ResourceRole:

- ResouceRole.type - An element with the stereotype «ResourceRole» applied must have the «Resource» stereotype (or its specializations) applied to the targets of its extended metaclass property "type".
- ResourceRole.class - Value for the class property must be stereotyped «Resource» or its specializations.

Attribute

The following are attributes for ResourceRole:

- performsInContext : Function[*] - Functions used by the ResourceRole.

Generalizations

The following are generalization relationships for ResourceRole:

- Element

8.2.1.1.7.4.18 Software

MODAF: An executable computer programme.
DoDAF: Materiel: Equipment, apparatus or supplies that are of interest, without distinction as to its application for administrative or combat purposes.

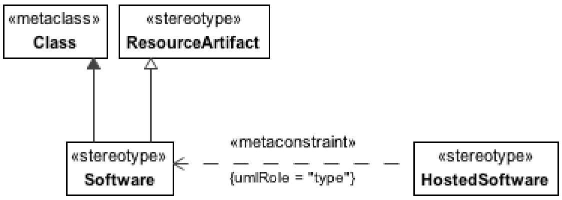


Figure 8.136 - Software

Extensions

The following are extensions for Software:

- Class

Generalizations

The following are generalization relationships for Software:

- ResourceArtifact

8.2.1.1.7.4.19 SubjectOfForecast

MODAF: Abstract Any element that may be subject to a Forecast.

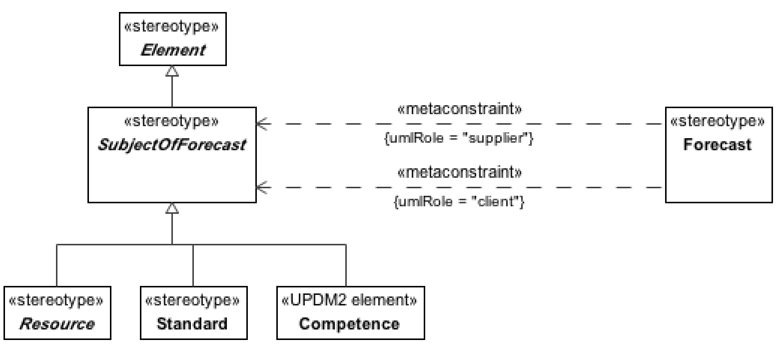


Figure 8.137 - SubjectOfForecast

Generalizations

The following are generalization relationships for SubjectOfForecast:

- Element

8.2.1.1.7.4.20 SubjectOfResourceConstraint

MODAF: Abstract. Anything that may be constrained by a ResourceConstraint.

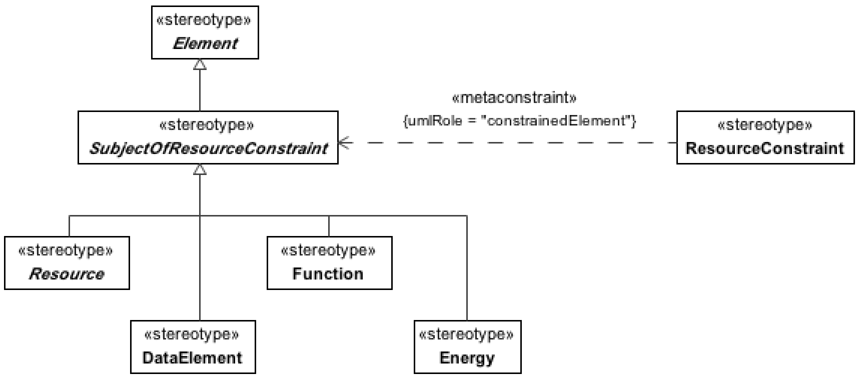


Figure 8.138 - SubjectOfResourceConstraint

Generalizations

The following are generalization relationships for SubjectOfResourceConstraint:

- Element

8.2.1.1.7.4.21 SubSystemPart

UPDM: Indicates that a (sub)system is part of another system.
MODAF: Usage of an Artefact (UPDM::ResourceArtifact) as a part of another Artefact (UPDM::ResourceArtifact), equates to a MODAF::Part.
DoDAF: NA

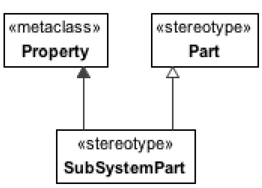


Figure 8.139 - SubSystemPart

Extensions

The following are extensions for SubSystemPart:

- Property

Generalizations

The following are generalization relationships for SubSystemPart:

- Part

8.2.1.1.7.4.22 UsedConfiguration

MODAF: The usage of a CapabilityConfiguration in another CapabilityConfiguration.
DoDAF: NA

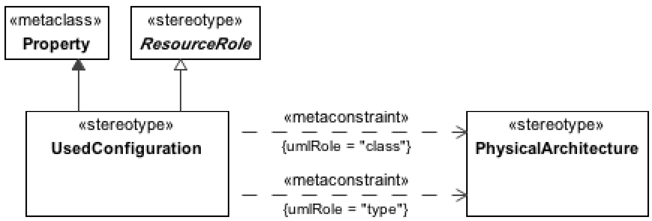


Figure 8.140 - UsedConfiguration

Constraints

The following are constraints for UsedConfiguration:

- UsedConfiguration.class - Value for the class property must be stereotyped «PhysicalArchitecture» or its specializations.
- UsedConfiguration.type - Value for the type property must be stereotyped «PhysicalArchitecture» or its specializations.

Extensions

The following are extensions for UsedConfiguration:

- Property

Generalizations

The following are generalization relationships for UsedConfiguration:

- ResourceRole

8.2.1.1.7.4.23 VersionOfConfiguration

MODAF:Asserts that a CapabilityConfiguration is a version of a WholeLifeConfiguration.
DoDAF:NA

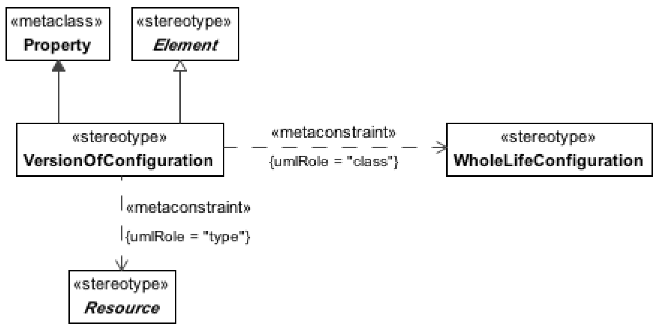


Figure 8.141 - VersionOfConfiguration

Constraints

The following are constraints for VersionOfConfiguration:

- VersionOfConfiguration.class - Value for the class property must be stereotyped «WholeLifeConfiguration» or its specializations.
- VersionOfConfiguration.type - Value for the type property must be stereotyped «Resource» or its specializations.

Extensions

The following are extensions for VersionOfConfiguration:

- Property

Generalizations

The following are generalization relationships for VersionOfConfiguration:

- Element

8.2.1.1.7.4.24 WholeLifeConfiguration

MODAF:A set of versions of a CapabilityConfiguration over time.
DoDAF:NA

Figure 8.142 - WholeLifeConfiguration

Extensions

The following are extensions for WholeLifeConfiguration:

- Class

Generalizations

The following are generalization relationships for WholeLifeConfiguration:

- Element

8.2.1.1.8 UPDM L1::UPDM L0::Core::TechnicalStandardsElements

Section 1.4.4 of the DoDAF version 1.5 Definitions and Guidelines (Volume I) Define the purpose of the Technical View as follows:

“The TV is the minimal set of rules governing the arrangement, interaction, and interdependence of system parts or elements. Its purpose is to ensure that a system satisfies a specified set of operational requirements. The TV provides the technical systems implementation guidelines upon which engineering specifications are based, common building blocks are established, and product lines are developed. It includes a collection of the technical standards, implementation conventions, standards options, rules, and criteria that can be organized into profile(s) that govern systems and system or service elements for a given architecture."

8.2.1.1.8.1 Protocol

MODAF: A Standard for communication. Protocols may be composite (i.e. a stack).
DoDAF: NA, See TechnicalStandard.

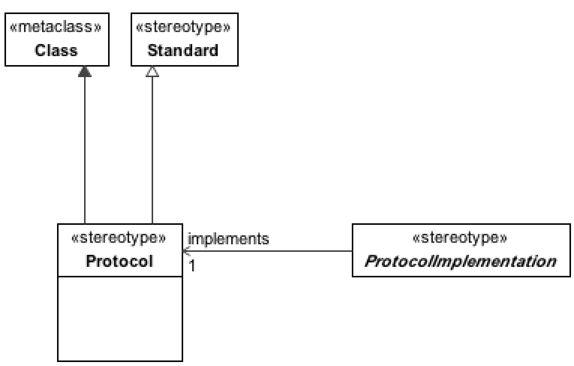


Figure 8.143 - Protocol

Extensions

The following are extensions for Protocol:

- Class

Generalizations

The following are generalization relationships for Protocol:

- Standard

8.2.1.1.8.2 ProtocolImplementation

UPDM: Abstract element: A connector that implements a specific Protocol.
MODAF: An element that can implement a Protocol.

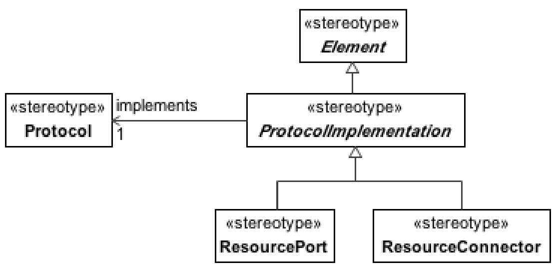


Figure 8.144 - ProtocolImplementation

Attribute

The following are attributes for ProtocolImplementation:

- implements : Protocol[1] - The <<Protocol>> which can be implemented by the Connector targets.

Generalizations

The following are generalization relationships for ProtocolImplementation:

- Element

8.2.1.1.8.3 Standard

MODAF: A ratified and peer-reviewed specification that is used to guide or constrain the architecture. A Standard may be applied to any element in the architecture via the [constrainedItem] property of UML::Constraint.
DoDAF: A formal agreement documenting generally accepted specifications or criteria for products, processes, procedures, policies, systems, and/or personnel.

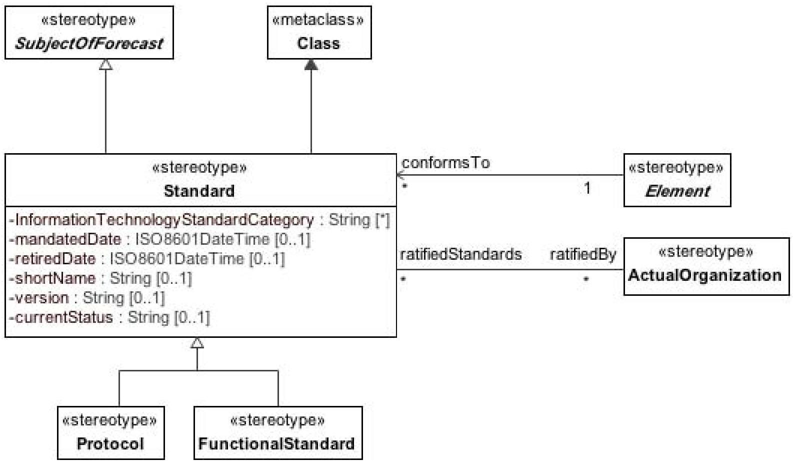


Figure 8.145 - Standard

Attribute

The following are attributes for Standard:

- currentStatus : String[0..1] - Current status of the Standard.
- InformationTechnologyStandardCategory : String[*] - The information technology standard category which the <<Standard>> belongs to.
- mandatedDate : ISO8601DateTime[0..1] - The date when this version of the Standard was published.
- ratifiedBy : ActualOrganization[*] - Organization that ratified this Standard.
- retiredDate : ISO8601DateTime[0..1] - The date when this version of the Standard was retired.
- shortName : String[0..1] - Short name of the Standard.
- version : String[0..1] - Represents the revision number of the Standard - e.g. "1.2.1", "v2", ":2004", etc.

Extensions

The following are extensions for Standard:

- Class

Generalizations

The following are generalization relationships for Standard:

- SubjectOfForecast

8.2.1.1.8.4 StandardConfiguration

MODAF: A UML::Comment that when attached to a CapabilityConfiguration indicates that it is a standard pattern for re-use in the architecture.
DoDAF: NA

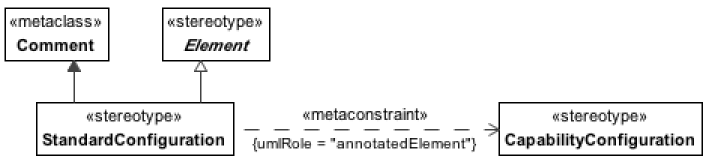


Figure 8.146 - StandardConfiguration

Constraints

The following are constraints for StandardConfiguration:

- StandardConfiguration.annotatedElement - Value for the annotatedElement property must be stereotyped «CapabilityConfiguration».

Extensions

The following are extensions for StandardConfiguration:

- Comment

Generalizations

The following are generalization relationships for StandardConfiguration:

- Element

8.2.1.1.8.5 UPDM L1::UPDM L0::Core::TechnicalStandardsElements::Data

The data portion of the AllElements profile.

8.2.1.1.8.5.1 EntityAttribute

MODAF: A defined property of an EntityItem.
DoDAF: NA

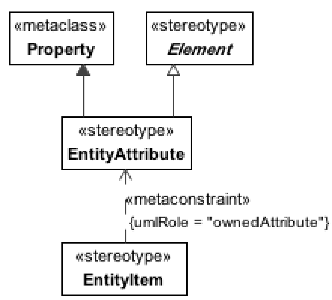


Figure 8.147 - EntityAttribute

Constraints

The following are constraints for EntityAttribute:

- EntityAttribute.canBeAppliedTo - «EntityAttribute» stereotype can be applied to Properties that are owned only by «EntityItem»

Extensions

The following are extensions for EntityAttribute:

- Property

Generalizations

The following are generalization relationships for EntityAttribute:

- Element

8.2.1.1.8.5.2 EntityItem

MODAF: (MODAF::Entity): A definition (type) of an item of interest.
DoDAF: NA

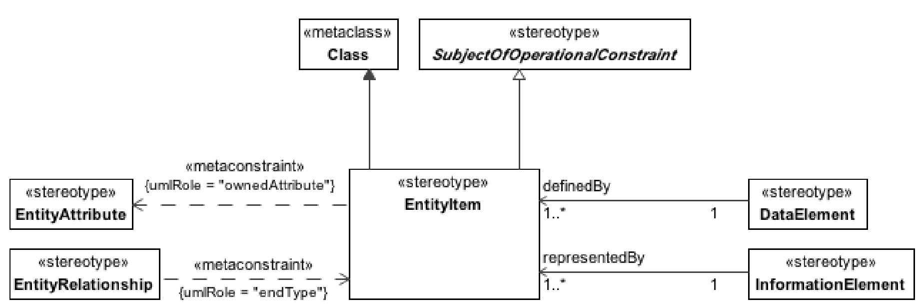


Figure 8.148 - EntityItem

Constraints

The following are constraints for EntityItem:

- EntityItem.ownedAttribute - Value for the slot property must be stereotyped «EntityAttribute» or its specializations.

Extensions

The following are extensions for EntityItem:

- Class

Generalizations

The following are generalization relationships for EntityItem:

- SubjectOfOperationalConstraint

8.2.1.1.8.5.3 EntityRelationship

MODAF: Asserts that there is a relationship between two EntityItems.
DoDAF: (DoDAF::DataAssociation): A relationship or association between two elements of proceduralized information.

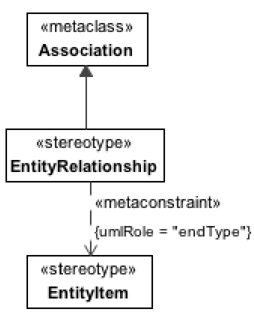


Figure 8.149 - EntityRelationship

Constraints

The following are constraints for EntityRelationship:

- EntityRelationship.endType - Values for the endType property must be stereotyped «EntityItem» or its specializations.

Extensions

The following are extensions for EntityRelationship:

- Association

Generalizations

The following are generalization relationships for EntityRelationship:

- Element

8.2.1.2 UPDM L1::UPDM L0::DoDAF

Elements that are not considered part of the Core architectural model, but necessary for DoDAF.

8.2.1.2.1 UPDM L1::UPDM L0::DoDAF::AcquisitionElements

8.2.1.2.1.1 Project

DoDAF:A temporary endeavor undertaken to create Resources or Desired Effects.

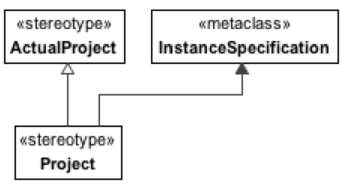


Figure 8.150 ProjectActivity

Extensions

The following are extensions for ProjectActivity:

- Activity

Generalizations

The following are generalization relationships for ProjectActivity:

- Activity

8.2.1.2.1.2 ProjectType

MODAF:NA
DoDAF:The powertype of Project.

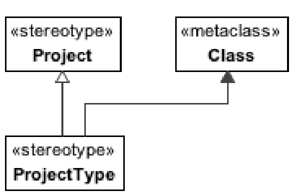


Figure 8.151 - ProjectType

Extensions

The following are extensions for ProjectType:

- Class

Generalizations

The following are generalization relationships for ProjectType:

- Project

8.2.1.2.2 UPDM L1::UPDM L0::DoDAF::AllElements

The All View elements for DoDAF specific models. The All View elements provide information about the entire Architecture. They are used for support rather than architectural models.

8.2.1.2.2.1 UPDM L1::UPDM L0::DoDAF::AllElements::Behavior

8.2.1.2.2.1.1 ActivityPerformedByPerformer

UPDM: Links a Performer to the behavior that it can perform
MODAF: NA
DoDAF:An overlap of an Activity with a Resource, in particular a consuming or producing Activity that expresses an input, output, consumption, or production Activity of the Resource.

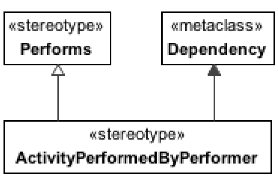


Figure 8.152 - ActivityPerformedByPerformer

Extensions

The following are extensions for ActivityPerformedByPerformer:

- Dependency

Generalizations

The following are generalization relationships for ActivityPerformedByPerformer:

- Performs

8.2.1.2.2.2 UPDM L1::UPDM L0::DoDAF::AllElements::Environment

8.2.1.2.2.2.1 ActivityPerformableUnderCondition

UPDM:Represents that an activity was / is / can-be/ must-be conducted under certain conditions with a spatiotemporal overlap of the activity with the condition.
MODAF:NA
DoDAF:Represents that an activity was / is / can-be/ must-be conducted under certain conditions with a spatiotemporal overlap of the activity with the condition.

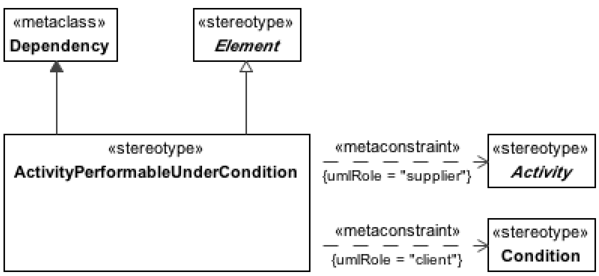


Figure 8.153 - ActivityPerformableUnderCondition

Extensions

The following are extensions for ActivityPerformableUnderCondition:

- Dependency

Generalizations

The following are generalization relationships for ActivityPerformableUnderCondition:

- Element

8.2.1.2.2.2.2 Condition

MODAF: A definition of the conditions in which something exists or functions. An Environment may be specified in terms of LocationType (e.g. terrain), Climate (e.g. tropical), and LightCondition (e.g. dark, light, dusk, etc.)
DoDAF: An object that encompasses meteorological, geographic, and control features mission significance.

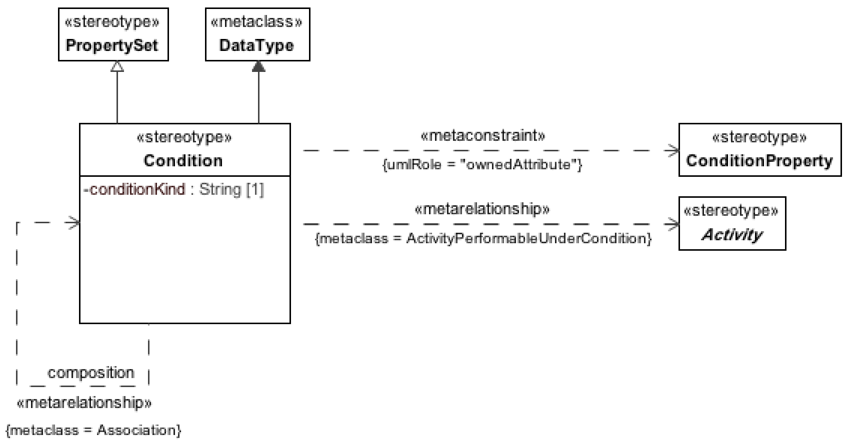


Figure 8.154 - Condition

Constraints

The following are constraints for Condition:

- Condition.ownedAttribute - Values for the ownedAttribute property must be stereotyped «ConditionProperty» or its specializations.

Attribute

The following are attributes for Condition:

- conditionKind : String[1] -

Extensions

The following are extensions for Condition:

- DataType

Generalizations

The following are generalization relationships for Condition:

- PropertySet

8.2.1.2.2.2.3 ConditionProperty

MODAF: EnvironmentalProperty: Asserts that an Environment has one or more properties. These may be Climate, LocationType, or LightCondition.
DoDAF: NA

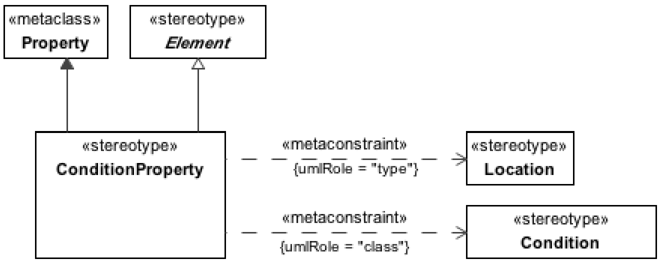


Figure 8.155 - ConditionProperty

Constraints

The following are constraints for ConditionProperty:

- ConditionProperty.class - Value for the class property must be stereotyped «Condition» or its specializations.
- ConditionProperty.type - Value for the type property must be stereotyped «Location» or its specializations.

Extensions

The following are extensions for ConditionProperty:

- Property

Generalizations

The following are generalization relationships for ConditionProperty:

- Element
- Property

8.2.1.2.2.2.4 GeoPoliticalExtent

MODAF:NA
DoDAF:A geospatial extent whose boundaries are by declaration or agreement by political parties.

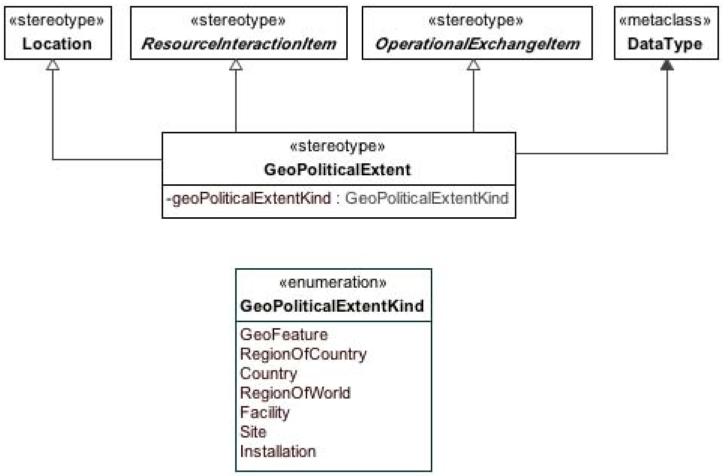


Figure 8.156 - GeoPoliticalExtent

Attribute

The following are attributes for GeoPoliticalExtent:

- geoPoliticalExtentKind : GeoPoliticalExtentKind[] -

Extensions

The following are extensions for GeoPoliticalExtent:

- DataType

Generalizations

The following are generalization relationships for GeoPoliticalExtent:

- Location
- ResourceInteractionItem
- OperationalExchangeItem

8.2.1.2.2.2.5 Location

DoDAF: All subtypes of << IndividualType>> Location, such as Facility, Site, etc.

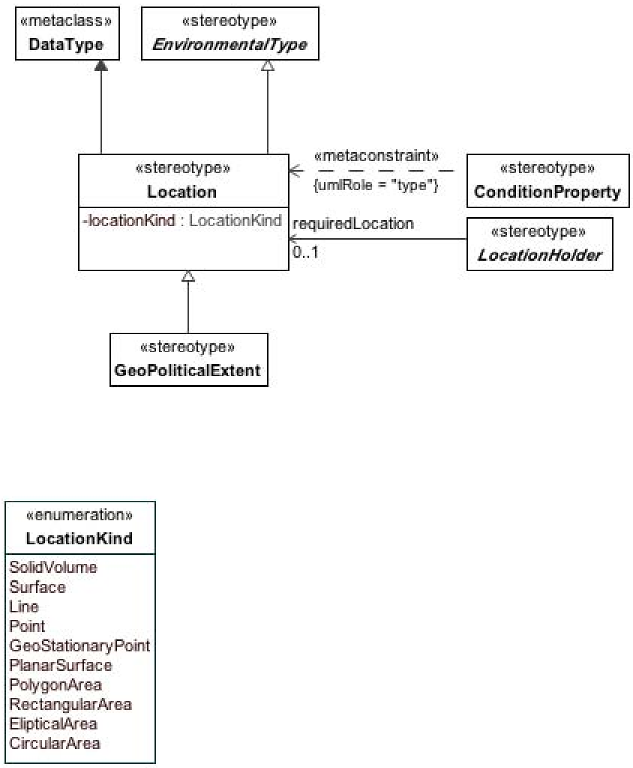


Figure 8.157 - Location

Extensions

The following are extensions for Location:

- DataType

Generalizations

The following are generalization relationships for Location:

- PhysicalLocation

8.2.1.2.2.2.6 LocationType

MODAF:NA
DoDAF:The powertype of Location.

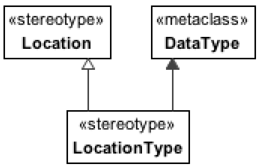


Figure 8.158 - LocationType

Extensions

The following are extensions for LocationType:

- DataType

Generalizations

The following are generalization relationships for LocationType:

- Location

8.2.1.2.2.3 UPDM L1::UPDM L0::DoDAF::AllElements::Measurements

8.2.1.2.2.3.1 Measure

MODAF:NA
DoDAF:The magnitude of some attribute of an individual.

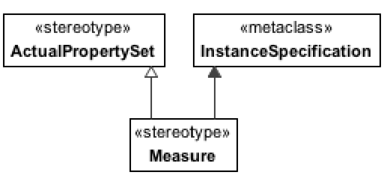


Figure 8.159 - Measure

Extensions

The following are extensions for Measure:

- InstanceSpecification

Generalizations

The following are generalization relationships for Measure:

- ActualPropertySet

8.2.1.2.2.3.2 MeasureType

MODAF:NA
DoDAF: A category of Measures.

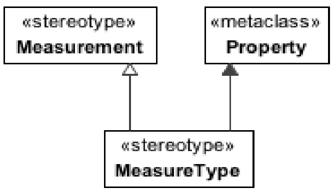


Figure 8.160 - MeasureType

Extensions

The following are extensions for MeasureType:

- Property

Generalizations

The following are generalization relationships for MeasureType:

- Measurement

8.2.1.2.3 UPDM L1::UPDM L0::DoDAF::OperationalElements

The Operational View elements for DoDAF specific models.

8.2.1.2.3.1 UPDM L1::UPDM L0::DoDAF::OperationalElements::Data

8.2.1.2.3.1.1 InformationType

UPDM:An item of information of data being exchanged.
DoDAF:Category or type of information.

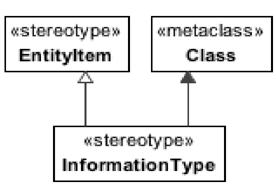


Figure 8.161 - InformationType

Extensions

The following are extensions for InformationType:

- Class

Generalizations

The following are generalization relationships for InformationType:

- EntityItem

8.2.1.2.3.2 UPDM L1::UPDM L0::DoDAF::OperationalElements::Structure

Section of the OperationalElements profile that describe stuctural concepts for DoDAF.

8.2.1.2.3.2.1 Performer

MODAF:NA
DoDAF:Any entity - human, automated, or any aggregation of human and/or automated - that performs an activity and provides a capability. An alias for Node in DoDAF.

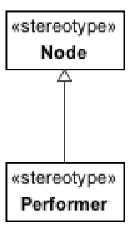


Figure 8.162 - Performer

Extensions

The following are extensions for Performer:

- Class

Generalizations

The following are generalization relationships for Performer:

- Node

8.2.1.2.3.2.2 UPDM L1::UPDM L0::DoDAF::OperationalElements::Structure::Organizational

8.2.1.2.3.2.2.1 IndividualPerson

UPDM: An individual person.
MODAF:NA
DoDAF: An Individual person.

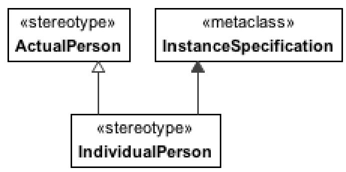


Figure 8.163 - IndividualPerson

Extensions

The following are extensions for IndividualPerson:

- InstanceSpecification

Generalizations

The following are generalization relationships for IndividualPerson:

- ActualPerson

8.2.1.2.3.2.2.2 Organization

DoDAF:A specific real-world assemblage of people and other resources organized for an on-going purpose.

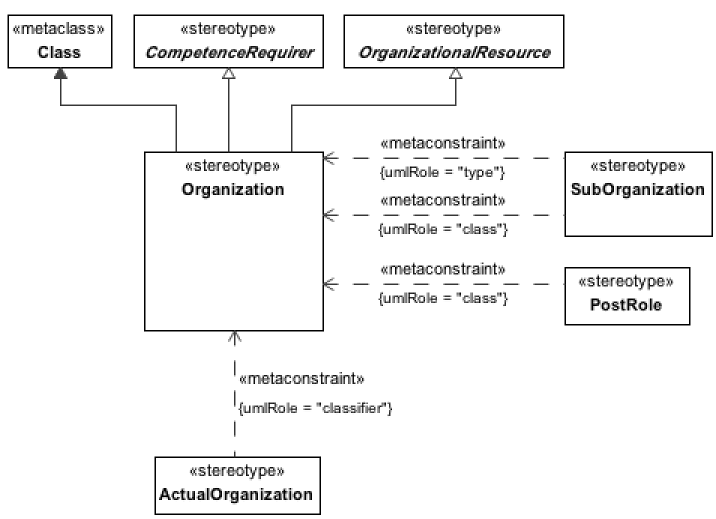


Figure 8.164 - Organization

Extensions

The following are extensions for Organization:

- InstanceSpecification

Generalizations

The following are generalization relationships for Organization:

- ActualOrganization

8.2.1.2.3.2.2.3 OrganizationType

DoDAF:A type of Organization.

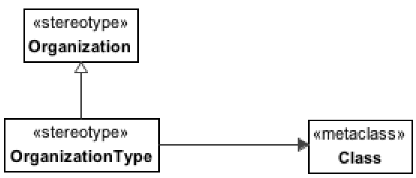


Figure 8.165 - OrganizationType

Extensions

The following are extensions for OrganizationType:

- Class

Generalizations

The following are generalization relationships for OrganizationType:

- Organization

8.2.1.2.3.2.2.4 PersonType

DoDAF:A category of persons defined by the role or roles they share that are relevant to an architecture. Includes assigned materiel.
MODAF:NA

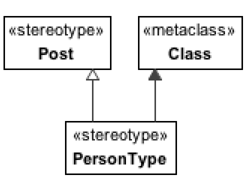


Figure 8.166 - PersonType

Extensions

The following are extensions for PersonType:

- Class

Generalizations

The following are generalization relationships for PersonType:

- Post

8.2.1.2.3.2.2.5 Skill

MODAF:A specific set of abilities defined by knowledge, skills and attitude (Competence).
DoDAF:The ability, coming from one's knowledge, practice, aptitude, etc., to do something well.

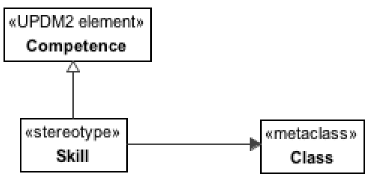


Figure 8.167 - Skill

Extensions

The following are extensions for Skill:

- Class

Generalizations

The following are generalization relationships for Skill:

- Competence

8.2.1.2.3.2.2.6 SkillOfPersonType

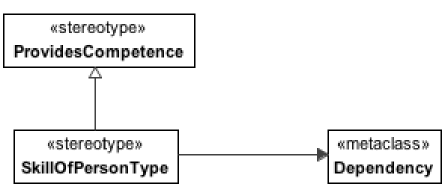


Figure 8.168 - SkillOfPersonType

Extensions

The following are extensions for SkillOfPersonType:

- Dependency

Generalizations

The following are generalization relationships for SkillOfPersonType:

- ProvidesCompetence

8.2.1.2.4 UPDM L1::UPDM L0::DoDAF::StrategicElements

8.2.1.2.4.1 ActivityPartOfCapability

Extensions

The following are extensions for ActivityPartOfCapability:

- Dependency

Generalizations

The following are generalization relationships for ActivityPartOfCapability:

- MapsToCapability

8.2.1.2.4.2 CapabilityOfPerformer

UPDM:A couple that represents the capability that a resource, node or enterprise phase exhibits (Exhibits).
MODAF:An assertion that a Node is required to have a Capability (Capability for node).
DoDAF: A couple that represents the capability that a performer has.

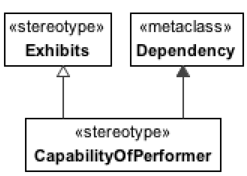


Figure 8.169 - CapabilityOfPerformer

Extensions

The following are extensions for CapabilityOfPerformer:

- Dependency

Generalizations

The following are generalization relationships for CapabilityOfPerformer:

- Exhibits

8.2.1.2.4.3 CapabilityPhase

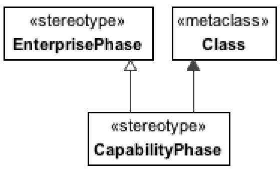


Figure 8.170 - CapabilityPhase

Extensions

The following are extensions for CapabilityPhase:

- Class

Generalizations

The following are generalization relationships for CapabilityPhase:

- EnterprisePhase

8.2.1.2.4.4 DesiredEffect

MODAF:NA
DoDAF:A desired state of a Resource.

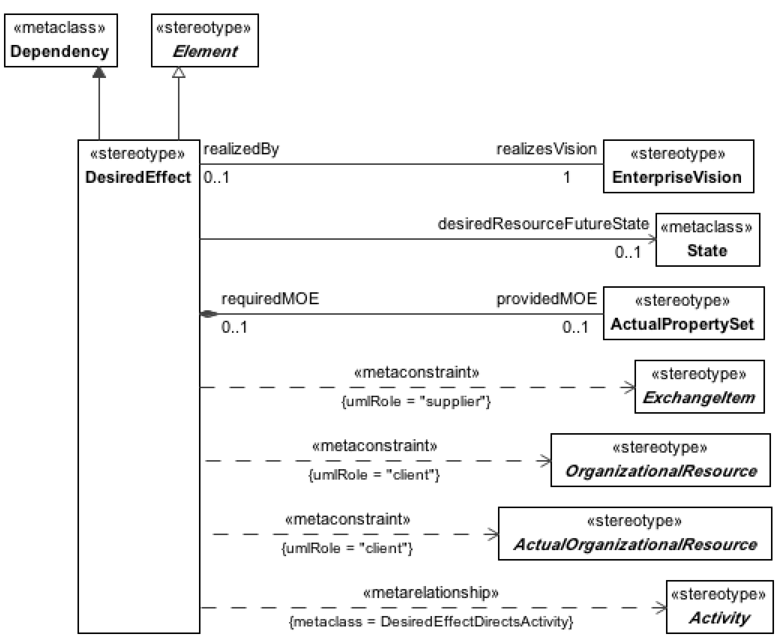


Figure 8.171 - DesiredEffect

Constraints

The following are constraints for DesiredEffect:

- DesiredEffect.client - Value for the client property must be stereotyped a specialization of «OrganizationalResource», «ActualOrganizationalResource», or their specializations.
- DesiredEffect.supplier - Value for the supplier property must be stereotyped a specialization of «ExchangeItem».

Attribute

The following are attributes for DesiredEffect:

- desiredResourceFutureState : State[0..1] -
- providedMOE : ActualPropertySet[0..1] -
- realizesVision : EnterpriseVision[1] -

Extensions

The following are extensions for DesiredEffect:

- Dependency

Generalizations

The following are generalization relationships for DesiredEffect:

- Element

8.2.1.2.4.5 DesiredEffectDirectsActivity

MODAF:NA
DoDAF:The couple that represents how a desired effect directs an activity.

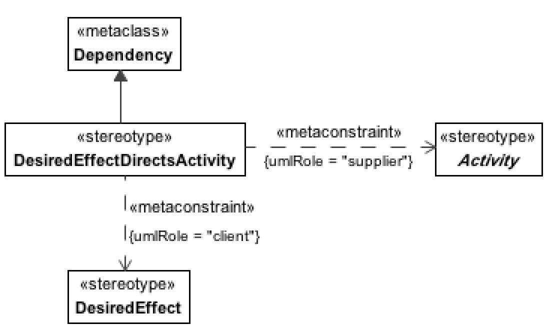


Figure 8.172 - DesiredEffectDirectsActivity

Constraints

The following are constraints for DesiredEffectDirectsActivity:

- DesiredEffectDirectsActivity.client - Value for the client property must be stereotyped «DesiredEffect» or its specializations.
- DesiredEffectDirectsActivity.supplier - Value for the supplier property must be stereotyped a specialization of «Activity».

Extensions

The following are extensions for DesiredEffectDirectsActivity:

- Dependency

8.2.1.2.4.6 DesiredEffectOfCapability

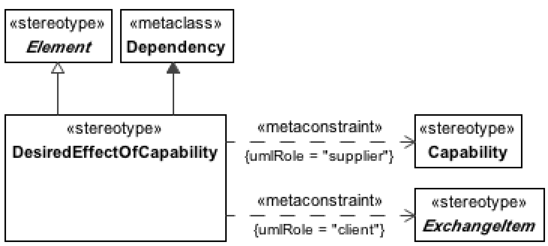


Figure 8.173 - DesiredEffectOfCapability

Constraints

The following are constraints for DesiredEffectOfCapability:

- DesiredEffectOfCapability.client - Value for the client property must be stereotyped «ExchangeItem» or its specializations.
- DesiredEffectOfCapability.supplier - Value for the supplier property must be stereotyped a specialization of «Capability».

Extensions

The following are extensions for DesiredEffectOfCapability:

- Dependency

Generalizations

The following are generalization relationships for DesiredEffectOfCapability:

- Element

8.2.1.2.4.7 Vision

MODAF:The overall aims of an enterprise over a given period of time. (EnterpriseVision)
DoDAF:An end that describes the future state of the enterprise, without regard to how it is to be achieved; a mental image of what the future will or could be like.

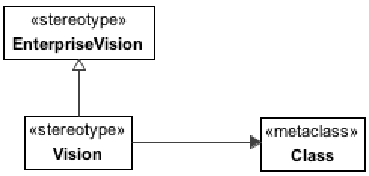


Figure 8.174 - Vision

Extensions

The following are extensions for Vision:

- Class

Generalizations

The following are generalization relationships for Vision:

- EnterpriseVision

8.2.1.2.5 UPDM L1::UPDM L0::DoDAF::SystemElements

The System View elements for DoDAF specific models.

8.2.1.2.5.1 UPDM L1::UPDM L0::DoDAF::SystemElements::Data

8.2.1.2.5.1.1 DataType

MODAF:NA
DoDAF:Powertype of Data.

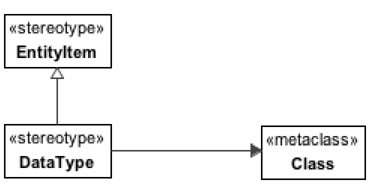


Figure 8.175 - DataType

Extensions

The following are extensions for DataType:

- Class

Generalizations

The following are generalization relationships for DataType:

- EntityItem

8.2.1.2.5.2 UPDM L1::UPDM L0::DoDAF::SystemElements::Structure

Defines the structure parts of the system elements.

8.2.1.2.5.2.1 ChangesResource

MODAF:NA
DoDAF: Represents that an activity was / is / will-be the cause of change in the effected object with a before-after relationship (ActivityProducesResource).

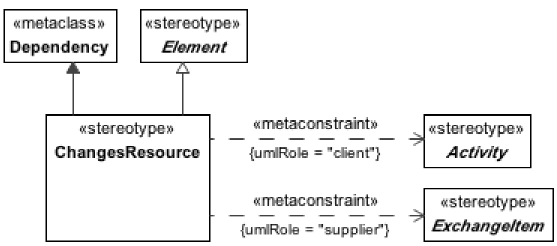


Figure 8.176 - ChangesResource

Constraints

The following are constraints for ChangesResource:

- ChangesResource.client - Value for the client property must be stereotyped «Activity» or its specializations.
- ChangesResource.supplier - Value for the supplier property must be stereotyped a specialization of «ExchangeItem».

Extensions

The following are extensions for ChangesResource:

- Dependency

Generalizations

The following are generalization relationships for ChangesResource:

- Element

8.2.1.2.5.2.2 System

A DoDAF alias for ResourceArtifact.

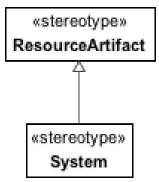


Figure 8.177 - System

Extensions

The following are extensions for System:

- Class

Generalizations

The following are generalization relationships for System:

- ResourceArtifact

8.2.1.2.5.2.3 SystemConnector

UPDM: A link between two systems.
MODAF: Asserts that a connection exists between two ports belonging to parts in a system composite structure model (MODAF:: SystemPortConnector).

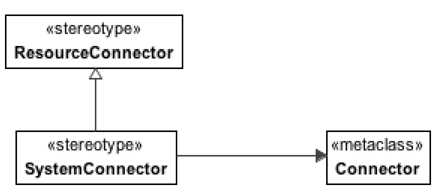


Figure 8.178 - SystemConnector

Extensions

The following are extensions for SystemConnector:

- Connector

Generalizations

The following are generalization relationships for SystemConnector:

- ResourceConnector

8.2.1.2.6 UPDM L1::UPDM L0::DoDAF::TechnicalStandardsElements

8.2.1.2.6.1 FunctionalStandard

MODAF:NA
DoDAF:Functional standards set forth rules, conditions, guidelines, and characteristics.

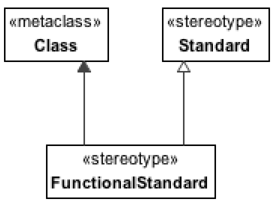


Figure 8.179 - FunctionalStandard

Extensions

The following are extensions for FunctionalStandard:

- Class

Generalizations

The following are generalization relationships for FunctionalStandard:

- Standard

8.2.1.2.6.2 TechnicalStandard

MODAF: A ratified and peer-reviewed specification that is used to guide or constrain the architecture. A Standard may be applied to any element in the architecture via the [constrainedItem] property of UML::Constraint (Standard).
DoDAF: Technical standards document specific technical methodologies and practices to design and implement.

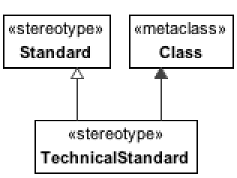


Figure 8.180 - TechnicalStandard

Extensions

The following are extensions for TechnicalStandard:

- Class

Generalizations

The following are generalization relationships for TechnicalStandard:

- Standard

8.2.1.2.6.3 UPDM L1::UPDM L0::DoDAF::TechnicalStandardsElements::Data

8.2.1.2.6.3.1 AssociationOfInformation

MODAF: Asserts that there is a relationship between two entities (Entity Relationship).
DoDAF: A relationship or association between two elements of information.

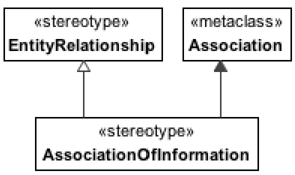


Figure 8.181 - AssociationOfInformation

Extensions

The following are extensions for AssociationOfInformation:

- Association

Generalizations

The following are generalization relationships for AssociationOfInformation:

- EntityRelationship

8.2.1.2.6.3.2 SecurityAttributesGroup

MODAF:NA
DoDAF:The group of Information Security Marking attributes in which the use of attributes 'classification' and 'ownerProducer' is required. This group is to be contrasted with group 'SecurityAttributesOptionGroup' in which use of those attributes is optional.

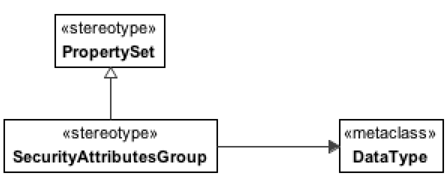


Figure 8.182 - SecurityAttributesGroup

Extensions

The following are extensions for SecurityAttributesGroup:

- DataType

Generalizations

The following are generalization relationships for SecurityAttributesGroup:

- PropertySet

8.2.1.3 UPDM L1::UPDM L0::MODAF

Elements that are not considered part of the Core architectural model, but necessary for MODAF.

8.2.1.3.1 UPDM L1::UPDM L0::MODAF::AcquisitionElements

The Acquisition View elements for MODAF specific models.

8.2.1.3.1.1 UPDM L1::UPDM L0::MODAF::AcquisitionElements::Milestones

Milestones are an event in a Project by which progress is measured.

