ECAD LIBRARY INTEGRATION/ NEW PART INTRODUCTION

Linda Mazzitelli

PTC Principal Technical Account Manager

June 2016

AGENDA

• Panel Introductions and Format	Linda Mazzitelli
• ECAD-MCAD Collaboration Part Alignment	Phil Lindberg, Nick DeMatt, Jody Miller
• Library Synchronization 101	Scott Claes
• Design Data Management Part Alignment	L. Srinivasen, Pat Cox, Hemant Shah
• Summary	Linda Mazzitelli
• Q&A	

PANEL MEMBERS

- Phil Lindberg
- Johns Hopkins Applied Physics Lab
- ECAD/PLM Integration

- Nick DeMatt
- Johns Hopkins Applied Physics Lab
- Chief Engineer for Engineering and Fabrication

- Jody Miller
- Mentor Graphics Corp.
- Product Manager

- Lakshmiraghavan Srinivasan (LS)
- GE Appliances
- eServices Program Manager

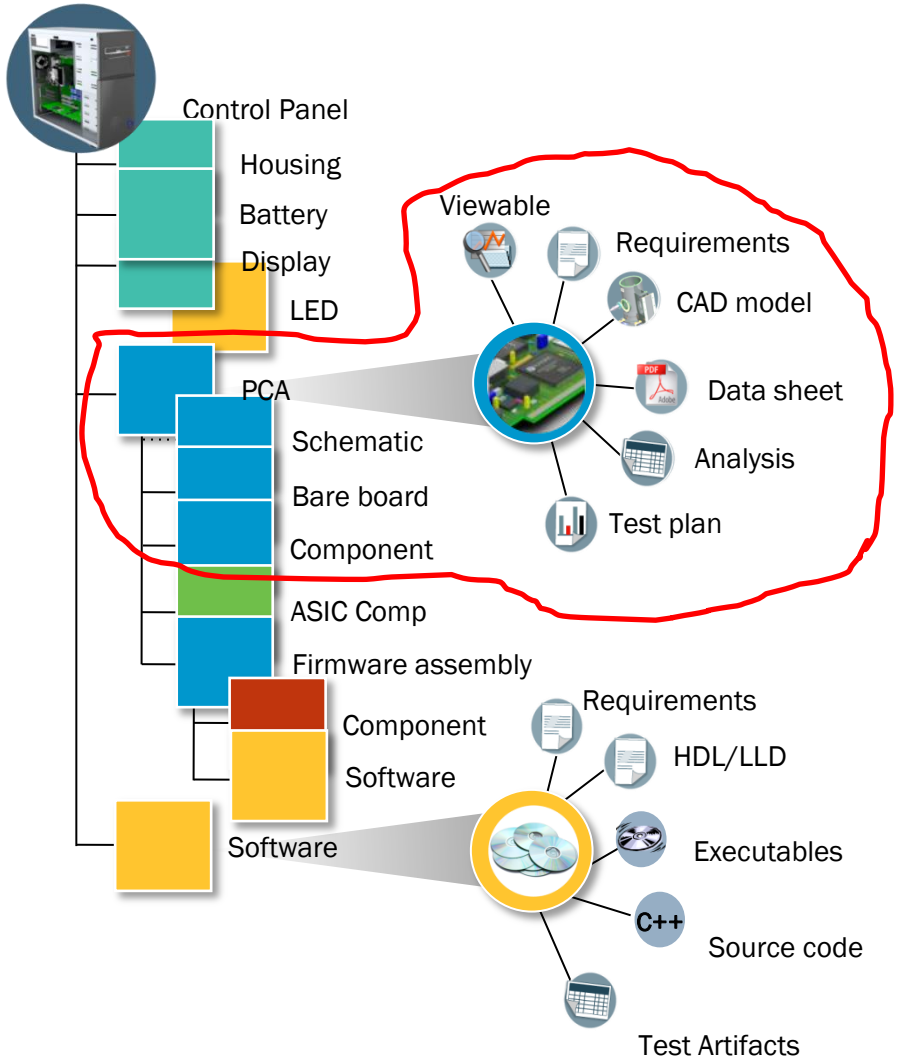
- Patrick Cox
- GE Appliances
- ECAD Leader

- Hemant Shah
- Cadence Design Systems
- Product Management Group Director

- Scott Claes
- PLM
- ECAD Leader

MULTI-DISCIPLINE LIBRARY ALIGNMENT

Mechanical, Electrical, and Software

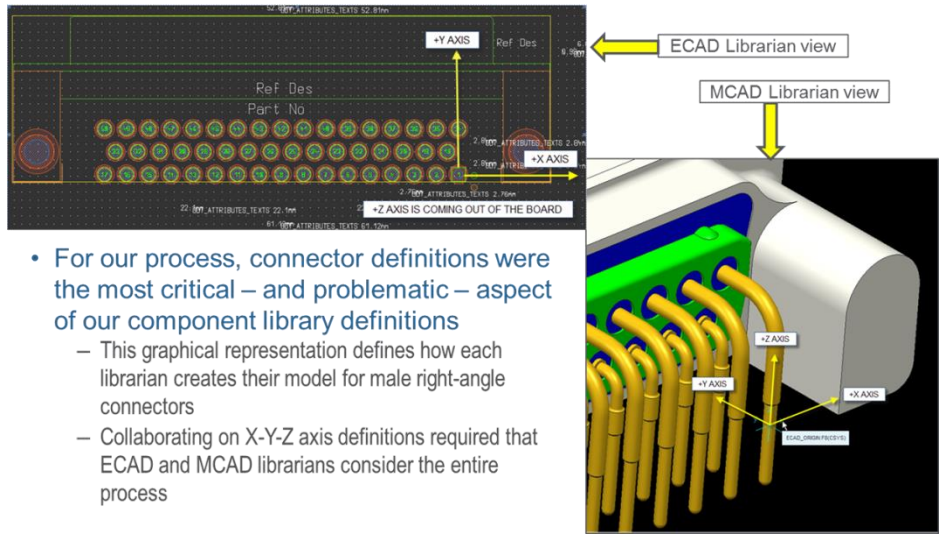


ECAD-MCAD COLLABORATION PART ALIGNMENT

ECAD-MCAD LIBRARY ALIGNMENT

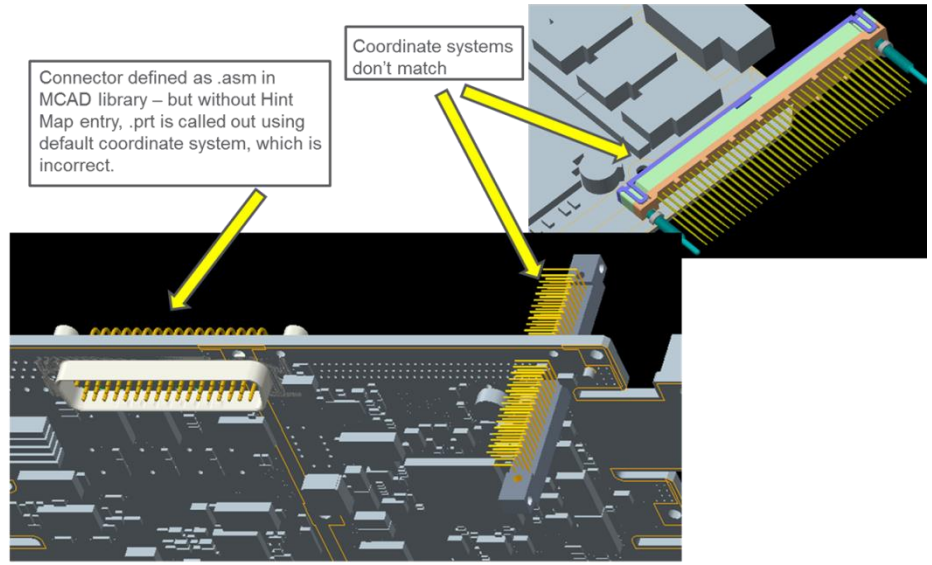
- Why is the library crucial for ECAD-MCAD collaboration?
- What attributes are common between ECAD and MCAD?
- How to handle naming inconsistencies between MGX/DMS and PTC Windchill PLM?
- What to do with these flipping connectors?
- How to change PTC Windchill PLM library?

