



ECAD LIBRARY INTEGRATION/ NEW PART INTRODUCTION

Linda Mazzitelli

PTC Principal Technical Account Manager

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AGENDA



- Panel Introductions and Format
- ECAD-MCAD Collaboration Part Alignment
- Library Synchronization 101
- Design Data Management Part Alignment
- Summary
- Q&A

Linda Mazzitelli

Phil Lindberg, Nick DeMatt, Jody Miller

Scott Claes

L. Srinivasen, Pat Cox, Hemant Shah

Linda Mazzitelli



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

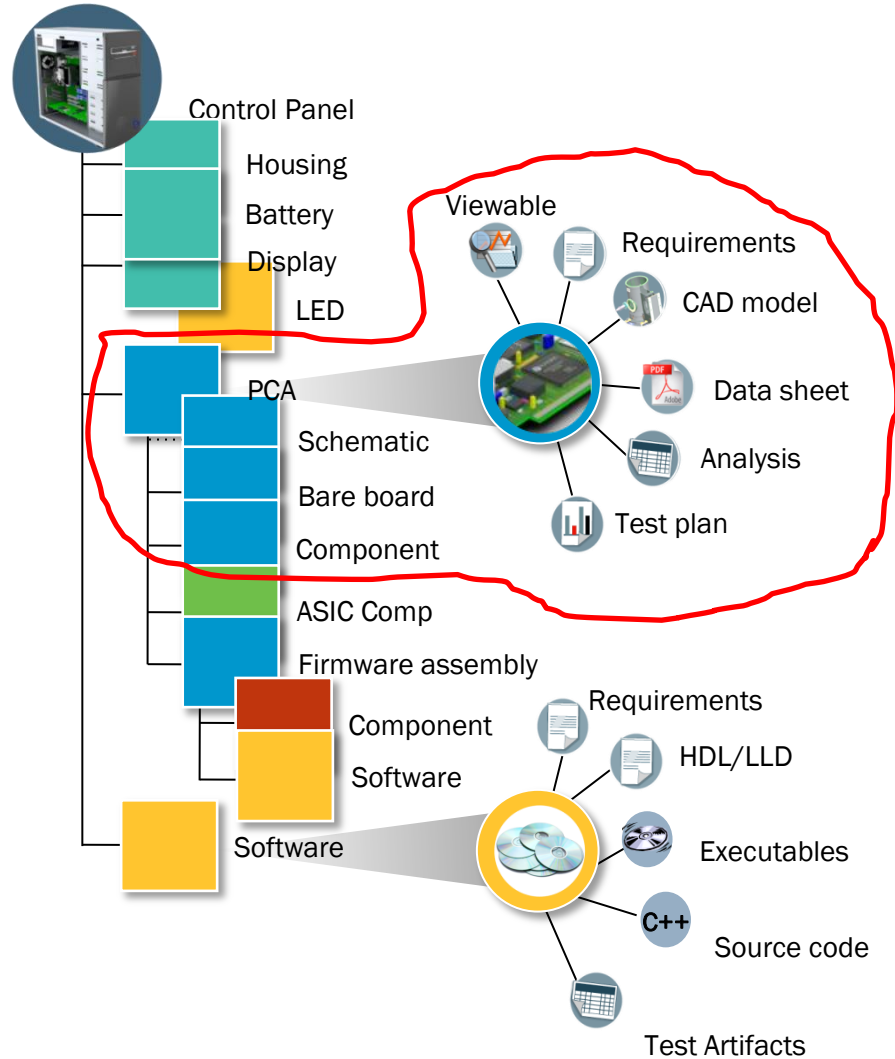
- Hemant Shah
- Cadence Design Systems
- Product Management Group Director

- Scott Claes
- PLM
- ECAD Leader

MULTI-DISCIPLINE LIBRARY ALIGNMENT



Mechanical, Electrical, and Software



ECAD-MCAD COLLABORATION PART ALIGNMENT

ECAD-MCAD LIBRARY ALIGNMENT

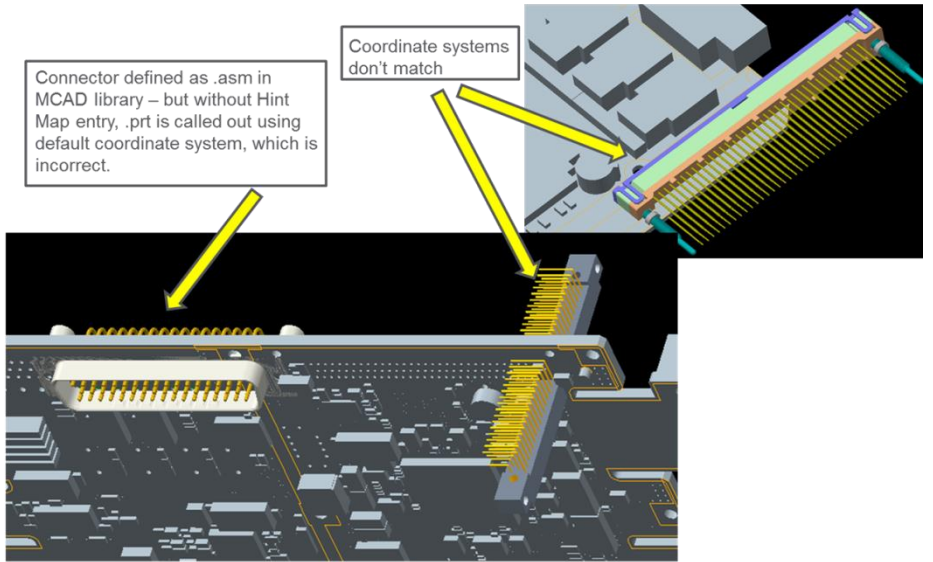
- Why is the library crucial for ECAD-MCAD collaboration?
- What attributes are common between ECAD and MCAD?
- How to handle naming inconsistencies between MGX/DMS and PTC Windchill PLM?
- What to do with these flipping connectors?
- How to change PTC Windchill PLM library?



