



**Essig PLM**

*Enabling Innovation*



**BOM TO CAD**

**Revolutionizing Product Development**



# About Essig PLM

▶ Delivering First Class PLM Solutions for over 25 years with a focus on:

- Optimizing Product Development Efficiencies
- Control of Corporate Intellectual Property
- Connecting the Enterprise

▶ Headquartered in Nashua, New Hampshire with locations & partners in:

- North America, Europe & Asia

▶ Your Solution Partner

- Partnership with Aras began in 2012
- Aras Gold Certified Partner & Reseller
- Developer of CAD Connectors for PLM

▶ Essig PLM solutions support companies of various sizes, industries and locations worldwide



**aras**

2024 PARTNER

GOLD  
CERTIFIED

**aras**

2024 PARTNER

ISV  
CERTIFIED



## Features:

- ▶ In-depth Application Integration
- ▶ Direct Connection to Aras Innovator from the CAD Application
- ▶ Easily Manage the Product Hierarchy
  - CAD Documents
  - Parts
  - Assemblies
  - BOMs
- ▶ Bi-directional Property Mapping between CAD and Aras Innovator
- ▶ Easy to Install, Configure and Use



# Essig PLM Customers





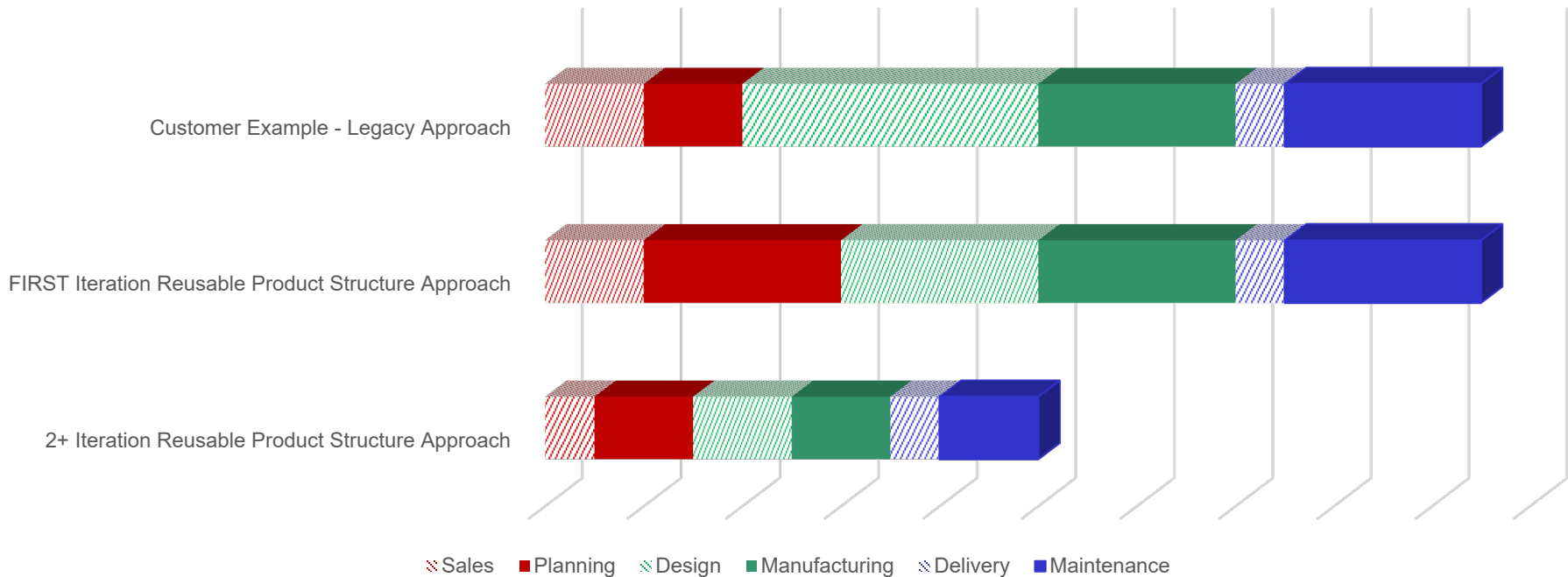
**BOM to CAD – Why is it Revolutionary?**

