

# ***Migrating to ENOVIA V6***

*This white paper provides a comprehensive business and technical perspective on what is involved and what issues need to be considered when planning and then implementing a data migration to ENOVIA V6.*



## ***Introduction***

Migrating to ENOVIA® V6 is a logical PLM direction for companies that are looking to evolve their PLM system and expand its functionality. ENOVIA V6 provides scalability together with a rich portfolio of out of the box modules and a set of configuration and customization tools allowing companies to tailor the solution to their unique business process. Migrating data from a legacy PLM system is not always a simple task. Indeed, it requires extensive due diligence as well as careful advance planning to ensure the migration's success. However, a well-planned transition will result in happy users and a meaningful value added for the organization.

This paper will address both business and technical implementation aspects when migrating data into ENOVIA. Some examples will be based on xLM Solution's recent experience with migrating a very large SolidWorks® SmarTeam environment to ENOVIA V6. However, the points in this paper apply to any data migration to ENOVIA V6, regardless of the CAD system.

## ***Things to Consider***

- 1) Ask yourself and your organization what is the business driver for moving to ENOVIA V6? Common answers might be: (1) taking advantage of the integration features with CATIA® V6 for companies interested in moving to CATIA V6 or required by their OEM, or (2) taking advantage of the rich out of the box portfolio in ENOVIA V6 such as project management, quality control, engineering and manufacturing BOM management, supply chain integration, variant management (configurator) and so on.

The answers to these questions will allow your migration consultant to better estimate the effort required and time involved, allowing you to better prepare for the migration. The greater the number of modules of ENOVIA V6 to be implemented and the more legacy data to support such modules, the longer the time will be to complete the migration. Also, clearly, greater data volume adds to the complexity of the project. Migrating legacy data to different modules of ENOVIA V6 can facilitate a roll out using a phased approach. By doing so, we can break the project down into smaller and more manageable sub-projects.

- 2) How will ENOVIA V6 be implemented and configured?
  - a. Will it be based on or close to the ENOVIA V6 out of the box data model? This of course makes the ENOVIA V6 implementation easier though it entails a greater learning curve for users. For example, users will need to learn the new terminology (changes of life cycle, state names, class/type names, operation names, etc.) and changes in the user interface. The creation / update of work procedures will need to be in place to demonstrate how operations are performed in the new system. Additional focus needs to be put on mapping source data (attributes, states, etc.) to the out of the box ENOVIA V6 equivalent objects.
  - b. Will it be based on a custom data model; i.e., something similar to the legacy system? This option will make the company's transformation easier from a

business stand point, but will require additional configuration/customization on the ENOVIA V6 implementation side. This also may have an impact on the level of effort involved in upgrading ENOVIA V6 to newer versions.

- c. Or does the company take some type of hybrid approach where they take the best aspects of the out of the box ENOVIA V6 design and only tweak aspects of the out of box design to support their unique business models and/or address lessons learned from their legacy PLM system design and work processes.
- 3) What is the scope of the migration? Are you looking to migrate documents/CAD data only, BOMs, workflow (engineering changes) history, other data types? The more you plan on migrating, the longer the migration will take and the higher level of effort that will be required. What you decide to migrate will determine the order in which the data is migrated and any special mapping of types, states and attributes that need to be set. For instance:
- a. If a document's data and item/BOM data will be migrated, you will need to make sure that the proper relationships are created between such objects. Otherwise, ENOVIA V6 behaviors such as EBOM synch will not be functional. If workflow data will be migrated, most likely there will not be a direct one to one mapping of the legacy workflow data to the ENOVIA workflow functionality such as ECO or ECR types, routes, etc. If workflow mapping is necessary, xLM Solutions provides the following options:
    - Map workflow object's meta-data to matching ECO/ECR object in ENOVIA V6.
    - Export workflow history into Excel or any other format and migrate it as a Sketch object in ENOVIA V6.
    - Create PDF files to represent the legacy data workflow form (metadata) and save the PDF file as a document object in ENOVIA V6.
    - Recreate relationships between the legacy workflow object and its associated affected objects (documents, items, etc.)
    - We recommend migrating only completed workflows in (ended or terminated status as released in ENOVIA V6). Running/in process workflows should be manually implemented in an ENOVIA V6 post migration.
  - b. We recommend using out of the box ENOVIA V6 types for CAD objects to avoid complications and untested special cases. This is even more important when dealing with a SolidWorks® integration.
- 4) Phased approach – Depending on the size of the data to be migrated and the time to conduct the migration, companies may want to split the migration across multiple windows to minimize down time, but still have users use and modify data in both the legacy PLM system and ENOVIA V6. While this will reduce the down time for the end users, it makes the migration effort extremely complex. In such situations we