ECAD and MCAD Librarians need to work together!



- For our process, connector definitions were the most critical – and problematic – aspect of our component library definitions
  - This graphical representation defines how each librarian creates their model for male right-angle connectors
  - Collaborating on X-Y-Z axis definitions required that ECAD and MCAD librarians consider the entire process

What happens when connector definitions are inconsistent:

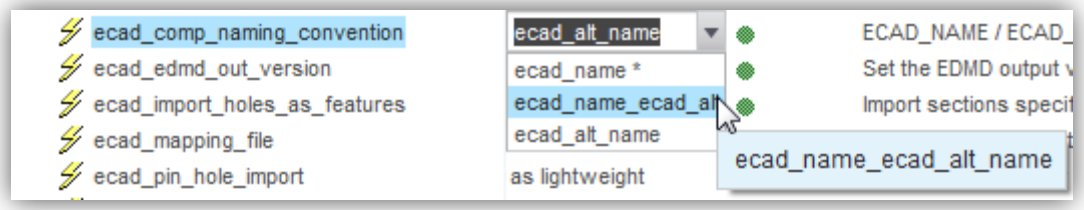


PART MAPPING DURING IDX IMPORT

- Hint.map is a file that allows the Package Name and Part Number to map to any specified Creo Parametric .prt file

```
map_objects_by_name->
ECAD_NAME  "0402"
ECAD_ALT_NAME  "195-0486-000"
ECAD_TYPE  ""
MCAD_NAME  "195-0486-000_1"
MCAD_TYPE  "part"
MCAD_LAYER  "components"
END
#
```

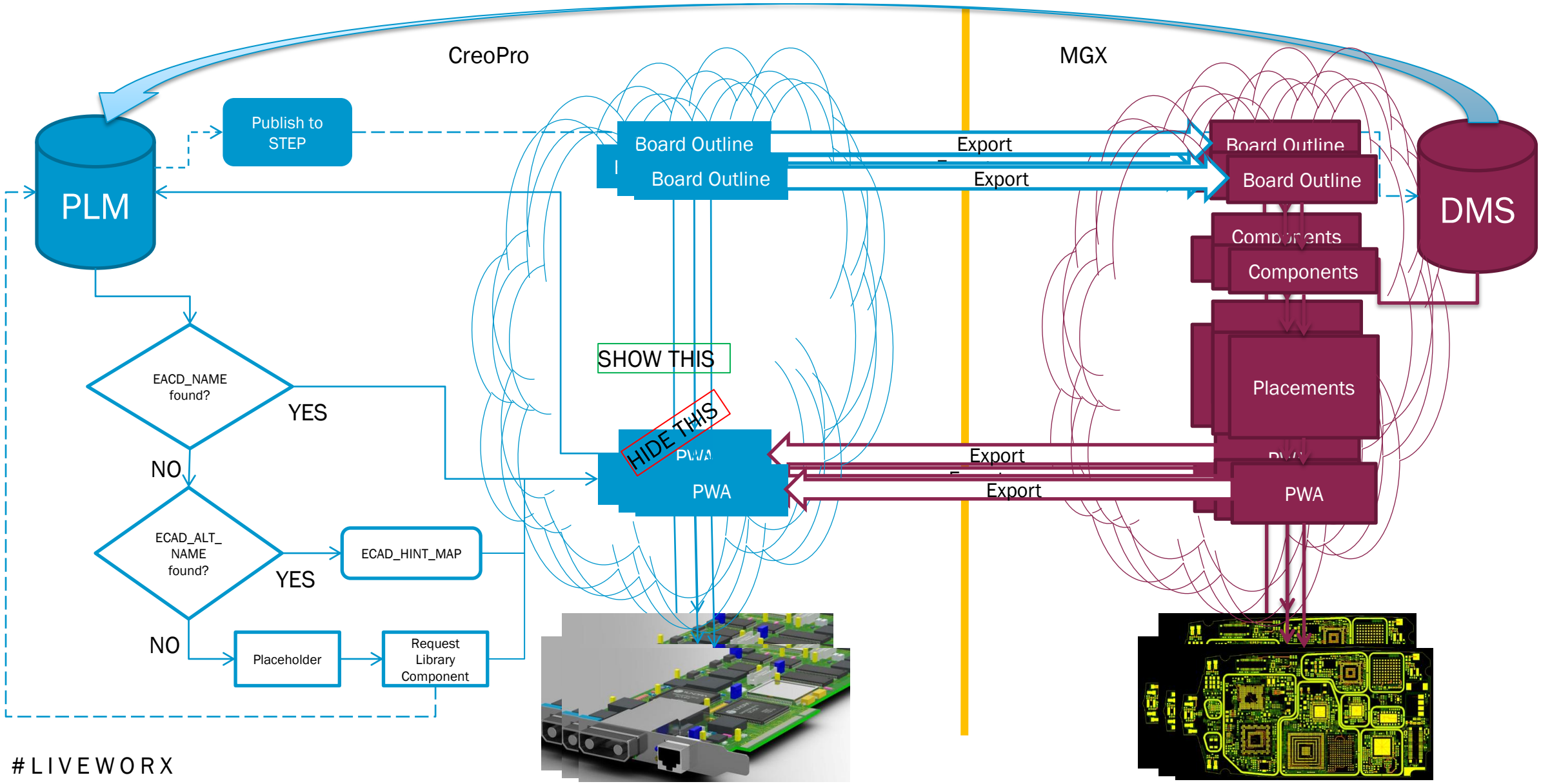
- Hint.map can be avoided if all Creo Parametric parts use one of these conventions for filenames:



