



3DEXPERIENCE®

CONFIGURED PRODUCT DEVELOPMENT

DS DASSAULT
SYSTEMES | The 3DEXPERIENCE® Company

AGENDA

Configured Engineering Item

XEN – User Interface

PAU – User Interface

Best Practices | Solution Design

Usecase Scenarios

CONFIGURED ENGINEERING ITEM

WHAT IS AN ENGINEERING ITEM?

DroneVX1
Engineering Item



Propeller CW X10
Engineering Item



- An Engineering item:

- accounts for the holistic engineering (xCADs, Software, Documents) definition of a product
- is implemented through a “Physical Product” in the 3DEXPERIENCE platform, starting from R2018x (i.e. Engineering item is the same object as Physical Product)



- Engineering item can contain the following definitions:



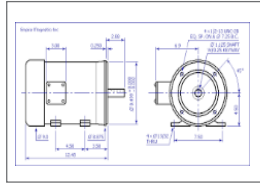
3D Model



Engineering Definition attributes



Instances of other Engineering Items



Drawing



Reference Document
(MS Excel, MS Word ...)

ENGINEERING ITEM

From Widget / PowerBy xCAD / 3DEXP Native Client / ..

- Explorer (CSV)

The screenshot displays two side-by-side windows from the ENOVIA software. The left window, titled 'ENOVIA - Product Structure Explore - Excavator - R1132100867374', shows a hierarchical tree of product components. The right window, titled 'ENOVIA - 3D Navigate - ExcavatorA.1', shows a 3D model of an excavator.

Title	Revision	Type	Name	Descript	Menu
Excavator	A.1	Physical Product	prd-R1132100867374-00122787		
+ Upper BodyA.1	A.1	Physical Product	prd-R1132100867374-00122768		
- Lower ChassisA.1	A.1	Physical Product	prd-R1132100867374-00122837		
- FrameA.1	A.1	Physical Product	prd-R1132100867374-00122775		
+ Front FrameA.1	A.1	Physical Product	prd-R1132100867374-00122795		
+ Back FrameA.1	A.1	Physical Product	prd-R1132100867374-00122809		
+ ActuatorExt_...	A.1	Physical Product	prd-R1132100867374-00122793		
+ ActuatorExt_...	A.1	Physical Product	prd-R1132100867374-00122810		
+ FixPart FRA.1	A.1	Physical Product	prd-R1132100867374-00122832		
+ Leg FRA.1	A.1	Physical Product	prd-R1132100867374-00122772		
+ Crawlers_V1_Sy...	A.1	Physical Product	prd-R1132100867374-00122803		
+ FixPart FLA.1	A.1	Physical Product	prd-R1132100867374-00122818		
+ Leg FLA.1	A.1	Physical Product	prd-R1132100867374-00122835		
+ Crawlers_V1_1	A.1	Physical Product	prd-R1132100867374-00122773		

The bottom toolbar of the left window is highlighted with an orange box, showing icons for Home, Tree, Tools, and other functions.

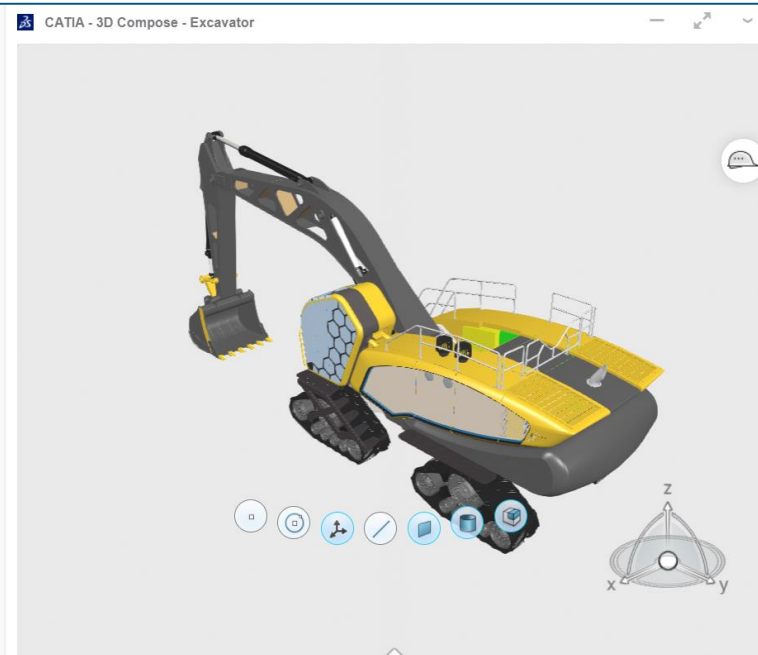
ENGINEERING ITEM

- Editor (PAU)

ENOVIA - Product Structure Editor - Excavator - R1132100867374

Title	Revision	Type	Name	Menu
Excavator	A.1	Physical Product	prd-R1132100867374-00122	
Upper BodyA.1	A.1	Physical Product	prd-R1132100867374-00122	
Upper FrameA.1	A.1	Physical Product	prd-R1132100867374-00122	
Upper_FrameA.1	A.1	Physical Product	prd-R1132100867374-00122	
Frame-Counterwei...	A.1	Physical Product	prd-R1132100867374-00122	
Frame CounterWei...	A.1	Physical Product	prd-R1132100867374-00122	
CounterWeight Act...	A.1	Physical Product	prd-R1132100867374-00122	
CounterWeight Act...	A.1	Physical Product	prd-R1132100867374-00122	
Internal_EquipmentA.1	A.1	Physical Product	prd-R1132100867374-00122	
Moving-Cabin-Assembl...	A.1	Physical Product	prd-R1132100867374-00122	
Body PanelsA.1	A.1	Physical Product	prd-R1132100867374-00122	
CounterWeightA.1	A.1	Physical Product	prd-R1132100867374-00122	

Tools: Edit, View, Tools, Lifecycle, Collaboration, Configuration



ENGINEERING ITEM

- Release Engineer (XEN)

ENOVIA - Engineering Release - Excavator-R1132100867374

Excavator A.1 [Model Version]

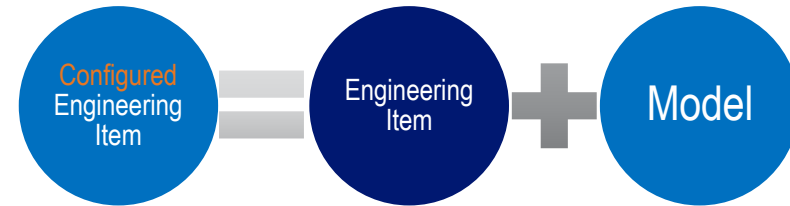
Enterprise Item Number : None Creation Date : 8/10/2020 11:03:47 PM
Owner : Srikanth SANTHANAM Modification Date : 10/27/2020 9:18:22 AM
Maturity State : In Work

3 Items

	Title	Name	Revision	Is Last Revision	Maturity State	Type
1	[-] Upper BodyA.1	prd-R1132100867374-00122768	A.1	✓	In Work	Physical Product
2	[-] Upper FrameA.1	prd-R1132100867374-00122831	A.1	✓	In Work	Physical Product
3	[+] Upper_FrameA.1	prd-R1132100867374-00122885	A.1	✓	In Work	Physical Product
4	[+] Frame-Counterweight_R...	prd-R1132100867374-00122856	A.1	✓	In Work	Physical Product
5	[+] Frame CounterWeight Ac...	prd-R1132100867374-00122871	A.1	✓	In Work	Physical Product
6	[+] CounterWeight Actuator ...	prd-R1132100867374-00122853	A.1	✓	In Work	Physical Product
7	[+] CounterWeight Actuator ...	prd-R1132100867374-00122853	A.1	✓	In Work	Physical Product
8	[+] Internal_EquipmentA.1	prd-R1132100867374-00122801	A.1	✓	In Work	Physical Product
9	[+] Moving-Cabin-AssemblyA.1	prd-R1132100867374-00122778	A.1	✓	In Work	Physical Product
10	[+] Body PanelsA.1	prd-R1132100867374-00122777	A.1	✓	In Work	Physical Product
11	[+] CounterWeightA.1	prd-R1132100867374-00122824	A.1	✓	In Work	Physical Product
12	[+] Lower ChassisA.1	prd-R1132100867374-00122837	A.1	✓	In Work	Physical Product
13	[+] Boom and Arm	prd-R1132100867374-00122776	A.1	✓	In Work	Physical Product

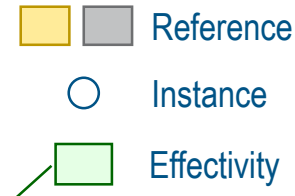
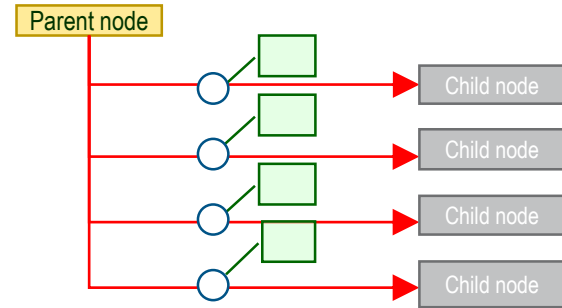
CONFIGURED ENGINEERING ITEM - INTRODUCTION

- **Engineering item** is “**configured**” as soon as it is associated with a **Model** as “Configuration Context”
- **Configured Engineering item** captures the 150% engineering definition for the **Model**
- Only the relevant **variants and options** (associated with this model version) will be available for defining the effectivity **on children**
- Effectivity can be defined either on the:
 - Variant
 - Evolution

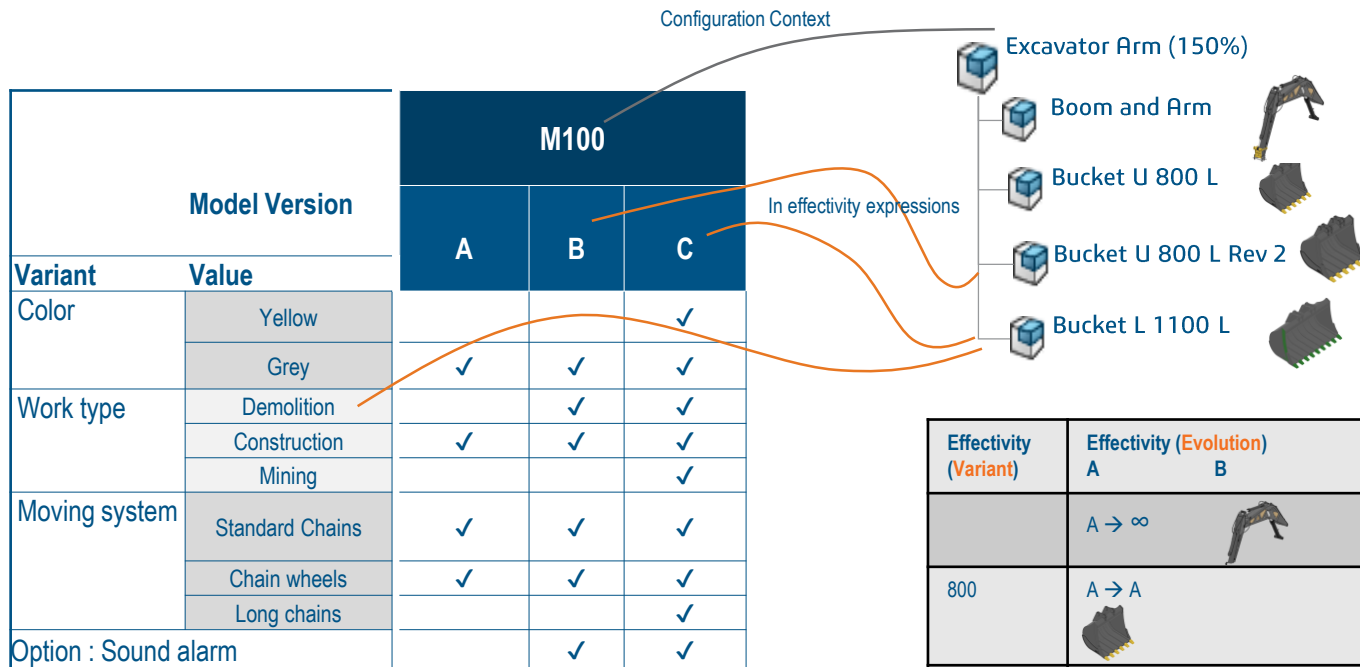






WHAT IS A CONFIGURED STRUCTURE?

