



Rolls-Royce

Project implementation of S1000D

Lessons learned

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Another opportunity to excel!

- The excitement -



Congratulations!

Your
manager



Celebration!

Your excited but have no
knowledge of S1000D and you're
probably wondering . . .



WHAT DO WE DO NOW?

Another opportunity to excel!

- The realities -

- Ours was the only S1000D compliant project using XML for our company in Continental Europe.



- Our mood varied from day to day as we moved forward and learned more and more about S1000D and what we need to do to make the project work. But we wondered:

What do we have to do to make our project a success?

So what do you need to do?

- Create a workable Data Module Requirements List (DMRL).
- Gather the required Source Data (SD).
- Become an expert on S1000D - Chapters 3 and 4.
- Assemble and train an authoring / Quality Assurance (QA) team.
- Build workable schemas and create a valid Business Rules Checker (BRC) that incorporates the customer's ever changing Business Rules (BR).
- Write and QA like mad.
- **Now that was simple, wasn't it?**

Focus on the key points!

- Define the structure of your project.
- Learn about S1000D.
- Understand Business Rules.
- Master the basics of XML and schemas.
- Be prepared for change.
- Develop a Business Rules Checker.

Project structure

- The project team -

- Ours was a three man team whose responsibilities tended to result in each of us having a specialty.
- You might think of us as the “three kings”.
 - The DMRL King
 - The SD King
 - The S1000D King
- Each brought something special to the table and together we accomplished a few small miracles!



Project structure

- Partner companies -

- In addition to physical distance from our Partner Companies (PC) we had to deal with:
 - Availability of our counterparts.
 - Challenges about sharing / certifying source data.
 - Gaining support for our project when the PC was not being compensated for the work we needed.
 - Extensive use of telephone and e-mail to raise and resolve questions or allow the PC to QA data modules.



You have to develop a strong follow-up / tracking system to keep tabs on all the message flow, especially, SD and QA matters.

Project structure

- The authoring team -

- We used a third-party authoring team while retaining QA at our level.
- Like us, our authoring team had no previous exposure to S1000D, XML or using schemas.
- Nonetheless, we had little doubt of future success after we were introduced to some of the authors and our lead illustrator. They included:



Hawthorne



Dickens



Shakespeare



Van Gogh

Project structure

- The customer -

- Our customer would supply the engine together with all the engine related maintenance data modules we produced to the airframer. The airframer would:
 - Manage the Common Source Data Base (CSDB) and perform the final QA on our data modules.
 - Manage initial and revision deliveries to multiple customers.
 - Work with the various end users to develop consensus on the selection of business rules decisions as the project progressed. Over the course of two years we worked through four iterations of BR's plus two releases of the Engine Documentation Instruction Manual (EDIM).

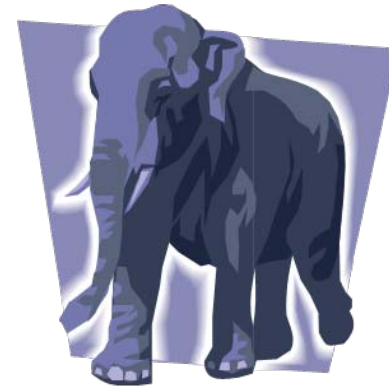
Project structure

- The customer and us -

- Because the engine was in development approximately two years ahead of the rest of the airframe this posed some interesting challenges. They included:
 - Our project was really on the cutting edge of learning how to implement using S1000D.
 - We discovered that because of the gap in deliverables we were producing DM's while our customer's ability to provide firm QA feedback was not developed until later in the project.
 - As the end users were still defining the structure of the final deliverables it was not until well after project inception that we finally had a final "hard" set of business rules to guide the production of data modules.

