

V5R11 Outfitting Overview

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March 31, 2003



V5R11 Overview

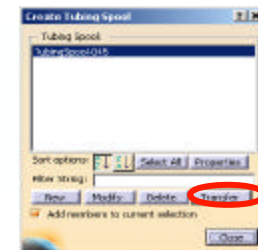
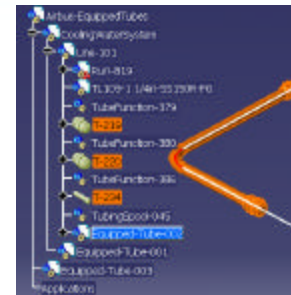
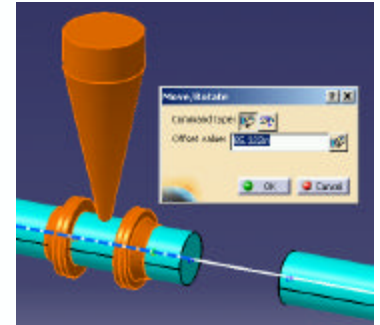
- Large data management
 - Improved cache mode support
 - ⇒ Convert to Cache mode
 - By line
 - All objects directly connected to a selected object.
 - ⇒ Creation, Modification and Analysis commands automatically convert what needs to be converted to design mode.
- Performance Improvement
- V5R11 Enhancement
- Electrical Cable Routing Enhancements
 - PRM Integration
 - Function/Physical integration
 - Schematic driven design
 - More efficient cable way network definition
 - Cross document connection Integration
- Diagram Enhancements
 - Copy/Paste Functionality
 - Integrated Schematic/Drafting Translation
 - Snap Connect
- ENOVIA Integration
 - Manage cross document relationships
 - Impact on/Impact by.

V5R11 Key Enhancements



General Enhancements (1/4)

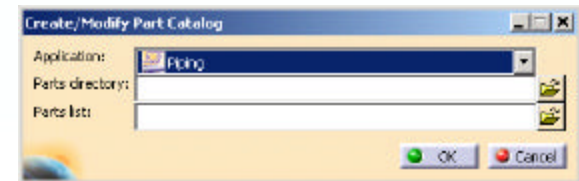
- Adjust part assembly (Series of connected parts)
 - Dedicated move command to allow move along a run.
- Transfer a spool to a separate document
 - Move all parts
 - Move line and spool instances
- Improve Unique reference handling
 - Modify existing reference as needed (during adjustment).
 - No automatic save on disk (keep document in memory).
 - User decides where to store it on disk.



General Enhancements (2/4)

■ Automatic Catalog Creation

- Resolved Catalog creation
 - Build the catalog from a user defined directory of parts
 - Automatic definition of catalog keywords based on attribute names and values
 - Build catalog hierarchy using the object type hierarchy.
- Parametric catalog creation
 - Build the catalog from a user defined directory of parametric parts.
 - For every part found in the director
 - Import design table in to the catalog
 - Define keywords based on attributes defined in the design table as well as the Part.
 - Build catalog hierarchy using the object type hierarchy.



General Enhancements (3/4)

■ Drawing Customization per View using XML

- Filter view content: Only Piping, Only HVAC, Both, Etc.
- Define graphic attributes for each application by view
 - Color, Line style, Line type, Etc..
- Graphic representations to be displayed:
 - Single less than 2 1/2in
 - Double greater than 2 1/2in
 - Envelope, etc.
- Customize Centerline display
- Etc.

```
- <std:node name="PipingDesign">
  <!-- ***** OBJECT A PIPING PART ***** -->
  - <std:node name="PipingPart">
    <!-- ***** Graphic Representations Domain Start ***** -->
    <!-- ***** Default Values ***** -->
    - <std:node name="Visible">
      <std:enumval name="Yes/No">Yes</std:enumval>
    </std:node>
    <!-- ***** Default Color ***** -->
    - <std:node name="Color">
      <std:colorval @ 0 255 0 /std:colorval>
    </std:node>
    <!-- ***** Default LineType ***** -->
    - <std:node name="LineStyle">
      <std:enumval @ 1 /std:enumval>
    </std:node>
```