- Any Structure can be configured, meaning that we will define an **effectivity** on the instance between the parent node and the child node.
- The **effectivity** is a logical expression (including operators like AND, OR, NOT, ...) using the elements from the **Configuration Dictionary** and defining under which condition a child belongs to a given configuration
- When filtering the structure, a child node will be displayed only if the elements from the Configuration dictionary that have been selected in the filter criteria are validating the effectivity logical expression



CONFIGURED ENGINEERING ITEM - INTRODUCTION



Effectivity (Variant)	Effectivity (Evolution)		
	A	B	C
	A → ∞		
800	A → A		
800	B → ∞		
1100	C → ∞		

XEN USER INTERFACE ENGINEERING RELEASE

XEN – EDIT CONFIGURATION CONTEXT

ENOVIA - Engineering Release - Excavator-R1132100867374

Excavator A.1 [Model Version]

Enterprise Item Number : None
Owner : Srikanth SANTHANAM
Maturity State : In Work

Creation Date : 10/27/2020 10:00
Modification Date : 10/27/2020 10:00

3 Items

	Title	Name	Revision	Is Last Revision
1	Upper Body	prd-R1132100867374-00140186	A.1	✓
2	Lower Chassis	prd-R1132100867374-00140187	A.1	✓
3	Boom and Arm	prd-R1132100867374-00140188	A.1	✓

- Maturity
- Revisions
- Revision Explorer
- New Revision
- New Branch
- New Revision From
- Duplicate
- Compare
- Delete
- Reserve
- Unreserve
- Move to
- Share
- Update content revisions
- Set Enterprise Item Number
- Relations
- Export
- Subscriptions
- Edit Configuration Context**

Edit Configuration Context - Excavator



No configuration context is attached

Close

Edit Configuration Context - Excavator

Activated Criteria : Model Version, Variants and Options

Model100

Srikanth SANTHANAM
2020-10-27

Close

Edit Configuration Context - Excavator

Activated Criteria : Model Version, Variants and Options

Evolution

- ☒ Model Version
- ☐ Date
- ☐ Unit

Variability

- ☒ Variants and Options



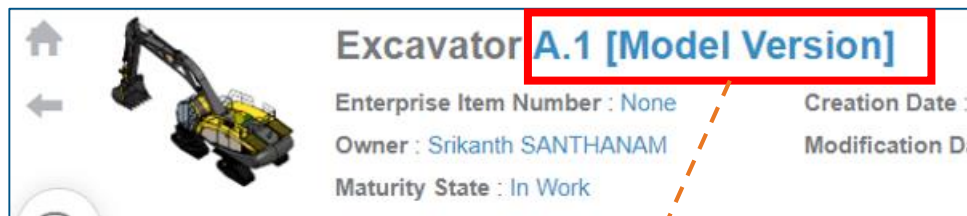
Model100

Model100 | Srikanth SANTHANAM
Preliminary | 2020-10-27

Close

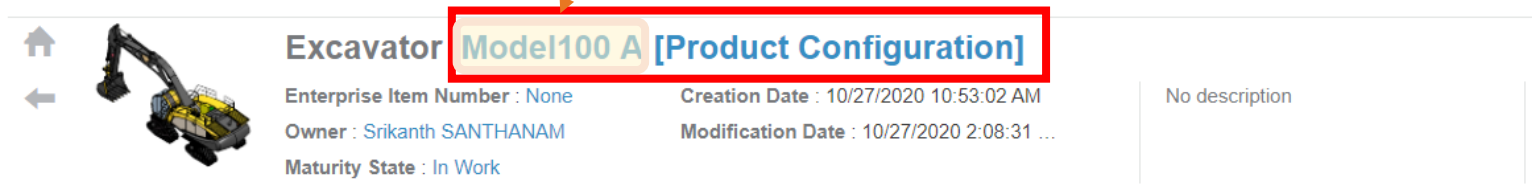
XEN – VISUAL QUES

- Un-configured Engineering Item displays EI Revision



- Configured Engineering item displays “Model Version / Prod Cfg”

ENOVIA - Engineering Release - Excavator-R1132100867374



XEN – VISUAL QUES

- Configured Engineering item displays “Model Version / Prod Cfg”

ENOVIA - Engineering Release - Excavator-R1132100867374

Excavator **Model100 A [Product Configuration]**

Enterprise Item Number : None
Owner : Srikanth SANTHANAM
Maturity State : In Work

Creation Date : 10/27/2020 10:53:02 AM
Modification Date : 10/27/2020 2:08:31 ...

No description

To apply other MV

To view or select model version thru revision explorer

To apply a PC context

Revision Explorer

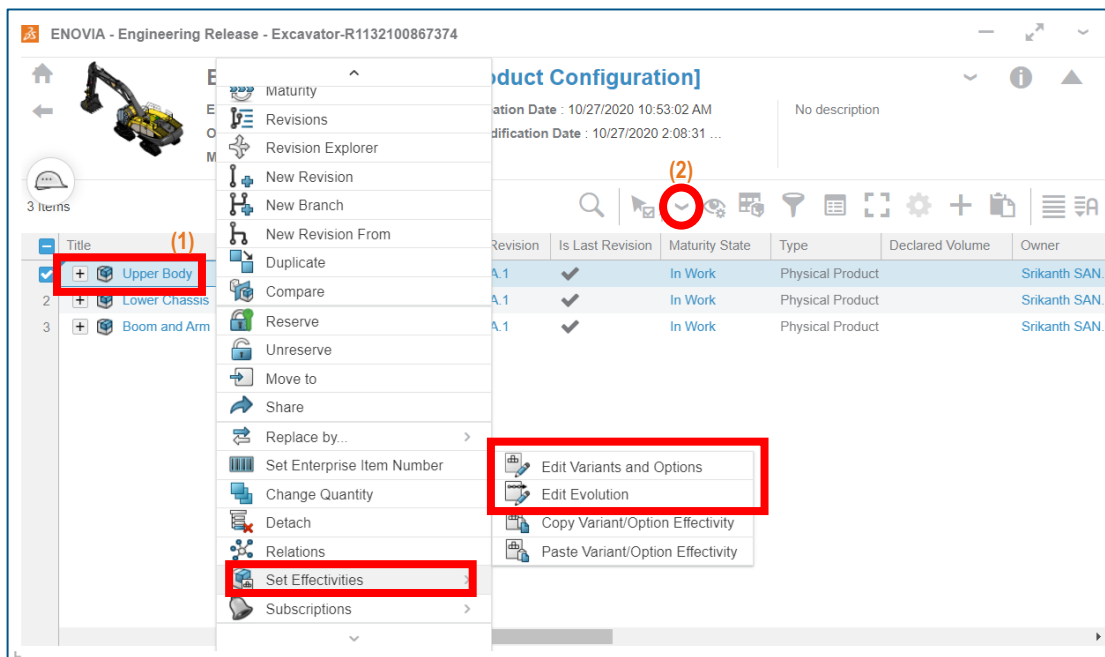
Evolution filter view: ☒ Official View ☐ Projected View

Graph	Title	Revision	Maturity
<input type="checkbox"/>	Model100	C	Prelimr
<input type="checkbox"/>	Model100	B	Prelimr
<input checked="" type="checkbox"/>	Model100	A	Prelimr

Open
Properties

XEN – EDIT EFFECTIVITIES (EVOLUTION / VARIANT)

- Same UI as in PAU



XEN – VISUAL QUES

- Effectivity in “information” tab or column displays

ENOVIA - Engineering Release - Excavator-R1132100867374

Excavator Model100 A [Product Configuration]

Enterprise Item Number : None Creation Date : 10/27/2020 10:53:02 AM
Owner : Srikanth SANTHANAM Modification Date : 10/27/2020 2:08:31 ...
Maturity State : In Work No description

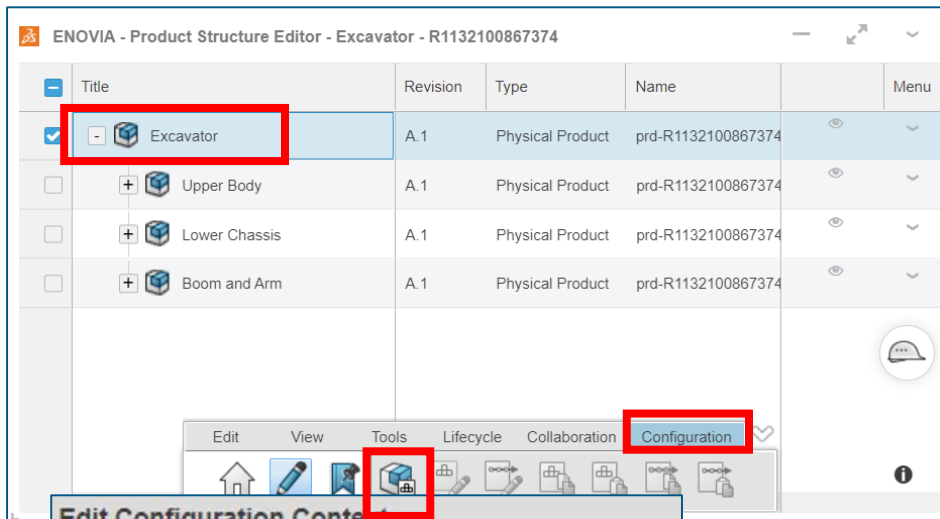
3 Items

	Title	Variant/Option	Current Evolution	Title	Modification D...	Configuration
1	Upper Body	Model100: Exc-WorkType[Exc-Construction]	Model100: Model version Model100-A<	Upper Body.1	10/27/2020 10...	
2	Lower Chassis	None	None	Lower Chassis.1	10/27/2020 10...	
3	Boom and Arm	None	None	Boom and Arm.1	10/27/2020 10...	

