PTC® Live Global

Top-Down Design for Assemblies and Mechanisms in PTC Creo 3.0

Moshe Baum
Product Manager – PTC Creo

June 2015

Agenda

- Best practices of **top-down design** with PTC Creo 3.0
- How to use **Motion Skeletons** for setting-up a mechanism design
- **Reference Control**
- Q&A

Is it not the same??

Not the same

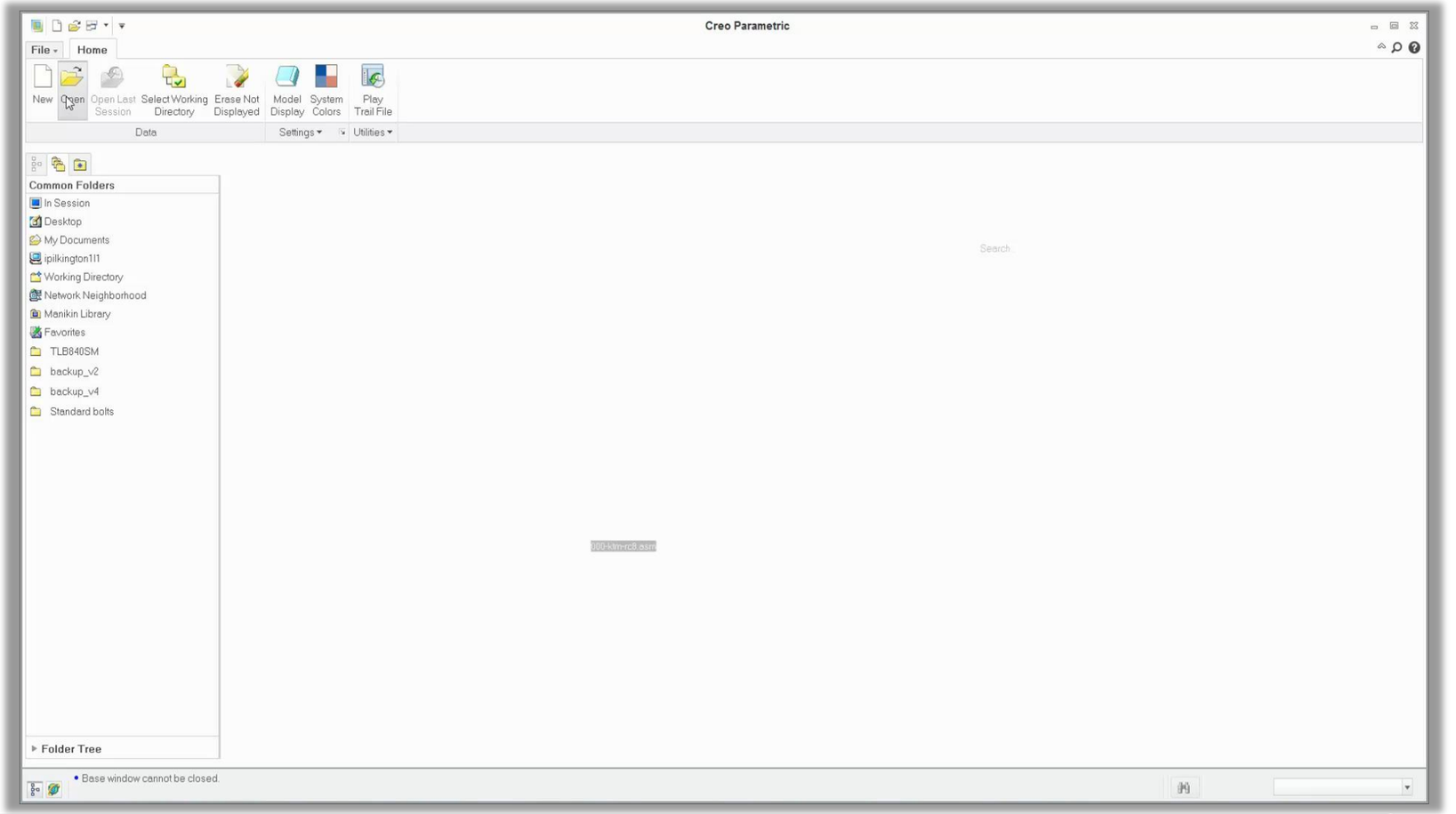
But highly complementing

Top-Down Design and Large Assembly Management

PTC® Live Global

Large Assembly Management tools

- Design in Context
- Open Subset
- Lightweight Graphics
- On-demand Retrieval



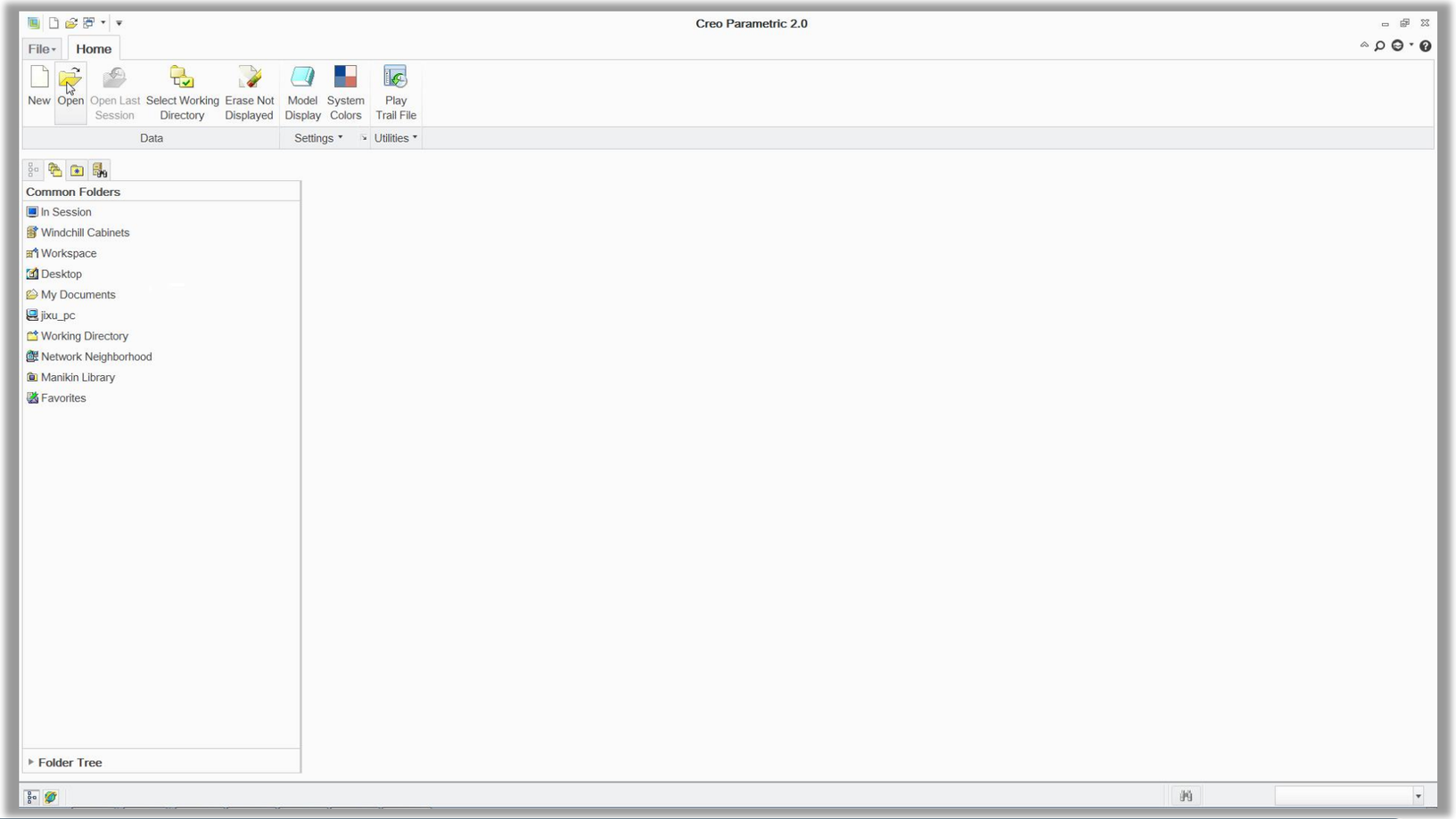
