

# STEP AP242 and AP243

Consistently defined complex products and their context

Bernd Feldvoss – Airbus Commercial Aircraft

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# GLOBAL PRODUCT DATA INTEROPERABILITY SUMMIT 2023



## Presenters Bio

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Bernd Feldvoss is PLM Interoperability Standards Specialist at Airbus in Hamburg, Germany. Bernd joined Airbus in 1998 and worked as a Systems Engineer where he was involved in the development of Data Exchange Methods. During this time he participated in international working groups and made a contribution to the “Airbus Concurrent Engineering (ACE)” project. He was involved in projects including the launching of the A380 and establishing cDMU between the UK, Spain, France, and Germany. Additionally, In 2006, Bernd was appointed as the Team leader for Product Data Exchange at Airbus Germany where he managed 15 internal and external employees. He was appointed to his current role in 2022. As part of his professional life, Bernd represents Airbus on numerous committees including; the prostep ivip Technical Steering Committee and the JT Open Technical Review Board. He is also a member of the Global Collaboration Working Group in the CIMdata managed PLM Aerospace & Defense Action Group. Bernd studied Computer Science at the University of Hamburg, where his focus was on Computer Aided Engineering.



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**Kyle Hall** is the Airbus lead for ISO 10303-243:2021 (MoSSEC). The focus of their career has been to realise methods to digitize and transform the ways in which knowledge can be made accessible to machines - in close cooperation with international partners across industries and academia. In their current role as an Airbus Data Driven System Engineer they are working closely with Airbus' digitalization transformation community to produce and procure solutions which answer the domain specific requirements of Airbus' Centres of Competence, while also providing effective interoperability amongst Airbus teams, their systems and Airbus' extended enterprise partners.



## STEP AP242 and AP243 - Consistently defined complex products and their context

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To define complex products across an industrial digital thread, a consistent technical data and context representation is necessary to formulate a consolidated understanding across a portfolio of interconnected product families. This consistent foundational representation permits a network of tools to be built organically from the needs and requirements of the engineering teams involved, without losing data integrity.

Here we will discuss and demonstrate how the STEP standards AP242 and AP243 can be used to build this foundational technical and contextual data representation.

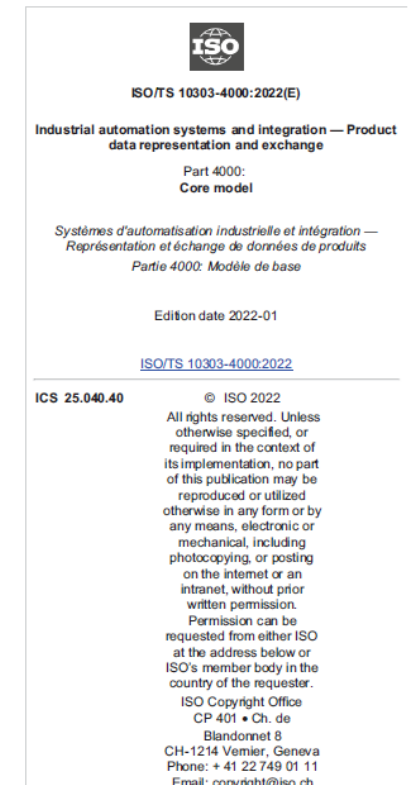
# STEP Core Model introduction: ISO 10303-4000

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This document specifies the use of the integrated resources necessary for the scope and information requirements for the Core model.

The following **Core technical capabilities** [CTCs] are within the scope of this document:

- Activity;
- Analysis;
- Breakdown;
- Collection;
- Common resources;
- Document management;
- Individual part;
- Interface;
- Management resources;
- Message;
- Product data management;
- Product specification and configuration;
- Representation and external element reference, including:
  - Definition and external element reference of geometric models;
  - Definition and external element reference of the topological aspects of geometric models.
- Requirement management;
- Resources;
- Task description;
- Work management



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# STEP Core Model introduction: ISO 10303-4000

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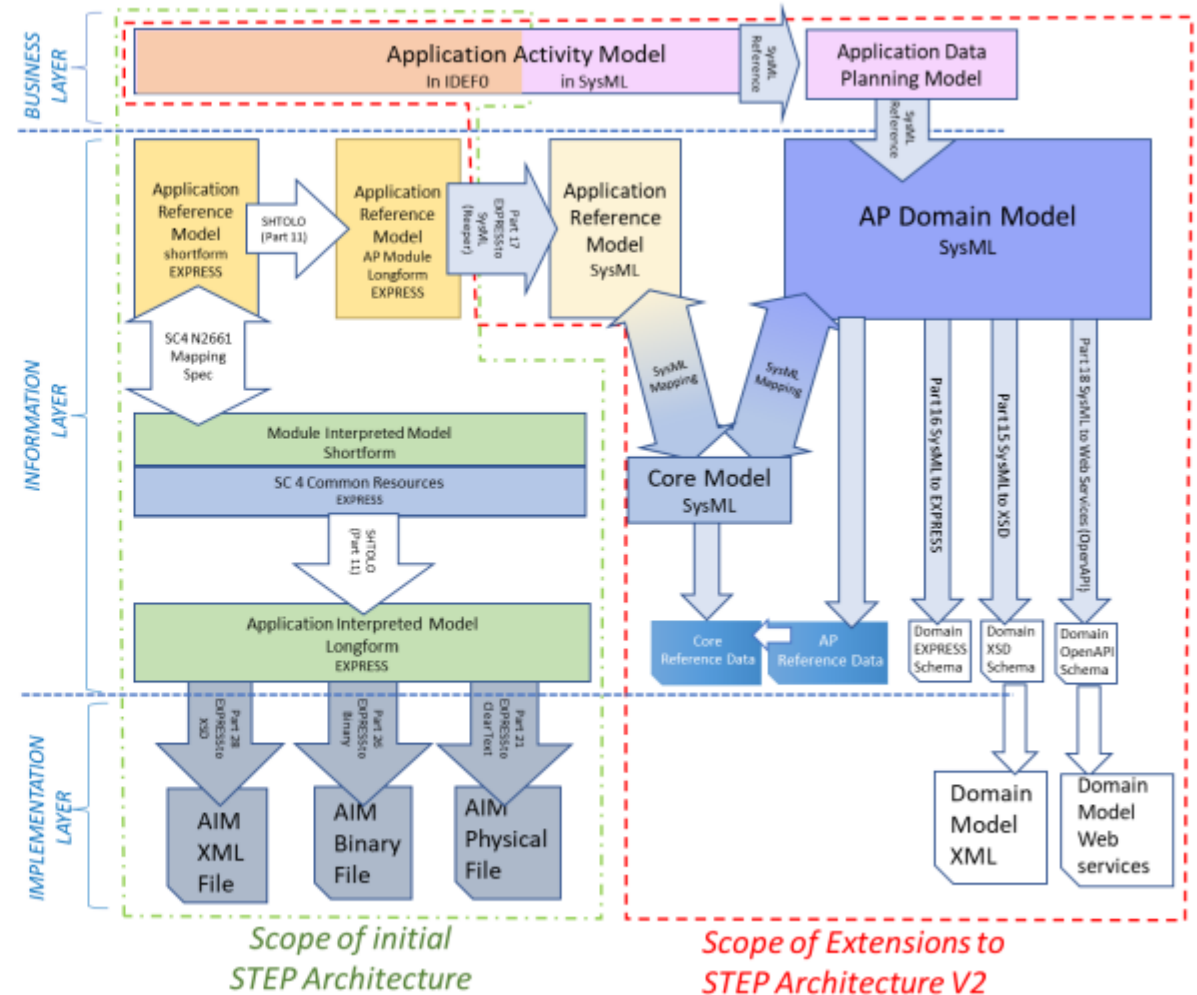
The following are outside the scope of this document:

- Composite structural shape and structure;
- Delta change;
- Electrical harness;
- Engineering analysis processes;
- Kinematics;
- Material;
- Mating;
- Observation;
- Planned and evaluated characteristics;
- Planning and scheduling;
- Probability;
- Process plan;
- Representation of geometry and topology;
- Risk;
- Shape association and structure;
- Slot;
- Additional core technical capabilities that could be defined in relation with future Application Protocol development projects.

