

S1000D Users Forum 2010

“Application of S1000D within a state-of-the-art Integrated Logistic Support environment”

**September 27 - September 30, 2010
Aerostar Hotel, Moscow, Russia**

S1000D Tutorials
Svante Ericsson – Nicolas Dupuy
Corena PTC





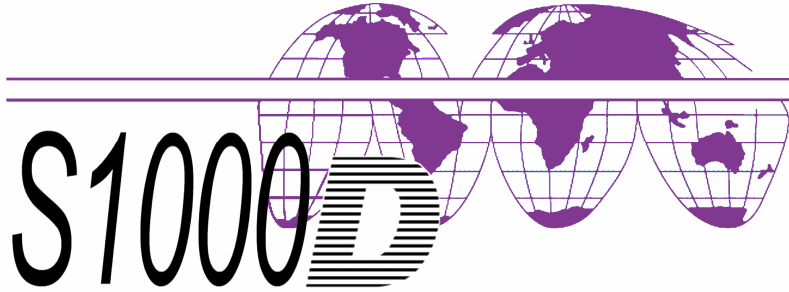
Svante Ericsson

- Consultant in Corena since 2009
- Located in Stockholm
- Academic background in mathematics & computer science
- Has worked for the Swedish defense and defense industries since 1991
- Has worked with standardisation around technical publications for 20 years (CALS, SGML, etc)
- Has been closely involved in S1000D for 10 years
- Was chair/co-chair of S1000D EPWG for some 6 years
- Active member of several S1000D bodies, eg SC
- Represent the Swedish defense (DMA) in those bodies



Nicolas Dupuy

- Senior Business Consultant in PTC Arbortext for A&D Business Unit, since 2009
- Located in Paris FRANCE
- Ingenior in computer science
(*Xml is my native language*)
- Involved in the technical documentation since 2002
- Co chairman of the S1000D EPWG, since 2006
- Active member of several S1000D Task Team
- XML Schema "owner"
- GIFAS French Industries representative



S1000D Users Forum 2010

“Application of S1000D within a state-of-the-art Integrated Logistic Support environment”

**S1000D Tutorials
Basic introduction to S1000D**





Topics – Agenda

S1000D – Basic introduction

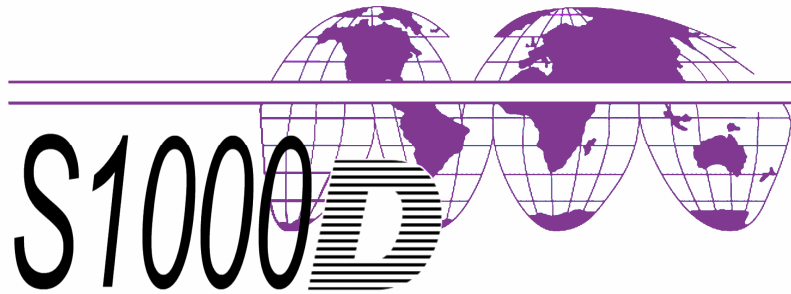
13:15-15:00

- *Background*
- *Where is it applied?*
- *Basic concepts and properties*
- *How is it managed and by whom?*

S1000D – Advanced

15:30-17:00

- *The S1000D publication process*
- *Implementing S1000D*
- *The CSDB and its objects*
- *The XML schema platform*



S1000D Background



International specification for technical publications

utilizing
a common source database





What is the S1000D?

- S1000D is a technical data and publication specification for standardized documentation of any civil, military vehicle or equipment (air/land/sea)
- S1000D provides:
 - **Process** for production, maintenance and presentation of **technical publications**
 - Principle concept for **structuring** the complex **information**
 - **Generic** concept for **quality assurance** of technical publications
 - Definition of a standardized **transfer format** for interchange of information between any parties
 - Standardized **layout for page** oriented technical publications
 - Set the basic **principles** for standardized presentation of **IETP**



S1000D History – Why?

1984

- With a number of emerging collaborative project ...
seven ASD countries and MoD customers realized ...





S1000D History – Why?

- 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
 - End customers with different languages, viewers, business rules, etc...
 - ATA Spec 100 was a good starting point, but didn't support requirements for workshare
 - S1000D needed to place greater emphasis on **granularity** and **interchangeability** of information than Spec 100



S1000D History – Why?

June 1989

- First release signed



AECMA

The European Association of Aerospace Industries



S1000D History – Why?

- AECMA has now become ASD
- ASD is a European organization
 - The **AeroSpace and Defence Industries Association of Europe**, ASD, represents the European industries in common issues, with the goal of increasing the competitiveness in the sector
- Most EU (European Union) countries are represented
 - Belgium, Denmark, UK, Finland, France, The Netherlands, Ireland, Italy, Portugal, Spain, Sweden, Germany, Austria, Czech Republic, ...
- Produces standards and specifications (among other things), eg
 - ASD STE - Simplified Technical English. Dictionaries and writing rules.
 - ASD S2000M for materiel administration
 - S1000D for Technical Publications



S1000D History – Why?

- The US Military/Industry problem
 - Too many specifications, no consistency between or even within service branches
 - The services were spending an estimated \$5M/year just on technical publication specification maintenance
 - Each specification requires unique knowledge base and software solutions = COST
 - S1000D provides an INTERNATIONAL solution to standardize on a common spec across the services
 - Although it started out as Air specific, S1000D now supports Land, Sea, and Air in a single specification
- 2001: American Industry Association joined





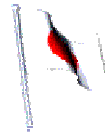
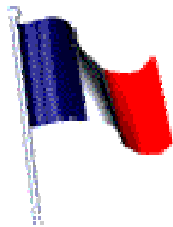
S1000D History – Why?

- The Commercial Airline 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 Spec 100
- 2005: Civil aviation joined



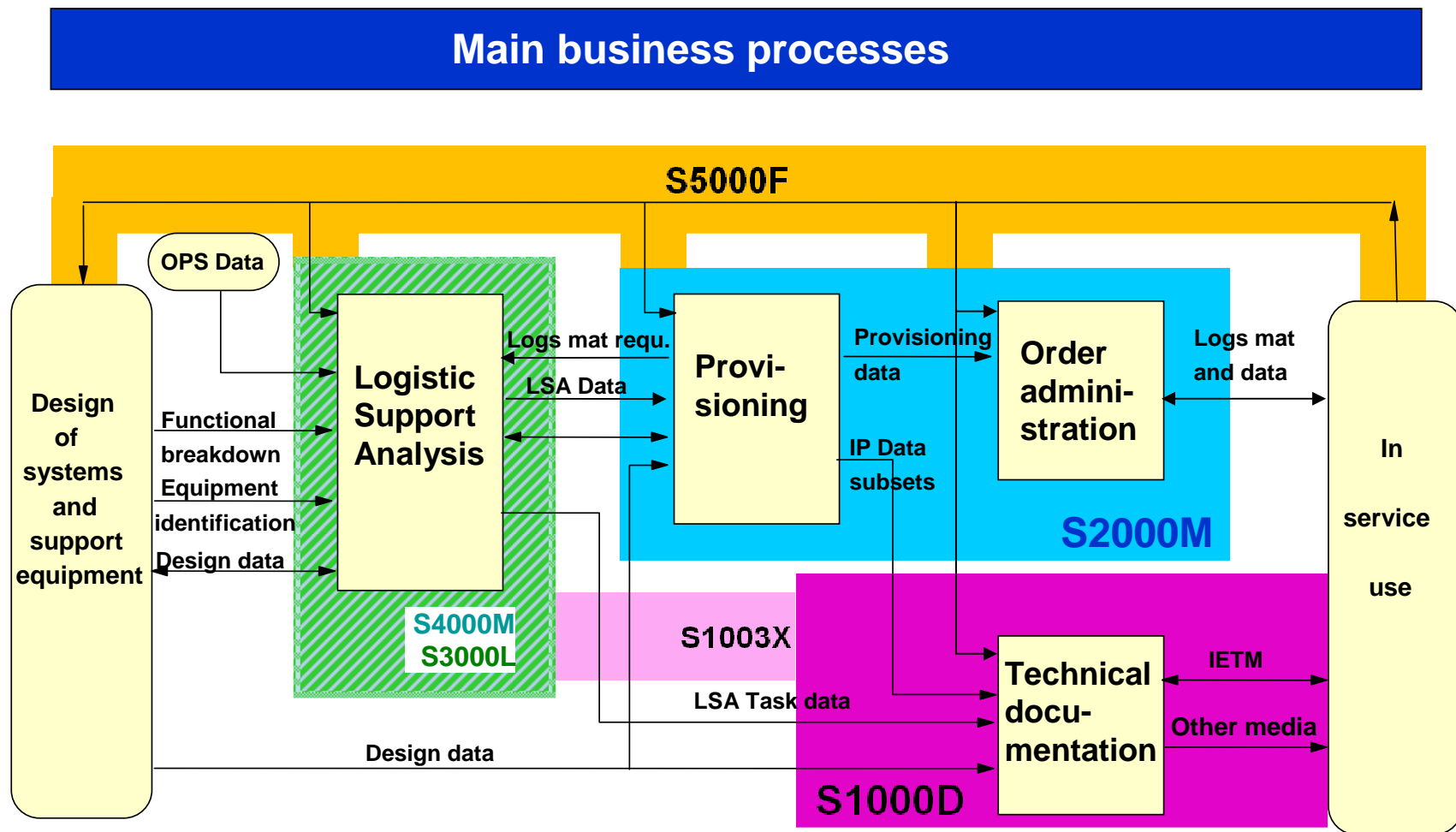


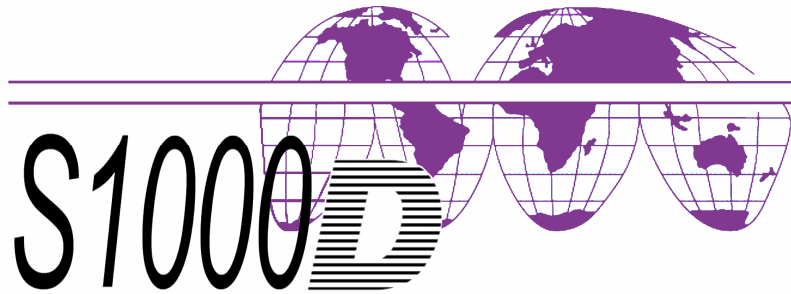
Industry & Governments





Where does S1000D fit in?





Why use S1000D?





Why should you use it?

- To establish a standard that is used internationally by a wide variety of organizations
- To reduce the need for individual development of such standards by the various organizations and countries
- To enhance interoperability of tech data – thus reducing duplication
- To support collaborative production and use of information



Why should you use it?

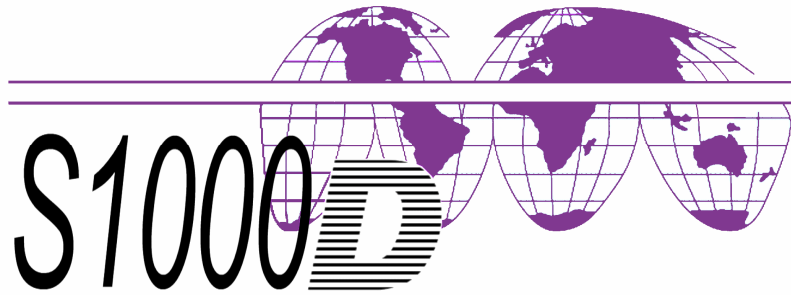
- S1000D is internationally accepted concept
 - if you are using S1000D there's always someone to ask
- It has been developed by the industry side and the customer/user side, in close cooperation, to serve both in the best possible way
 - it is most likely that your needs are covered
- It is a proven concept for producing, managing and delivering you technical publications
 - the risk for nasty surprises is very, very limited



Why should you use it?

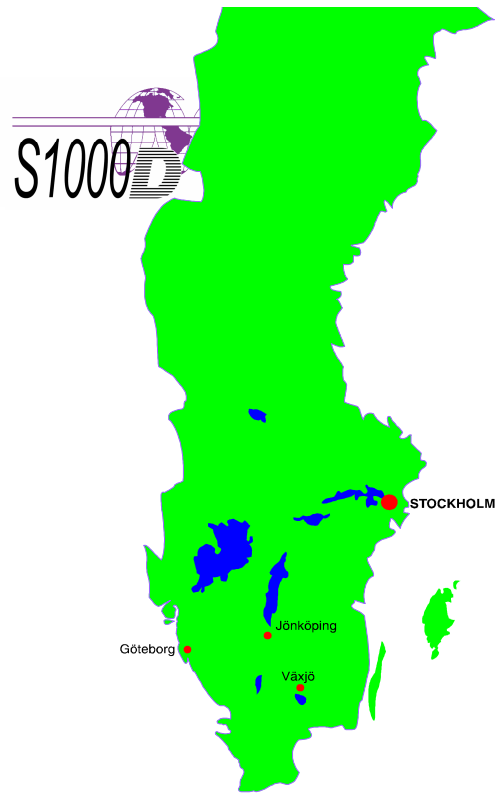
In other words, S1000D is ...

- Saving costs
- Supporting interoperability
- Supporting enhanced information quality
- Offering flexibility
- Offering independance
-



Where is S1000D used?





Sweden



Key requirements for tech data

- No written statement from FMV to use S1000D
- **All** new projects are using S1000D (since a number of years)
- Key requirements are:
 - PLCS (ISO 10303 / AP239)
 - SCORM



Swedish Forces

- Combat vehicle 90 Change 8
 - Swedish Defence
 - Finnish Defence
 - Swiss Army
 - The Netherlands Army



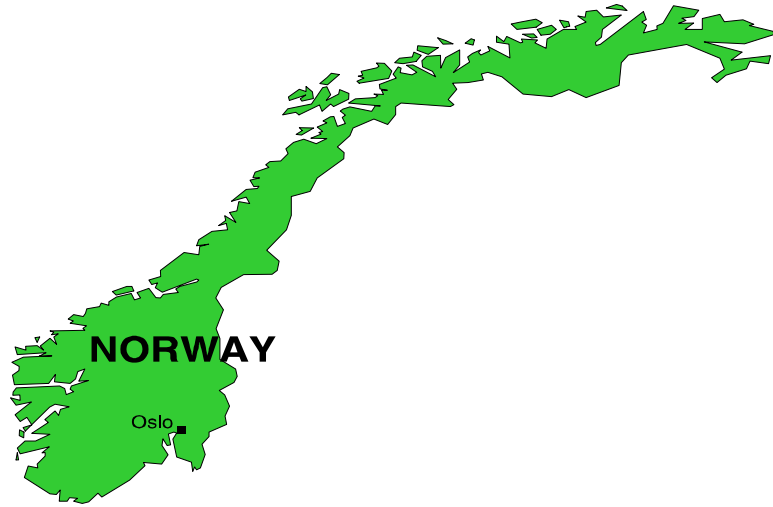
- JAS39 Gripen Issue 2.0



Swedish Forces

- RBS 15 Mk3/K130
Missile Fire Control System
Change 9
- HKP 14
“Nordic” helicopter
NH 90







New MoD infrastructure

- The Norwegian Defence Logistic Organization (NDLO) have requirements for a new common infrastructure for ILS related information and processes
- The solution is being implemented through the GOLF program
- Key requirements:
 - PLCS (ISO 10303 / AP239)
 - S1000D
 - SCORM (being evaluated)
- Future acquisition programs will require information deliveries in accordance with these standards
- Norwegian MoD has also forwarded this requirement to JSF





Norwegian Forces

- Coastguard – SVALBARD Class
- Documentation being converted to S1000D Issue 2.1





Norwegian Forces

- M113 – Midlife upgrade
- All documentation planned to be authored in S1000D Issue 2.1





German Air Force

- Eurofighter/Typhoon Change 8



- NH 90 Helicopter Change 8



German Navy/Army

- Submarine 212 A

Issue 2.2



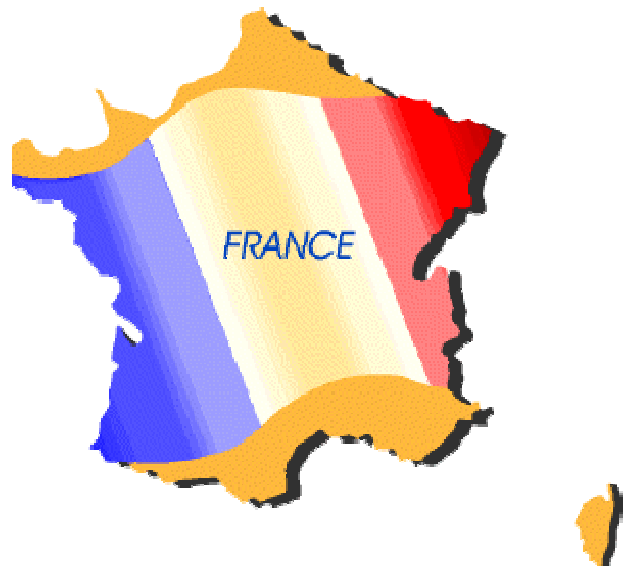
- Tank Leopard 2

Change 9





... and another 100+ !!!!



- RAFALE fighter - Dassault-Aviation



- TIGER helicopter - Eurocopter

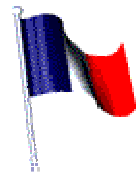


- Missile projects, such as
 - AA APACHE
 - AB MICA
 - EG SCALP
 - PA ASMPA
 - 70 STORMA SHADOW
 - 77 ASRAAM
 - ME METEOR
 - LM Missile ramp 2066 for Mirage 2000
 - BV BREVEL weapon system (UCAV on land vehicle)
 - many, many more



Land programs

- EFA Assault **Bridge** Equipment – CEF 7.000 Dms
- SPRAT System for fast deployment of military bridges - CNIM
- MIDS-Terre Network MIDS land vehicles and terminals
- MARTA Battle field area tactical management **vehicles**
- CAESAR Automatic **test bench** - Giat
- SM **Meteo station** - Thales



Emerging programs

- A400M Transport aircraft
 - France
 - Germany
 - Spain
 - Belgium
 - UK
 - Turkey



Will be based on Issue 4 (?)

Will be based on CAWG business rules







- Eurofighter/Typhoon
- NH90 Helicopter





Active participation in SC since 2004

Czech Republic



- Gripen Fighter
- Sojka III UAV

Issue 2.0

Issue 2.2.1



- Helicopter programs
- L159A/B Light combat A/C
- Armoured vehicle

Planned to go S1000D

Tender for S1000D





South Africa - Defence



- Various major defence systems converted to S1000D
 - Oryx – Medium transport helicopter ATA to S1000D
 - Rooivalk - Combat support helicopter S1000D Ch 1.7
 - Agusta 109E S1000D
 - Hawk S1000D
 - Gripen S1000D

Issue 2.0



South Africa - Commercial environment



- First major non-defence S1000D implementation for local South African Rail operator **locomotive** upgrade project.
 - S1000D Data module concept implemented for content reusability / maintainability.
 - DMRL/DML compilation and DM Code allocation required major effort.
 - Most equipment could be fitted into S1000D SNS categories.





United Kingdom Armed Forces



- | | |
|------------------------------|------------|
| • Eurofighter/Typhoon | Change 8 |
| • Nimrod MRA4 | Change 8 |
| • RTM322 – Engine | Change 6/8 |
| • Apache | Change 6 |
| • NH90 | Change 8 |
| • EH101 | Change 6 |
| • Chinook | Change 6 |
| • Gnome - Engine | Change 8 |
| • BR710 – Engine Nimrod | Change 8 |
| • EJ200 – Engine Eurofighter | Change 8 |
| • Merlin – Helicopter | Change 6 |



United Kingdom Armed Forces



- Bowman radio system Change 8
- CASSOM – Missile system Change 7
- Type 45 Frigate Change 9
- Astute – Submarine Change 8
- All Terrain Vehicle Change 8
- Boxer (UK produced) Change 9
 - The Netherlands
 - Germany



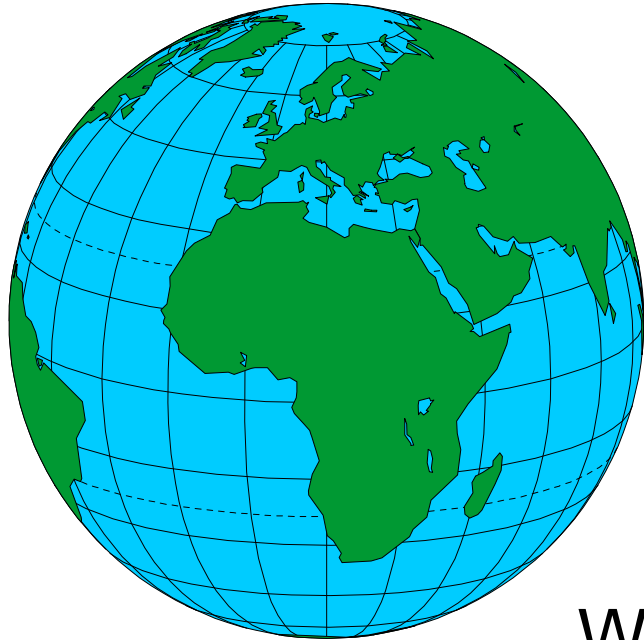
- Tupolev TU-204/214



- Mil/Civil helicopter MI-17V5



... and many others!



Worldwide ...



Shipping industry

- Shipdex foundation
 - 7 companies
- 2007 decision to develop a common standard
 - Problems with varying format/quality of contractor/subcontractor data
- Driven by SpecTec Group (IT)
- 2009 the Shipdex specification –
the shipping industry business rules for applying S1000D
in their business area



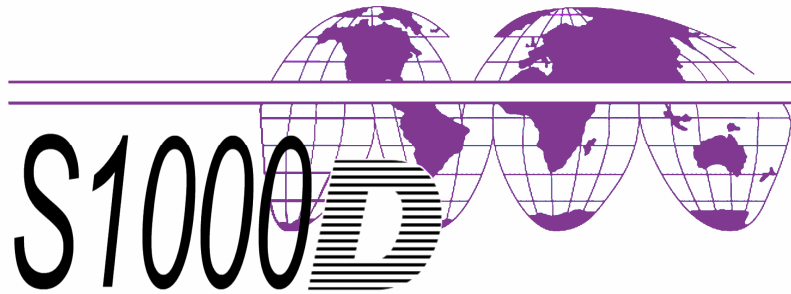
Other industry sectors to come ...?

- Rail transport sector?
- Energy industry?
- Process industry in general ...?



... and why not ...?





S1000D Basic Concepts & Properties



AeroSpace and Defence
Industries Association of Europe



Air Transport Association



UNITED
AIRCRAFT
CORPORATION



R&D CALS CENTER
APPLIED LOGISTICS



Specification TOC

The specification contains 9 chapters and many subchaps

- Chap 1 Introduction to the specification
- Chap 2 Documentation process
- Chap 3 Information generation
- Chap 4 Information management
- Chap 5 Information sets and publications
- Chap 6 Information presentation/use
- Chap 7 Information processing
- Chap 8 Standard numbering systems,
information codes and learn codes
- Chap 9 Terms and data dictionary

The chapters ...

