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CUST210: Creo View Publishing Strategy and Implementation at John Deere

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*All Presentations are subject to change

Agenda

- Overview of John Deere
- Current State of Ag & Turf System
- Deere Visualization Requirements
- Deere Visualization Solution
- Challenges
- Results

Overview of John Deere

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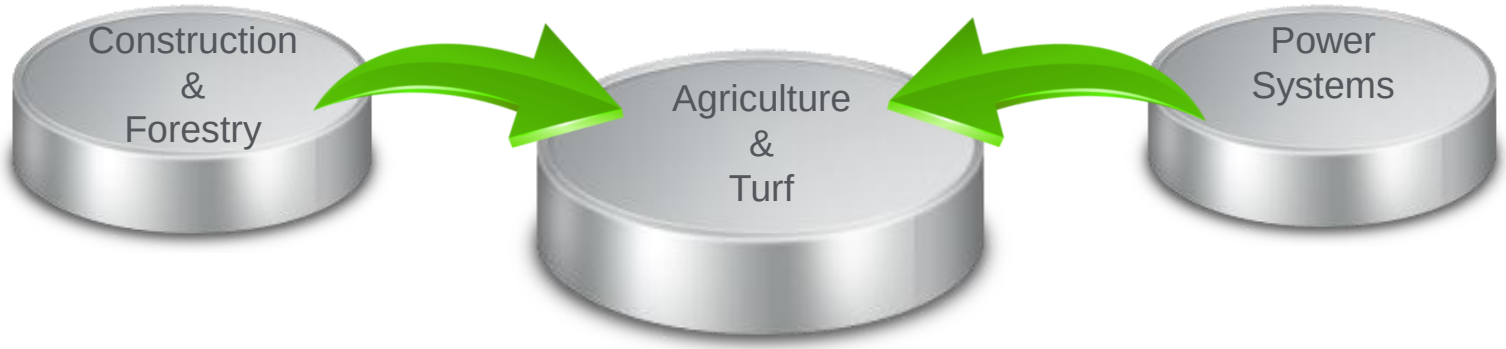
- The world's leading producer of agricultural equipment..
- A leader in the production of equipment for construction, forestry and turf care.
- One of the largest equipment finance companies in the U.S.
- $36 billion in sales and revenues in fiscal 2012.
- More than 65,000 employees working on six continents.

PDMLink Convergence Program

- Currently in the process of consolidating three PDMLink systems.



- Agriculture & Turf PDMLink system is the largest in the company.
- Creo View publishing was implemented on the Ag & Turf PDMLink system in January 2013.

Current State of the Ag & Turf System

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- Windchill 10.0 M040
- Pro/Engineer WF4 M230
- Creo View 2 M010 adapters
- Creo View 2 M040 client
- Open Assembly
  – custom software for translating and storing derivative data.
  (JT, STEP, IGES, HPGL, VRML, PDF, etc.)

Current State of the Ag & Turf System

- 8+ million CAD documents in the database.
- 10,000+ Pro/ENGINEER check-ins per day.
- 150+ Windchill products and libraries.
- 9 Windchill replica sites.
- Assemblies with 265,000 nodes in the CAD BOM.
  (40,000 unique)

Deere Visualization Requirements

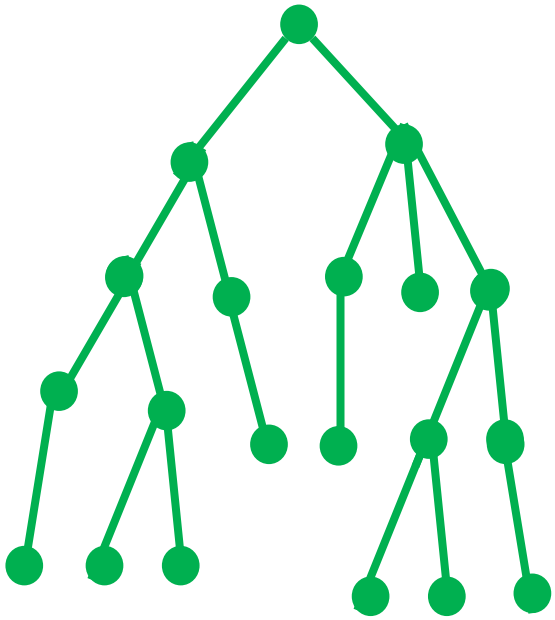
- CAD and MS Office documents are to be published.
- Publishing must be fully automated – no manual publishing required.
- 100% correct data – Users are not allowed to configure publish jobs or move representations to ensure correctness and consistency.
- Publishing is to occur on check-in.
- 3D representations must always use “latest” config spec.
- Representations must always be up to date.
- 2D representations for drawings must always use “as_stored” config spec.

