PTC® Live Global

CUST321 - Whether Bottom up or Top down, - Let PTC Windchill do the heavy lifting…..

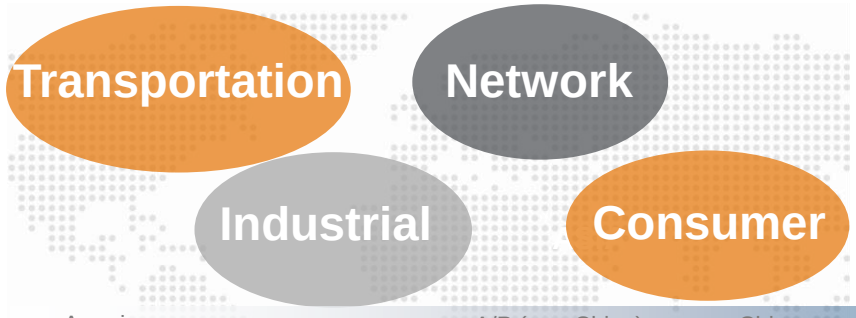
Jay Nallani
Lead Business Analyst

PTC Live 2015, Nashville, TN
Date: Wednesday, June 10
Time: 11:30 AM – 12:15 PM

A WORLD LEADER IN CONNECTIVITY

- Solving connectivity challenges with the broadest range of products
- Engineering driven, customer focused
- Leveraging technology innovations across industries

GLOBAL SCALE AND STRENGTH



Americas	EMEA	A/P (non-China)	China
10 design centers	5 design centers	3 design centers	3 design centers
38 mfg. sites	33 mfg. sites	12 mfg. sites	16 mfg. sites
2,375 engineers	1,700 engineers	950 engineers	1,880 engineers

$13.3B SALES WORLDWIDE

LEADING WITH INNOVATION

For the third consecutive year, Thomson Reuters recognized TE as a Top 100 Global Innovator. This distinction recognizes our commitment to innovation.

2013 THOMSON REUTERS
TOP 100
GLOBAL INNOVATORS

7,000
ENGINEERS AROUND THE GLOBE

18,000+
PATENTS GRANTED OR PENDING

24%
OF SALES FROM NEW PRODUCTS INTRODUCED OVER THE LAST THREE FISCALYEARS

$675M
MILLION INVESTED IN R&D AND ENGINEERING

JAY NALLANI

- Lead Business Analyst at TE Connectivity
- 15 Plus years of industry experience (Automotive, Technology, Electronics)
- Areas of Specialty: CAD Data Management, Engineering Bill of Materials, Implementing PDMLink Solutions, Production Support & Project Management.
- **Internet Presence:** LinkedIn
- **Hobbies**: Boy Scouts, Soccer Coach, Bollywood Music Choreography and Playing Drums.

Agenda

- PDMLink Objects and Design Strategy Definitions
- When to use these design strategies ?
- Interaction with respect to *CAD* design & Design Challenges
- Demo – Top down design of a Connector
- Lessons learned

Expectation/Takeaways

1. A better understanding of bottom-up and top-down design strategies.
2. How to use Windchill design strategies to eliminate design headaches?
3. Understand the techniques and tools to manage design strategies within your Organization/Team ?

PTC® Live Global

PDMLink Objects and Design Strategy Definitions

What PTC Windchill PDMLink Objects do we have to begin with ?

PTC Live Global

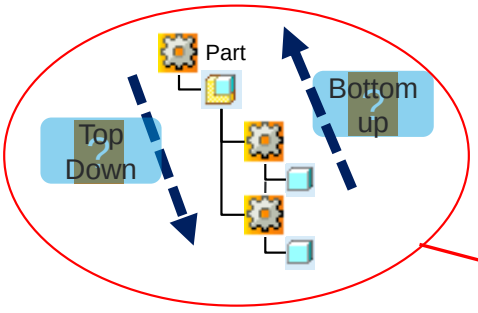
WTParts

EPMDocs

WTDocs

CAD Models

CAD Drawings



Associating or Linking various Objects builds the design.

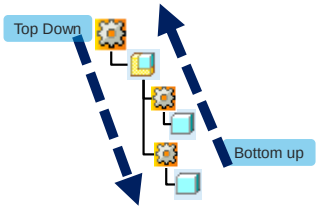
PTC Windchill PDMLink Design Strategies Presentation Focus

Out of scope: CREO Methodology and usage of PTC CREO Skeleton Assemblies

Definitions – PTC Windchill PDMLink Design Strategies

PTC Live Global

The Process of designing products and managing product data using Windchill requires the use of specific design methodologies and techniques. Windchill supports 3 different design strategies.



✓ *1. Bottom-Up design*

CAD-driven (bottom-up) design is the traditional methodology used to create a product structure and has been a mainstay for product data management using Windchill.

✓ *2. Top-Down design*

Top-down design is a methodology best practice typically used for creating large multidisciplinary product assemblies.

3. Design-in-Context

Design-in-context is a special Windchill technique that enables you to effectively filter a very large product structure and reduce it to a selection of components.

When to use these three design strategies ?

Bottom-Up, Top Down & Design-in-Context

When do I use these three different Design Strategies ?

PTC® Live Global

The methodology employed usually depends on the

- Physical size of the product design
- Complexity of the product design
- Geographic organization of the enterprise involved.

Bottom-Up design	Top-Down design	Design-in-Context
➢ Simple design ➢ Immediate requirement to define geometry or placement of components ➢ Mostly Owner Associations between CAD Structure and Part Structure.	➢ No need to define geometry or placement of components. ➢ Immediate requirement to define high level product structure framework. ➢ Tasks can be delegated to teams that are geographically dispersed across the enterprise.	Modifying few data sets in a Large CAD Assemblies.

