



Recommended Practices
for
STEP AP242 Edition 3
Domain Model XML
Change Management

Release 0.5

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Table of Contents

1	Introduction.....	5
1.1	Document Overview	5
1.1.1	Goal and Objectives	5
1.1.2	Implementation Basis	5
1.1.3	Intended Audience	6
1.1.4	Intended Use.....	6
1.1.5	Document Style.....	6
1.1.6	Document Structure.....	7
1.1.7	Instantiation Diagrams	7
1.2	Organizational Framework.....	11
1.2.1	Vendor Communities	11
1.2.2	User Communities	11
1.3	Maintenance of this Document	11
2	Scope.....	12
2.1	In Scope	12
2.2	Out of Scope	12
2.3	Implementation Changes between AP242 Ed.1 TC and AP242 Ed.3	13
3	Reference to Recommended Practices	13
3.1	Reference to Core Document [242-PAS].....	13
3.2	Listing of Recommended Practices Version in Exchange Files.....	13
4	Fundamental Concepts and Assumptions	14
5	Change Management Templates	15
5.1	Template “WorkRequest”	15
5.1.1	ENTITY WorkRequest	15
5.1.2	ENTITY WorkRequestRelationship	19
5.2	Template “WorkOrder”.....	20
5.2.1	ENTITY WorkOrder	20
5.2.2	ENTITY WorkOrderAssignment.....	23
5.2.3	ENTITY WorkOrderRelationship.....	25
5.3	Template “Activity”	26
5.3.1	ENTITY ActualActivity.....	31
5.3.2	ENTITY DirectedActualActivity	32
5.3.3	ENTITY PlannedActivity	32
5.3.4	ENTITY DirectedPlannedActivity	33
5.3.5	ENTITY ActivityAssignment.....	34
5.3.6	ENTITY ActivityRelationship.....	36
5.3.7	ENTITY AssignmentObjectRelationship.....	39
5.4	Template “Observation”	41
5.4.1	ENTITY Observation.....	41
5.4.2	ENTITY ObservationAssignment.....	44
5.4.3	ENTITY ObservationConsequence	45
5.4.4	ENTITY ObservationRelationship.....	46
6	Visual Issue Management Usecase	47

7 List of Templates	53
Annex A Known Issues.....	54
Annex B Reference Documents	54

List of Figures

Figure 1: The overall Digital change Management Process	14
Figure 2: Template "WorkRequest"	15
Figure 3: Template "WorkOrder"	20
Figure 4: Template "Activity"	27
Figure 5: Template "ActivityRelationship"	36
Figure 6: Template "AssignmentObjectRelationship"	39
Figure 7: Template "Observation"	41

List of Tables

Table 1: Instance Diagram Notation	10
Table 2: "WorkRequest" Attributes	17
Table 3: "WorkRequestRelationship" Attributes	19
Table 4: "WorkOrder" Attributes	22
Table 5: "WorkOrderAssignment" Attributes	24
Table 6: "WorkOrderRelationship" Attributes	25
Table 7: "Activity" Attributes.....	29
Table 8: "ActualActivity" Attributes.....	31
Table 9: "DirectedActualActivity" Attributes.....	32
Table 10: "PlannedActivity" Attributes.....	32
Table 11: "DirectedPlannedActivity" Attributes	33
Table 12: "ActivityAssignment" Attributes	35
Table 13: "ActivityRelationship" Attributes	37
Table 14: "AssignmentObjectRelationship" Attributes.....	40
Table 15: "Observation" Attributes.....	42
Table 16: "ObservationAssignment" Attributes	44
Table 17: "ObservationConsequence" Attributes	45
Table 18: "ObservationRelationship" Attributes	46

Document History

Revision	Date	Change
0.1	2020-02-19	Initial creation as section 15 of the Recommended Practices for AP242 XML Product & Assembly Structure Section 4.1: Updated recommendations for organizational data
0.2	2020-03-30	Section 4.1: updated work request scope Section 4.2: added attributes on WorkOrder

Revision	Date	Change
		New sections 4.3.3 – 4.3.6 to extend Activity recommendations
0.3	2020-06-18	Splitting of Change Management Recommended Practices into separate document
0.4	2020-07-07	Section 2: Update Scope definition New Section 6 on application of Change Management concepts to the VIM Use Case
0.5	2023-12-06	<p>Initial adaptation for AP242 Edition 3 Domain Model See section 2.3 for Implementation changes to AP242 Ed.3</p> <p>Throughout: Updated references from AP242 Ed.1 TC BO Model to AP242 Ed.3 Domain Model</p> <p>Added objects:</p> <ul style="list-style-type: none"> - WorkRequestRelationship (section 5.1.2) - WorkOrderRelationship (section 5.2.3) - AssignmentObjectRelationship (section 5.3.7) <p>Section 1.1.2: URL of Domain Model corrected</p> <p>Section 2.2 and Annex B: add reference to PSMS recommendation</p> <p>Section 5.1.1: added handling of multiple versions of the same WorkRequest</p> <p>Section 5.2.1: Update to WorkOrder.Scope; added handling of multiple versions of the same WorkOrder</p> <p>Section 5.3.3: added handling of multiple versions of the same PlannedActivity</p> <p>Section 5.4: update of VIM usecase recommendations, now using Edition 4 capabilities; Template “Observation”, to be completed when the Domain Model of Edition 4 is available</p> <p>Section 5.4.1: added handling of multiple versions of the same Observation</p> <p>Annex A: new issue numbers after switch from PDES Inc. Bugzilla to ISO Jira</p>

1 Introduction

1.1 Document Overview

1.1.1 Goal and Objectives

The goal of this document is to describe the recommended structure and attribute population for particular instance models created from the entities and attributes defined by the STEP AP242 “Managed Model-based 3D Engineering” Domain model and populated according to its XML Schema.

The selected instance models illustrate how to encode data values that need to be exchanged in support of key industry requirements common across the mechanical design domain. The objectives of the usage guide are to:

- Support the short-term needs of the requirements of the Aerospace & Defense and the Automotive industries in the realm of mechanical design
- Prevent the emergence of “flavors”, i.e. diverging/conflicting implementations of the AP242 Domain Model XML for different communities
- Ensure consistency with existing Recommended Practices, in particular the joint PDM-IF / MBx-IF / JT-IF Recommended Practices for AP242 Domain Model XML Product and Assembly Structure.

1.1.2 Implementation Basis

This document describes the Recommended Practices for the exchange of Change Management information. It is based on the Technical Corrigendum of the third edition of STEP AP242, which was published in 2022. It contains the Domain Model (ISO 10303-4442:2022) and the corresponding XML schemas, which can be found at: http://standards.iso.org/iso/ts/10303/-4442/ed-3/tech/xml-schema/domain_model

Therefore, the the XML header of AP242 Domain Model XML files which shall comply to Ed.3 shall look like the following:

```
xmlns:n0="http://standards.iso.org/iso/ts/10303/-4442/ed-3/tech/xml-schema/domain_model " xsi:schemaLocation="http://standards.iso.org/iso/ts/10303/-4442/ed-3/tech/xml-schema/domain_model http://standards.iso.org/iso/ts/10303/-4442/ed-3/tech/xml-schema/domain_model/DomainModel.xsd"
```

Remark: due to some delay in the publication of the standard, this URL may not be available yet. In this case, please use a local copy of the Domain Model XSD available on <https://globalx.prostep.com/>.

This document has not the intention to define all aspects of PLM and change management. Focus is to support the implementation of AP242 in software systems for some predefined use cases that are introduced in chapter 4. Only those change management aspects will be highlighted in chapter 5 that are relevant to match the domain and use case specific view to the corresponding technical view for the software developer. Finally, chapter 6 will provide guidance on how to apply the concepts introduced in sections 4 and 5 to the VIM Use Case defined by the PDM-IF User Group.

Because this document is only a recommendation, some document specific definitions of change management terms are used, which reflect industry practice. Also, the PLM system landscape and the lifecycle processes applied by industry may have a more detailed view to the handling of product structures in change management processes. This document, however, raises the claim to give a summary of the most common aspects.

1.1.3 Intended Audience

This document is intended to be an implementation guide for developers of PDM and file translation application systems that support and exchange change management information with other systems and applications, in support of the design engineering and related downstream business processes.

1.1.4 Intended Use

This document is intended to be a manual and companion to the developer of STEP data exchange and translator software used by applications that support change management definitions. It provides guidelines for the consistent preprocessor instance model creation and requirement value encoding to enable meaningful information exchange between different systems and applications using the STEP AP242 Domain model, and guidelines for the consistent interpretation by a postprocessor of the STEP AP242 Domain model exchange file.

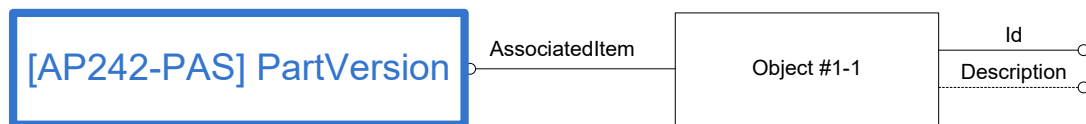
1.1.5 Document Style

The overall document proceeds in an incremental, step-by-step fashion to describe, and in parallel to illustrate the recommended instantiations of the XML elements in the STEP AP242 Domain model.

The “template” concept is used in this document. Structures and sub-structures are defined in one section; they are then re-used in other sections of the documents. These templates are represented by the blue boxes in the diagrams.

Templates for common core constructs, such as product, are defined in the “Recommended Practices for AP242 Domain Model XML Product and Assembly Structure” and reused here. References to such templates are prefixed with [242-PAS].

The instantiation diagrams are presented using a graphical notation intended to illustrate the instance model. Detailed notation is described in chapter 1.1.7.



Following each instance diagram, a table lists all the attributes of each displayed entity according to the XMLschema specification of ISO 10303-3001. The table includes not only the attributes of the EXPRESS schema of the AP242 Domain Model, but also inverse attributes of all possible relations to the element in question. Attributes that are considered important for the scope of these Recommended Practices are in these tables written in black. Attributes that are written in grey are not covered by these Recommended Practices; their use is discouraged as it would depend on mutual agreements between data exchange partners.

ENTITY <Object>	Attribute Type
Id	Id
Description	OPTIONAL DescriptionSelect
AssociatedItem	PartVersion

Below the table, all recommended attributes (written in black) are listed, and recommendations are made for them.

Attribute recommendations:

- **Id:** The id attribute specifies the identifier of the <Object> entity.
- **associatedItem:** the PartVersion that identifies a part which is a valid implementation for the <Object>

Finally, a STEP AP242 Domain model XML exchange structure example is included. The example exchange file corresponds directly to the instance model diagram and illustrates the very same thing using a different notation, i.e., STEP AP242 Domain model XML syntax versus the graphical instance model notation.

```
<Object uid="obj---01">  
    <Id id="Manufactural Product"/>  
    <AssociatedItem uidRef="pv---02"/>  
</Object>
```

1.1.6 Document Structure

The overall scope of requirements is partitioned into a set of major sections corresponding to the identified units of functionality. Within a major section, there may be sub-sections. These sub-sections further divide the scope into smaller components of coherent functionality (called “feature”) that interact with each other to realize the functionality of the entire unit.

There is generally a description of requirements and a corresponding instance diagram associated with each section and sub-section of this document. Each instance diagram is followed by a detailed explanation and specific recommendations for the entities used in the instantiation diagram example. The entity listing and explanation is in turn followed by the corresponding XML exchange structure example.

Within a section, diagrams corresponding to sub-sections incrementally build upon one another to finally achieve a complete instance model example that illustrates the entire scope of the unit of functionality.

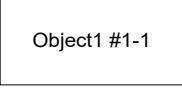
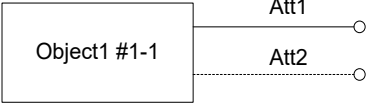
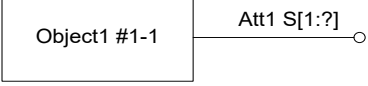
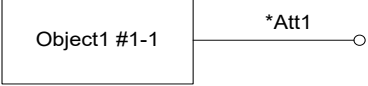
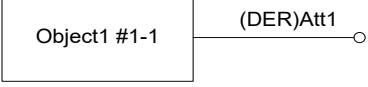
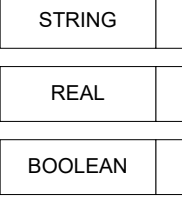


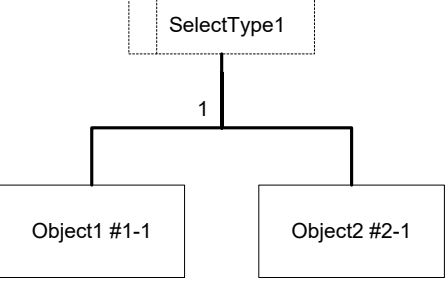
1.1.7 Instantiation Diagrams

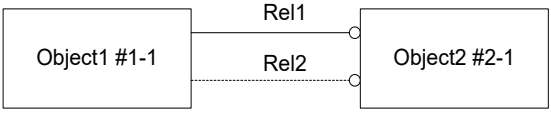
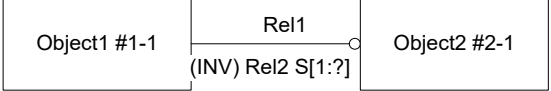
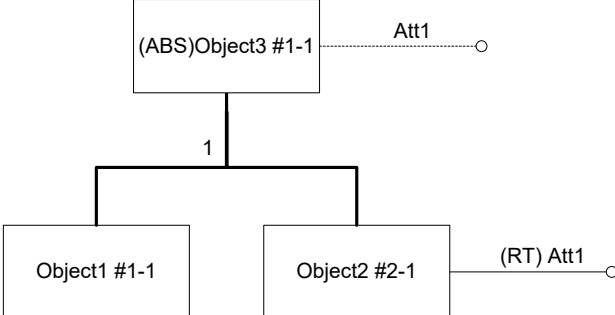
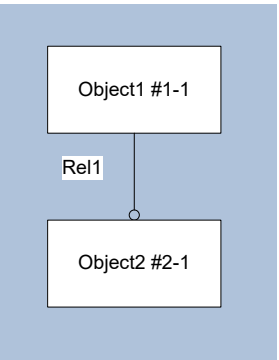
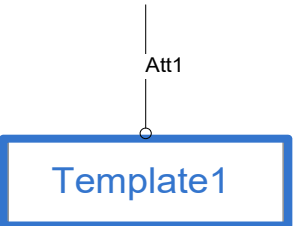
The diagrams are presented using a graphical notation intended to illustrate the instance model.

