

S1000D

Issue 4.1 Chapter 4.13 Optimization and Reuse?

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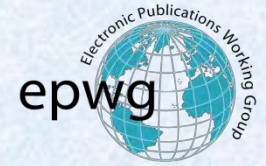
Agenda



- Common information repository
- CIR incremental update
- Container data module
- Alternates



Common Information Repository



Common Information Repository



Common Information Repository Definition



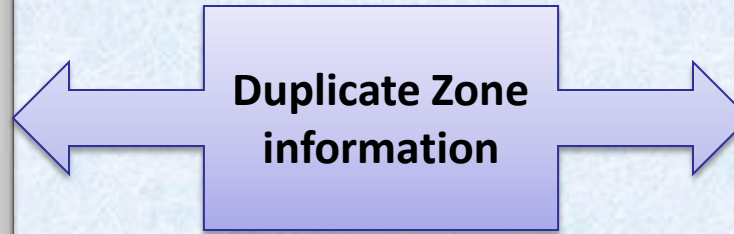
- Data modules which contain a list of common information objects of a certain type (a library)
 - Each object contains a description
 - Each object contains an extensive set of properties
- Other data modules can reference/reuse individual objects in the repository



Common Information Repository Concept



Procedural DM	DMC A
ID and Status	
Content	
...	
<pre><preliminaryRqmts> <productionMaintData> <zoneRef zoneNumber="310"> <name>Fuselage aft of the Pressure bulkhead</name> <shortName>Fslg aft blkhd </shortName> </zoneRef></pre>	
...	
<pre></productionMaintData></pre>	



IPD DM	DMC B
ID and Status	
Content	
...	
<pre><illustratedPartsCatalog> <zoneGroup> <zoneRef zoneNumber="310"> <name>Fuselage aft of the Pressure bulkhead</name> <shortName>Fslg aft blkhd </shortName> </zoneRef></pre>	
...	
<pre></zoneGroup></pre>	



Common Information Repository Concept



Procedural DM DMC A

ID and Status

Content

```
...  
<preliminaryRqmts>  
<productionMaintData>  
<zoneRef zoneNumber="310">  
<name>Fuselage aft of the  
Pressure bulkhead</name>  
<shortName>Fslg aft blkhd  
</shortName>  
</zoneRef>  
...  
</productionMaintData>
```

IPD DM DMC B

ID and Status

Content

```
...  
<illustratedPartsCatalog>  
<zoneGroup>  
<zoneRef zoneNumber="310">  
<name>Fuselage aft of the  
Pressure bulkhead</name>  
<shortName>Fslg aft blkhd  
</shortName>  
</zoneRef>  
...  
</zoneGroup>
```



Common Information Repository Concept



Procedural DM	DMC A
ID and Status	
Content	
...	
<code><preliminaryRqmts></code>	
<code><productionMaintData></code>	
<code><zoneRef zoneNumber="310"></code>	
<code><name>Fuselage aft of the</code>	
<code>Pressure bulkhead</name></code>	
<code><shortName>Fslg aft blkhd</code>	
<code></shortName></code>	
<code></zoneRef></code>	
...	
<code></productionMaintData></code>	

```
<zoneRef zoneNumber="310">
<name>Fuselage aft of the
Pressure bulkhead</name>
<shortName>Fslg aft blkhd
</shortName>
</zoneRef>
```

IPD DM	DMC B
ID and Status	
Content	
...	
<code><illustratedPartsCatalog></code>	
<code><zoneGroup></code>	
<code><zoneRef zoneNumber="310"></code>	
<code><name>Fuselage aft of the</code>	
<code>Pressure bulkhead</name></code>	
<code><shortName>Fslg aft blkhd</code>	
<code></shortName></code>	
<code></zoneRef></code>	
...	
<code></zoneGroup></code>	

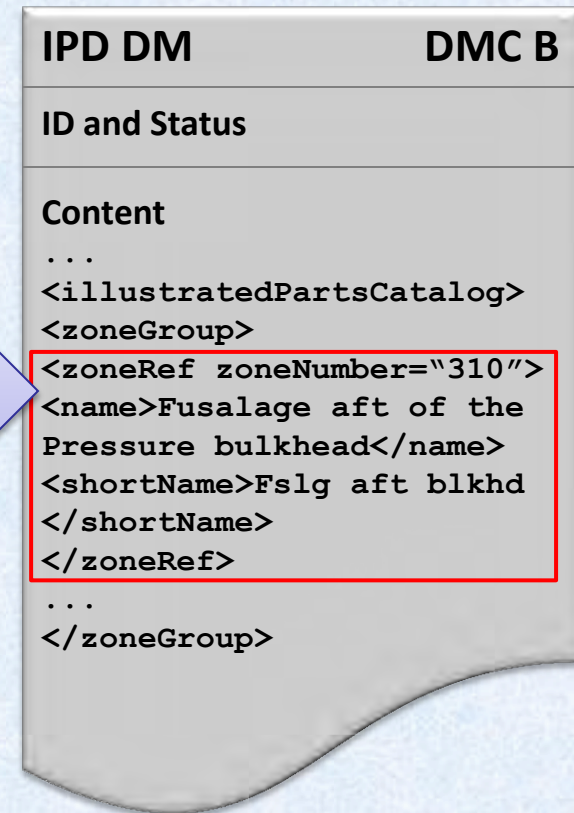
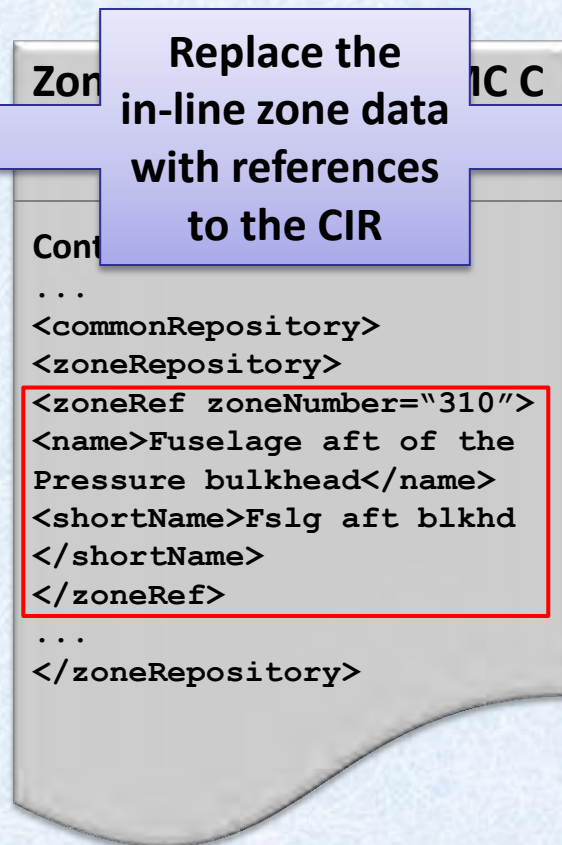
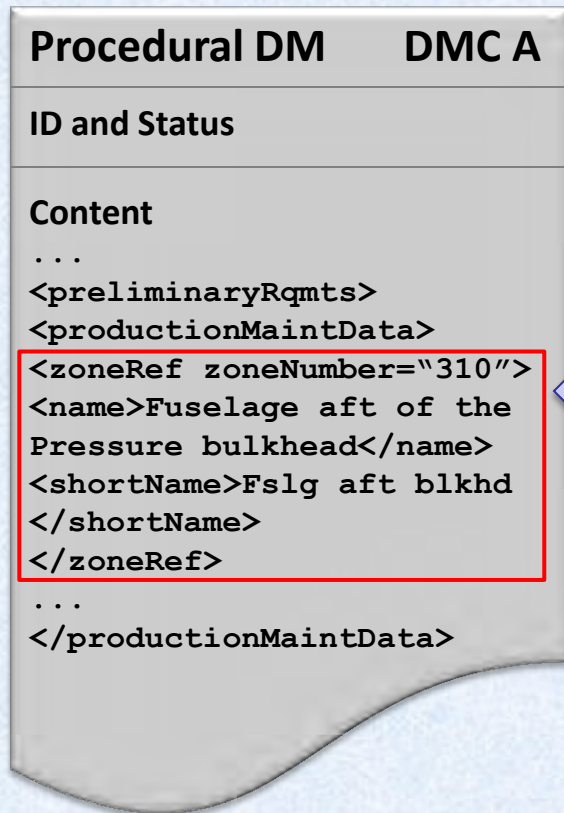
Zone CIR DM	DMC C
ID and Status	
Content	
...	
<code><commonRepository></code>	
<code><zoneRepository></code>	
...	
<code></zoneRepository></code>	