Chapters have similar structures

- General
 - scope and limitations
- Chapter matter
 - describes the matter the chapter concerns
- Business rules decisions
 - summarizes the decisions required
- Markup examples
 - provides examples of markup in connection to the chapter matter



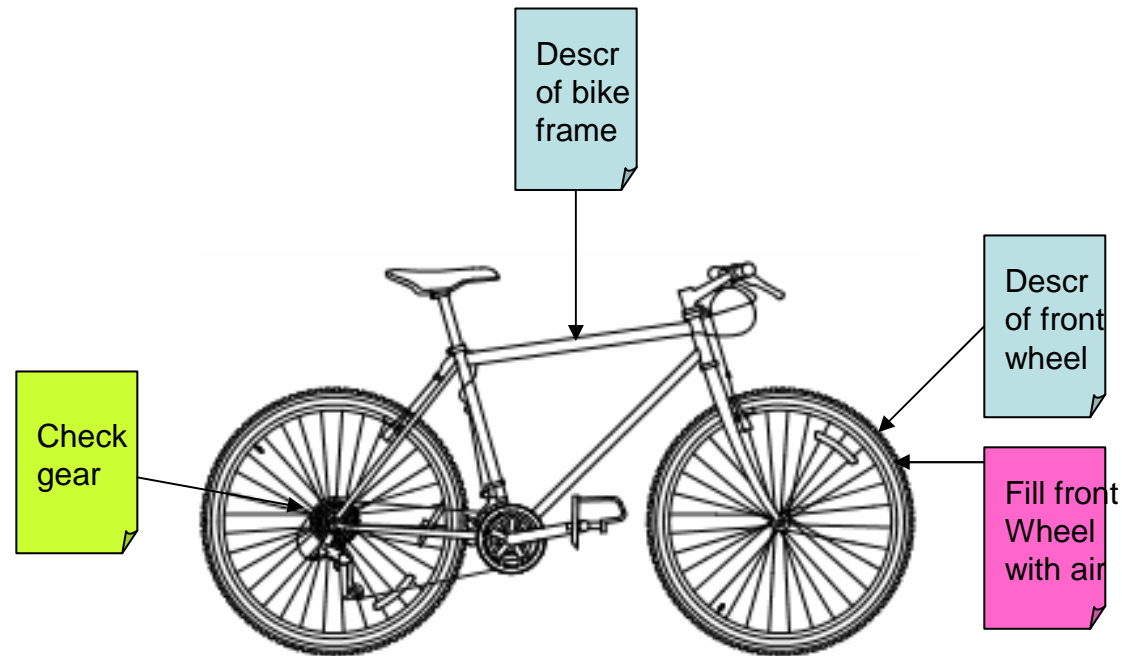
Standards based

S1000D is based on international standards

- ISO – codes, info formats, etc
- W3C – web related standards (xml, xsl, ...)
- ATA – graphics

Basic definitions

- Data module - DM
 - A stand alone information unit conveying a particular type of information about some specific part of Product



Basic definitions

- Data module - DM

- Identification based on the **Data Module Code - DMC**

- A code to identify data modules and to facilitate storing and retrieving them from a CSDB

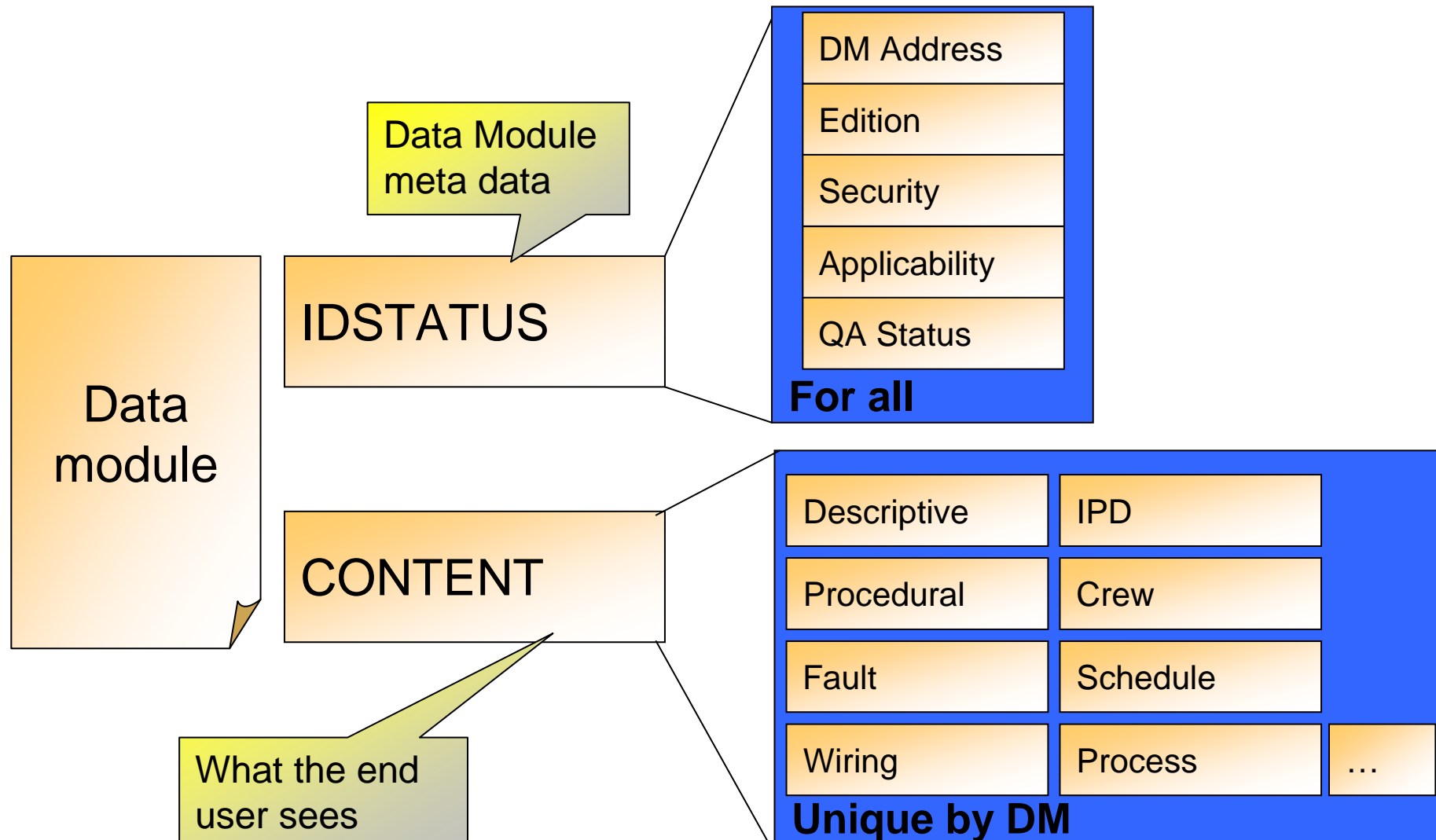
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Front wheel

Description

- Produced in XML according to specific Schemas, and in such a form that it could be stored in and retrieved from a Common Source DataBase by the data module code as the identifier

Basic definitions

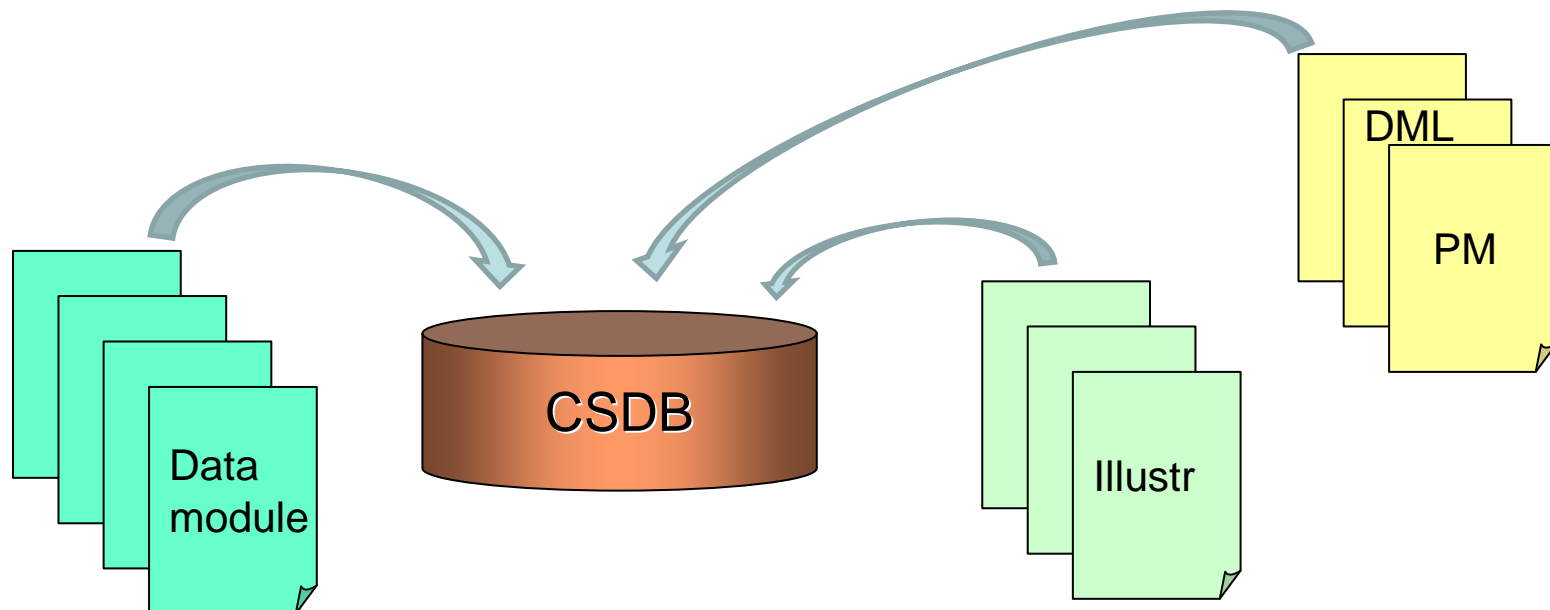


Basic definitions

- Illustrations and multimedia objects
 - Data modules can include illustrations in CGM, TIFF, PDF, etc
(aligned with ATA GREXCHANGE)
 - Multimedia objects in numerous formats
 - Identified by an Information Control Number - ICN
 - A code to identify a graphic or multimedia object and to facilitate storing and retrieving them from a CSDB
 - Two different formats

Basic definitions

- Common Source DataBase - CSDB
 - A virtual store for the objects produced by a project
 - data modules, graphics and multimedia objects
 - publication modules
 - administrative objects, eg Data Module Lists - DML



Basic definitions

- Data Module Requirement List - DMRL
 - Defines the scope of data modules to be created
 - Consitutes the "intended content" of the CSDB
 - Usually a contractual document
- CSDB Status List - CSL
 - A snapshot of the CSDB status – What's there?
 - Exchanged between producer and customer
 - Communicated as necessary

Basic definitions

- Publication module - PM
 - Defines the content and structure of a publication by referencing
 - Data modules
(incl front matter and access illustrations data modules)
 - Publication modules
 - Legacy technical publications
 - Produced in XML according to the PM DTD/Schema
 - Identification based on *Publication Module Code* - PMC
 - A 14- thru 26-character code to identify a publication module and to facilitate storing and retrieving them from a CSDB

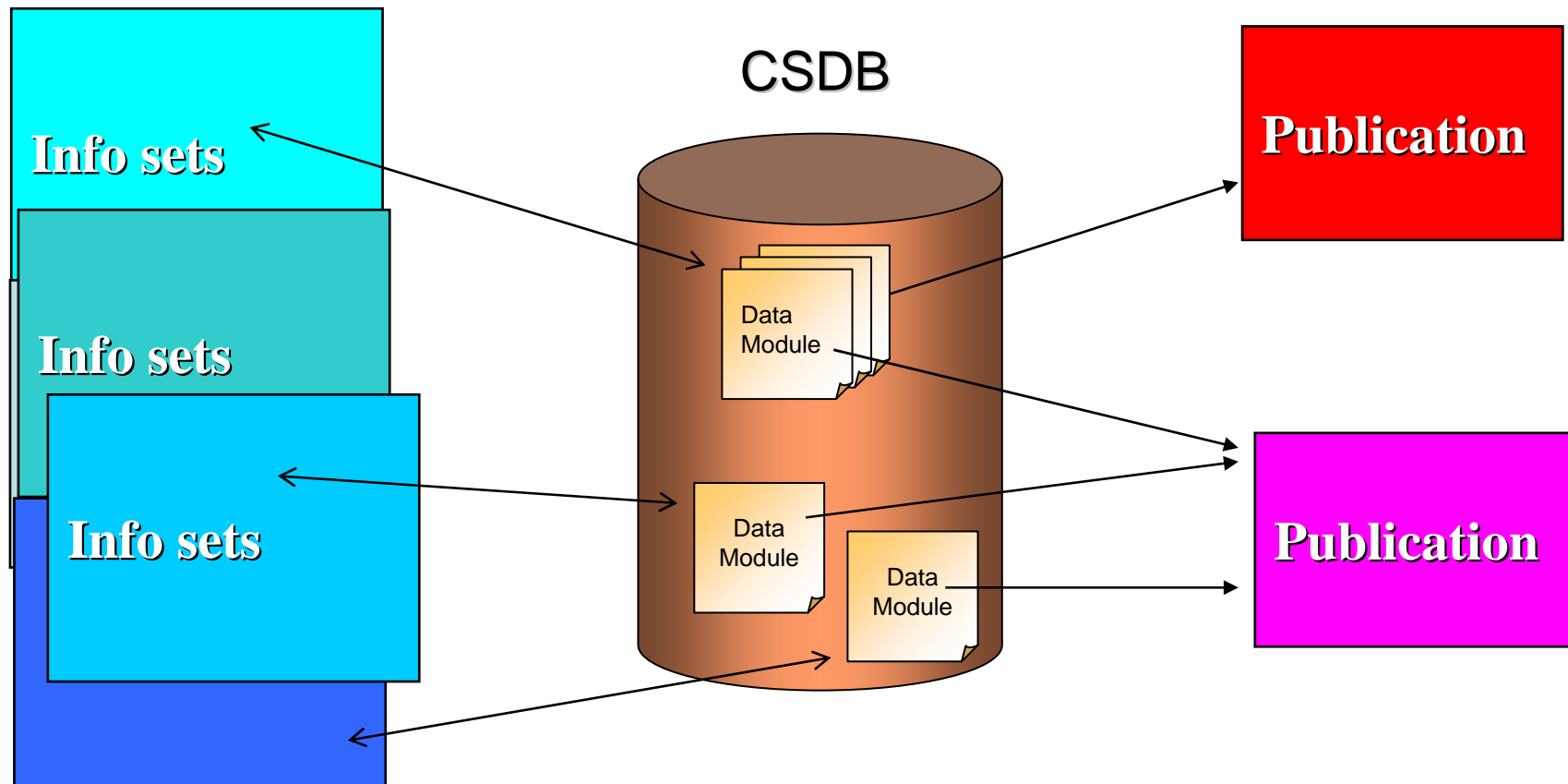
Basic definitions

Information set

- The required information in a *defined scope and depth* [...] in form of data modules managed in the CSDB.
(A project data module requirements list lists all required data modules for that project)
- 20+ different info sets described in Chapter 5 (Iss 4.0.1)
- Examples
 - Crew/Operator information
 - Description and operation
 - Maintenance information
 - IPD
 - Service bulletins

Basic definitions

Information set vs Publication



Basic definitions

- SCORM content package module
 - Organizing information in a CSDB developed and/or selected for a learning product
 - By referencing
 - Data modules (incl front matter and access illustrations data modules)
 - Publication modules
 - Legacy technical publications
 - Produced in XML according to the PM DTD/Schema
 - Identification based on Publication Module Code
 - A 14- thru 26-character code to identify a publication module and to facilitate storing and retrieving them from a CSDB



Basic definitions

- Business Rules - BR
 - Rules for implementation are needed since there are choices to make
 - A project or organization must specify the rules applied when S1000D is implemented
- Business Rules Exchange - BREX
 - A method to formally specify and exchange Business Rules between parties with interests in the CSDB content

Basic definitions

- Common Information Repository – CIR
(Technical Information Repository – TIR)
 - Data modules ... with a special purpose
 - Basically data base types of information
 - Equipment, tools, spares, and others
 - Optional externalization of certain “items”
 - Much used by Civil Aviation



Basic definitions

File based transfer method

- S1000D's standardized method/format to interchange any of the objects (DM, PM, CSL, etc) in a CSDB with a receiver

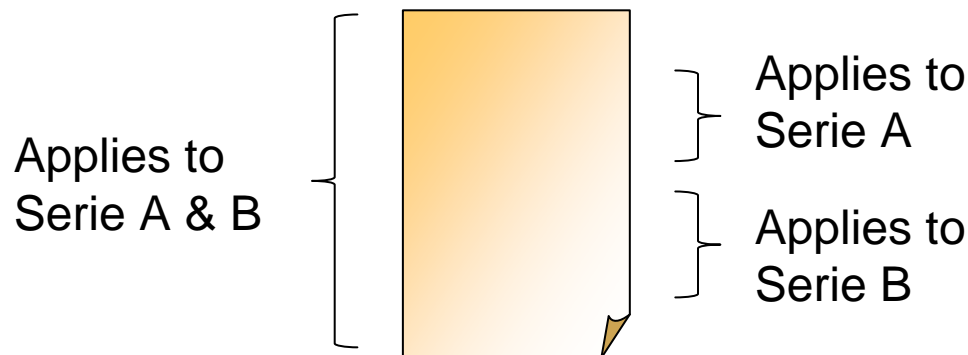
DDN - Data Dispatch Note

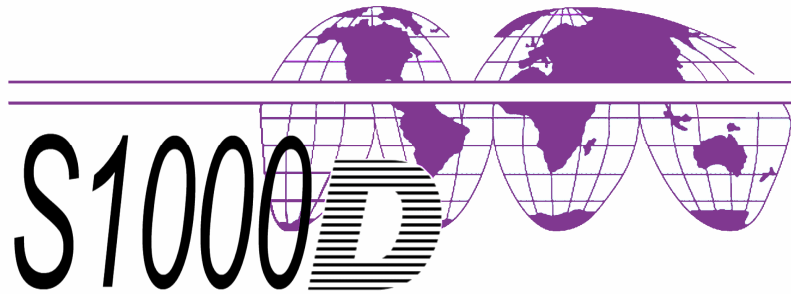
- Defines sender, receiver and content of the File based transfer package

Basic definitions

Applicability

- Defines to which configuration of the product/materiel, or to which other condition, the information is written
- Can be based on parameters defined by the project (since Issue 3.0)
- Every data module must define its applicability
- Portions of a data module may restrict applicability as compared to the entire module





S1000D Work Committee Structure



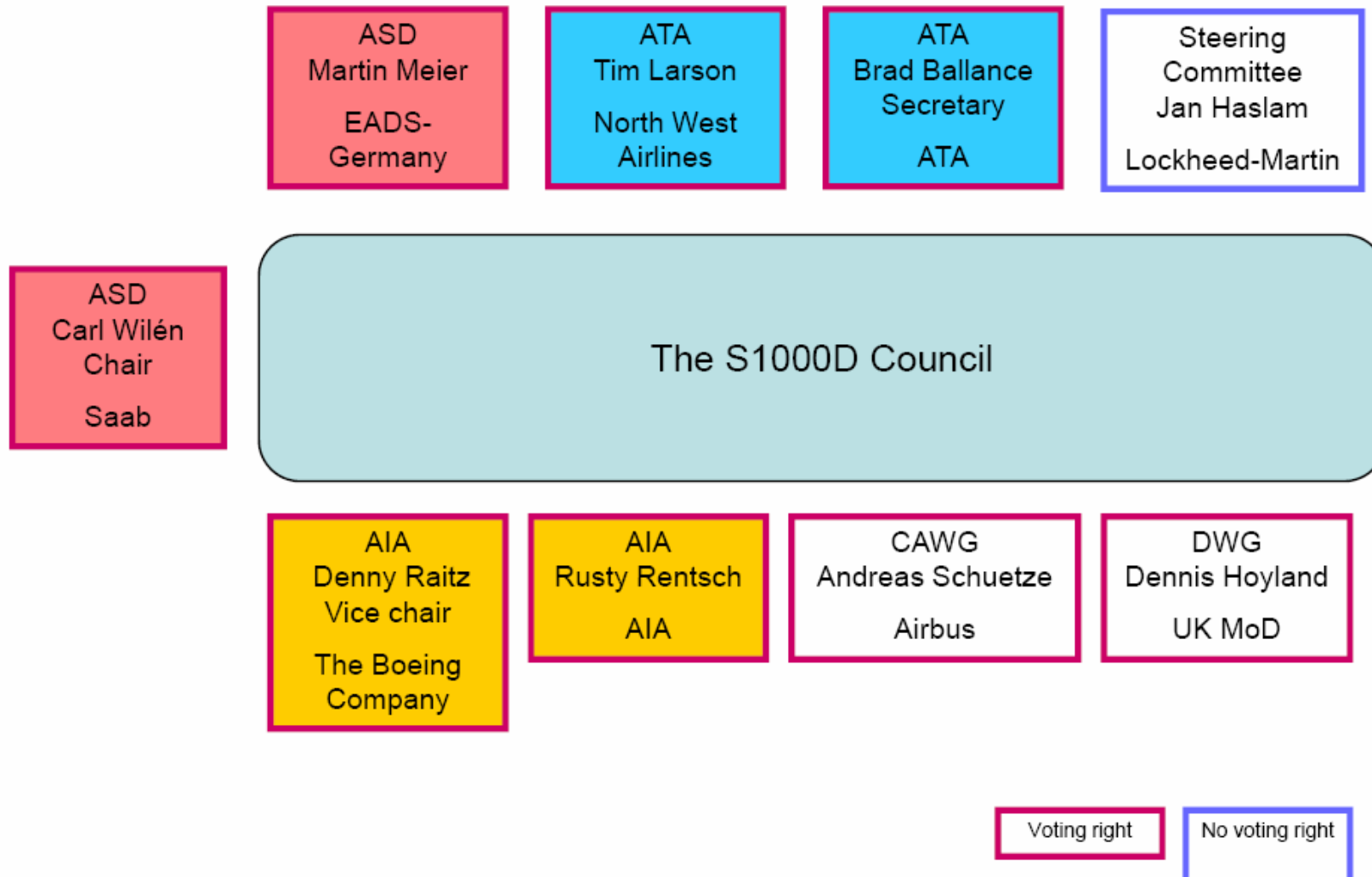
How is it run?

S1000D International Organization





The S1000D Council





The S1000D Steering Committee

Vice Chair
Michel Domeon
FR Ind

Chair
Jan Haslam
US Ind

Secr
Mike Day
UK Ind



The S1000D Steering Committee

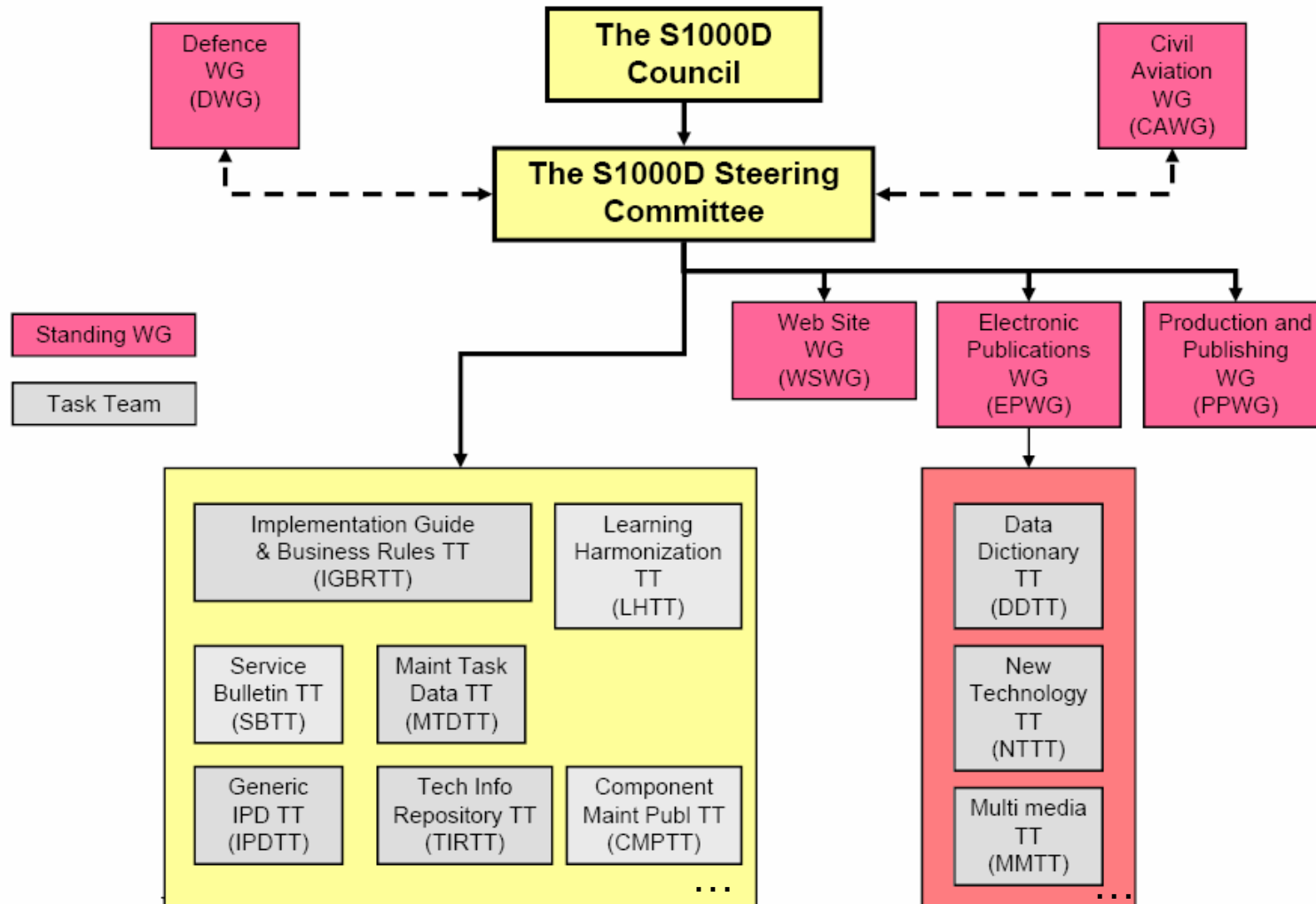


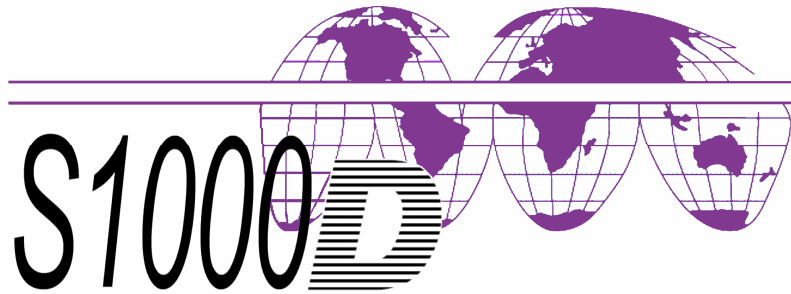
ATA e-Business
8 reps

Observers
2 reps/nation
+ DWG Chair

Members
2 reps/nation

Organizational structure





More information?





www.s1000d.org

Home | **Getting Started** | Change Proposals | Downloads | Links | Members Only

S1000D
Benefits
Organizational Structure
S1000D User Forum
Contact Us

Welcome To S1000D

Welcome to S1000D, the International Specification for Technical Publications utilizing a Common Source Database. Since its inception over 20 years ago, S1000D has grown to where it is now used widely around the world. Currently, its uses include:

- Defense systems – including land, sea, and air products
- Civil aviation products
- Construction industry products

The specification is publicly available and is free to download from this web site. Downloads include the specification, schemas, and sample files.

The S1000D web site

This web site is provided by the S1000D Council and Steering Committee as a means to provide useful information to help you in your implementation of S1000D. Key information available on these pages includes:

- The history of S1000D
- The benefits of adoption
- How to deal with legacy data
- Information on various methods presented in the specification
- Free downloads of the S1000D specification and XML schemas

We hope this web site helps you adopt and implement the specification to suit your business requirements. We also invite you to provide feedback to help us focus on related issues that concern you. All ideas are welcome. Please visit our [Contact Us](#) page to provide your comments.