PAU USER INTERFACE

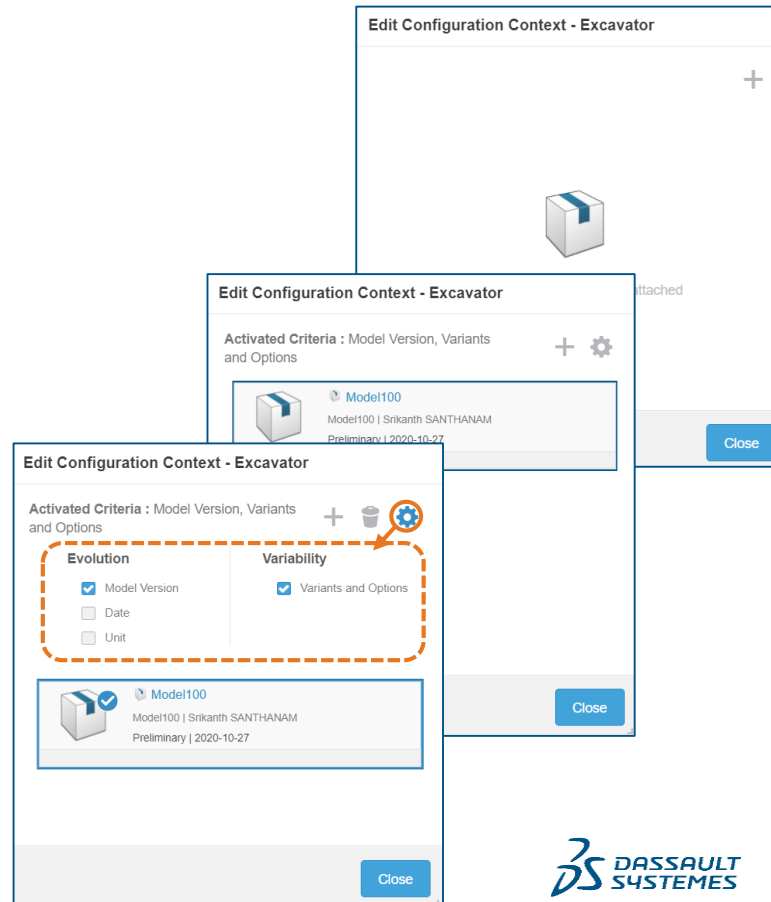
PRODUCT STRUCTURE EDITOR

PAU – EDIT CONFIGURATION CONTEXT



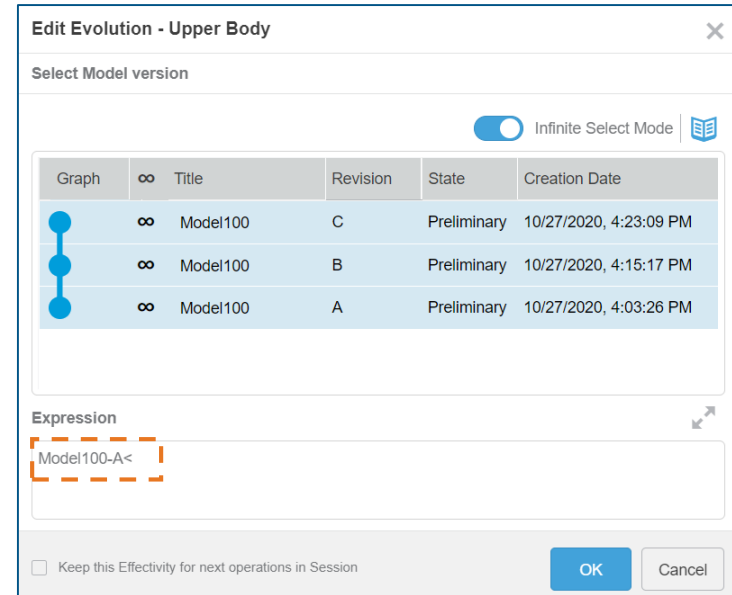
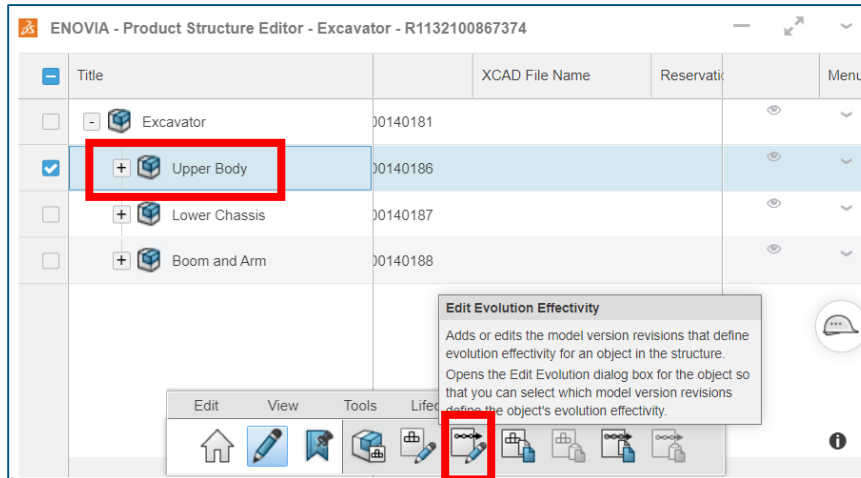
Edit Configuration Context

Adds or removes a model as a configuration context.
Opens the Edit Configuration Context dialog box for the object so that you can add or remove a model as its configuration context.



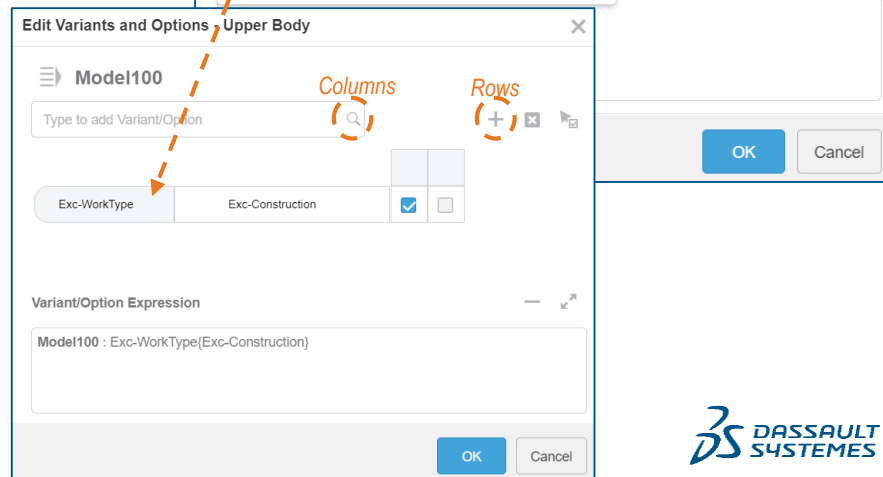
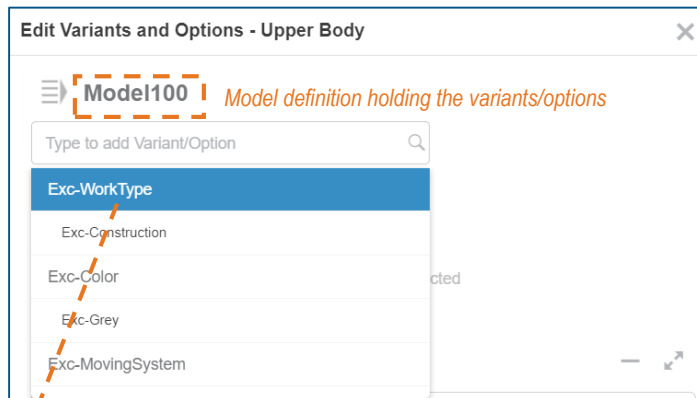
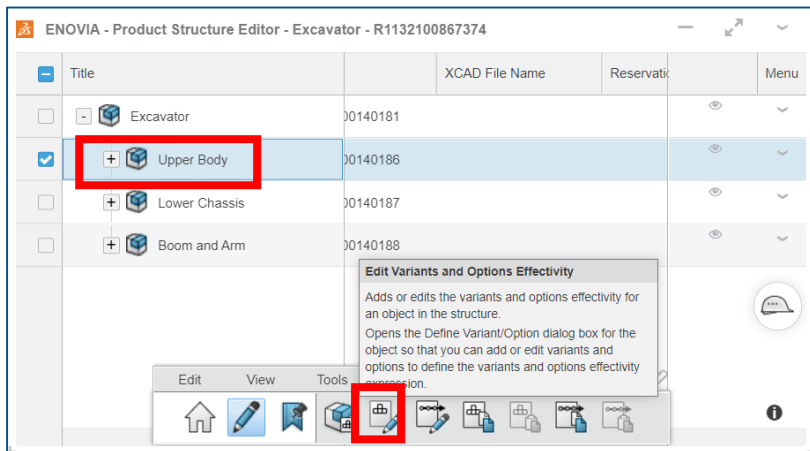
PAU – EDIT EFFECTIVITY - EVOLUTION

- Evolution – Range or not,..



PAU – EDIT EFFECTIVITY - VARIANT

- Variants – Values, Options



FILTER BY CONFIGURATION CRITERIA

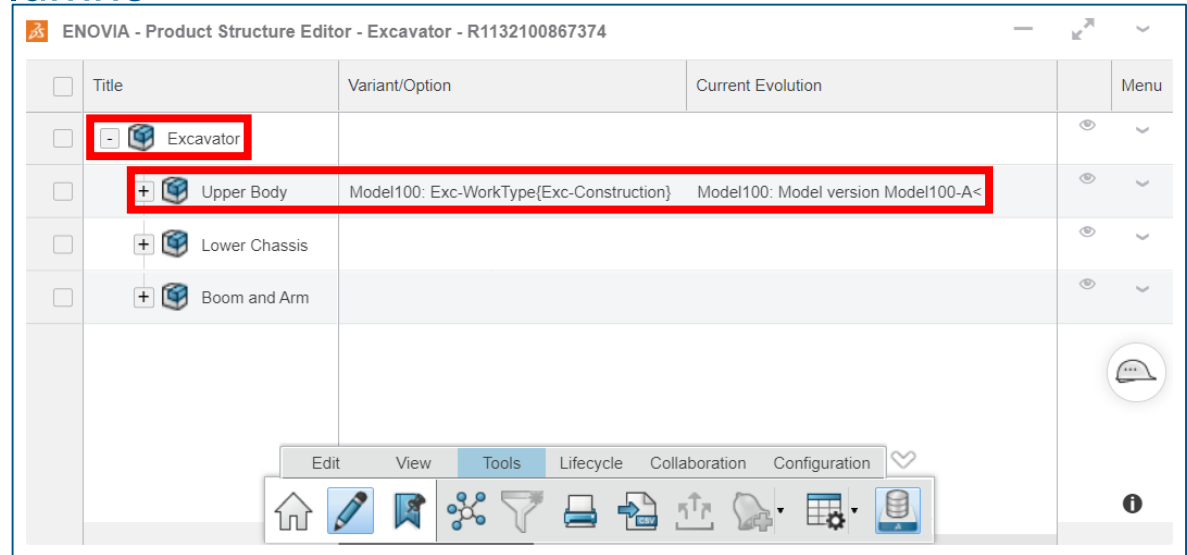
The screenshot displays the ENOVIA Product Structure Editor and CATIA 3D Compose interface for an excavator model. The left panel shows the 'Filter specification' for 'Filter-51', which applies to the 'Excavator' model. Under the 'Configuration' section, 'Model Model100' is selected. The 'Evolution' section shows 'Official View' and 'Projected View' options. The 'Model version' section is highlighted with a red box, showing 'Model100-C' selected. The 'Variants and Options' section is also highlighted with a red box, showing a search icon. The central panel shows the product structure tree with the following items:

Item	Title	Title	Posi	Menu
<input checked="" type="checkbox"/>	Excavator			
<input type="checkbox"/>	Upper Body	Upper Body.1		
<input type="checkbox"/>	Lower Chassis	Lower Chassis.1		
<input type="checkbox"/>	Boom and Arm	Boom and Arm.1		

The right panel shows the 3D model of the excavator in CATIA 3D Compose. The bottom toolbar of the ENOVIA interface is visible, with the 'Tools' tab selected and the 'Filter' icon highlighted with a red circle.

PAU – VISUAL QUES


- No visual que if configured or not
- Effectivity display in columns






BEST PRACTICES - SOLUTION DESIGN

CONFIGURED ENGINEERING ITEM - LIFECYCLE

- ! Lifecycle is managed on the Model Version, not on the Configured Engineering Item

 ENOVIA - Engineering Release - Excavator-R1132100867374



Excavator **Model100 A [Product Configuration]**

Enterprise Item Number : None Creation Date : 10/27/2020 10:53:02 AM
Owner : Srikanth SANTHANAM Modification Date : 10/27/2020 2:08:31 ...
Maturity State : In Work

No description

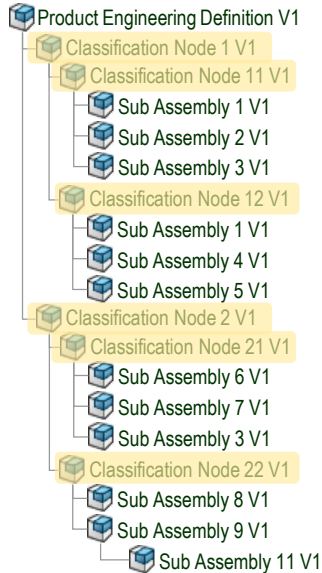
- ! Effectivity on the instance cannot be modified once the MV is Released (wrt to Released MV)