Create a Zone Common Info Repository DM

Place the duplicate Zone data in the DM



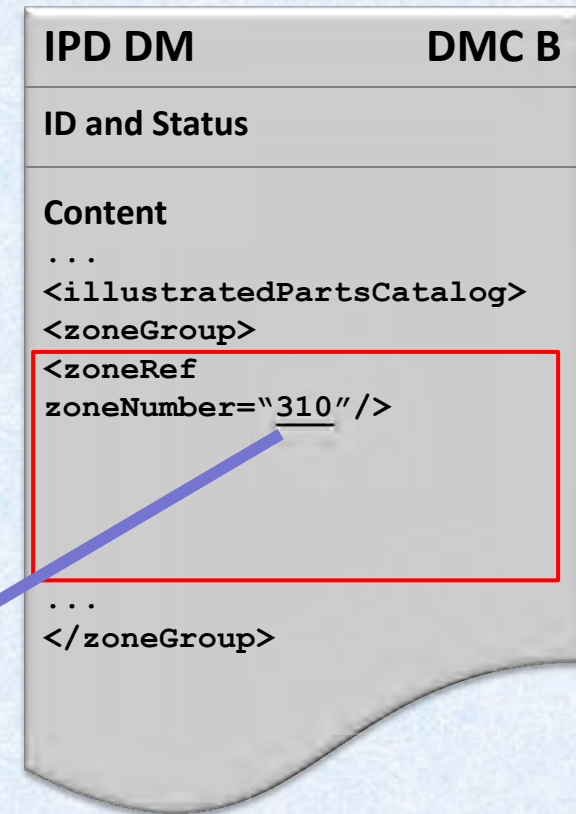
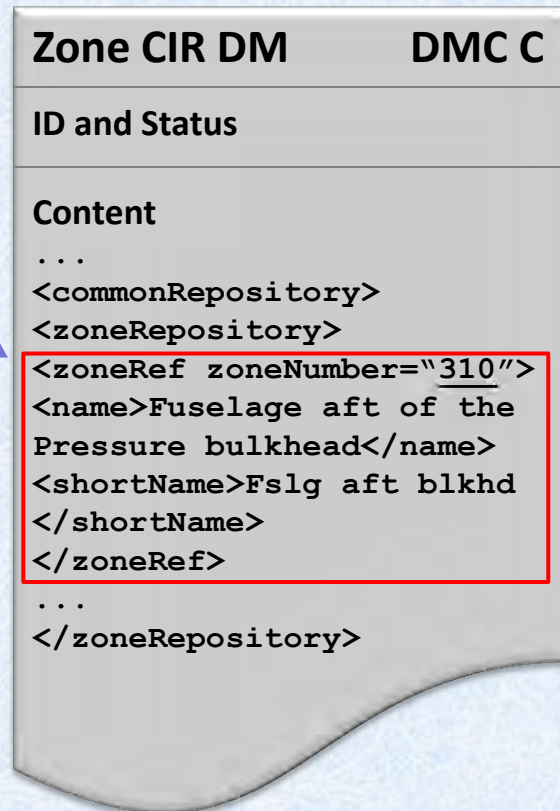
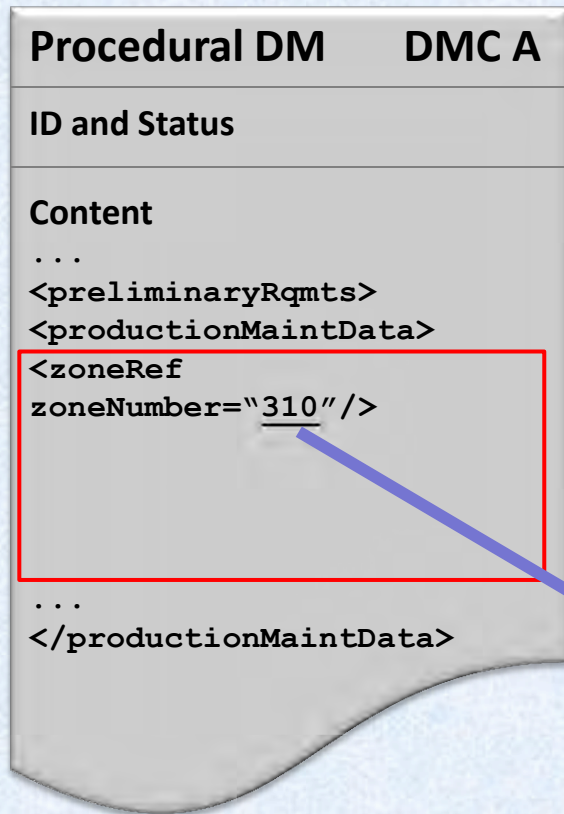
Common Information Repository Concept



**Replace the
in-line zone data
with references
to the CIR**



Common Information Repository Concept





Common Information Repository Concept



Procedural DM DMC A

ID and Status

Content

```
...
<preliminaryRqmts>
<productionMaintData>
<zoneRef
zoneNumber="310"/>
...
</productionMaintData>
```

IPD DM DMC B

ID and Status

Content

```
...
<illustratedPartsCatalog>
<zoneGroup>
<zoneRef
zoneNumber="310"/>
...
</zoneGroup>
```

Zone CIR DM DMC C

ID and Status

Content

```
...
<commonRepository>
<zoneRepository>
<zoneRef zoneNumber="310">
<name>Fuselage aft of the
Pressure bulkhead</name>
<shortName>Fslg aft blkhd
</shortName>
<zoneSide .../>
<boundaryFrom>...
<boundaryTo>...
</zoneRef>
...
</zoneRepository>
```

The repository can also include more information about the zone than was available in the "regular" DM



Common Information Repository Information Types



Information type	Info code
Functional item numbers	00E
Circuit breakers	00F
Parts	00G
Zones	00H
Access panels and doors	00J
Organizations	00K
Supplies – List of products	00L
Supplies – List of requirements	00M
Support equipment	00N
Controls and indicators	00X
Functional and/or physical areas	0A1
Applicability	0A2
General warnings	012
General cautions	012



Common Information Repository Internal vs. Exchange



- Data consistency and exchange
 - CIR can be used as an “internal repository”
 - Enforces consistency of data
 - Enables a “late” inclusion of common information into DMs before delivery of self-contained DMs
 - CIR can be exchanged between project partners or delivered to the customer



Common Information Repository

Expanded schema model



NOTE:

For most of the common information types the exchange of CIR data modules supports exchanging more properties than the inclusion into self-contained data modules (due to schema limitations).

