STEP FOR DOWNSTREAM CONSUMPTION

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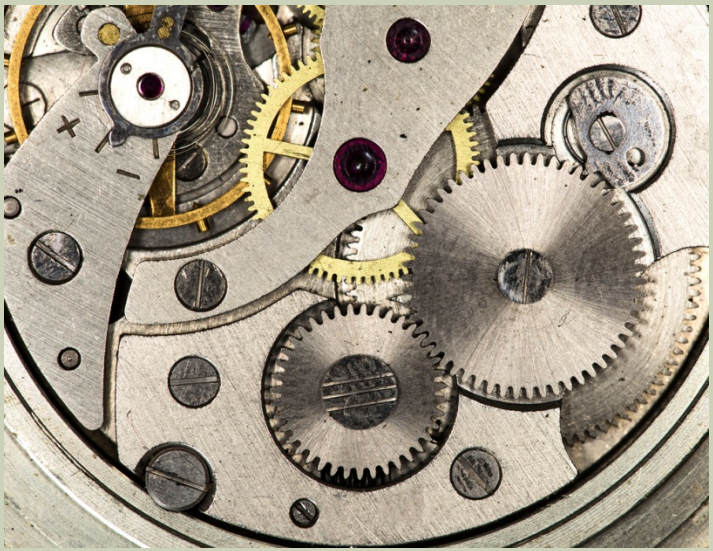
INTEGRATION GUARD RECOVER. EXTEND. SUSTAIN.

AGENDA

1. Introduction
2. Quick Demo
3. STEP Associativity
4. How it Works
5. Manufacturing Solution
6. CAE Solution
7. Wrap-up

INTRODUCTION

- Why exchange data in any non-STEP format?
- Is the challenge really about translation?
- Did you know current STEP formats (AP-203) already support sustained integration



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EXPECTATIONS OF ASSOCIATIVITY

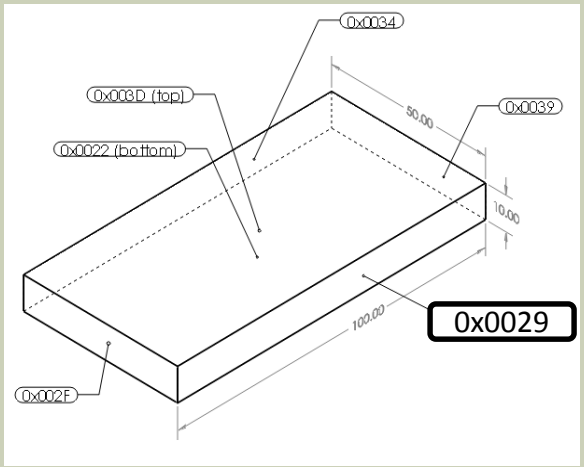
Associativity is **NOT**

- ✖ **A magic wand!**
- ✖ **The same as automation**
- ✖ **The same as translation**

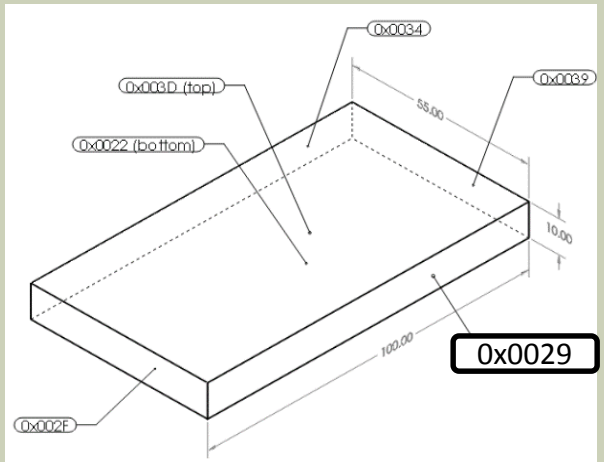
Associativity **should**

- ☑ **Avoid change-trauma**
- ☑ **Provide consistency**
- ☑ **Cut re-engineering**
- ☑ **Stay reliable**

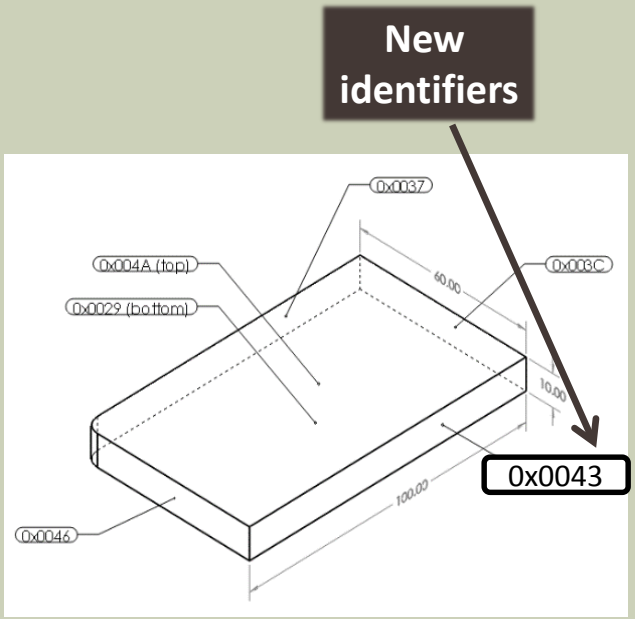
WHY IS THIS SO DIFFICULT?