Why to revise a Model version

- Evolve the offering
- Evolve the design to meet the offering

FLAT STRUCTURE APPROACH - SUMMARY

Typical structures often seen at customers

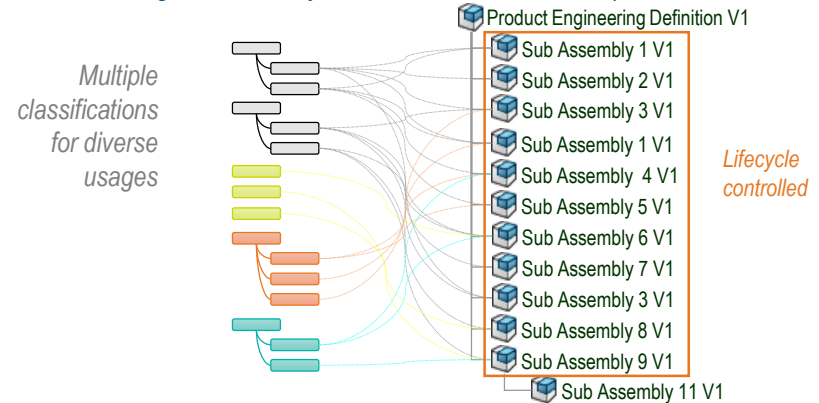


Pains

- **Single classification** : preventing to organize along different classifications according to the various disciplines needs
- **Mixing lifecycle data and grouping nodes** : complexifying management and understandability on the data
- **[Technical** : Complex engineering relation management (path depth)]

“Flat” Structure approach

(aka. An engineering data organization pattern in which lifecycle controlled nodes are managed differently than classification nodes)

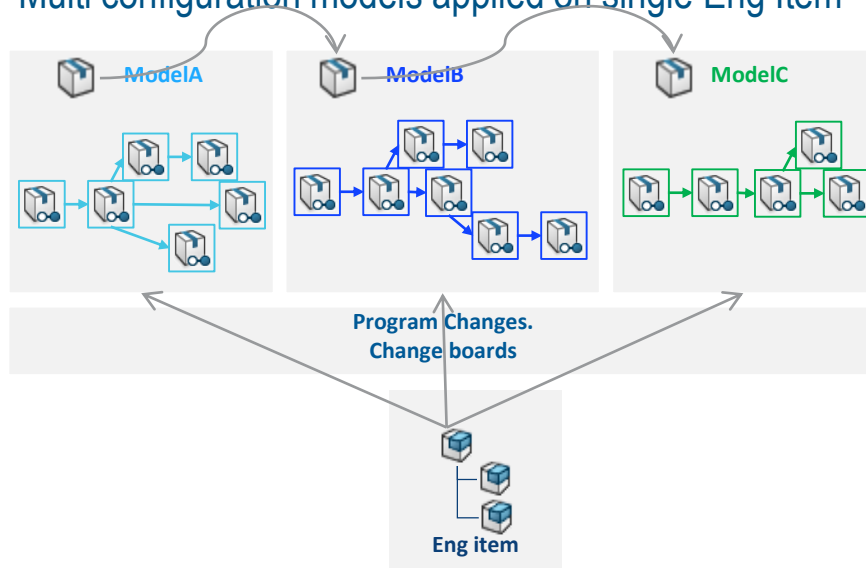


Values

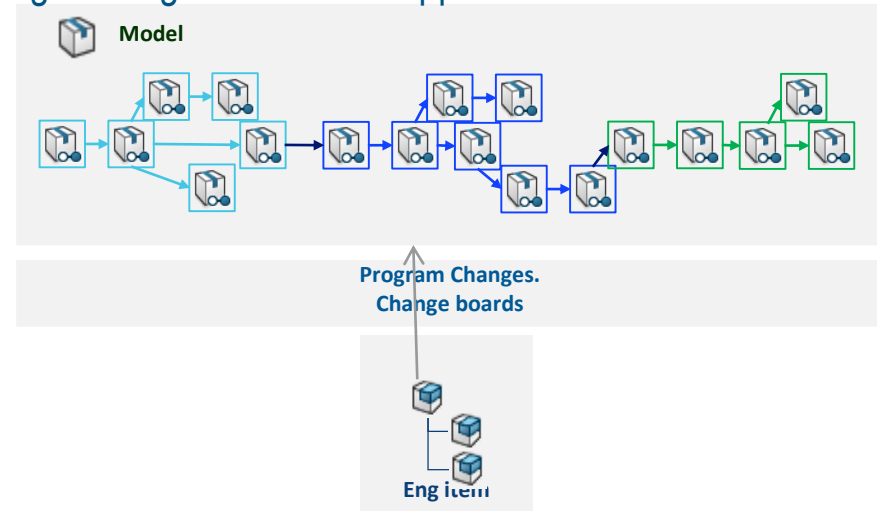
- **Multiple classifications** : allowing to organize along different needs and allow multi-angle criterias filtering (ex: zone + function + maturity)
- **Clear identification of lifecycle data** : allowing users to understand governance processes (responsibilities, release process, ...)
- **Simplified configuration management** : modifying/adding classification doesn't break data integrity
- **Simplified structure** : clear list of design components to be consumed by downstream (manufacturing, ...) [technical + paths simplification]

SINGLE MODEL APPROACH: SUMMARY

Multi configuration models applied on single Eng Item



Single configuration model approach



Pains

- **Multiple change process:** Multiple governance authority to drive a single definition
- **Multi model Effectivity:** requires modifying the validated effectivities to reuse definition content on a new model
- **Navigation on configuration in a single model only:** prevent building 150% authoring session (across models) that would enable to maximize commonality

Values

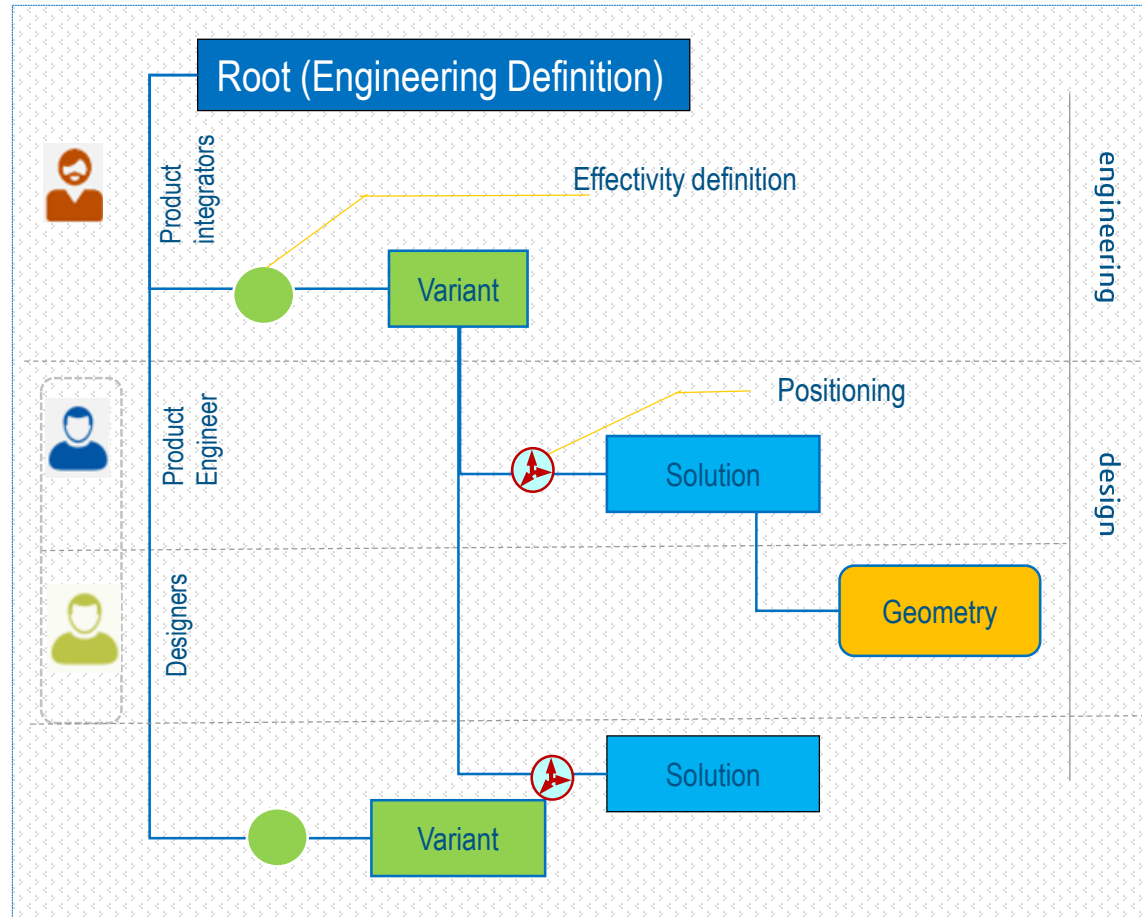
- **Clear identification of the lifecycle management authority :** allowing program to drive the evolution in a single genealogy tree. Change applicability can be defined with one/multiple versions
- **Model Version graph:** branching enables to initiate a new derivative with no modification of the definition
- **Navigating on multi versions (multi-branch) :** enabling authoring in 150% sessions to maximize commonality
- **Single source to drive downstream:** Flexible allocation to planned units

VARIANT NODE

- Responsibility is shared between:
 - **Product Integrators** – working on the engineering level definition
 - Effectivity definition of the variants in the context of the root (150%)
 - **Product Engineer/Designers** – working on the design (geometry) and position level in the context of the variants

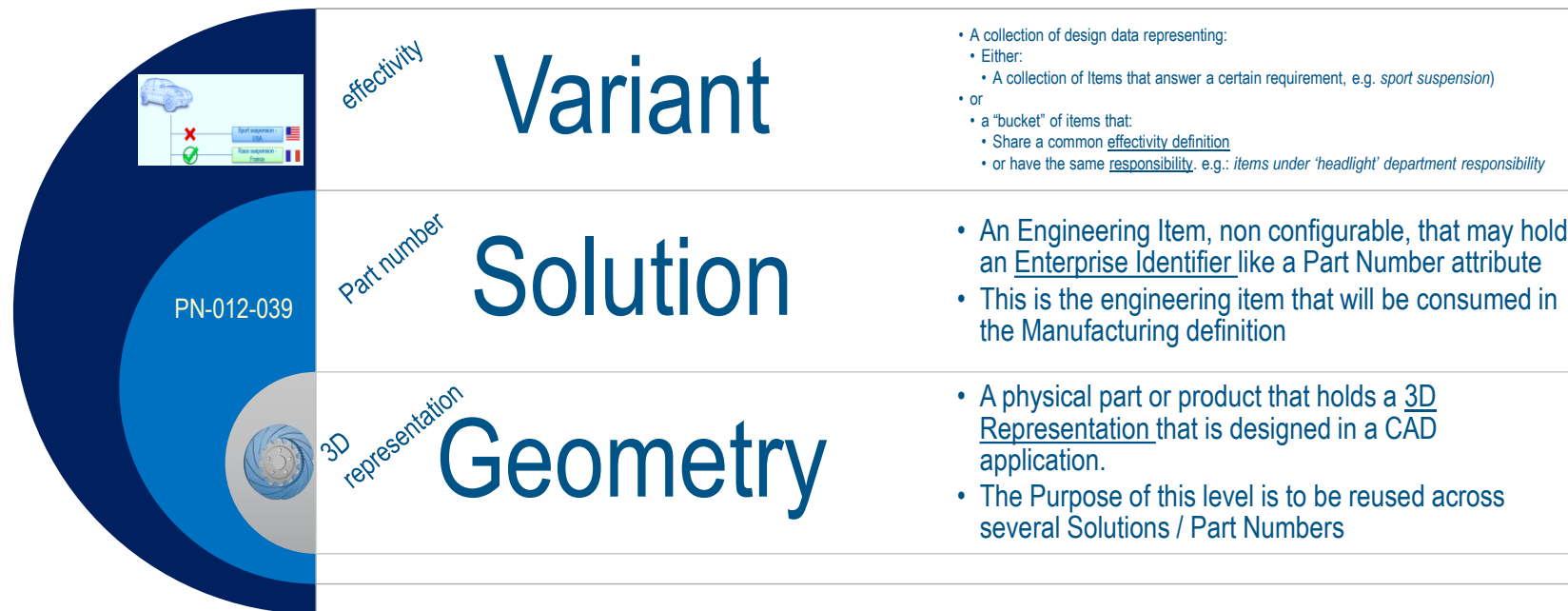


Depending on the size of the company, the designer and product engineer might be the same person