# STEP Core Model introduction

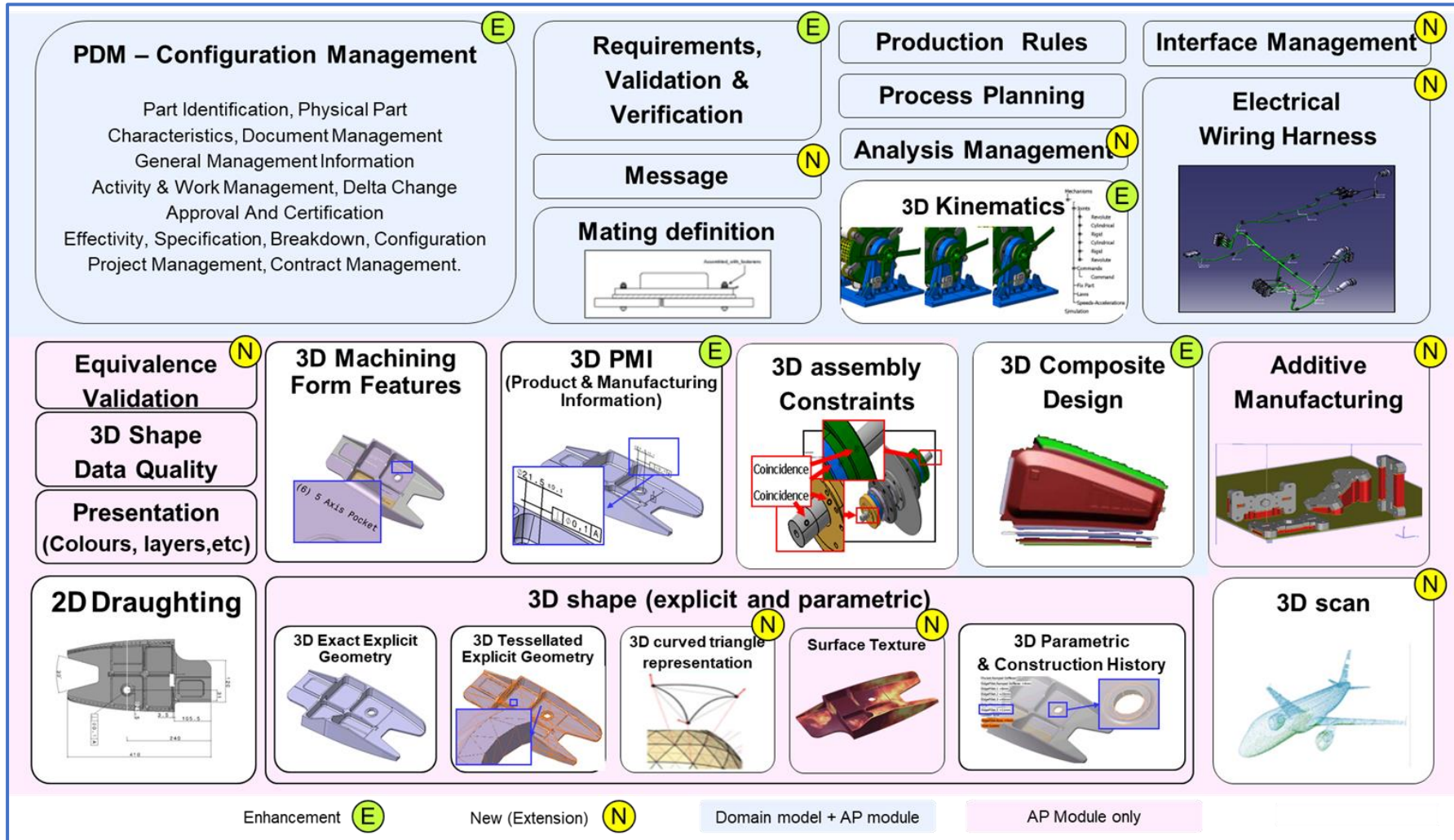
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- Develop Core model and enhance the integrations with other STEP standards
- Adopt Extended architecture use of SysML Modeling
  - This enables interoperability across application protocols and other standards
  - Supports implementations to make use of xml and web services



# STEP AP242 Edition 4

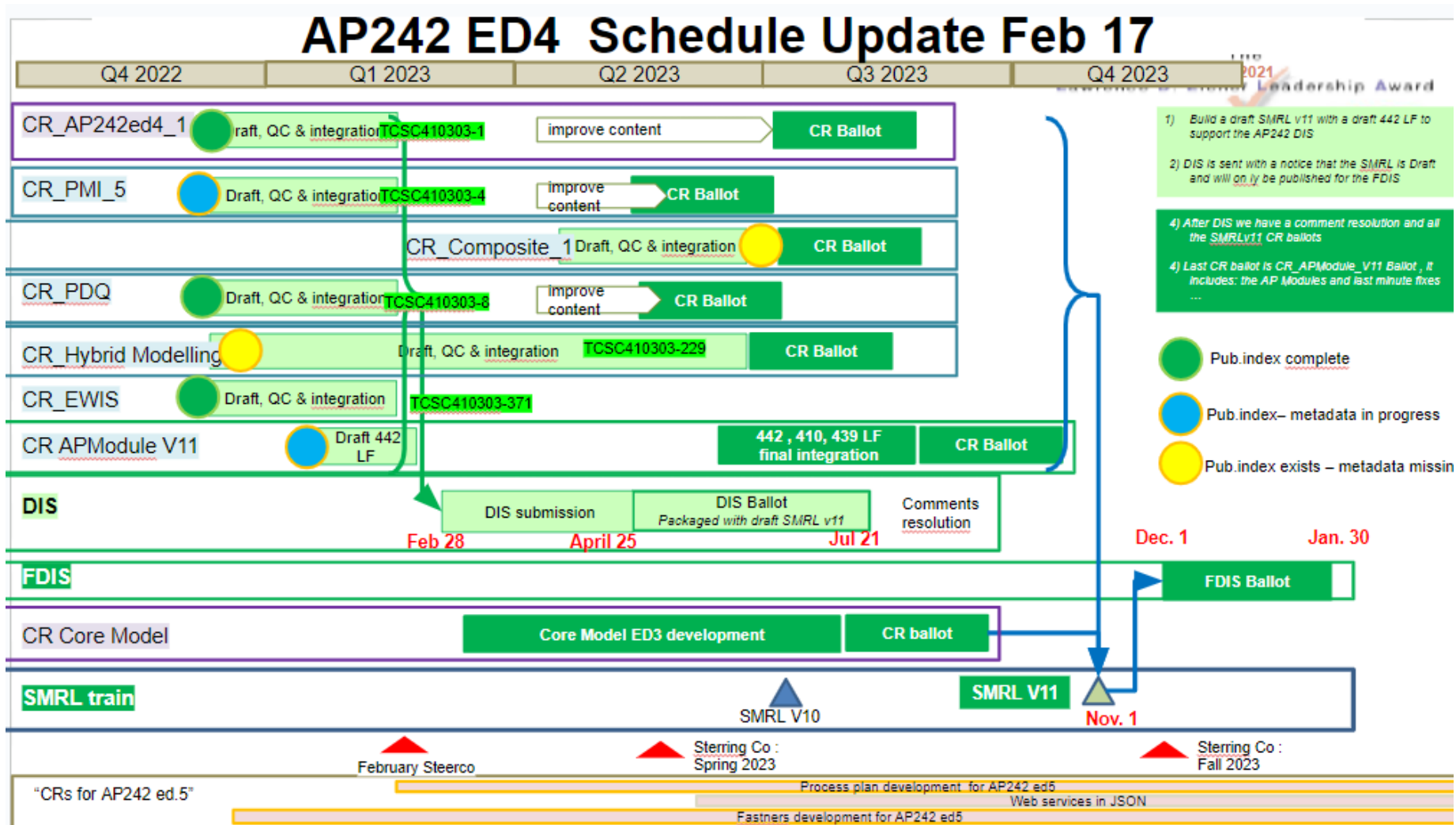
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# STEP AP242 Edition 4