123-A
Original part
after import



123-B
Revision #1
after import



123-C
Revision #2
after import
Different Namespace

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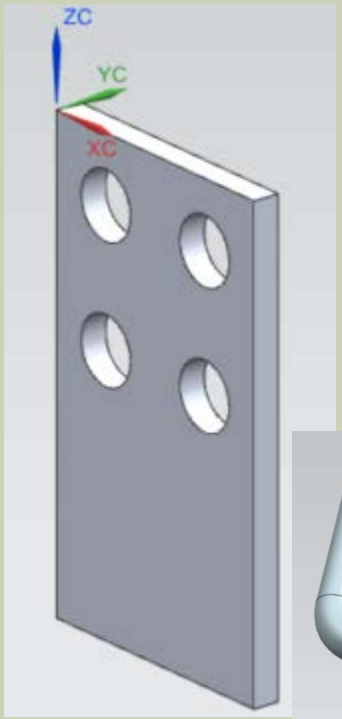
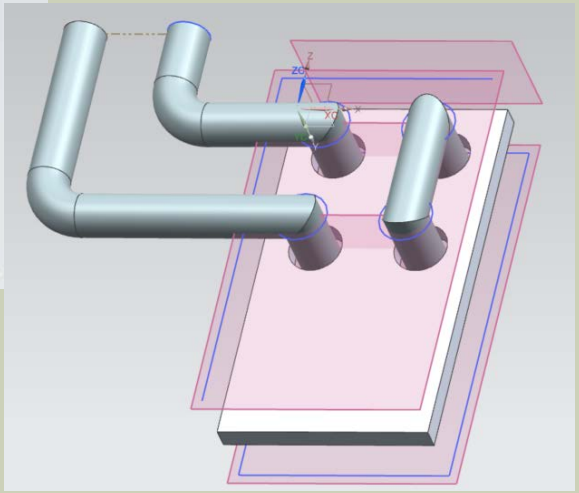
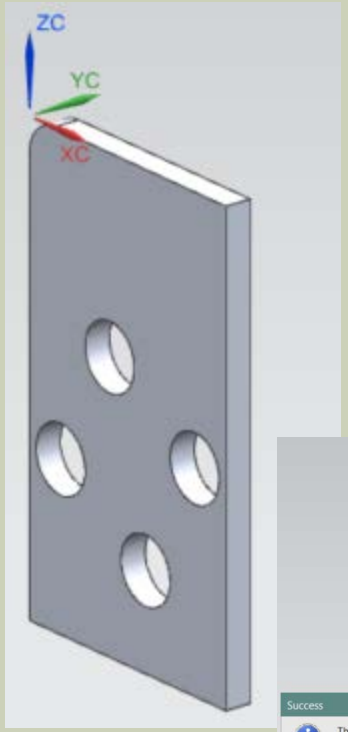
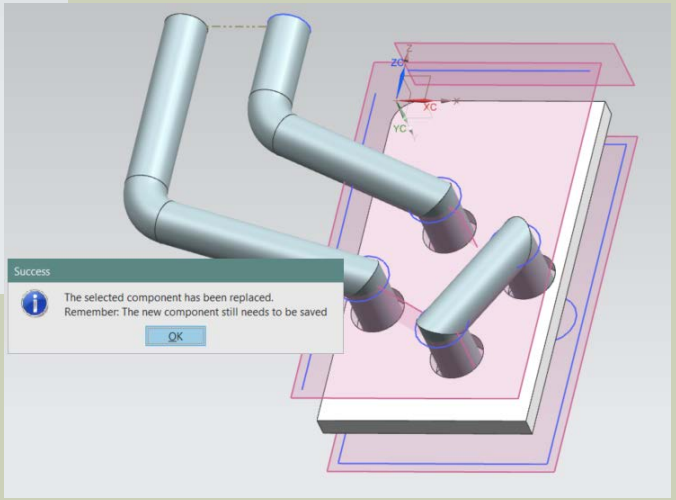
ASSEMBLY - QUICK DEMO









