2018 Forum Tutorial
Session 1 – S1000D Overview

Sierra Fisher
Lead, Supplier Data Engrg. & Systems
The Boeing Company
E-mail: sierra.l.fisher@boeing.com

Thomas Malloy
trilogi Account Manager
BAE Systems
E-mail: thomas.malley@baesystems.com

Don Bridges
Consulting Manager
JANA, Inc.
E-mail: dbridges@janacorp.com
The Good, the Bad, and the Ugly

S1000D is an “international specification for the production of technical publications using a common source database”.

- Data re-use
- Reduces cost
- The spec is free!
  (visit http://s1000d.org/Pages/Home.aspx)

- It’s big (3,500+ pages; 49.5MB)

- It uses XML to structure the data
The European Military/Industry problem

- Distributed work share programs
  - Different companies / countries developing data for the same program
  - Disparate data must be integrated into a coherent publication

- ATA 100 was a good starting point, but it didn’t support requirements for work share

- S1000D was developed from ATA 100 to place greater emphasis on granularity and interchangeability of information
S1000D History - Why

The **US Military/Industry** problem

- Too many specifications, no consistency between or even within service branches
  - Each US service was spending a lot of tax dollars, just on technical publication specification maintenance
    - One service estimated $5M/year
  - Each specification required unique knowledge base and software solutions = COST
- S1000D provides an INTERNATIONAL solution to standardize on a common specification across the services
  - Although it started out as Air specific, S1000D now supports Land, Sea, and Air in a single specification
S1000D History - Why

The Civil Aviation Industry problem

• ATA tech pubs specifications were SGML based and publication based

• Manufacturers and Industry were looking to develop an information exchange, as opposed to a publication exchange (and wanted newer technology – XML)

• S1000D had already cracked that nut, and had the same ancestor in ATA 100
S1000D Organizational Structure

AIA  ASD  ATA

S1000D Council

CAWG

Country ‘X’

Country ‘Y’

Country ‘Z’

S1000D Steering Committee

PPWG  WSWG

EPWG  DSWG

BRWG  GMWG

DIG

Task Teams

Member
Observer
Reporting

S1000D User Forum 2018
S1000D – So what is it REALLY?

• Specification that defines how to produce technical information for use in the support of operations, maintenance and training for a Product.

• Breaks traditional documents down into “data modules” – the smallest self contained informational unit with a technical publication

• Data modules are collected to build up to a “publication module”

• All of this is done using XML
Life Cycle Support of Information

• S1000D addresses the life cycle of information management, not just the exchange.

S1000D User Forum 2018
S1000D Enables Two Methodologies

CSDB (Eg subcontractor) → CSDB interchange package → CSDB (Eg Contractor) → Data receiver CSDB (Eg airline) → Data (data delivery)

Self-contained DM in XML
Links resolved
Ready to use

Repository-dependent DM in XML
(Need accompanying CIR)
For further work up

DM in neutral repository format
DM in XML with XLinks resolved
For further work up

CIR DM can be delivered as a supplement
CIR DM are included

IEETP-X
IEETP
Pubs (to end-user)
PDF
Vision

To be the globally adopted specification for efficient interoperable technical information for operations, maintenance and training that support the life cycle of the product.
Mission/Goals

The specification must:
• be agile
• be efficient
• be interoperable
• be data module-centric
• be platform neutral
• have consistent data structures
• leverage other standards
• meet applicable regulatory requirements
• enable optimum reuse
• be based on a modular approach (future!)
Life Cycle Support of Information

• S1000D addresses the life cycle of information management, not just the exchange.
Business Rules - Concept

• Attempt by S1000D practitioners to put guidance into the specification on what information is required when “doing” an S1000D program

• Everybody using the spec needs to understand these as they are probably fundamental to a good implementation
  - Most projects use them already in some capacity

• Projects can falter/fail if all aspects are not understood
What is a Business Rule?

Rule:

“A rule is a principle or condition that customarily governs behaviour”

Business Rule:

“Business rules represent policies, procedures and constraints regarding how an enterprise conducts its business”

• In the past, business rules in S1000D programs only applied to the author/creator of the information.

