



Moving to Web User Interface and SAP Product Lifecycle Management

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Session ID # ASUG83947

About the Speakers

James Hodgins

- Business Process Lead, Cognex
- Business background in Quality and Lean manufacturing, 14 years in Cognex
- Running 4 Marathons this year ✓✓??

Jody Derick

- Manager, Capgemini
- Over 20 years of experience implementing and supporting SAP
- Not running any Marathons, but will run a few 5Ks

Key Outcomes/Objectives

1. How we configured the go live system
2. Explain our frustration with the go live system and what we learned
3. Describe our short term improvements and long term plan

Agenda

1. Provide an overview of the PLM Web UI implementation
2. Walk through the evolution of PLM Web UI functionality improvements
3. Proposed transition to Product Structure Management (PSM)

COGNEX

The world's leading provider of vision systems, software and industrial barcode readers used in manufacturing automation.

Cognex vision helps companies improve product quality, eliminate production errors, lower manufacturing costs, and exceed consumer expectations for high quality products at an affordable price. Typical applications for machine vision include detecting defects, monitoring production lines, guiding assembly robots, and tracking, sorting and identifying parts.

Cognex serves an international customer base from offices located throughout the Americas, Europe and Asia, and through a global network of integration and distribution partners. The company is headquartered close to Boston in Natick, Massachusetts, USA.

2018 employees 1500
2018 Revenue \$806 million



ASUG



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SAP Implementation scope

SAP version 1610

Standard SAP streams

FTM - Finance to Manage

OTC - Order to Cash

DTS – Demand to Supply

PTP – Procure to Pay

STC – Service to Cash

Additional modules

PLM – Product Life cycle
Management

GTS – Global Trade Solution

BI – Business Intelligence

	▪ PeopleSoft (ERP)
	▪ Dovetail (Warranty service sytem)
	▪ Arena (Product Lifecycle Management)
	▪ Galt (Demand Planning)
	▪ Cincom (Configurator)
	▪ Qlikview (Reporting)
	▪ CIC (Cust. Info. Center)

Implementation team

Cognex – 22 : 6 Data, 4 Peoplesoft, 8 Business leads, 1 BI, 2 Infrastructure, 2 PMO (25 Superusers to support testing and training)

Capgemini - 22 : 7 Stream leads, 1 BI, 5 Data/Development, 3 PMO, 8 Remote support

Product Lifecycle Management at Cognex

- Cognex is Engineering driven: success is dependent on the ability to provide multiple innovative products to the market every year.
- Engineering focuses on developing new products and enhancing existing products through the product lifecycle.
- PLM is where we create/manage our new Materials, BOM and Documentation.
- Early lifecycle changes are tracked by revision and later lifecycle statuses are changed with an ECR.
- These critical objects are Change Controlled via the workflow process and approved with an Engineering “change” Record (ECR).

Lifecycle Status	Description
10	Unreleased
20	In Design
30	New Production
40	Released to Manufacture
50	Not Intended For New Applications
60	Last Time Buy
70	Obsolete
80	Deprecated

Arena PLM transition to SAP

Arena PLM went live 5 years ago. It supported the growth of the company from \$400 to \$806 million. It managed the following for **7 Engineering sites,**

2 Distribution sites, 1 New products manufacturing site and as well as many marketing and sales teams.

- New part/BOM creations
- Sourcing/approved manufacturers
- Document management
- Change control process
- Supplier collaboration (Arena Exchange)



Capgemini proposed the use of Change master and Material Master Data management as the replacement for Arena PLM. It became clear that these standard functions in SAP were not equivalent to what Arena provided and a better solution was required.

- Material master, Documents and Change master are separate.
- Material BOM's and Materials are separate, BOM's do not have redline.
- Core SAP workflow for change master too much for go live.

Solution is PLM WEB UI.

PLM design analogy



Is SAAS system so there is very little required to get the system built. The fire station is built by them and you get limited instructions to configure the system.



SAP PLM does not have instructions, you are given a box of bricks to build whatever you want, there are many configuration options. Having the knowledge of all the possible configurations is critical. Not many people understand all the possible options.

Summary of PLM Web UI Functionality

Materials

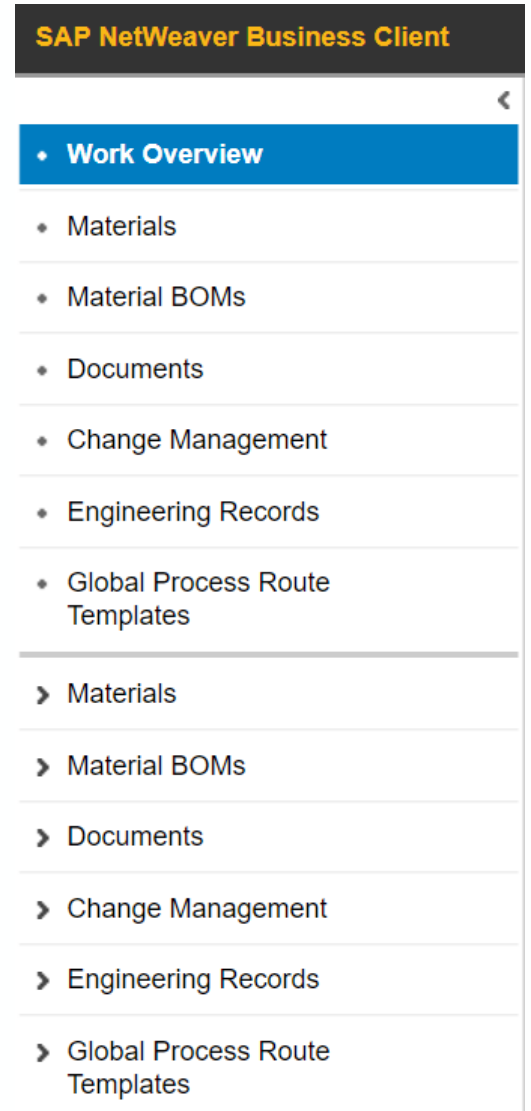
- Basic data and Classification views
- Revisions
- To support the HERS Material type in PLM Web UI, a custom development was required to support Internal Number Assignment, allowing the linking of multiple Manufacturer parts to a Material