# A Fundamental Shift

**Not just a tool feature, but a new operational strategy.**

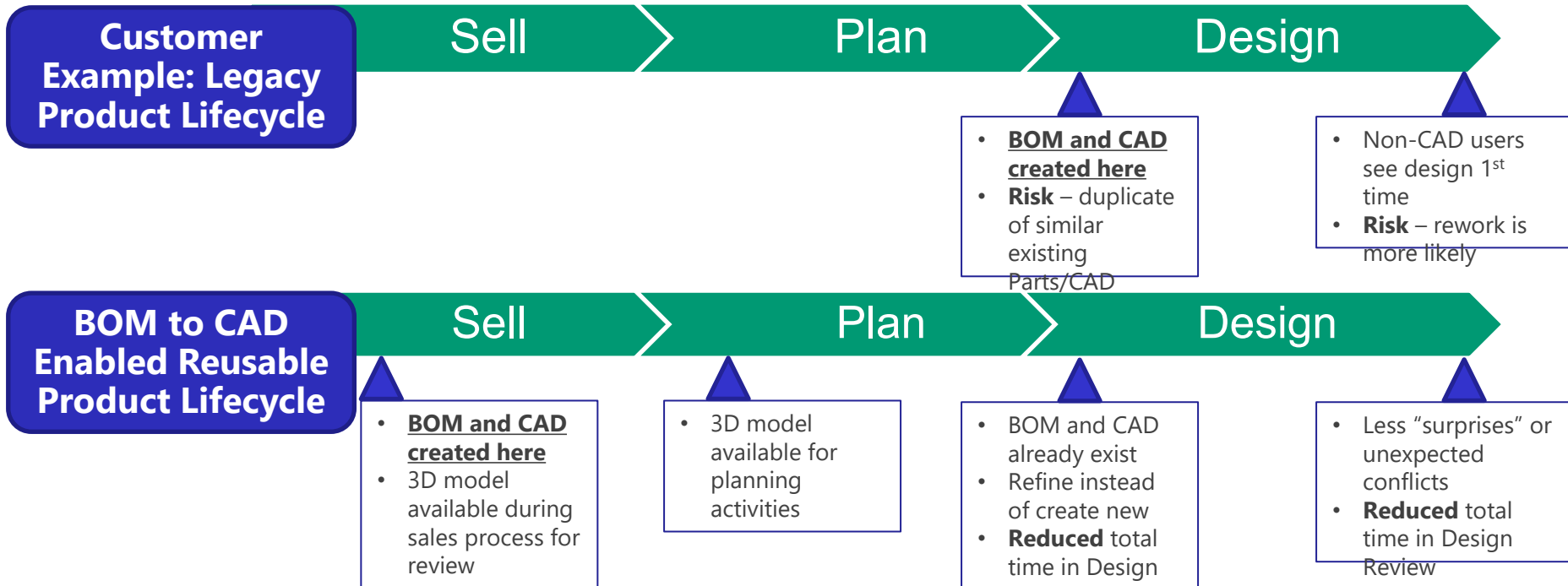
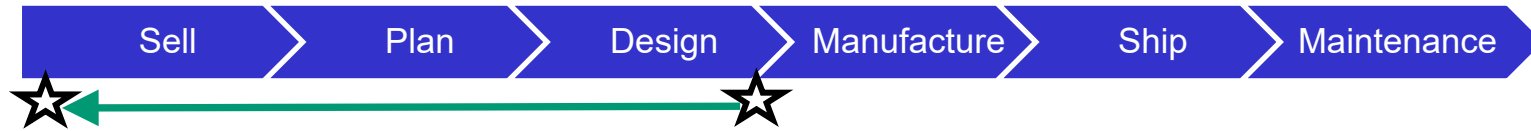
- ▶ Invest more time early in product development
- ▶ Gain efficiently downstream
- ▶ ROI grows with each reuse of product structure

Product Development Lifecycle Phases



# A Fundamental Shift

Establishing the Digital Twin earlier in the Product Lifecycle reduces risk of rework throughout the rest of the lifecycle.

