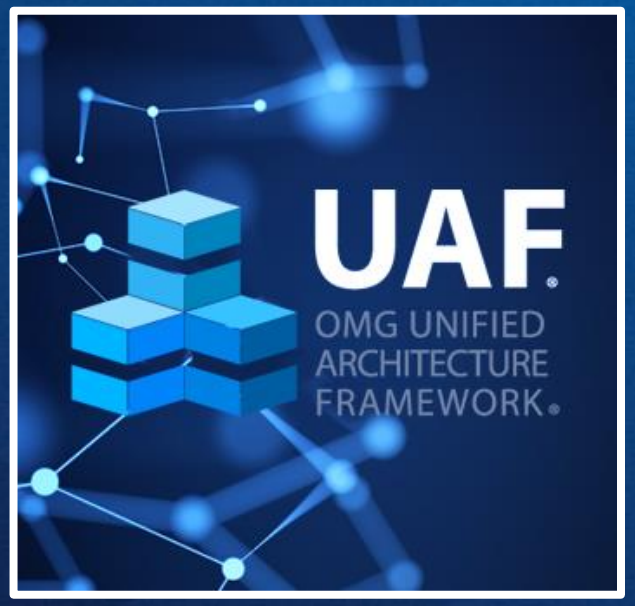


Object Management Group

2023 UAF® SUMMIT

ACTIONABLE ARCHITECTURE IN THE 21ST CENTURY – A HYBRID EVENT

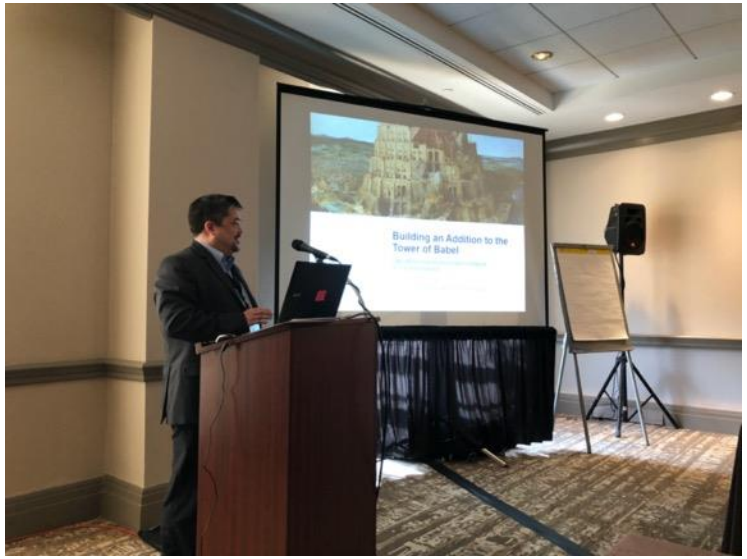
Hosts

Laura E. Hart

Dr. Aurelijus Morkevicius

Matthew Hause

UAF Annual Events



Object Management Group®

UAF Annual Events Calendar

- UAF and MBSE Information Day, 2015, Reston, VA
- UAF and MBSE Summit, 2016, Reston, VA,
- UAF and MBSE Summit, 2017, Reston, VA,
- UAF, UPDM, and MBSE tutorials, 2017, Reston, VA,
- UAF and MBSE Summit, 2017, Brussels, Belgium
- UAF and MBSE tutorials, 2017, Brussels, Belgium
- UAF and MBSE Summit, 2018, Reston, VA
- UAF and MBSE tutorials, 2018, Reston, VA
- MBSE-inspired Actionable Enterprise Architectures Summit, 2018, Ottawa, Canada
- MBSE-inspired Actionable Enterprise Architectures Tutorials, 2018, Ottawa, Canada
- MBSE-inspired Actionable Enterprise Architectures Summit, 2019, Reston, VA
- UAF in the context of the NATO Architecture Framework (NAF), 2019, Amsterdam, Netherlands
- UAF Summit: Actionable Architecture in the 21st century, 2020, Virtual
- UAF Summit: Actionable Architecture in the 21st century and beyond, 2021, Virtual
- UAF Summit: Actionable Architecture in the 21st century - Hybrid event, 2022, Reston, VA
- UAF Tool Vendor Roadshow, - Hybrid event, 2022, Austin, TX

https://www.brighttalk.com/search/?q=UAF

UAF Summit: Actionable Architecture in the 21st century - Hybrid event, 2023, Reston, VA

Object Management Group

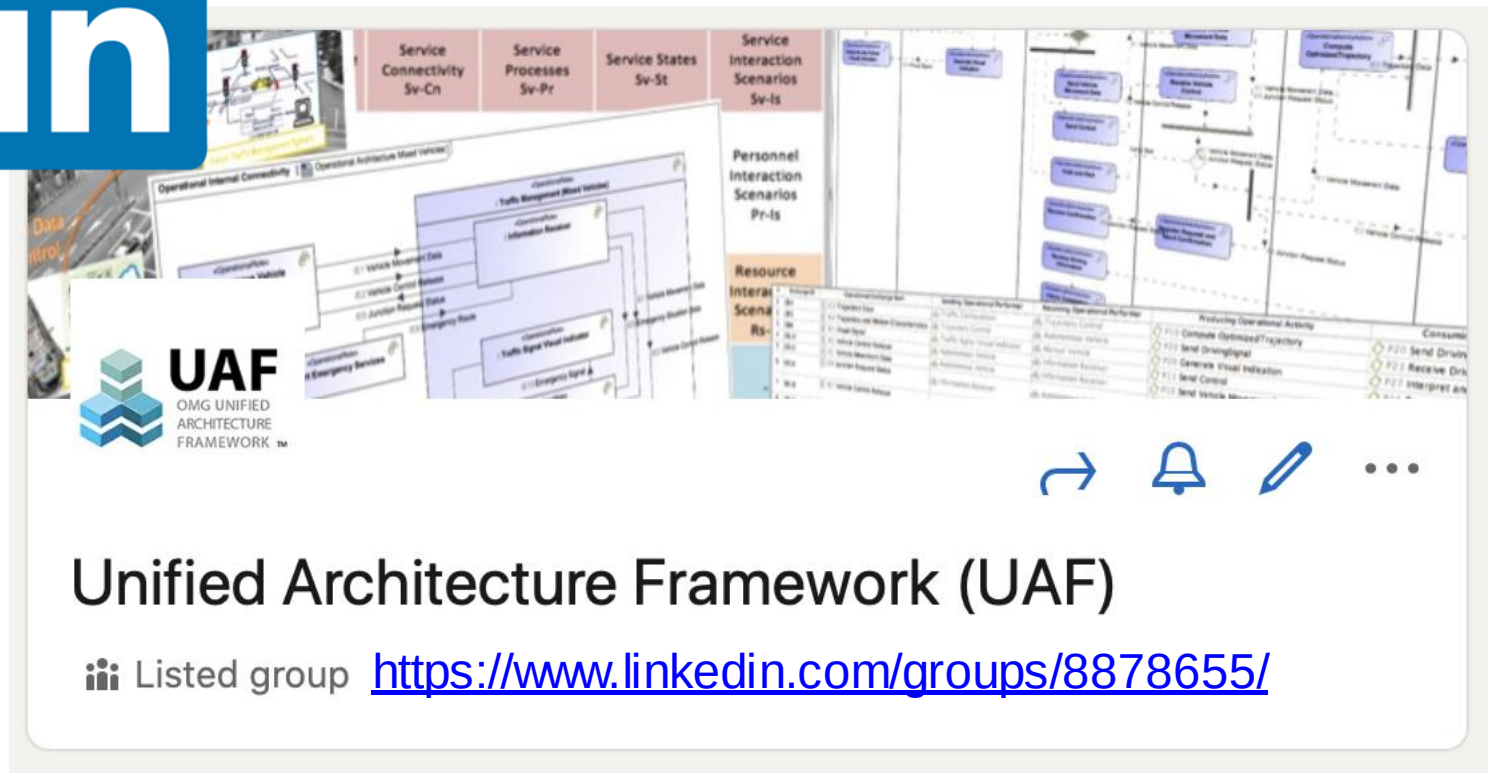
Morning Agenda

Time (EST)	
9:00 – 9:30	Welcome Address: Technology Update on Unified Architecture Framework *Co-Chair: Aurelijus Morkevicius, Industry Process Consulting Director (Dassault Systèmes)* *Co-Chair: Laura Hart, Research Engineer Senior Manager (Lockheed Martin)*
9:30 – 10:00	**Morning Keynote:** Application of UAF in Support Mission Engineering of Early Stage Concept Development *Bill Jankowski, Model Based Mission Engineering Lead (Naval Sea Systems Command/Naval Undersea Warfare Center, Newport)*
10:00 – 10:30	**Morning Break**
10:30 – 11:00	Applying UAF and The Airbus MBSE Framework within Future Combat Air System Development *Dominique Ernadote, MBSE Senior Expert (Airbus), Jörg Wirtz, Senior Manager Process, Methods & Tools FCAS (Airbus), Lalitha Abhaya, Systems Architect (Airbus)*
11:00 – 11:30	Using the Unified Architecture Framework in Support of Mission Engineering Activities *James Martin, Distinguished Engineer (The Aerospace Corporation)*
11:30 – 12:00	Keeping People First in the Smart Cities Enterprise *Jennifer Russell, Program & Management Support Leader (Garver), Matthew Hause, Principal Consultant (System Strategy)*
12:00 – 13:30	**Lunch Break**

