S1000D Applicability Model Evolution and Application

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AMERICA'S FLEET STARTS HERE

S1000D Applicability Model Evolution and Application

NAVSEA WARFARE CENTERS Carderock

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Outline

-Applicability – What is it?

-Applying Applicability in S1000D Issues 3.0, 4.0, 4.1, & 4.2

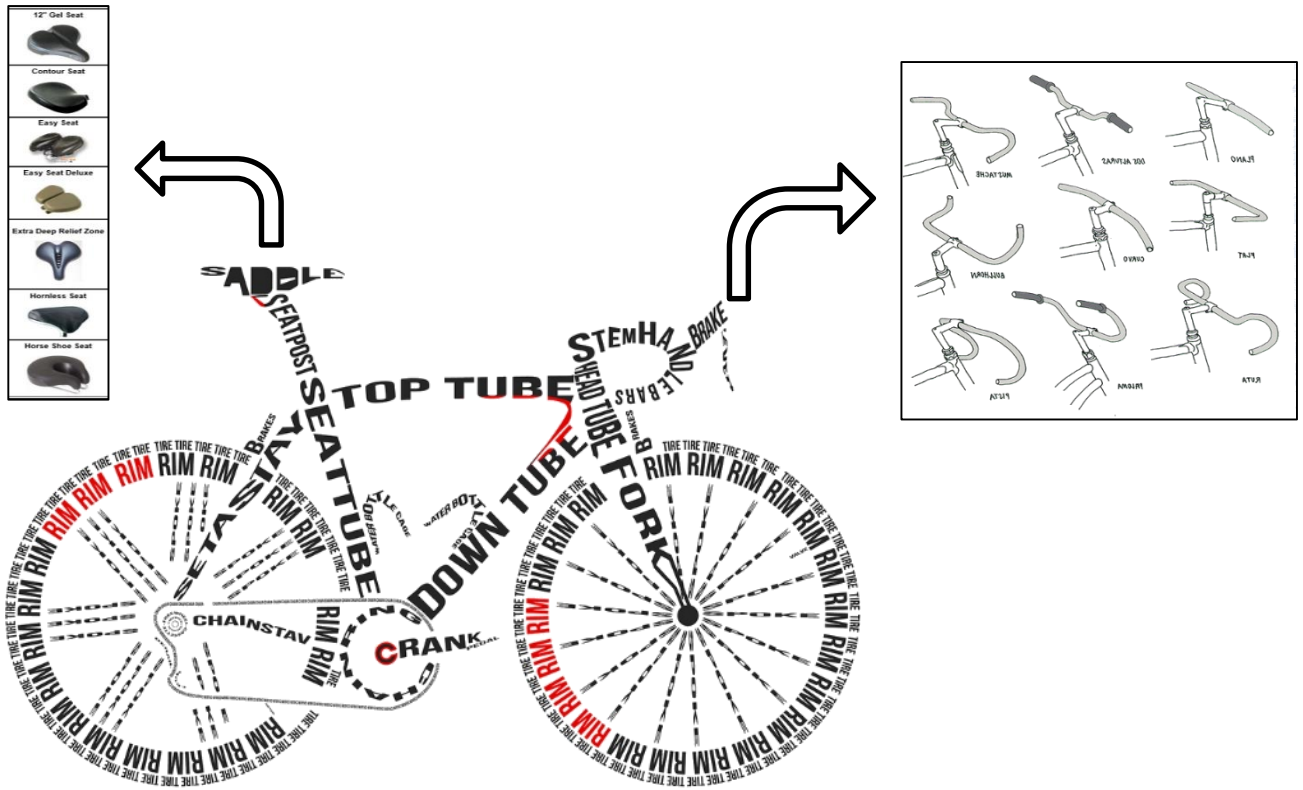
-Applicability Model Evolution in S1000D Issues 3.0, 4.0, 4.1, & 4.2

Applicability – What is it?

Identifies which context is to be associated with the physical configuration of the Product but can include other aspects such as availability of resources and environmental conditions

Implemented at:

- Publish Time
  - Data->**Publish**->Display
- Display/Run Time
  - Data->Publish->**Display**



S1000D

Applying Applicability (A)
S1000D Issues: 3.0, 4.0, 4.1, & 4.2

Denoted herein as:

$A_{3.0}$ $A_{4.0}$ $A_{4.1}$ & $A_{4.2}$

Why Understand How to Apply Applicability?

What is the problem?

Authors need to know how to apply applicability for their products.

Applicability can be defined in many ways for the product attributes.

Development of an applicability strategy requires forethought.

End User overload with multiple configuration levels and conditions

Why this problem is important?

Each program and project wants to apply applicability differently.

Once an applicability strategy is started, more difficult to change.

What is the solution to the problem?

Education, training, planning and business rules.