Deere Visualization Requirements

- Assembly features must always translate correctly.
  (assembly cuts, flexible components, cables, etc.)
- There must not be any missing default representations.
  Every object must have a derivative.
- Must be able to visualize both CAD and WTPart data.
- All components must be positioned correctly.
  (insert, mate, align, etc must hold true)
- Must be able to set security on each component.
- Exact BREP data (analytical) is needed in the derivative for detailed analysis.

Positioning Assemblies

- Used for higher level assemblies.
- Unlimited assembly size limit.
- Representation will always be up-to-date with “latest” config spec.
- Security settings are enforced on components.



Extended Positioning Assemblies

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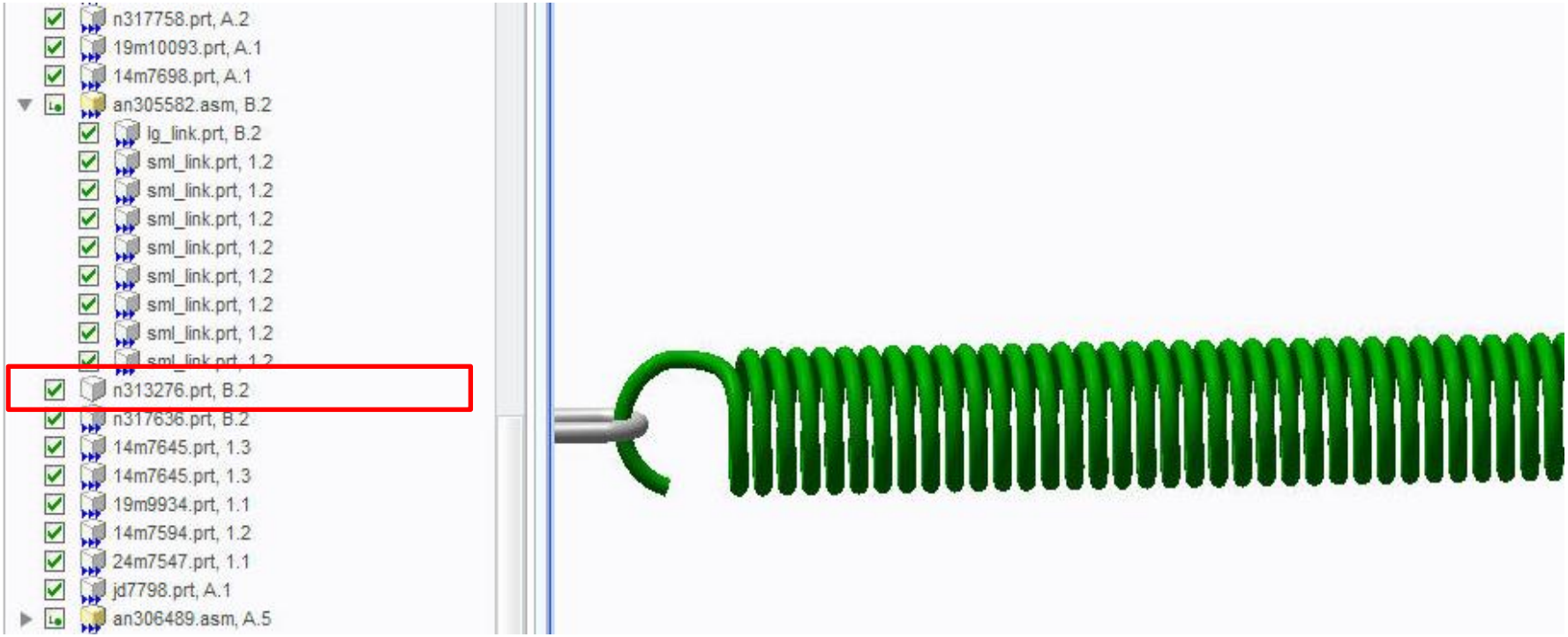
- Used for lower level assemblies and assemblies with assembly features.
- The simplified rep named “default” is used for the publish job.
- Representation will always be up-to-date with “latest” config spec.
- Recipe overlay property is used to regenerate the assembly when published.