8.2.1.3.1.1.1 ActualProjectMilestone

MODAF: (ProjectMilestone): An event in a ActualProject (MODAF::Project) by which progress is measured. Note: in the case of an acquisition project, there are two key types of milestones which shall be represented using subtypes - IncrementMilestone (MODAF::CapabilityIncrement) and OutOfServiceMilestone (MODAF::OutOfService)
DoDAF: NA

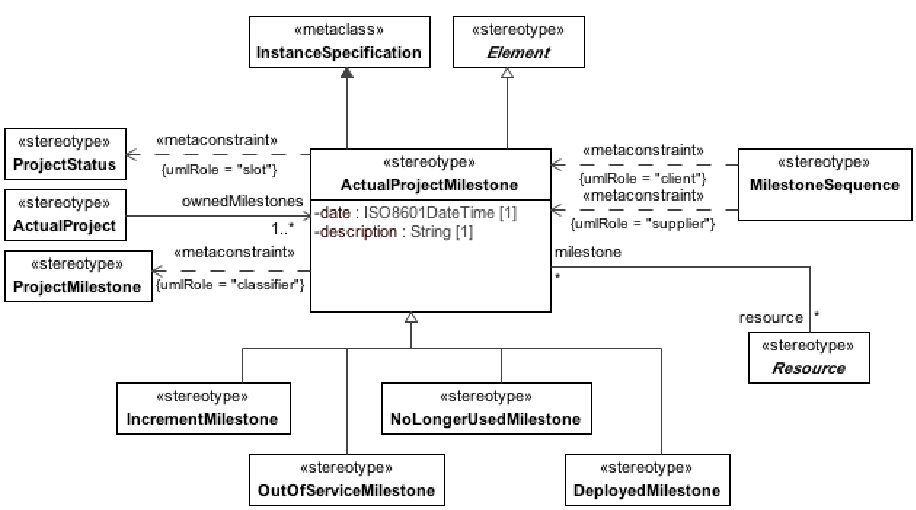


Figure 8.183 - ActualProjectMilestone

MODAF: ProjectMilestone: An event in a Project by which progress is measured - modelled as a Project of zero duration. -- Note: in the case of an acquisition project, there are two key types of milestones which shall be represented using subtypes - CapabilityIncrement and OutOfService
DoDAF: N/A

Constraints

The following are constraints for ActualProjectMilestone:

- ActualProjectMilestone.classifier - Value for the classifier property must be stereotyped «ProjectMilestone» or its specializations.
- ActualProjectMilestone.slot - Slot values have to be stereotyped «ProjectStatus» or its specializations.

Attribute

The following are attributes for ActualProjectMilestone:

- date : ISO8601DateTime[1] - Defines time for this ProjectMilestone.
- description : String[1] -
- resource : Resource[*] - Affected resource.

Extensions

The following are extensions for ActualProjectMilestone:

- InstanceSpecification

Generalizations

The following are generalization relationships for ActualProjectMilestone:

- Element

8.2.1.3.1.1.2 IncrementMilestone

MODAF: (MODAF::CapabilityIncrement): An ActualProjectMilestone (MODAF::ProjectMilestone) that indicates the point in time at which a project is predicted to deliver or has delivered a Capability.
DoDAF: NA

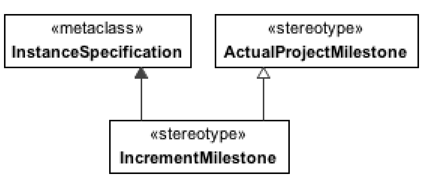


Figure 8.184 - IncrementMilestone

Elements related to the CapabilityIncrementMilestone stereotype.

Extensions

The following are extensions for IncrementMilestone:

- InstanceSpecification

Generalizations

The following are generalization relationships for IncrementMilestone:

- ActualProjectMilestone

8.2.1.3.1.1.3 MilestoneSequence

MODAF: A MilestoneSequence (MODAF::MilestoneRelationship) is a relationship between two milestones.
DoDAF: NA

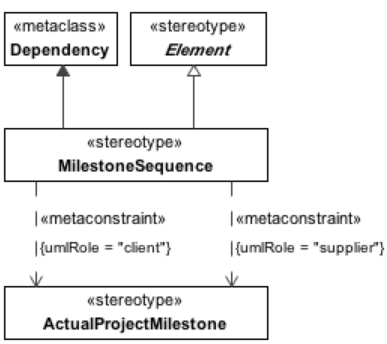


Figure 8.185 - MilestoneSequence

Elements related to the MileStoneSequence stereotype.

Constraints

The following are constraints for MilestoneSequence:

- MilestoneSequence.client - Client must be «ProjectMilestone».
- MilestoneSequence.supplier - Supplier must be «ProjectMilestone».

Extensions

The following are extensions for MilestoneSequence:

- Dependency

Generalizations

The following are generalization relationships for MilestoneSequence:

- Element

8.2.1.3.1.1.4 OutOfServiceMilestone

MODAF: An OutOfServiceMilestone (MODAF::OutOfService) is a ProjectMilestone that indicates a project's deliverable is to go out of service.
DoDAF: NA

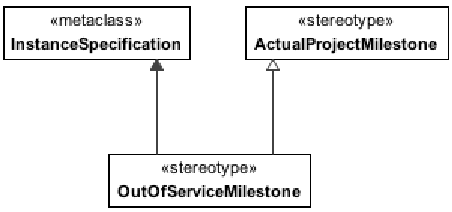


Figure 8.186 - OutOfServiceMilestone

Elements related to the OutOfServiceMilestone stereotype.

Extensions

The following are extensions for OutOfServiceMilestone:

- InstanceSpecification

Generalizations

The following are generalization relationships for OutOfServiceMilestone:

- ActualProjectMilestone

8.2.1.3.1.1.5 ProjectMilestone

UPDM: An element representing a collection of themes (e.g. DLOD or DOTMLPF) which is connected to a Project as part of a Project’s definition. This is used as a template for ActualProjectMilestones.
MODAF: An event in a Project by which progress is measured.

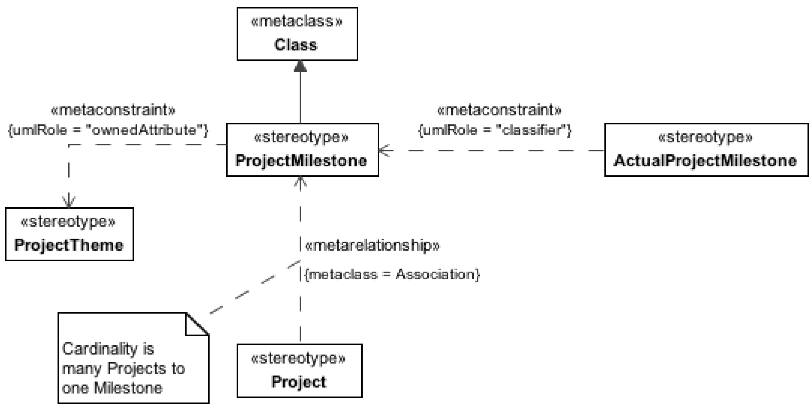


Figure 8.187 - ProjectMilestone

Elements related to the ProjectMilestoneType stereotype.

Constraints

The following are constraints for ProjectMilestone:

- ProjectMilestone.ownedAttributes - Owned attributes have to be stereotyped <<ProjectTheme>>.
- ProjectMilestone.ownedThemes - All of the ProjectThemes, owned by a ProjectMilestone, must be typed by the same ProjectThemeStatus.

Extensions

The following are extensions for ProjectMilestone:

- Class

Generalizations

The following are generalization relationships for ProjectMilestone:

- Element

8.2.1.3.1.1.6 ProjectOwnership

MODAF:A type of OrganisationProjectRelationship where the organisation is the party responsible for the project.

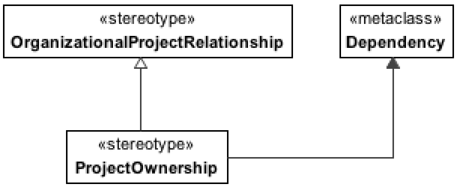


Figure 8.188 - ProjectOwnership

Extensions

The following are extensions for ProjectOwnership:

- Dependency

Generalizations

The following are generalization relationships for ProjectOwnership:

- OrganizationalProjectRelationship

8.2.1.3.1.1.7 ProjectSequence

MODAF: Asserts that one ActualProject (MODAF::Project) follows from another - i.e. the target ActualProject cannot start until the source ActualProject has ended.
DoDAF: NA

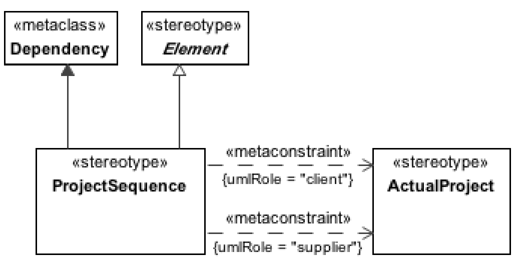


Figure 8.189 - ProjectSequence

Elements related to the ProjectSequence stereotype.

Constraints

The following are constraints for ProjectSequence:

- ProjectSequence.client - Client property value must be stereotyped «ActualProject» or its specializations.
- ProjectSequence.supplier - Supplier property value must be stereotyped «ActualProject» or its specializations.

Extensions

The following are extensions for ProjectSequence:

- Dependency

Generalizations

The following are generalization relationships for ProjectSequence:

- Element

8.2.1.3.1.2 UPDM L1::UPDM L0::MODAF::AcquisitionElements::Structure

Structure for Acquisition View elements for MODAF specific models.

8.2.1.3.1.2.1 ProjectStatus

MODAF: A ProjectStatus (MODAF::StatusAtMilestone) is a relationship between a Status and a milestone that asserts the status (i.e. level of progress) of a ProjectTheme for the project at the time of the ActualProjectMilestone (MODAF::Milestone).
DoDAF: NA

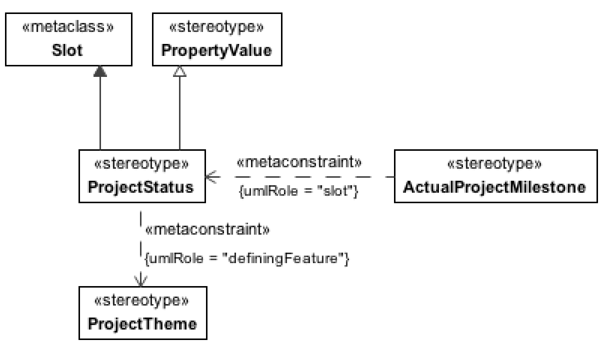


Figure 8.190 - ProjectStatus

Elements related to the ProjectStatus stereotype.

Constraints

The following are constraints for ProjectStatus:

- ProjectStatus.definingFeature - DefiningFeature value must be stereotyped «ProjectTheme» or its specializations.

Extensions

The following are extensions for ProjectStatus:

- Slot

Generalizations

The following are generalization relationships for ProjectStatus:

- PropertyValue

8.2.1.3.1.2.2 ProjectTheme

MODAF:An aspect by which the progress of various Projects may be measured. In UK MOD, this could be one of the defence lines of development (DLOD), or DOTMLPF in the US.
DoDAF: NA

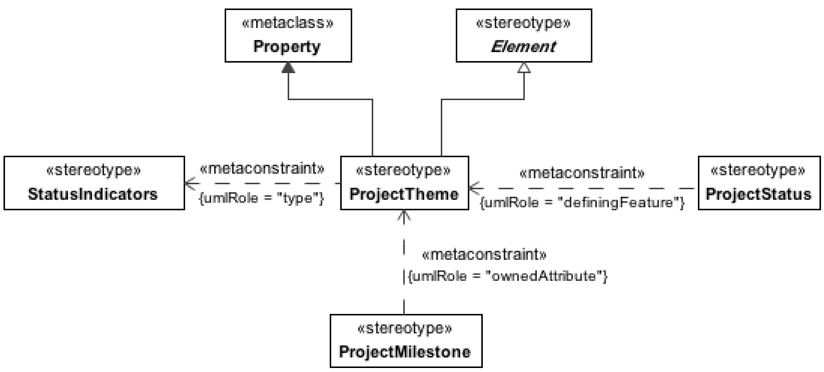


Figure 8.191 - ProjectTheme

Elements related to the ProjectTheme stereotype.

Constraints

The following are constraints for ProjectTheme:

- ProjectTheme.type - Value for the type property must be stereotyped «ProjectThemeStatus» or its specializations.

Extensions

The following are extensions for ProjectTheme:

- Property

Generalizations

The following are generalization relationships for ProjectTheme:

- Element

8.2.1.3.1.2.3 StatusIndicators

UPDM: Specifies a status for a ProjectTheme (such as training status).
MODAF: An enumeration of the possible statuses (MODAF::StatusIndicator) for one of more ProjectThemes.

Extensions

The following are extensions for StatusIndicators:

- Enumeration

Generalizations

The following are generalization relationships for StatusIndicators:

- Element

8.2.1.3.2 UPDM L1::UPDM L0::MODAF::AllElements

The All View elements for MODAF specific models.

8.2.1.3.2.1 UPDM L1::UPDM L0::MODAF::AllElements::Environment

8.2.1.3.2.1.1 Climate

MODAF:A type of weather condition, or combination of weather conditions (e.g. high temperature & dry).
DoDAF: NA

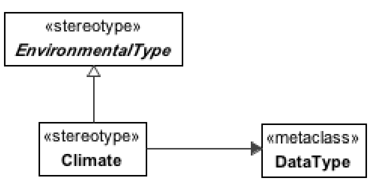


Figure 8.192 - Climate

Extensions

The following are extensions for Climate:

- DataType

Generalizations

The following are generalization relationships for Climate:

- EnvironmentalType

8.2.1.3.2.1.2 Environment

MODAF:A definition of the conditions in which something exists or functions.
DoDAF:NA

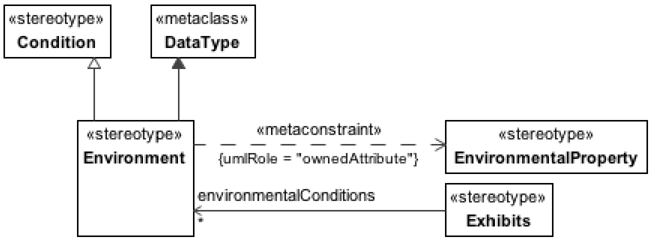


Figure 8.193 - Environment

Constraints

The following are constraints for Environment:

- Environment.ownedAttributes - Owned attributes have to be stereotyped <<EnvironmentalProperty>>.

Extensions

The following are extensions for Environment:

- DataType

Generalizations

The following are generalization relationships for Environment:

- Condition

8.2.1.3.2.1.3 EnvironmentalProperty

MODAF:Asserts that an Environment has one or more properties. These may be Climate, LocationType, or LightCondition.
DoDAF:NA

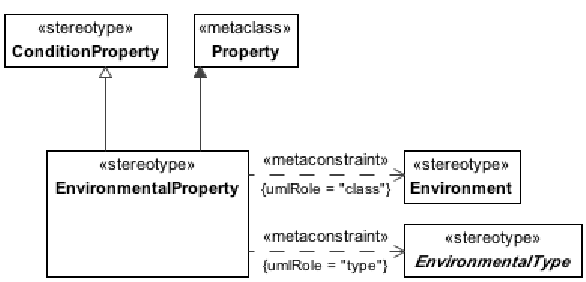


Figure 8.194 - EnvironmentalProperty

Constraints

The following are constraints for EnvironmentalProperty:

- EnvironmentalProperty.class - Value for the class property must be stereotyped «Environment» or its specializations.
- EnvironmentalProperty.type - Value for the type property must be stereotyped «EnvironmentalType» or its specializations.

Extensions

The following are extensions for EnvironmentalProperty:

- Property

Generalizations

The following are generalization relationships for EnvironmentalProperty:

- ConditionProperty

8.2.1.3.2.1.4 EnvironmentalType

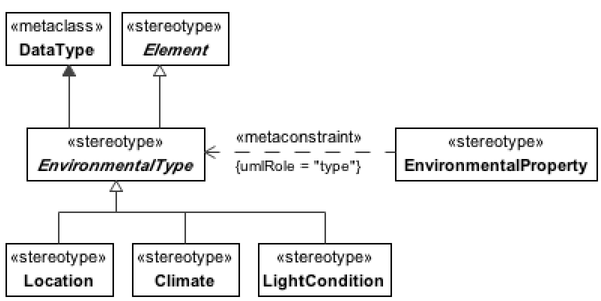


Figure 8.195 - EnvironmentalType

Extensions

The following are extensions for EnvironmentalType:

- DataType

Generalizations

The following are generalization relationships for EnvironmentalType:

- Element

8.2.1.3.2.1.5 LightCondition

MODAF: a specification of environmental lighting conditions.

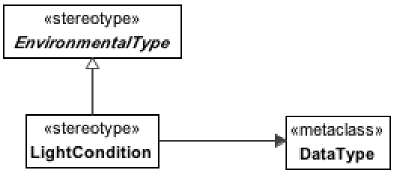


Figure 8.196 - LightCondition

Extensions

The following are extensions for LightCondition:

- DataType

Generalizations

The following are generalization relationships for LightCondition:

- EnvironmentalType

8.2.1.3.2.2 UPDM L1::UPDM L0::MODAF::AllElements::Ontology

Ontology elements from All Elements.

8.2.1.3.2.2.1 Alias

A UPDM Artifact used to define an alternative name for an element as used by DoDAF or MODAF.

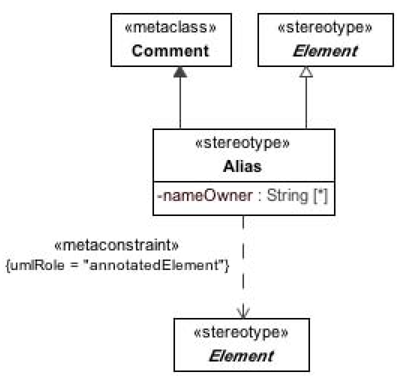


Figure 8.197 - Alias

Constraints

The following are constraints for Alias:

- Allias.annotatedElement - Value for the annotatedElement property must be stereotyped «UPDMElement» or its specializations.

Attribute

The following are attributes for Alias:

- nameOwner : String[*] - The person or organization that uses this alternative name.

Extensions

The following are extensions for Alias:

- Comment

Generalizations

The following are generalization relationships for Alias:

- Element

8.2.1.3.2.2.2 Definition

MODAF: A definition of an element in the architecture.
DoDAF:NA

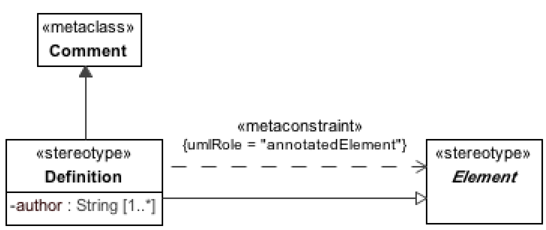


Figure 8.198 - Definition

Constraints

The following are constraints for Definition:

- Definition.annotatedElement - Value for the annotatedElement property must be stereotyped «UPDMElement» or its specializations.

Attribute

The following are attributes for Definition:

- author : String[1..*] - The original or current person (architect) responsible for the element.

Extensions

The following are extensions for Definition:

- Comment

Generalizations

The following are generalization relationships for Definition:

- Element

8.2.1.3.2.2.3 ExternalIndividual

MODAF: An individual (i.e. something which has spatial and temporal extent) defined by an external ontology.
DoDAF: NA

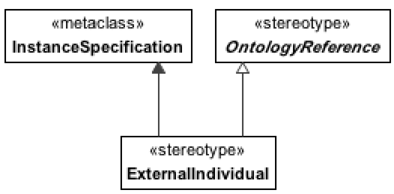


Figure 8.199 - ExternalIndividual

Extensions

The following are extensions for ExternalIndividual:

- InstanceSpecification

Generalizations

The following are generalization relationships for ExternalIndividual:

- OntologyReference

8.2.1.3.2.2.4 ExternalTuple

UPDM: An instance of ExternalTupleType defined in an external Ontology.
MODAF:NA
DoDAF:NA

Extensions

The following are extensions for ExternalTuple:

- Element

Generalizations

The following are generalization relationships for ExternalTuple:

- OntologyReference

8.2.1.3.2.2.5 ExternalTupleType

UPDM: An TupleType defined in an external Ontology.
MODAF:NA
DoDAF:NA

Extensions

The following are extensions for ExternalTupleType:

- Class

Generalizations

The following are generalization relationships for ExternalTupleType:

- ExternalType

8.2.1.3.2.2.6 ExternalType

MODAF: A type defined by an external ontology.
DoDAF: NA

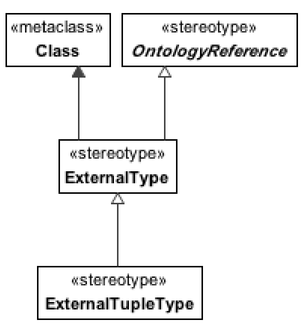


Figure 8.200 - ExternalType

Extensions

The following are extensions for ExternalType:

- Class

Generalizations

The following are generalization relationships for ExternalType:

- OntologyReference

8.2.1.3.2.2.7 InformationPedigree

MODAF:NA
DoDAF: No definition.

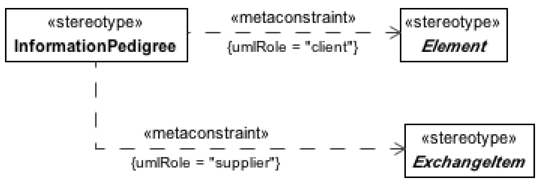


Figure 8.201 - InformationPedigree

Constraints

The following are constraints for InformationPedigree:

- PedigreeInformation.client - Values for the client property must be stereotyped «Element» or its specializations.
- PedigreeInformation.supplier - Values for the supplier property must be stereotyped «ExchangeItem» or its specializations.

Attribute

The following are attributes for InformationPedigree:

- description : String[1] -

Extensions

The following are extensions for InformationPedigree:

- Dependency

8.2.1.3.2.2.8 OntologyReference

MODAF: A reference to an element in a recognized external ontology or taxonomy.
DoDAF:NA

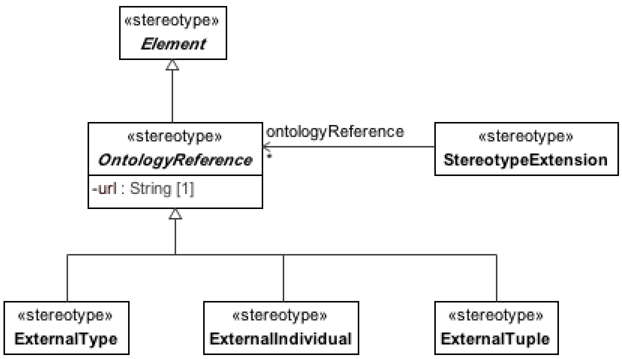


Figure 8.202 - OntologyReference

Attribute

The following are attributes for OntologyReference:

- url : String[1] - Unique identifier for the element.

Generalizations

The following are generalization relationships for OntologyReference:

- Element

8.2.1.3.2.2.9 Overlap

IDEAS:A couple of wholePart couples where the part in each couple is the same.

Constraints

The following are constraints for Overlap:

- Overlap.client - Values for the client property must be stereotyped «UPDMElement» or its specializations.
- Overlap.supplier - Values for the supplier property must be stereotyped «Element» or its specializations.

Extensions

The following are extensions for Overlap:

- Dependency

Generalizations

The following are generalization relationships for Overlap:

- Element

8.2.1.3.2.2.10 SameAs

MODAF: Asserts that two elements refer to the same real-world thing.
DoDAF: NA

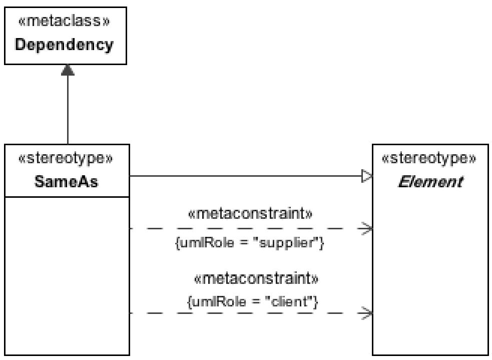


Figure 8.203 - SameAs

Constraints

The following are constraints for SameAs:

- SameAs.client - Values for the client property must be stereotyped «UPDMElement» or its specializations.
- SameAs.supplier - Values for the supplier property must be stereotyped «Element» or its specializations.

Extensions

The following are extensions for SameAs:

- Dependency

Generalizations

The following are generalization relationships for SameAs:

- Element

8.2.1.3.2.2.11 StereotypeExtension

MODAF: Defines an additional stereotype used in the architecture which is not defined in this meta-model. The body attribute contains the name of the new stereotype. The extendedStereotype tagged value shall contain the name of the meta-model stereotype which is extended. The ontologyReference tagged value shall be populated with a reference to the external ontology element represented by the new stereotype.
DoDAF: NA

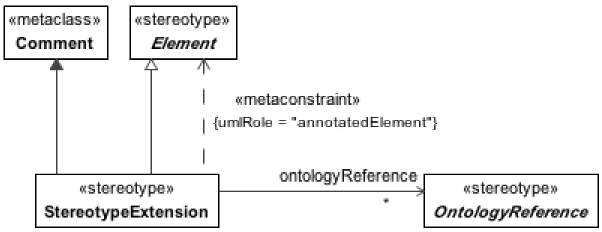


Figure 8.204 - StereotypeExtension

Constraints

The following are constraints for StereotypeExtension:

- StereotypeExtension.annotatedElement - Values for the annotatedElement property must be stereotyped «Element» or its specializations.

Attribute

The following are attributes for StereotypeExtension:

- ontologyReference : OntologyReference[*] -

Extensions

The following are extensions for StereotypeExtension:

- Comment

Generalizations

The following are generalization relationships for StereotypeExtension:

- Element

8.2.1.3.3 UPDM L1::UPDM L0::MODAF::OperationalElements

The Operational View elements for MODAF specific models.

8.2.1.3.3.1 UPDM L1::UPDM L0::MODAF::OperationalElements::Behavior

Behavior for Operaional View elements for MODAF specific models.

8.2.1.3.3.1.1 ActivitySubject

MODAF: Anything that is acted upon by an OperationalActivity
DoDAF: NA

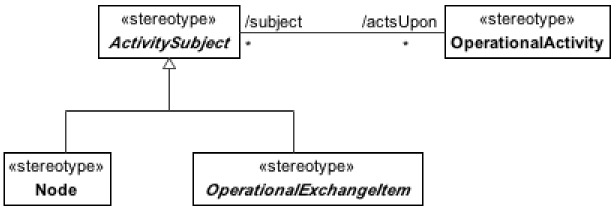


Figure 8.205 - ActivitySubject

Attribute

The following are attributes for ActivitySubject:

- actsUpon : OperationalActivity[*] - OperationalActivities that this ActivitySubject is acting upon.

Generalizations

The following are generalization relationships for ActivitySubject:

- Element

8.2.1.3.3.1.2 OwnsProcess

UPDM:Asserts that an ActualOrganizationalResource owns a Process.

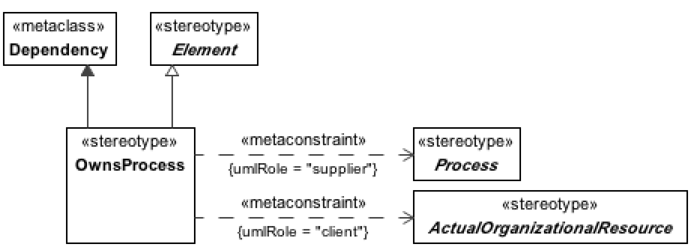


Figure 8.206 - OwnsProcess

Constraints

The following are constraints for OwnsProcess:

- OwnsProcess.client - Value for the client property must be stereotyped «ActualOrganizationalResource» or its specializations.
- OwnsProcess.supplier - Value for the supplier property must be stereotyped a specialization of «Process».

Extensions

The following are extensions for OwnsProcess:

- Dependency

Generalizations

The following are generalization relationships for OwnsProcess:

- Element

8.2.1.3.3.1.3 Process

MODAF:The abstract supertype of OperationalActivity and EnduringTask.
DoDAF:NA

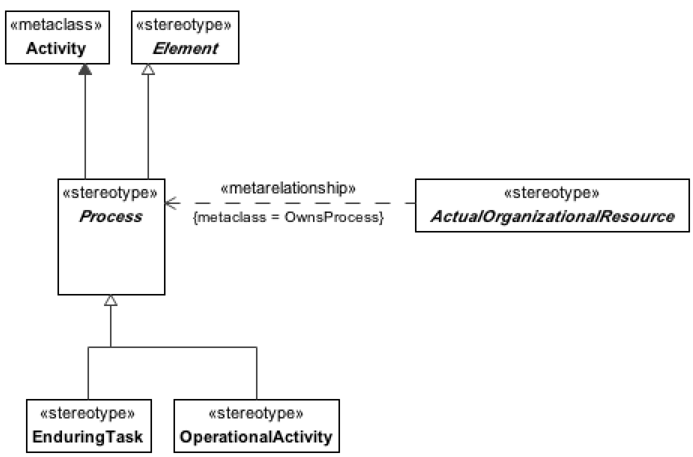


Figure 8.207 - Process

Extensions

The following are extensions for Process:

- Activity

Generalizations

The following are generalization relationships for Process:

- Element

8.2.1.3.3.1.4 StandardOperationalActivity

MODAF: An OperationalActivity that is a standard procedure that is doctrinal . Note: This is equivalent to what some defence organisations call JETLs.
DoDAF: Work, not specific to a single organization, weapon system or individual, that transforms inputs into outputs or changes their state (DoDAF:: Activity).

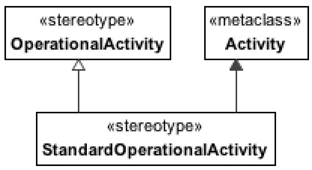


Figure 8.208 - StandardOperationalActivity

Extensions

The following are extensions for StandardOperationalActivity:

- Activity

Generalizations

The following are generalization relationships for StandardOperationalActivity:

- OperationalActivity

8.2.1.3.3.2 UPDM L1::UPDM L0::MODAF::OperationalElements::Flows

Flows for Operational View elements for MODAF specific models.

8.2.1.3.3.2.1 Control

MODAF: A type of ResourceInteraction where one Resource (source) controls another (target). --Examples - the driver of a tank, one organisation having operational control of another, a fire control system controlling a weapons system.
DoDAF: NA

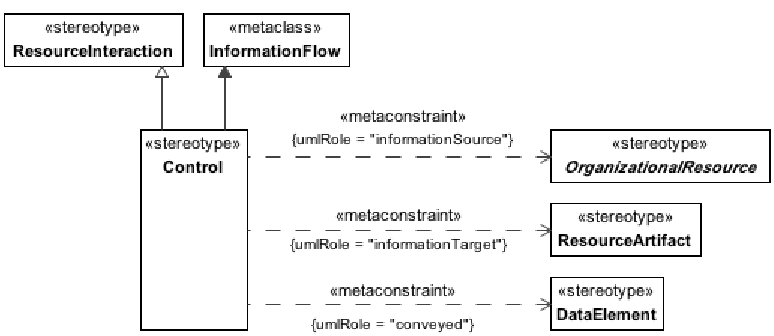


Figure 8.209 - Control

Constraints

The following are constraints for Control:

- Controls.conveyed - Value for the conveyed property must be stereotyped «DataElement» or its specializations.

- Controls.informationSource - Value for the informationSource property must be stereotyped «OrganizationalResource» or its specializations.
- Controls.informationTarget - Value for the informationTarget property must be stereotyped «ResourceArtifact» or its specializations.

Extensions

The following are extensions for Control:

- InformationFlow

Generalizations

The following are generalization relationships for Control:

- ResourceInteraction

8.2.1.3.3.3 UPDM L1::UPDM L0::MODAF::OperationalElements::Structure

Structure for Operational View elements for MODAF specific models.

8.2.1.3.3.3.1 Energy

UPDM: Energy to be exchanged between Nodes.
MODAF: A unit of energy that flows along an EnergyFLow or OperationalActivityEnergyFlow
DoDAF: NA

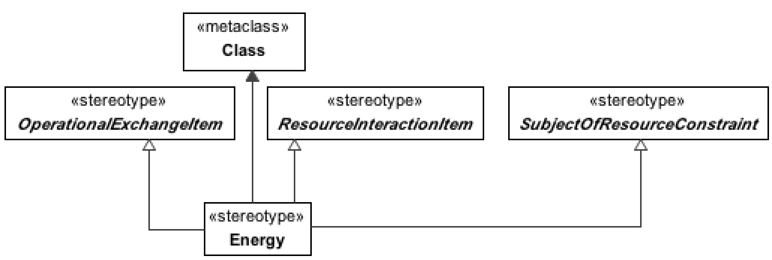


Figure 8.210 - Energy

Extensions

The following are extensions for Energy:

- Class

Generalizations

The following are generalization relationships for Energy:

- ResourceInteractionItem
- OperationalExchangeItem

- SubjectOfResourceConstraint

8.2.1.3.3.3.2 ProblemDomain

MODAF: The boundary containing those Nodes which may be realised by functional resources specified in SV-1. There may be more than one alternative solution for a given ProblemDomain specified as a set of SV suites. There may be only one ProblemDomain in a LogicalArchitecture.
DoDAF: NA – covered by the more general temporalWholePart element.

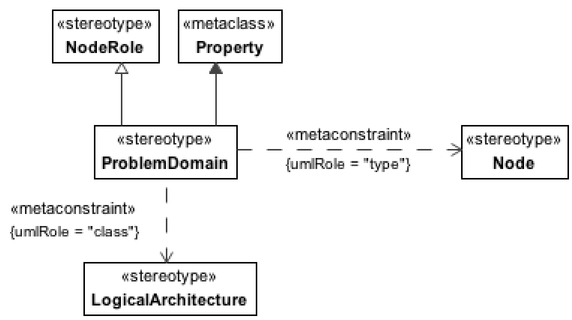


Figure 8.211 - ProblemDomain

Constraints

The following are constraints for ProblemDomain:

- ProblemDomain.class - Value for the class property must be stereotyped «LogicalArchitecture» or its specializations.
- ProblemDomain.type - Value for the type property must be stereotyped «Node» or its specializations.

Extensions

The following are extensions for ProblemDomain:

- Property

Generalizations

The following are generalization relationships for ProblemDomain:

- NodeRole

8.2.1.3.3.3.3 Trustline

MODAF: Asserts that the trustingParty (either a Node or a KnownResource) trusts the trustedParty to a given level (indicated by the level attribute). Note: No unit of measure is associated with the level - security architects must define their own scale of trust levels for a given architecture or set of architectures.
DoDAF: NA

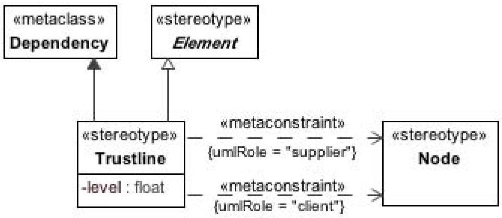


Figure 8.212 - Trustline

Constraints

The following are constraints for Trustline:

- Trustline.client - Values for the client property must be stereotyped «Node» or its specializations.
- Trustline.supplier - Values for the supplier property must be stereotyped «Node» or its specializations.

Attribute

The following are attributes for Trustline:

- level : float[] -

Extensions

The following are extensions for Trustline:

- Dependency

Generalizations

The following are generalization relationships for Trustline:

- Element

8.2.1.3.3.3.4 UPDM L1::UPDM L0::MODAF::OperationalElements::Structure::Organizational

8.2.1.3.3.3.4.1 RoleType

MODAF: An aspect of a person or organization that enables them to fulfill a particular function.

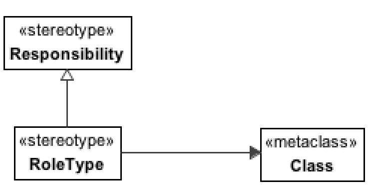


Figure 8.213 - RoleType

Extensions

The following are extensions for RoleType:

- Class

Generalizations

The following are generalization relationships for RoleType:

- Responsibility

8.2.1.3.4 UPDM L1::UPDM L0::MODAF::StrategicElements

The Strategic View elements for MODAF specific models.

8.2.1.3.4.1 UPDM L1::UPDM L0::MODAF::StrategicElements::Milestones

Milestone elements for Strategic View elements for MODAF specific models.

8.2.1.3.4.1.1 DeployedMilestone

MODAF: Asserts that an ActualOrganisationResource started to use, or is slated to start using a CapabilityConfiguration from a specific point in time. --This is used to describe capabilities going into service with specific organisations or posts. DoDAF: NA

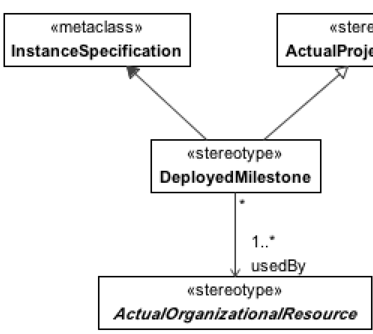


Figure 8.214 - DeployedMilestone

Attribute

The following are attributes for DeployedMilestone:

- usedBy : ActualOrganizationalResource[1..*] - ActualOrganizationalResources using CapabilityConfiguration deployed at this Milestone.

Extensions

The following are extensions for DeployedMilestone:

- InstanceSpecification

Generalizations

The following are generalization relationships for DeployedMilestone:

- ActualProjectMilestone

8.2.1.3.4.1.2 NoLongerUsedMilestone

MODAF: Asserts that an ActualOrganisationResource ceased to use or is slated to cease using a CapabilityConfiguration from a specific point in time. --This is used to describe capabilities going out of service with specific organisations or posts.
DoDAF:NA

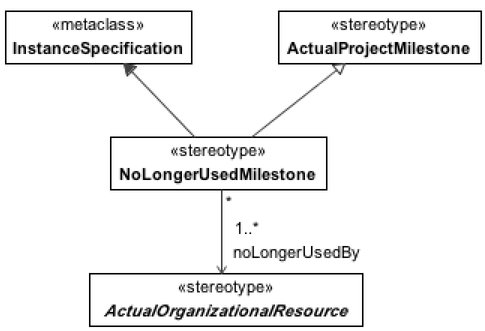


Figure 8.215 - NoLongerUsedMilestone

Attribute

The following are attributes for NoLongerUsedMilestone:

- noLongerUsedBy : ActualOrganizationalResource[1..*] - ActualOrganizationalResources that are no longer using CapabilityConfiguration that went out of service at this Milestone.

Extensions

The following are extensions for NoLongerUsedMilestone:

- InstanceSpecification

Generalizations

The following are generalization relationships for NoLongerUsedMilestone:

- ActualProjectMilestone

8.2.1.3.4.2 UPDM L1::UPDM L0::MODAF::StrategicElements::Structure

Structure elements for Strategic View elements for MODAF specific models.

8.2.1.3.4.2.1 EnduringTask

MODAF: A type of behaviour recognised by an enterprise as being essential to achieving its goals - i.e. a strategic specification of what the enterprise does.
DoDAF: NA

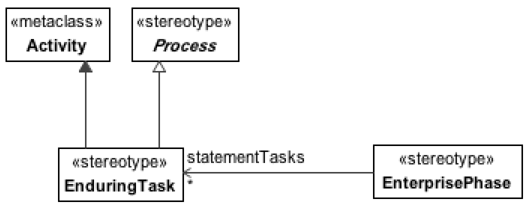


Figure 8.216 - EnduringTask

Extensions

The following are extensions for EnduringTask:

- Activity

Generalizations

The following are generalization relationships for EnduringTask:

- Process

8.2.1.3.4.2.2 WholeLifeEnterprise

UPDM: A WholeLifeEnterprise is a purposeful endeavor of any size involving people, organizations and supporting systems (including physical systems and/or processes).
MODAF: An EnterprisePhase that represents the whole existance of an enterprise.
DoDAF: NA

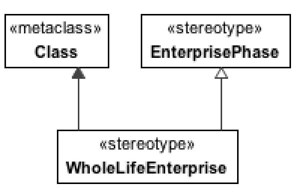


Figure 8.217 - WholeLifeEnterprise

Extensions

The following are extensions for WholeLifeEnterprise:

- Class

Generalizations

The following are generalization relationships for WholeLifeEnterprise:

- EnterprisePhase

8.2.1.3.5 UPDM L1::UPDM L0::MODAF::TechnicalStandardsElements

8.2.1.3.5.1 ProtocolLayer

MODAF: Asserts that a Protocol (upperLayer) uses another Protocol (lowerLayer).

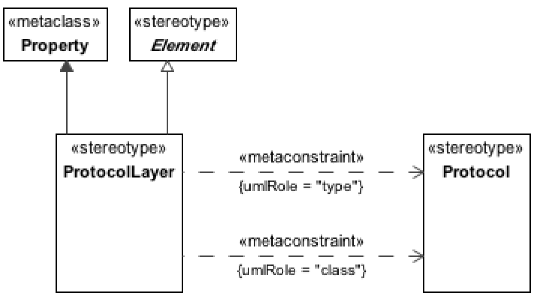


Figure 8.218 - ProtocolLayer

Constraints

The following are constraints for ProtocolLayer:

- ProtocolLayer.class - Value for the class property must be stereotyped «Protocol» or its specializations.
- ProtocolLayer.type - Value for the type property must be stereotyped «Protocol» or its specializations.

Extensions

The following are extensions for ProtocolLayer:

- Property

Generalizations

The following are generalization relationships for ProtocolLayer:

- Element

8.2.1.4 UPDM L1::UPDM L0::SOPES

8.2.1.4.1 Contract

Constraints

The following are constraints for Contract:

- Contract.conveyed - conveyed property value must be stereotyped «Semantic», «Transactional» or their specializations.

Extensions

The following are extensions for Contract:

- InformationFlow

8.2.1.4.2 Semantic

Constraints

The following are constraints for Semantic:

- Semantic.ownedAttribute - ownedAttribute property value must be stereotyped «SemanticAttribute» or its specializations.

Attribute

The following are attributes for Semantic:

- containedTransactionals : Transactional[0..*] -
- identifier : Transactional[1] -

Extensions

The following are extensions for Semantic:

- DataType

8.2.1.4.3 SemanticAttribute

Extensions

The following are extensions for SemanticAttribute:

- Property

8.2.1.4.4 Transactional

Constraints

The following are constraints for Transactional:

- Transactional.ownedAttribute - ownedAttribute property value must be stereotyped «TransactionalAttribute» or its specializations.

Attribute

The following are attributes for Transactional:

- containedTransactionals : Transactional[0..*] -
- identifier : Wrapper[1] -
- representedWrappers : Wrapper[1..*] -

Extensions

The following are extensions for Transactional:

- DataType

8.2.1.4.5 TransactionalAttribute

Extensions

The following are extensions for TransactionalAttribute:

- Property

8.2.1.4.6 Wrapper

Constraints

The following are constraints for Wrapper:

- Wrapper.ownedAttribute - ownedAttribute property value must be stereotyped «WrapperAttribute» or its specializations.

Extensions

The following are extensions for Wrapper:

- Class

8.2.1.4.7 WrapperAttribute

Extensions

The following are extensions for WrapperAttribute:

- Property

8.2.1.5 UPDM L1::UPDM L0::SwAF

DesignRule

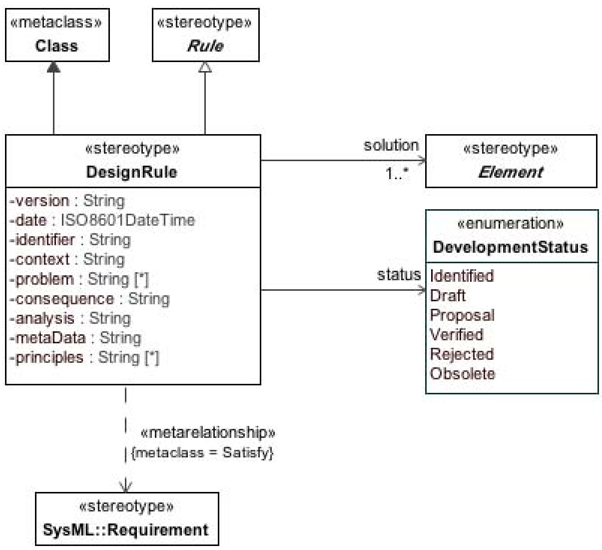


Figure 8.219 - DesignRule

Constraints

The following are constraints for DesignRule:

- DesignRule.ruleKind - Guidance

Attribute

The following are attributes for DesignRule:

- analysis : String[] -
- consequence : String[] -
- context : String[] -
- date : ISO8601DateTime[] -
- identifier : String[] -
- metaData : String[] -
- principles : String[*] -
- problem : String[*] -
- solution : Element[1..*] -
- status : DevelopmentStatus[] -

- version : String[] -

Extensions

The following are extensions for DesignRule:

- Class

Generalizations

The following are generalization relationships for DesignRule:

- Rule

Part IV - Annexes

This part contains the following annexes:

A - Domain Metamodel

B - UPDM Elements Traceability to DoDAF/MODAF Elements

C - Sample Problem

D - Bibliography

Annex A - Domain Metamodel (DMM)

(non-normative)

This Annex comprises various diagrams which document the Domain Metamodel (DMM) that document the MoDAF 1.5 and MoDAF 1.2 integrated model. This model was used as a basis for creating the UPDM profile.

Note that the diagrams rely on color to aid the reader in understanding the model. Please refer to the legend in the various diagrams to understand the specific definitions.

A.1 Products

This section documents each of the products of the DMM.

A.2 AcV

The AcquisitionElements describe project details, including dependencies between projects and capability integration. These Views guide the acquisition and fielding processes.