• As knowledge grew within programs, it was identified that there were multiple aspects that affected Business.
  – Contractual
  – Organisational
  – Geographical
  – Etc.
Business Rule Categories

BR Category I: General

BR Category II: Product Definition

BR Category III: Maintenance Philosophy and Concepts of Operation

BR Category IV: Security

BR Category V: Business Process

BR Category VI: Data Creation

BR Category VII: Data Exchange

BR Category VIII: Data Integrity and Management

BR Category IX: Legacy Data ...

BR Category X: Data Output

Organization / Project Business Rules
6.2 Permissible characters in codes and numbers
Throughout the S1000D the following definitions on permissible characters (alphas and numbers) when used in codes (e.g., data module codes, publication module codes, learn codes, learn event codes, data management lists) and numbers (e.g., issue numbers) are given below.

...  

6.2.5 Use of the alpha characters "I" and "O"

*Business rule decision point BRDP-S1-00001 - Use of "I" and "O":*

- Decide whether and when to use the alpha characters "I" and "O".

...

*Business rule decision point BRDP-S1-00151 - Use of the attribute materialUsage in the element <supportEquipDescr>, the element <supplyDescr> and the element <spareDescr> context:*

- Decide whether to use the attribute materialUsage in the elements <supportEquipDescr>, <supplyDescr> and <spareDescr> context and what values to be used.
Layering examples

6-layered Defense Business Rules Model

- Layer 1 – S1000D BRs
- Layer 2 – National defense BRs
- Layer 3 – Organization BRs
- Layer 4 – Project BRs
- Layer 5 – Subproject BRs
- Layer 6 – Sub-subproject BRs

3-layered Civil Business Rules Model

- Layer 1 – S1000D BRs
- Layer 2 – Civil Aviation BRs
- Layer 3 – Project BRs
Business Rules are Enforced by BREXes

• **Business Rules Exchange (BREX)**

• The BREX provides a mechanism to “exchange” business rules

  ```xml
  <brexDmRef id="SOR-4">
    <!-- <brDecisionRef brDecisionIdentNumber="BREX-TDWG-00034"/> -->
    <objectPath allowedObjectFlag="0" /> //caution[@cautionType] </objectPath>
  <objectUse>BREX-TDWG-00034: The attribute "cautionType" must not be used in cautions.</objectUse>
  </brexDmRef>
  ```

• Since BREXes contain business rules, they follow the same layered approach and refer to each other using the `<brexDmRef>` element.

  ```xml
  <brexDmRef>
    <dmRef>
      <dmRefIdent>
        <dmCode itemLocationCode="D" infoCodeVariant="A" infoCode="022" disassyCodeVariant="A" disassyCode="00" assyCode="00000" subSubSystemCode="0" subSystemCode="0" systemCode="00" systemDiffCode="E" modelIdentCode="ATABREX"/>
      </dmRefIdent>
    </dmRef>
  </brexDmRef>
  ```
In issue 4.2, the concept of a business rules document was added to provide:

- A place to record decisions
- A means of exchanging business rules between concerned parties while rules are being developed
- Provide a reference to business rules in various documents
- Reduced risk of any misinterpretations and misunderstandings through formal descriptions of the business rules
- Governance and capturing of business rule decisions including explanations and guidance through the life of the project and/or organization
- A means to record the priority and severity information for each business rule decision.
- A means of identifying the business rules decisions to capture in a BREX data module.
- A means of indicating relationships between various BRDP and various constructs defined by S1000D
- A method of tracking the required dates for business rules development and recording the progress of business rules development
• The business rules document has its own schema (brDoc)
brDoc
Life Cycle Support of Information

• S1000D addresses the life cycle of information management, not just the exchange.
Information Set/Publication - Definitions

• An **information set** is the required information in a defined scope and depth (author view) in the form of data modules. A project data module requirement list (DMRL) lists all required data modules for that project.

• A **publication** is the compilation and publishing of information for a customer.
  • This can be an IETP, a paper publication all compiled from data modules

• A publication can be a subset of, or equal to, an information set, but it can also be a superset of several information sets or parts of them.

