Pro/Users of the Carolinas

Assembly Process Plan

Advanced Assembly Extension

Mark Bohannon | November 9, 2017

A little about me…

BSME NC State University 1994
Married 23 years to Jennifer. We have two daughters, Rachel and Rebecca

Work Experience

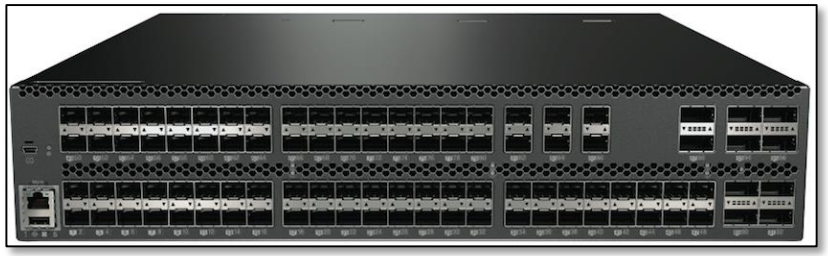
1994-95 Nortel Operations
1995-97 Nortel Mfg. Engineer
1997-98 Nortel Mechanical Engineer
1998-06 Solectron Mech. Engineer
2006-2012 IBM Mechanical Engineer
2012-14 IBM Windchill/Creo Admin
2014- Lenovo Windchill/Creo, …

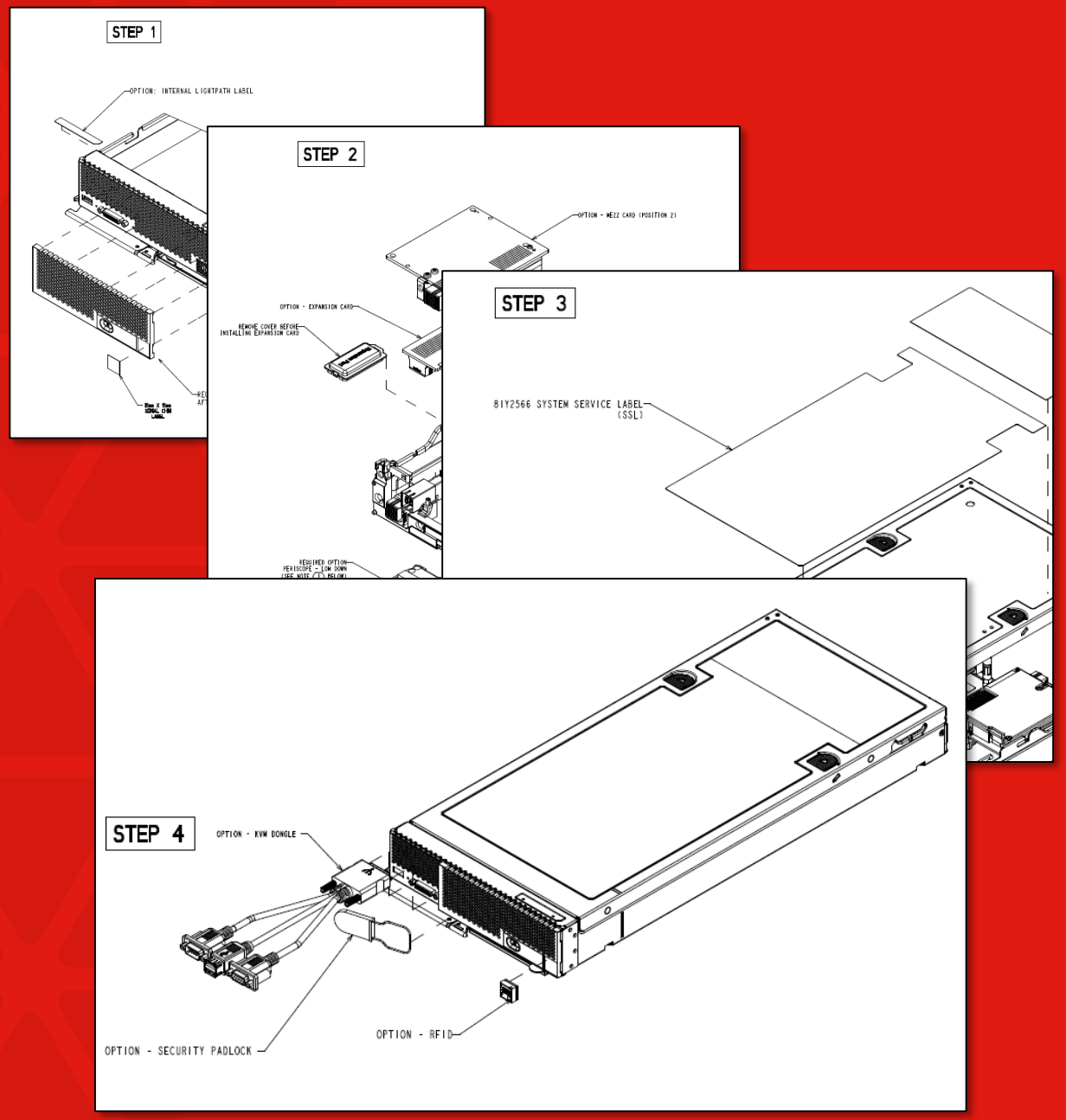
Assembly Process Plan

I first started using Assembly Process Plan module in 1996 while working as a manufacturing engineer at Nortel

About Lenovo

Lenovo (HKSE: 992) (ADR: LNVGY) is a US$43 billion global Fortune 500 company and a leader in providing innovative consumer, commercial, and data center technology. Our portfolio of high-quality, secure products and services covers PCs (including the legendary Think and multimode Yoga brands), workstations, servers, storage, networking, software (including ThinkSystem and ThinkAgile solutions), smart TVs and a family of mobile products like smartphones (including the Motorola brand), tablets and apps.