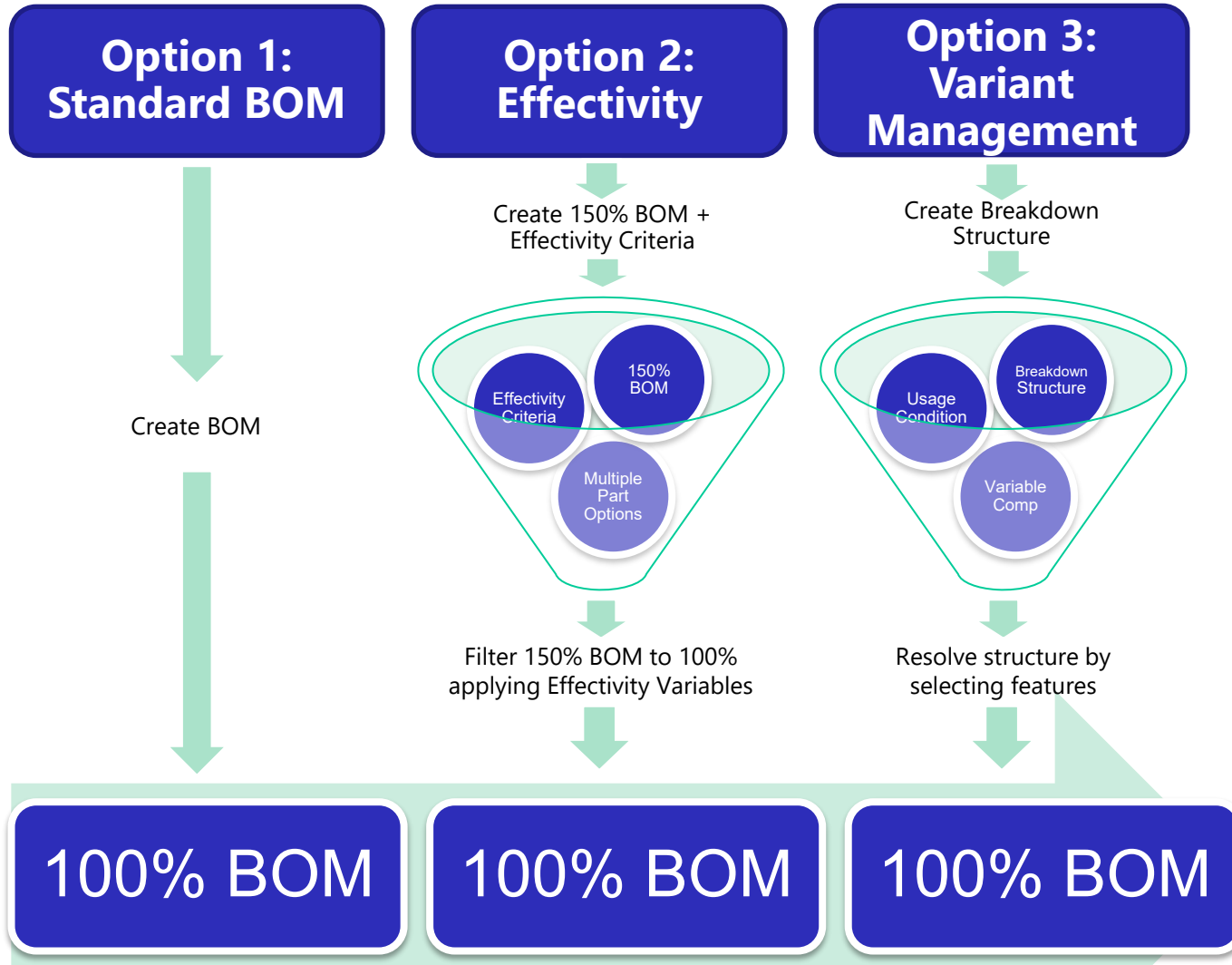




**BOM to CAD – How Does It Work?**



# BOM to CAD Scenarios



# Option 1 – Create Standard BOM

- ▶ Any BOM in your system can use BOM to CAD!
  - If no CAD Docs exist – template files
  - If part position is unknown – user will need to place
- ▶ Use to combine subassemblies or add parts to new or existing

The screenshot displays the Essig PLM software interface. On the left, a 'Part' card for 'JR-TEST-022224' is visible, showing details like 'Revision 00' and 'State Preliminary'. Below it, a 'BOM' table lists components. On the right, a CAD model of a blue power hand tool is shown in an exploded view, with its assembly tree visible in the background. A context menu is open over the BOM table, with 'Essig PLM BOM to CAD' selected.

Seq...	Part Number	Revi...	Name
2	HW-00000043	00	Screw 1
3	HW-00000042	00	Screw
4	ROT-00000288-JRR-Test-0212	00	Power Hand Tool

# Option 2 – Effectivity

Supports **reusable product structure**.

A 150% BOM can be filtered down to a 100% BOM by using *effectivity variables*.

Part Number: ROT-00000047 | Revision: 00 | State: Preliminary

Assigned Creator: [World](#)

Name: Rotary Tool

Designated User: [World](#)

Type: Assembly | Unit: EA | Make / Buy: Make | Cost: [ ]


Effective Date: [ ]

Long Description: Cup Brushes, Cutoff Wheels, Drill Bits, Drum Sanders, Grinding Bits, Grinding Bobs, Grinding Burs, Grinding Wheels, Polishing Wheels, Sanding Bands, Wheel Brushes

Changes Pending | Color: [ ] | Weight: [ ]

150% BOM

Is Phantom | Material: [ ]



> Extended Classification

**Effectivity Criteria Filter** [X]

Scope: Aras Part BOM Scope [ ]

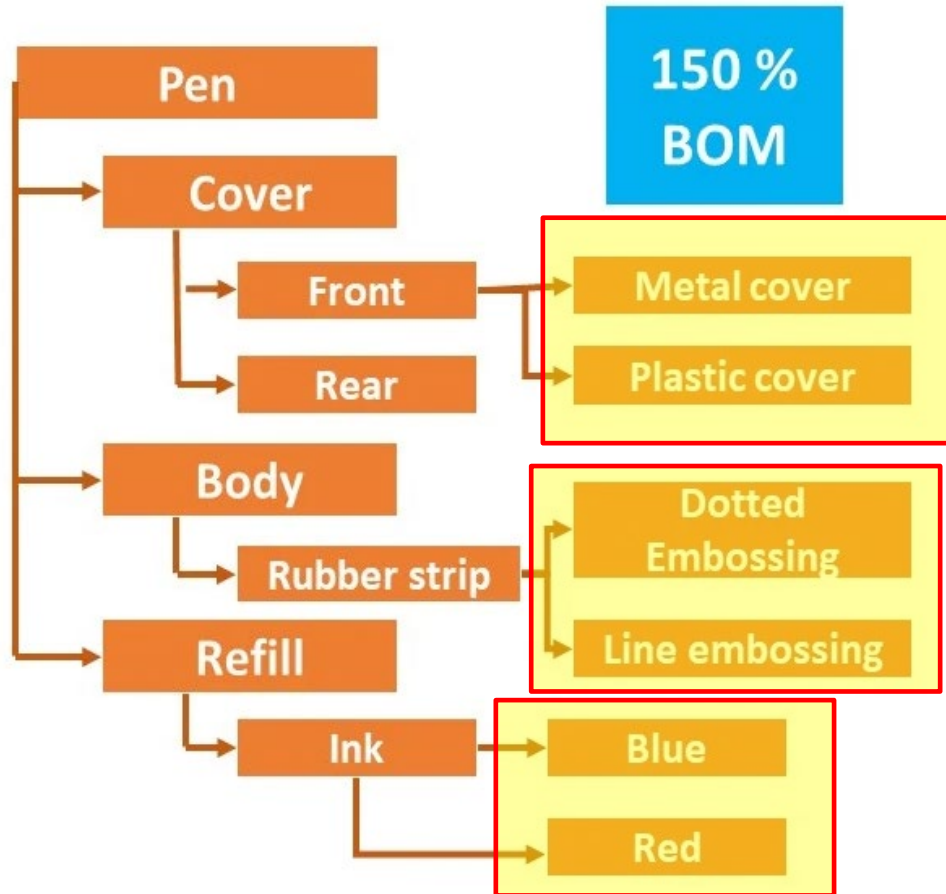
Variable	Value
Unit	
Date	
Location	USA
Options	Steel Brush
Insulation Type	Rubber Housing
Category	Pet
Application	Grinding
Model	Cordless Rotary [v]

^ BOM **BOM Structure** Alternates AML Documents CAD Documents Goals Changes Part Subm [ ] ts Instantiated