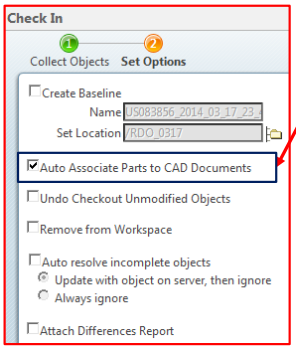
Interaction with respect to *CAD* design

Bottom-up design basics

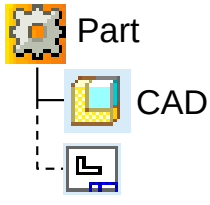
Auto-Associate during Check-in *(Bottom-up design basics)*

PTC® Live Global

1. Create CREO CAD Model and Drawing
2. Check-in to Windchill PDMLink



3. During Check-in, select “Auto Associate Parts to CAD Documents” to create associations.



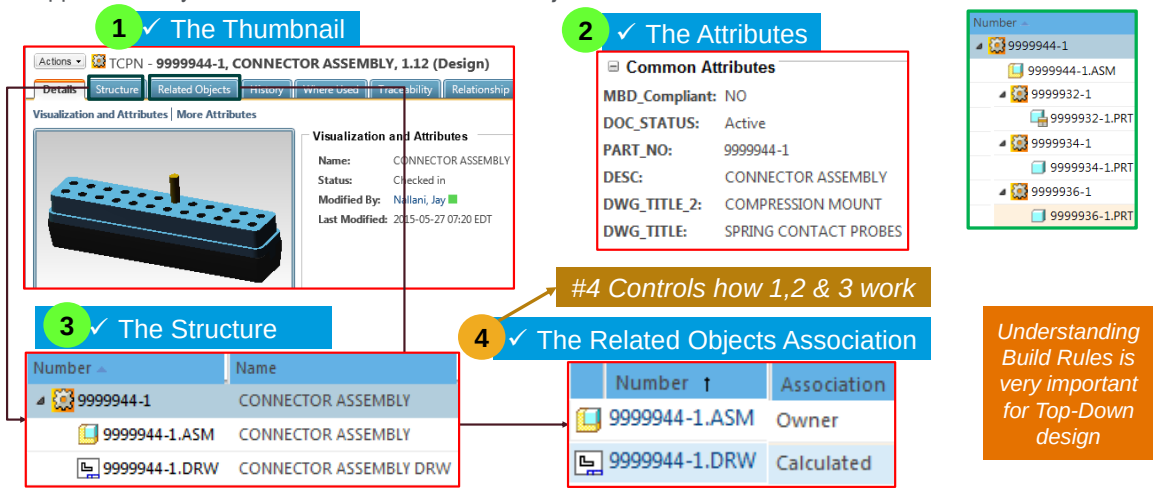
CAD Model - Owner Association, Drawing – Calculated Association

TE Standard Practice is to use Check-in with Auto-Associate

Auto-Associate during Check-in *(Bottom-up design basics)*

PTC Live Global

What happens when you associate a Part with a CAD Object ?



The usage of these **buildi**ng blocks for creating relationships between CAD and Parts must follow the above **rules**.

15

PTC Windchill PDMLink Design Strategies - Workflow

PTC Live Global

Bottom-Up design	Top-Down design	Design-in-Context
Create CAD Assembly/Part Models and Save to Workspace	Define a Conceptual Enterprise Product Structure Framework	Navigate to the Full Product Part Structure
Check Models into Commonspace	Add Non-Geometric Business Data to the Enterprise Parts	Filter the Part Structure
Compare CAD and Part Structures	Create CAD Document Templates and Add CAD Start Parts to Enterprise Structure.	Create a Configuration Context
Review Model Information in Windchill	Check Out and Build CAD Assemblies/Parts and Check In to Compare Structures.	Verify the Configuration Context
Check out/Check in Models as needed to Initiate Design Changes	Validate, Finalize and Release Enterprise Product Structure.	Create a Design Context
TIME X	TIME Y	TIME Z

Question:
If you have Windchill 10x, where does the CREO work begin with respect to Bottom-Up & Top-Down ?

16

PTC Windchill PDMLink Design Strategies - Challenges

PTC Live Global

Some business units take CAD centric approach, few try to take top-down design approach.

Bottom-Up design	Top-Down design	Design-in-Context
TIME X	TIME Y	TIME Z

Challenges

1. How to choose a design strategy for a project ?
2. How to handle geographically located resources ?
3. Ideas for new products are dumped on engineering groups that are already busy and are unable to deliver new designs …….
4. Pressure to increase sales driving the company to launch new products at unprecedented rates.
5. Companies are impacted by forces from all directions, but it all comes down to execution. if you don't execute you will not win the market.

PTC Live Global

Creating connector design using PTC Windchill Top-Down Design

Concept to Production at a faster pace, Speed to market

Idea & Design Requirement

PTC Live Global

Time Zone1: Product Architect in a sales and marketing meeting explores a design idea.

Time Zone2: PDMLink Designer, releases the Product.

Design Idea: Create a 6 pair spring probe connector design that can support a wide range of termination options.

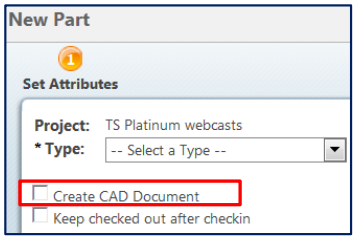
Level	TCPN	DESCRIPTION	Comment
0	9999948-1	CONNECTOR ASSEMBLY	***Use Windchill TOP-DOWN Design capability and generate a New Prototype design.***
1	9999936-1	SPRING PROBES	***Design ReUse*** -- In-House Design already exists
1	9999932-1	CONNECTOR HOUSING INSTANCE	***Design ReUse*** -- In-House Design already exists
1	9999934-1	CONNECTOR HOUSING MATE	***Design ReUse*** -- In-House Design already exists
1	9999939-1	IDI CORE SPRING CONTACT PROBE	***Purchased Item -*** Supplier given CAD File by Supply Chain Management group
2	1-9999921-5	JN RESIN123 BLACK	
1	9999938-1	HOUSING TERMINATOR	***New Design -*** Create brand ***New*** CREO design

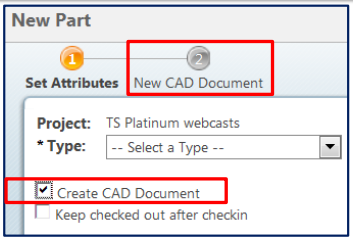
Windchill 10x allows you create WTParts with CAD associated (owner links) to build your CAD Product Structure

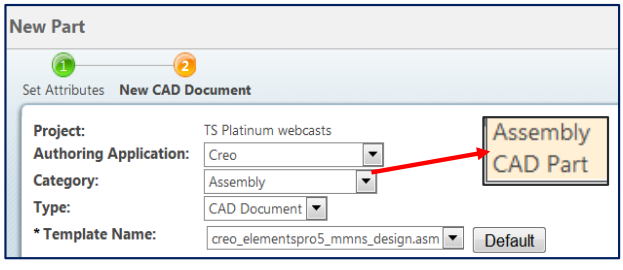
1st Step: Created Required brand new WTParts and CAD Models

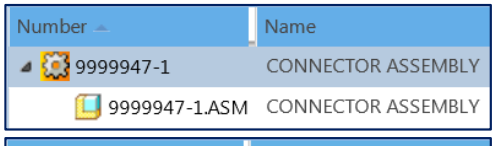
PTC Live Global

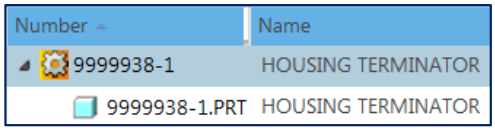
Non-CREO User







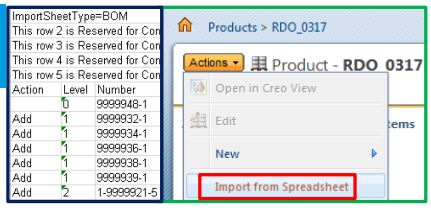




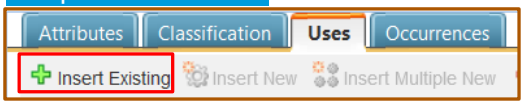
2nd Step: Design Product Structure.