Afternoon Agenda

Time (EST)	
13:30 – 14:15	**Afternoon Keynote:** Aligning to Industry Best Practices; UAF @ OSD *Daniel Hettema, Director of Digital Engineering, Modeling and Simulation (Office of the Under Secretary of Defense for Research & Engineering)*
14:15 – 14:45	OMG UAF Model Based Acquisition (MBAcq) Overview and Update *Laura Hart, Research Engineer Senior Manager (Lockheed Martin)*
14:45 – 15:15	How I Stumbled Across A Domain Overlay and Why It's Actually Useful *Michael Shearin, Senior Research Engineer (Georgia Tech Research Institute)* *Richard Wise, Senior Research Engineer (Georgia Tech Research Institute)*
15:15 – 15:45	Afternoon Break
15:45 – 16:15	Lessons Learned While Applying Mission Engineering to The Military Acquisition Process Using The Unified Architecture Framework *Monte Porter, Consultant (Monte Porter Associates LLC)*
16:15 – 17:00	Closing Address: Q&A Session and Discussion *Co-Chair: Aurelijus Morkevicius, Industry Process Consulting Director (Dassault Systèmes)* *Co-Chair: Laura Hart, Research Engineer Senior Manager (Lockheed Martin)* *Co-Chair: Matthew Hause, Principal Consultant (System Strategy)*

Presentations will be recorded and made available on BrightTalk and Youtube!



Object Management Group

Who is behind?

Tool vendors:

- Dassault Systemes
- IBM
- KDM
- MEGA
- Orbus Software
- PTC
- Sparx Systems
- Tom Sawyer

Industry/ Government Contributors:

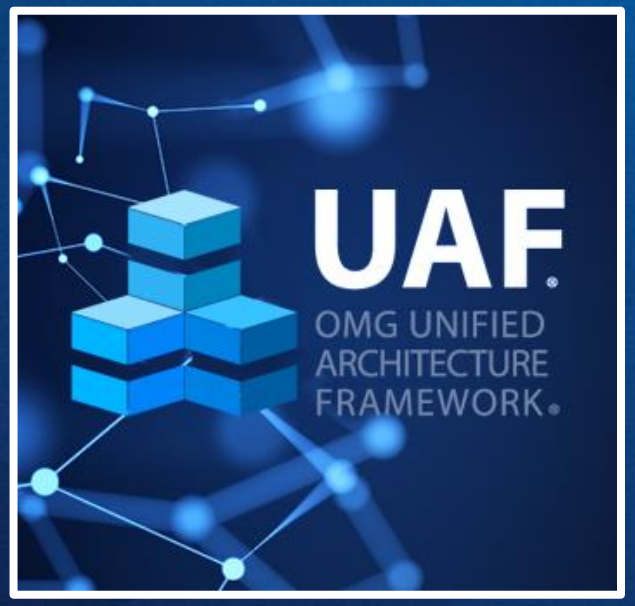
- Aerospace Corporation
- Airbus
- Arcfield
- BAE Systems
- Boeing
- Department of Navy (US)
- DoD CIO
- Lockheed Martin
- MITRE
- Northrop Grumman
- Rolls-Royce Corporation
- CAG Syntell
- Thales
- INCOSE and GfSE

Leadership

Laura E. Hart

Dr. Aurelijus Morkevicius

Matthew Hause



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2023 UAF® OVERVIEW

UAF is a Standard…

- To develop architectural descriptions for **commercial industries**, **federal governments** and **military organizations**
- Is compatible with **DoDAF** and **NAF**
- Has many different use cases from **Enteprise as a System** and **SoS** and **Cyber-Systems engineering** to enabler for **Digital Transformation planning**
- Developed by Object Management Group (OMG) with the leadership from Dassault Systemes, Lockheed Martin and System Strategy
- Is an international ISO standard ***ISO/IEC 19540:1*** *and* ***ISO/IEC 19540:2***
- Current version of UAF specification is 1.2
  https://www.omg.org/spec/UAF/1.2/About-UAF

UAF specification at a glance

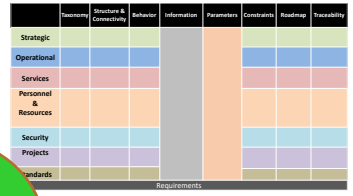
UAF
OMG UNIFIED ARCHITECTURE FRAMEWORK ™

Specification

EA guide (EAG)

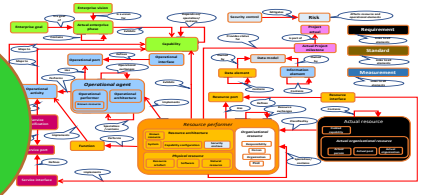
4

View specifications organized in viewpoints and aspects (Grid)



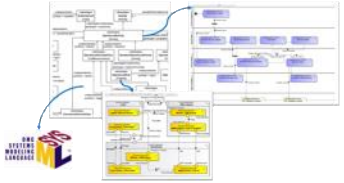
1

Domain MetaModel (DMM)



2

UAF Modeling Language (UAFML) based on SysML)



3

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UAF specification at a glance

The grid is a graphical way of organizing the various **view specifications** (cells), using **viewpoints** (horizontal rows) and **aspects** (the columns).

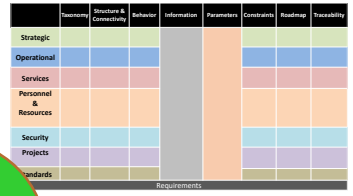
UAF
OMG UNIFIED ARCHITECTURE FRAMEWORK ™

Specification

EA guide (EAG)

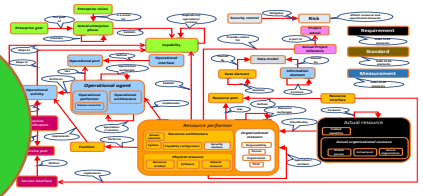
4

View specifications organized in viewpoints and aspects (Grid)



1

Domain MetaModel (DMM)