Locate, filter and distribute design contexts

Top-Down Design and Large Assembly Management

PTC® Live Global

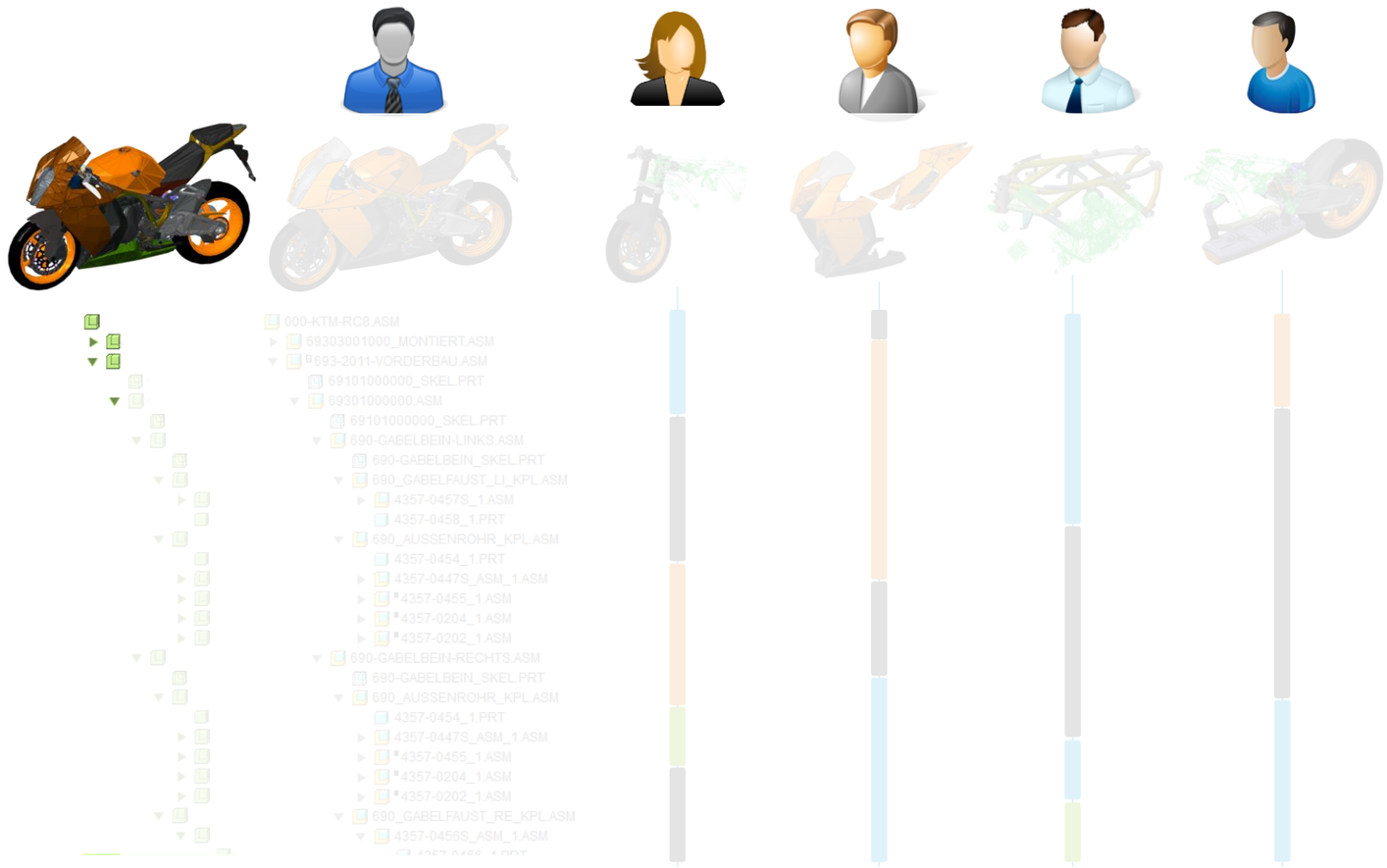
Top-Down Design tools

- Skeletons
- Data-Sharing Features
- Reference Control
- Smart Replace
- Basic Modular Design
- Automation tools



Create and iterate content efficiently and concurrently

Simplified Representations (“Simpreps”) – short history



100%	Master					
~70%	Geometry					
~30%	Graphic					
0%	Exclude					
Typical memory consumption	Level of details		Assembly structure	Part level graphics	Reference geometry	Features and parameters

