

# Change Management Process Standardization & Implementation

ACE 2012



# About Lear...

- Major automotive parts supplier
- 2011 revenues of \$14.2B
- 98,000 employees at 207 locations in 35 countries
- Headquartered in Southfield, Michigan, USA
- [www.lear.com](http://www.lear.com)
- Two large product segments:
  - Seating Systems
  - Electrical Power Management Systems
    - Electrical Distribution
    - Electronics



# Current State of the Aras Innovator Implementation

- Launched in November 2009 to be the master for our part information
- Current Statistics:
  - 110,000+ parts
  - 35,000+ documents
  - 2,000+ users
- Requirements Gathering for Change Management in 2010 through early 2011
- Core change management implementation ongoing



## Current Infrastructure

- One global database in Southfield, MI (USA)
- Accessed from:
  - USA, Mexico
  - Spain
  - China, Philippines
  - Germany
  - Brazil
  - South Africa
  - Other Countries
- 35 sites in 15 countries total
- Regional Vaults during Phase 2 for CAD data



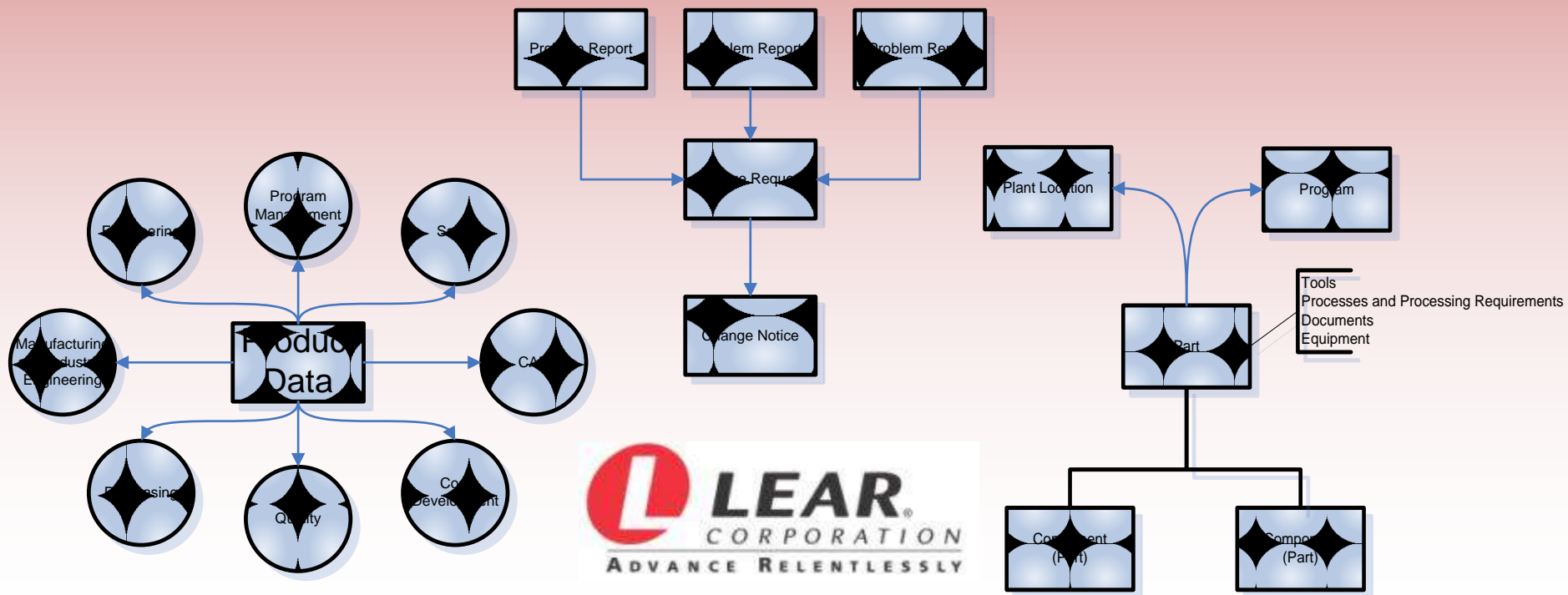
# Presentation Objectives

- Present an approach to standardizing the Change Request process and how we have dealt with its complexity
- Present specific functionality that has been implemented to deal with the Change Request process
- Give you an idea of some of the possibilities for customization of the Aras Innovator platform to meet our specific ease-of-use and automation requirements