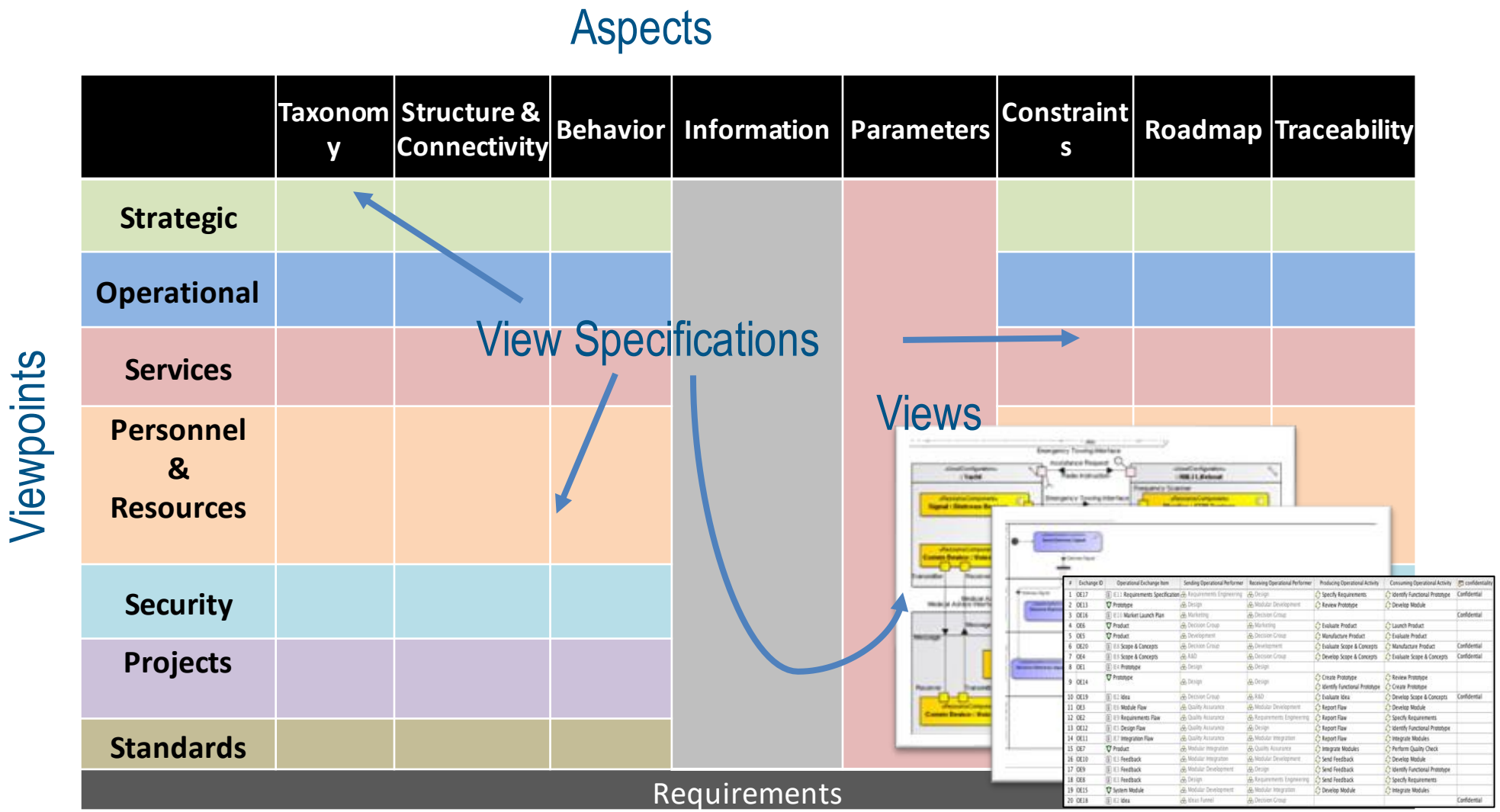
2

UAF Modeling Language (UAFML) based on SysML)

3

OMG Object Management Group®

UAF Grid



1

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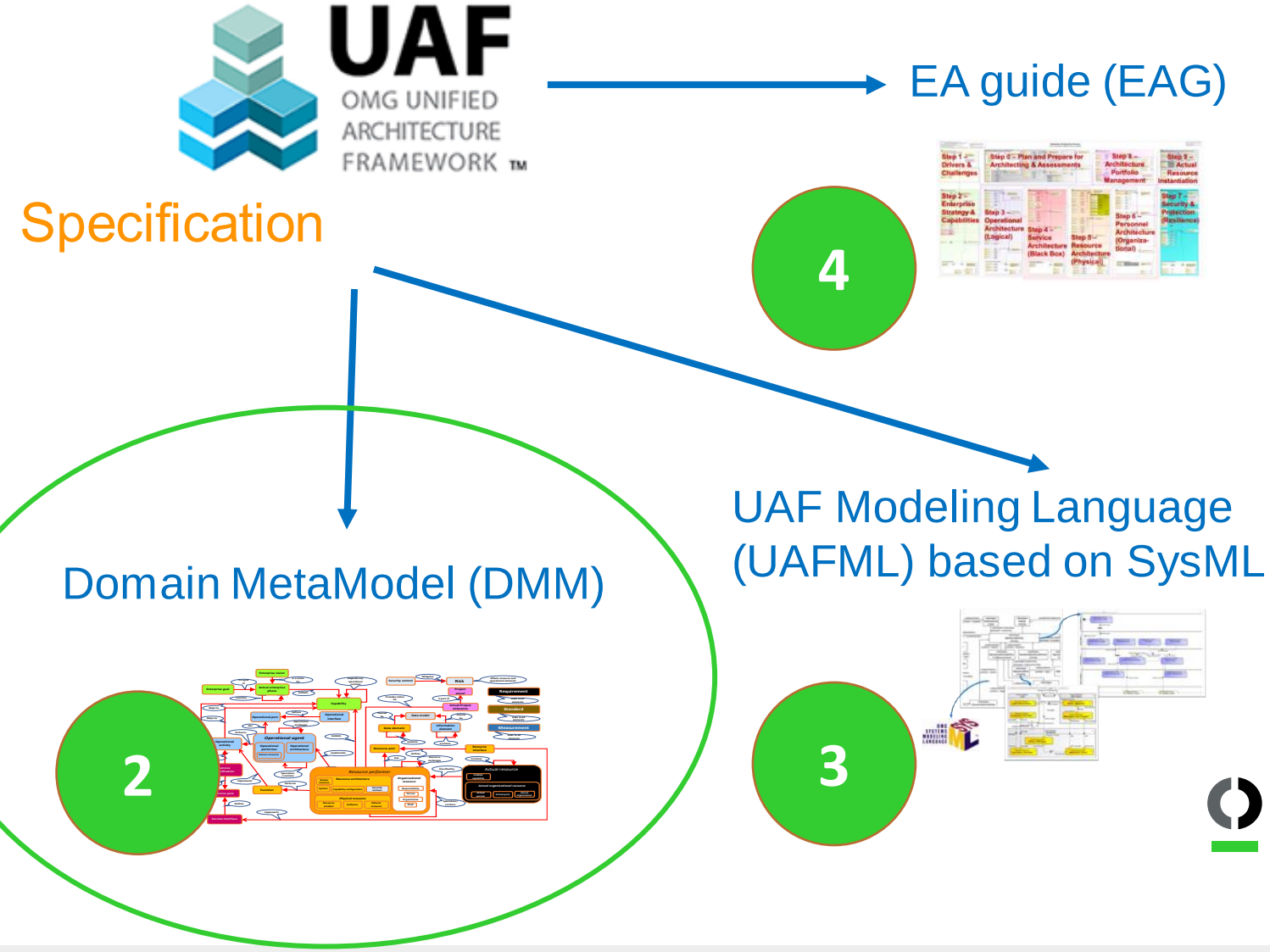
UAF OMG UNIFIED ARCHITECTURE FRAMEWORK	Motivation Mv	Taxonomy Tx	Structure Sr	Connectivity Cn	Processes Pr	States St	Sequences Sq	Information[c] If	Parameters[d] Pm	Constraints Ct	Roadmap Rm	Traceability Tr
Architecture Management[a] Am	Architecture Principles Am-Mv	Architecture Extensions Am-Tx[e]	Architecture Views Am-Sr	Architecture References Am-Cn	Architecture Development Method Am-Pr	Architecture Status Am-St		Dictionary Am-If	Architecture Parameters Am-Pm	Architecture Constraints Am-Ct	Architecture Roadmap Am-Rm	Architecture Traceability Am-Tr
Summary & Overview Sm-Ov												
Strategic St	Strategic Motivation St-Mv	Strategic Taxonomy St-Tx	Strategic Structure St-Sr	Strategic Connectivity St-Cn	Strategic Processes St-Pr	Strategic States St-St		Strategic Information St-If	Environment En-Pm-E and Measurements Me-Pm-M and Risks Rk-Pm-R	Strategic Constraints St-Ct	Strategic Deployment, St-Rm-D Strategic Phasing St-Rm-P	Strategic Traceability St-Tr
Operational Op	Requirements Rq-Mv	Operational Taxonomy Op-Tx	Operational Structure Op-Sr	Operational Connectivity Op-Cn	Operational Processes Op-Pr	Operational States Op-St	Operational Sequences Op-Sq	Operational Information Op-If		Operational Constraints Op-Ct		Operational Traceability Op-Tr
Services Sv		Services Taxonomy Sv-Tx	Services Structure Sv-Sr	Services Connectivity Sv-Cn	Services Processes Sv-Pr	Services States Sv-St	Services Sequences Sv-Sq			Services Constraints Sv-Ct	Services Roadmap Sv-Rm	Services Traceability Sv-Tr
Personnel Ps		Personnel Taxonomy Ps-Tx	Personnel Structure Ps-Sr	Personnel Connectivity Ps-Cn	Personnel Processes Ps-Pr	Personnel States Ps-St	Personnel Sequences Ps-Sq	Resources Information Rs-If		Competence, Drivers, Performance Ps-Ct	Personnel Availability Ps-Rm-A Personnel Evolution PS-Rm-E Personnel Forecast Ps-Rm-F	Personnel Traceability Ps-Tr
Resources Rs		Resources Taxonomy Rs-Tx	Resources Structure Rs-Sr	Resources Connectivity Rs-Cn	Resources Processes Rs-Pr	Resources States Rs-St	Resources Sequences Rs-Sq			Resources Constraints Rs-Ct	Resources evolution Rs-Rm-E Resources forecast Rs-Rm-F	Resources Traceability Rs-Tr
Security Sc	Security Controls Sc-Mv	Security Taxonomy Sc-Tx	Security Structure Sc-Sr	Security Connectivity Sc-Cn	Security Processes Sc-Pr					Security Constraints Sc-Ct		Security Traceability Sc-Tr
Projects Pj		Projects Taxonomy Pj-Tx	Projects Structure Pj-Sr	Projects Connectivity Pj-Cn	Projects Processes Pj-Pr						Projects Roadmap Pj-Rm	Projects Traceability Pj-Tr
Standards Sd		Standards Taxonomy Sd-Tx	Standards Structure Sd-Sr								Standards Roadmap Sd-Rm	Standards Traceability Sd-Tr
Actual Resources Ar			Actual Resources Structure, Ar-Sr	Actual Resources Connectivity, Ar-Cn	Simulation[b]					Parametric Execution/ Evaluation[b]		