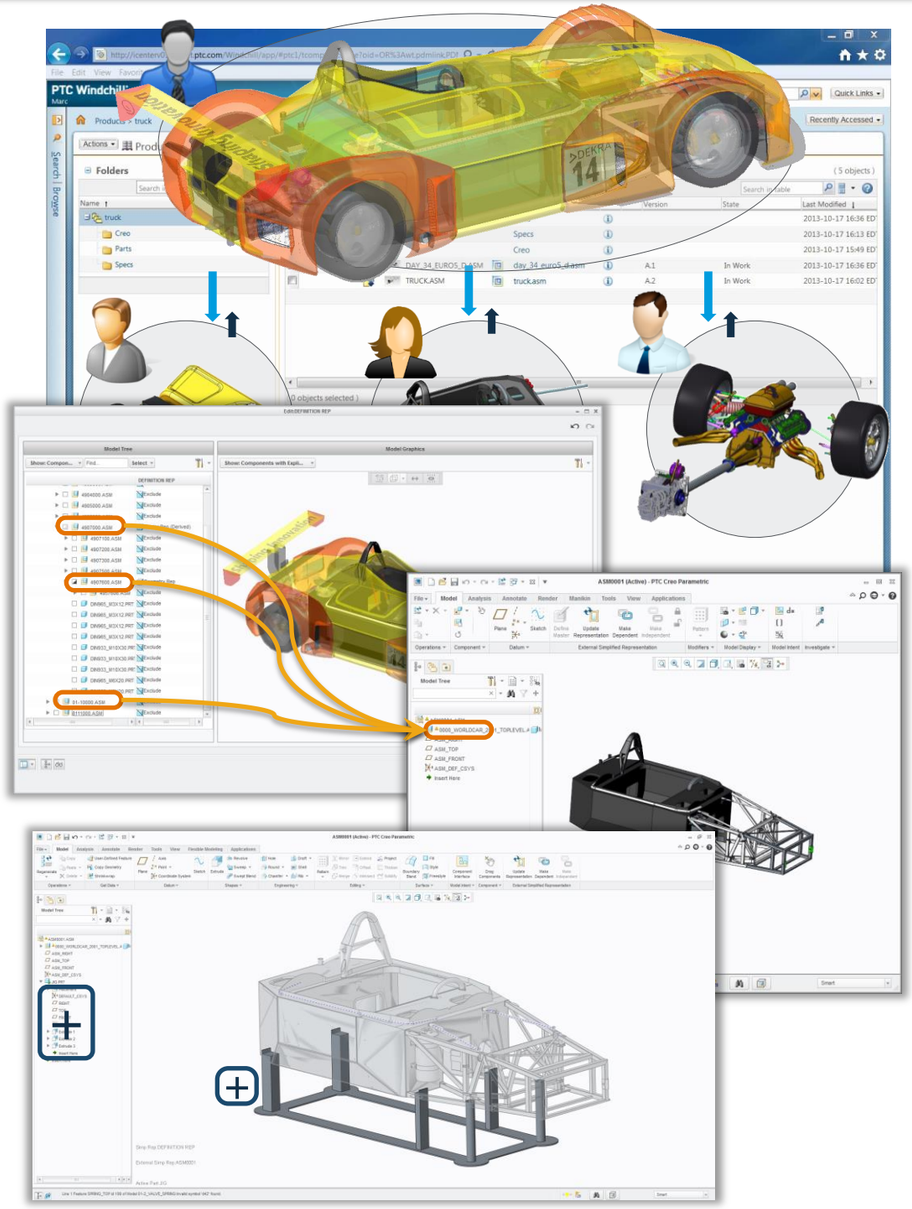
- Filter retrieved content
- Concurrent design in shared context
- Comprehensive drawing views and process steps
- Fast scenery with thumbnail graphics

Design in Context

PTC® Live Global

- Large Assembly Mgmt.
  - **Design in Context**
  - Open Subset
  - Lightweight Graphics
  - On-demand Retrieval
- Top-Down Design
  - Skeletons
  - Data-Sharing Features
  - Reference Control
  - Smart Replace
  - Basic Modular Design

- Capabilities
  - Define scope directly from PTC Windchill
  - Store simprep definition in a separate file
- Common uses
  - Distribute work to users with limited access/permissions to modify top design assembly
  - Filter-down overloaded designs to a standalone valid configuration/variant
- Design in context
  - Edit sub-models in reduced scope of large assembly
  - Can define certain portions read-only
  - Add content w/o modifying original context
    - Manufacturing/testing structures
    - Add-on designs

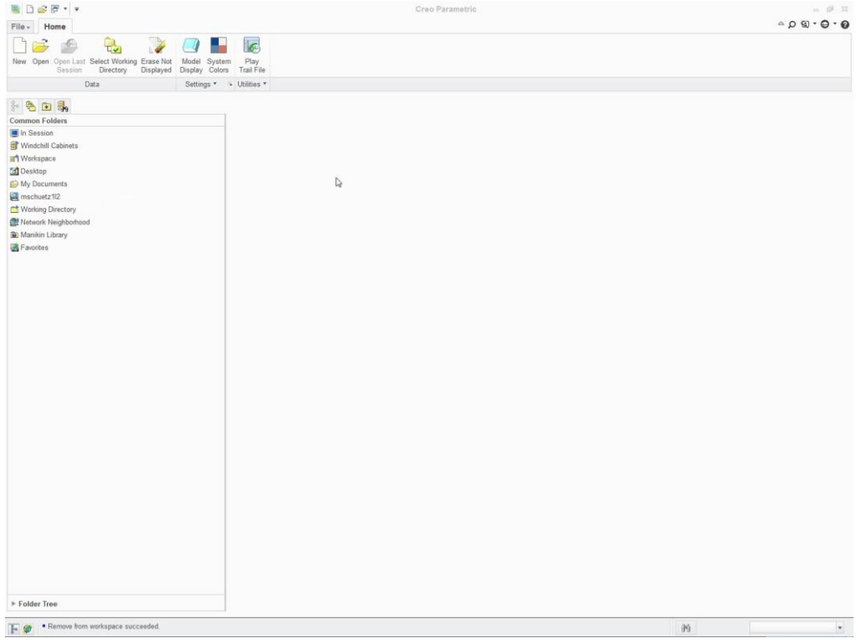


Open Subset

PTC® Live Global

- Large Assembly Mgmt.
  - Design in Context
  - **Open Subset**
  - Lightweight Graphics
  - On-demand Retrieval
- Top-Down Design
  - Skeletons
  - Data-Sharing Features
  - Reference Control
  - Smart Replace
  - Basic Modular Design