Solution -> components

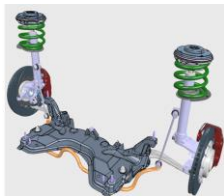
VARIANT / SOLUTION / GEOMETRY



Solution -> components

EXAMPLE

Variant: Race suspension



Variant

Solution

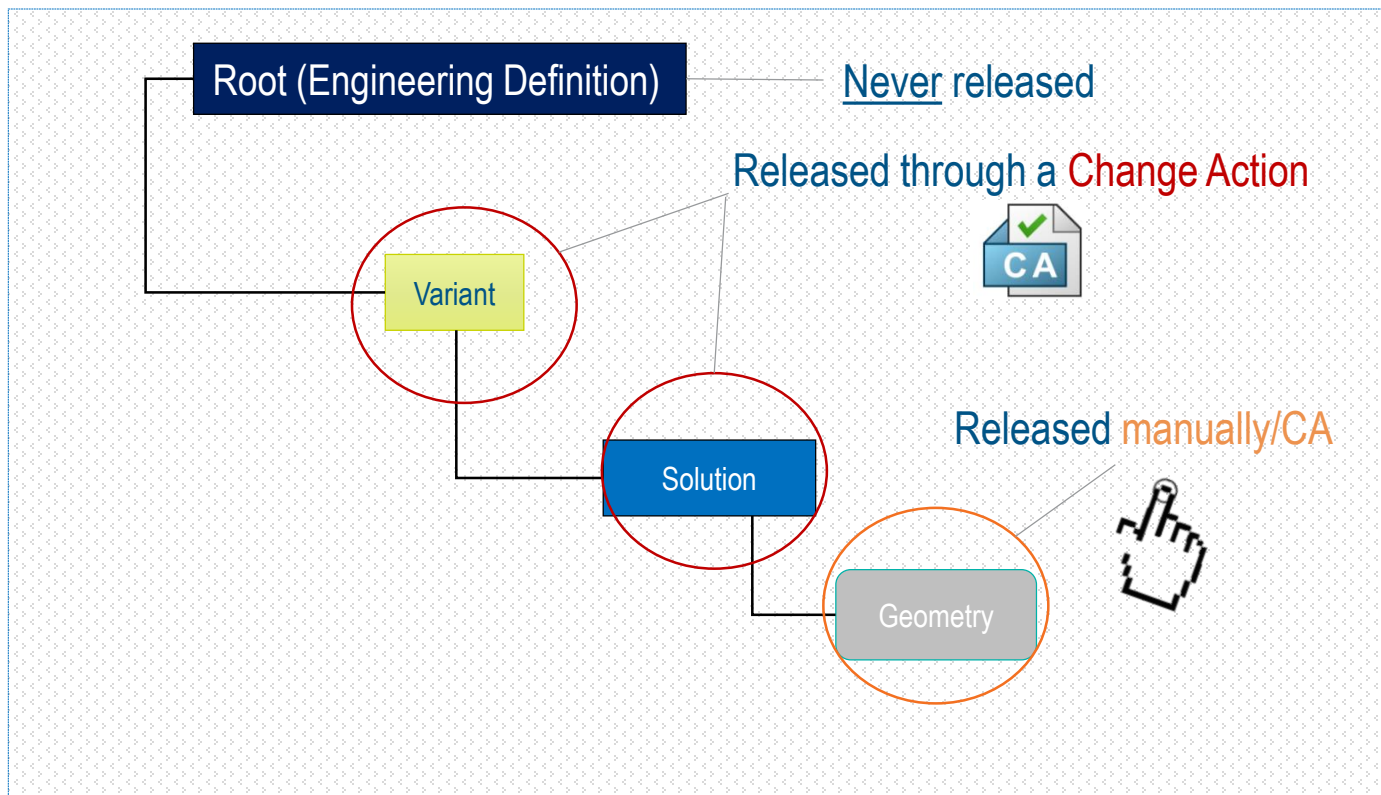
Geometry

Geometry

-	Delivery		Physical Product
-	Race_Variant_Suspension Module - Front	Race_Variant_Suspension Module - Front.1	Physical Product
+	Solution_Frame	Solution_Frame.2	Physical Product
+	Solution_Knuckle	Solution_Knuckle.1	Physical Product
+	Solution_Strut	Solution_Strut.1	Physical Product
-	Race_Solution_Caliper	Solution_Caliper.1	Physical Product
+	Loaded Caliper Front Left Race	Loaded Caliper Front Left Race.1	Physical Product
+	Loaded Caliper Front Right Race	Loaded Caliper Front Right Race.1	Physical Product
-	Race_Solution_Brake Disk	Solution_Brake Disk.1	Physical Product
+	BrakeDisk Front Left Race	BrakeDisk Front Left Race.1	Physical Product
+	BrakeDisk Front Right Race	BrakeDisk Front Right Race.1	Physical Product

Solution -> components

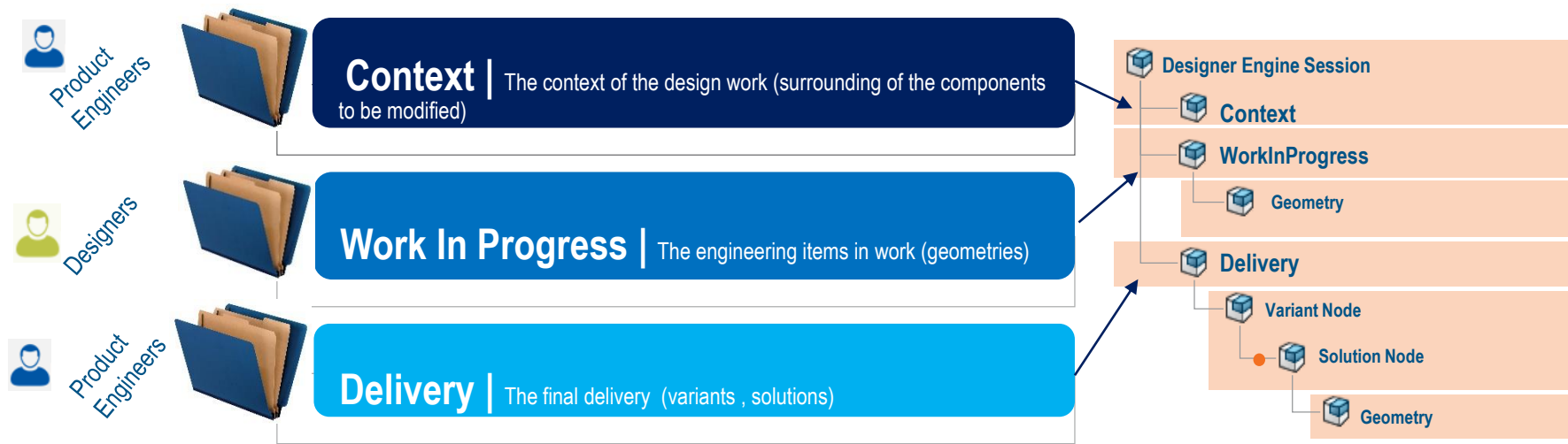
RELEASE



Solution -> components

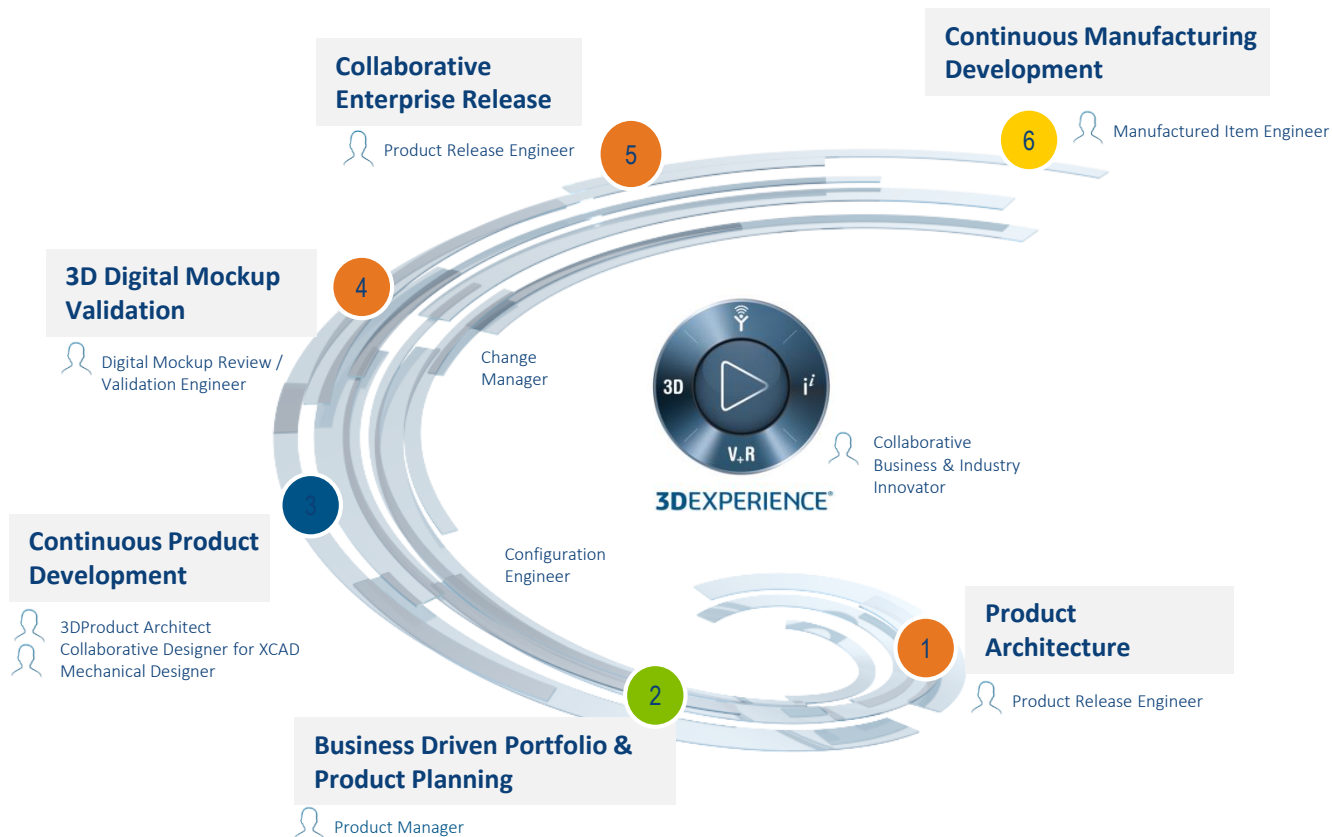
DESIGNER ENVIRONMENT

- Designer Environment is a way to organize the work of all users (integrators, engineers, designers)



USE CASE SCENARIOS

INDUSTRY PROCESSES – PRODUCT DEVELOPMENT



CLAES SLIDE

SHORT DEMO INTRODUCTION

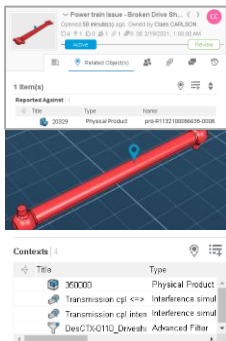
HIGH LEVEL STEPS

For recording changes...

