

The Journey to Globalization: Building a Successful and Scalable S1000D Authoring and Data Delivery Methodology

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Overview

- Over the last five years, Boeing Defense has migrated 19 programs to the Common Authoring Environment (CAE)
- The CAE is a unified tech data service offered as a secure hosted environment, managed by CDG
- Users engage via a thin client by a subscription model
- Recently, this same model has been used to serve commercial non-Boeing platforms
- This presentation outlines our journey to building a successful and scalable S1000D authoring and data delivery methodology



The landscape



Drivers for change

- Disparate working methodologies across the enterprise
- Disparate data sets and specifications: MIL-STD, customized S1000D 1.6, ATA iSpec 2200, PDF, Word, and Interleaf data
- Non-transferable skill sets: proprietary systems and processes
- Complex and expensive software systems and maintenance
- Inconsistent presentation of corporate data
(Multiple style sheet variations, where each program is delivering data with their own “look-and-feel”)



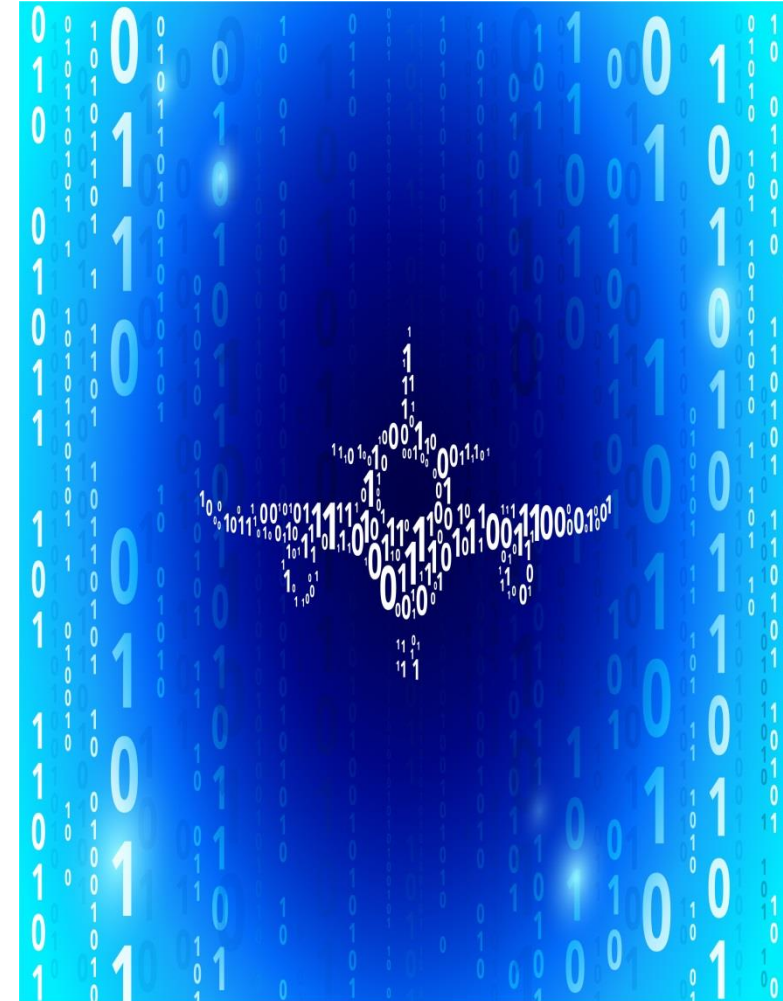
What strategic decisions were made?

- Compliance with the S1000D specification
S1000D Issue 4.0.1 selected to best support data reuse and optimize the configuration management of technical data
- Consolidation and standardization of software usage across the enterprise
- Migration of technical data authored in legacy and proprietary formats to the S1000D specification
- Standardization of ...
 - Engineering/parts data interfaces across the enterprise
 - Effectivity/applicability constructs across the enterprise
 - Publishing technologies and approaches



