

JT Open Program technology

Providing participating members of the JT Open Program with level playing field access to JT technology

Benefits

- Build JT applications, based on the industry standard JT Open Toolkit, that can read and write virtually any JT file ever produced
- Leverage the full content of the JT File Format in a broad range of industry workflows
- Produce JT data compliant with the ISO-accepted JT File Format Specification

Summary

The JT Open Program is a unique community of corporate, academic and individual adopters of JT™ technology committed to the widespread utilization of JT as the lightweight 3D format of choice for visualization, collaboration and data sharing.

All JT Open Program members are provided with equal access to the industry standard JT Open Toolkit (also known as JTTK). The JT Open Toolkit is the single most widely used application programming interface (API) for developers of JT-enabled software. For more information about JT Open itself, see our *JT Open Fact Sheet*.

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The JT Open Toolkit is a read/write toolkit that enables consistent access to JT file content. Any vendor or corporate entity can join the JT Open Program and gain access to the toolkit, as well as the series of executable utility applications provided for immediate use in testing and validating JT implementations and applications.

Siemens PLM Software plays a key role in facilitating JT openness by providing a comprehensive JT Open Toolkit, as well as the JT File Format Reference, from: www.jtopen.com.

The JT Open File Format Reference provides a full description of the JT file format. Publication of the reference was made in direct response to a request from JT Open Program members. The File Format Reference is available free of charge.

The JT File Format Reference has been adopted by the ISO as a publicly available specification (PAS). PAS is an ISO product used to harvest industry standards for immediate use by the global community; the JT standard is called ISO PAS 14306. Siemens PLM Software is working in concert with ProSTEP iViP and the JT Open Program membership to facilitate complete acceptance of JT as an ISO International Standard; this effort is currently on track.

JT Open Toolkit

The JT Open Toolkit (JTTK) is an object oriented C++ application programming interface. By using JTTK, programmers have full access to

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all aspects of the JT file for read and write, including the following capabilities.

- *Reading and writing XT B-rep Data through extended XT B-Rep classes.* XT B-Rep API allows for the construction of industry standard Parasolid® XT B-Rep topology and geometry (modeling functions require the additional purchase of Parasolid toolkit).
- *Tessellation of individual geometry definitions, bodies or complete parts and assemblies.* The JT Tessellator provides unique association functionality to retain connectivity with geometry used to create the resulting facets. When represented by NURBS geometry, topological faceted data, stored in a JT file, can be used by visualization applications to select entities based on their faces, edges or vertices. When created as analytic geometry, entities may also be selected based on their analytic features like the centerline of a cylinder. This information also allows an application to measure distances between edges and faces corresponding to visualized entities and to query analytic parameters like the radius of a circle.
- *Product Manufacturing Information (PMI).* JTTK allows users to represent PMI in JT files through a comprehensive set of classes for PMI content including, properties, annotations (such as dimensions, notes and datum targets), text, reference geometry, cross hatching, design groups, view sets and model views.
- *Full product structure definition and query*
- *Configuration file support* to externally control specific JTTK functions in a deployed application
- *Extensive property capabilities* supporting the creation of properties as value pairs associated with nearly any data entity available in a JT file
- *Numerous capabilities for supporting visualization.* Attributes are provided for defining materials, color, lighting and textures. Embedded shader language parameters in a JT file provide support for CG and GLSL shading languages. Definition of image stamps can be persistently displayed in compliant viewer sessions, including those facilitated by JT2Go and Teamcenter® software's lifecycle visualization suite. Construction of CAE reporting color bars within the JT file can be displayed by supporting viewing tools such as Teamcenter's lifecycle visualization suite.
- *Layers and layer filters*
- *Creation of an ultra lightweight precise (ULP) data segment.* ULP is a data segment tessellated on the fly by supporting applications such as Teamcenter lifecycle visualization suite and JT2Go. ULP is utilized in specific workflows where extremely small data files are preferred over load performance.