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:

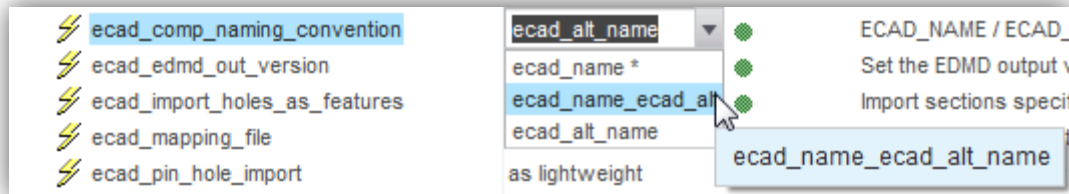


PART MAPPING DURING IDX IMPORT

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

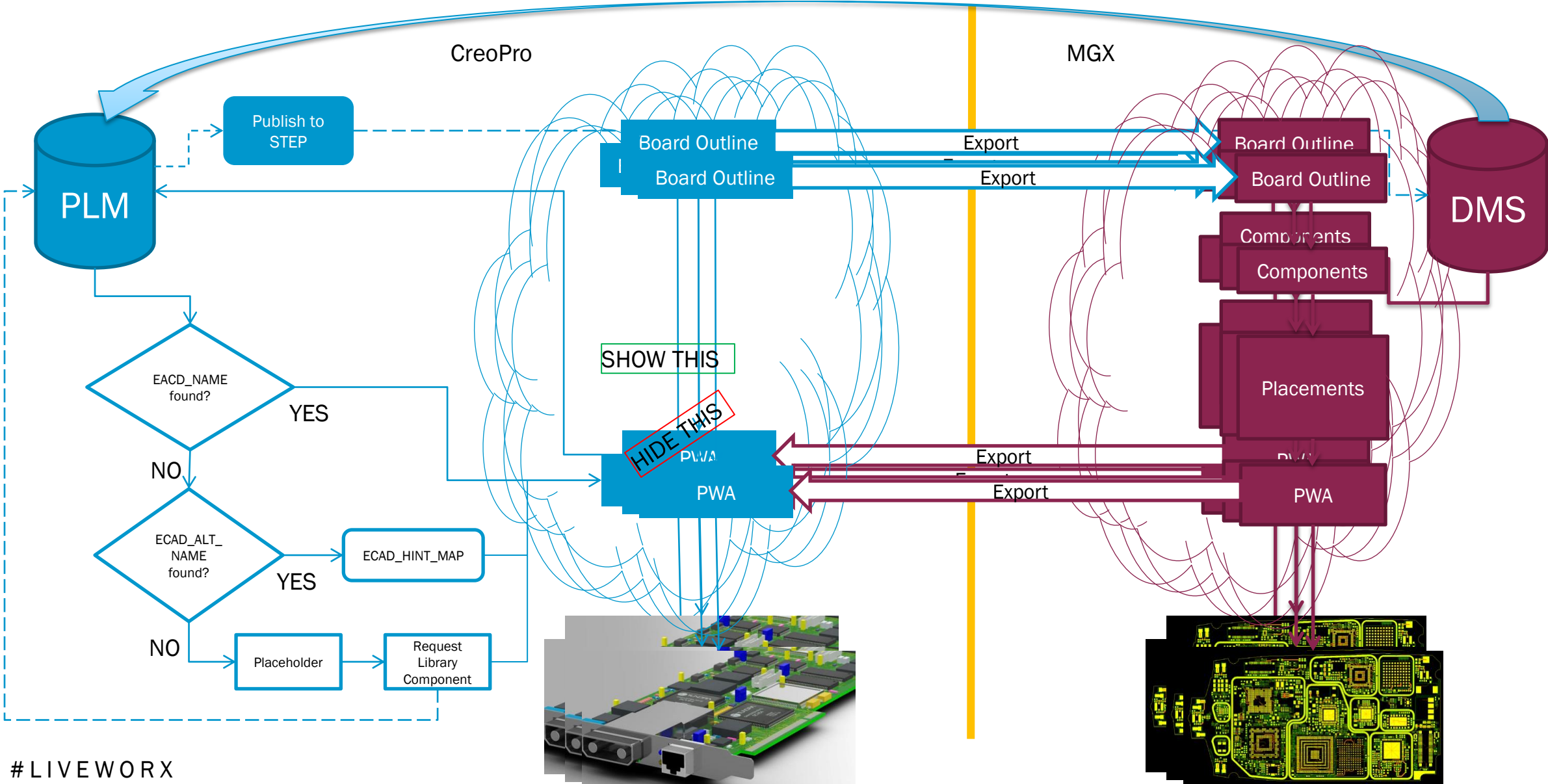
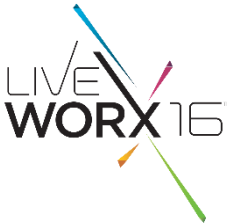
```
map_objects_by_name->
ECAD_NAME "0402"
ECAD_ALT_NAME "195-0486-000"
ECAD_TYPE ""
MCAD_NAME "195-0486-000_1"
MCAD_TYPE "part"
MCAD_LAYER "components"
END
#
```