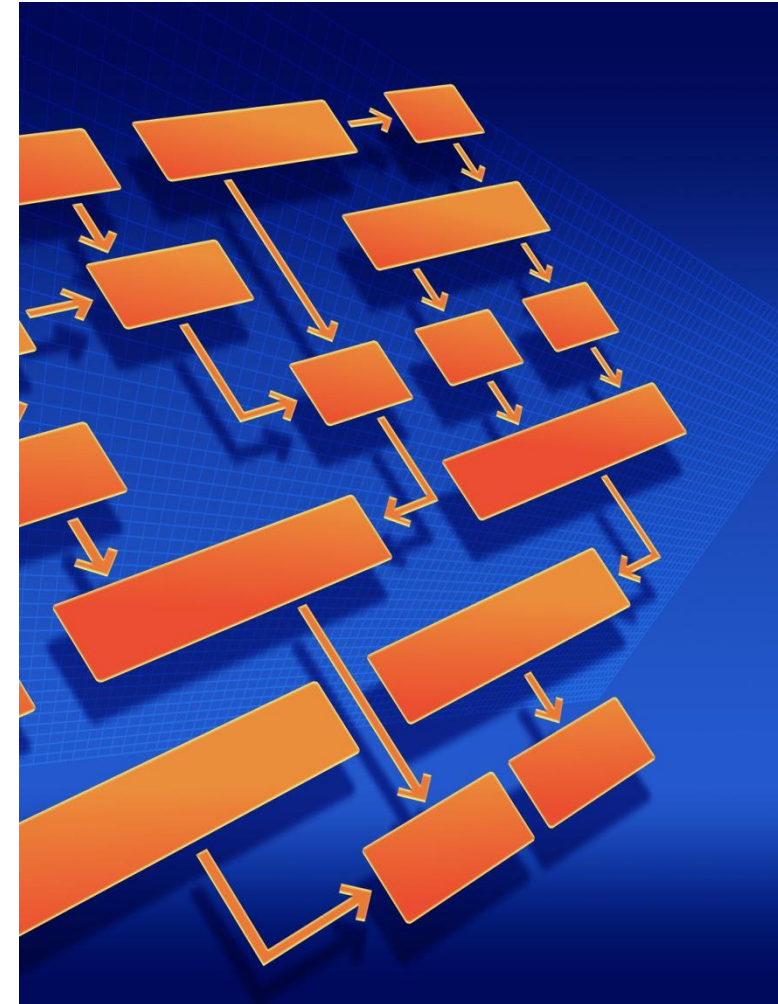
How are projects migrated?

- Move program-by-program to the new environment
- Leverage existing legacy data analysis
- Transition legacy production projects in a phased approach
 - Based on technical publication release cycles
 - Alleviates production interruptions and downtime
- Identify and manage S1000D business rules requirements
- Map legacy data to S1000D (DMRL and illustration requirements)
- Address data conversion requirements



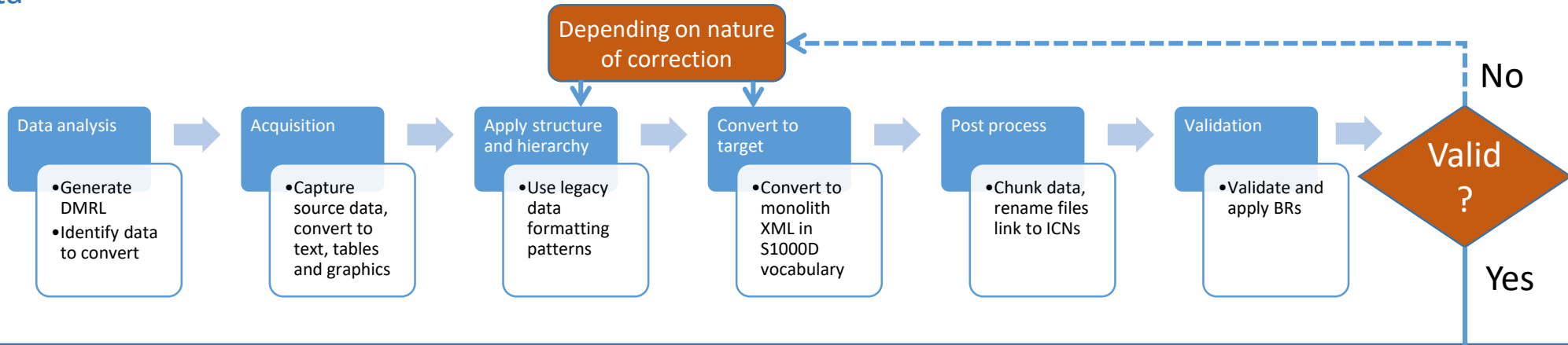
What are the mechanics?

1. Create or leverage existing S1000D Business Rules
2. Analyze legacy data to create project Data Management Requirements Lists (DMRLs)
3. Develop plan for conversion of legacy data
 - a) Automated: scripts; data conversion tools
 - b) Manual: re-authoring of data
4. Determine illustration requirements (vector/raster/hotspots)
5. Determine provisioning methodology / parts database
6. Determine quality assurance (QA) and verification processes
7. Determine publishing/delivery strategy (PDF/IETP/both)