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## A Minor Revision

- ISO rules required a publication as new edition

Document is in publication by ISO

Content, models and schemas are stable and untouched since a while

- The XML and EXPRESS schemas already provided to the implementers are the same which will be in the final ISO package

# STEP AP242 CAD

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CAD information	Implementation format							Level of implementation		
	AP242 Ed1		AP242 Ed2		AP242 Ed3		Pilot	IF test	COTS	
	P21- AIM	XML-BOM	P21- AIM	XML-DM	P21- AIM	XML-DM				
3D Geometry	3D exact BREP representation	YES	n/a	YES	n/a	PLANNED	n/a		YES	
	3D tessellated BREP representation	YES	n/a	YES	n/a	PLANNED	n/a		YES	
	Presentation (color, layers, transparency, invisibility, etc.)	YES	n/a	YES	n/a	PLANNED	n/a		YES	
	Alternative Representation for same Shape (e.g., B-Rep / Tessellated)	YES	n/a	YES	n/a	PLANNED	n/a		YES	
	Alternative Part Shapes (e.g., sheet metal before / after stamping)	YES	n/a	YES	n/a	PLANNED	n/a		YES	
ID Product & Manufacturing Information (PMI)	Graphic Presentation (Part Level)	YES	n/a	YES	n/a	PLANNED	n/a		YES	
	Semantic Representation (Part Level)	YES	n/a	YES	n/a	PLANNED	n/a		YES	
	Saved View (Part Level)	YES	n/a	YES	n/a	PLANNED	n/a		YES	
	Graphic Presentation (Assembly Level)	YES	n/a	YES	n/a	PLANNED	n/a		YES	
	Semantic Representation (Assembly Level)	YES	n/a	YES	n/a	PLANNED	n/a	not covered ye	YES	
	Saved View (Assembly Level)	YES	n/a	YES	n/a	PLANNED	n/a	not covered ye	YES	
	PMI Presentation Placeholder	YES	n/a	YES	n/a	PLANNED	n/a		YES	
Assembly and Installation with Fasteners	Hole and fasteners definition based on UDA, UDF and geometric set	YES	n/a	YES	n/a	PLANNED	n/a	not covered ye	YES	
	Mating requirement	YES	NO	YES	NO	PLANNED	NO	not covered ye	YES	
	Fasteners installation	YES	NO	YES	NO	PLANNED	NO	not covered ye	YES	
	Hole definition	YES	n/a	YES	n/a	PLANNED	n/a	not covered ye	YES	
Assembly Structure	Single File with Assembly Structure and Geometry	YES	n/a	YES	n/a	PLANNED	n/a		YES	
	Single File with Assembly Structure and references to CAD 3D files	YES	YES	YES	PLANNED	PLANNED	PLANNED		YES	
	Nested Assembly files with references to CAD 3D files	YES	YES	YES	PLANNED	PLANNED	PLANNED		YES	
	External Element References (EER)	YES	N.R.	YES	N.R.	PLANNED	PLANNED	not covered ye	YES	
Composite Design	Basic Composite (Ply Laminate Table)	YES	N.R.	YES	N.R.	PLANNED	N.R.		YES	
	Cartesian Rosette	YES	N.R.	YES	N.R.	PLANNED	N.R.		YES	
	Rosette Guided by a Curve	YES	N.R.	YES	N.R.	PLANNED	N.R.		YES	
	Ply Shape Explicit Contour	YES	N.R.	YES	N.R.	PLANNED	N.R.		YES	
	Ply Shape 3D Tessellated Representation	YES	N.R.	YES	N.R.	PLANNED	N.R.		YES	
	Composite Material	YES	N.R.	YES	N.R.	PLANNED	N.R.		YES	
	Core Solid	n/a	N.R.	YES	N.R.	PLANNED	N.R.	not covered ye	YES	
	Cut Pieces	n/a	N.R.	YES	N.R.	PLANNED	N.R.	not covered ye	YES	
Electrical Wiring Harness	Wiring harness assembly structure	n/a	n/a	YES	PLANNED	PLANNED	PLANNED		YES	
	Wiring harness topology	n/a	n/a	YES	PLANNED	PLANNED	PLANNED		YES	
	Wiring harness connectivity	n/a	n/a	YES	PLANNED	PLANNED	PLANNED		YES	
	Harness segments and cables content description	n/a	n/a	YES	PLANNED	PLANNED	PLANNED		YES	
Kinematics	Motion	n/a	n/a	YES	NO	PLANNED	NO	not covered ye	YES	
	Mechanism	n/a	n/a	YES	NO	PLANNED	NO		YES	
Properties	User Defined Attributes (UDA) on geometry level	YES	n/a	YES	n/a	PLANNED	n/a		YES	
	User Defined Attributes (UDA) on part level	YES	YES	YES	YES	PLANNED	PLANNED		YES	
	Graphic Presentation (Assembly Level)	YES	YES	YES	YES	PLANNED	PLANNED		YES	
STEP Compressed File		YES	YES	YES	YES	PLANNED	PLANNED		YES	
Validation Properties	3D Geometry	YES	N.R.	YES	N.R.	PLANNED	N.R.		YES	
	PMI	YES	n/a	YES	n/a	PLANNED	n/a		YES	
	Kinematics	n/a	n/a	YES	NO	PLANNED	NO		YES	
	Assembly Structure	YES	YES	YES	YES	PLANNED	PLANNED		YES	
	Composites	YES	n/a	YES	N.R.	PLANNED	N.R.		YES	
	User Defined Attributes (UDA)	YES	YES	YES	YES	PLANNED	PLANNED		YES	