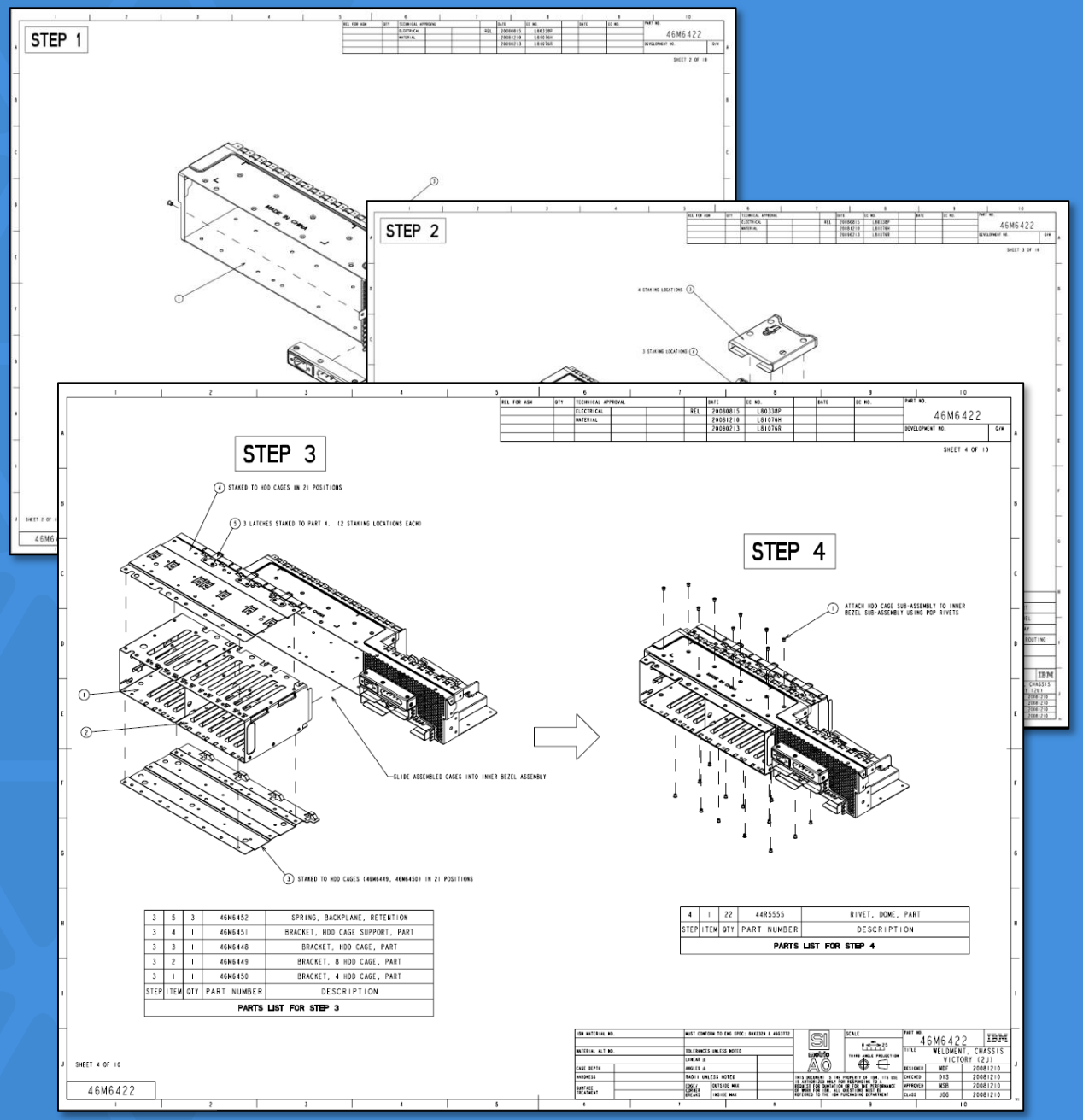


Assembly Process Plan

Used to create assembly process plans and serviceability documentation. A process plan allows:

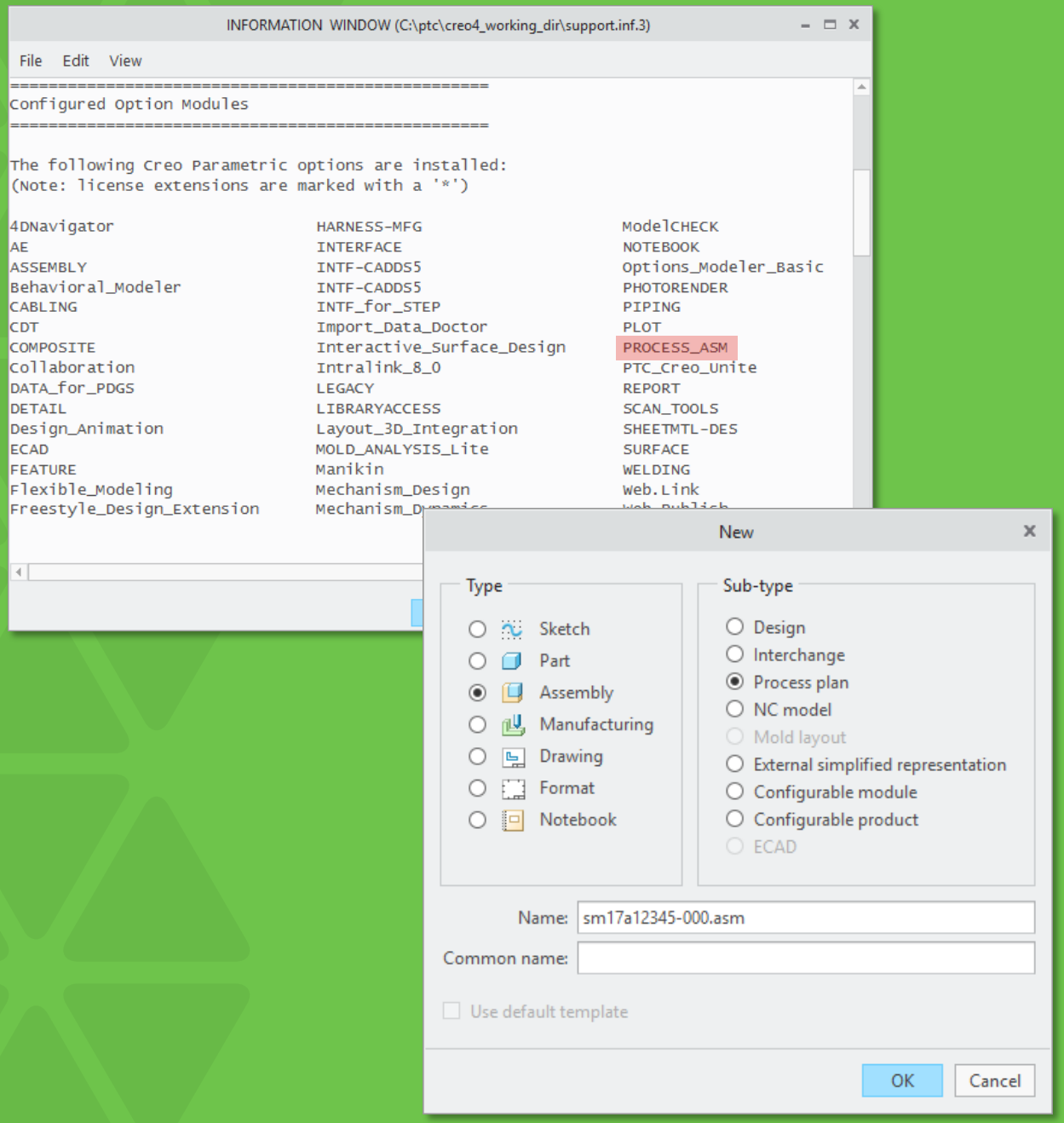
- Steps of an assembly fabrication process or a disassembly process
- Manufacturing BOM for each step
- Regroup components independent of the design assembly to accurately model the fabrication structure
- Assemble tools and processes unique to a process step without affecting the design assembly
- Perform time and cost estimates for the assembly fabrication process.
- Detailed drawing views for each step
- Customize the display of each process step by defining multiple explode states and by assigning different colors and line styles to components based on their status in the step

Source: Creo Parametric Help



When to use Pro/Process?

- If an assembly requires three or more steps to properly explain the assembly process
- Desire to have multiple BOM tables with unique BOM balloons for each step on drawing
- If you need to document the assembly steps prior to creating 2d assembly drawing
- Need to add tools and fixtures to the assembly models
- Need flexibility to create unique simplified reps, explode states, etc. without impacting design assembly