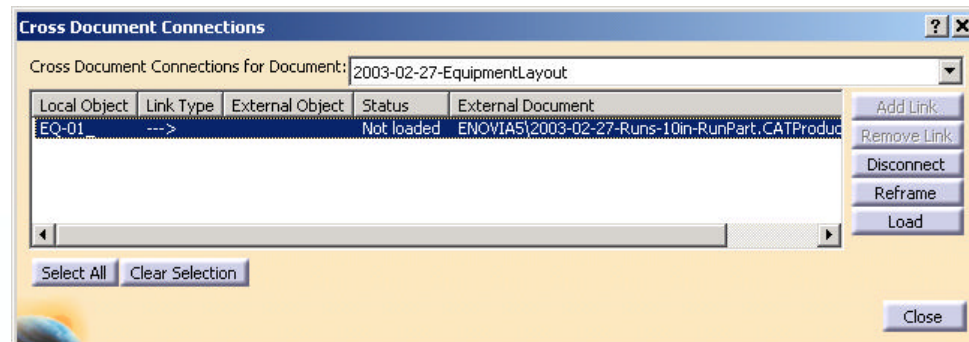
```
+ <std:node name="PipingDesign">
  <!-- ***** OBJECT A PIPING PART ***** -->
  <!-- * END APPLICATION - P I P ***** -->
  <!-- -->
  <!-- ***** OBJECT X ***** -->
  <!-- * START APPLICATION - EQUIP ***** -->
+ <std:node name="EquipmentArrangement">
  <!-- ***** OBJECT X ***** -->
  <!-- * END APPLICATION - EQUIP ***** -->
  <!-- -->
  <!-- ***** OBJECT X ***** -->
  <!-- * START APPLICATION - HVAC I ***** -->
+ <std:node name="HVACDesign">
  <!-- ***** OBJECT A ***** -->
  <!-- * END APPLICATION - HVAC I ***** -->
  <!-- -->
  <!-- ***** OBJECT A ***** -->
  <!-- * START APPLICATION - T U P ***** -->
+ <std:node name="TubingDesign">
  <!-- ***** OBJECT X ***** -->
  <!-- * END APPLICATION - T U P ***** -->
  <!-- -->
  <!-- ***** OBJECT X ***** -->
  <!-- * START APPLICATION - Compar ***** -->
+ <std:node name="CompartmentAndAccess">
```



General Enhancements (4/4)

■ Cross document connection management

- Create connection between objects in two different work Packages without storing connection in common parent
- One way and two way connections need to be supported
- *Interactive functionality* to allow cross document link management.
 - ➔ Query cross document connections
 - ➔ Repair cross document links (Add/Remove, or Disconnect links)
 - ➔ Load connected work packages



Electrical Cable Routing (1/2)

- PRM Integration
 - Manage all resources associated to a project
Catalogs, Dictionaries, Line lists, Etc.
 - Switch dynamically switch between projects.
Resources are automatically associated.

- Integration with existing Schematic and Technological modeler
 - Create sub-type and add attribute
 - Define discrete values for attributes
 - Object ID Schema definition

- 2D functional/3D physical integration
 - Same look and feel across all 2D and 3D applications
 - Function/physical mapping: Allows proper physical part selection
 - Physical Part selection in the schematic diagram
 - Schematic driven 3D Electrical equipment placement
 - Schematic driven Cable routing



Electrical Cable Routing (2/2)

- 2D/3D integration using standard integrator for 3D Equipment reconciliation with the schematic.
- Improved Cableway definition
 - Cableway extremity connectivity to multiple equipment
 - All connectors on equipment to map to one cableway “entrance”
 - Integration of cable extremity with cableway extremity
- Optimize cable route definition
 - Relationship between cable and cableways
 - Cross document pathway connections.

