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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

ISO 14306 was prepared by Technical Committee ISO TC 184/SC 4, *Automation systems and integration*, Subcommittee SC 4 *Industrial data*.

This first edition of ISO 14306 cancels and replaces ISO/PAS 14306:2011, which has been technically revised.

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Introduction

The JT format is an industry focused, high-performance, lightweight, flexible file format for capturing and repurposing 3D product definition data that enables collaboration, validation and visualization throughout the extended enterprise.

The JT format is both robust, and streamable, and contains best-in-class compression for compact and efficient representation. The format was designed to be easily integrated into enterprise translation solutions, producing a single set of 3D digital assets that support a full range of downstream processes from lightweight web-based viewing to full product digital mockups.

Some of the highlights of the JT format include:

— built-in support for assemblies, sub-assemblies and part constructs;

— a flexible partitioning scheme, supporting single or multiple files;

— b-rep solid shape representations;

— product manufacturing information in support of paperless manufacturing initiatives;

— precise and imprecise wireframe shape representations;

— discrete purpose-built levels of detail;

— triangle sets, polygon sets, point sets, line sets and implicit primitive sets (such as cylinder, cone and sphere);

— a full array of visual attributes such as for materials, textures, lights, shaders;

— hierarchical bounding box and bounding spheres;

— data compression that allows producers of JT files to fine tune the tradeoff between compression ratio and fidelity of the data.

Beyond the data contents description of the JT format, the overall physical structure/organization of the format is also designed to support operations such as:

— offline optimizations of the data contents, i.e. file granularity and flexibility optimized to meet the needs of enterprise data translation solutions;

— asynchronous streaming of content, i.e. viewing optimizations such as view frustum and occlusion culling and fixed-framerate display modes;

— layers, and layer filters.

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Industrial automation systems and integration — JT file format specification for 3D visualization

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1 Scope

This International Standard defines the syntax and semantics of the JT Version 9.5 file format. At its core, the JT format is a scene graph with Computer Aided Design (CAD) specific node and attributes support.

The following are within scope of this International Standard:

— facet information (triangles), stored with geometry compression techniques;

— visual attributes such as lights, textures and materials ;

— product manufacturing information (PMI);

— boundary representation (b-rep) solid model shape representations and associated metadata;

— configuration representations;

— delivery methods such as asynchronous streaming of content.

The following are outside the scope of this International Standard:

— the implementation of, or definition of a run-time architecture for viewing and/or processing JT data;

— long term data retention;

— non-faceted geometric data exchange.

NOTE 1 Along with the pure syntactical definition of the format, there is also a series of conventions that, although not required to have a reference compliant JT file, have become commonplace within JT format translators. These conventions have been documented in Clause 14.

NOTE 2 Procedural shape information is included with this description for completeness. Due to the complexities of construction and interpretation of this type of data, it is advisable that more common geometry representations such as non-uniform rational b-splines (NURBS) be used in place of procedural shape information.

2 Terms, definitions and abbreviated terms

2.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1.1
assembly
related collection of model parts, represented in a JT format logical scene graph as a logical graph branch

2.1.2
attribute
objects associated with nodes in a logical scene graph and specifying one of several appearances, positioning, or rendering characteristics of a shape

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