

# Optimizing Data Migration and PLM Consolidation

## **CIMdata Commentary**

*Key takeaways:*

- *Consolidating your data allows process streamlining and system reduction, improving company performance and reducing IT costs*
- *Using the right process, people and tools makes data migration and consolidation a straightforward, predictable project*
- *I-Cubed has a proven data migration methodology that reduces the time, cost, and risk associated with global data consolidation*

## **Introduction**

Achieving success in bringing a product to market requires expertise, planning and experience. As the Russian author Anton Chekhov said, “Only entropy comes easy.” Customer requirements are becoming more stringent, material and labor costs are going up, and regulation is increasing. Companies are trying to do more with less to ensure profitability and customer satisfaction. Over the last twenty-five years, the prevalence of computing throughout the complete product lifecycle process has led to rapid development of product related content. The data supporting this content is often distributed, and even duplicated, across many independent repositories, including homegrown data management systems, commercial data management solutions, PDM solutions, operating system folders, in the cloud, and on removable media. Mergers and acquisitions can add more data sources and more complexity. This data sprawl makes it difficult to find and reuse data, answer questions, ensure compliance and, most importantly, make decisions, which can have a negative impact on product cost, quality, and time to market.

Engineering and manufacturing organizations have recognized these issues for many years, and have accordingly developed procedures, processes, and even software tools to control data and minimize the disorganization. Over time commercial solutions were also developed to address these data management issues. Adopting a data management system usually requires that it be populated with data from one or more old systems. Until it is populated with a critical mass of data, the usefulness of the new system is limited. At CIMdata, we have assessed PLM implementations at hundreds of companies, and the time and cost to migrate data from legacy environments are consistently the most underestimated portions of the implementation project.

## **The Risks Related to Migrating and Consolidating Data**

Basic data migration procedures are well defined and understood, and can be referred to as **Extract, Transform and Load (ETL)**. All migrations require these technical steps, but to be consistently successful companies should add three additional activities: Planning, Analysis and Validation. Proper Planning Prevents Problems, referred to as the four P’s of project management, absolutely applies to data migration projects. Data migration always uncovers issues. So, including a validation step at each milestone in the ETL process allows corrective actions to the transformation or cleansing process to be executed before the project gets too far along, increasing the likelihood of success. Once the data load is complete, a final validation step will certify that success was achieved and “close the loop.”

Every data migration project is unique due to variations in products, processes, technology and other factors. The uncertainties and conflicts created by these variations increase risk. Identifying and mitigating the risks are the key steps to a successful data migration project. While it is difficult to identify all the causes of variation and conflict, CIMdata has seen several key items over and over including:

- Data location
- Differences in formats and media
- Data discrepancies

### **Data Location**

Before data can be extracted it must be located. While simple in concept, this can be surprisingly difficult. CAD data can be especially problematic because files are interlinked to represent parts, drawings and assemblies. Most CAD software supports the capability of a search path, which allows an assembly model to load parts from multiple libraries. Common libraries include in-process, released, and standard components. If multiple workgroups are involved, they may have separate servers or work practices that lead to fragmented data. Users will sometimes copy data to local drives to speed up CAD file opening or overcome the lack of remote access to data stores. In addition to many types of data files, metadata may be in even worse shape. Even if a PDM system is used to manage data files, it is rare that all the metadata that describes a product is stored in the PDM database, it may be scattered around in files and databases. Excel is the most common tool used to manage metadata, and finding the spreadsheets and ensuring the data matches what is embedded in the design files can be an issue.