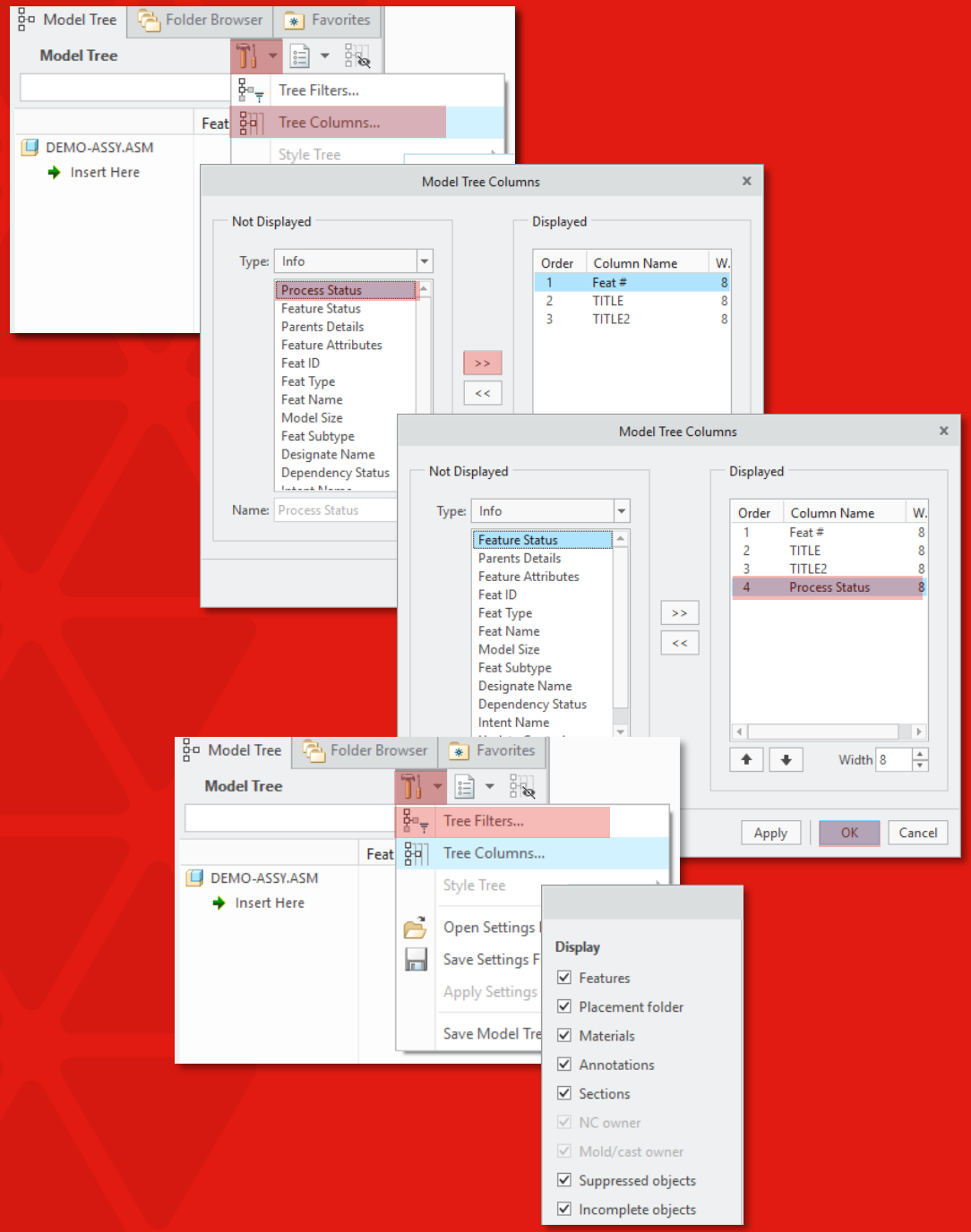


Accessing Assembly Process

- Must be using license with Advanced Assembly Extension (AAX) (e.g. PROE_EngineerIIAAX)

- New
  - Click **File** > **New**. In the New dialog box, click **Assembly** and **Process Plan**. Lenovo names the file using the base name of the design assembly and a suffix of “-000” (e.g. sm17a12345-000.asm)

- Existing
  - Click **File** > **Open** and select an existing assembly process file

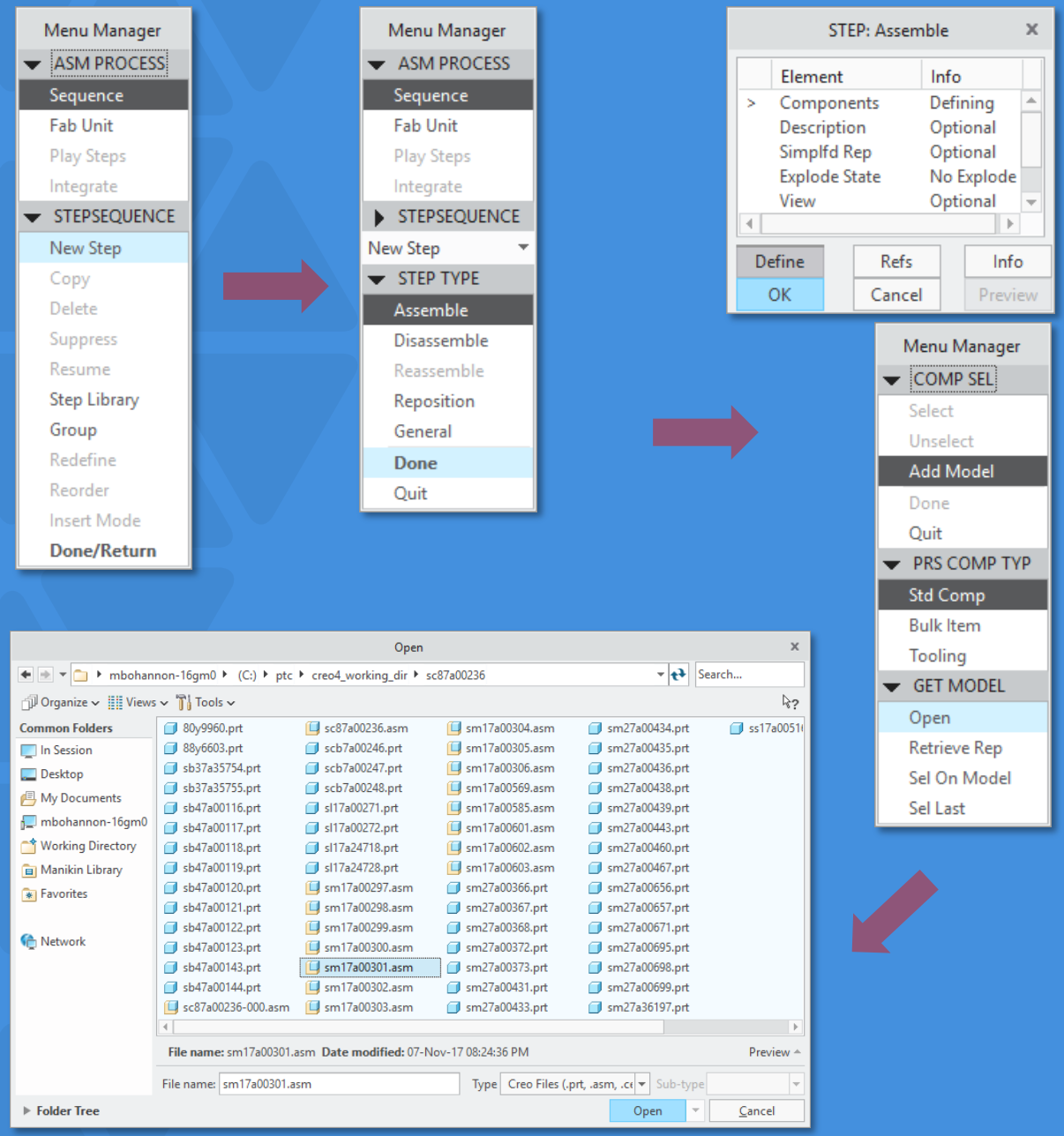


Model Tree

Add Process Status to model tree to identify components needing to be assembled

- To display process status in the model tree, click **Settings** > **Tree Columns** above the model tree. Select **Process Status** from the **Type Info** list and click **Add** button. Click **OK**

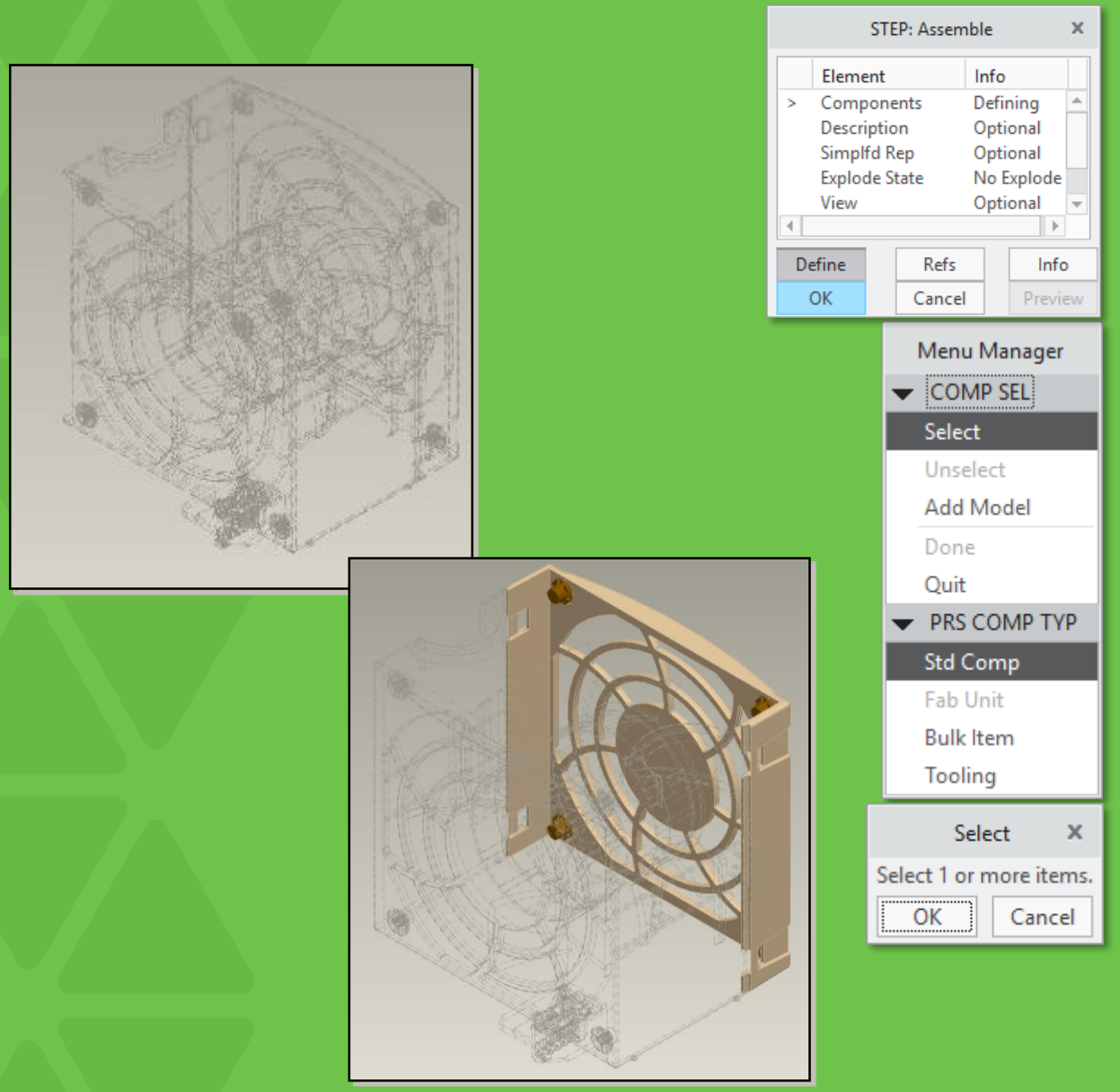
- To display process steps in the model tree, click **Settings** > **Tree Filters** above the model tree. Check the box next to **Features** in the Display list