Material BOM

- Group BOM maintained through PLM
- BOM Redlines

Documents

- Linked to Materials and other Documents
- Versions and Revisions



Summary of PLM Web UI Functionality

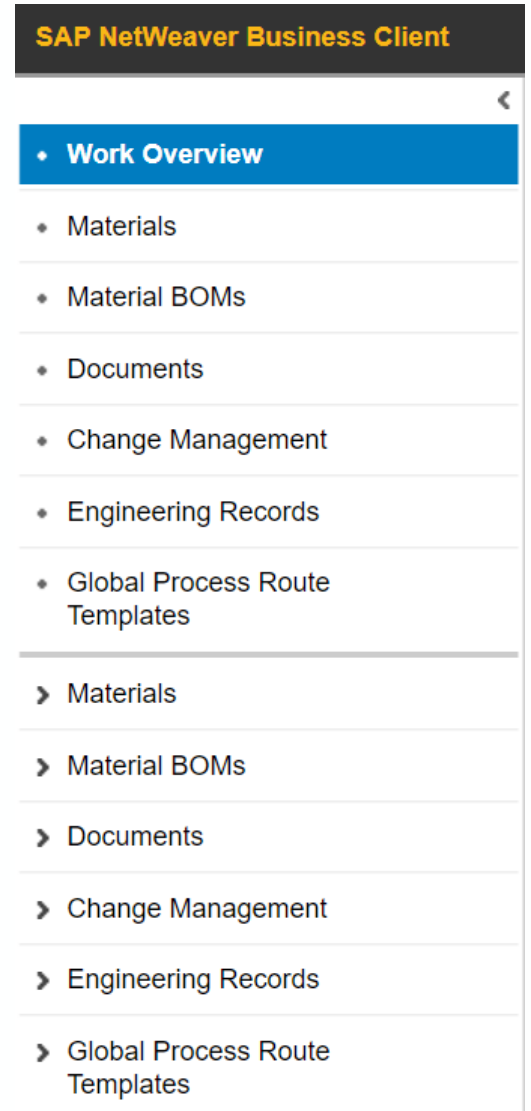
Engineering Record

- Status profile to track ECR creation, approval, and implementation
- Automatic generation of change master based on status
- Embedded workflow functionality with easy start of approval process
- Auto Global Process Route assignment
- Auto Status Determination using BRF+
- Approval or Rejection Decisions
- Send Email notifications

Global Process Route Templates

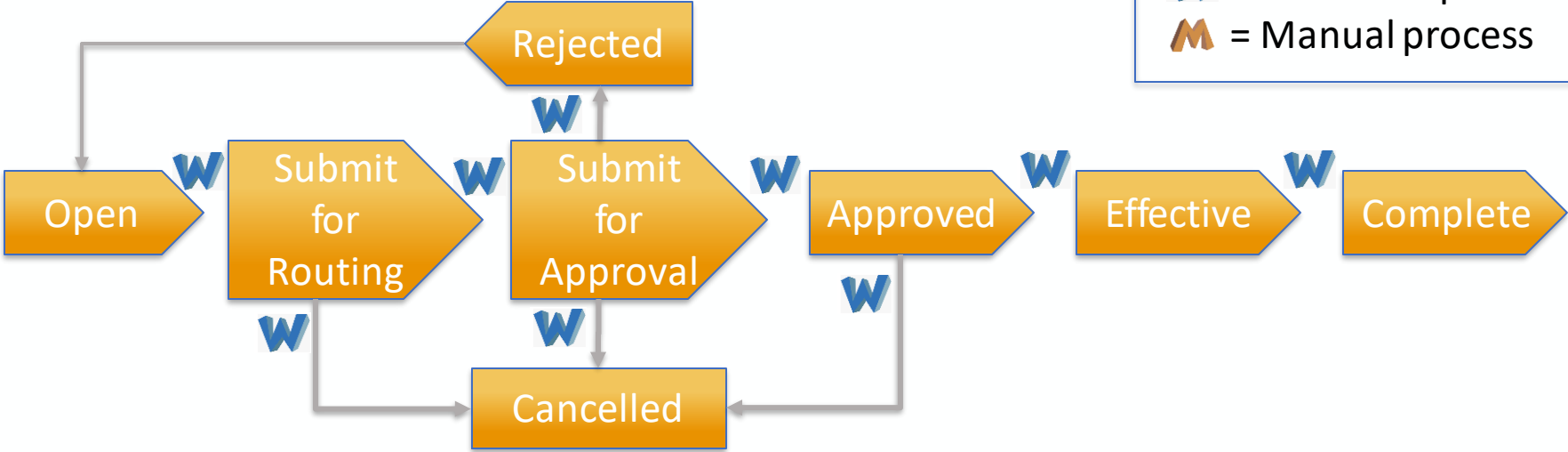
- Sequential and Parallel approval tasks
- Decisions defined for each approval task
- Approval Task assigned to a Position
- User ids assigned to the Position (in Organizational Management)

