

In partnership with



Business Collaboration through Standards

By

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DASSAULT SYSTEMES R&D Technology Interoperability

Agenda

R&D Involvement in STEP groups

STEP support within **3DEXPERIENCE** and CATIA V5

R&D Collaboration with buildingSMART on IFC

IFC support within **3DEXPERIENCE**

Conclusion

R&D Involvement in STEP groups

- ▶ Member of ISO/TC184 (AFNOR/IDMI) and AFNeT (FR), PDES Inc (US) and ProSTEP(DE)
 - ▷ Strong collaboration with STEP experts to enhance Business Collaboration and Long Term Archiving
 - ▷ Contribution to and validation of STEP Recommended Practices
 - ▷ Participation to ISO/SC4 Plenary, Standardization Days, STEP AP242 Day
- ▶ Cooperation on archiving with Aerospace joint group LOTAR
 - ▷ Data model definition (tessellation, PMI, ...)
 - ▷ Participation to LOTAR pilots to validate data models
- ▶ Key actor through AFNeT in Implementor Fora
 - ▷ Participation to all CAX-IF Test rounds since TR2J (1999)
 - ▷ Participation to PDM-IF
 - ▷ Participation to EWIS-IF
- ▶ Participation to CAD and PDM Benchmarks (AFNeT and ProSTEP IVIP)
 - ▷ <http://benchmark.ap242.org/>

Agenda

R&D Involvement in STEP groups

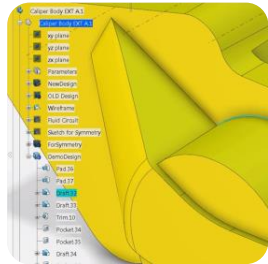
STEP support within **3DEXPERIENCE** and CATIA V5