# STEP AP242 PDM

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PDM information	Implementation format						Level of implementation			
	AP242 Ed1		AP242 Ed2		AP242 Ed3		Pilot	IF test	COTS	
	P21- AIM	XML-BOM	P21- AIM	XML-DM	P21- AIM	XML-DM				
"As Designed" PDM product structure	YES	YES	YES	YES	PLANNED	PLANNED			YES	
"As Planned" PDM product structure	YES	YES	YES	YES	PLANNED	PLANNED			YES	
Nested PDM product structure	YES	YES	YES	YES	PLANNED	PLANNED			YES	
Incremental Exchange	NO	NO	NO	NO	PLANNED	PLANNED			YES	
Assembly validation properties	YES	YES	YES	YES	PLANNED	PLANNED			YES	
Lifecycle management (LifeCycle, ApplicationDomain, Approvals)	YES	YES	YES	YES	PLANNED	PLANNED			YES	
Document management	YES	YES	YES	YES	PLANNED	PLANNED			YES	
Person and organization	YES	YES	YES	YES	PLANNED	PLANNED			YES	
Date and Time	YES	YES	YES	YES	PLANNED	PLANNED			YES	
Classification	YES	YES	YES	YES	PLANNED	PLANNED			YES	
Material properties	YES	NO	YES	NO	PLANNED	PLANNED		not covered yet	YES	
Customized PDM properties	YES	YES	YES	YES	PLANNED	PLANNED			YES	
User defined attribute	YES	YES	YES	YES	PLANNED	PLANNED			YES	
Multi-identification	YES	YES	YES	YES	PLANNED	PLANNED			YES	
Change Management (WorkRequest, WorkOrder, Activity)	YES	NO	YES	NO	PLANNED	PLANNED			YES	
Configuration management	based on effectivities	YES	NO	YES	NO	PLANNED	PLANNED			YES
	based on specifications	YES	NO	YES	NO	PLANNED	PLANNED			YES
	filtering information	YES	NO	YES	NO	PLANNED	PLANNED			YES
Alternate / Substitute Parts	YES	NO	YES	NO	PLANNED	PLANNED			YES	
Mirrored Parts	YES	NO	YES	NO	PLANNED	PLANNED			YES	
LOTAR Product Structure Validation Properties	NO	YES	NO	YES	PLANNED	PLANNED	YES	in preparation		



## ISO 10303-243 The MoSSEC Application Protocol

A complete activity flow describing how to perform M&S activities in a collaborative systems engineering context



← ICS ← 25 ← 25.040 ← 25.040.40

### ISO 10303-243:2021

Industrial automation systems and integration — Product data representation and exchange — Part 243: Application protocol: For modelling and simulation information in a collaborative systems engineering context (MoSSEC)

#### Abstract

[Preview](#)

This document specifies the use of the integrated resources necessary for the scope and information requirements for modelling and simulation information in a collaborative systems engineering context (MoSSEC).

The following are within the scope of this document:

- the representation of the collaborative understanding of the requirements and their verification;
- the representation of the elements that together comprise a set of "results" for a study including the audit-trail of what is to be done, and what has been done, and evolution;
- the representation of the definitions of models and key values that are part of the modelling;
- the representation of information concerning organization and person in those organizations;
- the representation of properties and documents;
- the representation of a collaborative package of work that is launched to drive the evolution and maturity of something;
- the identification of a breakdown of something, the identification of the elements that comprise a breakdown, the parent-child relationships between breakdown elements and the identification of relationships between elements in different breakdowns;
- the representation of interfaces including connections, ports and definitions;
- the identification of which breakdowns, interfaces and models are included in an architecture;

Buy this standard

Format	Language
✓ HTML	English

CHF 208 [Buy](#)

## ISO 10303-4443 The MoSSEC Domain Model

The domain neutral object model used to share the context behind decisions made in collaborative M&S activities



← ICS ← 25 ← 25.040 ← 25.040.40

### ISO/TS 10303-4443:2022

Industrial automation systems and integration — Product data representation and exchange — Part 4443: Domain model: For modelling and simulation information in a collaborative systems engineering context (MoSSEC)

#### Abstract

[Preview](#)

ISO/TS 10303-4443 specifies the domain model for modelling and simulation information in a collaborative systems engineering context (MoSSEC).

The following are within the scope of ISO/TS 10303-4443:

- Domain objects in ISO 10303-243, For modelling and simulation information in a collaborative systems engineering context (MoSSEC);
- Business terminology used to describe capabilities in a manner that will facilitate the development of application programmer interfaces for ISO 10303-243, For modelling and simulation information in a collaborative systems engineering context (MoSSEC);
- Business terminology suited for the communication with and understandability by domains experts of Aerospace and Defence, Automotive and other engineering industries;
- Domain Object OpenAPI JSON Schema for ISO 10303-243;
- Necessary subset of ISO/TS 10303-4000, Core Model, to implement the application protocol;
- Mappings to ISO/TS 10303-4000, Core Model.

General information

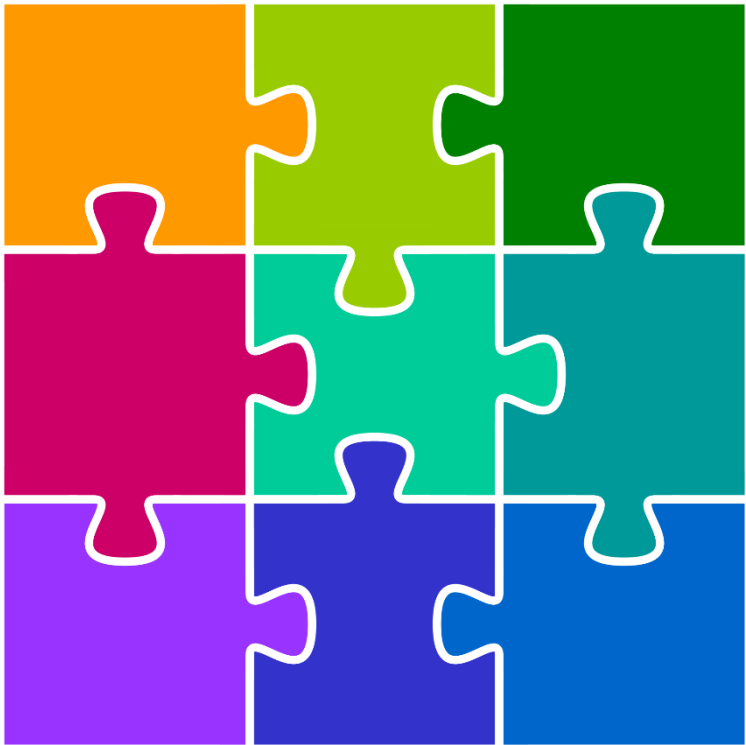
#### Buy this standard

[STEP Module and Resource Library \(SMRL\) v9](#)

This collection is a standard for the exchange of product model data (STEP) module and resource library (SMRL). It is intended for those who are considering adopting ISO 10303 modular application protocols, application modules, and resource parts, or systems built on them, for product data representation ...

# The MoSSEC Domain Model

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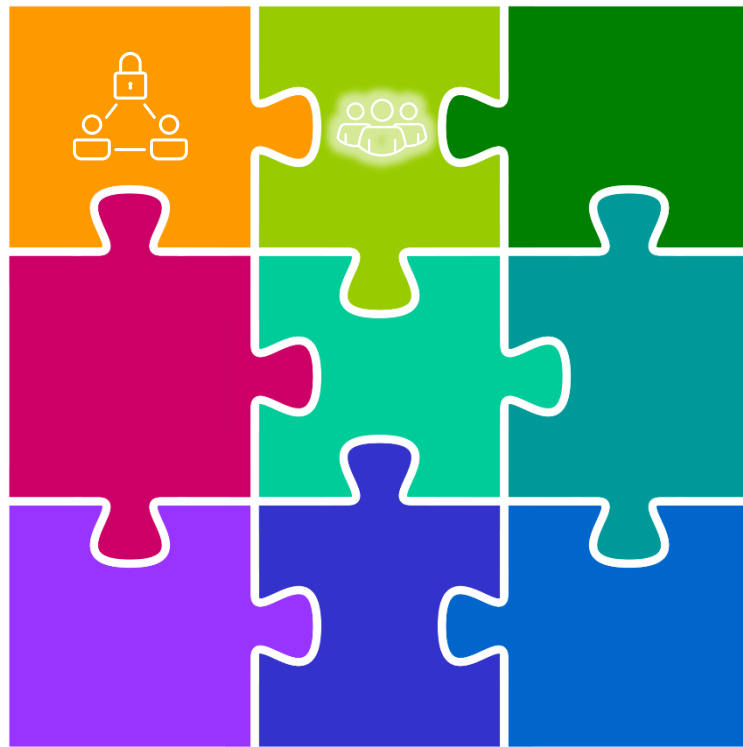


