



OBJECT MANAGEMENT GROUP®

Update on the Unified Architecture Framework® (UAF)

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Laura Heart (Lockheed Martin)

Matthew Hause (SSI)



- Brief Introduction to UAF
- What's New in UAF 1.2
- UAF community
- Future Roadmap
- Q/A

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Why OMG UAF?

- UAF is a Standard to develop architectural descriptions in commercial industries, federal governments and military organizations
- UAF is Developed by Object Management Group (OMG)
- It Has many different use cases from Enterprise as a System to Cyber-Systems engineering or enabler for Digital Transformation planning
- The current UAF version is 1.1
- UAF 1.1 DMM is one of the meta-models to be used for creating NAFv4 compliant architectures
- UAF 1.1 is mandated by DISR
- UAF 1.1. was submitted as international ISO standard *ISO/IEC 19540*.
Comments due September

Who is behind?

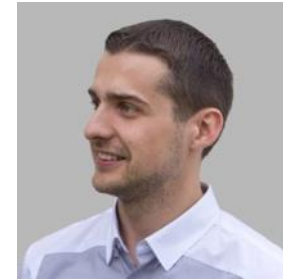
Tool vendors:

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

Industry Contributors:

- Airbus
- Aerospace Corporation
- BAE Systems
- Boeing
- DISA
- Lockheed Martin
- MITRE
- Northrop Grumman
- Syntell
- Thales
- INCOSE

Co-chairs



Dr. Aurelijus
Morkevicius



Laura E.
Hart

UAF specification at a glance



Specification

EA guide (EAG)

UAF v1.2

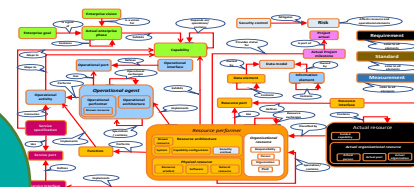
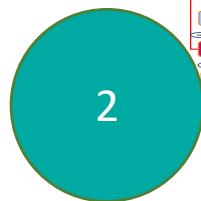


View specifications organized in domains and model kinds (Grid)

| | Teamwork | Structure & Connectivity | Behavior | Information | Parameters | Constraints | Roadmap | Traceability |
|-----------------------|--------------|--------------------------|----------|-------------|------------|-------------|---------|--------------|
| Strategic | | | | | | | | |
| Operational | | | | | | | | |
| Services | | | | | | | | |
| Personnel & Resources | | | | | | | | |
| Security | | | | | | | | |
| Projects | | | | | | | | |
| Standards | | | | | | | | |
| | Requirements | | | | | | | |

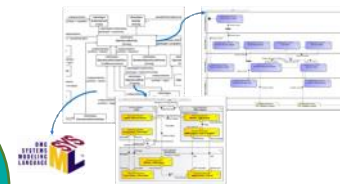


Domain MetaModel (DMM)



Modeling Language based on SysML (UAFP) (ML)