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

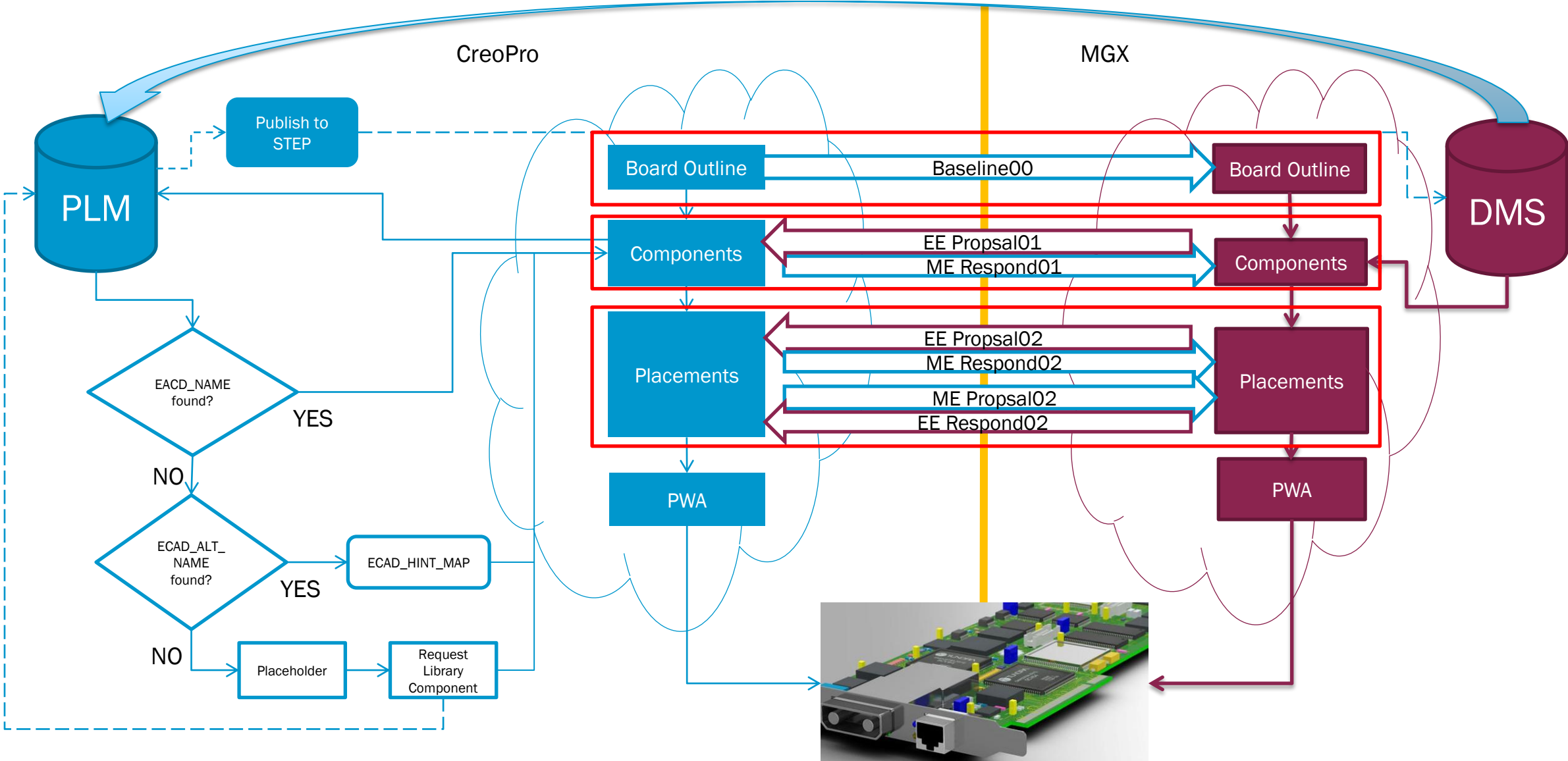
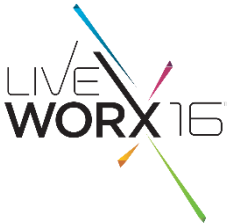


- ECAD_NAME – “Package Name”
 - ECAD_NAME_ECAD_ALT_NAME – “Package Name”_”Part Number” (requires Creo 1.0 or higher)
 - ECAD_ALT_NAME – “Part Number” (requires Creo 1.0 or higher)
- Choose what best fits your company
 - Sometimes the best fit is a mix of direct mapping and hint.map for certain components.

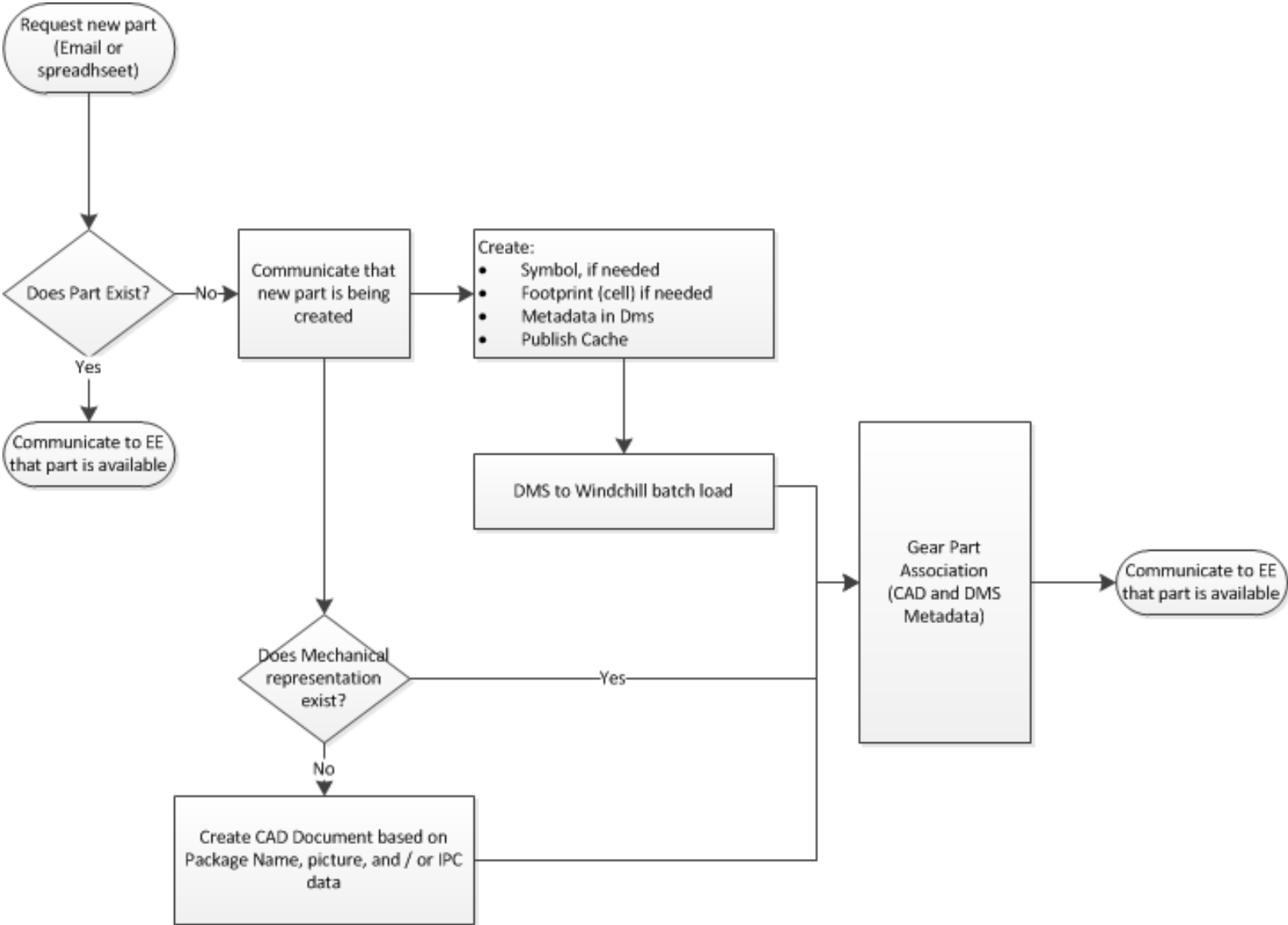
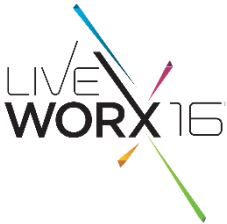
COLLABORATION PROCESS – IDF IF MULTIPLE CHANGES