• The information sets define coding guidance!!
Information Set - Example

Purpose
This chapter contains the rules for the preparation and coding of data modules for the Product maintenance procedures.

Scope
It covers the requirements for the preparation of information which will enable skilled maintenance personnel to carry out maintenance tasks on the Product and its installed components.

The information must be given to enable personnel to:
- connect and disconnect test equipment and power supplies
- use any required special tool and support equipment
- maintain and service the Product and its systems/components
- perform tests which will show whether systems and components meet their minimum acceptable performance standards
- rectify failures
- remove and install all systems/components in a minimum amount of time
Life Cycle Support of Information

• S1000D addresses the life cycle of information management, not just the exchange.
The DMRL is generally generated from two primary sources:

• For information requirements derived from a Logistic Support Analysis (LSA), the data module coding reflects the:
  - Product Breakdown structure
  - Logistic Control Number (LCN)
  - And the associated activities

• A review of the information sets is conducted to capture information requirements
  - This gives data module coding based on scope and depth identified.
Data Module Requirement List (DMRL)

As this is an iterative process initially you will tend to only identify DMC at a high level aligned with the product, but covering all the essential information, such as:

- Descriptive
- Procedural
- Spares (eg, IPD)
- Operator
- Etc.
## Data Module Requirement List (DMRL)

### Annex A - Outline DMRL

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# Data Module Requirement List (DMRL)

## Annex C - Final DMRL

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Life Cycle Support of Information

• S1000D addresses the life cycle of information management, not just the exchange.
Data Modules
Data Modules:

- Are unique ‘packages’ of information
- Are associated with a particular element/item of equipment
- Contain textual information, and may reference non-textual information
- Are split into two parts:
  - An **identification and status** section
  - A **content** section

Each data module is assigned a unique **Data Module Code (DMC)**.
The Identification and Status section

Contains **identification** data
- Data module code
- Title
- Issue number
- Issue date
- Language
- Etc.

Contains **status** data
- Security classification
- Responsible partner company
- Originator
- Applicability
- Technical standard
- QA
- Skill
- Etc.
The Identification and Status section

The identification and status section provides data that can be used for:

• management of the data module within the CSDB
• management of the use of applicability
• management of the quality control process
• management and control of retrieval functions
• automatic compilation of sets or subsets of information
• general information for users accessing the CSDB
Data Module Code (DMC)

The DMC defines the data module in terms of:

• **Assembly/sub-assembly/item information**, providing information about the equipment being documented.
  - Equipment
  - Hierarchical position
  - Disassembly sequence

• **Module usage information**, providing information about the Data Module.
  - Information Contents
  - Location
DMC Structure - Generic

Hardware/System identification

- KLASSEK130AAAA
- AAAB
- HM3-30-0103
- 01ABC
- 253B
- D
- T25CD

Information type

- 2 to 14 MI
- 1 to 4 SDC
- 1 (opt.) + 6 or 8 SNS
- 2+1 to 3 DC/DCV
- 3 + 1 IC/ICV
- 1 ILC
- 3 + 1 LC/LEC
= 17 to 41 DMC

Learn type

- 3 + 1 DMC
Model Identification - MI

• Project register with NSPA to avoid duplication.
• Example: **BATTLETANK1234**

**Rules for MOI/MI codes**

• MI codes can be from 2 alphanumeric characters thru 14 alphanumeric characters.
• It is recommended not to pad the MI code with arbitrary characters just to receive a 14-character code.
• Only discrete MI codes can be registered (ranges are not allowed).
• The permissible characters are:
  - Numeric: "0"..."9"
  - Alpha: "A"..."Z" in uppercase (It is recommended to avoid the use of letters "I" and "O")
DMC Structure - Generic

Hardware/System identification

- KLASSEK130AAAA
- AAAB
- HM3-30-0103
- 01ABC
- 253B
- D
- T25CD

Information type

- 2 to 14 MI
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- 1 ILC
- 3 + 1 LC/LEC
- = 17 to 41 DMC

Learn type
Standard Numbering System (SNS)

- Identifies the physical location within the Material or Equipment
- SNS breakdown is similar to ATA and to Mil-Spec-1808 for air vehicles