# Three Main Objectives of PLM:

- Make the product data available to every function for their own use
- Use best-in-class processes to manage the product data
- Create the necessary linkages to enable automation

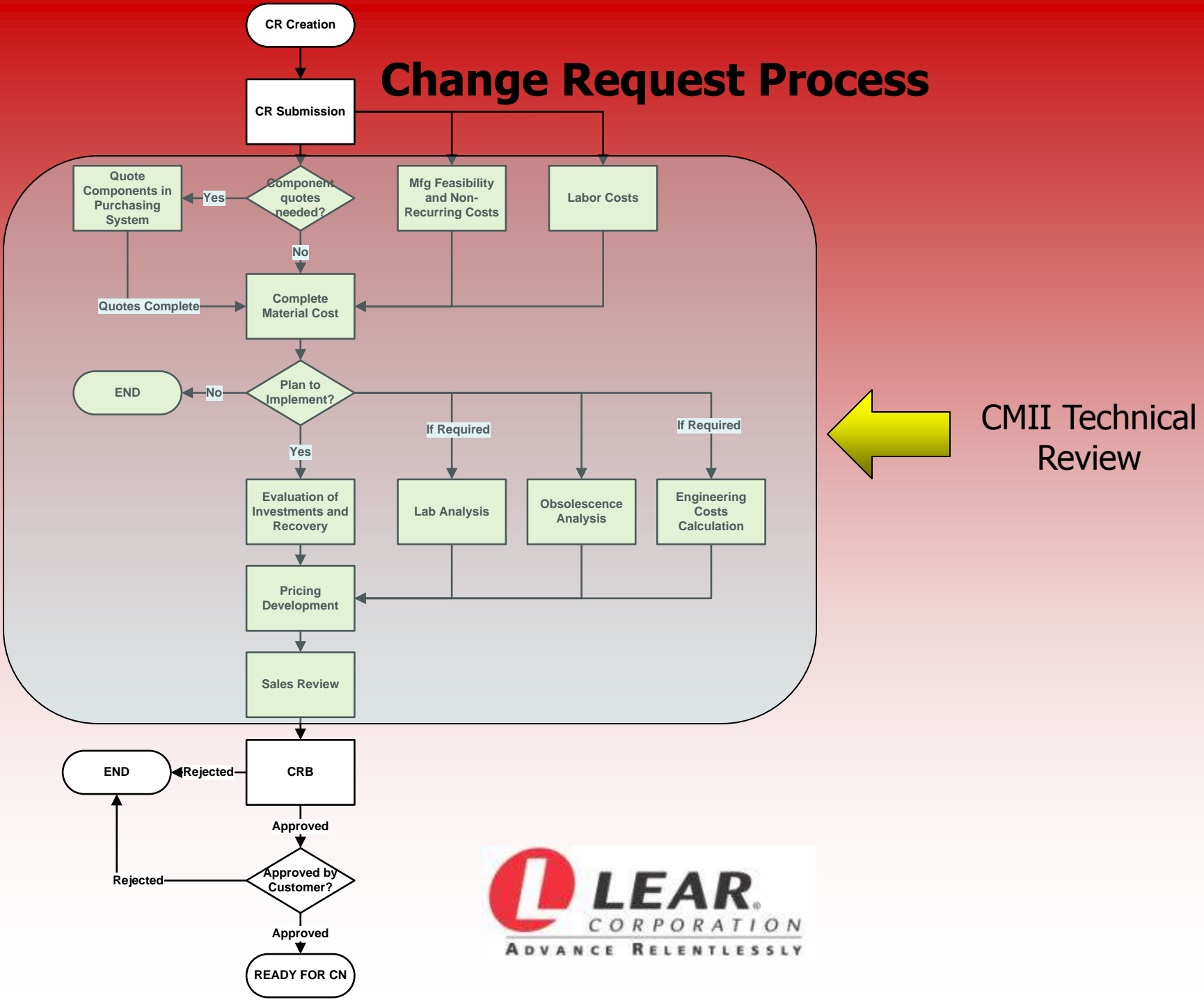


# Change Request Process

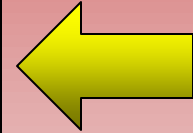
- Information Collected:
  - “Proposed change” definition
    - Parts affected
    - Drawing markups, other attachments
    - Verbal description of changes
  - Manufacturing feasibility
  - Recurring and non-recurring costs
  - Pricing info (if a customer-driven change)
  - Approvals (CRB)



