PTC Creo 3.0 – Assembly
Best Practices and Design Exploration
Agenda

- Best Practices – recap
- Design Exploration Extension in Creo 3.0
- Demo
- Q&A

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Top-Down Design – Best Practices
Is it not the same??

Not the same

But highly complementing
Top-Down Design and Large Assembly Management

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

Top-Down Design tools

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

Create and iterate content efficiently and concurrently

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Simplified Representations ("Simpreps") – short history

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

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

#1: Level of details

Skeleton-based modeling allows completing design tasks with bare-minimum required data.
What does it have to do with working on Large Assemblies?

#2: Process efficiency

Distribute work with common context/intent

Integrator / Lead designer

Components designers

Integrator / Lead designer

Automate massive design changes from single object
Motion Skeletons

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
Reference Control

- **Reference restrictions**
  - Scope of creation
  - Scope of selection
  - References backup

- **Dependency handling**

- **Applicable context**
  - Global settings (Options)
  - Model-specific settings (RMB / Prepare)
  - Component-specific settings (RMB)
Design Exploration Extension
Challenges of Product Evolution

What do you do when you...

• **Try out ideas** for next version of the product?

• About to perform **significant changes** to a **complex design**?

• **Evaluate different concepts** for a product design?

• **Incorporate** new ideas into the “official” design?
Challenges of Product Evolution

What do you do when you…

Typically these involve…

- **Back-up** and **duplicate** models to ad-hoc folders… Multiple times
- Repeatedly closing/clearing session to **reload different design versions**
- Take a lot of **screenshots** to use for Design Review…
- **Manually identify**/incorporate design changes to **carry forward** for “real”
A “Sandbox” for your designs

• Snapshot entire session content
• Capture incremental changes

• Instantly toggle checkpoints
• Accept changes or revert risk-free

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Explore: Ideate – Evaluate – Decide

- Split to different directions
- Develop simultaneously different ideas
- Evaluate all options before making decisions
DEX Session Content Storage

• Default behavior
  – Paths only to unmodified models
  – Backup modified models only in checkpoints

• Optional setting
  – Full backups all models in DEX session file
    • Upon Entry, Retrieval, or Manually

• Sharing with other users?
  – Same file system? Keep default behavior \textit{w/o backup}
  – Different files accessibility? Use \textit{full backup}
Useful Operations

• Checkpoint properties

• Quick Search
  – Shows instant results
    • By checkpoint names
    • By keywords
  – Shows previously searched names
  – Filters tree to found checkpoints

• Review Changes
  – Compare to pre-modified or to other Checkpoints
Session content while connected to PDM

• Can initiate with already modified items
  – Start models captured: Pre-modified
  – Modified models: Entry checkpoint

• One-way download when in active Design Exploration session
  – Can only upload “legit” designs from regular session

• Store TMZ file
  – Design Review
  – Documentation
  – Revisit decisions
  – …
Store and access .TMZ file on Windchill

Distinct common top object

Attach as **Secondary Content**

Create **common context**

- Product1.asm
- Product2.asm
- ...

Yes

No

My_Awesome_ideas.asm
Coming up: TMZ TMU as Primary Content

To be supported in **Creo 3.0 MOR + Windchill 11.0 (X-26) onwards**

- Session content to be captured in a **TMU** file fully recognized as a CAD object in Windchill

- Related models and required versions will be registered in TMU and linked as **Reference** objects

- Check-in TMU as regular Primary Object
  - Will be recognized by Windchill as **Design Exploration Session**

- To restore a DEX session
  - Download TMU
  - Set dependencies to ‘**All**’
  - Set requested versions to ‘**As Stored**’ (instead of default ‘Latest’)

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Update Control for Advanced Assembly users

Confidently handle **consequences** of design change:

- Intermediate update state
  - Data Sharing Features

- Live **notifications** of outdated items

- Preview changes
  - Before/After
  - Isolate

- Selective **Update**

- Or explore update consequences
  - Can **accept** changes
  - Or **revert** to entry-point

Legacy “**Dependent**”

Legacy “**Independent**” *Restorable*

Break Dependency *Permanently*

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Update Control for Layout users

- Entity level changes tracking
- Selective children update
  - Propagate to all children in one shot
  - or update only some

Update Control and Data Sharing Features

Retrieve Data Sharing Feature reference model: No

Allow individual update control for children when updating a layout feature.

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What’s the benefit?

**DEX allows exploring x7 more design iterations**

Design Exploration Extension workflow allows creating Checkpoints that backup only modified and new models. Switching checkpoints in single click – only incremental differences are reloaded.

**DEX allows 500% more efficient review process**

Design Exploration Extension workflow allows sharing a single compressed file and live instant toggle of checkpoints without data duplicates.

**DEX allows nearly instantaneous integration and ZERO errors**

Design Exploration Extension workflow allows integrating only changed and new models with a single click of accepting a checkpoint.
Summary

- Unleash **creativity**
- Evaluate all possibilities
- Confidently handle **consequence** of complex design changes
- Interactive **Design Reviews**
- Efficiently **incorporate** design changes
- Document **decision making** process