This notation is not EXPRESS-G and does not illustrate the XML schema; rather it is a graphical illustration of a specific population of a particular instance model of the schema. This notation supports:

- Illustration of entity instances and attribute values (both mapped as XML elements)
- Illustration and identification of referenced entity instances that are either fully illustrated in the current figure, or that refer to another template (if not fully illustrated in the current figure)
- Indication of optional attributes and optional reference entity instances (dashed lines),
- Illustration and identification of groups of functionally related instances (shaded bounding box), showing how XML elements are embedded into each other (the XML elements representing the entity instances placed below are embedded into the XML element representing the entity instance placed above), and
- Identification of specific attribute values (typically string values, may also be enumerated type values or numerical values).

A legend for the diagram notation is shown below:

	<p>Object (instance of an EXPRESS ENTITY) After the #, an instance number is given</p>
	<p>Att1: mandatory attribute Att2: optional attribute</p>
	<p>Aggregate type for the definition of the cardinality constraint:</p> <p>B: Bag (non-ordered and may contain duplicates) S: Set (non-ordered and may not contain duplicates) L: List (ordered)</p> <p>[x : y]: lower size : upper size ?: unconstrained</p> <p>A: Array (indexed) [x : y]: lower index : upper index</p>
	<p>Additional constraint on the object: the attribute(s) depicted with '*' have to contain unique values.</p> <p><i>Currently not used in this document</i></p>
	<p>Derived Information from another object or attribute</p> <p><i>Currently not used in this document</i></p>
	<p>Simple data types</p>
	<p>User-defined data type</p> <p><i>Currently not used in this document</i></p>
	<p>Enumeration Type (consists of a limited list of possible values defined for this type)</p>
	<p>Select Type (is used if a relationship from an object may apply either to Object1 or Object2)</p> <p>For a better readability, the members of a select type are displayed using the inheritance link (see below) and the mutually exclusive constraint. This has the same semantic as a select type.</p>

	<p><i>Currently not used in this document</i></p> <p>Attribute as relationship between two Objects (mandatory or optional), The circle at the end of the line gives the direction. Rel1: mandatory relationship Rel2: optional relationship</p>
	<p>Rel2: inverse attribute (i.e. in the converse direction to Rel1) with cardinality constraint <i>Currently not used in this document</i></p>
	<p>Inheritance from a Supertype to its Subtypes An Abstract Supertype (ABS) cannot be instantiated without one of its non-abstract Subtypes 1: Only one subtype can be instantiated at a time (the subtypes are mutually exclusive). Per default, all the subtypes may be combined (not supported by XML) RT: an inherited attribute is retyped, for example through restriction of its type, length, value range, cardinality, mandatory instead of optional or DERIVED <i>Currently not used in this document</i></p>
	<p>Objects shown under each other within a blue colored square are embedded into each other in XML: here Object2 #2-1 is embedded into Object1 #1-1 as its XML element Rel1</p>
	<p>The templates defined in this document are re-used in other sections. This is the simple way to refer to a template (if the object referenced within the template is implicit, for example the object 'Classification' for the template 'Classification')</p>

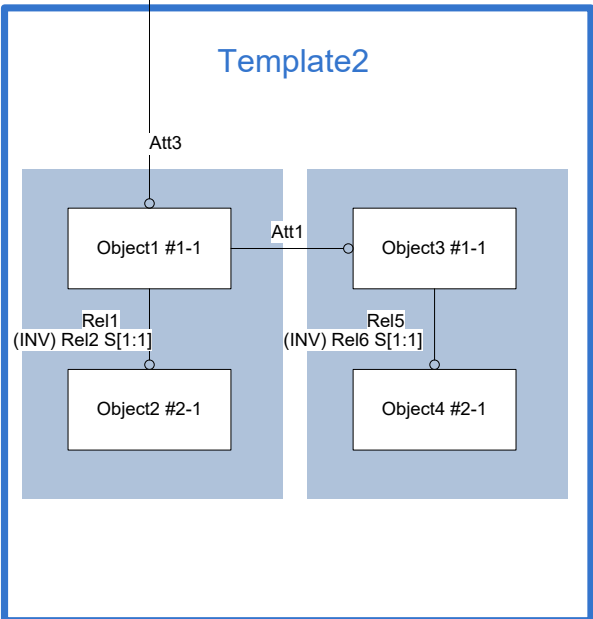
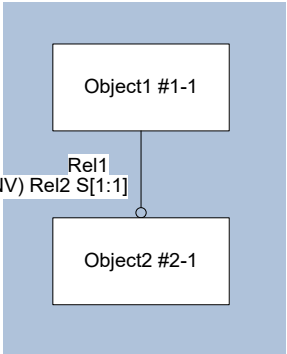
	<p>If the template is more complex and the object referenced within the template is shown explicitly, portions of the reused template are displayed within a blue frame.</p>
	<p>Alternatively, a template may be reused through adding new XML containments to it</p>

Table 1: Instance Diagram Notation

1.2 **Organizational Framework**

These “Recommended Practices for AP242 Domain Model XML Change Management” are developed and supported by a number of “communities”, specifically the vendor and user communities devoted to the development and implementation of AP242 and its associated Domain Model. This section describes those communities’ responsibilities.

1.2.1 **Vendor Communities**

The **PDM-IF Implementor Group (IG)** will be responsible for the overall organization and development of this document. The PDM-IF IG will:

- Coordinate the creation of the document
- Verify the approach of the recommended practices in PDM-IF Test Rounds, and publish result summaries of testing “AP242 Domain Model Change Management”
- Ensure the consistency with other “AP242 Domain Model XML Recommended Practices”

1.2.2 **User Communities**

The **PDM-IF User Group (UG)** is a forum of PDM experts from the Aerospace and Defense as well as the automotive industries. The PDM-IF UG is responsible for development of the document and will:

- Support the development of the document
- Provide subject matter experts
- Provide industry requirements and ensure they are fulfilled
- Ensure the consistency with PDM standards spanning the complete product life cycle

1.3 **Maintenance of this Document**

This document describes the recommended practices to implement change management data using the AP242 Domain Model. It is based on the joint PDM-IF / CAX-IF / JT-IF “Recommended Practices for AP242 Domain Model XML Product and Assembly Structure”. Since change management is an extension to the core scope that is specific to the PDM domain, it is documented in a separate document with references to the core document where needed.

It is the responsibility of the PDM-IF not only to maintain this document, but also to ensure its consistency with the core document.

AFNeT and the prostep ivip Association are the hosting organizations of the PDM Interoperability Forum and as such will maintain and extend the document as long as it provides utility to the vendor community.

2 Scope

2.1 In Scope

The following AP242 change management aspects are in scope of this document:

- WorkRequest, WorkRequestRelationship
- WorkOrder, WorkOrderRelationship
- Activity, ActivityAssignment, ActivityRelationship

The following capabilities are included in this document for completeness of the definitions, but have not yet been fully tested by the involved Implementor Forums:

- WorkOrderAssignment

These sections are defined to the best knowledge of the authors; however, changes based on implementation feedback are possible once these capabilities are being tested.

2.2 Out of Scope

The following are out of scope for this document because they are or will be covered in other documents:

- CAx-specific Capabilities such as Kinematics, Composites, etc.
- Basic PDM Capabilities for Product Identification and Assembly Structure [242-PAS]
- Configuration Management including Configuration and Effectivity
- External Element References (into Part 21 files or between Domain Model XML files)
- Implementations based on any edition of the AP242 Domain Model (ISO 10303-3001) other than Edition 3 (2022).
- Revision rules for PlannedActivity, WorkOrder, WorkRequest, as these are already covered by [242-PAS]
- Project, ProjectAssignment, ProjectRelationship are covered by the prostep ivip Recommendation PSI 25 (PSMS: Project Schedule Management Synchronization in cooperation networks) [PSMS]

The following are out of scope for this document at the moment, because the underlying use cases and requirements have not yet been fully described:

- ActivityMethod
- ActivityHappeningRelationship
- ElementDelivery
- State, StateAssignment, StateCauseEffect, StateHypothesisToConfirmationRelationship, StateObserved, StatePredicted, StatePredictedToObserved, StateRelationship, StateTransition
- StateDefinition, StateDefinitionAssignment, StateDefinitionCauseEffect, StateDefinitionComposition, StateDefinitionConfirmedAssignment, StateDefinitionHypothesisAssignment, StateDefinitionPredictedAssignment, StateDefinitionRelationship, StateDefinitionStateAssignment, StateDefinitionStateAssignmentRelationship, StateDefinitionTransition
- WorkRequestAssignment

- Work Orders in manufacturing and service area and their relationships under each other as well as with the design change orders.

These will be added in later revisions of this document, based on users' needs and testing progress.

2.3 Implementation Changes between AP242 Ed.1 TC and AP242 Ed.3

- WorkOrder.Scope added (#8186) to define the ProductClass or ProductConfiguration affected by this WorkOrder (like WorkRequest.Scope) (section 5.2)

3 Reference to Recommended Practices

3.1 Reference to Core Document [242-PAS]

This document is an extension of the joint CAx-IF / JT-IF Recommended Practices for AP242 Domain Model Product and Assembly Structure. Definitions of templates and XML elements contained in the core document are not repeated here.

Where necessary, references to sections of the core document are given in this format:

[242-PAS] 4.6.7

This means a reference to the Recommended Practices for AP242 Domain Model Product and Assembly Structure, section 4.6.7.

This Recommended Practices for AP242 Domain Model XML Change Management are built on the following version of the core document:

Version 3.2; dated 2024-01-11

This document is available in the private area of the PDM-IF web pages.

3.2 Listing of Recommended Practices Version in Exchange Files

For validation purposes, STEP processors shall state which Recommended Practice document and version thereof have been used in the creation of the STEP file. This will not only indicate what information a consumer can expect to find in the file, but even more importantly where to find it in the file.

This shall be done by adding a pre-defined string to the first string element of the `Documentation` attribute of the `Header` element in the XML file (for details see section [242-PAS] 4.1.5), while the first value shall be the value defined in section 3 of [242-PAS]. The value follows a specific pattern well established in Part 21 files:

Document Type---Document Name---Document Version---Publication Date

The string corresponding to this version of this document is:

```
<Documentation>MBx-IF Rec.Pracs.---AP242 Domain Model XML  
Change Management---0.5---2023-12-08</Documentation>
```

General Postprocessor Recommendation:

If a postprocessor encounters attribute values, or object instantiations different from the ones recommended in this version of the document, a warning shall be recorded. In such case, an additional exchange agreement is supposed to be in place among the parties involved in the data exchange.

4 Fundamental Concepts and Assumptions

This document is inspired from the object mapping defined within:

- VDA-4965 Engineering Change Management (Part1: ECR, Part 2: ECO) Appendix B (Mapping to AP214) to map Engineering Change Requests (WorkRequest) and Engineering Change Orders (WorkOrder).
- CC8 Recommended Practices V1.2b, chapter 6.27

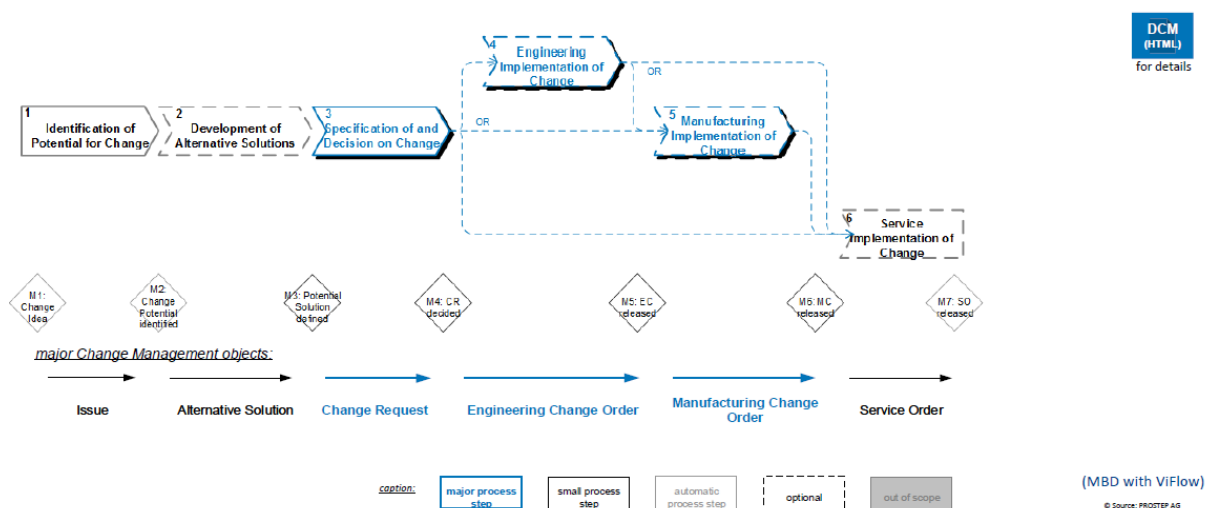
Both recommend mapping an 'Activity' for each ECR and ECO and to attach all the contents of an ECR or ECO to this Activity via ActivityAssignment, rather than to attach the contents directly to the WorkRequest via WorkRequestAssignment.

According to VDA-4965, comments and acceptance of an ECR or ECO shall be defined in further 'Activity' objects related to the 'main' Activity of the ECR/ECO via ActivityRelationship.

A further entity called 'Observation' is planned to be added to AP242 Ed 4. It shall represent a predecisional phase to analyze an issue, that may lead to WorkRequests/WorkOrders.

The overall Digital Change Management process PROSTEP

Overview (top level 1) of the Reference Model defining, e.g., the project scope



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Source: PROSTEP AG; based on VDA 4965

Figure 1: The overall Digital change Management Process

Until this entity is available, the recommendation is to map it as WorkRequest and Activity of type 'issue'.

5 Change Management Templates

5.1 Template “WorkRequest”

5.1.1 ENTITY WorkRequest

The WorkRequest entity represents a solicitation for some work to be done.