recommend companies find temporary solutions for working during the production migration down time. In the very unusual situation where it is anticipated that the migration may extend beyond a weekend (note: we have seen only a very few cases where a migration takes longer than a weekend), we recommend the following: (i) work with the legacy system in read only mode and (ii) update the data in local folders and manually merge such changes post migration. The effort to automate a migration by “deltas” almost is never worth the effort.

Another matter to consider is the order of rolling out ENOVIA V6 modules. For example, if a company is starting with Program Management, the module may have no impact on any legacy data and this functionality can be turned on live with the need to first conduct a migration. However, if the company starts with Quality Management, and wants to execute the various quality processes around existing data, you may need to migrate the legacy items data. In addition, if the legacy items are related to documents, it makes sense to migrate the documents as well, so plan accordingly. Make sure you explain this to all stakeholders and users of the system, even if it means you must wait a little longer to go live. Setting correct user expectations has proven to be a success or fail factor in many migration projects.

- 5) How do you data map from a legacy PLM environment to ENOVIA V6 and translate/convert the legacy data?
  - a. Handling unique names and serialization of migrated data in ENOVIA V6 — ENOVIA V6 object’s uniqueness is defined by the combination of type, name and revision. For any migration, you need to ensure the migration methodology addresses this object uniqueness. In the tools xLM Solutions has developed, we allow the use of both serial numbers (i.e. an incremental number generator) and the actual file name itself (specifically to the SolidWorks integration) to be used to populate the name attribute of the object. Serial numbers will allow you to carry over the data as is (including duplications around file name) and will require less cleanup effort, though it does allow for possible duplicate ‘bad data’ to be migrated in the process.
  - b. Data manipulations – Merging multiple source attributes from the legacy system into a single attribute in ENOVIA V6, merging multiple data categories ( i.e. classes from SmarTeam) into a single type in V6 or converting attribute types (i.e. Boolean to Yes/No string, etc.), are available through customization and will increase the level of effort involved. This being said, many companies see migrations as a good opportunity to clean up data as well as to standardize based on new procedures and processes. In these cases, it makes sense to go through the data manipulation process. We have implemented such data manipulations / merges rules successfully per our customer migration rules. It is important to communicate with users and stakeholders that it is not just a migration anymore, but a data manipulation project as well and will affect how the users use the system and may affect the overall company’s business processes.