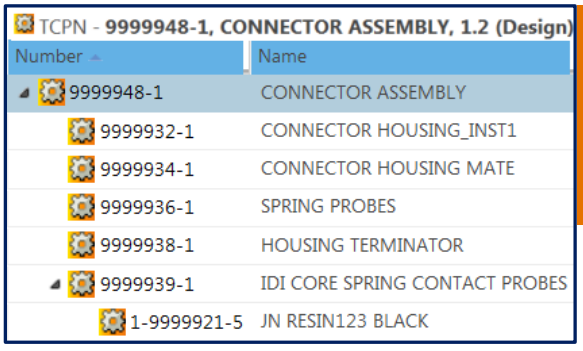
PTC Live Global

Import thru a spreadsheet



OR manually insert required WTParts





Timezone1: Product Architect in a sales and marketing meeting explores a design idea and created a Top-Down Design in Windchill PDMLink

Demo - Creating connector design using PTC Windchill Top-Down Design

PTC Live Global

- Let's see what else Product Architect does in PTC Windchill **– Play Demo1**

What did the design engineer received from Product Architect ?

- Lets see design engineer complete the rest of the design – **Play Demo2**

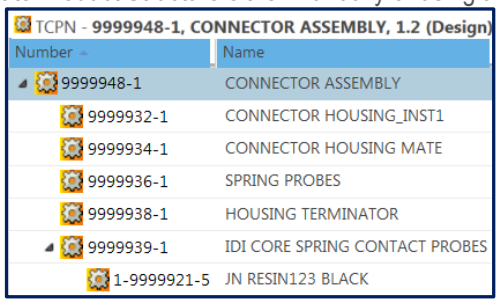
Job ready for Production, in summary tools used

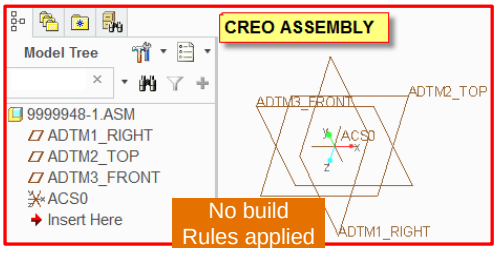
- Product Architect : PTC Windchill + PTC CREO view
- Design Engineer : PTC Windchill + PTC CREO

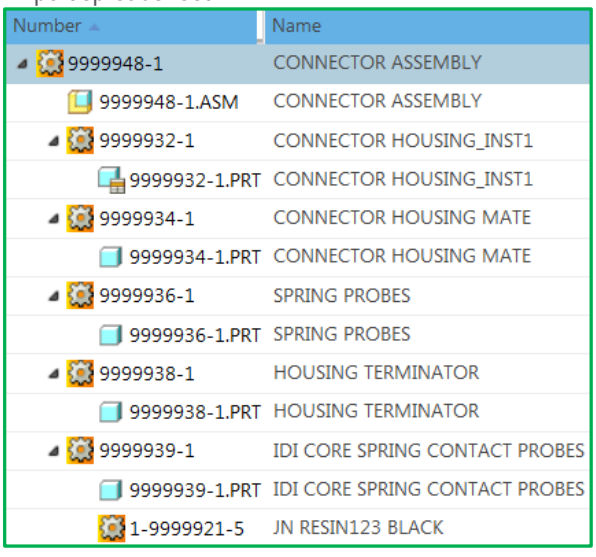
Recap of the Connector Design using PTC Windchill TOP Down Design

PTC Live Global

Update Product Structure either manually or using an import spreadsheet



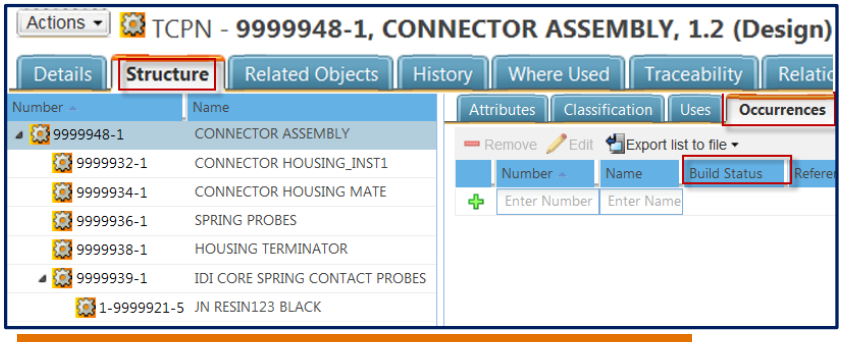




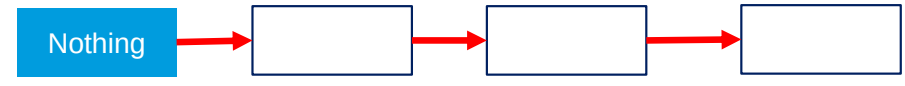
Recap of the Connector Design using PTC Windchill TOP Down Design *Cont…*