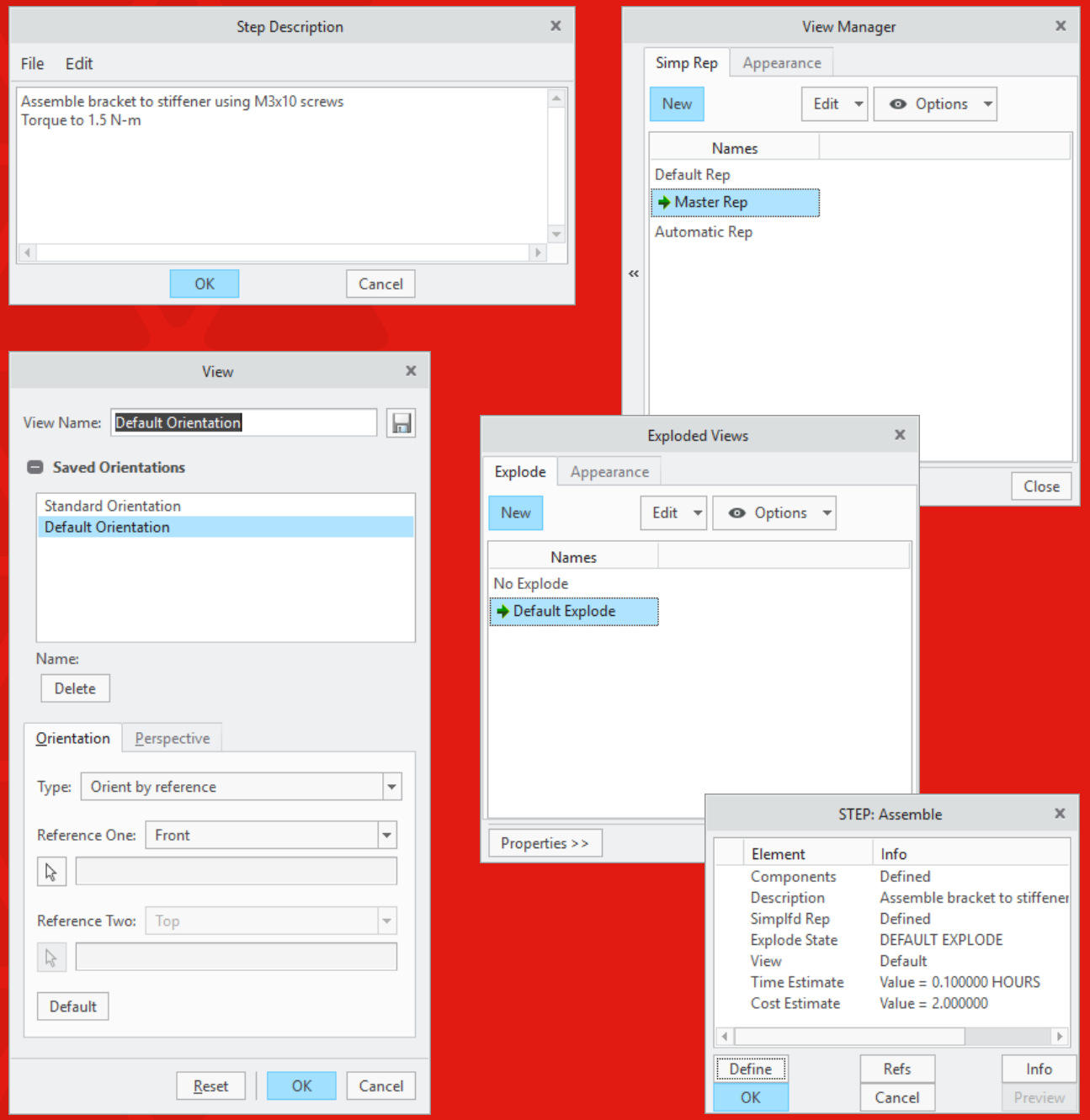
Creating First Step

- Click **ASM PROCESS** > **Sequence** > **New Step**
- Choose the type from the **STEP TYPE** menu: **Assemble**, **Disassemble**, **Reassemble**, **Reposition**, or **General**. Click **Done**. (Assemble is most often used)
- Select **Add Model** from **COMP SEL** menu, **Std Comp** from **PRS COMP TYP** menu, **Open** from **GET MODEL** menu and navigate to desired assembly model. Click **Open**

Creating First Step (continued)



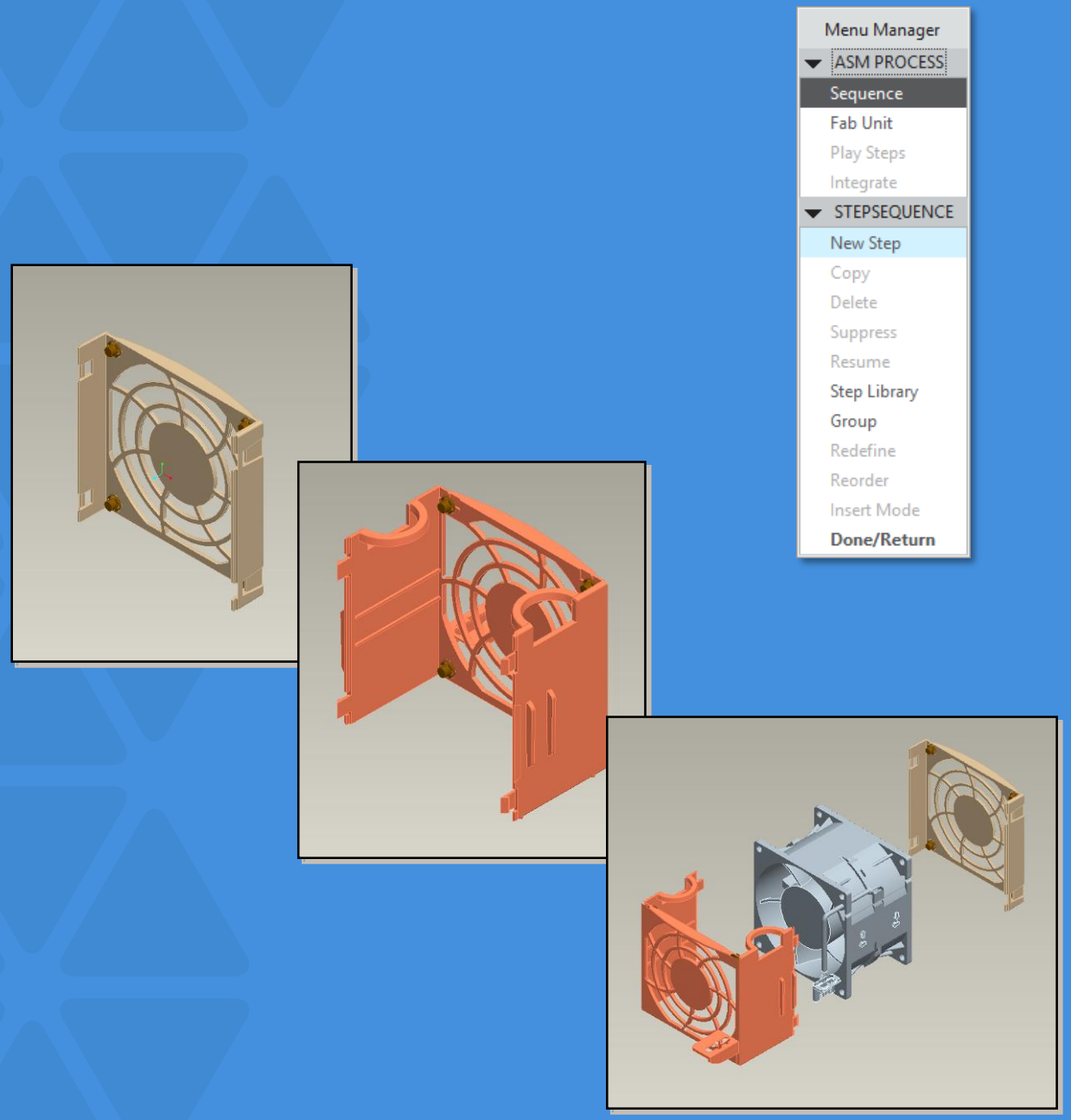
- Select dialog becomes active after clicking Open in previous step
- Unassembled models are displayed with phantom lines by default
- **Select** the components to assemble from the model tree or onscreen and click **OK**
- Components being assembled will be shown in current display style by default