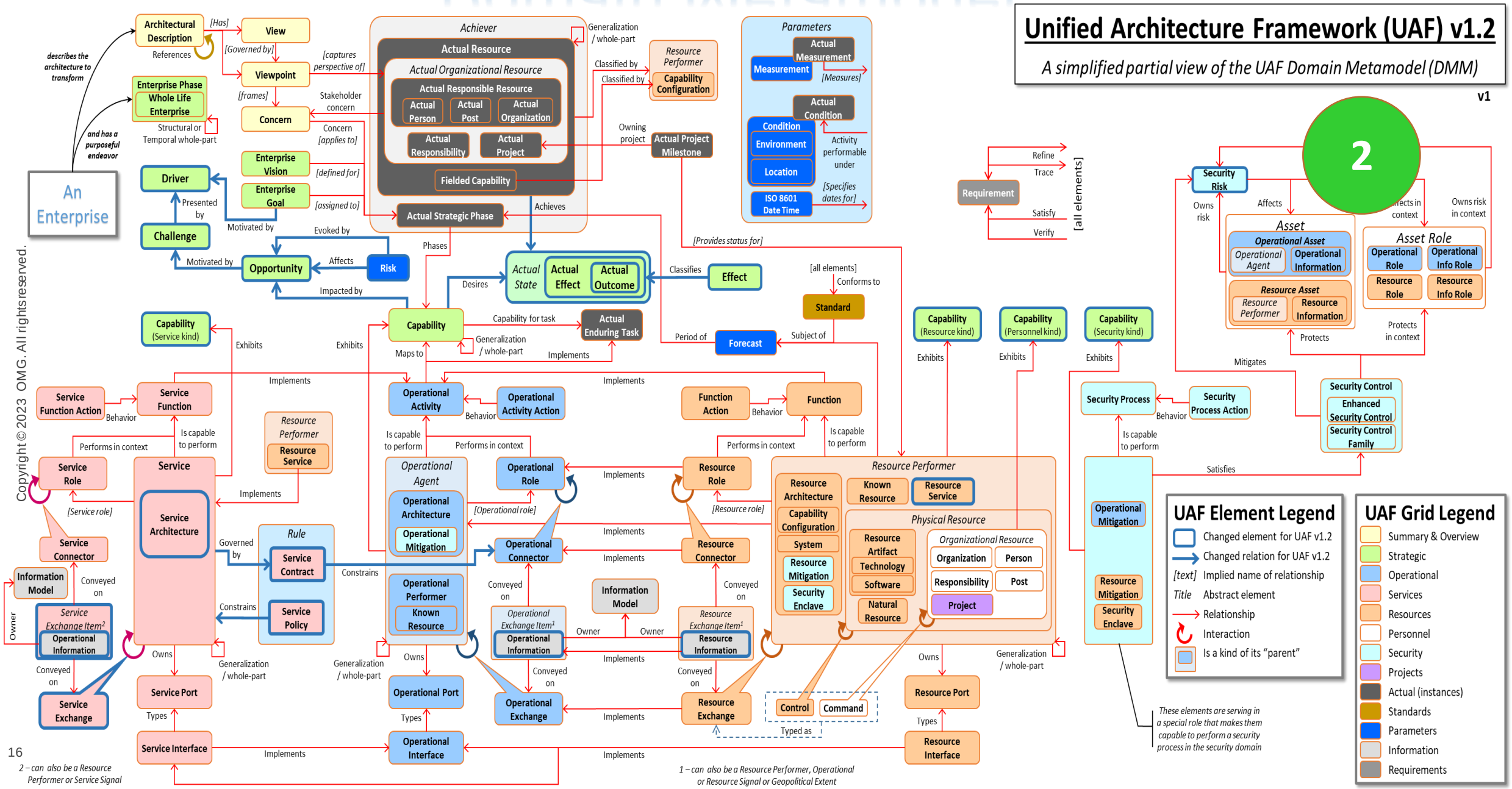
UAF specification at a glance

The UAF Domain Metamodel (DMM) establishes the underlying foundational modeling constructs to be used in modeling an enterprise and major entities within the enterprise. It provides the definition of **concepts**, **relationships** and viewpoints for the framework. The UAF DMM is the basis for any implementation of UAF including non-UML/SysML implementations.



Object Management Group

Domain Metamodel



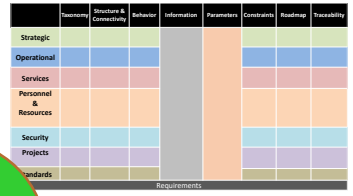
UAF specification at a glance

UAF
OMG UNIFIED ARCHITECTURE FRAMEWORK ™

Specification

The UAF Modeling Language (UAFML) is a UML/SysML specification for implementing the UAF DMM

View specifications organized in viewpoints and aspects (Grid)



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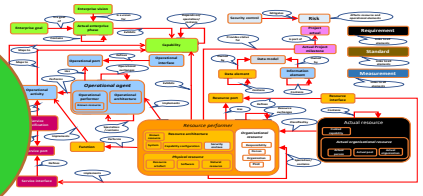
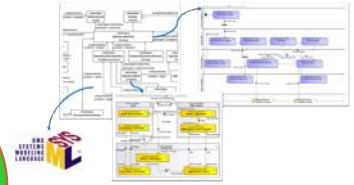
Domain MetaModel (DMM)