COLLABORATION PROCESS - IDX



NEW LIBRARY PART (ECAD-MCAD) CREATION PROCESS



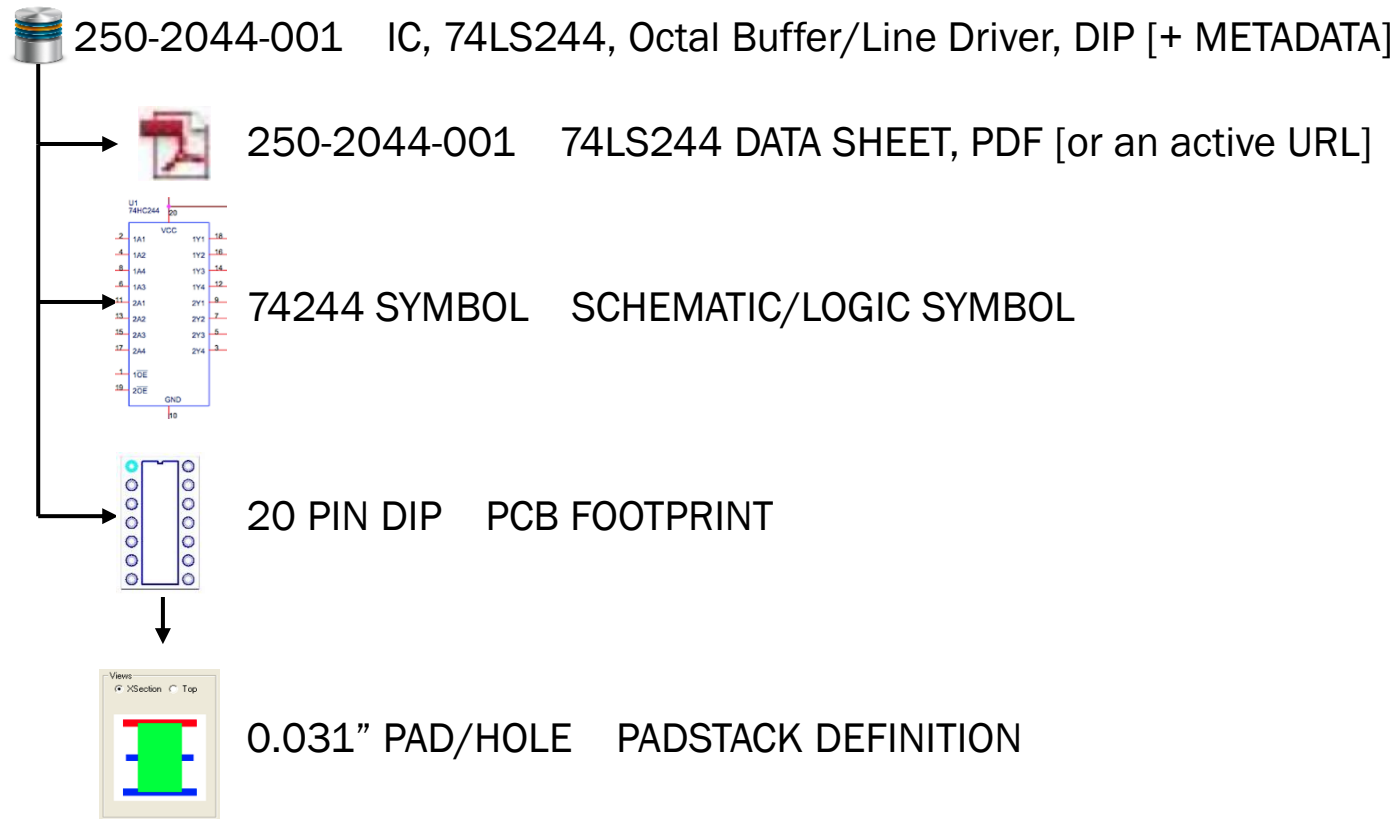
PTC WINDCHILL-ECAD LIBRARY SYNCHRONIZATION 101

ECAD PART LIBRARY DATA DETAIL



ECAD Part; Library Definition Elements

ECAD TOOL MANAGED



PART LIB

SYMBOL LIB

FOOTPRINT LIB

PAD LIB

ECAD PART DATA IN PTC WINDCHILL



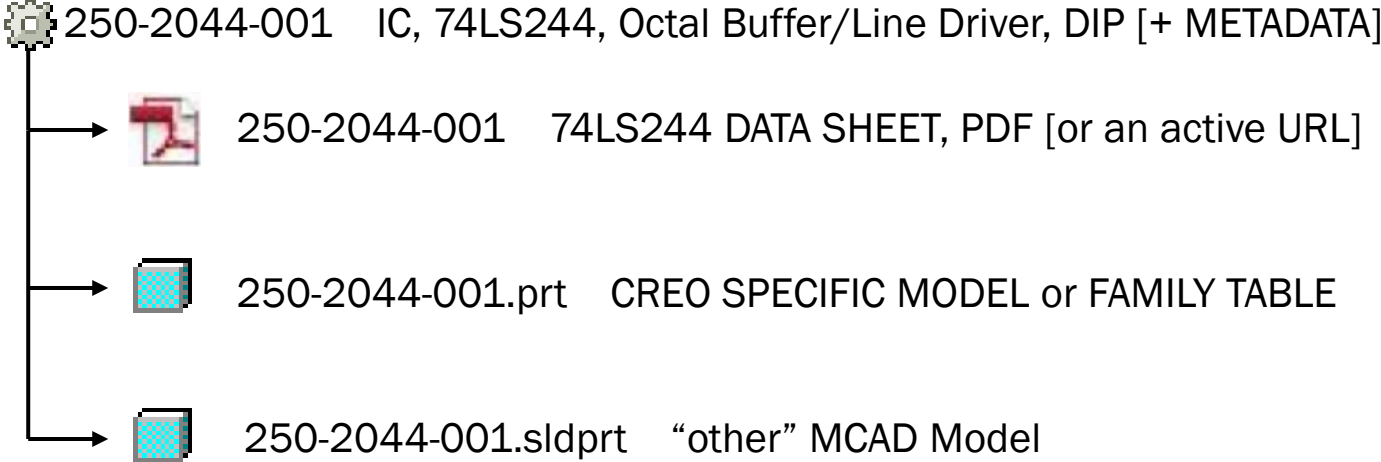
PTC Windchill Part NUMBER NAME optional attributes