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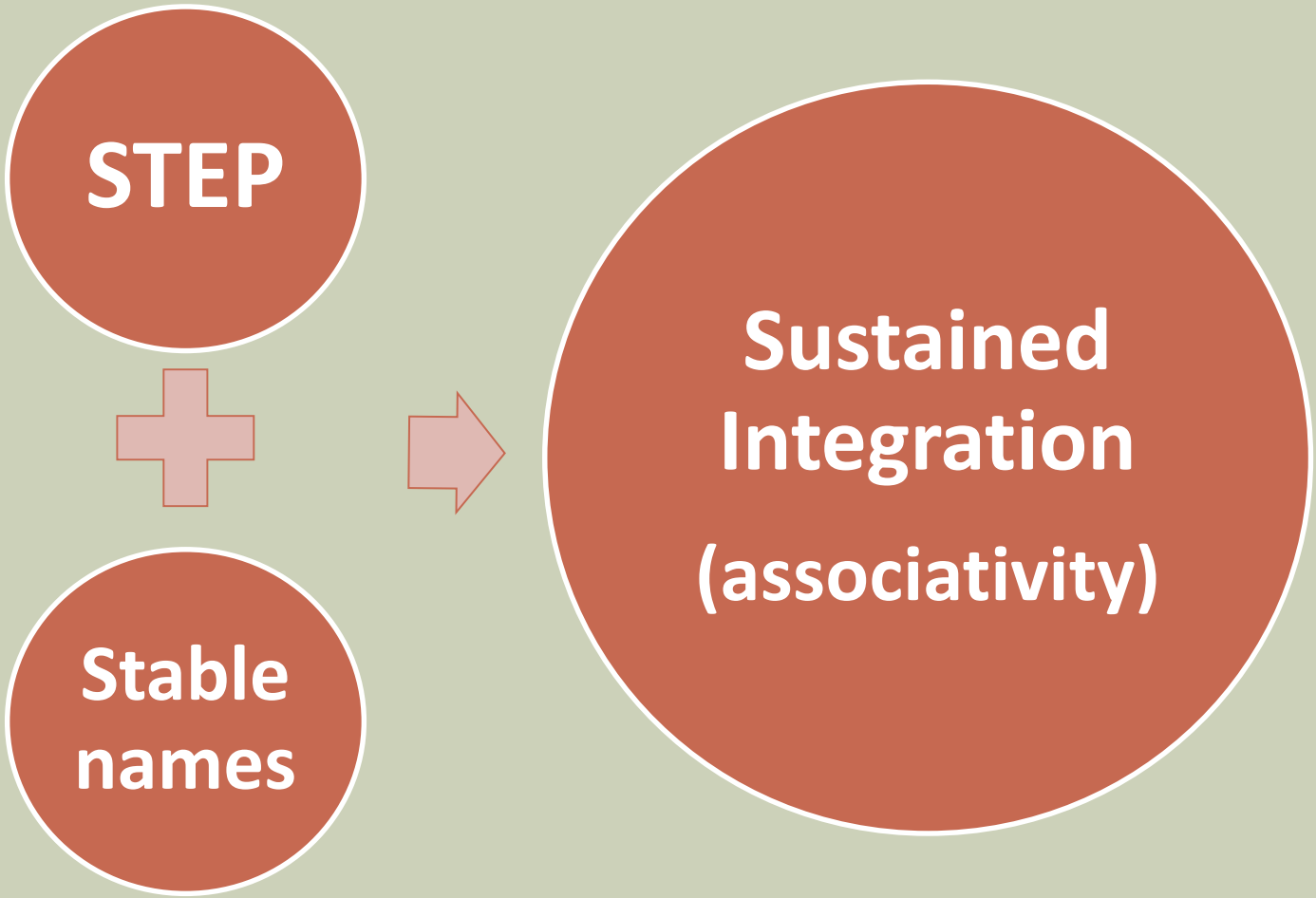
ASSOCIATIVITY VIA STEP FILES



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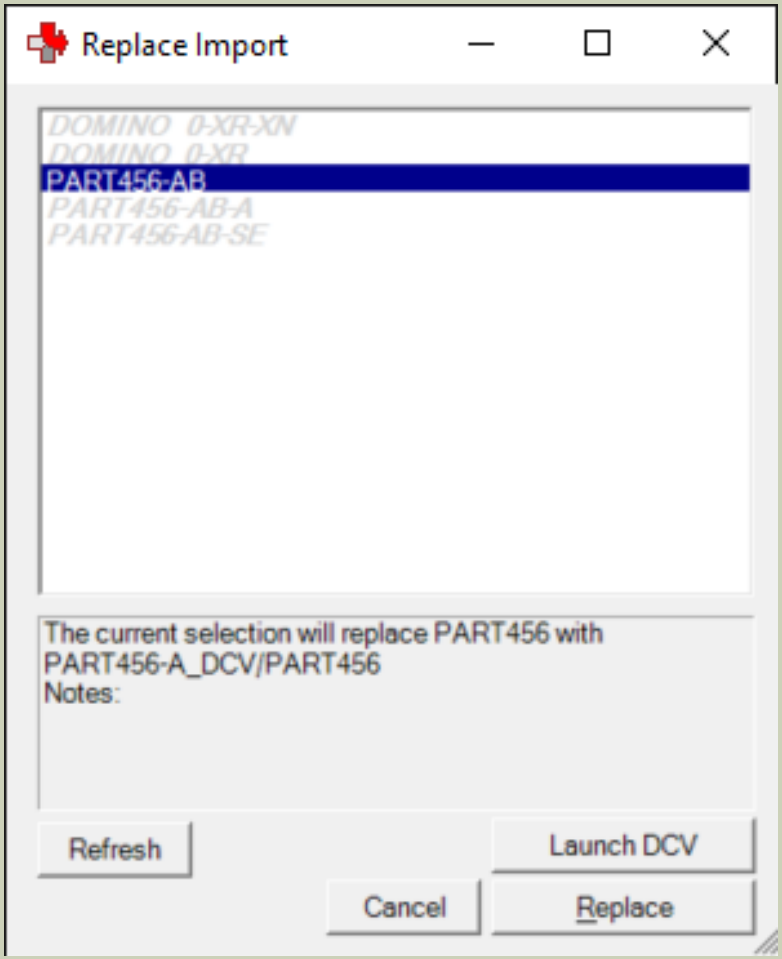
DESIGN CHANGE VECTORS

- **Where did this file come from?**
  - DCV generated locally
  - No requirements on the sender
  - No support from the exporting CAD format