Creating First Step (continued)

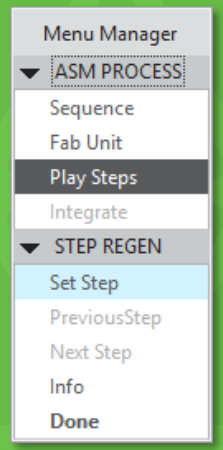
- Define the following optional elements
  - Description
  - Simplified Rep
  - Explode State
  - View
  - Time Estimate
  - Cost Estimate
- Click OK when done

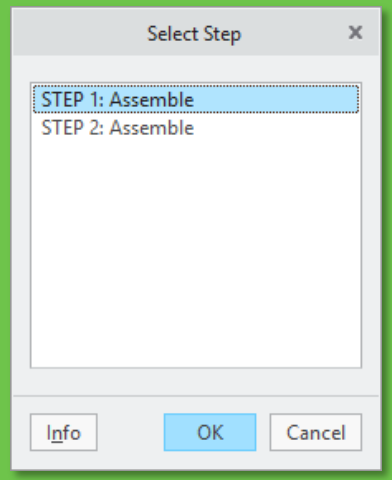
It is recommended to name Simplified Rep, Explode State and View using current step number (e.g. STEP1) for easier use in the detail drawing. A combined state may also be helpful.

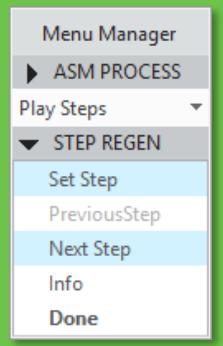


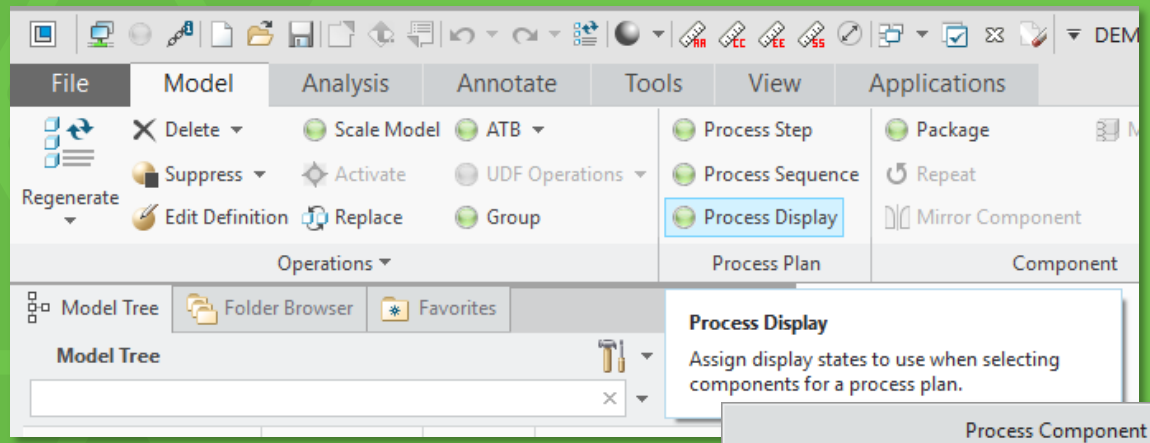
Creating Next Steps

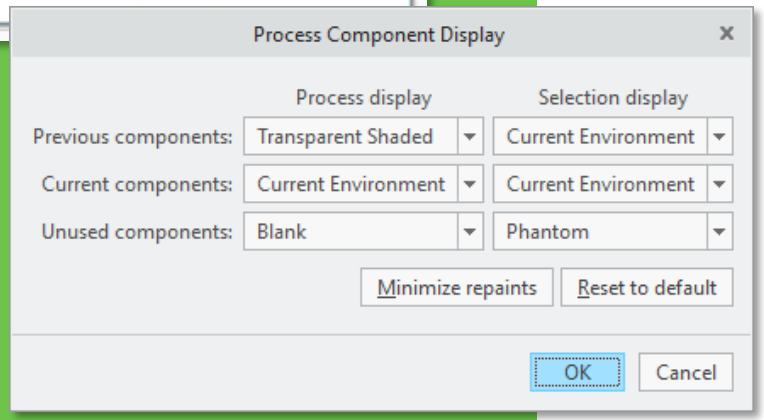
- Click **ASM PROCESS** > **Sequence** > **New Step**
- Select components and define optional elements as required for the new assembly step











Play Steps/Process Display

- Click **ASM PROCESS** > **Play Steps** > **Set Step**
- Select **Step** and click **OK**
- Click **Next Step** and **Previous Step** to play steps forward and backwards