Overview

S1000D is an international specification for the production of technical publications. Although the title emphasizes its use for *technical* publications, application of the specification to non-technical publications is also possible and can be very beneficial to businesses requiring processes and controls.

This specification was initially developed by the AeroSpace and Defence Industries Association of Europe (ASD). Currently, S1000D is jointly produced by the following organizations, their members, and customers:

Announcements (show all)

- 2009 User Forum Presentations Available!
- Issue 4.0.1 Default BREX data module
- Issue 4.0.1 release
- Issue 2.3.1 errata release
- Issue 3.0.1 errata release
- Issue 4.0. Available

Events (show all)

■ 2010 S1000D User Forum - Register NOW!	Sep. 27-30, 2010
■ 2009 S1000D User Forum	Oct 12-15, 2009
■ 2008 Joint S1000D User Forum and ATA e-Business Forum	Oct 21-23, 2008

Join the S1000D Mailing List

Enter your email address below to receive up-to-date news about S1000D, including:

- User Forum announcements
- New S1000D Issue release announcements
- Special events
- and more....

Email:



Download page

- The S1000D™ specification is downloadable from the web. (pdf file)
 - Current Issue
 - Past Issues
- Functionality matrix
- A default BREX data module
- Unit of Measure
- Package
 - XML Schemas (*Sgml / Xml DTD*)
 - Bike data module set
 - Data dictionary (Schema documentation)
 - ISO entities
 - XCF – Xml Companion File
- Example SNS's
- The mapping tool (for issue 4.0)



How it is updated?

- A formal process exists to get things added, changed or deleted. This is called a Change Proposal Form (CPF)
 - Schema Proposal Form SPF
 - Bike samples
 - Business rules
- Anyone can submit a CPF for consideration.
- CPF instructions can be located at Chapter 1.5 (page 34 of 2588) or from the web site:

<http://cpf.s1000d.org/>



CPF Browser

[HOME](#)
[DOWNLOADS](#)
[CHANGE PROPOSALS](#)
[EVENTS](#)

F.A.Q.
New Proposal
Resume Draft
Update Proposal
Check Status
Browse CPFs
RSS Feeds

Browse CPF's

You can now browse the CPF database, filtering by several factors as well as browse all 636 proposals. Select how you would like to browse the database to start.

☒ status
 ☐ group
 ☐ date
 ☐ issue
 ☐ browse all

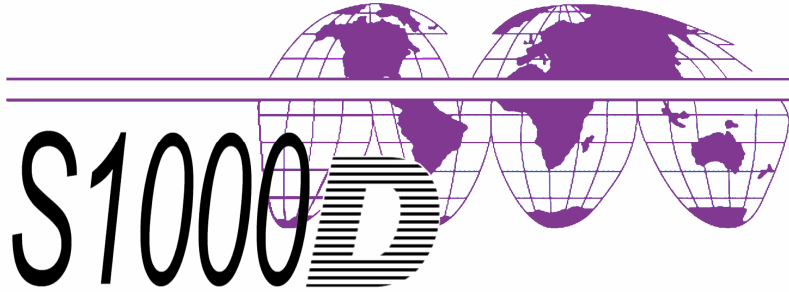
12 Results

	CPF Number	CPF Title	Status
	CPF-*2009-169S1*	Test CPF	TEST
	CPF-2009-121S1	Merge Figure and Multimedia to create a single ICN Object	Inwork
	CPF-2009-151S1	Technical Repository for Standard Parts	Candidate
	CPF-2009-152S1	Technical Repository for Standard Supersession	Candidate
	CPF-2009-153S1	Technical Repository for Part Interchangeability	New
	CPF-2009-154S1	Technical Repository for Part Dependencies	New
	CPF-2009-171AA	Alignment of S1000D and iSpec2200Graphic Style chapters	New
	CPF-2010-001GB	DML - clarify purpose of ANSWER	Withdrawn
	CPF-2010-012SE	Add < name > and < shortName > in < zoneSpec >	Candidate
	CPF-2010-019S1	enterpriseRef	New
	CPF-2010-022SE	Attribute specific	New
	CPF-2010-023SE	Rename < typeDesignation >	New



Who can join?

- Any one who is a user of the specification can contribute to the standard via the CPF process
- If you have a particular area of interest and are willing to do some work you can be a part of the standards body.

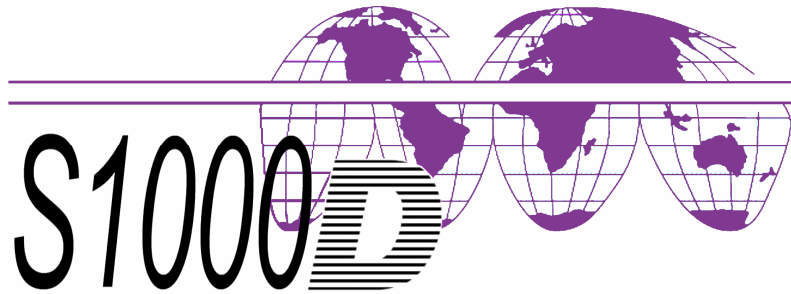


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Questions?



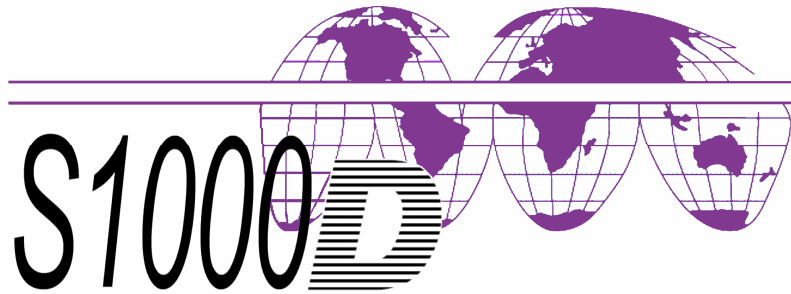


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S1000D Tutorials
S1000D Advanced Concepts





S1000D - The publication process





Life Cycle Support of Information

Processes

Planning
DMRL
Data Module
Rqmts List

Status
CSL
CSDB Status
List

Feedback
Comment

Delivery
DDN
Data Dispatch
Note

Aggregation

Maintenance
PM
Publication
Module

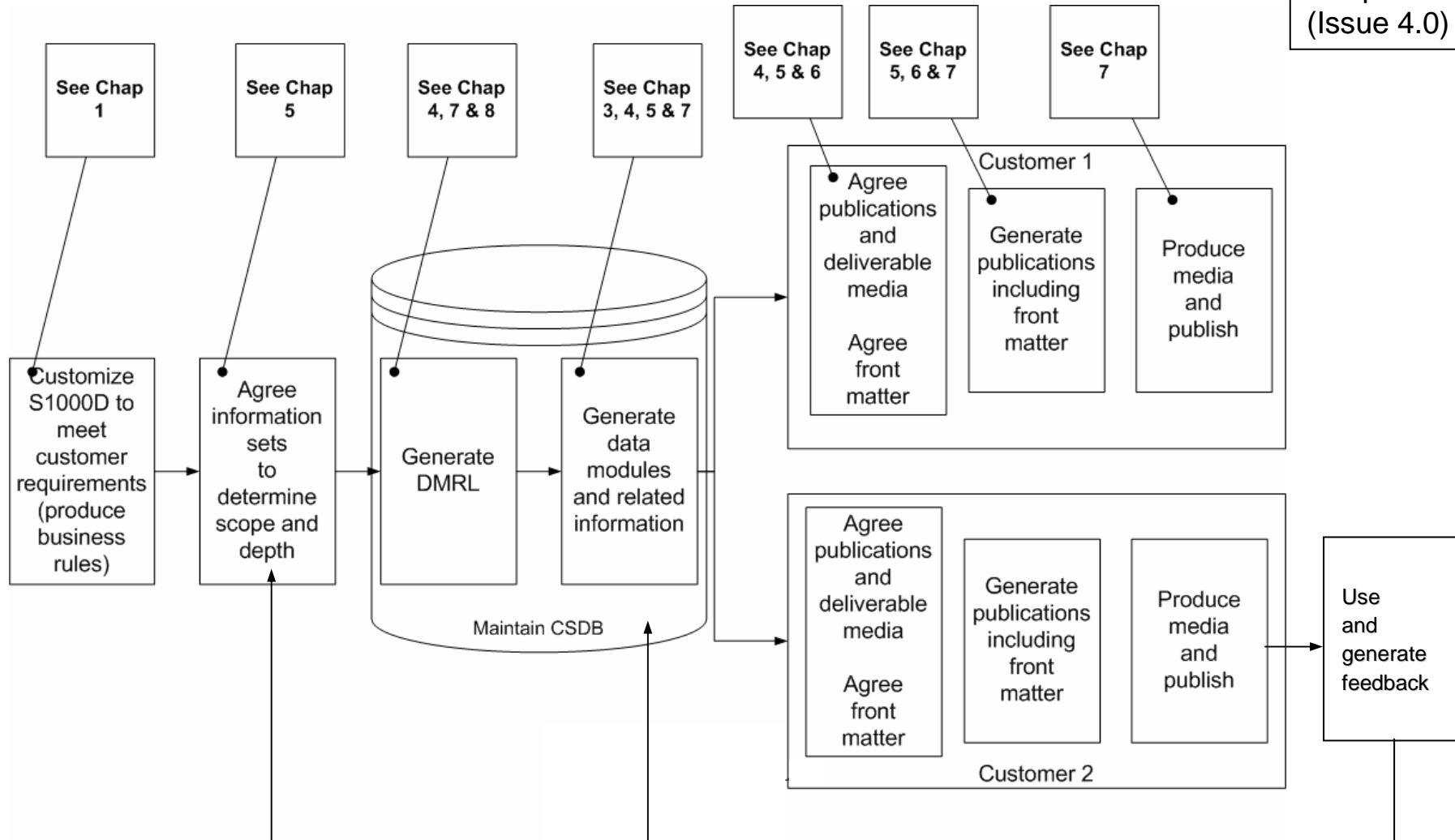
Training
SCM
SCORM Content
Package Module

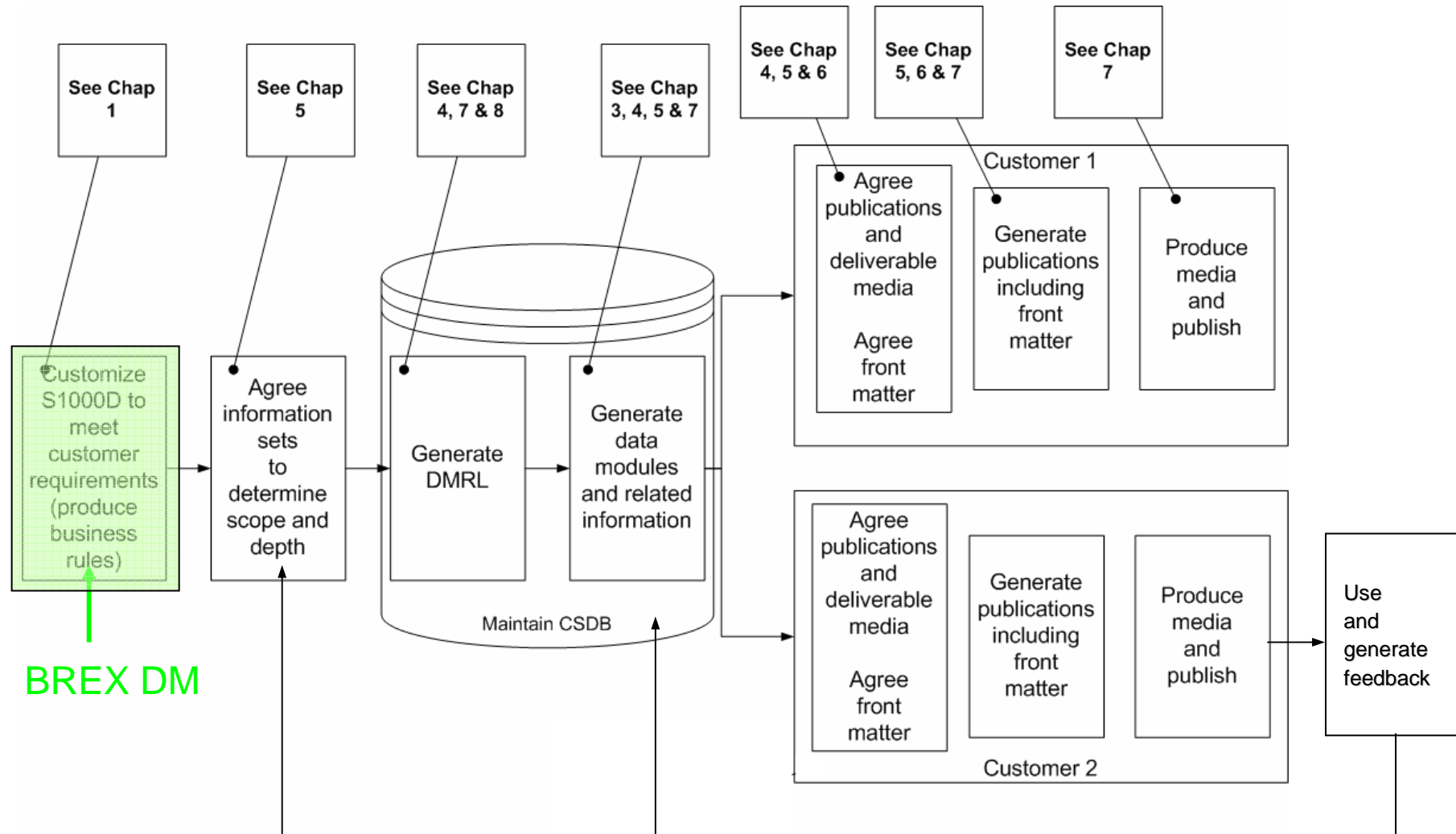
Data

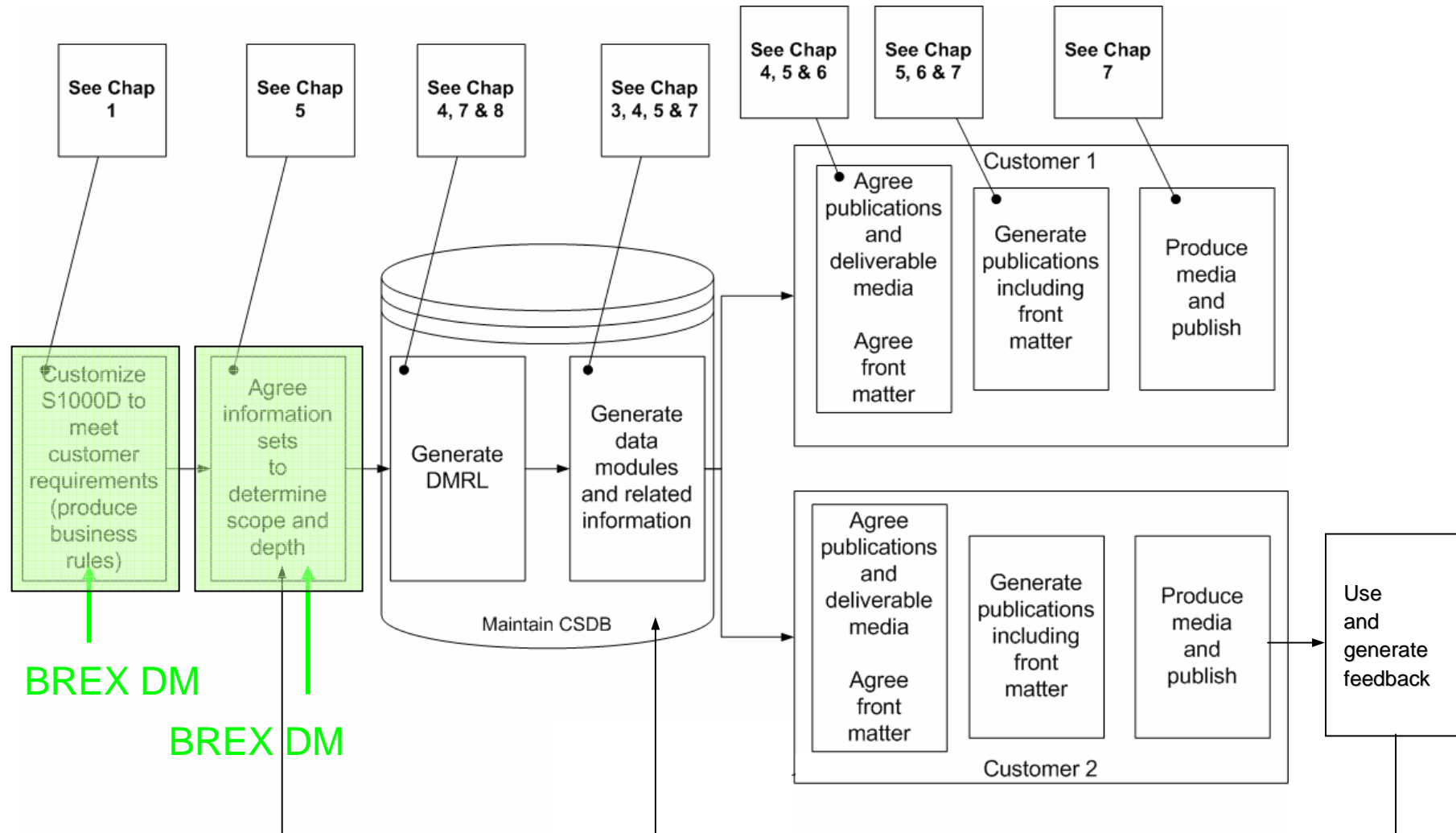
<u>Ap</u> Cro Da	<u>Bu</u> Bus Da	<u>C</u> C Da	<u>Ap</u> C Da	<u>Alt</u> Co Da	<u>De</u> Da	<u>Fau</u> Da	<u>De</u> Da	<u>Fau</u> Da	<u>Ill</u> Pa Da	<u>T</u> Le Da	<u>App</u> Cro Da	<u>Pr</u> Pr Da	<u>Inte</u> P Da	<u>Sc</u> S Da	<u>Re</u> T Da	<u>W</u> Wi Da	<u>Wiring</u> Wrngflds Wiring Fields Data Module
------------------------	------------------------	---------------------	----------------------	------------------------	-----------------	------------------	-----------------	------------------	------------------------	----------------------	-------------------------	-----------------------	------------------------	----------------------	----------------------	----------------------	---

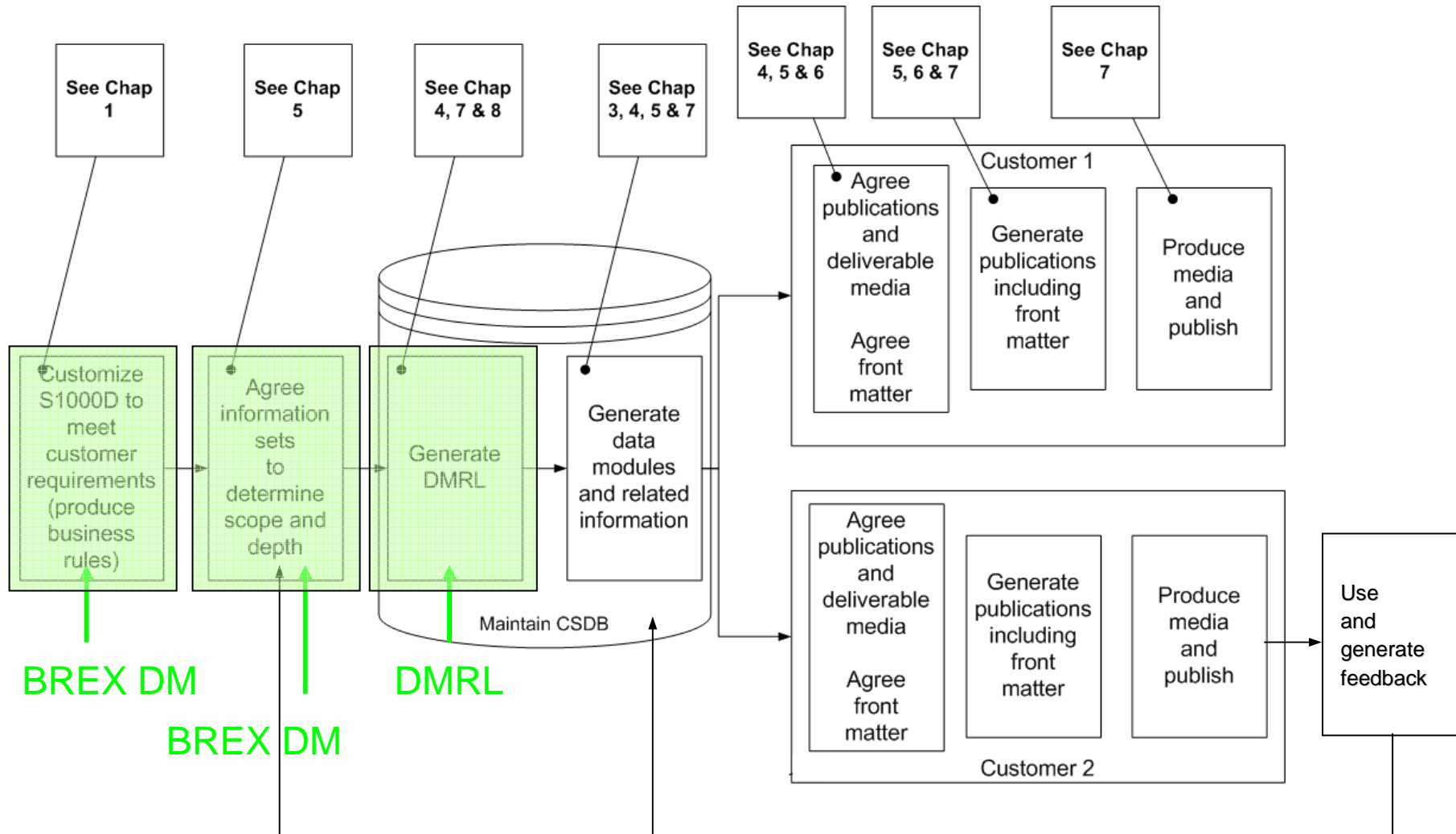
The publication process

Figure 1
from
Chap 2.1
(Issue 4.0)









Data Module Lists (DML)

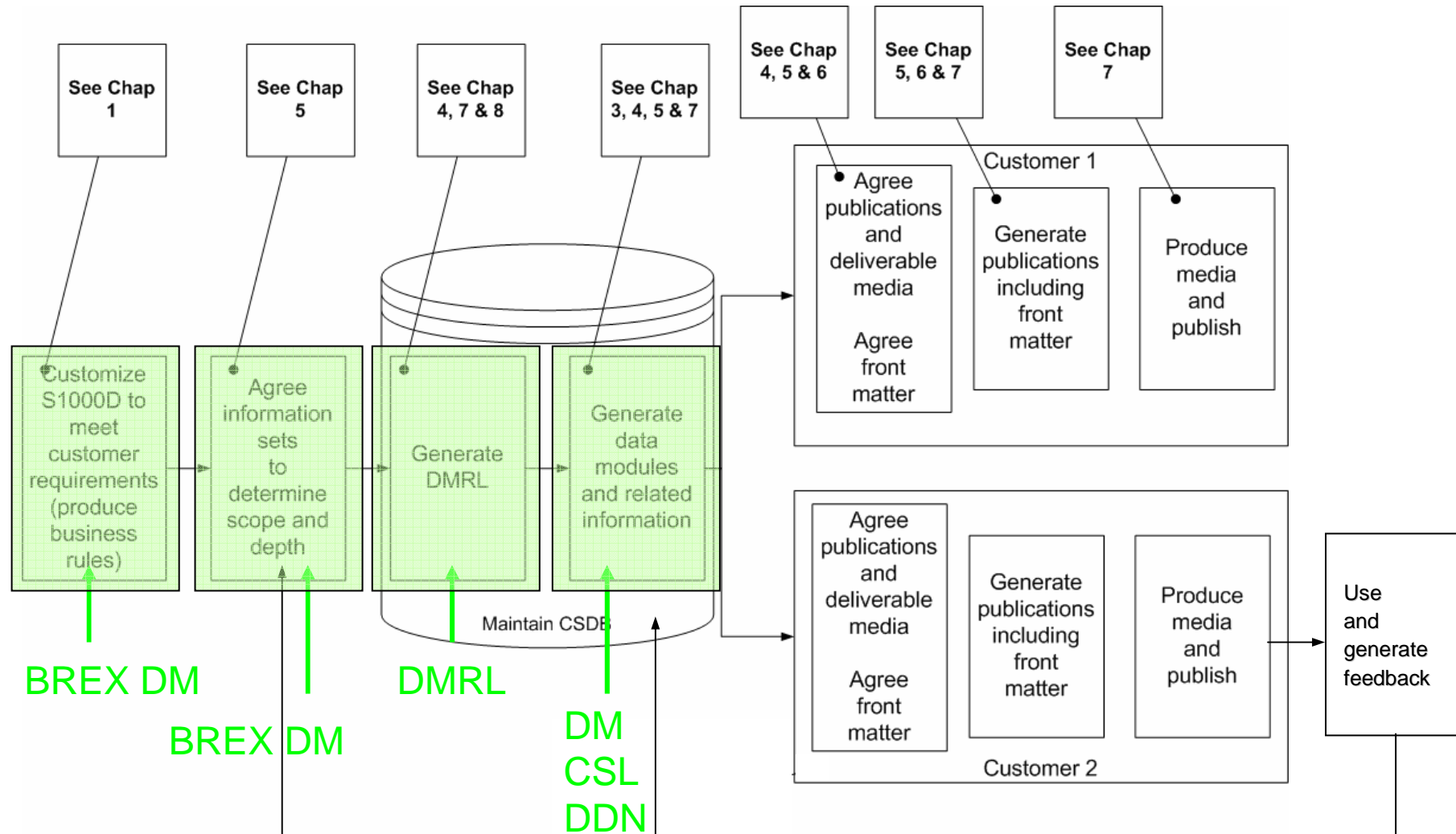
- For the planning, management and control of the content of the CSDB for individual projects the use of the following Data Module Lists (DML) are recommended
 - Data Module Requirement List (DMRL)
 - CSDB Status List (CSL)