### **Differences in Formats and Media**

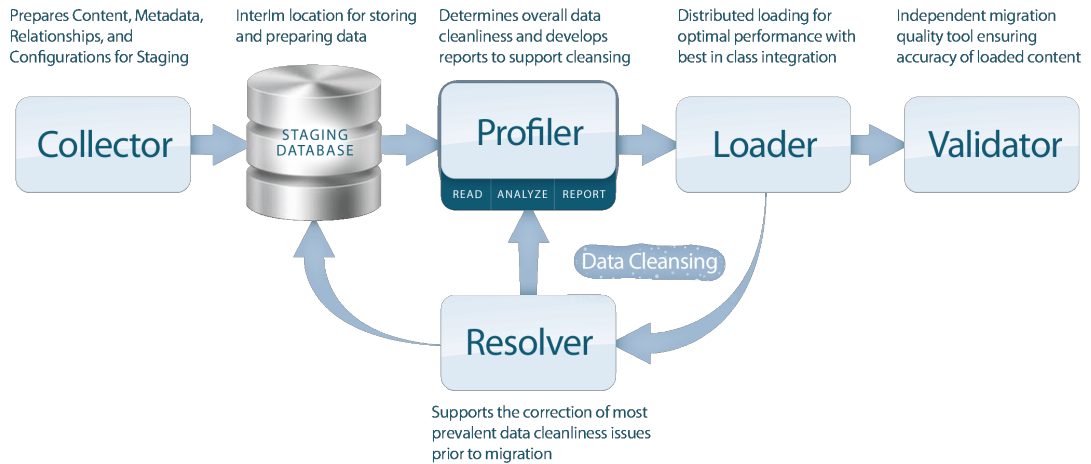
The ability to manage media and file formats is critical. If data cannot be read it cannot be migrated. Media have changed a lot over the last 15 years; data may be stored on tapes, CDs, DVDs, etc. The hardware to read older media may not be readily available. File formats can also cause issues. Some applications can only read from a limited number of previous versions. If data is not saved in a recent release, it may not be readable. Data may still exist from applications that are no longer available or supported. Even if data is readable, it may have been created using older or obsolete creation techniques or standards. Reading data and upgrading it to a current format can usually be accomplished, but can have major impacts on a migration schedule.

### **Data Discrepancies**

Once data is identified and extracted, it must be transformed to meet the requirements of the target system. The transformation step is where data discrepancies and conflicts are resolved to ensure that the new solution works as planned. There are many potential issues with data that may need to be addressed. Duplicate data must be eliminated, and near duplicates need to be assessed to see if consolidation is possible. Data security models need to be mapped to the new environment. Data configurations need to be maintained, the BOM must link to and load the correct versions of parts. Detailed data within files like drawing formats may need to be updated.

## Getting to Production

Data migrations rarely happen overnight; so proper planning is necessary to ensure the transition period from the old system(s) to the new system is smooth. Ensuring that the transition does not impact production is a critical success factor in the data migration process. Users need to know when to use the old or new system. They need to know which set of data is the master, and that the migrated data is correct.



**Figure 1—I-Cubed's Global Data Migration Solution Architecture**

I-Cubed has focused on data migrations for over 15 years and has developed a sophisticated solution consisting of proprietary tools and processes to ensure successful data migrations. They have completed migrations from a wide variety of source PDM systems including Teamcenter from Siemens PLM Software; PTC products including Pro/PDM, Pro/INTRALINK and Windchill; Dassault Systèmes products including PDMWorks, SmartTeam, MatrixOne and ENOVIA; and a variety of lesser-known systems. They have also completed CAD system migrations from CATIA V4 and V5, NX/Unigraphics, SolidWorks, Inventor, and Pro/ENGINEER. In some cases data was migrated from multiple CAD tools to support consolidation.

I-Cubed's approach is based around the principles of early detection, usability and integrity assurance, and frequent validation. These principles are incorporated into their process of Assess, Test, Migrate, and Validate. I-Cubed's toolset, as shown in Figure 1, supports the migration process. The Test and Migrate phases include the standard ETL activities.

Assessment consists of an evaluation undertaken to gather requirements and determine the migration strategy, a Profile to identify data integrity issues, and an Analysis to determine preparation and migration effort and schedule. This allows customers to understand the issues with their data so they can plan their implementation and maximize the data migration ROI by protecting the value of legacy intellectual property.

CAD and PDM systems have complicated data models that can be difficult to migrate. While their capabilities are usually similar, each system has unique methods of representing and processing data. The APIs of the CAD and PDM software are used to extract detailed information about data relationships in the legacy environments so it can be properly mapped into the target environment. Profiler, shown in Figure 2, uses the APIs of the CAD and PDM systems to analyze data quality.