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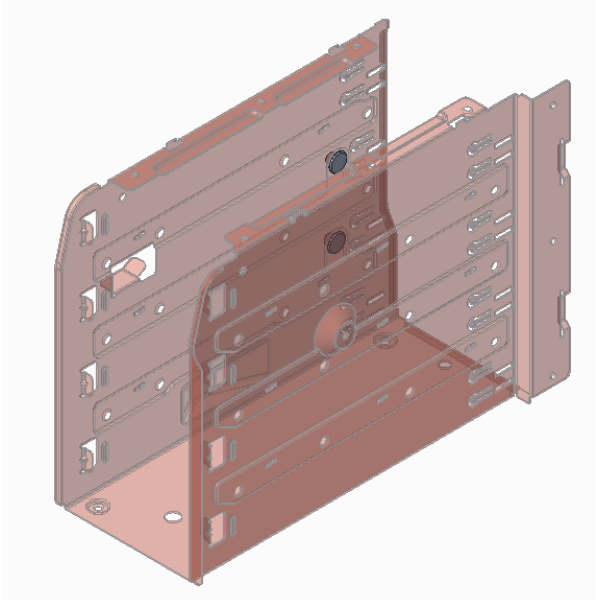
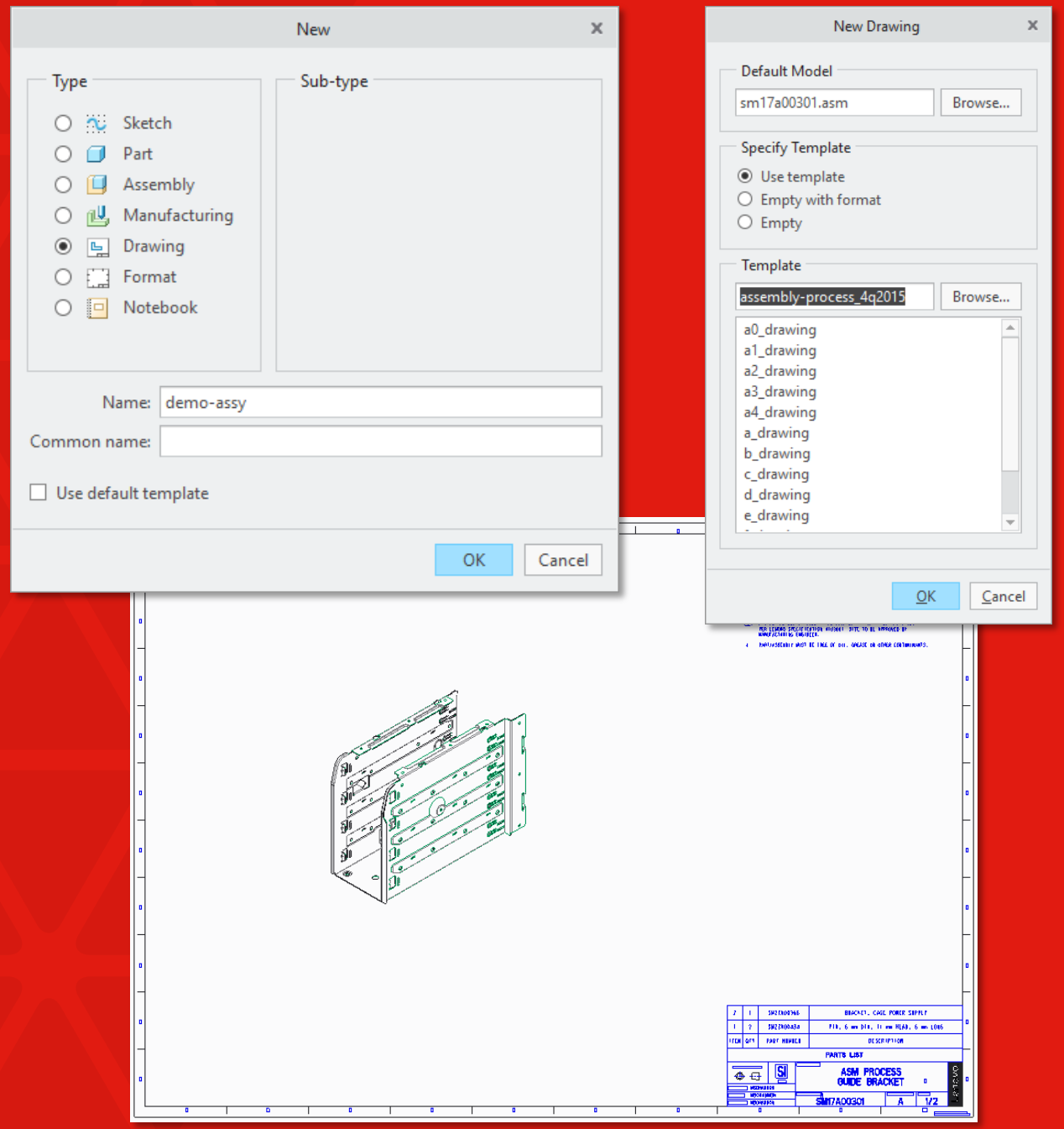
- Select **Process Display** from the **Model** tab

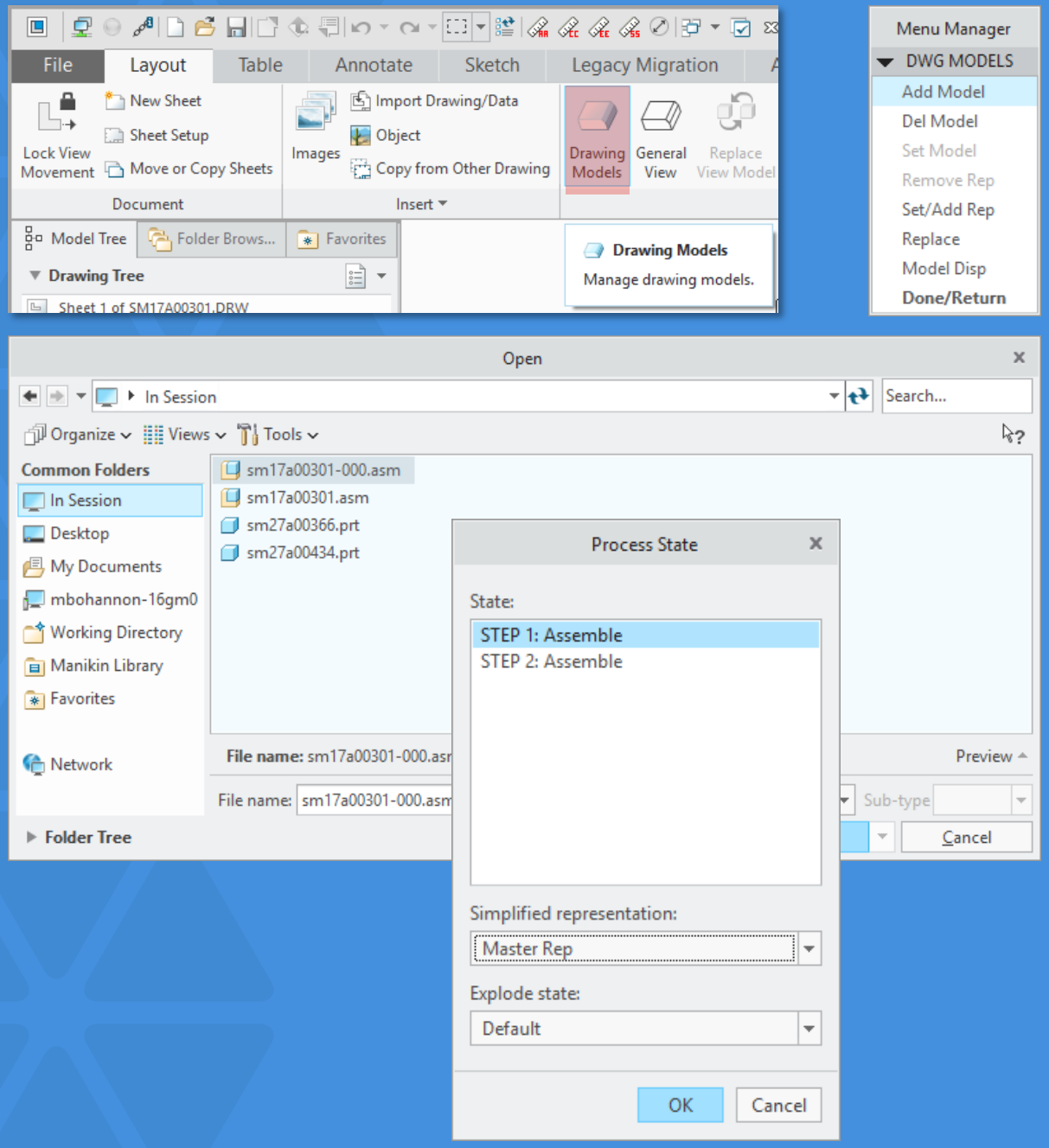




Process Drawing

- Activate design assembly model (not the assembly process model)
- Click **File** > **New** > **Drawing**. Uncheck **Use default template**, enter a Name and click **OK**.
- Select **Use Template** and click the template named **assy-process_4q2015**. Click **OK**

Process Drawing (continued)