Functionality was implemented via configuration settings, without additional development effort

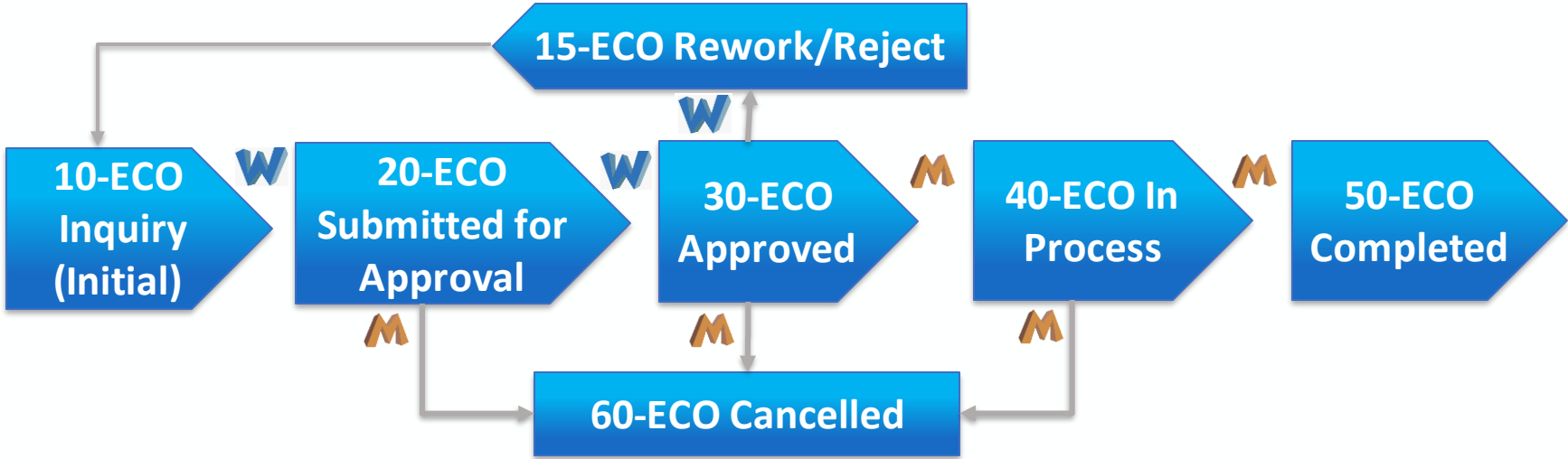


Arena and SAP Workflow

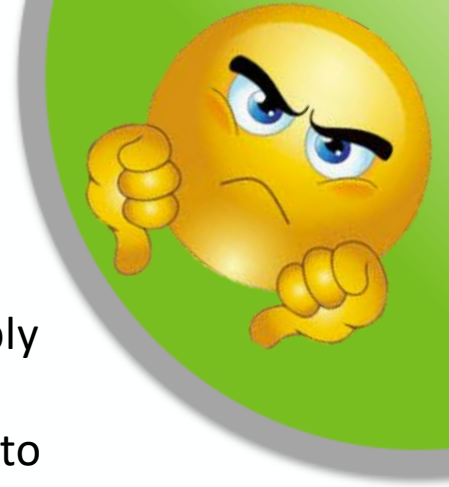
Key
W = Workflow process
M = Manual process



July '18
to
Feb '19



BAD



Functionality lost when moving to SAP

- ✓ Working revision used to take a copy of an object which is then redlined to describe the change and apply the change. {Only implemented for Material BOM redlining in SAP}
- PSM ✖ Use excel template to list the changes that the requestor wants to make. This is also the instruction to Documentation control to follow when keying the change.
- ✓ Ability to prevent modifications to Objects that are on an Engineering Change Record (ECR). These should be locked until the ECR is completed or rejected.
- PSM ✖ Manual request to engineers not to change objects on ECR's. Not a reliable solution.
- ✖ No BOM upload tool.
 - ✖ Capgemini had to create custom code to create an upload tool to allow Cognex to import BOM's from ECAD into SAP/PLM.
- ✖ The Supplier collaboration tool for PLM/cFolders was removed from S4 Hana.
 - ✖ Cognex created a BOM export to export a BOM with the relevant information out of SAP into an excel file that could be shared with suppliers. All Documents required will be put into a Zip file with the BOM to give the supplier all the information they require. Manual process to collect all the data required.
- ✓ Document revision not linked to material revisions.
- PSM ✖ Modified configuration to show documents based on validity date. Dates have to match material validity.