Both are implemented in the DML DTD



Data Module Requirement List

- A DMRL is a tool to identify the required Data Modules for a project.
- The DMRL supports planning, reporting, production and configuration control, especially in a work-share environment
- A DMRL can be generated in parts (eg by partner companies for later merging) or in a complete form





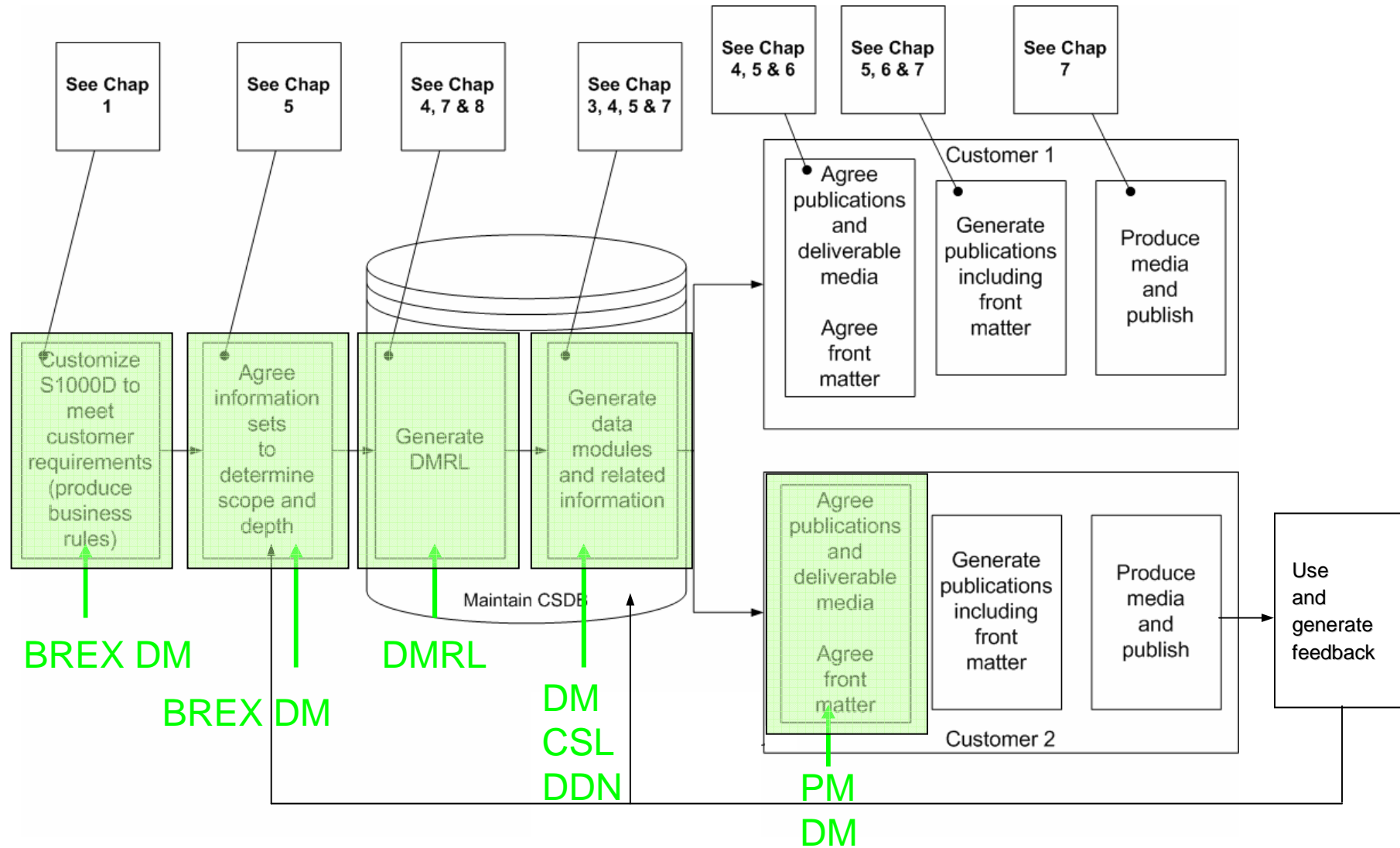
CSDB Status List (CSL)

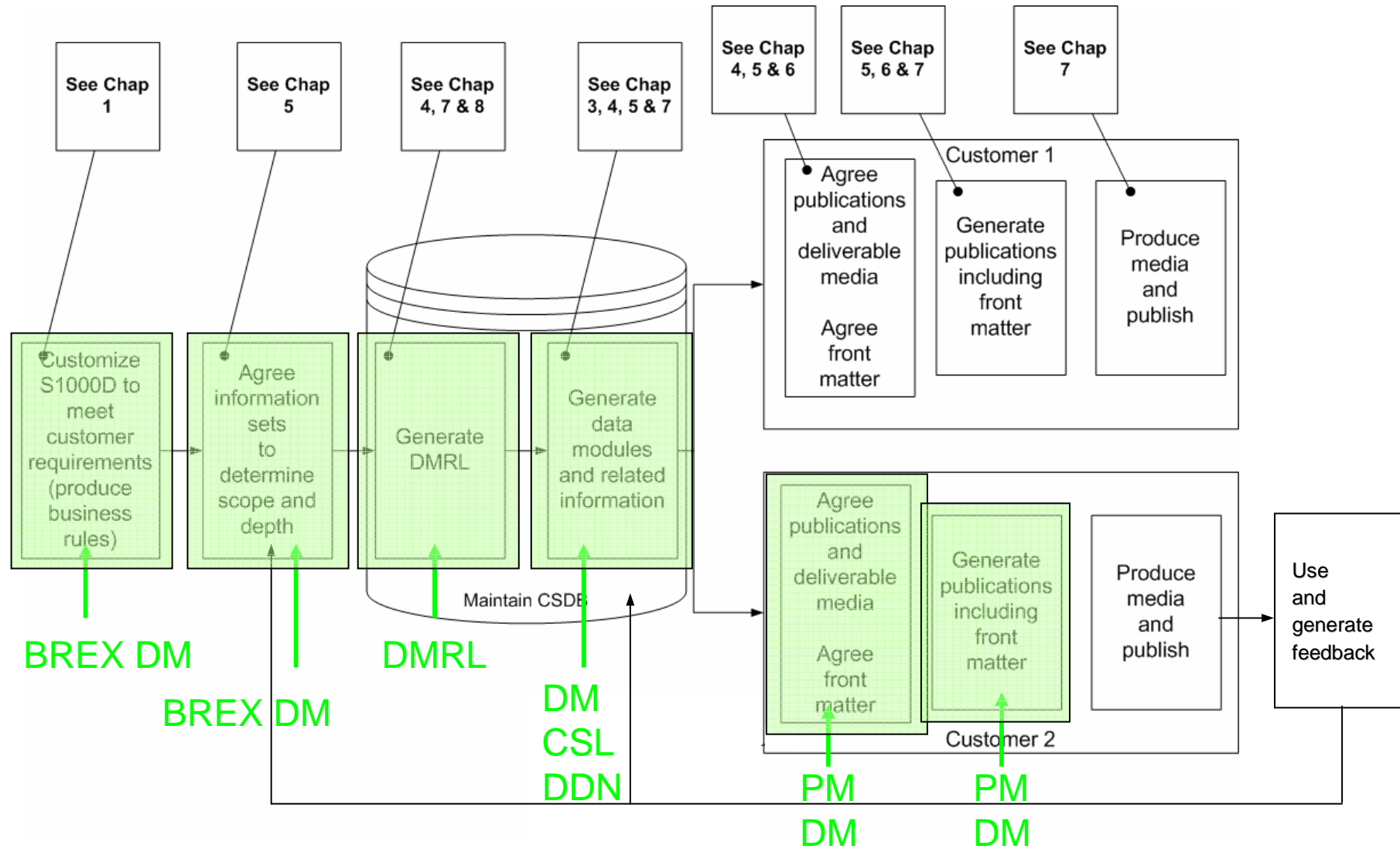
- A CSDB Status List (CSL) is a tool to identify the status of a CSDB for a project
- At all times, the CSDB at the originating agency/company is the definitive source of DMs for which that agency/company has responsibility
- A CSL contains the same address, status and DM entry elements as a DMRL.

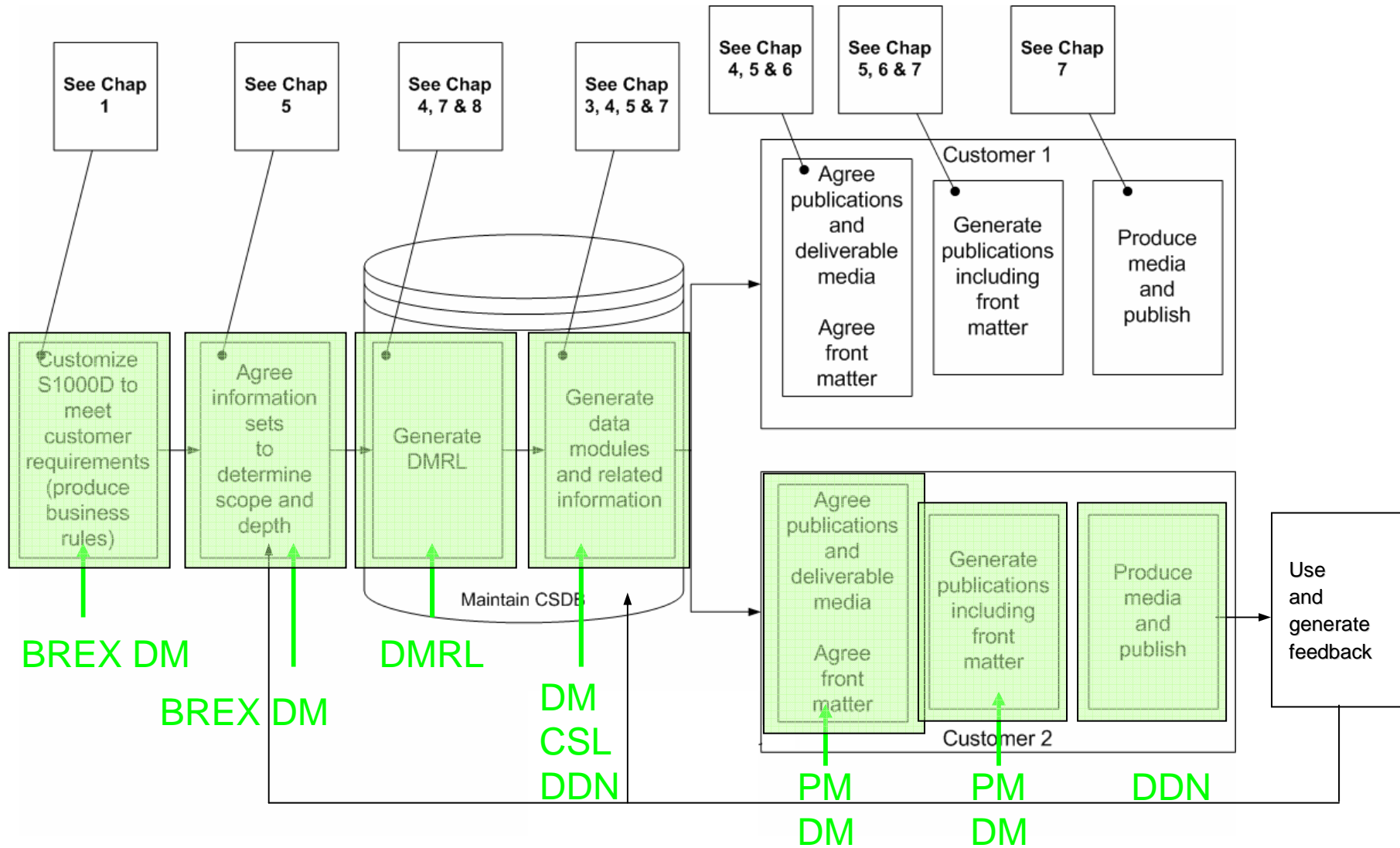


Interchange – File based transfer

- The DDN provides metadata describing a file based transfer of Data Modules from one organization to another
- It is a useful tool for managing the exchange of data between data producers and customers







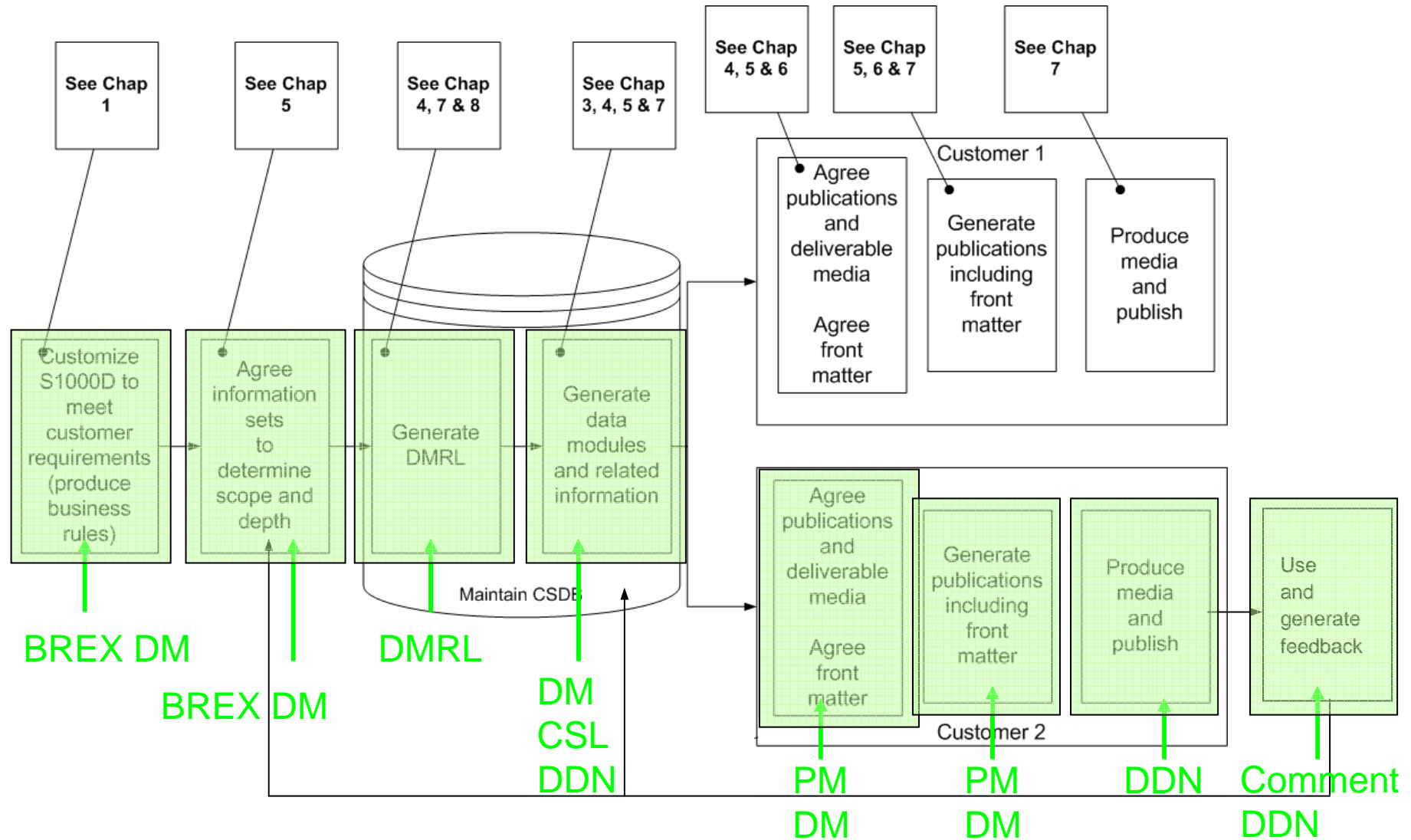


Interchange package structure

- An S1000D CSDB interchange (transfer) package consists of one Data Dispatch Note (DDN) and at least one of the following data categories:
 - One or more Data Modules (DM) and associated illustrations
 - One CSDB Status List (CSL)
 - One Data Module Requirement List (DMRL)
 - One or more COMment forms (COM)
 - One or more Publication Modules (PM)

Interchange package structure

- The files may be transferred in any order, but it is recommended that the DDN shall be the first data file in the sequence
- Appropriate data compression techniques (eg ZIP, GZIP, TAR or X/Open (UNIX) compress) may be applied to the data file set as a whole before transfer, as mutually agreed upon between sender and receiver for each individual project
- File naming conventions are described in Chapter 7.5.1, Para 2.2



Comments

- Commenting and reporting, on issues raised on data modules or publication modules during the verification process and the in-service phase of the Product, is to be done using the comment form.
- This form is compiled by the commenting authority and sent to the issuing authority of the data modules or publication modules who provided the information.
- The comment form is also used to provide a response to the originator of the comment.



Life Cycle Support of Information

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

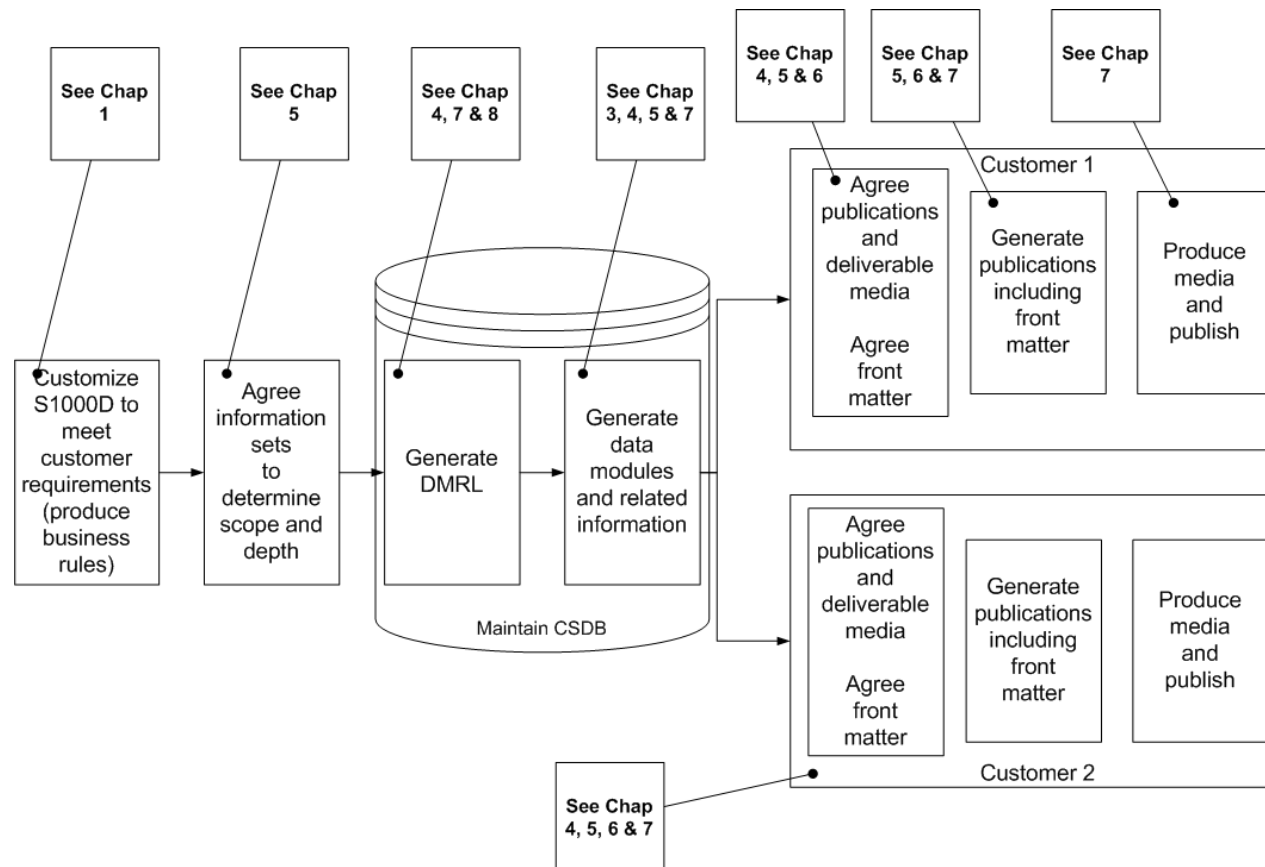
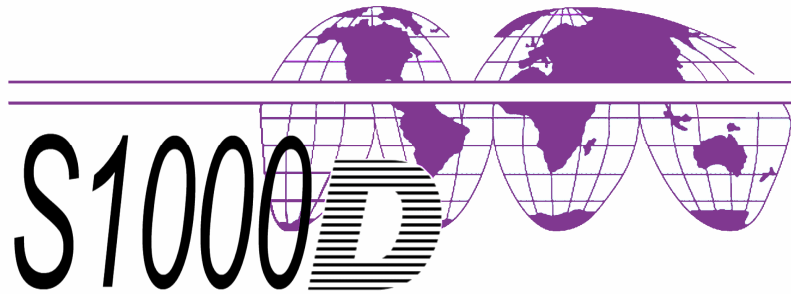


Figure 1
from
Chap 2.1
(Issue 4.0)



Tailoring S1000D

Business Rules





S1000D ...

- Started as a military aerospace interest
 - One category of "users"
 - Lots of nuts and bolts in the products
 - Homogenous producer/user environments
 - Complex and costly projects
- Can now be applied to any product/system
 - Air/sea/land
 - Hardware/software
 - Civil/defence
 - 5000000000 EUR/50000 SEK
 - ...



The S1000D versatility costs ...

- Has to support all kinds of ...
 - target products/systems
 - business processes
 - infra structures
 - integrations with related tools and platforms
- Consequently, has to leave many ends open!



Business Rules

- Definition:
A S1000D Business Rule is a decision/description to apply S1000D in a certain way in a certain respect
- For example:
All procedural data modules produced must be verified by the customer/user. Verification must be performed on a relevant configuration of the system concerned.



Business Rules

- S1000D contains many Business Rules decision points!
- The *Business Rules for a project or organization* is the entire set of business rules that have been decided for the project/organization with regard to the S1000D implementation.
- S1000D Business Rules should always specify how the information contained in the CSDB is managed in relation to all other related information stores.

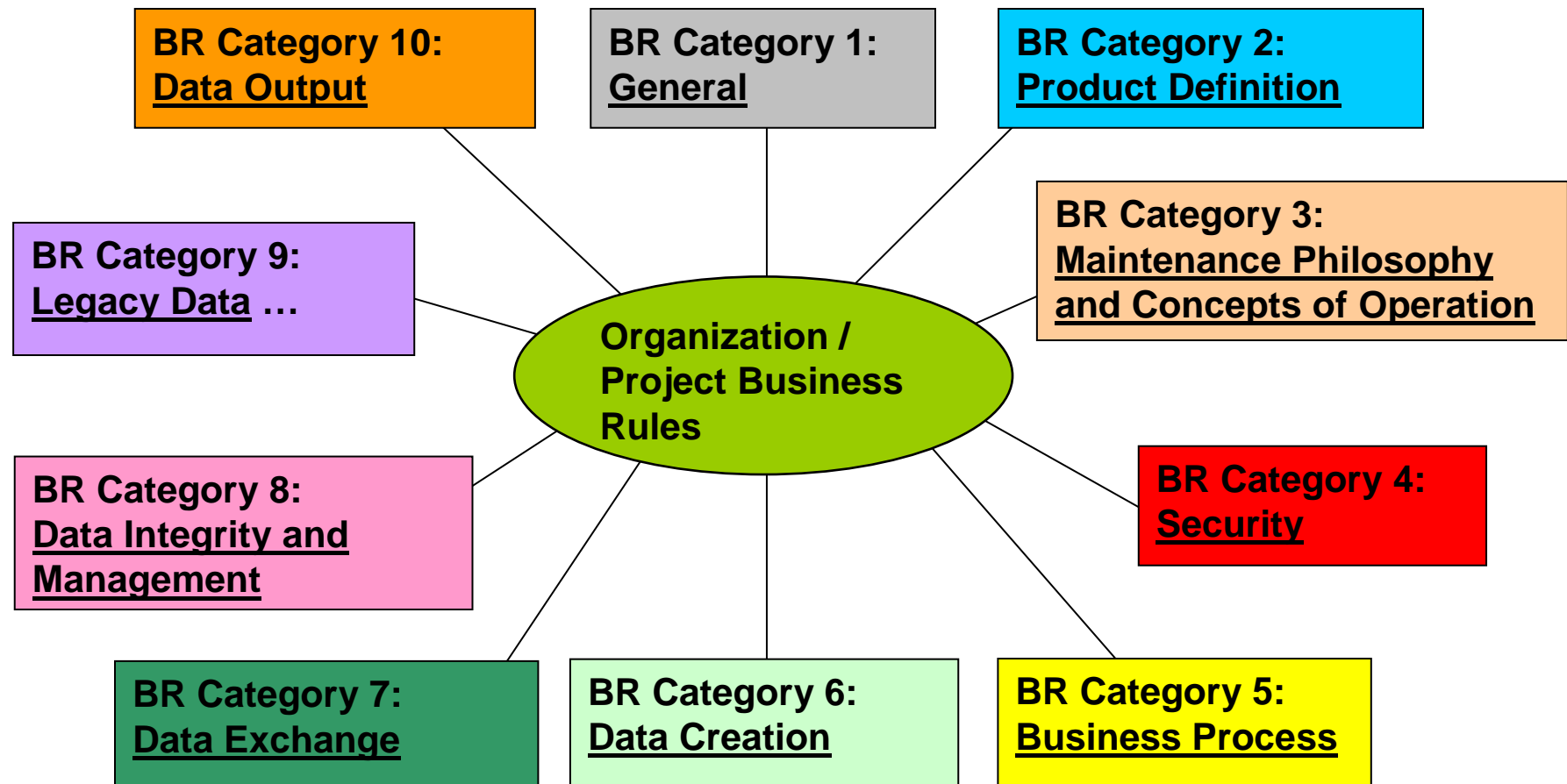


This could be helpful:

- Chap 2.5.1 gives both definition of each category (including short summary) and offers examples for each BR category for a better understanding
- The BR categories list in Chap 2.5.1 can serve as an overall checklist for BR-production

Note: you can use Chapter 2.5.1 of Issue 4.0 as an orientation/checklist for your project/organization BR independent on which Issue of S1000D you implement!!!