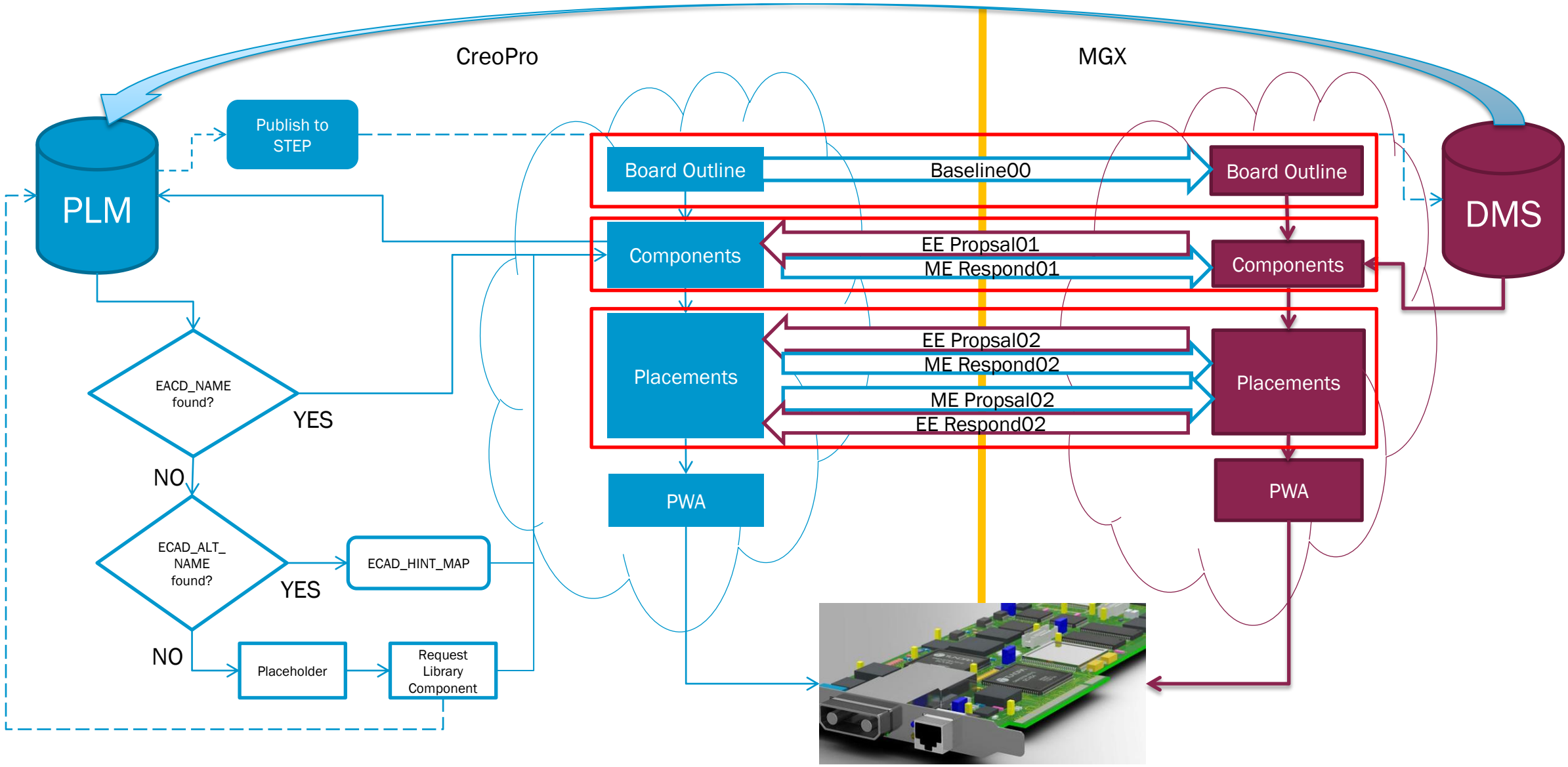
  - ECAD_NAME – “Package Name”
  - ECAD_NAME_ECAD_ALT_NAME – “Package Name”_”Part Number” (requires Creo 1.0 or higher)
  - ECAD_ALT_NAME – “Part Number” (requires Creo 1.0 or higher)

- Choose what best fits your company
  - Sometimes the best fit is a mix of direct mapping and hint.map for certain components.

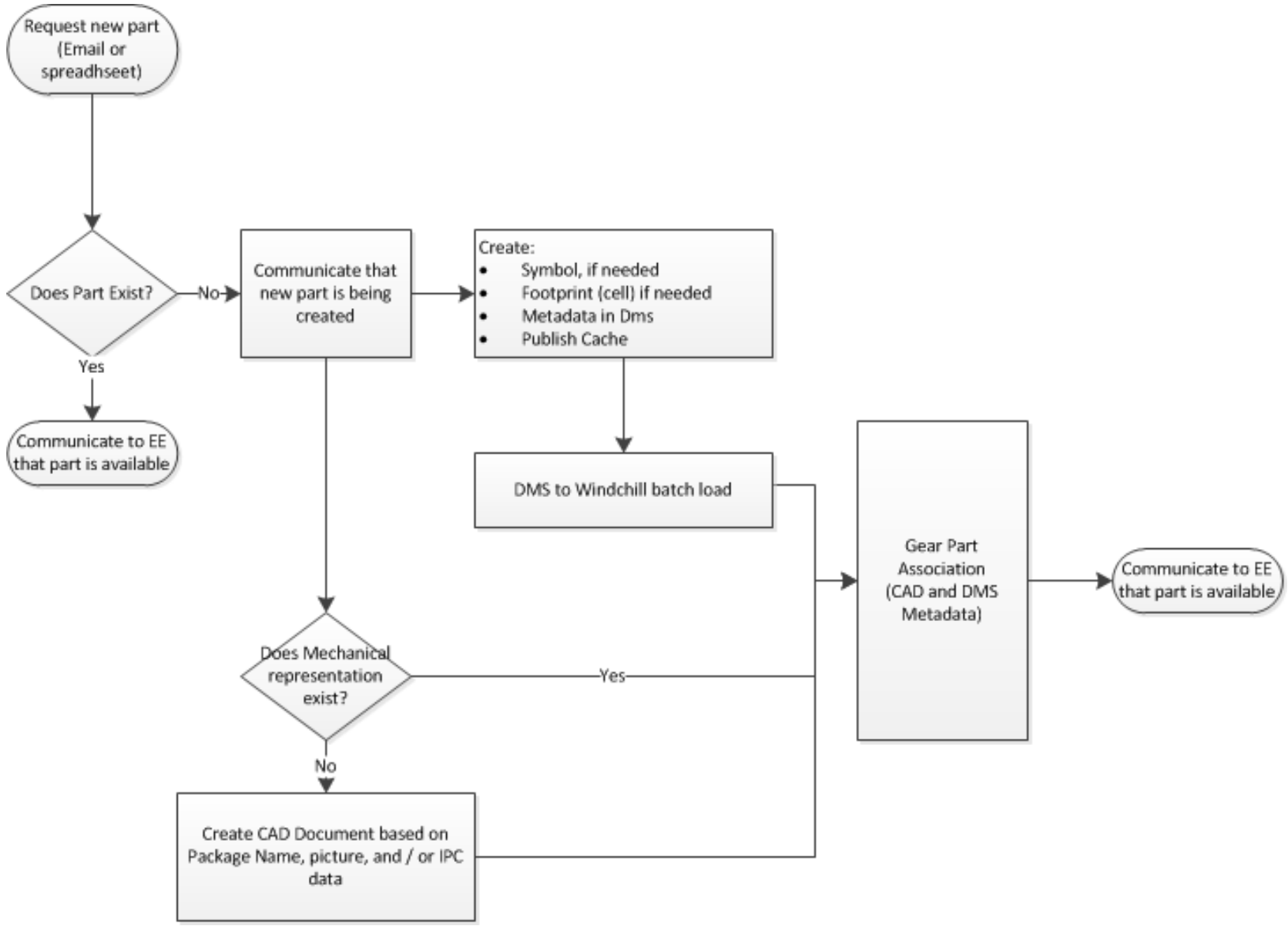
COLLABORATION PROCESS – IDF IF MULTIPLE CHANGES