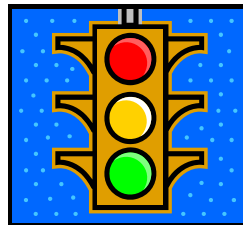
Learning to read and understand S1000D

- S1000D is a **BIG** specification. If you haven't noticed:
 - Issue 2.2 is 2315 pages
 - Issue 2.3 is 2588 pages
 - Issue 3.0 is 2593 pages
 - Issue 4.0 is 2762 pages
- How do you eat an elephant?
 - **One bite at a time!**
- Where do you start?
 - Look at the Table of Contents for Chapters 3 and 4.
 - Look at your BR's and you will probably see that it spends a lot of time discussing decisions dealing with Chapters 3 and 4.



Learning to read and understand S1000D

- Make a PDF copy of the index to Chapters 3 and 4. Why? To gain some balance on where you need to focus.



- The green items are straightforward. Read and understand what is in S1000D.
- The yellow items will require you to modify the affected chapters to comply with the business decisions.
- The red items are not a part of your project so mark-out and forget.

AE-TPSMG-01000-00

Chapter 3 Information generation

| Table of contents | Document |
|-------------------|---|
| Chap 3 | Information generation - Introduction AE-A-03-00-0000-00A-040A-A |
| Chap 3.1 | Information generation - Data modules AE-A-03-01-0000-00A-040A-A |
| Chap 3.2 | Information generation - Information sets AE-A-03-02-0000-00A-040A-A |
| Chap 3.3 | Information generation - Zoning and access AE-A-03-03-0000-00A-040A-A |
| Chap 3.4 | Information generation - Updating data module AE-A-03-04-0000-00A-040A-A |
| Chap 3.5 | Information generation - Security and data restrictions AE-A-03-05-0000-00A-040A-A |
| Chap 3.6 | Information generation - Quality assurance AE-A-03-06-0000-00A-040A-A |
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| Chap 3.8 | Information generation - Authoring AE-A-03-08-0000-00A-040A-A |
| Chap 3.9 | Authoring - General writing rules AE-A-03-09-0100-00A-040A-A |
| Chap 3.9.1 | Authoring - Illustration rules and multimedia AE-A-03-09-0200-00A-040A-A |
| Chap 3.9.1.1 | Illustration rules and multimedia - Illustrations, General AE-A-03-09-0201-00A-040A-A |
| Chap 3.9.1.2 | Illustration rules and multimedia - Navigation and configuration AE-A-03-09-0202-00A-040A-A |
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| Chap 3.9.2 | Authoring - Warnings, cautions and notes AE-A-03-09-0300-00A-040A-A |
| Chap 3.9.3 | Authoring - Front matter AE-A-03-09-0400-00A-040A-A |
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| Chap 3.9.5 | Data modules - Identification and status section AE-A-03-09-0601-00A-040A-A |
| Chap 3.9.5.1 | Data modules - Content section AE-A-03-09-0602-01A-040A-A |
| Chap 3.9.5.1.1 | Common constructs - Change marking AE-A-03-09-0602-01B-040A-A |
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| Chap 3.9.5.1.7 | Common constructs - Figures AE-A-03-09-0602-01H-040A-A |
| Chap 3.9.5.1.8 | Common constructs - Hotspots AE-A-03-09-0602-01I-040A-A |
| Chap 3.9.5.1.9 | Common constructs - Preliminary requirements and Requirements after job completion AE-A-03-09-0602-01K-040A-A |
| Chap 3.9.5.2.1 | Common constructs - Paras AE-A-03-09-0602-02A-040A-A |
| Chap 3.9.5.2.2 | Content section - Descriptive information AE-A-03-09-0602-02A-040A-A |
| Chap 3.9.5.2.3 | Content section - Procedural information AE-A-03-09-0602-03A-040A-A |
| Chap 3.9.5.2.4 | Content section - Fault information AE-A-03-09-0602-04A-040A-A |

Effectivity: All AE-A-03-00-0000-00A-040A-A
Chap 3
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Learning to read and understand S1000D

- Now grab a cup of coffee and scan over the BR's.
 - Use your marker to highlight important points and another to black out items that don't apply to you.
 - Focus on the “project decisions” and understand that here a choice is being made for you.
 - Mark any project decisions that are To Be Determined (TBD) in RED as they may be important to your project.
- Get ready to read S1000D with an initial focus on:
 - Chapter 3 - Information generation
 - Chapter 4 - Information management
- OK, now you've reviewed the BR's and have an idea of how big S1000D is. As you go forward why not create a “Brain Bank”.

