Declarative 3D for the Web Architecture
W3C Community Group

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Declarative 3D Community Group

● W3C Community Group
● Launched August 16th, 2011
● Initiated by DFKI, Fraunhofer IGD and Web3D consortium
● Mission:
  ○ Short: Declarative 3D as extension to HTML
  ○ Explicit: Group Charter
● First proposal: No longer than one year!

http://www.w3.org/community/declarative3d/
"The goal of this Community Group is to evaluate the necessary requirements for a successful standardization of a declarative approach to interactive 3D graphics as part of HTML documents."
History

- **Until 2007:**
  - 3D in the Browser only via Plug-ins
- **2007**
  - First experiments with DOM, X3D and Canvas3D
- **2008**
  - Extended X3D/ DOM integration lead to X3DOM
  - HTML5 mentioning Declarative 3D
- **2009**
  - Open source Release of X3DOM
  - Presentation at W3C TPAC
  - XML3D started
History

● 2010:
  ○ Common presentation of “Declarative 3D” approaches at W3C TPAC
  ○ Invitation to start Incubator Group
  ○ Creation of Charter

● 2011
  ○ W3C: Community and Business Groups replace Incubator Groups
  ○ Official launch: August 16th, 2011
Motivation

- **3D graphics is becoming a commodity**
  - High performance graphics - even on mobiles
  - 3D-Stereo and 3D-Input - even for consumers
  - Fast Internet Connections - even wireless

- **But not easily usable for the Web**
  - Exclusively focused on games (plus some CAD, etc.)
  - Specialized content for specialized engines (and v.v.)
  - Needs skilled OGL/DX and content developers

➤ Need to adapt 3D graphics for Web
Motivation

- **Compare to Video Technology**
  - Technology had been there in the mid 1990ies ...
  - ... RealVideo, MMX ...
  - ... but nothing happened

- **Video on the Web: YouTube (2005)**
  - They allowed anyone to easily add video to the Web
  - Everyone could: create, share, experience video
  - Today: 2 billion views per day
  - Revenue of $1.1 Billion (target for 2011)

➤ Can we repeat something similar for 3D?
Motivation

● Ease of use
  ○ Bring 3D to the Web developers (not v.v.)
  ○ Fully integrate 3D content into HTML5 documents
  ○ Interactive 3D graphics as first class DOM objects
  ○ Reuse existing Web technology wherever possible
  ○ Do not add new concepts, unless absolutely necessary

► Make it easy to add 3D to Web pages
Motivation

● **User generated content**
  ○ User generated has shaped the Internet (Wiki, Facebook, YouTube)
  ○ Imagine:
    ■ Post a 3D model to a blog
    ■ Send 3D scene via email
  ○ Create new content from existing content
  ○ Index and search 3D content

► Share and experience 3D content
Motivation

● **Industrial-strength 3D graphics**
  ○ 3D is part of the HTML document:
    ■ Generate 3D content from databases
    ■ Gather 3D content from multiple sources
      ■ Ajax, RESTful
    ■ Use existing web development tools
  ○ Security
    ■ Fixed function: No direct GPU programs necessary
    ■ Programmable: Indirection layer
  ○ Eases client-, server- and hybrid rendering

▶ **Infrastructure**
  for 3D Web Applications
Motivation

● Efficiency & Platform Independence
  ○ Enables highly efficient native implementation:
    ■ Utilizes all (battery) resources efficiently
    ■ Leverage heterogeneous HW
    ■ Use CPU time for application, not for rendering, collision, traversal, scene-housekeeping, ...
    ■ Critical for mobile platforms
  ○ Independence:
    ■ Platform
    ■ Rendering algorithm

► Renderer as native part of Browser
Non-technical Goals

- Show and explain advantages of declarative approach
- Show feasibility
  - XML3D and X3DOM platforms
- Promote the technology
  - Community
  - Industry: Intel, SAP, RTT, FT/Orange, EDF
- Convince browser vendors
  - Currently busy with WebGL
  - Initial contacts established
Process

- **Tasks:**
  - Collect use cases
  - Evaluate and rate use cases to develop suitable requirements
  - Extract core 3D features from the requirements
  - Propose new feasible concepts and technical solutions
  - Demonstrate
  - Report

► Will be executed in parallel
Evaluation Platforms

- Two fully working prototypes: X3DOM & XML3D
  - Utilize DOM as central data-repository
  - Support HTML and XHTML pages
  - Introduce `<..3D..>` for 3D subtree (similar to `<svg>`)
  - Reuse `<img>`, `<video>`, `<canvas>` for textures
  - Support common/fixed and explicit shader materials
  - Support various point, line and face primitives
  - Support reuse of scene elements
  - 3D Extension to HTML DOM Level 2 Mouse Events
  - CSS 3D Transforms
  - CSS Animation on CSS 3D Transform

- Open for any other (open) platform
X3DOM

- 3D scene graph is based on X3D
- Introduces new "HTML" X3D-Profile
  - No High-level sensors
  - Routes and Timesensor support
  - Animation via Interpolator/Follower
- Reuse existing Web technology
- Single open-source layer supports various render backends
  - Native implementation
  - X3D/SAI plugin
  - WebGL
  - Flash 11

► Freely available: http://www.x3dom.org
XML3D

- Fresh design:
  - Not constrained by backward compatibility
  - HTML5 as starting point
  - Minimal number of new concepts
- Three implementations:
  - Native implementations:
    - Firefox & Chromium
    - Realtime Ray Tracing and OGL
  - WebGL/JavaScript
- Programmability using compiler infrastructure:
  - Dynamics, Animations & Shaders

Freely available: http://www.xml3d.org
W3C Community Group

● Easy to join
  ○ W3C membership not mandatory
  ○ No fees
  ○ Fewer commitments (compared to Incubator Group)

● Transition to W3C Standards Track
  ○ CG report may serve as Working Group input
  ○ IPR commitments in two steps

► http://www.w3.org/2010/12/community/
W3C Community Group

● Ways to join
  ○ As representative of W3C member organization
  ○ As representative of non-W3C member organization
  ○ As individual, not representing any company

● Looking for your contributions
  ○ Use cases
  ○ Concepts & Specifications
  ○ Demos & Development
  ○ Outreach
Summary

● **Main take-away**
  ○ “Declarative 3D for the Web Architecture” Community Group is up and running!
  ○ DFKI, IGD, and Web3D consortium joining forces
  ○ Two fully working prototypes
  ○ CG is open and easy to join
  ○ Looking for your contributions!

► **Join our initiative!**