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**NATIONAL STANDARD OF THE
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**Information technology -- Computer graphics and image
processing -- Extensible 3D (X3D) -- Part 1: Architecture and
base component**

信息技术 计算机图形和图像处理 可扩展三维组件 (X3D) 第1部分: 体系结构和
基础组件

(English Translation)

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Foreword

GB/T 28170 "Information technology computer graphics and image processing Extensible three-dimensional components (X3D)" is divided into two parts.

- Part 1. architecture and infrastructure components;

Part 2. Scenario Access Interface (SAI).

This part is part 1 of GB/T 28170.

This part is drafted in accordance with the rules given in GB/T 1.1-2009.

This part uses the translation method equivalent to the international standard ISO/IEC 19775-1.:2004 "Information Technology Computer Graphics and Imaging Office Extensible 3D Graphics (X3D) Part 1. Architecture and Fundamental Components.

This part also makes the following editorial changes.

--- "ISO/IEC 19775 this part" to "this part";

- to remove the preamble of international standards;

- other international standards cited in ISO/IEC 19775, have been adopted as our standard, with our standard instead of the corresponding International standards. The rest is not used as the international standard of our standard, in this part are directly quoted;

--- According to the format of GB/T 1.1-2009, the number of tables and figures are modified according to the order of tables and graphs in this section.

In this part of the normative reference to the international documents have a consistent correspondence between the following documents.

--- GB/T 2659-2000 Country and Region Name Codes (ISO 3166-1.:1997, EQV) GB/T 4880.1-2005 Language name code Part 1. 2 letter code (ISO 639-1.:2002, MOD) GB/T 4880.2-2000 Language name code Part 2. 3 letter code (ISO 639-2.:1998, EQV)

--- GB 13001.1-2010 Information technology Universal multi-octet character set (UCS) (ISO/IEC 10646-1.:2003, IDT)

--- GB/T 15121.1-1994 Information processing system Computer graphics storage and transmission of picture description information of the yuan Volume 1. Functional Description (ISO 8632-1. 1987, IDT)

--- GB/T 15121.3-1994 Information processing system Computer graphics storage and transmission of picture description information of the yuan Volume Part 3. Binary Encoding (ISO/IEC 8632-3.:1992, IDT)

--- GB/T 15121.4-1994 Information processing system Computer graphics storage and transmission of picture description information of the yuan Volume 4. Clear text encoding (ISO/IEC 8632-4.:1992, IDT) GB/T 15272-1994 Programming language C (ISO/IEC 9899.:1990, IDT) GB/T 18232-2000 Information technology - Computer graphics and image processing - Ranking of graphical items (ISO/IEC 9973.

1994, EQV)

0.1 Overview

Extensible 3D (X3D) is a software standard that defines Web-based and broadcast-based 3D content that integrates multimedia. X3D can be used for a variety of hardware devices and a variety of applications such as engineering and scientific visualization, multimedia presentation, entertainment and education, web and shared virtual world. X3D also tries to become a unified format for integrated 3D graphics and multimedia. X3D is Virtual Reality Modeling Language (VRML) Successor, VRML is the original Web-based 3D graphics (ISO/IEC 14772). X3D is an improvement on VRML, with new ones Features, advanced application programming interfaces, new data encoding formats, more stringent compliance and the ability to support standard components in a modular manner of the architecture.

This introduction is an introduction to the background, including the design goals behind X3D development, the X3D feature review, and the description of the X3D specification process.

0.2 Design goals

X3D is to meet specific market and technical needs to develop, to meet these needs, X3D uses the following design goals.

- separating the runtime architecture from the data encoding;
- Supports multiple encoding formats, including Extensible Markup Language (XML);
- Added new graphics, behavior and interaction objects;
- Provide multiple optional application programming interfaces (APIs) to the 3D scene;
- Define a specification subset ("configuration file") that meets different market requirements;
- allow the implementation of specifications at different service levels;
- Eliminate unspecified or implicitly regulated behavior as much as possible.

0.3 X3D features

X3D has a rich set of features to support such as engineering and scientific visualization, multimedia presentation, entertainment and educational programs, web pages and Share the virtual world. The X3D feature set includes.

- 3D graphics. multi-faceted geometry, parametric geometry, hierarchical transformation, illumination, material and multi-step or multi-stage texture mapping;
- 2D graphics. text, two-bit vector and plane shape displayed in the 3D transformation hierarchy;

- animation. drive continuous animation timer and interpolator; human animation and deformation;
- spatial audio and video. mapping to the scene in the geometry of the audio and video source;
- user interaction. mouse-based click and drag; keyboard input;
- navigation. camera; user movement in 3D scene; collision detection, proximity detection and visibility detection;
- User-defined objects. Expand the built-in functionality of the browser by creating user-defined data types;
- Script. dynamically changes the scene through the programming language and scripting language;
- Networking. assembling an X3D scene with resources on the network; hyperlinking objects to other scenes in the World Wide Web on the source - Physical simulation. human animation; geospatial datasets; integration with distributed interactive simulation protocols (DIS).

For a complete list of X3D features, see Chapter 7 through Chapter 29 for a description of the components.

Information technology - Computer graphics and image processing Extensible 3D components (X3D) Part 1. architecture and infrastructure components

1 Scope

GB/T 28170 defines a software system that integrates 3D graphics and multimedia capabilities with network capabilities. Conceptually, every X3D the application is a time-base three-dimensional space, which consists of graphics and auditory objects that can be dynamically modified by a variety of mechanisms. This section defines X3D the architecture and the underlying components.

X3D semantics describes a time-based, three-dimensional interactive, multimedia information abstract function behavior. This section does not define physical settings or any other implementation-related concepts (such as screen resolution and input devices). This part is intended to be used as widely as possible Preparation and application, in the interpretation and implementation of the function as far as possible to provide a wide range. For example, this section does not assume a mouse or a two-dimensional display device Must exist.

X3D applies to.

- a) implicitly create a world coordinate space for all defined objects and all the objects