Business Rules Categories

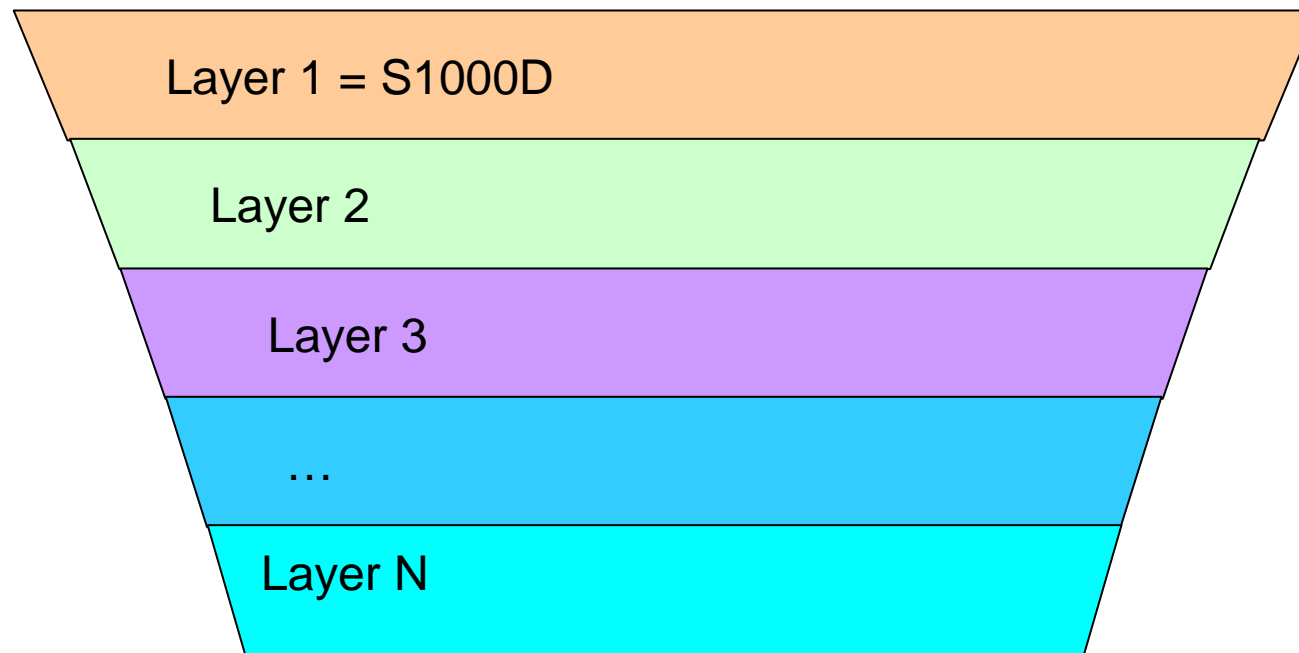




Business Rules Layers

Definition: A business rules layer indicates the level of stakeholders within the hierarchy to which the business rules apply.

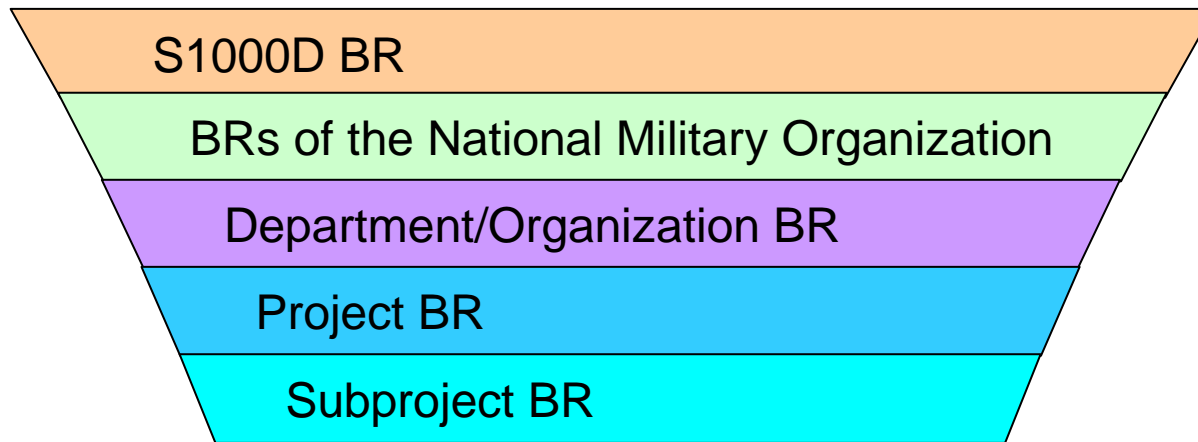
Generic view



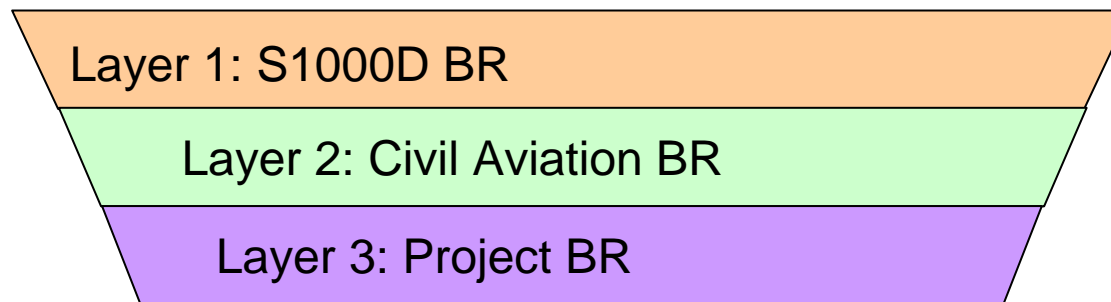
Layer 1 is represented by S1000D



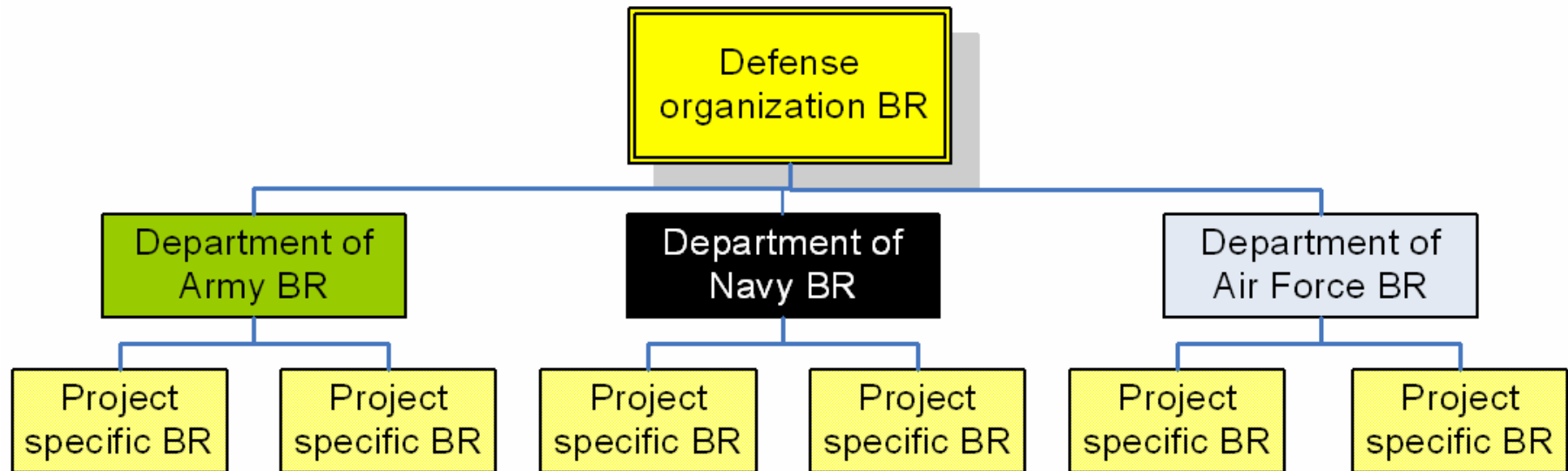
Example of a 5-layered Rules Model



3-layered Rules Model



Tree-like BR structure



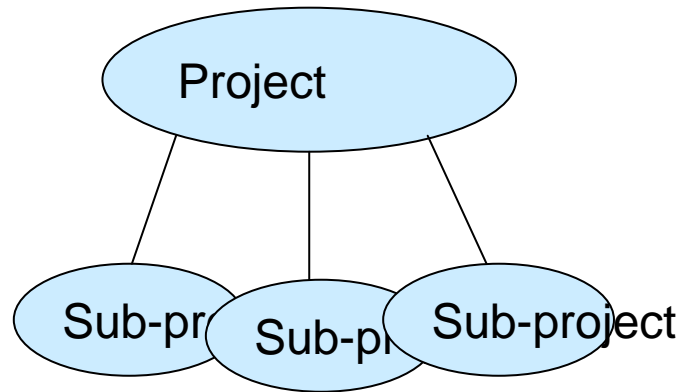
Challenge: When a change in BR of one of the upper layers is required → the other “parallel” levels have to agree.

This and other possible “BR-conflicts” are addressed in Chap 2.5.1 of Issue 4.0.



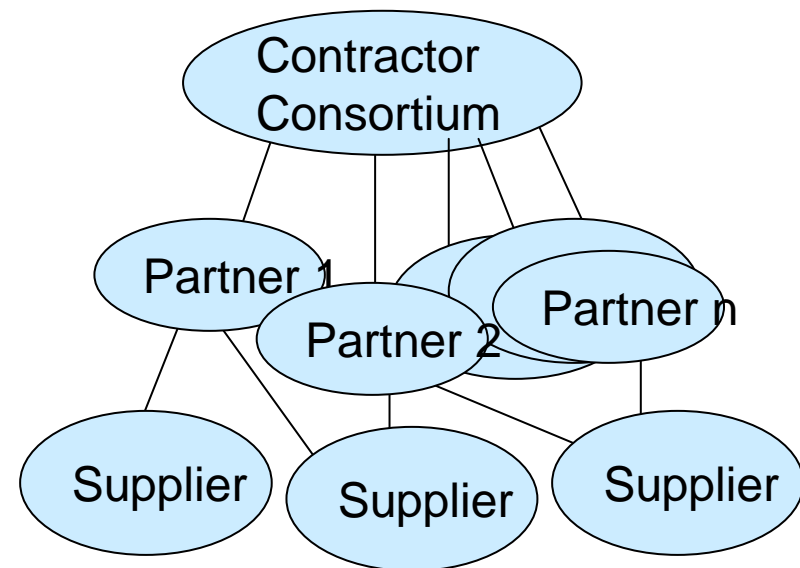
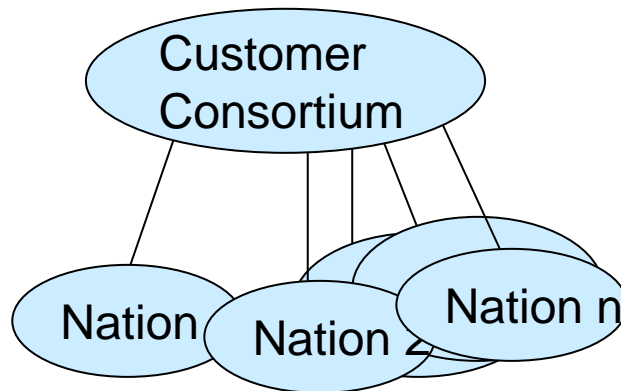
Project and organizational levels

Project View



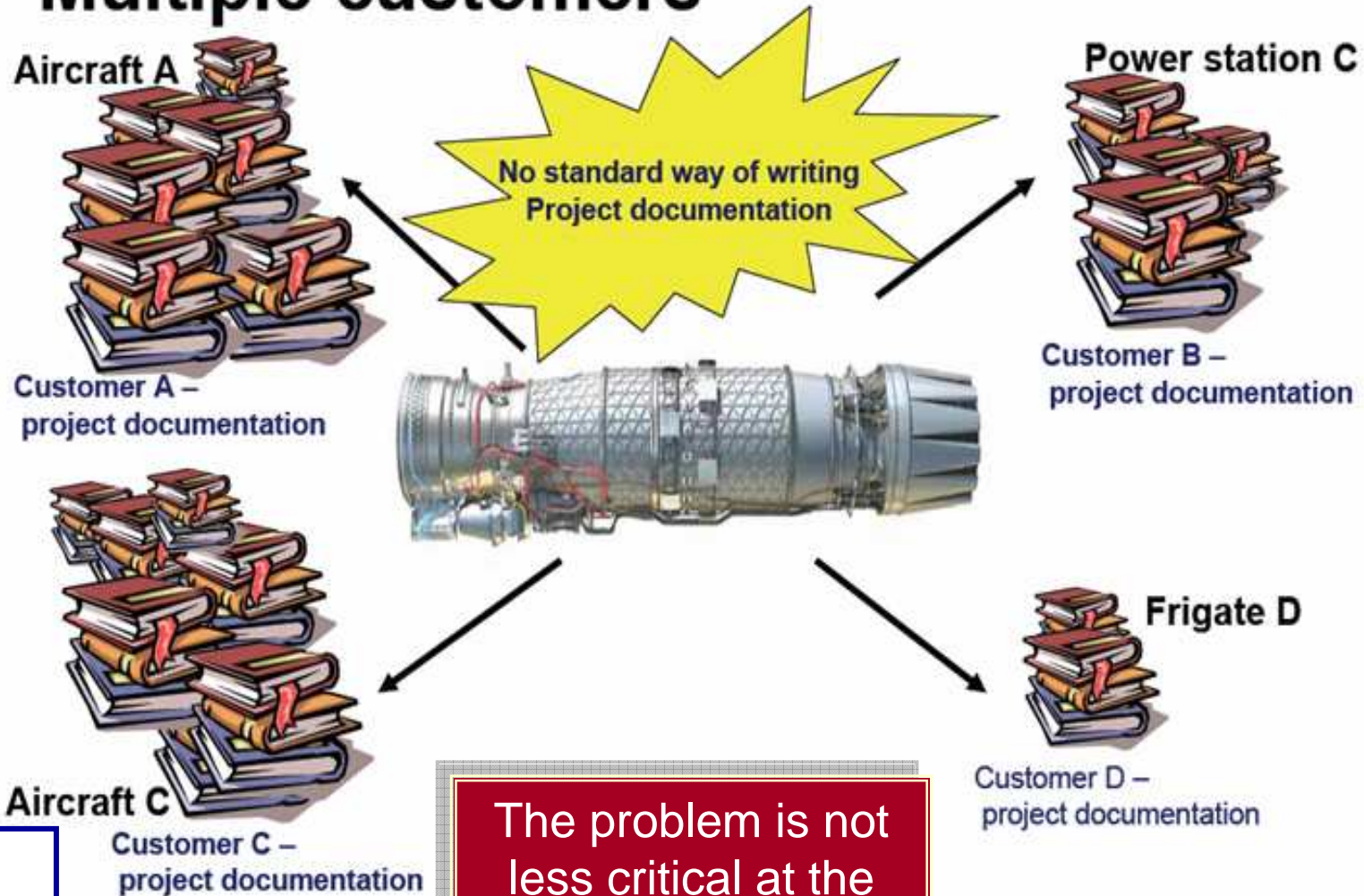
Examples of various Layering options

Organizational View

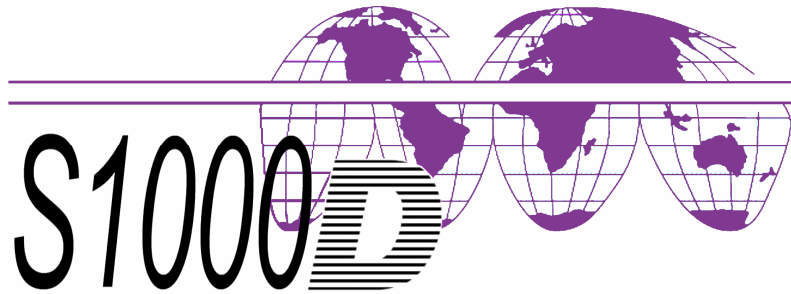


A big Problem

Multiple customers



The problem is not less critical at the customer side!!!



Implementing S1000D

A few thoughts



AeroSpace and Defence
Industries Association of Europe



Air Transport Association



UNITED
AIRCRAFT
CORPORATION



R&D CALS CENTER
APPLIED LOGISTICS



Pitfalls

- Insufficient "instructions" to contractors
 - E.g. no business rules agreed
- Unclear agreements with customers
 - E.g. no business rules agreed
- Insufficient implementation support
 - Sometimes it takes an expert to explain how simple a thing is
- Unawareness of related information and applications (this is part of the "ILS" concept!)
 - Duplication of data and resulting inconsistencies

Pitfalls

- Insufficiently defined logistics structures
 - Which objects are subject of operation?
 - Which objects are subjects of maintenance?
 - Is SNS appropriately specified?
- Purely defined "applicability" – how to best use it?
- Unclear review process
 - Eg who will review what and does that connect to S1000D first/second verification?



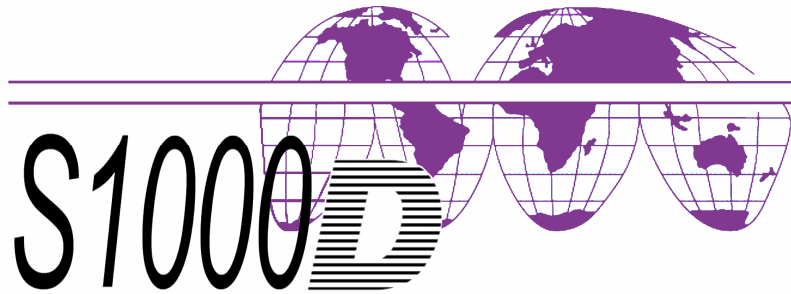
Some success characteristics

- *Stable* processes
- Efficient *processes*
- An "S1000D *mindset*"
- Well founded *business rules*
- *Suiteable* software support



Do not forget

- Technical documentation is a Product life-cycle matter
- Major project phases:
 - Business Rules development
 - Production of data and publications
 - Verification of data and publications
 - Customer involvement?
 - Delivery of data and publications
 - Subcontractors and customers!
- Training!

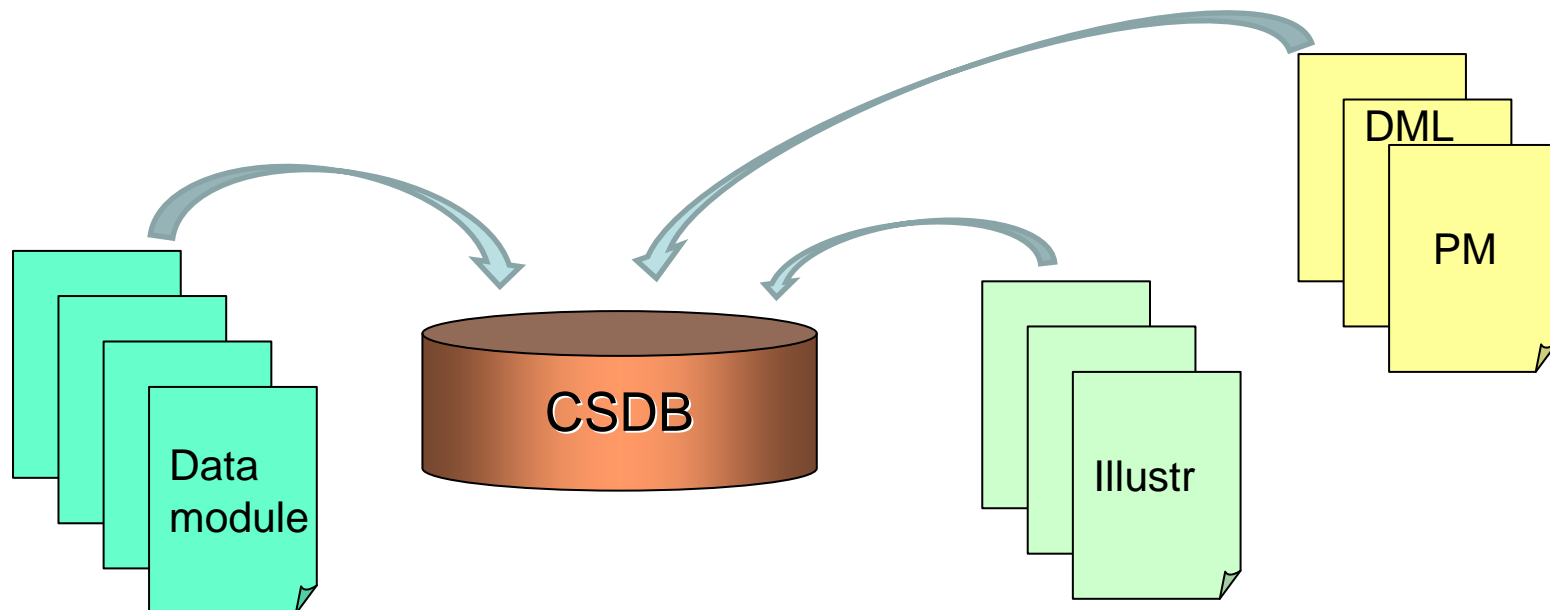


The CSDB and its objects



Basic definitions

- Common Source DataBase - CSDB
 - A virtual store for the objects produced by a project
 - data modules, graphics and multimedia objects
 - publication modules
 - administrative objects, eg Data Module Lists - DML