System Difference Code (SDC)

- 1 thru 4 alphanumeric
- Identifies alternative versions of the system and subsystem/subsubsystem for SNS without affecting the type, model, or variant identity
- Enables a relationship between the system difference codes and the one thru four alphanumeric characters of the "System level Usable On Code (UOC)" from a logistics database (eg, Logistic Support Analysis Record (LSAR)).
- Important to positively identify the system/subsystem variant and the applicability of the related information.
- The value "A" is always used for the first configuration, the value "B" for the second and so on.
- Define the system difference code values for configuration: Field Change
  Design Change
  Ship Alteration

Example	SDC
Cfig 1	**A000**
Cfig 2	**B000**
Cfig 3	**C000**
Cfig 1 + Cfig 2	**A001**
Cfig 1 + Cfig 2 + Cfig 3	**A003**
Cfig 2 + Cfig 3	**B001**

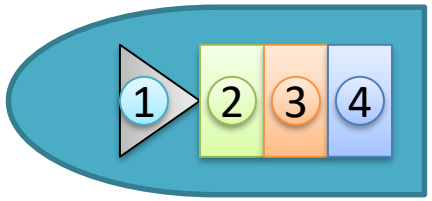
YYYYYYYYYYY – **YYYY** – YYY – YY – YYYY – YYYY – YYYY - Y

{Issue 4 and newer}
systemDiffCode="AAAA“

Variants of a System

A system with more than one system variant available (eg, system 34 (Navigation), sub-subsystem 41 (Navigation radar)). This can be used to identify the independent positioning for determining installation in the vehicle. However it can be that there are several types of Navigation radar available.

Variant A

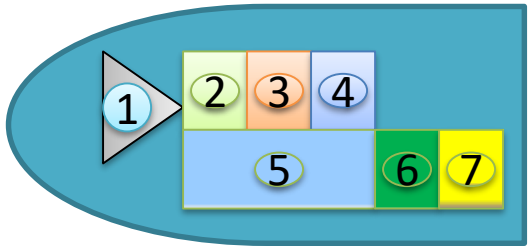


ACMERADAR-A000-34-41-00-YXA-XXXA-A

Consisting of:

ACMERADAR-A000-34-41-10-YXA-XXXA-A
ACMERADAR-A000-34-41-20-YXA-XXXA-A
ACMERADAR-A000-34-41-30-YXA-XXXA-A
ACMERADAR-A000-34-41-40-YXA-XXXA-A

Variant B



ACMERADAR-B000-34-41-00-YXA-XXXA-A

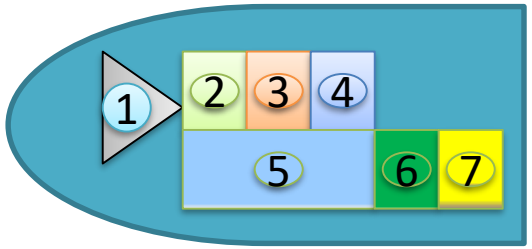
Consisting of:

ACMERADAR-B000-34-41-10-YXA-XXXA-A
ACMERADAR-B000-34-41-20-YXA-XXXA-A
ACMERADAR-B000-34-41-30-YXA-XXXA-A
ACMERADAR-B000-34-41-40-YXA-XXXA-A
ACMERADAR-B000-34-41-50-YXA-XXXA-A
ACMERADAR-B000-34-41-60-YXA-XXXA-A
ACMERADAR-B000-34-41-70-YXA-XXXA-A

Variant A001 of a System

A mixed breed with Variant A and Variant B DMs.
Components 1-3 are from Variant A and 4-7 from Variant B.

Variant A001



ACMERADAR-A001-34-41-00-YXA-XXXA-A

Consisting of:

ACMERADAR-A000-34-41-10-YXA-XXXA-A
ACMERADAR-A000-34-41-20-YXA-XXXA-A
ACMERADAR-A000-34-41-30-YXA-XXXA-A
ACMERADAR-B000-34-41-40-YXA-XXXA-A
ACMERADAR-B000-34-41-50-YXA-XXXA-A
ACMERADAR-B000-34-41-60-YXA-XXXA-A
ACMERADAR-B000-34-41-70-YXA-XXXA-A

How does a developer track all the variants?

Let's hold this thought!

Is there another approach?

Applicability – Establishing a Strategy

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To establish an applicability strategy, the Project must:

- **Define the product attributes and conditions using a consistent naming and identification scheme.**
- **Clearly convey to the end user the right configuration for each given condition.**
- **Decide what types of properties about the Product become**
  - product attributes in the Applicability Cross-reference Table (ACT) data module
  - versus conditions in the Conditions Cross-reference Table (CCT) data module

Product Attributes vs Conditions

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Product Attributes

Define the attributes about your Product such as model, series, and serial number.