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<tr>
<th>System</th>
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<th>Title</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>05</td>
<td>-00</td>
<td>Scheduled/unscheduled maintenance</td>
<td>Manufacturers’ recommendation for time limits inspection (both scheduled and unscheduled).</td>
</tr>
<tr>
<td></td>
<td>-10</td>
<td>Time limits</td>
<td>Those manufacturer recommended time limits for maintenance and overhaul of the Product, its systems and subassemblies, and life of its parts.</td>
</tr>
<tr>
<td></td>
<td>-20</td>
<td>Scheduled maintenance checks lists</td>
<td>A list of the manufacturer recommended scheduled and unscheduled maintenance checks and inspections, including operating tests applicable to the Product, its systems and subassemblies. The checks listed at -40, -50 and -60 must be included.</td>
</tr>
</tbody>
</table>
SNS Generic breakdown rules

System
Sub System
Sub, sub system
Unit or assembly

F4-10-00  F4-20-00  etc
F4-11-00  F4-12-00
F4-11-10
F4-11-20
Disassembly Code and Variant

Disassembly Code

• The disassembly code identifies the breakdown condition of an assembly to which maintenance information applies.

• The characters are typically numeric. They can be extended when more than 99 identifiers are needed. The extension must commence "A1" to "ZZ".

• The disassembly code is also used for sequential numbering of data modules when more than one data module is used for the same SNS (Chap 5)
Disassembly principles

Basic principle

• The disassembling principle is based on the consecutive numbering of assemblies obtained during equipment disassembly and subsequent maintenance activities. The assemblies numbered are subsequently allocated their own set of data modules. The allocation of "00" is reserved for the complete equipment followed by sequential numbering in accordance with this chapter.

• **Note:** The numbering sequence is not necessarily inline with any step by step maintenance task.
Disassembly principles
Disassembly principles

Rules for numbering assemblies

• Assemblies need to be numbered, using the disassembly code, only if one or more of the following three conditions apply:

Rule No. 1

• The first condition for numbering an assembly, using the disassembly code, is the performance of further maintenance actions on that assembly. If there are no maintenance actions performed on an assembly, that assembly will not be allocated a number or a set of data modules.

Rule No. 2

• The second condition for the allocation of a number, using the disassembly code, is the complexity of an assembly. Simple assemblies may not need data modules. This is to prevent unnecessary breakdown of maintenance information.

Rule No. 3

• In addition and to prevent unnecessary breakdown, a number is allocated, using the disassembly code, only in such cases where the volume of maintenance information relating to maintenance actions to be taken is sufficient to warrant an individual data module to be prepared.

All obvious if no requirement for technical data no requirement exist to breakdown the assembly.
Disassembly Code and Variant

• The disassembly code variant designates alternative items of equipment or components differing slightly in design, but not enough to warrant a change of the system difference code. The characters are typically alpha characters.

• The variable length of the disassembly code variant allows the use of the "Alternate Logistic Control number (ALC)" or the "Alternate Indentured Product Code (AIPC)" from LSA records.

• The decision on how to use the disassembly code variant in this way is a project or organization decision and has to be documented in the project or organization business rules.

• The disassembly code variant is also used for figure number variants when IPD data modules are generated from an S2000M provisioning database.
DMC Structure - Generic

- Hardware/System identification:
  - KLASSEK130AAAA
  - AAAB
  - HM3-30-0103
  - 01ABC

- Information type:
  - 253B
  - D

- Learn type:
  - T25CD

- MI:
  - 2 to 14

- SDC:
  - 1 to 4

- SNS:
  - 1 (opt.) + 6 or 8

- DC/DCV:
  - 2+1 to 3

- IC/ICV:
  - 3 + 1

- ILC:
  - 1

- LC/LEC:
  - 3 + 1

- DMC:
  - = 17 to 41
Information Codes

• The information codes identify the type of information contained within a data module there is a grouping structure.