COLLABORATION PROCESS - IDX



NEW LIBRARY PART (ECAD-MCAD) CREATION PROCESS

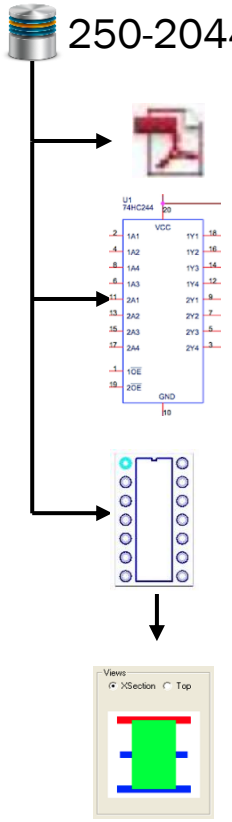


PTC WINDCHILL-ECAD LIBRARY SYNCHRONIZATION 101

ECAD PART LIBRARY DATA DETAIL

ECAD Part; Library Definition Elements

ECAD TOOL MANAGED



250-2044-001 IC, 74LS244, Octal Buffer/Line Driver, DIP [+ METADATA] — PART LIB

250-2044-001 74LS244 DATA SHEET, PDF [or an active URL]

74244 SYMBOL SCHEMATIC/LOGIC SYMBOL — SYMBOL LIB

20 PIN DIP PCB FOOTPRINT — FOOTPRINT LIB

0.031” PAD/HOLE PADSTACK DEFINITION — PAD LIB

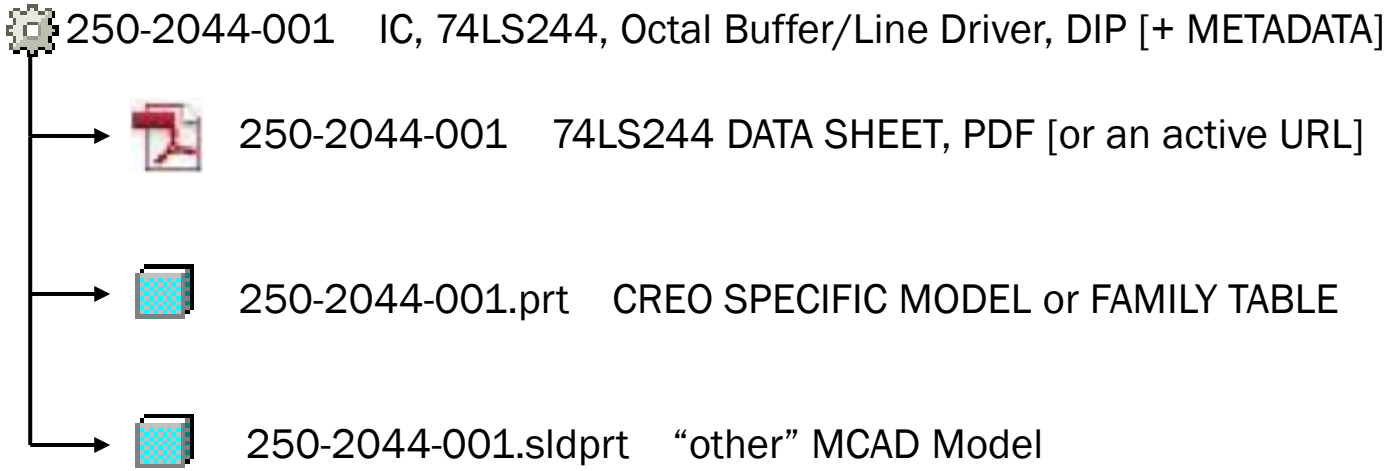
ECAD PART DATA IN PTC WINDCHILL

PTC Windchill Part NUMBER NAME optional attributes

250-2044-001 IC, 74LS244, Octal Buffer/Line Driver, DIP [+ METADATA]

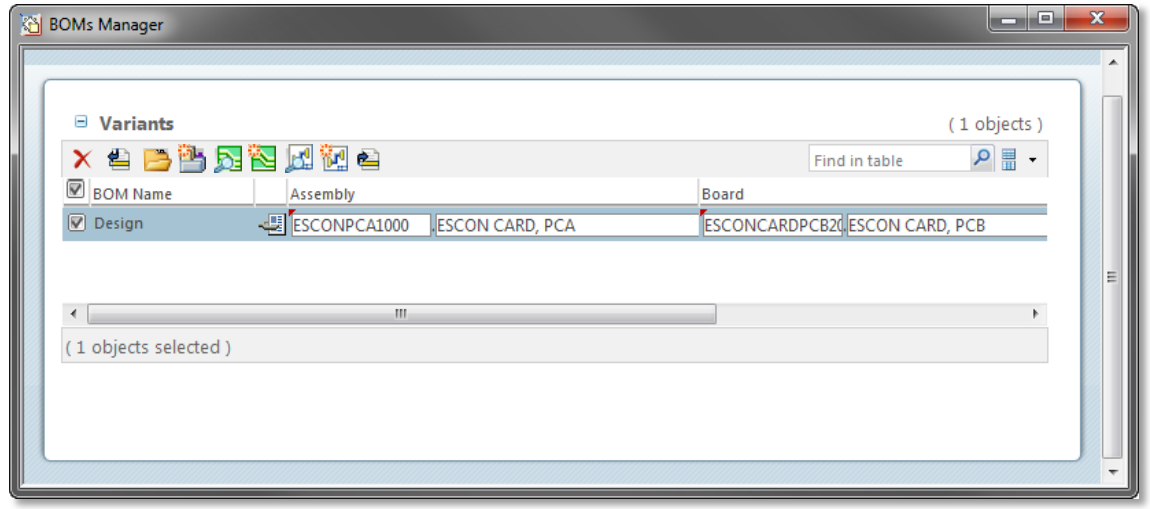
ECAD WT PART DATA IN WINDCHILL

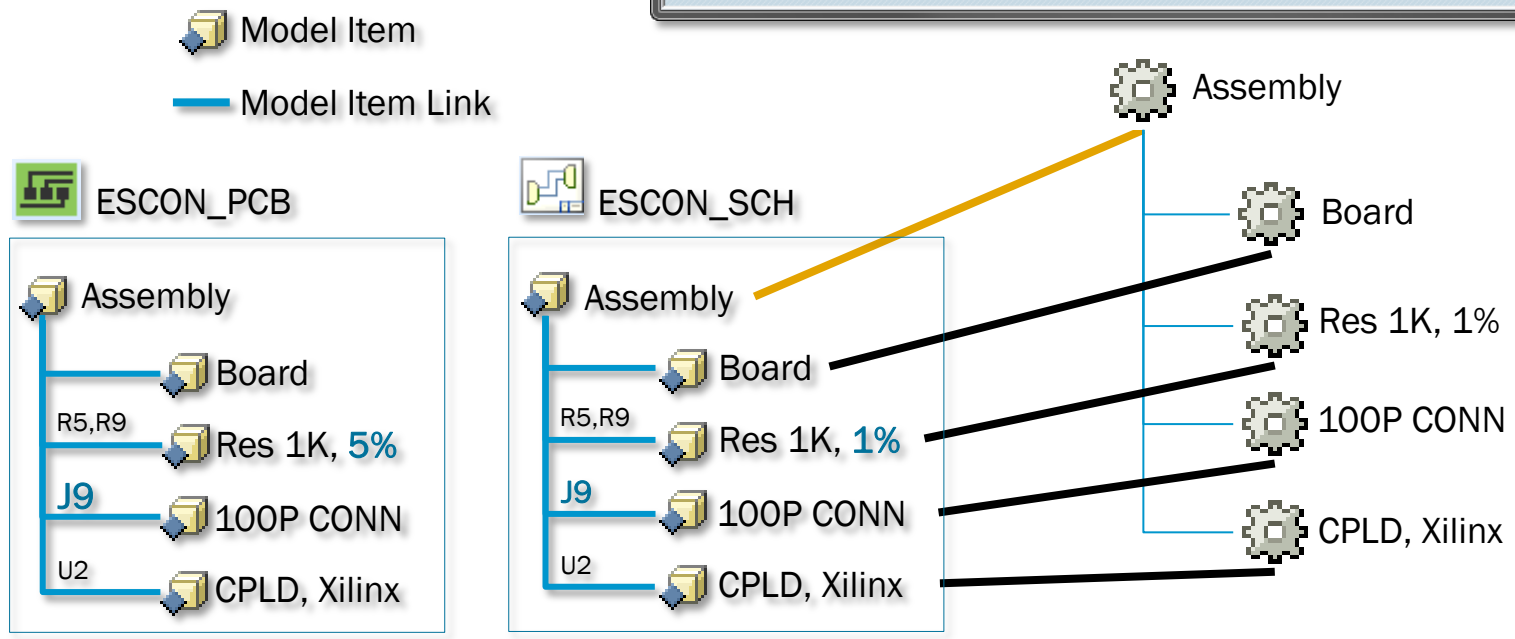
PTC Windchill Part NUMBER NAME optional attributes