UAF v1.2

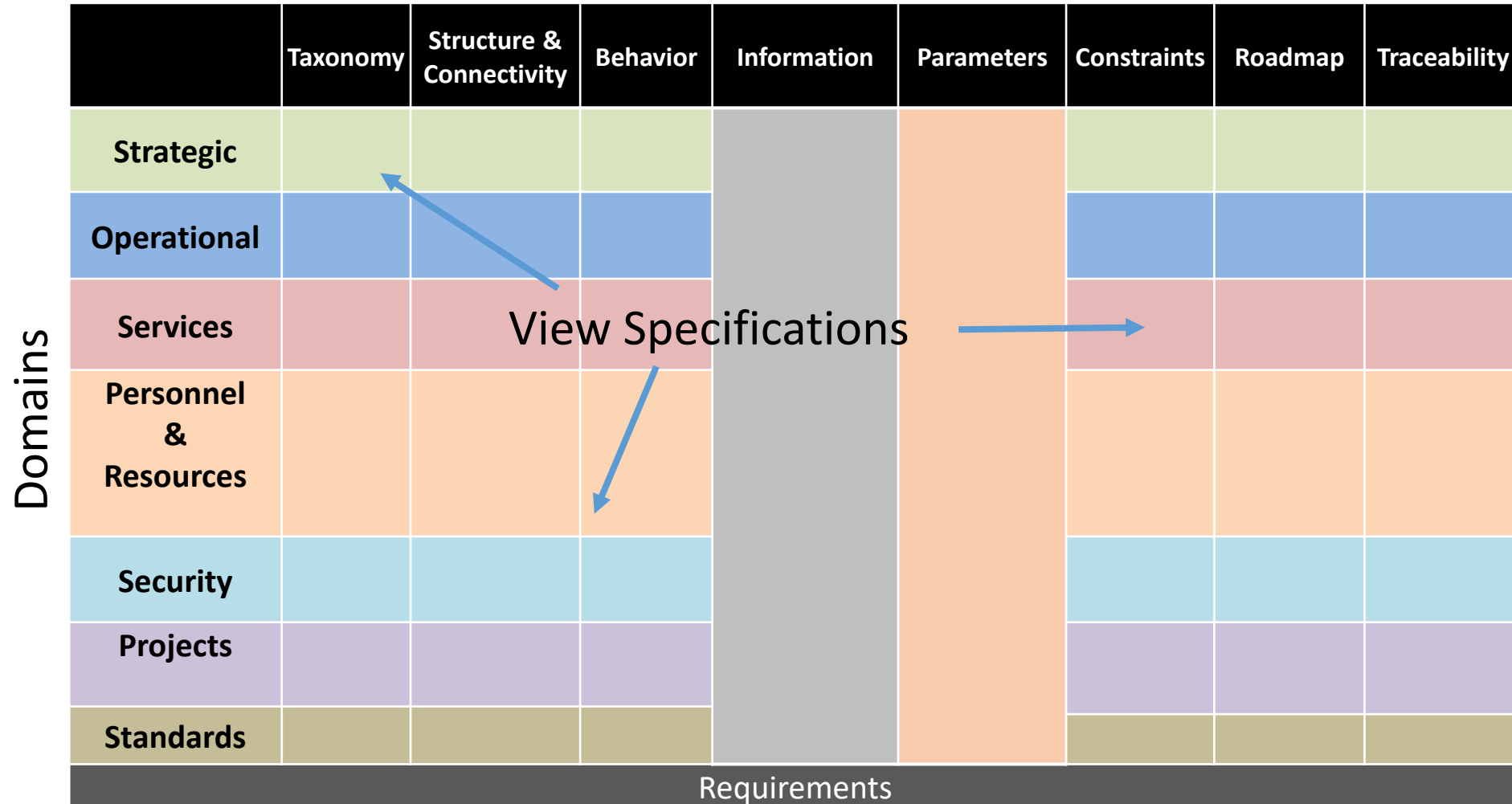


UAF grid

Model Kinds

| | Taxonomy | Structure & Connectivity | Behavior | Information | Parameters | Constraints | Roadmap | Traceability |
|---------|-----------------------|--------------------------|----------|--------------|------------|-------------|---------|--------------|
| Domains | Strategic | | | Requirements | | | | |
| | Operational | | | | | | | |
| | Services | | | | | | | |
| | Personnel & Resources | | | | | | | |
| | Security | | | | | | | |
| | Projects | | | | | | | |
| | Standards | | | | | | | |
| | Requirements | | | | | | | |

View Specifications



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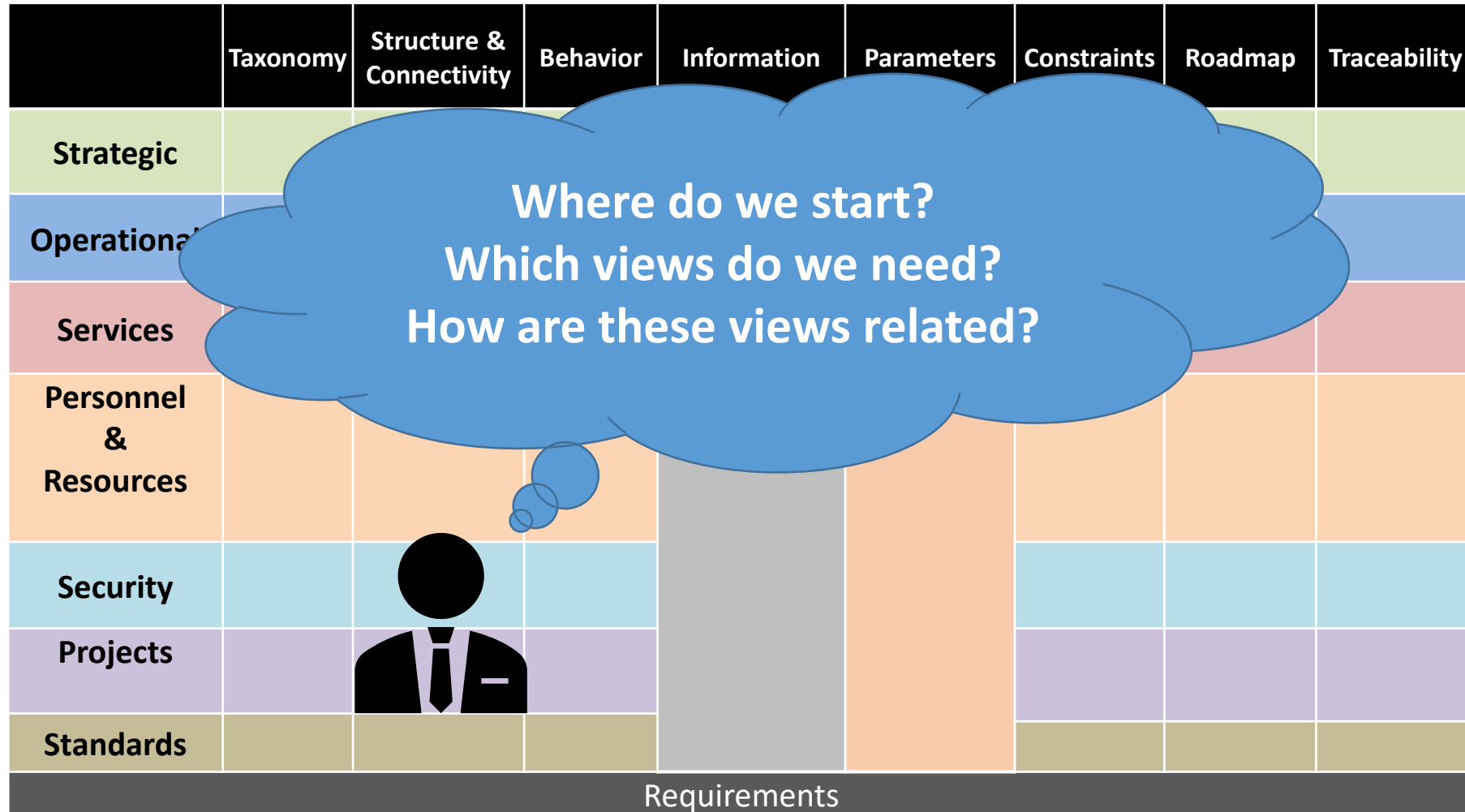
What's New in UAF 1.2