1+n Issues



- Issues can be reported by all.
- Change Actions can be created from Issues



1+n Change Action



- Change Actions with proposed changes
- Dependencies
- Applicability
- Members

Realized Changes



- “Work Under” will record changes

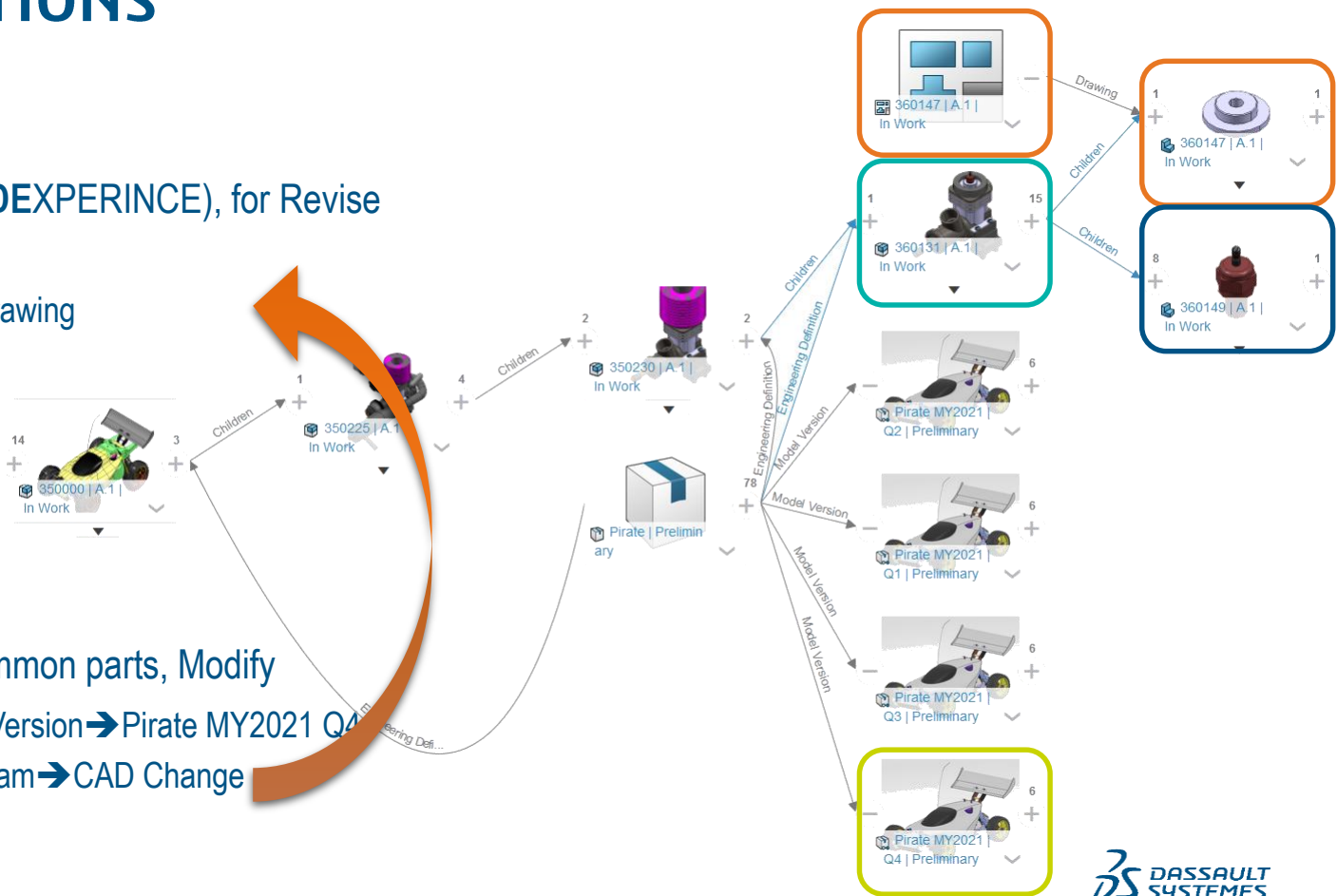
2 CHANGE ACTIONS

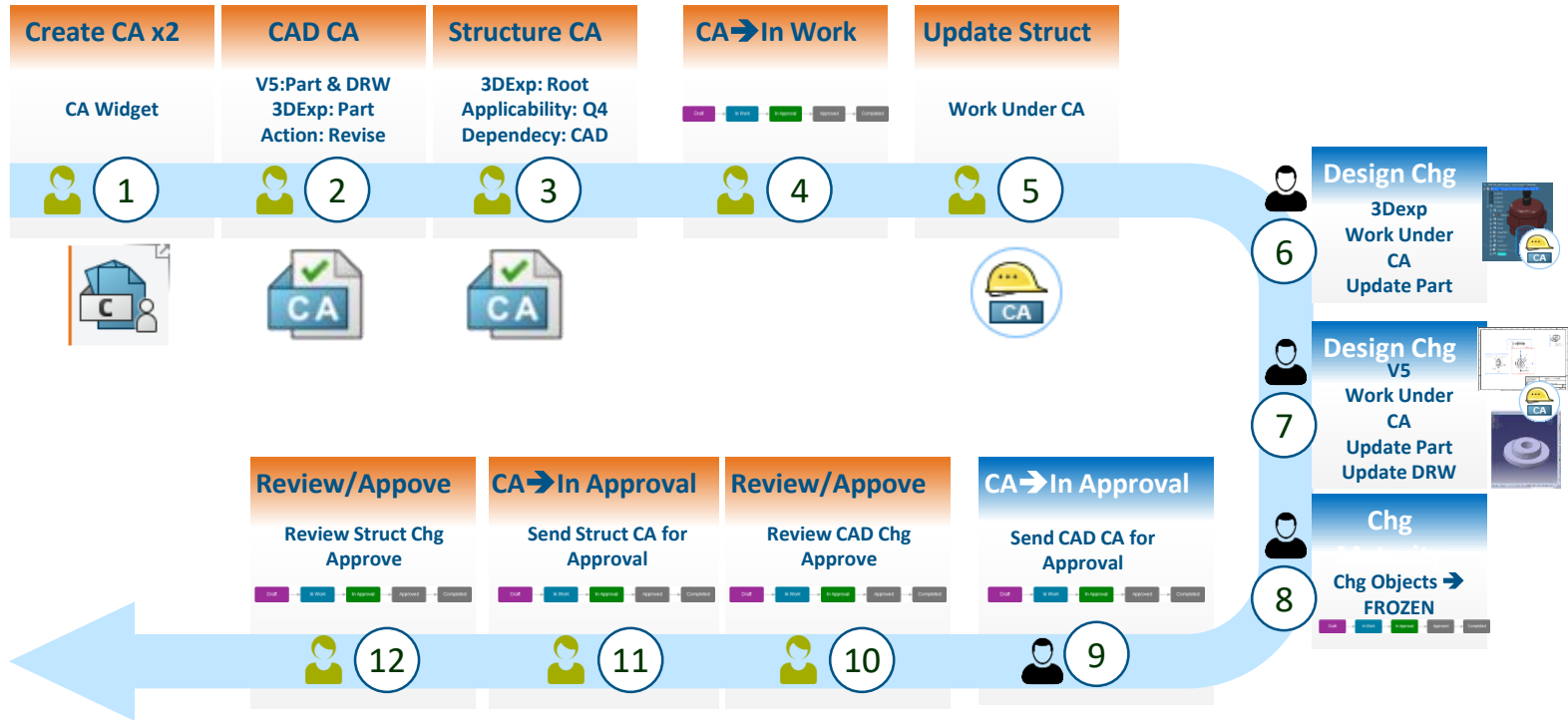
With dependency

- CAD Change (V5 + 3DEXPERENCE), for Revise
Proposed Changes:

- V5, CatPart and CatDrawing
- 3DEXPERENCE, Part

- Structure Update, Common parts, Modify
- Applicability → Model Version → Pirate MY2021 Q4
- Dependency → Upstream → CAD Change





Program/Product Manager



Product Integrator



Review Manager



Product Engineer



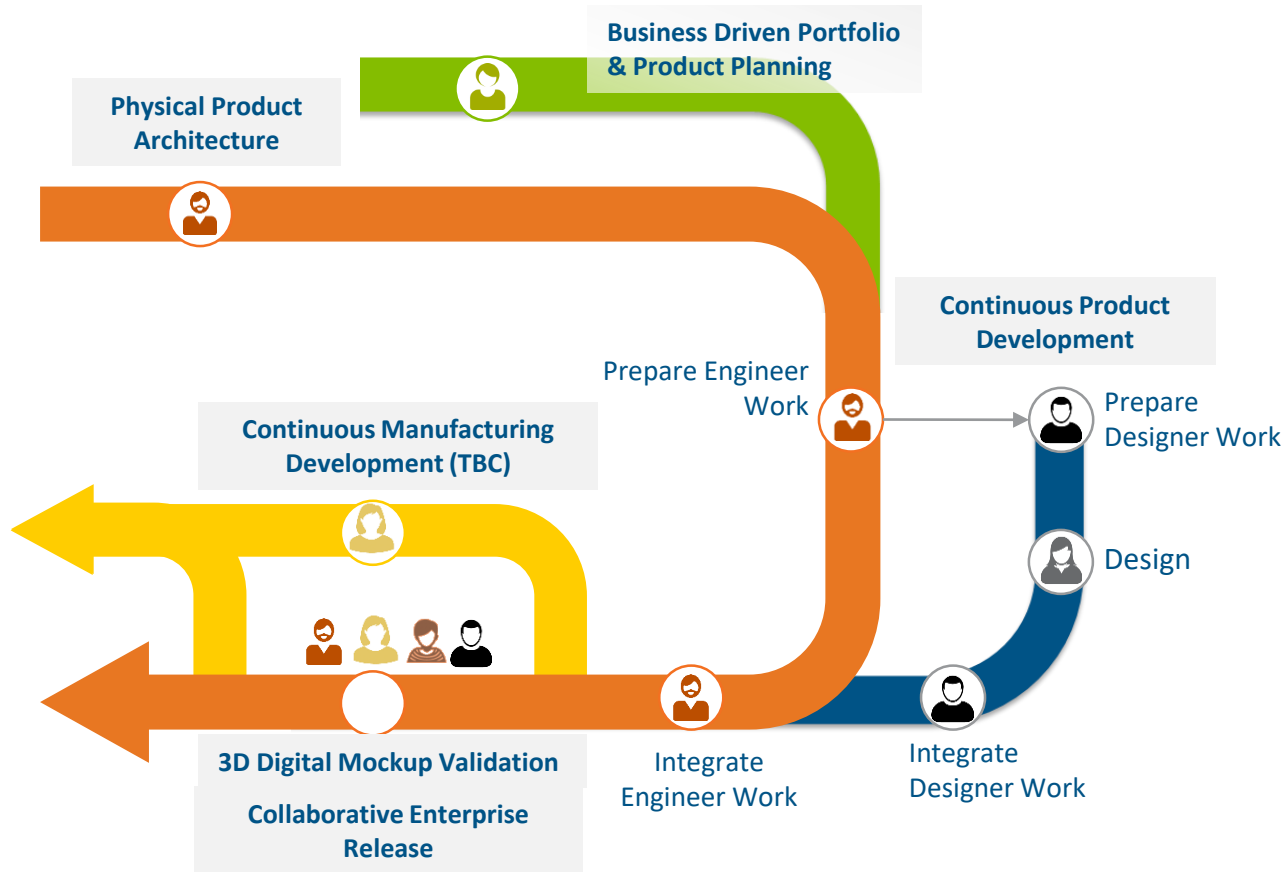
Packaging Engineer
Design Engineer
Electrical Engineer
Simulation Engineer



Manufacturing Engineer



USECASES



Program/Product Manager



Product Integrator



Review Manager



Product Engineer



Packaging Engineer
Design Engineer
Electrical Engineer
Simulation Engineer



Manufacturing Engineer

Engineering Definition Initialization and update

Carry over existing engineering definition or **create new**

Modify Engineering Definition

- Update attributes massively (i.e. Make_Buy_intent, node type)
- Add part numbers
- Add engineering items, Add documents

Portfolio definition

Define New Model Version and Marketing Rules (**)

Prepare Engineer Work



Apply **Evolution** effectivities (Product States) on Engineering Items



Apply **Variant** or **Option** effectivities on Engineering Items (**)

Engineering Definition
IN WORK

Model Version
IN WORK

Engineering Definition
RELEASED under Change



Engineering Definition
Manually FROZEN

Engineering Definition Completion



Prepare Designer's Environment



Initiate 3D definitions in Designer's environments



Deliver Solutions with 3D Definitions
Integrate them in Engineering Definition
Freeze Design

Manufacturing

Final Manufacturing Items definition, based on Released engineering definition

Release under Change Management

Validate & complete the change Action

Promote 3D Definitions to release maturity status

Create a change action for release process

Manufacturing

Early Manufacturing Items Definition taking benefits from make/buy preparation (if attribute is defined)