R&D Collaboration with buildingSMART on IFC

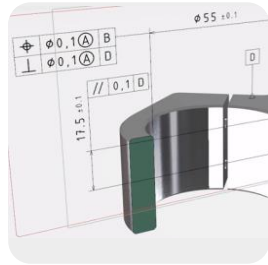
IFC support within **3DEXPERIENCE**

Conclusion

STEP | Major Supported functionalities



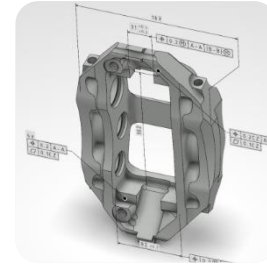
Exact Geometry,
Product Structure



Graphic PMI,
Validation Properties



Composite,
Tessellated Geometry



Semantic PMI,
PDM

STEP AP242
Ed2

Composite*,
Semantic PMI*

V6R2013x

3DEXPERIENCE R2018x

3DEXPERIENCE R2022x

V5R07

V5R20

V5-6R2013

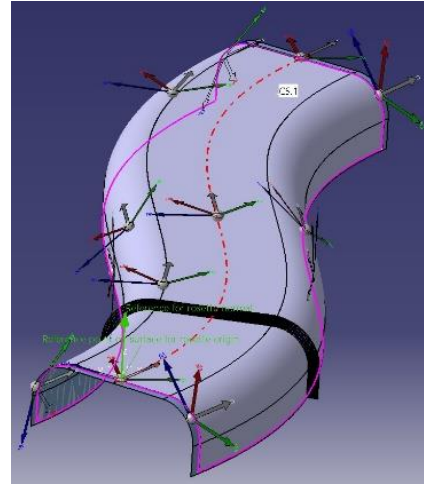
V5-6R2018

V5-6R2022

STEP AP242 CAD | Applicative Data

▶ Enhanced composite design support

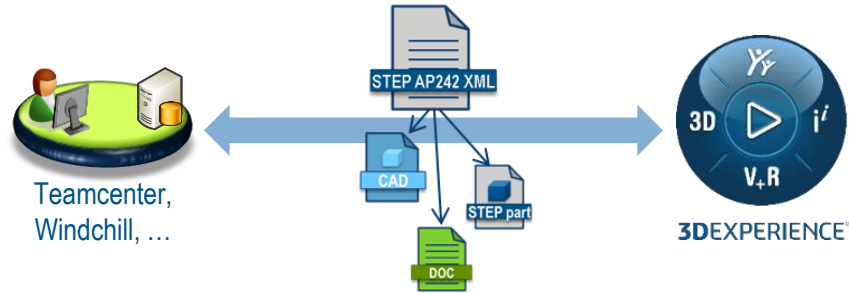
- ▷ Rosette guided by curve
 - ▶ Required for Cylinder or Curved surfaces
- ▷ Multiple rosettes



▶ Improved completeness of applicative data interoperability

- ▷ Export-Import of the User Attributes defined thru a Parameter set at Part/Product level
- ▷ Export-Import of the Geometric Sets with their associated Attributes.

STEP AP242 PDM | Collaboration in 3DEXPERIENCE



► Scenarios supported with STEP AP242 XML.

- ▷ Exchange of assemblies referencing CAD files (STEP or native) and non-CAD documents (PDF, Office,...)
- ▷ STEP PDM Collaboration with **lifecycle** management (Update and Versioning)
- ▷ STEP PDM Collaboration with **configuration** management (Effectivities)
- ▷ Exchange between **customized PDM system**

STEP AP242 PDM | Work in progress

► Configuration

- ▷ Exchange of assembly, filtered by means of effectivity-based criteria



► PDM Exchange

- ▷ Improve completeness of exchanged semantic



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R&D Collaboration with buildingSMART on IFC

- ▶ **Member of buildingSMART Community**
 - ▷ BuildingSMART International enables the development, creation and adoption of open digital standards such as the Industry Foundation Classes (IFC).
- ▶ **Participation to bSI-ISG/MSG/IFC Development Meeting**
 - ▷ Implementor and Modeling expert meetings to discuss implementation and future of IFC.
- ▶ **Participation to IFC Rail Implementers Forum**
 - ▷ Implementers forum to test and validate upcoming IFC4x3 Rail standard.

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IFC | Major Supported functionalities



Building semantic
Faceted geometry



Exact geometry (IFC4)
Tessellation (IFC4)



Terrain (IFC4)
Alignments (IFC4x1)



Piping, HVAC, Raceway
Bridge (IFC4x2)



Rail (IFC4x3)

3DEXPERIENCE R2014x

3DEXPERIENCE R2016x

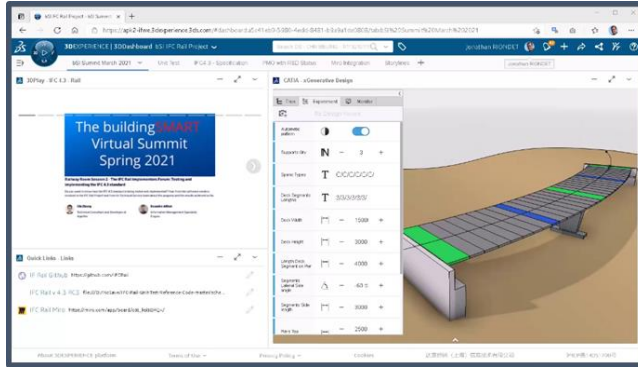
3DEXPERIENCE R2018x

3DEXPERIENCE R2020x

3DEXPERIENCE R2022x

IFC | Work In progress

- ▶ Participation to Implementor Forum and prototyping of IFC Rail support (IFC4x3 RCx)



- ▶ Enhance IFC Import User Experience:
 - ▷ Geolocation: Capability to choose the CRS when information is not present in IFC File.
 - ▷ Merging and Filtering: Enhance capabilities with new Import mode.
- ▶ Enhance IFC semantic support:
 - ▷ Completing support of Domain specific data (IfcElectricalDomain, IfcHvacDomain, IfcPlumbingFireProtectionDomain)

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- ▶ Dassault Systèmes R&D will continue to contribute to both development and implementation of Standards.
- ▶ Client need is captured through direct relationship and via « User-Group Use Cases » (defined and tested in Implementers Fora)

- ▶ Next milestones
 - ▷ Integration IFC4x3 as soon as it becomes a released standard.
 - ▷ Expand semantic coverage of STEP and IFC within our solution.