- UAF EA Guide
- UAF Grid and Metamodel Improvements
 - Architecture Management Domain
 - Improvements in Strategic and Services Domains (clarify semantics, add new concepts, improve exposition)
 - Support of Value Streams
 - Risk becomes cross-cutting construct
- Alignment with ISO42010

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EA Guide



- **Provides a standardized workflow for modeling an Enterprise**
- Currently under development with planned release in 2022 with UAF v1.2
 - Preliminary workflow model developed to cover all UAF views
 - Basic 9 steps defined down to 3rd level of decomposition
 - Defines “what” to do for creating the UAF views, but does not identify or define methods or tools relevant for each step (since this is methodology dependent)
- The workflow can be tailored to the particular steps needed for the EA task at hand

EA Guide Steps





- **Basis for building Architecture Views and Models**
 - Agreement between Upper Enterprise and Lower Enterprise on division of responsibility and dependencies between models, eg...
 - ✓ Department of Defense → Air Force
 - ✓ Corporate Headquarters → Business Unit
 - ✓ Missile Defense Agency → Missile XYZ Program
 - Agreement between Acquisition Agency/Office and Prime Contractor...
 - Agreement between Prime Contractor and Suppliers...
 - Organization of training for Architecture Modeling classes and workshops
 - Assessment of EA modeling capabilities and competencies
- **Basis for creating an Organization's Modeling Methodology** – Methodology = Process + Methods + Tools + Techniques + Templates...
- **Process Guide instantiated in modeling tools**
 - Navigation Panel, Dashboard, Landing Page, etc for the Model – Model Management WBS and resource planning

What's New in UAF 1.2

- UAF EA Guide
- **UAF Grid and Metamodel Improvements**
 - Architecture Management Domain
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 - Support of Value Streams and updates to the Strategic Phasing
 - Risk becomes cross-cutting construct
- Alignment with ISO42010



| | Motivation Mv | Taxonomy Tx | Structure Sr | Connectivity Cn | Processes Pr | States St | Sequences Sq | Information If | Parameters Pm | Constraints Ct | Roadmap Rm | Traceability Tr |
|-------------------------------|----------------------------------|----------------------------------|--------------------------------------|---|---|-----------------------------------|---------------------------------|----------------------------------|---|-------------------------------------|--|------------------------------------|
| Architecture Management Am | Architecture Principles Am-Mv | Architecture Extensions Am-Tx | Architecture Views Am-Sr | Architecture References Am-Cn | Architecture Development Method Am-Pr | Architecture Annotations Am-St | Architecture Sequences Am-Sq | Dictionary Am-If | Architecture Parameters Am-Pm | Architecture Constraints Am-Ct | Architecture Roadmap Am-Rm | Architecture Traceability Am-Tr |
| Summary & Overview | | | | | | | | | | | | |
| 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 Sequences St-Sq | Strategic Information St-If | Environment En-Pm and Measurements Me-Pm and Risks Rk-Pm | 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 | Personnel Information Ps-If | | Personnel Constraints 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 Information Rs-If | | Resources Constraints Rs-Ct | Resources evolution, Resources forecast Rs-Rm | 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 | | Project Taxonomy Pj-Tx | Project Structure Pj-Sr | Project Connectivity Pj-Cn | Project Processes Pj-Pr | | | | | | Project Roadmap Pj-Rm | Project Traceability Pj-Tr |
| Standards Sd | | Standards Taxonomy Sd-Tx | Standards Structure Sd-Sr | | | | | | | | Standards Roadmap Sd-Rm | Standards Traceability Sd-Tr |
| Actual Resources Ar | June 8th 2022 | | Actual Resources Structure, Ar-Sr | Actual Resources Connectivity, Ar-Cn | Copyright © 2022 UAF. All rights reserved. Simulation | | | | | Parametric Execution/ Evaluation | 16 | Draft v1.2 |