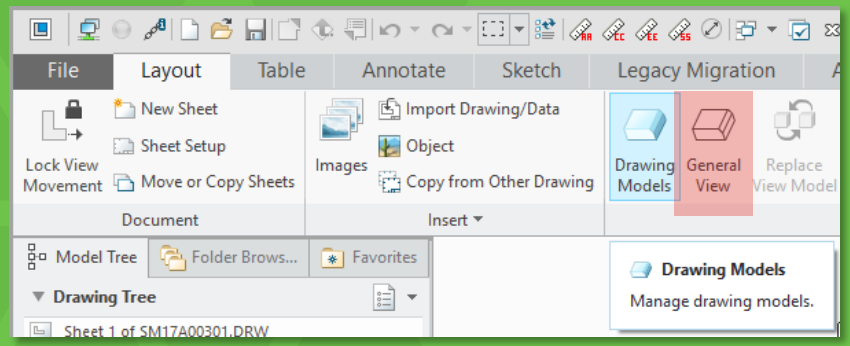


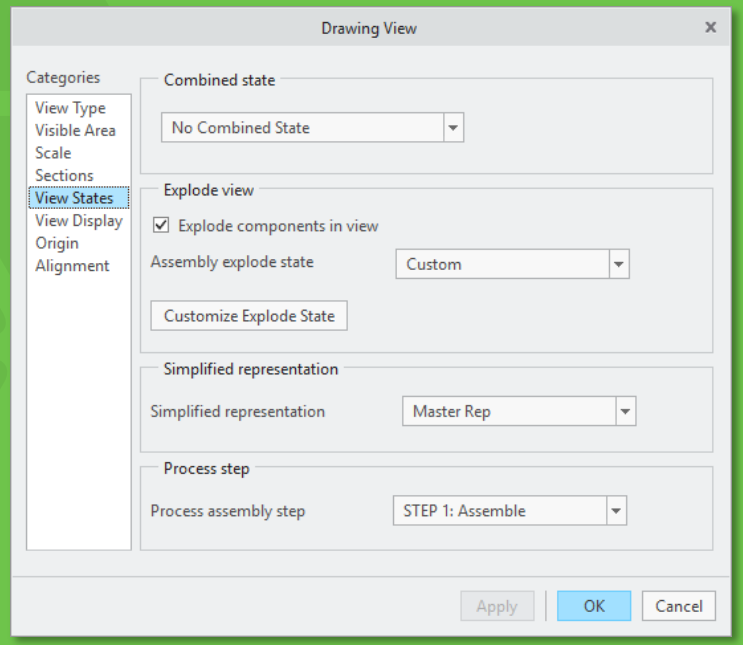
Next, let's add the assembly process model

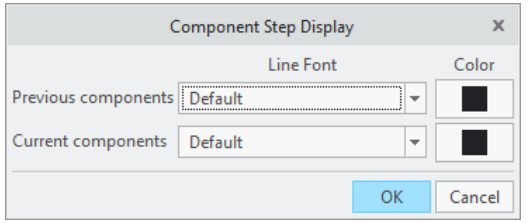
- Click **Drawing Models** from the **Layout** tab
- Select **model** and click **Open**
- Select **State**, **Simplified representation**, and **Explode state**. Click **OK**

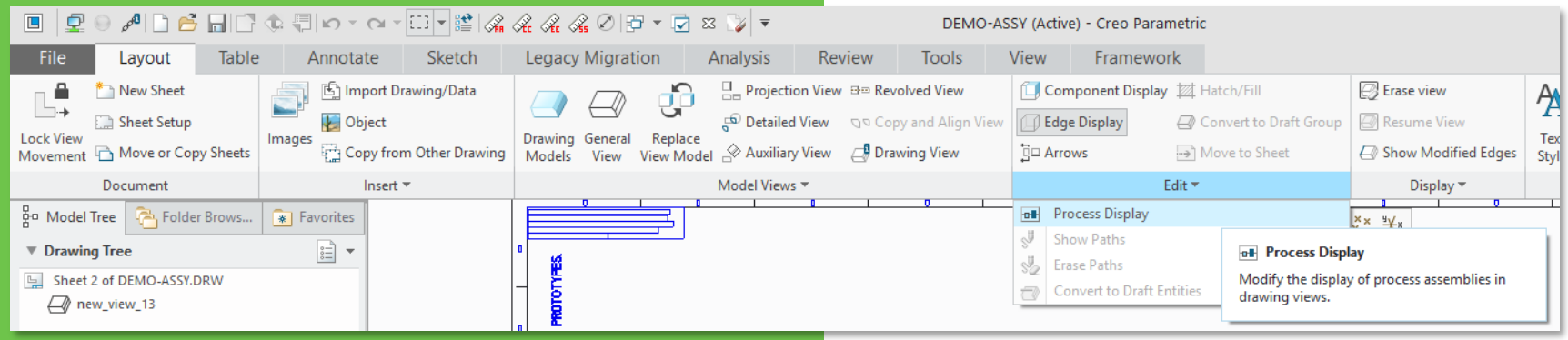
Process Drawing (continued)

- Click **General View** from **Layout** tab and add view to sheet
- Select **Combined State** if used and click **OK**
- Modify **Drawing View** properties as required
- Modify **Process Display** as desired





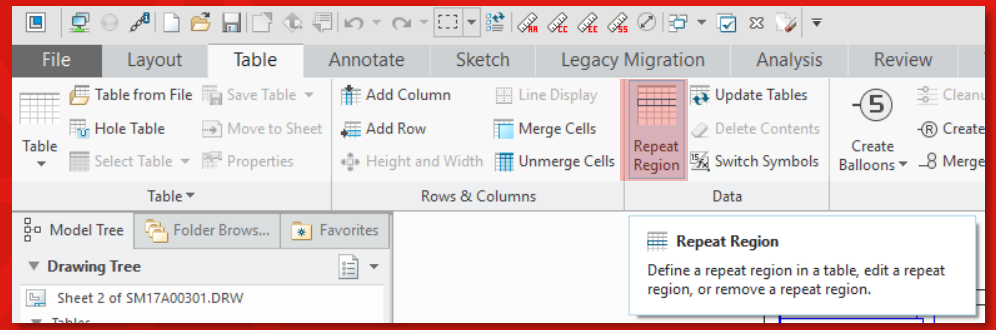


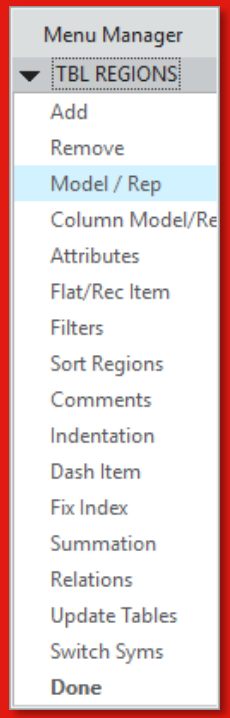


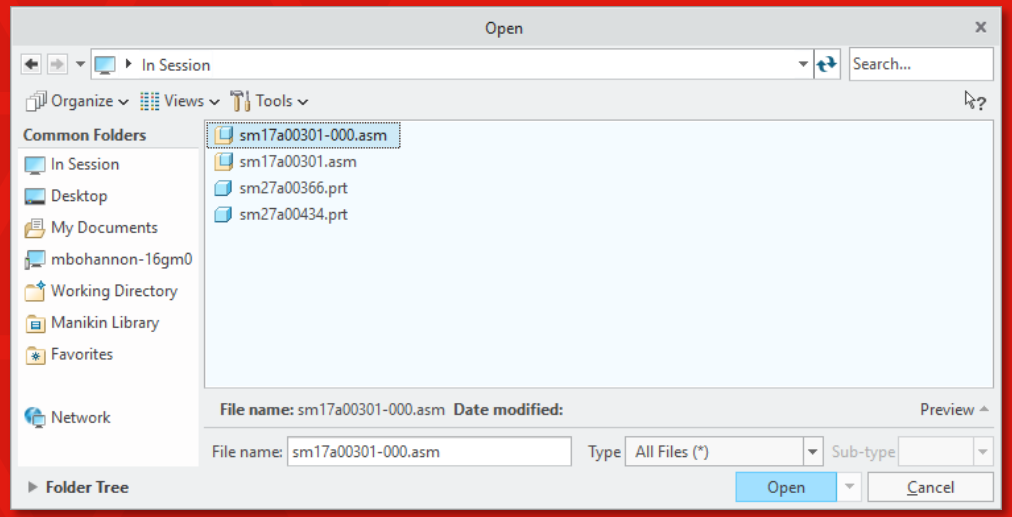
Process Drawing (continued)