• The primary codes are defined as:
  - 000 Function, data for plans and description
  - 100 Operation
  - 200 Servicing
  - 300 Examinations, tests and checks
  - 400 Fault report and isolation procedures
  - 500 Disconnect, remove and disassemble procedures
  - 600 Repairs and locally make procedures and data
  - 700 Assemble, install and connect procedures
  - 800 Storage procedures and data
  - 900 Miscellaneous
Information Codes

• Each of these have secondary codes

• Examples:
  - 210 Fill
  - 211 Refuel
  - 212 Fill with oil
  - 213 Fill with oxygen
  - 214 Fill with nitrogen
  - 215 Fill with air
Learn Codes

**Human Performance Technology ("H")** learn codes have been added to provide an organization with a means to define and capture requirements of an S1000D project to plan and evaluate technical and training data modules.

Sample “H” Learn Codes:

- 18 = Work Environment Information from Environmental Analysis
- 31 = Performance Support Requirements
- 53 = Summative Analysis Data on Job Transfer (Level 3)
Learn Codes

**Training** ("T") learn codes have been added to the DMC to provide a more robust and instructionally coherent means of creating and identifying training data modules.

Sample “T” Learn Codes:

- **2D** = Enabling Objective for Intellectual Skill of the Procedure Type
- **43** = Static Content for Concept Learning
- **57** = Learning Guidance provided as a Demonstration
Learn Codes

Learn schema has been added to capture “H” and “T” learning content.

Contains five optional branches that accommodate common structures for learning content.

Learn Event Code was added to signify in the DMC which branch of Learn schema is used for the content.

Uses the “Content Branch” of the Learn Schema.
# DMC Structure - Generic

<table>
<thead>
<tr>
<th>Information type</th>
<th>Learn type</th>
<th>Hardware/System identification</th>
<th>DME</th>
</tr>
</thead>
<tbody>
<tr>
<td>2+1 to 3 DC/DCV</td>
<td>T25CD</td>
<td>AAAB</td>
<td>12345A KLASSEK130AAA A</td>
</tr>
<tr>
<td>3 + 1 IC/ICV</td>
<td></td>
<td>HM3-30-0103</td>
<td></td>
</tr>
<tr>
<td>1 ILC</td>
<td></td>
<td>01ABC</td>
<td></td>
</tr>
<tr>
<td>3 + 1 LC/LEC</td>
<td></td>
<td>253B</td>
<td></td>
</tr>
<tr>
<td>17 to 41 DMC</td>
<td></td>
<td>D</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DME PLU</th>
<th>MI</th>
<th>SDC</th>
<th>SNS</th>
<th>DC/DCV</th>
<th>IC/ICV</th>
<th>ILC</th>
<th>LC/LEC</th>
<th>DMC</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 to 14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 to 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (opt.) + 6 or 8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2+1 to 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 + 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>= 17 to 41</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Data module code extension (DME)

Description:

• The element `<identExtension>` establishes a producer unique subdomain for instance identification. The data module identification extension gives the additional parameters needed to establish a unique identification of a data module in those cases when data module code, issue and in-work numbers together with the language and country are insufficient to form a universally unique identity.

**Markup element:** `<identExtension>` (O)

**Attributes:**

• `extensionProducer` (M), the data module producer the value of which forms part of the universally unique identifier of a data module instance and contains the CAGE code of the producer of the data module instance.

• `extensionCode` (M), the data module extended code the value of which is decided by the data module producer. Typically, but not necessarily, it will contain a customer related content, eg customer CAGE amended with a sequence number. If it is used, it must contain uppercase alphabetic (A-Z) and numeric (0-9) characters.
Illustrations and Multimedia
Illustrations

Why have them?

- To clarify text
- To avoid lengthy explanations
- When information cannot be conveyed through text
- Ease in multi lingual situations
  - Para beber
  - Dos
Illustrations

Illustration Rules

• S1000D describes in detail how illustrations should be prepared and controlled. It covers:
  - Presentation techniques
  - Symbols
  - Types of Illustrations
  - Illustration sizes, formats, line weights, typefaces, etc.
  - Layout – including reference locations, call-outs, etc.
  - Information Control Number (ICN)
Illustrations

Hot spotting. This allows linking:

• From data module to location(s) within a graphic.
• From data module to location(s) within several graphics.
• From within graphic to within data modules.
• From graphic to graphic.