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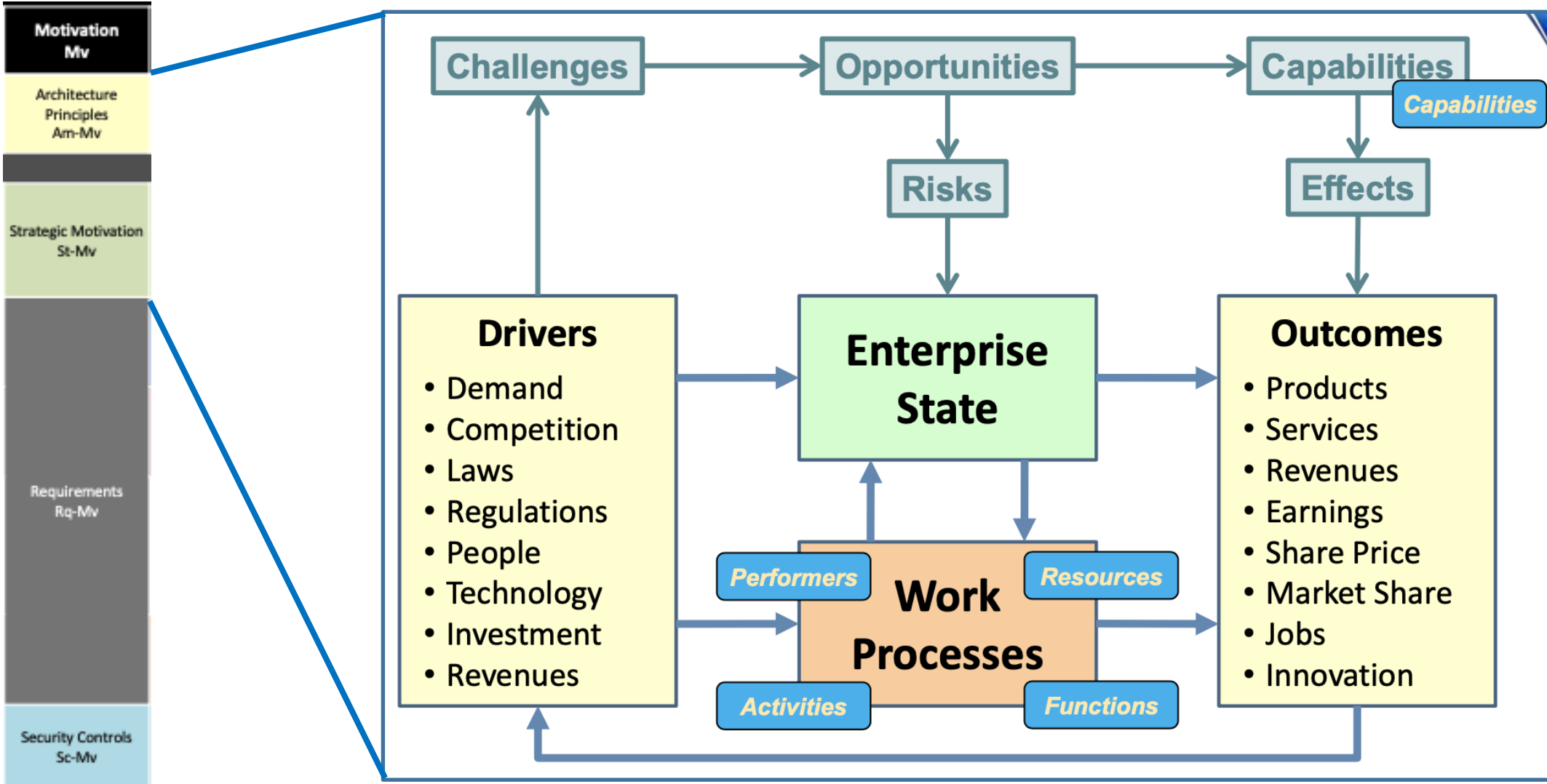
2

1

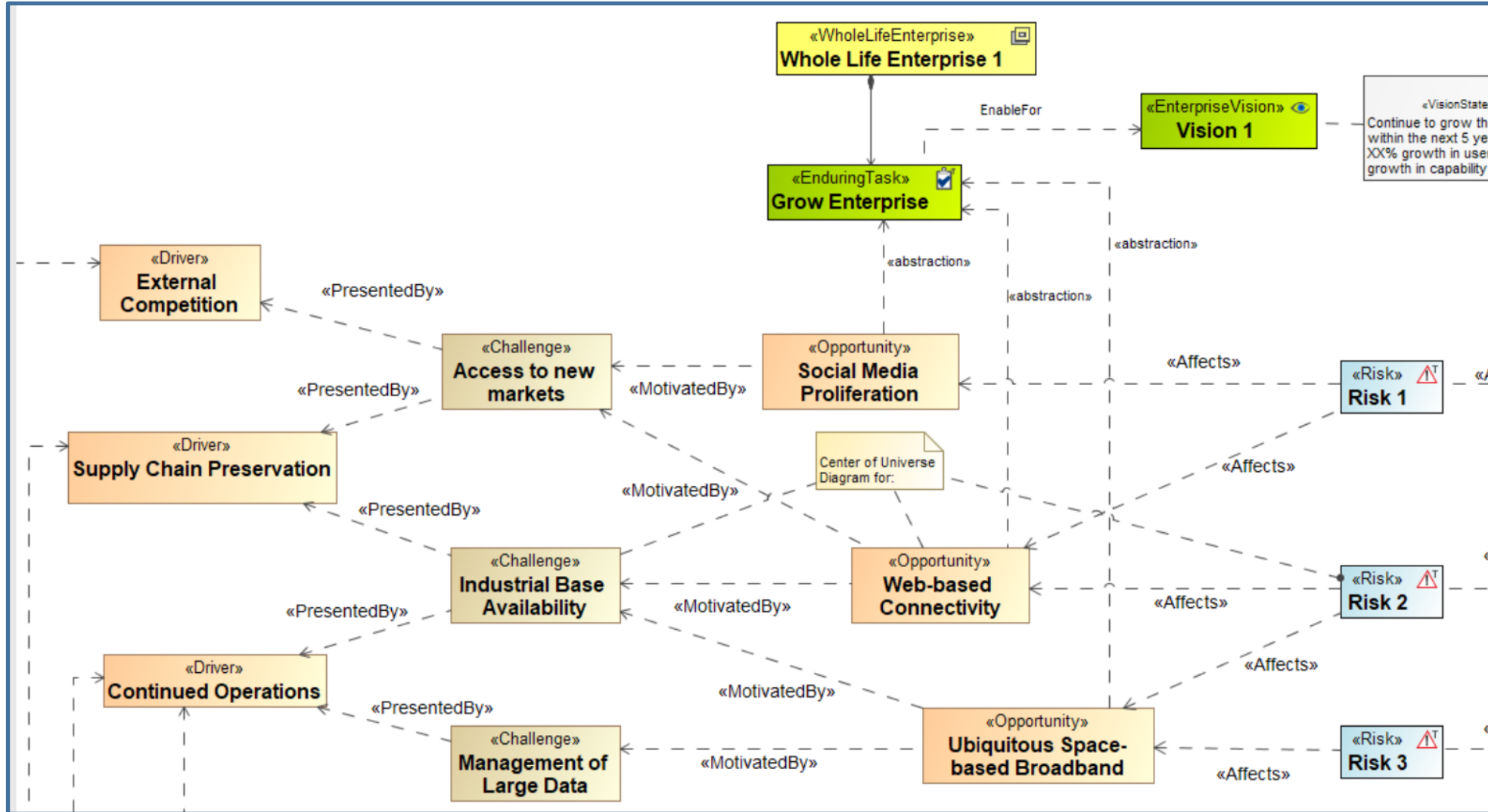
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Motivation Model Kind