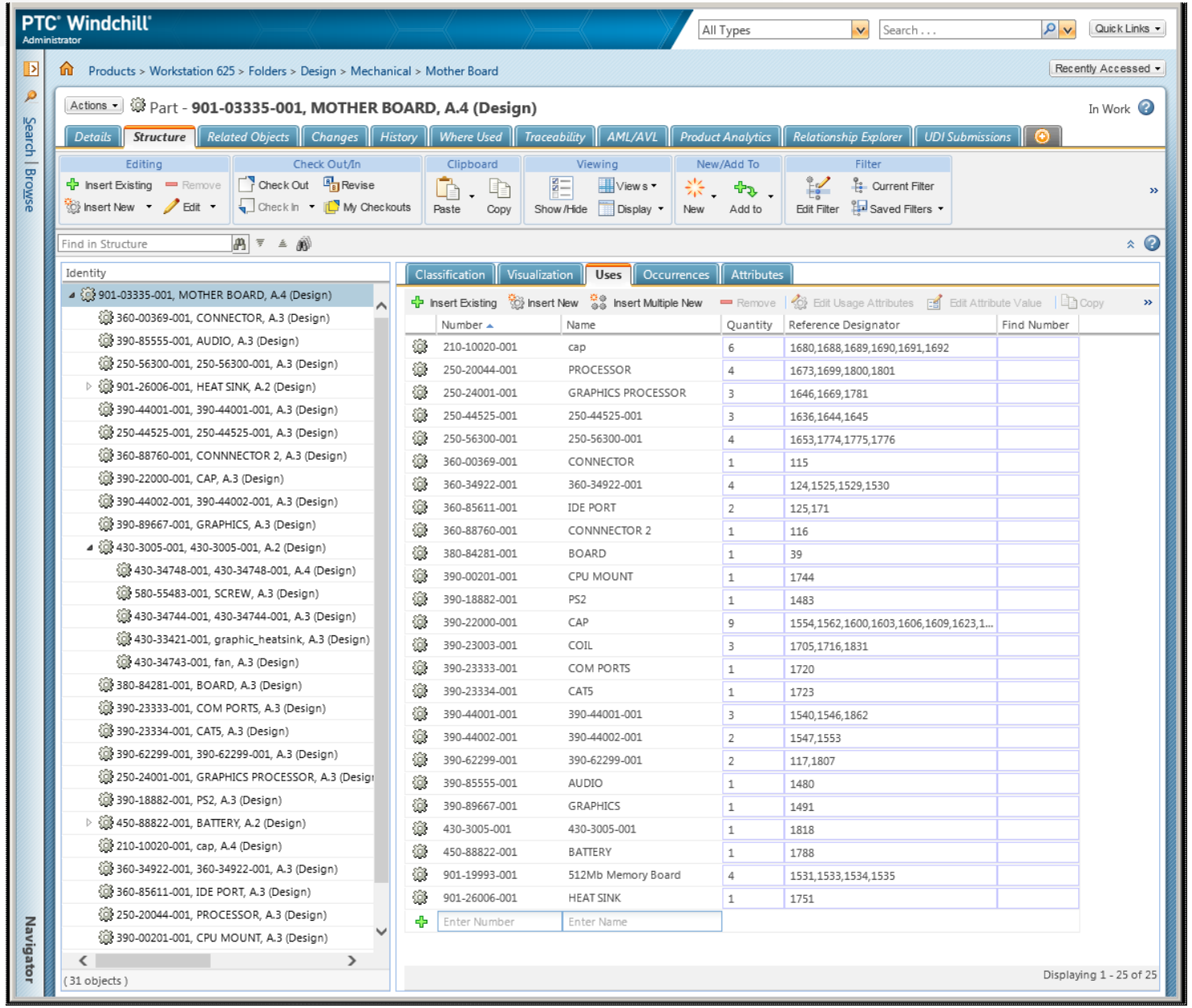
ECAD-WINDCHILL BOM MANAGER MAPPING

- Create Assembly Part for BOM association
- Assign Bare Board Part
- Assign Variants





PCB ASSEMBLY PRODUCT STRUCTURE & BOM



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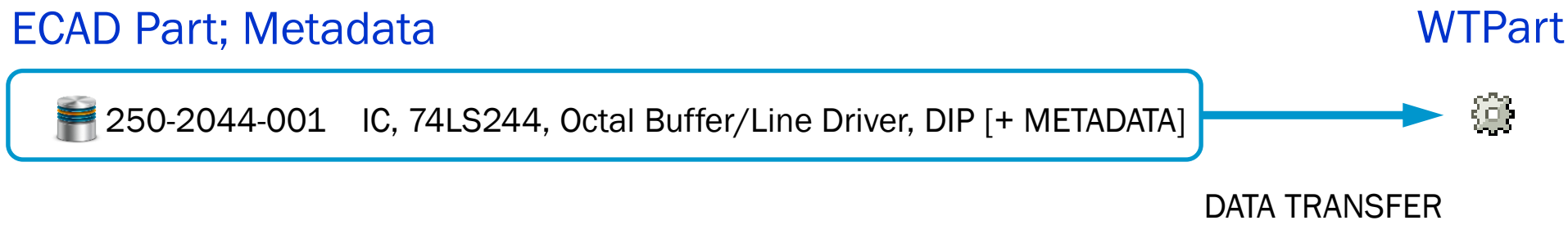
ECAD METADATA PART SYNCHRONIZATION