UGLY

Functionality not in PLM but in SAP

- ✓ BOM compare – Moved T-code to PLM GUI after go-live.
- ✓ Multilevel where used. - Moved T-code to PLM GUI after go-live.
- * Mass change

Manual implementation of changes after the ECR has been approved.

(All of these lead to extra processing time and increase the risk of error)

* BOM redlines need to be manually “Applied”

- ✓
- PSM
- * Any change to a Material
 - * Any change to a Manufacturer
 - * Any change to a Document

Master Data

- * Data must be maintained across Sales Orgs, Distribution and Plants. Extra headcount required to manage this.
- * External data collection tool developed by Cognex to collect Master Data information.

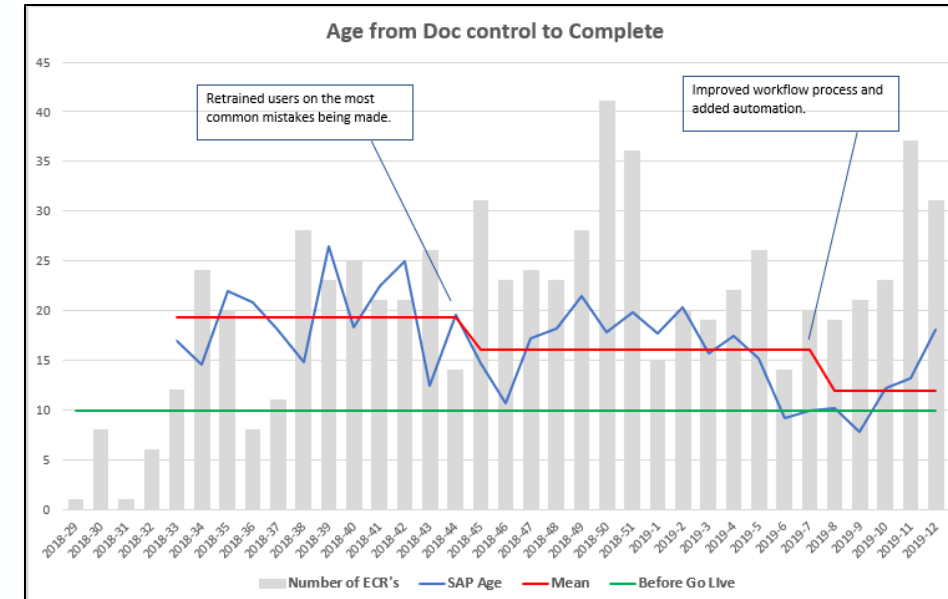
GUI

- * Since PLM is a broad platform there are a lot of redundant fields and data/options that are not required by Cognex. This confuses users and leads to errors.
- * There is a lot of duplication on different screen and more than one was to view it. Display material and Object navigator for example.
- * The Global process route names used by the ECR creator does not get stored or displayed after use.



Go-Live Experience

- Engineers did not like the GUI and felt that the system increased the time they spend in PLM by 30%. Many fields displayed were not required, very little error proofing build into the system, fields did not default standard values, many screens needed where one screen did all in Arena.
- The amount of time taken to process ECR's from Doc Control review to approval to completion increased from an average of 10 days to a peak of 26 and average of 19 down to 12 after the workflow improvements.
- The Global process route used to send ECR for approval was no longer displayed once it was used. 40% of ECRs were rejected initially and users had to remember the process route they used when resubmitting. We have 253 global process routes.
- Auto Status Determination BRF+ was turned off due to incorrect Process Route creation which resulted in workflow errors and ECR's requiring help from IT to restart the process.
- Users found that history and traceability to changes were not consistent or reliable. Documents (DIRs) were not linked to material revisions, changes to characteristics were not linked to revisions.
- In general the PLM experience was very negative and was escalated to CEO level. Extra resources were added: one Consultant with SAP PLM experience and one SAP PLM employee who was involved in the design of PLM WEB UI.



Improvements to PLM Web UI

- **GUI Improvements**
 - Unnecessary fields were hidden
 - Removed entries from the menu and added transactions
 - Default values were set for key fields
- **Engineering Record (ECR) Improvements**
 - Class Name and Cross Plant status was added to the ECR Material Object
 - ECR email revised to include the description of the ECR in the subject
 - Added a Display button to Workflow Inbox to prevent Executing the work item when wanting to view only
 - Activated Forward and Substitution functionality for workflow reviewers
- **System Structure**
 - Additional Engineering Record Status added to take advantage of processing built into standard BADI for preventing an object from being on more than one ECR at a time

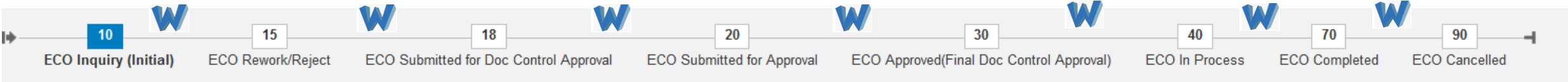
Arena and SAP Workflow

Key
W = Workflow process
M = Manual process



July '18 to Feb '19

Feb '19



Improvements to PLM Web UI

- **Update to Approval Processing**

- All status levels added to workflow approval
- Automatic status determination re-activated
- Visual Status Map added with current status highlighted
- Process route determination via Classification
- Global Process Route Template captured for automatic process route determination after a rejection
- Rejection routing automatically to the ECR originator
- As an administrator, ability to forward the ECR for approval at any step in the process route
- Remove the background tasks from the Team Definition tab
- Addition of a Process Route Log to see any workflow errors

