



James Ackron ▶ CT Core Technologies ▶ 7/21/2008

Data Migration from CATIA V4 VPM to CATIA V5 LCA

At MAN Truck

This document is to outline the process that CT Core Technologies took to help MAN Truck develop a semi-automated approach to migrate their Catia V4 Virtual Product Management (VPM) to Catia V5-R18 Life Cycle Applications (LCA) environment. CT Core Technologies software suite 3D_Evolution, also ensures that a 100% geometric accuracy is achieved during each stage of the migration process through a model compare functionality.

Abstract

The question that has been asked time and time again from CATIA users: Is there an automated process to convert CATIA V4 to V5? How can I translate surfaces without gaps to CATIA V5, is there a way to get rid of gaps without manually redrawing the whole surface? How can I confirm that 100% migration from CATIA V4 model to a CATIA V5 workbench? We have not yet migrated from V4 to V5, what is going to happen when we begin to use CATIA V6.

Migration inoperability companies have taken the challenge with some painful success. Directors of Engineering have seen standard out of the box demos. However, what happens in the real world has proven that demo's lack the understanding of requirements from each customer, and more specifically each model. After a few meeting with Core Technologies development team we have been put to the challenge to think outside the box and almost start from scratch. It was simple, fail soon and often. With the process of

listing the failures in our migration the development team was able to take the laundry list of required enhancement and put the intellectual capital of our team in Lyon, France to work. The results became one of Core Technologies greatest success to date.

Understanding the Requirements

The requirements for this project while unique to MAN Truck can be applied as building blocks for other companies facing the same types of challenges. Some of the challenges that this project faced:

- I. Extracting the data out of the CATIA V4 VPM
- II. Ensuring that the now extracted V4 data is in fact parametric data, file names are correct, Multi Model Links(MML) are correct,
- III. Migrating the feature information from V4 To V5
- IV. Assembly reconstruction based on the MML and information extracted from the VPM
- V. Ensure that each step no information has been lost.
- VI. Provide a mechanism to correct variances in the data.

With the understanding of the details of the above steps CT Core Technologies developers and MAN Truck set out to automate as much as possible.

Development by MAN Truck

Since MAN Truck understands their data and how it is represented in their VPM system it was only logical that they develop an internal process to extract this information out of the VPM system. MAN created a 'macro' command that places all of the data to be migrated into a data directory containing:

- A set of .model files
- An .xml file for assembly structure (fig. 1)
- A .txt file for options of migration process

- .rdy file (lets 3D_Evolution know that the migration is ready to start)

Phase 2

During this stage of the migration process it is necessary to run a pre-process on the CATIA V4 data, to check for the following:

- BREP data
- Feature based data
- Sheet metal data
- Solid-M (if Solid-M 3D_Evolution translate to a CAITA CGR file)
- Check the Multi Model Links
- Perform an update solid on the models

By performing these pre process operations 3D_Evolution will be able compute the order in which the models must be treated in the rest of the process to keep valid dependency links. This order is recorded in a report file for later use if needed. Once this process has been completed 3D_Evolution runs a model compare with the original V4 models with the new updated models.

```
<?xml version="1.0" standalone="yes"?>
<!--(c) by JR/DF/DZ MAN NUTZFAHRZEUGE AG -->
<Root Name="VS_00TGA_0000">
  <Model Name="VS_00TGA_0000_00_-" R1="1" R2="0" R3="0"
R4="0" R5="1" R6="0" R7="0" R8="0" R9="1" X="0" Y="0" Z="0"/>
  <Node Name="VS_00TGA_0003_00_N_" R1="1.000000"
R2="0.000000" R3="0.000000" R4="0.000000" R5="1.000000"
R6="0.000000" R7="0.000000" R8="0.000000" R9="1.000000"
X="0.000000" Y="0.000000" Z="0.000000">
```

Fig 1

Conversion phase

For the conversion phase of migrating the V4 data to V5, the design team at MAN use CT Core Technologies Enterprise Batch Manager (EBM) as a web based interface to the migration process. Figure two shows the interface. The designer will log into the EBM and locate the data directory of exported data from the VPM, and then based on the user in

puts they start the translation process via a click of a button. The EBM will automatically run the rest of the migration process:

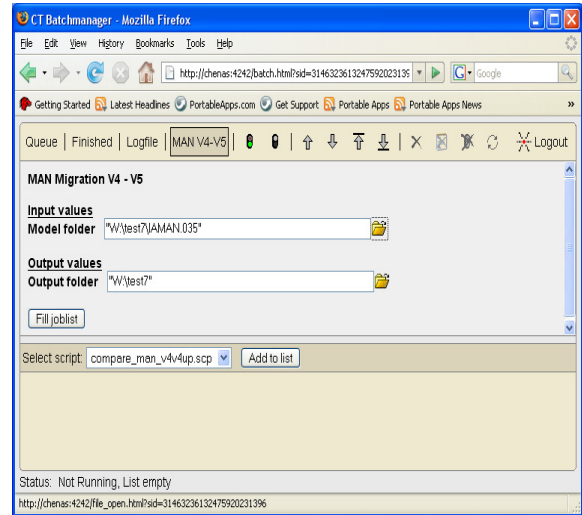


Fig.2

- Starts CATIA v5 in the background of the conversion computer.
- Uses the Dassault migration tool for feature conversion
- Uses 3D_Evolution to correctly rebuild the MML and assembly structure
- Correctly builds the part name and revision information is filled out based on MAN Truck naming conventions (fig. 3)
- Automatic model comparison from original V4 data to the new migrated V5 data