ACT
- **Component**
  - **Model**
  - **Serial Number**
- **Part**
  - **Model**
  - **Serial Number**
  - **Part Number**
  - **Version**

Conditions

Technical, operational, environmental, or any type condition that can affect applicability of the technical data.

Divide
product attributes into properties set during manufacturing
and
conditions into properties set after market.

Or

product attributes into properties which the value will not change throughout the service life of the product instance
and
conditions into properties which the value can change.

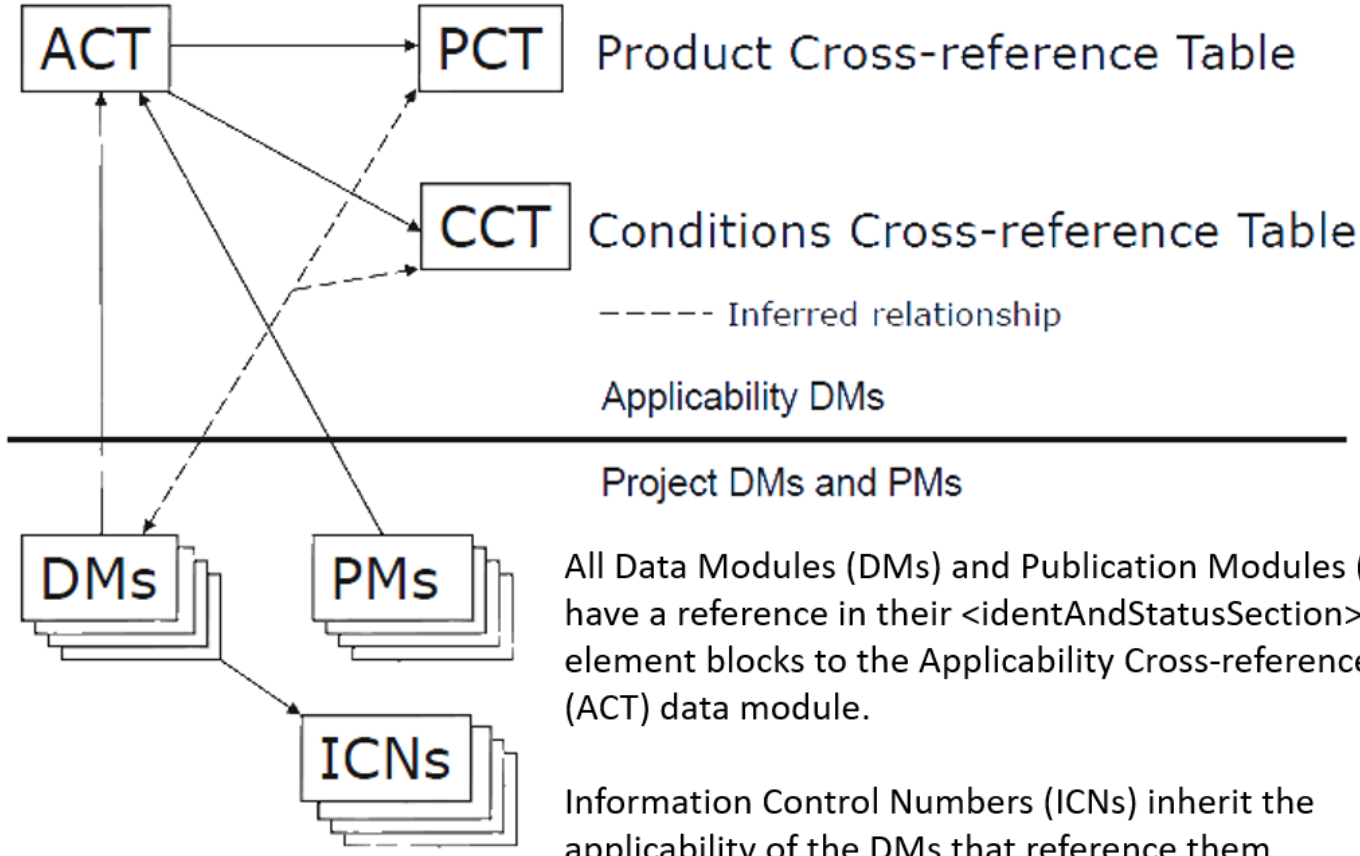
CCT
- **Technical**
  - **Field Change**
  - **Modification**
  - **Reconditioned**
- **Operational**
  - **Normal**
  - **Emergency**
  - **Pre-operation**
- **Environmental**
  - **Ocean Spray**
  - **Icy**
  - **Chemical**

ACT, CCT, PCT Referencing Scheme

Projects must decide to what extent they configuration manage and limit editing access to the product attributes.

Modification of an existing product attribute can have a significant affect to existing data.

Domain of the Configuration Manager



All Data Modules (DMs) and Publication Modules (PMs) have a reference in their <identAndStatusSection> element blocks to the Applicability Cross-reference Table (ACT) data module.