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

ECAD WT PART DATA IN WINDCHILL

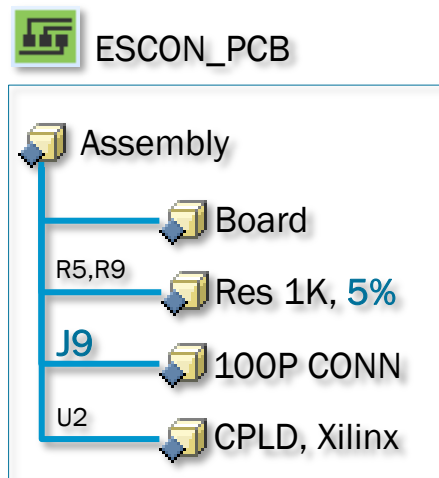
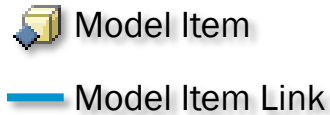
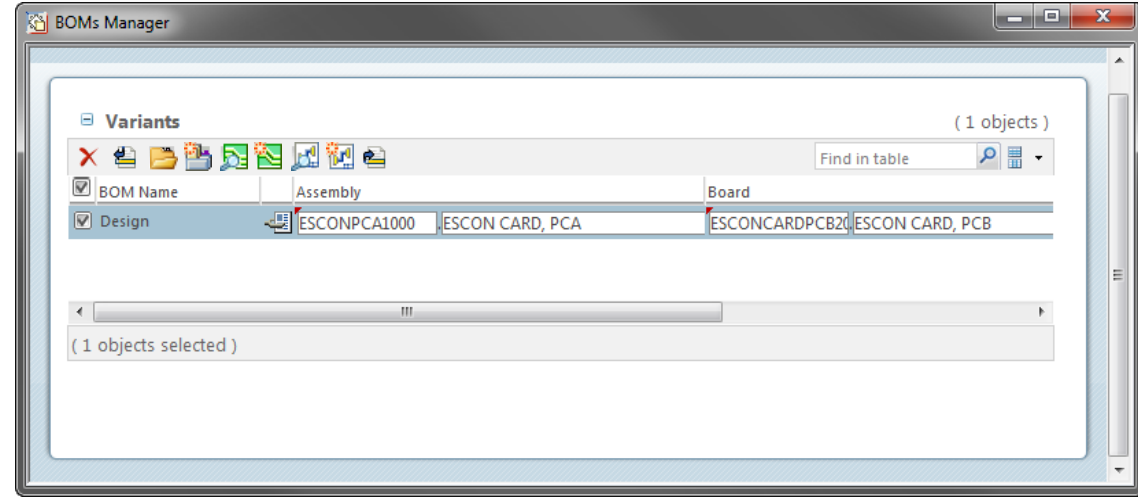


PTC Windchill Part NUMBER NAME optional attributes



ECAD-WINDCHILL BOM MANAGER MAPPING

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



PCB ASSEMBLY PRODUCT STRUCTURE & BOM



PTC Windchill Administrator

Products > Workstation 625 > Folders > Design > Mechanical > Mother Board

Part - 901-03335-001, MOTHER BOARD, A.4 (Design) In Work

Structure | Related Objects | Changes | History | Where Used | Traceability | AML/AVL | Product Analytics | Relationship Explorer | UDI Submissions

Editing: Insert Existing, Remove, Insert New, Edit
 Check Out/In: Check Out, Revise, Check In, My Checkouts
 Clipboard: Paste, Copy
 Viewing: Show/Hide, View s, Display
 New/Add To: New, Add to
 Filter: Current Filter, Edit Filter, Saved Filters

Find in Structure

Identity

- 901-03335-001, MOTHER BOARD, A.4 (Design)
 - 360-00369-001, CONNECTOR, A.3 (Design)
 - 390-85555-001, AUDIO, A.3 (Design)
 - 250-56300-001, 250-56300-001, A.3 (Design)
 - 901-26006-001, HEAT SINK, A.2 (Design)
 - 390-44001-001, 390-44001-001, A.3 (Design)
 - 250-44525-001, 250-44525-001, A.3 (Design)
 - 360-88760-001, CONNECTOR 2, A.3 (Design)
 - 390-22000-001, CAP, A.3 (Design)
 - 390-44002-001, 390-44002-001, A.3 (Design)
 - 390-89667-001, GRAPHICS, A.3 (Design)
 - 430-3005-001, 430-3005-001, A.2 (Design)
 - 430-34748-001, 430-34748-001, A.4 (Design)
 - 580-55483-001, SCREW, A.3 (Design)
 - 430-34744-001, 430-34744-001, A.3 (Design)
 - 430-33421-001, graphic_heatsink, A.3 (Design)
 - 430-34743-001, fan, A.3 (Design)
 - 380-84281-001, BOARD, A.3 (Design)
 - 390-23333-001, COM PORTS, A.3 (Design)
 - 390-23334-001, CAT5, A.3 (Design)
 - 390-62299-001, 390-62299-001, A.3 (Design)
 - 250-24001-001, GRAPHICS PROCESSOR, A.3 (Design)
 - 390-18882-001, PS2, A.3 (Design)
 - 450-88822-001, BATTERY, A.2 (Design)
 - 210-10020-001, cap, A.4 (Design)
 - 360-34922-001, 360-34922-001, A.3 (Design)
 - 360-85611-001, IDE PORT, A.3 (Design)
 - 250-20044-001, PROCESSOR, A.3 (Design)
 - 390-00201-001, CPU MOUNT, A.3 (Design)

Classification | Visualization | Uses | Occurrences | Attributes

Insert Existing | Insert New | Insert Multiple New | Remove | Edit Usage Attributes | Edit Attribute Value | Copy