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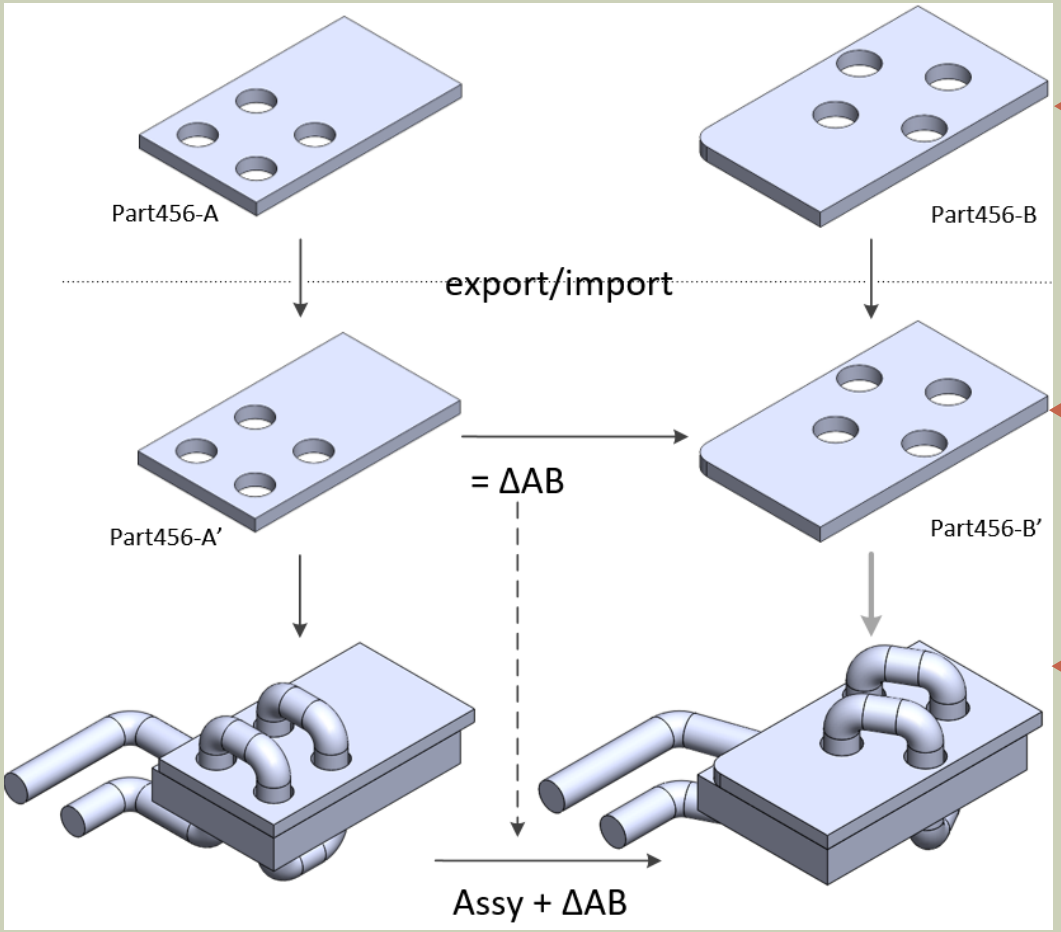
DCV PROCESS DETAILS