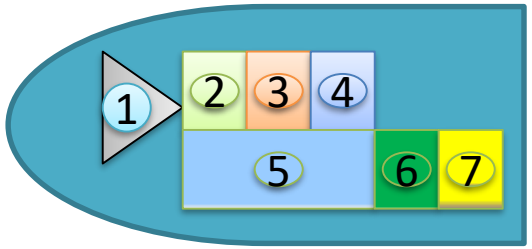
Information Control Numbers (ICNs) inherit the applicability of the DMs that reference them.

Domain of Technical Writers

Variant A001 of a System

A mixed breed with Variant A and Variant B DMs.
Components 1-3 are from Variant A and 4-7 from Variant B.

Variant A001



ACMERADAR-A001-34-41-00-YXA-XXXA-A

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ACMERADAR-A000-34-41-20-YXA-XXXA-A
ACMERADAR-A000-34-41-30-YXA-XXXA-A
ACMERADAR-B000-34-41-40-YXA-XXXA-A
ACMERADAR-B000-34-41-50-YXA-XXXA-A
ACMERADAR-B000-34-41-60-YXA-XXXA-A
ACMERADAR-B000-34-41-70-YXA-XXXA-A

How does a developer keep track of the variants?

Config	Hardware	Software	Hardware Mods Installed
1	1, 2, 3, 4	3.2	FC 101 – 107, 110-117
2	1A, 2A, 3A, 4A, 5, 6, 7	5.8	FC 104 – 110, 115-118
3	1,2,3,4,5,6,7	10.2	FC 110 -117

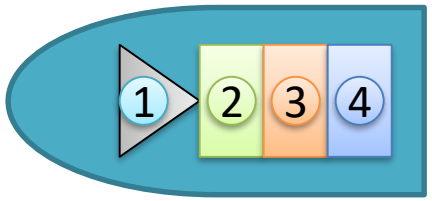
What if the configuration was the Product for the PCT?

And the software versions and hardware mods were the conditions?

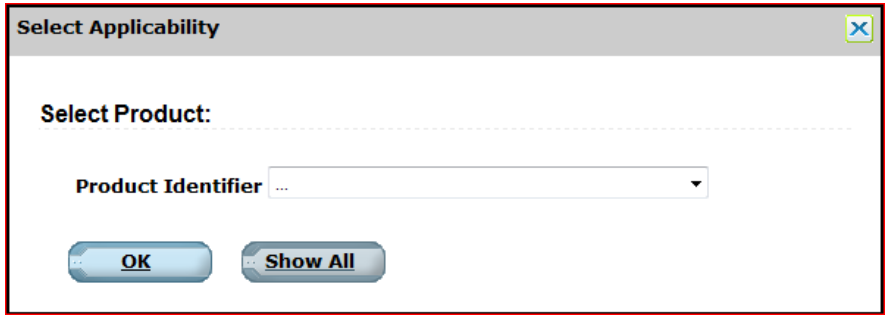
Example of Product Cross Reference Table

Product ID	applicPropertyIdent	applicPropertyType	applicPropertyValue
Config-1	Software	condition	3.2
	FC101	condition	Installed
	FC102	condition	Installed
	FC103	condition	Not Installed
	FC104	condition	Installed
	FC105	condition	Installed
	FC106	condition	Not Installed
	FC107	condition	Installed
	FC110	condition	Installed
	FC111	condition	Installed
	FC112	condition	Not Installed
	FC113	condition	Installed

Config	1
Hardware	1, 2, 3, 4
Software	3.2
Hardware Mods Installed	FC 101 - 107, 110 - 117



Example of Display Time Applicability



User's Product Configuration

Config	1
Hardware	1, 2, 3, 4
Software	3.2
Hardware Mods Installed	FC 101 – 107, 110-117

Select Applicability

Select Product:

Product Identifier: Config - 1

OK **Show All**

Selected Technical Conditions and Product Attributes

Product Attributes:

Config	**Config - 1**

Technical Conditions:

Software Version	3.2
Field Change FC 101	[Installed]
Field Change FC 102	[Installed]
Field Change FC 103	[Installed / Not Installed]
Field Change FC 104	[Installed / Not Installed]
Field Change FC 105	[Installed]
Field Change FC 106	[Installed / Not Installed]
Field Change FC 107	[Installed / Not Installed]
Field Change FC 110	[Installed]
Field Change FC 111	[Installed]
Field Change FC 112	[Installed / Not Installed]

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What is the problem?

Authors need to know how to apply applicability for their products.

Applicability can be defined in many ways for the product attributes.

Development of an applicability strategy requires forethought.

End User overload with multiple configuration levels and conditions

Why this problem is important?

Each program and project wants to apply applicability differently.

Once an applicability strategy is started, more difficult to change.

What is the solution to the problem?

Education, training, planning and business rules.