- c. Revision schema adjustments – ENOVIA V6 out of the box CAD objects revisions are alphabetical, versions are numeric and non-CAD document type revisions are numerical. Parts revisions are also numeric. If you decide to use the ENOVIA V6 out of the box revisions or simply use the migration as an opportunity to update revision schema based on some standards, how revisions are mapped need to be considered. It is also possible to change the revision schema in the policy in ENOVIA V6 to match what the revisions schema is in the legacy system.
- 6) Cut Over Plan – When the production migration and the actual switching of systems occur, the end users’ needs should be carefully thought out. Always discuss downtime implications and restrictions with your customer/end users and stakeholders. Although most average sized legacy migrations can be completed over a weekend or a holiday weekend, some large migrations may require extended downtime.
- a. It is critical to set proper expectations with the users and stakeholders in this case.
  - b. Dedicate a full test cycle prior to the production migration and perform it in a test environment similar to the production environment to measure the actual migration time (time the system will need to be down).
    - i. Develop a plan with the users to access data during down time. For instance, set the legacy system to be read-only.
  - c. Make sure that the cut over plan allocates time and resources to ensure that any required software be installed on each end user’s computer and that all end users have been adequately trained and have supporting documentation so they will be proficient in the new ENOVIA system.
- 7) Data Clean Up – Data cleanup is one of the key tasks during migrations. This is normally a time when companies wake up and realize the messy state of their data. There is always a discussion about data clean up as they see this as an opportunity to clean up the bad data in the legacy system. “Bad data” may be characterized in two ways:
- a. Logical/Business issues – These are typically cases of inconsistent data in context of how the business wants to see the data but not really “broken” data in the legacy system (such bad data will not corrupt anything in the legacy or ENOVIA system). Such examples may be a revision in that it is not aligned with the migration’s mapping rules. Another business related example is inconsistent projects or folders structure, i.e. in SmarTeam all data should be linked to a project or folder but some objects have no links to these objects. These examples are normally a result of bad practices in SmarTeam.
  - b. Low-level corrupted data – These are typically issues that have resulted from a crash of SmarTeam during an operation or bad automation (scripts and customizations). Almost every database will have such issues. Such issues, even though only a very few, may cause problems with the migration. Fixing these issues can be done (i) by the administrator manually fixing the data, (ii) deletion of the problematic data or (iii) direct database updates. For instance, with SmarTeam these issues may cause issues with the daily use of SmarTeam and may pose problems when migrating the data to ENOVIA V6. Examples would be a shared file ID across different revisions of a file, changing a CAD reference

name between revisions, etc. xLM Solutions has developed tools to identify such bad data and possible solutions for resolution.

Dealing with data cleanup is always a heated topic. How far do you go with cleaning up data? We encounter the typical: "if we are going to do this we might as well also do this." There is no exact formula for how much to undertake. There is a tradeoff between the cleanup and the level of effort involved. There are multiple variables in the equation: a) business need for cleanup, b) how large is the data set to migrate, c) how much bad data is there, and lastly, d) project deadlines.

xLM Solutions has developed a set of analysis tools and queries to help identify such problematic data. Though our tools mainly deal with issues that would prevent data migration to ENOVIA V6, there may be bad data that is business specific. In such cases, we can develop customer specific queries to analyze and report on such data. Data analysis should be an ongoing process through the entire migration process. Performing data validation (normally through sampling of data) is another critical milestone in identifying issues ahead of time and dealing with them pre-migration. Every migration process should have a data analysis stage early on.

- 8) Data Validation – Data validation is probably the most “neglected” part (by companies) of a migration project. Companies normally tend to put too much confidence and faith in tools and technology providers. This is a mistake! You know your business and data better than anyone else and only you should validate migration results. The level of effort invested in data validation should be proportional to the volume of the migrated data set. Normally days, possibly weeks, should be invested in testing, and preferably, by more than one user, if possible. Data validation should include two components:
  - a. Validate as is migrated data – For example, verify (i) attributes mapping, revision history, and confirm that relations show up as expected, and (ii) check out and opening of files (specifically CAD files) to make sure they open and their links are correct.
  - b. Document and validate specific use cases in ENOVIA V6 post migration. For example, if you migrated documents and parts from SmarTeam to ENOVIA V6, ensure that the EBOM synch works in the V6 post migration. Document your use cases carefully and test them. Make sure you can perform the ‘new’ ENOVIA functions on the migrated data.

### ***Other Aspects to Consider***

- 1) File Name vs. Serial number as part of the document object’s unique name in ENOVIA V6 – As mentioned, ENOVIA V6 allows you to control a document’s name, more specifically, CAD document object names by file name or by serial numbers. There is no golden rule as to what to implement in ENOVIA V6. If the decision is to use a file name as a unique object name in ENOVIA V6, refer back to the clean-up section. For example, if the legacy system allowed duplicate file names (SmarTeam allows this), any data with a duplicate file name being migrated will have to be changed. It is one thing to change a

name of a flat file like an MS office document where there are no references. However, for CAD files that have references, you would need to update all “where-used” referencing files including history data, which, cannot be done manually. For cases involving SmarTeam, xLM Solutions has developed custom programs to update “where used” referencing files directly in the vault without changing the file revision or state in SmarTeam.