The screenshot displays the SAP Change Engineering Record (ECR) web interface for record 6000000030. At the top, there is a 'Visual Status Map' showing a sequence of steps from 10 to 40. The current status is 'ECO Inquiry (Initial)'. Below this, the 'Header Data' section contains various fields: 'Engineering Record Description' (Release 825-11386-1R), 'Reason for Change' (0010 - New release), 'Priority' (2-High), 'Lead Change Number', 'Change Number Status' (00), 'Valid From', 'Engineering Record Status' (10-ECO Inquiry (Initial)), 'Target Run-In Date' (07/27/2015), and 'Change Coordinator' (JHODGINS - HODGINS, James). The 'Process Route Selection' section shows 'Class Type: 046 - Engineering Record Header' and 'Status: Released'. The 'Classes' tab is highlighted in the bottom navigation bar.

Improvements were made through a combination of configuration settings and leveraging the BADI's available in PLM for custom development

VIDEO

Change Redlining for Material BOM:ASUG DEMO

Save Check Entries Close Redlining You can also

Material 200-10073-IR Material Description PCA TOP AIMER BOARD MX-100 Plant Plant Description BOM Usage Universal Alternative BOM 1 Redlining Name ASUG DEMO Redlining Status In Work

Redlining

Header Administrative Data

Header Data
Name: ASUG DEMO : In Work Status: Completed
Description: ASUG DEMO VIDEO Long Text Responsible: JHODGINS HODGINS, James

Validity
Engineering Record: Eng. Record Status:
Change Number: Validity Date: 03/21/2019

Create Delete Details Send E-Mail Apply Add to Engineering Record

Items Header Manufacturer Parts

Select Item Category View: Stock item Export Show Item Details Go To Item

Item	Item Category	Indicator	Redlining Notes	Component	Unit	Assembly	Subitems	MPNs	Valid From	Valid To	Change Number
0001	Stock item		Create Notes	203-10073-RER	5	EA			01/01/2015	12/31/9999	
0002	Stock item			161-1159R	1	EA			01/01/2015	12/31/9999	
0003	Stock item			161-10070R	1	EA			01/01/2015	12/31/9999	
0004	Stock item		Create Notes	161-1122R	1	EA			01/01/2015	12/31/9999	
0005	Stock item			161-1175R	1	EA			01/01/2015	12/31/9999	
0006	Stock item			161-1041R	3	EA			01/01/2015	12/31/9999	
0007	Stock item		Create Notes	161-10096R	2	EA			01/01/2015	12/31/9999	
0008	Stock item			162-10070R	1	EA			01/01/2015	12/31/9999	
0009	Stock item			162-10071R	1	EA			01/01/2015	12/31/9999	
0010	Stock item			119-10090R	1	EA			01/01/2015	12/31/9999	
0011	Stock item			119-10091R	2	EA			01/01/2015	12/31/9999	
0012	Stock item			182-10174R	1	EA			01/01/2015	12/31/9999	
0013	Stock item			162-10089R	2	EA			01/01/2015	12/31/9999	
0014	Stock item			165-10030R	1	EA			01/01/2015	12/31/9999	
0015	Stock item			165-0173R	1	EA			01/01/2015	12/31/9999	

Add to Engineering Record

Engineering Record

Existing Engineering Record

New Engineering Record

Engineering Record Type: ZECO-Cognex Engineering Change Order

Engineering Record:

Description:

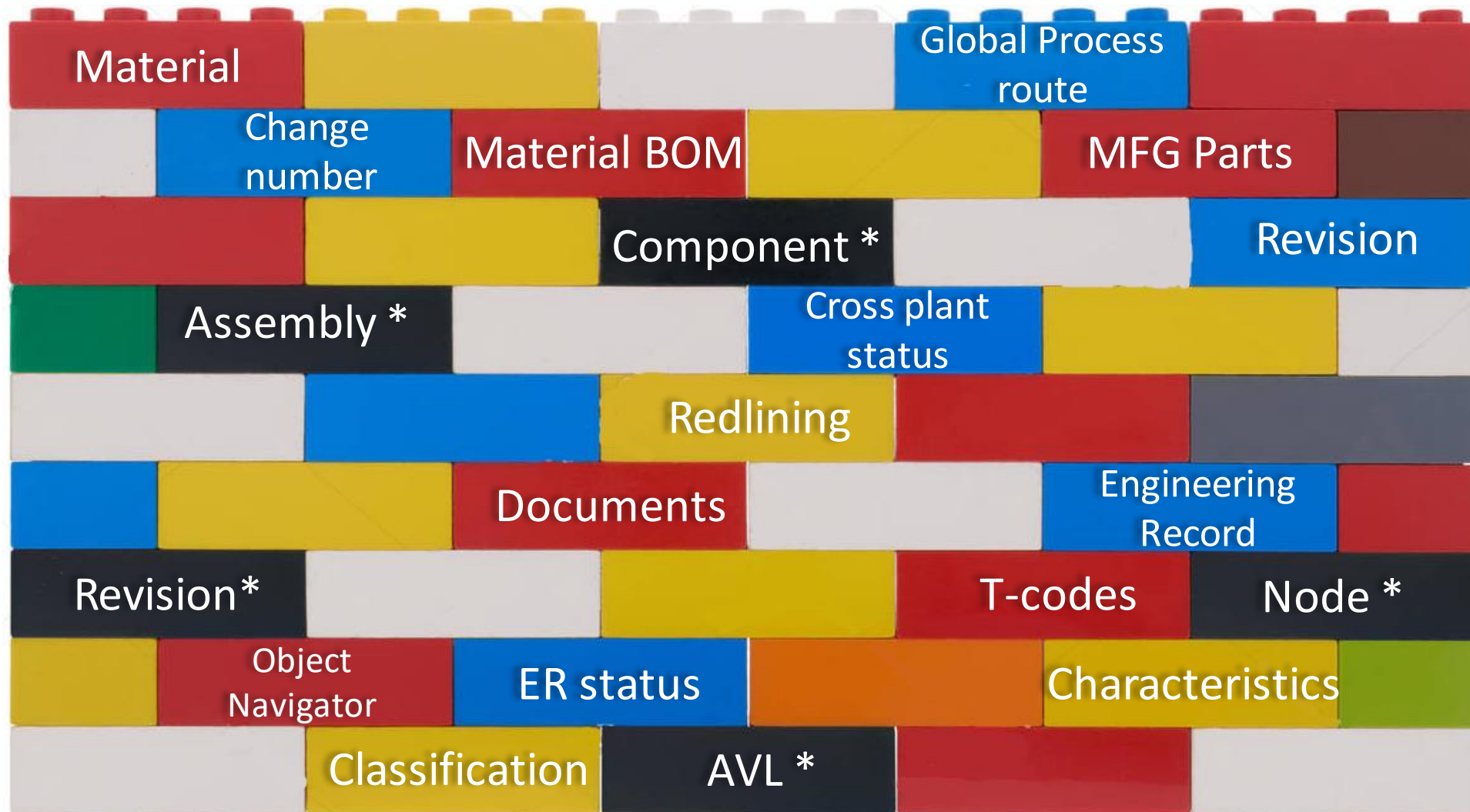
Change Coordinator:

Target Run-In Date:

Reason for Change:

OK Cancel

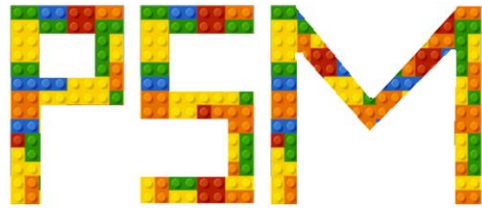
The blocks that Cognex used.



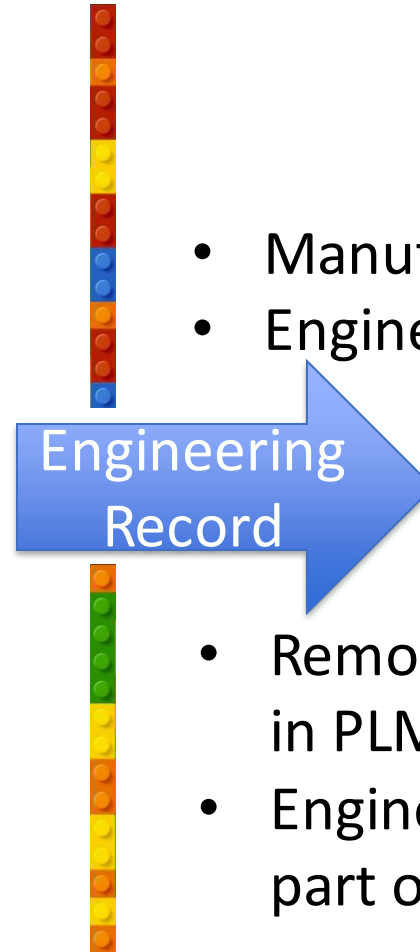
* Black blocks are to be used in the next phase of our project to add PSM functionality

What's Next ? – Use more PLM Lego block

Add the Product Structure Management (PSM) functionality to the PLM setup. PSM implementation will require master data conversion and configuration changes to remove functionality from PLM and the modification of custom programs to work with PSM



- Engineering workspace
- Engineering Materials, BOM's and Documents
- Multiple revisions controlled by status
- Full historical structure maintained and traceable
- Single screen navigation for the majority of function



- Manufacture workspace
- Engineering Record is required to move a material from PSM into PLM to make it available for general ERP use
- Remove the ability to “Create or Change” in PLM. All creation and change is in PSM
- Engineering Record management is still part of PLM

Product Structure Management

Change Product Structure: 821_5000_1

[Save](#)
[Read Only](#)
[Check Entries](#)
[Proceed To](#)
[View](#)
[Edit Simulation](#)
[Activate Simulation](#)
[Assign](#)
[Additional Functions](#)
[You can also](#)
[Related Links](#)