The Test phase includes a proof of concept and a series of rehearsals. Each step in the Test phase has specific objectives to verify the migration environment, identify unforeseen issues

with the data or system configurations, correct the issues, mitigate identified risks and predict the actual migration quality and times. The Migration phase is the culmination of the Assessment and Tests yielding a predictable conclusion to the entire migration effort.

Validation is not a stand-alone phase within I-Cubed’s process. Rather, it is ongoing throughout the entire process. Validation is performed whenever data is moved or transformed. Completeness, correctness and usability tests are performed at appropriate points within the process to ensure data integrity and to verify that it meets expectations.

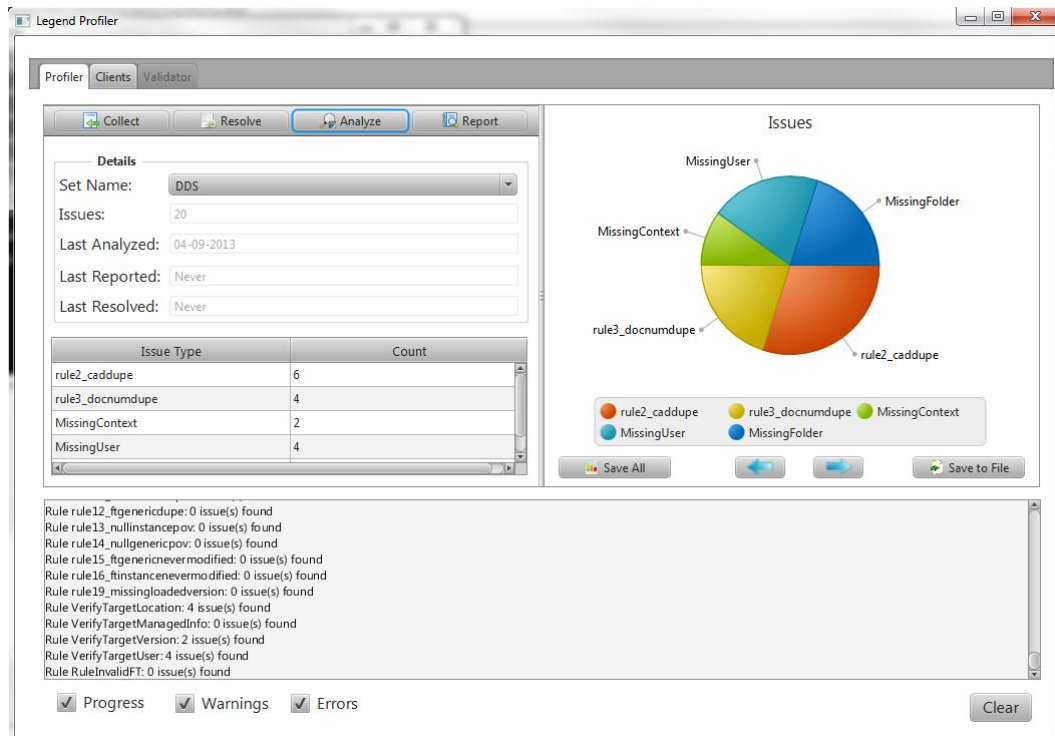


Figure 2—Profiler from I-Cubed Provides Analysis and Reporting on Data Cleanliness

## Summary

The purpose of a PDM solution within a PLM strategy is to manage the data that describes a product’s lifecycle. The solution needs to be populated with clean data to add value. Companies often underestimate the time and effort it takes to cleanse and load the necessary data. Using a well-defined process to identify, cleanse, load and validate data helps to ensure that product development using that data will be more efficient and of higher quality. I-Cubed has developed solutions and a methodology to help companies consolidate, cleanse and load data into their PDM solution and ensure that only clean data gets loaded.

## About CIMdata

CIMdata, an independent worldwide firm, provides strategic management consulting to maximize an enterprise’s ability to design and deliver innovative products and services through the application of Product Lifecycle Management (PLM). CIMdata provides world-class knowledge, expertise, and best-practice methods on PLM. CIMdata also offers research, subscription services, publications, and education through international conferences. To learn more about CIMdata’s services, visit our website at <http://www.CIMdata.com> or contact CIMdata at: 3909 Research Park Drive, Ann Arbor, MI

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