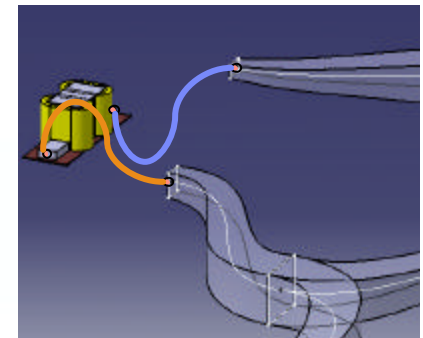
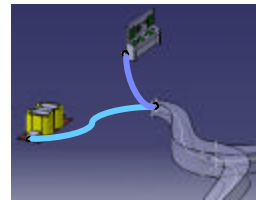


Diagram Enhancements (1/2)

■ Copy/Paste Functionality

- Support for technological information
 - ➔ Logical lines
 - ➔ Equipment
 - ➔ Discipline parts (piping, HVAC, electrical, ...)
 - ➔ Discipline lines (pipe line function, HVAC, line function, cable, ...)
- Support for drafting objects
 - ➔ Geometry
 - ➔ Annotation
- User interface
 - ➔ Select objects to copy via all standard selection mechanisms
 - ➔ Paste into document and drag image to proper placement position

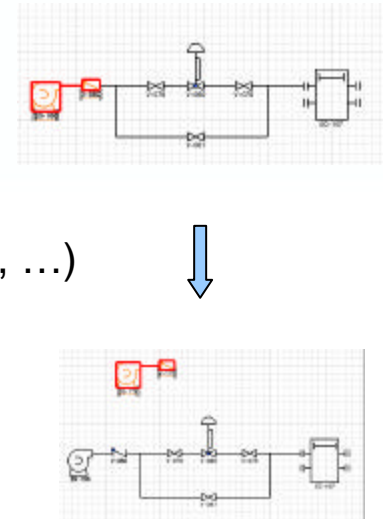


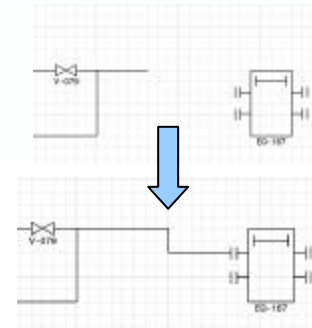
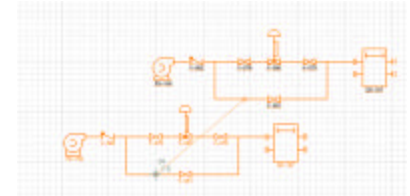
Diagram Enhancements (2/2)

■ Integrated Schematic/Drafting Translation

- Ability to translate schematic and drafting information in one integrated step
- Select objects to translate via all standard selection mechanisms
- Drag image to proper translation position

■ Snap Connect

- Connect any two compatible objects
 - Line to line
 - Component to component
 - Line to component
- Snap first object to second object with correct translation and orientation



ENOVIA Integration

- Usability enhancement to improve Work package management
 - Automatically place parts in the proper work package
 - Place parts in the same document as the Run
 - Place nozzles in the same document as the Equipment
 - Place branch parts in the same document as the main Run
 - Etc.
 - Allow users to manually decide what document to use for parts placement.
 - Insure that Runs are placed inside a work package.
 - Insure that placement of Equipment in free space is inside a work package.

- Relationships between objects in different documents
 - Cross document connections
 - Cableway to equipment
 - Impact on/Impact by
 - Off sheet



Performance Improvements



3D Outfitting – Performance Analysis (1/2)

■ Hardware / Software information

- Windows 2000
- Hardware specifications
 - ➔ Speed= 2200 MHz
 - ➔ Ram=2000Mb
- “Work Package” Mode – Piping Example, but, also applies all Fluidic Routable

Test Case 1 - 50 Spools		
Description	Count V5R10 SP2	Count V5R10 SP4
Number of files	650	650
Number of piping parts references	506	506
Number of piping part instances	650	650

■ Put / Get data

- File base
- ENOVIA V5

Description	Test Case 1 - 50 Spools		
	Count V5R10 SP2	Count V5R10 SP4	% Improvement
Document Size on Disk (KB)	3553	2762	22%