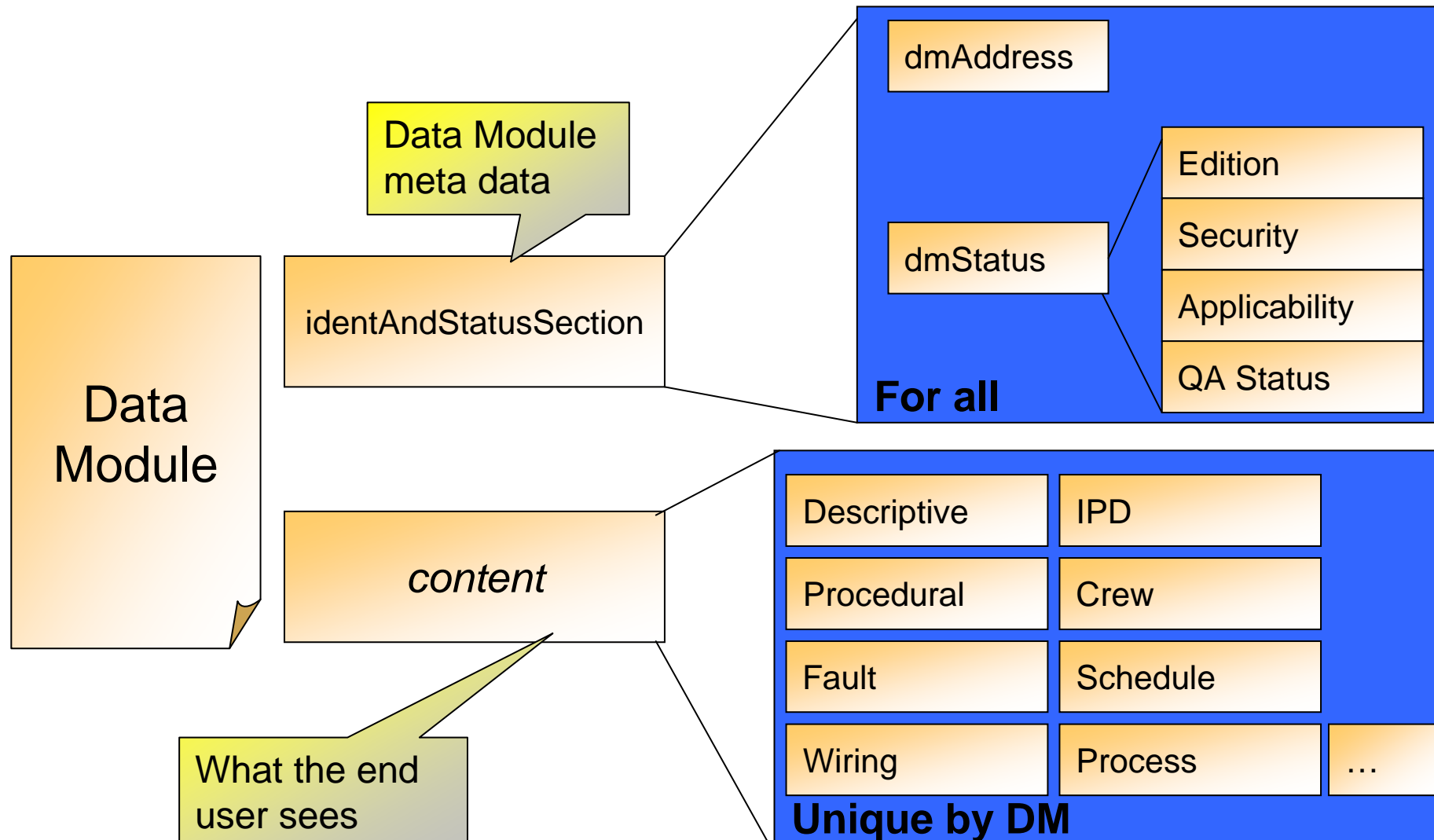




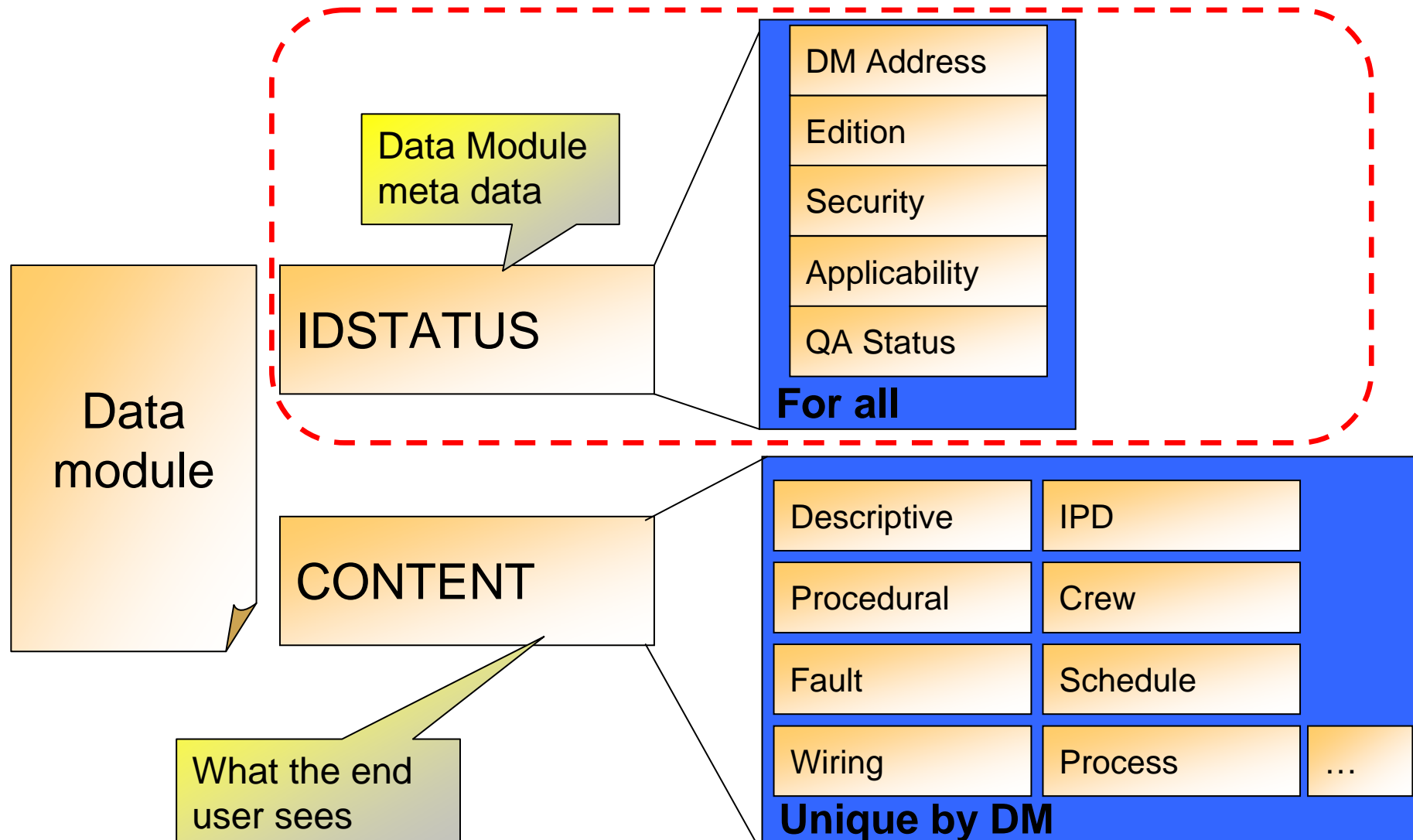
Data Module Structure

- Each Data Module comprises two parts:
 - Identification and Status Section
 - Divided into
 - Identification metadata <dmAddress>
 - Status metadata <dmStatus>
 - Every DM contains the same <identAndStatusSection> structure
 - All other objects (PM, DDN, DML, etc...) contain similar structure
 - Content section
 - Content will differ depending on the data module type

Data Module



Basic definitions





Identification and Status

- Provides information for:
 - Managing the Data Module within the CSDB.
 - Managing Data Module applicability.
 - Managing the Quality Assurance process.
 - Controlling the retrieval processes.
 - Automatic compilation of User information.



Data Module Address

- Unique identification of the DM
 - Data Module identification
 - DM Code
 - Language
 - Issue number
 - Data Module Address
 - Issue date
 - Title
 - techname
 - infoname



Data Module Code - DMC

- Are unique 'packages' of information.
- Are associated with a particular element/item of equipment.
- Contain textual and may reference non textual information.
- 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



Data Module Code



BICYCLEAAAAAAAA -

AAAA - D00-00-0000 - 00AAA - 040A - A

MI

SDC

SNS

DC/DCV

Item
location
code

Optional MICC

IC/ICV

17 thru 37 characters length



Data Module Code

- MI: project identifier
(project can allocate and register with NAMSA to avoid duplication)
- SDC: identify the different functions of a 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
 - Various SNS and exemplar SNS in spec
 - Materiel Item Category Code: differences several SNSs into a same MI
(Optional information)



Data Module Code

- DC: identify the assembly and disassembly of an equipment
- DCV: identify variant for the assembly and disassembly of an equipment
- IC: identify the information type of the data module
- ICV: identify variant for the information type of the data module
- ILC: identify the situation to which the information is applicable



Information Codes

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



<dmStatus> section

- Responsible partner company
- Originator
- Applicability (Effectivity)
 - Overall applicability for an entire data module
- Security
 - Security level: category, class or grade assigned to defense information or material
 - Commercial classification: category or grade assigned to company or government department information or material to indicate the degree of danger to the company or government department security
 - Caveat: a restrictive marking (eg UK/US EYES ONLY) or security code word that is applied to complement an appropriate security classification

<dmStatus> section

- Data restrictions (partial list)
 - Distribution statement
 - Export control statement: security instructions given the instructions for the control of export of data modules
 - Special handling instructions, including storage
 - Destruction statement
 - Copyright
- Quality assurance status
 - Collection of checking activities that are carried out to ensure that the contents are fit for purpose and technically accurate
- Reason for update
 - Short explanation of the reason for updating of the data module



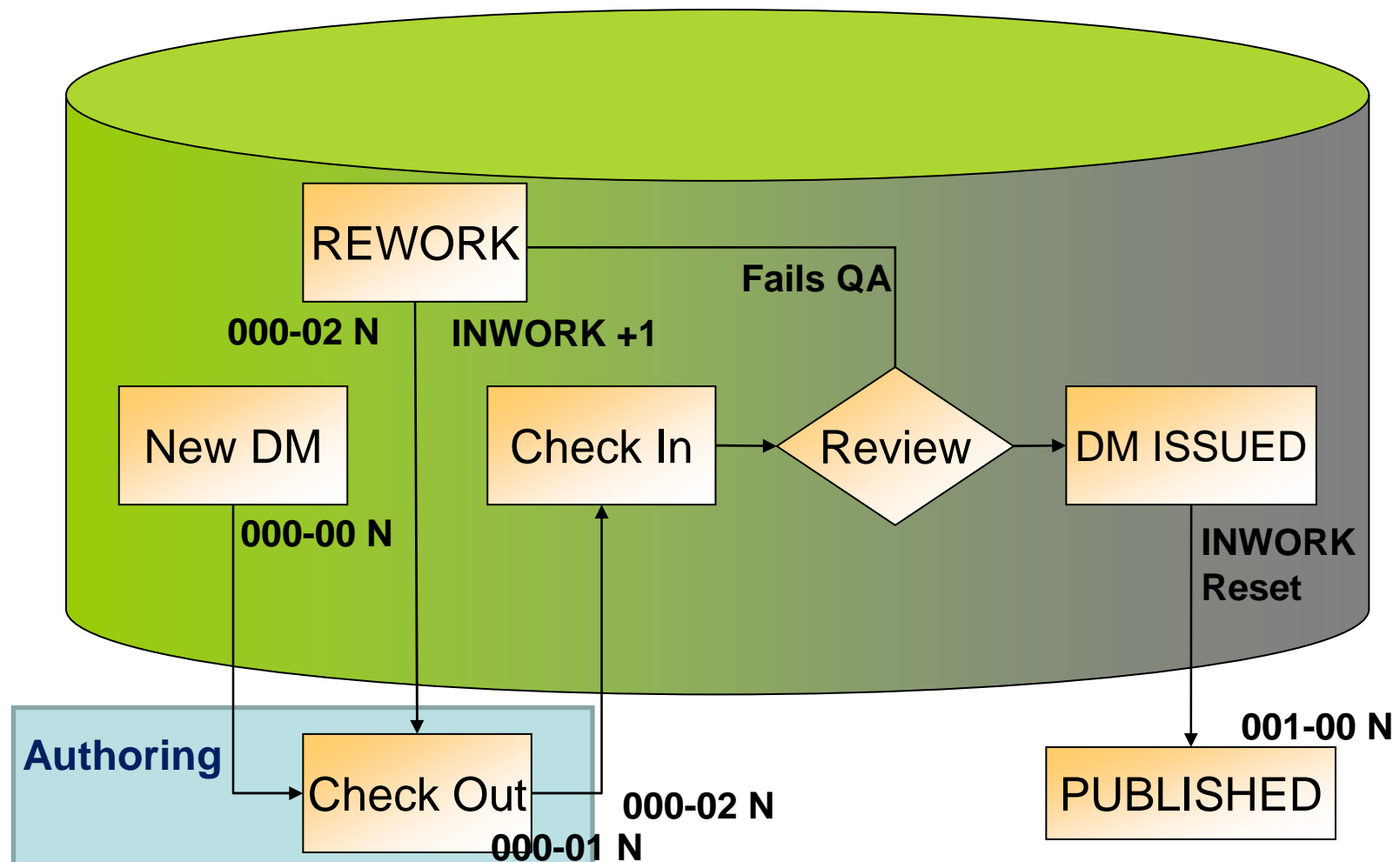
Identification and Status

- Remarks
 - Contain general remarks
- Brex Data Module Reference
- *Several other data items...*



Data Module Workflow

Issue number + In work number management





Data Module Workflow

issueInfo		issueType	State
issueNumber	inWork		
000	00	N/A	DM created in the CSDB (DMC allocated)
000	01	New	First draft
000	02	New	Second draft
000	0n	New	n draft
001	00	New	First Issue
001	01	New	First Issue + first draft
001	0n	New	First Issue + n draft
002	00	Changed Revised Status	Second Issue
003	00	Deleted	Third Issue
004	00	Rinstate-changed Rinstate-revised Rinstate-status	Fourth Issue



Illustrations

- S1000D describes in detail how illustrations should be prepared and controlled.

It covers:

- Illustrations / Symbols
- Multimedia
- Types of Illustrations
- Illustration sizes, formats, line weights, typefaces etc.
- Layout – including reference locations, call-outs etc.
- Information Control Number (ICN)



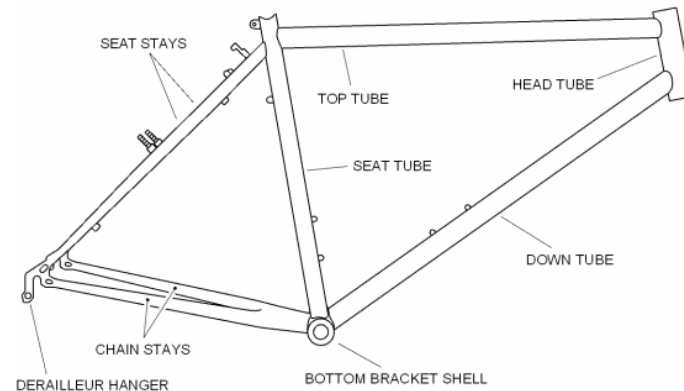
Information Control Number

- The **unique** identifier 'code' for a non XML entity (illustration, multimedia, audio, video, ...)
- ICN is independent of the file format
- Two different ICN formats:
 - Cage code based
 - Model Identification code based
- Derived from a hierarchical breakdown of a particular type of equipment and sequence number.



Information Control Number

ICN - S1000DBIKE -



AAA - D000000 - 0 - U8025 - 00502 - A - 004 - 1

PREFIX

MI

SDC

SNS

RPC

ORIG
Cage code

Identifier

Variant

Issue
number

Security

28 thru 48 characters length

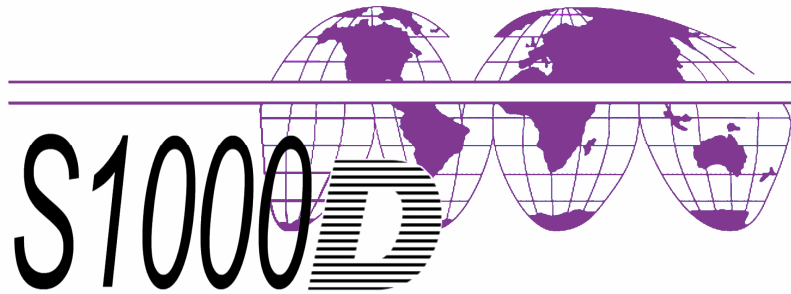


ICN

- MI: identify the different functions of a system
- SDC: identify the different functions of a system
- SNS: identify the equipment breakdown System
- RPC: company or organization responsible for the illustration
- Cage Code: manufacturer code
- Unique identifier: identify a unique illustration
- Variant Code: identify the variants of a basic illustration
- Issue number: issue of the illustration
- Secutity classification: classification of the illustration

Illustrations

- Why have them?
 - To clarify text
 - To avoid lengthy explanations
 - When information cannot be conveyed through text
 - Ease in multi lingual situations
- Hot spotting to allow 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

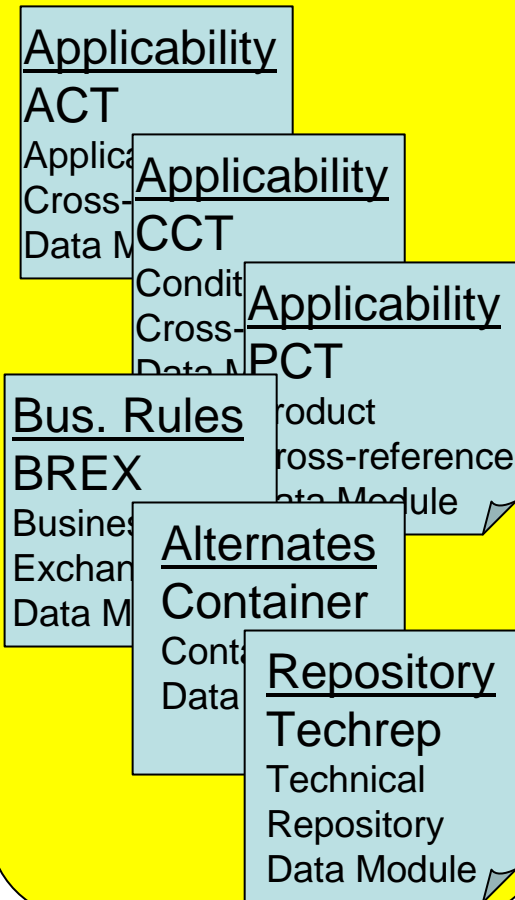


Schema principles and package

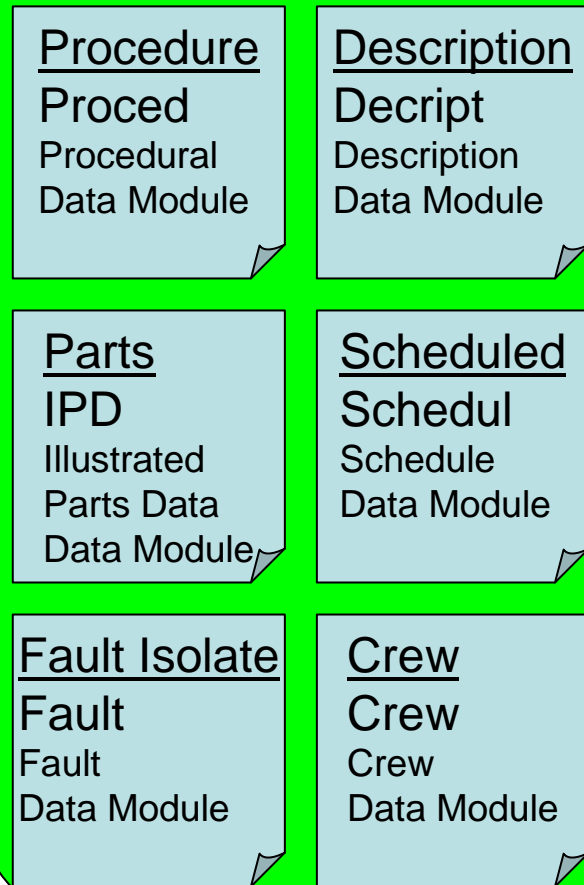


Types of data modules

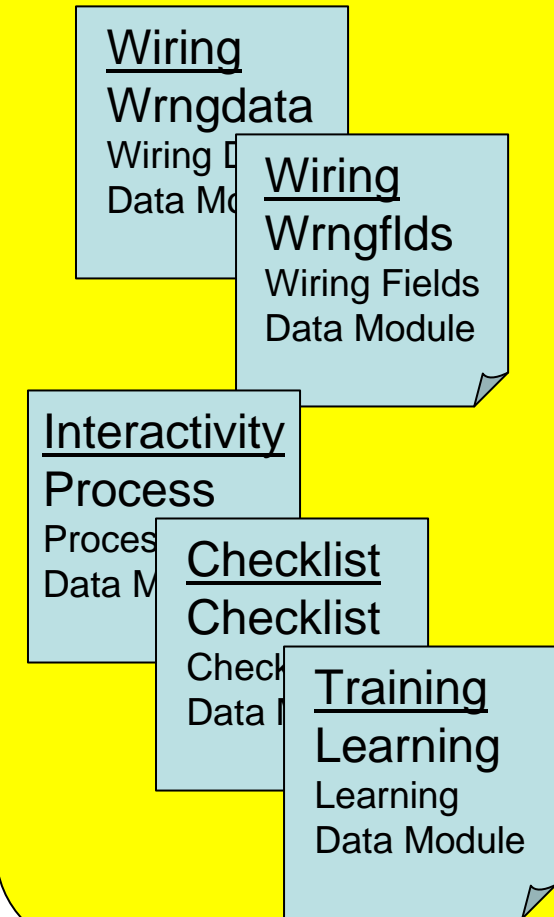
Supporting Data



Traditional S1000D



Specific concepts





Traditional Data Modules & objects

Spec Issue								Doctype	Description
1.9	2.0	2.1	2.2	2.3	3.0	4.0	4.1		
X	X	X	X	X	X	X	X	Crew	Operator information
X	X	X	X	X	X	X	X	Descript	Descriptive
X	X	X	X	X	X	X	X	Fault	Fault Isolation
X	X	X	X	X	X	X	X	IPD	Illustrated parts Data (for S2000M and non S2000M project)
X	X	X	X	X	X	X	X	Proced	Procedural Information
X	X	X	X	X	X	X	X	Schedul	Maintenance schedules
	X	X	X	X	X	X	X	DDN	Data dispatch notes
	X	X	X	X	X	X	X	DML	Data Module List
	X	X	X	X	X	X	X	PM	Publication module

Supporting Data Modules

Spec Issue								Doctype	Description
1.9	2.0	2.1	2.2	2.3	3.0	4.0	4.1		
					X	X	X	Appliccrossreftable	Cross reference of many applicability statements
	X	X	X	X	X	X	X	BREX	Business rules Exchange
							X	Comrep	List of common objects on the repository
					X	X	X	Condcrossreftable	List of conditions that may affect applicability
					X	X	X	Container	A way of linking different DMC with a master 'container' DMC
					X	X	X	Prdcrossreftable	A list of product instances – links to the physical product
					X	X	No	Techrep	List of re useable objects
							X	Update	Incremental updates



Specific concepts Data Modules & objects

Spec Issue								Doctype	Description
1.9	2.0	2.1	2.2	2.3	3.0	4.0	4.1		
						X	X	Checklist	Maintenance checklists and inspections
						X	X	Learning	Learning plan information
	X	X	X	X	X	X	X	Process	Interactive Process information
							X	Sb	Service Bulletin information
							X	Scocontent	Scorm course content
						X	X	Scormcontentpackage	Scorm course publication
	X	X	X	X	X	X	X	Wrngdata	Wire and harness data information
	X	X	X	X	X	X	X	Wrngflds	Wiring data description information
	X	X	X	X	X	X	X	Comment	Commenting
				X	X	X	X	XCF	XML companion file



XML Schema Package

S1000D_4-0

ent

Iso Entities

lom_schema

Lerning Object Model Schemas

samples

Bike package

(S1000D implementation samples)

samples_master

xml_schema_cat

XML Catalogue

xml_schema_doc

XML Schema Documentation

xml_schema_flat

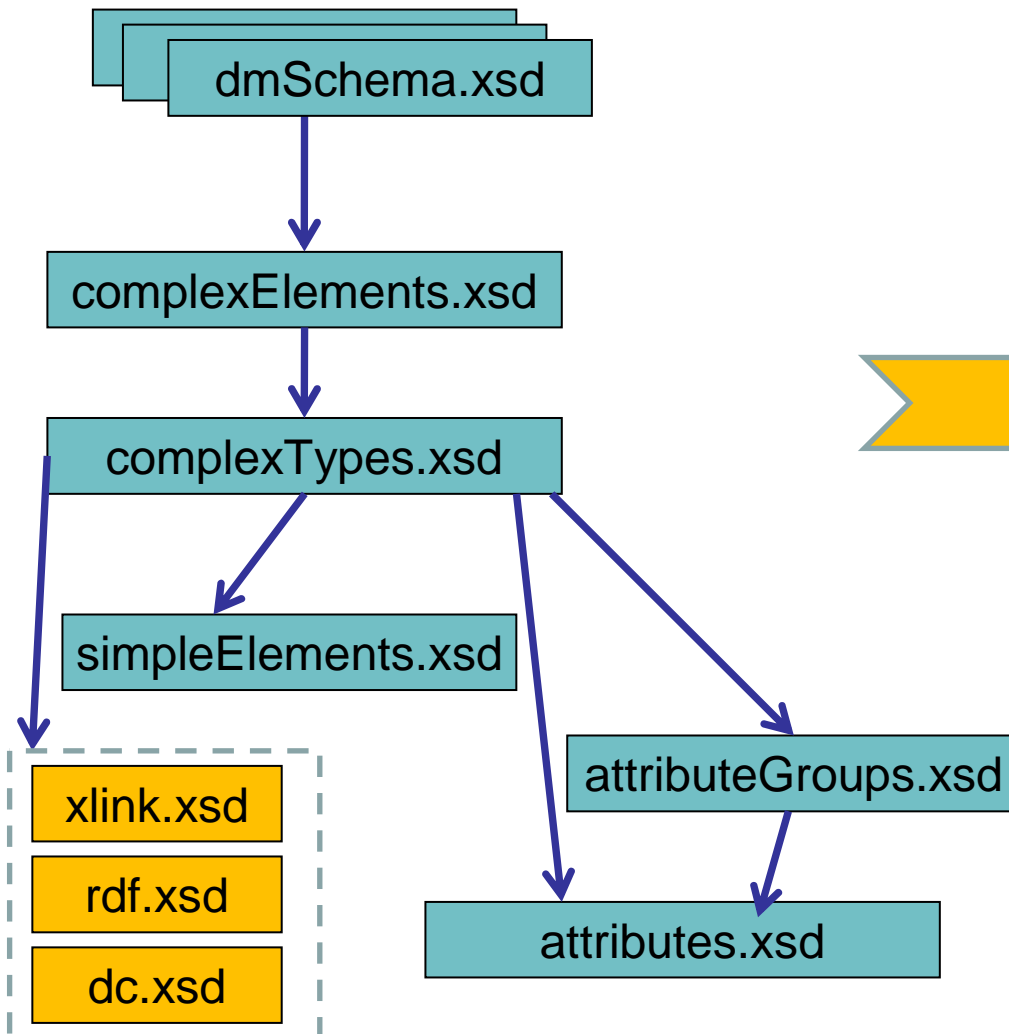
xml_schema_master

XML Schemas

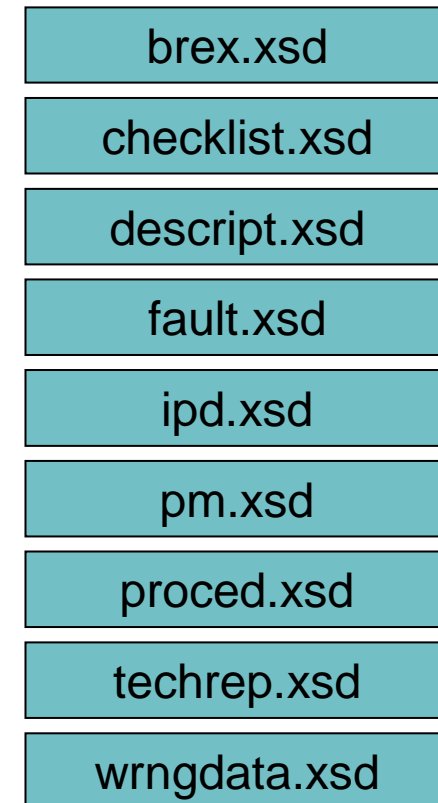
xcf_schema_master

XML Schema Master vs. Flat

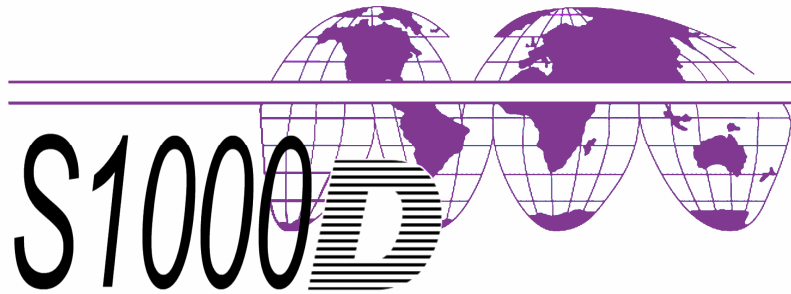
XML Schema Master



XML Schema Flat



.....