2

UAF Modeling Language (UAFML) based on SysML

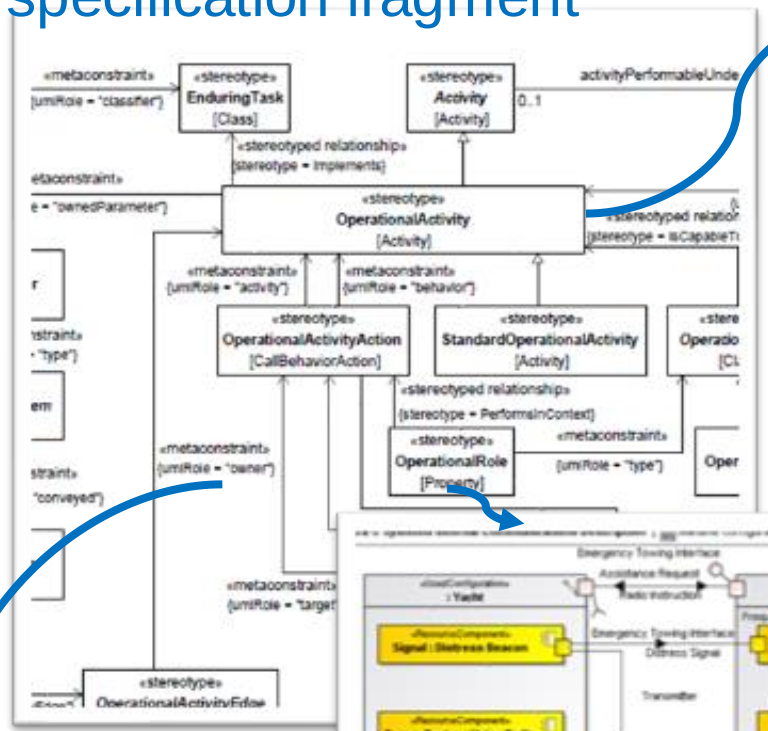


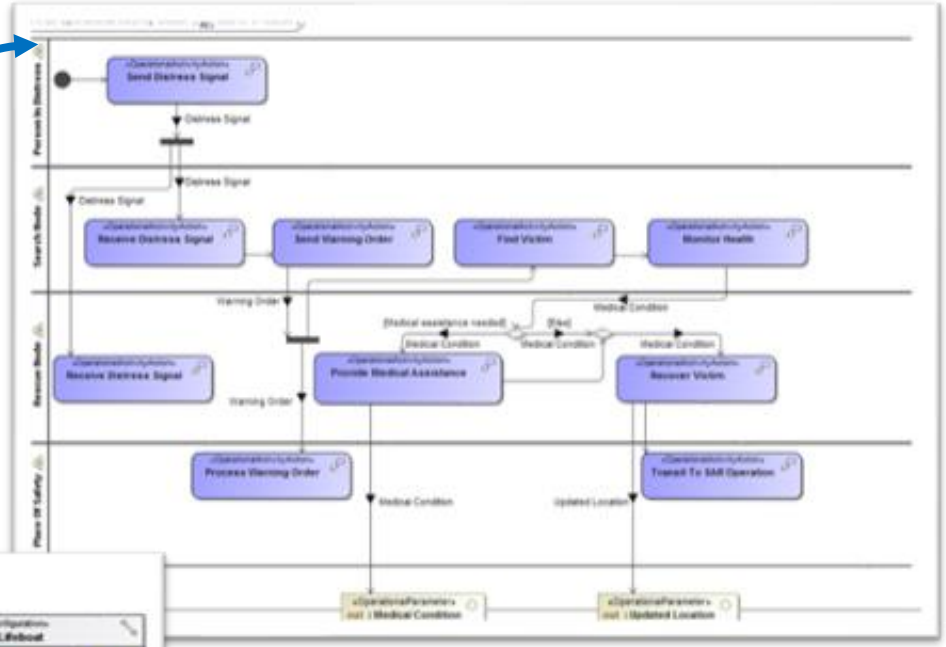
3

OMG Object Management Group®

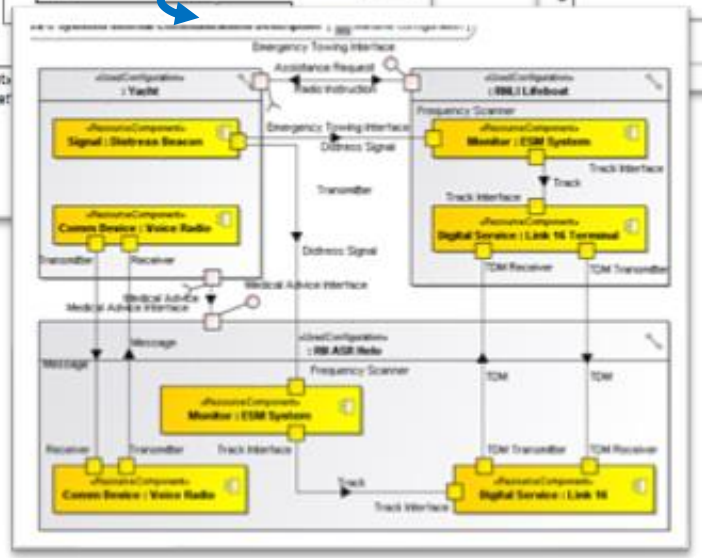
UAF Modeling Language (UAFML) – Implementation in SysML

UAFML specification fragment





Extends



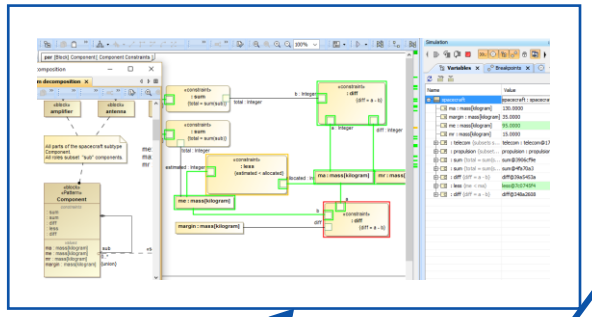
SysML Internal Block Diagram

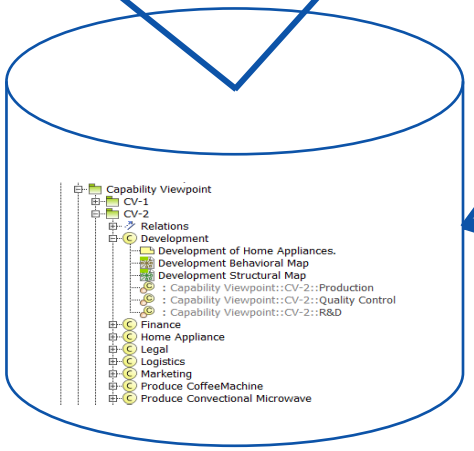
3

Architecture Model

FRONT END AND BACK END

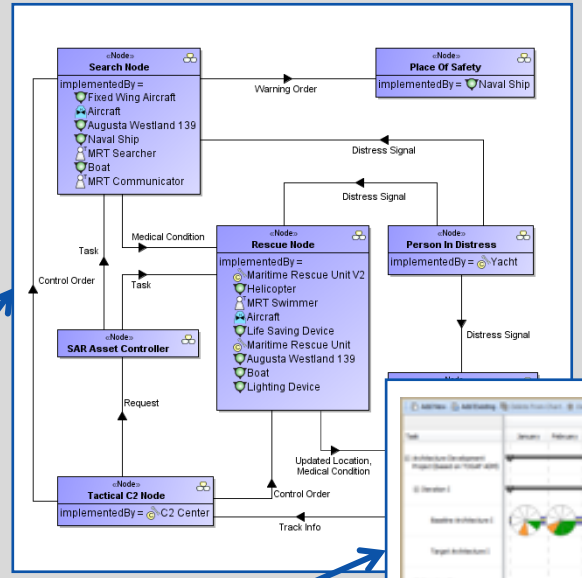
ANALYSIS & SIMULATION

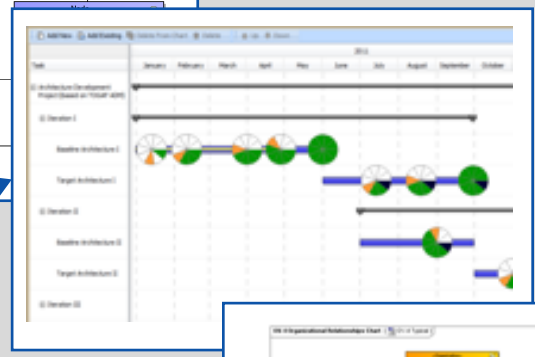


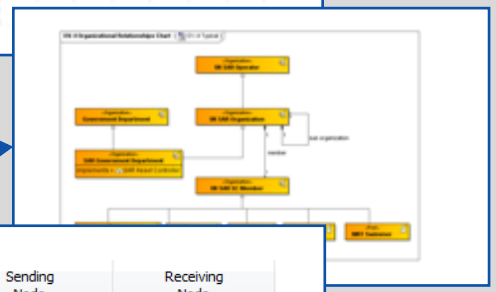


ARCHITECTURE MODEL

ARCHITECTURE VIEWS







#	Exchange ID	Needline ID	Operational Exchange Item	Sending Node	Receiving Node
1	IE7	7	Control Order	Tactical C2 Node	Search Node
2	IE8	8	Request	Tactical C2 Node	SAR Asset Controller
3	IE5	5	Control Order	Tactical C2 Node	Rescue Node
4	IE1	1	Warning Order	Search Node	Place Of Safety
5	IE10	10	Task	SAR Asset Controller	Search Node
6	IE9	9	Task	SAR Asset Controller	Rescue Node
7	IE2	2	Medical Condition	Search Node	Rescue Node
8	IE11	11	Distress Signal	Person In Distress	Search Node
9	IE3	3	Distress Signal	Person In Distress	Rescue Node
10	IE4	4	Distress Signal	Person In Distress	Monitoring Node
11	IE6	6	Track Info	Monitoring Node	Tactical C2 Node

UAF specification at a glance

The UAF Enterprise Architecture Guide (EAG) provides guidance on how to use the UAFML to model an architecture.

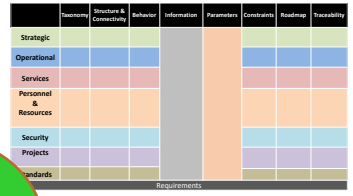
UAF
OMG UNIFIED ARCHITECTURE FRAMEWORK ™

Specification

EA guide (EAG)

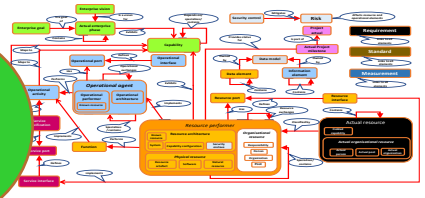
4

View specifications organized in viewpoints and aspects (Grid)



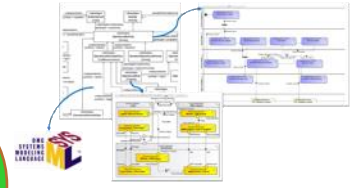
1

Domain MetaModel (DMM)