S1000D

Applicability (A) Model Evolution

S1000D Issues: 3.0, 4.0, 4.1, & 4.2

Denoted herein as:

$A_{3.0}$ $A_{4.0}$ $A_{4.1}$ & $A_{4.2}$

Applicability Model Evolution: $A_{3.0}$, $A_{4.0}$, $A_{4.1}$, & $A_{4.2}$

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What is the problem?

Applicability structures and philosophy changed with newer Issues.

Why this problem is important?

- Vendor publishing tools must know how to handle mixed Issue data or all data must use the same Issue schemas.
- Earlier developed Data Modules (DMs) may require re-tagging/re-authoring if migrating the DM to a newer issue.
- Project costs may be impacted.

What is the solution to the Problem?

First, let's analyze the problem.

S1000D Applicability Evolution

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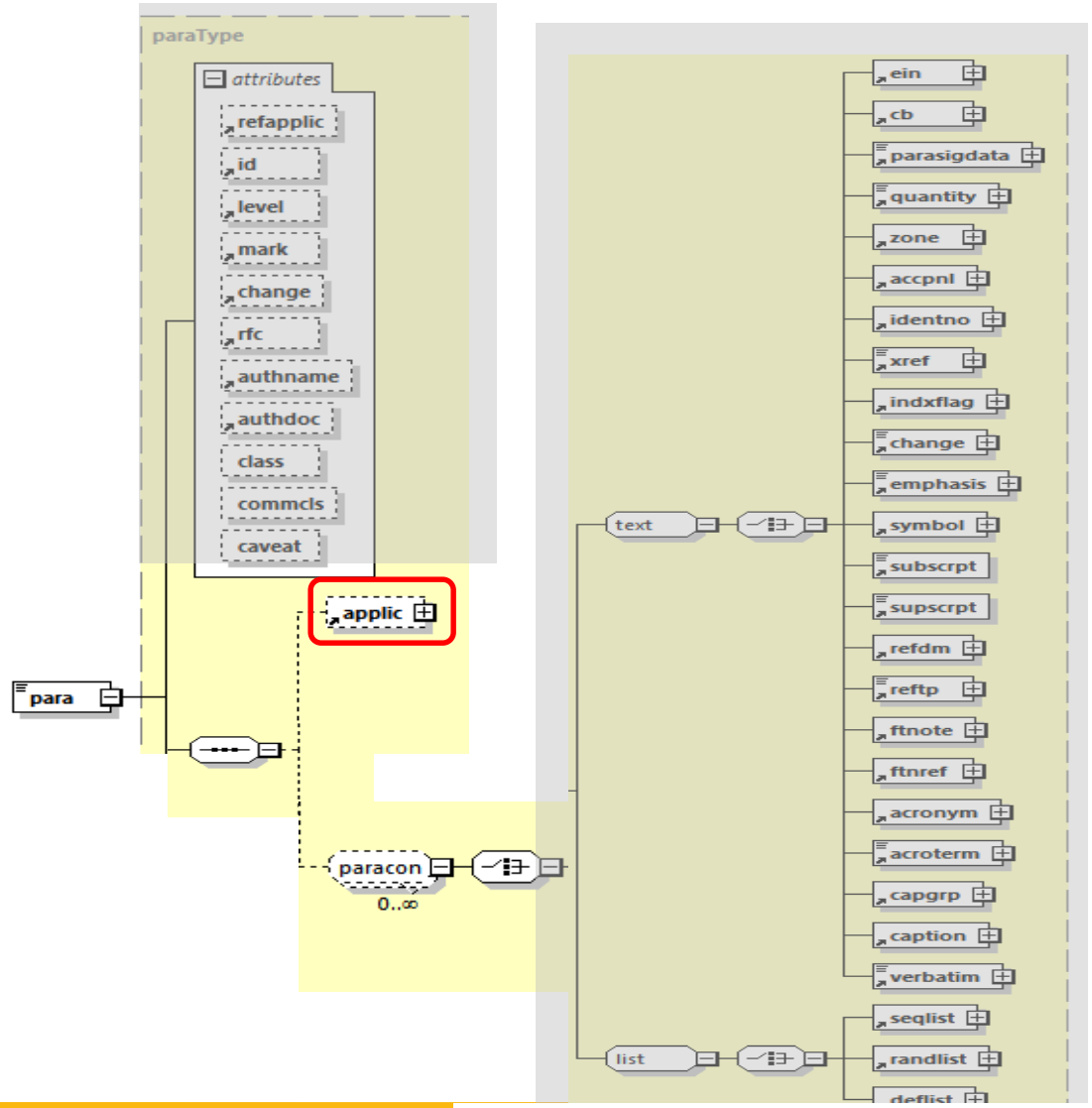
$A_{3.0} \rightarrow A_{4.0}$

Whole DM Applicability did not change from **Issue 3.0** to **Issue 4.2.**
The element <applic> remained under <status>/<dmStatus>.