A.2.1 AcV-1 - DMM

MODAF: AcV-1 view products represent an organizational perspective on projects.

DoDAF: AcV-1 view [DoDAF::Project Portfolio Relationships (PV-1) DoDAF-described View] represents an organizational perspective on programs, projects, or a portfolio of projects.

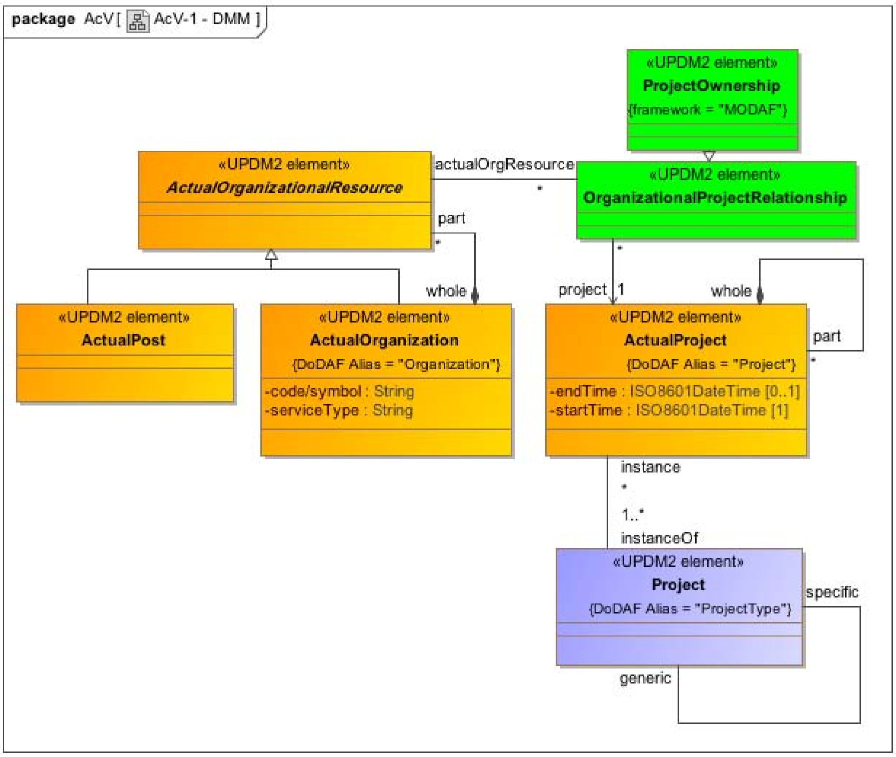


Figure A.1 - AcV-1 - DMM

A.2.2 AcV-2 - DMM

MODAF: AcV-2 view products provide a timeline perspective on projects.

DoDAF: AcV-2 (DoDAF::PV-2: Project Timelines DoDAF-described View) provides a timeline perspective on programs or projects.

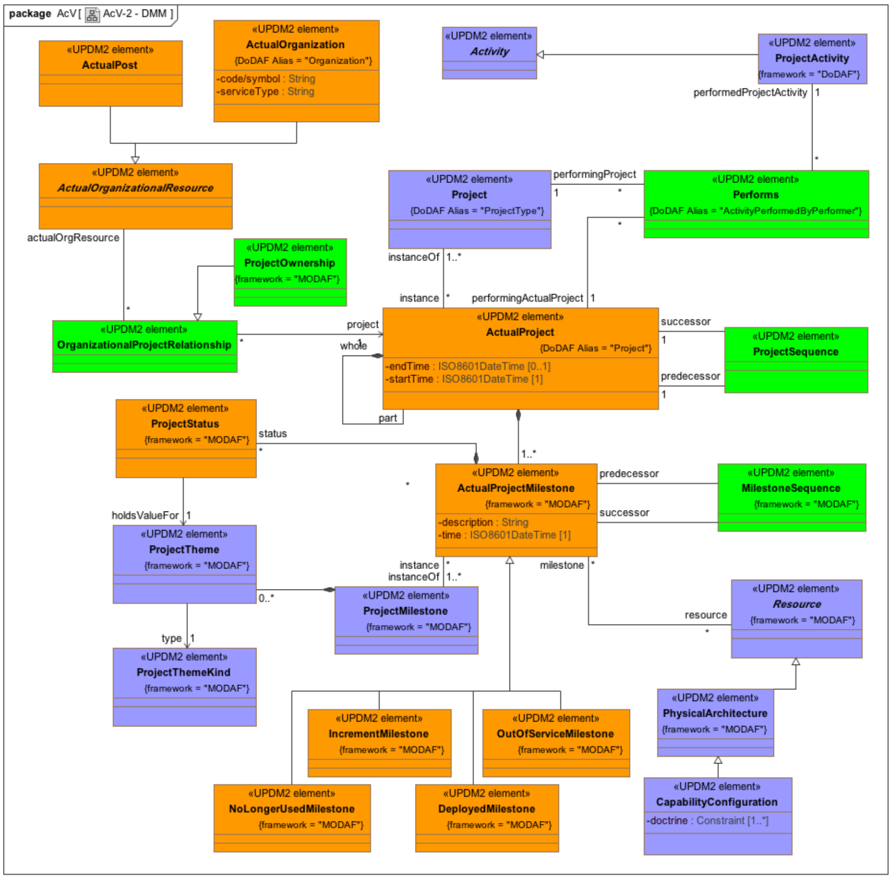


Figure A.2 - AcV-2 - DMM

A.2.3 PV-3 - DMM

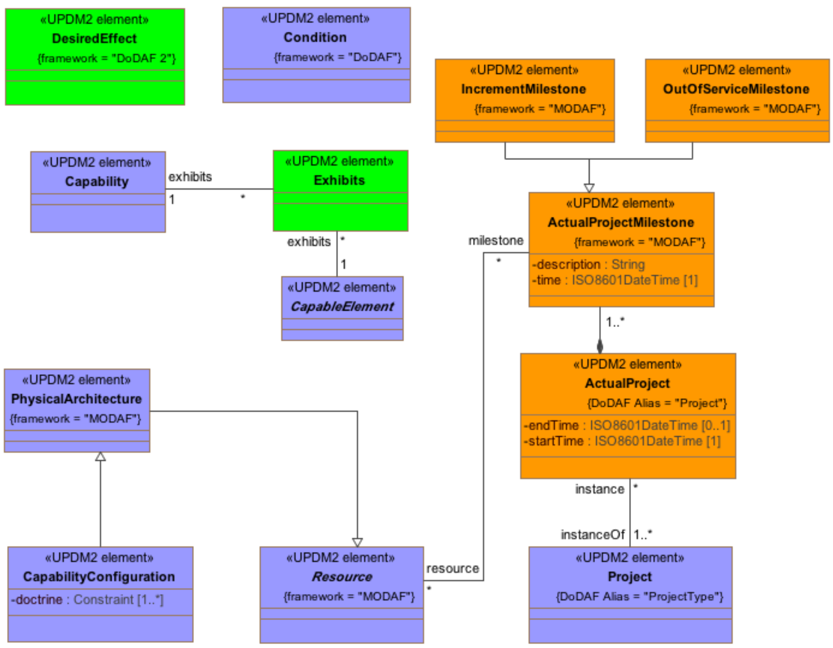


Figure A.3 - PV-3 - DMM

A.3 AV

Elements that are part of the All View. The All-Views (AVs) provide an overarching description of the architecture, its scope, ownership, timeframe and all of the other meta data that is required in order to effectively search and query architectural models. They also provide a place to record any findings arising from the architecting process. The AVs include a dictionary of the terms used in the construction of the architecture – which helps others fully understand it?fs meaning at a later date. Since the AVs provide critical information for the future access and exploitation of an architectural model their population is essential whenever an architecture is created or modified. The AVs provide a critical input into the processes that provide architectural governance.

A.3.1 AV-1 - DMM

MODAF: The overview and summary information contained within the AV-1 product provides executive-level summary information in a consistent form that allows quick reference and comparison between architectural descriptions. --AV-1 includes assumptions, constraints, and limitations that may affect high-level decisions relating to an architecture-based work programme.
DoDAF: The overview and summary information contained within the AV-1 DoDAF-described View provides executive-level summary information in a consistent form that allows quick reference and comparison between architectural descriptions.-- The AV-1 includes assumptions, constraints, and limitations that may affect high-level decisions relating to an architecture-based work program.

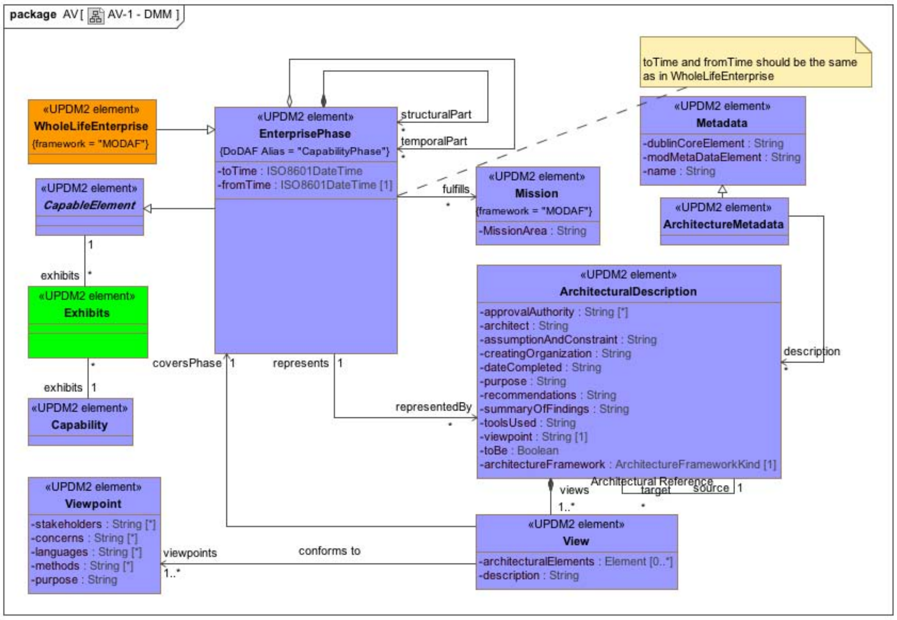


Figure A.4 - AV-1 - DMM

A.3.2 AV-2 - DMM

MODAF: AV-2 presents all the Elements used in an architecture as a stand alone structure. An AV-2 presents all the Elements as a specialisation hierarchy, provides a text definition for each one and references the source of the element (e.g. MODAF Ontology, IDEAS Model, local, etc.).--An AV-2 shows elements from the MODAF Ontology that have been used in the architecture and new elements (i.e. not in the MODAF Ontology) that have been introduced by the architecture.

DoDAF: The AV-2 presents all the metadata used in an architecture as a standalone structure. An AV-2 presents all the metadata as a specialization hierarchy, provides a text definition for each one and references the source of the element (e.g. DoDAF Meta-model, IDEAS, a published document or policy).-- An AV-2 shows elements from the DoDAF Meta-model that have been used in the architecture and new elements (i.e. not in the DoDAF Meta-model) that have been introduced by the architecture.

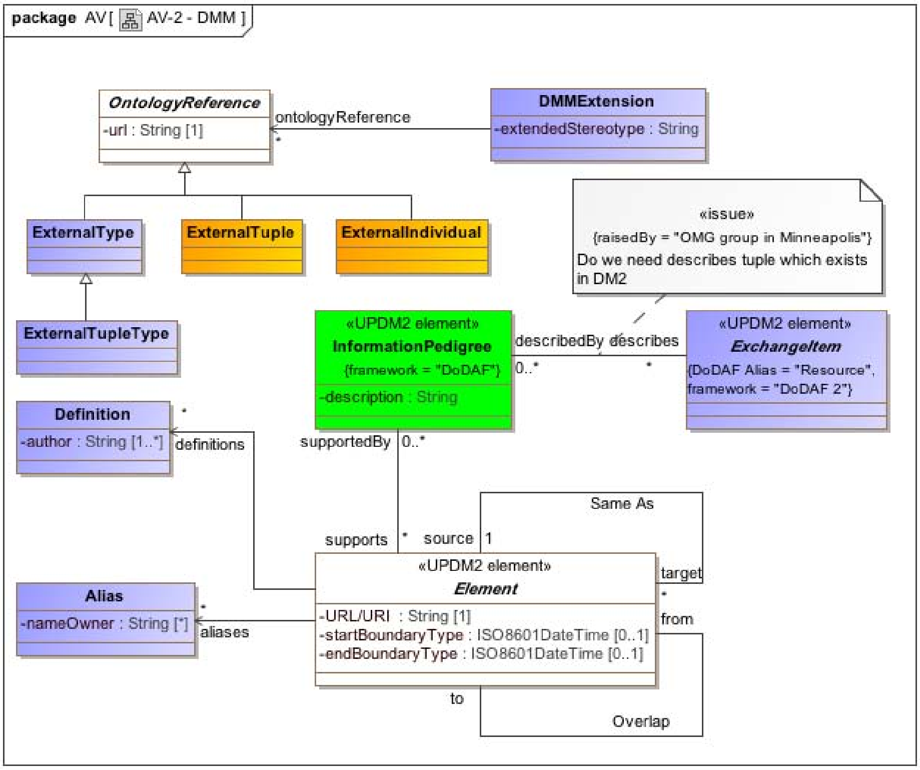


Figure A.5 - AV-2 - DMM

A.4 OV

The Operational View is about real-world activities, the people and machinery that perform them, and the means by which they are performed. The Operational View is divided into nine products intended to answer the ?gwho?h, ?gwhat?h, ?gwhen?h, ?gwhere?h, ?gwhy?h, and ?ghow?h of a mission. They are summarized in the table below.

A.4.1 OV-1 - DMM

MODAF: OV-1 addresses the high level operational concepts related to one or more missions. An OV-1 describes a mission, class of mission, or scenario; and highlights the main operational elements and interesting or unique aspects of operations.

The OV-1 has two purposes. First, it provides a means of organising the operational architecture models into distinct groups based on scenario context. Second, it communicates the essence of the scenario context in an essentially graphical form.

DoDAF: The OV-1 DoDAF-described View describes a mission, class of mission, or scenario. It shows the main operational concepts and interesting or unique aspects of operations. It describes the interactions between the subject architecture and its environment, and between the architecture and external systems. A textual description accompanying the graphic is crucial. Graphics alone are not sufficient for capturing the necessary architecture data.

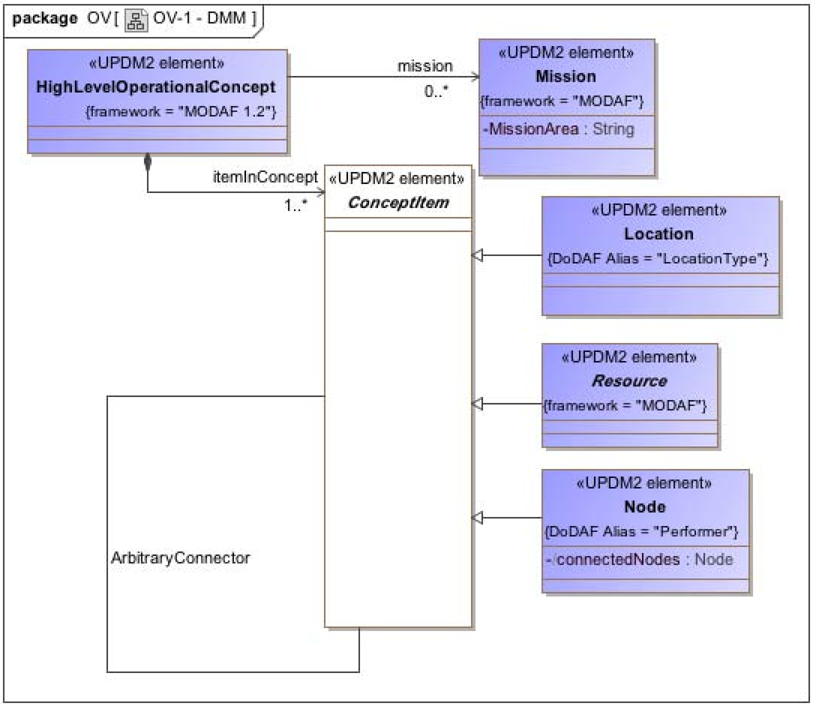


Figure A.6 - OV-1 - DMM

A.4.2 OV-2 - DMM

MODAF: The Operational Node Relationships Description (OV-2) addresses localisation of operational capability. DoDAF: The Operational Resource Description (OV-2) DoDAF-described View applies the context of the operational capability to a community of anticipated users.

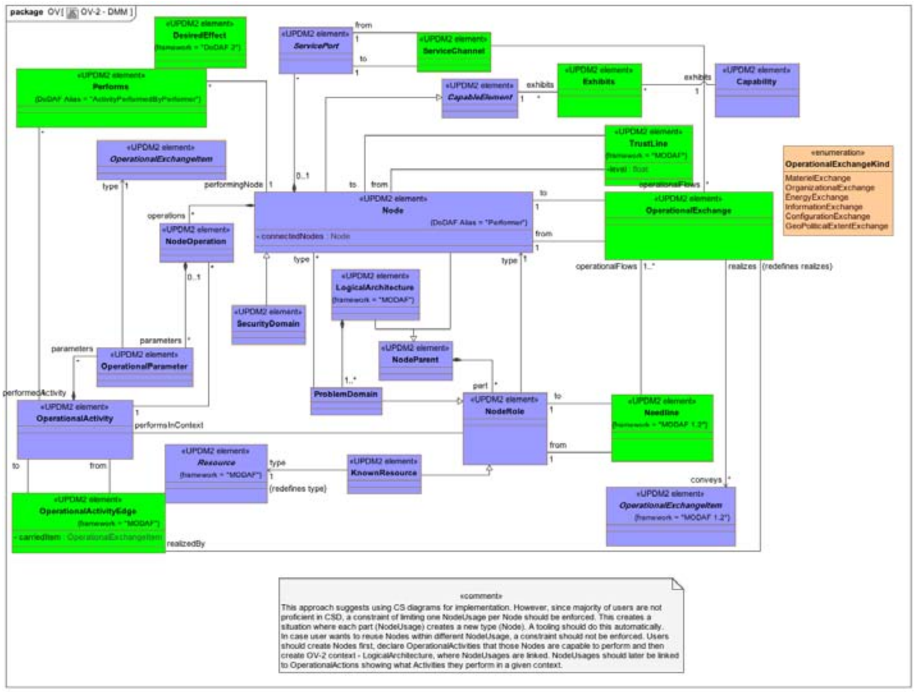


Figure A.7 - OV-2 - DMM

A.4.3 OV-3 - DMM

MODAF: The Operational Information Exchange Matrix (OV-3) addresses operational information exchanges between nodes.
DoDAF: The Operational Resource Flow Matrix (OV-3) DoDAF-described addresses operational resource flows exchanged between Operational Activities and locations.

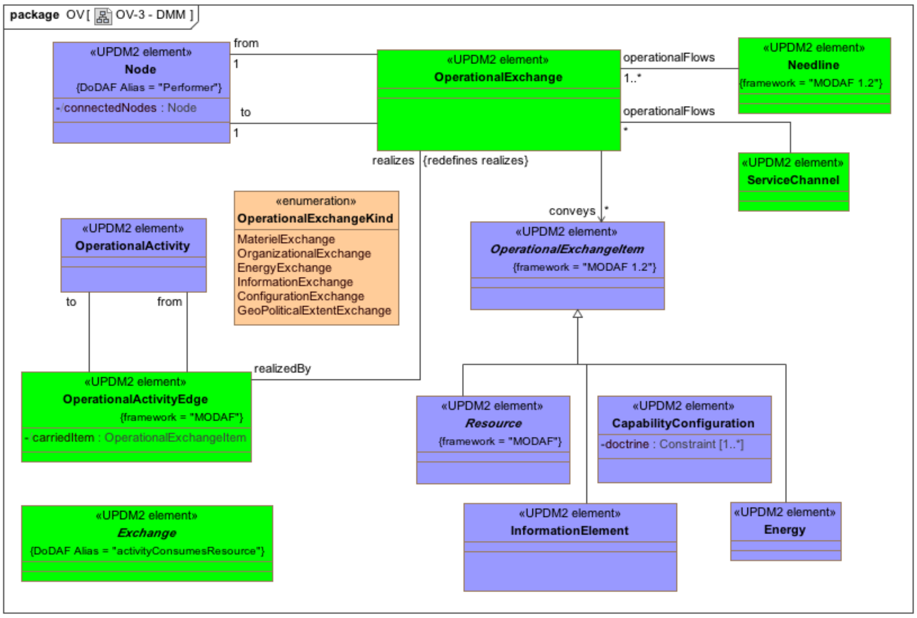


Figure A.8 - OV-3 - DMM

A.4.4 OV-4 Actual - DMM

This is the OV-4 Actual View. The Organizational Relationships Chart illustrates the command structure or relationships (as opposed to relationships with respect to a business process flow) among human roles, organizations, or organization types that are the key players in architecture. MODAF divides The OV-4 two views, an OV-4 Typical and an OV-4 Actual. The former is exactly as the DoDAF OV-4, while the latter is a special form of the SV-1; where the resources are restricted to being organizational

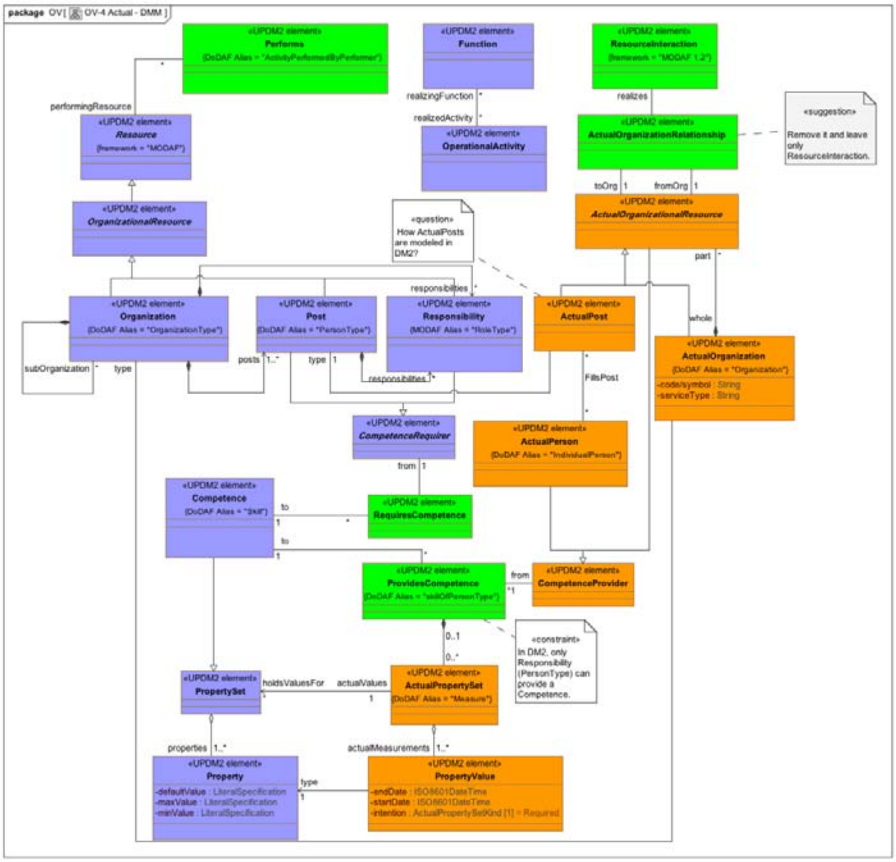


Figure A.9 - OV-4 Actual - DMM

A.4.5 OV-4 Typical - DMM

MODAF: The OV-4 shows organisational structures and interactions. The organisations shown may be civil or military. A typical OV-4 shows the possible relationships between organisational resources (organisations and posts).
DoDAF: DoDAF: The OV-4 DoDAF-described View shows organizational structures and interactions. The organizations shown may be civil or military. A typical OV-4 shows the possible relationships between organizational resources.

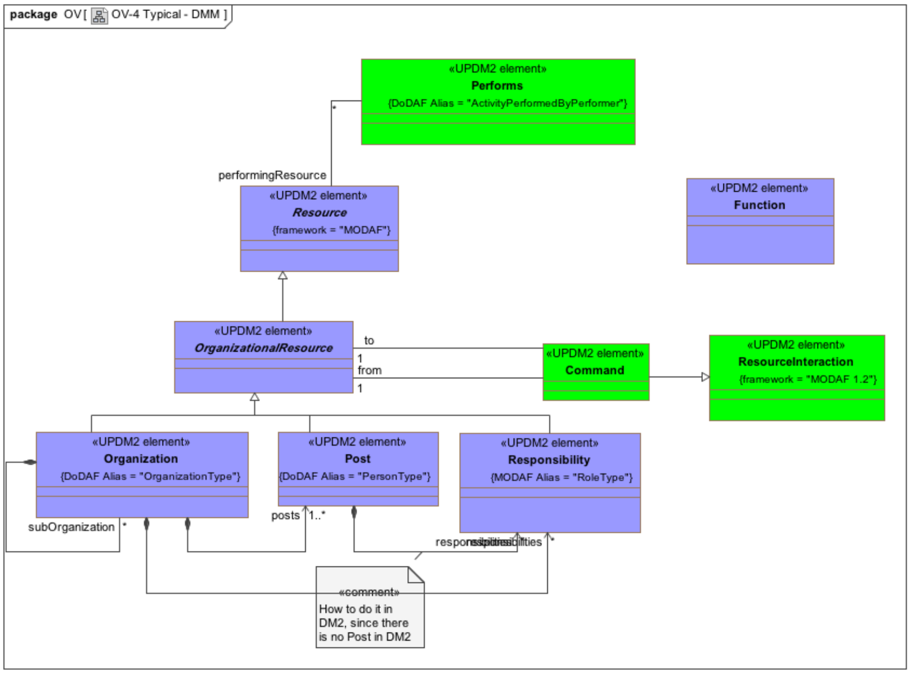


Figure A.10 - OV-4 Typical - DMM

A.4.6 OV-5 - DMM

MODAF: The Operational Activity Model (OV-5) describes the operations that are normally conducted in the course of achieving a mission or a business goal. It describes operational activities (or tasks), Input/Output flows between activities and to/from activities that are outside the scope of the Architecture.

DoDAF: The Operational Activity Model DoDAF-described View describes the operations that are normally conducted in the course of achieving a mission or a business goal. It describes operational activities (or tasks); Input/Output flows between activities, and to/from activities that are outside the scope of the Architecture.

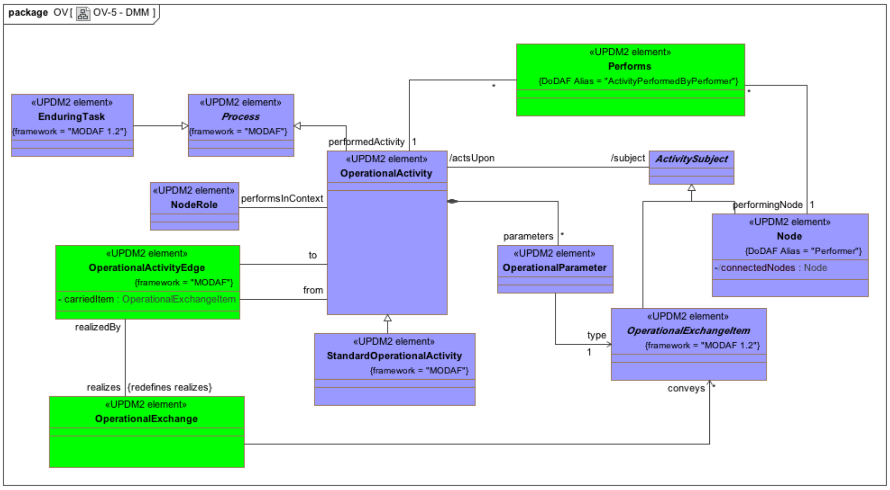


Figure A.11 - OV-5 - DMM

A.4.7 OV-6a - DMM

MODAF: An Operational Rules Model (OV-6a) specifies operational or business rules that are constraints on the way that business is done in the enterprise.
DoDAF: An Operational Rules Model (OV-6a) DoDAF-described View specifies operational or business rules that are constraints on the way that business is done in the enterprise.

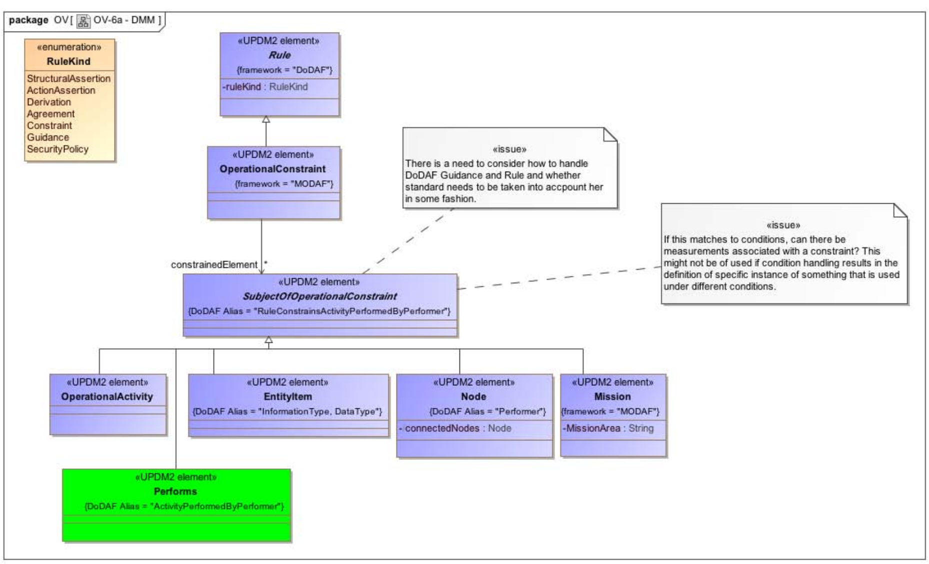


Figure A.12 - OV-6a - DMM

A.4.8 OV-6b - DMM

MODAF: OV-6b: The Operational State Transition Description is a graphical method of describing how an Operational Node or activity responds to various events by changing its state. The diagram represents the sets of events to which the Architecture will respond (by taking an action to move to a new state) as a function of its current state. Each transition specifies an event and an action.
DoDAF: The Operational State Transition Description (OV-6b) DoDAF-described View is a graphical method of describing how an Operational Activity responds to various events by changing its state. The diagram represents the sets of events to which the Architecture will respond (by taking an action to move to a new state) as a function of its current state. Each transition specifies an event and an action.

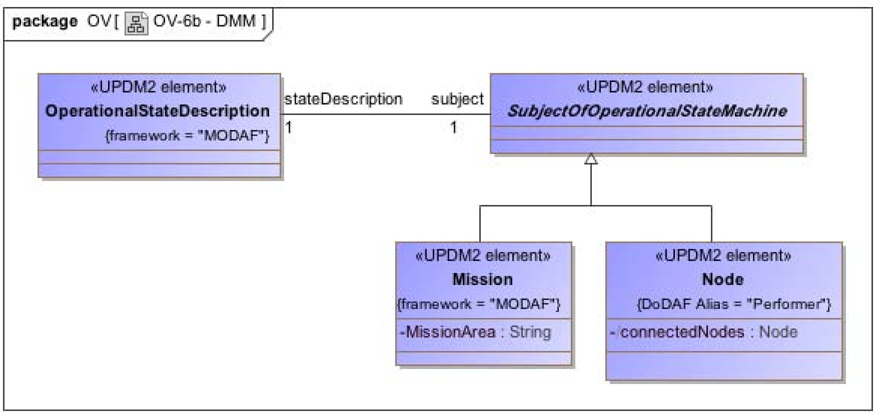


Figure A.13 - OV-6b - DMM

A.4.9 OV-6c - DMM

MODAF: OV-6c: The Operational Event-Trace Description provides a time-ordered examination of the information exchanges between participating Operational Nodes as a result of a particular scenario. Each event-trace diagram will have an accompanying description that defines the particular scenario or situation.
DoDAF: The Operational Event-Trace Description (OV-6c) DoDAF-described View provides a time ordered examination of the resource flows as a result of a particular scenario. Each event-trace diagram will have an accompanying description that defines the particular scenario or situation.

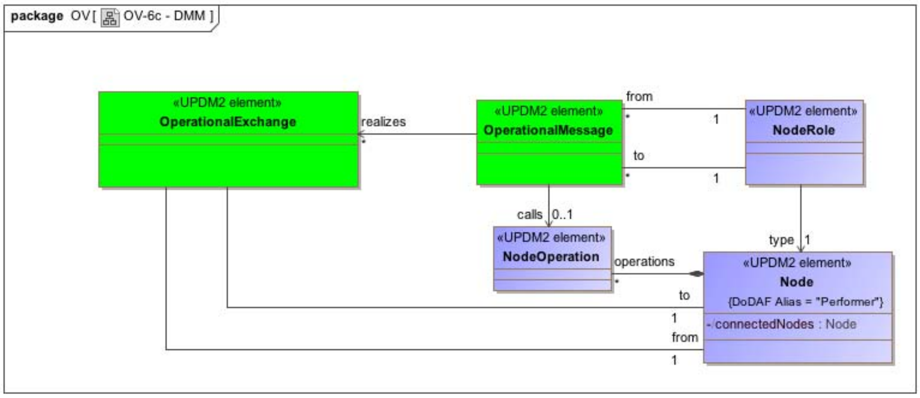


Figure A.14 - OV-6c - DMM

A.4.10 OV-7 - DMM

MODAF: Information Models (OV-7) address the information perspective on an operational architecture.
DoDAF: The Conceptual Data Model (DIV-1), a new DoDAF-described View in DoDAF V2.0, addresses the information concepts at a high-level on an operational architecture.
The Logical Data Model (DIV-2) DoDAF-described View allows analysis of an architecture?fs data definition aspect, without consideration of implementation specific or product specific issues.

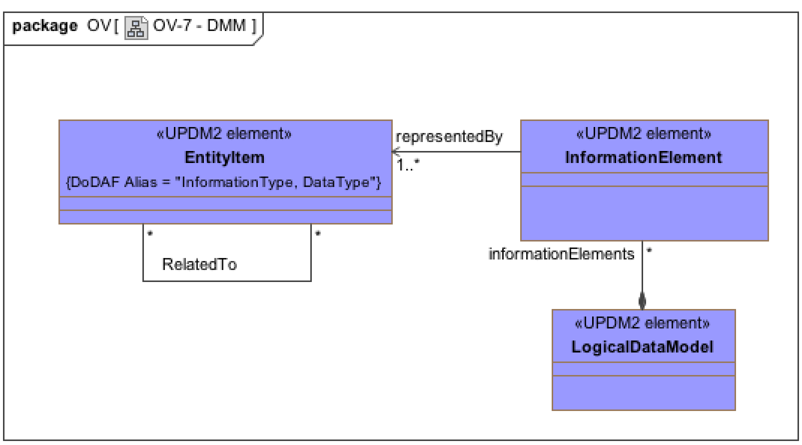


Figure A.15 - OV-7 - DMM

A.5 SOV

The Service-Orientated View (SOV) is a description of services needed to directly support the operational domain as described in the OperationalView. A service is described as a unit of work through which a particular Resource provides a useful result to a consuming Resource.

The direction taken by UPDM in modeling services is heavily based on a simplified version of the UPMS profile. Only those elements which are compatible with existing DoDAF/MODAF concepts have been used. A full integration with UPMS will be assessed at a later date.

A.5.1 SOV-1 - DMM

The Service Taxonomy View (SOV-1) specifies a hierarchy of services. The elements in the hierarchy are service specifications (i.e. service interfaces), and the relationships between the elements are specializations – i.e. one Service is a special type of another. Along with SOV-2, it specifies a standard library of Service specifications for an enterprise, which Service implementers are expected to conform to.

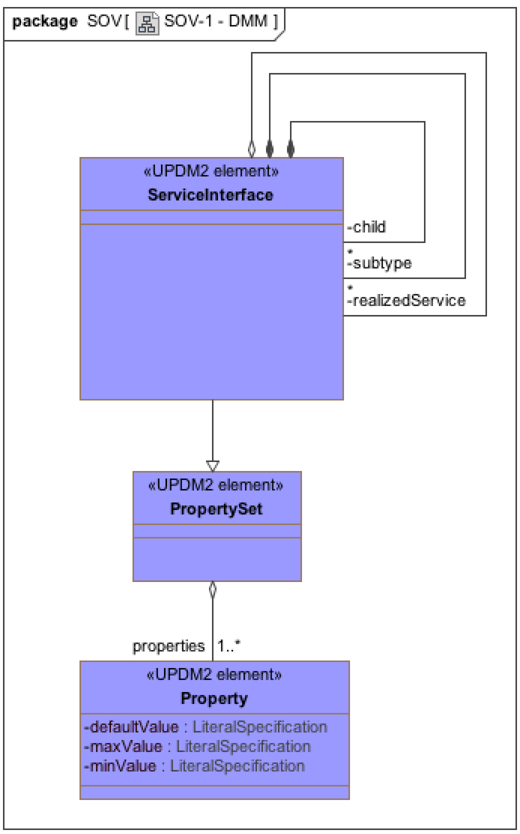


Figure A.16 - SOV-1 - DMM

A.5.2 SOV-2 - DMM

MODAF: The Service Taxonomy View (SOV-1) specifies a hierarchy of services. The elements in the hierarchy are service specifications (rather than service implementations), and the relationships between the elements are specialisations – i.e. one Service is a special type of another.
DoDAF: NA

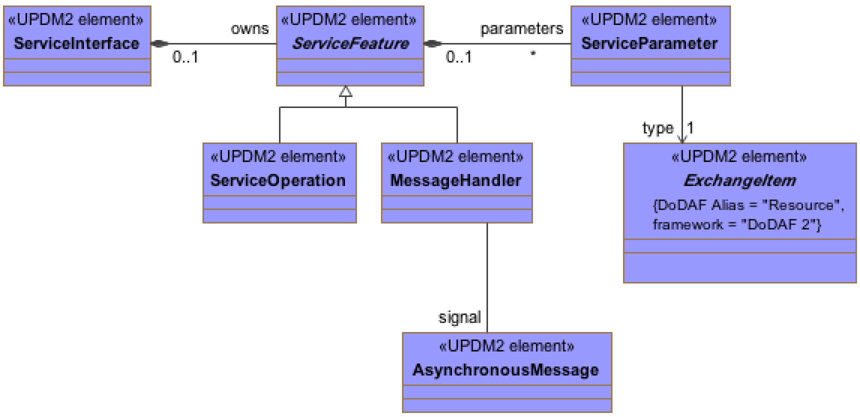


Figure A.17 - SOV-2 - DMM

A.5.3 SOV-3 - DMM

MODAF: The Capability to Service Mapping View (SOV-3) depicts which services contribute to the achievement of a capability.
DoDAF: The Operational Activity to Services Function Traceability Matrix (SvcV-5) DoDAF-described View addresses the linkage between service functions described in SvcV-4 and Operational Activities specified in OV-5.

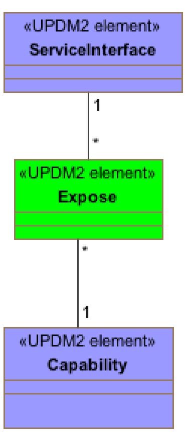


Figure A.18 - SOV-3 - DMM

A.5.4 SOV-4a - DMM

MODAF: The purpose of the Service Constraints View (SOV-4a) is to specify constraints that apply to implementations of services.
DoDAF: The SvcV-10a DoDAF-described View describes constraints on the resources, functions, data and ports that make up the Service View physical architecture. The constraints are specified in text and may be functional or structural (i.e. non-functional).

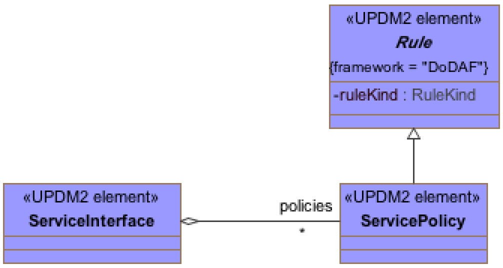


Figure A.19 - SOV-4a - DMM

A.5.5 SOV-4b - DMM

MODAF: The purpose of the Service State Model View (SOV-4b) is to specify the possible states a service may have, and the possible transitions between those states.
DoDAF: The Services State Transition Description DoDAF-described View is a graphical method of describing a resource (or function) response to various events by changing its state. The diagram basically represents the sets of events to which the resources in the Architecture will respond (by taking an action to move to a new state) as a function of its current state. Each transition specifies an event and an action.

Figure A.20 - SOV-4b - DMM

A.5.6 SOV-4c - DMM

The purpose of the Service Interaction Specification View (SOV-4c) is to specify how a service interacts with external agents, and the sequence and dependencies of those interactions. An SOV-4c product does not specify the sequencing of an orchestrated set of services (see OV-6c). Its purpose is to specify the general sequence of interactions that are possible for a given service.

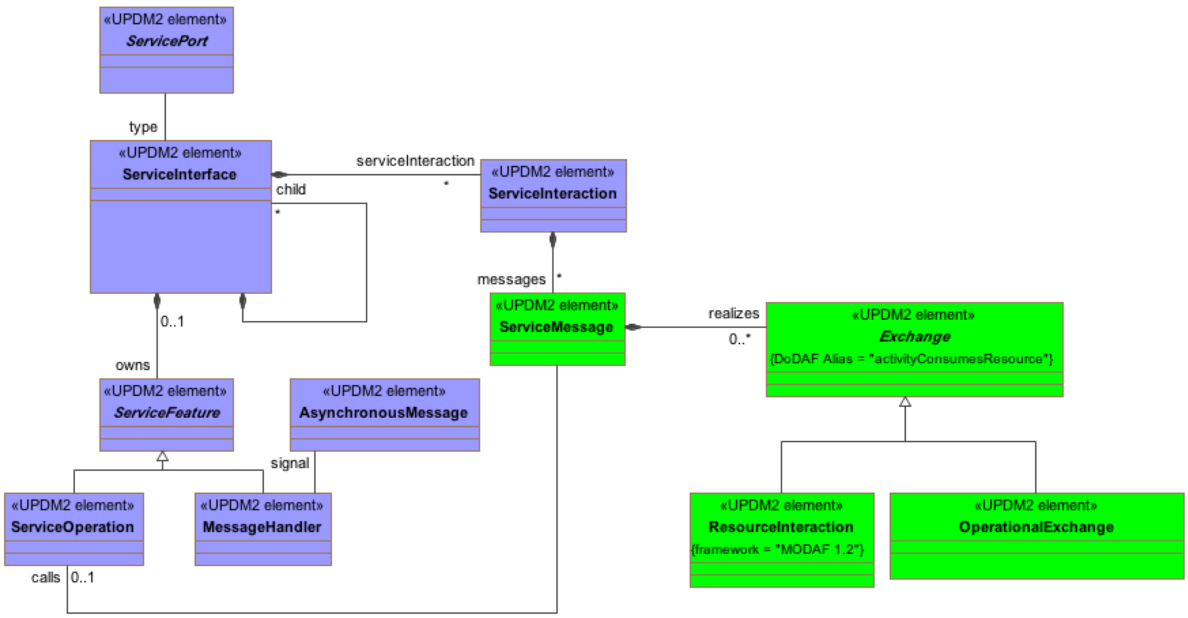


Figure A.21 Figure 242 SOV-4c - DMM

A.5.7 SOV-5 - DMM

MODAF: The Service Functionality View (SOV-5) defines the behaviour of a service in terms of the functions it is expected to perform.
DoDAF: The Services Functionality Description provides detailed information regarding the: Allocation of service functions to resources, and Flow of resources between service functions.

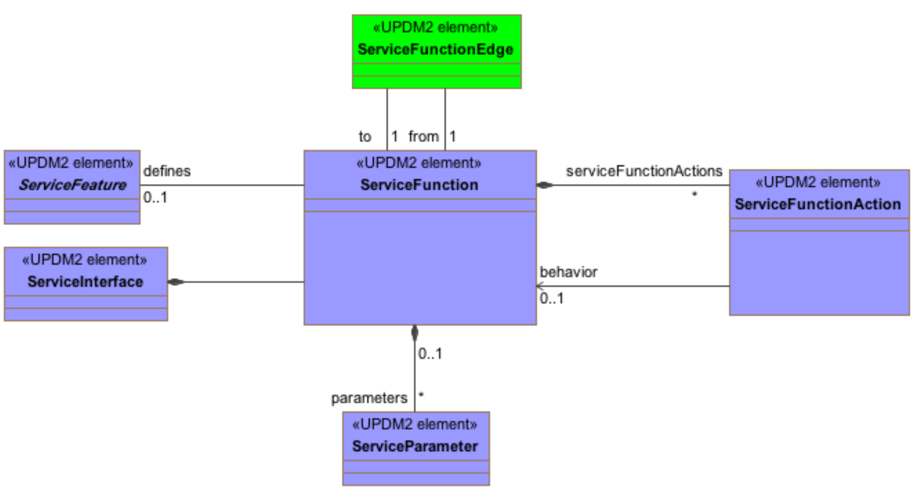


Figure A.22 - SOV-5 - DMM

A.6 StV

The Strategic Elements are used in the Strategic View which provides an overall Enterprise Architecture assessment of the Capabilities and their relationships facilitating Capability Management (e.g. capability introduction, integration, re-alignment and removal). While an Enterprise will have a number of UPDM Architecture Descriptions that have the Operational, System, Technical Standards, and All Views, only one Strategic View will exist across a number of Architecture Descriptions.