Advanced concepts of Issue 4.0 & 4.1





Highlights - 4.0

- **Main changes**

- Identification and status section
- Steps and paragraphs
- Warnings, cautions, and notes
- Hotspots
- Process data module
- Publication module
- References
- Information codes
- IPD data module
- Preliminary requirements
- BREX data module
- Schema cleanup
- Technical information repository data module
- Schedule data module
- Checklist data module
- Training
- Comment schema

- **Summary**

- Predominately changes for US ARMY
- Issue 4.0 is a complete revision of the specification, so no change marks appear.
 - Schema construct and name changes greatest aspect and biggest impact



S1000D Issue 4.0 main areas

- Business Rules
- Applicability
 - ACT
 - CCT
 - PCT
- Container alternate
- Technical Repositories
- Learning
- Process DM
- Maintenance checklist



Issue 4.1 Advanced concepts

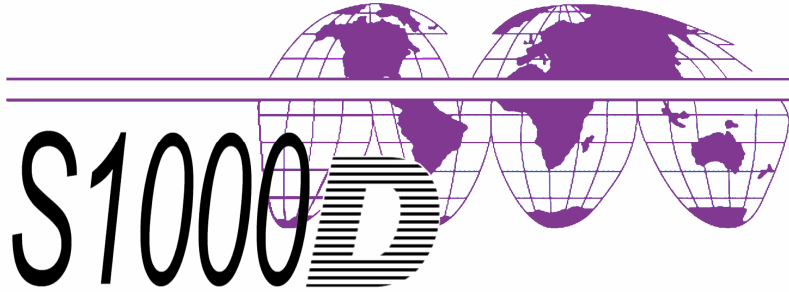
- Generic IPD
 - S2000M or non S2000M project support
- Common Information Repository (CIR)
- Service Bulletins (SB)
- Incremental updates

*Topics discussed in details during this User Forum:
Wednesday , September 29 (morning)*



Guidance in S1000D

- Web Site www.s1000d.org
 - S1000D™ specification
 - Default BREX data module
 - XML Schema Package + Bike samples
- The mapping tool (for issue 4.0)
- White paper



S1000D Users Forum 2010

“Application of S1000D within a state-of-the-art Integrated Logistic Support environment”

**September 27 - September 30, 2010
Aerostar Hotel, Moscow, Russia**

S1000D Tutorials
Svante Ericsson – Nicolas Dupuy
Corena PTC







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.
- The S1000D 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.



Applicability A New Approach

- Prior to Issue 3.0:
 - Specific structure was used to specify values to a small set of product properties (model, version, etc)
 - Inflexible
 - Suitable for paper output (no rules for computer interpretation)
- Issue 3.0 replaced with a completely new concept
 - Flexible framework where the data provider chooses the product properties and operational conditions to use for applicability
 - Computing rules are associated with the statement structure
 - A system where both the human and the computer can understand and act upon the applicability statement
 - Allows for (this is optional) IETP viewers to filter information to the end user based on applicability

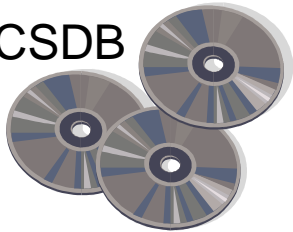
Conceptual Overview

Product Definition

Author (Applic)



CSDB



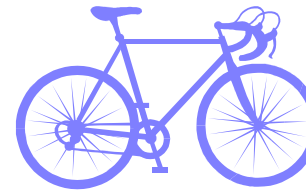
Product
Attributes (**ACT**)



Conditions (**CCT**)

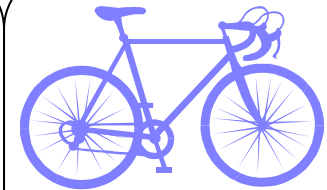


Product List (**PCT**)



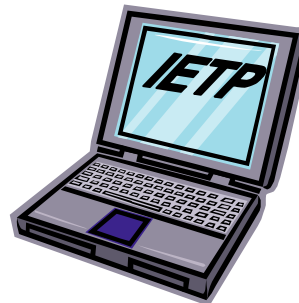
Serial: 002
Model: BKTRK
Series: 2
Frame: Steel

Brakes: Tekro
Headlight: False
SB-BT-3: Post



Serial: 001
Model: BKTRK
Series: 1
Frame: Aluminum

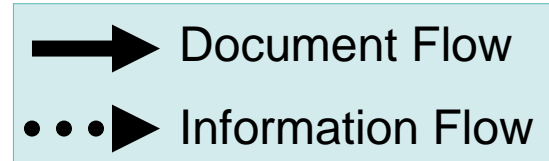
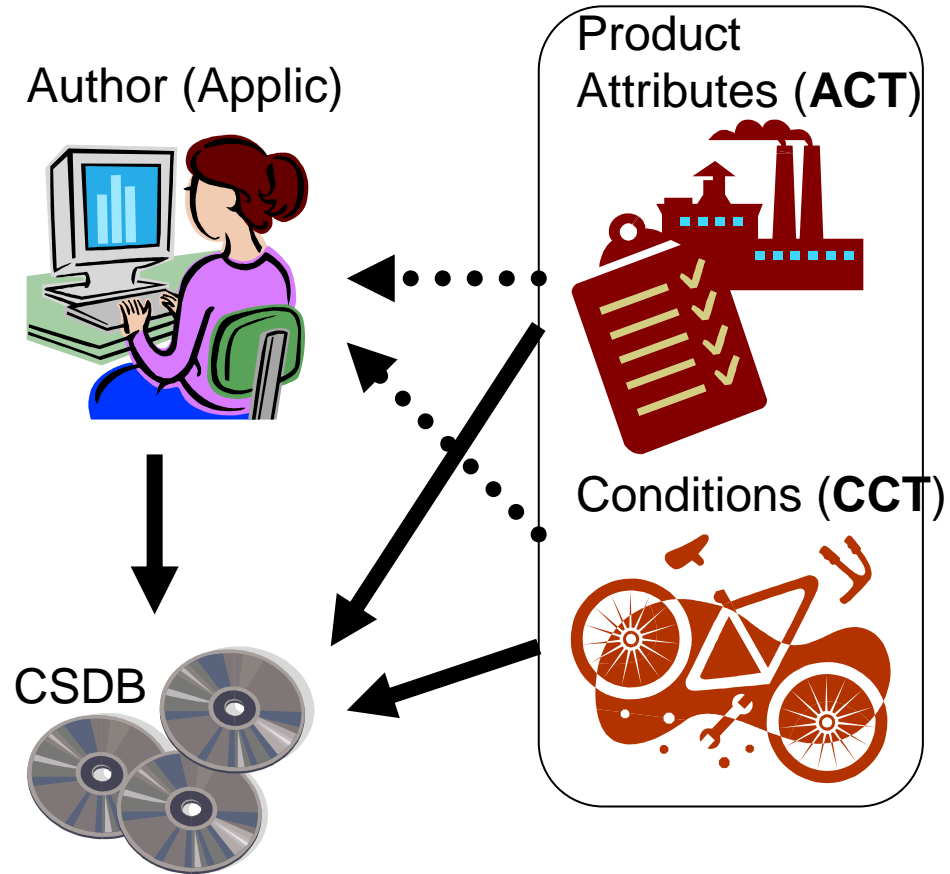
Brakes: Shimano
Headlight: False
SB-BT-3: Pre



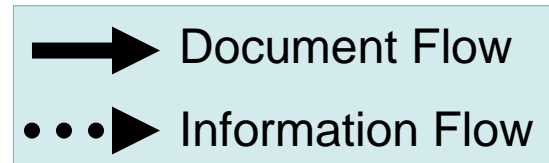
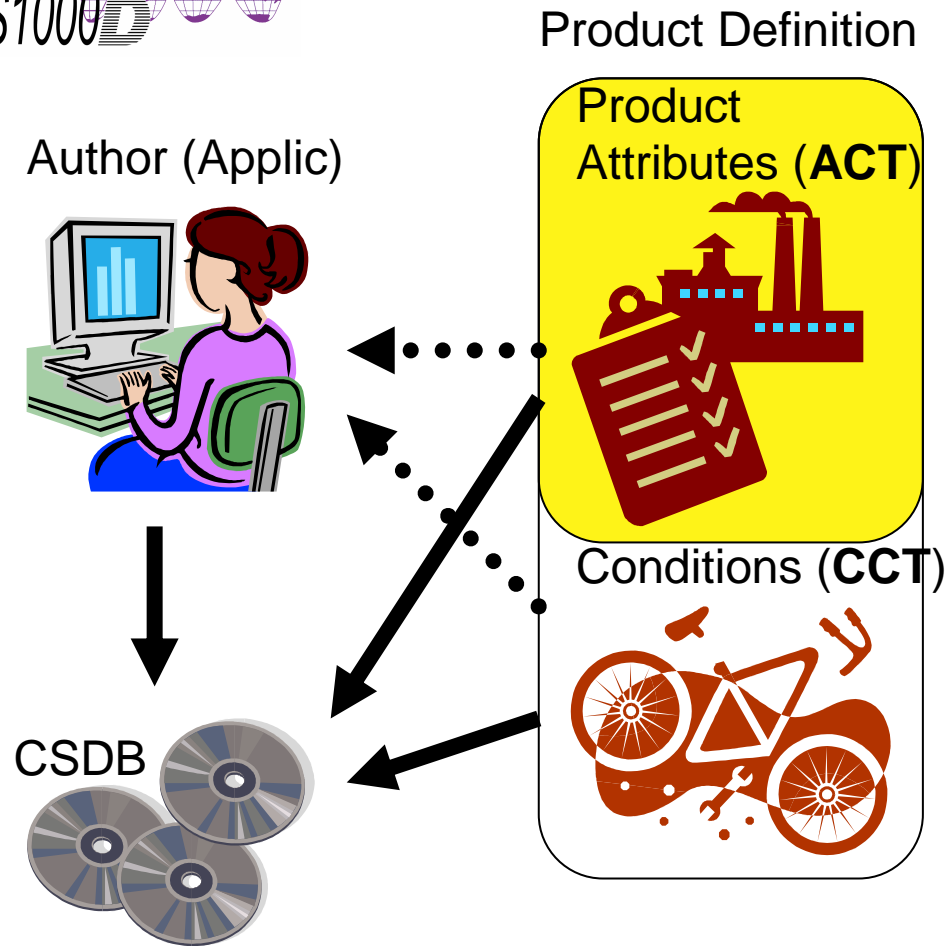
→ Document Flow
...→ Information Flow

Conceptual Overview

Product Definition



Example: Product Attributes





Example: Product Attributes

```
<productattributes>
```

```
  <prodattr id="serialno">
```

```
    <name>Serial number</name>
```

```
    <description>Serial number</description>
```

```
  </prodattr>
```

```
  <prodattr id="model">
```

```
    <name>Model</name>
```

```
    <description>Model</description>
```

```
    <enum actvalues="BKTRK"/>
```

```
  </prodattr>
```

```
  <prodattr id="series">
```

```
    <name>Series</name>
```

```
    <description>Model series</description>
```

```
    <enum actvalues="1~3"/>
```

```
  </prodattr>
```

```
  <prodattr id="frame">
```

```
    <name>Frame type</name>
```

```
    <description>The frame material</description>
```

```
    <enum actvalues="Steel|Aluminum"/>
```

```
  </prodattr>
```

```
</productattributes>
```

Serial number
with open text

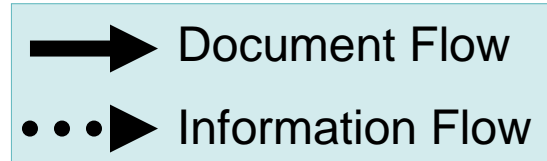
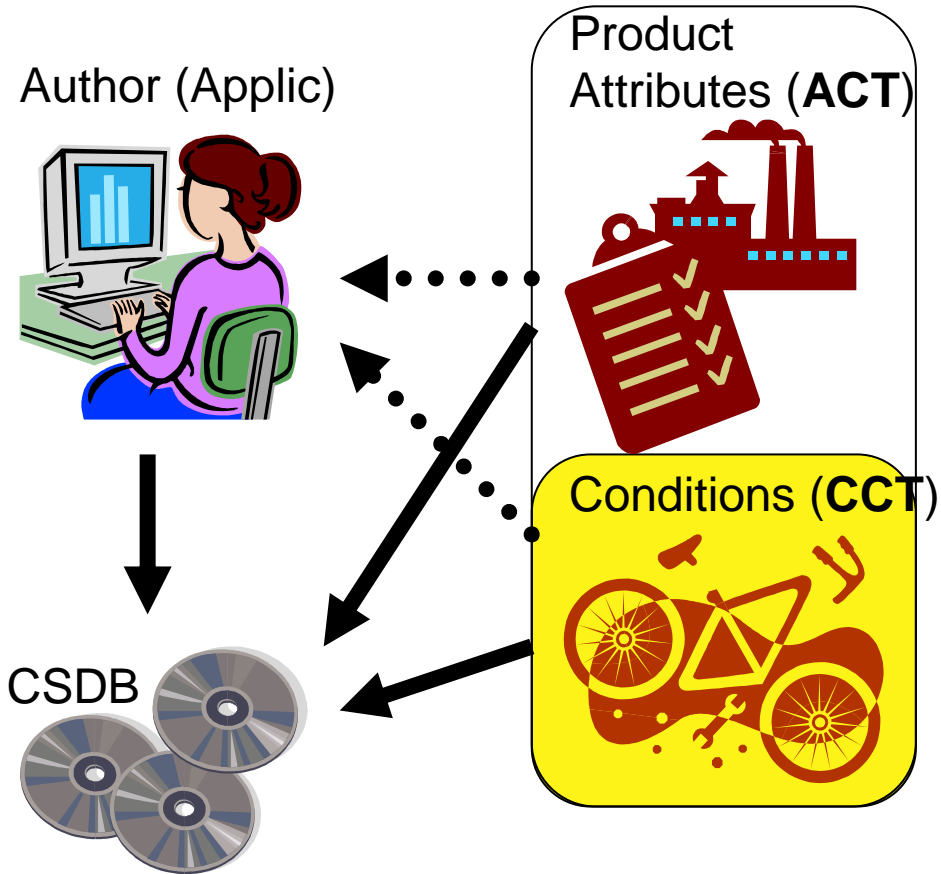
Model with one
value allowed

Series with three
values allowed

Frame type with
two values
allowed

Example: Conditions

Product Definition





Example: Conditions

<conditionlist>

<condition id="brakes" condtyperef="brakeType">

<name>Brakes</name>

<description>Brand of brakes installed</description>

</condition>

<condition id="HDLT-2A" condtyperef="optEquip">

<name>Headlight installed</name>

<description>Headlight kit HDLT-2A installed</description>

</condition>

<condition id="SB-BT-3" condtyperef="sbType">

<name>Chain guard (SB-BT-3)</name>

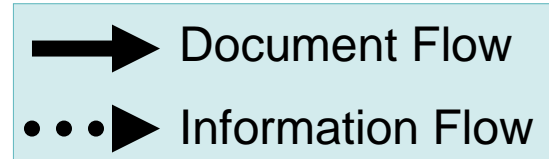
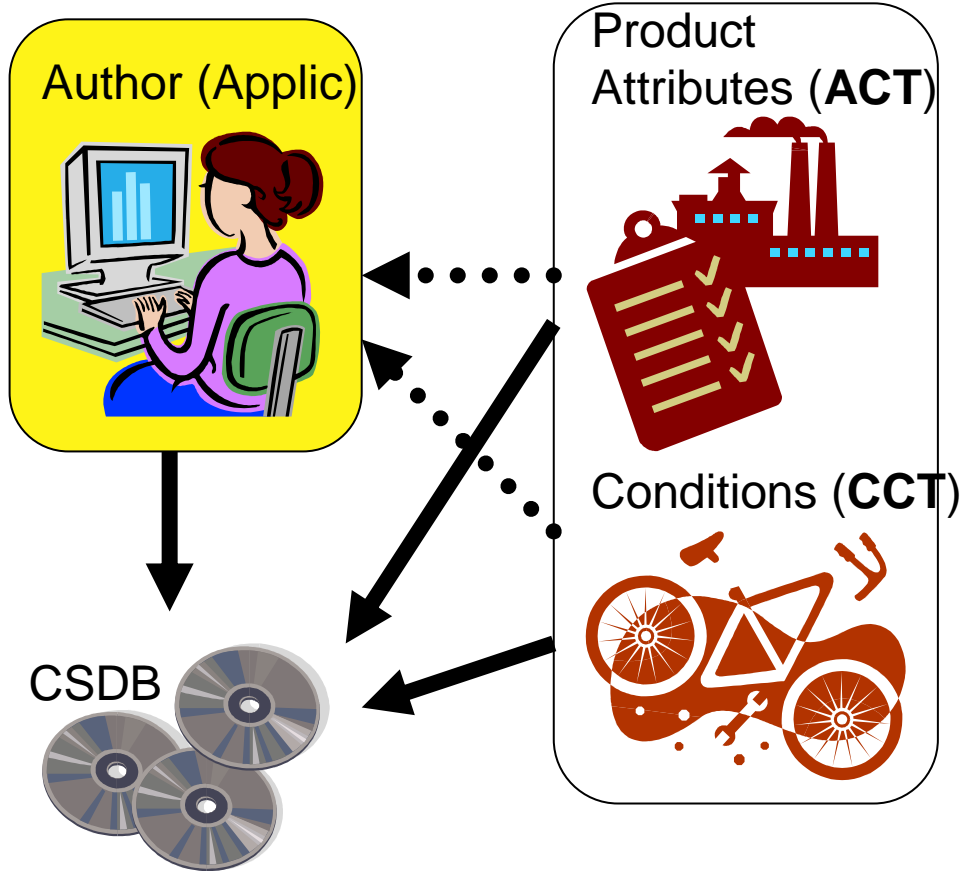
<description>Chain guard service bulletin embodied
(SB-BT-3)</description>

</condition>

</conditionlist>

Example: Applicability Model

Product Definition





Example: Applicability Model

```
<applic>  
  <displaytext>S/N 200-350</displaytext>  
  <assert actidref="serialNo" actreftype="prodatt"  
    actvalues="200~350"/>  
</applic>
```



Example: Applicability Model

```
<applic>
  <displaytext>Model Brook trekker-1 S/N 200-350</displaytext>
  <evaluate oper="and">
    <assert actidref="model" actreftype="prodattr"
      actvalues="BKTRK"/>
    <assert actidref="series" actreftype="prodattr"
      actvalues="1"/>
    <assert actidref="serialNo" actreftype="prodattr"
      actvalues="200~350"/>
  </evaluate>
</applic>
```

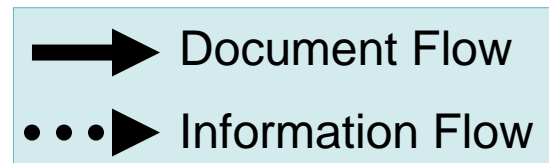
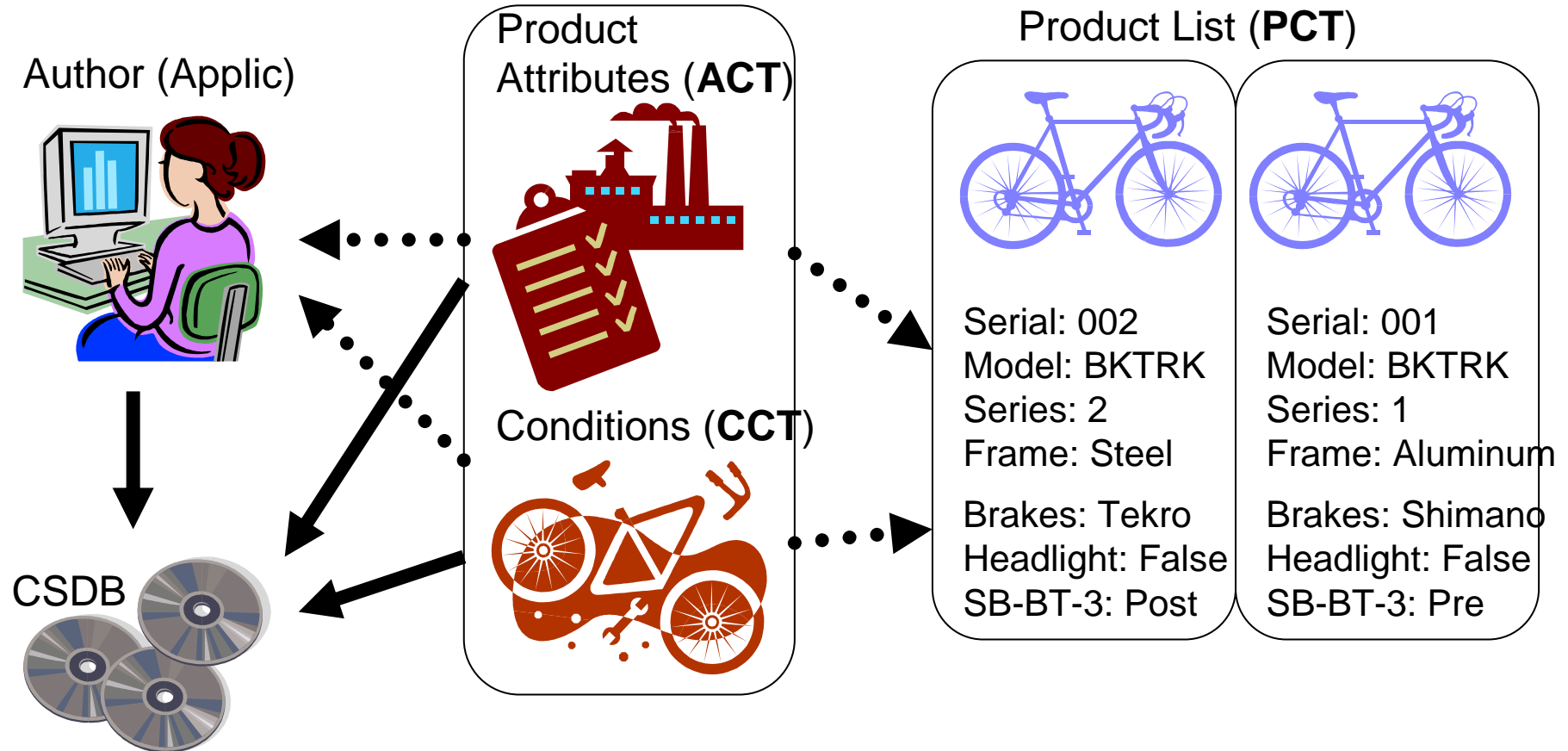


Example: Applicability Model

```
<applic>
  <displaytext>
    S/N 1-10 with Tekro brakes; S/N 1-20 with Shimano brakes
  </displaytext>
  <evaluate oper="or">
    <evaluate oper="and">
      <assert actidref="serialNo" actreftype="prodattr" actvalues="1~10"/>
      <assert actidref="brakes" actreftype="condition" actvalues="Tekro"/>
    </evaluate>
    <evaluate oper="and">
      <assert actidref="serialNo" actreftype="prodattr" actvalues="1~20"/>
      <assert actidref="brakes" actreftype="condition" actvalues="Shimano"/>
    </evaluate>
  </evaluate>
</applic>
```

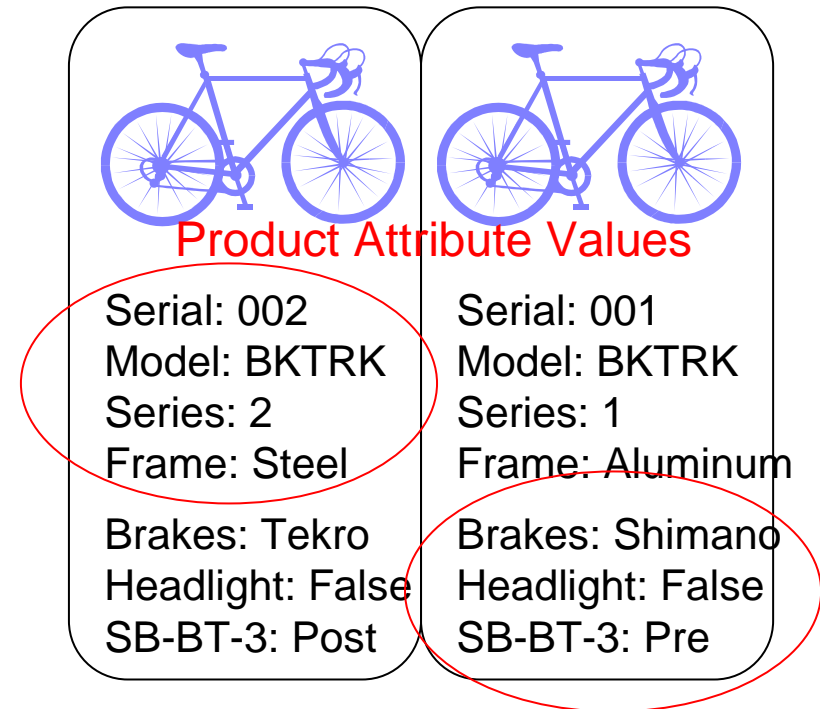

Conceptual Overview

Product Definition

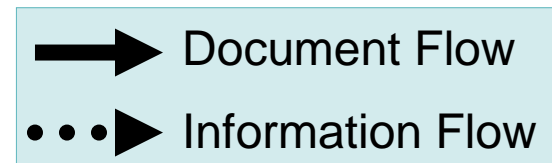


Conceptual Overview

Product List (PCT)