# Change Request Process



CMII Technical Review



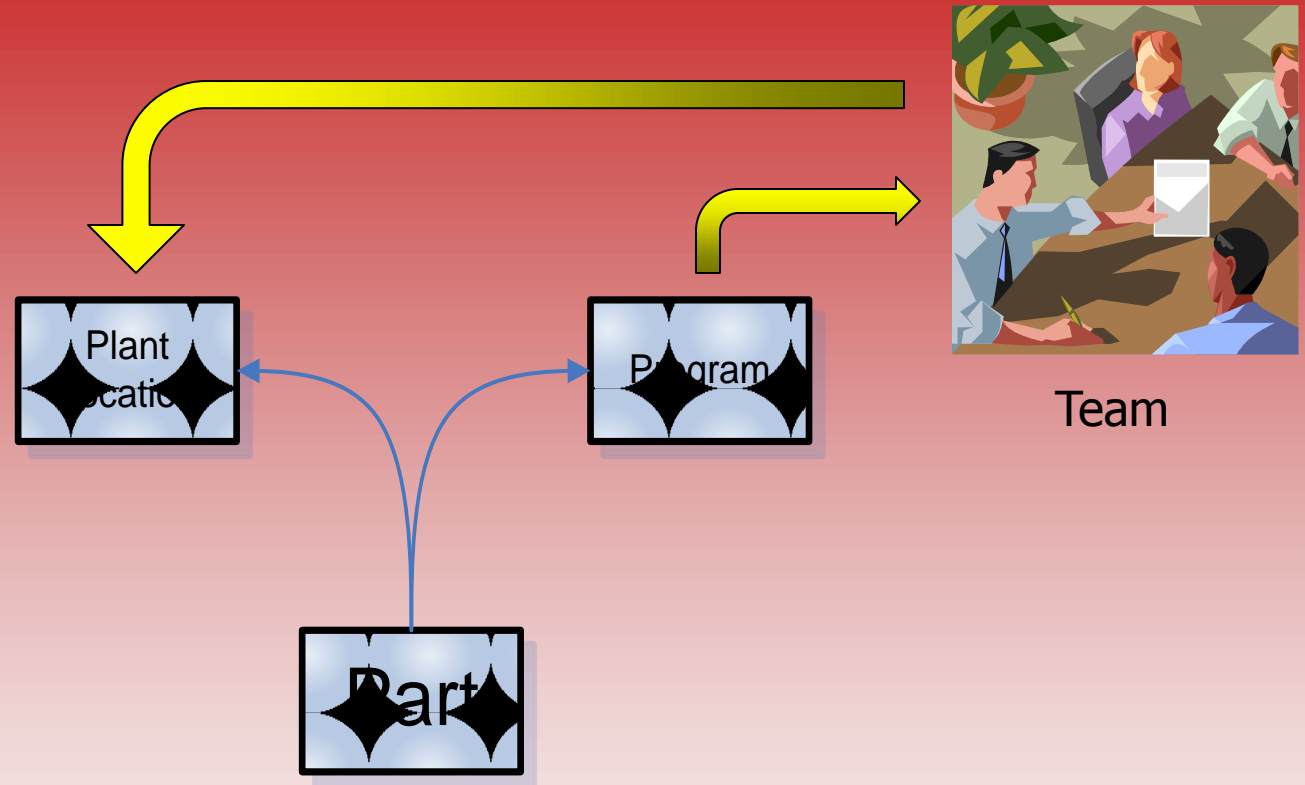


# Change Request Process

- Workflow Challenges
  - Many participants
    - Who's next?
      - Function
      - Membership to program
      - Location
  - Several loop-backs
  - Parallel data inputs
    - Two (or more) working on the same item at the same time



# Who's next?



- Program contains team members
- Some members (certain functions) are tied to locations
- Parts are tied to both programs and locations