- Preview assembly graphics
- Filter desired content
  - By selection
  - By size
  - Remove Internal/External
- Define temporary simprep on-the-fly

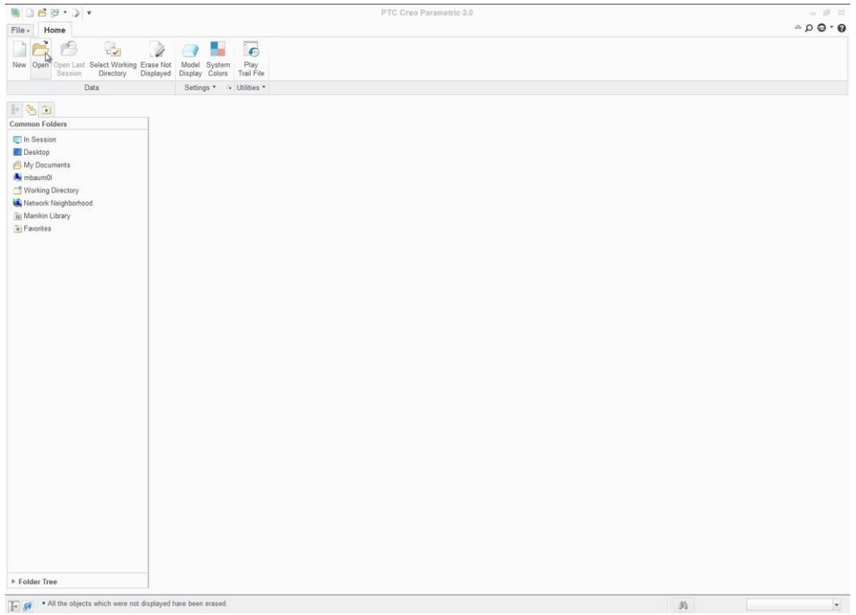


Lightweight Graphics

PTC® Live Global

- Large Assembly Mgmt.
  - Design in Context
  - Open Subset
  - **Lightweight Graphics**
  - On-demand Retrieval
- Top-Down Design
  - Skeletons
  - Data-Sharing Features
  - Reference Control
  - Smart Replace
  - Basic Modular Design

- Quick rough high-level thumbnails
- Selectively drill-down to load more details
- Exclude unneeded areas or keep as rough scenery

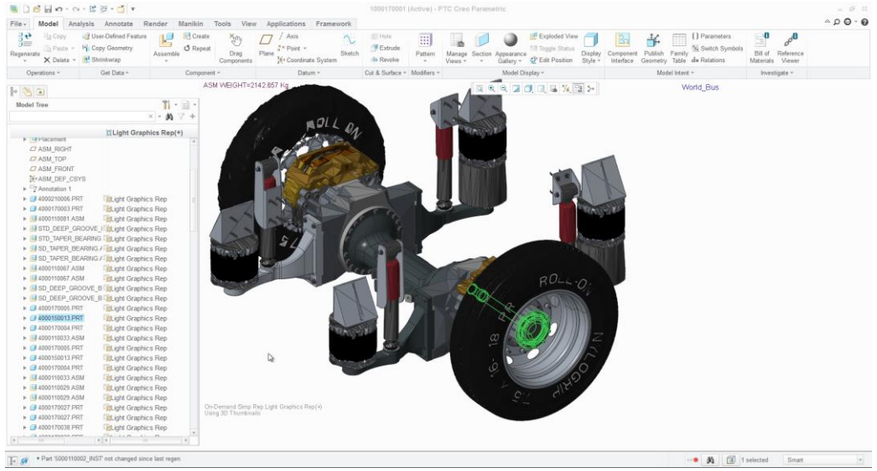


On-demand Retrieval

PTC® Live Global

- Large Assembly Mgmt.
  - Design in Context
  - Open Subset
  - Lightweight Graphics
  - **On-demand Retrieval**
- Top-Down Design
  - Skeletons
  - Data-Sharing Features
  - Reference Control
  - Smart Replace
  - Basic Modular Design

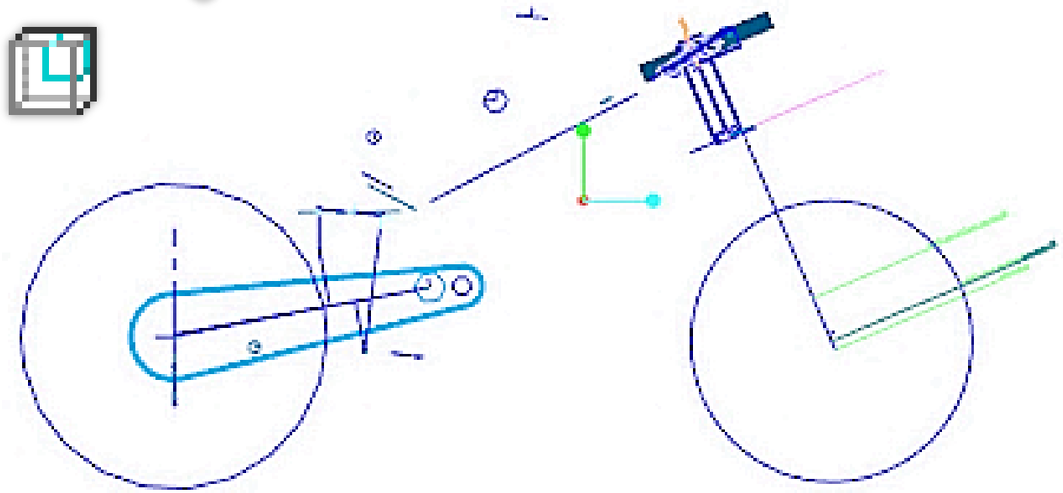
- Automatically load minimal required level of details
  - Edited component
  - Reference models
- Config controlled (enabled by default)
  - Simprep_ondemand_*



Skeletons

- Large Assembly Mgmt.
  - Design in Context
  - Open Subset
  - Lightweight Graphics
  - On-demand Retrieval
- Top-Down Design
  - **Skeletons**
  - Data-Sharing Features
  - Reference Control
  - Smart Replace
  - Basic Modular Design