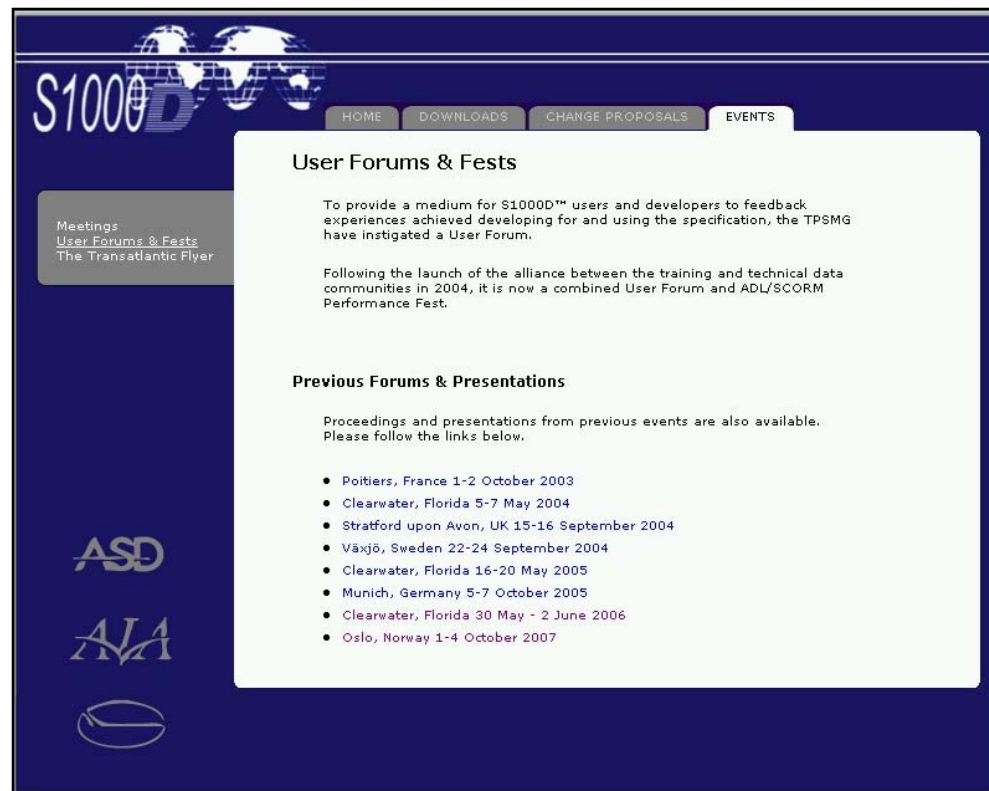
Learning to read and understand S1000D

- What is a “Brain Bank”?
 - It is using your computer and electronic documents (just like S1000D) to create a paperless (almost) office.
 - Print PDF copies of each chapter of S1000D that you will be using in your project as you review them.
 - Then as you read the chapter you can tailor it exactly to the requirements of the BR’s.



Learning to read and understand S1000D

- Now go to the forum and get an education: www.s1000d.org
Click on “**Events**” and go to “**User Forum and Fests**”.