# Workflow Assignment Configuration

**Program**  
Life Cycle State: NEW

Name: Program X  
SRM Code: 9TBW  
Program Type: Full Service (Design and Mfg)

Customer (Primary): Customer Y  
Product Line: Electronics

Additional Program Description

Program Leaders

Name	Role	Assigned Locations
Reynaldo Reyes (rreyes01)	Plant Program Leader	
Reynaldo Reyes (rreyes01)	Material Cost Estimator	Gabriela,Monarca
Reynaldo Reyes (rreyes01)	Labor Cost Estimator	Juarez,Monarca
Reynaldo Reyes (rreyes01)	Materials Analyst	
Reynaldo Reyes (rreyes01)	Engineering Leader	

The system automatically determines the affected program based on affected Parts on the CR

If the affected Parts in the CR are tied to your location, you will be flagged for the activity

Membership and role are used to determine workflow activity responsibility

# Workflow Assignment Configuration

**Location**

Name: Monarca

Type: Manufacturing Facility

DUNS:

City: Juarez

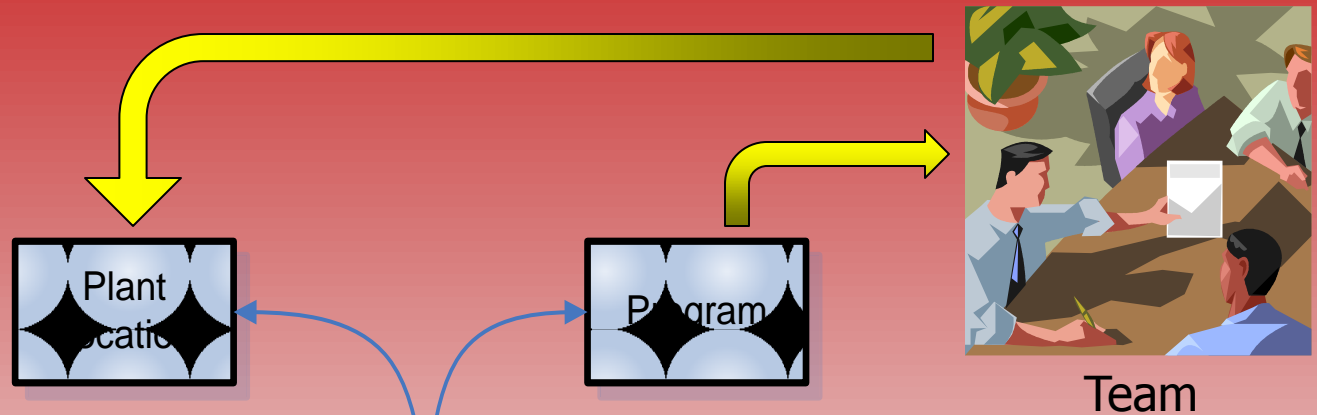
Country: Mexico

Navigation: Parts, Location Admins, Members, Customers, Products, Financials

Part Number	Revision	Name	Type	State
25010207J	A	STBLT WH SUBASSY, 44000028	Wire Harness Subass...	Released
224071F01		SUBASSY	Electronics Subassem...	Released

If the affected parts in the CR are tied to this location, team members on the program related to the same location will be flagged for workflow activity assignments

# Workflow Assignment Configuration



Multiple technical reviews are spawned and reconciled before CRB if more than one program is affected

Affected Parts are defined through a custom implementation of the ECO Impact Matrix

# Workflow Challenge: Two (or more) People in Parallel

- The “default” arrangement of items that have relationships are tabs along the bottom of the screen
- In order to avoid conflicts in locking the main item to enter data for the related items, the relationships are pushed one level below. This provides the ability to lock the individual relationships and input grids without having to lock the main item.
- Users click on the buttons on the screen to start entering data on ensuing forms and grids

The screenshot displays a software interface for a 'QIE' (Quality Improvement Event) form. On the left, the text 'QIE' is positioned above a horizontal line. The main form area contains several input fields: 'cr\_number' and 'Program' are text boxes with dropdown arrows; 'CR Description' is a large text area with scrollbars; and 'QIE Status' is a smaller text box. To the right of the form is a vertical stack of buttons: 'Pricing', 'Cost Analysis', 'Engineering Costs', 'Invest & Amort', 'Purchasing', and 'Lab Analysis'. The 'Lab Analysis' button is highlighted with a dashed border, indicating it is the active or selected option.