A.6.1 CV-7 - DMM

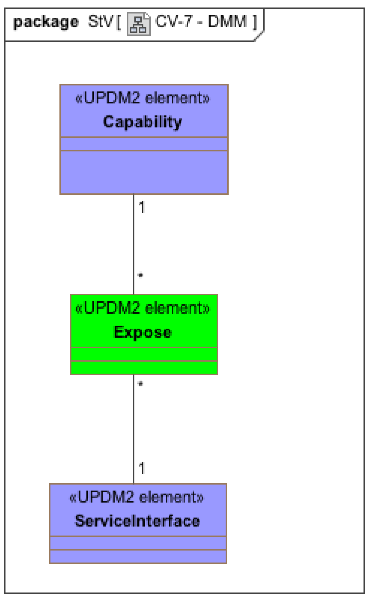


Figure A.23 - CV-7 - DMM

A.6.2 StV-1 - DMM

MODAF: StV-1 addresses the enterprise concerns associated with the overall vision for transformational endeavours and thus defines the strategic context for a group of Enterprise capabilities.
DoDAF: CV-1: Vision: addresses the enterprise concerns associated with the overall vision for transformational endeavors and thus defines the strategic context for a group of capabilities.

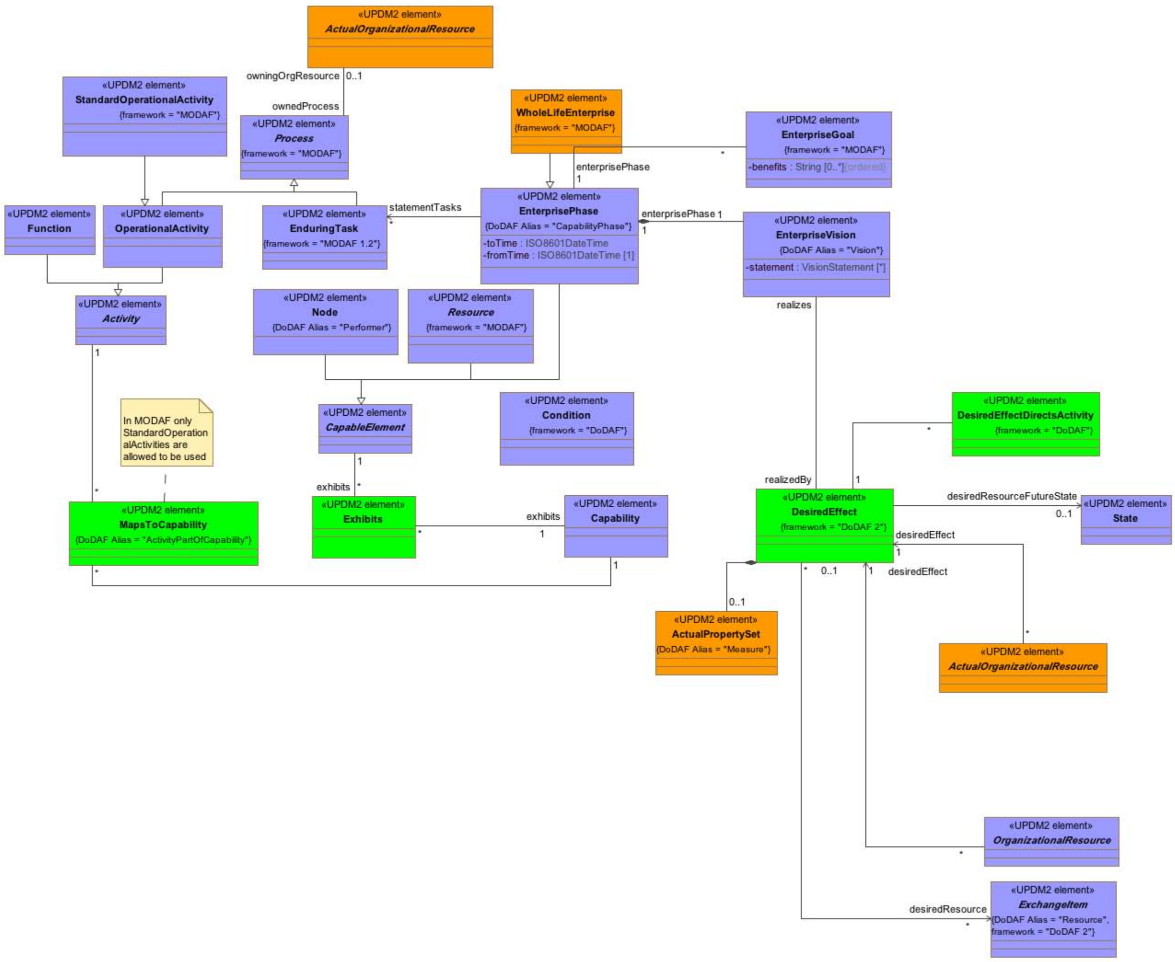


Figure A.24 - StV-1 - DMM

A.6.3 StV-2 - DMM

MODAF: The StV-2 Product models capability taxonomies.
DoDAF: The CV-2 DoDAF-described View models capability taxonomies.

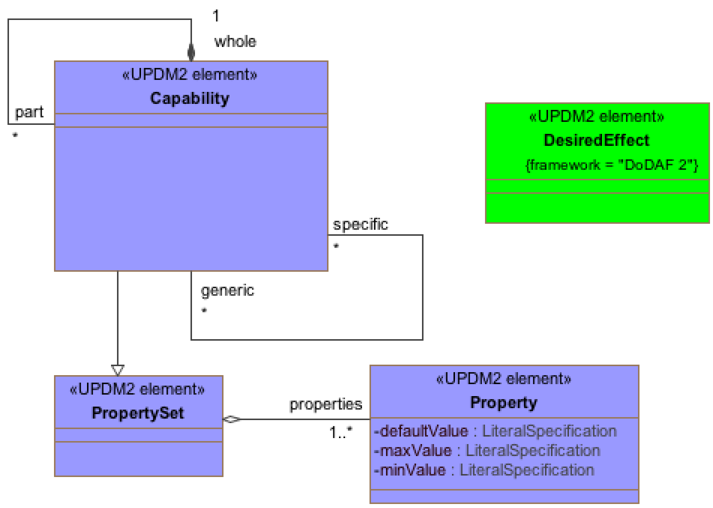


Figure A.25 - StV-2 - DMM

A.6.4 StV-3 - DMM

MODAF: StV-3 addresses the planned achievement of capability at different points in time or during specific periods of time, i.e. capability phasing.
DoDAF: CV-3: Capability Phasing The CV-3 addresses the planned achievement of capability at different points in time or during specific periods of time, i.e. capability phasing.

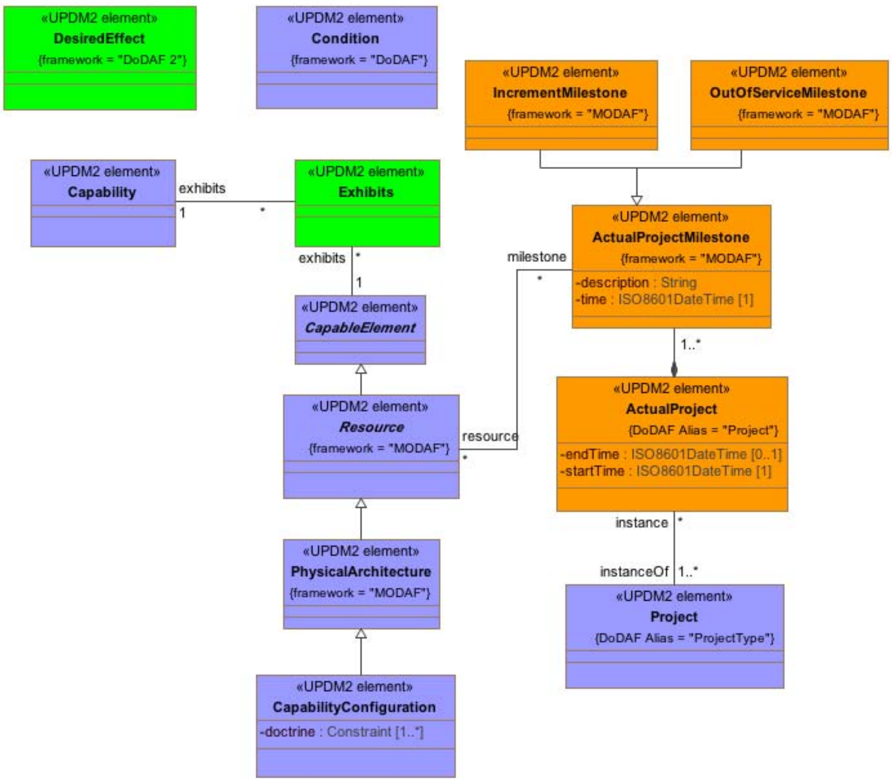


Figure A.26 - StV-3 - DMM

A.6.5 StV-4 - DMM

MODAF: The StV-4 Product describes the dependencies between planned capabilities. It also defines logical groupings of capabilities (capability clusters).
DoDAF: CV-4: Capability Dependencies: The CV-4 DoDAF-described View describes the dependencies between planned capabilities. It also defines logical groupings of capabilities.

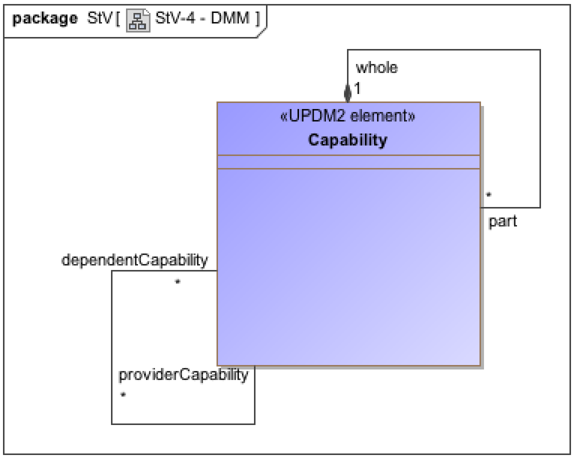


Figure A.27 - StV-4 - DMM

A.6.6 StV-5 - DMM

MODAF: StV-5 addresses the fulfilment of capability requirements, in particular by network enabled capabilities. DoDAF: CV-5: Capability to Organizational Development Mapping: The CV-5 addresses the fulfillment of capability requirements.

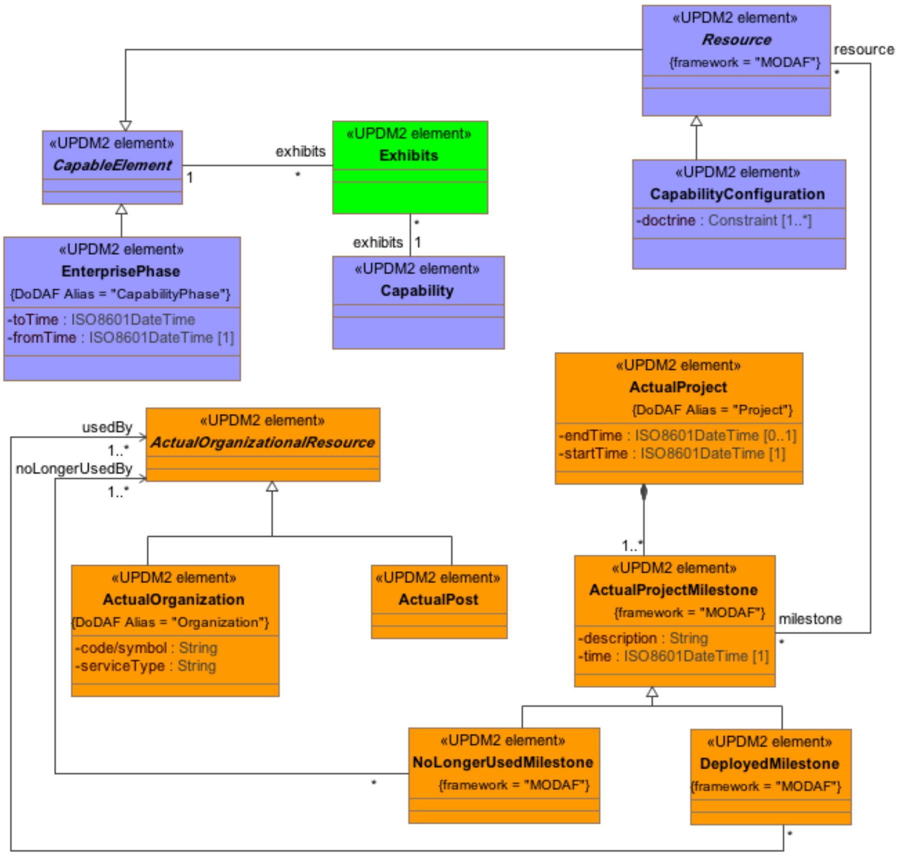


Figure A.28 - StV-5 - DMM

A.6.7 StV-6 - DMM

MODAF: The StV-6 Product describes the mapping between the capabilities required by an Enterprise and the operational activities that those capabilities support.

DoDAF: CV-6: Capability to Operational Activities Mapping: The CV-6 DoDAF-described View describes the mapping between the capabilities required and the operational activities that those capabilities support.

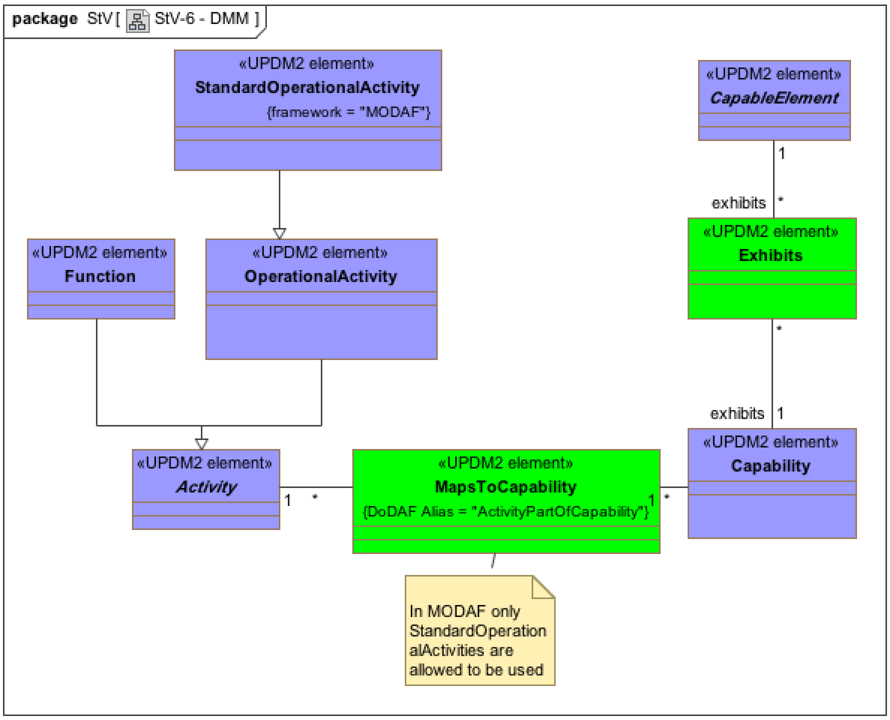


Figure A.29 - StV-6 - DMM

A.7 SV

Models in the System Viewpoint represent alternate realizations in terms of equipment capability of the operational capabilities expressed through models in the Operational Viewpoint and in the User Requirements. The System Viewpoint primarily addresses the specification of the system capability needed (rather than implementation details). Significant changes originally made in MODAF improved the ability for modelers to represent configuration of capability that include people as well as systems and platforms.

A.7.1 SV-1 - DMM

MODAF: Resource Interaction Specification (SV-1) address the composition and interaction of resources. From MODAF v1.1, SV-1 incorporates the human elements – Posts, Organisations and Roles.
DoDAF: The Systems Interface Description (SV-1) DoDAF-described View addresses the composition and interaction of Systems. For DoDAF v2.0, the SV-1 incorporates the human elements as types of Performers- Organizations and Personnel Types.

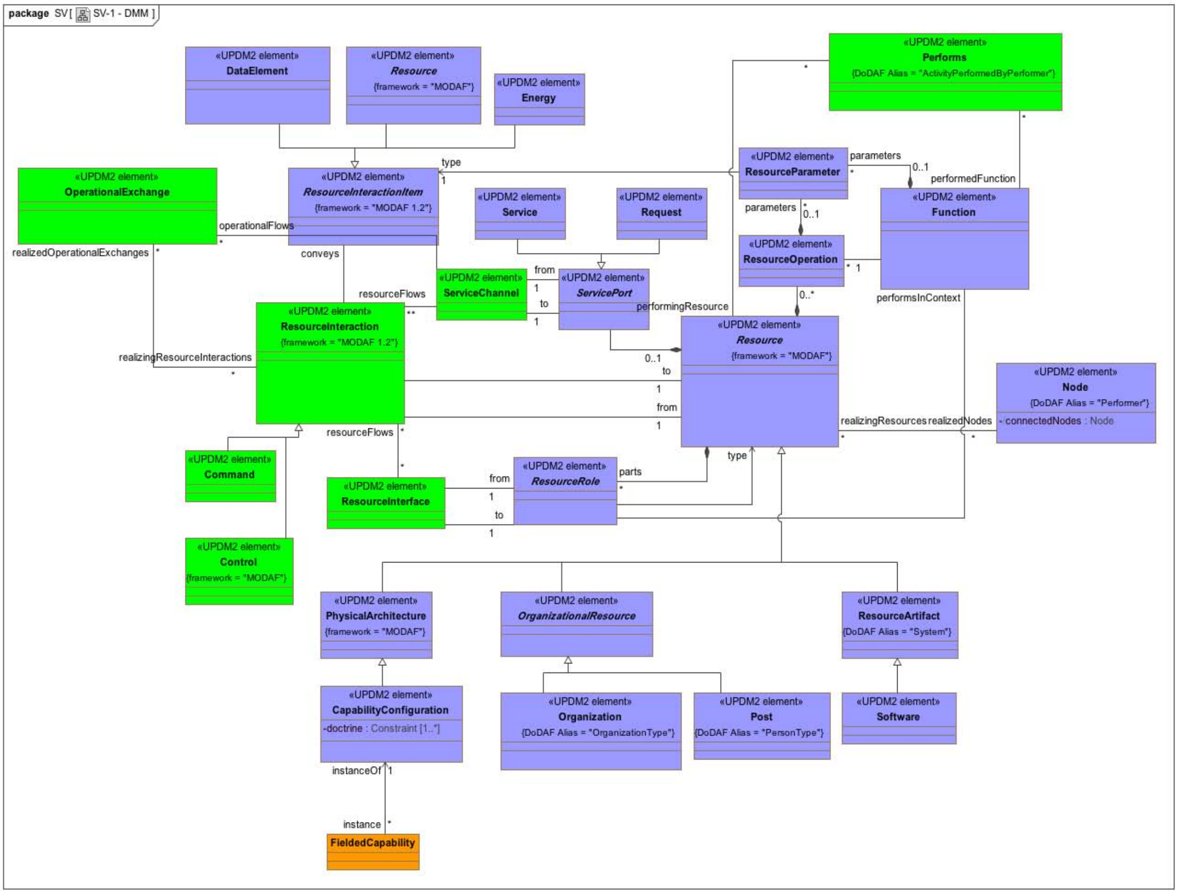


Figure A.30 - SV-1 - DMM

A.7.2 SV-10a - DMM

MODAF: The purpose of this Product is to specify functional and non-functional constraints on the implementation aspects of the architecture (i.e. the structural and behavioural elements of the SV viewpoint).
DoDAF: The SV-10a Systems Rules Model DoDAF-described View describes constraints on the resources, functions, data and ports that make up the SV physical architecture. The constraints are specified in text and may be functional or structural (i.e. non-functional).

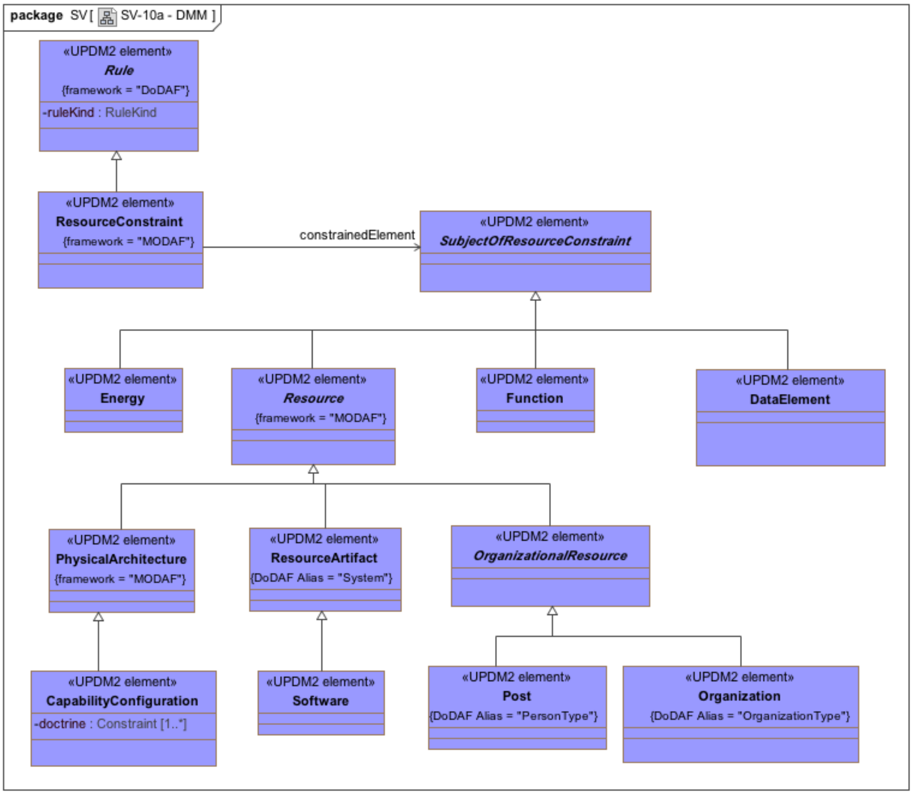


Figure A.31 - SV-10a - DMM

A.7.3 SV-10b - DMM

MODAF: The Resource State Transition Description is a graphical method of describing a resource (or function) response to various events by changing its state. The diagram basically represents the sets of events to which the Resources in the Architecture will respond (by taking an action to move to a new state) as a function of its current state. Each transition specifies an event and an action.
DoDAF: The Systems State Transition Description DoDAF-described View is a graphical method of describing a resource (or system function) response to various events by changing its state. The diagram basically represents the sets of events to which the resources in the Architecture will respond (by taking an action to move to a new state) as a function of its current state. Each transition specifies an event and an action.

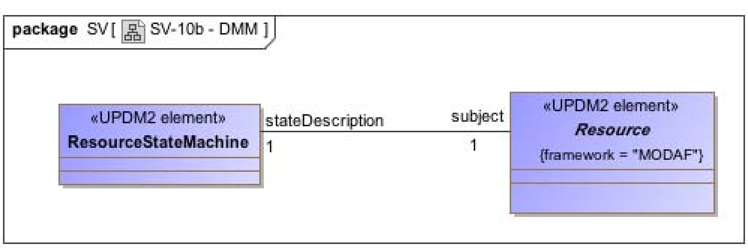


Figure A.32 - SV-10b - DMM

A.7.4 SV-10c - DMM

MODAF: The Resource Event-Trace Description provides a time-ordered examination of the interactions between resources. Each event-trace diagram will have an accompanying description that defines the particular scenario or situation.
DoDAF: The Systems Event-Trace Description provides a time-ordered examination of the interactions between functional resources. Each event-trace diagram will have an accompanying description that defines the particular scenario or situation.

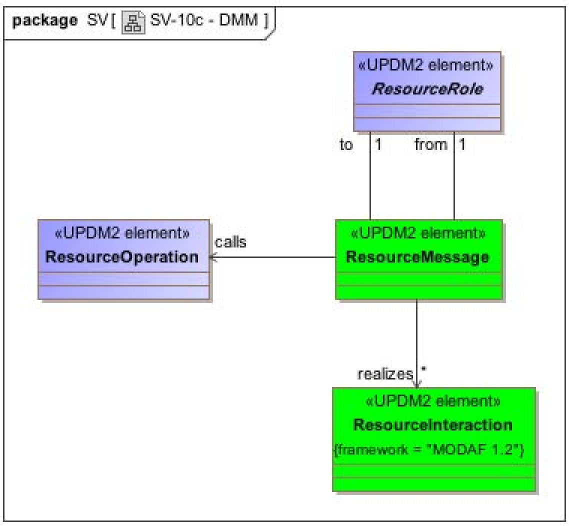


Figure A.33 - SV-10c - DMM

A.7.5 SV-11 - DMM

MODAF: The SV-11 View defines the structure of the various kinds of system data that are utilised by the systems in the Architecture.
DoDAF: The DIV-3 Physical Data Model DoDAF-described view defines the structure of the various kinds of system or service data that are utilized by the systems or services in the Architecture.

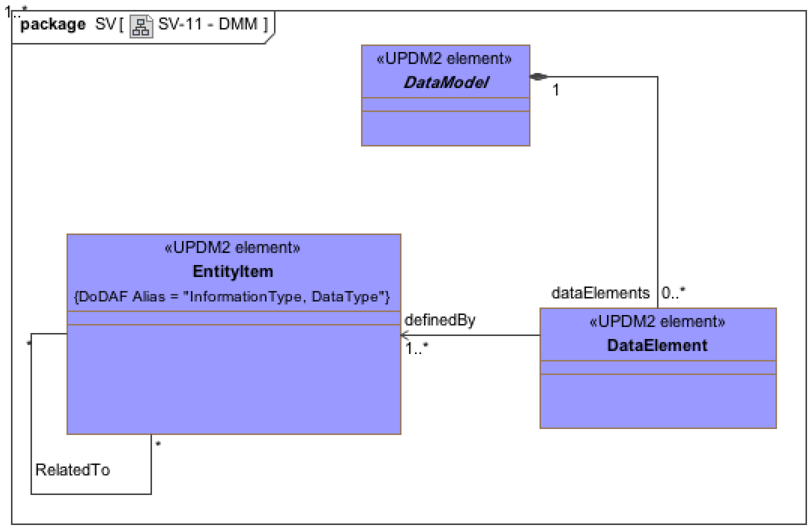


Figure A.34 - SV-11 - DMM

A.7.6 SV-12 - DMM

MODAF: The Service Provision View (SV-12) specifies configurations of resources that can deliver a service, and the levels of service those resources can deliver in different environments.
DoDAF: NA

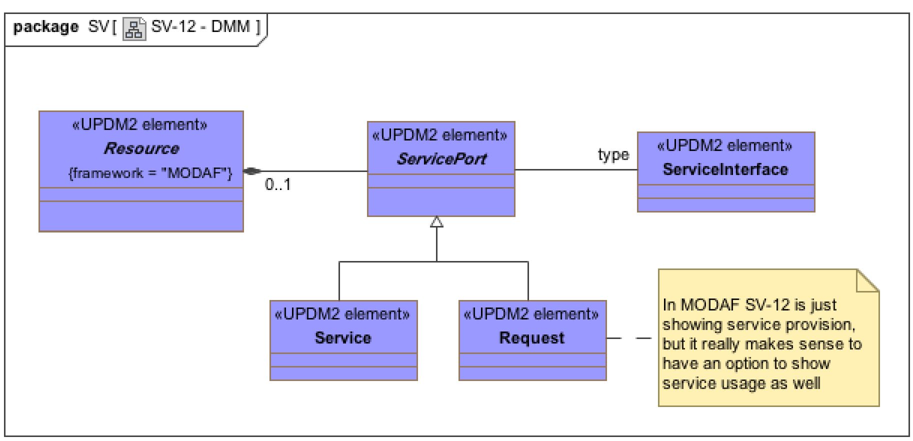


Figure A.35 - SV-12 - DMM

A.7.7 SV-2 - DMM

MODAF: The Systems Communications Description (SV-2a/2b/2c) series of views is intended for the representation of communications networks and pathways that link communications systems, and provides details regarding their configuration.
DoDAF: A Systems Resource Flow Description (SV-2) DoDAF-described View specifies the resource flows between Systems and may also list the protocol stacks used in connections.

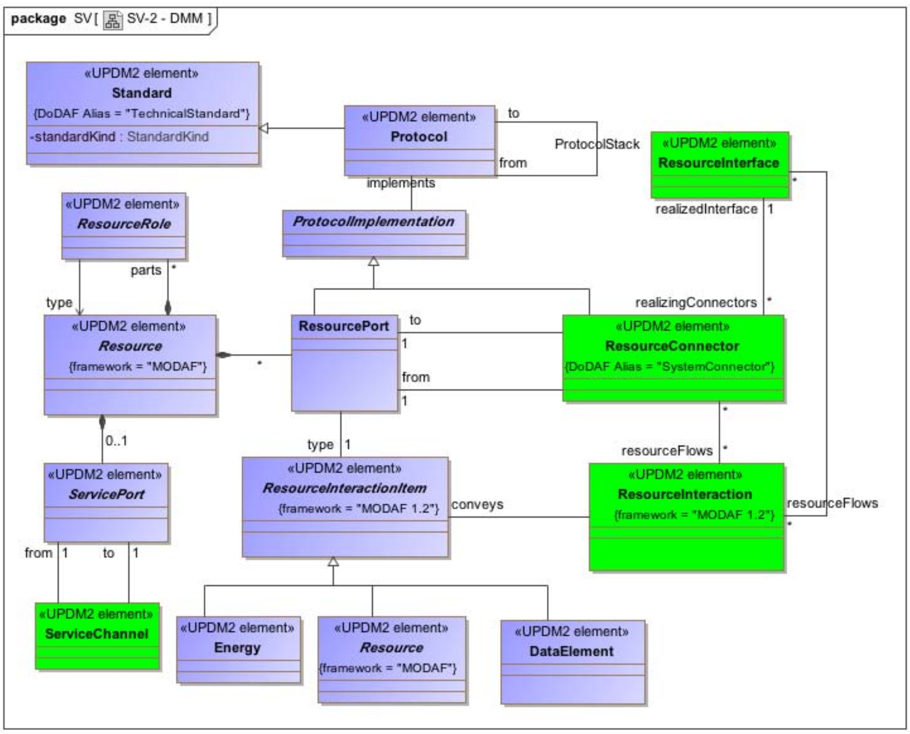


Figure A.36 - SV-2 - DMM

A.7.8 SV-3 - DMM

MODAF: The Resource Interaction Matrix provides a tabular summary of the resource interactions specified in the SV-1 for the Architecture.
DoDAF: The Systems – Systems Matrix (SV-3) DoDAF-described View provides a tabular summary of the system interactions specified in the SV-1 for the Architecture.

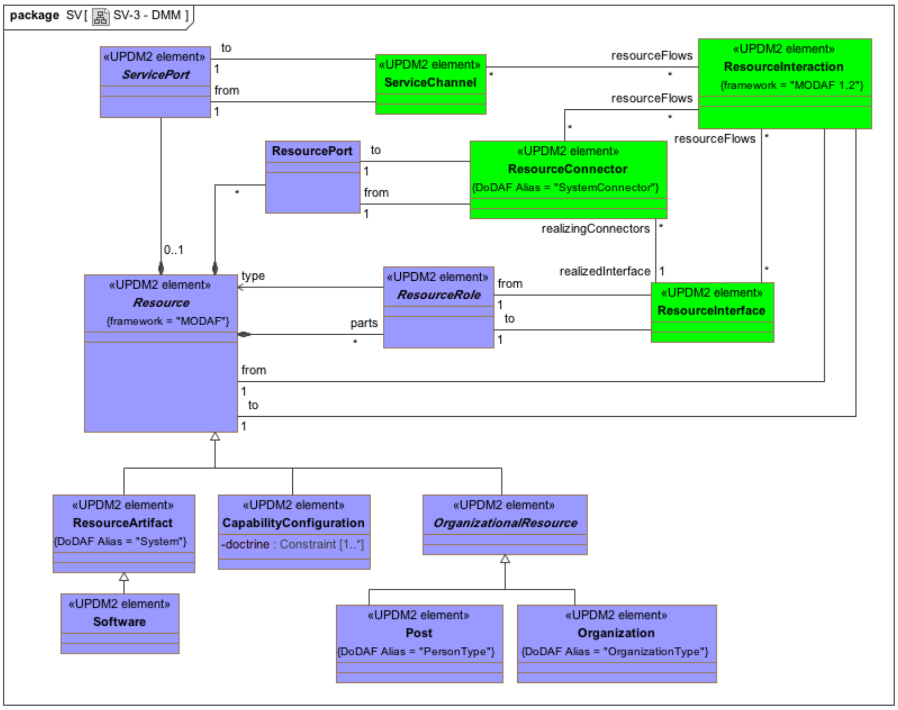


Figure A.37 - SV-3 - DMM

A.7.9 SV-4 - DMM

MODAF: Functionality Descriptions (SV-4) address human and system functionality.
DoDAF: The Systems Functionality Description (SV-4) DoDAF-described View addresses human and system functionality.

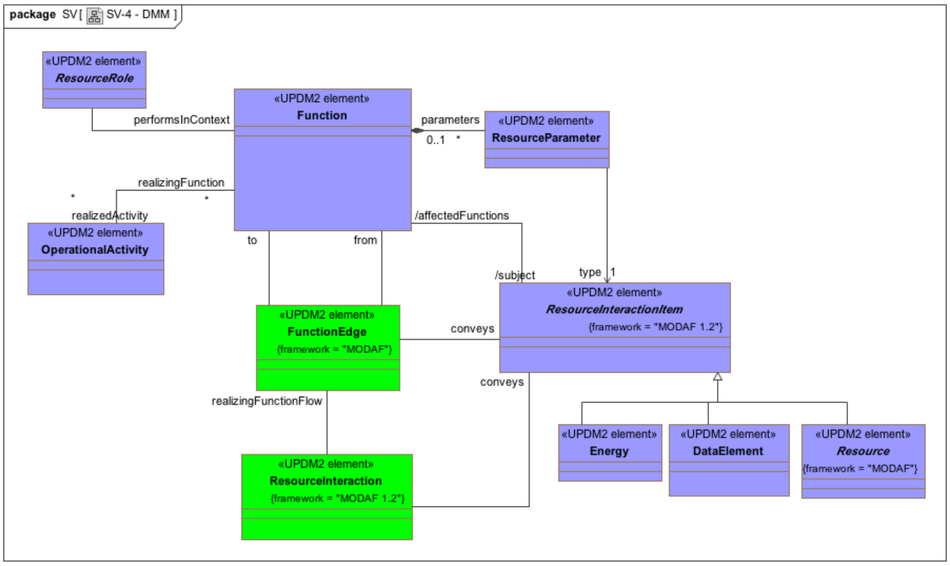


Figure A.38 - SV-4 - DMM

A.7.10 SV-5 - DMM

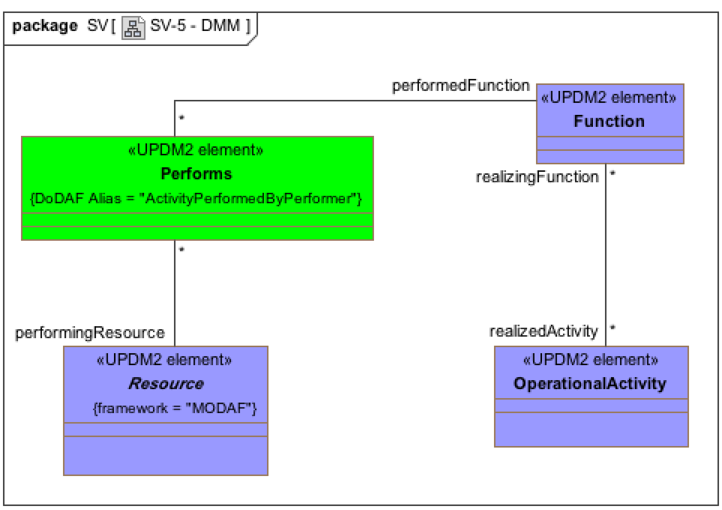


Figure A.39 - SV-5 - DMM

A.7.11 SV-6 - DMM

MODAF: The Systems Data Exchange Matrix specifies the characteristics of the system data exchanged between systems. The focus is on data crossing the system boundary.

DoDAF: The Systems Resource Flow Exchange Matrix DoDAF-described View specifies the characteristics of the system resource flows exchanged between systems. The focus is on resource crossing the system boundary.

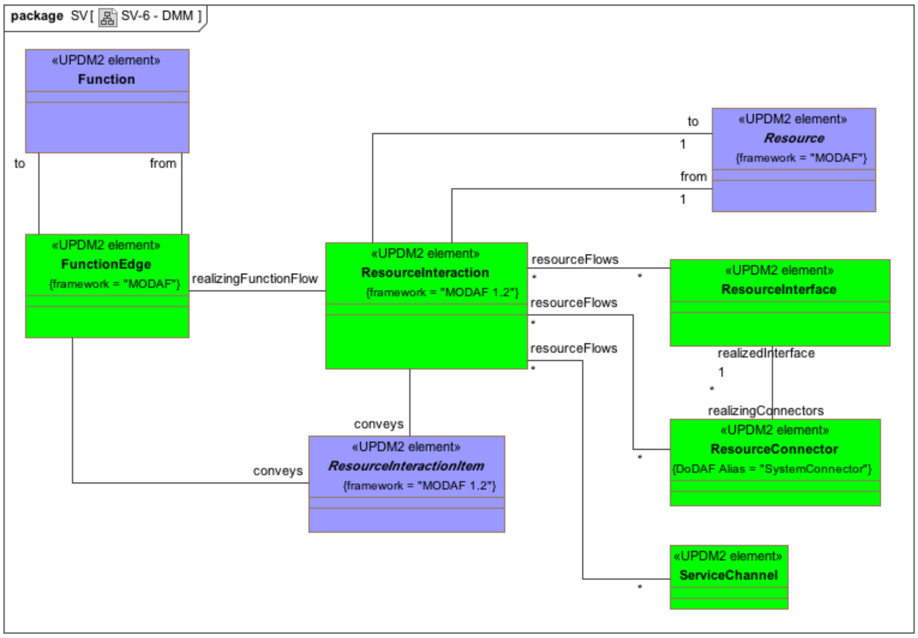


Figure A.40 - SV-6 - DMM

A.7.12 SV-7 - DMM

MODAF: The SV-7 is the Resource Performance Parameters Matrix and depicts the performance characteristics of a Resource (e.g. system, role or capability configuraiton).
DoDAF: The SV-7 DoDAF-described View is the Systems Measures Matrix and depicts the measures (metrics) of resources.

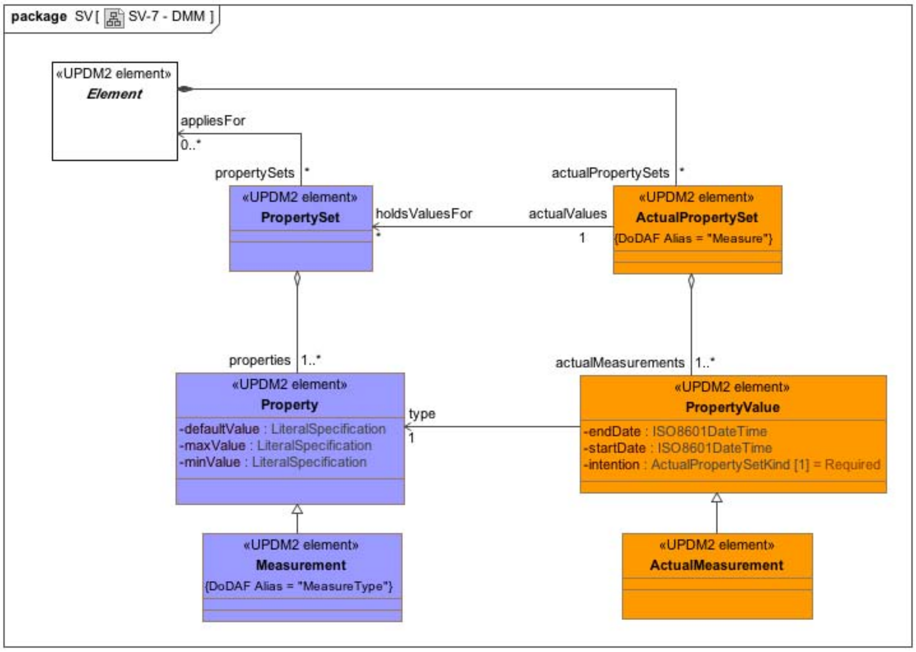


Figure A.41 - SV-7 - DMM

A.7.13 SV-8 - DMM

MODAF: The SV-8 provides an overview of how a capability configuration structure changes over time. It shows the structure of several capability configurations mapped against a timeline.
DoDAF: The Systems Evolution Description DoDAF-described View presents a whole lifecycle view of resources (systems), describing how it changes over time. It shows the structure of several resources mapped against a timeline.

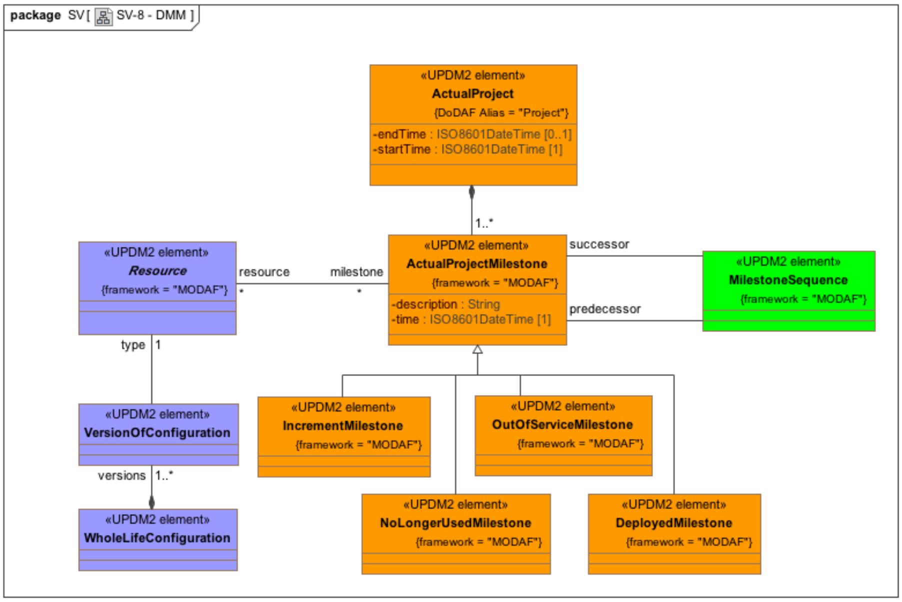


Figure A.42 - SV-8 - DMM

A.7.14 SV-9 - DMM

MODAF: The Technology & Skills Forecast defines the underlying current and expected supporting technologies and skills. Expected supporting technologies and skills are those that can be reasonably forecast given the current state of technology and skills, and expected improvements / trends. New technologies and skills will be tied to specific time periods, which can correlate against the time periods used in SV-8 milestones and linked to Enterprise Phases.
DoDAF: The Technology & Skills Forecast defines the underlying current and expected supporting technologies and skills. Expected supporting technologies and skills are those that can be reasonably forecast given the current state of technology and skills, and expected improvements / trends. New technologies and skills will be tied to specific time periods, which can correlate against the time periods used in SV-8 milestones and linked to Enterprise Phases.

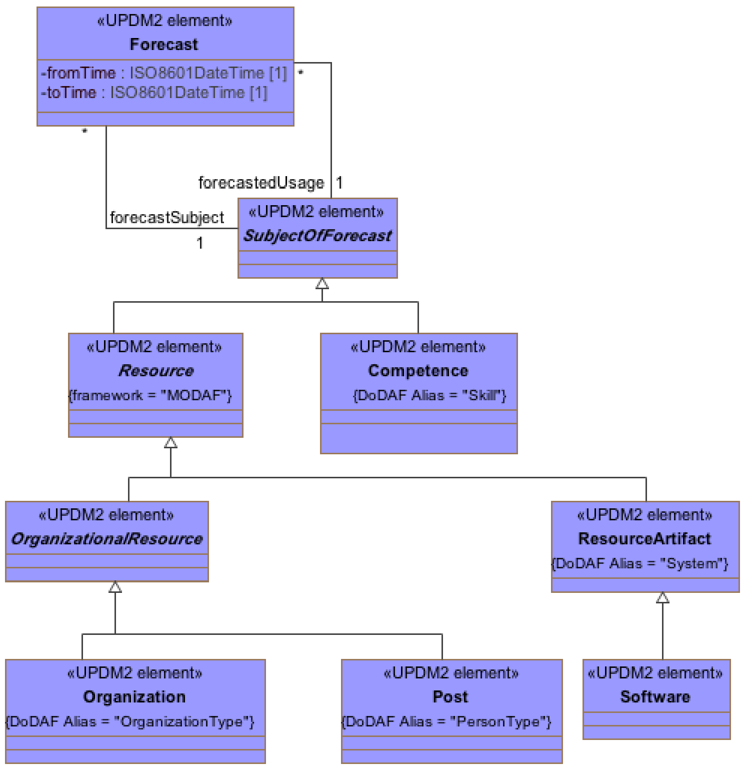


Figure A.43 - SV-9 - DMM

A.8 TV

The Technical View is a set of products delineating standards, rules, notations, and conventions that apply to the implementation of the system architecture. When the standards profile is tied to the system elements to which they apply, TV-1 serves as the bridge between the SV and TV. SV-9 forecasts relate to the TV-1 in that a timed technology forecast may contribute to the decision to retire or phase out the use of a certain standard in connection with a system element. Similarly, SV-9 forecasts relate to TV-2 standards forecasts in that a certain standard may be adopted depending on a certain technology becoming available (e.g., the availability of Java Script may influence the decision to adopt a new HTML standard).