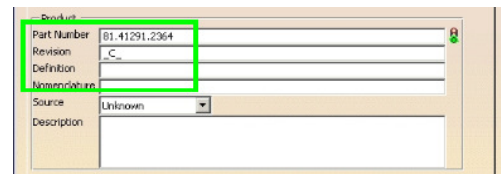
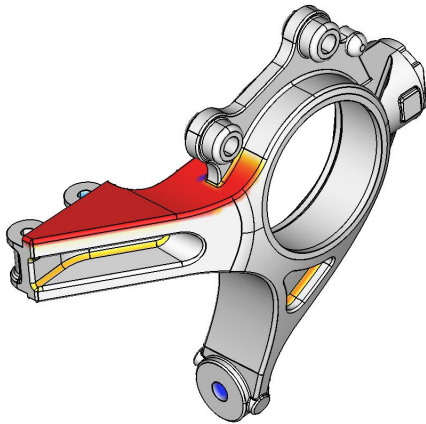


Fig. 3

Model Comparison

During each step of the migration process 3D_Evolution will automatically run a model comparison of the original V4 data. This provides the user of the system at each step of the migration

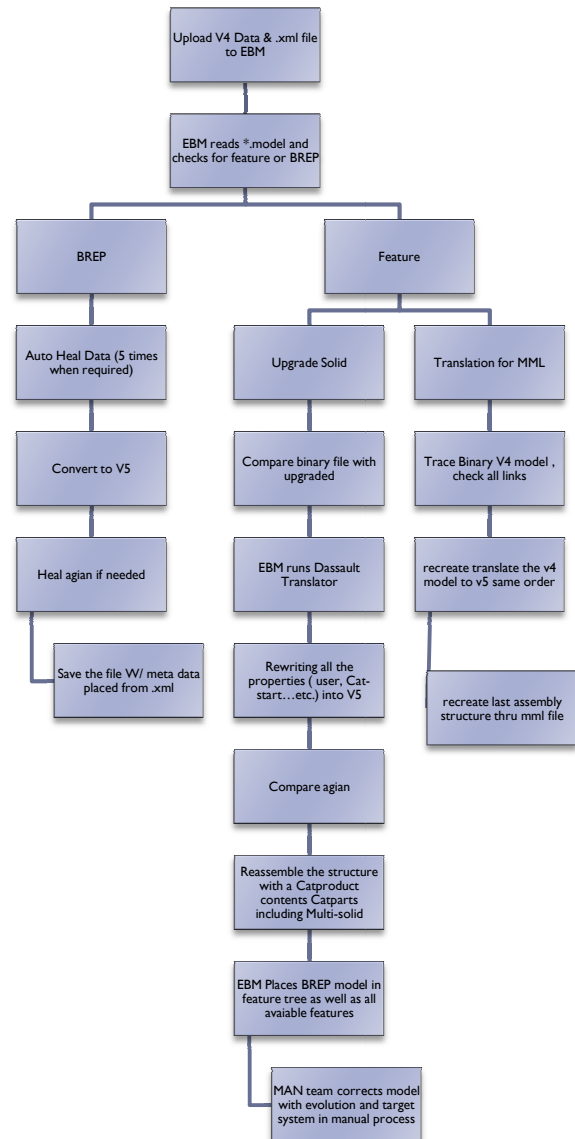


process detailed information about how the mathematical differences of CATIA V4 and CATIA V5 is affecting the data and the design intent. Fig. 4 shows one example of how 3D_Evolution presents the differences in the geometry. The darker red indicates too much material, the darker blue indicated to little material. This method of checking can be customized to a user defined threshold.

Interactive Translation

During each and every step of the translation process the user has the ability to stop the process if a quality threshold is broken or not met. Using 3D_Evolution to view the model comparison report the designer can then understand how to correct the problem. In case of MAN Truck they have a 3 person dedicated staff to use 3D_Evolution in the interactive mode to correct any features that don't come across correctly. During this mode when 3D_Evolution encounters a feature that CATIA V5 cannot create or the method is too different the process will stop and allow the designer to correct the geometry in CATIA V5 and then start the process again from that point.

Flow chart of process



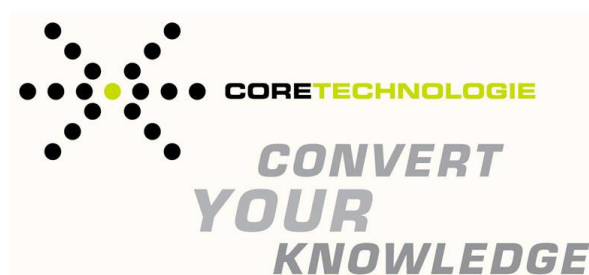
Conclusion

In an era that is witnessing technological discontinuities, managers should not focus on size as a goal; instead, they should focus on the development of new business models that help them have a competitive advantage to stay alive. It has been said, "if you are not [implementing automated process] in this era, you will not be in business" Companies like Core Technologies allow its customer to automated migration projects, reducing time-to-market while making its core business the engineering chore. The end result is displacing our competition while increasing its intellectual capital through resources, technology, and methodologies.

It is important to note that the increased automation of routine scripts will not remove the human element in innovation. On the contrary, it will allow people to focus on areas where their value is greatest; generating novel ideas and concepts, learning from experiments, and ultimately making decisions that require judgment. Core Technologies welcome the understanding of our customers migration needs.

Acknowledgments

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Contact Information

CT CoreTechnologies GmbH

Am Kreuzberg 7
63776 Mömbris
Germany
Tel: + 49 6029 9943-86
Fax: +49 6029 9943-87

CT CoreTechnologies France S.A.R.L

38 Place des pavillons
69007 Lyon
France
Tel: +33478617-942
Fax: +33478617-449

CT CoreTechnologies INC

63 Dixie Hwy
Rossford, Ohio
U.S.A.
Tel: 1-248-709-6618

INFO@Coretechnologies-inc.com