- 2) Latest revision vs. full history –This is another dilemma to deal with and the decision may change per company. Full history is a significantly more involved migration process. However, it allows the company to disengage completely from the legacy system (no need to maintain hardware, licenses, maintenance, etc. for the legacy system). Also, the company will now be able to consider its ENOVIA V6 system the full system of record. Migrating the latest revisions only may also break ‘as built’ designs or constraints and mates when dealing with CAD data. For instance, consider what happens if a non-latest part was used in an assembly. If migrating latest only, the non-latest part would now be represented by the latest part which could break the integrity of the data.

I personally believe that if you take the time and effort to migrate to a new system the full history migration is the right way to go. At the end of the day it will justify the investment.

- 3) Migration environment – If possible budget for at least two full migration test environments. One of the two systems would mimic the to-be production environment to enable accurate performance analysis and measuring of migration down time. The other system can be used for changes and evaluation of such changes without affecting current test migration data. For example, one machine can be used for communicating issues with users or support, while the other can be used for testing new modules, etc. Always check with Dassault Systèmes latest documentation regarding recommended hardware and software for your business needs and use cases. In addition, with the use of virtual machines the cost to create such environments can be greatly reduced.
- 4) Set permission and grants in V6 – It is not recommended to migrate users, groups or grants during the migration. Though possible, this process is not always trivial due to the data model discrepancy between the legacy system and ENOVIA V6. We at xLM Solutions normally do that in ENOVIA V6 manually post migrate and pre go-live.
- 5) SolidWorks® (“SW”) Data – When dealing with migrating SolidWorks data there are a few things you want to consider when developing a migration strategy:



- a. Families and instances – In ENOVIA V6, SW data has both family objects (file level properties) and instances (config. specific objects). When dealing with SmarTeam on the other hand, it normally manages data either as configurations (if the CFO mechanism is enabled), and in that case there is no matching family object; or when the CFO mechanism is disabled as file level objects only (no configuration objects). When migrating to ENOVIA V6, SLW/DEK (the SolidWorks Integration) is the module you want to ensure that your solution “invents” the missing objects required by ENOVIA V6.
- b. “Inventing” family objects – When creating the family object for the migration, it should be the object that carries the revision history of the family for the file (the file itself, not the specific configuration). In the case of SmarTeam, it is not trivial to identify such objects, especially in many cases, configuration objects were deleted in SmarTeam and there is inconsistent history to follow. As a result, the revision history of the family object may not be correct. Therefore, building the family object requires unique algorithms to determine what to use. xLM Solutions has developed an algorithm to provide a best possible solution in determining what object to use at the family object.

## ***Technologies***

There are multiple available custom migration technologies promoted by Dassault Systèmes:

- V5C Tools for CATIA V5 design data migration. V5C = FBDI + DBDI – set of out-of-the box tools for CATIA V5 design data migration and coexistence with CATIA V6. This set of tools can be used not only when SmarTeam is used for CATIA design management, but also for VPM V4/V5, or in the case when there is no PDM is used (file based).
  - FBDI - File Based Design Import. Used to import CATIA V4/V5 data into V6
  - DBDI - Database Design Import. Used to import ENOVIA SmarTeam / VPM V4/V5 (product structure / meta data / representation data) into V6
- JPO (using ENOVIA V6 API), MQL and TCL scripts are good as they make use of the ENOVIA API and can perform data integrity checks before loading/creating objects in ENOVIA V6. However, they tend to be slower and may drag the migration time past a weekend for larger migrations.
- Spinner – Spinner is a tool provided by Dassault Systèmes Services and it requires a license (extra cost). Spinner is useful for small data migrations, data model updates and upgrades, but it is not a good solution for a large data set migration to V6 due to downtime constraints.



- The ENOVIA V6 adaplet is provided free of charge as part of the ENOVIA solution library and is probably the best fit for large migrations that require short downtime periods. Configuring the adaplet to map the legacy data to the ENOVIA V6 types and attributes mapping requires its own craft as well as a very good understanding of both the legacy system and ENOVIA V6 data models and behaviors. xLM Solutions has been using this technology and gained experience in conducting SmarTeam ENOVIA V6 migrations with it. We have migrated data on a scale of tens of millions of objects being migrated in just a few days (over an extended weekend). That being said, the configuration process is a craft not everyone excels at. Like any other tool, there are known issues and limitations with adaplets. xLM Solutions has developed file import workarounds and other tweaks to complete the import process using the adaplet technology.