2

UAF Modeling Language (UAFML) based on SysML



3

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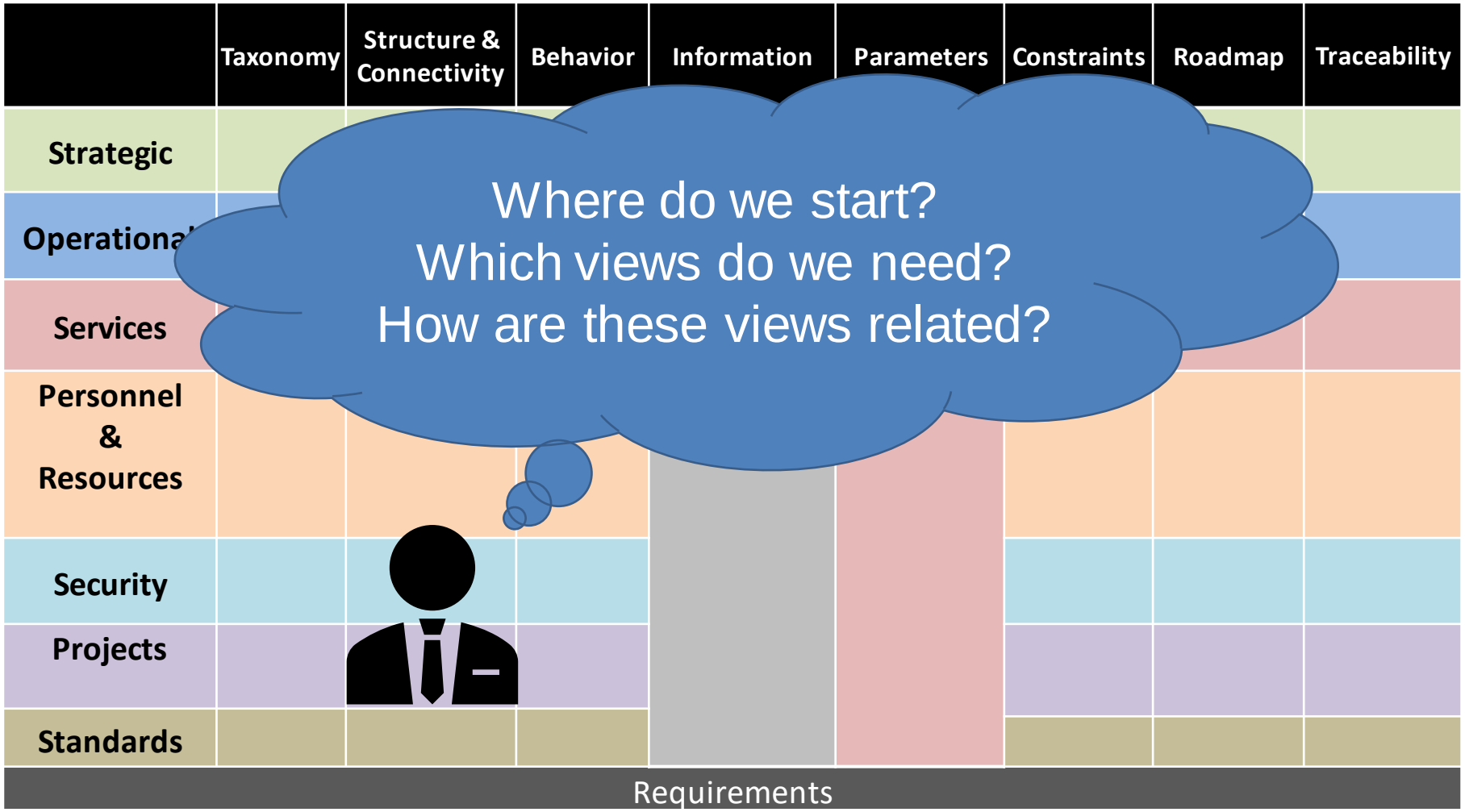
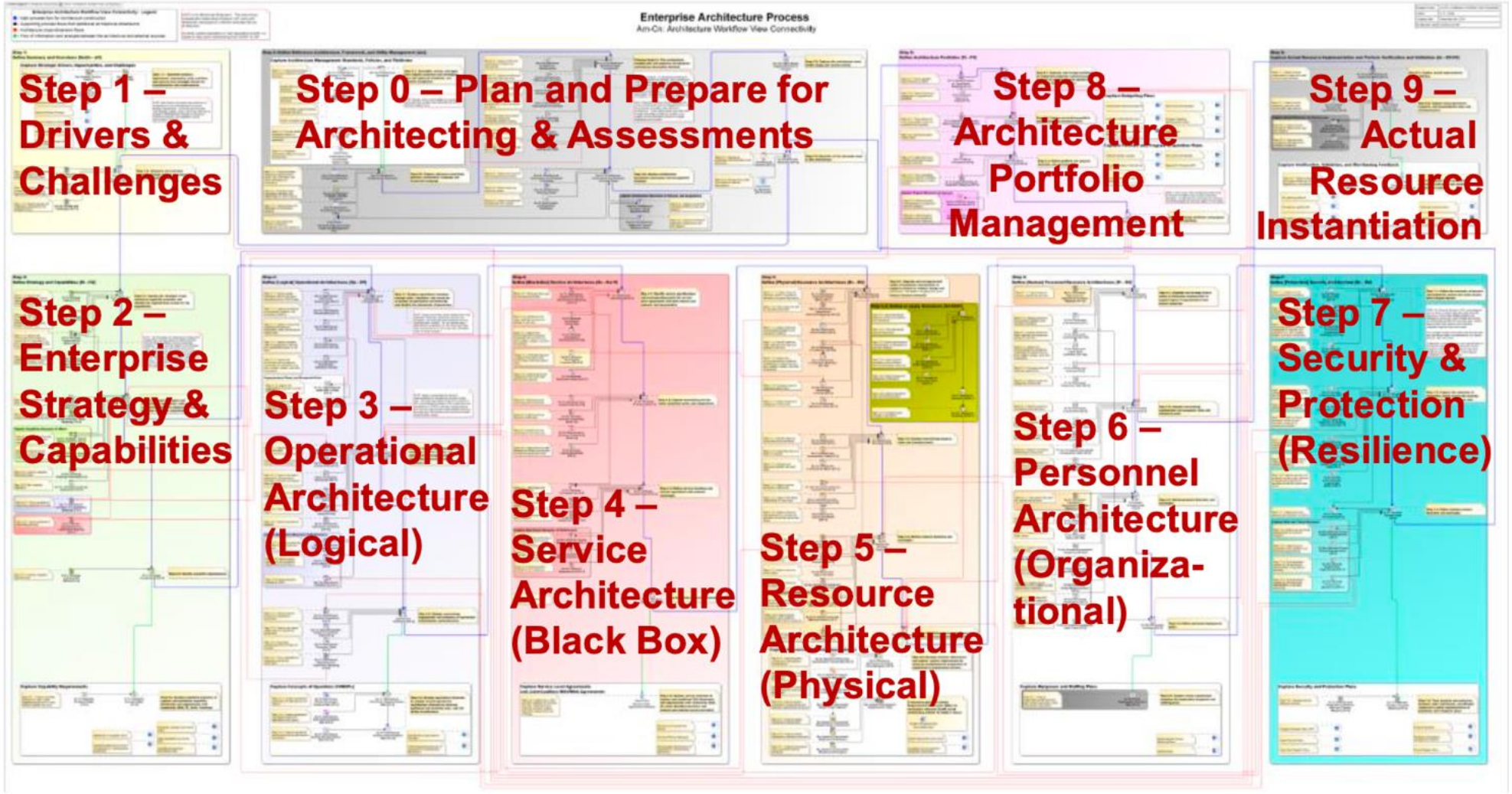
EA Guide



4

Object Management Group

EA Guide Steps



4

OMG Object Management Group®

Why Use Frameworks?

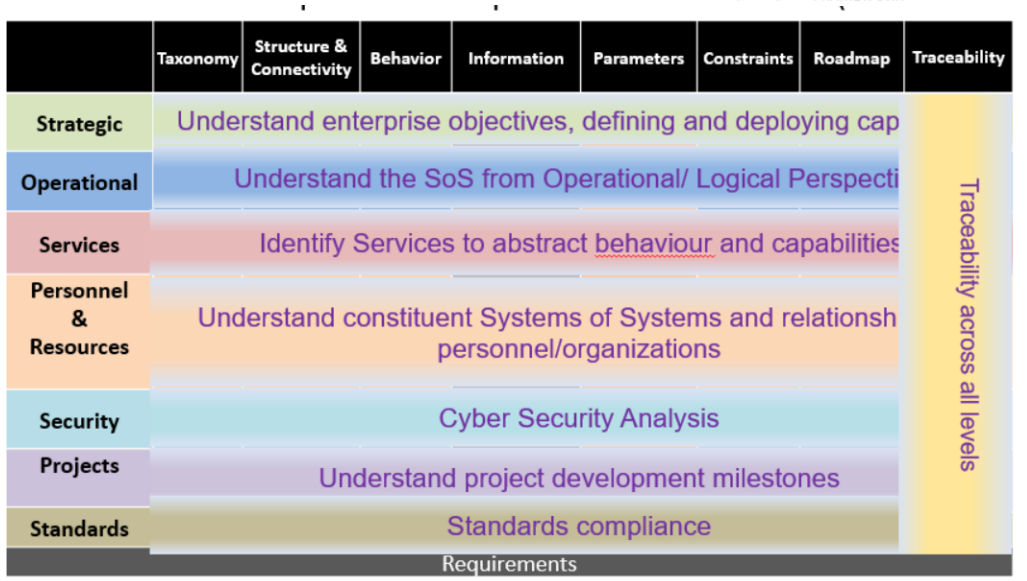
Frameworks such as Unified Architecture Framework (UAF):