Example:

Circuit Breaker CIR DM supports:

- Name
- `shortName`
- `functionalPhysicalAreaRef`
- `circuitBreakerRef`
- `circuitBreakerClass`
- location (complex)
- `functionalItemRef`
- `amperage`

Procedural DM supports:

- Name
-
-
- `circuitBreakerRef`
-
- location (simple)
- `functionalItemRef`
-



Common Information Repository Data Module Coding



- An information code is assigned for each information type within the CIR
- It is recommended to have only one CIR DM within a project (or model identification code) for each CIR type
 - SNS 00-00-00 can be used in this case
- Multiple CIR DMs are allowed within a project for each CIR type
 - The project will have to decide the SNS breakdown to use



Common Information Repository Publishing



- Publishing CIR DMs
 - Can be used to publish as a document in a page-oriented publication
 - Some information types make more sense than others
 - Zone CIR could be published as a consolidated list of zones
 - Controls and Indicators CIR can be published as a separate document
 - Introductory text for publication is supported through the `<commonInfo>` element within the CIR DM



Common Information Repository Referencing



- Two referencing mechanisms are supported:

- Two referencing mechanisms are supported:

Procedural DM	DMC A
ID and Status	
Content	
...	
<code><preliminaryRqmts></code>	
<code><productionMaintData></code>	
<code><zoneRef</code>	
<code> zoneNumber="310"/></code>	
...	
<code></productionMaintData></code>	

Implicit

Reference by
identifier only

Similar to CSN
reference.
Software has to
know where to
find the DM

Zone CIR DM	DMC C
ID and Status	
Content	
...	
<code><commonRepository></code>	
<code><zoneRepository></code>	
<code><zoneRef zoneNumber="310"></code>	
<code><name>Fuselage aft of the</code>	
<code> Pressure bulkhead</name></code>	
<code><shortName>Fslg aft blkhd</code>	
<code></shortName></code>	
<code></zoneRef></code>	
...	
<code></zoneRepository></code>	

- Two referencing mechanisms are supported:

Procedural DM	DMC A
ID and Status	
Content	
...	
<code><preliminaryRqmts></code>	
<code><productionMaintData></code>	
<code><zoneRef zoneNumber="310"></code>	
<code><refs></code>	
<code><dmRef>...</dmRef></code>	
<code></refs></code>	
<code></zoneRef></code>	
...	
<code></productionMaintData></code>	

Explicit

Reference by Data Module then identifier

Standard DM reference mechanism

Zone CIR DM	DMC C
ID and Status	
Content	
...	
<code><commonRepository></code>	
<code><zoneRepository></code>	
<code><zoneRef zoneNumber="310"></code>	
<code><name>Fuselage aft of the Pressure bulkhead</name></code>	
<code><shortName>Fslg aft blkhd</shortName></code>	
<code></zoneRef></code>	
...	
<code></zoneRepository></code>	



Common Information Repository Referencing



- Page oriented and IETP behaviors of CIR references are not specified
- Possible behaviors include:
 - Embed the referenced data fragment into the current DM display
 - Display the referenced data fragment in a pop-up window
 - Link to the complete CIR data module
 - Etc...



Common Information Repository

CIR-dependant data modules



- So far we have been discussing use of CIR for reference type of data:
 - Zones
 - Parts
 - Etc...
- In 4.1 we have externalized some mandatory information from DMs into the CIR:
 - Warnings
 - Cautions
 - Applicability annotations



Common Information Repository CIR-dependant data modules



- Works the same as before:



Common Information Repository Concept



Procedural DM

DMC A

ID and Status

Content

...

<warningsAndCautions>

<warning>

<warningAndCautionPara>Do not get Detergent B into your eyes. If it gets into your eyes, wash them immediately in clean warm water.

</warningAndCautionPara>

</warning>

...

</warningsAndCautions>

Warning CIR DM

DMC B

ID and Status

Content

...

<commonRepository>

<warningRepository>

...

"warn-0524": ...

"warn-0525": Do not get Detergent B into your eyes. If it gets into your eyes, wash them immediately in clean warm water.

"warn-0526": ...

"warn-0527": ...

...

</warningRepository>



Common Information Repository Concept



Procedural DM	DMC A
ID and Status	
Content	
...	
<code><warningsAndCautionRefs></code>	
<code><warningRef</code>	
<code>warningIdentNumber="warn-0525"/></code>	
...	
<code></warningsAndCautionRefs></code>	

Warning CIR DM	DMC B
ID and Status	
Content	
...	
<code><commonRepository></code>	
<code><warningRepository></code>	
...	
<code>"warn-0524": ...</code>	
<code>"warn-0525": Do not get Detergent B</code>	
<code>into your eyes. If it</code>	
<code>gets into your eyes,</code>	
<code>wash them immediately</code>	
<code>in clean warm water.</code>	
<code>"warn-0526": ...</code>	
<code>"warn-0527": ...</code>	
...	
<code></warningRepository></code>	



Common Information Repository

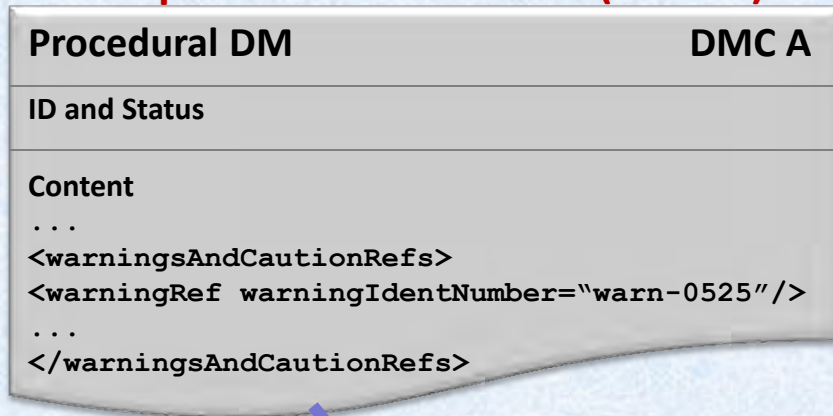
CIR-dependant data modules



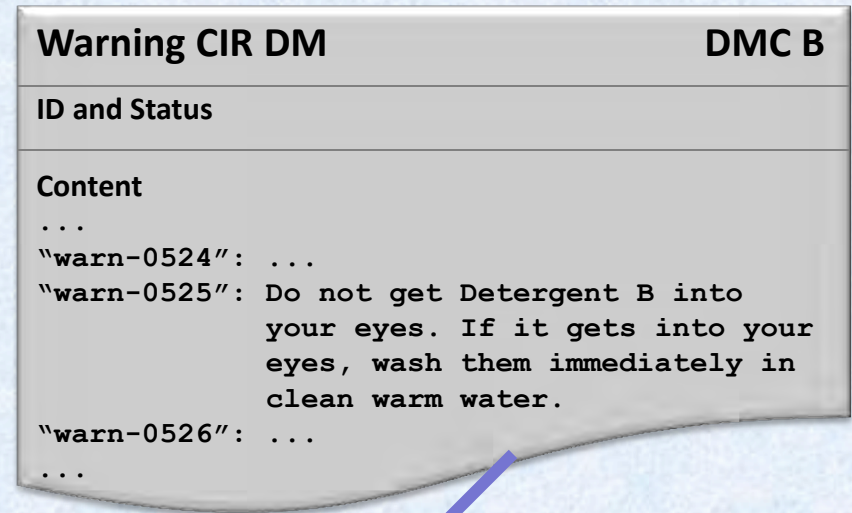
- Difference is that the externalized data is mandatory
- The original procedural data module is no longer “self standing”
- Instead of a reference, this **must** be treated as an inclusion