As for data extraction out of the legacy system, there are two common ways:

- Legacy System API – This is good for small size migrations and does not require an understanding of the underlying database structure; however, extracting data via the API is usually slower than accessing the database directly.
- Direct database queries to extract the data– If the database structure can be understood, this is the fastest way to extract data. In the case of SmarTeam, xLM Solutions has a very good understanding of the SmarTeam tables and has proven that direct database extraction is the fastest way (by far) to extract data from SmarTeam. For example, an extraction of parts documents and folder structure in accordance to the V6 mapping rules took only a few hours for a data base with over 2 million document objects as well as a high number of items objects.

### ***Available Solutions***

As far as we are aware there are no other solutions out there promoted by Dassault or its partners and resellers to conduct such migrations. At xLM Solutions we developed our own tool set and proven methodologies specifically to migrate SmarTeam environments to ENOVIA V6 with specific emphasis also for non-CATIA users (support for SLW/DEK) which is currently not supported by most solutions available today. We also have the technologies and know how to migrate any data into ENOVIA V6.

As with any other project, make sure that the solution you pick has been used successfully before and that your service provider has very high skills on both the legacy system side and ENOVIA V6. Be sure to thoroughly check references. At xLM Solutions we have accumulated over 30 years of SmarTeam implementation experience and over 11 years of ENOVIA V6 (previously MatrixOne) experience. xLM Solutions, with its inventory of custom tools developed over the years to facilitate migration issues and overcome problems, together with our broad experience across many industries and involving all types and sizes of PLM data migration, is uniquely positioned to work with you on any of your migration needs.

We also believe that no one migration is ever identical to another migration. Every company has its own flavors, data model nuances and unique migration requirements. We therefore designed our solutions to be 70% generic and 30% customer specific. We believe that a one button migration tool will always be limited in customer specific functionality. For additional information about our migration SmarTeam to ENOVIA V6 solution, please go to <http://www.xlmsolutions.com/wp-content/uploads/2014/06/ENOVIA-SmarTeam-to-ENOVIA-V6-web.pdf>.

## ***Conclusion***

As stated earlier in this paper, migrating data from a legacy system to ENOVIA V6 is not only a natural next step in the PLM evolution, but also allows companies to take advantage of the rich portfolio of ENOVIA V6 as well as gain proven scalability and improved performance. Smooth migrations must be well planned ahead of time to avoid any hurdles. Often times a poorly planned migration will go over budget, experience delays and leave a bad taste with the projects' stake holders and sponsors. However, if done right, companies will realize the potential and returned value of their new system. This paper has exposed the main issues to consider in planning for a migration with the ultimate goal of minimizing risk and ensuring a smoother migration process.

## ***About the Author***

Ilan Madjar has been implementing PDM/PLM solutions for over 16 years for a wide range of customers across different industries. Through the years, Ilan has conducted and led teams in many large data migrations projects, from a variety of legacy systems and network drives files, into Dassault Systemes' family of PDM/PLM products (ENOVIA SmarTeam, ENOVIA V6, SolidWorks EPDM and SolidWorks (WG)). Ilan and his colleagues at xLM Solutions not only master technologies and tools, but developed methodologies based on his vast data migration and PLM implementations experience to excel in such processes. Ilan holds an MBA in Technology and BSc. in Industrial Engineering. Ilan can be reached at [imadjar@xlmsolutions.com](mailto:imadjar@xlmsolutions.com).

## ***About xLM Solutions***

xLM is a consulting company with extensive experience in delivering innovative solutions and customizations to solve difficult PLM and IT challenges. It is our goal to assist you with your PLM implementations and to partner with you in developing and deploying the best PLM and collaboration solutions for your environment. Contact us and let us show you how we can meet ***your challenges*** with ***our solutions***, and make things simpler and more efficient with a true bottom line benefit.

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