PTC Live Global

No Build Rules applied – Nothing in Occurrences Tab



Build Status – Occurrences Tab – 4 step Workflow

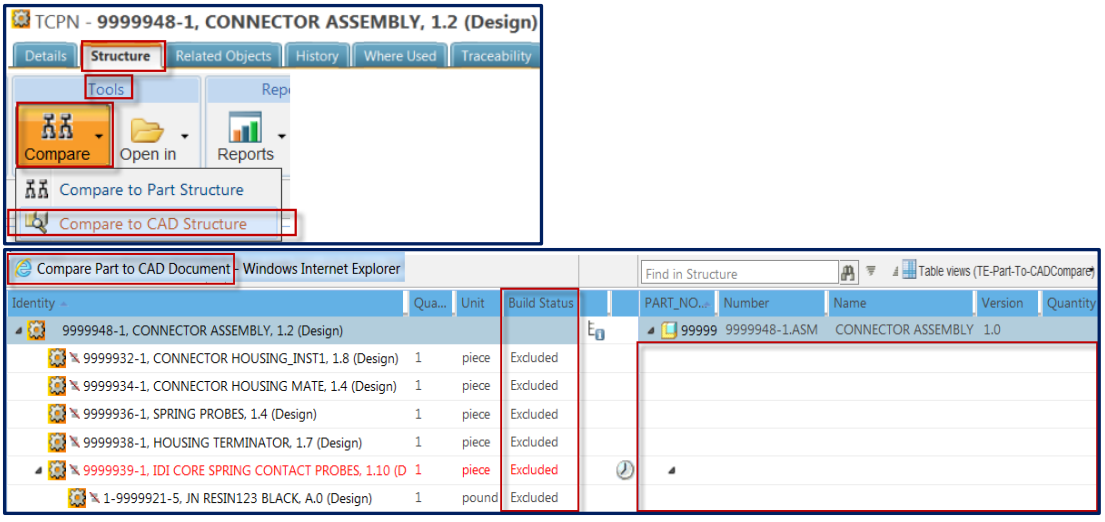


✓ Product Structure

Recap of the Connector Design using PTC Windchill TOP Down Design *Cont…*

PTC Live Global

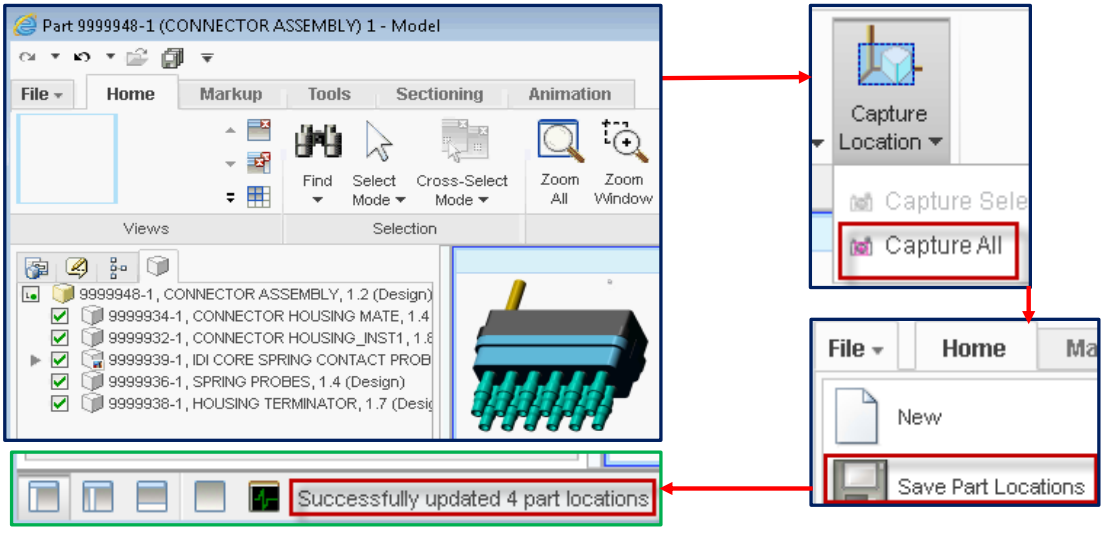
No Build Rules applied – Nothing in the right side frame of Compare with CAD Structure



Recap of the Connector Design using PTC Windchill TOP Down Design *Cont…*

PTC Live Global

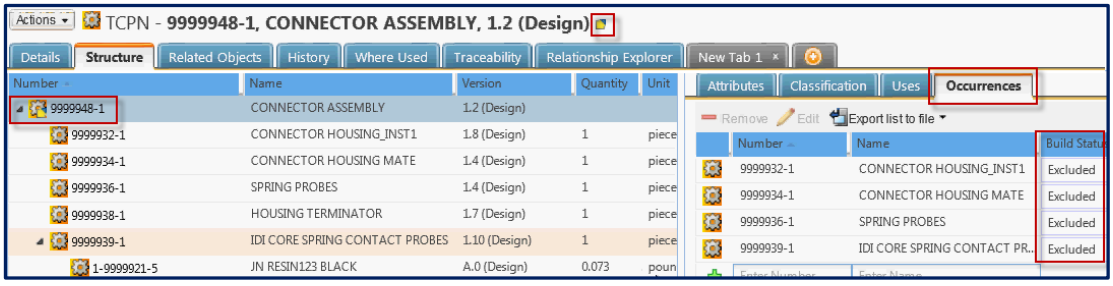
PTC CREO View learning -- Open the Top Level Assembly TCPN in CREO View and adjust the positioning



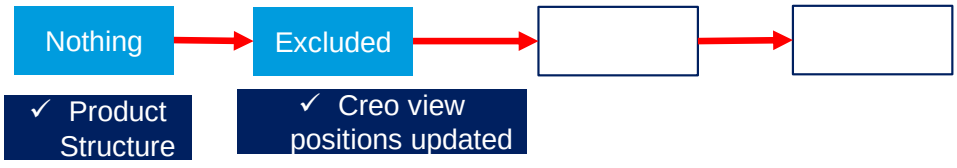
Recap of the Connector Design using PTC Windchill TOP Down Design *Cont…*

PTC Live Global

After Visually changing the design in **PTC CREO View**, observe the Build Status column in Occurrences Tab



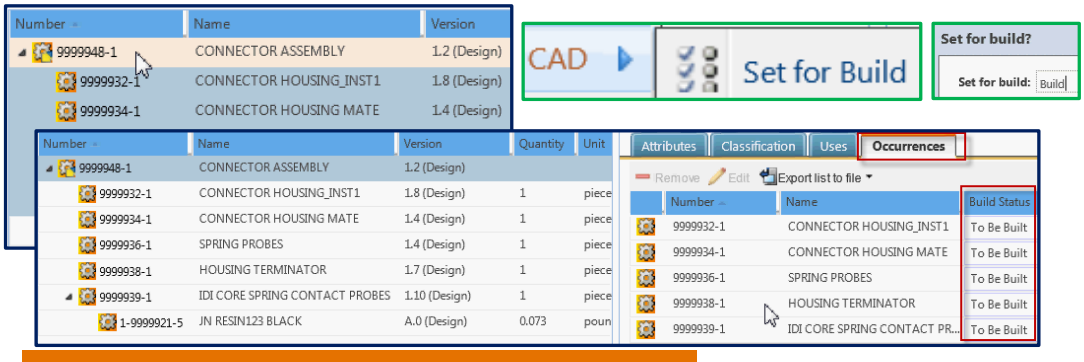
Build Status – Occurrences Tab – 4 step Workflow