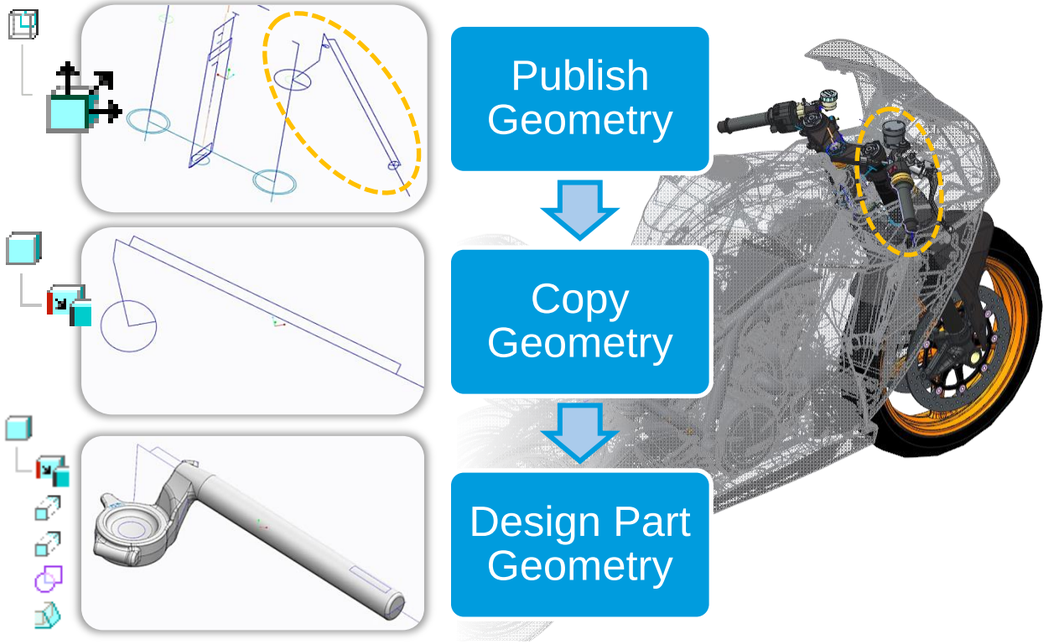
- Central object to capture design intent
  - Abstract system outlines
  - Common associative references
  - Distribute design spaces
- Automatically excluded from Mass calculations
- Easily identified and located
- Common uses
  - Geometry references
  - Placement references

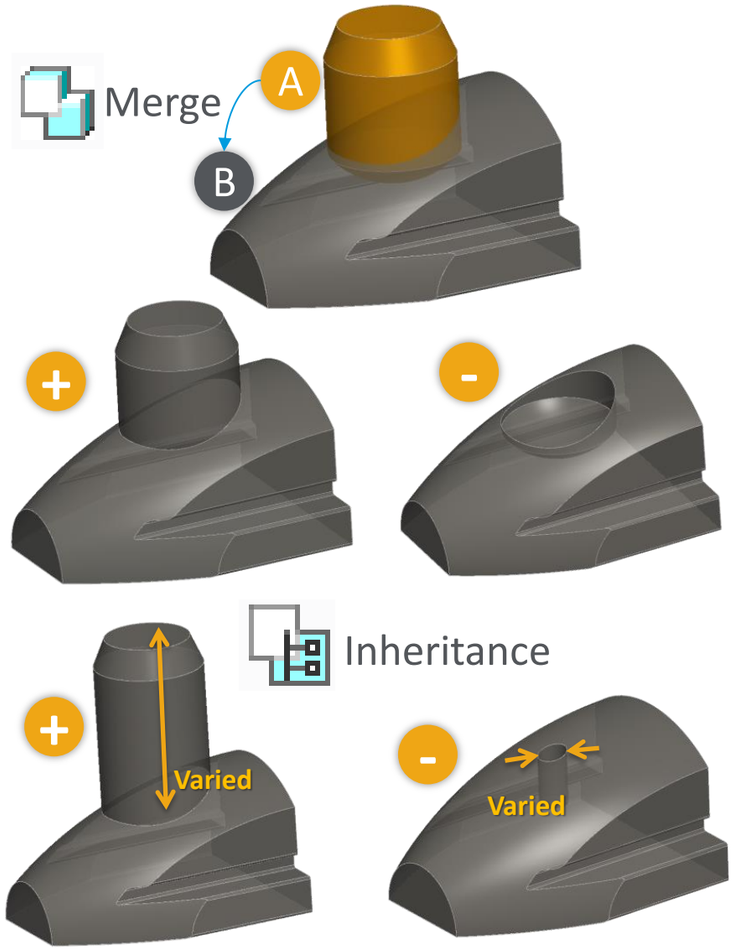


Data-Sharing Features

- Large Assembly Mgmt.
  - Design in Context
  - Open Subset
  - Lightweight Graphics
  - On-demand Retrieval
- Top-Down Design
  - Skeletons
  - **Data-Sharing Features**
  - Reference Control
  - Smart Replace
  - Basic Modular Design

- Associatively share design intent across models
- Reuse and manipulate designs of multiple objects by single parent
- Usage:
  - Skeleton to sub-model
  - Model to model