Screen tips.

• There is meant to be an example here!
Multimedia

• The implementation of multimedia elements in a project requires testing in the role in which it will be used and support environment in which it will operate.

• Consideration must be given to display backgrounds, colours and presentation methods used.

• Working conditions such as lighting, weather and noise levels can have a major impact on the ability to use or understand the presentation.

• Once all these factors have been considered and defined in the project requirements plan, agreement can then be reached on the user interface and delivery methods to be deployed.
Multimedia

• The most common form of multimedia used in S1000D programs currently is e-learning.

• Interestingly in S1000D this chapter is to be populated, most current implementations are SCORM based or proprietary.
ICN-BATTLE TANK1234


Prefix  MI  SDC  SNS  RPC code  Originator code  Sequential number  Variant code  Security class.

Issue no.
ICN – Metadata file

• In order to allow proper management of illustrations and multimedia objects in the CSDB, it is possible to store and exchange metadata information about an ICN object (i.e., an illustration or a multimedia object) in an ICN metadata file.

• The ICN metadata file is connected to its corresponding ICN object by the identity, which is derived from the ICN concerned.
ICN – Metadata file

The ICN metadata file is **NOT** a data module. It is split into two parts, like a data module:

• An identification and status section
• A content section
ICN – Metadata file

The identification and status section is synergistic with a data modules id and status.

The content section contains the metadata related to the ICN object to enable it to be invoked and presented in a specific context:

• Size, location, length
• Output (format, output media)
Data Module Content, Constructs and Information types
S1000D Content

Wiring Data
  Wiring Data Description
  Applicability Cross Reference
  Conditions Cross Reference
  Products Cross Reference
    Process
    Container
  Service Bulletins
  Shareable Content Objects
  Front Matter

S1000D Content

  Descriptive
  Procedural
  Crew/Operator
  BDAR
  Maintenance Checklists
  Business Rules
  Parts
  Maintenance Planning
  Learning
  Fault Isolation
  Common Information Repository
S1000D Content

- Wiring Data
  - Wiring Data Description
  - Applicability Cross Reference
  - Conditions Cross Reference
  - Products Cross Reference
    - Process
    - Container
    - Service Bulletins
    - Shareable Content Objects

- Title Page
- Table of Contents
- Front Matter
- Highlights and FM lists
The **Front matter** Schema can be used to minimize manual authoring and in most cases support auto-generation of Front matter.

- The following Front Matter information can be captured and represented:
  - Title page - TITLE
  - Table of contents - TOC
  - List of effective pages - LOEP
  - List of effective data modules - LOEDM
  - Highlights - HIGH
So what is a CIR?

Is it…

A Database?
A Data Module?
A list of spares?

• In reality it can be all of the above! But in S1000D terms it is a **data module**.

• CIRs can be implemented using two methods:
  - Internal to an organization
  - External as part of the deliverable
CIR - Principle

• Some information is used in many places in many data modules.
• In addition, properties associated to such information types (like description and zone) are duplicated in various data modules. The duplication of information can lead to data inconsistency and adds complexity to content management of the technical information.
• The grouping of all the properties related to technical information in the same place, called a common information repository, ensures data consistency and simplifies the management of technical information.
• This minimization can be done in two ways:
  - Internally in the production environment by using "libraries" for repeated information. This is commonly used for tools or consumables, among others.
  - By the use of common information repository data modules. These data modules can be used within the production environment only or be delivered to the customer as part of the publications or publication package.
• Using the previous example it is possible to minimize data redundancy and simplify data management by using a common information repository.
CIR - Principle

DM xxx
~~~~~~~~~~~~~~
<functionalItemRef
  functionalItemNumber="101HG1"
  manufacturerCodeValue="FAPE3">
  <name>CTL MODULE-VENT FWD</name>
  <zoneRef
    zoneNumber="132"></zoneRef>
</functionalItemRef>
~~~~~~~~~~~~~~