Number	Name	Quantity	Reference Designator	Find Number
210-10020-001	cap	6	1680,1688,1689,1690,1691,1692	
250-20044-001	PROCESSOR	4	1673,1699,1800,1801	
250-24001-001	GRAPHICS PROCESSOR	3	1646,1669,1781	
250-44525-001	250-44525-001	3	1636,1644,1645	
250-56300-001	250-56300-001	4	1653,1774,1775,1776	
360-00369-001	CONNECTOR	1	115	
360-34922-001	360-34922-001	4	124,1525,1529,1530	
360-85611-001	IDE PORT	2	125,171	
360-88760-001	CONNECTOR 2	1	116	
380-84281-001	BOARD	1	39	
390-00201-001	CPU MOUNT	1	1744	
390-18882-001	PS2	1	1483	
390-22000-001	CAP	9	1554,1562,1600,1603,1606,1609,1623,1...	
390-23003-001	COIL	3	1705,1716,1831	
390-23333-001	COM PORTS	1	1720	
390-23334-001	CAT5	1	1723	
390-44001-001	390-44001-001	3	1540,1546,1862	
390-44002-001	390-44002-001	2	1547,1553	
390-62299-001	390-62299-001	2	117,1807	
390-85555-001	AUDIO	1	1480	
390-89667-001	GRAPHICS	1	1491	
430-3005-001	430-3005-001	1	1818	
450-88822-001	BATTERY	1	1788	
901-19993-001	512Mb Memory Board	4	1531,1533,1534,1535	
901-26006-001	HEAT SINK	1	1751	

Enter Number | Enter Name

(31 objects) | Displaying 1 - 25 of 25

ECAD METADATA PART SYNCHRONIZATION



ECAD Part; Metadata



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

WTPart



DATA TRANSFER

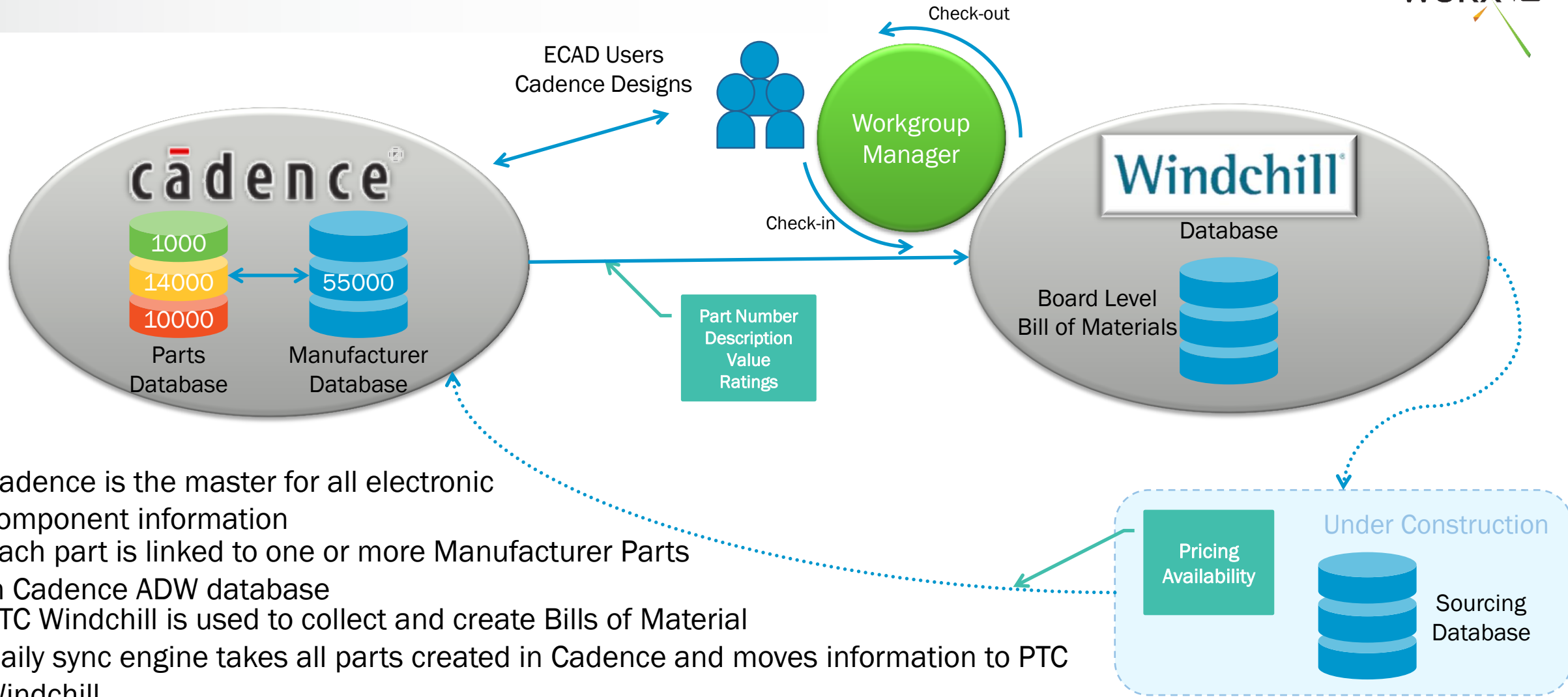
Transfer methods:

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

The slide features several large, colorful, triangular geometric shapes: a large pink triangle pointing down from the top left, a blue triangle pointing down from the top center, a yellow triangle pointing down from the top right, and a green triangle pointing up from the bottom left. These shapes are set against a background of vertical white lines on a light gray gradient.

ECAD DESIGN DATA MANAGEMENT PART ALIGNMENT

GE APPLIANCES DATABASE ARCHITECTURE

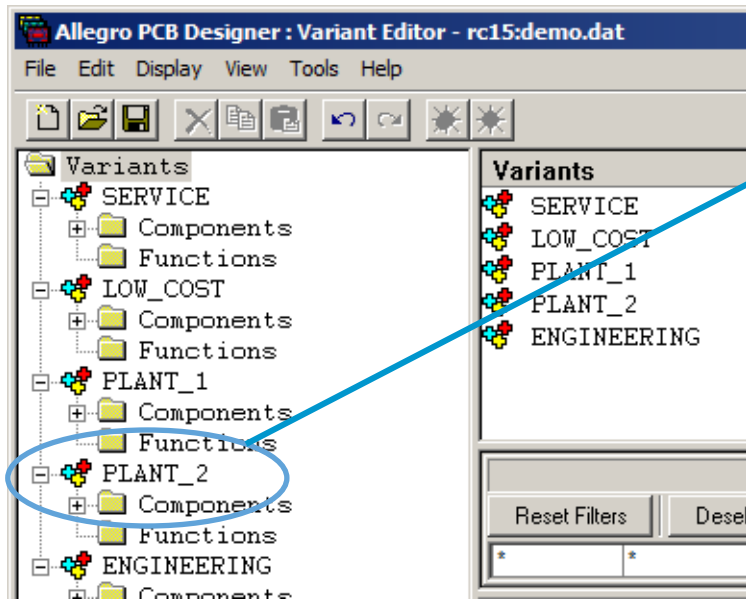


- Cadence is the master for all electronic component information
- Each part is linked to one or more Manufacturer Parts in Cadence ADW database
- PTC Windchill is used to collect and create Bills of Material
- Daily sync engine takes all parts created in Cadence and moves information to PTC Windchill
- 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)