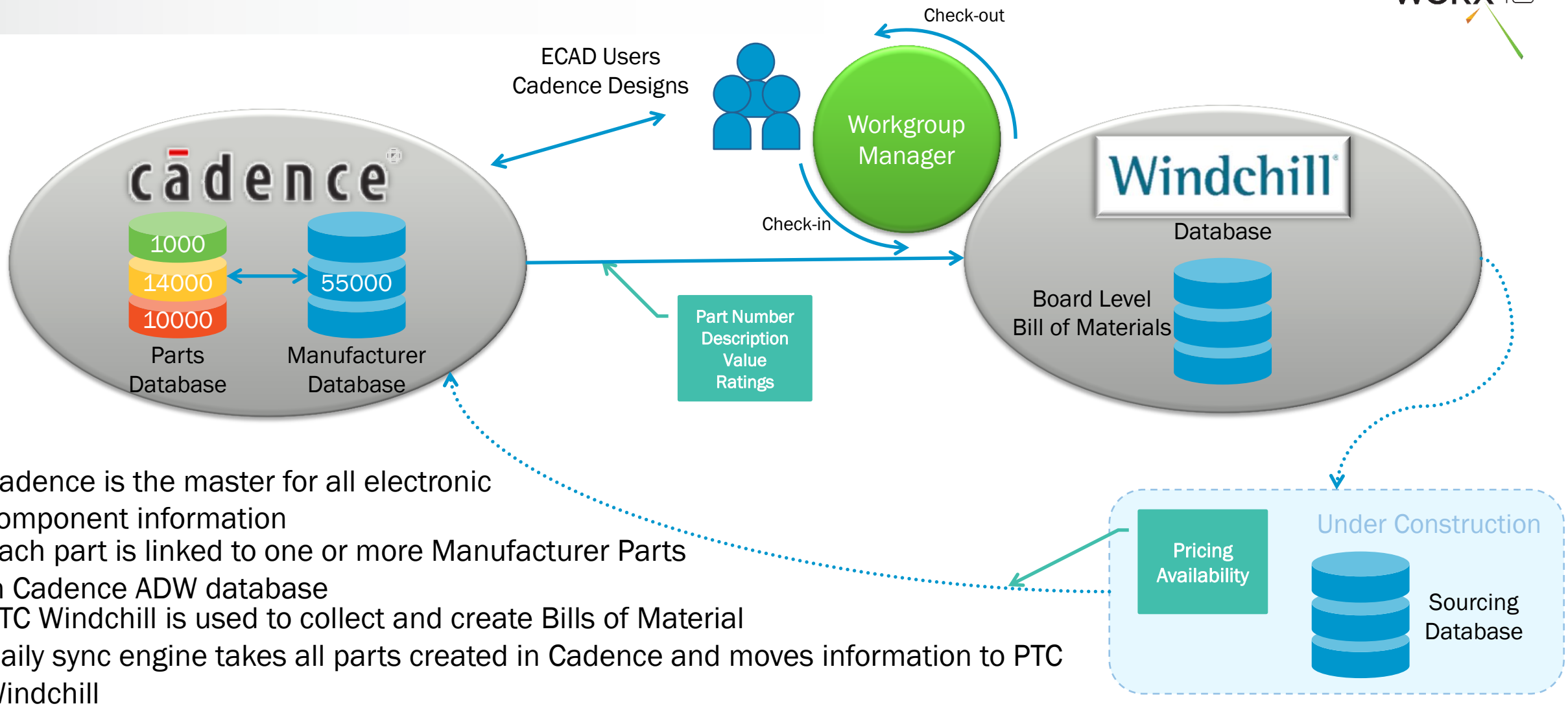


Transfer methods:

- Manual data entry
- Manual XLS file loads
- Cadence ADW bi-directional (ADW Library Gateway)
- Scheduled automated file creation & import
- Scheduled automated data exchange

ECAD DESIGN DATA MANAGEMENT PART ALIGNMENT

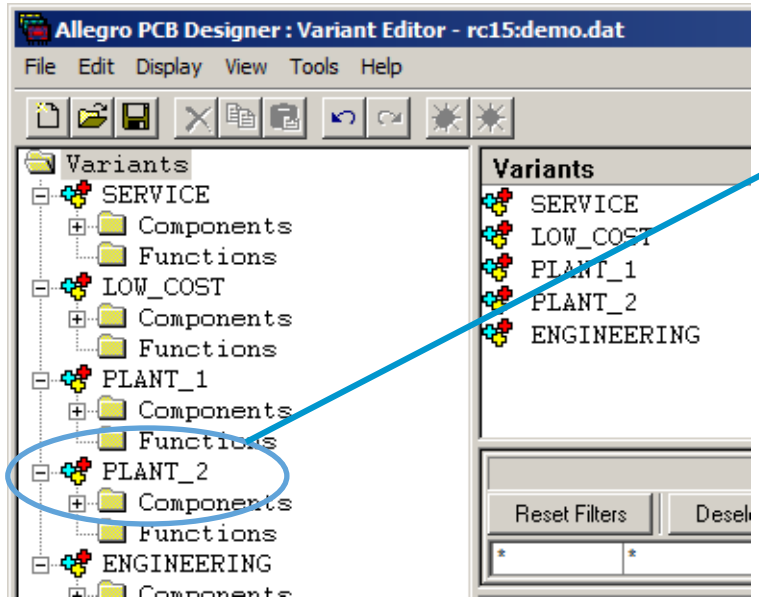
GE APPLIANCES DATABASE ARCHITECTURE

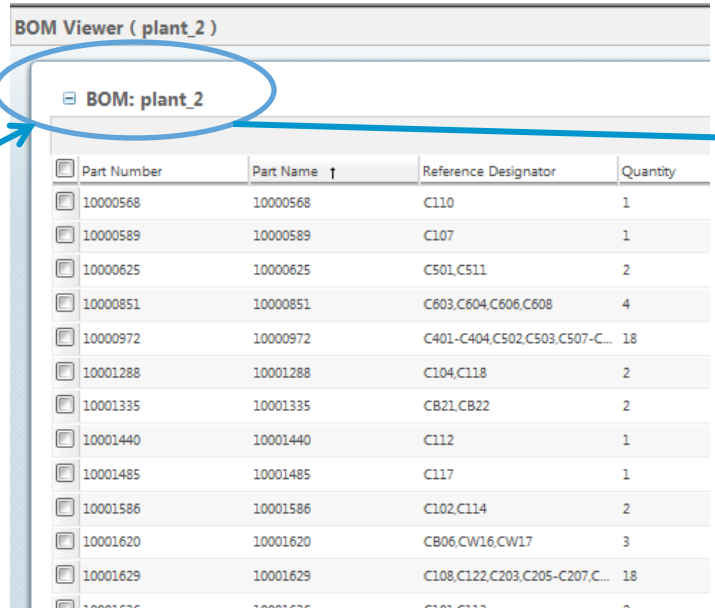


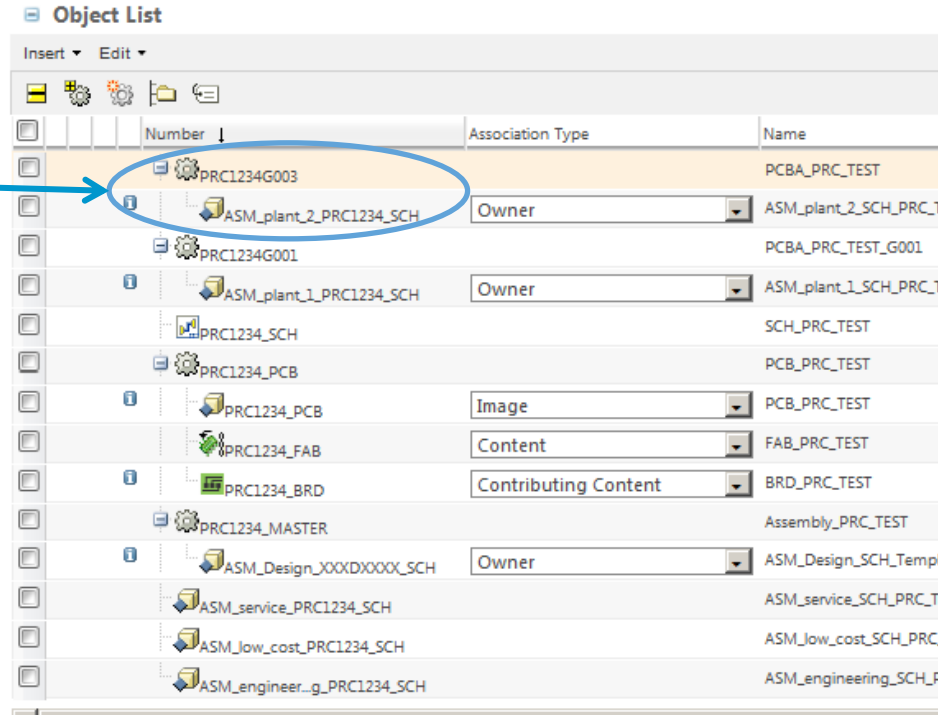
- Cadence is the master for all electronic component information
- Each part is linked to one or more Manufacturer Parts in Cadence ADW database
- PTC Windchill is used to collect and create Bills of Material
- Daily sync engine takes all parts created in Cadence and moves information to PTC Windchill
- Future Sourcing Database system will pull BOM from PTC Windchill for quotes to suppliers and return information to the Manufacturer Database in Cadence ADW