DM yyy
~~~~~~~~~~~~~~
<functionalItemRef
  functionalItemNumber="101HG1"
  manufacturerCodeValue="FAPE3">
  <name>CTL MODULE-VENT FWD</name>
  <zoneRef
    zoneNumber="132"></zoneRef>
</functionalItemRef>
~~~~~~~~~~~~~~
CIR - Principle

Data Modules

DM xxx

<functionalItemRef
   functionalItemNumber="101HG1"
   manufacturerCodeValue="FAPE3">
</functionalItemRef>

DM yyy

<functionalItemRef
   functionalItemNumber="101HG1"
   manufacturerCodeValue="FAPE3">
</functionalItemRef>

Common repository data module

<techRepository>
   <functionalItemRepository>
      <functionalItemSpec id="101HG1-FAPE3">
         <functionalItemIdent
            functionalItemNumber="101HG" manufacturerCodeValue="FAPE3"/>
         <name>CTL MODULE-VENT FWD</name>
         ...
      </functionalItemSpec>

      <functionalItemSpec id="101HG1-FAPE3">
         <functionalItemIdent
            functionalItemNumber="101HG" manufacturerCodeValue="FAPE3"/>
         <name>CTL MODULE-VENT FWD</name>
         ...
      </functionalItemSpec>
   </functionalItemRepository>
</techRepository>
Applicability... and filtering
Applicability - Definition

• Applicability provides the mechanism to identify the context for which a data module or parts of a data module is valid.

• This context is usually associated with the physical configuration of the Product but can include other aspects such as tool availability and environmental conditions.
Applicability is S1000D

Applicability appears in S1000D in several guises

• Within a procedural data module for example you can have Applicability at the data module level

• This allows you to filter the data in the viewer or CSDB at that level. For example:
  - Single seat
  - Twin seat

• In the case above you could have a paragraph for each applicability each being displayed dependent on filter

• The applicability is always “rolled up” to the ID and status area
Applicability is S1000D

Applicability is stored in the element `<applic>` and has the same construct whether applied to the whole data module or a part of the content and whether externalized or not.

• The element `<applic>` has two logical branches which are used for separate purposes:

  • A **human readable applicability annotation** – consists of the element `<displayText>` which provides human readable applicability information. This branch can be used in conjunction with either of the other two branches as required.
  
  • A **computable applicability annotation** – consists of the element `<assert>` and element `<evaluate>` which provide applicability information in a computable format which can be used to support dynamic display of the annotated content.
The applicability model can support schemes from the very simple to the complex, supporting the full range from page-oriented to automated filtering in a viewer.

• If only static applicability is required and computation of applicability is not needed, then only a part of the applicability annotation is used within data modules. **The ACT, CCT and PCT data modules are not needed.**

• If applicability filtering is required, then the full applicability annotation, including the **ACT, CCT and PCT data modules are required.**
Applicability – Common Understanding

Scenario

• The OEM develops a cell phone that can take 3 batteries:
  - Alkaline
  - Ni-MH
  - Lithium Ion

• The OEM sells the phone to Customer A who only offers Alkaline and Ni-MH

• The OEM also sells the phone to Customer B who only offers Alkaline and Lithium Ion

• IETP is capable of displaying a “filtered” view for a specific product / cell phone
Applicability – Common Understanding

Conventions

• Applicability is in GREEN
• Filtering criteria is in BLUE
• Applicability statements are generalized, for example:
  <aplic>
    <!--Alkaline battery installed-->
  </aplic>
Data Module applicability (publishing process only)

Delivery A: 00001
------------------
Batteries:
Alkaline
Ni-MH

Delivery B: 00002
------------------
Batteries:
Alkaline
Lithium Ion

Applicability
Filtering criteria
Data Module applicability (publishing process and IETP)

Filtering criteria

Applicability

Delivery A: 00001
----------------------
Batteries:
Alkaline
Ni-MH

Publication / Delivery

IETP (filtering)

Phone S/N: XYZ-123
Batteries: Ni-MH

DM
DMC-MP-01-01-01-...-700A...
--------------------------------------------------------
{idstatus}...
<applic>
<!---Alkaline battery installed-->
</applic>...
</idstatus>
<content>...