# Custom Impact Matrix

- “Out-of-the-Box” Impact Matrix behavior within ECO process (Lear does not use ECO)
  - Changes BOM structure automatically at the end of ECO process
  - Some options such as “replace” are not included
  - UI is basic & straightforward
  - Does not incorporate additional data items such as
    - Custom Part number cross referencing
    - Additional audits for needed automations



# Custom Impact Matrix

Generate Inputs

Errors Total: 1

CR

CR Number: CR-000025

Change Summary

Target Implementation Date

CR Owner

CR Release Date

Customer Approval Req? Basic Cost Analysis Only? Requested By: Lear

Impact Matrix | Affected Items | Change Info | Attachments | Signoffs | Change Item Properties | QIEs | Impact Notifications | Related CR

E	PN	Name	Rev	State	Qty	UOM	Action	New PN	Name	Rev	State
!	E00052700	BRACKET,PLSTC,CABIN...	A	Released							

Error Tracker

Custom Actions

- Delete Row
- Copy Row
- Select BOM Part(s)
- Change
- New Variant
- Initial Part Release
- Add
- Remove
- Replace
- Change Qty
- Reset



# Custom Impact Matrix

Generate Inputs

Errors Total: 1

CR

CR Number: CR-000025

Change Summary

Target Implement

CR Owner

CR Release Da

Customer Approval Req?

Basic Cost Analysis Only?

Requested By: Lear

Impact Matrix

PN	Name	Rev	State	Qty	UOM	Action	New PN
E00052700	BRACKET_PLSTC_CABIN	A	Released		EA	Change	

Context menu options:

- Delete Row
- Copy Row
- Select BOM Part(s)
- Change
- New Variant
- Initial Part Release
- Add
- Remove
- Replace
- Change Qty
- Reset

Shows just the contents of the BOM of the selected part

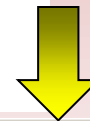


Search dialog - Part BOM -- Webpage Dialog

Simple Search

Page Size: Max Results:

Sequence	Quantity	Reference Designator	related_id [...]
1	1		<a href="#">E00052900</a>
2	1		<a href="#">E00053100</a>
3	1		<a href="#">E00053000</a>



Impact Matrix


PN	Name	Rev	State	Qty	UOM	Action	N
E00052700	BRACKET_PLSTC_CABIN_MASS...	A	Released		EA	Change	
E00053000	BRACKET_PLSTC_CABIN_ASSM1...	A	Released	1	EA		
E00053100	BRACKET_PLSTC_CABIN_ASSM1...	A	Released	1	EA		
E00052900	BRACKET_PLSTC_DOOR_ASSM1...	A	Released	1	EA		

Selecting parts from the actual BOM of the released part to propose changes

# Custom Impact Matrix

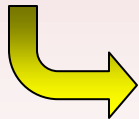
Impact Matrix								Affected Items	Change Info	Attachments	Signoffs	Change Item Properties	QIEs
E	PN	Name	Rev	State	Qty	UOM	Action						
!	<a href="#">E00052700</a>	BRACKET_PLSTC,CABIN,MASS...	A	Released		EA	Change						
	<a href="#">E00053000</a>	BRACKET_PLSTC,CABIN,ASSM1...	A	Released	1	EA							
	<a href="#">E00053100</a>	BRACKET_PLSTC,CABIN,ASSM1...	A	Released									
	<a href="#">E00052900</a>	BRACKET_PLSTC,DOOR,ASSM1...	A	Released									

- Delete Row
- Copy Row
- Select BOM Part(s)
- Change
- New Variant
- Initial Part Release
- Add
- Remove
- Replace
- Change Qty
- Reset



BOM markup to replace a part

Search dialog - Part -- Webpage Dialog					
Part Number		Revision	Name	Type	State
E00053700					eliminaryRel
E00053700	A	BRACKET_METAL,TRNK_ASSM3 PREL/COMP REL	Bracket	Released	