The screenshot shows the S1000D website interface. At the top left is the S1000D logo with a globe. A navigation bar contains links for HOME, DOWNLOADS, CHANGE PROPOSALS, and EVENTS. The main content area is titled 'User Forums & Fests' and contains the following text:

To provide a medium for S1000D™ users and developers to feedback experiences achieved developing for and using the specification, the TPSMG have instigated a User Forum.

Following the launch of the alliance between the training and technical data communities in 2004, it is now a combined User Forum and ADL/SCORM Performance Fest.

Previous Forums & Presentations

Proceedings and presentations from previous events are also available. Please follow the links below.

- Poitiers, France 1-2 October 2003
- Clearwater, Florida 5-7 May 2004
- Stratford upon Avon, UK 15-16 September 2004
- Växjö, Sweden 22-24 September 2004
- Clearwater, Florida 16-20 May 2005
- Munich, Germany 5-7 October 2005
- Clearwater, Florida 30 May - 2 June 2006
- Oslo, Norway 1-4 October 2007

On the left side of the page, there is a sidebar with the text: Meetings, User Forums & Fests, The Transatlantic Flyer. At the bottom left, there are logos for ASD, AIA, and a stylized 'S' logo.

Get a grip on the business rules

- By now you should have realized that it is imperative that your project gets a grip on the BR's.
- If you missed Mike Day's presentation on Business Rules earlier today make sure you view it at the User Forum.
- Press your customer to provide a firm, final set of business rules so your project can move ahead.
- Without BR's your project will have no clear direction!



Get a grip on the business rules

- Urge you customer to structure their BR's in the S1000D chapter format.
- If not, cross-reference the BR's to the chapter/sub-chapter/paragraph format of S1000D.
 - This will prevent confusion.
 - When you look at the BR you can see which chapter in your brain bank to consult.
- Don't be afraid to make the BR's in PDF and mark them up just like your chapters in the Brain Bank.
- For difficult subjects revert to the clip and paste method until things clear up.

Get a grip on the business rules

- Try for project specific business rules.
- Ask that marked up flat schemas be used.

Supplies (M)

Definition

S1000D: The element <supply> contains the same sub-elements as the element <supequi>, as described at [Para 2.1.4](#), except that element <tool> is not used and an element <con> is allowed.

Project decision (deviation): For items (of supply) of indeterminate quantity, "AR" must be entered as text in the element <qty> and the attribute @uom is not used.

Addition: When specified, the value of attribute @uom must belong to the list of 1 272 allowed values given in the [Units of Measure Dictionary](#) (with no exceptions).

Project specific decision

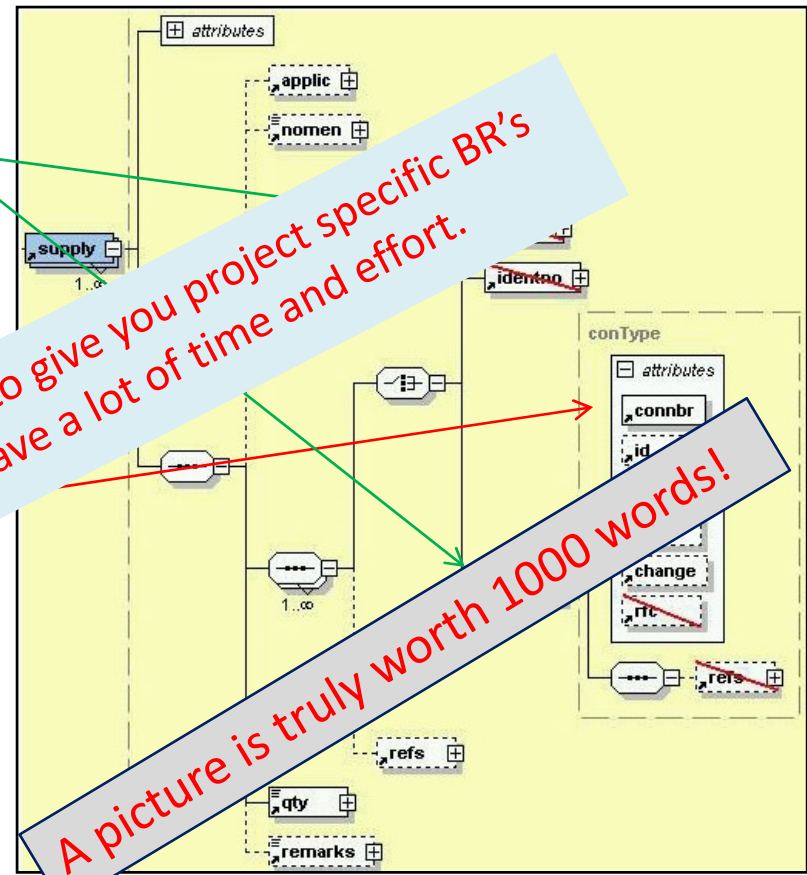
S1000D: The use of identification. Projects must decide which elements to be used for identification and how to populate these elements.