MODAF extends the core DoDAF Technical Standards Views to include non-technical standards and policies applicable to the architecture such as operational doctrine, industry process standards, etc. Additionally, the TV-1 may also document policies and standards applicable to the operational or business context. MODAF also distinguishes between ?eapplicability?f and ?econformance?f with regard to architectural elements. If a standard is applicable to a given architecture, that architecture need not be fully conformant with the standard. The degree of conformance to a given standard may be judged on a risk basis at an approval point. An association between a Standard and an architectural element is not to be interpreted as stating the level of compliance of the element is fully compliant with that Standard. Additional evidences would need to be given (outside MODAF) to confirm the level of compliance. Finally, MODAF adds the explicit requirement that any Standards cited in TV-1 View must, where appropriate, be in accordance with the trend towards open architectures – i.e. standards which encourage stove-piped systems are expressly prohibited.

A.8.1 TV-1&2&3 - DMM

MODAF: Standards Profile (TV-1) defines the technical and non-technical standards, guidance and policy applicable to the architecture.

The Standards Forecast (TV-2) contains expected changes in technology-related standards and conventions, which are documented in the TV-1 Product.

DoDAF: The Standards Profile StdV-1 DoDAF-described View defines the technical, operational, and business standards, guidance and policy applicable to the architecture.

The StdV-2 Standards Forecast DoDAF-described View contains expected changes in technology related standards, operational standards, or business standards and conventions, which are documented in the StdV-1 view.

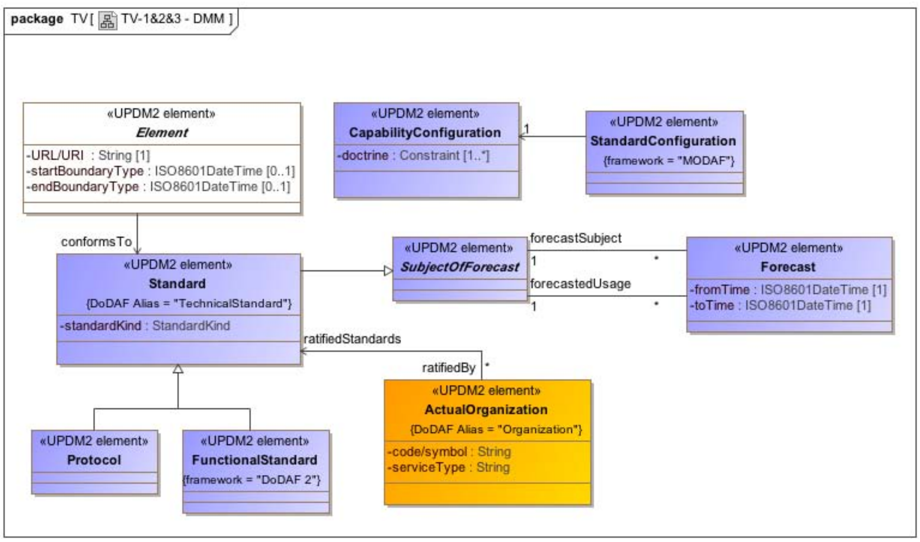


Figure A.44 - TV-1&2&3 - DMM

Annex B - UPDM Elements Traceability

(non-normative)

This Annex shows the traceability among UPDM stereotypes and DODAF/MODAF/NAF elements. There are different tables for the different mapping.

B.1 UPDM Elements to DoDAF 1.5/MODAF Traceability

Table B.1 shows the traceability among UPDM stereotypes and DODAF 1.5/MODAF elements. Please note that not all DoDAF/MODAF elements have corresponding UPDM stereotype. Those DoDAF/MODAF elements are modeled by UML artifacts directly, which shows in the Metaclass column.

Table B.1

Viewpoint	MODAF 1.2 Model Elements	DoDAF 1.5 Model Elements	UPDM Stereotype	Metaclass
Acquisition	CapabilityIncrement	N/A	IncrementMilestone	InstanceSpecification
Acquisition	MilestoneInProject	N/A	ActualProjectMilestone	InstanceSpecification
Acquisition	MilestoneRelationship	N/A	MilestoneSequence	Dependency
Acquisition	OrganisationProjectRelationship	N/A		Dependency
Acquisition	OutOfService	N/A	OutOfServiceMilestone	InstanceSpecification
Acquisition	Project	N/A	Project/ProjectMilestone	InstanceSpecification
Acquisition	ProjectMilestone	N/A	ProjectMilestoneType	Class
Acquisition	ProjectOwnership	N/A		Dependency
Acquisition	ProjectSequence	N/A	ProjectSequence	InformationFlow
Acquisition	ProjectTheme	N/A	ProjectTheme	Property
Acquisition	ProjectType	N/A	ProjectType	Class
Acquisition	ProjectWholePart	N/A		Slot
Acquisition	RelatedProjectReference	N/A		InstanceValue
Acquisition	Status	N/A	ProjectStatus	Slot
Acquisition	StatusAtMilestone	N/A		Slot

Table B.1

Acquisition	StatusIndicators	N/A		Enumeration
Acquisition	StatusLiteral	N/A		LiteralString
All Views	Alias	Alias	Alias	Comment
All Views	ArchitecturalDescription	ArchitecturalDescription	ArchitecturalDescription	Package
All Views	ArchitecturalFramework	ArchitecturalFramework		Package
All Views	ArchitecturalProduct	ArchitecturalProduct		Package
All Views	ArchitecturalReference	ArchitecturalReference	ArchitecturalReference	Dependency
All Views	Architecture	Architecture	DefinesArchitecture	Abstraction
All Views	ArchitectureMetaData	N/A	ArchitectureMetadata	Comment
All Views	AssignedProperty	N/A		Property
All Views	Climate	N/A	Climate	Class
All Views	Concern	Concern		UseCase
All Views	ConformsTo	ConformsTo	Conform	Dependency
All Views	Definition	Definition	Definition	Comment
All Views	EnterprisePhase	N/A	EnterprisePhase	Class
All Views	EnterpriseStructure	N/A		Property
All Views	EnterpriseTemporalPart	N/A		Property
All Views	Environment	Environment	Environment	Class
All Views	EnvironmentalProperty	Environmental Property	EnvironmentProperty	Property
All Views	ExternalIndividual	ExternalIndividual	ExternalIndividual	InstanceSpecification
All Views	ExternalType	ExternalType	ExternalType	Class
All Views	FrequencyRange	N/A		Slot
All Views	InformationModel	InformationModel		Package
All Views	ISO8601DateTime	N/A	ISO8601DateTime	LiteralString
All Views	LightCondition	N/A	LightCondition	Class
All Views	Matrix	Matrix		Package
All Views	MeasurableProperty	Measurable Property	MeasureOfPerformance	Slot
All Views	MetaData	MetaData	Metadata	Comment

Table B.1

All Views	Ontology	Ontology		Package
All Views	OntologyReference	Ontology Reference	OntologyReference	Extension
All Views	ProductOfView	ProductOfView		Instantiate
All Views	QualitativeProperty	Qualitative Property	QualitativeProperty	Property
All Views	SameAs	N/A	SameAs	Dependency
All Views	StakeholderHasConcern	StakeholderHas Concern		Dependency
All Views	Standard	Standard	Standard	Class
All Views	StereotypeExtension	Stereotype Extension	StereotypeExtension	Comment
All Views	TextProduct	TextProduct		Package
All Views	View	Product	View	Package
All Views	WholeLifeEnterprise	Enterprise	Enterprise	Class
Operational	ActivityComposition	Activity Composition	Activity	Activity
Operational	ActivitySubject	ActivitySubject	ActivitySubject	Class
Operational	ActsUpon	ActsUpon		Association
Operational	ActualCompetence	N/A		InstanceSpecification
Operational	PhysicalLocation	N/A	PhysicalLocation	DataType
Operational	ActualOrganisation	Organization	ActualOrganization	InstanceSpecification
Operational	ActualOrganisationalResource	N/A	ActualOrganizational Resource	InstanceSpecification
Operational	ActualOrganisationRelationship	N/A	ActualOrganization Relationship	InformationFlow
Operational	ActualOrganizationComposition	N/A	ActualOrganizationRole	Slot
Operational	ActualPost	Billet	ActualPost	InstanceSpecification
Operational	ArbitraryConnection	N/A	ArbitraryRelationship Connector	Relationship
Operational	CapabilityForNode	N/A		Property
Operational	Competence	N/A	Competence	Class
Operational	CompetenceForRole	N/A	ProvidesCompetence/ RequiresCompetence	Dependency

Table B.1

Operational	ConceptDescription	Concept Description		Comment
Operational	ConceptItem	ConceptItem	ConceptItem	Element
Operational	Consumes	N/A		Dependency
Operational	EnergyFlow	N/A	EnergyExchange	InformationFlow
Operational	HighLevelOperationalConcept	Operational Concept	HighLevelOperational Concept	Class
Operational	InformationElement	Information Element	InformationElement	InformationItem
Operational	InformationExchange	Information Exchange	InformationExchange	InformationFlow
Operational	InformationExchangeMessage	Information ExchangeMessage	OperationalExchangeItem	Class
Operational	InstanceInConcept	InstanceInConcept		Property
Operational	ItemInConcept	ItemInConcept	ItemInConcept	Property
Operational	KnownResource	KnownResource	KnownResource	Property
Operational	Location	Location	Location	Class
Operational	LogicalArchitecture	N/A	LogicalArchitecture	Class
Operational	LogicalDataModel	LogicalData Model	LogicalDataModel	Package
Operational	LogicalFlow	LogicalFlow		InformationFlow
Operational	MaterielFlow	N/A	MaterielExchange	InformationFlow
Operational	Mission	Mission	Mission	UseCase
Operational	MovementOfPeople	N/A		InformationFlow
Operational	Needline	Needline	Needline	Connector Association
Operational	Node	OperationalNode	Node/OperationalNode	Class
Operational	NodeEnvironment	N/A		Class
Operational	NodeHasBehaviour	N/A		InstanceSpecification
Operational	NodeParent	N/A	NodeParent	Element
Operational	NodeType	OperationalNode	Node	Class
Operational	OpActivityInputPin	N/A		InputPin
Operational	OpActivityOutputPin	N/A		OutputPin
Operational	OperationalActivity	Operational Activity	OperationalActivity	Activity

Table B.1

Operational	OperationalActivityAction	N/A	OperationalActivity Action	CallBehaviorAction
Operational	OperationalActivityFlow	N/A	OperationalActivityEdge	ActivityEdge
Operational	OperationalConstraint	Operational Constraint	OperationalConstraint/ OperationalRule	Constraint
Operational	OperationalInteractionSpecification	N/A		Interaction
Operational	OperationalNodeLifeline	OperationalNode Lifeline		Lifeline
Operational	OperationalStateDescription	OperationalState Description	OperationalStateMachine	StateMachine
Operational	OperationalSwimlane	N/A		ActivityPartition
Operational	OrgResourceReference	N/A		InstanceValue
Operational	ProblemDomain	ProblemDomain		Class
Operational	ProcessOwner	N/A	OwnsProcess	Dependency
Operational	Provides	N/A		Dependency
Operational	ReferredLocation	Location	ReferredLocation	Class
Operational	RequiredNodeLocation	RequiredNode Location		Dependency
Operational	SubjectOfOperationalConstraint	SubjectOf Operational Constraint	SubjectOfOperational Constraint	Classifier
Services	AsynchronousMessage	N/A		DataType
Services	MessageHandler	N/A		Class
Services	Service	Service	Service	UseCase
Services	ServiceAimsToAchieve	ServiceAimsTo Achieve		Realization
Services	ServiceAttribute	ServiceAttribute	ServiceAttribute	Property
Services	ServiceComposition	Service Composition	Service	UseCase
Services	ServiceConnectorEnd	ServiceConnector End		Role
Services	ServiceConsumer	ServiceConsumer	ServiceConsumer	Actor
Services	ServiceFunction	N/A	ServiceFunction	Activity
Services	ServiceGeneralisation	Service Generalization		Generalization

Table B.1

Services	ServiceInteractionSpecification	ServiceInteraction Specification	ServiceInteraction Specification	Interaction
Services	ServiceInterface	ServiceInterface	ServiceInterface	Port
Services	ServiceInterfaceDefinition	ServiceInterface Definition	ServiceInterface Definition	Interface
Services	ServiceInterfaceOperation	ServiceInterface Operation	ServiceOperation	Operation
Services	ServiceInterfaceParameter	ServiceInterface Parameter	ServiceParameter	Parameter
Services	ServiceInterfaceSchema	ServiceInterface Schema		Class
Services	ServiceLevel	ServiceLevel	ServiceLevel	InstanceSpecification
Services	ServiceLifeLine	N/A		Lifeline
Services	ServiceNeedline	N/A	ServiceNeedline	Connector
Services	ServiceParameterType	ServiceParameter Type	ServiceParameterType	DataType
Services	ServicePolicy	ServicePolicy	ServicePolicy	Constraint
Services	ServiceProvision	N/A		Package
Services	ServiceStateMachine	N/A	ServiceStateMachine	StateMachine
Services	ServiceSupportsActivity	ServiceSupports Activity	SupportsOperational Activity	Usage
Services	UsesService	N/A		Dependency
Strategic	ActivityMapsToCapability	N/A	MapsToCapability	Dependency
Strategic	Capability	Capability	Capability	Class
Strategic	CapabilityComposition	N/A	Capability	Class
Strategic	CapabilityDependency	N/A	RequiresCapability	Dependency
Strategic	CapabilitySpecialisation	N/A		
Strategic	ConfigurationDeployed	N/A	DeployedMilestone	InstanceSpecification
Strategic	ConfigurationNoLongerUsed	N/A	NoLongerUsedMilestone	InstanceSpecification
Strategic	EnduringTask	N/A	EnduringTask	UseCase
Strategic	EnterpriseGoal	N/A	EnterpriseGoal	Class
Strategic	EnterpriseVision	N/A	EnterpriseVision	Class
Strategic	EnvironmentalConditions	N/A	Environment	Class

Table B.1

Strategic	StandardOperationalActivity	N/A	StandardOperational Activity	Activity
Strategic	VisionStatement	VisionStatement	VisionStatement	Comment
Systems	ActivityToFunctionMapping	ActivityToFunctio nMapping		Dependency
Systems	Artefact	System	Artefact	Class
Systems	CapabilityConfiguration	SystemNode	CapabilityConfiguration	Class
Systems	CapabilityRealisation	N/A		Realization
Systems	Commands	Commands	Commands	InformationFlow
Systems	Controls	Controls	Controls	InformationFlow
Systems	DataElement	DataElement	DataElement	Class
Systems	FieldedCapability	N/A	FieldedCapability	InstanceSpecification
Systems	Forecast	Forecast	Forecast	Comment
Systems	Function	SystemFunction	Function	Activity
Systems	FunctionFlow	N/A	FunctionEdge	ActivityEdge
Systems	FunctionProvision	N/A	FunctionParameter	Parameter
Systems	FunctionsUpon	N/A	FunctionAction	CallBehaviorAction
Systems	HostedSoftware	N/A	HostedSoftware	Property
Systems	HumanResource	HumanResource	HumanResource	Property
Systems	ImplementsDataModel	ImplementsData Model	DataModel	Package
Systems	NodeRealisation	N/A		InstanceSpecification
Systems	OrganisationalResource	N/A	OrganizationalResource	Class
Systems	OrganisationType	Organization	Organization	Class
Systems	Part	N/A	OrganizationPart/Part	Property
Systems	PhysicalArchitecture	N/A		Class
Systems	PhysicalAsset	Platform		Class
Systems	PhysicalDataModel	PhysicalData Model	PhysicalDataModel	Package
Systems	Platform	Platform	Platform	Property
Systems	Post	Billet	Post	Property
Systems	PostType	N/A	PostType	Class
Systems	RadioFrequencyPortConnector	N/A		Dependency

Table B.1

Systems	ResourceConfiguration	N/A		Class
Systems	ResourceConstraint	N/A	ResourceConstraint	Constraint
Systems	ResourceInteraction	N/A	ResourceInteraction	InformationFlow
Systems	ResourceInteractionSpecification	N/A		Comments
Systems	ResourceLifeLine	N/A		Lifeline
Systems	ResourceLifelineItem	N/A		ConnectableElement
Systems	ResourcePartition	N/A		SwimLane
Systems	ResourceStateMachine	N/A	ResourceStateMachine	StateMachine
Systems	ResourceStateMachineOwner	N/A		Actor
Systems	ResourceType	N/A	ResourceType	Class
Systems	ResourceUsage	N/A		Usage
Systems	Role	Role	Role	Property
Systems	RoleType	N/A		Class
Systems	ServiceFunctionToFunctionMappin g	N/A		Denpendency
Systems	Software	Software	Software	Class
Systems	SoftwareComponent	Software Component		Class
Systems	SubjectOfForecast	SubjectOfForecast	SubjectOfForecast	Element
Systems	SubjectOfResourceConstraint	N/A	SubjectOfResource Constraint	Element
Systems	SubOrganisation	N/A	SubOrganization	Property
Systems	System	System	System	Class
Systems	SystemPort	SystemPort		Port
Systems	SystemPortConnector	SystemPort Connector	SystemConnector	Connector
Systems	SystemPortConnectorEnd	SystemPort ConnectorEnd		Comments
Systems	SystemStructureModel	SystemStructure Model		Package
Systems	UsedConfiguration	N/A		Class
Systems	VersionOfConfiguration	N/A		Class
Systems	WholeLifeConfiguration	N/A		Class
Technical	Attribute	Attribute	Attribute	Property

Table B.1

Technical	DataModel	DataModel	DataModel	Package
Technical	Entity	Entity	Entity	DataType
Technical	EntityRelationship	EntityRelationship	EntityRelationship	Association
Technical	ImplementsProtocol	Implements Protocol		Dependency
Technical	Protocol	Protocol	Protocol	Class
Technical	ProtocolImplementation	Protocol Implementation	ProtocolImplementation	Connector
Technical	ProtocolStack	ProtocolStack		Property
Technical	RatificationBody	N/A		Dependency
Technical	SpectrumAllocation	N/A		Dependency
Technical	StandardConfiguration	Standard Configuration	StandardsConfiguration	Comment
Technical	SubtypeRelationship	Subtype Relationship		Dependency

B.2 UPDM to NAF Elements Traceability

NAF 3.1 was based on MODAF 1.2.003 and contains a few additions compared to MODAF. If it is compared with MODAF 1.2.004 the number of differences increases. However, the intent of the differences are approximately the same as the additions made in 1.2.004 with some exceptions such as security handling etc. Based on the limited number of difference between the two meta-models, it is a simple statement of fact that UPDM fully supports NAF.

The list below itemizes the differences between NAF 3.1 and MODAF 1.2.003 with some explanations as to why they are there. Table B.2 shows the traceability among UPDM stereotypes and NAF 3.1 elements.

Table B.2

NAF and MODAF View Comparison	
NAF View/Element	**MODAF View/Element**
NAV-1 Overview and summary information	AV-1 Overview and summary information
NAV-1 Architectural Product	AV-1 Architectural product
NAV-2 Integrated dictionary	AV-2
NAV-3 Metadata	-
The following two views contain elements that are already in AV-2 in MODAF and a specific view in order to textually describe architecture compliance	
NAV-3a Architecture compliance statement	
NAV-3b Metadata extensions	
NAV Effectivity	Effectivity

Table B.2

NAV Environment	Environment
NAV Measurable properties	Measurable properties
NAV Requirements	Requirements
NCV-1 Capability vision	StV-1
NCV-2 Capability taxonomy	StV-2
NCV-3 Capability phasing	StV-3
NCV-4 Capability dependencies	StV-4
NCV-5 Capability to organizational deployment mapping	StV-5
NCV-6 Operational activity to capability mapping	StV-6
NOV-1 High level operational concept description	OV-1
NOV-2 Operational node relationship description	OV-2
NOV-3 Operational information exchange matrix	OV-3
NOV-4 Organizational relationships chart Typical	OV-4 Typical
NOV-4 Organizational relationships chart Actual	OV-4 actual
NOV-5 Operational activity model	OV-5
NOV-6 Operational activity sequence and timing description	OV-6
NOV-6a Operational rule model	OV-6a
NOV-6b Operational state transition description	OV-6b
NOV-6c Operational event-trace description	OV-6c
NOV-7 Information model	OV-7
NSOV-1 Service taxonomy	SOV-1
NSOV-2 Service definition	SOV-2
NSOV-3 Capability to service mapping	SOV-3
NSOV-4 Service constraints, state model and interaction specification	SOV-4
SOV-5 Service functionality	SOV-5
NSOV-6 Service composition	-
The NSOV-6 Service composition view has a complicated history. When the service views were created in MODAF 1.1 and included as proposed it was placed as SOV-3. When MODAF 1.2 was created it was not included since the appreciation of what the intent was less than clear in MOD. The elements that were needed to create it still exist in the MODAF meta-model and this is still the case in MODAF 1.2.004. When NAF 3.1 as created the view was retained but in order to align with MODAF 1.2.003 it was moved from its original place and became view NSOV-6 instead of 3. The reasoning behind this view has to do with reuse of existing specifications of services and therefore ties together with any discussion concerning the separation of the SoaML concept of service and the specification of services which is what both the NAF and MODAF views are about.	
NSV-1 Resource Interaction specification	SV-1
NSV-1 Resources specification	SV-1
NSV Competence	Competence
NSV-2 Systems communications description	
NSV-2a System port specification	SV-2a
NSV-2b System port connectivity	SV-2b
NSV-2c System connectivity clusters	SV-2c
NSV-2d Systems communications quality requirements -	

Table B.2

The NSV-2d Systems communications quality requirements view contains exactly the same elements as NSV-2b with the exception of one additional element namely Network. This is unique to NAF and is a specialization of System. Since it has no additional relationships or attributes, it is essentially equivalent to System.	
NSV-3 Resource Interaction Matrix	SV-3
NSV-4 System Functionality description	SV-4
NSV-5 System function to operational activity traceability matrix	SV-5
NSV-6 Systems data exchange matrix	SV-6
NSV-7 System quality requirements description	SV-7
NSV-8 System configuration management	SV-8
NSV-9 Technology and skills forecast	SV-9
NSV-10 Resource constraints, state transitions and even-trace description	SV-10
NSV-10a Resource constraints specification	SV-10a
NSV-10b Resource state transition description	SV-10b
NSV-10c Resource event trace description	SV-10c
NSV-11 System data model -	
NSV-11a Logical data model -	The meta-model for this is the same as for NOV-7. The level of detail differs however.
NSV-11b Physical data model	SV-11
NSV-12 Service provision	SV-12
NTV-1&2 Standards profile and standards forecast	TV-1&2
NTV-3 Standard configurations	TV-3
NPV-1 Programme portfolio relationships	AcV-1
NPV-2 Programme to capability mapping	AcV-2

Element additions in NAF 3.1 compared to MODAF 1.2.003

AV:

ArchitectureComplianceStatement - A comment stereotype enabling statements of architectural compliance that can be attached to various elements.

OV:

OperationalActivityFlowItem - An element created in order to allow transfer of other things between activities than information elements. A slightly different way was used to achieve the same purpose in MODAF 1.2.004. Supported in UPDM.

OperationalExchangeMessage - An element intended to allow the handling of messages in an NOV-6c showing other things than just information elements. A slightly different mechanism was used to achieve the same purpose in MODAF 1.2.004. Supported in UPDM.

SV:

Energy (Class) - Inserted to handle UPDM 1.0 Energy. Is contained in MODAF 1.2.004. Supported in UPDM.

FunctionAction (CallBehaviourAction) - Inserted to make NSV-4 equivalent to NOV-5. Done in MODAF 1.2.004 but differently. Supported in UPDM.

FunctionComposition (Association) - Inserted to allow decomposition of functions. Not included explicitly in MODAF 1.2.004. Supported in UPDM.

FunctionFlowItem - A system equivalent of OperationalActivityFlowItem. Done in MODAF 1.2.004 but differently. Supported in UPDM.

FunctionInputPin - Inserted to make NSV-4 equivalent to NOV-5. Done in MODAF 1.2.004 but differently. Supported in UPDM.

FunctionOutputPin - Inserted to make NSV-4 equivalent to NOV-5. Done in MODAF 1.2.004 but differently. Supported in UPDM.

Network (Property) - A specialization of System desired by NATO. Not included in MODAF 1.2.004. Not supported in UPDM.

ResourceExchangeMessage (Message) - Inserted in order to allow sequence diagrams to show something other than information elements. Done in MODAF 1.2.004 but differently. Supported in UPDM.

ResourcesWithMaterielContent (Class) - Inserted as a container for various items enabling exchange of material as well as whole capability configurations. Not done in MODAF 1.2.004 implying that physical architectures or capability configurations cannot be exchanged in MODAF 1.2.004. Supported in UPDM.

B.3 DoDAF 2.0 to MODAF 1.2 Views Traceability

Table B.3 shows the traceability between the DoDAF 2.0 and MODAF 1.2 views. It is evident from the table that there is sufficient mapping between the vast majority of the views.

Table B.3

DoDAF 2 views	MODAF 1.2 views	Comment
AV-1 Overview and summary	AV-1 Overview and summary information	-
AV-2 Integrated dictionary	AV-2 Integrated dictionary	-
OV-1 High level operational concept graphic description	OV-1a High Level Operational Concept Graphics, OV-1b Operational Concept Description, OV-1c Operational Performance attributes	-
OV-2 Operational resource flow description	OV-2 Operational Node Relationships Description	-
OV-3 Operational Resource flow matrix	OV-3 Operational Information Exchange Matrix	-
OV-4 Organisational relationships chart	OV-4 Organisational Relationships Chart	-

Table B.3

OV-5a Operational activity decomposition tree	OV-5 Operational Activity Model	Both DoDAF diagrams is dealt with in the same MODAF diagram
OV-5b Operational activity model	OV-5 Operational Activity Model	Both DoDAF diagrams is dealt with in the same MODAF diagram
OV-6a Operational rules model	OV-6a Operational Rules Model	-
OV-6b State transition description	OV-6b Operational state transition description	-
OV-6c Event-trace description	OV-6b Operational event-trace description	-
StdV-1 Standards profile	TV-1 Standards profile	-
StdV-2 Standards forecast	TV-2 Standards forecast	-
PV-1 Project portfolio relationships	AcV-1 Acquisition clusters	-
PV-2 Project timelines	AcV-2 Programme timelines	-
PV-3 Project to capability mapping	-	It is difficult to see any difference to this and CV-3 Capability phasing. At least it is covered by StV-3 Capability phasing.
CV-1 Vision	StV-1 Enterprise vision	-
CV-2 Capability taxonomy	StV-2 Capability taxonomy	-
CV-3 Capability phasing	StV-3 Capability phasing	-
CV-4 Capability dependencies	StV-4 Capability dependencies	-
CV-5 Capability to organisational mapping	StV-5 Capability to organisation deployment mapping	-
CV-6 Capability to operational activities mapping	StV-6 Operational activity to capability mapping	It should be noted that DoDAF has no counterpart of StandardOperationalActivities which is the reason behind this view in MODAF.
CV-7 Capability to services mapping	SOV-3 Capability to service mapping	See handling of services below since this is where the connection break down between MODAF and DoDAF 2.0 to a large extent.
DIV-1 Conceptual data model	-	This looks like the NAF 3.1 NOV-7 concept but has no direct counterpart in MODAF.
DIV-2 Logical data model	OV-7 Information Model	-
DIV-3 Physical data model	SV-11 Physical schema	-
SV-1 Systems interface description	SV-1 Resources interaction specification	-
SV-2 Systems resource flow description	SV-2a System port specification, SV-2b System to system port connectivity description, SV-2c System connectivity clusters	-
SV-3 Systems - systems matrix	SV-3 Resource interaction matrix	-
SV-4 Systems functionality description	SV-4 Functionality description	-
SV-5a Operational activity to systems traceability matrix	-	There is no direct counterpart to this traceability in a direct form in MODAF.

Table B.3

SV-5b Operational activity to systems function traceability matrix	SV-5 Function to Operational activity traceability matrix	-
SV-6 Systems resource flow matrix	SV-6 Systems data exchange matrix	-
SV-7 Systems measures matrix	SV-7 Resource performance parameters matrix	-
SV-8 Systems - systems evolution matrix	SV-8 Capability configuration management	-
SV-9 Systems technology & skills forecast	SV-9 Technology and skills forecast	-
SV-10a Systems rules model	SV-10a Resource constraints specification	-
SV-10b Systems state transition description	SV-10b Resource state transitions description	-
SV-10c Systems event-trace description	SV-10c Resource event-trace description	-
Services handling in MODAF 1.2.004 and DoDAF 2.0		The services concept in MODAF and DoDAF differ significantly, they are therefore treated differently in this table with connections shown only when a limited semblance exists. The MODAF or DoDAF counterparts here are written in italics.
-	SOV-1 Service taxonomy	No formal taxonomy view for services exist in DoDAF 2.0
-	SOV-2 Service interface specification	SvcV-2 is a possible candidate but the definitions in MODAF go a lot deeper than in DoDAF 2.0. The comparison also disregards the fact that services in MODAF are specifications of services whereas services in DoDAF seems to describe implementations in specific performers, albeit somewhat more abstract than real implementation descriptions. This is a general caveat and applies to all MODAF view comments below.
-	SOV-3 Capability to service mapping	Presumably this maps somewhat to CV-7 in DoDAF 2. The general caveat applies.
-	SOV-4a Service constraints	This maps somewhat to SvcV-10a in DoDAF 2. The general caveat applies.
-	SOV-4b Service state model	This maps somewhat to SvcV-10b in DoDAF 2. The general caveat applies.
-	SOV-4c Service interaction specification	This maps somewhat to SvcV-10c in DoDAF 2. The general caveat applies.
-	SOV-5 Service functionality	This maps somewhat to SvcV-4 in DoDAF 2. The general caveat applies.
-	SV-12a Service provision	This maps somewhat to SvcV-1 in DoDAF 2. Since this discusses realisations of services the mapping may well be somewhat stronger than previously described. DoDAF Service would here be viewed as ServiceLevel in MODAF.

Table B.3

-	SV-12b Service composition	This maps somewhat to SvcV-2 in DoDAF 2. Since this discusses realisations of services the mapping may well be somewhat stronger than previously described. DoDAF Service would here be viewed as ServiceLevel in MODAF.
SvcV-1 Services context description	SV-12a Service provision	See above
SvcV-2 Services resource flow description	SV-12b Service composition	See above
SvcV-3a Systems - services matrix	SV-12a Service provision	The MODAF reference is not a Matrix, the data intended should be derivable from this MODAF view however.
SvcV-3b Services - services matrix	SV-12b Service composition	The MODAF reference is not a Matrix, the data intended should be derivable from this MODAF view however.
SvcV-4 Services functionality description	SOV-5 Service functionality, (perhaps more SV-4)	The general caveat applies.
SvcV-5 Operational activity to services traceability	SV-5 Service function to Operational activity traceability matrix.	The general caveat applies.
SvcV-6 Services resource flow matrix	SV-12a Service provision	See above
SvcV-7 Services measures matrix	SV-7 Resource performance parameters matrix	The general caveat applies.
SvcV-8 Services evolution description	SV-8 Capability configuration management	The general caveat applies.
SvcV-9 Services technology & skills forecast	SV-9 Technology and skills forecast	The general caveat applies.
SvcV-10a Services rules model	SOV-4a Service constraints perhaps more SV-10a.	The general caveat applies.
SvcV-10b Services state transition description	SOV-4b Service state model perhaps more SV-10b	The general caveat applies.
SvcV-10c Services event-trace description	SOV-4c Service interaction specification perhaps more SV-10c	The general caveat applies.

Annex C - Sample Problem

(non-normative)

C.1 Purpose

The purpose of this annex is to illustrate how UPDM can support DODAF and MoDAF requirements for organizations developing Network Enabled Capability (NEC) systems using some of the basic features of the specification. This example provides a model that illustrates a sample of DoDAF and MoDAF views addressing the problem space described below.

C.2 Scope

The scope of this example is to provide a diagram for the views that are most used and most requested by the defense community. The intent is to select portions of the sample problem to illustrate how the diagrams can be applied, and demonstrate some of the possible interrelationships among the model elements in the different diagrams. The sample problem does not highlight all of the features of the specification.

C.3 Problem Scenario

C.3.1 Problem Domain Suitability

The problem domain is civilian maritime search and rescue (SAR). Civilian SAR was selected for several reasons:

- UK MODAF 1.1 has previously used this domain to illustrate its framework[1] .
- The scenario and modeling was easily updated to include UPDM concepts including US DoDAF 1.5.
- SAR is internationally recognized problem domain with easy-to-recognize typical scenarios.
- SAR is based on publicly available International Agreements[2] and implementing or conforming National Plans including the US[3] and the UK[4].

1. See Acknowledgements
2. See for example, International Aeronautical and Maritime Search and Rescue (IAMSAR) Manua l, 2007 ed., 6th ed. London: IMO; Montreal: ICAO, 2007. IAMSAR Manual is by jointly published by the International Maritime Organization (IMO) and the International Civil Aviation Organization (ICAO). It consists of a three volume set: Volume I is Organization and Management; Volume II is Mission Co-ordination; & Volume III is Mobile Facilities.
3. See for example, U.S. National Search and Rescue Supplement (NSS) to the International Aeronautical and Maritime Search and Rescue Manual. National Search and Rescue Plan of the United States (US National SAR Plan). http://www.uscg.mil/hq/cg5/cg534/manuals/Natl_SAR_Plan(2007).pdf
4. See for example, Search and Rescue Framework for the United Kingdom of Great Britain and Northern Ireland, Queen’s Printer and Controller, June 2002. (Published by MCGA - Maritime & Coastguard Agency, Spring Place, 105 Commercial Road, Southampton. SO15 1EG.) "The organization for Search and Rescue (SAR) in the UK is an amalgam of separate Governments Departments, the emergency services, and other organizations. A number of charities and voluntary organizations dedicated to SAR also play a significant role. The purpose of this document is to provide a management framework for SAR in the UK. (back cover)”. http://www.mcga.gov.uk/c4mca/mcga-uk_sar_framework_document.pdf

- The documentation is generally unclassified as opposed to many equivalent defense or military plans.
- Subject matter experts and periodicals are readily available.[1]
- The domain is sufficiently large and complex involving mixed human, software, and hardware solutions. As such, it will support the current specification that includes parametric modeling from systems engineering (SysML)[2] as well as future evolutions of UPDM that may include more national and multinational architecture frameworks. Several of the countries share usage of the same automated information systems and sensors.

C.3.2 Acknowledgements

The scenario is derived from the UK Search and Rescue framework, which is publicly available on the internet[3]. The sample problem is based on a concept derived by VEGA under contract for the UK MOD[4] . The UPDM Group acknowledges its debt owed to the authors of the original problem:

- Ian Bailey of Model Futures,
- Peter Martin of Logica CMG, and
- Paul King of Vega

We have modified it to make it more generic in order to allow it to apply to SAR architecture for any country. This allows us to communicate the use of UPDM without the need for too much detail or getting involved in the particular procedures of any given country. Consequently, there will be "errors" in the specifics of the procedures. Any suggestions on how to improve the model would of course be gratefully received by the UPDM group.

C.3.3 Summary

We have included as many of the UPDM diagrams as is possible given that the tools for creating diagrams compliant with UPDM 2.0 will not be created until after the release of this specification. In addition, presenting an architecture is something like telling a story with the exception that in this case the elements interrelate to an extent that it is difficult to pick a natural order. Consequently we have decided to present them by view as that will at least make them easier to find when attempting to cross reference them. As UPDM 1.0 has more in common with MODAF 1.2, the models were created in the MODAF version of UPDM and the labels changed to correspond to DoDAF 2.0 terminology.

Anyone familiar with the terminology in DoDAF 2.0 and MODAF 1.2 is aware that the two architecture frameworks are different. In order to avoid having to show a MODAF and a DODAF diagram for each example, simple variants for each diagram are described. Where they are significantly different duplicate diagrams are shown.

---

1. See for example, ON SCENE - The Journal of U. S. Coast Guard Search and Rescue . Summer 2008, “Exceptional SAR Stories”, pp. 29 – 40 for more detailed scenarios similar to the Problem Scenario and Fall 2003, “SPECIAL SECTION - SAR Case Studies: A Review”, pp. 18 -28 regarding performance standards.
2. See U SCG, “SAR System Performance Benchmark ” – “ Percent of lives saved from imminent danger in the maritime environment” and subbenchmarks. http://uscg.mil/hq/cg5/cg534/SAR_Program_Info.asp (Current as of 29 April 2009).
3. See “MODAF: Examples: Search and Rescue Example” and the corresponding files are at http://www.modaf.org.uk/file_download/33/SAR.zip (as of 29 April 2009)
4. http://www.modaf.org.uk/vExamples/163/search-and-rescue-example

C.3.4 The "Yacht in Distress" Scenario

The Sample Problem applies UPDM to a common scenario in civilian maritime Search and Rescue (SAR) operations -- a yacht in distress. A monitoring unit picks up the distress signal from the yacht and passes it on to the Command and Control (C2) Center. The C2 Center coordinates the search and rescue operation among helicopters, a naval ship, and a Royal National Lifeboat Institution (RNLI) Lifeboat. This section is structured to show each diagram in the context of how it might be used in such an example problem.

C.4 Diagrams

C.4.1 Package Overview (Structure of the Sample Model)

Acronyms

The table below provides definitions for acronyms used in this sample problem.

Table C-1: Acronyms

DoT	Department of Transport
NIMROD	Aircraft name
MRA	Maritime Role Aircraft
ESM	Electronic Signal Monitoring
RN ASR Helo	Royal Navy Approach Surveillance Radar Helicopter
RNLI	Royal National Lifeboat Institution
HMG	Her Majesty's Government
TDM	Time Division Multiplex
MRT	Maritime Rescue Team
SAR	Search and Rescue
C2	Command and Control

Flow of SAR Example Models

Figure C.1 shows the flow of the SAR example models through the different viewpoints. Beginning with the All Viewpoint, the natural progression is through the key Strategic Views, the key Operational Views, the key Service Oriented Views, the key Systems Views, and finally to the Acquisition Views.

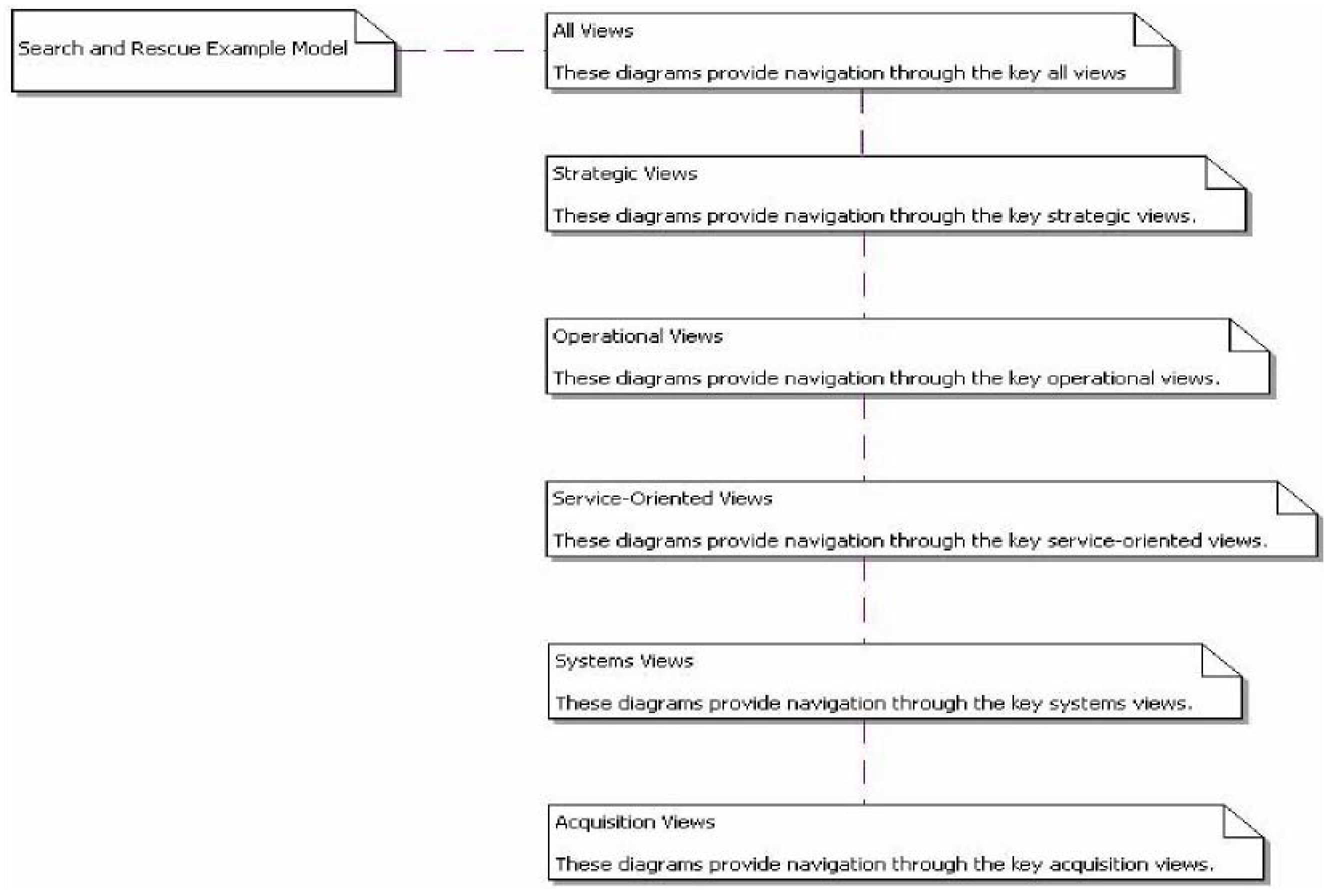


Figure C.1 - Diagram Flow

C.5 All Views

The All Views provide overview and summary information as well as an integrated dictionary. This information is provided in a consistent form that allows quick reference and comparison among architectures.

C.5.1 AV-1 Enterprise Definition

The text shown in Figure C.2 below provides executive-level summary information in a consistent form that allows quick reference and comparison between architectural descriptions. It includes assumptions, constraints, and limitations that may affect high-level decisions relating to an architecture-based work program.

Architecture Project Identification

Name:
SAR Architecture

Architect:
Bill Firenz

Developing Organization:
Maritime & Coastguard Agency

Assumptions & Constraints:
None.

Approval Authority:
Howard Overtree, Project Manager

Date Completed:
TBD

Scope

Views & Products Developed:

- Acquisition Views - AcV-1, AcV-2, AcV-3
- All Views - AV-1, AV-2, AV-3
- Operational Views - OV-1a, OV-1b, OV-1c, OV-1d, OV-2, OV-3, OV-4, OV-5, OV-6a, OV-6b, OV-6c, OV-7
- Service Orientated Views - SOV-1, SOV-2, SOV-3, SOV-4a, SOV-4b, SOV-5
- Strategic Views - StV-1, StV-2, StV-3, StV-4, StV-5, StV-6
- System Views - SV-1, SV-2, SV-3, SV-4, SV-5, SV-6, SV-7, SV-8, SV-9, SV-10a, SV-10b, SV-10c, SV-11, SV-12
- Technical Views - TV-1, TV-2, TV-3

Time Frames Addressed:
Present.

Organizations Involved:
Department Of Transport, Maritime & Coastguard Agency

Purpose and Viewpoint

Purpose of the Architecture:
To detect and locate mariners, aviators and recreational enthusiasts in distress.

Architecture Viewpoint:
Users of the system.

Context

Mission:
Manage, coordinate and implement SAR activities.

Doctrine, Goals & Vision:
TBD

Rules, Criteria & Conventions:
TBD

Tools and File Formats

Tools:
Artisan Studio, Word and Excel.

File Formats:
DOCX, XLS and Studio Models.

Findings

Analysis Results:
TBD

Recommendations:
TBD

Figure C.2 - AV-1

C.5.2 AV-2 Architecture Dictionary

Architecture development projects not using model-based techniques would often create an initial dictionary defining terms and names for the different model elements. Diagrams created in Microsoft PowerPoint or Visio would then be checked against this dictionary to ensure compliance. A model-based architecture using UPDM has in-built consistency in that elements appearing on different diagrams will have the same name as they are the same object. Consequently, the AV-2 diagrams are reports generated from the model, which itself is the architecture dictionary. Table C.1 shows a generated report of the operational activities in the model. There are fields for the name, the complete name in the model package hierarchy, the definition of the activity, the alias, and any elements for which this is the same.

DoDAF 2.0 variant: In DoDAF 2.0 the Operational Activity would simply be called an Activity.

Table C.1 – AV-2 Operational Activity Dictionary report

OperationalActivity				
Name	**Full Scoped Name**	**Definition**	**Alias**	**Same As**
Monitor For Distress Signal	SAR Architecture::Operational Activities::Monitor For Distress Signal			
Process Warning Order	SAR Architecture::Operational Activities::Process Warning Order			
Receive Distress Signal	SAR Architecture::Operational Activities::Receive Distress Signal			
Rescue	SAR Architecture::Operational Activities::Rescue			
Search	SAR Architecture::Operational Activities::Search			
Send Distress Signal	SAR Architecture::Operational Activities::Send Distress Signal			
Send Warning Order	SAR Architecture::Operational Activities::Send Warning Order			
Transit To SAR Operation	SAR Architecture::Operational Activities::Transit To SAR Operation			

Table C.2 shows the generated report of the Capability Configurations in the model. The fields are the same as the previous report in Table C.1.

DoDAF 2.0 Variant: In DoDAF 2.0 the Capability Configuration would be a performer.