Motivation Example

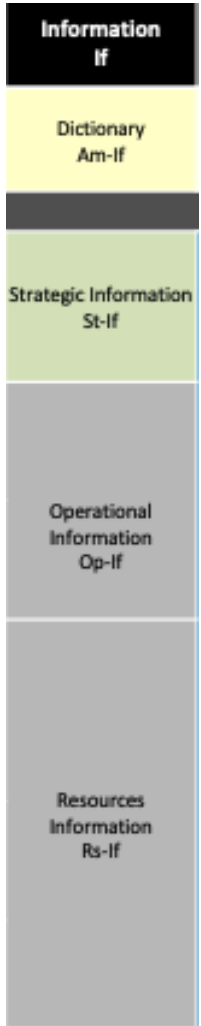


Architecture Management Domain

|  UAF | Motivation Mv | Taxonomy Tx | Structure Sr | Connectivity Cn | Processes Pr | States St | Sequences Sq | Information If | Parameters Pm | Constraints Ct | Roadmap Rm | Traceability Tr |
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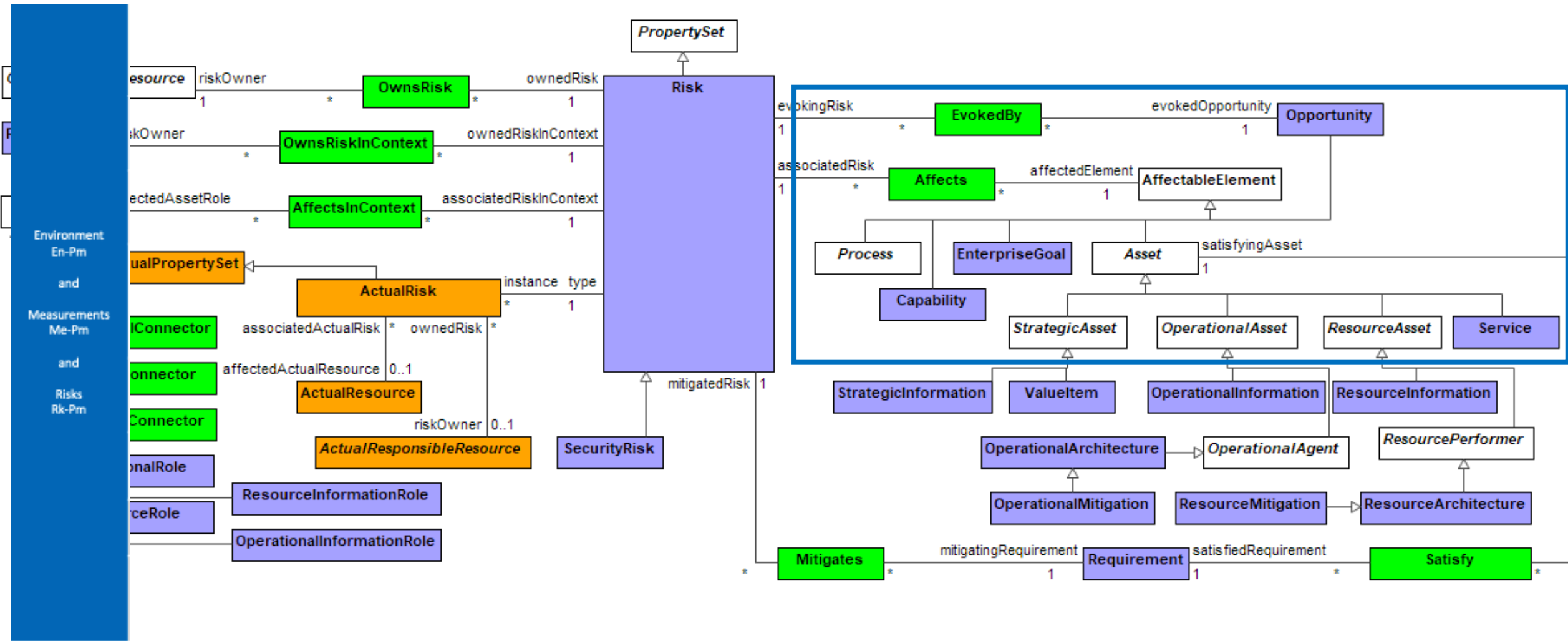
- Rename the Domain
- Align the domain with NAF V4
- Provide View Specifications for Architecture Management Domain
- Dictionary is a part of Architecture Management Domain
- Architecture Principles is a new View Specification. Principle is a special kind of a Driver.