Original customer model

Imported model

Integrated assembly



Revised customer model

Imported revision

The previous assembly adds ΔAB to become the new model

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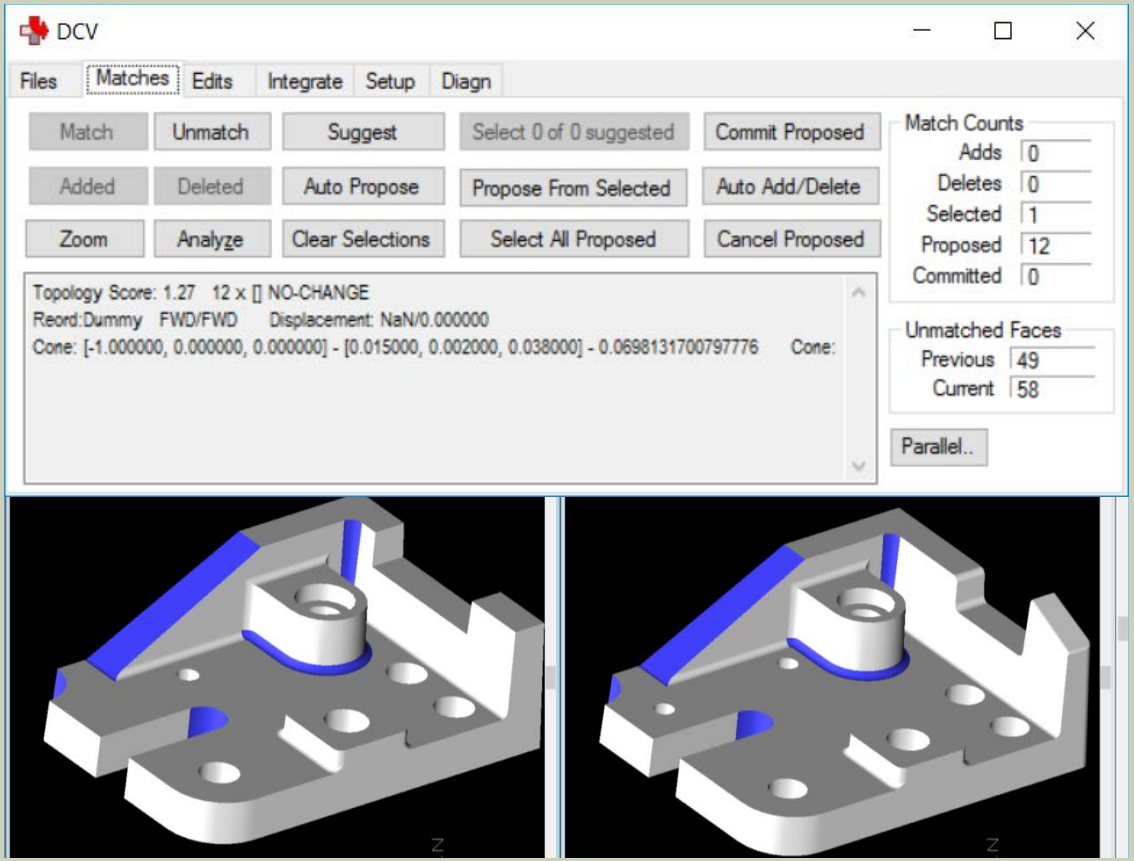
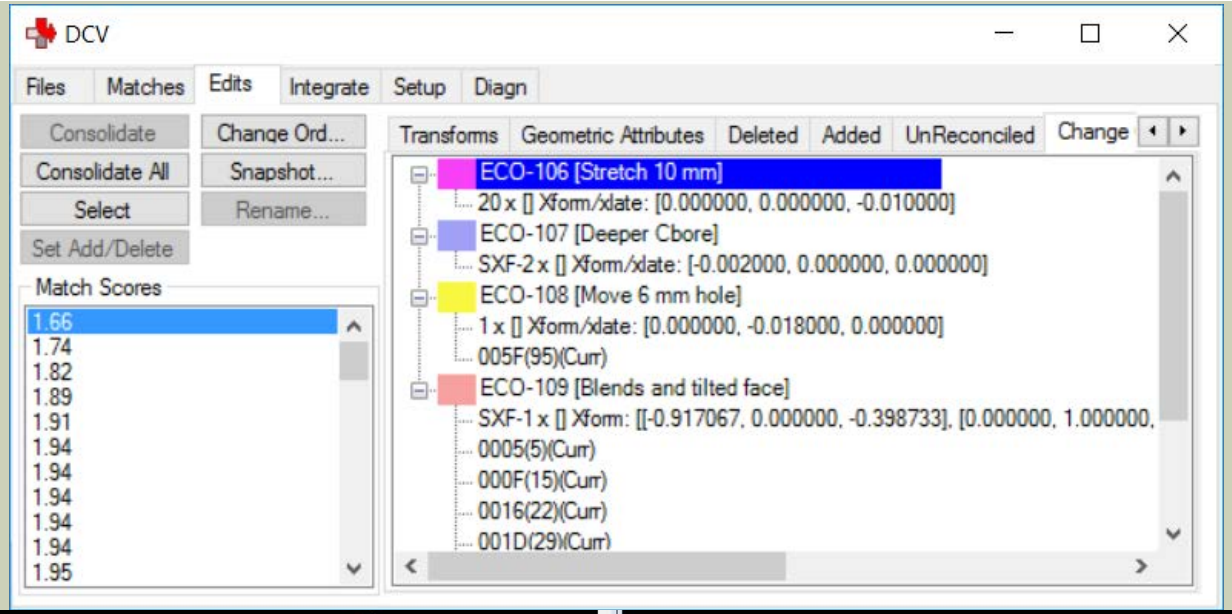
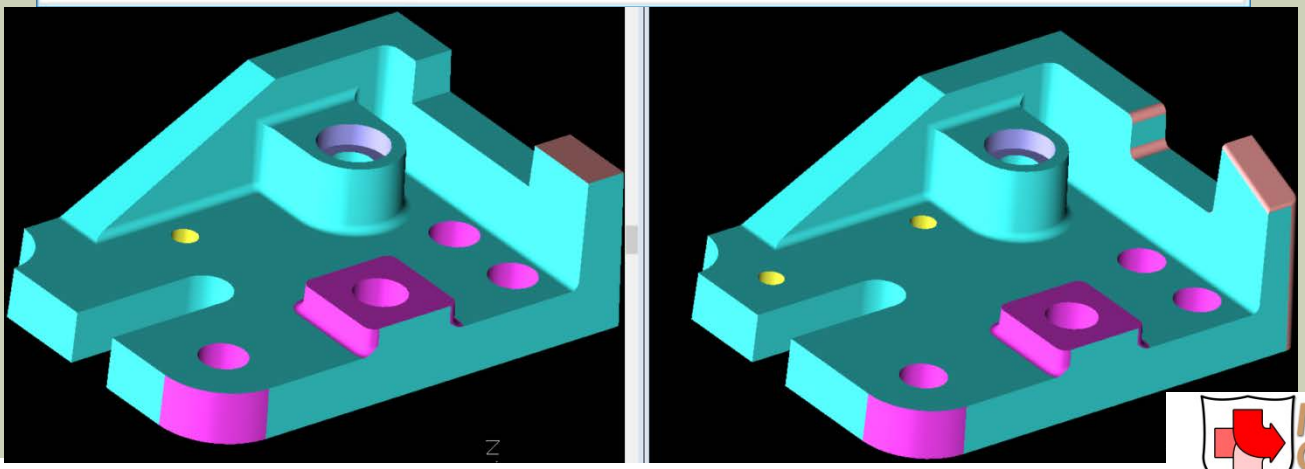
CREATING A DCV

- Matches universal b-Rep geometry
- Better than 98% automatic
- N-squared search issues are solved