Sequen... ↑	Part Number	Revision	State	Quantity	Name	Effectivity
5	C-00000026	00	Preliminary	1	Case Left	(Model = [Cordless Rotary] OR Model = [Power Rotary]) AND (Location = USA OR Location = Europe)
15	C-00000033	00	Preliminary	1	Case Right	(Model = [Cordless Rotary] OR Model = [Power Rotary]) AND (Location = USA OR Location = Europe)
20	C-00000034	00	Preliminary	1	Button	NOT((Insulation Type) = [Double Jacket])
25	C-00000035	00	Preliminary	2	Plastic Cover	NOT(Options = [Steel Brush] OR Options = Router)
30	C-00000036	00	Preliminary	1	Switch	
35	HW-00000037	00	Preliminary	1	Board	Model = [Power Rotary] OR Model = [Cordless Rotary]

# 150% BOM

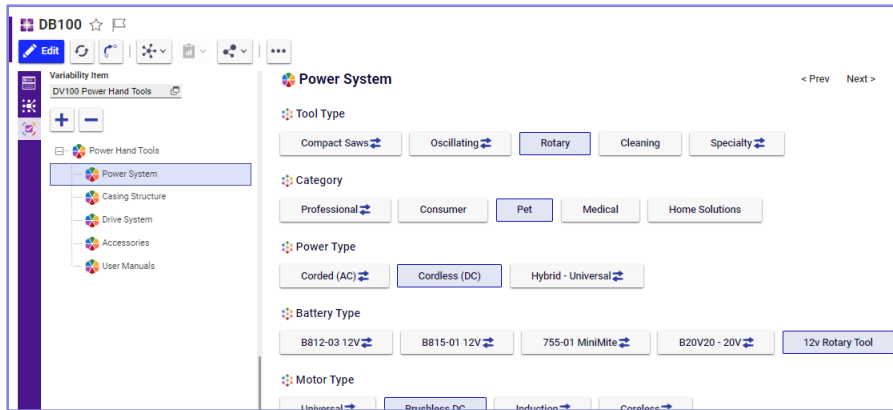
The 150% BOM captures *all possible component variants* of a product in one single BOM, providing a holistic view of a product's structure. The 150% BOM can then be instantiated into a valid 100% BOM by applying Effectivity rules.



# Option 3 – Variant Management

Supports **reusable product structure**.

Variant Management rules can be applied to resolve a 100% BOM from a breakdown structure.



Number	Name
DB100	Power Hand Tool
DB200	Power System
DB200-1	Motor Structure
MOT-00000032	Motor Assembly
DB200-2	Power Hardware
HW-00000043	Screw 1
00000042	Screw
00000039	Wire Holder
00000041	Cable1
00000037	Board
00000036	Switch
2	Battery
00000055	Battery Pack 12v
	Casing Structure
	Case Right
00000033	Case Right
DV300-2	Case Left
C-00000026	Case Left
DV300-3	Plastic Cover
C-00000035	Plastic Cover
DB400	Drive System
C-00000038	Speed Wheel
DV400	Collet
C-00000046	Collet .8mm
C-00000044	Cap

Variant management has more user friendly interface for resolving BOMs, but it is more complex to setup.

VM example – BOM to CAD Webinar

- <https://essigplm.com/bom-to-cad>

# Essig PLM Create BOM

An action used to instantiate a resolved 100% BOM after EITHER applying Effectivity Rules OR resolving a Variant Management Breakdown item.

ROT-00000047

Edit

**Part**

Part Number	Revision	State
ROT-00000047	00	Preliminary

Name  
Rotary Tool

Type	Unit	Make / Buy	Cost
Assembly	EA	Make	

Long Description  
Cup Brushes, Cutoff Wheels, Drill Bits, Drum Sanders, Grinding Bobs, Grinding Burs, Grinding Wheels, Polishing Wheels, Sanding Bands, Wheel Brushes

Changes Pending    Color:

150% BOM




Is Phantom    Material:

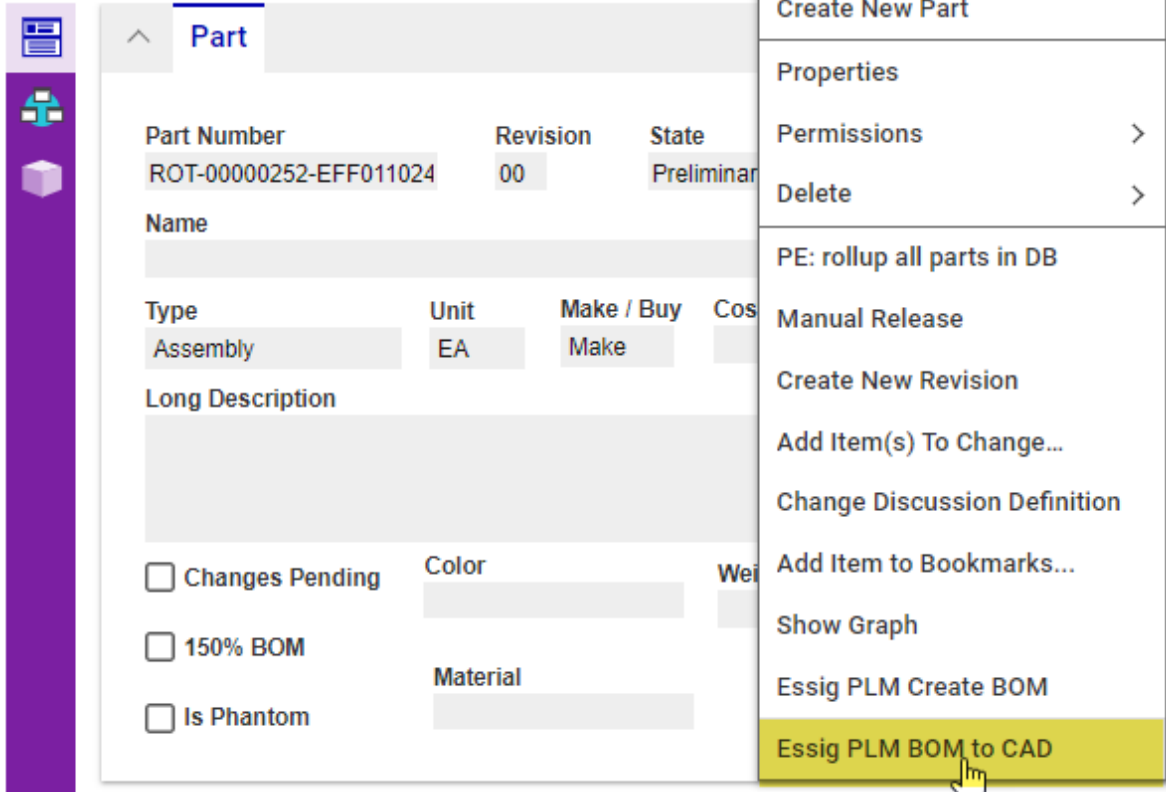
- Create New Part
- Properties
- Permissions >
- Delete >
- PE: rollup all parts in DB
- Manual Release
- Create New Revision
- Add Item(s) To Change...
- Change Discussion Definition
- Add Item to Bookmarks...
- Show Graph
- Essig PLM Create BOM**
- Essig PLM BOM to CAD