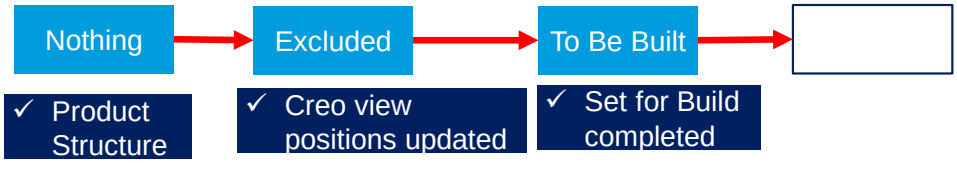
Recap of the Connector Design using PTC Windchill TOP Down Design *Cont…*

PTC Live Global

Component Level CAD "Set for Build" applied



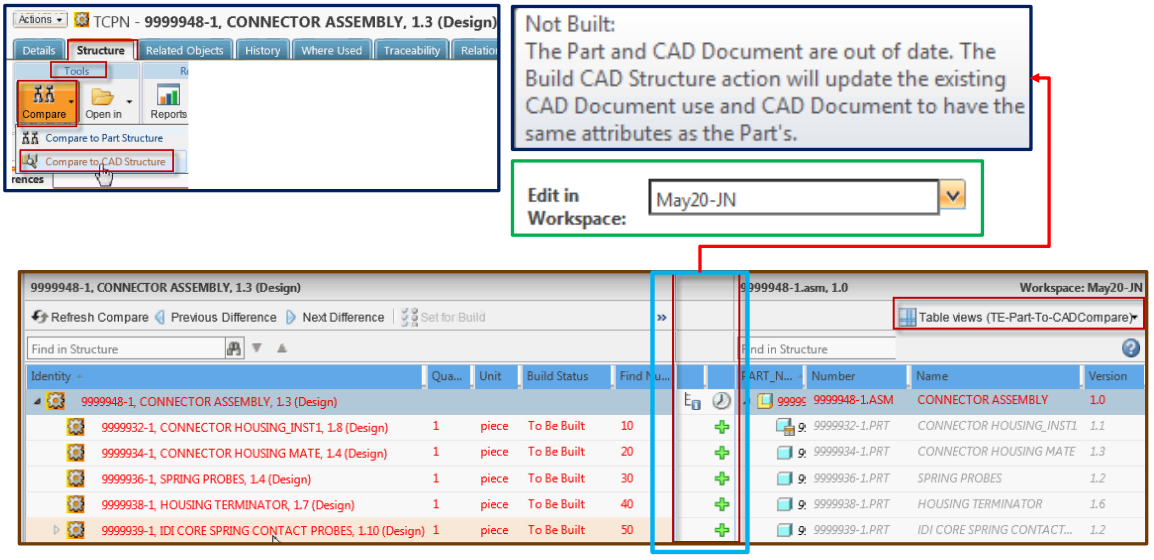
Build Status – Occurrences Tab – 4 step Workflow



Recap of the Connector Design using PTC Windchill TOP Down Design *Cont…*

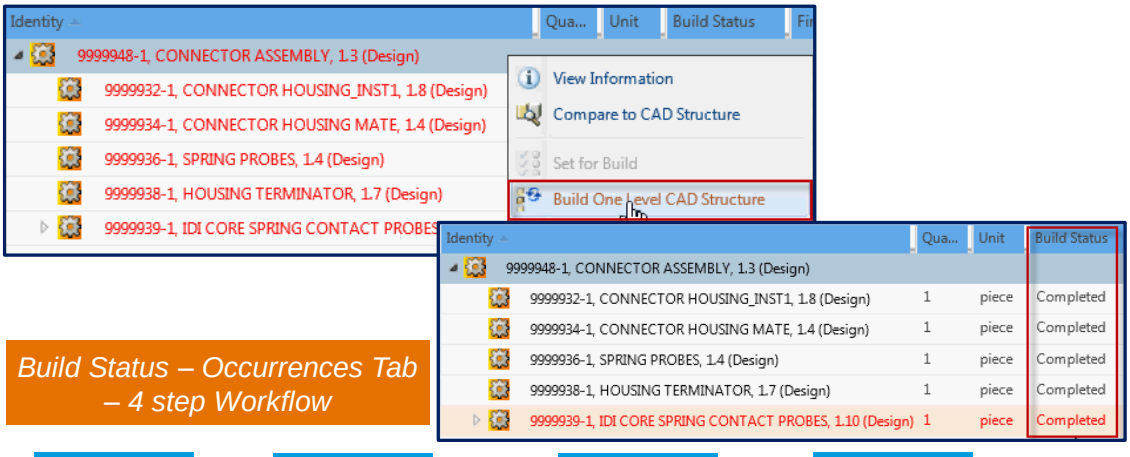
PTC Live Global

Compare to CAD Structure – allows you to connect to design engineers workspace, Hover over information glyphs



Recap of the Connector Design using PTC Windchill TOP Down Design *Cont…*

PTC Live Global



Build Status – Occurrences Tab – 4 step Workflow

Nothing → Excluded → To Be Built → Completed

- ✓ Product Structure
- ✓ Creo view positions updated
- ✓ Set for Build completed
- ✓ Ready to handover to Design Engineer

Recap of the Connector Design using PTC Windchill TOP Down Design *Cont…*

PTC Live Global

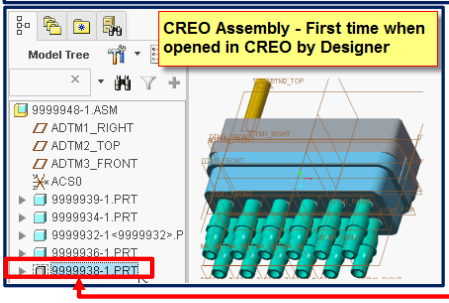
How the design looks for the first time when opened in PTC CREO ?