- Supports semantic interoperability

through the use of a common vocabulary enabling:

  - Portfolio and capability management
  - SoS Operational planning, Mission Engineering and Acquisition

- UAF is methodology-agnostic (structured, OO, etc.)
- Extends UPDM with additional architectural dimensions: Security, Personnel, Requirements, Analysis, Simulation with full cross-cutting Traceability using a common semantic vocabulary



Architecture Framework: Conventions, principles and practices for the description of architectures established within a specific domain of applications and/or community of stakeholders. ISO/IEC/IEEE 42010:2011

OMG Object Management Group

THE ROLE OF UAF IN SUPPORT OF NATO AND DOD

DoD and NATO positioning

DoD

Standard Citation

Standard Overview

Mandated by DISR
November 10, 2021

Standard Identifier	OMG UAFP v1.0
Standard Title	Unified Architecture Framework Profile (UAFP) v1.0, OMG formal/2017-12-01, November 2017 including all normative appendices.
DoD Status	Mandated
IC Status	IC-Mandated

NATO

3 UNIFIED ARCHITECTURE FRAMEWORK® (UAF) DOMAIN META-MODEL (DMM)®

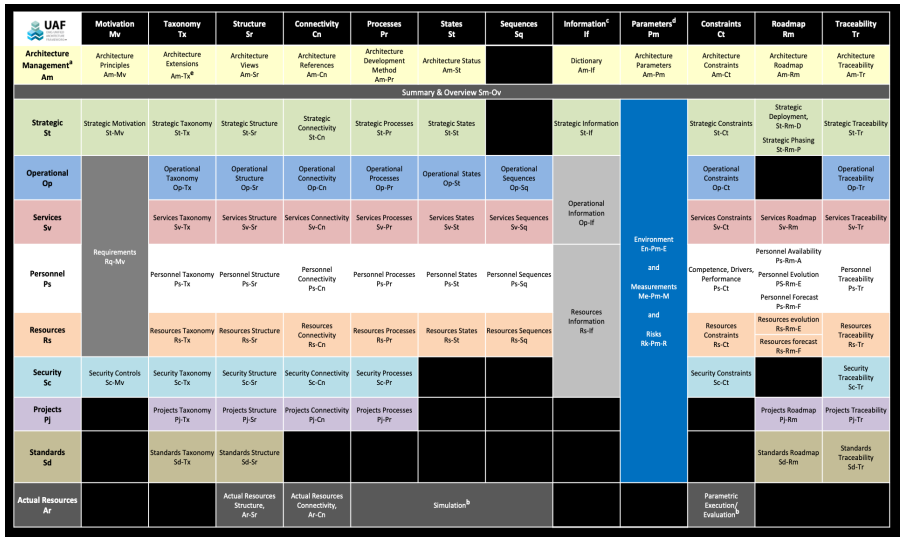
3.1 The Unified Architecture Framework (UAF) Domain Meta-model (DMM) is an open and non-implementation specific meta-model developed by the Object Management Group® to describe various stakeholder concerns, such as security or information, associated with a system through a set of predefined viewpoints and associated views, mapped to the corresponding view in NAFv4.

3.2 Since scope and expressiveness of the UAF DMM exceed the current needs of NAFv4 and some of the mapped viewpoints differ between NAFv4 and UAF, the use of UAF in NAFv4 is based on a subset of the UAF DMM described in a separate guideline document.

3.3 Architectures implemented using the full UAF DMM are fully compliant to NAFv4 when covering the corresponding viewpoints. To ensure further compliance, the additional parts of the UAF DMM must first be used if extending the UAF DMM based NAFv4 metamodel.

Overlay of DoDAF Views onto the UAF Grid

	Taxonomy Tx	Structure Sr	Connectivity Cn	Processes Pr	States St	Interaction Scenarios Is	Information If	Parameters Pm	Constraints Ct	Roadmap Rm	Traceability Tr
Metadata Md	-	-	-	-	-	-	DIV-1	ScV-7	-	-	-
Strategic St	CV-2	CV-1	CV-4	-	-	-			-	CV-3 CV-5	CV-6
Operational Op	OV-2 OV-1	OV-2	OV-2 OV-3	OV-5a OV-5b	OV-6b	OV-6c			OV-6a	-	-
Services Sv	SvcV-1	SvcV-1 SvcV-2	SvcV-3a SvcV-3b SvcV-6	SvcV-4	SvcV-10b	SvcV-10c	DIV-2		SvcV-10a	SvcV 8 SvcV-9	SvcV-5 CV-7
Personnel Pr	OV-4	OV-4	OV-4 SV-6	SV-4	SV-10b	SV-10c	DIV-3		OV-4 SV-10a SV-7	PV-2 SV-8 SV-9	SV-5a SV-5b
Resources Rs	SV-1 SV-2	SV-1 SV-2	SV-3 SV-6	SV-4	SV-10b	SV-10c		SV-7	SV-10a	SV-8 SV-9	SV-5a SV-5b
Security Sc	-	-	-	-	-	-			-	-	-
Projects Pj	PV-1	PV-1	PV-2	-	-	-			-	PV-2	PV-3
Standards Sd	StdV-1	StdV-1	-	-	-	-			-	StdV-2	StdV-1
Actual Resources Ar		OV-4	OV-4 SV-1 & SV-2	Simulation					Parametric Execution/Evaluation	-	-
Dictionary Dc (AV-2)											
Summary & Overview SmOv (AV-1, OV-1)											
Requirements -											



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UAF ROADMAP

Work in Progress

- UAF Certification Program
- Model-Based Acquisition
- Addition of Use Cases and Use Case Diagrams
- Mission Engineering and Mission Threads
- Improvements in Portfolio Management
- Security Viewpoint improvements and alignment with RAAML
- Service Architecture improvements
- Alignment with ISO style guide and ISO 42010 terminology
- **Standard Implementation in the SysML v2**

Upcoming version of UAF is V2

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UAF Certification Program

- Validate the breadth and depth of an individual's knowledge within the enterprise architecture and systems engineering domains
- Instills peers and employers alike with confidence in a certified candidate's participation and/or leadership role in real-world Architecture development team for an Enterprise, System or System of Systems employing a UAF-based modeling methodology.