## Security & Trust



- Collaboration contracts
- Access rights
- Security classifications

## Actors & Organizations



- Organizations
- Persons
- Teams



## Value Generation



- Expectations
- Needs and Goals
- Value Creation Strategy

## Requirements and Quality



- Requirements
- Approvals
- Assumptions
- Justifications
- Quality Gates

## Study Management



- Studies
- Objectives
- Concepts

## Models Management



- Model Networks
- Model Types & Instances
- Key Value Types & Instances



## Methodologies



- Templates
- Methods
- Libraries

## Architecture & Interfaces



- Connections
- Components
- Breakdowns

## Optimisation



- Objectives
- Variables
- Uncertainties

# MoSSEC Web Services – The MoSSEC OpenAPI schema

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[https://standards.iso.org/iso/ts/10303/-4443/ed-1/tech/openapi-schema/domain\\_model/DomainModel.json](https://standards.iso.org/iso/ts/10303/-4443/ed-1/tech/openapi-schema/domain_model/DomainModel.json)

```
1 components:
2   responses:
3     '400':
4       description: Bad Request.
5     '401':
6       description: Unauthorized.
7     '403':
8       description: Forbidden.
9     '404':
10      description: Not Found.
11   200_PutPatch:
12     description: Resource updated successfully.
13   201_POST:
14     content:
15       application/json:
16         example: _18_4_1_1b310459_1511445569604_398628_32624
17         schema:
18           $ref: '#/components/schemas/ID'
19       application/xml:
20         example: _18_4_1_1b310459_1511445569604_398628_32624
21         schema:
22           $ref: '#/components/schemas/ID'
23       description: Resource created successfully.
24   schemas:
25     AccessibleModelInstanceConstituent:
26       properties:
27         AccessibleModelInstanceConstituent:
28           properties:
29             $href:
30               $ref: '#/components/schemas/uri'
31             ClassifiedAs:
32               items:
33                 $ref: '#/components/schemas/uri'
34             minItems: 1
35             type: array
36             CreatedBy:
37               $ref: '#/components/schemas/PersonOrOrganizationItemReference'
38             CreatedOn:
39               $ref: '#/components/schemas/dateTime'
40             Descriptions:
41               items:
42                 $ref: '#/components/schemas/LocalizedStringPart'
43             minItems: 1
44             type: array
45             Identifiers:
46               items:
47                 $ref: '#/components/schemas/ContextStringPart'
48             minItems: 1
49             type: array
50             IsAnInstanceOf:
51               $ref: '#/components/schemas/AccessibleModelTypeConstituentReference'
52             LastModified:
53               $ref: '#/components/schemas/dateTime'
54             ModifiedBy:
55               $ref: '#/components/schemas/PersonOrOrganizationItemReference'
56             Names:
57               items:
58                 $ref: '#/components/schemas/ContextStringPart'
59             minItems: 1
60             type: array
61             OwnerOf:
```

## ISO/TS 10303-4443 OpenAPI3.0 Web Services specification

1.0.0 OAS 3.0

ISO TC 184/SC 4/WG 12 N10989 ISO/TS 10303-4443 Edition 1: OpenAPI specification for Modelling and Simulation information in a systems engineering context. OpenAPI 3.0 Web Services specification containing the services and object definitions.

### Common

**POST** /match Match payload and return using format.

### AccessibleModelInstanceConstituent

**GET** /AccessibleModelInstanceConstituent/{uid} Return 'AccessibleModelInstanceConstituent' object by uid.

**PATCH** /AccessibleModelInstanceConstituent/{uid} Update 'AccessibleModelInstanceConstituent' object by uid.

**PUT** /AccessibleModelInstanceConstituent/{uid} Replace 'AccessibleModelInstanceConstituent' object by uid.

### AccessibleModelTypeConstituent

**GET** /AccessibleModelTypeConstituent/{uid} Return 'AccessibleModelTypeConstituent' object by uid.

**PATCH** /AccessibleModelTypeConstituent/{uid} Update 'AccessibleModelTypeConstituent' object by uid.

**PUT** /AccessibleModelTypeConstituent/{uid} Replace 'AccessibleModelTypeConstituent' object by uid.

### ActualActivity

**POST** /ActualActivity Create a new 'ActualActivity' object.

**GET** /ActualActivity/{uid} Return 'ActualActivity' object by uid.

```
Study {
  Study* {
    $href
    Approvals > [...]
    Authorisations > [...]
    ClassifiedAs > [...]
    Concepts > [...]
    ControllerOf* PersonOrOrganizationItemReference > {...}
    CreatedBy* PersonOrOrganizationItemReference > {...}
    CreatedOn* dateTime > [...]
    Creates > [...]
    DeadlineDate dateTime > [...]
    Deploys > [...]
    Descriptions > [...]
    Identifiers* > [...]
    Inputs > [...]
    LastModified* dateTime > [...]
    Manages > [...]
    ModifiedBy* PersonOrOrganizationItemReference > {...}
    Names > [...]
    OwnerOf PersonOrOrganizationItemPart > {...}
    ProgrammeContext > [...]
    Requirements > [...]
    Status* uri > [...]
    StudyReports > [...]
    Type* uri > [...]
    WatchersOf > [...]
  }
}
```

GUI generated using [editor.swagger.io](https://editor.swagger.io)



# ISO 10303-18:2021 – SysML XMI to Web services transformation

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The screenshot shows the ISO Online Browsing Platform (OBP) interface. The search bar contains "ISO/TS 10303-18:2021(en)". The document title is "ISO/TS 10303-18:2021(en) Industrial automation systems and integration – Product data representation and exchange – Part 18: Description methods: SysML XMI to Web services transformation". The table of contents on the left lists sections from Foreword to Parts. The main content area displays the "Foreword" section, which includes text about ISO's role, the development process, and patent considerations.

*“This document specifies the definition for services at the point of interaction between a client and server.*