BOM Viewer (plant_2)

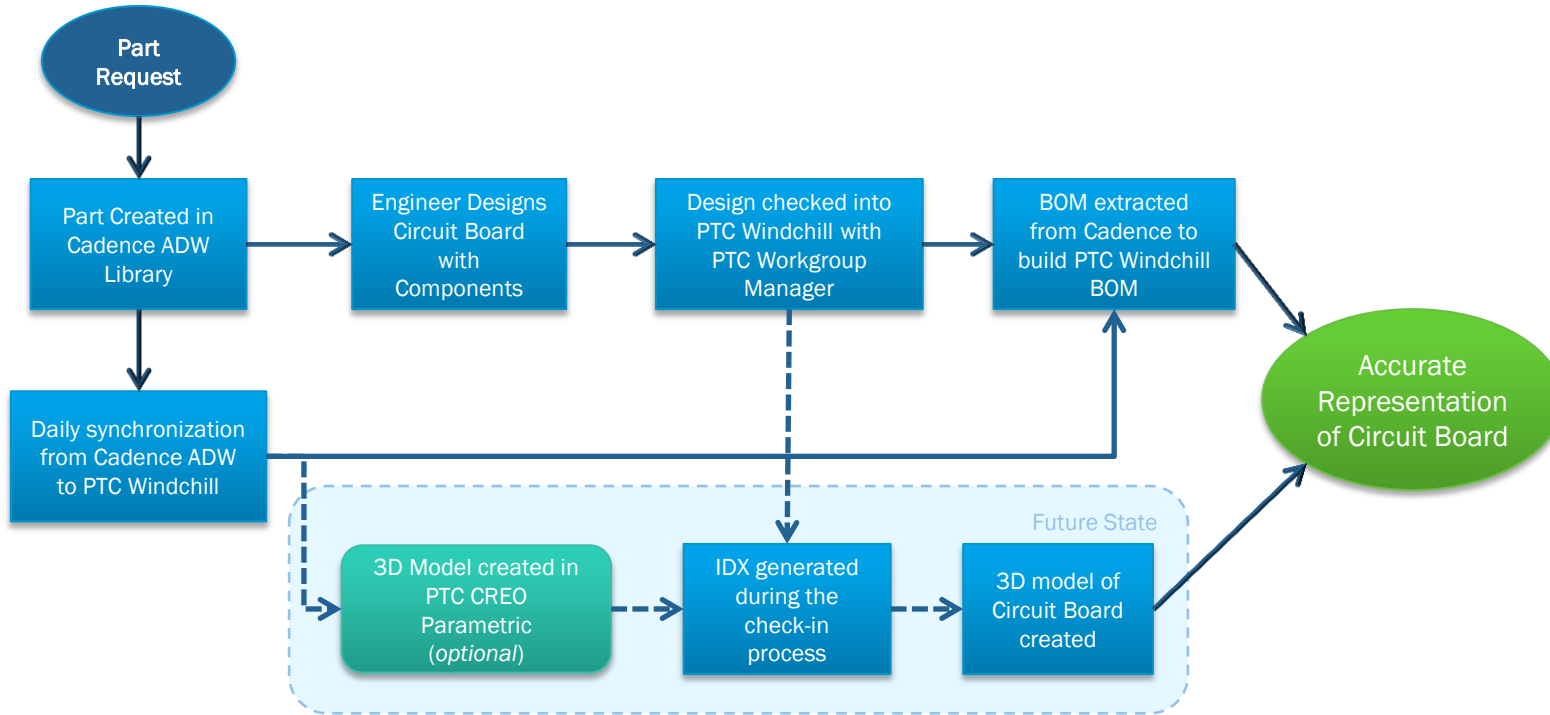
BOM: plant_2

Part Number	Part Name	Reference Designator	Quantity
10000568	10000568	C110	1
10000589	10000589	C107	1
10000625	10000625	C501,C511	2
10000851	10000851	C603,C604,C606,C608	4
10000972	10000972	C401-C404,C502,C503,C507-C...	18
10001288	10001288	C104,C118	2
10001335	10001335	CB21,CB22	2
10001440	10001440	C112	1
10001485	10001485	C117	1
10001586	10001586	C102,C114	2
10001620	10001620	CB06,CW16,CW17	3
10001629	10001629	C108,C122,C203,C205-C207,C...	18

Object List

Number	Association Type	Name
PRC1234G003		PCBA_PRC_TEST
PRC1234G001	Owner	ASM_plant_2_SCH_PRC_...
PRC1234G001	Owner	ASM_plant_1_SCH_PRC_...
PRC1234_SCH		SCH_PRC_TEST
PRC1234_PCB		PCB_PRC_TEST
PRC1234_PCB	Image	PCB_PRC_TEST
PRC1234_FAB	Content	FAB_PRC_TEST
PRC1234_BRD	Contributing Content	BRD_PRC_TEST
PRC1234_MASTER		Assembly_PRC_TEST
PRC1234_MASTER	Owner	ASM_Design_XXXXXXX_SCH
PRC1234_MASTER		ASM_service_SCH_PRC_T...
PRC1234_MASTER		ASM_low_cost_SCH_PRC...
PRC1234_MASTER		ASM_engineer_g_PRC1234_SCH