Project decision: Supplies are entered using the element <con> equal to the identification of the supply in the list of requirements repository.

Information: In the list of requirements for supplies, the supply is identified by the attribute @nature and the element <conitemid>. To make a single string these two are concatenated.

S1000D: The use of cross-references Projects must make use of cross-references from the Procedure to the list of requirements. The attribute xrefid of element <xref> and the element <supply> respectively, are used to establish the link between the list of requirements and the supply. The use of cross-references guarantee consistent use identification throughout the Procedure. The use of cross-references is encouraged.

Project decision: A supply listed in the preliminary requirements must be the target of a cross-reference from the text of the procedure.



That's a 67% reduction!

TIP

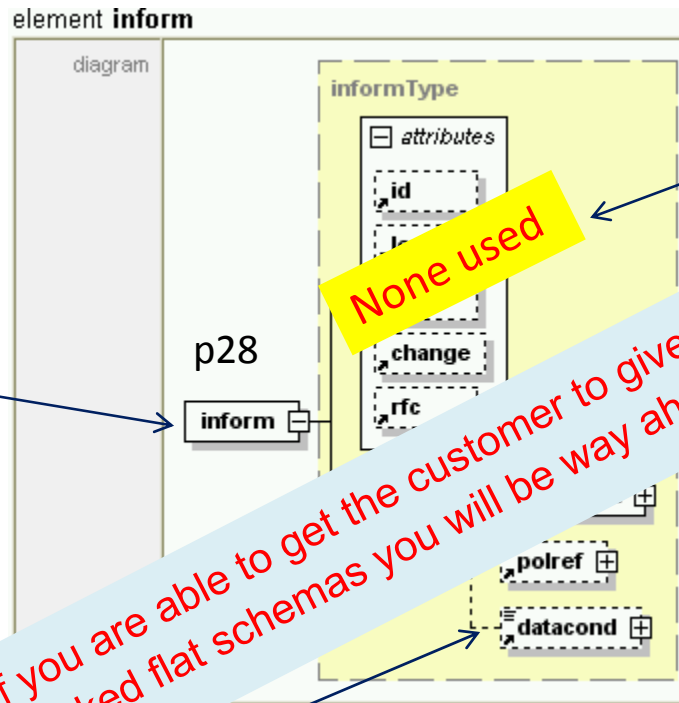
If you can get your customer to give you project specific BR's using flat schema you will save a lot of time and effort.

A picture is truly worth 1000 words!

Understanding XML

- XML is quite confusing. Why? Well everyone expects it to “do something” and it really “does nothing”.
- XML is a way to store and transmit your data.
- Understanding XML will aid you in working with your IT group in the shaping of schemas and writing the BRC.
- Resources to get you going on XML, schemas and such:
 - XML for Dummies (ISBN 0-7645-8845-1)
 - XML A Primer (ISBN 0-7645-4777-1)
 - W3C XML school – www.w3schools.com/xml/ - learn from the masters.