Simulation | Product Structure 821_5000_1 | Description 821_5000_1 | Class ZPLM_ALL_PRODUCTS | Key Date | Active Change Number
 Inactive

Product Structure

Position: 821_5000_1

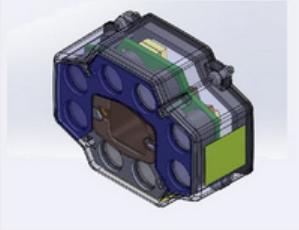
Show: **Item Detailed View** | Levels | Items

Item	Description	Status
821_5000_1	821_5000_1	
▶ R01 - 5000000455	DM262ETH,1.2MP,16mmLens,LL,Half-POLKCS	
▶ R02 - 5000000457	DM262ETH,1.3MP,16mmLens,LL,Half-POLKCS	
371_1000_01	OPTICS INTERFACE, DM150, SECOND SOURCE	
▶ R01 - 5000000455	OPTICS INTERFACE, DM150, SECOND SOURCE	
▶ R02 - 5000000457	OPTICS INTERFACE, DM150, added AML	
▶ 371_2000_01	371_2000_01	
▶ R01 - 5000000455	SPRING PIN, FOR USER INTERFACE, DM150	
▶ R02 - 5000000457	SPRING PIN, FOR USER INTERFACE, DM150	
▶ 371_3000_01	371_3000_01	
▶ R01 - 5000000455	Blindplug,malethread,connM12x1,BLK	
▶ R02 - 5000000457	Blindplug,malethread,connM12x1,BLK	
▶ 371_4000_01	371_4000_01	
▶ R01 - 5000000456	PCB Holder, Simba	

[General Data](#)
[Assembly Phase](#)
[Revisions](#)
[File Attachments](#)
[Administrative Data](#)

Identification

Product Item: [Rename](#)
 Item Name: [Long Text](#)
 Item Type: Assembly
 Class: All Cognex Products



Control Data

Required Component
 Multiple Selection of Product Item Variants Allowed

Header Data

[Export](#) | [Delete Row\(s\)](#) | [Filter Settings](#)

	Material	Plant	Usage
	STDVAR	1000000313	Engineering/design
	STDVAR	1000000313	

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Presentation Materials

Access the slides from 2019 ASUG Annual Conference here:

<http://info.asug.com/2019-ac-slides>

Q&A

For questions after this session, contact us at

James.Hodgins@Cognex.com and Jody.Derick@Capgemini.com

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Appendix

Additional implementation details are provided for reference

Enhancements Activated

- Easy start of approval process

(Logistics – General > PLM > Case Management > Set Status Administration > Create Status Profile)

In the Status Profile definition, removing the Event for Case "In Process" added the Start Approval option

- Process Route and Team Definition BADI's activated

(Logistics – General > PLM > PLM Web User Interface > Objects in PLM Web UI > Process Route > Additional Settings)

Create Engineering Record

Save Start Approval Check Entries Hide Header Data Additional Functions You can also Related Links

Process route template 000000000003 loaded successfully

Record Number	Description	Engineering Change	Engineering Record Type	ZECO	Status	ECO Inquiry (Initial)	Run-In Date
Change Coordinator	Derick, Jody						03/06/2018

Display View "Status Values": Overview

Dialog Structure: Status Profile (ZPLM_ECR) > Status Values

Status	Status Description	SystemStat.	System Status Descr.	Low Sta...	High Stat.	Auto	Event for Case
10	ECO Inquiry (Initial)	001	Open/New	0	20	<input type="checkbox"/>	CREATED
15	ECO Rework/Reject	001	Open/New	0	30	<input type="checkbox"/>	CREATED
18	ECO Submitted for Doc Control	002	In Process	10	30	<input type="checkbox"/>	
20	ECO Submitted for Approval	002	In Process	10	30	<input type="checkbox"/>	
30	ECO Approved/Final Doc Control	005	Released/Approved	15	40	<input type="checkbox"/>	
40	ECO In Process	002	In Process	30	40	<input type="checkbox"/>	
50	ECO Completed	009	Voided/Deleted/Canceled	30	50	<input checked="" type="checkbox"/>	COMPLETED
60	ECO Cancelled	009	Voided/Deleted/Canceled	10	60	<input checked="" type="checkbox"/>	COMPLETED
70	ECO Completed	007	Closed	30	70	<input type="checkbox"/>	COMPLETED
90	ECO Cancelled	007	Closed	10	90	<input type="checkbox"/>	COMPLETED

Display View "Additional Settings": Overview

Additional Settings

Parameter Name	Description	Parameter Value
PR_AUTO_EXEC_IS_ON		X
PR_TD_IS_ON		X

Items **Process Route** Team Definition Notes Documents Administrative Data

Show: Detailed View Expand All Collapse All Show Details Delete Task Add Sequential Task Add Parallel Task Actions Additional Functions

Process Tasks	Type	Activity	Status Icon	Status	Long Text	Latest End Date	Latest End Time	Processing Time (Days)
Header							00:00:00	0
Document Control	Position	Approval			Create		00:00:00	0
System	Background	Approval Complete			Create		00:00:00	0