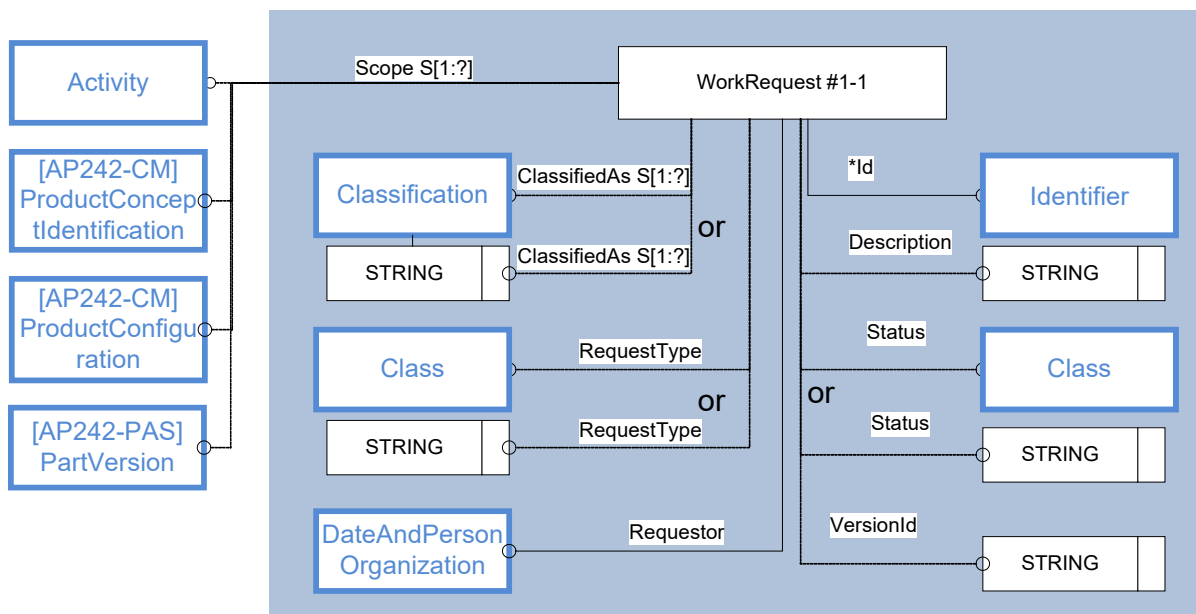


Figure 2: Template “WorkRequest”

The Instance Model: STEP exchange file format (ISO10303 AP242 Domain Model XML syntax)

```
<WorkRequest uid="wr--1">
  <Id>
    <Identifier uid="wr--1--id1" id="WR0001" idRoleRef="rl--ii" idContextRef="o--000000178"/>
  </Id>
  <Requestor uid="dpo--1">
    <Date>2019-10-16T09:08:07</Date>
    <PersonOrOrganization uidRef="pio--005-TPEVD-Mustermann"></PersonOrOrganization>
  </Requestor>
  <RequestType>
    <ClassString>cost reduction</ClassString>
  </RequestType>
  <Scope>
    <Activity uidRef="act--1"/>
  </Scope>
  <VersionId id="A.1"/>
</WorkRequest>
```

Entity WorkRequest attributes	Attribute type
ClassifiedAs	OPTIONAL SET[1:?] of Classification
Description	OPTIONAL DescriptorSelect
Id	IdentifierSelect
NotifiedPersons	OPTIONAL SET[1:?] OF DateAndPersonOrganization
Requestor	DateAndPersonOrganization
RequestType	ClassSelect
RetentionPeriod	OPTIONAL SET[1:?] of RetentionPeriod
SameAs	OPTIONAL SET[1:?] of ProxySelect
Scope	OPTIONAL SET[1:?] OF ActivityAssignmentSelect
Status	OPTIONAL ClassSelect
VersionId	OPTIONAL IdentifierSelect
ActivityMethodAssignment	OPTIONAL SET[1:?] of ActivityMethodAssignment
ApprovalAssignment	OPTIONAL SET[1:?] of ApprovalAssignment
ContractAssignment	OPTIONAL SET[1:?] of ContractAssignment
DateAndPersonAssignment	OPTIONAL SET[1:?] of DateAndPersonAssignment
DatetimeAssignment	OPTIONAL SET[1:?] of DateTimeAssignment
DocumentAssignment	OPTIONAL SET[1:?] of DocumentAssignment
EventAssignment	OPTIONAL SET[1:?] of EventAssignment
InformationUsageRightAssignment	OPTIONAL SET[1:?] of InformationUsageRightAssignment
ModelPropertyAssignment	OPTIONAL SET[1:?] of ModelPropertyAssignment
OrganizationOrPersonInOrganizationAssignment	OPTIONAL SET[1:?] of OrganizationOrPersonInOrganizationAssignment
PropertyDefinitionAssignment	OPTIONAL SET[1:?] of PropertyDefinitionAssignment
PropertyValueAssignment	OPTIONAL SET[1:?] of PropertyValueAssignment
RequirementAssignment	OPTIONAL SET[1:?] of RequirementAssignment
SecurityClassificationAssignment	OPTIONAL SET[1:?] of SecurityClassificationAssignment
StateAssignment	OPTIONAL SET[1:?] of StateAssignment
StateDefinitionAssignment	OPTIONAL SET[1:?] of StateDefinitionAssignment
SuppliedObjectRelationship	OPTIONAL SET[1:?] of SuppliedObjectRelationship
TimeIntervalAssignment	OPTIONAL SET[1:?] of TimeIntervalAssignment

Entity WorkRequest attributes	Attribute type
WorkRequestRelationship	OPTIONAL SET[1:?] of WorkRequestRelationship

Table 2: "WorkRequest" Attributes

Attribute recommendations

- **ApprovalAssignment:** the workflow status of the WorkRequest. The value of this attribute need not be specified. Use "Approval" template (see [242-PAS] 4.6.12).
- **ClassifiedAs:** the classifications of the WorkRequest. The value of this attribute need not be specified. Use "Classification" template (see [242-PAS] 4.6.5).
- **DatetimeAssignment:** the date and time of the creation or update of the WorkRequest. The value of this attribute need not be specified. Use "DateTime" template (see [242-PAS] 4.6.11).
- **Description:** an expanded name or text that provides further information about the WorkRequest. The value of this attribute need not be specified. Use Description template (see [242-PAS] 4.6.7).
- **DocumentAssignment:** to assign a DocumentVersion to the WorkRequest. The value of this attribute need not be specified. See [242-PAS] 11.2 for details.
- **Id:** the identifier or set of identifiers for the WorkRequest, the work request number. The referenced Identifier element shall have valid values for elements Identifier.idRoleRef and Identifier.idContextRef. Use "Identifier" template (see [242-PAS] 4.6.6).
- **OrganizationOrPersonInOrganizationAssignment:** an organization or person in organization with a specific relation to the WorkRequest according to the OrganizationOrPersonInOrganizationAssignment.role attribute. The value of this attribute need not be specified. Use "PersonInOrganization" template (see 4.6.14).
- **PropertyValueAssignment:** to assign a PropertyValue to the WorkRequest. Use the "PropertyValueAssignment" template; see [242-PAS] 6.2 for details.
- **Requestor:** the Person or Organization who issued the WorkRequest and the date the request was submitted. Use "DateAndPersonOrganization" template (see [242-PAS] 4.6.15).
- **RequestType:** the intention of the WorkRequest. Use ClassString type if one of the values below is used, otherwise use "Class" template (see [242-PAS] 4.6.4). As defined in the ISO AP242 specification. When applicable, the value of this element shall be one of the following:

RequestType	Explanation
change of standard	A request to translate a change to a standard into action
cost reduction	A request aimed at reducing the engineering and manufacturing costs of an item
customer rejection	A request resulting from a rejection by a customer
customer request	A request for an activity that is necessary to solve the request of a customer

RequestType	Explanation
durability improvement	A request aimed at extending the life time of an item
government regulation	A request resulting from legal requirements
procurement alignment	A request to adjust the purchasing process of different items
production alignment	A request to adjust the manufacturing process of different items
production relief	A request aimed at achieving a simpler assembly and production process
production requirement	A request for an activity that is necessary from a production point of view
quality improvement	A request aimed at increasing the quality of an item
security reason	A request for an activity that is necessary from a security point of view
standardization	A request to unify variants of an item
supplier request	A request for an activity necessary to solve the request of a supplier
technical improvement	A request aimed at improving the technical aspects of an item
tool improvement	A request aimed at increasing the useful life of a tool

- Scope:** the objects that are subject to the WorkRequest. The value of this attribute need not be specified. One scope of type 'ProductClass', 'ProductConfiguration' or 'PartVersion' (the root node of the product structure) is recommended to tell in which context (i.e. on which product or which product configuration) the WorkRequest applies. Use "ProductConceptIdentification" and "ConfigurationItem" templates (see Recommended Practices for AP242 Domain Model XML Configuration Management).
- Status:** the text that provides a user interpretable designation for the level of completion of the study and resolution of the WorkRequest.

Use ClassString type if one of the values below is used, otherwise use "Class" template (see [242-PAS] 4.6.4). As defined in the ISO AP242 specification. When applicable, the value of this element shall be one of the following:

'drafted', 'issued', 'deferred', 'proposed', 'in work', 'completed', 'resolved', 'cancelled', and 'rejected'.

The value of this attribute need not be specified.
- VersionId:** the identifier or set of identifiers for a specific version of the WorkRequest. Use IdentifierString type or "Identifier" template (see [242-PAS] 4.6.6).
- WorkRequestRelationship:** to relate to another WorkRequest. Use the "WorkRequestRelationship" template, see 5.1.2.
- Other attributes than these are not covered by these Recommended Practices; their use is discouraged as it would depend on mutual agreements between data exchange partners.

Preprocessor Recommendations:

If multiple versions of a WorkRequest are needed, since WorkRequest.Id and WorkRequest.VersionId are in the same object, all versionless attributes of WorkRequest (Id, Requestor, RequestType, Scope, ...) shall be redundantly mapped to all versions, including the multiple identifiers.

Postprocessor Recommendation:

T.B.S.

5.1.2 ENTITY WorkRequestRelationship

A WorkRequestRelationship is a relationship between two WorkRequest objects. The meaning of this relationship is specified further by the attribute relationType.

Entity WorkRequestRelationship attributes	Attribute Type
ClassifiedAs	OPTIONAL SET[1:?] of Classification
Description	OPTIONAL DescriptorSelect
Id	OPTIONAL IdentifierSelect
Related	WorkRequest
RelationType	ClassSelect
EffectivityAssignment	OPTIONAL SET[1:?] of EffectivityAssignment
ModelPropertyAssignment	OPTIONAL SET[1:?] of ModelPropertyAssignment
PropertyDefinitionAssignment	OPTIONAL SET[1:?] of PropertyDefinitionAssignment
PropertyValueAssignment	OPTIONAL SET[1:?] of PropertyValueAssignment

Table 3: "WorkRequestRelationship" Attributes

Attribute recommendations:

- **RelationType:** the meaning of the relationship. Use ClassString type if one of the values below is used, otherwise use "Class" template (see [242-PAS] 4.6.4). According to the ISO AP242 Specification, where applicable, the following values shall be used:

RelationType	
'dependency'	the related WorkRequest is dependent on the Relating WorkRequest

Additionally, the following value is recommended:

'sequence'	The business object defines a logical sequence where the related WorkRequest comes after the relating WorkRequest. In case the Id is equal and VersionId of both WorkRequests is different, a version sequence is defined.
------------	---

- **Related:** the other object of WorkRequest that is part of the relationship

The Instance Model: STEP exchange file format (ISO10303 AP242 Domain Model XML syntax)

```

<WorkRequest uid="wr--1">
  <Id>
    <Identifier uid="wr--1--id1" id="WR0001" idRoleRef="rl--ii" id-
ContextRef="o--000000178"/>
  ...
  <VersionId id="A.1"/>
  <WorkRequestRelationship uid="wrr--1">
    <Related uidRef="wr--1b"/>
    <RelationType>
      <ClassString>sequence</ClassString>
    </RelationType>
  </WorkRequestRelationship>
</WorkRequest>
...
<WorkRequest uid="wr--1b">
  <Id>
    <Identifier uid="wr--1--id1b" id="WR0001" idRoleRef="rl--ii"
idContextRef="o--000000178"/>
  </Id>
  ...
  <VersionId id="B.1"/>
</WorkRequest>
  
```

5.2 Template “WorkOrder”

5.2.1 ENTITY WorkOrder

The WorkOrder entity is an authorization for one or more Activity objects to be performed.

One or more means that it is controlling the main activity and any sub-activity related to the activity by ActivityRelationship with relationType of 'decomposition'

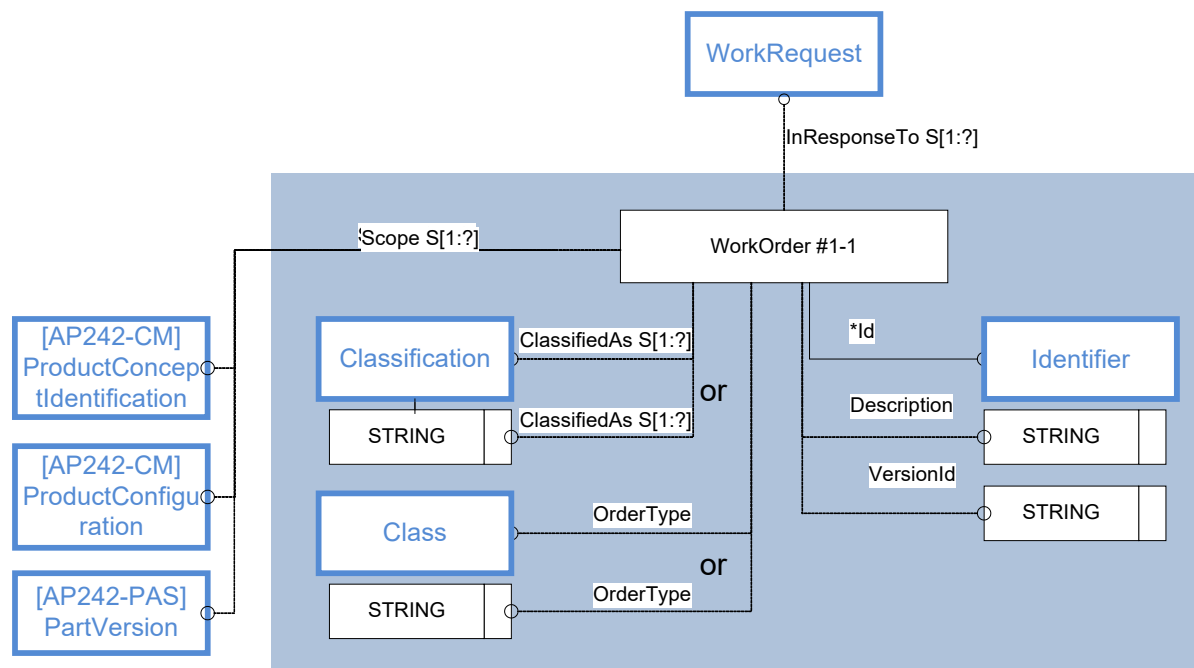


Figure 3: Template “WorkOrder”

The Instance Model: STEP exchange file format (ISO10303 AP242 Domain Model XML syntax)

```
<WorkOrder uid="wo--1">
  <Id>
    <Identifier uid="wo--1--id1" id="WO0001" idRoleRef="rl--ii" idContextRef="o--000000178"/>
  </Id>
  <InResponseTo>
    <WorkRequest uidRef="wr--1"/>
  </InResponseTo>
  <OrderType>
    <ClassString>design release</ClassString>
  </OrderType>
  <VersionId id="A.1"/>
</WorkOrder>
```

