CONTIGRA

A High-Level XML-Based Approach to Interactive 3D Components

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Outline

- Motivation
  - (Web)3D User Interfaces: Current Situation & Future Vision
- The CONTIGRA Architecture
  - 3D Application Example
  - Component Development Levels & Tasks
  - CONTIGRA Markup Languages
- Conclusion & Future Work
Motivation

Current Situation

- Improvements in 3D graphics hardware & fast-evolving Internet technologies
- Increase of Web-based 3D applications

Problems:
- Variety of proprietary Web3d-formats | X3D
- Lack of design standards, authoring tools, no interdisciplinary development
- Too much programming, time-consuming, few concepts of reuse
Motivation

- Future Vision
  - Standards for three-dimensional user interfaces
  - Repertory of adaptable 3D Widgets, Metaphors
  - Reuse of 3D building blocks (components)
    - Less or no coding, high-level approach
    - Graphical tools, interdisciplinary development

- Existing Approaches
  - Bamboo, i4D, 3D Beans, …
  - 3D format dependency & code-centered
CONTIGRA Architecture

Component Oriented Three-dimensional Interactive Graphical Applications

Characteristics

- Document-centered 3D component architecture
- Documents describing component interfaces, implementation, configuration, and assembly
- Declarative approach based on XML languages
- High-level view, hides scene graph details
- Abstraction to existing 3D toolkits, formats, APIs
3D Application Example

Navigation Technique: **Collapsible Cylindrical Trees (CCT)**
Component Levels & Tasks

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CONTIGRA Levels

- Basis: markup languages (XML Schema)
  - CONTIGRA SceneGraph
    - Component implementation language
    - Integrates various scene graph & media files
  - CONTIGRA SceneComponent
    - Component description & configuration language
    - Prototype concept
  - CONTIGRA Scene
    - High-level component integration language
    - Dependence on specific 3D Web environment
CONTIGGRA Levels

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<tr>
<td>CONTIGGRA SceneComponent</td>
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<td>X3D, Audio3D, Behavior3D</td>
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**CONTIGGRA**
- SceneGraph
- SceneComponent
- Scene
Conclusion & Future Work

- CONTIGRA features
  - Componentization (design | deployment)
  - Reuse and platform independence
  - Abstraction to specific 3D formats
  - Declarative approach, well suited for tool support

- Future Work
  - Further improvements of Contigra schemas
  - Development of runtime-framework (translators) & 3D User Interface Builder
References

Papers


Web pages


- Extensible 3D (X3D): [http://www.web3d.org/x3d.html](http://www.web3d.org/x3d.html)

- Contigra: [http://www.contigra.com](http://www.contigra.com)