Review and Reports Generation

Analyze CAD Readiness, Maturity

Access and Review 150% (**) Engineering Definition

Apply 100% filter and review (**)

leader

leader



14



13



12



11



10



9



8



7



Program/Product Manager



Product Integrator



Review Manager



Product Engineer

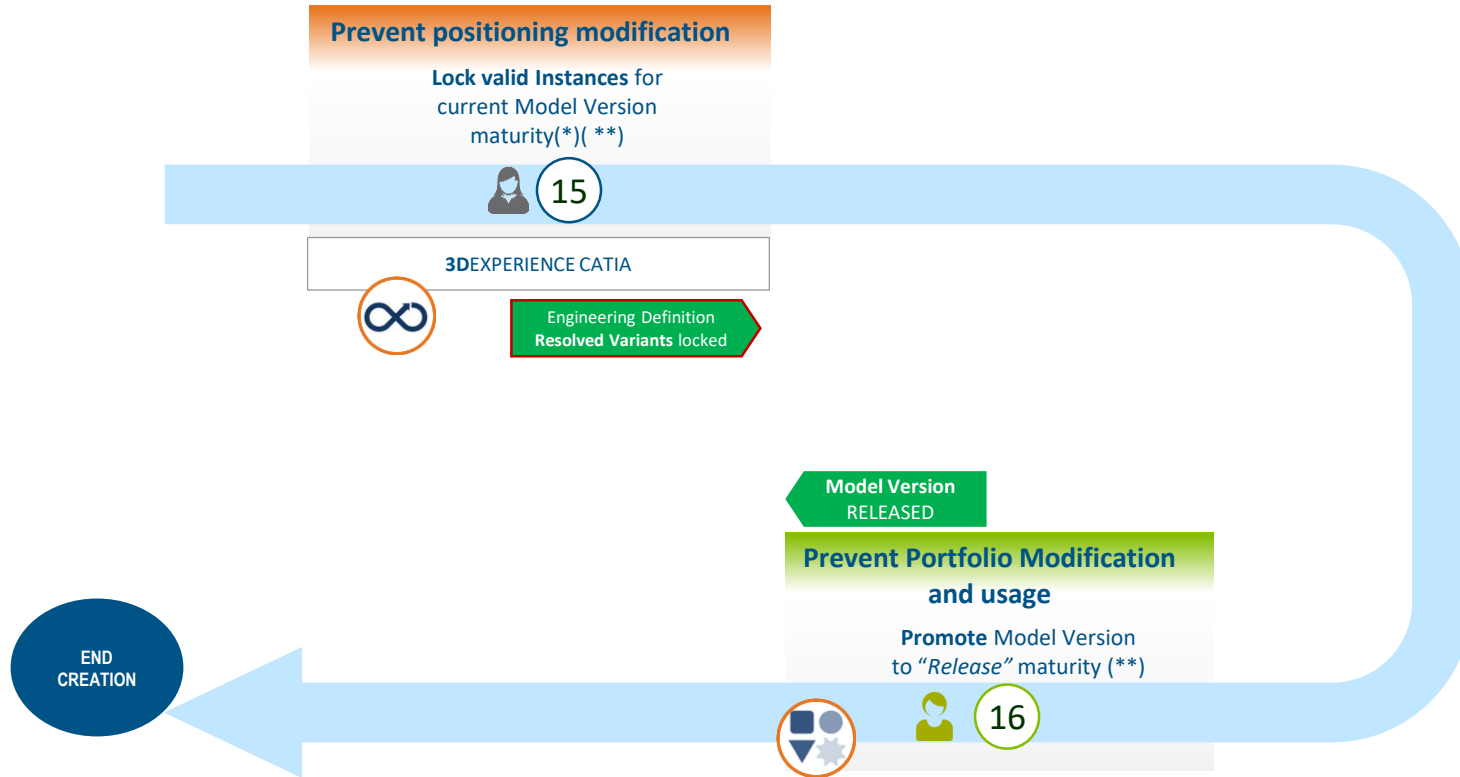


Packaging Engineer
Design Engineer
Electrical Engineer
Simulation Engineer



Manufacturing Engineer

** If Configuration is requested



Program/Product Manager



Product Integrator



Review Manager



Product Engineer



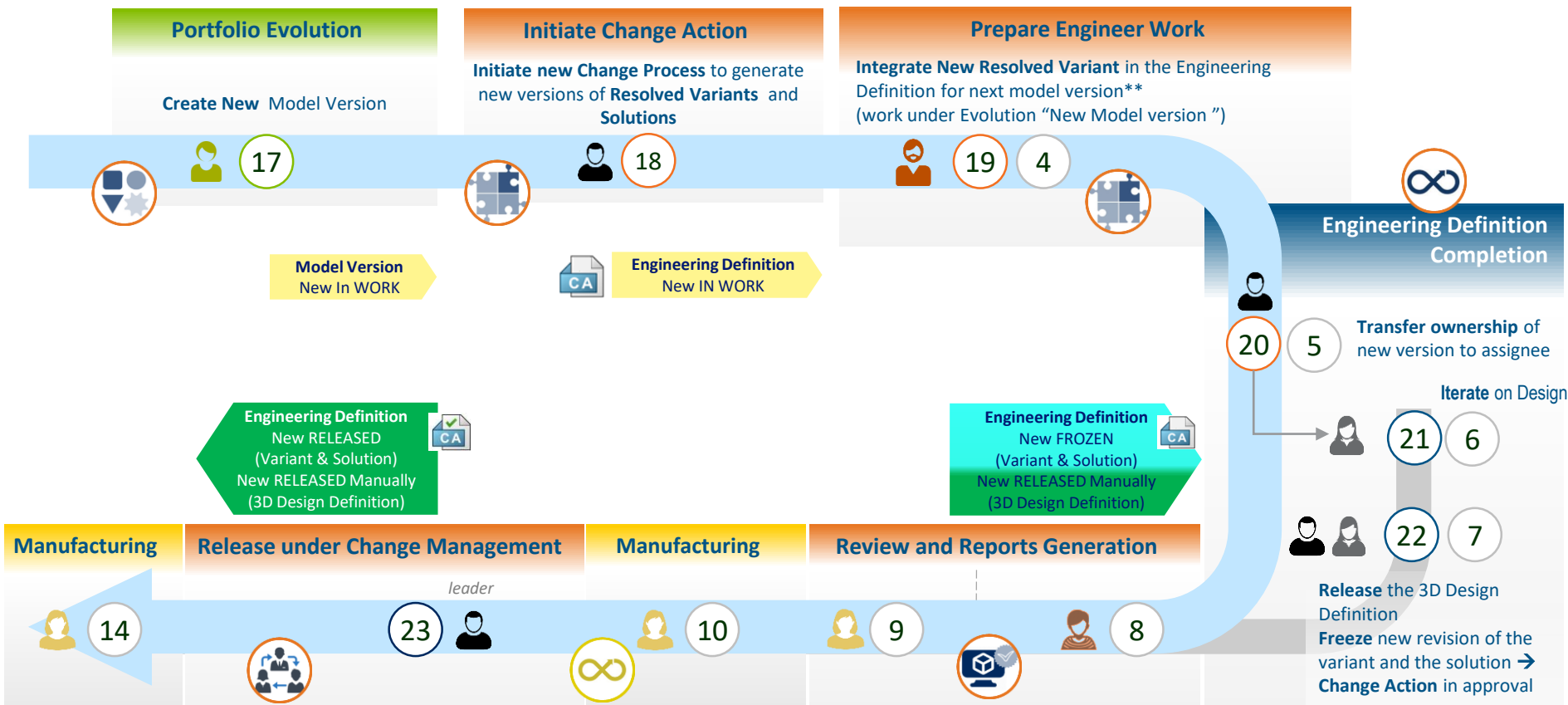
Packaging Engineer
Design Engineer
Electrical Engineer
Simulation Engineer



Manufacturing Engineer



**** If Configuration is requested**



Program/Product Manager



Product Integrator



Review Manager



Product Engineer



Packaging Engineer
Design Engineer
Electrical Engineer
Simulation Engineer



Manufacturing Engineer



Similar as
previous

** If Configuration
is requested

Engineering Definition Initialization and update

Business & Industry Innovation
Product Release Engineer



1



2

Portfolio definition

Business & Industry Innovation
Product Manager



3

Prepare Engineer Work

Business & Industry Innovation
Product Release Engineer
Configuration Management (**)



4

Engineering Definition Completion

Business & Industry Innovation
3D Product Architect
Mechanical Designer
3D Component Designer
Configuration Management (**)



5

6

7



8

Review and Reports Generation

Business & Industry Innovation
Configuration Management (**) to create new filters
Design Reviewer - Design Review Manager(Native)
Report Generator

3D Markup Engineer



9

Manufacturing

Business & Industry Innovation
Manufacturing Items Manager
Change Management
Configuration Management (**)



10

Release under Change Management

Business & Industry Innovation
Product Release Engineer
Change Management
Configuration Management (**)

leader

leader



13



12



11

Manufacturing

Business & Industry Innovation
Manufacturing Items Manager
Change Management
Configuration Management (**)



14



Program/Product Manager



Product Integrator



Review Manager



Product Engineer

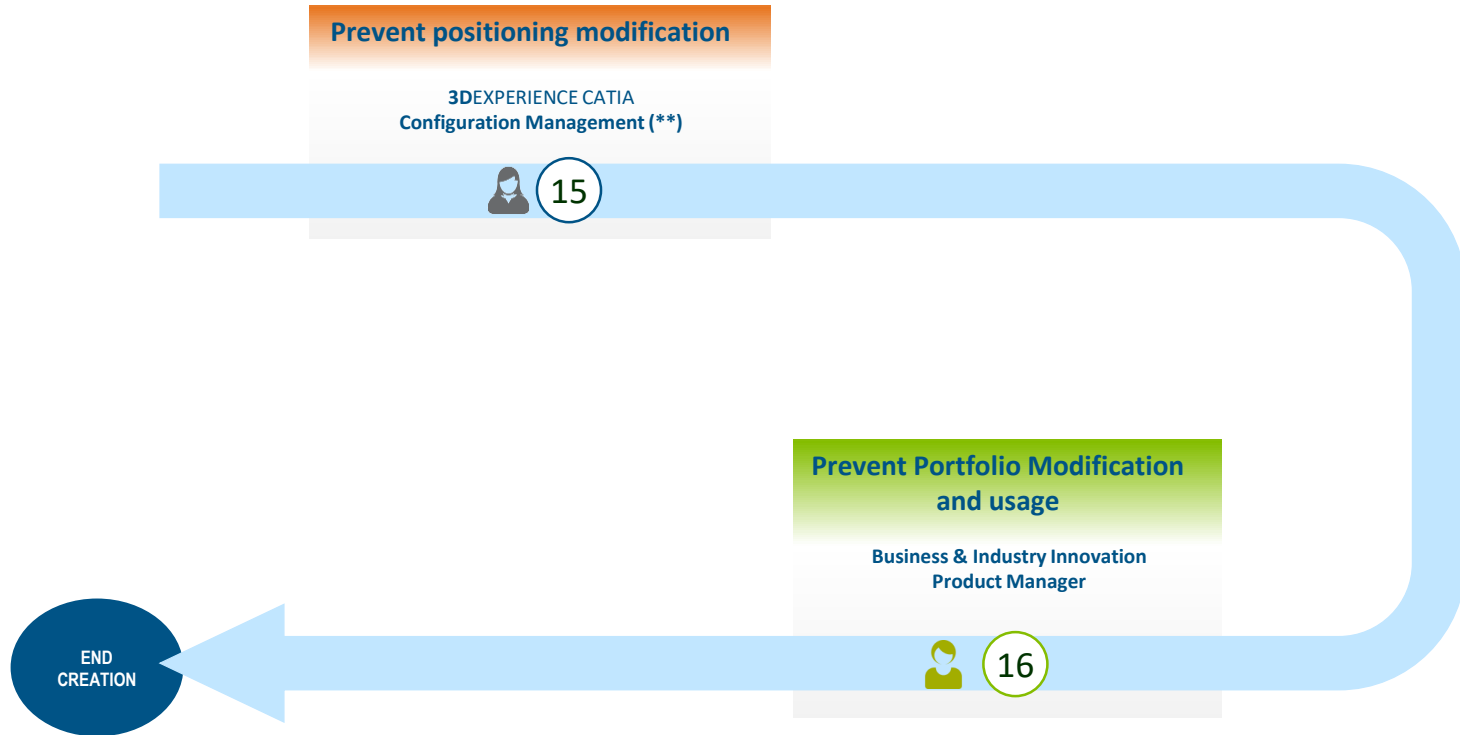


Packaging Engineer
Design Engineer
Electrical Engineer
Simulation Engineer



Manufacturing Engineer

** If Configuration is requested



Program/Product Manager



Product Integrator



Review Manager



Product Engineer



Packaging Engineer
Design Engineer
Electrical Engineer
Simulation Engineer



Manufacturing Engineer



**** If Configuration
is requested**

Portfolio Update

Business & Industry Innovation
Product Manager



17

Initiate Change Action

Business & Industry Innovation
Change Management



18

Prepare Engineer Work

Business & Industry Innovation
Product Release Engineer
Configuration Management (**)