Entity WorkOrder attributes	Attribute type
ClassifiedAs	OPTIONAL SET[1:?] of Classification
Description	OPTIONAL DescriptorSelect
Id	IdentifierSelect
InResponseTo	OPTIONAL SET[1:?] OF WorkRequest
OrderType	ClassSelect
RetentionPeriod	OPTIONAL SET[1:?] of RetentionPeriod
SameAs	OPTIONAL SET[1:?] of ProxySelect
Scope	OPTIONAL SET[1:?] OF ActivityAssignmentSelect
VersionId	OPTIONAL IdentifierSelect
ApprovalAssignment	OPTIONAL SET[1:?] of ApprovalAssignment
ContractAssignment	OPTIONAL SET[1:?] of ContractAssignment
DateAndPersonAssignment	OPTIONAL SET[1:?] of DateAndPersonAssignment
DatetimeAssignment	OPTIONAL SET[1:?] of DateTimeAssignment
DocumentAssignment	OPTIONAL SET[1:?] of DocumentAssignment
EffectivityAssignment	OPTIONAL SET[1:?] of EffectivityAssignment
EventAssignment	OPTIONAL SET[1:?] of EventAssignment
InformationUsageRightAssignment	OPTIONAL SET[1:?] of InformationUsageRightAssignment
ModelPropertyAssignment	OPTIONAL SET[1:?] of ModelPropertyAssignment
OrganizationOrPersonInOrganizationAssignment	OPTIONAL SET[1:?] of OrganizationOrPersonInOrganizationAssignment
PropertyDefinitionAssignment	OPTIONAL SET[1:?] of PropertyDefinitionAssignment

Entity WorkOrder attributes	Attribute type
PropertyValueAssignment	OPTIONAL SET[1:?] of PropertyValueAssignment
SecurityClassificationAssignment	OPTIONAL SET[1:?] of SecurityClassificationAssignment
StateAssignment	OPTIONAL SET[1:?] of StateAssignment
StateDefinitionAssignment	OPTIONAL SET[1:?] of StateDefinitionAssignment
SuppliedObjectRelationship	OPTIONAL SET[1:?] of SuppliedObjectRelationship
TimeIntervalAssignment	OPTIONAL SET[1:?] of TimeIntervalAssignment
WorkOrderRelationship	OPTIONAL SET[1:?] of WorkOrderRelationship

Table 4: "WorkOrder" Attributes

Attribute recommendations

- **ApprovalAssignment:** the workflow status of the WorkOrder. The value of this attribute need not be specified. Use "Approval" template (see [242-PAS] 4.6.12).
- **ClassifiedAs:** the classifications of the WorkOrder. The value of this attribute need not be specified. Use "Classification" template (see [242-PAS] 4.6.5).
- **DatetimeAssignment:** the date and time of the creation or update of the WorkOrder. The value of this attribute need not be specified. Use "DateTime" template (see [242-PAS] 4.6.11).
- **Description:** an expanded name or text that provides further information about the WorkOrder. The value of this attribute need not be specified. Use Description template (see [242-PAS] 4.6.7).
- **Id:** the identifier or set of identifiers for the WorkOrder, the work order number. The referenced Identifier element shall have valid values for elements Identifier.idRoleRef and Identifier.idContextRef. Use "Identifier" template (see [242-PAS] 4.6.6).
- **DocumentAssignment:** to assign a DocumentVersion to the WorkOrder. The value of this attribute need not be specified. See [242-PAS] 11.2 for details.
- **InResponseTo:** one or many instances of WorkRequest that define the expected WorkOrder. The value of this attribute need not be specified. Use "WorkRequest" template (see 5.1).
- **OrderType:** the kind of the WorkOrder. Use ClassString type if one of the values below is used, otherwise use "Class" template (see 4.6.4). As defined in the ISO AP242 specification. When applicable, the value of this element shall be one of the following:

OrderType	Explanation
design deviation permit	An authorization for a deviation from the approved design data
design release	An authorization for the design of a product or of an item or to create a bill of material
management resolution	An authorization by a committee, such as the board of directors, to design or change an item

OrderType	Explanation
manufacturing release	An authorization for the manufacturing process of a product or of an item
production deviation permit	An authorization for a deviation from the approved manufacturing process
design change order	An authorization for a design change

- **OrganizationOrPersonInOrganizationAssignment:** an organization or person in organization with a specific relation to the WorkOrder according to the OrganizationOrPersonInOrganizationAssignment.role attribute. The value of this attribute need not be specified. Use "PersonInOrganization" template (see [242-PAS] 4.6.14).
- **PropertyValueAssignment:** to assign a PropertyValue to the WorkOrder. Use the "PropertyAssignment" template; see [242-PAS] 6.2 for details.
- **VersionId:** the identifier or set of identifiers for a specific version of the WorkOrder. The value of this attribute need not be specified. Use IdentifierString type or "Identifier" template (see 4.6.6).
- **Scope:** the objects that are subject to the WorkOrder. The value of this attribute need not be specified. One scope of type 'ProductClass', 'ProductConfiguration' or PartVersion (root node of the product structure) is recommended to tell in which context (i.e. on which product or which product configuration) the WorkOrder applies. Use "ProductConceptIdentification" and "ConfigurationItem" templates (see Recommended Practices for AP242 Domain Model XML Configuration Management).
- **WorkOrderRelationship:** to relate to another WorkRequest. Use the "WorkRequestRelationship" template, see 5.2.3.
- Other attributes than these are not covered by these Recommended Practices; their use is discouraged as it would depend on mutual agreements between data exchange partners.

Preprocessor Recommendations:

- If multiple versions of a WorkOrder are needed, since WorkOrder.Id and WorkOrder.VersionId are in the same object, all versionless attributes of WorkOrder (Id, InResponseTo, OrderType, Scope, ...) shall be redundantly mapped to all versions, including the multiple identifiers.

Postprocessor Recommendation:

T.B.S.

5.2.2 ENTITY WorkOrderAssignment

A WorkOrderAssignment is an association of a [WorkOrder](#) with activity data objects listed in [WorkOrderAssignmentSelect](#) that are subjects of this [WorkOrder, except WorkRequest \(mapped as WorkOrder.Scope\)](#).

Entity WorkOrderAssignment attributes	Attribute type
AssignedWorkOrder	WorkOrder
ClassifiedAs	OPTIONAL SET[1:?] of Classification
Description	OPTIONAL DescriptorSelect

Entity WorkOrderAssignment attributes	Attribute type
Id	IdentifierSelect
Role	ClassSelect
ActivityAssignment	OPTIONAL SET[1:?] of ActivityAssignment
ActivityMethodAssignment	OPTIONAL SET[1:?] of ActivityMethodAssignment
ApprovalAssignment	OPTIONAL SET[1:?] of ApprovalAssignment
AssignmentObjectRelationship	OPTIONAL SET[1:?] of AssignmentObjectRelationship
ConditionAssignment	OPTIONAL SET[1:?] of ConditionAssignment
DateAndPersonAssignment	OPTIONAL SET[1:?] of DateAndPersonAssignment
DatetimeAssignment	OPTIONAL SET[1:?] of DateTimeAssignment
DocumentAssignment	OPTIONAL SET[1:?] of DocumentAssignment
EffectivityAssignment	OPTIONAL SET[1:?] of EffectivityAssignment
EventAssignment	OPTIONAL SET[1:?] of EventAssignment
FrozenAssignment	OPTIONAL SET[1:?] of FrozenAssignment
ModelPropertyAssignment	OPTIONAL SET[1:?] of ModelPropertyAssignment
OrganizationOrPersonInOrganizationAssignment	OPTIONAL SET[1:?] of OrganizationOrPersonInOrganizationAssignment
PropertyDefinitionAssignment	OPTIONAL SET[1:?] of PropertyDefinitionAssignment
PropertyValueAssignment	OPTIONAL SET[1:?] of PropertyValueAssignment
TimeIntervalAssignment	OPTIONAL SET[1:?] of TimeIntervalAssignment

Table 5: "WorkOrderAssignment" Attributes

Attribute recommendations

- **AssignedWorkOrder:** the [WorkOrder](#) for which a set of items is being identified.
- **Role:** the meaning of the association. It is recommended to use the value 'controlled' as ClassString.
- Other attributes than these are not covered by these Recommended Practices; their use is discouraged as it would depend on mutual agreements between data exchange partners.

The Instance Model: STEP exchange file format (ISO10303 AP242 Domain Model XML syntax)

???

Preprocessor Recommendations:

T.B.S.

Postprocessor Recommendation:

T.B.S.

5.2.3 ENTITY WorkOrderRelationship

A WorkOrderRelationship is a relationship between two WorkOrder objects. The meaning of this relationship is specified further by the attribute relationType.

Entity WorkOrderRelationship attributes	Attribute Type
ClassifiedAs	OPTIONAL SET[1:?] of Classification
Description	OPTIONAL DescriptorSelect
Id	OPTIONAL IdentifierSelect
Related	WorkOrder
RelationType	ClassSelect
EffectivityAssignment	OPTIONAL SET[1:?] of EffectivityAssignment

Table 6: "WorkOrderRelationship" Attributes

Attribute recommendations:

- **RelationType:** the meaning of the relationship. Use ClassString type if one of the values below is used, otherwise use "Class" template (see [242-PAS] 4.6.4). According to the ISO AP242 Specification, where applicable, the following values shall be used:

RelationType	
'dependency'	the related WorkOrder is dependent on the Relating WorkOrder

Additionally, the following value is recommended:

'sequence'	The business object defines a logical sequence where the related WorkOrder comes after the relating WorkOrder. In case the Id is equal and VersionId of both WorkOrders is different, a version sequence is defined.
------------	---

- **Related:** the other object of WorkOrder that is part of the relationship

The Instance Model: STEP exchange file format (ISO10303 AP242 Domain Model XML syntax)

```
<WorkOrder uid="wo--1">
  <Id>
    <Identifier uid="wo--1--id1" id="WO0001" idRoleRef="r1--ii" id-
ContextRef="o--000000178"/>
  </Id>
  ...
  <VersionId id="A.1"/>
  <WorkOrderRelationship uid="wor--1">
    <Related uidRef="wo--1b"/>
    <RelationType>
      <ClassString>sequence</ClassString>
    </RelationType>
  </WorkOrderRelationship>
</WorkOrder>
...
<WorkOrder uid="wo--1b">
  <Id>
    <Identifier uid="wo--1--id1b" id="WO0001" idRoleRef="r1--ii"
idContextRef="o--000000178"/>
  </Id>
```

```
</Id>  
...  
  <VersionId id="B.1"/>  
</WorkOrder>
```

5.3 *Template “Activity”*

An Activity is an identification of the occurrence of an action that has taken place, is taking place, or is expected to take place in the future.

Change, distilling, design, a process to drill a hole, and a task such as training someone, are examples of activities.

Each item that is affected by an Activity, for example as input or output, shall reference the Activity via an ActivityAssignment element.

Since Activity is an abstract element, it is recommended to use the subtype:

- DirectedActualActivity or DirectedPlannedActivity if the Activity is driven by a WorkOrder.
- ActualActivity or PlannedActivity otherwise.

The existence of an ActualActivity instance means that the ActualActivity has commenced.

A PlannedActivity is a predicted Activity that is expected to take place in the future.

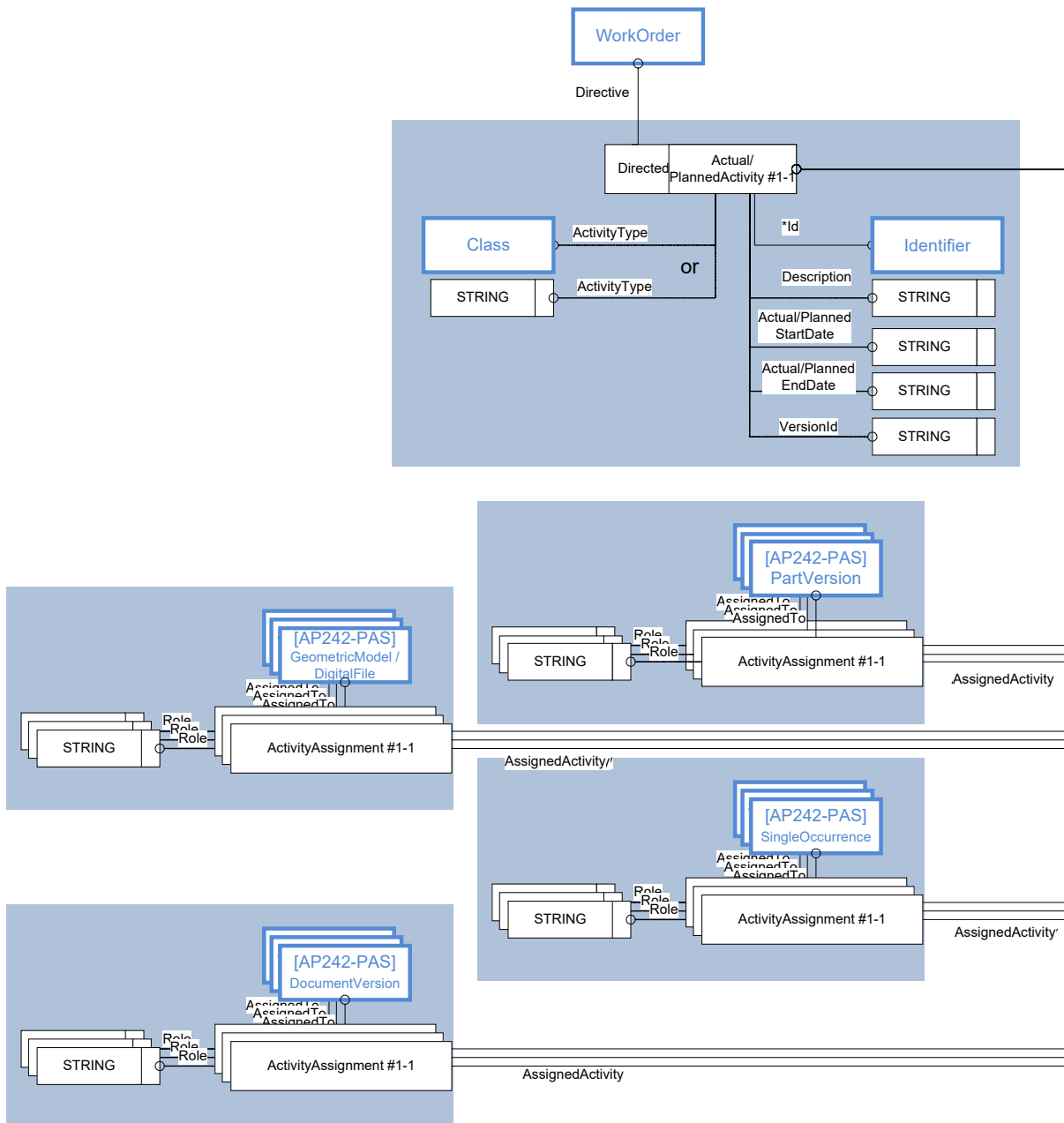


Figure 4: Template "Activity"