Content Applicability within a DM	$A_{3.0}$	$A_{4.0}$	$A_{4.1}$ & $A_{4.2}$
Inline applicability annotations included in text by just adding the element `<applic>` to the context concerned.	X		
Applicability annotations collected in element `<inlineapplics>/<referencedApplicGroup>` contained under identification and status.	X	X	
Applicability annotations collected in the element `<referencedApplicGroup>` contained under content.			X

Note: No changes in content applicability between Issues 4.1 and 4.2
Elements and attributes were renamed in Issue 4.0 with the adoption of new policies for maintaining quality and consistency in the schemas.

$A_{3.0}$ Only: Inline applicability annotations by just adding the element <applic> to the context concerned.

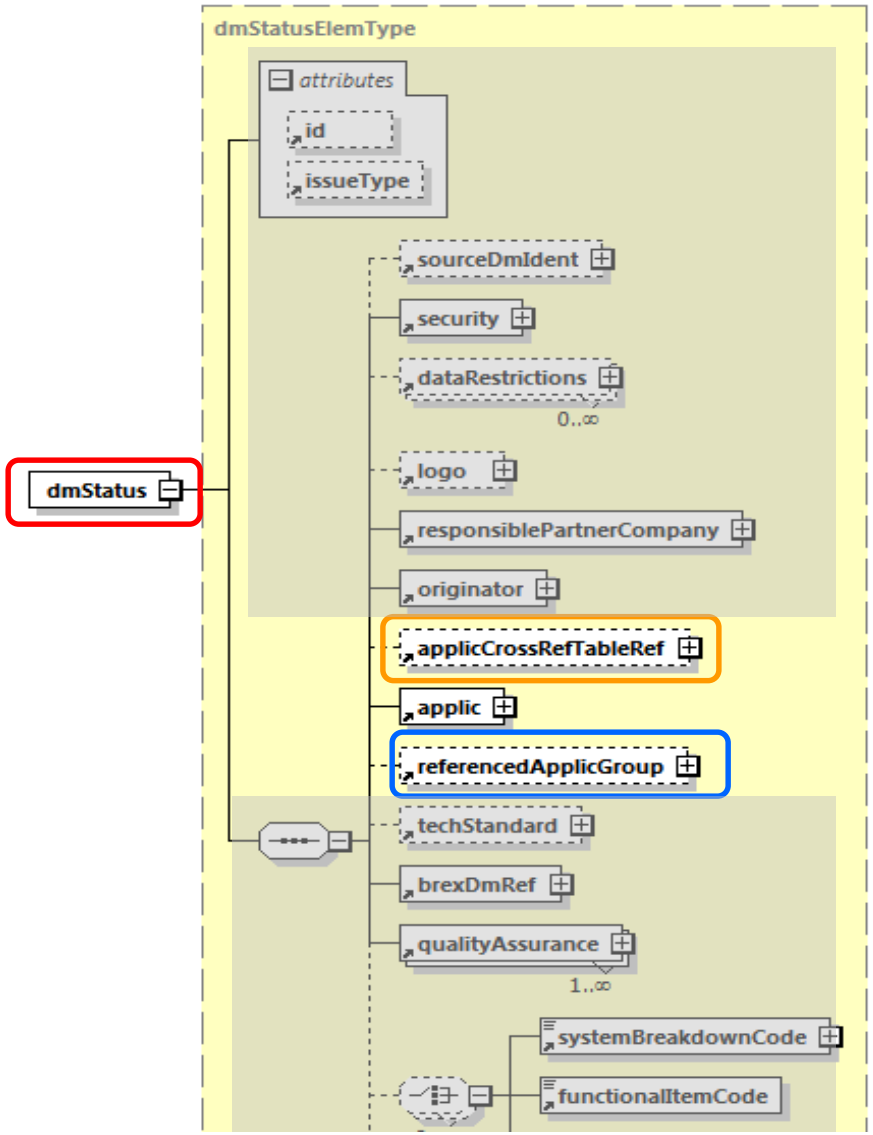



```
<content>
...
 <step1>
<para><applic>
<displaytext>Mountain storm Mk1</displaytext>
<evaluate operator="and">
<assert model="Mountain storm"/>
<assert version="Mk1"/>
</evaluate>
</applic>
Place bike on test stand MS-Mk1</para>

<para><applic>
<displaytext>Brook trekker Mk9</displaytext>
<evaluate operator="and">
<assert model="Brook trekker"/>
<assert version="Mk9"/>
</evaluate>
</applic>
Place bike on test stand BT-Mk9</para>

</step1>
...
</content>
```

$A_{3.0}$ & $A_{4.0}$ Only: Applicability collected in element <inlineapplics>/ <referencedApplicGroup> under identification and status.