Number	Name	Version
9999948-1	CONNECTOR ASSEMBLY	1.3 (Design)
9999932-1	CONNECTOR HOUSING_INST1	1.8 (Design)
9999934-1	CONNECTOR HOUSING MATE	1.4 (Design)
9999936-1	SPRING PROBES	1.4 (Design)
9999938-1	HOUSING TERMINATOR	1.7 (Design)
9999939-1	IDI CORE SPRING CONTACT PROBES	1.10 (Design)
1-9999921-5	JN RESIN123 BLACK	A.0 (Design)

Attributes | Classification | Uses | **Occurrences**

Remove | Edit | Export list to file

Number	Name	Build Status
9999932-1	CONNECTOR HOUSING_INST1	Completed
9999934-1	CONNECTOR HOUSING MATE	Completed
9999936-1	SPRING PROBES	Completed
9999938-1	HOUSING TERMINATOR	Completed
9999939-1	IDI CORE SPRING CONTACT PR..	Completed



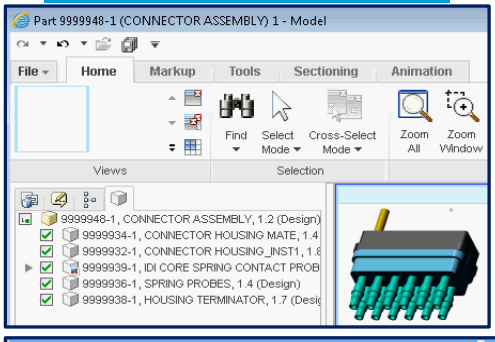
Design Requirement

Level	TCPN	DESCRIPTION	Comment
0	9999948-1	CONNECTOR ASSEMBLY	***Use Windchill TOP-DOWN Design capability and generate a New Prototype design.***
1	9999936-1	SPRING PROBES	***Design ReUse*** -- In-House Design already exists
1	9999932-1	CONNECTOR HOUSING INSTANCE	***Design ReUse*** -- In-House Design already exists
1	9999934-1	CONNECTOR HOUSING MATE	***Design ReUse*** -- In-House Design already exists
1	9999939-1	IDI CORE SPRING CONTACT PROBE	***Purchased Item*** - Supplier given CAD File by Supply Chain Management group
2	1-9999921-5	JN RESIN123 BLACK	
1	9999938-1	HOUSING TERMINATOR	***New Design*** - Create brand ***New*** CREO design

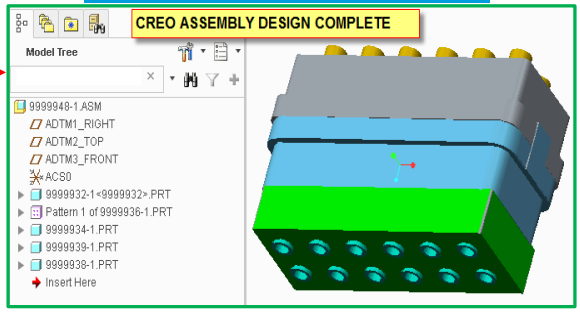
PTC Windchill PDMLink --- Top Down Design Strategy - Summary

PTC Live Global

Product Acrhitect + PTC Creo View



Design Engineer + PTC CREO



Identity	Qua...	Uni
9999948-1, CONNECTOR ASSEMBLY, 1.3 (Design)		
9999932-1, CONNECTOR HOUSING_INST1, 1.8 (Design)	1	pie
9999934-1, CONNECTOR HOUSING MATE, 1.4 (Design)	1	pie
9999936-1, SPRING PROBES, 1.4 (Design)	1	pie
9999938-1, HOUSING TERMINATOR, 1.7 (Design)	1	pie
9999939-1, IDI CORE SPRING CONTACT PROBES, 1.10 (Design)	1	pie

Number	Name	Version	Quantity	Unit
9999948-1	CONNECTOR ASSEMBLY	1.4 (Design)		
9999932-1	CONNECTOR HOUSING_INST1	1.8 (Design)	1	piece
9999934-1	CONNECTOR HOUSING MATE	1.4 (Design)	1	piece
9999936-1	SPRING PROBES	1.5 (Design)	12	piece
9999938-1	HOUSING TERMINATOR	1.8 (Design)	1	piece
9999939-1	IDI CORE SPRING CONTACT PRO...	1.10 (Design)	1	piece

Implement within your Organization Teams

Design Strategies – Lessons Learned

Decision Factors on using PTC Windchill Design Strategies ?

PTC® Live Global

Design Strategy
- Bottom up
- Top Down
- Design-in Context

1. How Build Rules work for different WTPart-CAD Associations ?
(Owner, Image, Contributing Image, Content, Contributing Content)
- Structure
- Attribute
- Representation (Thumbnail)

2. Methodology Employed
- Physical size of the product design
- Complexity of the product design
- Geographical Organization

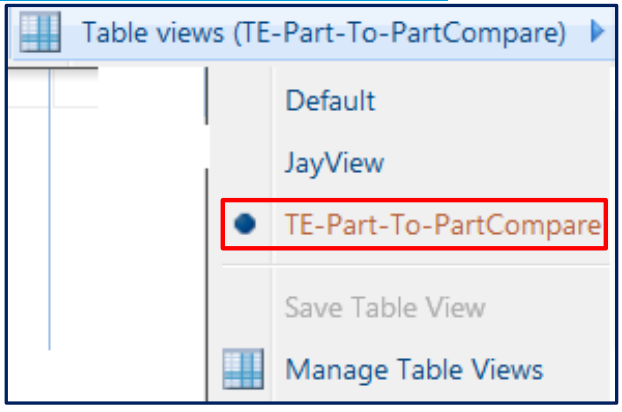
How to determine your structures are in Sync?

PTC Live Global

Compare Table views come very handy

- Truly able to tell if structures are in sync or not by looking at the two structures (CAD and Part) side by side.
- Configure Table Views with required attributes.