Table C.2 – AV-2 Capability Configuration Dictionary report

CapabilityConfiguration				
Name	**Full Scoped Name**	**Definition**	**Alias**	**Same As**
Automated Rescue Unit v1	SAR Architecture::Resources::Capability Configurations::Automated Rescue Unit v1			
Control Center	SAR Architecture::Resources::Capability Configurations::Control Center			
Maritime Rescue Architecture v1	SAR Architecture::Resources::Capability Configurations::Maritime Rescue Architecture v1			
Maritime Rescue Unit v1	SAR Architecture::Resources::Capability Configurations::Maritime Rescue Unit v1			
Maritime Rescue Unit v2	SAR Architecture::Resources::Capability Configurations::Maritime Rescue Unit v2			
Monitor	SAR Architecture::Resources::Capability Configurations::Monitor			

C.5.3 AV Measurements Definition (Fit for Purpose)

Figure C.3 shows the class diagram version of the measurements diagram. This provides a means of defining types of measurements that are important to the system. These consist of measureable quantitative measurements. It defines the measurements that are important to the capabilities in the strategic view such as find time and persistence, shown later. These concepts are defined in All Views, as they can pertain to all elements in all views of the model. Metrics specific to

System elements are addressed in the SV-7. As there is no diagram MODAF or DoDAF in All Views for expressing this information, we have created a new diagram. This could be called AV-n, Measurements Definition or other suitable name. This is an example of the extensibility features provided by UML and SysML enabling the easy creation of fit for purpose views.

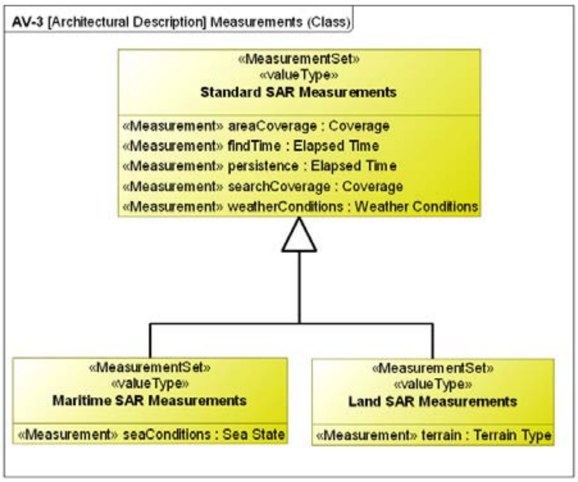


Figure C.3 - AV Measurements Class Diagram

C.5.4 AV Measurements Instances (Fit For Purpose)

Figure C.4 shows the instance diagram version of the measurements diagram. Instances of the measurements can be created and associated with architecture elements. In this case, they define the initial, required and final values for SAR capabilities.

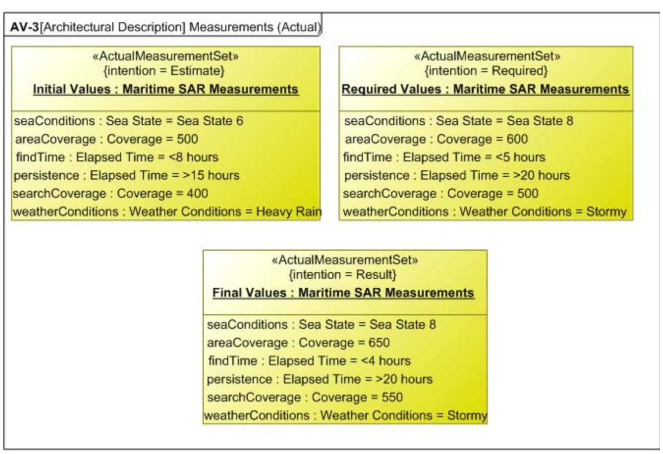


Figure C.4 – AV Measurements Instance Diagram

C.5.5 SysML Value Definitions – Fit For Purpose View

This SysML Block Definition Diagram (BDD) in Figure C.5 is used to define the value types, units and dimensions used in the measurements for the typical and actual measurements. This allows a more precise definition of the values and eliminates ambiguity. This is another example of a fit for purpose view.

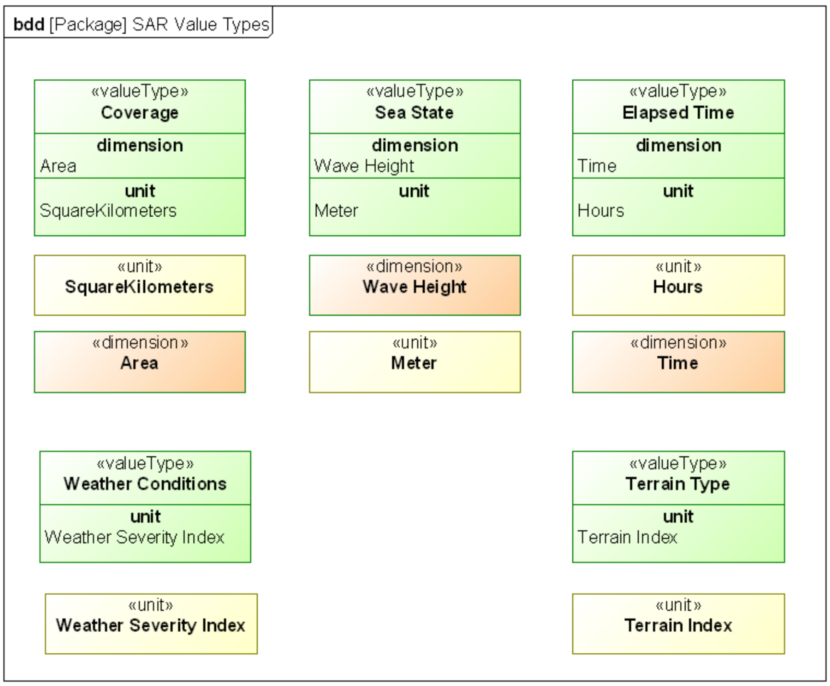


Figure C.5 – SysML BDD Units, Dimensions, and Value Types

C.5.6 SysML Requirements – Fit For Purpose View

One of the two principal extensions to OMG SysML is support for requirements. The «requirement» stereotype extends class to specify the textual “shall” statement and capture the requirement id#. The requirement diagram is used to integrate the system models with text based requirements that are typically captured in requirements management tools. The UML containment relationship (circle with a plus sign) is used to decompose a requirement into its constituent requirements. A requirement is related to other key modeling artifacts via a set of stereotyped dependencies. The «deriveReqt» and «satisfy» dependencies describe the derivation of requirements from other requirements and the satisfaction of requirements by design, respectively. The «verify» dependency shows the link from a test case to the requirement or requirements it verifies. In addition, the UML «refine» dependency is used to indicate that an OMG SysML model element is a refinement of a textual requirement, and «a copy» relationship is used to show reuse of a requirement within a different requirement hierarchy. The «rationale» concept can be used to annotate any model element to identify supporting rationale including analysis and trade studies for a derived requirement, a design or some other decision.

As UPDM level L1 has been built upon SysML, requirements can be integrated into the model. SysML traceability relationships can be used as shown in Figure C.6. The capabilities trace to the requirements and the Activities refine the requirements. System elements developed later in the design cycle will satisfy these requirements.

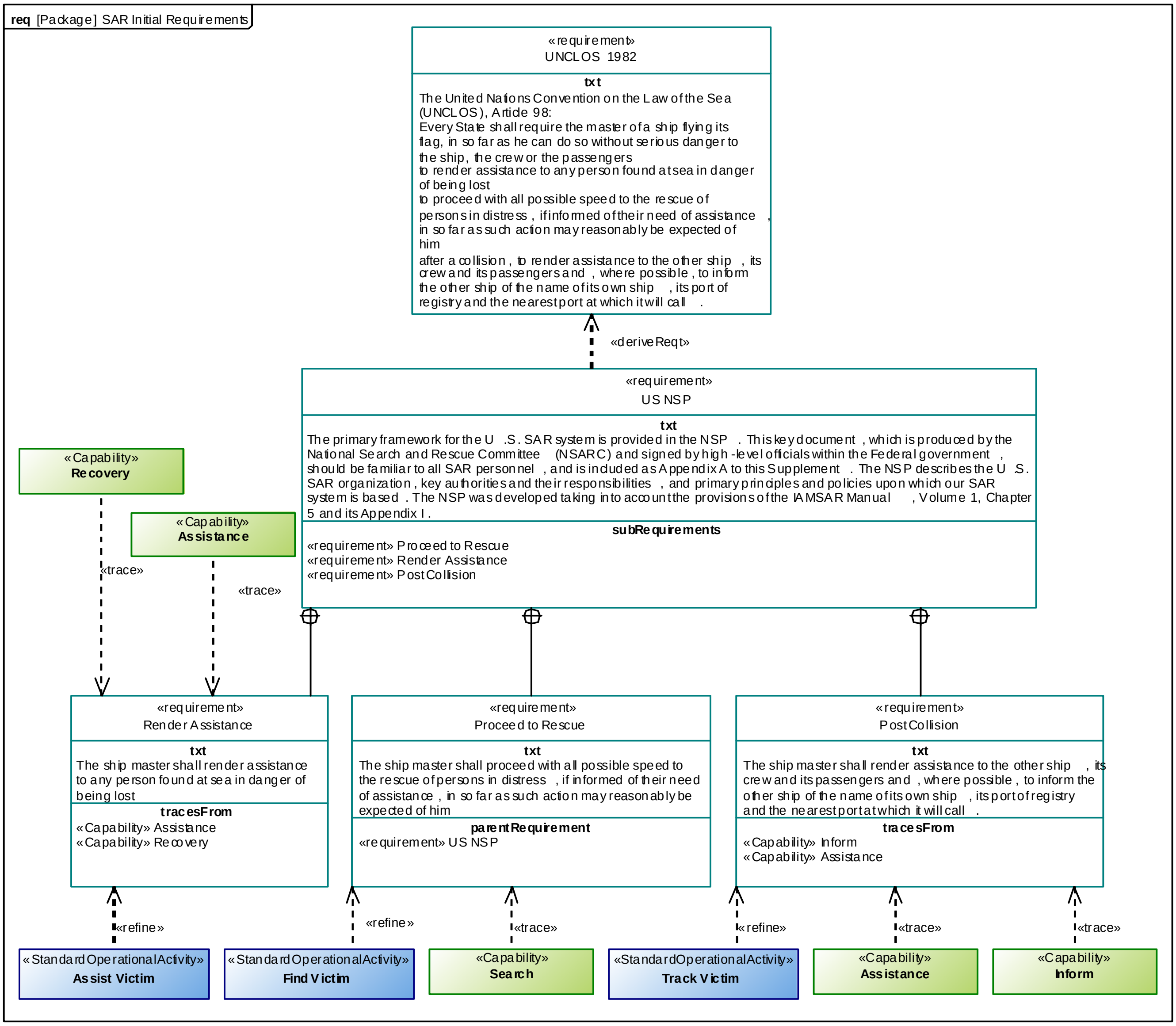


Figure C.6 - SysML Requirements

C.6 Strategic/Capability Views

The diagrams in the Strategic View (DoDAF 2.0 Capability Model) provide a capability view of the SAR operation. These views will show the relationships between these capabilities and between the capabilities and the resources required to realize them.

C.6.1 StV-1 Capability Vision (DoDAF CV-1)

Figure C.7 describes the strategic context for Search and Rescue Capabilities. It outlines the vision for a capability area over a specified period of time. It describes how high level goals and strategy are to be delivered in terms of capability. The concepts of the Whole Life Enterprise and Enterprise Phase are not elements in DoDAF 2.0.

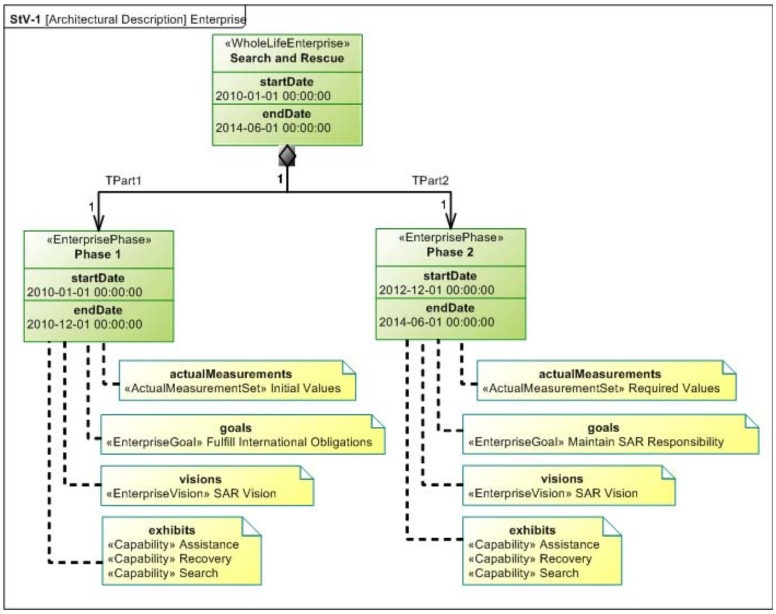


Figure C.7 - StV-1 Enterprise View

C.6.2 StV-2 Capability Taxonomy (DoDAF CV-2)

Capabilities need to be characterized in terms of the properties they need to exhibit which enable the enterprise to use them to achieve the enterprise goals, as well as their relationships in an inheritance hierarchy. In Figure C.8 we have characterized Maritime SAR in terms of required values. These are defined in Figure C.4 and include the length of a Maritime SAR operation, the sea conditions in which Maritime SAR must be deliverable, the search area covered by an operation and the time to find a victim.

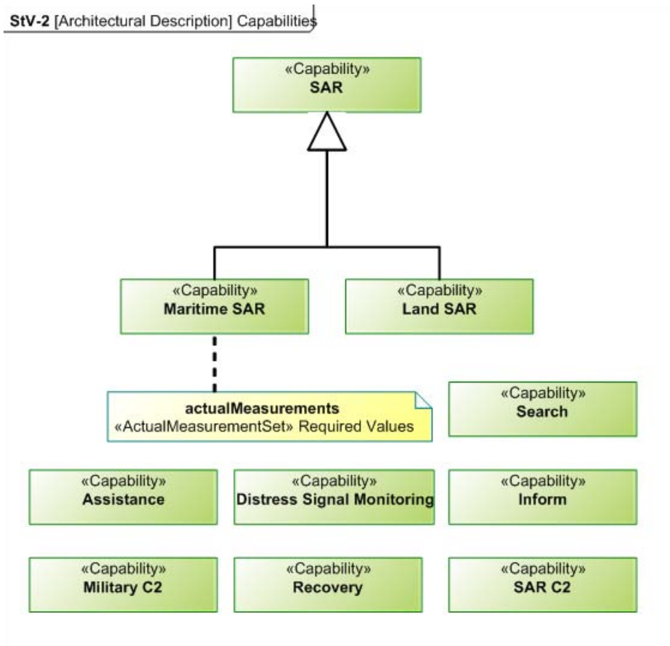
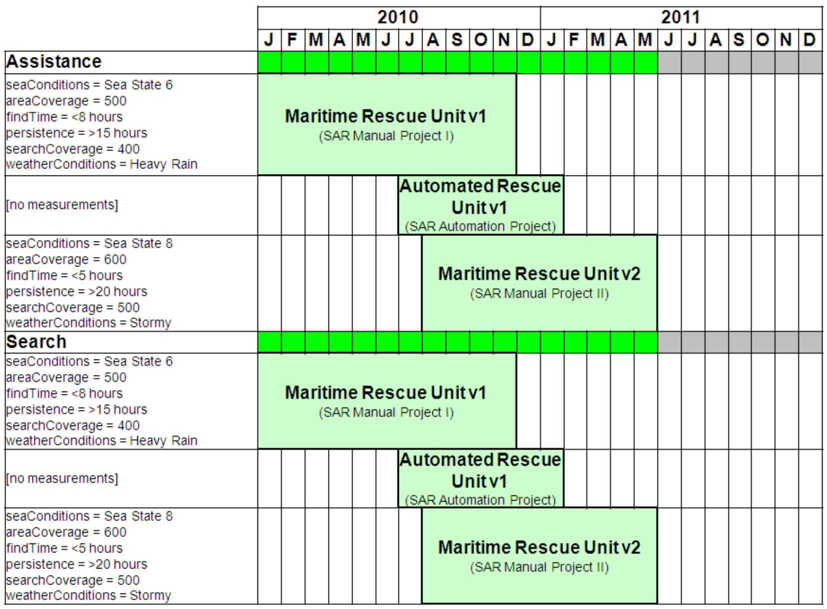


Figure C.8 - StV-2 Capability Taxonomy

C.6.3 StV-3 Capability Phasing (DoDAF CV-3)

StV-3 addresses the planned achievement of capability at different points in time or during specific periods of time, i.e. capability phasing. The example shown in Table C.3 is a generated report showing the capabilities, the systems that realize these capabilities and when they will be deployed and taken out of service, and the measurements that they are expected to achieve. Information for this report is defined using the AcV-3 Actual Projects diagram, the AV-3 measurements diagram, and the StV-2 Capability Taxonomy diagram.

Table C.3 - StV-3 Capability Phasing



C.6.4 StV-4 Capability Clusters (DoDAF CV-4)

This StV-4 view addresses the logical grouping of capabilities and the dependencies between them. In Figure C.9, SAR Command and Control depends on the Military C2 Capability. Similarly, the Assistance, Search and Recovery Capabilities are dependent upon the SAR C2 Capability, which in turn is dependent upon the Distress Signal Monitoring Capability. The UML composite structure diagram in Figure C.9 provides a means to define capabilities within a specific context, in this case search and rescue. The dependencies are scoped to this context.

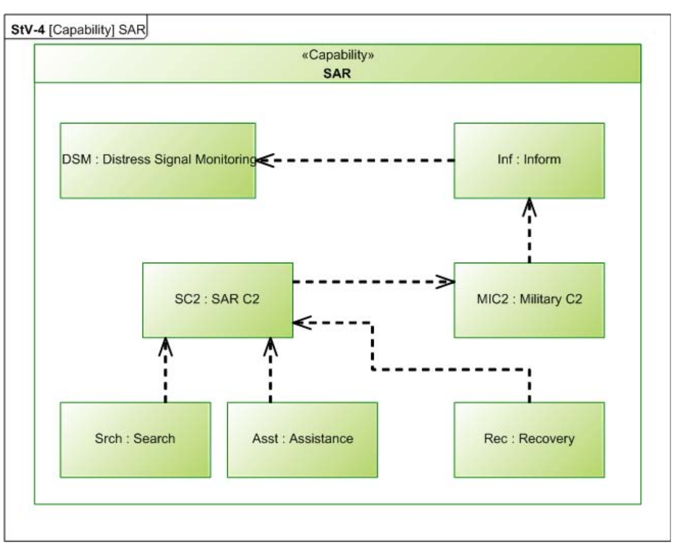


Figure C.9 - StV-4

C.6.5 StV-4 Capability Clusters Class Diagram (DoDAF CV-4)

Figure C.10 shows the class diagram version of the capability clusters. Dependencies can be defined between the capabilities, but there is no means to define a specific context.

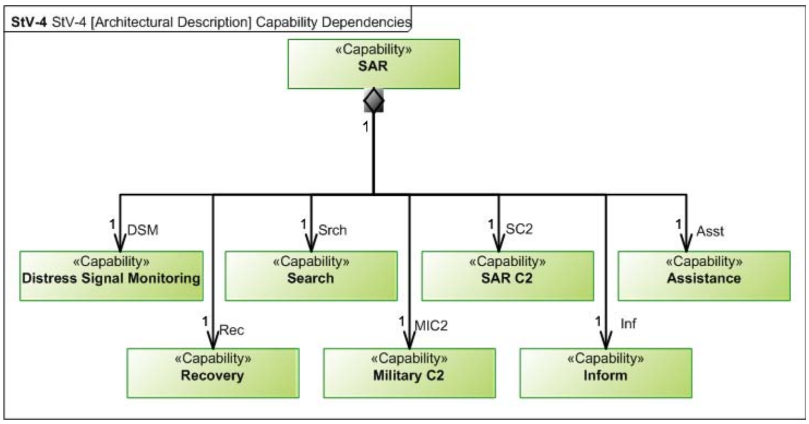


Figure C.10 - StV-4 Alternative View

C.6.6 StV-5 Capability to Organization Deployment (DoDAF CV-5)

Table C.4 shows the generated StV-5 table. The StV-5 defines Capability to Organization Deployment Mapping. It shows the planned capability deployment for a resource and the responsible organization. The StV-5 View is used to support the capability management process and, in particular, assist the planning of fielding. For example, the Assistance Capability is supported by the Maritime Rescue Unit. The Volunteer Rescue Organization and Maritime and Coastguard Agency are responsible for them.

Table C.4 - StV-5

Organizational Resources	Capabilities: Assistance	Inform	Recovery	Search
«ActualOrganization» Coastguard	Maritime Rescue Unit v1 Maritime Rescue Unit v2	Maritime Rescue Unit v1 Maritime Rescue Unit v2	Maritime Rescue Unit v1 Maritime Rescue Unit v2	Maritime Rescue Unit v1 Maritime Rescue Unit v2
«ActualOrganization» Maritime & Coastguard Agency	Maritime Rescue Unit v1 Maritime Rescue Unit v2	Maritime Rescue Unit v1 Maritime Rescue Unit v2	Maritime Rescue Unit v1 Maritime Rescue Unit v2	Maritime Rescue Unit v1 Maritime Rescue Unit v2
«ActualOrganization» Volunteer Rescue Organization	Maritime Rescue Unit v1 Maritime Rescue Unit v2	Maritime Rescue Unit v1 Maritime Rescue Unit v2	Maritime Rescue Unit v1 Maritime Rescue Unit v2	Maritime Rescue Unit v1 Maritime Rescue Unit v2

C.6.7 StV-6 Operational Activity to Capability Mapping (DoDAF CV-6)

This view, Figure C.11, identifies how operational activities support capabilities. The figure shows that in order to achieve Search and Assistance Capabilities, certain Standard Operational Activities must be performed, including Monitor Health and Provide Medical Assistance.

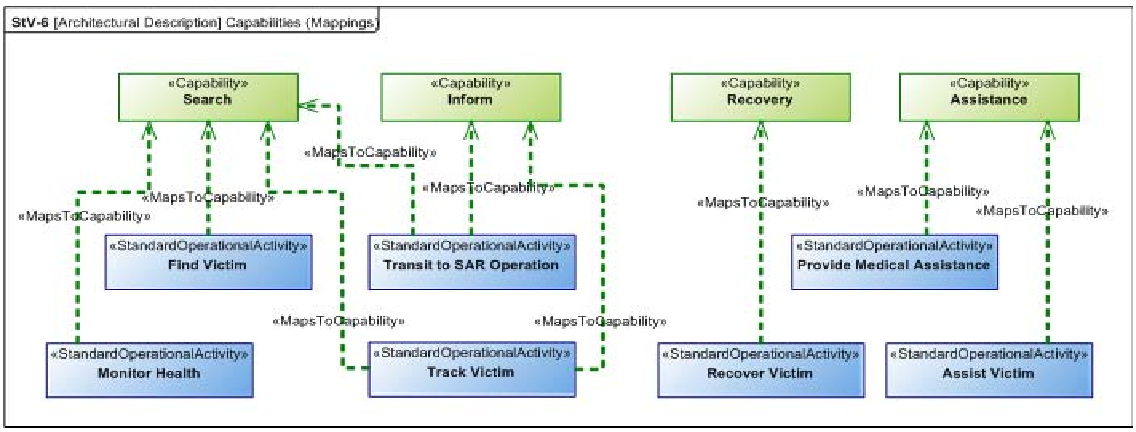


Figure C.11 - StV-6

C.7 Operational Views

The Operational Views identify what needs to be accomplished in the SAR operation and who needs to accomplish it. These views describe the tasks and activities, operational elements and exchanges of information, systems and energy that are required to conduct the operations.

C.7.1 OV-1a Operational Context Graphic

This diagram, Figure C.12, of the Maritime rescue sets the context by illustrating the search and rescue operation at sea involving a yacht in distress. The diagram shows that the monitoring unit picks up the distress calls of the yacht and sends them to a Command and Control (C2) center, which coordinates the operation among helicopters, a naval ship and a rescue boat.

In the OV-1a, each model element depicted may include a graphical depiction to help convey its intended meaning. The spatial relationships of the elements on the diagram sometimes convey their relative position, although this is not specifically captured in the semantics. A brief description of the interactions between the elements is provided. It may represent abstract conceptual relationships and will be refined in subsequent diagrams.

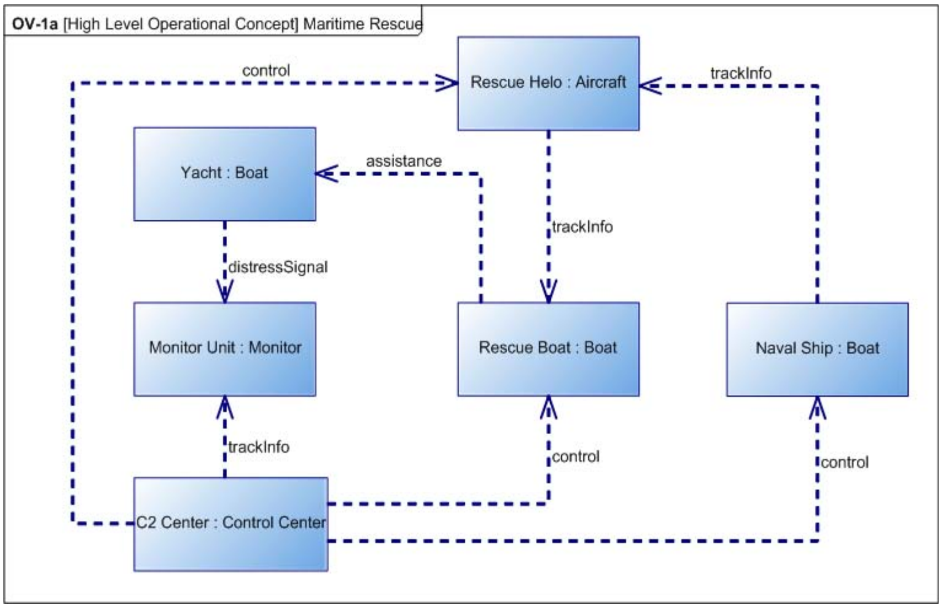


Figure C.12 - OV-1a

As shown below in Figure C.13, a pictorial background can be included to provide additional context. The elements on the diagram are exactly the same. They are simply represented as graphics rather than boxes. This helps to communicate with domain experts who may not be familiar with architectural frameworks. They are also shown as graphics, symbols, and photos to demonstrate that any graphic can be used. The yacht is shown pictured as a lifeboat to emphasize that they are in distress.

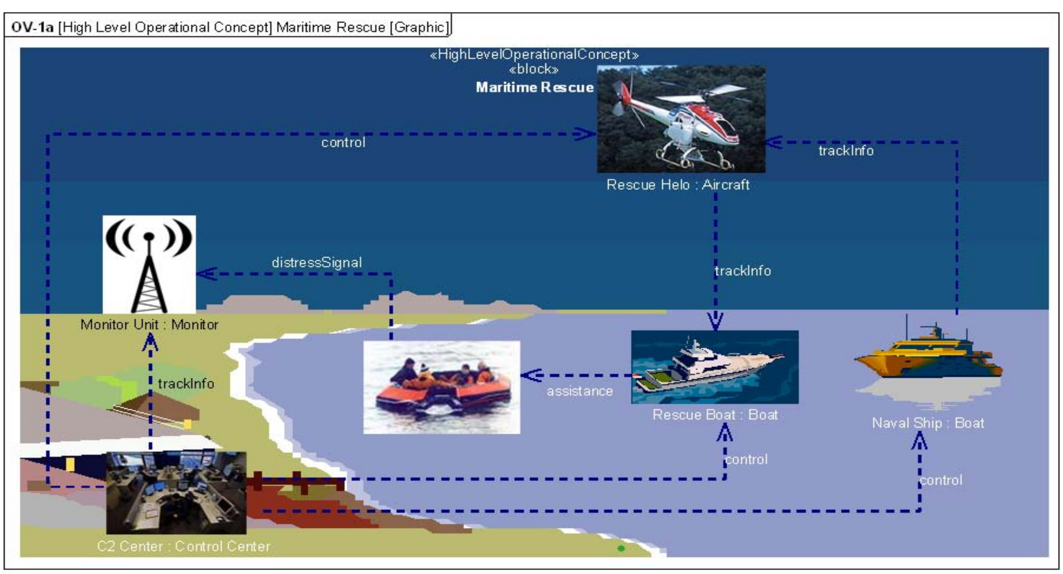


Figure C.13 - Alternate OV-1a

C.7.2 OV-1b Operational Context Description

The text shown below describes the scenario depicted in Figure C.13. There is normally an OV-1b associated with each OV-1a.

The "Yacht in Distress" Scenario

The Sample Problem applies UPDM to a common scenario in civilian maritime Search and Rescue (SAR) operations -- a Yacht in distress. A Monitor Unit picks up the distressSignal from the Yacht and passes it on to the Command and Control (C2 Center). The C2 Center coordinates the search and rescue operation among the Rescue Helo, a Naval Ship and a Rescue Boat.
This model is based on a UK MOD example model.

Figure C.14 - OV-1b

C.7.3 OV-1c Operational Context Measurements

The OV-1c shown in table C.5 provides a summary of the measures that the architecture is expected to achieve. These measures are defined in the AV-3 actual measurements diagram. The units and dimensions attached to the measurements were defined using the SysML BDD shown in Figure C.5. This view is not found in DoDAF 2.0, but could be a fit for purpose view.

Table C.5 - OV-1c

	Actual Measurement Set							
Name	**Name**	**Intention**	**Measurement**	**Minimum Value**	**Actual Value**	**Maximum Value**	**Unit**	**Dimension**
Maritime Rescue	Initial Values	Estimate	seaConditions	Sea State 1	Sea State 6	Sea State 10	Meter	Wave Height
			areaCoverage	100	500	1000	SquareKilometers	Area
			findTime	4	<8 hours	8	Hours	Time
			persistence	5	>15 hours	22	Hours	Time
			searchCoverage	200	400	600	SquareKilometers	Area
			weatherConditions	Calm	Heavy Rain	Hurricane	Weather Severity Index	
	Required Values	Required	seaConditions	Sea State 1	Sea State 8	Sea State 10	Meter	Wave Height
			areaCoverage	100	600	1000	SquareKilometers	Area
			findTime	4	<5 hours	8	Hours	Time
			persistence	5	>20 hours	22	Hours	Time
			searchCoverage	200	500	600	SquareKilometers	Area
			weatherConditions	Calm	Stormy	Hurricane	Weather Severity Index	
	Final Values	Result	seaConditions	Sea State 1	Sea State 8	Sea State 10	Meter	Wave Height
			areaCoverage	100	650	1000	SquareKilometers	Area
			findTime	4	<4 hours	8	Hours	Time
			persistence	5	>20 hours	22	Hours	Time
			searchCoverage	200	550	600	SquareKilometers	Area
			weatherConditions	Calm	Stormy	Hurricane	Weather Severity Index	

C.7.4 OV-1d Operational Context Use Cases (Fit for Purpose)

A Mission defines a functional goal that the stakeholders have. This aligns well with the definition of a Use Case. As UPDM is built on UML and SysML, it is possible to create Use Case diagrams showing the missions, their relationships, and the stakeholders involved in the mission. Figure C.15 defines the missions required for search and rescue.

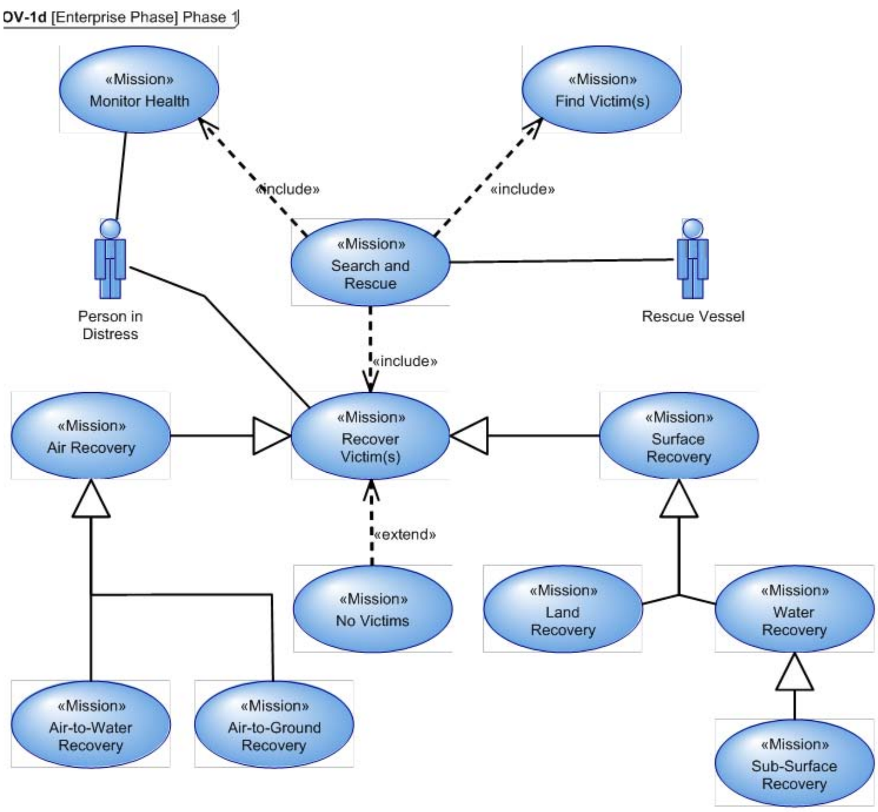


Figure C.15 – OV-1d

C.7.5 OV-2 Operational Node Connectivity Description (DoDAF Operational Resource Flow Description)

The OV-2 diagrams in Figure C.16, Figure C.17, and Figure C.18 depict the key players in the SAR operation and the interactions for information exchange. It identifies the different types of nodes (Performer in DoDAF) in the SAR operation: Person in Distress, Monitoring Node, Tactical C2 Node, SAR Asset Controller, Search Node, Rescue Node, and Place of Safety. This diagram indicates the need to exchange information between the operational nodes and also shows the interactions between these nodes. Other interactions can be exchanged between the nodes such as equipment, energy, and so forth. The OV-5 view shows the operational activities undertaken by a few select nodes. Figure C.16 is the class diagram version of the OV-2.

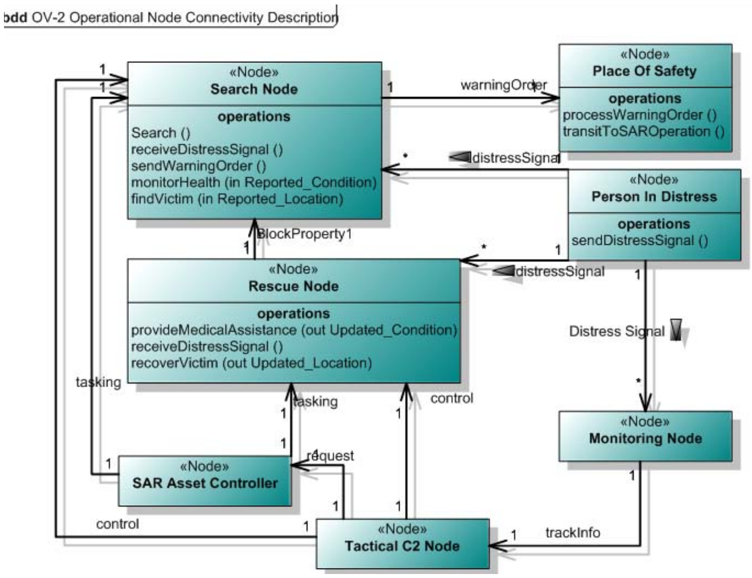


Figure C.16 - OV-2 Class Diagram

Figure C.17 shows an alternate way to display the OV-2. It can be illustrated as above with IO associations or as below using connectors and SysML Item Flows without flow ports as in Figure C.17 or with flow ports as in Figure C.18. Figure C.17 also shows the service ports. These define services that are required or provided by these nodes.

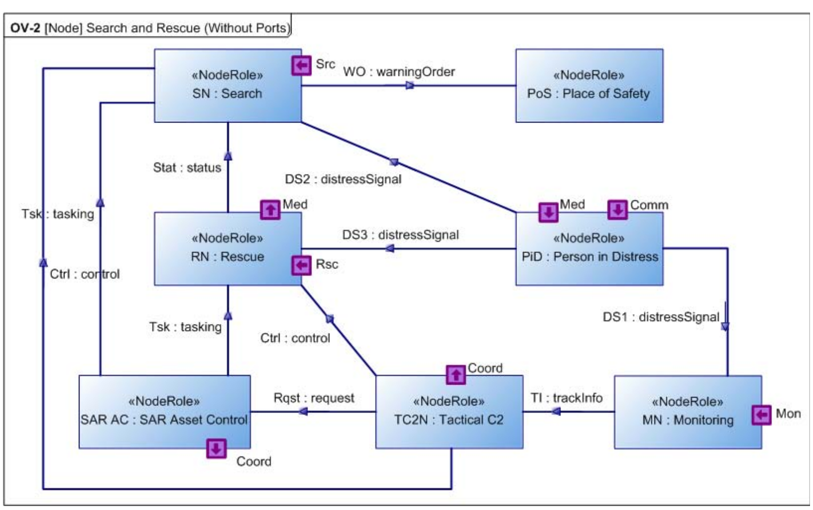


Figure C.17 - Alternate OV-2 SysML Version with Service Ports

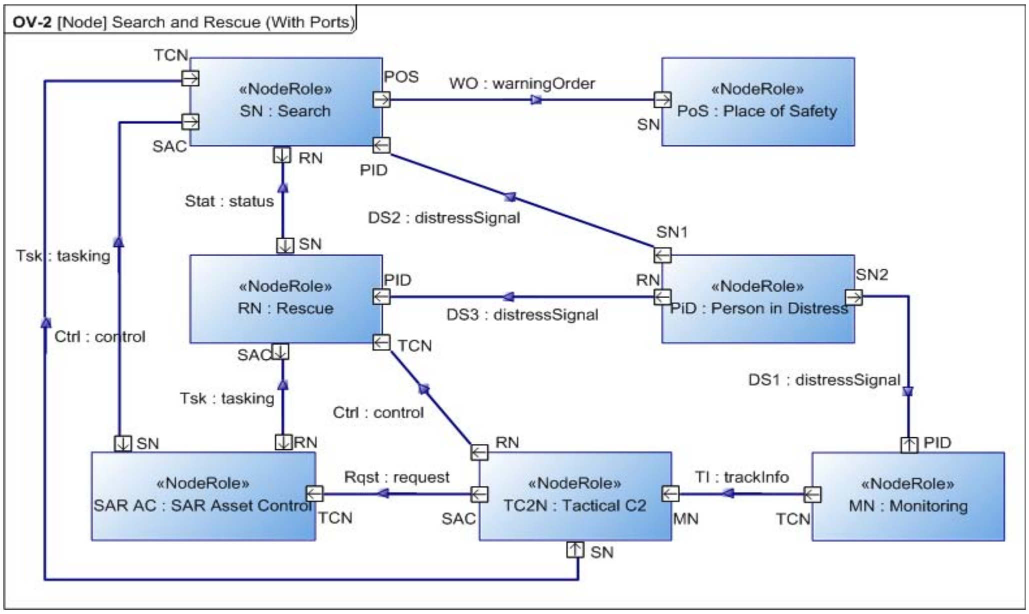


Figure C.18 Alternate OV-2 with SysML Flow Ports

Figure C.18 shows the SysML version with Flow Ports and Item Flows. The typed ports mean that the user can constrain the elements that can flow in and out of the port. This means that consistency checks can be performed on the ports to ensure that the flows correspond to the allowed elements. The stereotypes have also been removed to aid readability.

C.7.6 OV-3 Operational Exchange Summary (DoDAF Operational Resource Flow Matrix)

Table C.6 shows the operational exchanges between nodes. The OV-3 can include Information Exchanges associated with a Needline as well as Information Elements carried by one or more Information Exchange. Reports can also be generated summarizing other types of exchanges. The report show the producing and consuming nodes, and the activities performed by those nodes that produced and consumed the interchange. This provides a validation capability for the architecture in that the blank boxes for the producing and consuming activities indicates that further work needs to be done on the architecture: exchanges are being made for no apparent purpose. There is an important distinction between DoDAF and MODAF in this regard. Exchanges (activityConsumesResource in DoDAF) can only take place as a result of an activity.

Table C.6 - OV-3

Information		Producer		Needline	Consumer	
Name	**Conveyed**	**Node**	**Operational Activity**	**Name**	**Node**	**Operational Activity**
Ctrl	control	Tactical C2		TC2N - RN	Rescue	
Ctrl	control	Tactical C2		TC2N - SN	Search	
DS1	distressSignal	Person in Distress		PiD - MN	Monitoring	
DS2	distressSignal	Person in Distress	Send Distress Signal	SN1 - PID	Search	Receive Distress Signal
DS3	distressSignal	Person in Distress	Send Distress Signal	RN - PID	Rescue	Receive Distress Signal
Rqst	request	Tactical C2		SAC - TCN	SAR Asset Control	
Stat	status	Rescue		RN - SN	Search	
TI	trackInfo	Monitoring		TCN - MN	Tactical C2	
Tsk	tasking	SAR Asset Control		RN - SAC	Rescue	
Tsk	tasking	SAR Asset Control		SAR AC - SN	Search	
WO	warningOrder	Search	Send Warning Order	SN - PoS	Place of Safety	Process Warning Order

C.7.7 OV-4 Organizational Relationships Chart

The OV-4 illustrates the command structure or relationships (as opposed to relationships with respect to a business process flow) among human roles, organizations, or organization types that are the key players in the SAR operation.

The OV-4 exists in two forms - typical (typical command structure) and actual (organization chart for a department or agency). Figure C.19, the typical OV-4, shows the possible relationships between organizations and posts. It is also possible to define types of people who are capable of filling these posts. For example, a Qualified Lifeguard could become an MRT Swimmer. The class diagram defines a template from which the actual organization will be created. The actual organizations, posts, and relationships must comply with this template. In fact, it is not possible to add an element not defined in the template. This ensures a consistent model. Matrix organizations can also be created as multiple structures can be created. This provides both flexibility and structure.

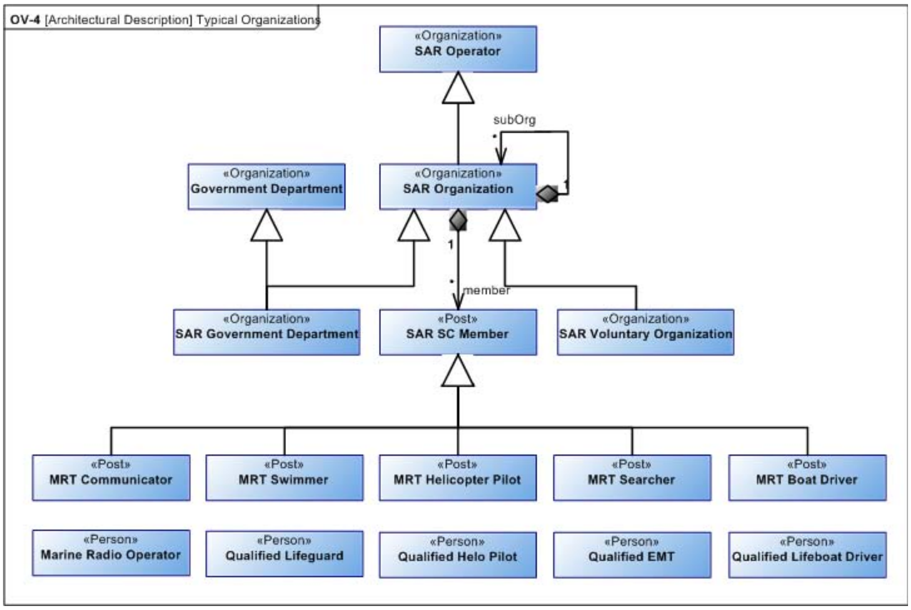


Figure C.19 - OV-4 - Typical

The actual OV-4, shown in Figure C.20, depicts the structure of the organization, the actual posts (Person Type in DoDAF) and the actual persons (IndividualPerson in DoDAF) who fill those posts. The diagram can also be annotated with the start and end dates for this for the people filling those posts. For example, Peter Pilot fills the post of Rescue Helo Pilot, which is a member of the Coast Guard, which is a sub organization of the Maritime and Coastguard Agency.

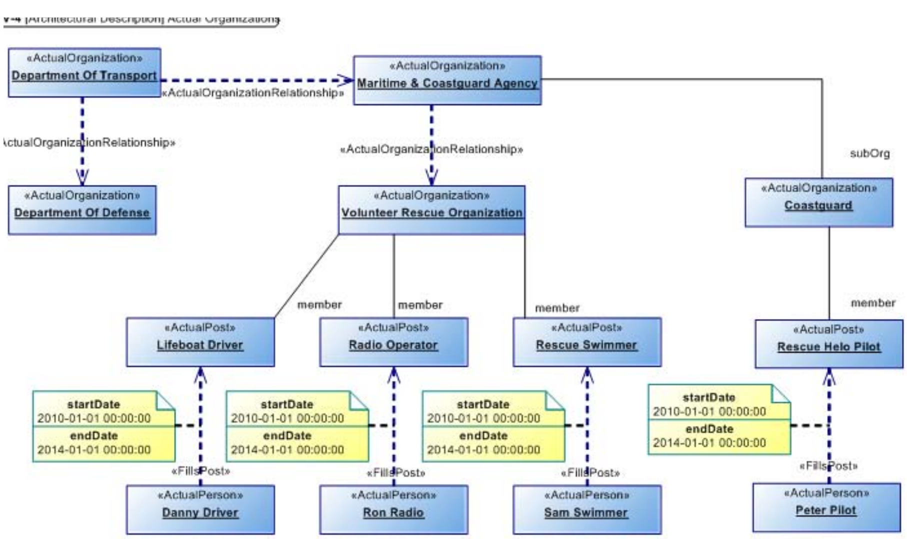


Figure C.20 - OV-4 Actual

C.7.8 OV-5 Operational Activity Model (DoDAF Operational Activity Decomposition Tree – OV-5A)

Figure C.21 describes the operations that are normally conducted in the different nodes of a Search and Rescue operation. This view shows the operational activities which are performed by the Search Node and Rescue Node. The class diagram views provides a means of breaking down activities to lower level activities as well as indicating the nodes that perform the activities.