Scenario Description	Test Case 1 - 50 Spools		
	CPU V5R10 SP2	CPU V5R10 SP4	% Improvement
Open data using file base - In design mode	306	119	61%
Open data using file base - In cache mode	120	45	63%
Put data From Catia V5 to ENOVIA V5	1120	960	14%
Send data from ENOVIA to Catia V5 - In design mode	1350	600	56%
Send data from ENOVIA to Catia V5 - In Cache mode	425	180	58%



3D Outfitting – Performance Analysis (2/2)

■ Hardware / Software information

- Windows 2000
- Hardware specifications
 - ➔ Speed= 2200 MHz
 - ➔ Ram=2000Mb

■ Catia V5 Functional measurement for Key scenarios

Scenario Description	CPU V5R10 SP2	CPU V5R10 SP4	% Improvement
Run related operations			
Create new Run	4	1.5	63%
Switch Run display (Solid/Single)	33	1	97%
Edit a node (No Bendable)	34	1	97%
Edit a node (with Bendable)	46	2	96%
Edit a segment (No bendable)	33	2	94%
Edit a segment (with bendable)	120	5	96%
Place parts			
Place a Valve	8	7	13%
Place a Bendable	8	6	25%
Place a Part on a Part	10	9	10%
Insert a Valve in a Bendable	40	17	58%
Modify a parts			
Rotate a part	120	0.6	100%
Move a part	120	1.5	99%
Delete parts			
Delete Bendable	7	2	71%
Delete Valve	7	2	71%
Switch graphic representation			
	7	1	86%



3D Outfitting – Additional Performance Improvements

■ V5R11 Performance Improvements

- Catia functional improvements in large design models (larger than 500 parts) – Optimization of:
 - Layout definition (Creating Runs) in large design documents
 - Part placement
 - Layout Modification – Run adjustment, Pipe with bend, adjust part location, Resize and Respec a layout
 - Full design (Creation and Modification scenarios) in Cache mode

■ V5R12 Performance Improvements

- Further Optimization of:
 - Design rules (compatibility, turn rules, etc.) access and processing.
 - Part placement
 - Layout modification (Adjust Runs with bendable, etc.)
- Reduce the number of references (Improves file open & get from Enovia)
 - Pipes stored in the design document (CATProduct document)
 - Welds stored in the design document (CATProduct document)
- Improve catalog loading and part selection
 - Allow nesting of catalog. One catalog for each part type.
 - Load only required catalog based on part type.



Outfitting Performance Conclusion

■ CATIA/ENOVIA “Loading Time”

- V5R10SP4
 - ➔ Applications provide x2 performance benefit over R10SP2
- V5R12
 - ➔ Applications will provide an additional x2 benefit over R10SP4 for a total of x4 benefit over POC environment (R10SP2)

■ “Functional Performance”

- V5R10SP4
 - ➔ Applications provide approx. 75% performance benefit (average) over R10SP2
- V5R12
 - ➔ Applications will improve performance in additional key areas of functionality



Reduce Memory usage



Reduce Memory usage: Load less data (1/2)

- Support design scenarios in **Visu mode** for all Applications.
 - Auto-Load objects in design mode as needed.
 - ➔ During the design process: Creation and modification scenarios.
 - Manual Load Tools:
 - ➔ By Line, Connected Objects, By Runs, Multi-Selection
- Support design scenarios in **B-Rep mode** for all Applications.
 - Provide the ability to manage technology, geometry and connectivity without loading unnecessary geometry specifications.



Reduce Memory usage: Reduce disk space (2/2)

- Reduce 3D geometry overhead
 - Remove unneeded geometry specification (Design table, parameters,...)
 - Use Cleaner to remove dead data (Catalogs, Design data)

- Don't create Mechanical constraints between parts and Runs.
 - Reduce geometric complexity
 - Reduce number of objects

- Light modeling of Technological attributes.
 - Nominal size, End style, Wall thickness, Etc.

- Define methodology for using WBS to define tree organization.
 - Using WBS methodology instead of product structure mechanism decreases the data size by at least 30%.