Information Model Kind

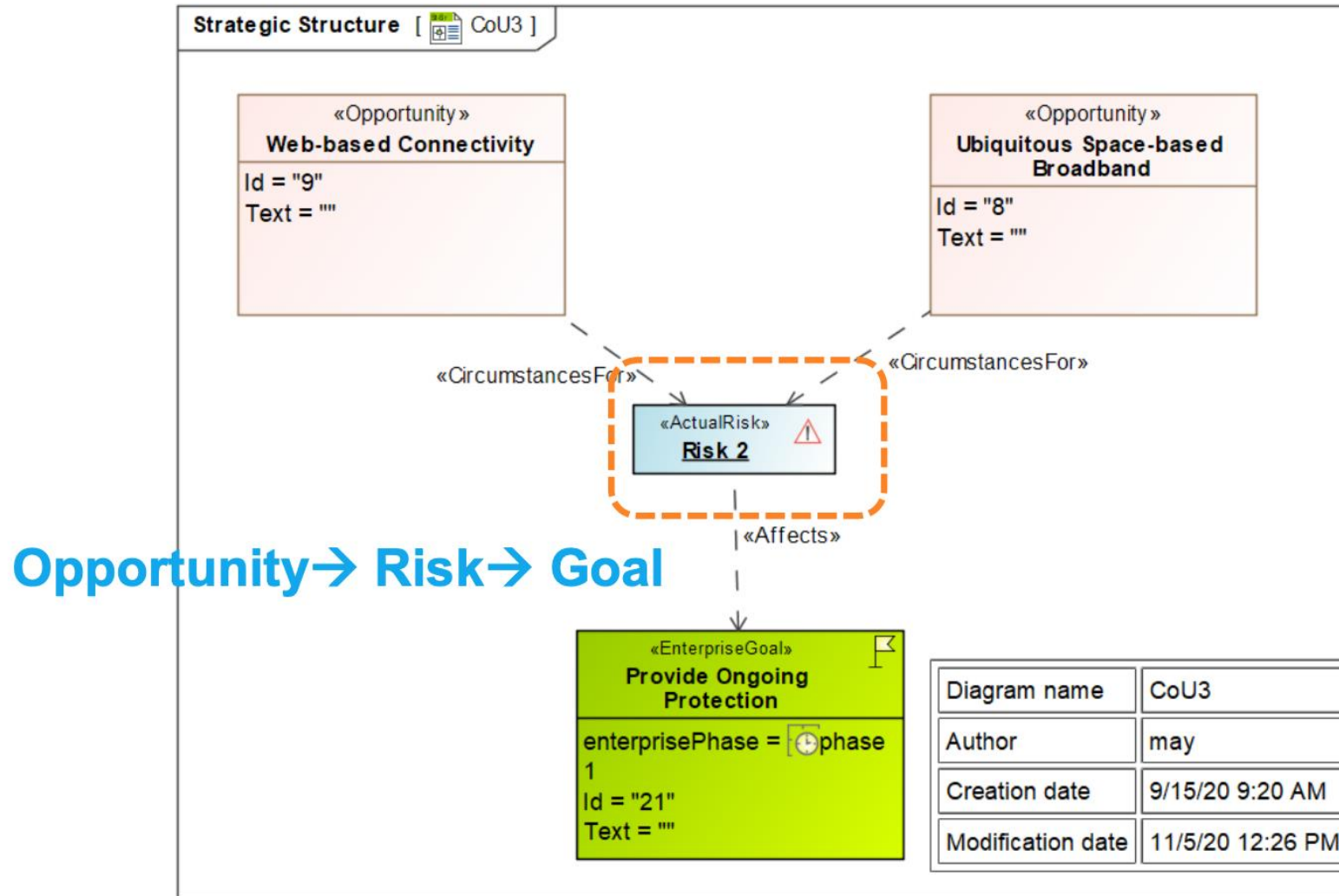


- Dictionary is a part of Information Model Kind
- Strategic Information to capture:
 - Knowledge Capital - (Intellectual Property, Personnel & Organizations (e.g., expertise, skills), Policies & Practices (patents, trade secrets, etc), Financial Good Will)
 - Know-How in developing and operating Enterprise Resources - (Platforms, Services, Facilities, Networks, Equipment, Infrastructure)
 - Know-Who and Know-Where (Partners, Suppliers, Distributors, Markets, Users)
- Use of Operational Information and Resources Information clarified
 - Services are using Operational Information