Impact Matrix												Affected Items	Change Info	Attachments	Signoffs	Change Item Properties	QIEs	Impact Notifications	Related CR
E	PN	Name	Rev	State	Qty	UOM	Action	New PN	Name	Rev									
!	<a href="#">E00052700</a>	BRACKET_PLSTC,CABIN,MASSM1 REL...	A	Released		EA	Change												
	<a href="#">E00053100</a>	BRACKET_PLSTC,CABIN,ASSM1 REL/...	A	Released	1	EA													
	<del>E00053000</del>	BRACKET_PLSTC,CABIN,ASSM1V REL...	A	Released	1	EA	Replace	<a href="#">E00053700</a>	BRACKET,META...	A	Rele								
	<a href="#">E00052900</a>	BRACKET_PLSTC,DOOR,ASSM1V REL...	A	Released	1	EA													

# Custom Impact Matrix

Impact Matrix | Affected Items | Change Info | Attachments | Signoffs | Change Item Properties | QIEs | Impact Notifications

E	PN	Name	Rev	State	Qty	UOM	Action	New PN
!	<a href="#">E00052700</a>	BRACKET,PLSTC,CABIN,MASSM1 REL...	A	Released		EA	Change	
	<a href="#">E00053100</a>	BRACKET,PLSTC,CABIN,ASSM1 REL...	A	Released	1	EA		
	<a href="#">E00053000</a>	BRACKET,PLSTC,CABIN,ASSM1V REL...	A	Released	1	EA	Replace	<a href="#">E00053700</a>
	<a href="#">E00052900</a>	BRACKET,PLSTC,DOOR,ASSM1V REL...	A	Released	1	EA		

Context menu options: Delete Row, Copy Row, Select BOM Part(s), Change, New Variant, Initial Part Release, **Add**, Remove

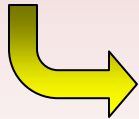
BOM markup to add a part



Search dialog - Part -- Webpage Dialog

Simple Search | Page Size: 50 | Max Results: | [OK] [Cancel] [Refresh]

Part Number	Revision	Name	Type	State
e00053800				eliminary Rel
E00053800	A	BRACKET,METAL,TRNK,ASSM3 PREL/COMP REL	Bracket	Released



Impact Matrix | Affected Items | Change Info | Attachments | Signoffs | Change Item Properties | QIEs | Impact Notifications | Related CR

E	PN	Name	Rev	State	Qty	UOM	Action	New PN	Name	Rev
!	<a href="#">E00052700</a>	BRACKET,PLSTC,CABIN,MASSM1 REL...	A	Released		EA	Change			
	<a href="#">E00053100</a>	BRACKET,PLSTC,CABIN,ASSM1 REL...	A	Released	1	EA				
	<a href="#">E00053000</a>	BRACKET,PLSTC,CABIN,ASSM1V REL...	A	Released	1	EA	Replace	<a href="#">E00053700</a>	BRACKET,META...	A
	<a href="#">E00052900</a>	BRACKET,PLSTC,DOOR,ASSM1V REL...	A	Released	1	EA				
	<a href="#">E00053800</a>	BRACKET,METAL,TRNK,ASSM3 PREL...	A	Released		EA	Add			

# Custom Impact Matrix

Impact Matrix    Affected Items    Change Info

E	PN	Name
!	<a href="#">E00052700</a>	BRACKET,PLSTC,CABIN
	<a href="#">E00053000</a>	BRACKET,PLSTC,CABIN
	<a href="#">E00053100</a>	BRACKET,PLSTC,CABIN
	<a href="#">E00052900</a>	BRA
	<a href="#">E00053800</a>	BRA

Adding more parts to Impact Matrix

Search dialog - Part -- Webpage Dialog

Simple Search    Page Size: 50    Max Results:    ✓ ✗ ➕

Part Number	Revision	Name	Type	State
E*52400				arylReleased
E00052400	A	WIRE HARNESS SUBASSEMBLY/OTHER_ASSEMBLY 2	Wire Harness Subass...	Released

Impact Matrix    Affected Items    Change Info    Attachments    Signoffs    Change Item Properties    QI