Common Information Repository Concept

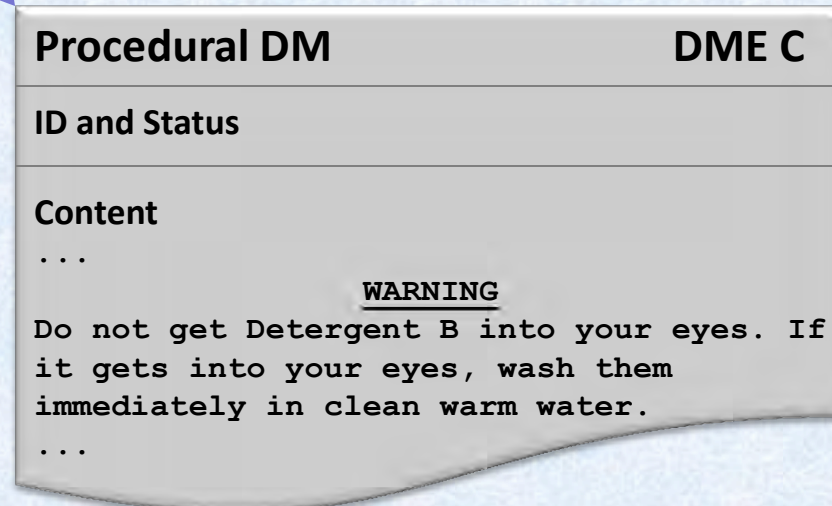
CIR-dependant data module (master)



CIR data module



Self-contained data module





Common Information Repository CIR-dependant data modules



- Inclusion can be performed in 2 places:
 - An IETP can perform this at display time
 - A self-contained data module can be created for delivery
 - It is recommended to use the data module code extension (DME) for identification
 - A customer delivery data module (DME) is created from the “master” data module (DMC)
 - This is a program decision



Common Information Repository CIR-dependant data modules



- Up issuing of CIR dependant data modules
- Examples show generation of self-contained data modules from CIR-dependant data modules and CIRs
 - Generation of the self-contained data modules follows the S1000D concept of Customization

Common Information Repository

Change indication

CIR-dependant data module (master)

Procedural DM	Issue 001	DMC A
ID and Status		
Content		
...		
<code><warningsAndCautionRefs></code>		
<code><warningRef warningIdentNumber="warn-0525"/></code>		
...		
<code></warningsAndCautionRefs></code>		

CIR data module

Warning CIR DM	Issue 001	DMC B
ID and Status		
Content		
...		
<code>"warn-0524": ...</code>		
<code>"warn-0525": Do not get Detergent B into your eyes. If it gets into your eyes, wash them immediately in clean warm water.</code>		
<code>"warn-0526": ...</code>		
...		

Self-contained data module

Procedural DM	Issue 001	DME C
ID and Status		
Content		
...		
<u>WARNING</u>		
Do not get Detergent B into your eyes. If it gets into your eyes, wash them immediately in clean warm water.		
...		



Common Information Repository Change indication

CIR-dependant data module (master)

Procedural DM	Issue 002	DMC A
ID and Status		
Content		
...		
<code><warningsAndCautionRefs></code>		
<code><warningRef warningIdentNumber="warn-0525"/></code>		
...		
<code></warningsAndCautionRefs></code>		

CIR data module

Warning CIR DM	Issue 001	DMC B
ID and Status		
Content		
...		
<code>"warn-0524": ...</code>		
<code>"warn-0525": Do not get Detergent B into your eyes. If it gets into your eyes, wash them immediately in clean warm water.</code>		
<code>"warn-0526": ...</code>		
...		

Self-contained data module

Procedural DM	Issue 001	DME C
ID and Status		
Content		
...		
<u>WARNING</u>		
Do not get Detergent B into your eyes. If it gets into your eyes, wash them immediately in clean warm water.		
...		

Scenario:
DMC A is
up-issued

Common Information Repository Change indication

CIR-dependant data module (master)

Procedural DM	Issue 002	DMC A
ID and Status		
Content		
...		
<code><warningsAndCautionRefs></code>		
<code><warningRef warningIdentNumber="warn-0525"/></code>		
...		
<code></warningsAndCautionRefs></code>		

CIR data module

Warning CIR DM	Issue 001	DMC B
ID and Status		
Content		
...		
<code>"warn-0524": ...</code>		
<code>"warn-0525": Do not get Detergent B into your eyes. If it gets into your eyes, wash them immediately in clean warm water.</code>		
<code>"warn-0526": ...</code>		
...		

Self-contained data module

Procedural DM	Issue 002	DME C
ID and Status		
Content		
...		
<u>WARNING</u>		
Do not get Detergent B into your eyes. If it gets into your eyes, wash them immediately in clean warm water.		
...		

Scenario:
DMC A is
up-issued

Result:
DME C is up-
issued with
changes from:
DMC A

Common Information Repository

Change indication

CIR-dependant data module (master)

Procedural DM	Issue 002	DMC A
ID and Status		
Content		
...		
<code><warningsAndCautionRefs></code>		
<code><warningRef warningIdentNumber="warn-0525"/></code>		
...		
<code></warningsAndCautionRefs></code>		

CIR data module

Warning CIR DM	Issue 001	DMC B
ID and Status		
Content		
...		
<code>"warn-0524": ...</code>		
<code>"warn-0525": Do not get Detergent B into your eyes. If it gets into your eyes, wash them immediately in clean warm water.</code>		
<code>"warn-0526": ...</code>		
...		

Self-contained data module

Procedural DM	Issue 002	DME C
ID and Status		
Content		
...		
<u>WARNING</u>		
Do not get Detergent B into your eyes. If it gets into your eyes, wash them immediately in clean warm water.		
...		



Common Information Repository

Change indication

CIR-dependant data module (master)

Procedural DM	Issue 003	DMC A
ID and Status		
Content		
...		
<code><warningsAndCautionRefs></code>		
<code><warningRef warningIdentNumber="warn-0525"/></code>		
...		
<code></warningsAndCautionRefs></code>		

CIR data module

Warning CIR DM	Issue 002	DMC B
ID and Status		
Content		
...		
<code>"warn-0524": ...</code>		
<code>"warn-0525": Do not get Detergent B into your eyes. If it gets into your eyes, wash them immediately in clean warm water.</code>		
<code>"warn-0526": ...</code>		
...		

Self-contained data module

Procedural DM	Issue 002	DME C
ID and Status		
Content		
...		
<u>WARNING</u>		
Do not get Detergent B into your eyes. If it gets into your eyes, wash them immediately in clean warm water.		
...		

Scenario:
DMCs A
and B are
up-issued

Common Information Repository

Change indication

CIR-dependant data module (master)

Procedural DM	Issue 003	DMC A
ID and Status		
Content		
...		
<code><warningsAndCautionRefs></code>		
<code><warningRef warningIdentNumber="warn-0525"/></code>		
...		
<code></warningsAndCautionRefs></code>		

CIR data module

Warning CIR DM	Issue 002	DMC B
ID and Status		
Content		
...		
<code>"warn-0524": ...</code>		
<code>"warn-0525": Do not get Detergent B into your eyes. If it gets into your eyes, wash them immediately in clean warm water.</code>		
<code>"warn-0526": ...</code>		
...		

Self-contained data module

Procedural DM	Issue 003	DME C
ID and Status		
Content		
...		
<u>WARNING</u>		
Do not get Detergent B into your eyes. If it gets into your eyes, wash them immediately in clean warm water.		
...		

Scenario:
DMCs A
and B are
up-issued

Result:
DME C is up-
issued with
changes from:
DMC A
DMC B

Common Information Repository

Change indication

CIR-dependant data module (master)

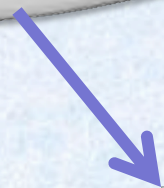
Procedural DM	Issue 003	DMC A
ID and Status		
Content		
...		
<code><warningsAndCautionRefs></code>		
<code><warningRef warningIdentNumber="warn-0525"/></code>		
...		
<code></warningsAndCautionRefs></code>		

CIR data module

Warning CIR DM	Issue 002	DMC B
ID and Status		
Content		
...		
<code>"warn-0524": ...</code>		
<code>"warn-0525": Do not get Detergent B into your eyes. If it gets into your eyes, wash them immediately in clean warm water.</code>		
<code>"warn-0526": ...</code>		
...		