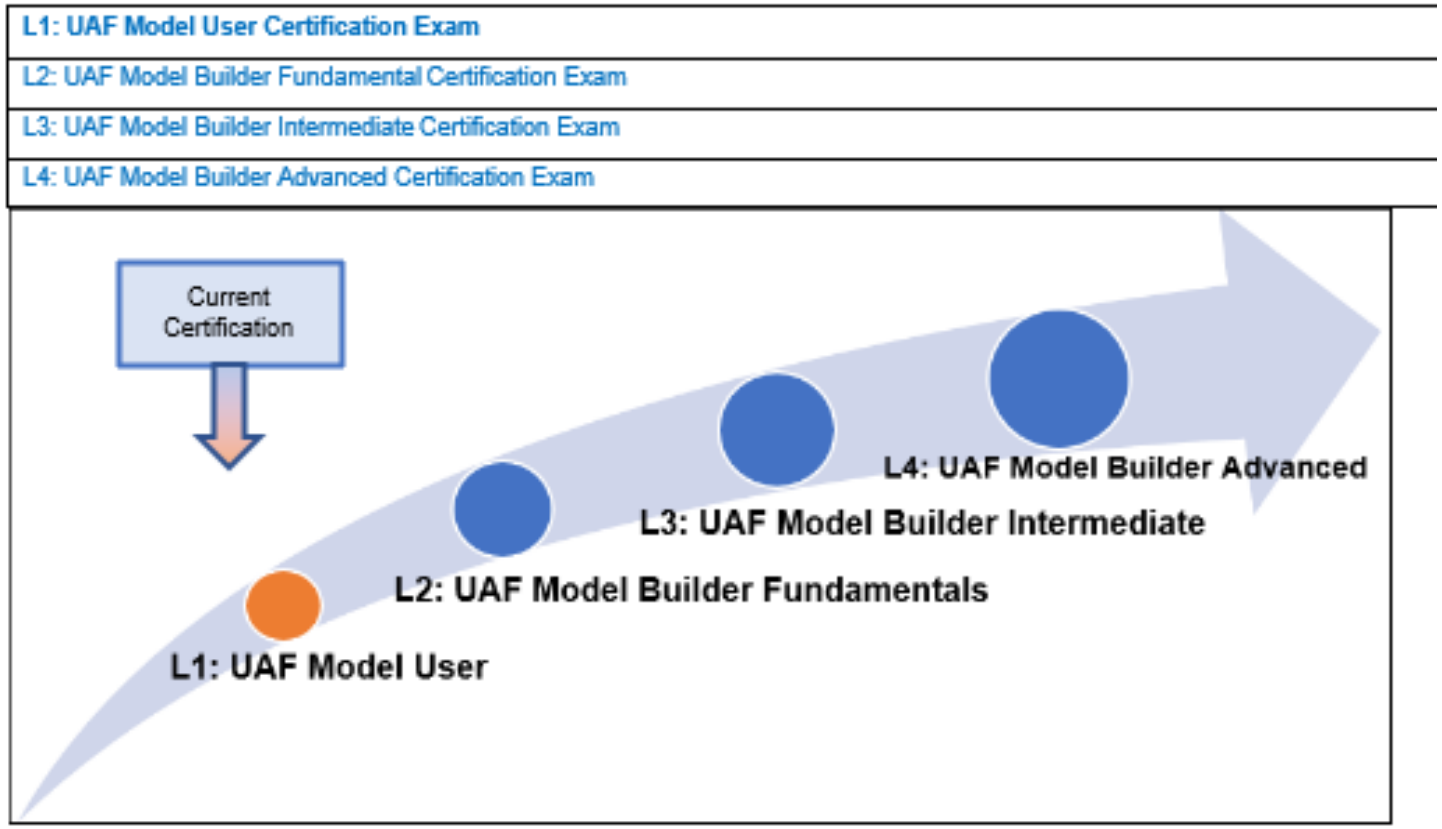

Figure 1. OMG UAF Certification Path

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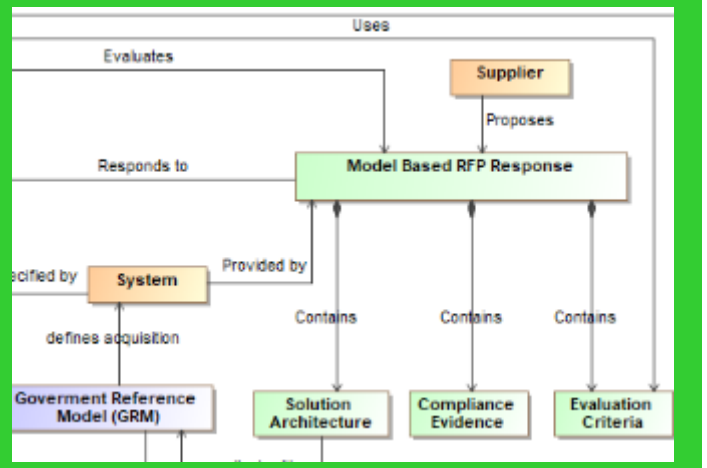
BLUF: Model-Based Acquisition (MBAcq)

About MBAcq

Model-based acquisition is the Technical approach to acquisition that uses models and other digital artifacts as the primary means of information exchange, rather than document-based information exchange.



Why MBAcq Matters

Customers are increasingly specifying MBSE in RFPs
Customers are increasingly requiring models in proposals
Lack of standardization raises proposal learning curves

MBAcq standardization minimizes acquisition risk while improving communication across industry

OMG MBAcq User Group

Is a broad industry body with participation from OMG, INCOSE, Armed Services, OUSD, DoD CIO, NDIA, DAU, FFRDCs and many industry suppliers such as Boeing, Northrop Grumman, Lockheed Martin, etc. working together to create the standards and guidance to successfully deploy MBAcq to the larger community.

Expected Timeline

2022: Formed Team & Framework
2023: Q4 Govt Ref Arch
2024: Q2 Acquisition Users Guide
Q2/3 DAU Acquisition Training
Q4 Acquisition Model Example

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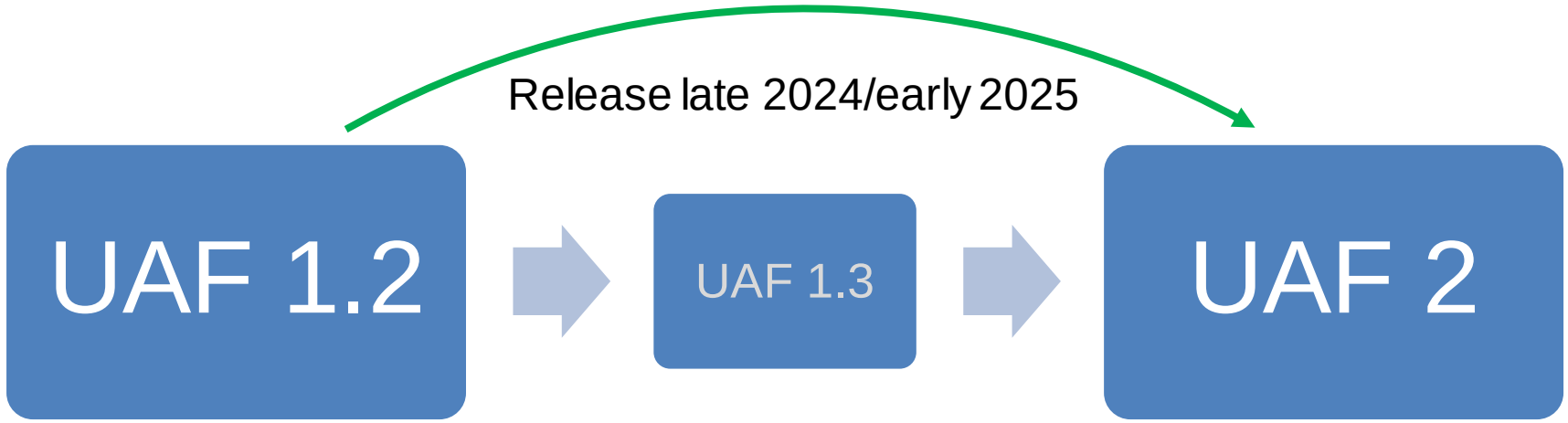
UAF V2



Normative
- UAF DMM
- UAF ML (SysML V1 based)

Non-normative
- Traceability
- Example Model
- EA Guide

Normative
- UAF DMM
- UAF ML (SysML V1 based)
- **UAF ML V2 (SysML V2 based)**

Non-normative
- Traceability
- Example Model
- EA Guide
- **MBAcq Guide**

SUMMARY AND OVERVIEW

Who Uses UAF?

1. Aerospace Corp.
2. Airbus
3. Arcfield
4. BAE Systems
5. Boeing
6. Bundeswehr
7. Deloitte
8. DISA
9. DGA
10. Leonardo
11. Lockheed Martin
12. MITRE
13. NATO
14. Northrop Grumman
15. Norwegian Air Traffic Control
16. Raytheon
17. Rolls Royce
18. SAAB
19. Swedish Defense Materiel Administration
20. US Airforce
21. US Navy
22. US Army
23. Volvo Construction Equipment

- not complete list

UAF is an enabler for NAF and DoDAF

and

alternatively it is a STAND ALONE framework to support a wide variety of architectures in different industries

which

Incorporates the best practices of MBSE

and

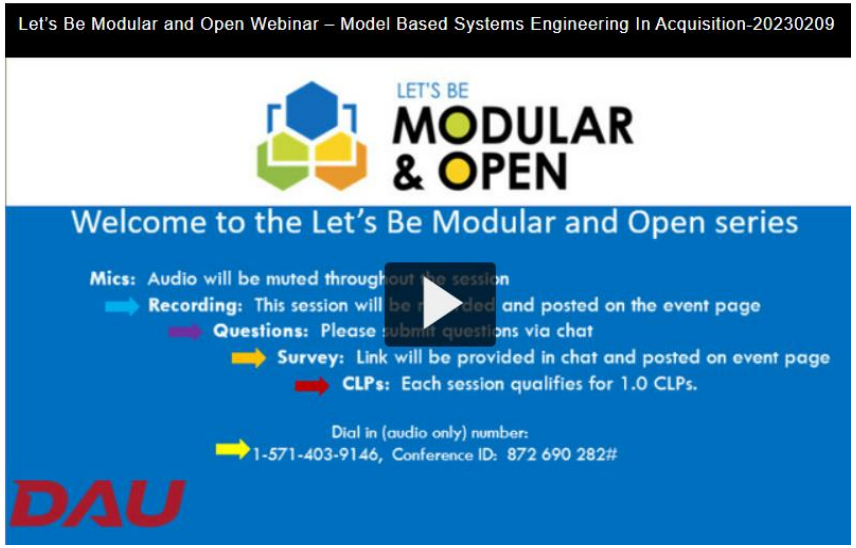
Evolves taking into account user feedback

More on UAF

Intro to UAF

https://youtu.be/AWJk_7KtQ0w

DAU MBAcq Recording



The session Link (~30 min presentation and 30 min Q&A) : https://www.dau.edu/event/Lets-Be-Modular-and-Open-Webinar-Model-Based-Systems-Engineering-In-Acquisition

Unified Architecture Framework (UAF)
https://www.linkedin.com/groups/8878655/

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Thank you!