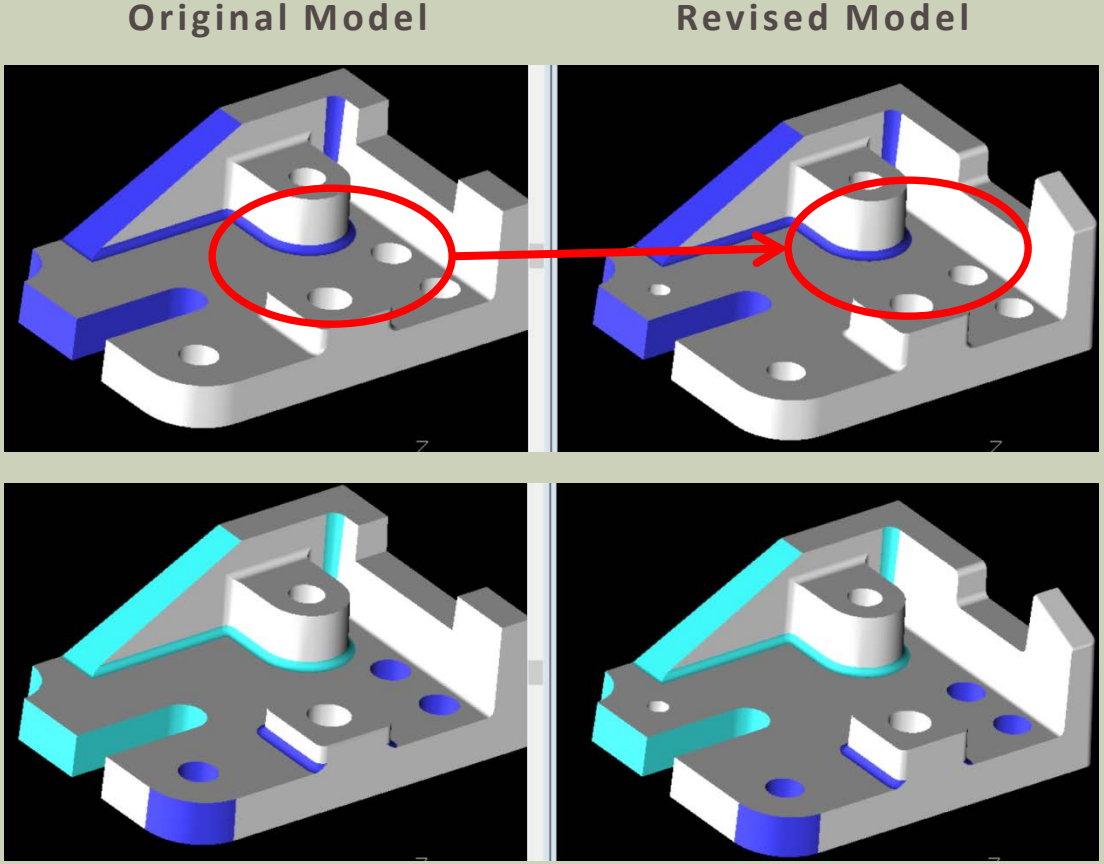
EXAMINING A DCV



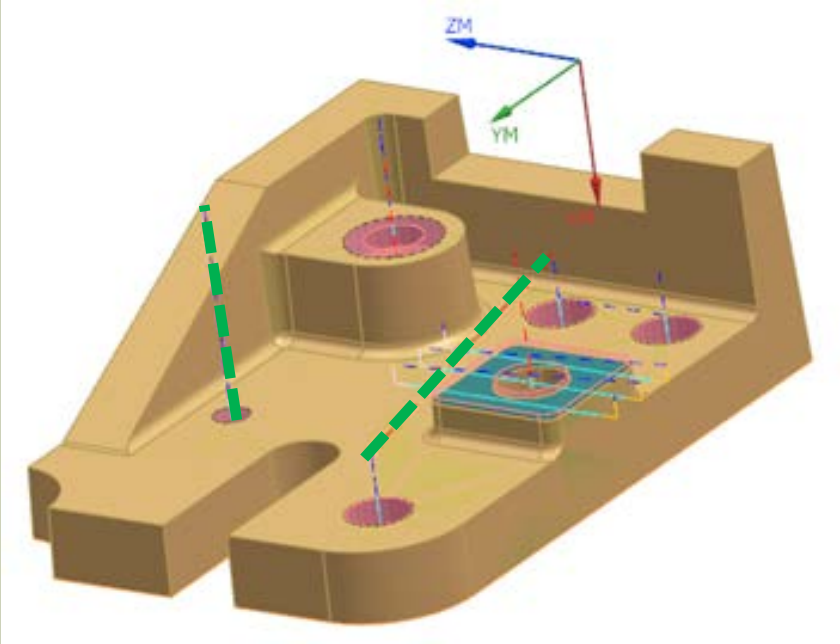


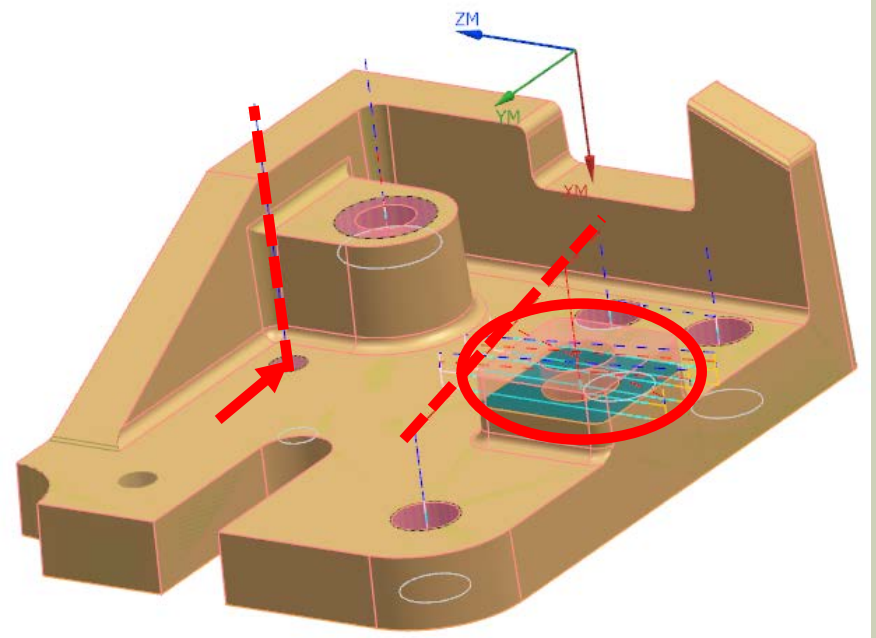
RECOGNIZING CHANGES TO A CASTING

- Casting made from the previous part