1. Creates top level Part Assembly
2. Instantiates the BOM
3. Adds the new 100% BOM to Instantiated Tab on 150% BOM
4. Captures all Effectivity variables for reference

# Essig PLM BOM to CAD

An action used to pass/create CAD information from Aras to a CAD Application based on a newly instantiated BOM Hierarchy.

 ROT-00000252-EFF011024  



Part Number	Revision	State
ROT-00000252-EFF011024	00	Preliminary

Name

Type	Unit	Make / Buy	Cost
Assembly	EA	Make	

Long Description

Changes Pending    Color

150% BOM

Is Phantom    Material

- Create New Part
- Properties
- Permissions >
- Delete >
- PE: rollup all parts in DB
- Manual Release
- Create New Revision
- Add Item(s) To Change...
- Change Discussion Definition
- Add Item to Bookmarks...
- Show Graph
- Essig PLM Create BOM
- Essig PLM BOM to CAD**

1. Creates new top level BOM CAD file
2. Reads the Transformation Matrix based on the Part BOM
3. Ability to use Template files for Part Items without CAD files



**Essig PLM**

*Enabling Innovation*

**BOM to CAD Demo**



# Aircraft Effectivity Scope

**Type:**

Civil  
CRAF  
Military

**Range:**

Short (SR)  
Long (LR)  
Extended (ER)

**Duty:**

Freighter  
Passenger  
Combi  
Convertible

**Service:**

Domestic  
International

**Ownership:**

EU  
UK  
US  
APAC  
Aras



**3** Types X **3** Ranges X **4** Duties **2** Services  
X **5** Owners = 360 total possible  
**combinations**

# Effectivity Scope

Aircraft ☆ □

Edit ↻ ↺ | ⚙️ | 🗑️ | 🔗 | ⋮

Effectivity Scope

Name  
Aircraft

Builder Method  
[effs\\_scopeObjectBuilderMethod](#)

Effectivity Scope ItemType Effectivity Variables

Effectivity Variables ☆

🔍 🗑️ Hidden 🔄 📄 🔗

Name	Type	List [...]	ItemType [...]
Aircraft Type	List	<a href="#">Aircraft Type</a>	
Aircraft Range	List	<a href="#">Aircraft Range</a>	
Aircraft Duty	List	<a href="#">Aircraft Duty</a>	
Aircraft Service	List	<a href="#">Aircraft Service</a>	
Aircraft Ownership	List	<a href="#">Aircraft Ownership</a>	

**Type:**  
Civil  
CRAF  
Military

**Range:**  
Short (SR)  
Long (LR)  
Extended (ER)

**Duty:**  
Freighter  
Passenger  
Combi  
Convertible

**Service:**  
Domestic  
International

**Ownership:**  
EU  
UK  
US  
APAC  
Aras

# Effectivity Rules

4 Engines for Freighter  
4 Engines for CRAF  
4 Engines for Military

2 Engines for Passenger & Civil  
2 Engines for Military and Passenger

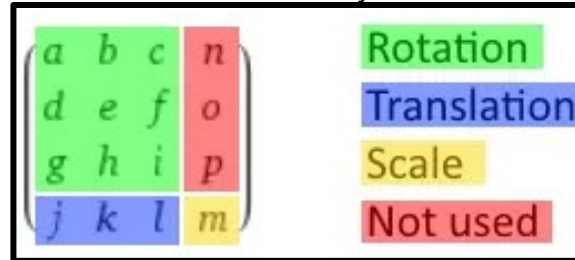
Heavy Gear for Freighter  
Heavy Gear for Military & Long Range (LR)

Light Gear for Passenger  
Light Gear for Civil

# Transformation Matrix

(Source) <https://cadbooster.com/complete-overview-of-matrix-transformations-in-the-solidworks-api/>

- SOLIDWORKS uses 4×4 matrices to define transformations. They call it a **MathTransform**. It's built up out of four sections:



(Not used means these values are always zero.)