CAD functional capabilities supported by the STEP AP242 interface

3DEXPERIENCE

3DEXPERIENCE STEP AP242	CAD information	Implementation format		Level of implementation		
		P21	XML	Pilot	IF test	COTS
3D Geometry	3D exact Brep	YES	n/a			X
	3D tessellated Brep	YES	n/a			X
	presentation(colors, layers, transparency, invisibility, etc...)	YES	n/a			X
3D PMI (GD&T, 3D Annotations, UDA)	graphic presentation	YES	n/a			X
	semantic presentation	YES	n/a			X
Assembly Structure	1 single P21 STEP file	YES	YES			X
	1 assembly STEP file referencing CAD P21 STEP files	YES	YES			X
	nested assembly STEP files referencing CAD P21 STEP files	YES	YES			X
Kinematics	Motion	NO	YES		X	
	Mechanism	NO	YES		X	
Composites design	implicit ply definition based on exact surface and contour	YES	NO			X
	explicit ply definition based on 3D tessellated solid	YES	NO			X
Electrical Wire Harness	Electrical BOM	NO	in work			
	Wire Harness Topology	NO	in work			
STEP Compressed file		YES	YES			X
Validation Properties	3D geometry, PMI, assembly, composite	YES	YES			X

CAD functional capabilities supported by the STEP AP242 interface

CATIA V5

V5 STEP AP242	CAD information	Implementation format		Level of implementation		
		P21	XML	Pilot	IF test	COTS
3D Geometry	3D exact Brep	YES	n/a			X
	3D tessellated Brep	YES	n/a			X
	presentation(colors, layers, transparency, invisibility, etc...)	YES	n/a			X
3D PMI (GD&T, 3D Annotations, UDA)	graphic presentation	YES	n/a			X
	semantic presentation	YES	n/a			X
Assembly Structure	1 single P21 STEP file	YES	YES			X
	1 assembly STEP file referencing CAD P21 STEP files	YES	YES			X
	nested assembly STEP files referencing CAD P21 STEP files	YES	YES			X
Kinematics	Motion	NO	NO			
	Mechanism	NO	NO			
Composites design	implicit ply definition based on exact surface and contour	YES	NO			X
	explicit ply definition based on 3D tessellated solid	YES	NO			X
Electrical Wire Harness	Electrical BOM	NO	NO			
	Wire Harness Topology	NO	NO			
STEP Compressed file		YES	YES			X
Validation Properties	3D geometry, PMI, assembly, composite	YES	YES			X

PDM functional capabilities supported by the STEP AP242 interface

3DEXPERIENCE

3DEXPERIENCE STEP AP242 PDM information	Implementation Format		Level of implementation		
	P21	XML	Pilot	IF test	COTS
"As Designed" PDM product structure	NO	YES			X
Nested PDM product structure	NO	YES			X
Assembly validation properties	NO	YES			X
Lifecycle management	NO	YES			X
Document structure	NO	YES			X
Person and organization	NO	YES			X
Date and Time	NO	YES			X
Classification	NO	YES			X
Material properties	NO	NO			
Customized PDM properties	NO	YES			X
Configuration management - based on effectivities	NO	YES		X	
Configuration management - based on specifications	NO	YES		X	
Configuration management - Filtered Assembly	NO	In work		X	
Change management	NO	In work		X	
"As planned" Product Structure related to "As Designed"	NO	In work		X	
Process Planning	NO	In work			