Risk – Cross Cutting Construct

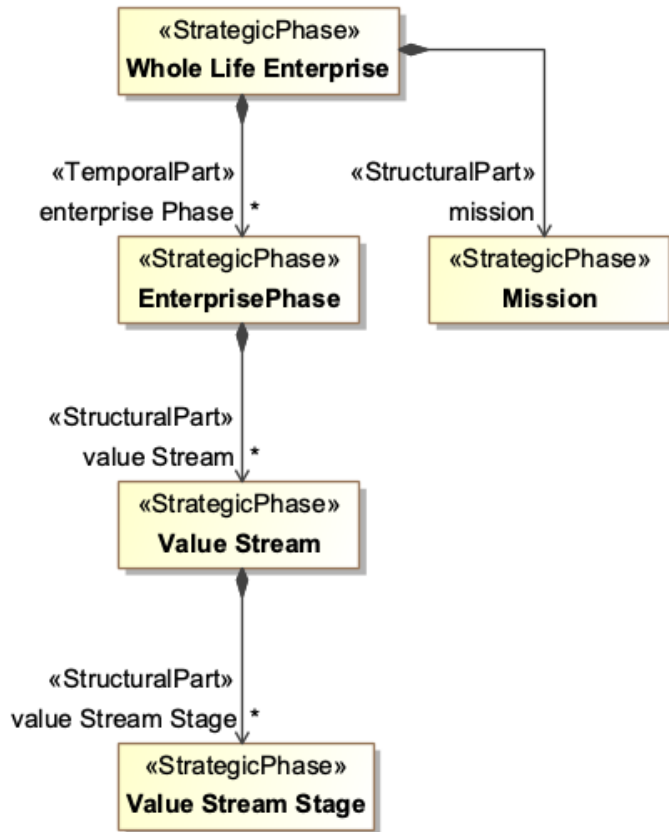


Risk Example

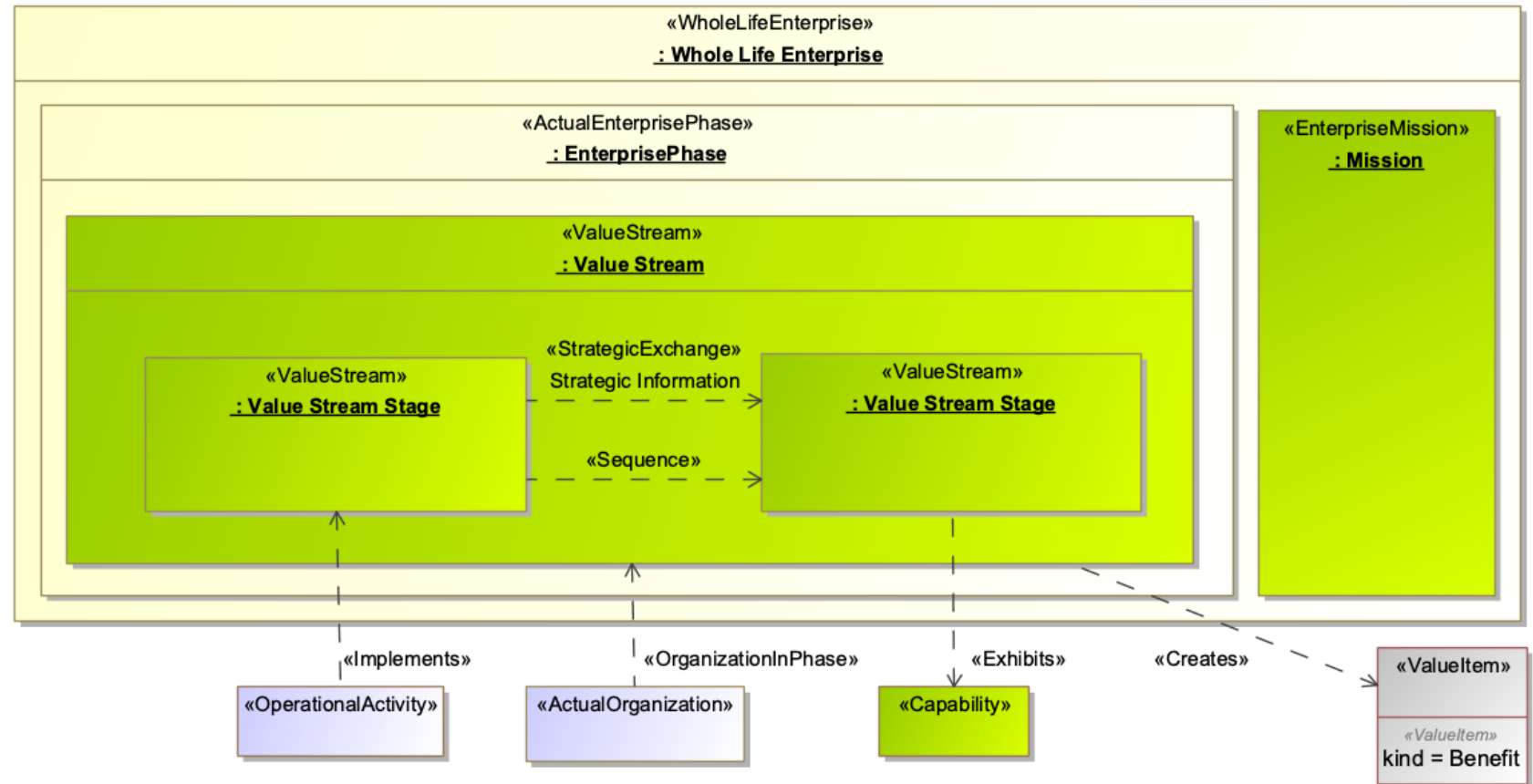


Strategic Phasing

1



2



- Improved Traceability between Service Layer and Operational and Resource layers.
- Service Specification renamed to Service
- Resource Service introduced to model technical services like web services, etc.