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

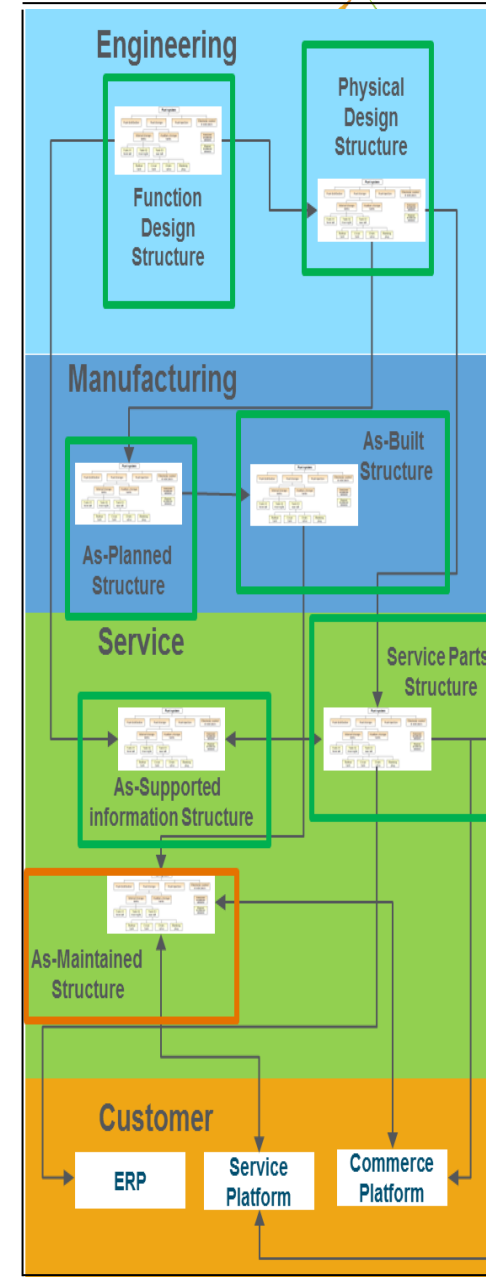
Manage alternate and substitute parts and track replacement history

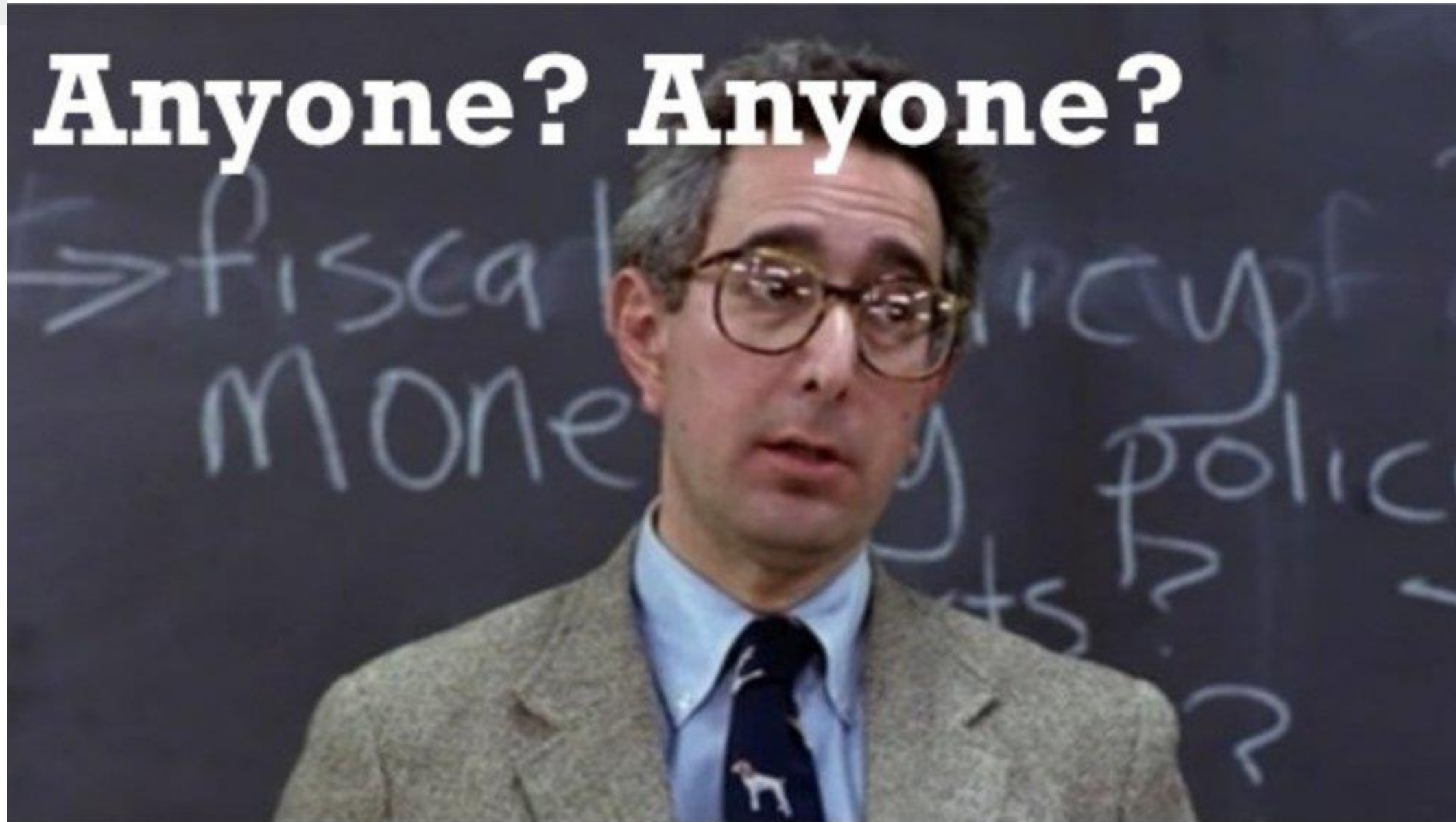
Options & Variants

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

Feed Upstream and Downstream Systems

Synchronizing with systems engineering, manufacturing process planning, quality, ERP, MES





The image features several colorful geometric shapes, primarily triangles and lines, scattered across the white background. A large, multi-colored triangular shape is prominent on the right side, composed of various shades of blue, green, yellow, orange, pink, and purple. Several thin, colored lines (blue, pink, green, orange) radiate from the center towards the edges. The text 'LIVE WORX 16' is centered in the upper half, with 'LIVE' in a thin, outlined font and 'WORX 16' in a bold, solid black font. A small 'TM' trademark symbol is positioned to the right of the '16'.

LIVE
WORX 16™

TAKE A FRESH LOOK AT THINGS

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