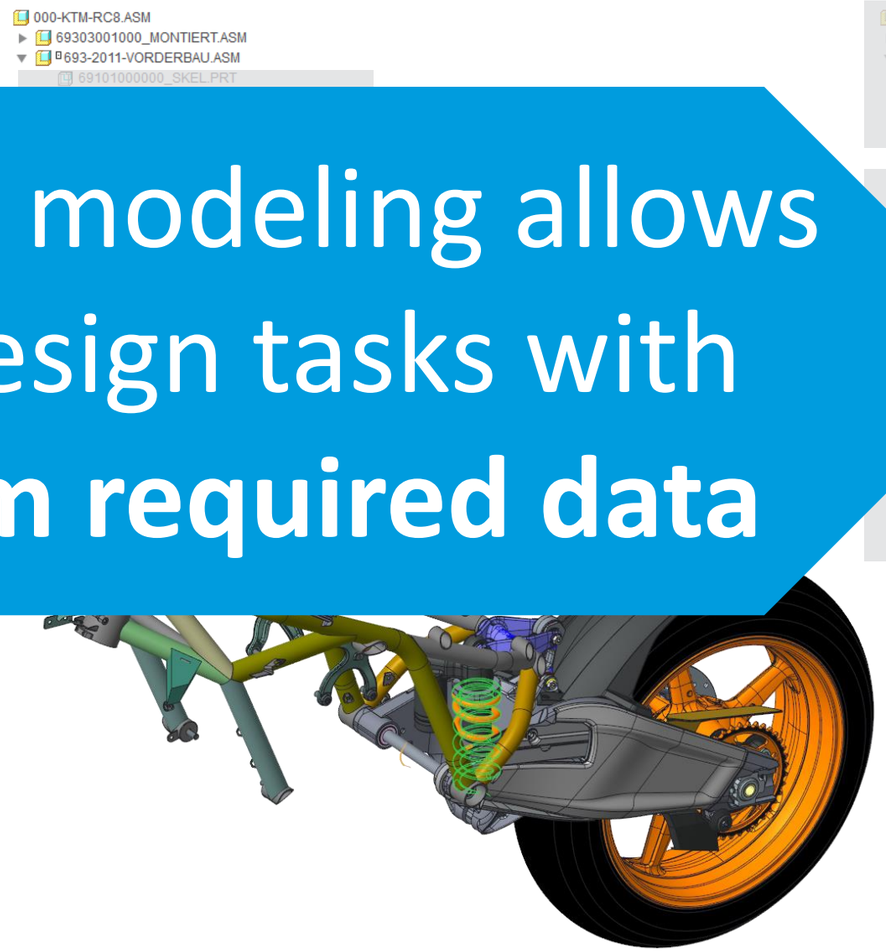


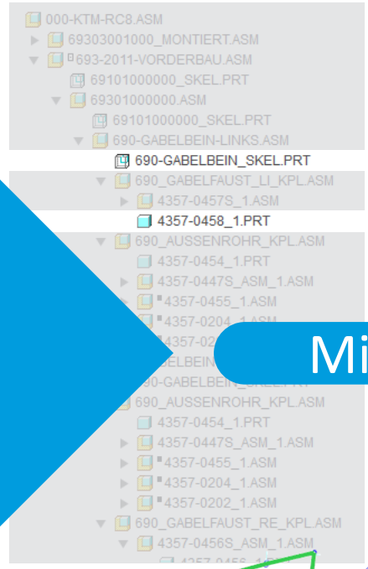
What does it have to do with working on Large Assemblies?

PTC® Live Global

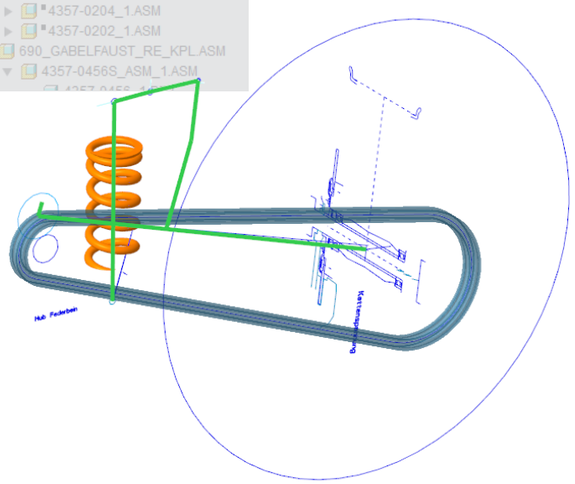
#1: Level of details

Skeleton-based modeling allows completing design tasks with **bare-minimum required data**





Minimal

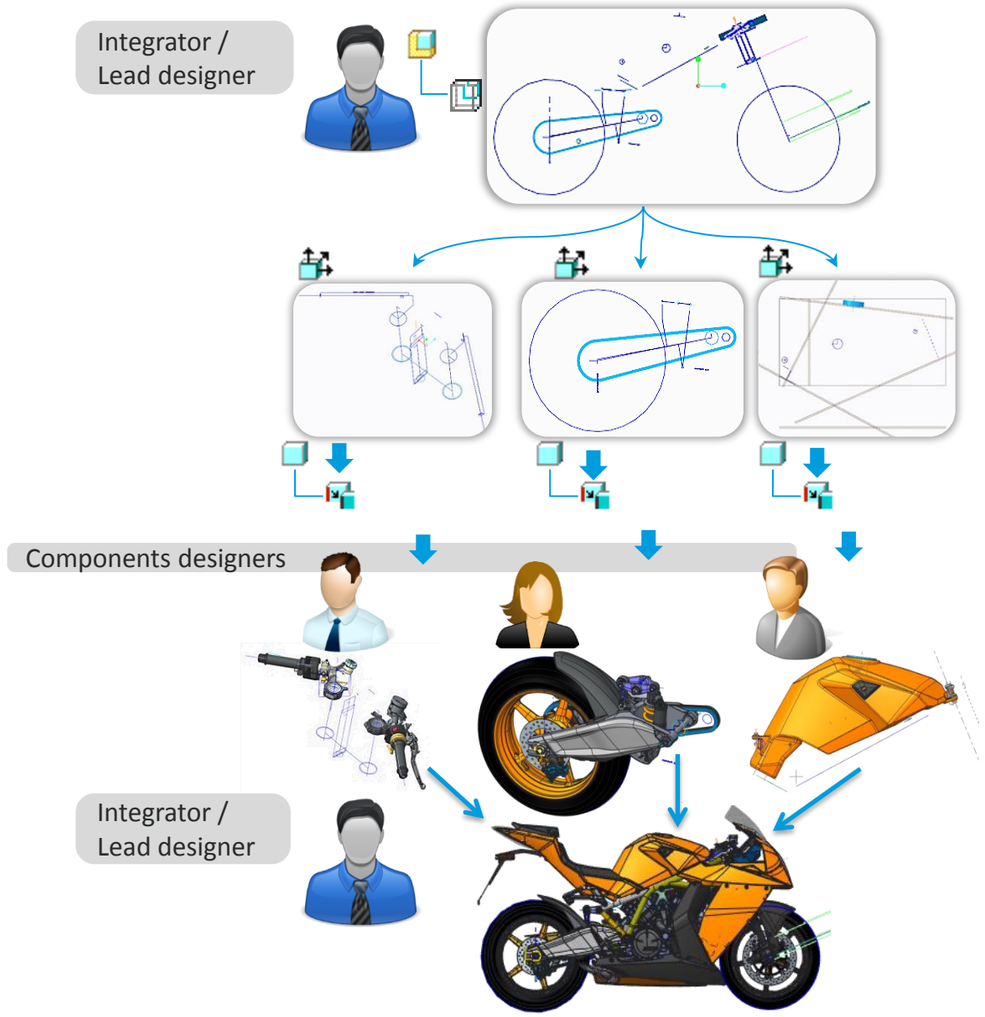


What does it have to do with working on Large Assemblies?