Develop a workable schema



Which element is this a sub element of and on which page?

Indicate which attribute is used

None used

Did I mention, if you are able to get the customer to give you a project specific set of BR's complete with remarked flat schemas you will be way ahead of the game.

P26 <copyright>-</copyright>

P75 refer to EDIM

P28 <datacond>-</datacond> or SECOPS

Which sub element is used and how to populate. Include reference to each

TIP

Develop a workable schema

- After we developed a working schema we delivered it to our team of authors and provided initial training.
- Next, we took actual editor (tagged) views of a data module and converted it to PDF. Then we commented each element, sub-element and attribute to clarify the exact mark-up based on the project BR decisions.
- We outputted this PDF in landscape on A3 and showed the comments to one side.
- This document gave the writers and QA group a quick reference for how to populate every aspect of the data module.

Migration to a higher issue of S1000D

| S1000D Issue | Pages Chapter 3 | Number of new pages | Percent change |
|--------------|-----------------|---------------------|----------------|
| 2.2 | 393 | - | - |
| 2.3 | 690 | 297 | +75.6 % |
| 3.0 | 708 | 18 | +2.6 % |
| 4.0 | 1251 | 543 | +76.7 % |

- Your customer should give guidance on which changes are expected to be used by your project as a result to moving to an up issue.
 - Go to CPF Forum to read the white papers and CPF's.
 - All of the key items for our project had detailed presentations and/or white papers available which allowed us to have a good idea of how the changes would impact us.

Migration to a higher issue of S1000D

- For this up issue the following had to occur:
 - Complete reread and understanding of the various chapters of S1000D.
 - New BR's that covered much more detail than before.
 - Complete rework of the schemas.
 - Redevelopment of the training data modules for the authors.



If your project anticipates moving to a newer issue of the specification you have to get out in front of the expected changes well in advance of the actual migration.



Building a better BRC

- A new and very detailed BRC was developed to automate the QA process.
 - The first iteration was focused on the metadata and the “big chunks”.
 - Our second focused on all the errors that were encountered as data module production moved into gear.
 - The third iteration included all the little details that you will discover during hand QA. Some examples: All <para> must end with a “.” Or between </quantity> <quantity> one whitespace must exist and <quantity> must be preceded by “(“.
- Ask your customer to provide you with a copy of the rules they developed for their BRC:
 - Exclude items that don't apply to your project.
 - Verify the values are correct, especially, if you have requested and been given a project specific set of business rules.

Building a better BRC

- Spend a day “gaming” a DM to “bullet proof” your BRC.
 - Starting with the Status/ID section purposefully make any error you can imagine.
 - Then run the BRC and see if you have detected an error that is currently unchecked.
 - Write new rules for the IT group to implement.



Your BRC will simplify your QA process and reduce the number of data modules being rejected because of avoidable errors!



Test the exchange mechanism

- Arrange a practice exchange using a Data Dispatch Note (DDN) and selected XML and CGM files.
- Go to your business rules and study the rules for data exchange. Make sure that:
 - You observe all file name conventions.
 - Deliver the data in the correct form.
 - Make any final manual adjustments to your files.



Make sure that these DM's do not get into the CSDB as this will cause problem later.