BILL OF MATERIALS (BOM) PROCESS FLOW

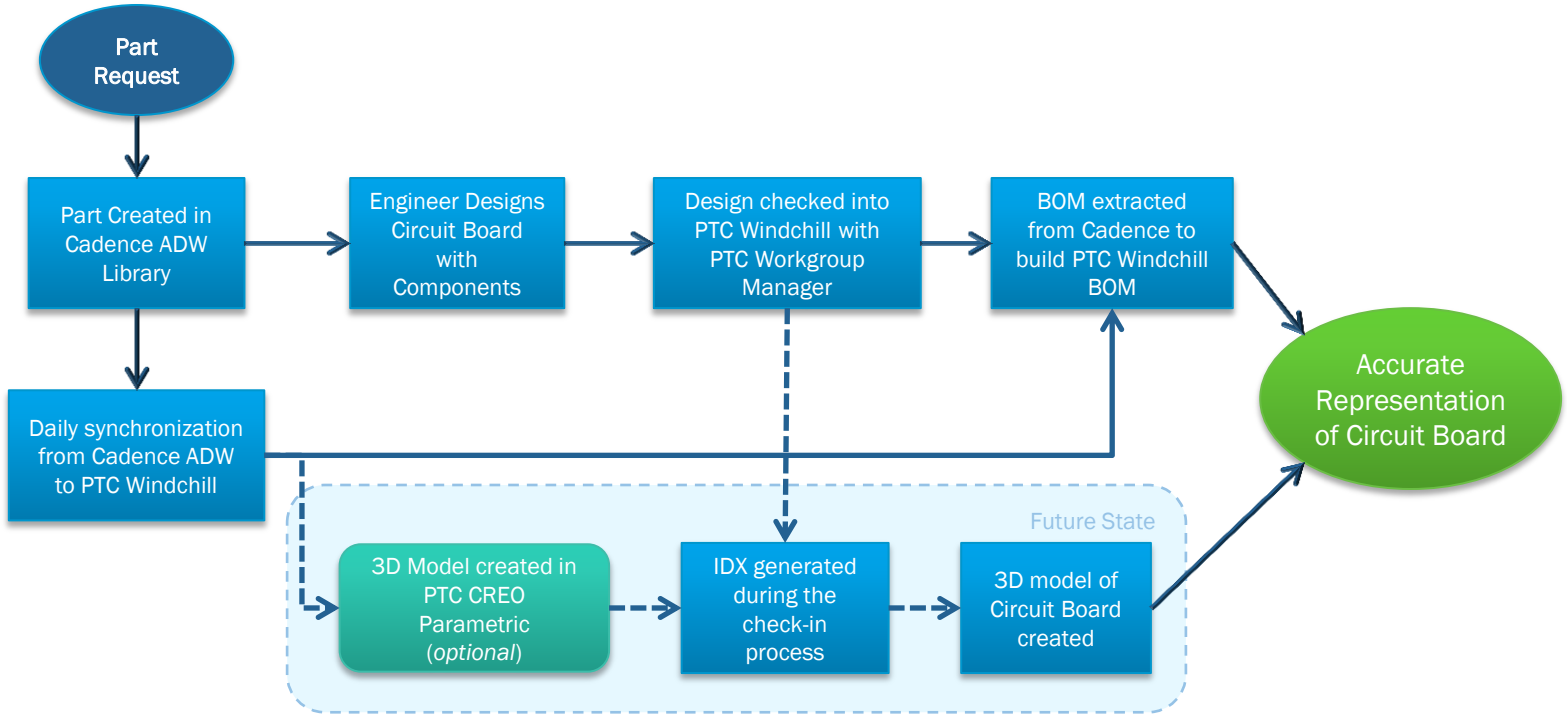
- Variants from the Cadence design are read in by PTC Windchill
- Bare Printed Circuit Board (PCB) is added as a component to each variant BOM
- Each Variant from Cadence is given a model item under the schematic, which then drives the structure of the Printed Circuit Board Assembly (PCBA)







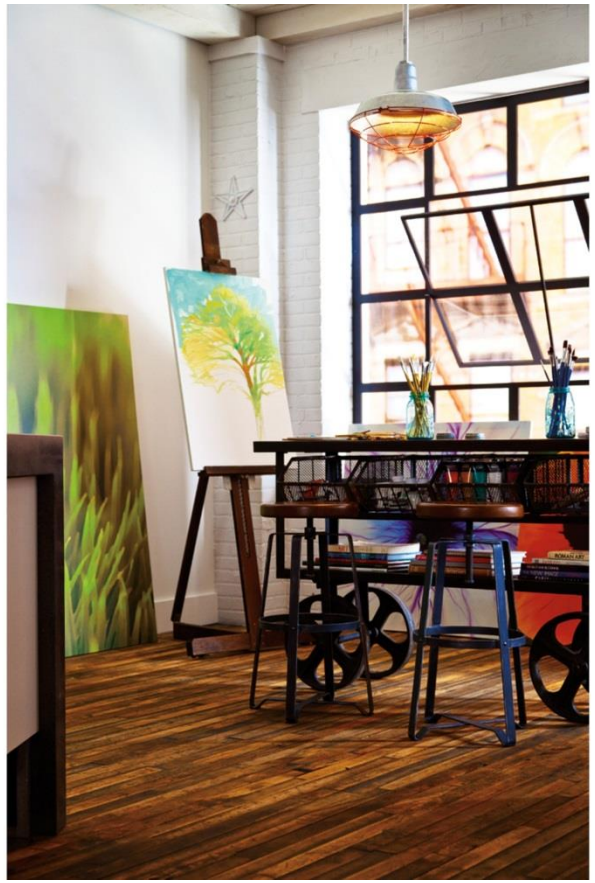
COMPONENT PROCESS FLOW



Identity	Reference Designator	Quantity
PRC1234G003, PCBA_PRC_TEST, A.1 (Design)		
PRC1234_SCH, A.2		
PRC1234_PCB, PCB_PRC_TEST, A.7 (Design)		1
PRC1234_BRD, A.7		
PRC1234_FAB, A.6		
10023587, 10023587, 0.1 (Design)	K903,K911,K913	3
10023586, 10023586, 0.2 (Design)	K901,K912,K914	3
10023582, 10023582, 0.0 (Design)	Z701	1
10023565, 10023565, 0.0 (Design)	J602	1
10023538, 10023538, 0.0 (Design)	UW01	1
10023523, 10023523, 0.0 (Design)	UB02	1
10023518, 10023518, 0.0 (Design)	U1201	1
10023491, 10023491, 0.0 (Design)	J103,J503,W102,W201-W...	49
10023453, 10023453, 0.0 (Design)	C904	1
10023438, 10023438, 0.0 (Design)	K907-K909,K915	4
10023436, 10023436, 0.0 (Design)	K910	1
10023435, 10023435, 0.0 (Design)	Q101	1
10023395, 10023395, 0.0 (Design)	M101	1