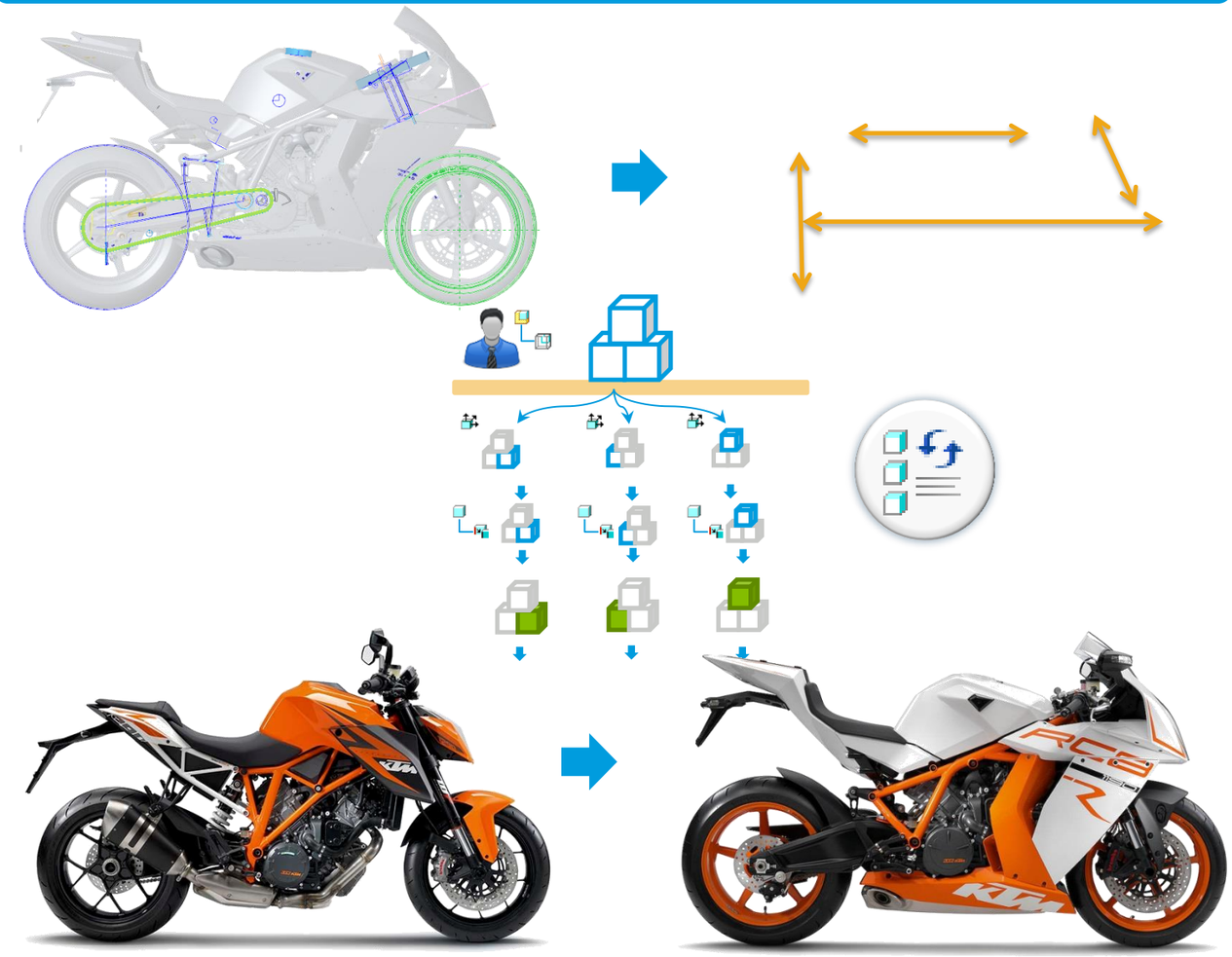
PTC® Live Global

#2: Process efficiency

Distribute work with common context/intent



Automate massive design changes from single object

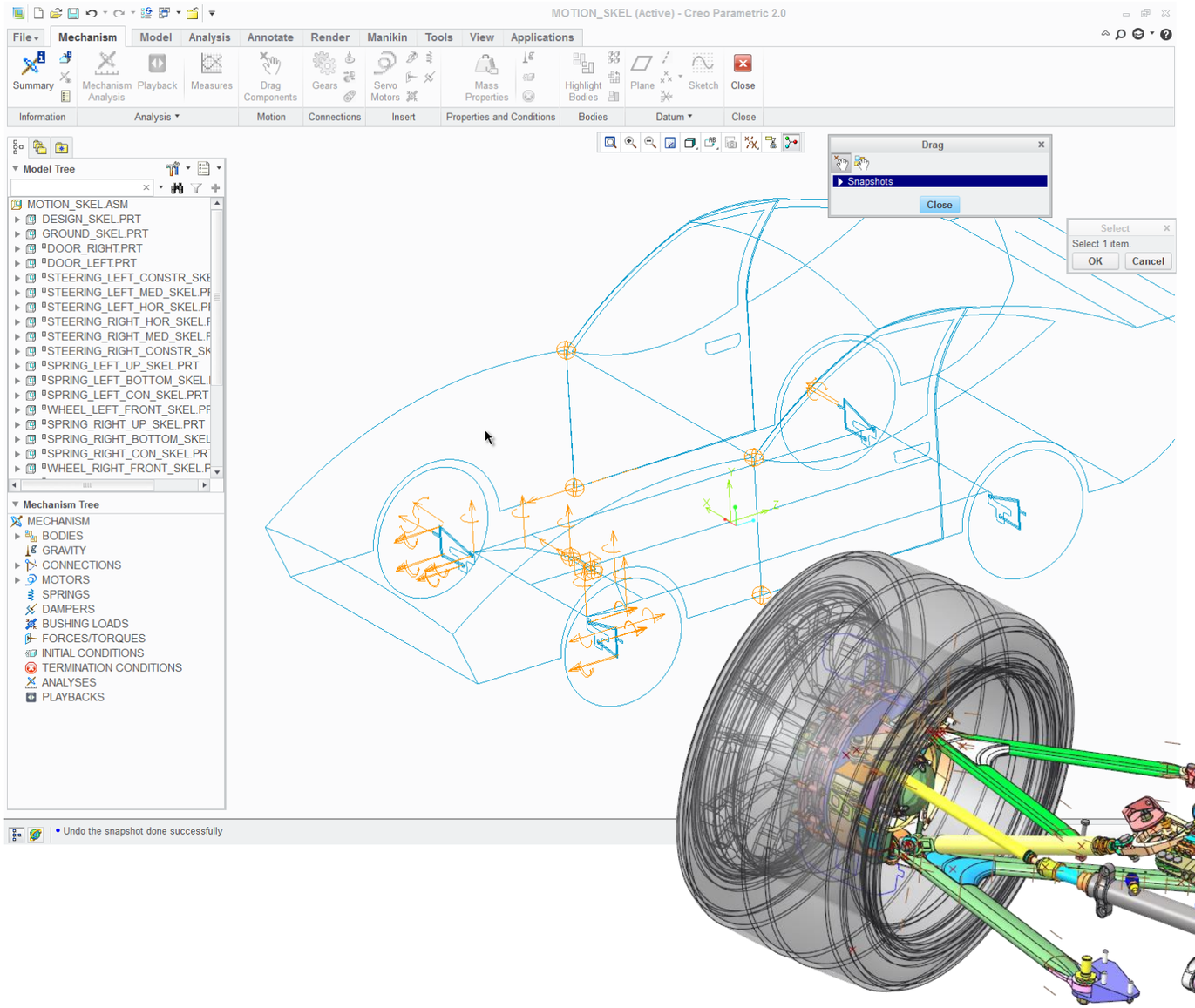


Motion Skeletons

PTC® Live Global

The fastest way to setup Mechanism top-down

- Create schematic assembly up-front
- Attach design models to skeleton bodies
- Automatically share reference geometry to bodies and parts
- Maximize simplification and predictability



Demo

Reference Control

- Large Assembly Mgmt.
  - Design in Context
  - Open Subset
  - Lightweight Graphics
  - On-demand Retrieval
- Top-Down Design
  - Skeletons
  - Data-Sharing Features
  - **Reference Control**
  - Smart Replace
  - Basic Modular Design

- Reference restrictions
  - Scope of creation
  - Scope of selection
  - References backup
- Dependency handling
- Applicable context
  - Global settings
  - Model-specific settings
  - Component-specific settings

Demo

Replace Unrelated

PTC® Live Global

- Large Assembly Mgmt.
  - Design in Context
  - Open Subset
  - Lightweight Graphics
  - On-demand Retrieval
- Top-Down Design
  - Skeletons
  - Data-Sharing Features
  - Reference Control
  - **Smart Replace**
  - Basic Modular Design

Demo

Basic Modular Design

PTC® Live Global