19

4



Manufacturing

Business & Industry
Innovation
Manufacturing
Items Manager
Change
Management
Configuration
Management (**)



14

Release under Change Management

Business & Industry Innovation
Product Release Engineer
Change Management
Configuration Management (**)

23



leader

Manufacturing

Business & Industry
Innovation
Manufacturing Items
Manager
Change Management
Configuration
Management (**)



10

Review and Reports Generation

Business & Industry Innovation
Configuration Management (**) to create new filters
Change Management
Design Reviewer - Design Review Manager(Native)
Report Generator



9

3D Markup Engineer



8

Engineering Definition Completion

Business & Industry Innovation
3D Product Architect
Mechanical Designer
3D Component Designer
Change Management
Configuration Management (**)

5

20



21

6

22

7



Program/Product Manager



Product Integrator



Review Manager



Product Engineer



Packaging Engineer
Design Engineer
Electrical Engineer
Simulation Engineer



Manufacturing Engineer



Similar as
previous

** If Configuration
is requested



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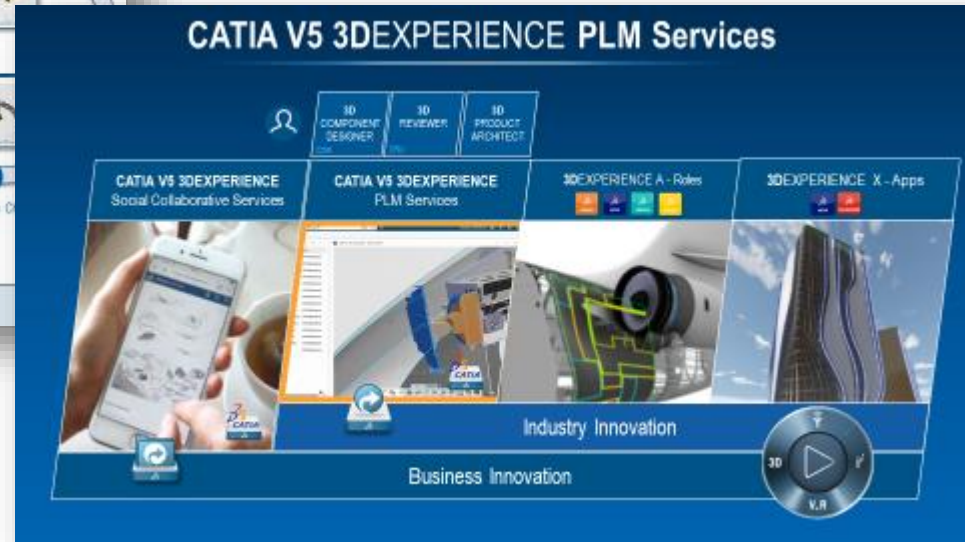
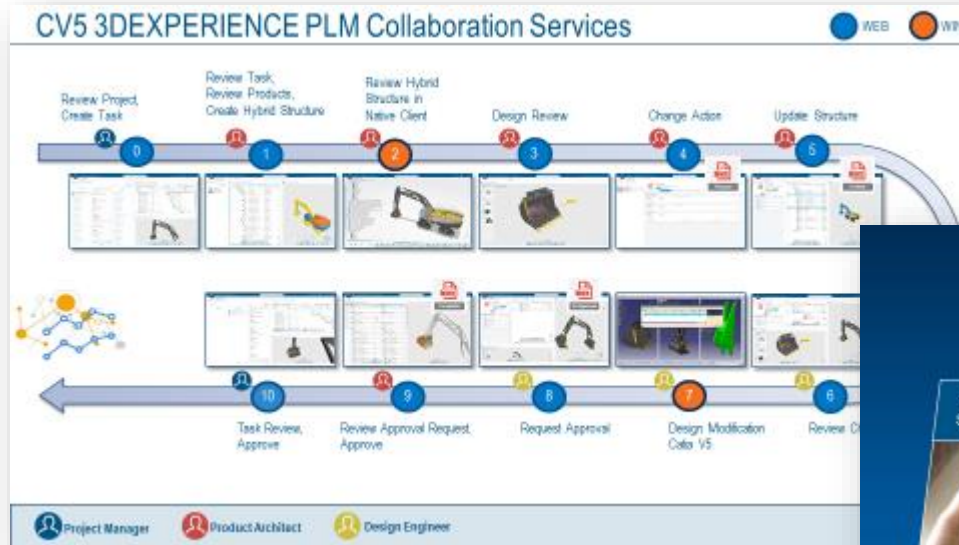
WHAT HAS BEEN SHOWN @ SCAF

Svenska CATIA & 3DX Användareföreningen

2018-2021

 **DASSAULT
SYSTEMES** | The 3DEXPERIENCE® Company

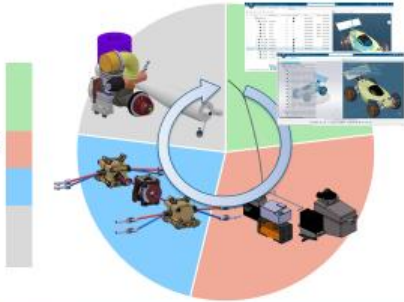
APRIL 2018, EXCAVATOR V5 & 3DEXPERIENCE



MAY 2019, V5, SOLIDWORKS & 3DEXPERIENCE

Agenda

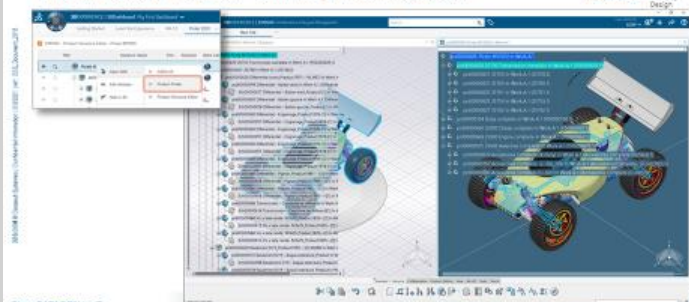
- ▶ Bakgrund
- ▶ Design environment
- ▶ Design SOLIDWORKS
- ▶ Design CATIA V5
- ▶ Design CATIA 3DX
- ▶ Design Context 3DX



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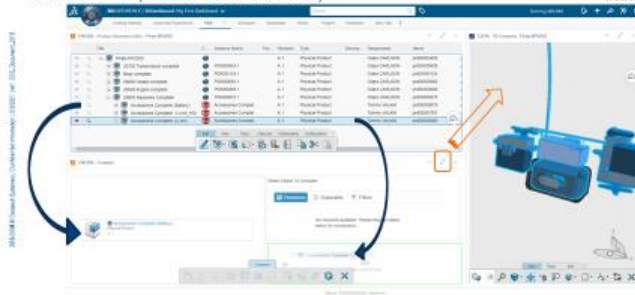
Hela strukturen / geometrin öppnad i Native Apparna:
"ENOVIA Product Finder" och "CATIA 3DX Assembly Design"



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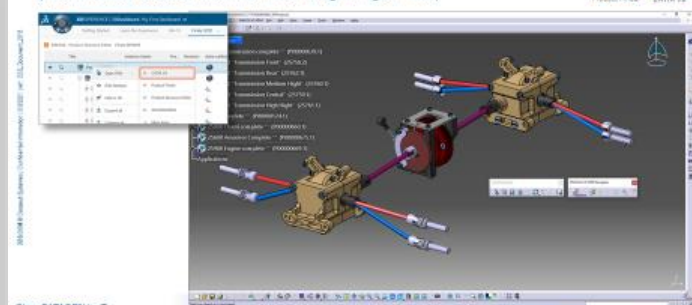
"Compare" på Batteri strukturer
DnD från PSE (Product Structure Editor)



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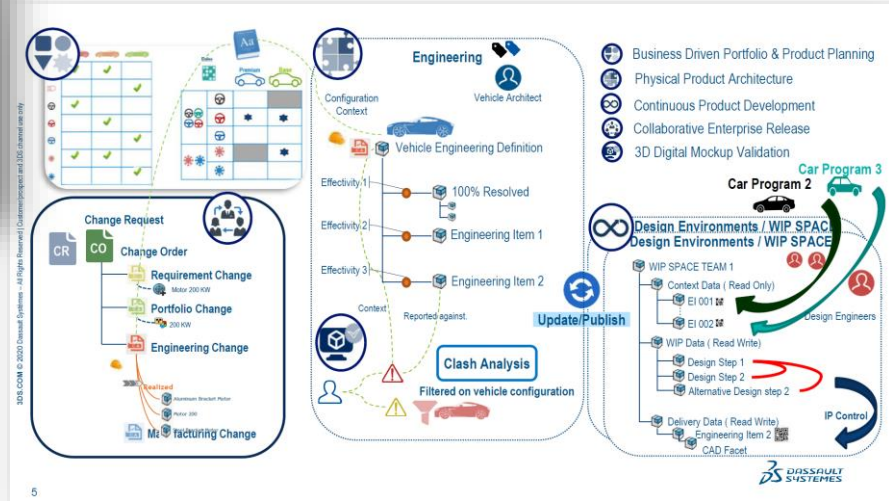
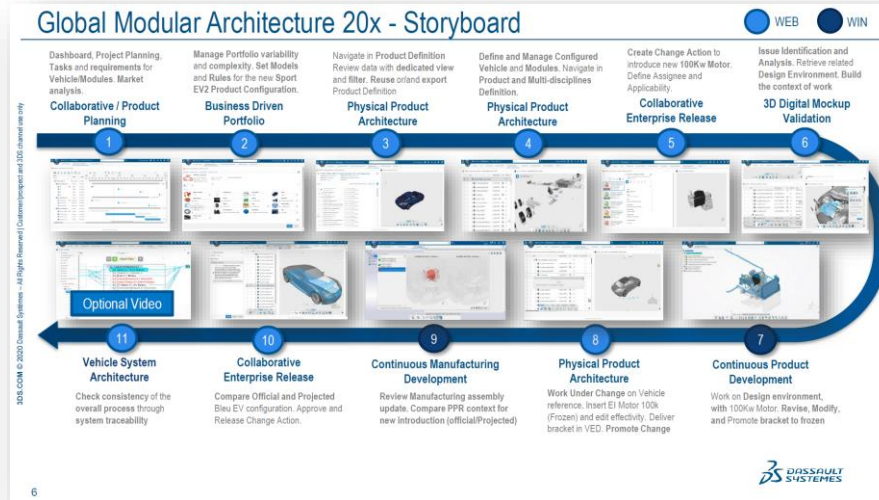
Hela strukturen / geometrin öppnad i CATIA V5:
(I kommande releaser kommer även omgivningen med)



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OCTOBER 2020, GMA



The context

The screenshot displays the SolidWorks Product Structure Editor (PSE) interface. The main window shows a list of components with columns for Name, Description, Status, Rev, and Date. The components are organized into a tree structure on the left. The right-hand panel contains several icons and labels: 'Compare', 'Model Definition', 'Collaborative Life', and 'Product Structure Editor'. The interface is designed for managing product structure and assembly relationships.

The scenario?

21xFO04

Compass

Model Definition

Collaborative Life

Product Structure Editor

SOLIDWORKS

Issue Management

21xFO04