The Instance Model: STEP exchange file format (ISO10303 AP242 Domain Model XML syntax)

```
<Activity uid="act--1" xsi:type="n0:DirectedActualActivity">
  <ActivityType>
    <ClassString>analysis</ClassString>
  </ActivityType>
  <Id>
    <Identifier uid="act--1--id1" id="ACT0001" idRoleRef="r1--ii" idContextRef="o--000000178"/>
  </Id>
  <ActualStartDate>2019-10-16T09:08:07</ActualStartDate>
  <Directive uidRef="wo--1"/>
</Activity>
```

```

...
<Part uid="p--0000000017D374A0">
...
  <Id>
    <Identifier uid="pid--0000000017D374A0--id1" id="as1-TSI-CUST" idRol-
eRef="rl--ii" idContextRef="o--000000178"/>
  </Id>
...
  <Versions>
    <PartVersion uid="pv--0000000017D374A0--id1">
...
      <Id id="A.1"/>
...
      <ActivityAssignment uid="actas--0000000017D374A0--id1">
        <AssignedActivity uidRef="act--1"/>
        <Role>
          <ClassString>input</ClassString>
        </Role>
      </ActivityAssignment>
...
    </PartVersion>
  </Versions>
</Part>

```

Entity Activity attributes	Attribute type
ActivityType	ClassSelect
ChosenMethod	OPTIONAL ChosenMethod
ClassifiedAs	OPTIONAL SET[1:?] of Classification
ConcernedOrganizations	OPTIONAL SET[1:?] OF Organization
Description	OPTIONAL DescriptorSelect
ElementDelivery	OPTIONAL SET[1:?] of ElementDelivery
Id	IdentifierSelect
MeasuredCharacteristic	OPTIONAL SET[1:?] OF MeasuredCharacteristic
PossibleMethods	OPTIONAL SET[1:?] OF ActivityMethod
Requestor	OPTIONAL DateAndPersonOrganization
RetentionPeriod	OPTIONAL SET[1:?] of RetentionPeriod
SameAs	OPTIONAL SET[1:?] of ProxySelect
Status	OPTIONAL ClassSelect
SupplyingOrganizations	OPTIONAL SET[1:?] OF Organization
ActivityAssignment	OPTIONAL SET[1:?] of ActivityAssignment
ActivityMethodAssignment	OPTIONAL SET[1:?] of ActivityMethodAssign- ment
ActivityRelationship	OPTIONAL SET[1:?] of ActivityRelationship
ApprovalAssignment	OPTIONAL SET[1:?] of ApprovalAssignment
CertificationAssignment	OPTIONAL SET[1:?] of CertificationAssignment
ConditionAssignment	OPTIONAL SET[1:?] of ConditionAssignment

Entity Activity attributes	Attribute type
ContractAssignment	OPTIONAL SET[1:?] of ContractAssignment
DateAndPersonAssignment	OPTIONAL SET[1:?] of DateAndPersonAssignment
DatetimeAssignment	OPTIONAL SET[1:?] of DateTimeAssignment
DocumentAssignment	OPTIONAL SET[1:?] of DocumentAssignment
EffectivityAssignment	OPTIONAL SET[1:?] of EffectivityAssignment
EventAssignment	OPTIONAL SET[1:?] of EventAssignment
FrozenAssignment	OPTIONAL SET[1:?] of FrozenAssignment
InformationUsageRightAssignment	OPTIONAL SET[1:?] of InformationUsageRightAssignment
ModelPropertyAssignment	OPTIONAL SET[1:?] of ModelPropertyAssignment
ObservationAssignment	OPTIONAL SET[1:?] of ObservationAssignment
OrganizationOrPersonInOrganizationAssignment	OPTIONAL SET[1:?] of OrganizationOrPersonInOrganizationAssignment
PropertyDefinitionAssignment	OPTIONAL SET[1:?] of PropertyDefinitionAssignment
PropertyValueAssignment	OPTIONAL SET[1:?] of PropertyValueAssignment
SecurityClassificationAssignment	OPTIONAL SET[1:?] of SecurityClassificationAssignment
StateAssignment	OPTIONAL SET[1:?] of StateAssignment
StateDefinitionAssignment	OPTIONAL SET[1:?] of StateDefinitionAssignment
SuppliedObjectRelationship	OPTIONAL SET[1:?] of SuppliedObjectRelationship
TimeIntervalAssignment	OPTIONAL SET[1:?] of TimeIntervalAssignment
WorkOrderAssignment	OPTIONAL SET[1:?] of WorkOrderAssignment
WorkRequestAssignment	OPTIONAL SET[1:?] of WorkRequestAssignment

Table 7: "Activity" Attributes

Attribute recommendations

- **ActivityType**: the purpose of the Activity. Use ClassString type if one of the values below is used, otherwise use "Class" template (see [242-PAS] 4.6.4). As defined in the ISO AP242 specification. When applicable, the value of this element shall be one of the following:

ActivityType	Explanation
amendment	An Activity to add information to product data
analysis	An Activity to determine the behaviour of an element under certain physical circumstances

ActivityType	Explanation
cancellation	An Activity to delete an element from the bill of material or to cancel the whole bill of material
delivery change	An Activity to change the delivery schedule of an element
design change	An Activity to change the design of an item or an assembly; this might include changes to the geometry or to properties of the object
design	An Activity concerning the development of a design of an item
mock-up creation	An Activity to create an experimental model or replica of an item
prototype building	An Activity to manufacture a preliminary version of an item
rectification	An Activity to correct the data, documentation or structure associated with an item
restructuring	An Activity to create a new structure or position within a bill of material without changing the data associated with the items in the bill of material
spare part creation	An Activity to design a spare part or to classify an item as a spare part
stop notice	An Activity to stop the manufacturing process of an item
testing	An Activity to test an item
work definition	An Activity to manage several sub-activities related to this Activity by an ActivityRelationship with a RelationType of value 'decomposition'
comment	An activity to comment a running activity (attached to the WorkOrder or WorkRequest) and attached to the running activity via ActivityRelationship having RelationType='decomposition' (according to VDA 4965)
specific detail	An activity to detail a running activity (attached to the WorkOrder or WorkRequest) and attached to the running activity via ActivityRelationship having RelationType='decomposition' (according to VDA 4965)

- **Description:** an expanded name or text that provides further information about the Activity. The value of this attribute need not be specified. Use Description template (see [242-PAS] 4.6.7).
- **Id:** the identifier or set of identifiers for the Activity, the activity number. The referenced Identifier element shall have valid values for elements Identifier.idRoleRef and Identifier.id-ContextRef. Use "Identifier" template (see [242-PAS] 4.6.6).

Status: the status specifies the level of completion of the Activity. Use ClassString type if one of the values below is used, otherwise use "Class" template (see [242-PAS] 4.6.4). As defined in the ISO AP242 specification. When applicable, the value of this element shall be one of the following:

'drafted', 'issued', 'deferred', 'proposed', 'in work', 'completed', 'resolved', 'cancelled', and 'rejected'

The value of this attribute need not be specified.

- **ApprovalAssignment:** the level of acceptance of the Activity. The value of this attribute need not be specified. Use "Approval" template (see [242-PAS] 4.6.12).
- **DatetimeAssignment:** the date and time of the creation or update of the Activity. The value of this attribute need not be specified. Use "DateTime" template (see [242-PAS] 4.6.11).
- **DocumentAssignment:** to assign a DocumentVersion to the Activity. The value of this attribute need not be specified. See [242-PAS] 11.2 for details.
- **ObservationAssignment:** to assign an Observation to the Activity. The value of this attribute need not be specified. See section 5.4.1 for details.
- **OrganizationOrPersonInOrganizationAssignment:** an organization or person in organization with a specific relation to the Activity according to the OrganizationOrPersonInOrganizationAssignment.role attribute. The value of this attribute need not be specified. Use "PersonInOrganization" template (see [242-PAS] 4.6.14).
- **PropertyValueAssignment:** to assign a PropertyValue to the Activity. Use the "PropertyAssignment" template; see [242-PAS] 6.2 for details.
- Other attributes than these are not covered by these Recommended Practices; their use is discouraged as it would depend on mutual agreements between data exchange partners.

Preprocessor Recommendations:

If a legacy system attaches directly the affected objects to a WorkOrder or to a WorkRequest, the WorkOrder or WorkRequest in AP242 shall be associated to an instance of Activity (in order to map the affected objects through ActivityAssignment)

In this case, according to the VDA 4965:

- The PropertyValueAssignments shall be attached to the Activity
- The ApprovalAssignments, the DateTimeAssignments, the DocumentAssignments and the OrganizationOrPersonInOrganizationAssignment shall be attached to the WorkOrder or WorkRequest

Postprocessor Recommendation:

If the legacy system doesn't map Activity as a distinct object (and all the affected objects are attached directly to the WorkOrder or WorkRequest, all attributes of the Activity(ies) attached to an instance of WorkOrder or WorkRequest shall be mapped to the WorkOrder or WorkRequest in the legacy system.

5.3.1 ENTITY ActualActivity

An ActualActivity adds a start date and an end date to the Activity.

It is a subtype of Activity and inherits, thus, all its attributes.

Entity ActualActivity attribute	Attribute Type
ActualEndDate	OPTIONAL DateTimeString
ActualStartDate	OPTIONAL DateTimeString

Table 8: "ActualActivity" Attributes

Attribute recommendations:

- **ActualEndDate:** The DateTime when the Activity finished. The value of this attribute need not be specified. If a value for this attribute is not defined, the interval of applicability has no upper limit. Use “DateTime” template for DateTimeString without DateTimeAssignment (see [242-PAS] 4.6.11).
- **ActualStartDate:** The DateTime when the Activity started. The value of this attribute need not be specified. If a value for this attribute is not defined, the interval of applicability has no lower limit. Use “DateTime” template for DateTimeString without DateTimeAssignment (see [242-PAS] 4.6.11).

5.3.2 ENTITY DirectedActualActivity

DirectedActualActivity adds a reference to a WorkOrder to the ActualActivity.
 It is a subtype of ActualActivity and inherits, thus, all its attributes.

Entity DirectedActualActivity attribute	Attribute Type
Directive	WorkOrder

Table 9: "DirectedActualActivity" Attributes

Attribute recommendations:

- **Directive:** The WorkOrder that governs the Activity. Use “WorkOrder” template (see 5.2).

Preprocessor Recommendations:

T.B.S.

Postprocessor Recommendations:

T.B.S:

5.3.3 ENTITY PlannedActivity

An PlanedActivity adds a start date and an end date to the Activity.
 It is a subtype of Activity and inherits, thus, all its attributes.

Entity PlannedActivity attribute	Attribute Type
PlannedEndDate	OPTIONAL PeriodOrDateSelect
PlannedStartDate	OPTIONAL PeriodOrDateSelect
VersionId	OPTIONAL IdentifierSelect

Table 10: "PlannedActivity" Attributes

Attribute recommendations:

- **PlannedEndDate:** The DateTime when the Activity is expected to finish. The value of this attribute need not be specified. If a value for this attribute is not defined, the interval of applicability has no upper limit. Use “DateTime” template for DateTimeString without DateTimeAssignment (see [242-PAS] 4.6.11).
- **PlannedStartDate:** The DateTime when the Activity is expected to start. The value of this attribute need not be specified. If a value for this attribute is not defined, the interval of applicability has no lower limit. Use “DateTime” template for DateTimeString without DateTimeAssignment (see [242-PAS] 4.6.11).
- **VersionId:** the identifier or set of identifiers for a specific version of the PlannedActivity. Use IdentifierString type or "Identifier" template (see [242-PAS] 4.6.6).

Preprocessor Recommendations:

- If multiple versions of a PlannedActivity are needed, since PlannedActivity.Id and PlannedActivity.VersionId are in the same object, all versionless attributes of PlannedActivity (Id, ActivityType, ...) shall be redundantly mapped to all versions, including the multiple identifiers.

Postprocessor Recommendation:

T.B.S.

5.3.4 ENTITY DirectedPlannedActivity

DirectedPlannedActivity adds a reference to a WorkOrder to the PlannedActivity.

It is a subtype of PlannedActivity and inherits, thus, all its attributes.

Entity DirectedPlannedActivity attribute	Attribute Type
Directive	WorkOrder

Table 11: "DirectedPlannedActivity" Attributes

Attribute recommendations:

- **Directive:** The WorkOrder that governs the Activity. Use “WorkOrder” template (see 5.2).

Preprocessor Recommendations:

T.B.S.

Postprocessor Recommendations:

T.B.S:

5.3.5 ENTITY ActivityAssignment

An ActivityAssignment is a an association of an Activity with product or activity data. It characterizes the role of the concepts represented with these data with respect to the activity.

NOTE 1 This entity should not be used to represent the association of an activity with the organizations that are responsible for its execution or its management. That kind of information can be represented with instances of OrganizationOrPersonInOrganizationAssignment.