- Large Assembly Mgmt.
  - Design in Context
  - Open Subset
  - Lightweight Graphics
  - On-demand Retrieval
- Top-Down Design
  - Skeletons
  - Data-Sharing Features
  - Reference Control
  - Smart Replace
  - **Basic Modular Design**

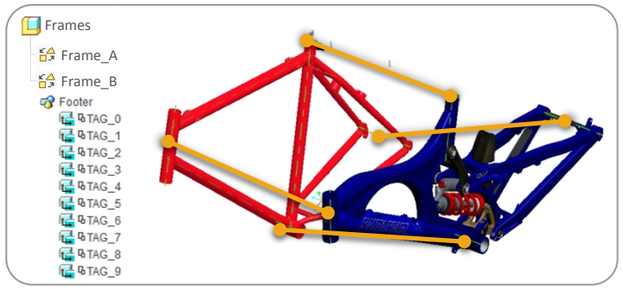
Define functional interchange groups
- "Buckets" for all items that may serve similar function in a product context

Map common references
- Tag common references that would be used in assembly context

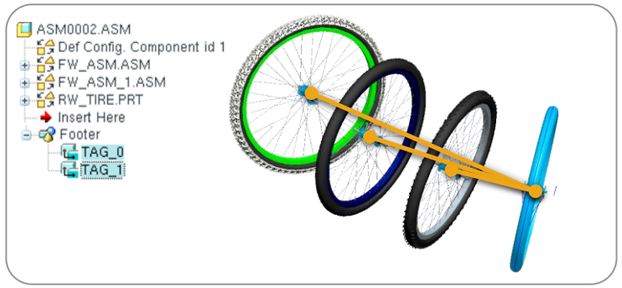
Define prime product structure
- Use tagged references the way they should be in product context

Replace by interchangeable items
- System automatically forward all in-going and out-going references

Interchange group / Module: Frames



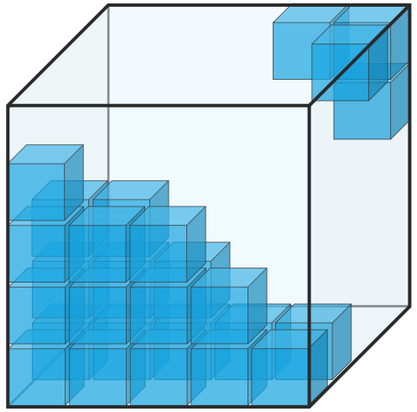
Interchange group / Module: Wheels



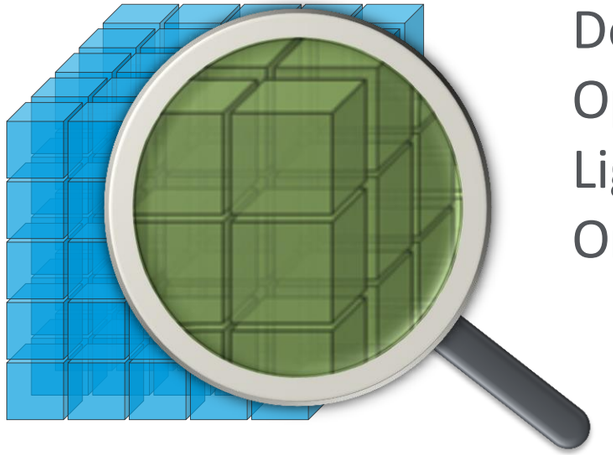
Product design structure

It is all about efficiency!

Skeletons
Data-Sharing Features
Reference Control
Smart Replace
Basic Modular Design
Automation tools



Top-Down Design



Design in Context
Open Subset
Lightweight Graphics
On-demand Retrieval

Large Assembly Management

Design, Distribute, Iterate and Integrate

Faster | Smarter | Easier | More robust

- 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®