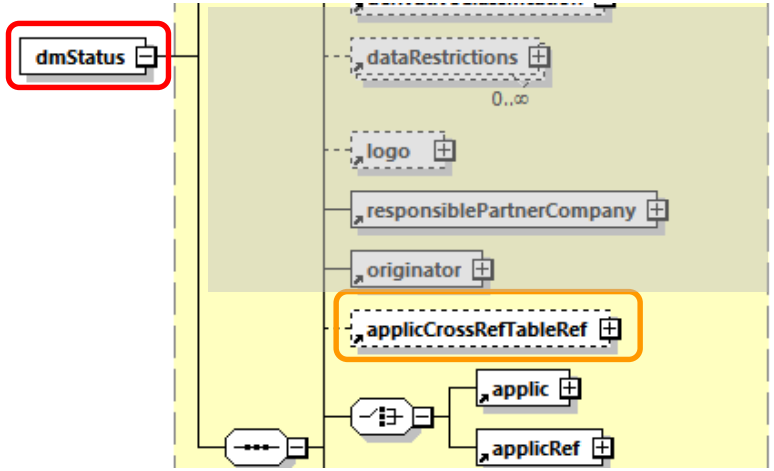


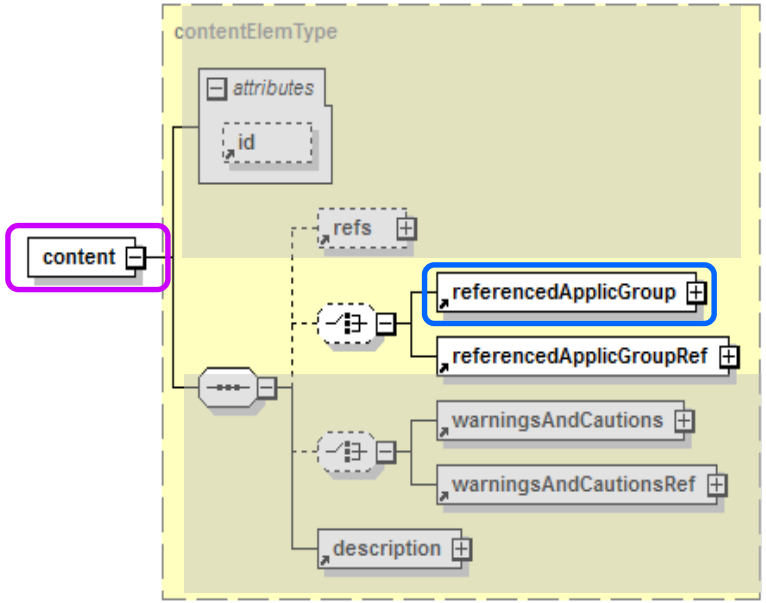
Issue 4.01

```
...
<identAndStatusSection>
...
<dmStatus>
...
<applicCrossRefTableRef>
...
</applicCrossRefTableRef>
...
<referencedApplicGroup>
<applic id="app-0001">
...
</referencedApplicGroup>
...
</dmstatus>
...
</identAndStatusSection>
...
<content>
...
<proceduralStep>
<para applicRefId="appl-0001">Place bike on test stand MS-Mk1</para>

<para applicRefId="appl-0002">Place bike on test stand BT-Mk9</para>
</proceduralStep>
...
</content>
```

$A_{4.1}$ & $A_{4.2}$ **Only**: Applicability annotations collected in the element `<referencedApplicGroup>` contained under content.





Issue 4.1

```
...
<identAndStatusSection>
...
<dmStatus>
...
<applicCrossRefTableRef>
...
</applicCrossRefTableRef>
...
</dmstatus>
...
</identAndStatusSection>
...
<content>
...
<referencedApplicGroup>
<applic id="app-0001">
...
</referencedApplicGroup>
...
<proceduralStep>
<para applicRefId="appl-0001">Place bike on test stand MS-Mk1</para>

<para applicRefId="appl-0002">Place bike on test stand BT-Mk9</para>
</proceduralStep>
...
</content>
...
```