Entity ActivityAssignment attributes	Attribute type
AssignedActivity	Activity
ClassifiedAs	OPTIONAL SET[1:?] of Classification
Description	OPTIONAL DescriptorSelect
Id	IdentifierSelect
RetentionPeriod	OPTIONAL SET[1:?] of RetentionPeriod
Role	ClassSelect
ActivityAssignment	OPTIONAL SET[1:?] of ActivityAssignment
ActivityMethodAssignment	OPTIONAL SET[1:?] of ActivityMethodAssignment
ApprovalAssignment	OPTIONAL SET[1:?] of ApprovalAssignment
AssignmentObjectRelationship	OPTIONAL SET[1:?] of AssignmentObjectRelationship
ConditionAssignment	OPTIONAL SET[1:?] of ConditionAssignment
DateAndPersonAssignment	OPTIONAL SET[1:?] of DateAndPersonAssignment
DatetimeAssignment	OPTIONAL SET[1:?] of DateTimeAssignment
DocumentAssignment	OPTIONAL SET[1:?] of DocumentAssignment
EffectivityAssignment	OPTIONAL SET[1:?] of EffectivityAssignment
EventAssignment	OPTIONAL SET[1:?] of EventAssignment
FrozenAssignment	OPTIONAL SET[1:?] of FrozenAssignment
InformationUsageRightAssignment	OPTIONAL SET[1:?] of InformationUsageRightAssignment
ModelPropertyAssignment	OPTIONAL SET[1:?] of ModelPropertyAssignment
OrganizationOrPersonInOrganizationAssignment	OPTIONAL SET[1:?] of OrganizationOrPersonInOrganizationAssignment
ProjectAssignment	OPTIONAL SET[1:?] of ProjectAssignment
PropertyDefinitionAssignment	OPTIONAL SET[1:?] of PropertyDefinitionAssignment
PropertyValueAssignment	OPTIONAL SET[1:?] of PropertyValueAssignment
SecurityClassificationAssignment	OPTIONAL SET[1:?] of SecurityClassificationAssignment
StateAssignment	OPTIONAL SET[1:?] of StateAssignment

Entity ActivityAssignment attributes	Attribute type
StateDefinitionAssignment	OPTIONAL SET[1:?] of StateDefinitionAssignment
TimeIntervalAssignment	OPTIONAL SET[1:?] of TimeIntervalAssignment

Table 12: "ActivityAssignment" Attributes

Attribute recommendations

- **AssignedActivity**: the activity that is considered.
- **Role**: the meaning of the association. Use ClassString type if one of the values below is used, otherwise use "Class" template (see [242-PAS] 4.6.4). As defined in the ISO AP242 specification. When applicable, the value of this element shall be one of the following:

Role	Explanation
input	the concepts represented by the items are inputs of the Activity
output	the concepts represented by the items result from the Activity
constraint	the concepts represented by the items influence the execution of the Activity (for example context geometry, possibly illustrating a 3D clash and redlining)

Additionally, the following values are recommended, where applicable:

Role	Explanation
product	the concepts represented by the items are the top product nodes relevant for the Activity

- Other attributes than these are not covered by these Recommended Practices; their use is discouraged as it would depend on mutual agreements between data exchange partners.

Preprocessor Recommendations:

If ActivityAssignment.Role has the value 'product', ActivityAssignment.AssignedActivity shall be an element of type PartVersion.

If ActivityAssignment.Role has one of the values 'input', 'output', ActivityAssignment.AssignedActivity shall be an element of type:

- SingleOccurrence or PartVersion, depending if the underlying PDM system supports changes in the structure resp. without versioning of the parent part or not.
- DigitalFile or DocumentVersion, depending if the underlying system supports managed documents or not
- ExternalGeometricModel (pointing to a Digital File) if the Geometry get positioned relatively to another object assigned to this Activity (for example as 'constraint')

The GeometricCoordinateSpace used for the objects refererenced by the Activity as 'constraint', 'markup' and 'product' shall be the same if they are not positioned relatively to 'constraint'.

The same applies to the 'input' and 'output' if there is no 'product' (i.e. the 'input' and 'output' are not positioned relatively to 'product') and if the the 'input' and 'output' objects are not positioned relatively to 'constraint'.

The PartVersions and SingleOccurrences referenced by the Activity as 'input' or 'output' shall:

- either be built underneath the top node(s) PartVersion(s) referenced as 'product', possibly over multiple assembly levels
- or be built underneath the object marked as 'constraint'

The ExternalGeometricModels referenced by the Activity as 'input' or 'output' shall be build underneath the top node(s) ExternalGeometricModel(s) referenced as 'constraint'.

Some PDM systems support the combination of one 'input' and one 'output' into one ActivityAssignment. To map this, it is recommended to use an AssignmentObjectRelationship with RelationType='simultaneity' between ActivityAssignments (see section 5.3.7)

Postprocessor Recommendation:

T.B.S.

5.3.6 ENTITY ActivityRelationship

An ActivityRelationship is a relationship between two Activity objects.

An ActivityHappeningRelationship is a type of ActivityRelationship. It is a relationship between a PlannedActivity and its ActualActivity.

NOTE 1 Many ActualActivity objects may be the actual for a single PlannedActivity.

NOTE 2 A single ActualActivity may fulfil several PlannedActivity objects.

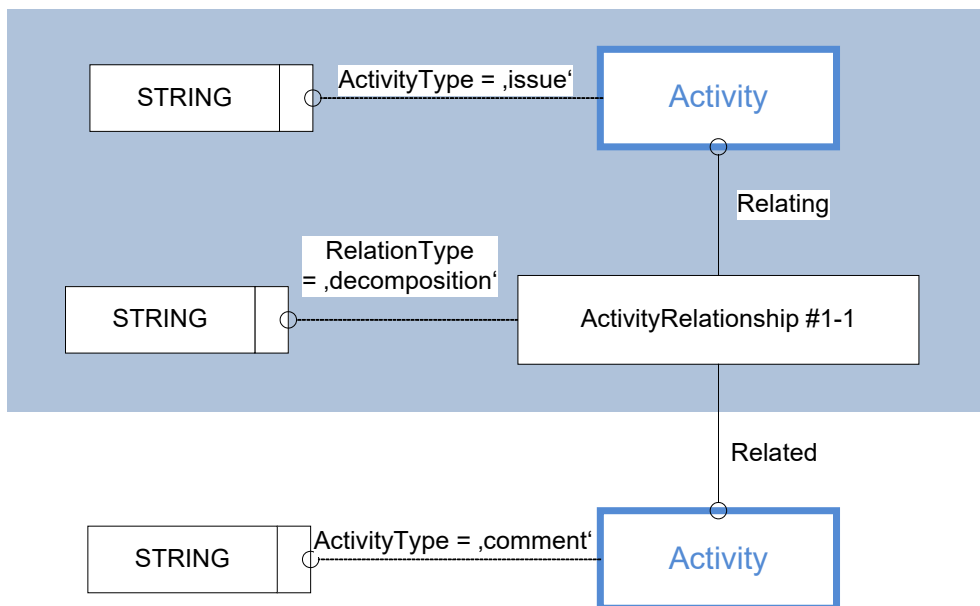


Figure 5: Template "ActivityRelationship"

The Instance Model: STEP exchange file format (ISO10303 AP242 Domain Model XML syntax)

```

<Activity uid="act--1" xsi:type="bom:DirectedActualActivity">
...
  <ActivityRelationship uid="ar--1" xsi:type="bom:ActivityRelationship">
    <Related uidRef="act--3"/>
    <RelationType>
      <ClassString>decomposition</ClassString>
    </RelationType>
  </ActivityRelationship>
  <ActivityRelationship uid="ar--2" xsi:type="bom:ActivityRelationship">
    <Related uidRef="act--4"/>
    <RelationType>
      <ClassString>decomposition</ClassString>
    </RelationType>
  </ActivityRelationship>
...
</Activity>
  
```

Entity ActivityRelationship attributes	Attribute type
ClassifiedAs	OPTIONAL SET[1:?] of Classification
Description	OPTIONAL DescriptorSelect
Id	OPTIONAL IdentifierSelect
Related	Activity
RelationType	ClassSelect
RetentionPeriod	OPTIONAL SET[1:?] of RetentionPeriod
ActivityAssignment	OPTIONAL SET[1:?] of ActivityAssignment
AnalysisAssignment	OPTIONAL SET[1:?] of AnalysisAssignment
DateAndPersonAssignment	OPTIONAL SET[1:?] of DateAndPersonAssignment
DatetimeAssignment	OPTIONAL SET[1:?] of DateTimeAssignment
DocumentAssignment	OPTIONAL SET[1:?] of DocumentAssignment
EffectivityAssignment	OPTIONAL SET[1:?] of EffectivityAssignment
EventAssignment	OPTIONAL SET[1:?] of EventAssignment
FrozenAssignment	OPTIONAL SET[1:?] of FrozenAssignment
ModelPropertyAssignment	OPTIONAL SET[1:?] of ModelPropertyAssignment
OrganizationOrPersonInOrganizationAssignment	OPTIONAL SET[1:?] of OrganizationOrPersonInOrganizationAssignment
PropertyDefinitionAssignment	OPTIONAL SET[1:?] of PropertyDefinitionAssignment
PropertyValueAssignment	OPTIONAL SET[1:?] of PropertyValueAssignment
TimeIntervalAssignment	OPTIONAL SET[1:?] of TimeIntervalAssignment

Table 13: "ActivityRelationship" Attributes

Attribute recommendations

- **RelationType**: the meaning of the relationship. Use ClassString type if one of the values below is used, otherwise use “Class” template (see [242-PAS] 4.6.4). According to the ISO AP242 Specification, where applicable, the following values shall be used:

RelationType	
'alternative'	The business object defines a relationship where the related Activity is an alternative to the relating Activity (not symmetric).
'decomposition'	The business object defines a relationship where the related Activity is one of potentially more sub-activities of into which the relating Activity is broken down
'derivation'	The business object defines a deriving relationship where the related Activity is derived from the relating Activity
'exclusiveness'	The business object defines a relationship where the relating and the related Activity shall not have any overlap in time of execution
'precedence'	The business object defines a relationship where the related Activity has higher priority than the relating Activity
'sequence'	The business object defines a relationship where the relating Activity shall be completed before the related Activity starts. In case the Id is equal and VersionId of both PlannedActivities is different, a version sequence is defined.
'simultaneity'	The business object defines a relationship that establishes that both the relating and related Activity are considered as occurring during the same time period or shall be performed together in order to ensure consistency and enhance efficiency
'happening'	Mandatory value if the subtype ActivityHappeningRelationship is used.

- **Related**: the other object of [Activity](#) that is part of the relationship
- Other attributes than these are not covered by these Recommended Practices; their use is discouraged as it would depend on mutual agreements between data exchange partners.

Preprocessor Recommendations:

- The relating and the related Activities shall be different objects
- In case of RelationType 'happening', the relating Activity shall be a PlannedActivity while the related Activity shall be an ActualActivity.

5.3.7 ENTITY AssignmentObjectRelationship

An AssignmentObjectRelationship is a relationship between two assignment objects.

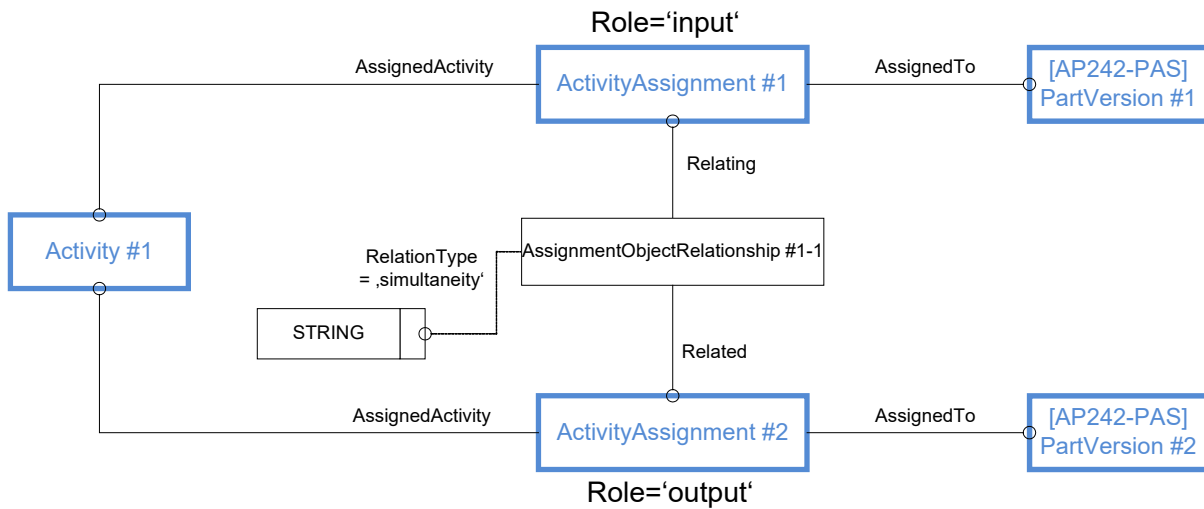


Figure 6: Template "AssignmentObjectRelationship"

The Instance Model: STEP exchange file format (ISO10303 AP242 Domain Model XML syntax)

```
<Part uid="p--0000000017D374A0">
...
  <Id>
    <Identifier uid="pid--0000000017D374A0--id1" id="as1-TSI-CUST"
idRoleRef="rl--ii" idContextRef="o--000000178"/>
  </Id>
...
  <Versions>
    <PartVersion uid="pv--0000000017D374A0--id1">
...
      <Id id="A.1"/>
...
      <ActivityAssignment uid="actas--0000000017D374A0--id1">
        <AssignedActivity uidRef="act--1"/>
        <Role>
          <ClassString>input</ClassString>
        </Role>
        <AssignmentObjectRelationship uid="aor--1">
          <Related uidRef="actas--0000000017D374A0--id2"/>
          <RelationType>
            <ClassString>simultaneity</ClassString>
          </RelationType>
        </AssignmentObjectRelationship>
      </ActivityAssignment>
...
    </PartVersion>
  </Versions>
</Part>
...
<Part uid="p--0000000017D37010">
  <Id>
    <Identifier uid="pid--0000000017D37010--id3" id="bracket_asm-
TSI-CUST" idRoleRef="rl--ii" idContextRef="o--000000178"/>
```

```

</Id>
...
<Versions>
  <PartVersion uid="pv--0000000017D37010--id3">
...
    <Id id="A.1"/>
    <ActivityAssignment uid="actas--0000000017D374A0--id2">
      <AssignedActivity uidRef="act--1"/>
      <Role>
        <ClassString>output</ClassString>
      </Role>
    </ActivityAssignment>
  </PartVersion>
</Versions>
</Part>

```

Entity AssignmentObjectRelationship attributes	Attribute type
ClassifiedAs	OPTIONAL SET[1:?] of Classification
Description	OPTIONAL DescriptorSelect
Id	OPTIONAL IdentifierSelect
Related	AssignmentObjectSelect
RelationType	ClassSelect
ActivityAssignment	OPTIONAL SET[1:?] of ActivityAssignment
EffectivityAssignment	OPTIONAL SET[1:?] of EffectivityAssignment
FrozenAssignment	OPTIONAL SET[1:?] of FrozenAssignment

Table 14: "AssignmentObjectRelationship" Attributes

Attribute recommendations

- **RelationType**: the meaning of the relationship. Use ClassString type if one of the values below is used, otherwise use "Class" template (see [242-PAS] 4.6.4).

Where applicable, the following values shall be used:

RelationType	
'simultaneity'	The business object defines a relationship that establishes that both the relating and related Relationship are considered as occurring during the same time period or shall be performed together in order to ensure consistency and enhance efficiency

- **Related**: the other object of [Relationship](#) that is part of the relationship
- Other attributes than these are not covered by these Recommended Practices; their use is discouraged as it would depend on mutual agreements between data exchange partners.

Preprocessor Recommendations:

5.4 Template “Observation”

This capability is introduced in Edition 4, therefore this section is not finalized yet.

5.4.1 ENTITY Observation

An Observation is a record of something that occurs during the life of a product or its support environment.

T.B.S.