- Cadence ADW and PTC Windchill run a daily sync for any new or changed parts
- Engineers check their designs into Windchill and the BOM is transferred to PTC Windchill
- Future plans are to have a similar process with 3D IDX data

CADENCE TO PTC WINDCHILL TAKEAWAYS



- Cadence is the master, all meta data is owned by the electrical engineering tools and synchronized to PTC Windchill
- Custom hooks are needed to generate the Bill of Materials data in order to create an accurate Bill of Materials in the PTC Windchill database
- Utilizing PTC Windchill for ECAD data has helped with managing both our 24-hour design cycle and creating consistent documentation

SUMMARY

ECAD-WINDCHILL BOM MANAGEMENT VALUE

Complete Bill-of-Materials
Accurately reflect product items – mechanical, electrical, bulk items, packaging, inspection documents, assembly instructions, datasheets, and analysis files

Multi-CAD Data Management
Manage PTC Creo and other MCAD and ECAD authoring tools; leverage CAD definitions to generate bill-of-materials structure

Search, Where-Used and Save-As
Ability to easily find, traverse and re-use previous designs

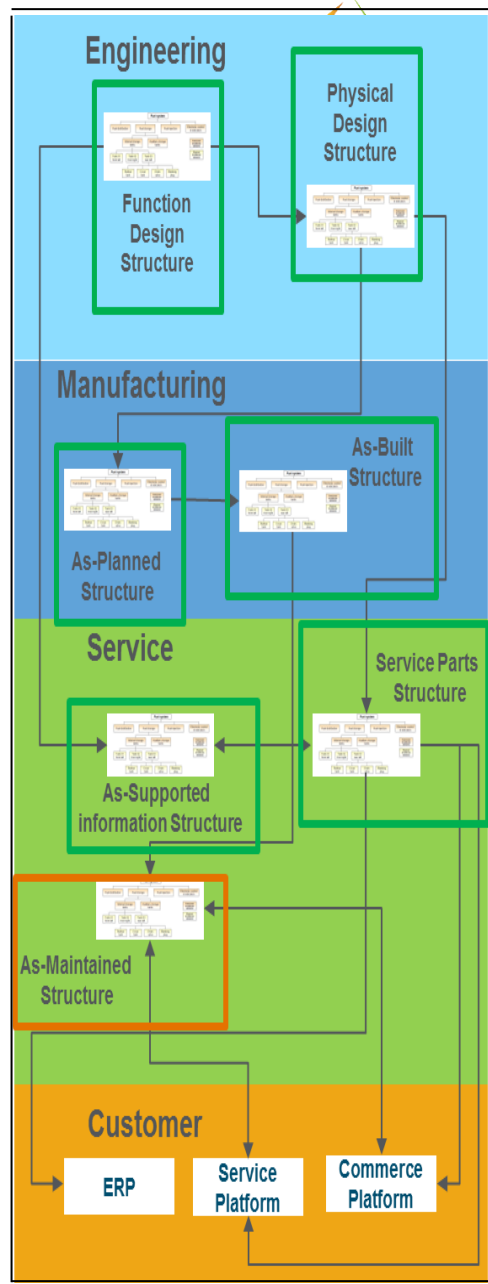
Spreadsheet Import/Export
Create and edit bills-of-materials using common tools

Change Impact and Mass Change
Track affected items, automate and standardize processes, communicate to enterprise

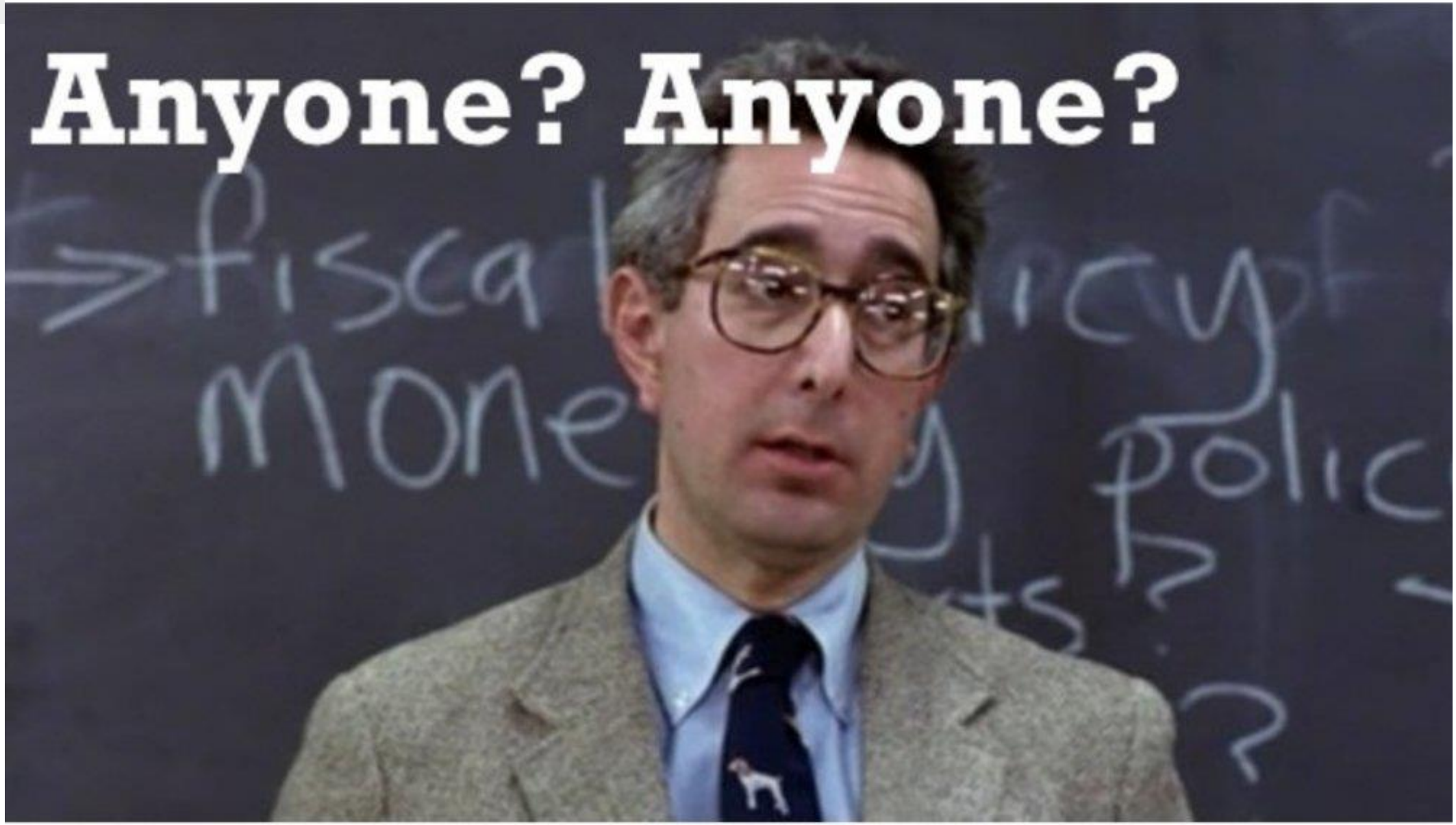
Substitutes and Replacements
Manage alternate and substitute parts and track replacement history

Options & Variants
Create choices that drive configurable bills-of-material use to generate product variations

Feed Upstream and Downstream Systems
Synchronize with systems engineering, manufacturing process planning, quality, ERP, MES



QUESTIONS



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