- The connector can pass transformation matrix data to and from the CAD application
- Aras stores the Transformation matrix on the Part BOM item

Seq... ↑1	Part Number ↑2	Revi...	Name	Reference Designator
13	ACE-1000062-MIL	00	Airframe 797 EU - MIL	
14	ACE-100098	00	Airframe 797 - ACE	
15	ACE-100039	00	Engine HPB G90	Engine-Inner-Left
16	ACE-100039	00	Engine HPB G90	Engine-Inner-Right
17	ACE-100039	00	Engine HPB G90	Engine-Outer-Left
18	ACE-100039	00	Engine HPB G90	Engine-Outer-Right

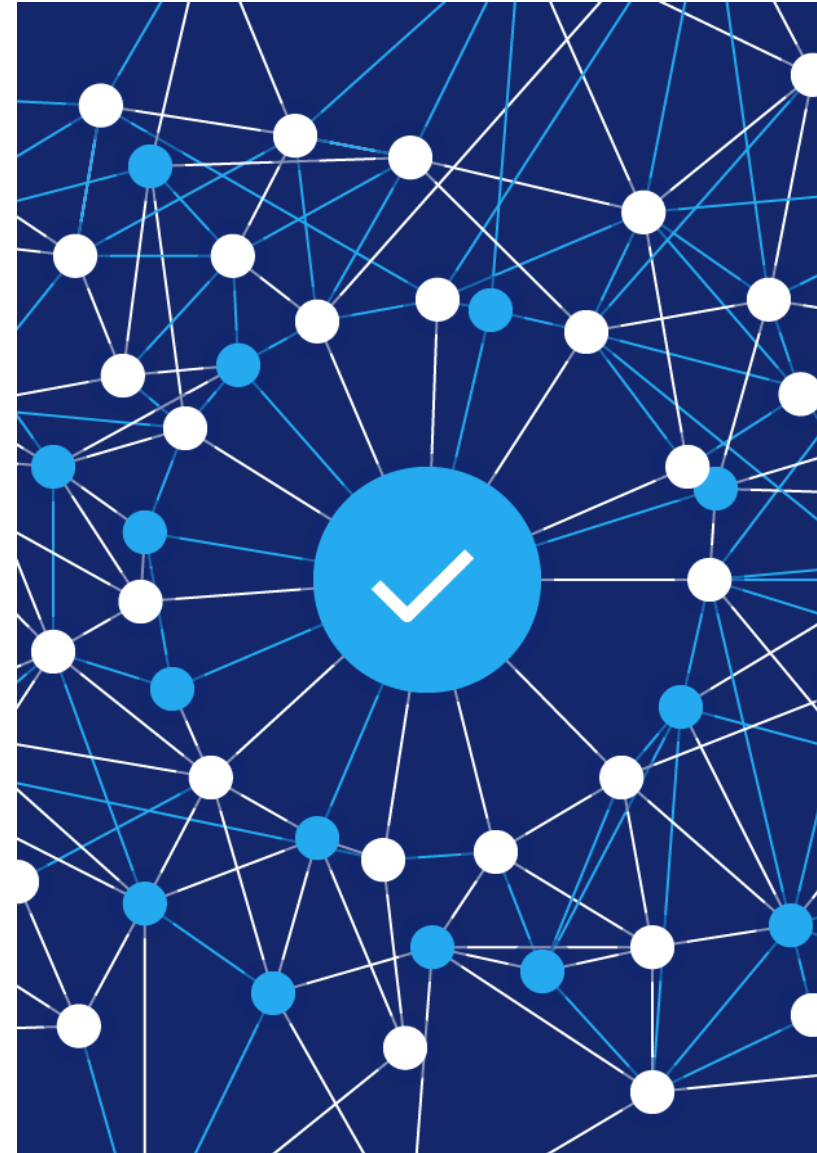


# **Agile Approach to Achieving Reusable Product Structure**

# Agile Approach to Reusable Product Structure

Two agile strategies to make reusable product structure achievable:

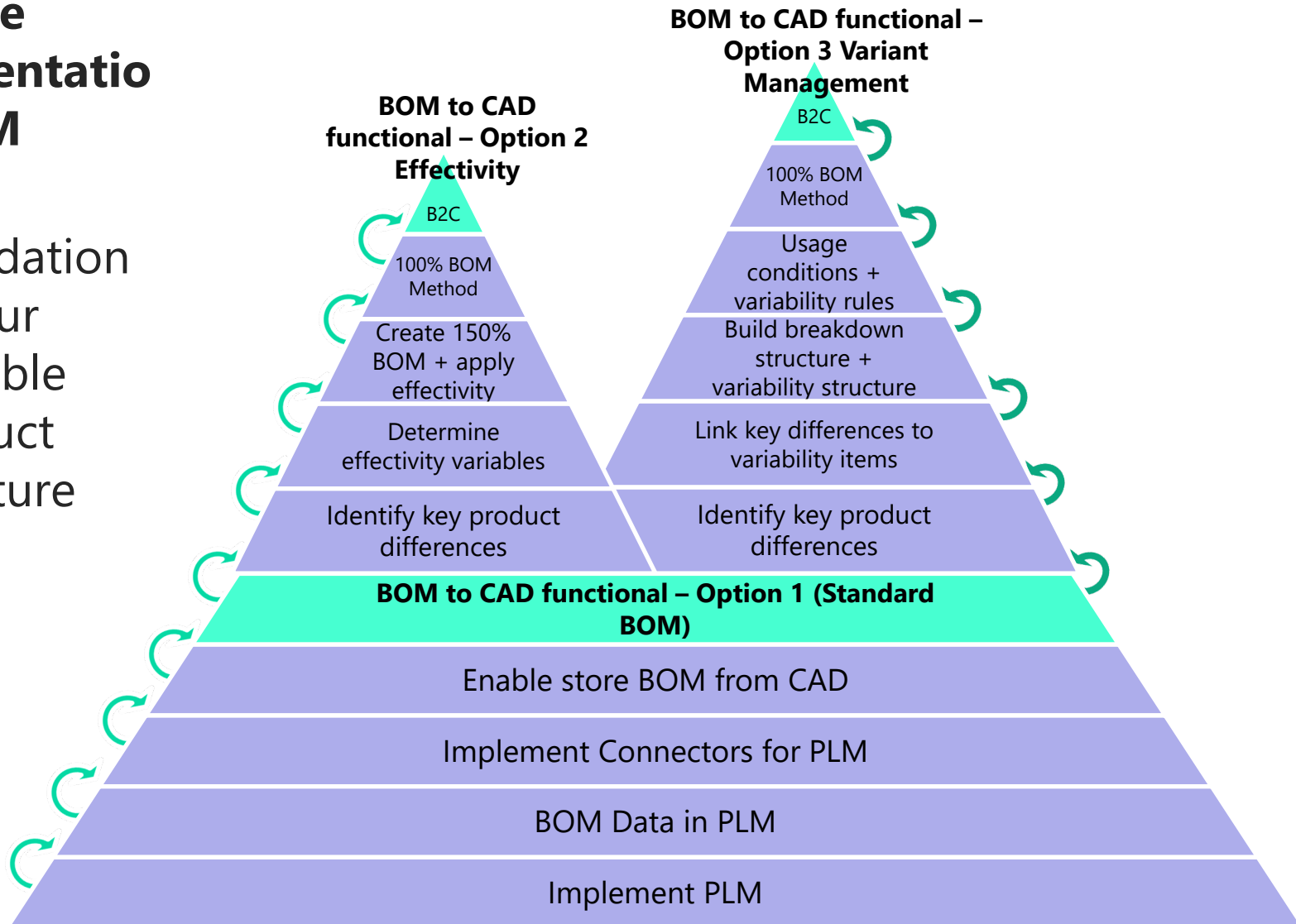
1. Iterative **implementation of PLM** system that supports reusable product structure
2. Iterative **introduction of reusable product structure** to your product portfolio
3. Iterative **improvements to your reusable product structure**



# Agile Approach to Reusable Product Structure

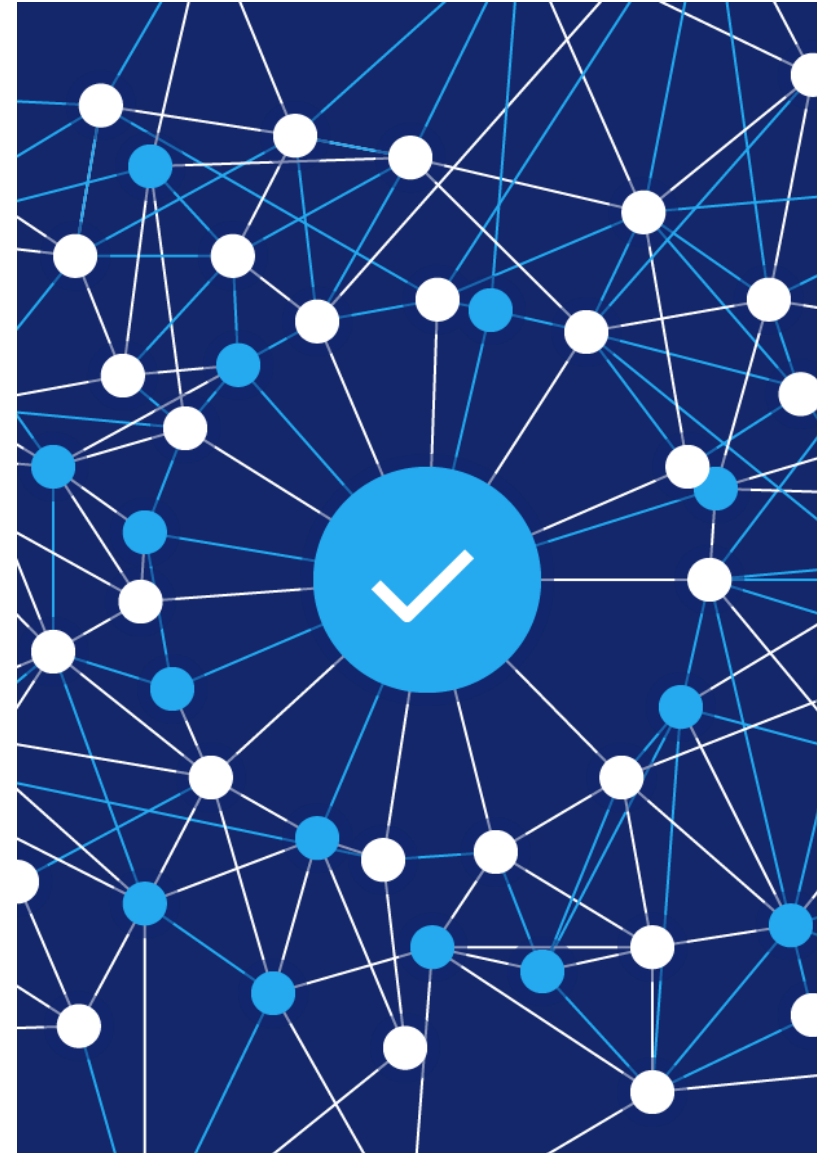
## ► Iterative implementation of PLM system