- Used ‘hints’ from the previous DCV
- The technique is called a DCV Parallel Vector



DCV FOR NC

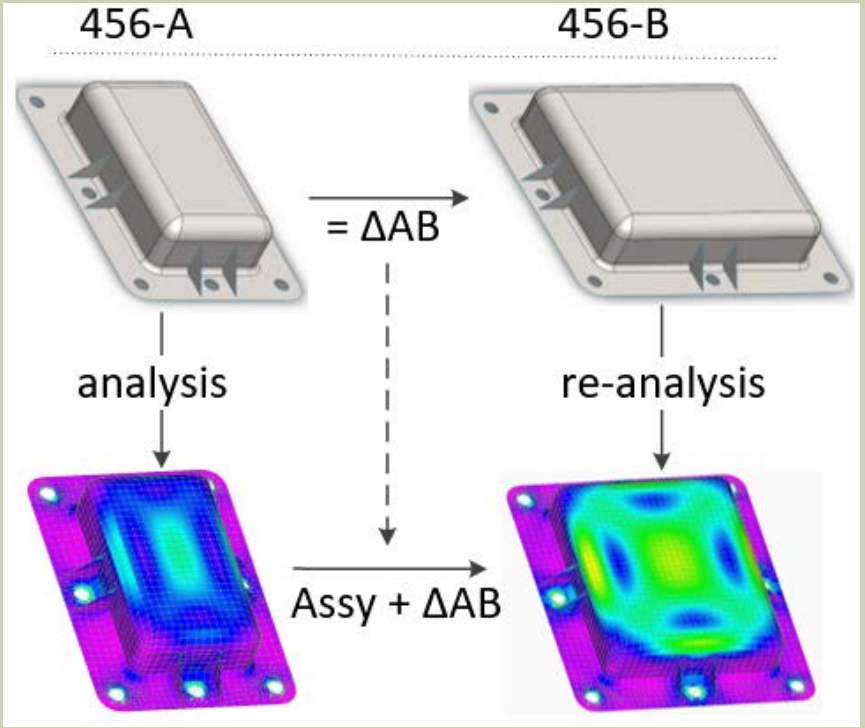




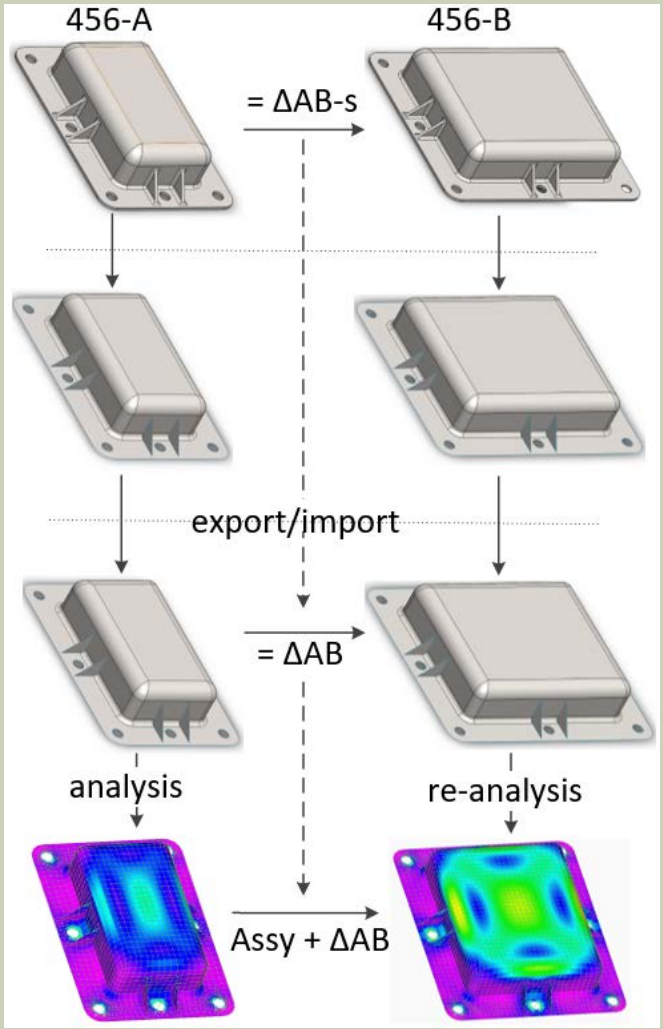
- Same integration as a native-edit
- No extra data exported.