E	PN	Name	Rev	State	Qty	UOM
!	<a href="#">E00052700</a>	BRACKET,PLSTC,CABIN,MASSM1 REL...	A	Released		EA
	<a href="#">E00053000</a>	BRACKET,PLSTC,CABIN,ASSM1V REL...	A	Released	1	EA
	<a href="#">E00053100</a>	BRACKET,PLSTC,CABIN,ASSM1 REL/...	A	Released	1	EA
	<a href="#">E00052900</a>	BRACKET,PLSTC,DOOR,ASSM1V REL...	A	Released	1	EA
	<a href="#">E00053800</a>	BRACKET,METAL,TRNK,ASSM3 PREL...	A	Released		EA
	<a href="#">E00052400</a>	WIRE HARNESS SUBASSEMBLY/OTH...	A	Released		EA

# Custom Impact Matrix

Impact Matrix									
Affected Items		Change Info	Attachments	Signoffs	Change Item Properties	QIEs	Impact Notifications	Related CR	
E	PN	Name	Rev	State	Qty	UOM	Action	New PN	
!	<a href="#">E00052700</a>	BRACKET,PLSTC,CABIN,MASSM1 REL/COMP REL	A	Released		EA	Change		
	<a href="#">E00053000</a>	BRACKET,PLSTC,CABIN,ASSM1V REL/COMP REL	A	Released	1	EA	Replace	<a href="#">E00053700</a>	
	<a href="#">E00053100</a>	BRACKET,PLSTC,CABIN,ASSM1 REL/COMP REL	A	Released	1	EA			
	<a href="#">E00052900</a>	BRACKET,PLSTC,DOOR,ASSM1V REL/COMP REL	A	Released					
	<a href="#">E00053800</a>	BRACKET,METAL,TRNK,ASSM3 PREL/COMP REL	A	Released					
	<a href="#">E00052400</a>	WIRE HARNESS SUBASSEMBLY/OTHER,ASSEMBLY 2	A	Released					

“Smart” copying of changes to other parts on the Impact Matrix

Select Parts Webpage Dialog

Part Number	Revision	Name	Type	State	created_on [...]
E00052400	A	WIRE HARNESS SUBASSEMBLY/OTHER,ASSEMBLY 2	Wire Harness Subass...	Released	29 February, 2012

Impact Matrix includes logic so Target parts on are only those where the change would “make sense” (can’t delete a Part from an Assembly that doesn’t have that Part)

Impact Matrix									
Affected Items		Change Info	Attachments	Signoffs	Change Item Properties	QIEs	Impact Notifications	Related CR	
E	PN	Name	Rev	State	Qty	UOM	Action	New PN	
!	<a href="#">E00052700</a>	BRACKET,PLSTC,CABIN,MASSM1 REL/COMP REL	A	Released		EA	Change		
	<a href="#">E00053000</a>	BRACKET,PLSTC,CABIN,ASSM1V REL/COMP REL	A	Released	1	EA	Replace	<a href="#">E00053700</a>	
	<a href="#">E00053100</a>	BRACKET,PLSTC,CABIN,ASSM1 REL/COMP REL	A	Released	1	EA			
	<a href="#">E00052900</a>	BRACKET,PLSTC,DOOR,ASSM1V REL/COMP REL	A	Released	1	EA			
	<a href="#">E00053800</a>	BRACKET,METAL,TRNK,ASSM3 PREL/COMP REL	A	Released		EA	Add		
	<a href="#">E00052400</a>	WIRE HARNESS SUBASSEMBLY/OTHER,ASSEMBLY 2	A	Released		EA	Change		
	<a href="#">E00053000</a>	BRACKET,PLSTC,CABIN,ASSM1V REL/COMP REL	A	Released	1	EA	Replace	<a href="#">E00053700</a>	

# Custom Impact Matrix

- Benefits
  - Smart behaviors and mistake-proofing checks prevent errors
  - “Copy Row” functions expedite engineering data entry
  - Intuitive UI
  - Other audits and automations not discussed here ensure the integrity of the change proposal and quoting process \$\$\$

# Observations and Conclusions

- Some of the customizations shown here required up to three months to define and develop
  - Hardest part is getting the business logic defined right
- The flexibility of the Aras Innovator platform to customize workflow and grid behaviors allow for an PLM environment that is much more user-friendly than the typical user would expect