Self-contained data module

Procedural DM	Issue 003	DME C
ID and Status		
Content		
...		
<u>WARNING</u>		
Do not get Detergent B into your eyes. If it gets into your eyes, wash them immediately in clean warm water.		
...		



Common Information Repository Change indication

CIR-dependant data module (master)

Procedural DM	Issue 003	DMC A
ID and Status		
Content		
...		
<code><warningsAndCautionRefs></code>		
<code><warningRef warningIdentNumber="warn-0525"/></code>		
...		
<code></warningsAndCautionRefs></code>		

CIR data module

Warning CIR DM	Issue 003	DMC B
ID and Status		
Content		
...		
<code>"warn-0524": ...</code>		
<code>"warn-0525": Do not get Detergent B into your eyes. If it gets into your eyes, wash them immediately in clean warm water.</code>		
<code>"warn-0526": ...</code>		
...		

Self-contained data module

Procedural DM	Issue 003	DME C
ID and Status		
Content		
...		
<u>WARNING</u>		
Do not get Detergent B into your eyes. If it gets into your eyes, wash them immediately in clean warm water.		
...		

Scenario:
DMC B is
up-issued

Common Information Repository Change indication

CIR-dependant data module (master)

Procedural DM	Issue 003	DMC A
ID and Status		
Content		
...		
<code><warningsAndCautionRefs></code>		
<code><warningRef warningIdentNumber="warn-0525"/></code>		
...		
<code></warningsAndCautionRefs></code>		

CIR data module

Warning CIR DM	Issue 003	DMC B
ID and Status		
Content		
...		
<code>"warn-0524": ...</code>		
<code>"warn-0525": Do not get Detergent B into your eyes. If it gets into your eyes, wash them immediately in clean warm water.</code>		
<code>"warn-0526": ...</code>		
...		

Self-contained data module

Procedural DM	Issue 004	DME C
ID and Status		
Content		
...		
<u>WARNING</u>		
Do not get Detergent B into your eyes. If it gets into your eyes, wash them immediately in clean warm water.		
...		

Scenario:
DMC B is
up-issued

Result:
DME C is up-
issued with
changes from:
DMC B



Common Information Repository

CIR-dependant data modules



- Up issuing of CIR dependant data modules:
 - The generated data module must be up issued if either:
 - The master data module is up issued
 - Any CIR reference is revised
- Issues to watch out for:
 - Determining whether a specific referenced CIR entry has been changed adds a level of complexity
 - Deleting a CIR entry must be done ONLY after all references to that object have been removed
 - Chance for invalid references
 - Each CIR entry should go through the same data consistency checks as a data module



Common Information Repository

CIR-dependant data modules



- Data change marking:
 - Change marking in the resulting DME C data module must follow all change marking rules
 - Previous issue change marks must be removed
 - Change marking must be maintained in CIR data modules
 - Change attributes and appropriate reasonForUpdate information must be copied from both the master data module and all referenced CIR data modules
 - The CIR reasonForChange that is copied should only be for those items referenced from the master data module



Common Information Repository Summary



- Advantages
 - Capability to manage small pieces of common data
 - Reduce data redundancy / increase data reuse
 - Standard method to reuse common data fragments and capability to exchange without loss of reuse
 - Promotes data consistency / enforces data consistency through reuse
 - Promotes authoring efficiency
 - Author once, reuse many
 - Update once, propagate everywhere
 - Reduce data exchange volume
 - CIR reference information can contain more detail than is available in other data modules



Common Information Repository Summary



- What should you look out for?
 - Is your organization willing to accept the level of complexity this will add
 - Requires additional data configuration management capabilities in the CSDB
 - You are now managing fragments of data modules
 - Requires process changes and strong governance over the common data
 - A seemingly simple change to common data may have vast unintended consequences
 - Make sure your software/vendor and your processes provide adequate support before going down this path
 - Make sure you and your customer are in agreement on the delivery method (dependant or stand-alone)



Common Information Repository Summary



- Why would you choose to use a CIR?
 - Factors to consider:
 - Is it contractually required?
 - How much common data does the program have?
 - What is the life expectancy of the program?
 - How often will the common data change?
 - For legacy data, what will it cost to identify and convert common data?
 - How much will it cost to update software and processes?