Extended Positioning Assemblies

- Components affected by an assembly feature are converted and stored in the same container.



- positioningassembly.usecadrep.filtermethod
  Is used to determine how to publish each assembly. The Deere code checks for WTPart soft type to make this determination.

Resubmitting Failed Publish Jobs

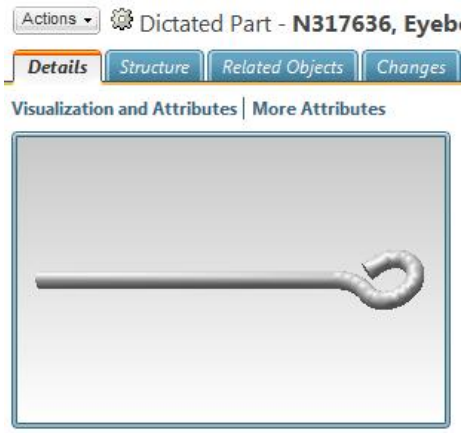
- Publish jobs occasionally fail for various reasons.
- Publish jobs that contain assembly features will also fail if they are published as positioning assemblies.
- We developed a custom schedule job to resubmit these failed jobs.
- Assemblies that contain assembly features are resubmitted as extended PAs.
- The designer is emailed if the model fails to publish.

doPublish API

- There is a Windchill API that allows publish jobs to be submitted with custom code.
- doPublish allows the config spec, assembly type, priority, and several other parameters to be set to instruct how the object is published.
- We use this API extensively in our customizations.
- This is how we are able to submit all 2D drawings using “as_stored” and 3D data using “latest”.

WTPart Visualization

- WTParts require visualization to use “options and variants” technology.
- We created a customization to copy the default rep from the associated CAD document to all of the WTPart iterations that are associated to this CAD document when published.
- WTPart publishing is disabled.
- This ensures all WTPart iterations associated to a particular CAD object always have identical representations.
- This also prevents duplicate derivative data creation. All copied reps point to the same .OL file.



Additional Customizations

- We developed a customization that allows us to upload a CSV file that contains a list of objects to be published.
- We developed a custom schedule job that calculates the publishing statistics every hour.
- A global filter method was written to prevent objects with certain file extensions from being submitted.
- A startup script was developed for the client that runs hidden.

Infrastructure

- 20 – Pro/ENGINEER workers running on VMware.
  - WinServer 2008
  - 2 processors
  - 22 GB RAM
- 1 - Office workers running on VMware.
- 30 - Numbered publisher queues.
- Three of the nine nodes in our Windchill cluster are dedicated to CAD translation. This includes both Creo View and Open Assembly.

Challenges

- Representations of drawings in the PDF format are not always correct. We are not currently publishing drawings because of this.
- Publishing jobs will timeout if mark out-of-date is enabled. This occurs on commonly used components due to the large query.
- Scheduled jobs are unable to complete if using a query. If we remove the query limit the job will finish after running for several days.
- Windchill replication runs slower than we can publish.

Challenges

- Many of our WTParts are missing build history due to legacy data loads. Visualization is not available on these WTParts until build history is established.
- Older versions of the client do not work well with positioning assemblies.
- Creo Parametric Light Graphics functionality does not work well with positioning assemblies.
- 100+ technical support calls.

Results

- All visualization requirements were met.
- 13 customizations were developed to meet these requirements.
- Retrieval performance is more than 2X faster than JT file retrieval with TeamCenter Visualization.
- The client is being phased into production to minimize risk.
  - 13 000+ users
  - ~15 countries

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