At TE Part-To-Part Compare views were configured with required attributes



35

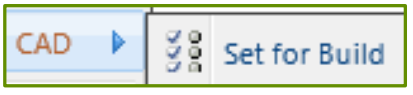
Lessons Learned - 1

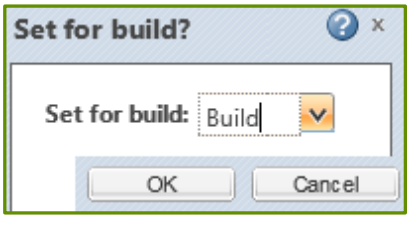
PTC Live Global

Before setting the build, Check out Top Level TCPN

Checkout symbol

Number	Name	Version
9999944-1	CONNECTORASSEMBLY	1.2 (Design)
9999944-1.ASM	CONNECTOR ASSEMBLY	1.1
9999932-1	CONNECTOR HOUSING	1.4 (Design)
9999932-1.PRT	CONNECTOR HOUSING	1.1
9999934-1	HOUSING MATE	1.2 (Design)
9999934-1.PRT	HOUSING MATE	1.1
9999936-1	PROBE2	1.3 (Design)
9999936-1.PRT	PROBE2	1.1





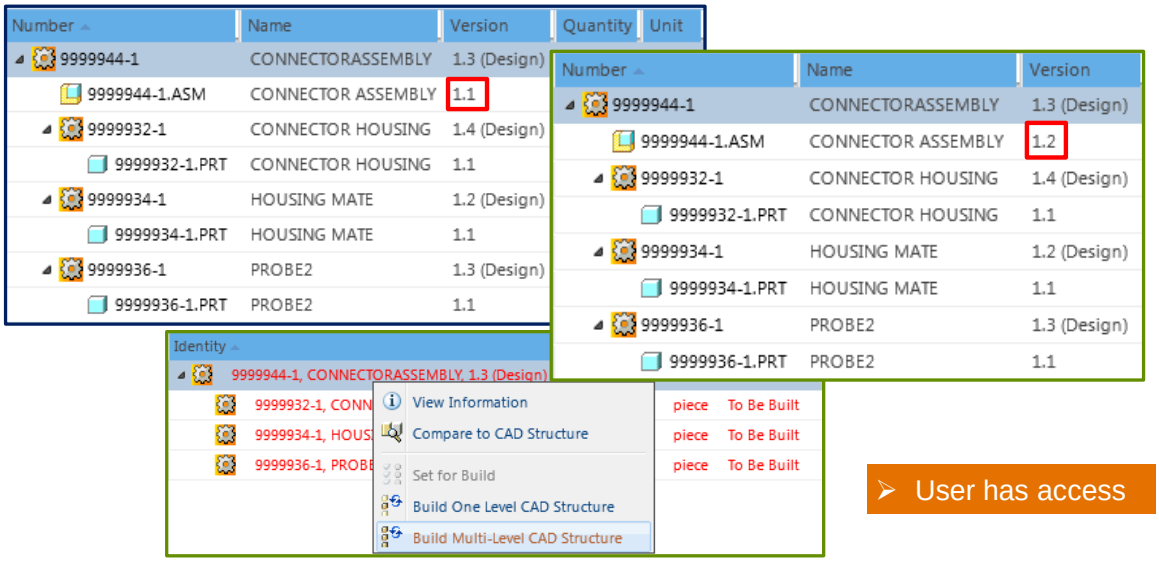
- Select one component at a time or
- Multiple components using CTRL key

36

Lessons Learned - 2

PTC® Live Global

CAD iteration changes when Build is completed.

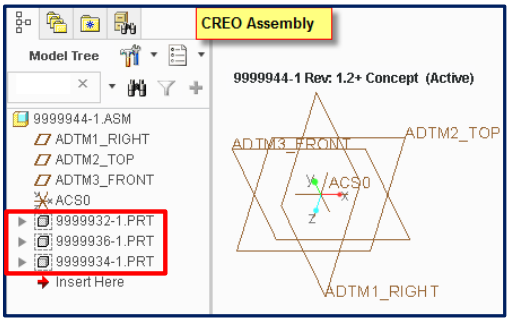


- User has access

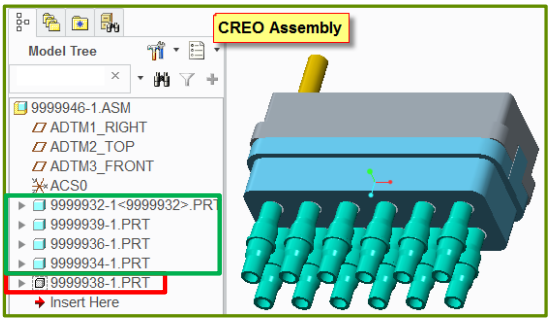
Lessons Learned - 3

PTC® Live Global

Visualization or PTC Creo View part location updates, retrieve models into PTC CREO Session when Assembly is opened



- No PTC Creo View position updates
- No models retrieved in CREO Session



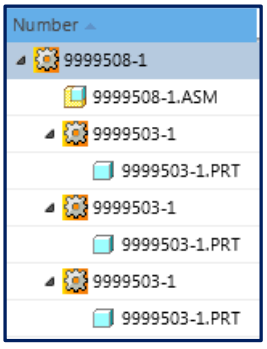
- 4 Models PTC Creo View Position updated
- Models retrieved in CREO Session

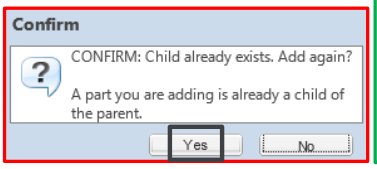
- 1 Model no PTC Creo View Position update

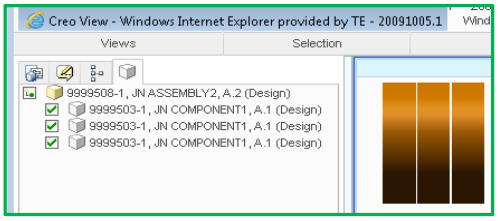
Lessons Learned - 4

PTC Live Global

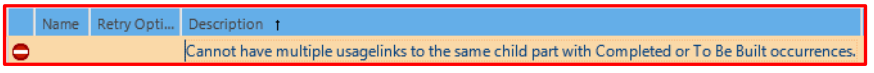
Adding same component multiple times



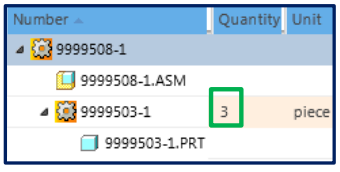


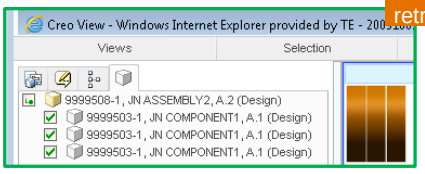


During build Problem starts

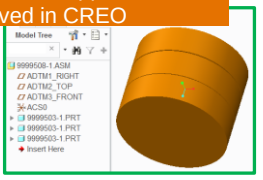


Best practice





Build Rules applied and retrieved in CREO

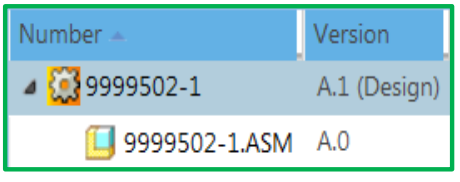


Lessons Learned - 5

PTC Live Global

Study of all different WTPart-CAD Association types with Windchill Top-Down Design approach