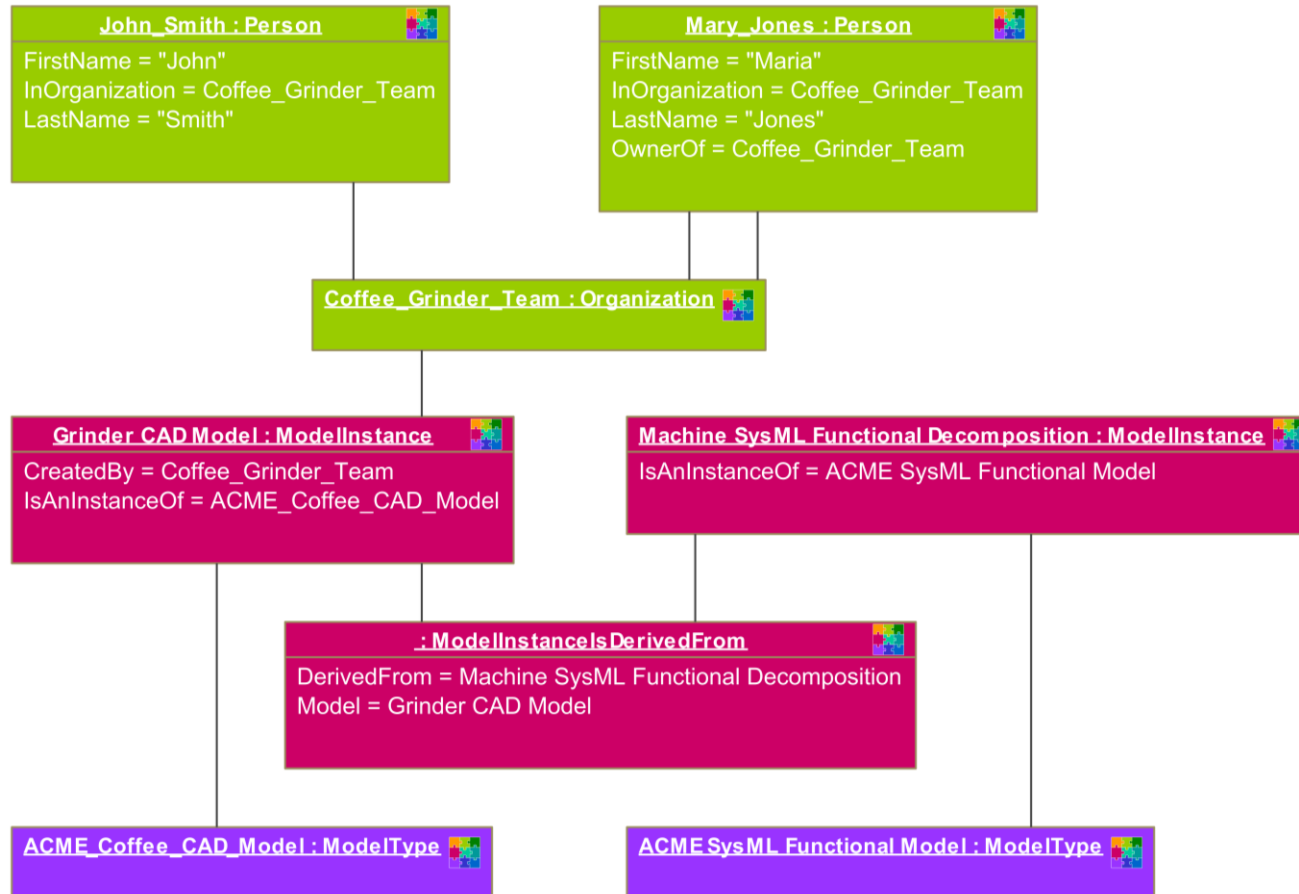
*The following are within the scope of this document:*

- *the specification of the structure, components and conventions for domain- and technology-independent services implementation methods for STEP (ISO 10303-1);*
- *transformation of the SysML metamodel constructs to OpenAPI constructs for RESTful web services (see OpenAPI:3.0.0[25] and IETF RFC7231).”*

ISO

# Applying MoSSEC OpenAPI Web Services – Introducing ACME Coffee Inc

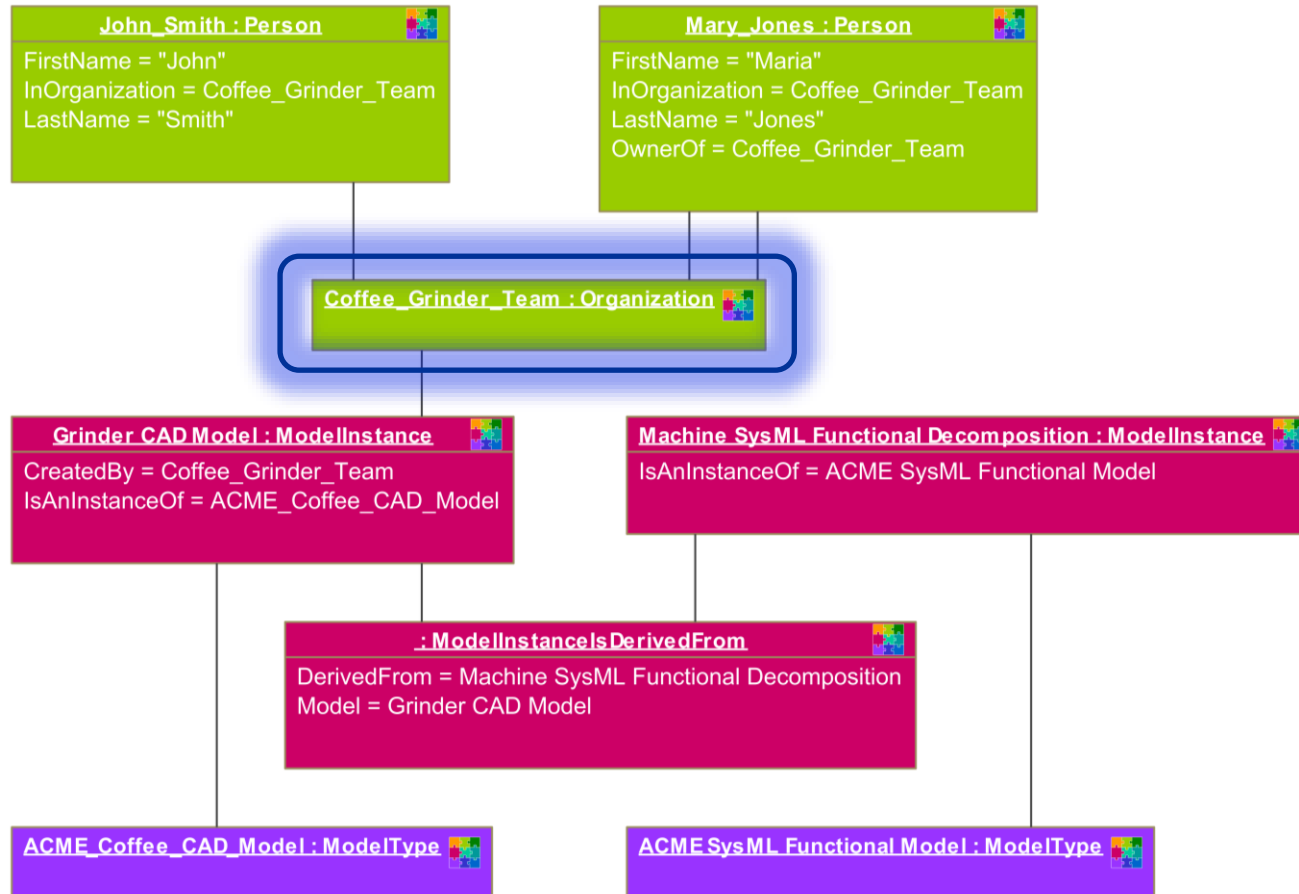
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NOTE: Representation of AP243 ONLY. Data not ACCURATE