Element <status>/<dmstatus>

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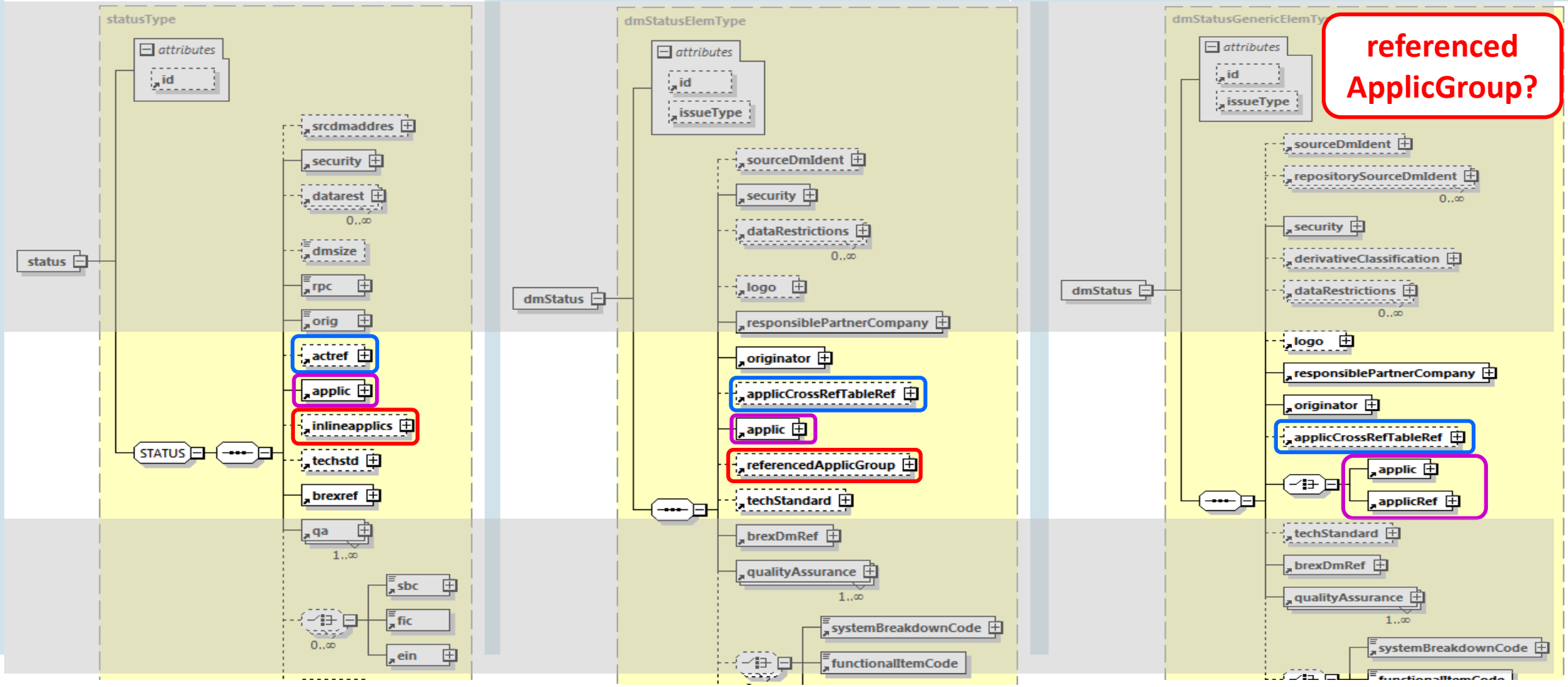
$A_{3.0}$	$A_{4.0}$	$A_{4.1}$ & $A_{4.2}$



$A_{4.0}$→& $A_{4.1}$: Change in element <referencedApplicGroup>

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$A_{4.0}$

```
...
<identAndStatusSection>
...
<dmStatus>
...
<applicCrossRefTableRef>
...
</applicCrossRefTableRef>
...
<referencedApplicGroup>
<applic id="app-0001">
...
</referencedApplicGroup>
...
</dmstatus>
...
</identAndStatusSection>
...
<content>
...
<proceduralStep>
<para applicRefId="appl-0001">Place bike on test stand MS-Mk1</para>

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</proceduralStep>
...
</content>
...
```

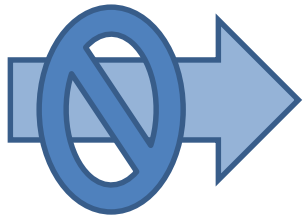

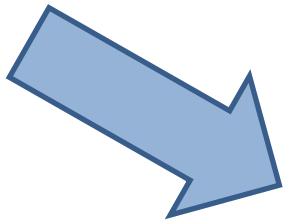

$A_{4.1}$

```
...
<identAndStatusSection>
...
<dmStatus>
...
<applicCrossRefTableRef>
...
</applicCrossRefTableRef>
...
</dmstatus>
...
</identAndStatusSection>
...
<content>
...
<referencedApplicGroup>
<applic id="app-0001">
...
</referencedApplicGroup>
...
<proceduralStep>
<para applicRefId="appl-0001">Place bike on test stand MS-Mk1</para>

<para applicRefId="appl-0002">Place bike on test stand BT-Mk9</para>
</proceduralStep>
...
</content>
...
```

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- Earlier developed Data Modules (DMs) may require re-tagging/re-authoring if migrating the DM up to a newer issue.
- Project costs may be impacted.

What is the solution to the Problem?

As each project or organization use different vendor tools, Projects must perform a tool and cost analysis to determine whether:

- They can continue to use mixed Issue data.
- They have to stay with their current Issue.
- They must convert part or all their data.

Thank you

for your attention!

Questions?