User creates an assembly WTPart with an associated CAD Document



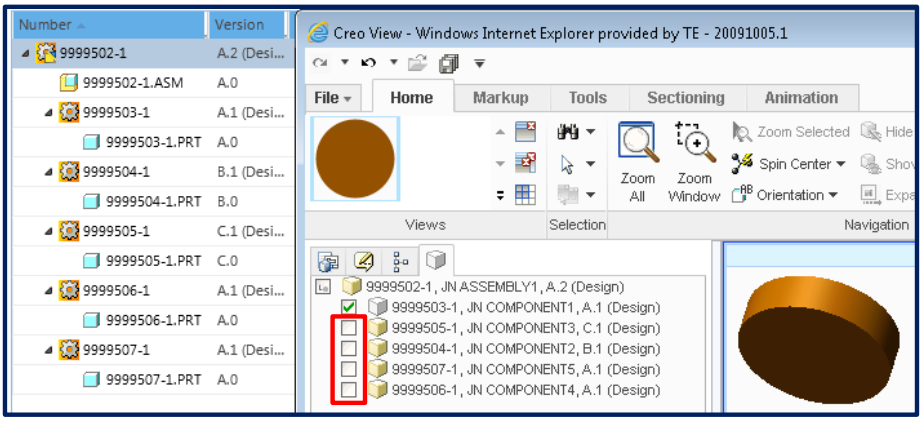
User Makes a Product Structure with some components that fit design criteria.

ImportSheetType=BOM			
This row 2 is Reserved for Comments Line			
This row 3 is Reserved for Comments Line			
This row 4 is Reserved for Comments Line			
This row 5 is Reserved for Comments Line			
Action	Level	Number	Organization ID
	0	9999502-1	
Add	1	9999503-1	
Add	1	9999504-1	
Add	1	9999505-1	
Add	1	9999506-1	
Add	1	9999507-1	

Lessons Learned – 5 *Cont….*

PTC® Live Global

Study of all different WTPart-CAD Association types with PTC Windchill Top-Down Design approach



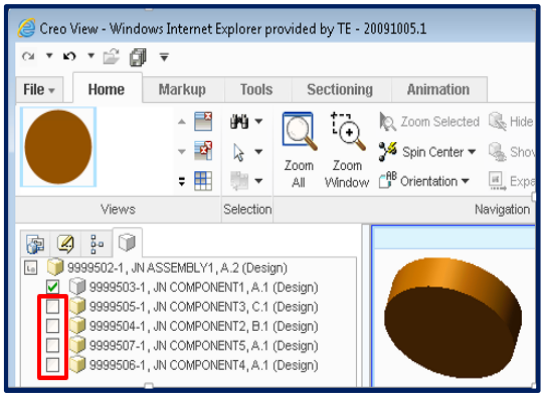
In PTC Creo View only one object shown and other check boxes cannot be selected. Why ?

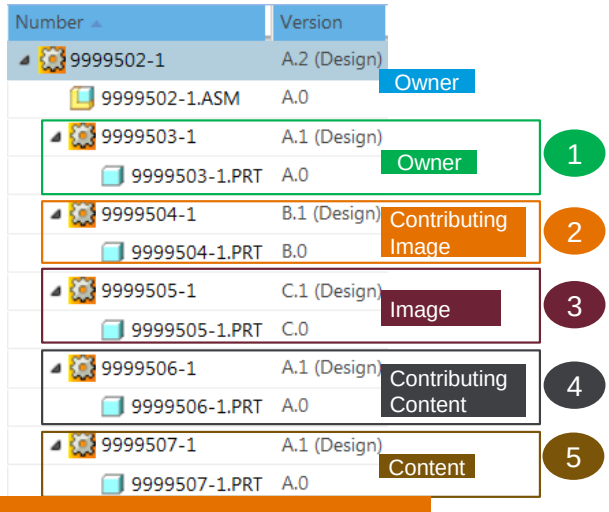
Associated WT Part has no thumbnail

Lessons Learned – 5 *Cont…..*

PTC® Live Global

Study of all different WTPart-CAD Association types with PTC Windchill Top-Down Design approach





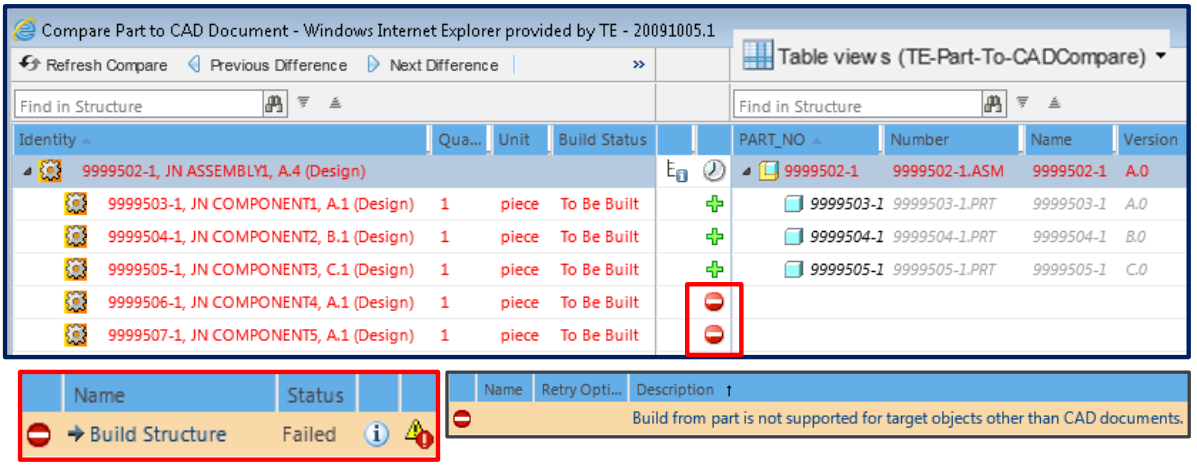
What else can be a problem ?

Only Owner Associated Component is shown in the CREO View

Lessons Learned – 5 *Cont…*

PTC® Live Global

Study of all different WTPart-CAD Association types with PTC Windchill Top-Down Design approach



Homework: What association types, do you like to see take advantage of Top-Down Design Strategy Approach ?

PTC® Live Global

- Your feedback is valuable
- Don’t miss out on the chance to provide your feedback
- Gain a chance to win an instant prize!
- Complete your session evaluation now


PTC® Live Global
PTC® PRODUCT & SERVICE ADVANTAGE®