DM
DMC-MP-01-01-01-...-700B...
--------------------------------------------------------
{idstatus}...
<applic>
<!---Ni-MH battery installed-->
</applic>...
</idstatus>
<content>...

DM
DMC-MP-01-01-01-...-700C...
--------------------------------------------------------
{idstatus}...
<applic>
<!---Lithium Ion battery installed-->
</applic>...
</idstatus>
<content>...

Publishing process (filtering)
In-line applicability (customization/publishing process only)

Delivery Rqmt A: 00001
Batteries:
- Alkaline
- Ni-MH

Customization Of DM / Publishing proc (filtering)

Customized DM
DME-OEM1-00001-MP-01-01-01...

...<step1>...</step1>
<step1>
<applic><!--Alkaline battery installed--></applic>
Alkaline battery cannot be charged...</step1>
<step1>
<applic><!--Ni-MH battery installed--></applic>
Recharge Ni-MH battery by...</step1>
<step1>
<applic><!--Lithium Ion battery installed--></applic>
Recharge Lithium Ion battery by...</step1>
...<step1>...</step1>

Delivery Rqmt B: 00002
Batteries:
- Alkaline
- Lithium Ion

Customization Of DM / Publishing proc (filtering)

Customized DM
DME-OEM1-00002-MP-01-01-01...

...<step1>...</step1>
<step1>
<applic><!--Alkaline battery installed--></applic>
Alkaline battery cannot be charged...</step1>
<step1>
<applic><!--Ni-MH battery installed--></applic>
Recharge Ni-MH battery by...</step1>
<step1>
<applic><!--Lithium Ion battery installed--></applic>
Recharge Lithium Ion battery by...</step1>
...<step1>...</step1>
In-line applicability (customization/publishing process and IETP)

Master DM
DMC-MP-01-01-01-...
------------------------------------------...
(step1).../(step1)
(step1)
<applic><!--Alkaline battery installed--></applic>
Alkaline battery cannot be charged...(step1)
(step1)
<applic><!--Ni-MH battery installed--></applic>
Recharge Ni-MH battery by...(step1)
(step1)
<applic><!--Lithium Ion battery installed--></applic>
Recharge Lithium Ion battery by...(step1)
(step1).../(step1)

Delivery Rqmt B : 00002
--------------------
Batteries:
Alkaline
Lithium Ion

Applicability
Filtering criteria

Customized DM
DME-OEM1-00002-MP-01-01-01-...
------------------------------------------...
...(step1).../(step1)
(step1)
<applic><!--Alkaline battery installed--></applic>
Alkaline battery cannot be charged...(step1)
(step1)
<applic><!--Ni-MH battery installed--></applic>
Recharge Ni-MH battery by...(step1)
(step1)
<applic><!--Lithium Ion battery installed--></applic>
Recharge Lithium Ion battery by...(step1)
...(step1).../(step1)

Customized / Filtered DM
DME-OEM1-00002-MP-01-01-01-...
------------------------------------------...
...(step1).../(step1)
(step1)
<applic><!--Alkaline battery installed--></applic>
Alkaline battery cannot be charged...(step1)
...(step1).../(step1)
<applic><!--Lithium Ion battery installed--></applic>
Recharge Lithium Ion battery by...(step1)
...(step1).../(step1)

Phone S/N: XYZ-456
Batteries: Lithium Ion

IETP
(filtering)

Customization
Of DM /
Publishing proc.
(filtering)
In-line applicability (using `<inlineapplics>`)
Life Cycle Support of Information

- S1000D addresses the life cycle of information management, not just the exchange.

- Customize S1000D to meet customer requirements (produce business rules)
- Agree information sets to determine scope and depth
- Generate DMRL
- Generate data modules and related information
- Agree publication and deliverable media
- Agree front matter
- Generate publications including front matter
- Produce media and publish

Maintain CSDB
Info Set/Publication/Deliverable

Final Deliverable

One or More Publications

Elements of one or more Info Sets

One or more dm and support data
S1000D – Publication Module (PM)

The PM defines the content and the structure of a publication. It is to contain one or more references to:

- data modules (including front matter data modules and access illustration data modules)
- publication modules
- legacy technical publications
Thank you
for your attention!

Questions?