CIR Incremental Update



CIR Incremental Update

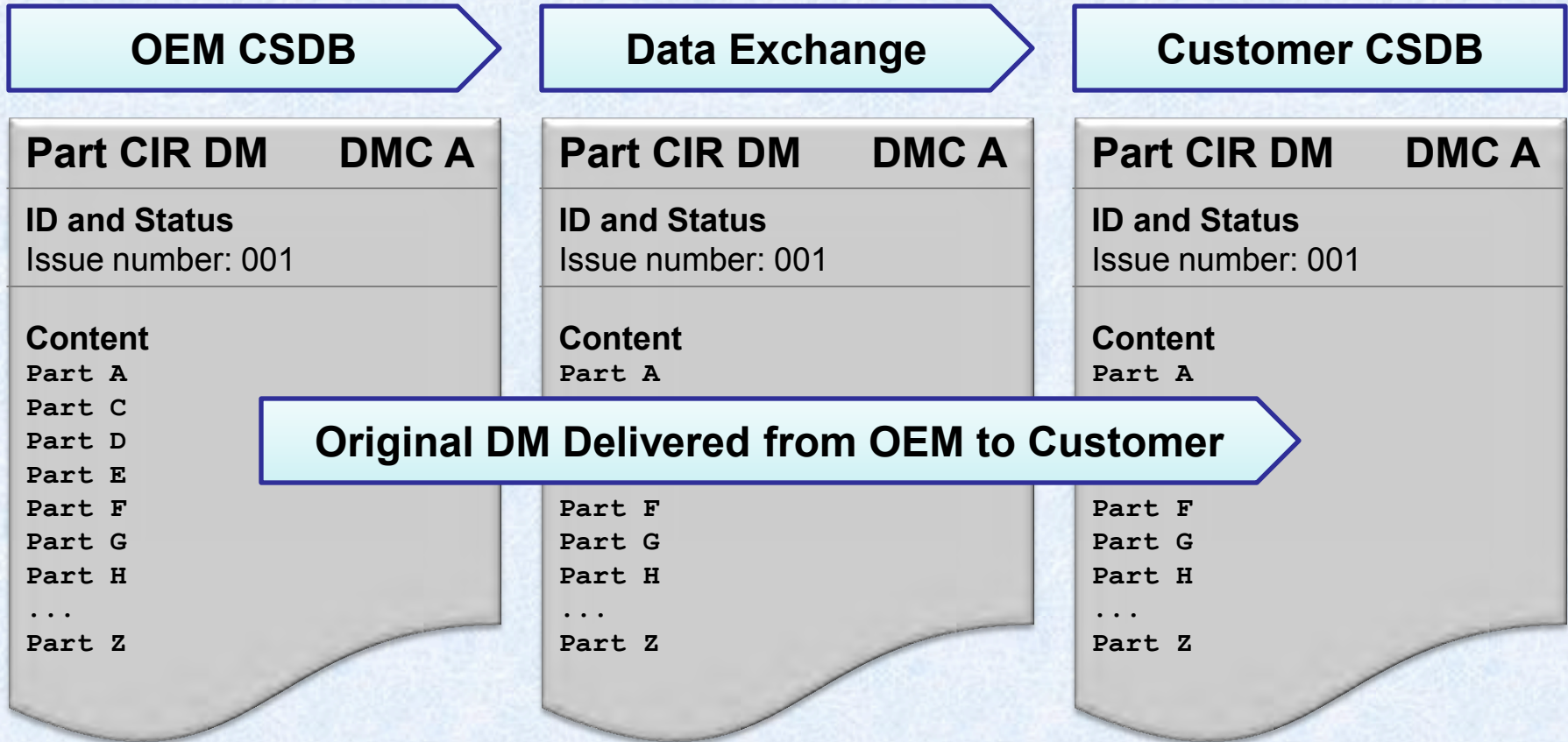


CIR Incremental Update Definition

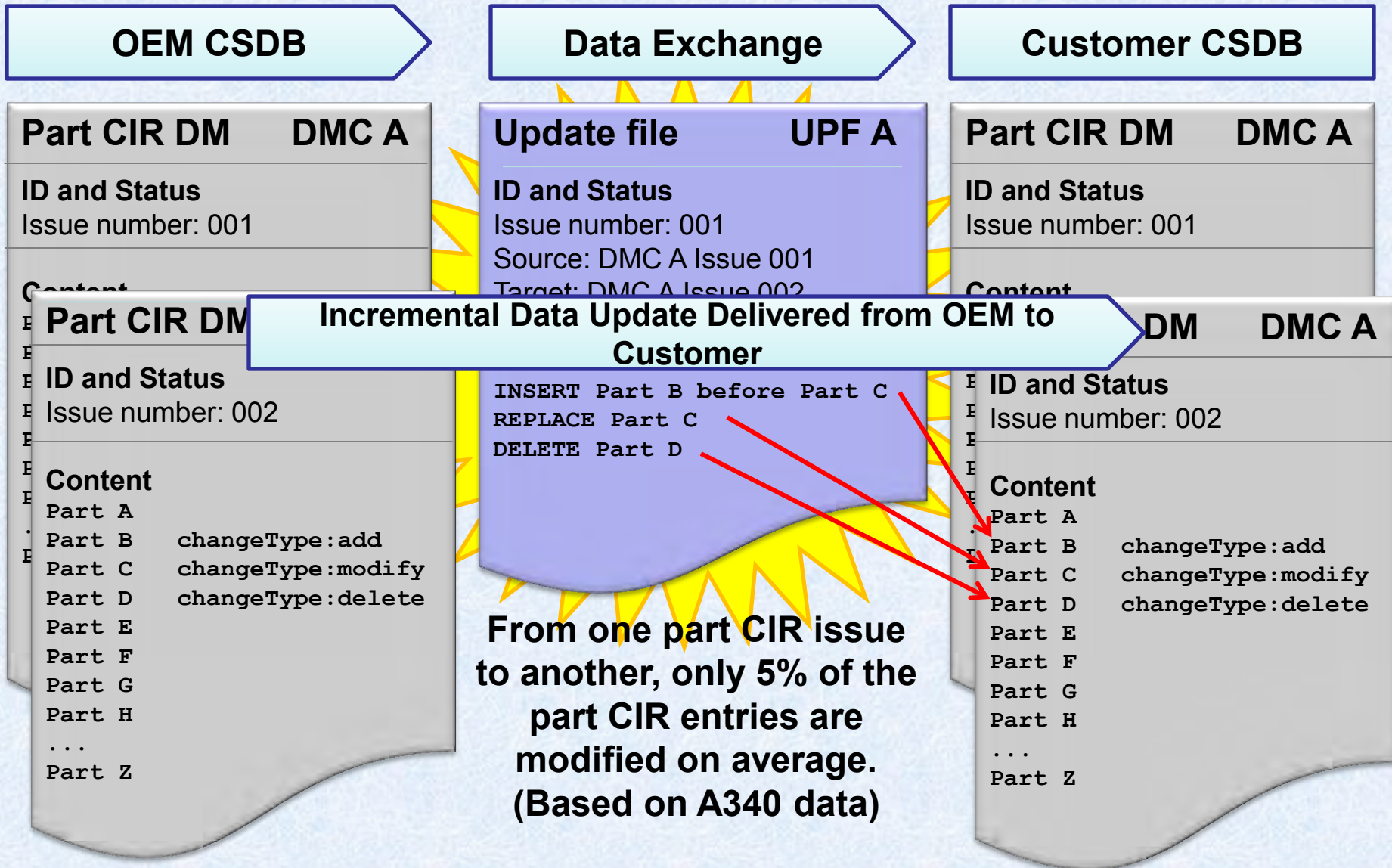


- The Data update file is used to deliver fragments from a Common Information Repository (CIR) data module
- These fragments correspond to objects that have been added, deleted, modified or reinstated since a previous issue of the CIR data module
- NOTE: The use of the Data update file is limited to the update of CIR data modules and it can be used in the context of data exchange only

CIR Incremental Update Concept



CIR Incremental Update Concept





CIR Incremental Update



- Advantages
 - Reduces volume of change data to deliver
 - Decreases download time
 - Enables more frequent updates



CIR Incremental Update



- What should I look out for?
 - Requires utilities to create and process update files
 - This is a new capability in Issue 4.1
 - Limited input outside of the submitting organization
 - Primarily due to the existence of distribution tools that already achieve this through software



CIR Incremental Update



- Why would you choose to use CIR incremental update?
 - If you have very large repository DMs with relatively few updates
 - And those updates need to be fielded quickly
 - If you have access to utilities that create and process incremental update files
 - If you do not have a distribution tool that already achieves this through software

Container Data Module



Container Data Module



Container Data Module Definition



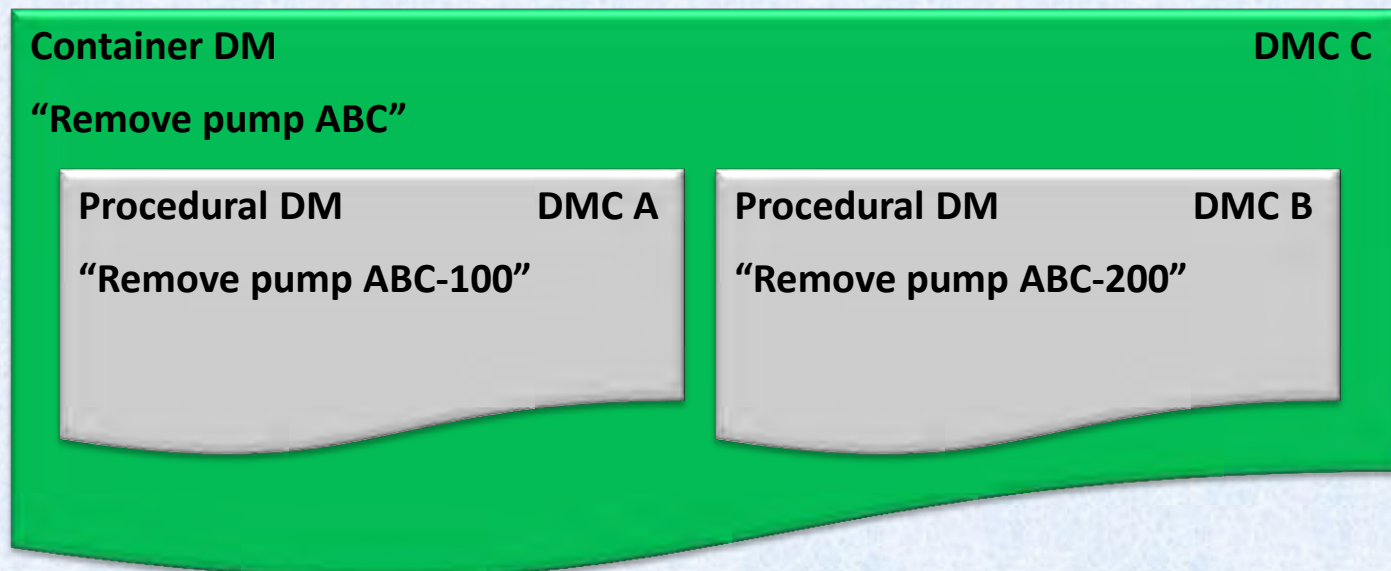
- A mechanism to group several data modules which achieve the same maintenance goal
- Detailed procedures of the associated data modules differ due to product configuration, maintenance environment, or other conditions