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Annual UAF summit

- Over 700 registrations
- 7 speakers with a keynote from US Space Force
- Presentations available online:

<https://events.omg.org/uaf-summit-0321/>

UAF community on LinkedIn



Unified Architecture Framework (UAF)

<https://www.linkedin.com/groups/8878655/>



**MAJOR GENERAL KIMBERLY A.
CRIDER**

Headquarters United States Space
Force

Mobilization Assistant to the Chief of
Space Operations

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UAF 1.2 submission approved by OMG AB in December 2022

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- UAF EA Guide (UAF EAG)

UAF 1.3

- Process Guide for Acquisition (ARM)
- Address critical comments from ISO if there are any

UAF 2.0

- Standard Implementation in the SysML v2

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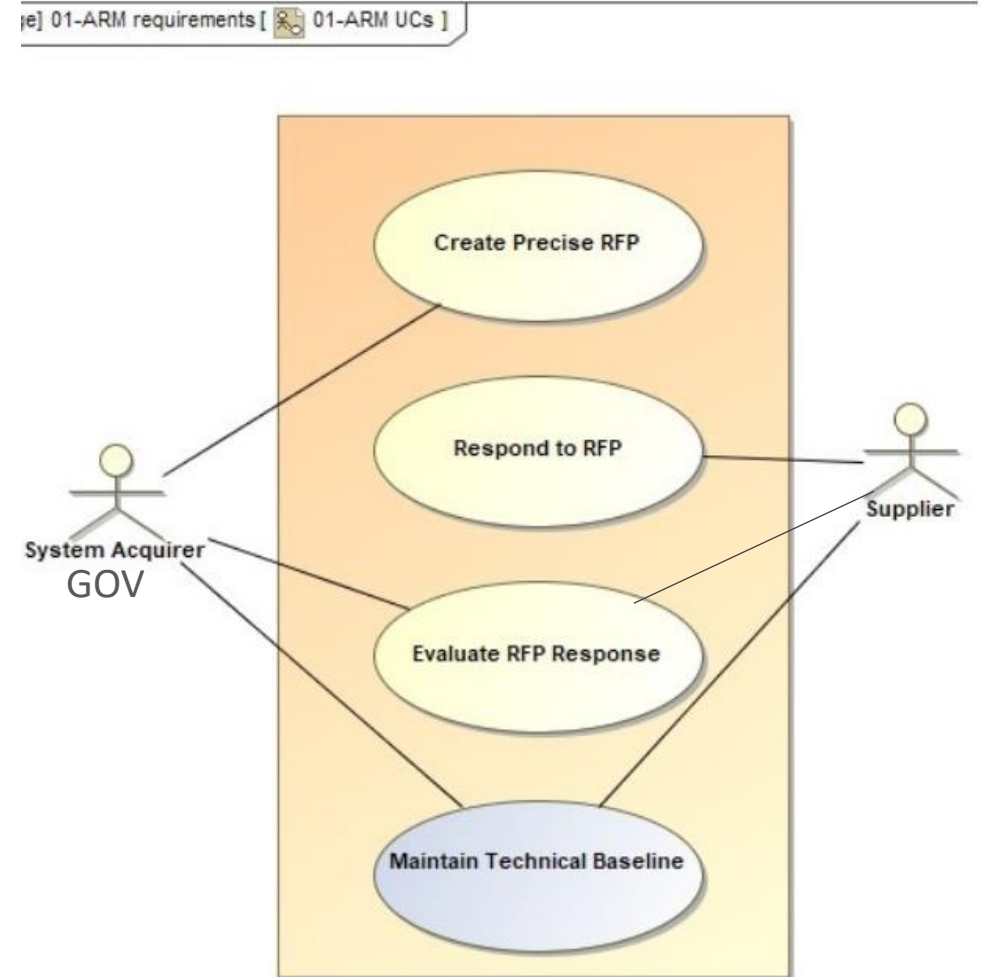
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What is the Acquisition Reference Model

ARM is a set of reusable model templates, and guidance used to structure a model-based RFP based on the UAF standard to support data driven decisions beginning with acquisition which can be maintained throughout the complete lifecycle of program.

Use Cases:

- **Create Precise RFP**
- **Respond to RFP**
- **Evaluate RFP Response**
 - Contractor Self Evaluation
 - Government Evaluation
- **Maintain Technical Baseline**
 - Model evolves overtime and represents the technical baseline



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- [Standard Implementation in the SysML v2](#)

- Standard implementation of the current version of UAF is based on SysML 1.x
 - SysML defines model kinds and notation used to create UAF models
- **OMG Is finalizing SysML v2**
 - A different type of language decoupled from UML
 - More formal
 - Models serialized in text-based syntax aka programming language
 - Provides API based on REST API
- **UAF WG collaborates with SysML SST**
- **UAF 2 will have either:**
 - implementation in SysML v2 defined
 - DMM extending SysML v2 metamodel

Intro to UAF



https://youtu.be/AWJk_7KtQ0w

Intro to ARM



OBJECT MANAGEMENT GROUP®
Model-Based Systems Engineering (MBSE)
Acquisition Reference Model (ARM)
Lowering the Barrier to Gov MBSE Adoption

Model Based Systems Engineering (MBSE) Acquisition Reference Model (ARM)
brighttalk.com
Abstract: This presentation will address the use of the Unified Architecture Framework (UAF) to lower the barrier to MBSE adoption by creating a templated Acquisition Reference Model (ARM), used to structure RFP content for consumption and evaluation...

<https://www.brighttalk.com/webcast/12231/394577?>



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



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Thank You!

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