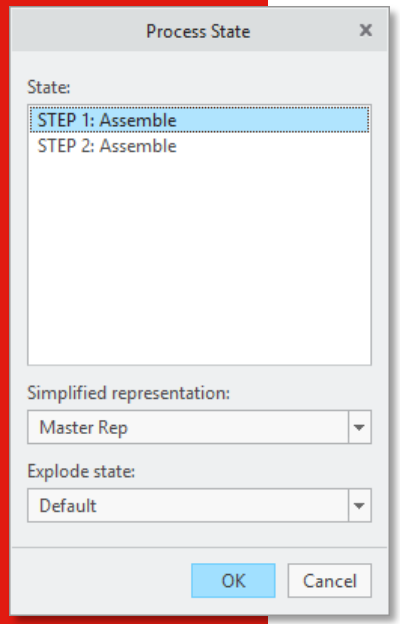
Update table repeat region to use correct process step

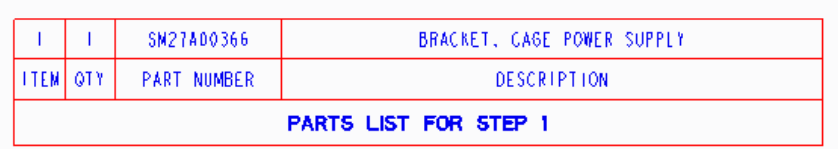
- Click **Repeat Region** from **Table** tab. Select the **region**.
- Select **State**, **Simplified representation**, and **Explode state**. Click **OK**











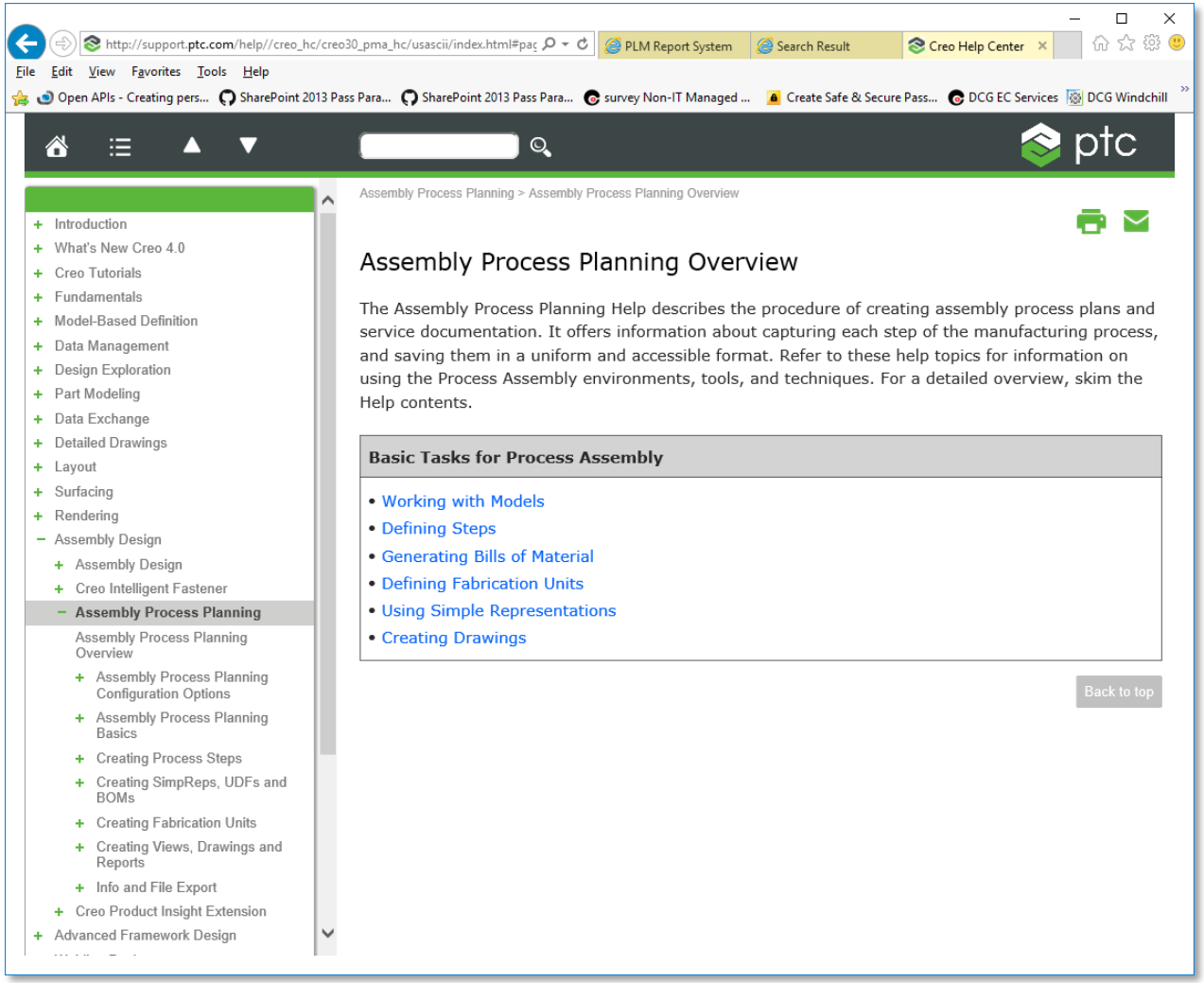
“

We should be glad of an opportunity to serve others by any invention of ours; and this we should do freely and generously.”

— Benjamin Franklin

ONLINE HELP

http://support.ptc.com/help//creo_hc/creo30_pma_hc/usascii/index.html#page/assembly/processassembly/Assembly_Process_Planning_Overview.html



Pro/Report Parameters

http://support.ptc.com/help//creo_hc/creo30_pma_hc/usascii/index.html#page/assembly/processassembly/AboutObjectParametersInDrawings.html

Parameter Name	Definition
&prs.actstep.comp.name	Displays the names of all assembly components in the active step.
&prs.actstep.comp.param.name	Displays the names of all parameters for each assembly component in the active step.
&prs.actstep.comp.param.value	Displays the values of all parameters for each assembly component in the active step
&prs.actstep.comp.type	Displays the method of assembly for each component in the active step.
&prs.actstep.comp.User Defined	Displays the values of any user defined parameters for each assembly component in the active step.
&prs.actstep.comp.desc	Displays the descriptive phrase of the active step.
&prs.actstep.name	Displays the name of the active step
&prs.actstep.number	Displays the active step number.
&prs.actstep.param.name	Displays the names of all parameters associated with the current assembly model.
&prs.actstep.param.value	Displays the values of all parameters associated with the current assembly model.
&prs.actstep.type	Displays the names of all parameters associated with the active step.
&prs.actstep.User Defined	Displays the values of any user defined parameters in the active steps.
&prs.step.comp.name	Displays the names of all components for each step displayed in the drawing.
&prs.step.comp.param.name	Displays the names of all parameters of each assembly component for each step in the drawing.
&prs.step.comp.param.value	Displays the values of all parameters of each assembly component for each step displayed in the drawing.
&prs.step.comp.type	Displays the type of component being assembled for each step displayed in the drawing.
&prs.step.comp.User Defined	Displays the values of any user defined parameters for every assembly component displayed in the drawing.
&prs.step.desc	Displays the descriptive phrase of each step shown in the drawing.
&prs.step.name	Displays the name of each step shown in the drawing.
&prs.step.number	Displays the step numbers of every step in the drawing.
&prs.step.param.name	Displays the names of all parameters associated with the steps displayed in the drawing.
&prs.step.param.value	Displays the values of all parameters associated with the steps displayed in the drawing.
&prs.step.type	Displays the methods of assembly used for each step displayed in the drawing.

Configuration Options for Assembly Process Planning

http://support.ptc.com/help//creo_hc/creo30_pma_hc/usascii/index.html#page/assembly%2Fprocessassembly%2FConfiguration_Options_for_Assembly_Process_Planning.html%23wwconnect_header

curr_proc_comp_def_color

Sets the default color for the current component in a process assembly.

curr_proc_comp_def_font

Sets the default font for the current component in a process assembly.

display_comps_to_assemble

yes, no

yes—The design model goes into memory and displays. Pick process components from the design model or the Model Tree.

no—Only the Model Tree displays components to assemble. Selected components go into memory.

offset_line_def_color

Sets the color of offset lines in drawings.

offset_line_def_font

Sets the offset line fonts in drawings.

prev_proc_comp_def_color

Sets the default color of components added to a process assembly in a previous step.

prev_proc_comp_def_font

Sets the default font of process assembly components that were added in a previous step.

Related Topics

About Assembly Process Planning Configuration Options

Different is better

Lenovo™