# Applying MoSSEC OpenAPI Web Services – Introducing ACME Coffee Inc

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```

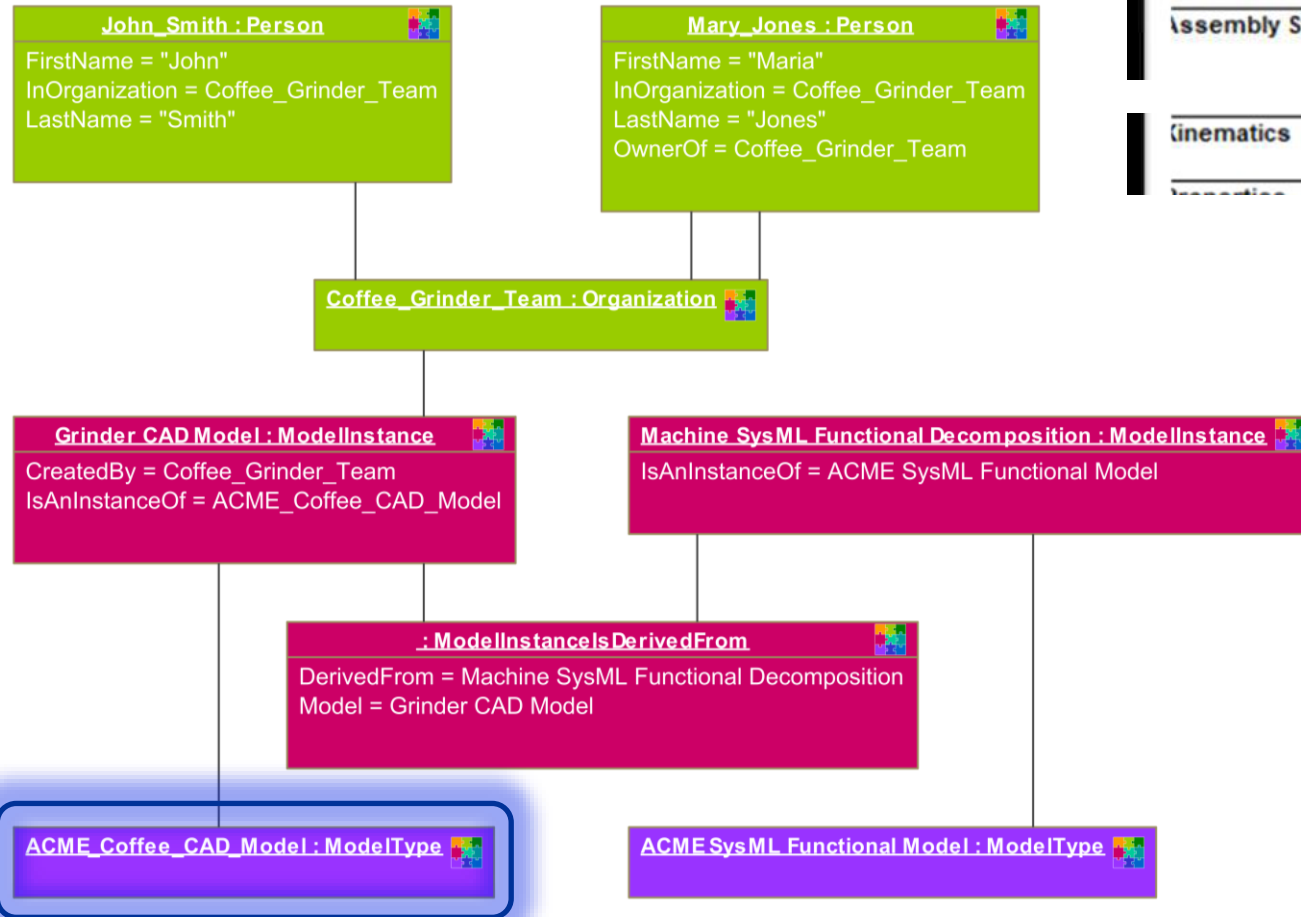
{
  "Organization": {
    "$href": "UID_CoffeeGrinderTeamOrganization",
    "InOrganization": [
      {
        "Reference": "UID_AcmeCoffeeOrganization"
      }
    ],
    "Names": [
      {
        "LocalizedString": {
          "$href": "UID_CoffeeGrinderTeamName",
          "Context": {
            "Reference": "UID_CoffeeGrinderTeamOrganization"
          },
          "Language": {
            "Language": {
              "CountryCode": "GB",
              "LanguageCode": "en"
            }
          }
        },
        "Text": "Coffee_Grinder_Team"
      }
    ]
  }
}

```

NOTE: Representation of AP243 ONLY. Data not ACCURATE

# Applying STEP OpenAPI Web Services – Breaking down the ACME Coffee CAD Model with AP242 interface

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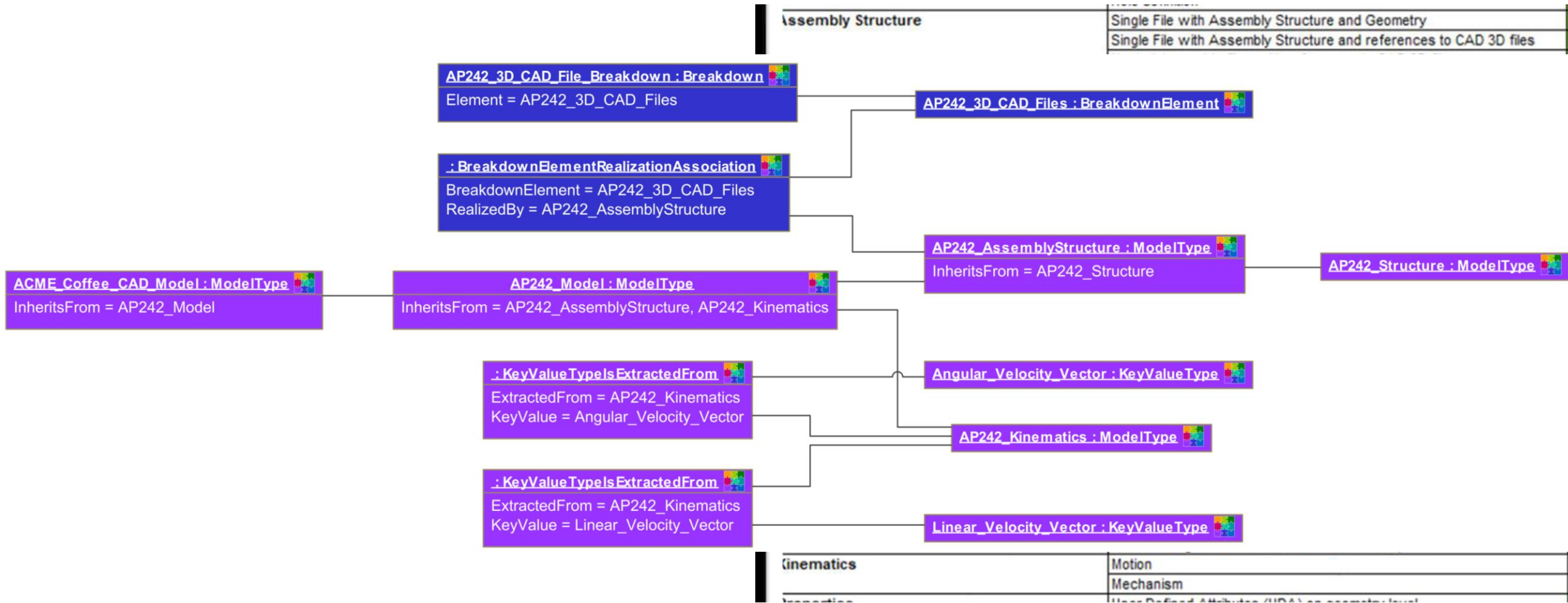


Assembly Structure	Single File with Assembly Structure and Geometry
	Single File with Assembly Structure and references to CAD 3D files
Kinematics	Motion
	Mechanism

NOTE: Representation of AP243 ONLY. Data not ACCURATE

# Applying STEP OpenAPI Web Services – Breaking down the ACME Coffee CAD Model with AP242 interface

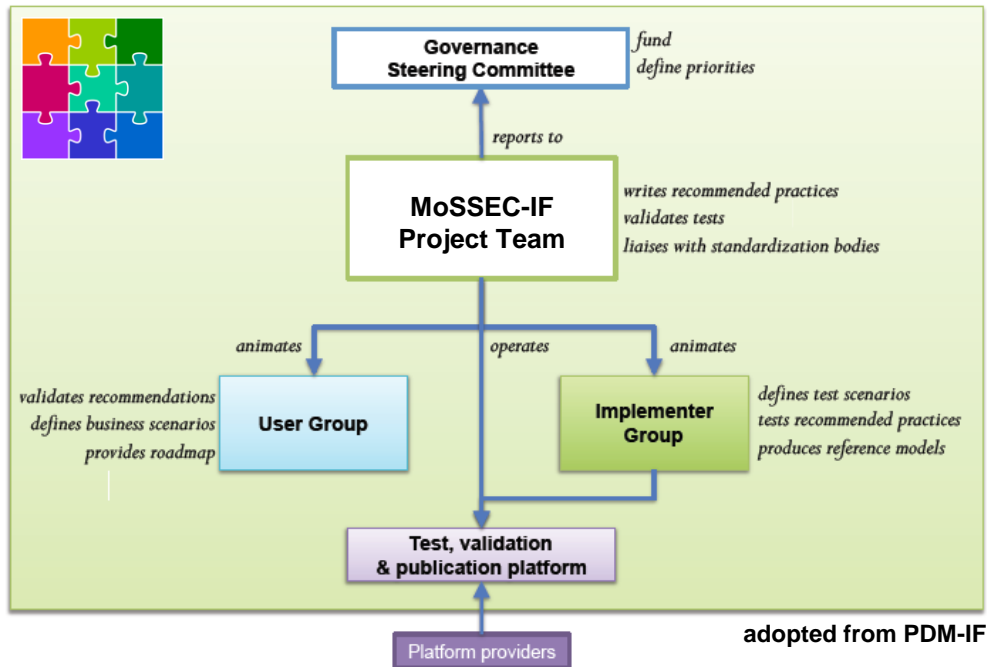
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NOTE: Representation of AP242 and AP243 ONLY. Data not ACCURATE

# The MoSSEC Implementation Forum

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- Need for IF collaboration and publication spaces.
- Proposal to integrate publications and developments through:  
**Tool Integration and Model Lifecycle Management (TIMLM) INCOSE Working Group**
- Yearly workshops at INCOSE IW with **MoSSEC-IF International Workshop #1** planned for INCOSE IW 2024.
- Integration sought between standardization bodies (support through NIST, SAE, ISO, etc.)
- Promote MoSSEC as a standard for use in collaboration frameworks such as MOSA.
- Promote the production of a MoSSEC vocabulary for OSLC.





The MBx Implementor Forum is a joint testing effort between [AFNeT](#), [PDES, Inc.](#) and [prostep ivip](#). The objective of the forum is to accelerate MBx translator development and ensure that users' requirements are satisfied. The MBx Implementor Forum is an approach to establish a common test activity in the CAD and CAE areas by merging AFNeT's, PDES, Inc.'s STEPnet and prostep ivip's RoundTable activities.

## The goals of the MBx Implementor Forum are to:

- Implement functionality for today's needs
- Identify functionality for tomorrow's needs
- Avoid roadblocks by establishing agreed upon approaches
- Increase user confidence by providing system and AP interoperability testing
- Ensure new functionality does not adversely impact existing implementations

The MBx Implementor Forum is significantly improving STEP translator quality and decreasing translator time-to-market

# STEP Recommended Practises

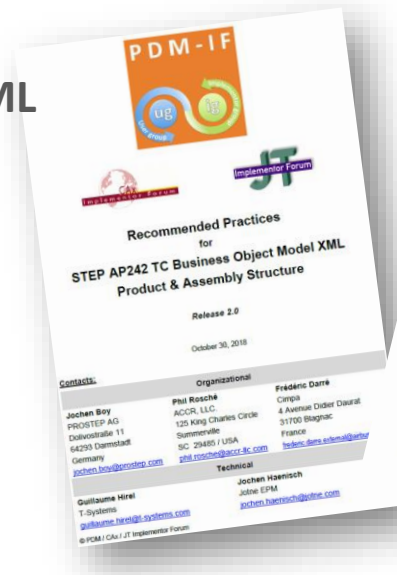
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- Recommended Practises
  - AP242 Domain Model XML Product Structure and Assembly
  - AP242 Domain Model XML Domain Model XML Kinematics
  - PMI Unicode Strings Specifications