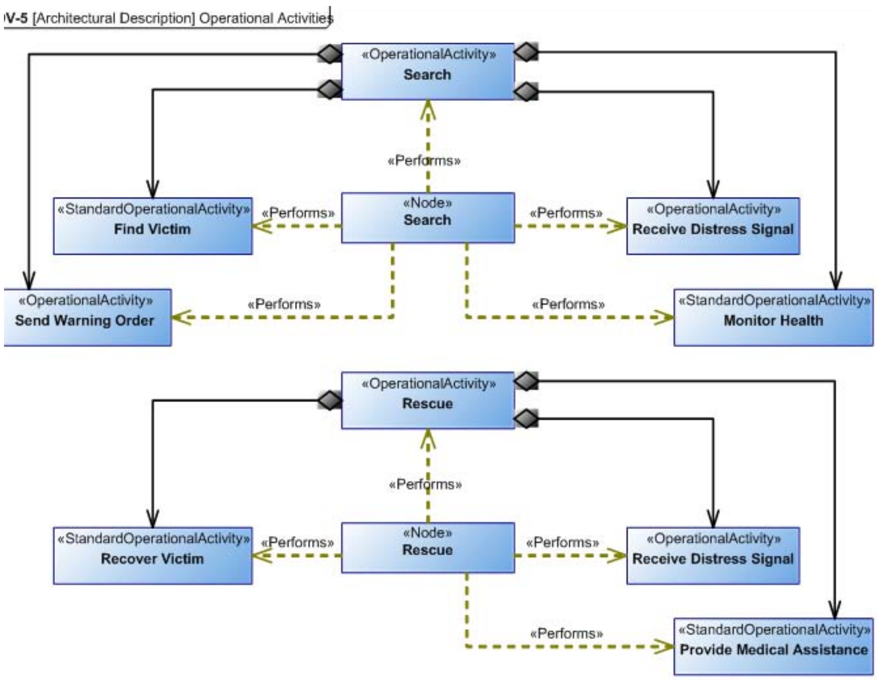


Figure C.21 - OV-5

Figure C. 22 shows the OV-5 as an activity diagram. It describes Operational Activity Actions, Input/Output flows between activities and to/from activities that are outside the scope of the context of the activity diagram. The example shows the execution of the search activity. There is a horizontally nested swim lane which is the search and rescue context. Inside this context are the nodes that were defined within the OV-2. This is an example of how UPDM ensures structural consistency across the model. Activities displayed within the swimlanes are allocated to the node that owns the swim lane.

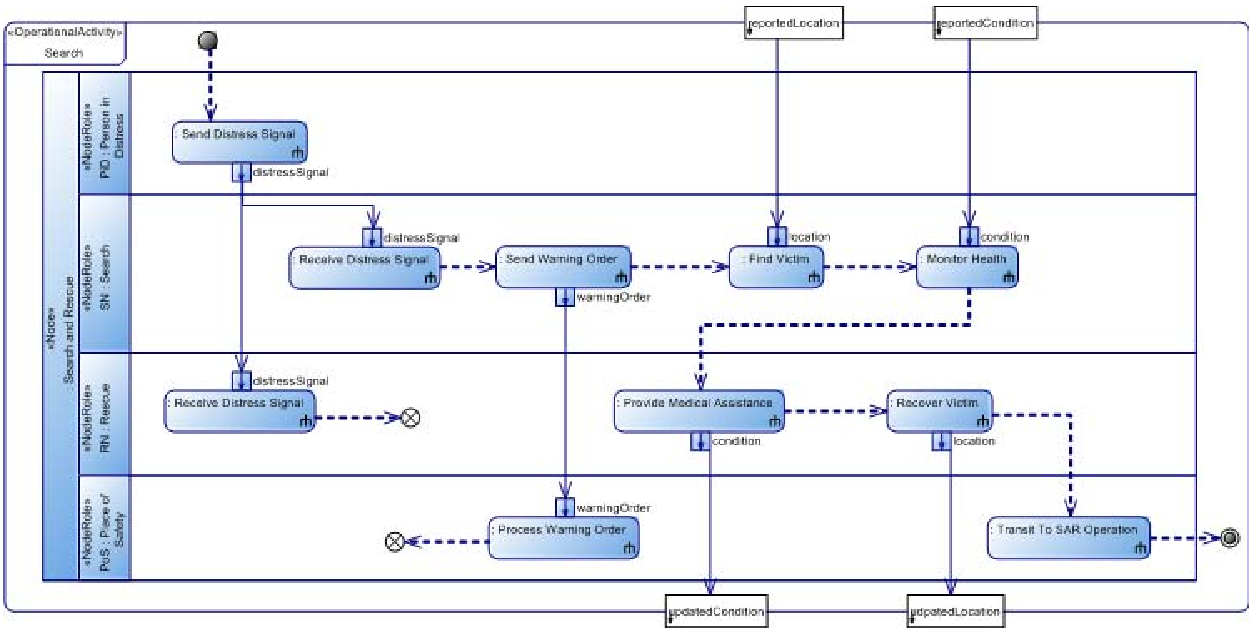


Figure C.22 - Alternate OV-5

C.7.9 OV-6a Operational Rules Model (Same in DoDAF)

Table C.7 is a generated report showing the operational constraints associated with operational elements such as nodes, organizations, Activities, etc.

Table C.7 - OV-6a Operational Constraints

Operational Element		Operational Constraint	
Type	**Name**	**Name**	**Text**
«Node»	Place of Safety	Location Constraints	The place of safety shall be isolated from the weather to ensure safety of the person n Distress.
«OperationalActivity»	Monitor For Distress Signal	Distress Signal Monitoring	Distress signals shall be monitored 24/7.
«OperationalActivity»	Search	Personnel Safety	Search personnel shall operate on a shift system to ensure that they can perform to maximum efficiency.
«OperationalActivity»	Send Distress Signal	Distress Signal Range	The maximum range for distress signals shall be posted at all ports and marinas.
«OperationalActivity»	Transit To SAR Operation	[none]	[none]

C.7.10 OV-6b Operational State Transition Description

Figure C.23 describes the operational states of the Search Node, the behaviors that take place within those states, the transitions between the states and the events and guards that cause those transitions to take place. For example, the search node is waiting for a distress signal. When one is received, the warning order is sent out and the search node transitions to searching for victim.

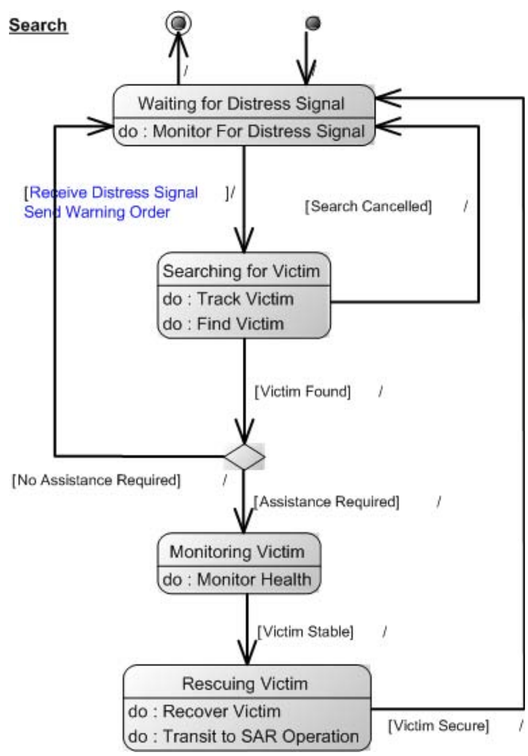


Figure C.23 - OV-6b

C.7.11 OV-6c Operational Event Trace Description

The OV-6c is used to define time based behavioral scenarios between operational elements. The interactions can be service operations as well as the interactions defined on the OV-2 and OV-5 diagrams. Figure C.24 shows the sequence of interactions for a search and rescue scenario.

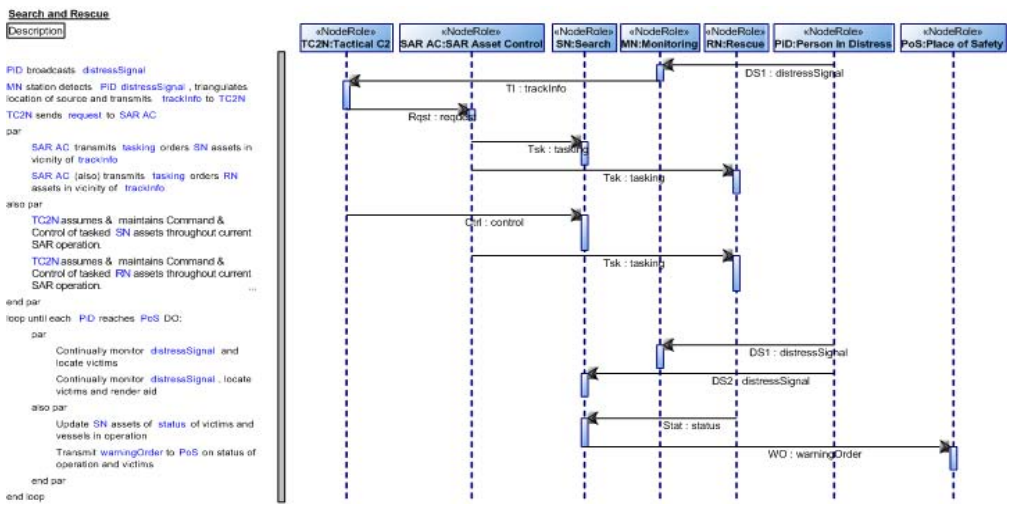


Figure C.24 – OV-6c

C.7.12 OV-7 Logical Data Model (DoDAF DIV-1/DIV-2)

The OV-7 view shown in Figure C.25 describes the information elements and entities used in the operational context. The boxes show the information items and the lines represent their inter-relationships. Attributes can be used to show the characteristics of the information items. The “represents entity” dependencies show the information elements that represent the entity items. These are used on the OV-2 and other diagrams.

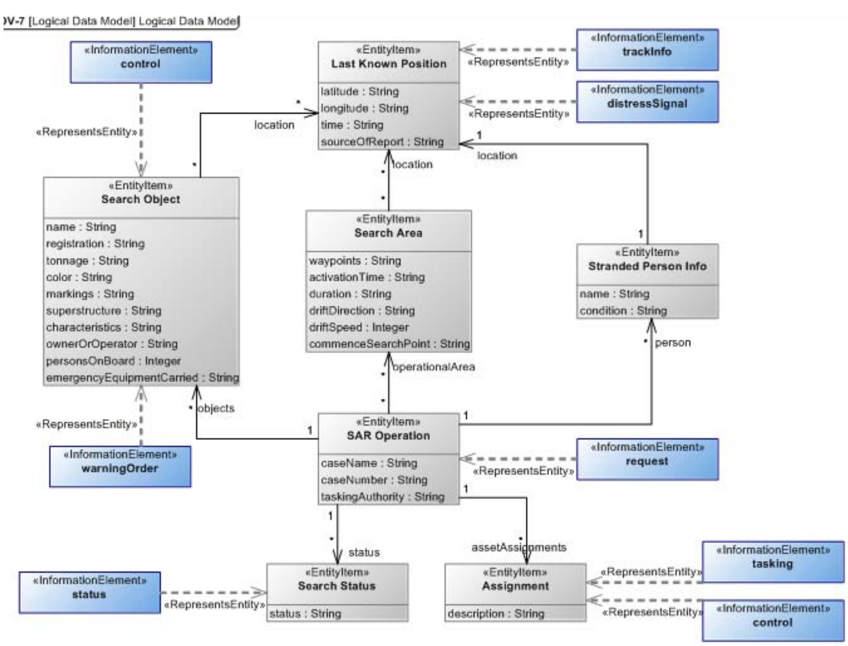


Figure C.25 - OV-7

C.8 Service Oriented Views (DoDAF SvcV-1)

The Service Oriented views describe the services needed to directly support the Search and Rescue operations described in the Operational View and System View. They are normally used when creating Service Oriented Architectures (SOA). The Service Oriented Views do not specify how the service is to be implemented, but the requirements for the services. The implementation of the services is normally implemented by the Systems Views. In this example, various services are defined to support Search and Rescue capabilities.

C.8.1 SOV-1 Service Taxonomy

The SOV-1 view specifies the hierarchy of services as well as the relationships between them. Figure C.26 shows the hierarchy of services within the Search and Rescue Service with Land and Maritime Search and Rescue Services as specializations of the SAR Service. Additional services are also defined to support SAR such as Communications, Coordination and so forth. These will be used in the rest of the SOVs as well as the OV and SV.

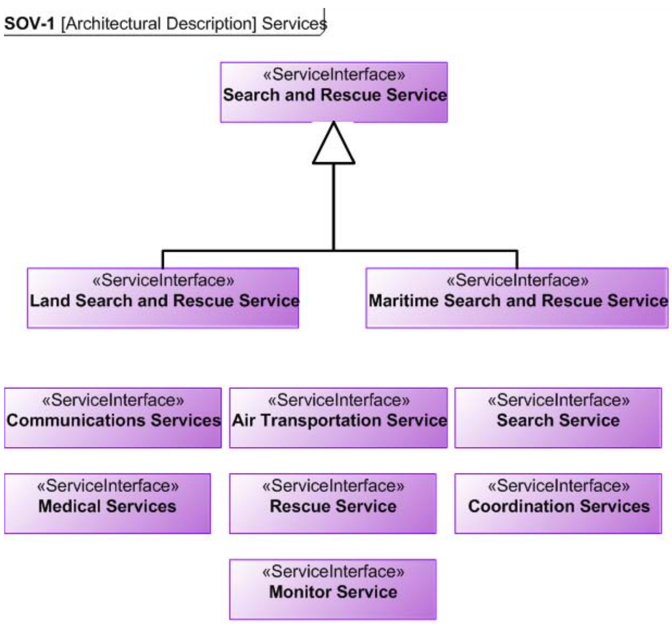


Figure C.26 - SOV-1

C.8.2 SOV-2 Service Interface Specification (DoDAF SvcV-2)

Figure C.27 defines the interfaces that will provide access to the services and those required by services. Many UPDM elements can provide and consume services. Specifying the interface for the service provides a means of determining compatibility between service consumers and providers. Service operations and attributes can also be defined on the SOV-2. Figure C.27 shows the interfaces for the services defined on the SOV-1, and the operations and parameters of the operations provided by the interfaces.

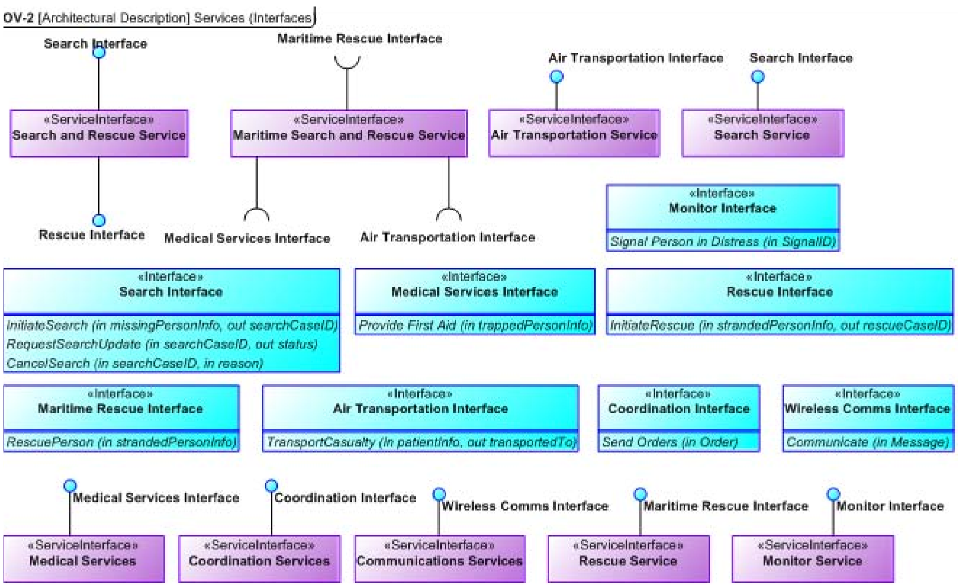


Figure C.27 - SOV-2

C.8.3 SOV-3 Capability to Service Mapping (DoDAF CV-7)

Figure C.28 shows which services contribute to the achievement of a capability. In this example, the Land Search and Rescue Service exposes (supports/realizes) the Land SAR Capability. Likewise, the Maritime Search and Rescue Service exposes the Maritime SAR Service. MODAF 1.2.004 specifies that the service must completely realize the capability it exposes. Additional services and capabilities are also shown.

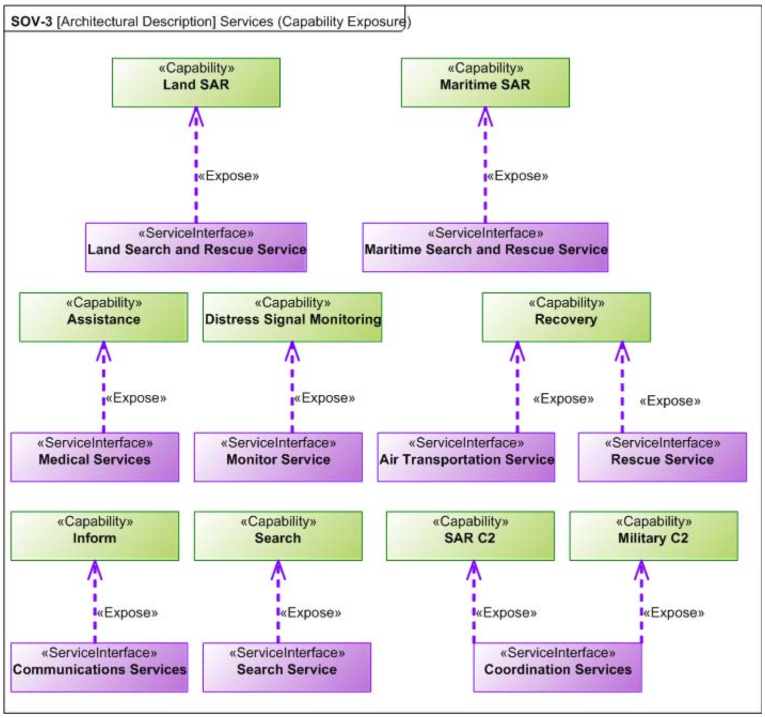


Figure C.28 - SOV-3

C.8.4 SOV-4a Service Behaviors and Constraints (DoDAF SvcV-10a)

The SOV-4a defines constraints that must be adhered to by Consumers and Providers of the Services via Service Policies. This also provides a means of performing trade-off analysis of the possible service providers. As a minimum it defines a set of criteria to determine whether or not the service provider meets the provision requirements defined by the constraints. Table C.8 shows a sample of the services and their associated service policies.

Table C.8 - SOV-4a Service Policies

Service Interface	Service Policy	
Name	Name	Text
Land Search and Rescue Service	Driving Record	Any member involved in the operation of road vehicles must have a clean driving record.
Maritime Search and Rescue Service	Swim	All members of the rescue team must be able to swim.
Search and Rescue Service	First Aid	All members of the rescue team must be able to perform basic first aid.
	Danger	No member of the search and rescue team should put themselves in unnecessary danger.

C.8.5 SOV-4b Service Behaviors and Constraints (DoDAF SvcV-10b)

The SOV-4b defines behavioral constraints that must be adhered to by Consumers and Providers of the Services. Specifically it defines the state based behavior of the service defining the states, transitions between those states, the events that cause those transitions to take place and behaviors within those states. Figure C.29 shows the state diagram describing the state based behavior of the Maritime Search and Rescue Service.

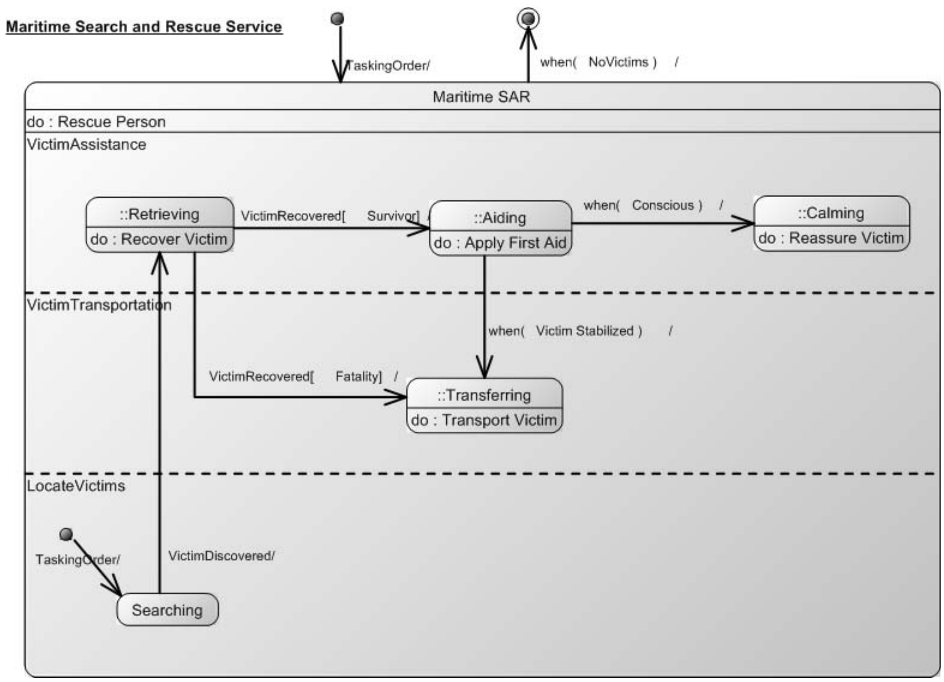


Figure C.29 - SOV-4b

C.8.6 SOV-5 Service Functionality (DoDAF SvcV-4)

Figure C.30 defines the Service Functions to describe the abstract behavior of each Service Operation. It specifies the set of functions that the service implementation is expected to perform. In this example, the Maritime Search and Rescue service provides the rescue function. This function is further decomposed to its sub-functions.

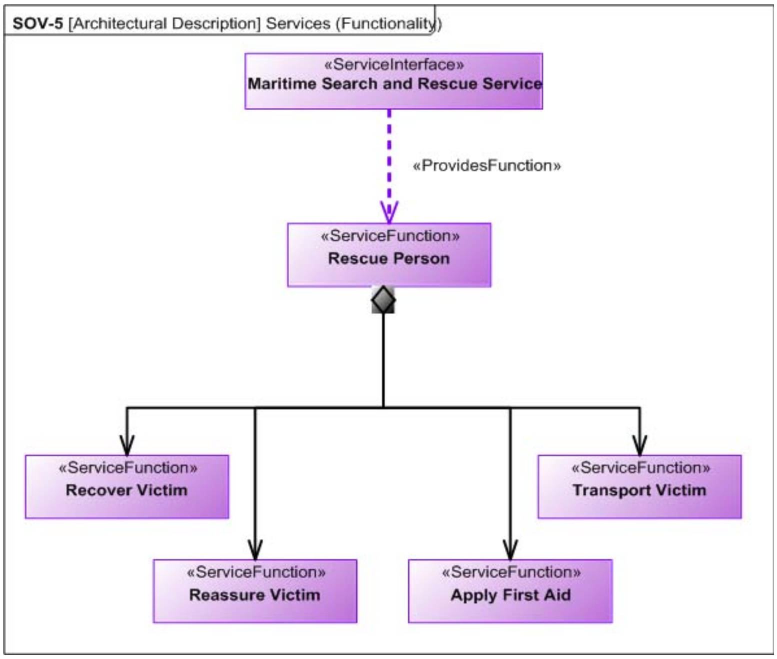


Figure C.30 - SOV-5

C.9 Systems Views

These views describe the resources that realize the SAR capabilities or implement services. They describe resource functions, interactions between resources, and can provide detailed system interface models. System views can describe the “as-is” and/or “to-be” configuration. In addition, several different configurations can be created to perform trade-off analysis. When used in conjunction with SysML, the systems should be developed to the degree that they define the requirements for actual systems that will be implemented. Developing the system views to too much detail will unnecessarily constrain the solution and will involve duplication of work.

System elements can include more than just physical systems. They can include software, organizational resources such as organizations, posts and roles. MODAF defines the concept of a Capability Configuration which is a composition of resources that can deliver a capability. As in the operational views, interactions can consist of more than just information and can include Posts, organizations, capability configurations, energy and software.

C.9.1 SV-1 Resource Interaction Specification (DoDAF Systems Interface Description)

The SV-1 defines the structure and internal flows of the system architectures to demonstrate how they realize the logical architecture defined in the operational views. The interfaces and interactions are defined at the level of specifying a need for the systems to interact and the way in which the do so. These systems can be decomposed to any level required. Figure C.31 shows the Capability Configuration of a Maritime Rescue Unit. The Maritime Rescue Unit is comprised of the Maritime Rescue Team (MRT), and the roles that make up the MRT, as well as the components that enable them to fulfill their role. This example shows that the Role of Driver is filled by a MRT Member who must interact with a MR Boat.

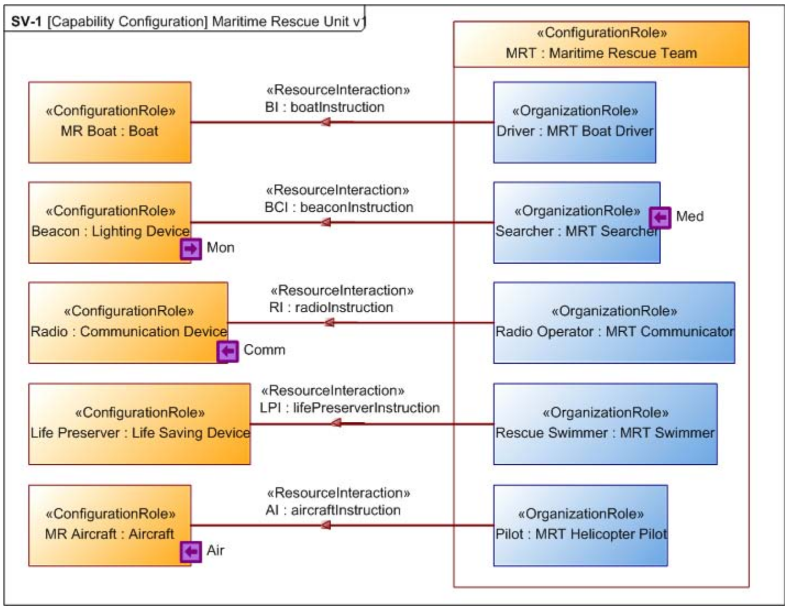


Figure C.31 - SV-1 Maritime Rescue Unit

C.9.2 SV-2 Systems Communications Description (DoDAF System Resource Flow Description)

The SV-2 defines the communications networks and pathways that link the systems as well as providing details about the configuration. MODAF defines 3 separate views for Port Specification (SV-2a), System to System Port Connectivity (SV-2b), and System Connectivity Clusters (SV-2c). All these details can be shown by using the Internal Block Diagram as has been implemented in UPDM. System Protocols and Standards can also be shown. Figure C.32 shows systems interconnections for a number of entities in a maritime search and rescue scenario.

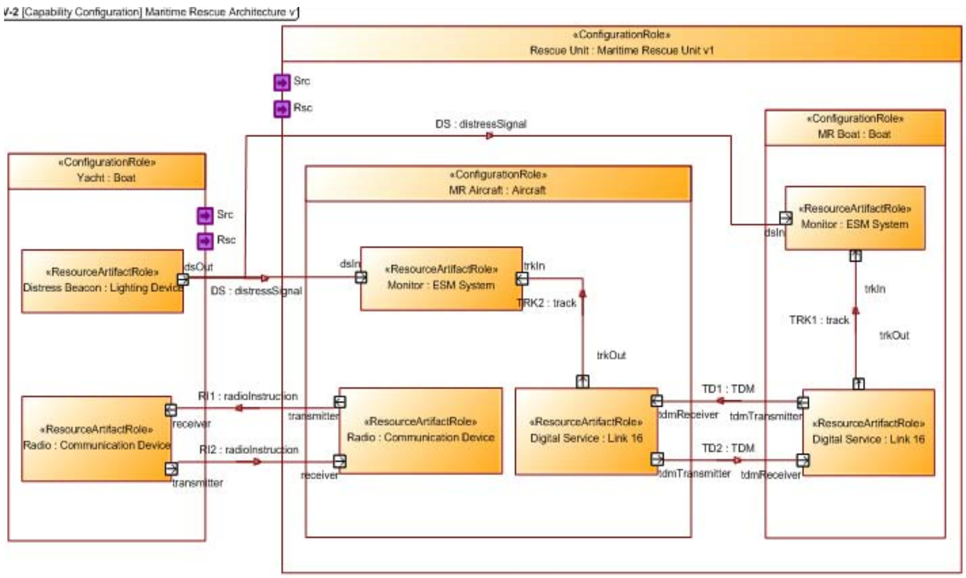


Figure C.32 - SV-2

C.9.3 SV-3 Resource Interaction Matrix (DoDAF Systems – Systems Matrix)

The SV-3 is a summary report of the interactions defined in the SV-1. It expresses the connections between the system elements. Table C.9 does this in the form of a matrix. For simplicity and readability, the matrix has been reduced to show only those systems that are connected.

Table C.9 – SV-3 System Connectivity Matrix

	«Resource Artifact» Aircraft	«Resource Artifact» Boat	«Resource Artifact» Communication Device	«Resource Artifact» ESM System	«Resource Artifact» Life Saving Device	«Resource Artifact» Lighting Device	«Resource Artifact» Link16	«Resource Artifact» Safety Device
«Post» MRT Boat Driver		X						
«Post» MRT Communicator			X					
«Post» MRT Helicopter Pilot	X							
«Post» MRT Searcher						X		
«Post» MRT Swimmer					X			
«ResourceArtifact» Communication Device			X					
«ResourceArtifact» Lighting Device				X				
«ResourceArtifact» Link16				X			X	
«ResourceArtifact» Safety Device								

C.9.4 SV-4 Functionality Description (DoDAF Systems Functionality Description)

The SV-4 defines the functions carried out by the different types of Resources. This includes organizational resources such as posts and organizations. Two forms can be used. Figure C.33 shows a hierarchical breakdown of the Rescue Victim function. It is also possible to show the resource that is performing the action. This provides a mapping of resource usage to function.

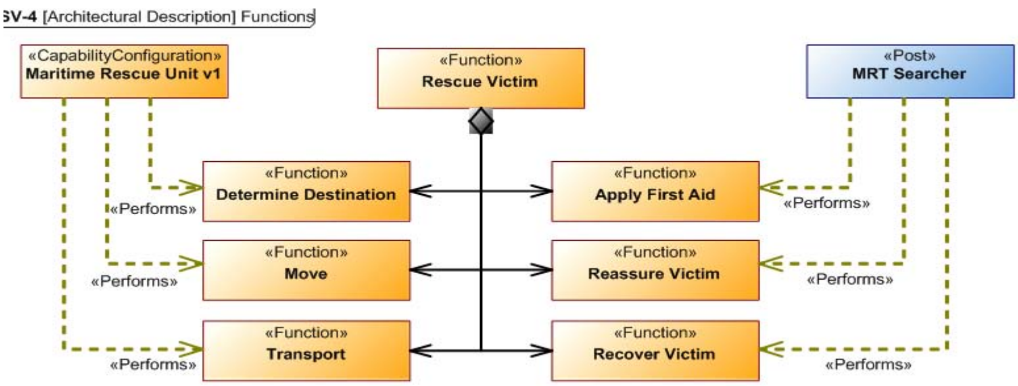


Figure C.33 - SV-4

Figure C.34 is the other type of SV-4 and takes the format of an activity diagram. It shows the Resources using Functions, the operational step-by-step workflows and the overall flow of control. The Maritime Rescue Unit v1 and the MRT Searcher are represented as swim lanes. It shows the functions used by these Resources, the order in which they take place, and the interactions between them to implement the Rescue Victim Activity.

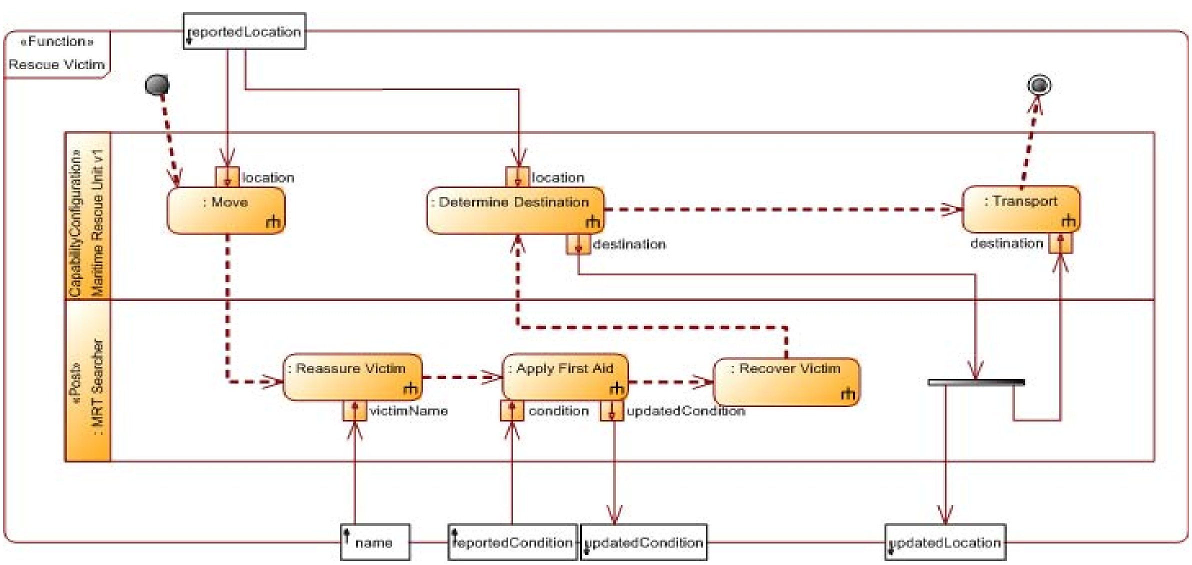


Figure C.34 - SV-4 Activity Diagram

C.9.5 SV-5 Function to Operational Activity/Service Function Traceability

The SV-5 view is used to show how System Functions support Operational Activities and Service Functions. UPDM also provides a graphical view to define these relationships. Figure C.35 shows the SAR Activities and those System Functions that implement them. This provides an essential requirements traceability capability as well as a means of validating the overall architecture. Functions that do not implement operational activities may be superfluous, and operational activities that are not implemented by functions have not been fully analyzed.

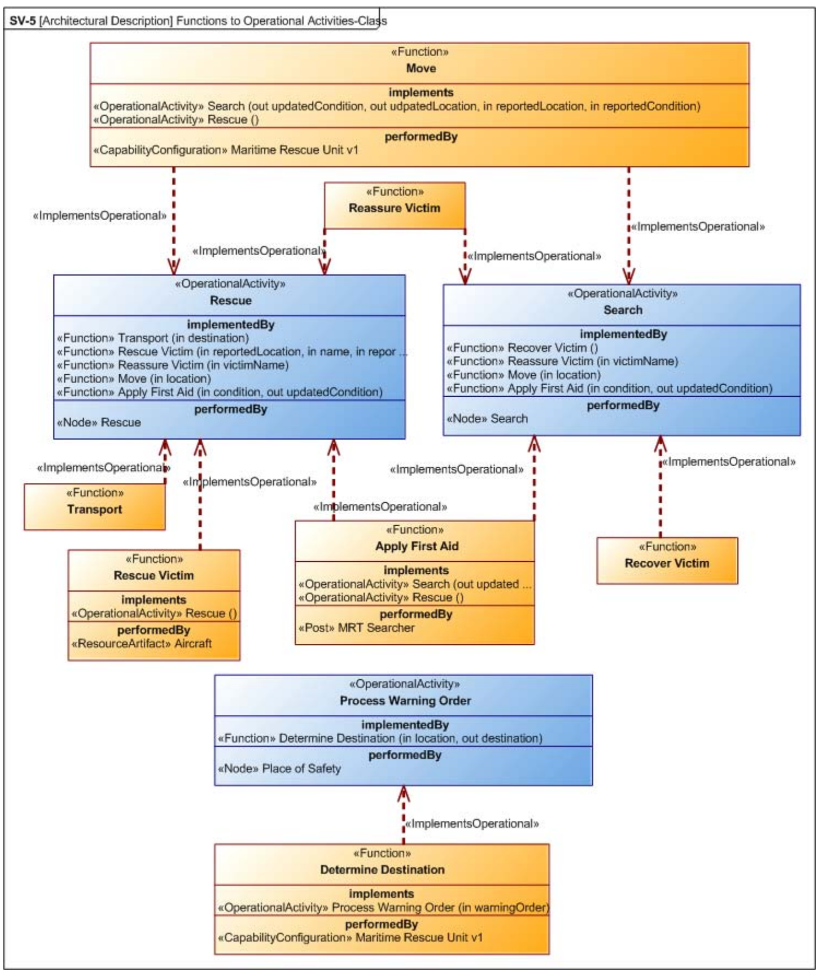


Figure C.35 – SV-5

C.9.6 SV-5 System Function to Operational Activity/Service Function Traceability Matrix

Table C10 summarizes the traceability between the system functions and operational activities in matrix form. It has been simplified for readability.

Table C.10 – SV-5

Realizing Function	Monitor For Distress Signal	Process Warning Order	Rescue	Search
Apply First Aid			X	X
Determine Destination		X		
Move			X	X
Reassure Victim			X	X
Recover Victim				X
Rescue Victim			X	
Search				
Transport			X	

C.9.7 SV-6 System Exchange Matrix (DoDAF Systems Resource Flow Matrix)

The SV-6 summarizes the interactions between the resources in the SV-1 and SV-2. Table C.11 shows the interactions between the SAR resources. Additional fields can also be includes such as measurements associated with the exchange.

Table C.11 – SV-6

Resource Interaction		Producer	Connector / Interface	Consumer
Name	Conveyed	Resource	Name	Resource
AI	aircraftInstruction	MRT Helicopter Pilot	Resource Interface	Aircraft
BCI	beaconInstruction	MRT Searcher	Resource Interface	Lighting Device
BI	boatInstruction	MRT Boat Driver	Resource Interface	Boat
DS	distressSignal	Lighting Device	Resource Connector	ESM System
DS	distressSignal	Lighting Device	Resource Connector	ESM System
LPI	lifePreserverInstruction	MRT Swimmer	Resource Interface	Life Saving Device
RI	radioInstruction	MRT Communicator	Resource Interface	Communication Device
RI1	radioInstruction	Communication Device	Resource Connector	Communication Device
RI2	radioInstruction	Communication Device	Resource Connector	Communication Device
TD1	TDM	Link 16	Resource Connector	Link 16
TD2	TDM	Link 16	Resource Connector	Link 16
TRK1	track	Link 16	Resource Connector	ESM System
TRK2	track	Link 16	Resource Connector	ESM System

C.9.8 SV-7 Resource Performance Parameters (DoDAF Systems Measures Matrix)

This view defines the types of measurements that are important to the system resources. It consists of measurable, qualitative properties. It is normally shown in tabular form. Figure C36 shows the Capability Configurations that are linked to the various measurements.

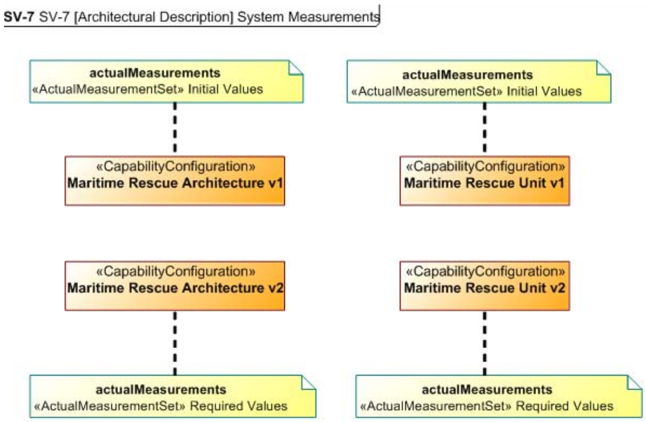


Figure C.36 - SV-7

Table C.12 shows the SV-7 in tabular format, specifying qualitative and quantitative characteristics of resources. These are the same measurements that were defined in Figure C.3 and Figure C.4. This is a generated report.

Table C.12 - SV-7 in Tabular Format

	Actual Measurement Set							
Name	**Name**	**Intention**	**Measurement**	**Minimum Value**	**Actual Value**	**Maximum Value**	**Unit**	**Dimension**
Maritime Rescue Unit v1	Initial Values	Estimate	seaConditions	Sea State 1	Sea State 6	Sea State 10	Meter	Wave Height
			areaCoverage	100	500	1000	SquareKilometers	Area
			findTime	4	<8 hours	8	Hours	Time
			persistence	5	>15 hours	22	Hours	Time
			searchCoverage	200	400	600	SquareKilometers	Area
			weatherConditions	Calm	Heavy Rain	Hurricane	Weather Severity Index	
Maritime Rescue Unit v2	Required Values	Required	seaConditions	Sea State 1	Sea State 8	Sea State 10	Meter	Wave Height
			areaCoverage	100	600	1000	SquareKilometers	Area
			findTime	4	<5 hours	8	Hours	Time
			persistence	5	>20 hours	22	Hours	Time
			searchCoverage	200	500	600	SquareKilometers	Area
			weatherConditions	Calm	Stormy	Hurricane	Weather Severity Index	
	Final Values	Result	seaConditions	Sea State 1	Sea State 8	Sea State 10	Meter	Wave Height
			areaCoverage	100	650	1000	SquareKilometers	Area
			findTime	4	<4 hours	8	Hours	Time
			persistence	5	>20 hours	22	Hours	Time
			searchCoverage	200	550	600	SquareKilometers	Area
			weatherConditions	Calm	Stormy	Hurricane	Weather Severity Index	
Monitor								

C.9.9 SV-8 System Capability Configuration Management (DoDAF Systems Evolution Matrix)

The SV-8 view is used to show the whole lifecycle of a resource showing how its configuration changes over time. It shows the capabilities, the resources that implement those capabilities, and any constituent components. Table C.13 shows the lifecycles for Assistance, Search, and Distress Signal Monitoring. Note that Distress Signal Monitoring does not have any implementing resources. This is also useful information.

Table C.13 - SV-8

<table>
<tr><th>Capability</th><th colspan="2">Realizing Resource</th><th colspan="6">Milestone Dates</th></tr>
<tr><th>Name</th><th>Name</th><th>Components</th><th>2010-01-01</th><th>2010-07-01</th><th>2010-08-01</th><th>2010-11-01</th><th>2011-01-01</th><th>2011-05-01</th></tr>
<tr><td rowspan="8">Assistance</td><td>«Capability Configuration»
Maritime Rescue Unit v2</td><td></td><td></td><td></td><td>Increment</td><td></td><td></td><td>Out Of Service</td></tr>
<tr><td rowspan="6">«Capability Configuration»
Maritime Rescue Unit v1</td><td>«Resource Artifact»
Lighting Device</td><td rowspan="6">Increment</td><td rowspan="6"></td><td rowspan="6"></td><td rowspan="6">Out Of Service</td><td rowspan="6"></td><td rowspan="6"></td></tr>
<tr><td>«Resource Artifact»
Life Saving Device</td></tr>
<tr><td>«Resource Artifact»
Aircraft</td></tr>
<tr><td>«Resource Artifact»
Boat</td></tr>
<tr><td>«Organization»
Maritime Rescue Team</td></tr>
<tr><td>«Resource Artifact»
Communication Device</td></tr>
<tr><td>«Capability Configuration»
Automated Rescue Unit v1</td><td></td><td></td><td>Increment</td><td></td><td></td><td>Out Of Service</td><td></td></tr>
<tr><td>Distress Signal Monitoring</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="8">Search</td><td>«Capability Configuration»
Maritime Rescue Unit v2</td><td></td><td></td><td></td><td>Increment</td><td></td><td></td><td>Out Of Service</td></tr>
<tr><td rowspan="6">«Capability Configuration»
Maritime Rescue Unit v1</td><td>«Resource Artifact»
Lighting Device</td><td rowspan="6">Increment</td><td rowspan="6"></td><td rowspan="6"></td><td rowspan="6">Out Of Service</td><td rowspan="6"></td><td rowspan="6"></td></tr>
<tr><td>«Resource Artifact»
Life Saving Device</td></tr>
<tr><td>«Resource Artifact»
Aircraft</td></tr>
<tr><td>«Resource Artifact»
Boat</td></tr>
<tr><td>«Organization»
Maritime Rescue Team</td></tr>
<tr><td>«Resource Artifact»
Communication Device</td></tr>
<tr><td>«Capability Configuration»
Automated Rescue Unit v1</td><td></td><td></td><td>Increment</td><td></td><td></td><td>Out Of Service</td><td></td></tr>
</table>

C.9.10 SV-9 Technology and Skills Forecast (DoDAF Systems Technology and Skills Forecast)

The SV-9 provides a summary of the current and emerging technologies and skills that impact on the Resources that constitute the architecture. The example shown in Figure C.37 and Table C.14 show the technology forecasts for the resource artifacts used in the systems views. Reports can also be created for competencies (Skill in DoDAF), posts (PersonType in DoDAF), organizations (OrganizationType in DoDAF), etc.