In addition to C++ API for JT files, JT Open Toolkit members receive PLM XML APIs. The PLM XML API provides a class structure defined by the PLM XML schema. Additional functionalities are provided in the PLM XML API to create data adapters and perform convenient XML tasks on content compliant with the schema. An example PLM XML JT Adapter is provided that creates XML output from the properties and product structure in a JT file with URL connections to JT geometry retained in JT format.

The JT Open Toolkit also includes a series of example programs to help programmers get to know the toolkit. Users have reported development times as low as one week to adopt the toolkit (results vary, depending on the level of support planned for a JT application)

In addition to the APIs provided with JT Open Program membership, members have access to JT Utilities, which are command line executable programs provided for supported platforms. These utilities include simple tools for tasks such as setting properties, constructing assemblies and modifying JT file LOD structures, as well as for obtaining information on a JT file's content.

The JT Open Toolkit supports all versions of JT available on the market today. By using the toolkit, companies ensure that their applications will read and write JT files compliant with the JT File Format Specification.

JT version	Release date	Feature	Motivation
6.4	1997	Scene graph, attributes, properties, VisPartNode, VisMetaDataNode, JtBrep, base PMI	Original first version of the DirectModel toolkit
7.0	1999	Uses Zlib compression to get approximately 70% compression over JT v6.4	Began leveraging compression technology to decrease JT file sizes
8.0	2002	About 50% smaller than JT v7.0 Natively detects FTP file corruption Lossy compression available for LODs, Advanced lossless compression for JtBrep Parasolid XTbrep	Major overhaul of the basic JT file format to make its internal structure more modular, internally consistent, and robust. Began using more sophisticated compression techniques as well as user-selectable lossy compression to make files even smaller.
8.1	2005	CADTags on PMI entities Flat shading, lighting enable, and separate specular draw styles View- and World-coordinate lights Multi-channel and enhanced textures Vertex- and fragment shaders	Improved associativity from PMI entities to original CAD objects. Incremental features for lighting, shading, and enhanced texture capabilities.
8.2	2006	Can tag light sources as shadow casters	Shadows
9.0	2007	10%-50% smaller than JT v8 TopoMesh used to store faceted geometry. Facets collected into "face groups" ULP semi-precise representation	Used topology coding to get best-in-class geometry compression performance. Introduced ULP to strike a middle ground between tessellated LODs and heavyweight exact B-Reps.
9.1	2007	Greatly enhanced texture image API Light maps HDR texture formats True bump maps	Gave textures a solid semantic identity to support the needs of programmable graphics hardware and generating shaders on-the-fly.
9.2	2008	Lightweight Precise Analytics representation	An exact and compact alternative to a B-Rep for representing common analytic curves and surfaces
9.3	2009	User-definable PMI glyph sets	
9.4	2010	Separator texture, material reflectivity, JtVec4fPropAtom User-defined vertex fields	Minor extensions in support of True Shading feature in TcVis
9.5	2010	Separate inhibit fields for material diffuse color and alpha values. Geometry shaders	

Platform support

Platform	OS	Compiler	
Windows	32-bit	Windows XP SP2	Visual Studio 2005 SP1 *
	64-bit	Windows XP 64-bit Ed.	Visual Studio 2005 SP1 *
	32-bit	Windows XP SP2	Visual Studio 2008 SP1
	64-bit	Windows XP 64-bit Ed.	Visual Studio 2008 SP1
IBM	32-bit	AIX v5.3	Visual Age C++ v8.0
	64-bit	AIX v5.3	Visual Age C++ v8.0
HP	32-bit	HP-UX B.11.00 A -or- HP-UX B.11.11 U	aC++ B3910B A 03.57
	64-bit	HP-UX B.11.00 A -or- HP-UX B.11.11 U	aC++ B3910B A 03.57
Linux	32-bit	SUSE Linux Ent. Server v10.1	gcc 4.1.2
	64-bit	SUSE Linux Ent. Server v10.1	gcc 4.1.2
Sun	32-bit	Solaris 10	Workshop 6 update2 C++ 5.7
	64-bit	Solaris 10	Workshop 6 update2 C++ 5.7
Apple	64-bit	Mac OS X v10.5.5	gcc 4.0.1

* Requires VS2008 runtime

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