Figure 7: Template “Observation”

The Instance Model: STEP exchange file format (ISO10303 AP242 Domain Model XML syntax)

T.B.S.

Entity Observation attributes	Attribute type
AssociatedActivity	OPTIONAL ActualActivity
ClassifiedAs	OPTIONAL SET[1:?] of Classification
Description	OPTIONAL DescriptorSelect
Id	IdentifierSelect
Name	OPTIONAL DescriptorSelect
NotifiedPersons	OPTIONAL SET[1:?] OF DateAndPersonOrganization
ObservationConsequence	OPTIONAL SET[1:?] of ObservationConsequence
ObservationContext	OPTIONAL SET[1:?] OF ObservationContextSelect;
ObservationType	ClassSelect
ObservedBy	ObserverSelect
RetentionPeriod	OPTIONAL SET[1:?] of RetentionPeriod
SameAs	OPTIONAL SET[1:?] of ProxySelect
Status	OPTIONAL ClassSelect
VersionId	OPTIONAL IdentifierSelect
ActivityAssignment	OPTIONAL SET[1:?] of ActivityAssignment
ActivityMethodAssignment	OPTIONAL SET[1:?] of ActivityMethodAssignment
ApprovalAssignment	OPTIONAL SET[1:?] of ApprovalAssignment
ContractAssignment	OPTIONAL SET[1:?] of ContractAssignment
DateAndPersonAssignment	OPTIONAL SET[1:?] of DateAndPersonAssignment
DatetimeAssignment	OPTIONAL SET[1:?] of DateTimeAssignment

Entity Observation attributes	Attribute type
DocumentAssignment	OPTIONAL SET[1:?] of DocumentAssignment
EventAssignment	OPTIONAL SET[1:?] of EventAssignment
InformationUsageRightAssignment	OPTIONAL SET[1:?] of InformationUsageRightAssignment
ModelPropertyAssignment	OPTIONAL SET[1:?] of ModelPropertyAssignment
ObservationRelationship	OPTIONAL SET[1:?] of ObservationRelationship
OrganizationOrPersonInOrganizationAssignment	OPTIONAL SET[1:?] of OrganizationOrPersonInOrganizationAssignment
PropertyDefinitionAssignment	OPTIONAL SET[1:?] of PropertyDefinitionAssignment
PropertyValueAssignment	OPTIONAL SET[1:?] of PropertyValueAssignment
RequirementAssignment	OPTIONAL SET[1:?] of RequirementAssignment
SecurityClassificationAssignment	OPTIONAL SET[1:?] of SecurityClassificationAssignment
StateAssignment	OPTIONAL SET[1:?] of StateAssignment
StateDefinitionAssignment	OPTIONAL SET[1:?] of StateDefinitionAssignment
SuppliedObjectRelationship	OPTIONAL SET[1:?] of SuppliedObjectRelationship
TimeIntervalAssignment	OPTIONAL SET[1:?] of TimeIntervalAssignment

Table 15: "Observation" Attributes

Attribute recommendations

- **ApprovalAssignment:** the workflow status of the Observation. The value of this attribute need not be specified. Use "Approval" template (see [242-PAS] 4.6.12).
- **ClassifiedAs:** the classifications of the Observation. The value of this attribute need not be specified. Use "Classification" template (see [242-PAS] 4.6.5).
- **DatetimeAssignment:** the date and time of the creation or update of the Observation. The value of this attribute need not be specified. Use "DateTime" template (see [242-PAS] 4.6.11).
- **Description:** an expanded name or text that provides further information about the Observation. The value of this attribute need not be specified. Use Description template (see [242-PAS] 4.6.7).
- **DocumentAssignment:** to assign a DocumentVersion to the Observation. The value of this attribute need not be specified. See [242-PAS] 11.2 for details.
- **Id:** the identifier or set of identifiers for the Observation, the work order number. The referenced Identifier element shall have valid values for elements Identifier.idRoleRef and Identifier.idContextRef. Use "Identifier" template (see [242-PAS] 4.6.6).
- **Name:** the label by which the Observation is known. The value of this attribute need not be specified. Use "Description" template (see [242-PAS] 4.6.7).
- **ObservationConsequence:** to relate the follow-up initiated out of the Observation. Use the "ObservationConsequence" template, see 5.4.3.

- **ObservationContext:** the objects that are subject to the Observation. The value of this attribute need not be specified. Optionally one context of type 'ProductClass' or 'ProductConfiguration' is recommended to tell in which context (i.e. on which product or which product configuration) the Observation applies. Use "ProductConceptIdentification" and "ConfigurationItem" templates (see Recommended Practices for AP242 Domain Model XML Configuration Management).
- **ObservationRelationship:** to relate to another Observation. Use the "ObservationRelationship" template, see 5.4.4.
- **ObservationType:** the kind of the Observation. Use ClassString type if one of the values below is used, otherwise use "Class" template (see 4.6.4). As defined in the ISO AP242 specification.
- **ObservedBy:** the Person or Organization who issued the Observation and the date the Observation was submitted. Use "DateAndPersonOrganization" template (see [242-PAS] 4.6.15).
- **OrganizationOrPersonInOrganizationAssignment:** an organization or person in organization with a specific relation to the Observation according to the OrganizationOrPersonInOrganizationAssignment.role attribute. The value of this attribute need not be specified. Use "PersonInOrganization" template (see [242-PAS] 4.6.14).
- **PropertyValueAssignment:** to assign a PropertyValue to the Observation. Use the "PropertyValueAssignment" template; see [242-PAS] 6.2 for details.
- **Status:** the text that provides a user interpretable designation for the level of completion / resolution of the Observation.

Use ClassString type if one of the values below is used, otherwise use "Class" template (see [242-PAS] 4.6.4). As defined in the ISO AP242 specification. When applicable, the value of this element shall be one of the following:

- ???.
- The value of this attribute need not be specified.
- **VersionId:** the identifier or set of identifiers for a specific version of the Observation. Use IdentifierString type or "Identifier" template (see 4.6.6).
- Other attributes than these are not covered by these Recommended Practices; their use is discouraged as it would depend on mutual agreements between data exchange partners.

Preprocessor Recommendations:

- If multiple versions of an Observation are needed, since Observation.Id and Observation.VersionId are in the same object, all versionless attributes of Observation (Id, Name, ObservationType, ObservedBy, ...) shall be redundantly mapped to all versions, including the multiple identifiers.

Postprocessor Recommendation:

T.B.S.

5.4.2 ENTITY ObservationAssignment

An ObservationAssignment is an association of a [Observation](#) with activity data objects listed in [ObservationAssignmentSelect](#) that are subjects of this [Observation](#).

Entity ObservationAssignment attributes	Attribute type
AssignedObservation	Observation
ClassifiedAs	OPTIONAL SET[1:?] of Classification
Description	OPTIONAL DescriptorSelect
Id	IdentifierSelect
RetentionPeriod	OPTIONAL SET[1:?] of RetentionPeriod
Role	ClassSelect
ActivityAssignment	OPTIONAL SET[1:?] of ActivityAssignment
ActivityMethodAssignment	OPTIONAL SET[1:?] of ActivityMethodAssignment
ApprovalAssignment	OPTIONAL SET[1:?] of ApprovalAssignment
AssignmentObjectRelationship	OPTIONAL SET[1:?] of AssignmentObjectRelationship
ConditionAssignment	OPTIONAL SET[1:?] of ConditionAssignment
DateAndPersonAssignment	OPTIONAL SET[1:?] of DateAndPersonAssignment
DatetimeAssignment	OPTIONAL SET[1:?] of DateTimeAssignment
DocumentAssignment	OPTIONAL SET[1:?] of DocumentAssignment
EffectivityAssignment	OPTIONAL SET[1:?] of EffectivityAssignment
EventAssignment	OPTIONAL SET[1:?] of EventAssignment
FrozenAssignment	OPTIONAL SET[1:?] of FrozenAssignment
ModelPropertyAssignment	OPTIONAL SET[1:?] of ModelPropertyAssignment
OrganizationOrPersonInOrganizationAssignment	OPTIONAL SET[1:?] of OrganizationOrPersonInOrganizationAssignment
PropertyDefinitionAssignment	OPTIONAL SET[1:?] of PropertyDefinitionAssignment
PropertyValueAssignment	OPTIONAL SET[1:?] of PropertyValueAssignment
TimeIntervalAssignment	OPTIONAL SET[1:?] of TimeIntervalAssignment

Table 16: "ObservationAssignment" Attributes

Attribute recommendations

- **AssignedObservation:** the [Observation](#) for which a set of items is being identified.
- **Role:** the meaning of the association. It is recommended to use the value 'controlled' as ClassString.
- Other attributes than these are not covered by these Recommended Practices; their use is discouraged as it would depend on mutual agreements between data exchange partners.

The Instance Model: STEP exchange file format (ISO10303 AP242 Domain Model XML syntax)

???

Preprocessor Recommendations:

T.B.S.

Postprocessor Recommendation:

T.B.S.

5.4.3 ENTITY ObservationConsequence

An ObservationConsequence is ???.

Entity ObservationAssignment attributes	Attribute type
Description	OPTIONAL DescriptorSelect
Id	IdentifierSelect
Request	ActivityAssignmentSelect
RetentionPeriod	OPTIONAL SET[1:?] of RetentionPeriod
Role	ClassSelect
ActivityAssignment	OPTIONAL SET[1:?] of ActivityAssignment
ActivityMethodAssignment	OPTIONAL SET[1:?] of ActivityMethodAssignment
ApprovalAssignment	OPTIONAL SET[1:?] of ApprovalAssignment
AssignmentObjectRelationship	OPTIONAL SET[1:?] of AssignmentObjectRelationship
ConditionAssignment	OPTIONAL SET[1:?] of ConditionAssignment
DateAndPersonAssignment	OPTIONAL SET[1:?] of DateAndPersonAssignment
DatetimeAssignment	OPTIONAL SET[1:?] of DateTimeAssignment
DocumentAssignment	OPTIONAL SET[1:?] of DocumentAssignment
EffectivityAssignment	OPTIONAL SET[1:?] of EffectivityAssignment
EventAssignment	OPTIONAL SET[1:?] of EventAssignment
FrozenAssignment	OPTIONAL SET[1:?] of FrozenAssignment
ModelPropertyAssignment	OPTIONAL SET[1:?] of ModelPropertyAssignment
OrganizationOrPersonInOrganizationAssignment	OPTIONAL SET[1:?] of OrganizationOrPersonInOrganizationAssignment
PropertyDefinitionAssignment	OPTIONAL SET[1:?] of PropertyDefinitionAssignment
PropertyValueAssignment	OPTIONAL SET[1:?] of PropertyValueAssignment
TimeIntervalAssignment	OPTIONAL SET[1:?] of TimeIntervalAssignment

Table 17: "ObservationConsequence" Attributes

Attribute recommendations

- **Role:** the meaning of the association. It is recommended to use the value 'controlled' as ClassString.
- Other attributes than these are not covered by these Recommended Practices; their use is discouraged as it would depend on mutual agreements between data exchange partners.

The Instance Model: STEP exchange file format (ISO10303 AP242 Domain Model XML syntax)

???

Preprocessor Recommendations:

T.B.S.

Postprocessor Recommendation:

T.B.S.

5.4.4 ENTITY ObservationRelationship

An ObservationRelationship is a relationship between two Observation objects. The meaning of this relationship is specified further by the attribute relationType.

Entity ObservationRelationship attributes	Attribute Type
ClassifiedAs	OPTIONAL SET[1:?] of Classification
Description	OPTIONAL DescriptorSelect
Id	OPTIONAL IdentifierSelect
Related	Observation
RelationType	ClassSelect
EffectivityAssignment	OPTIONAL SET[1:?] of EffectivityAssignment
ModelPropertyAssignment	OPTIONAL SET[1:?] of ModelPropertyAssignment
PropertyDefinitionAssignment	OPTIONAL SET[1:?] of PropertyDefinitionAssignment
PropertyValueAssignment	OPTIONAL SET[1:?] of PropertyValueAssignment

Table 18: "ObservationRelationship" Attributes

Attribute recommendations:

- **RelationType:** the meaning of the relationship. Use ClassString type if one of the values below is used, otherwise use "Class" template (see [242-PAS] 4.6.4). According to the ISO AP242 Specification, where applicable, the following values shall be used: T.B.S.
- **Related:** the other object of Observation that is part of the relationship

The Instance Model: STEP exchange file format (ISO10303 AP242 Domain Model XML syntax)

T.B.S.

6 Visual Issue Management Usecase

This section describes how to represent change management issues and is based on the chapters 4 and 5.

JIRA tickets to Edition 4 of the Domain Model have been created to fully support this use-case: [TCSC410303-35](#), [TCSC410303-36](#) and [TCSC410303-653](#). This section no longer describes the workaround but the uses the new capabilities of Edition 4:

The Issue shall be a pair of Observation and PlannedActivity (with ActivityType='design change') having the same Id and related over Observation.AssociatedActivity. Both are related via ObservationAssignment with Role='controlled'.

The relevant set of attributes is as following:

- Observation attributes:
 - Id, ObservationType, ObservedBy, Description, ApprovalAssignment, ObservationContext, Status
 - DocumentAssignment (zero to many)
- Observation Activity attributes:
 - Id, ActivityType='design change', creator (PersonInOrganizationAssignment), creation date (DateTimeAssignment), PlannedStartDate, PlannedEndDate, Status,
 - responsible persons (PersonInOrganizationAssignments with Role 'assignee', one to many),
 - Customized properties: name, solution proposal, tags, scope (the related project or product or product variant or product zone/subconcept)
 - ActivityRelationships with RelationType 'decomposition' to the 'comment' activities (zero to many)
- 'comment' Activity attributes:
 - Id, ActivityType='comment', creator (PersonInOrganizationAssignment), creation date (DateTimeAssignment), description
- Top assembly node containing as CAD model the context geometry (optional) and building the part nodes that contain the 'markup' and the 'product'
 - PartVersion.ActivityAssignment with role='constraint' referencing the 'design change' activity
- Top assembly node containing the relevant portion of the product and building the 'input' (one to many) and the 'output' parts (zero to many)
 - PartVersion.ActivityAssignment with role='product' referencing the 'design change' activity
- Parts or assemblies being affected by the Observation
 - PartVersion.ActivityAssignment with role='input' referencing the 'design change' activity
- Parts or assemblies being created/modified by the Observation
 - PartVersion.ActivityAssignment with role='output' referencing the 'design change' activity
- RepresentationItems (geometric elements, PMIs, saved camera views, ...) affected by or describing the Observation

- RepresentationItem.ActivityAssignment with role='input' referencing the 'design change' activity
- RepresentationItems (geometric elements, PMIs, saved camera views, ...) describing a comment
 - RepresentationItem.ActivityAssignment with role='input' referencing the 'comment' activity

The output may be a newer version of an input or replace a single part by another single part or by an assembly, or replace an assembly by another assembly or by a single part.