Condition Values



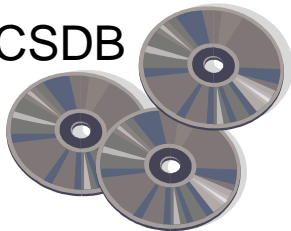
Example: Product List

Product Definition

Author (Applic)



CSDB



Product
Attributes (ACT)



Conditions (CCT)

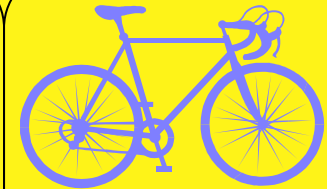


Product List (PCT)



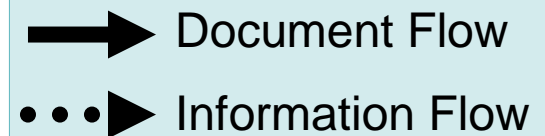
Serial: 002
Model: BKTRK
Series: 2
Frame: Steel

Brakes: Tekro
Headlight: False
SB-BT-3: Post



Serial: 001
Model: BKTRK
Series: 1
Frame: Aluminum

Brakes: Shimano
Headlight: False
SB-BT-3: Pre





Example: Product List

<pct>

<product>

<assign actidref="serialno" actreftype="prodattr" actvalue="001"/>

<assign actidref="model" actreftype="prodattr" actvalue="BKTRK"/>

<assign actidref="series" actreftype="prodattr" actvalue="1"/>

<assign actidref="frame" actreftype="prodattr" actvalue="Aluminum"/>

<assign actidref="brakes" actreftype="condition" actvalue="Shimano"/>

<assign actidref="HDLT-2A" actreftype="condition" actvalue="False"/>

<assign actidref="SB-BT-3" actreftype="condition" actvalue="Pre"/>

</product>

<product>

<assign actidref="serialno" actreftype="prodattr" actvalue="002"/>

<assign actidref="model" actreftype="prodattr" actvalue="BKTRK"/>

<assign actidref="series" actreftype="prodattr" actvalue="2"/>

<assign actidref="frame" actreftype="prodattr" actvalue="Steel"/>

<assign actidref="brakes" actreftype="condition" actvalue="Tekro"/>

<assign actidref="HDLT-2A" actreftype="condition" actvalue="False"/>

<assign actidref="SB-BT-3" actreftype="condition" actvalue="Post"/>

</product>

</pct>

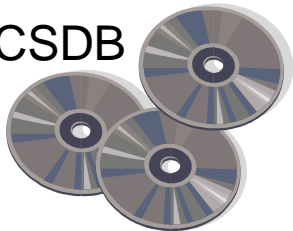
Conceptual Overview

Product Definition

Author (Applic)



CSDB



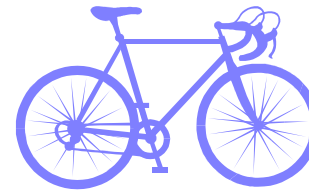
Product
Attributes (**ACT**)



Conditions (**CCT**)

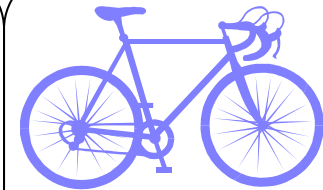


Product List (**PCT**)



Serial: 002
Model: BKTRK
Series: 2
Frame: Steel

Brakes: Tekro
Headlight: False
SB-BT-3: Post



Serial: 001
Model: BKTRK
Series: 1
Frame: Aluminum

Brakes: Shimano
Headlight: False
SB-BT-3: Pre



→ Document Flow

...→ Information Flow



Conceptual Overview



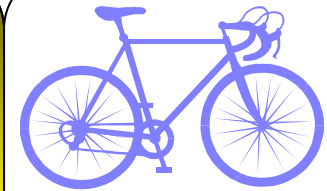
CSDB



Product List (PCT)



Serial: 002
Model: BKTRK
Series: 2
Frame: Steel
Brakes: Tekro
Headlight: False
SB-BT-3: Post



Serial: 001
Model: BKTRK
Series: 1
Frame: Aluminum
Brakes: Shimano
Headlight: False
SB-BT-3: Pre

→ Document Flow
...▶ Information Flow

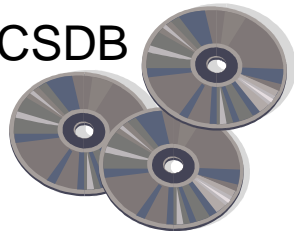
Conceptual Overview

Product Definition

Author (Applic)



CSDB



Product
Attributes (**ACT**)



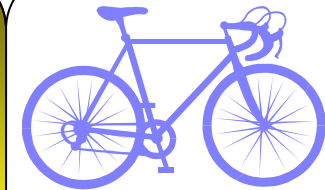
Conditions (**CCT**)



Product List (**PCT**)



Serial: 002
Model: BKTRK
Series: 2
Frame: Steel
Brakes: Tekro
Headlight: False
SB-BT-3: Post



Serial: 001
Model: BKTRK
Series: 1
Frame: Aluminum
Brakes: Shimano
Headlight: False
SB-BT-3: Pre

→ Document Flow
...→ Information Flow



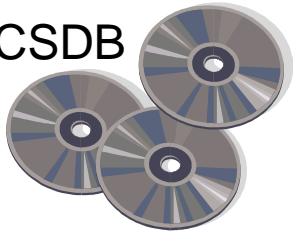
Conceptual Overview

Product Definition

Author (Applic)



CSDB



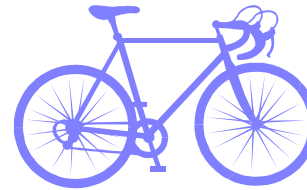
Product
Attributes (**ACT**)



Conditions (**CCT**)

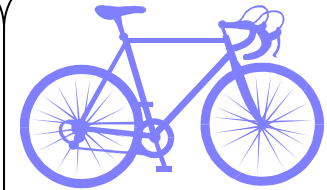


Product List (**PCT**)



Serial: 002
Model: BKTRK
Series: 2
Frame: Steel

Brakes: Tekro
Headlight: False
SB-BT-3: Post



Serial: 001
Model: BKTRK
Series: 1
Frame: Aluminum

Brakes: Shimano
Headlight: False
SB-BT-3: Pre



→ Document Flow
...→ Information Flow

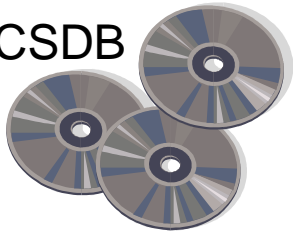
Conceptual Overview

Product Definition

Author (Applic)



CSDB



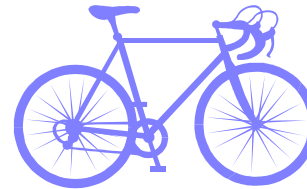
Product
Attributes (**ACT**)



Conditions (**CCT**)

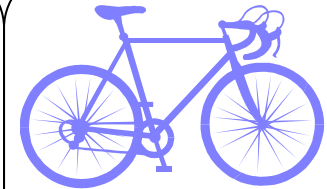


Product List (**PCT**)



Serial: 002
Model: BKTRK
Series: 2
Frame: Steel

Brakes: Tekro
Headlight: False
SB-BT-3: Post



Serial: 001
Model: BKTRK
Series: 1
Frame: Aluminum

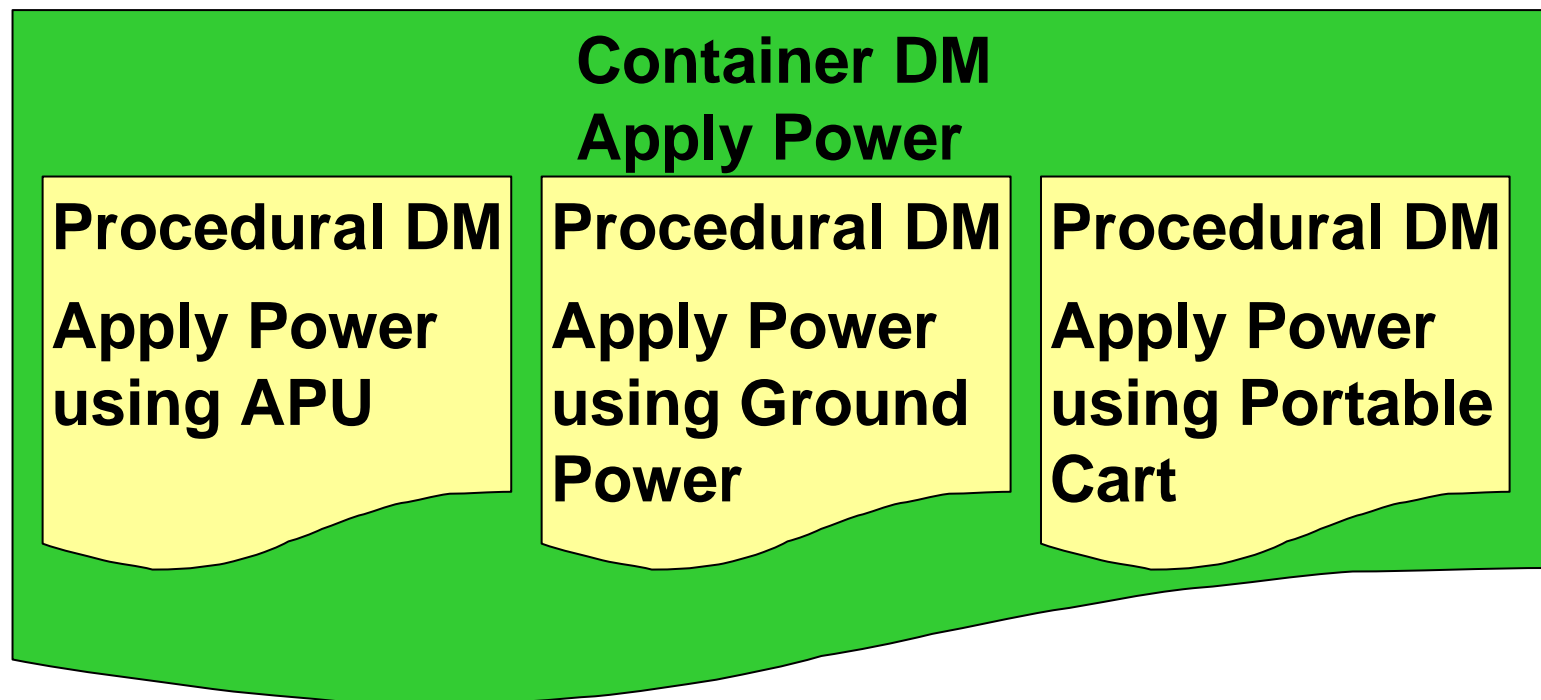
Brakes: Shimano
Headlight: False
SB-BT-3: Pre



→ Document Flow
...→ Information Flow

Container

- A Container DM is used group DMs together that achieve the same maintenance goal
- Container DM references the other DMs

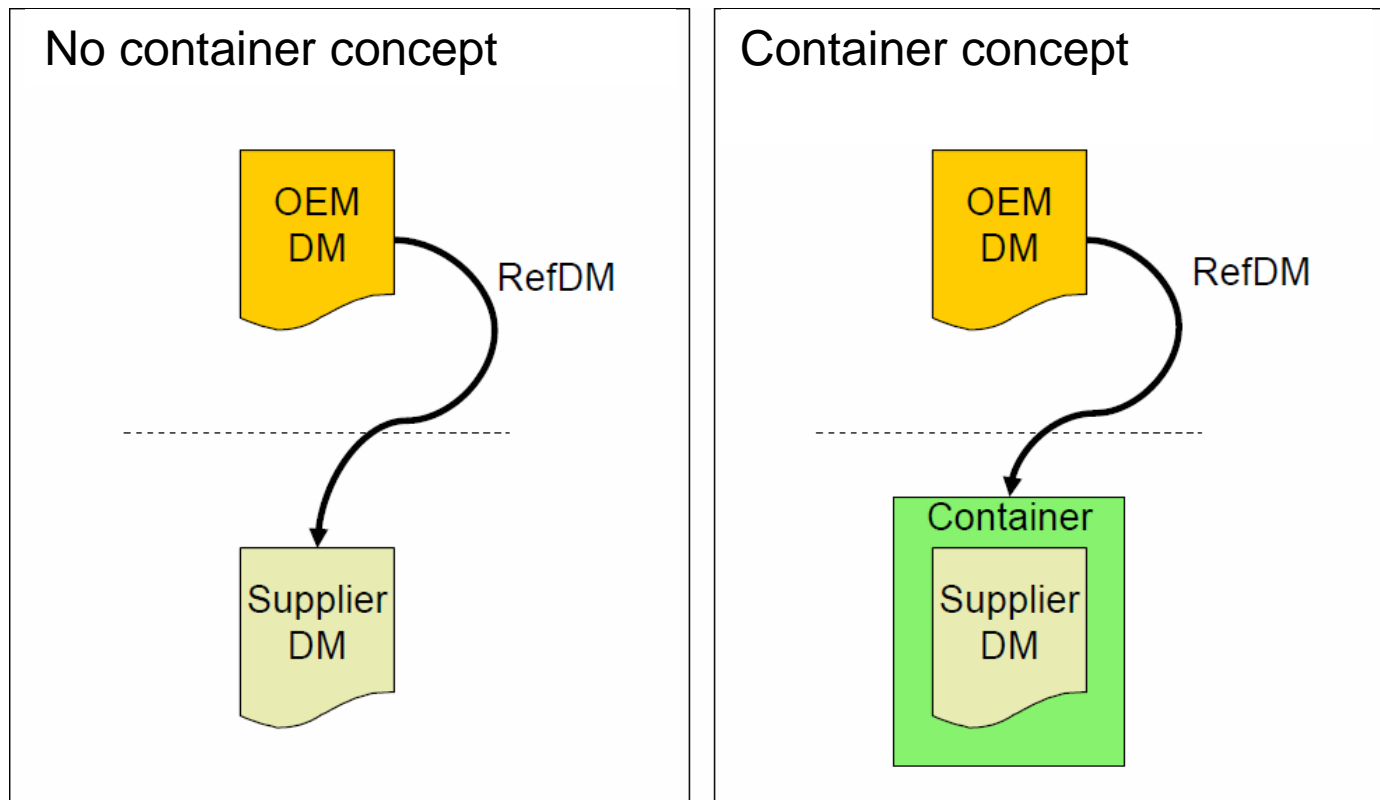




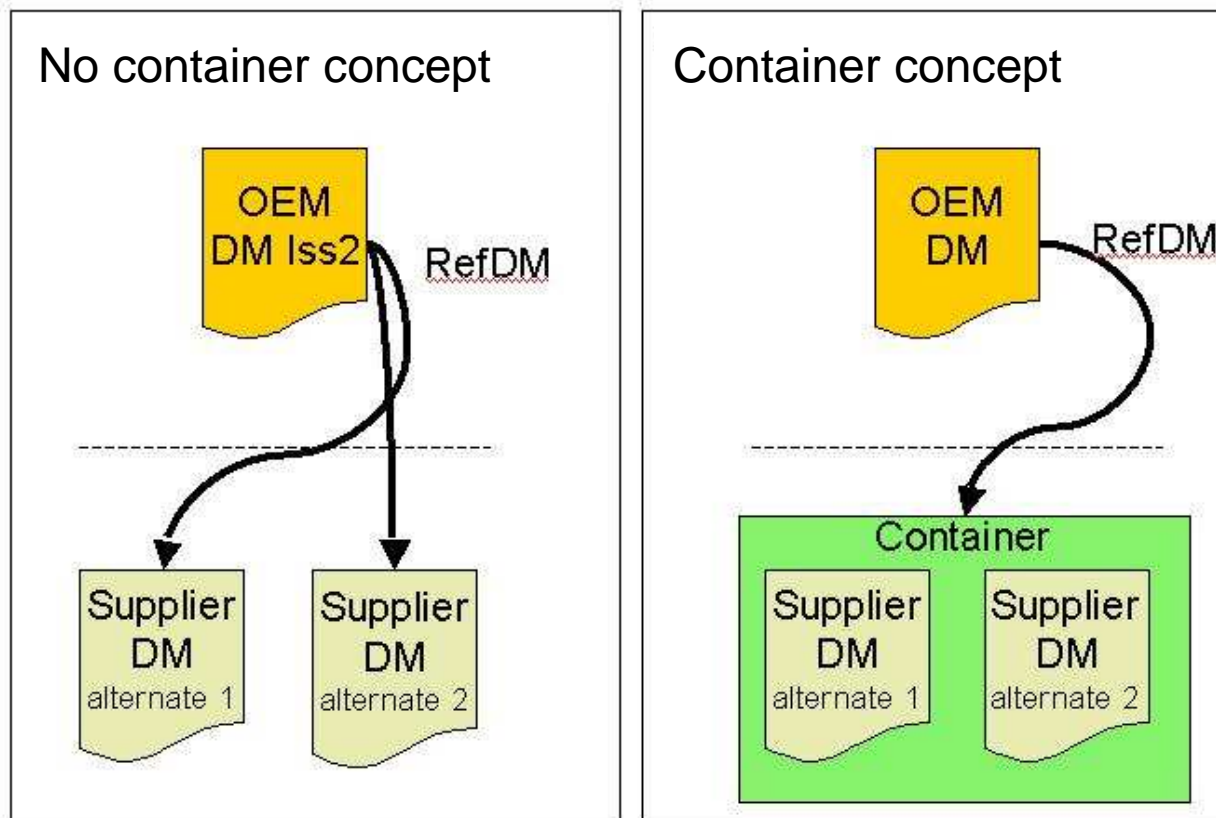
Concept

- The Container DM can also be used to isolate referencing DMs when the references change
- Examples:
 - Taking the previous example with applying power, suppose a new power source (Apply Power DM) is added
 - Suppose a supplier adds an alternate method in the data they provide to the integrator

Principle



Principle

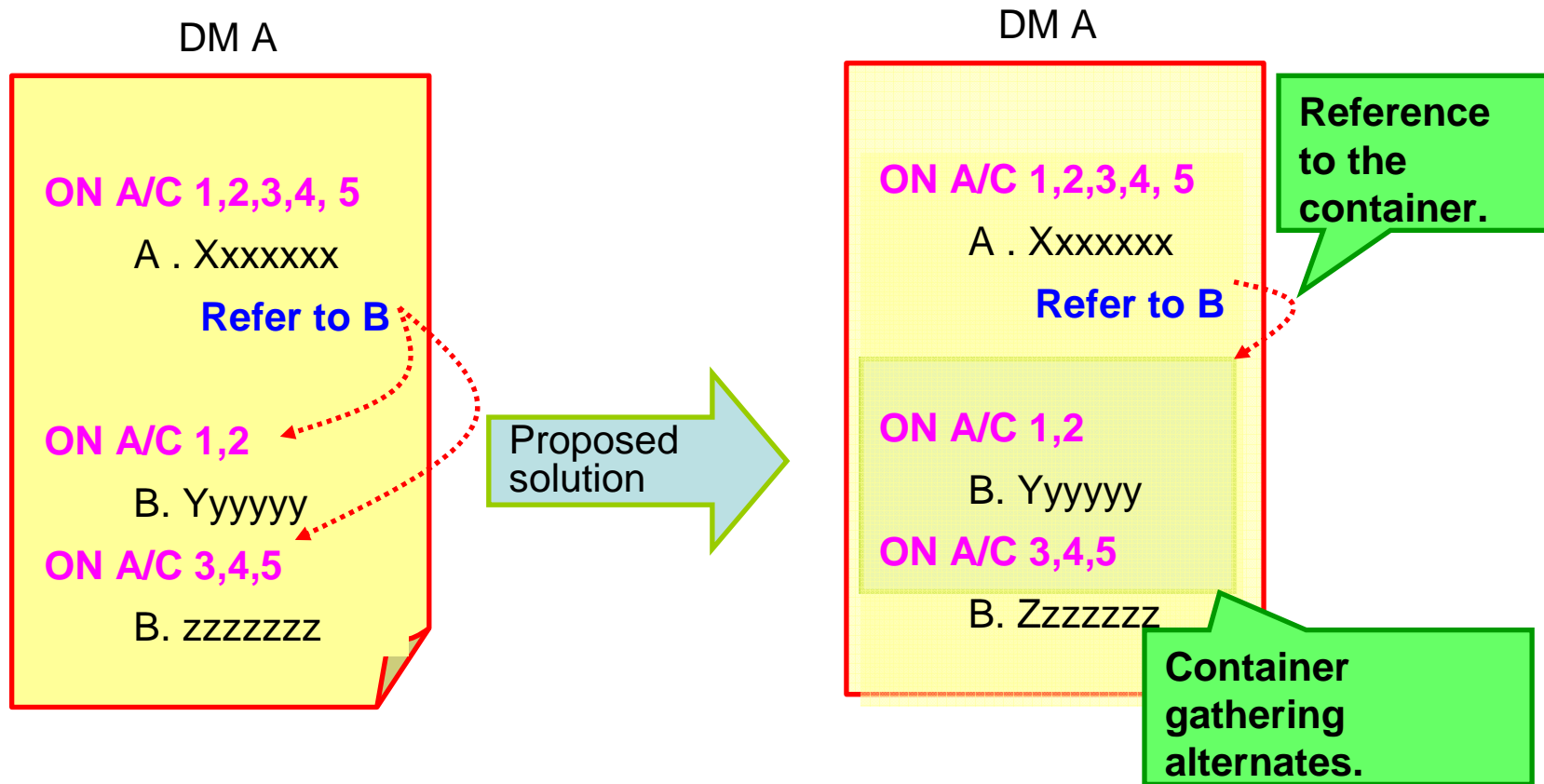




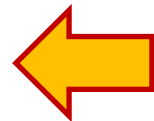
Container in a DM

- New concept proposed for Issue 4.1 is to do the same thing, but within the content of a DM
 - Using the container concept to capture alternate links dependent on applic for instance.

Container Alternate in DM



Remark: in case a new alternate B is created for A/C 6 in a later DM issue, there is no need to create a new alternate A

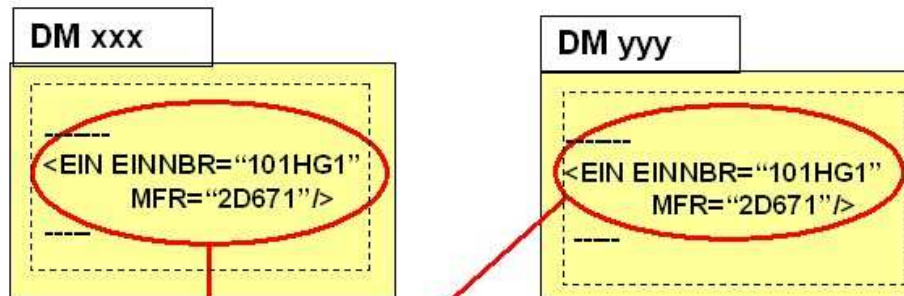


Technical repository

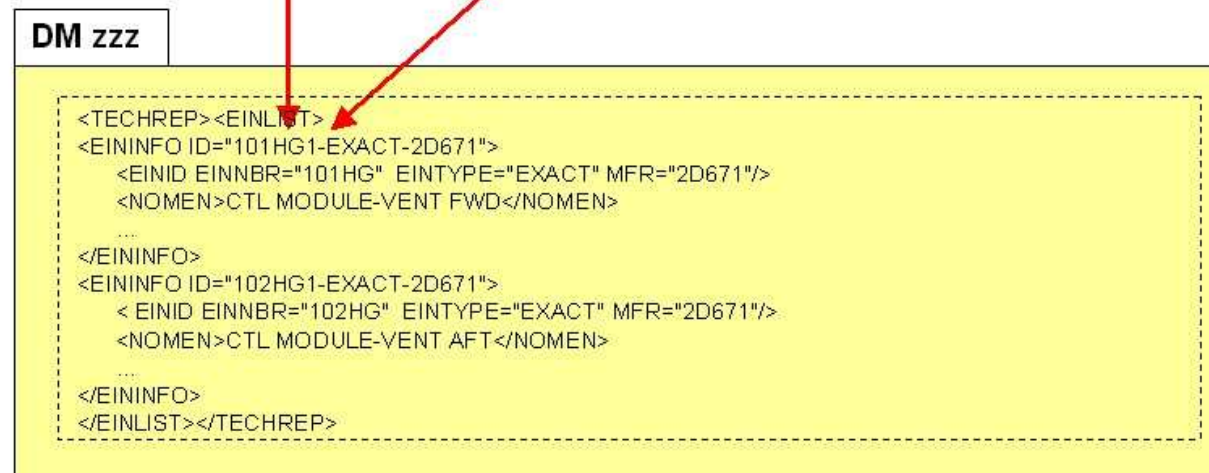
- Introduced into the specification at Issue 2.3 as a new DM type
- Support the exchange of collections of support data
 - Foster reuse – small pieces of information referenced from many places
 - Reduce redundancy – write once, use many times
 - Like containers not necessarily to be used in output
- How can you implement it
 - Two main methods
 - Internal to an organisation and external as part of the deliverable

Principle

Data modules



Technical
information
repository
data module



Repository Types

- Currently supported (Issue 4.0)
 - Functional item numbers
 - Circuit breakers
 - Parts
 - Zones
 - Access points
 - Tools
 - Enterprises
 - Supplies
 - Support equipment
 - Physical / functional areas (breakdown)
 - Controls and indicators
- Added in Issue 4.1
 - Warnings and cautions
 - Applicability