Container Data Module Examples



- Product configuration example
 - Maintenance action to remove a pump may be performed differently depending on the type of pump:
 - “Remove pump ABC-100”
 - “Remove pump ABC-200”





Container Data Module Examples



- Condition example
 - Applying power to an aircraft can be achieved in several ways
 - “Apply power using Auxiliary Power Unit (APU)”
 - “Apply power using a power cart”
 - “Apply power using ground power”

Container DM

DMC D

“Apply power”

Procedural DM

DMC A

“Apply power using APU”

Procedural DM

DMC B

“Apply power using power cart”

Procedural DM

DMC C

“Apply power using ground power”



Container Data Module

How it works



- How does the Container data module work?
 - The Container data module is a standard data module with the same ident and status as all data modules
 - The Container content is simply a list of references to the data modules that it “contains”
 - NOTE: The Container only references other DMs, it does not actually “contain” them as the name implies
 - The Container is a data management tool, there is no need to display it to the end user
 - The publishing system or IETP should resolve the references without involving the end user to the greatest extent possible

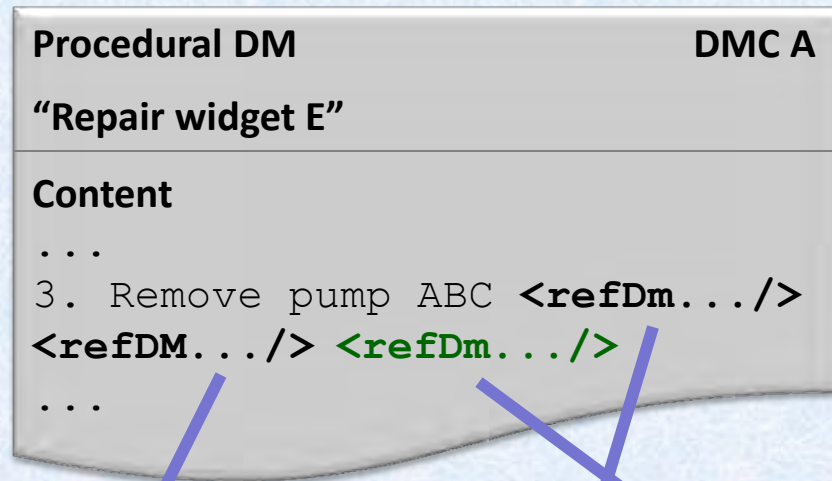


Container Data Module Referencing



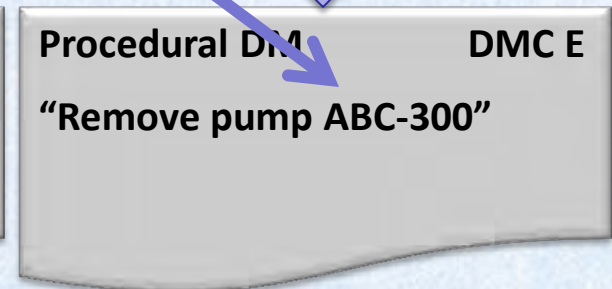
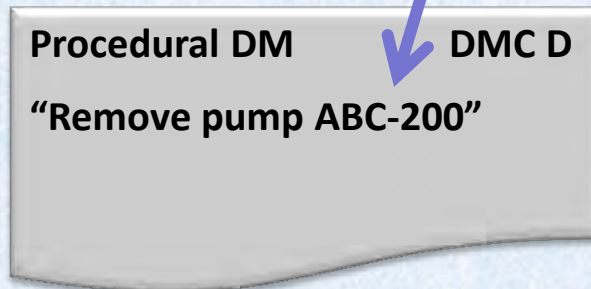
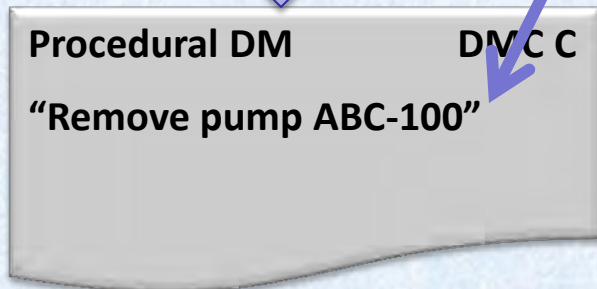
- Provides authors the simplicity to create a single reference to the generic container data module instead of references to each variation
 - Example: Reference “Remove pump ABC” instead of referencing both “Remove pump ABC-100” and “Remove pump ABC-200”
- If a new variation is added, the new variant is included in the Container data module, but all references to the Container stay the same

Example without using Container



References
are to the
individual
data modules

Adding a
variant
requires a
change to the
references



Container Data Module Example using Container

Single reference is to the container

Procedural DM DMC A

“Repair widget E”

Content

...
3. Remove pump ABC `<refDm.../>`
...

Adding a variant does not change the reference

Container DM

“Remove pump ABC”

DMC B

Procedural DM

DMC C

“Remove pump ABC-100”

Procedural DM

DMC D

“Remove pump ABC-200”

Procedural DM

DMC E

“Remove pump ABC-300”



Container Data Module Summary



- Advantages
 - Can simplify link management when there are variants to performing the same action
 - Can decrease the impact of change when variant data modules are added
 - Can provide an explicit relationship between data modules where using variant codes in the data module code only provide implicit relationships



Container Data Module Summary



- What should you look out for?
 - Need to establish a clear and consistent data module coding scheme for containers
 - S1000D provides several methods which may be used
 - No single method is prescribed
 - Need to establish clear rules for which data modules get containers
 - Adding to all data modules will double the number of data modules in your project
 - Only adding to a subset means someone needs to decide which subset gets containers
 - Ensure your CSDB and viewer can support Container data modules



Container Data Module Summary



- Why would you choose to use Containers?
 - Factors to consider:
 - Is it contractually required?
 - How many variant data modules does the program have?
 - What is the life expectancy of the program?
 - How often do you expect variant data modules to be added?
 - How will this impact your processes and author training?



Alternates



Alternates



Alternates Definition



- A mechanism used within data module content to group elements that represent alternates of the same information but for different applicability
- Same concept as the Container data module except within the content of a data module
- Issue 4.1 adds this capability
 - on 27 elements
 - in 15 data module types



Alternates Principle



- The Alternates group one to many alternates (or variants) of the same information
- Each alternate must be valid for a different applicability annotation
- For a given applicability, not more than one of the alternates is applicable

Alternates Principle - Example

5 Flush the sprockets, the derailleurs, the chain rings and the chain with water.

Note

If necessary, do the flush procedure again.

An alternates group for "Wash the Bike"

6 **Applicable to: Type Mountain Bicycle Model Mountain storm Version Mk1**

Wash the Bike

6.1 Soak the Sponge into Detergent A and water.

6.2 Clean the bicycle with a soaked sponge.

6.3 Flush the bicycle and make sure that all Detergent A is removed.

6.4 Move the bicycle up and down on its tires to remove all water.

1st alternate for cleaning the bike
Version: Mk1

6 **Applicable to: Type Mountain Bicycle Model Brook Trekker Version Mk9**

Wash the Bike

6.1 Soak the Sponge into Detergent B and water.

6.2 Clean the bicycle with a soaked sponge.

7.3 Soak the Sponge into Detergent A and water.

6.4 Fully clean the bicycle with the soaked sponge.

6.5 Flush the bicycle and make sure that all Detergents are removed.

6.6 Move the bicycle up and down on its tires to remove all water.

2nd alternate for cleaning the bike
Version: Mk9

7 **Applicable to: All**

Lubricate the bicycle (refer to S1000DBIKE-AAA-DA4-10-00-00AA-241A-A)