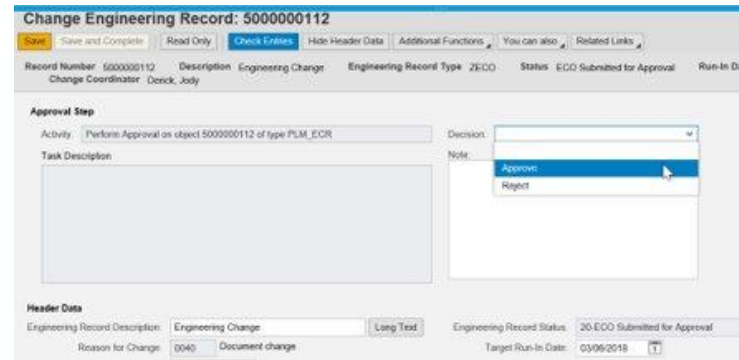
Items Process Route **Team Definition** Notes Documents

Process Tasks	Type	Activity
Header		
Document Control	Position	Approval
Fisher, Brent	SAP User	Approval
Derick, Jody	SAP User	Approval
HODGINS, James	SAP User	Approval
System	Background	Approval Complete



Configuration

- Activities and Decisions defined for Process Route tasks
(Logistics – General > PLM > PLM Web User Interface > Objects in PLM Web UI > Process Route > Define and Assign Decisions)



- Background services defined for changing ER status based on task in Process Route
(Logistics – General > PLM > PLM Web User Interface > Objects in PLM Web UI > Process Route > Define Background Services)

Display View "Decision Definition": Overview

Decision	Decision Descr.	Rejection
APPROVE	Approve	<input type="checkbox"/>
CANCEL	Cancel ECR	<input checked="" type="checkbox"/>
COMPLETE	Approval Complete	<input type="checkbox"/>
ECOROUTING	ECO Routing Complete	<input type="checkbox"/>
REJECT	Reject	<input checked="" type="checkbox"/>
REVCOMPL	Review Complete	<input type="checkbox"/>
REWORKCOMPLETE	Rework Complete	<input type="checkbox"/>

Decision

Object Type: P1M_ECR

Service Assignment

Class: /PLMI/CL_ECR_SRV_DEC_REJECTION

Activities

Activity	Activity Description
ZAPRV	Approval
ZDOCCNTR	Doc Control Routing
ZIMPLMNT	Doc Control Final Approval
ZREVIEW	Review
ZREWORK	Rework

Activity: ZAPRV

Decision	Decision Descr.
APPROVE	Approve
REJECT	Reject

Display View "Service Definition": Overview

Service ID	Service Description	Class
APPROVAL_COMP	Approval Complete	/PLMI/CL_ECR_SRV_STATUS_CHANGE
ZSTATUS_CHG	Status Change	/PLMI/CL_ECR_SRV_STATUS_CHANGE

BRF+ for Status Determination

- Defined BRF+ for Status Determination
 (Logistics – General > PLM > PLM Web User Interface > Objects in PLM Web UI > Engineering Record > Set Up Rule-Based Status Determination)

Display View "Engineering Record Status Determination": Details



Engineering Record Status Determination	
BRFplus Application	ZGENERAL_STATUS
BRFplus Function	GET_STATUS

Business Rule Framework plus

Workbench Tools

Repository Catalog

Show: Search Result Search

Search Result S..

- PLM ER PR Template
- PLM ER Status Rules
 - Data Object
 - Element
 - Structure
 - Function
 - Get Status of ER
 - Uses
 - Data Object
 - Where Used
 - Ruleset
 - PLM ER Status

Decision Table: PR_ZECO_DEC_TABLE, ZECO Status values

General

Detail

Export To Excel Context Overview Start Simulation

Table Contents

Find: Next Previous Table Settings

Eng. Record Status	Decision	Eng. Record Status
=10		18
=18	=ECOROUTING	20
=18	=CANCEL	90
=18	=REJECT	15
=18		20
=15	=REWORKCOMPLETE	18
=15	=CANCEL	90
=20	=APPROVE	30
=20		15
=30	=COMPLETE	40
=30	=REJECT	15

Manufacturer Part Number Enhancement

- In the SAP GUI, the HERS material type provides the field MARA-BMATN to link the manufacturers part with the material number
- Within the PLM Web UI this field was missing
- A standard message displays stating "cannot be saved because it must be enhanced"

The screenshot displays the SAP PLM Web UI interface for creating a material. At the top, the title is "Create Material: 251". Below the title, there are buttons for "Save", "Check Entries", "Additional Functions", and "You can also". A warning message is displayed: "Material 251 cannot be saved because it must be enhanced - Display Help". The main content area is divided into sections: "Basic Data", "Descriptions", "Status", "Classes", "Characteristic Values", "Documents", and "Process Route". The "Basic Data" section is active and contains the following fields:

- * Material Description: Long Text
- Manufacturer Part**
- * Manufacturer Part Number:
- Int. material number: (highlighted with a yellow arrow)
- Manufacturer:

Below the "Manufacturer Part" section is the "Administrative Data" section, which includes fields for "Created On", "Changed On", "Created By", and "Changed By".