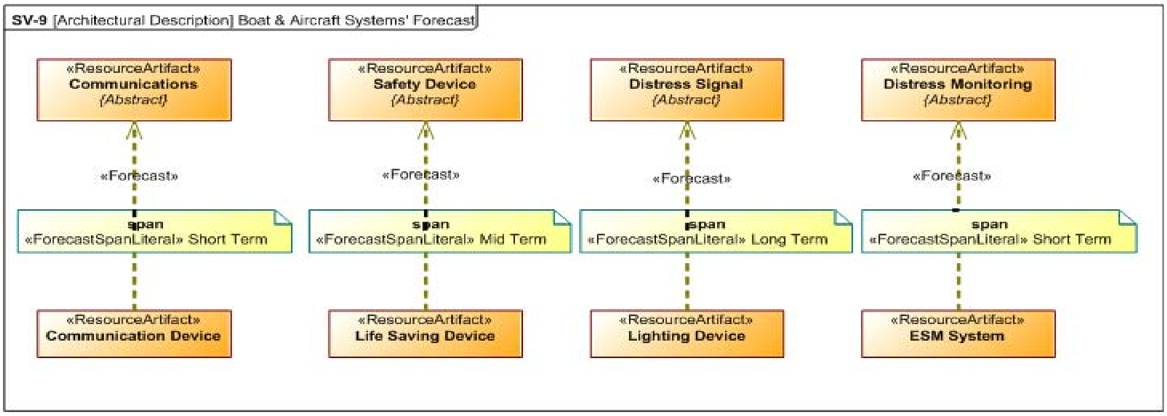


Figure C.37 – SV-9

C.9.11 SV-9 Technology and Skills Forecast

Table C.14 shows the tabular view of the technology forecast for the system resources.

Table C.14 – SV-9

Category Type	Category	Short Term	Long Term	Mid Term
«ResourceArtifact»	Communications	Communication Device		
«ResourceArtifact»	Distress Monitoring	ESM System		
«ResourceArtifact»	Distress Signal		Lighting Device	
«ResourceArtifact»	Safety Device			Life Saving Device

C.9.12 SV-10a System Rules and Constraints (DoDAF Systems Rules Model)

The SV-4 defines the functional specification of the behavior of the system resources. The SV-10a, SV-10b, and SV-10c augment this by defining the constraints, state behavior, and sequence of interactions of the resources. Table C.15 defines the constraints on a sample of system resources.

Table C.15 - SV-10a

	Resource Constraint	
Name	**Name**	**Text**
Boat	GMDSS Vessel Requirements	Ships subject to Title II Part II and Part III of the Communications Act of 1934, as amended have to fit GMDSS equipment under FCC Regulation 47 CFR 80 Subpart W. These include all ships, including fishing vessels, to be navigated in the open sea outside of a harbor or port, except: Ships other than passenger vessels less than 300 gross tonnage, Passenger ships having six passengers or less, U.S. government ships, Yachts of less than 600 gross tons, Vessels in tow, Ships navigating solely on any bays, sounds, rivers or protected waters within the U.S., Ships being navigated within the Great Lakes of North America, and Small passenger ships meeting the requirements of 47 CFR 80 Subpart S.
	Marine Vessel Communications	Mariners need to be able to communicate with other ships of any size or nationality. Mariners need to be able to receive and send urgent maritime safety information. Mariners need to be able to send or receive distress alerts in an emergency to or from rescue coordination centers ashore and nearby ships anywhere in the world.
	Radio Watch Keeping	In general, any vessel equipped with a VHF marine radiotelephone (whether voluntarily or required to) must maintain a watch on channel 16 (156.800 MHz) whenever the radiotelephone is not being used to communicate.
Communication Device	Distress System Usage	The radiotelephone alarm signal is used only in a distress, including when a person has been lost overboard and the assistance of other vessels is required.
	GMDSS Equipment Operation	A GMDSS Radio Operator's License is necessary for a person to use required GMDSS equipment.
Lighting Device	Distress System Usage	The radiotelephone alarm signal is used only in a distress, including when a person has been lost overboard and the assistance of other vessels is required.
Safety Device	[none]	[none]

C.9.13 SV-10b Resource State Transition Description (DoDAF System State Transition Description)

The SV-10b uses a state diagram to describe the resource's responses to the various events that it can receive. It can also be to show the operational states of the resource. Figure C.38 shows the state based behavior for the aircraft.

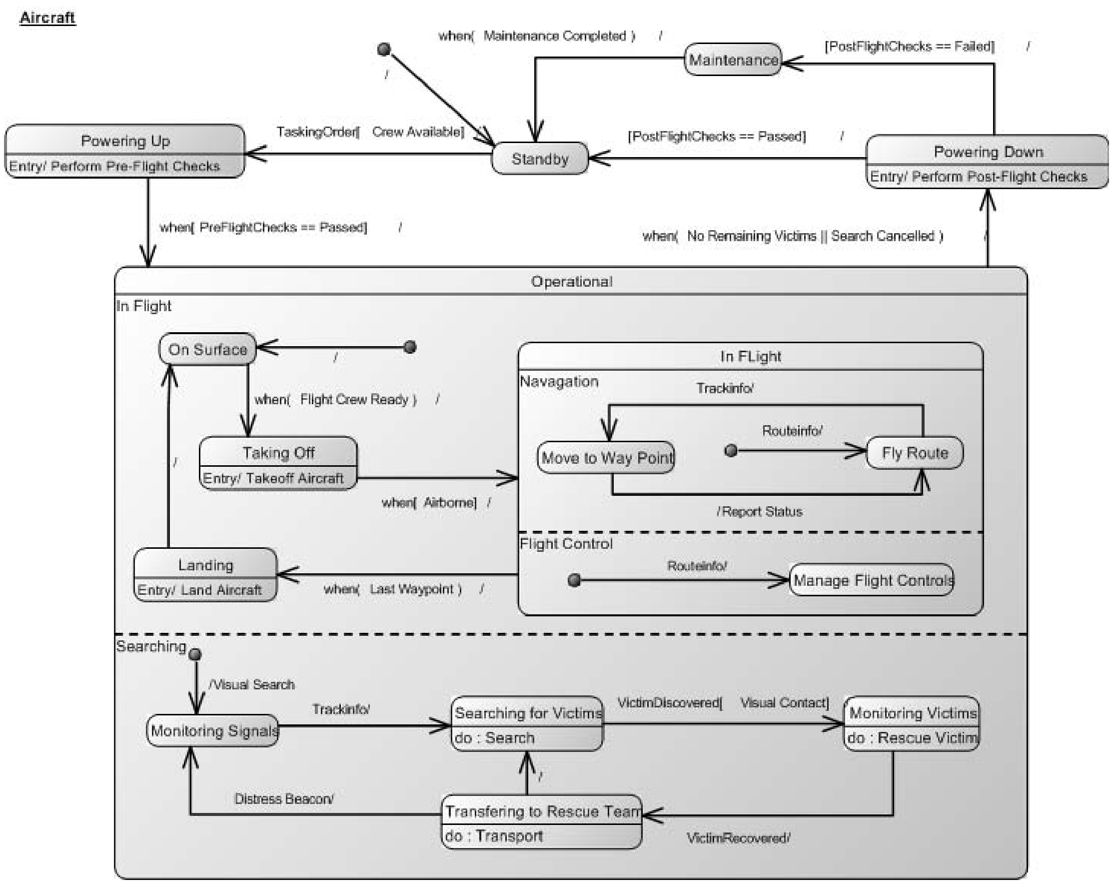


Figure C.38 – SV-10b

C.9.14 SV-10c Resource Event Trace Description (DoDAF System Event Trace Description)

The SV-10c defines a sequence of interaction between system resources in time order normally to execute a scenario or to fulfill some other functional requirement. This diagram is normally used once the architecture has been well defined. It is useful as a means of determining if sufficient interactions and system resources have been define to allow the architecture to fulfill its functional requirements. Figure C.39 shows a search and rescue scenario.

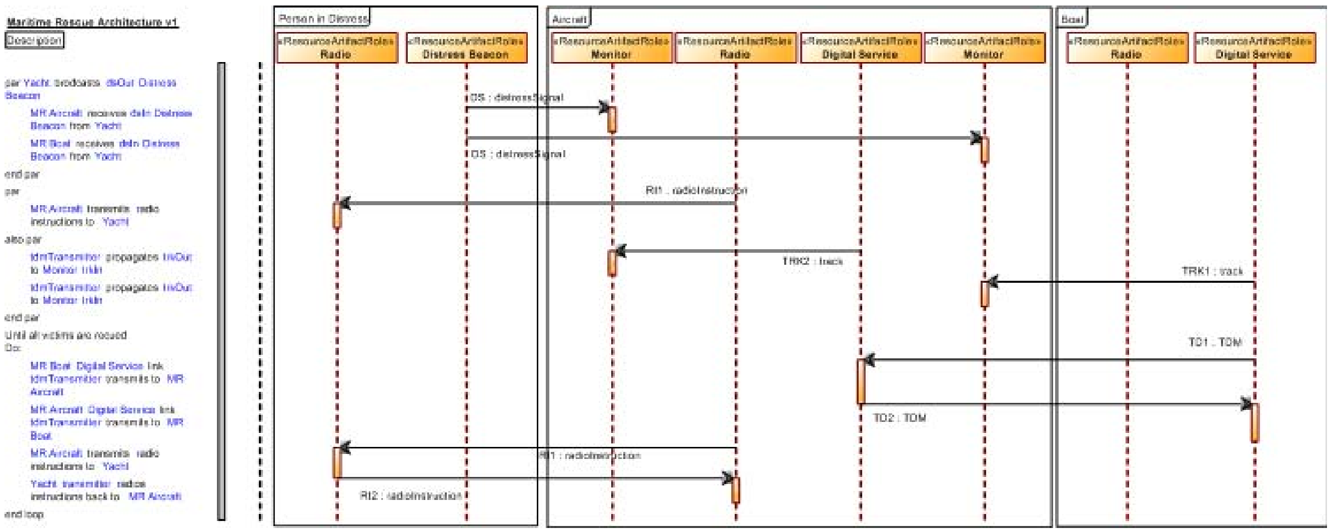


Figure C.39 – SV-10c

C.9.15 SV-11 Physical Schema (DoDAF DIV-3)

The SV-11 defines the structure of various kinds of system data that are utilized by the system resources. These are the data elements used by the SV-1, SV-2, SV-4, and SV-10c interactions. Data elements are defined that are defined by entities. These entities can have complex structures. Figure C.40 shows the initial stages of the definition of the SAR data model.

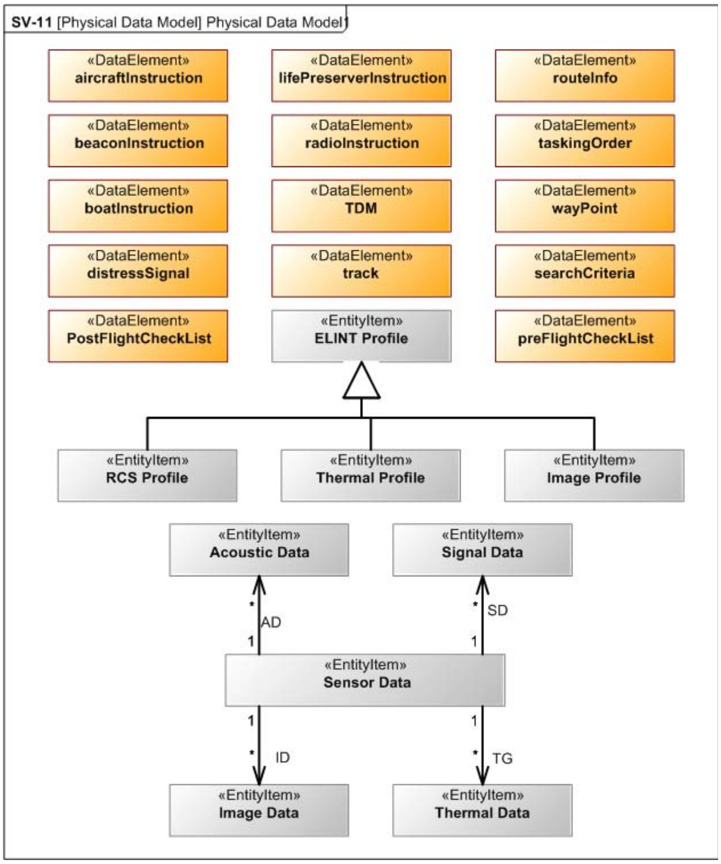


Figure C.40 – SV-11

C.9.16 SV-12 System Service Provision

The SV-12 is used to describe the system resources that deliver services. This takes the form of a matrix report. The service provision relationship is provided by the service point on the SV-1 and SV-2 diagrams. Table C.16 shows the system resources that provide these services. Note that they can be Posts, System Artifacts, Capability Configurations, etc.

Table C.16 – SV-12

	Air Transportation Service	Communications Services	Medical Services	Rescue Service	Search Service
«CapabilityConfiguration» Maritime Rescue Unit v1				X	X
«Post» MRT Searcher			X		
«ResourceArtifact» Aircraft	X				
«ResourceArtifact» Boat					
«ResourceArtifact» Communication Device		X			

C.10 Acquisition Views (DoDAF Project Views)

The Acquisition views identify top-level tasks in the acquisition process. They help you understand how resources, assets and capabilities are acquired during the life of the project. It gives you the ability to perform analysis to determine if the resources can be obtained, if they are available in the time they are needed, and the overall effect on the schedule. They can also show whether or not complete coverage of the Defence Lines of Development (DLOD) (known as DOTMLPF in the DoD are fully covered.

C.10.1 AcV-1 System of Systems Acquisition Clusters (DoDAF PV-1)

The AcV- 1 represents an organizational perspective of the program. It allows the user to model the organizational structures needed to manage a portfolio of projects. Table C.17 shows who is responsible for the SAR Project, as well as the project type.

Table C.17 – AcV-1

Project Owner	Actual Project
Department Of Transport	SAR Manual Project I
	SAR Automation Project
	SAR Manual Project II

C.10.2 AcV-2 Program Timeline (DoDAF PV-2)

The AcV-2 Program Timeline diagram allows management the ability to view a summary of project status across the complete program timeline. It also provides a means of viewing the DLOD status for each of the defined milestones for the project. This and the AcV-3 diagram provide much of the information for the StV-3 (DoDAF CV-3) view. Figure C.41 shows the 3 projects and their associated milestones. They are spaced according to time order. The pie charts represent the DLODs and their meaning is defined on the key to the right. The example is somewhat artificial in that the milestones are all spaced 6 months apart. This has been done for clarity of reading.

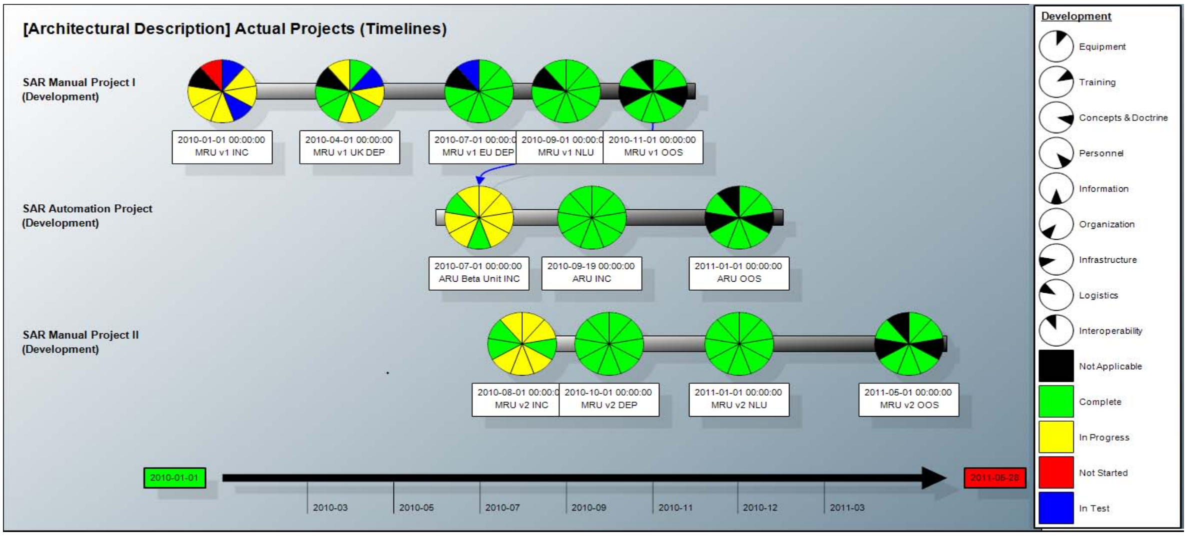


Figure C.41 – AcV-2

C.10.3 AcV-3 Typical Project (DoDAF PV-3)

The AcV-3 class diagram provides a means of defining projects and project types. In Figure C.42, the development project can contain other development projects. Development projects contain milestones containing project themes corresponding to DLOD (DoD DOTMLPF) themes.

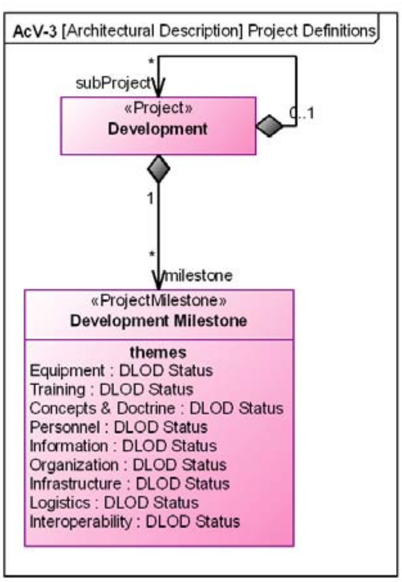


Figure C.42 - AcV-3 Class Diagram

C.10.4 AcV-3 Actual Project Instance (DoDAF PV-3)

The AcV-3 provides a means of defining actual projects and actual project milestones. In Figure C.43 three SAR projects and their project milestones are shown.

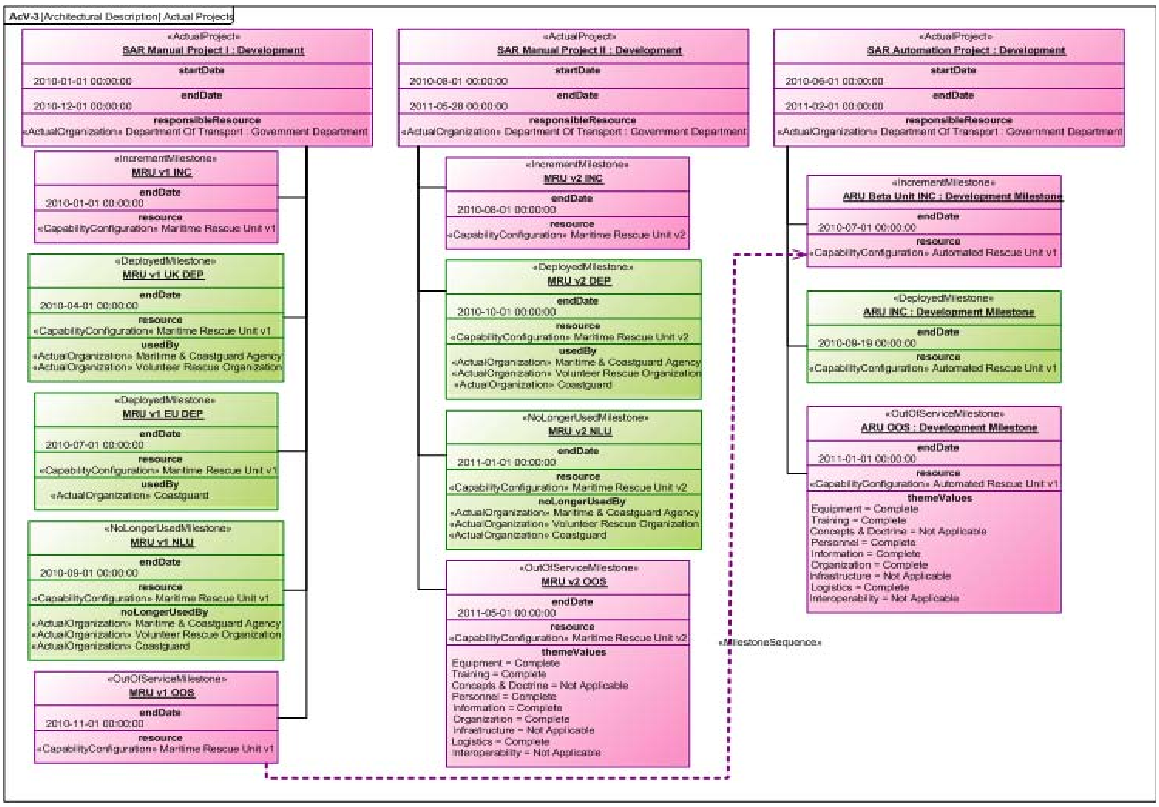


Figure C.43 - AcV-3 Actual

The project also contains increment and deployment milestones that provide a means of showing when resources are deployed and rendered out of service as well as capability increments. An example out of service milestone is shown in Figure C.44.

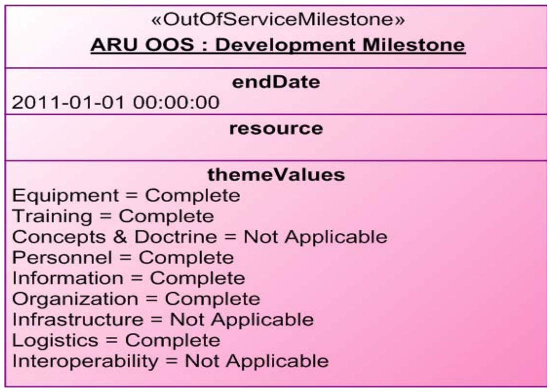


Figure C.44 – AcV-3 Additional Milestone Types

C.11 Technical Views (DoDAF Standards Views)

The Technical views identify the standards, rules, policy and guidance that are applicable to parts of the architecture and the architecture as a whole. Communications protocols can also be defined.

C.11.1 TV-1 Standards Profile (DoDAF StdV-1)

The TV-1 report is in the form of a matrix and summarizes the architecture elements that conform to the various defined standards. Table C.18 shows the conforming elements on the left and the applicable standards across the top. Systems can conform to multiple standards as in the Link 16.

Table C.18 – TV-1

Conforming Elements	«Standard» Global Maritime Distress and Safety System (GMDSS)	«Standard» MGN 324 Operational Guidance on the Use Of VHF Radio and Automatic Identification Systems	«Standard» MIL-STD-6016	«Standard» STANAG 5516	«Standard» USCG Marine Radio Information For Boaters
«ResourceArtifact» Communication Device (SAR Architecture::Resources::Resource Artifacts)		X			X
«ResourceArtifact» ESM System (SAR Architecture::Resources::Resource Artifacts)	X				
«ResourceArtifact» Lighting Device (SAR Architecture::Resources::Resource Artifacts)	X				
«ResourceArtifact» Link 16 (SAR Architecture::Resources::Resource Artifacts)			X	X	
«ResourcePort» dsIn (SAR Architecture::Resources::Resource Artifacts::ESM System)	X				
«ResourcePort» dsOut (SAR Architecture::Resources::Resource Artifacts::Lighting Device)	X				
«ResourcePort» receiver (SAR Architecture::Resources::Resource Artifacts::Communication Device)		X			X
«ResourcePort» tdmReceiver (SAR Architecture::Resources::Resource Artifacts::Link 16)			X	X	
«ResourcePort» tdmTransmitter (SAR Architecture::Resources::Resource Artifacts::Link 16)			X	X	
«ResourcePort» transmitter (SAR Architecture::Resources::Resource Artifacts::Communication Device)		X			X

C.11.2 TV-2 Standards Forecast (DoDAF StdV-2)

UPDM provides a class diagram and report format for the TV-2. The class diagram form provides a means of defining the standards and their attributes as well as linking the standards forecasts to them. Figure C.45 shows the various SAR standards provided by ASTM. ASTM International, originally known as the American Society for Testing and Materials (ASTM) is now an international standards body with standards ranging from safety in recreational aviation, to fiber optic cable installations in underground utilities, to homeland security. More information on them can be found at www.ASTM.org. The spans shown are for illustration purposes only. They are normally shown to denote emerging standards.

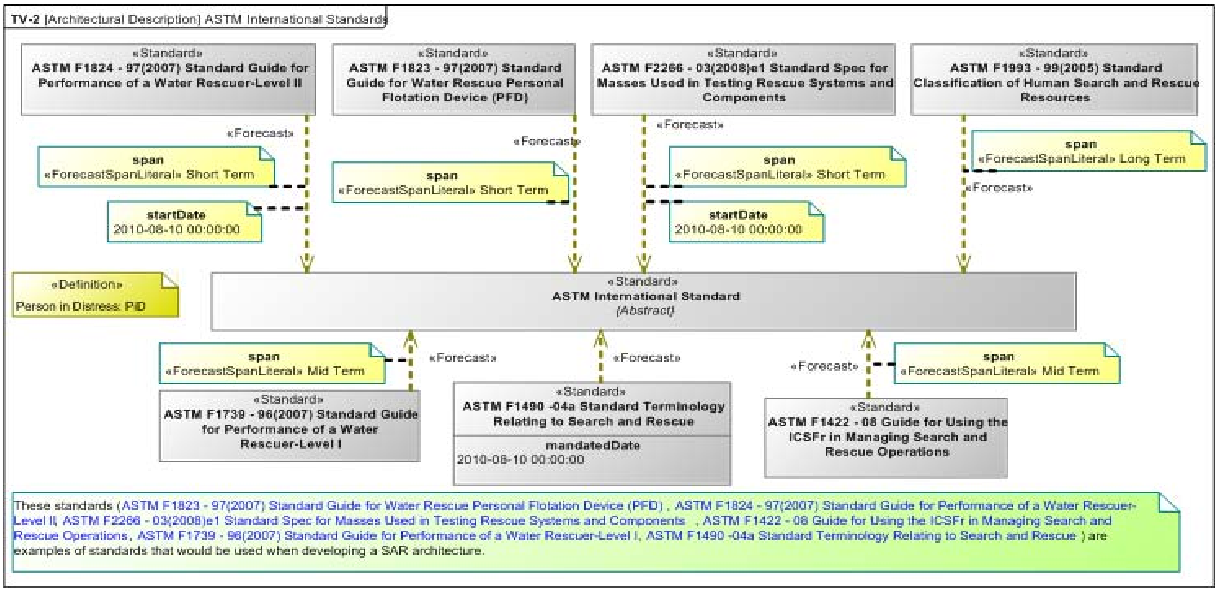


Figure C.45 – TV-2

Figure C.46 shows a variety of standards for marine radio, Link 16, and distress monitoring. These are part of the Capability Configuration shown in the SV-2 diagram.

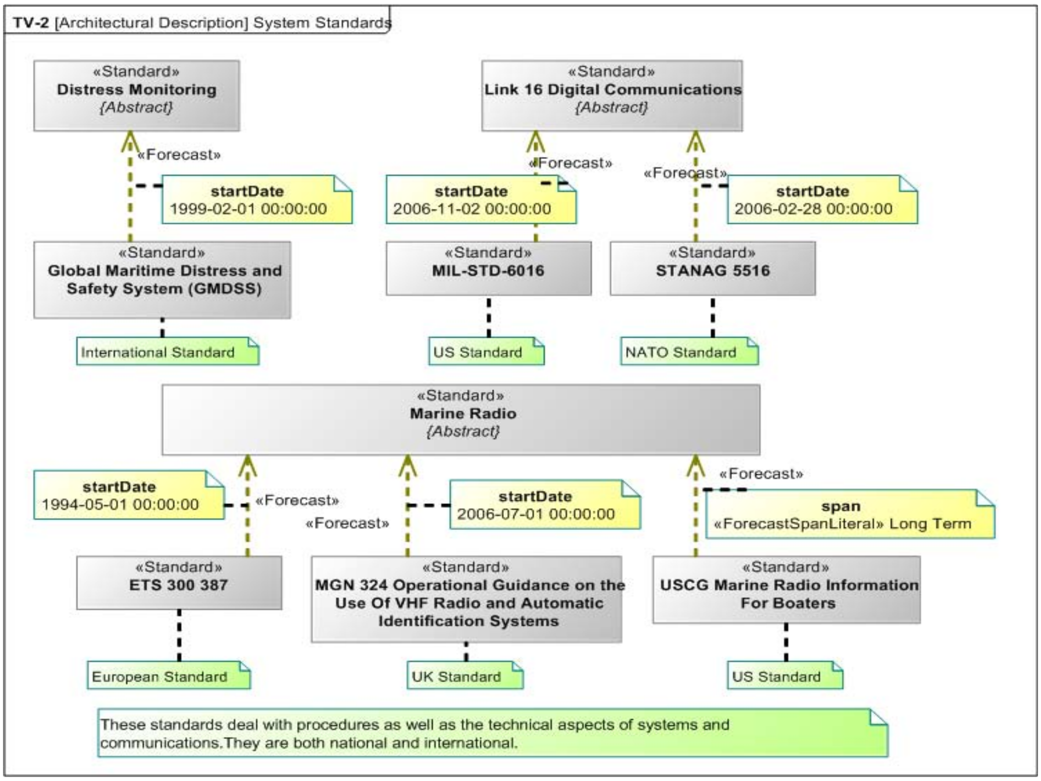


Figure C.46 – TV-2

C.11.3 TV-2 Standards Forecast Tabular Form (DoDAF StdV-2)

Table C.19 shows a summary of the ASTM international standards.

Table C.19 – TV-2

Category Type	Category	Mid Term	Short Term	Long Term	[Undefined]
«Standard»	ASTM International Standard	ASTM F1422 - 08 Guide for Using the ICSFr in Managing Search and Rescue Operations ASTM F1739 - 96(2007) Standard Guide for Performance of a Water Rescuer-Level I	ASTM F2266 - 03(2008)e1 Standard Spec for Masses Used in Testing Rescue Systems and Components ASTM F1823 - 97(2007) Standard Guide for Water Rescue Personal Flotation Device (PFD) ASTM F1824 - 97(2007) Standard Guide for Performance of a Water Rescuer-Level II	ASTM F1993 - 99(2005) Standard Classification of Human Search and Rescue Resources	ASTM F1490 -04a Standard Terminology Relating to Search and Rescue

C.12 A Simple Example of SysML Parametrics

C.12.1 SysML Parametrics

Parametric diagrams are used to describe constraints on system properties to support engineering analysis. In order to support this type of modeling a ConstraintBlock has been introduced into OMG SysML. A ConstraintBlock defines a set of parameters and one or more constraints on the parameters. The parameters and the connectors do not have direction by default. Hence, the constraint relationships are acausal in nature. Causality can be automatically interpreted based on the state of the model (i.e. what variables are known and what are unknown). These ConstraintBlocks are used in a parametric diagram to constrain system properties. ConstraintBlocks may be used to express mathematical equations such as ‘F=m•a’ and ‘a = δv/δt’, or statistical values and utility functions such as might be used in trade studies. Based on the reusable concept of a block new ConstraintBlocks can be built by reusing more primitive ConstraintBlocks such as basic mathematical operators. As shown in Figure C.47, blocks can also own constraint blocks. Blocks can also own parametric diagrams. This is in fact a more consistent, more scalable, more persistent, and can be less confusing for people new to parametric diagrams.

SysML also defines a model of value types that can have units and dimensions and probability distributions. The value types are used to type properties of blocks. The Parametric Diagram is a specialized variant of an internal block diagram that restricts diagram elements to represent constraint blocks, their parameters and the block properties that they bind to. Both parameters and properties may be represented as small “pin-like” boxes to help make the diagrams more scalable.

For more information on Parametric diagrams and SysML, refer to the following documents:

http://eislab.gatech.edu/pubs/conferences/2007-incose-is-1-peak-primer/

http://eislab.gatech.edu/pubs/conferences/2007-incose-is-2-peak-diversity /

C.12.2 Scenario Overview

The search and rescue organization is considering using Unmanned Aerial Vehicles (UAV) to perform set search patterns. One of the parameters of search and rescue is to determine how long it will take to cover a specific search area. Various parameters are number of aircraft, crew availability, aircraft speed, aircraft total flight time, etc. With this information they can budget how many aircraft, crew, etc. they will need to help them achieve their goals. The Little Eye model was created by InterCAX to define such a scenario and demonstrate how parametrics can be used to provide trade-off analysis to answer these questions. We are grateful to them for letting us use their example.

C.12.3 SV-3 System Context

The Little System Block Definition Diagram (BDD) shown in Figure C.47 defines the context of the problem definition. It contains the Aircraft, Crew, and Fuel. They each have a set of values corresponding to the properties to be used in the trade-off analysis. For example, the crew has properties of Crew Time On, Number Available Crews, and Number Crews. These will be used as parameters for the parametric equations. The System Availability Equation and the Scanning Equation are owned by the Little Eye System defining the context. The crew has the Crew Availability Equation; the Fuel has the Fuel Availability Equation. Finally, Aircraft has the Aircraft, Night Camera, and Day Camera Availability Equations and the Aircraft Duty Cycle Equation. These equations used together will determine the optimum values for the system configurations.

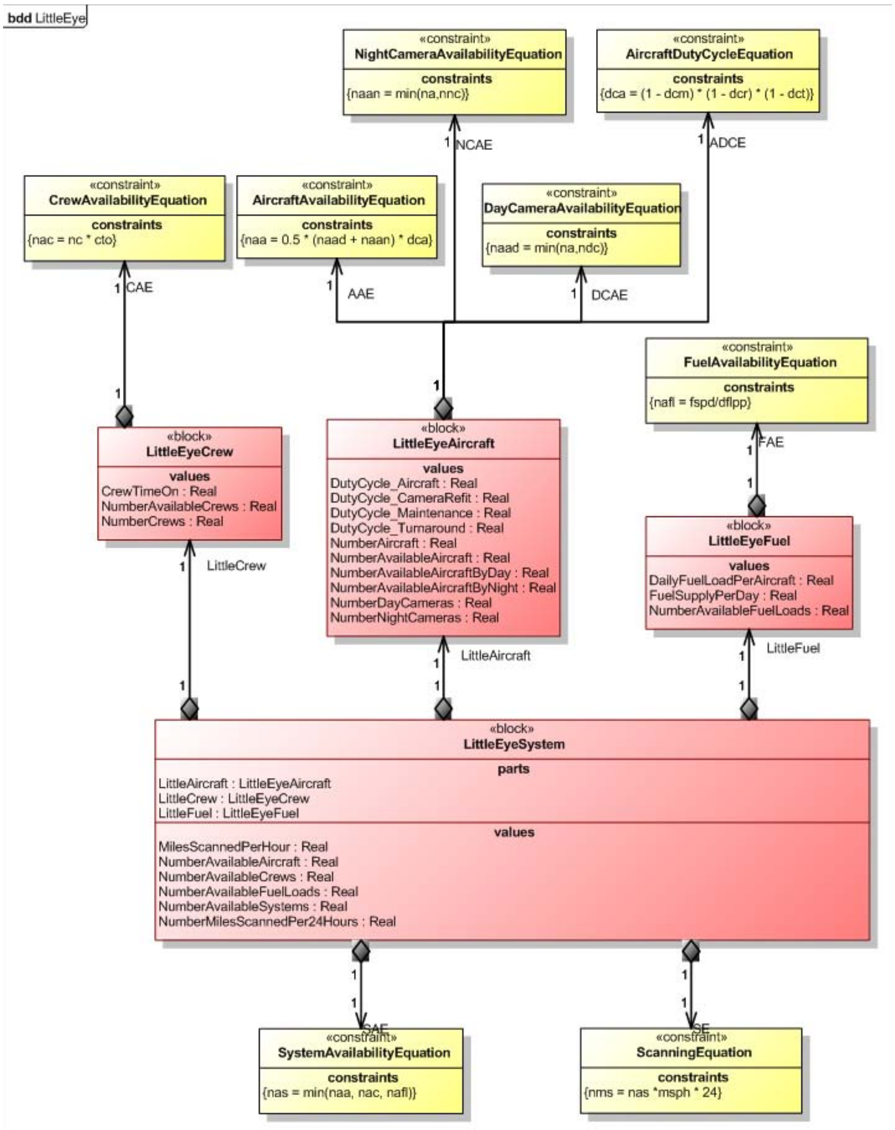


Figure C.47 – Block Definition Diagram

C.12.4 System Parametrics

Figure C.48 shows the Aircraft, Crew and Fuel value types linked to the System Context values.

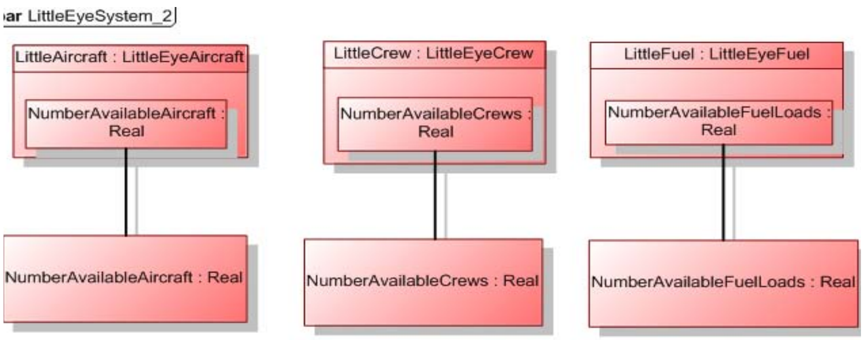


Figure C.48 - System Parametrics

C.12.5 Parametric Equations

Figure C.49 Shows the System Availability and Scanning Equations, their parameters, the value properties and the relationships between them.

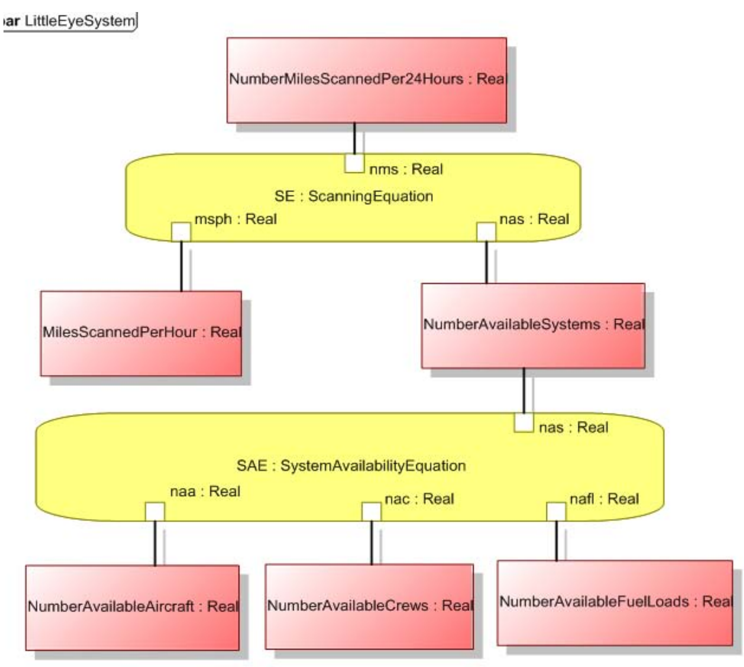


Figure C.49 – Scanning and Availability Equations

Figure C.50 shows the Fuel Availability Equation.

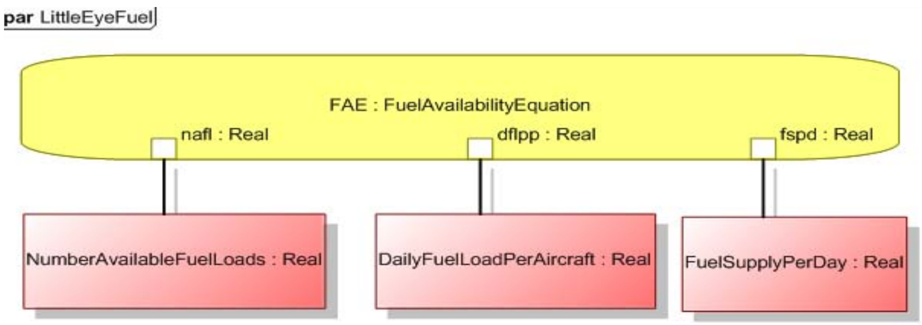


Figure C.50 – Fuel Availability Equation

Figure C.51 shows the Crew Availability Equation.

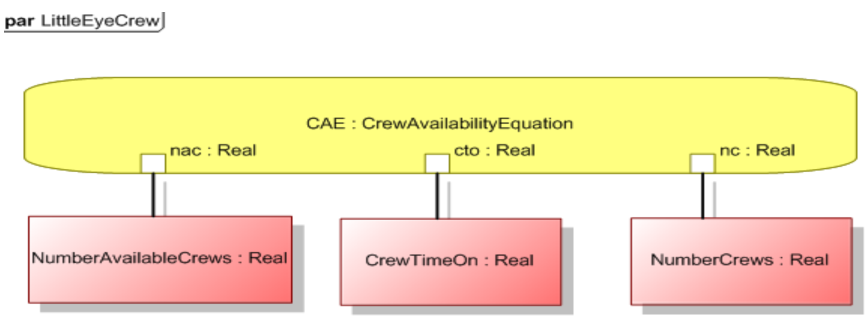


Figure C.51 - Crew Availability Equation

This diagram shows the constraint properties in Little Eye Aircraft. All these parametric equations can be combined together to define the trade-off analysis definition to provide a means of calculating the optimum configuration.

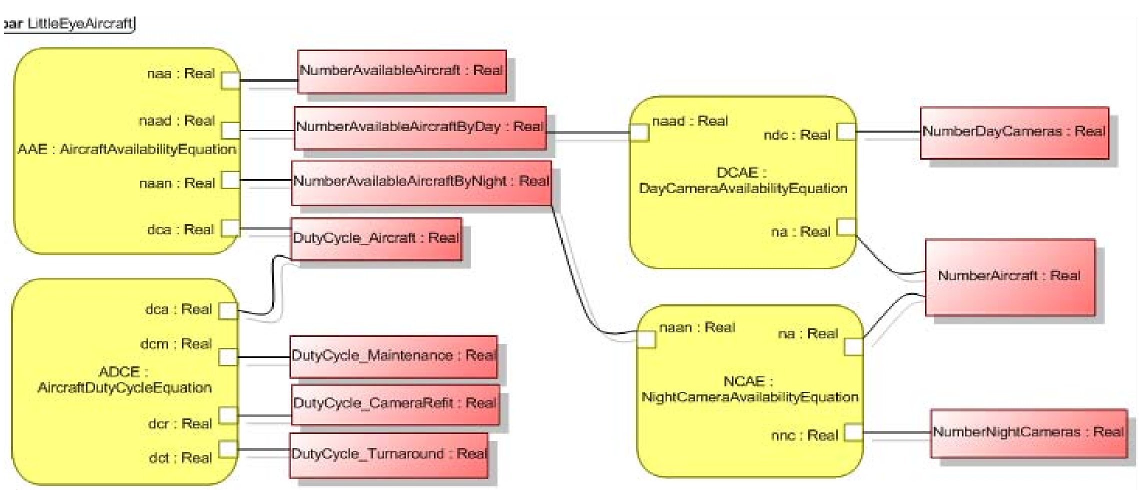


Figure C.52 - Aircraft System Parametric

C.12.6 Instance Diagram

To perform the trade-off analysis calculations an instance diagram of the system components is created as shown in Figure C.53. Initial values are created for some of the value properties as a means of defining set values against which the equation solver can work.

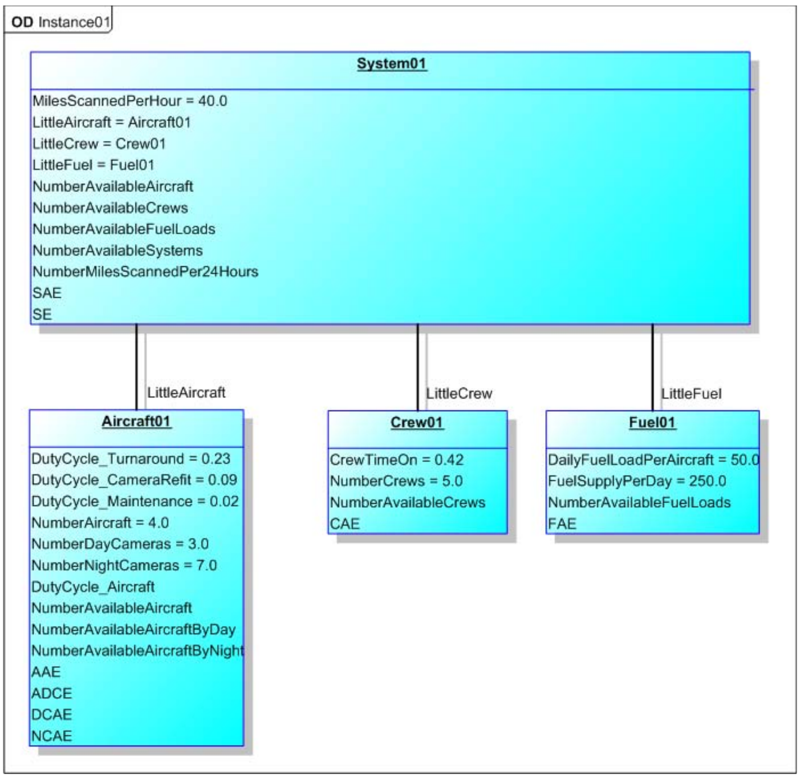


Figure C.53 - System Instance Diagram

Annex D - Bibliography

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