Even the number of outputs may be different from the number of inputs (if the issue does not produce outputs → only during the next phase of the change management) or if the technical solution requires it.

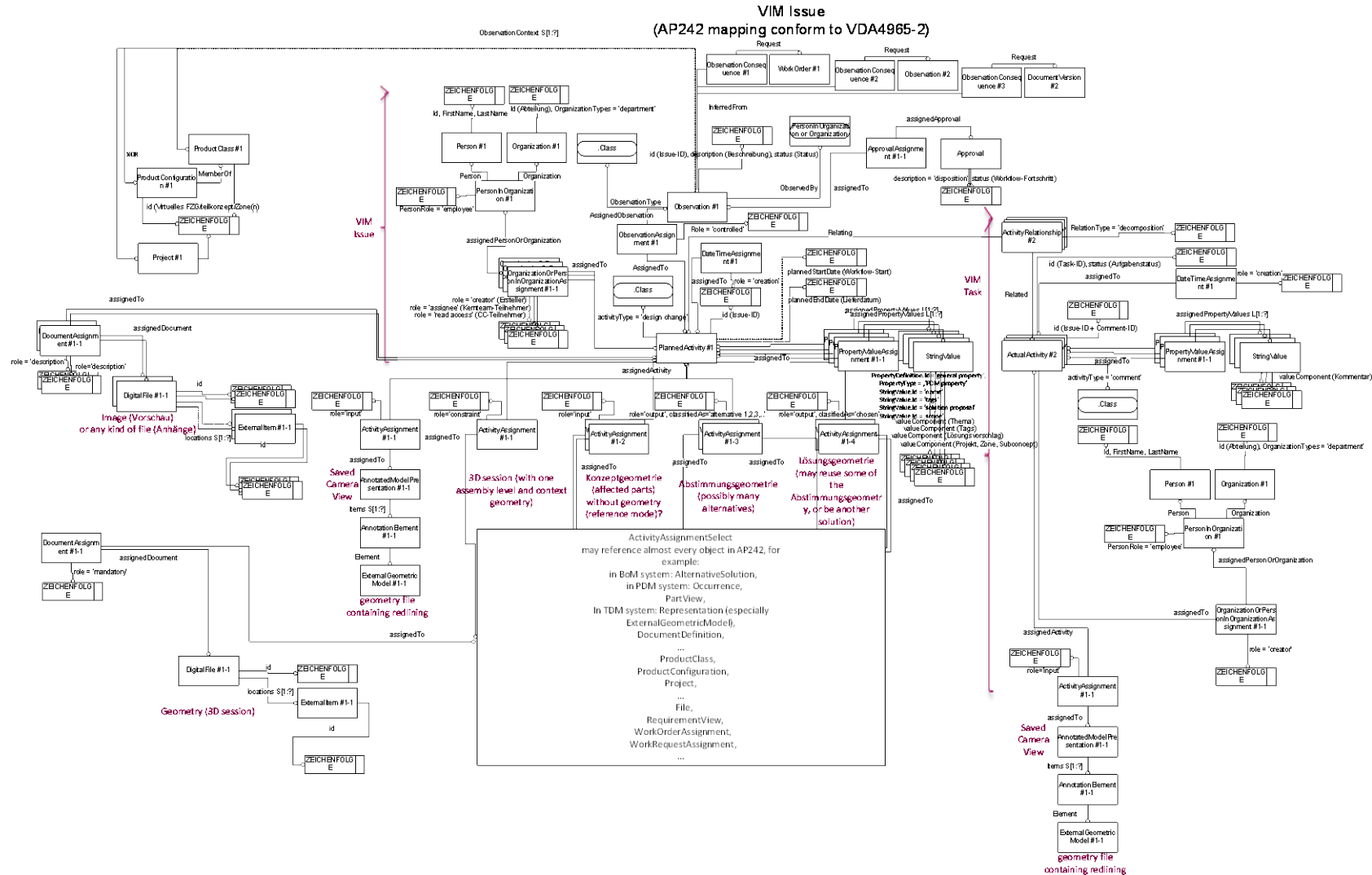
In case of assemblies, it is sufficient to have one ActivityAssignment to the assembly node.

Solution alternatives shall be marked with different values in ActivityAssignment.ClassifiedAs. Single parts and top assembly nodes belonging to the same alternative should have the same value in ActivityAssignment.ClassifiedAs.

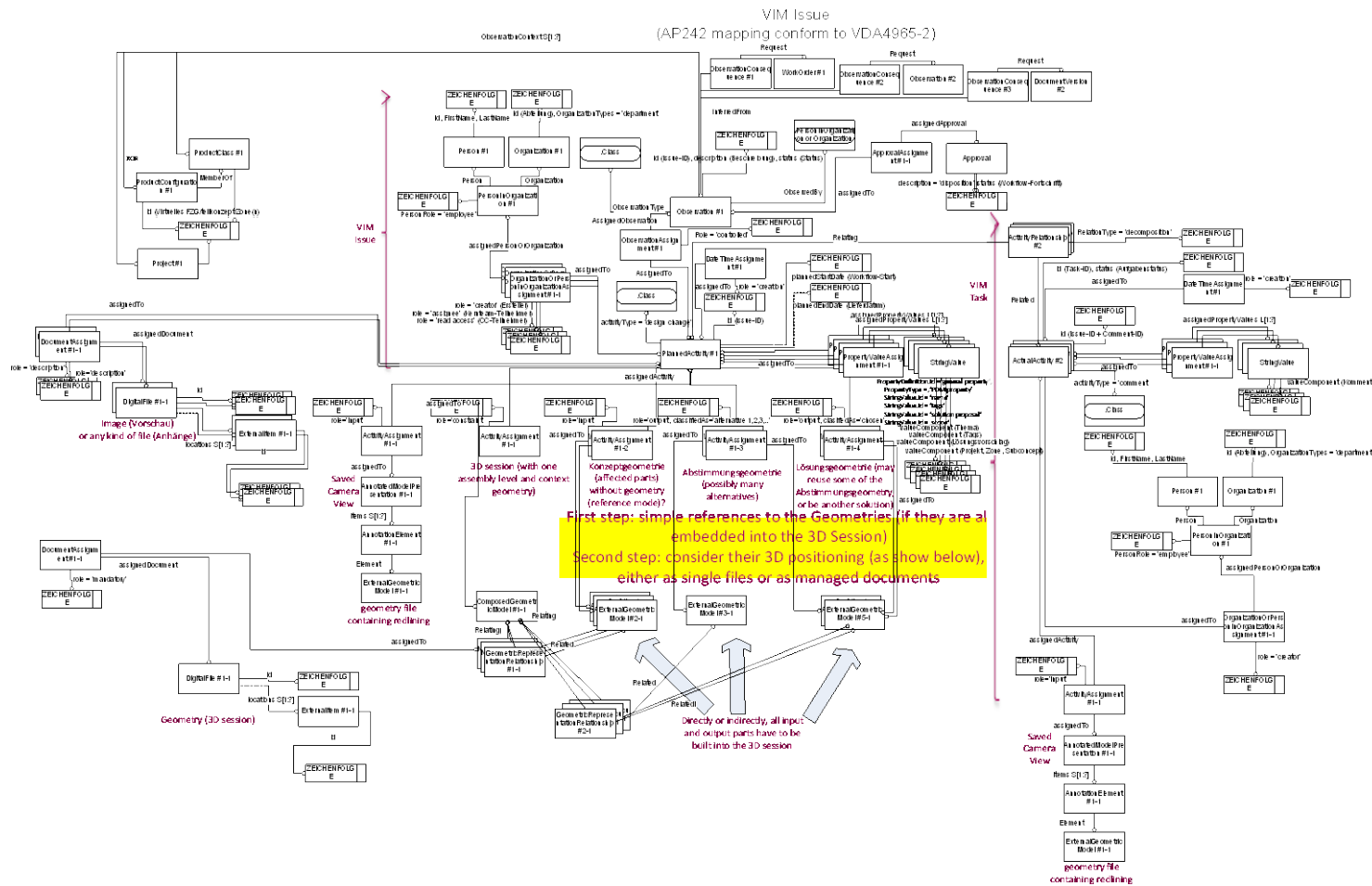
The chosen alternative shall have an additional ActivityAssignment.ClassifiedAs='chosen'. It does not have to be one of the alternatives, nor to use the whole solution for one alternative. Single parts and top assembly nodes belonging to the chosen alternative should all have the same value 'chosen' in ActivityAssignment.ClassifiedAs

For more details, refer to these three instantiation diagrams:

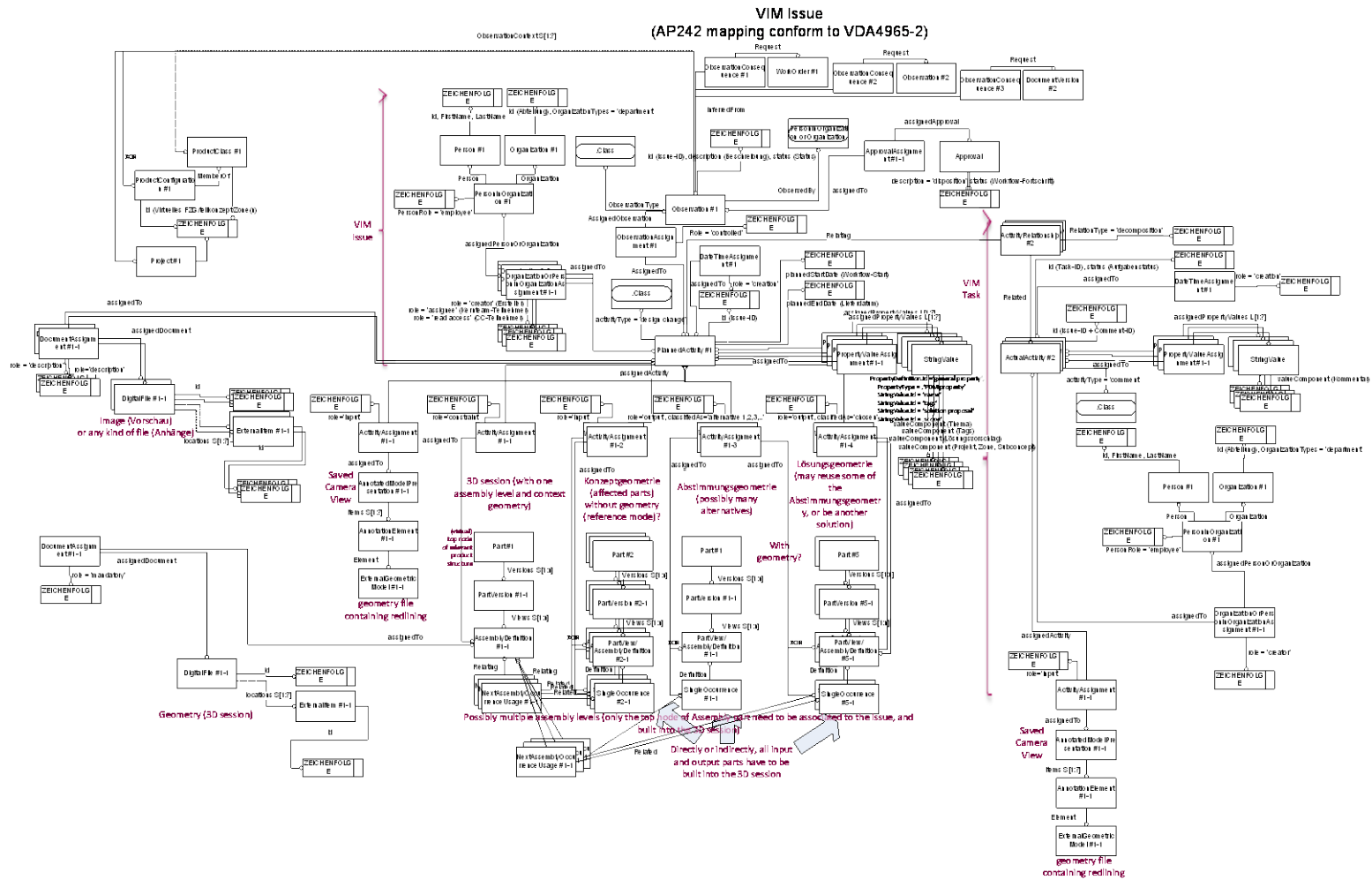
- General Mechanism and possible entities that may be associated via ActivityAssignment to the 'issue' Activity



- In a usecase based on Geometry File



- In a usecase based on product structure



7 List of Templates

This chapter gives a summary of the templates described in this document:

Name	Paragraph
Template "WorkRequest"	5.1
Template "WorkOrder"	5.2
Template "Activity"	5.3
Template "ActivityRelationship"	5.3.6

Annex A Known Issues

This section lists known issues with the AP242 Domain Model, both related to the assembly structure and to other domains within the Domain Model. These issues concern errors in the XSD, mismatches between the EXPRESS and XML schemas, deficiencies in the documentation and other issues that have already been communicated to the AP242 maintenance / development team for resolution. Many of these have been resolved by the Technical Corrigendum 1 (TC1) of AP242, which was published in 2016, by the Ed.2 (2019) and by the Ed.3 (2022).

Since 2022, the Bugzilla list hosted by PDES Inc. has been transferred to ISO JIRA with new issue numbers. The old Bugzilla issue numbers are still mentioned in the short description.

ISO Jira Issue	Summary	Target Milestone	Status
BS10303-5806	Support the combination of 'inputs' and 'outputs' into one ActivityAssignment (Bugzilla #8184)	CR_part42	Resolved
BS10303-5808	WorkOrder.Scope (Bugzilla #8186)	CR_part42	Resolved
TCSC410303-35	New object 'Issue'	10303-4442 Ed4	In Progress
TCSC410303-36	Relationship between Issue and Saved Camera View	10303-4442 Ed4	Done
TCSC410303-653	Add RepresentationItem to ActivityAssignmentSelect	10303-4442 Ed4	Done

Annex B Reference Documents

This Recommended Practices document is based on and derived from various other documents, schemas, and technical presentations. Those resources are listed below:

- AP242 Ed.3 Domain Model XML / EXPRESS Schema (2022) Recommended Practices for AP242 TC XML Product & Assembly Structure [242-PAS]
 - Version 3.2; dated 11 January 2024
- VDA-4965 Engineering Change Management (January 2010)
 - Part1: ECR
 - Part 2: ECO
- CC8 Recommended Practices V1.2b
- PDM Schema Usage Guide
 - Version 4.3, January 2002
- PSMS (Project Schedule Management Synchronization in cooperation networks) [PSMS]
 - Version 1.0, March 2022