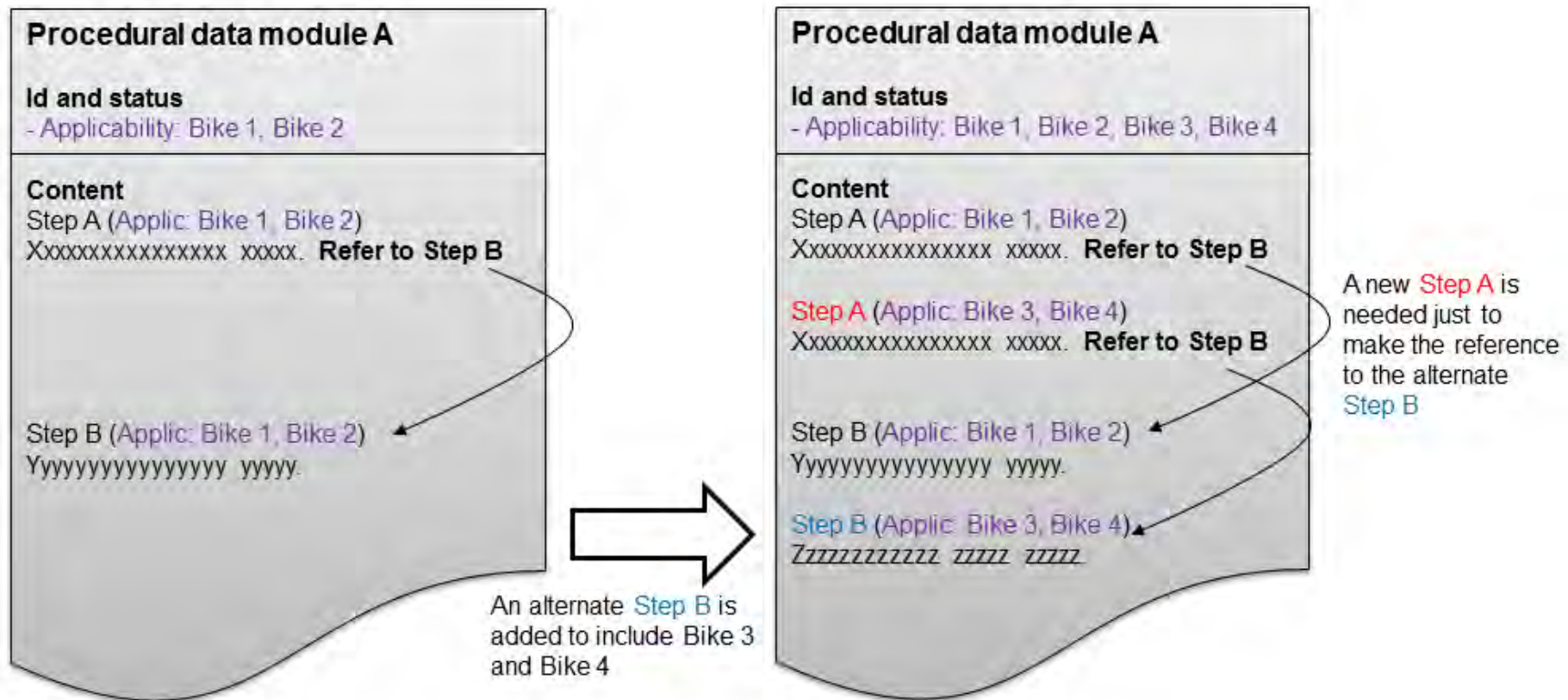
Alternates Referencing



- Similar to the Container data module concept, alternate groups can be internally referenced instead of individual element references

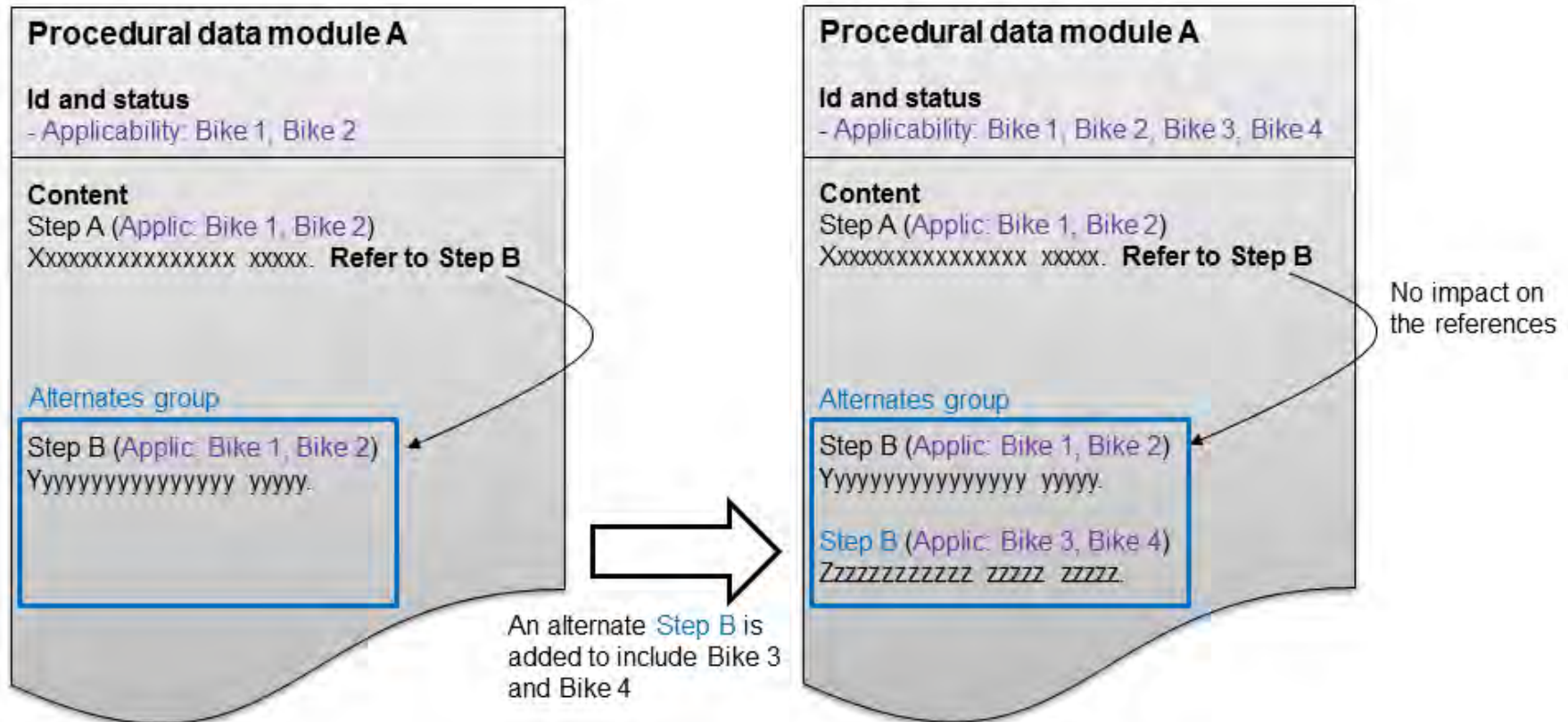
Alternates Referencing - Example

- No alternates group used



Alternates Referencing - Example

- Alternates group used





Alternates Summary



- Advantages
 - Can improve the step numbering of alternates
 - Provides an explicit relationship between alternates (or variants) of the same information
 - Reduces the dependancy of internal references on the applicability of the target when there are alternate targets



Alternates Summary



- What should you look out for?
 - Need to establish clear and consistent rules for use of alternates
 - Ensure your CSDB and viewer can support Alternates



Alternates Summary



- Why would you choose to use Alternates?
 - Factors to consider:
 - Is it contractually required?
 - Do you have a large amount of alternate information in your data depending on applicability?
 - What is the difference in display to the end user in the publishing system or viewer that you are using?

Issue 4.1 Chapter 4.13 Optimization and reuse?



QUESTIONS?