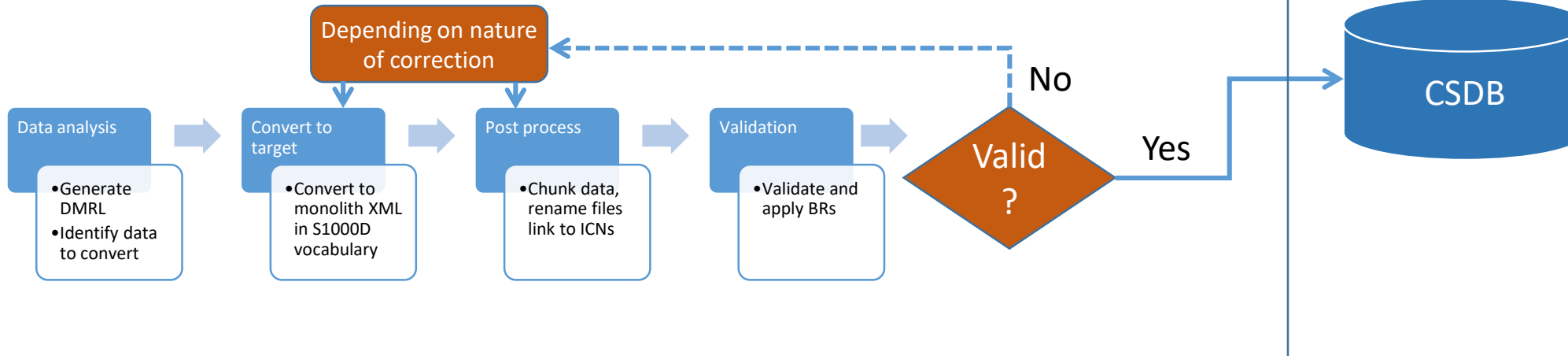


The data conversion workflow

Legacy, paginated data



Legacy XML / SGML



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How do we handle technology?

- CDG-hosted, cloud-based solution
- Access via HTTPS to highly-secured servers partitioned for each Program and located in multiple data centers
- Global access to the software through “virtual desktops” (VDIs) from each facility
- Optimization of S1000D software for very large data sets
Partitioned CSDB consisting of front-end and back-end servers to distribute and allocate jobs
- Multi-factor authentication for CSDB user management (provides additional layers of security)



How do we handle data?

- Authoring utilizing a COTS (browser-based) S1000D editor
- Data module extension (DME) methodology to filter data module content based on customer-specific product configurations (applicability) to produce tailored publications
- Data repositories for lists of “technical” or “common” information objects utilizing Technical Information Repositories (TIRs) or Common Information Repositories (CIRs)
- Container data module “mechanism” to associate several alternate data modules that represent the same maintenance goal differentiated by product configuration applicability



Data challenges/solutions

Challenge	Solution
Engineering / Parts Data Interfaces	Customized solution – an interface linking the CSDB to an LSAR database for the auto-generation of illustrated parts data (IPD) data modules and maintenance procedure constructs.
Customized reporting capability	<ul style="list-style-type: none"> • Performance at the user level • Jasper Reports – customized reporting (reporting at the DB level) • Earned Value reports
Ability to generate publications that are specific to the product configurations supported by each customer using the same source data	<ul style="list-style-type: none"> • Data module extension (DME) filtering to generate multiple customer instances of a specific data module • “Trunk and Branch” authoring streams for the tailoring and versioning of customer-specific deliverables • Common and unique sets of style sheets for multiple customer publications

How did we handle training and skill sets?

- The CAE required technical publication teams to learn new software and processes
- The level of structured authoring (XML) or Simplified Technical English (STE) experience often varied and required additional training
- S1000D specification and software training was provided by CDG in a classroom setting



Pain points? Lessons Learned?

- The reality (cost and complexity) of data conversion
 - Requires maintaining mappings for multiple file formats
 - Not push button – converted data often requires some level of manual cleanup
- The reality (cost and complexity) of style sheet development
 - The demand for “tailored” customer deliverables is becoming more commonplace
 - Can be time consuming and cause delays – get a jump on style sheet development



Pain points? Lessons Learned? cont.

- System performance: a significant technology change had to be made mid-stream to re-architecture systems to handle the large volumes of data and required response speeds



The upside

- Consolidation of hardware and software resources across the enterprise resulted in significant cost savings
- Maximizing data reuse across all programs reduced data creation and change management costs
- Standardization of technical publications processes and workflows across the enterprise
- Consolidation of authoring resources and skill sets across the enterprise
- Resulted in overall improvements in data quality, accuracy, and consistency



What value does this give to our organization?

- A proven, scalable, and consistent S1000D authoring environment suitable for large-scale commercial and defense organizations
- 24/7/365 global access to systems with 99% uptime
- Ability to publish very large publications (40K+ pages) without disrupting production



Can this model be reproduced?

- **Yes.** When extending the Boeing Defense environment the CAE model is duplicated followed by a process to initiate the project. All data migration activities tend to differ and are addressed on a program-by-program basis.
- When adding a non-Boeing commercial platform the approach is similar to that of the CAE model but more variants can be expected when working with applicability, publishing requirements, and setting up engineering data workflows.



Summary

In the technical data space, large-scale commercial and defense OEMs and suppliers can realize significant benefits and operational efficiencies through the standardization and consolidation of business practices across the enterprise

- Consolidation of hardware and software resources across the enterprise resulted in significant cost savings
- Maximizing data reuse across all programs reduced data creation and change management costs
- Standardization of technical publications processes and workflows across the enterprise improved operational efficiencies
- Consolidation of authoring resources and skill sets across the enterprise improved operational efficiencies
- Resulting in overall improvements in data quality, accuracy, and consistency

Thank you

for your attention!

Questions?



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