## Recommended Practices for STEP AP242 XML Product & Assembly Structure

V3.1 (18/11/2022) for AP242 ed3

- Transfer of **customized PDM data**
- Support of **Multi-View Product Structure Representation**
- Update for **Alternate & Substitute**



## Recommended Practices for STEP AP242 XML Kinematics

V1.1 (18/11/2022) for AP242 ed3

- **Kinematic Exchange** (STEP XML + STEP Geometry or JT)

# STEP AP242 Benchmark

Global Product Data Interoperability Summit | 2023

Two benchmarks on PDM scope launched since 2017

- Presentation of the test cases
- List of tested functionalities
- Results for each vendors STEP interface per test cases

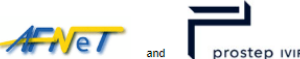


## Short Version

Step number	Criteria name	Solution with target PDM system (end-user check is done in the PDM system)			Solution without target PDM system (end-user check is done in 3DPDF or in the solutions)		
		Dassault Systèmes 3DEXPERIENCE R2020x FD01	PROSTEP AG OpenPDM v8.5.8 for TeamCenter v11.5	T-Systems COMPDM v2020.1.0 for Aras Innovator 12.0 SP1	Datakit CrossManager 2020.1	Elysium ASFALIS EX8.2	CoreTechnologie 3D_Evolution 4.3 SP1
<b>Phase A: STEP import from sample file and export</b>							
1	STEP IMPORT	●	●	●	●	●	●
2	End-user check	●	●	●	●	●	●
	End-user check of nb. child. VP	●	●	●	●	●	●
3	End-user check of centroid VP	●	●	●	●	●	●
	STEP EXPORT	●	●	●	n/a	●	●
3	Export of number of children VP	●	●	●	n/a	●	●
	Export of notional centroid VP	●	●	●	n/a	●	●
3	STEP file conformity	see the three lines below					
3	XML conformity check error	●	●	●	n/a	●	●
3	XSD conformity check error	●	●	●	n/a	●	●
3	Comparison and R.P. conformity check	●	●	●	n/a	●	●
3	Import of exported STEP File	●	●	●	●	●	●
<b>Phase B: STEP import from selected files</b>							
4	STEP IMPORT	●	●	●	●	●	●
2	End-user check	●	●	●	●	●	●
	End-user check of nb. child. VP	●	●	●	●	●	●
2	End-user check of centroid VP	●	●	●	●	●	●

Test result	Symbol
Total success	●
Success with minor issues	●
Partial success with major issues	●
Partial success with critical issues	●
Total fail	●
Not supported	●
Not applicable	n/a

STEP AP242 benchmarks are conducted by



Download Benchmark documents: Short Public Reports

Benchmark #3

[STEP AP242 Benchmark #3 - CAD test case - Short test report](#)  
Published on 30th of September 2020, version 1.0, public access.

[STEP AP242 Benchmark #3 - PDM test cases - Short test report](#)  
Published on 30th of September 2020, version 1.0, public access.

Benchmark #2

[STEP AP242 Benchmark #2 - CAD test cases - Short test report](#)  
Published on 21st of June 2017, version 1.1, public access.

[STEP AP242 Benchmark #2 - PDM test case - Short test report](#)  
Published on 15th of March 2017, version 1.0, public access.

Benchmark #1

[STEP AP242 Benchmark #1 - CAD test cases - Short test report](#)  
Published on 18th of September 2015, version 1.1, public access.

## MoSSEC

Standardised context to unlock  
robust digital continuity



Kyle Hall – Airbus Commercial Aircraft

Jonathan Taylor – Airbus Commercial Aircraft

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# STEP AP242 and AP243

Consistently defined complex products  
and their context

Bernd Feldvoss – Airbus Commercial Aircraft

Kyle Hall – Airbus Commercial Aircraft

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