CAE CASE

- **The model is midsurface shells, not a solid**
  - So, recognize the difference between the midsurface models
  - Then, add that difference to the CAE analysis
- **Problem:**
  - Recognizing the changes to a shell model is less automatic



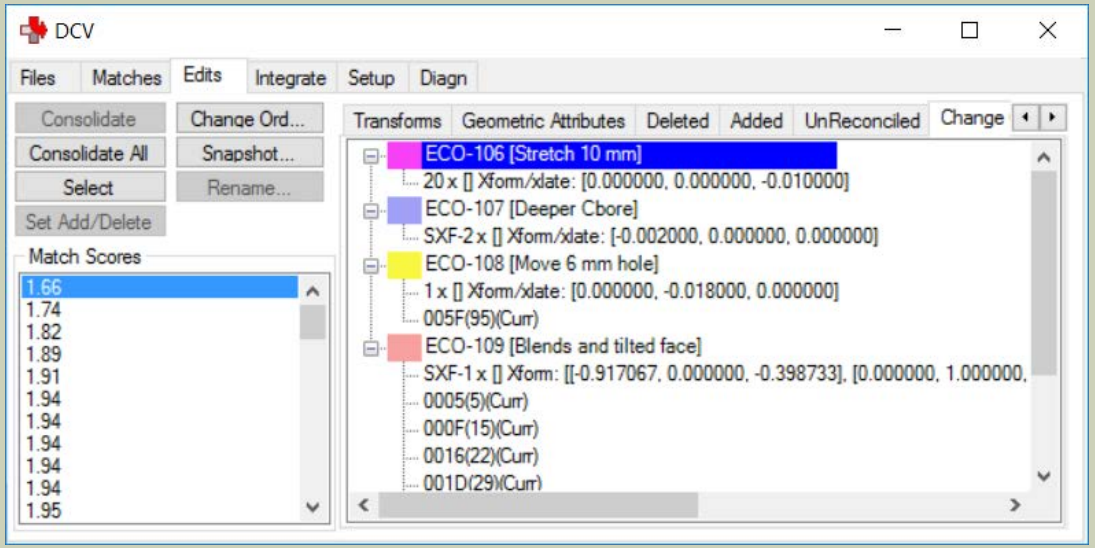
PARALLEL DCV FOR CAE

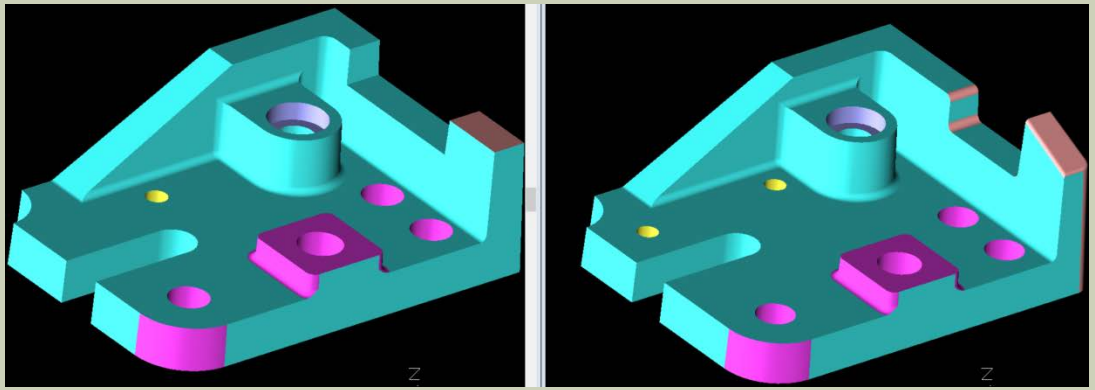


- Changes to the solid model recognized automatically.
- That result maps changes on the midsurface model
- Bonus: Double-checks the midsurface processing

IS DCV A NEW PROCESS STEP?

- **Perhaps, but..**
  - Engineers should assess the changes
  - Reconciles the ECO versus the 2 solids
- **DCV matching goal**
  98% automatic





MBE MYTHS

- **MYTH #1 – STEP needs more vendor support to provide full integration**
- FACT – You have just seen how to break through this barrier

- **MYTH #2 – Claims of associativity for imported CAD data are false, fragile, or absurdly narrow**
- OK – That happened, but now you have seen an exception

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BEST PRACTICES

- **All due cautions from native CAD integration**
- **Take the time to understand what changed**
  - Pattern movements in particular
- **Use a consistent export/import process**
- **Holes are best modelled as single cylinders**
- **You <u>don't</u> need to wait for a new project**

CONCLUSIONS

1. STEP is already sufficient to support sustained integration
2. You can count on persistent IDs/names
3. Broken integration can be repaired
4. MBE can be implemented gradually

RECOMMENDATIONS

1. **Manufacturers:**
   - Broaden your vendor base. Vendors can fully comply with company MBE standards via STEP.
2. **CAD vendors:**
   - Expect and use data imported with persistent IDs/names.
3. **All:**
   - Educate your executives! The issue is IDs/namespaces, not translation/format
   - STEP test parts could include some cases of successive versions.
   - Send challenge cases

QUESTIONS

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