- Foundation of your reusable product structure



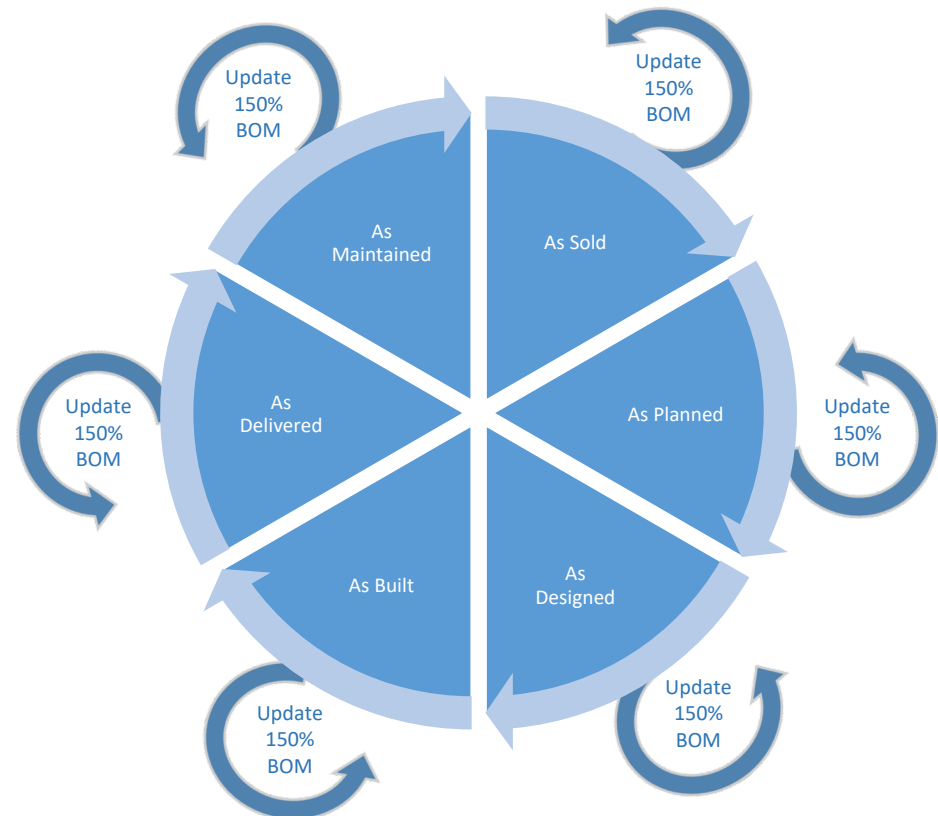
# Why Move to Reusable Product Structure?

- ▶ What do I gain from this effort?
  - Time and cost saving
  - Productivity gains
  - Time to market improvement
  - Streamline design processes
  
- ▶ Not a one-time effort
  - Continuously maintain and improve your reusable product structure
  - 150% BOM can evolve over time to include new features and options



# Reusable Product Structure Lifecycle

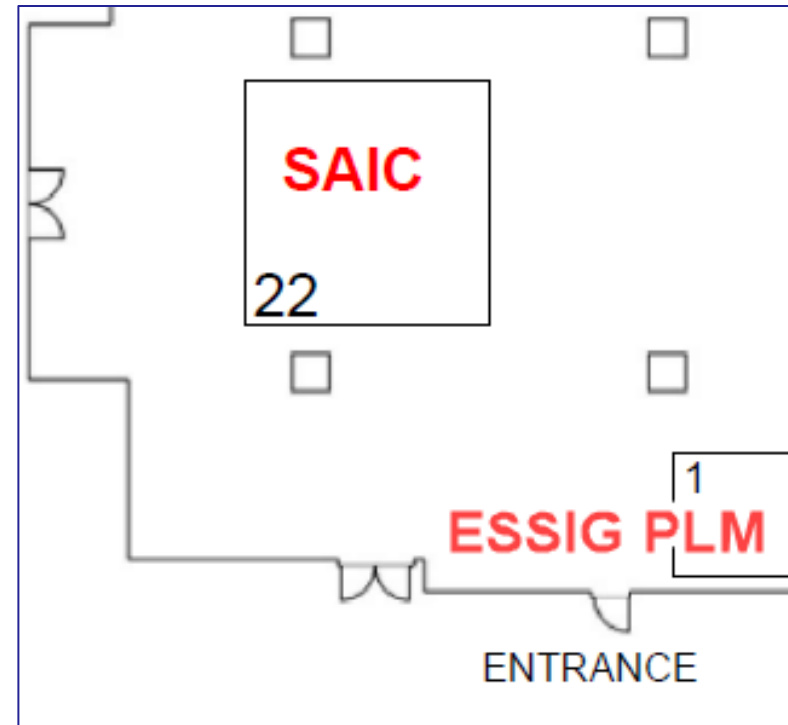
- ▶ Continuously update reusable structure as needed
- ▶ Updated 150% BOM can then be used for future product development





# More Information

- ▶ Stop by our booth – we're #1!
- ▶ Email us at: [info@essigplm.com](mailto:info@essigplm.com)
- ▶ Watch and Share – BOM to CAD Webinar
  - <https://essigplm.com/bom-to-cad>
- ▶ Jackie Rudolph Contact Info:
  - Email: [jrudolph@essigplm.com](mailto:jrudolph@essigplm.com)
  - Phone: (406) 296-4935
- ▶ Bill Gilchrist Contact Info:
  - Email: [bgilchrist@essigplm.com](mailto:bgilchrist@essigplm.com)
  - Phone: (267) 744-4412



# Coming Soon

- ▶ Co-hosted product strategy session with Alex Cadier – CAD Product Manager at Aras
- ▶ Focus Group with Aras customers and prospects interested in this topic to get their feedback, discuss strategy, continuous improvement ideas
- ▶ This is a continuously evolving product. We would be very interested to hear your feedback or your use cases as to how it would be used at your business
- ▶ **Wednesday April 17<sup>th</sup> 10AM EST**  
(tentative)



# Questions / Suggestions?



<https://essigplm.com/bom-to-cad>