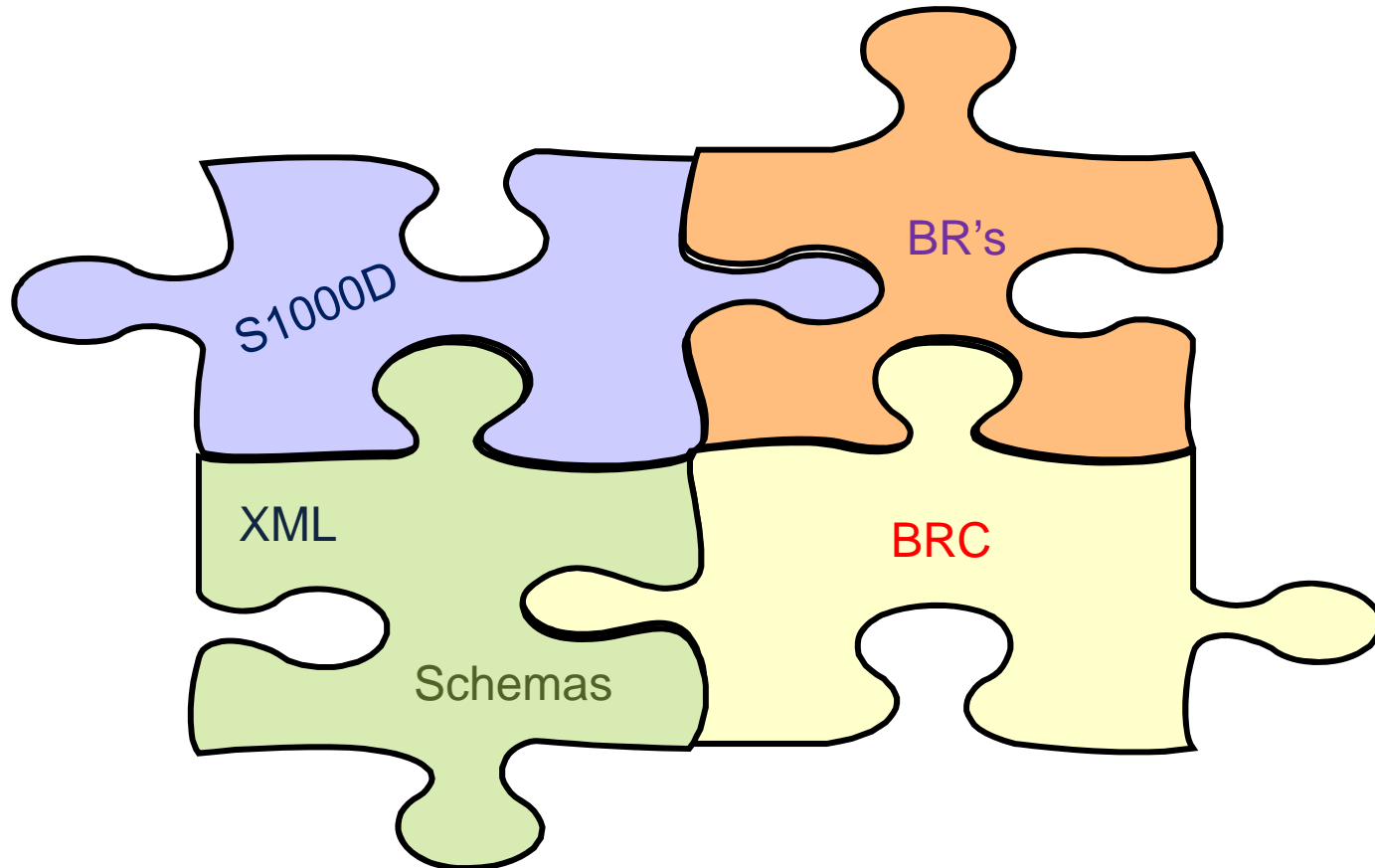
Get QA feedback

- Using the data exchange learn if you have:
 - A valid schema.
 - Populated the elements, sub-elements, attributes as per S1000D and the BR's.
 - Illustrations that are in compliance with the illustration guides, S1000D and the BR's.
 - Used the style/template for the procedure that is desired by the end user.



The faster you can obtain feedback from the group that will perform QA the faster you can advance your project!

Learning to love S1000D



- When you fit the pieces together, then you can see the structure of S1000D makes your project hum.

Learning to love S1000D

- If only we had known then, all that we know now, our project would have been so easy!
- Thanks for listening.
- Any questions.



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