Declarative 3D for the Web Architecture

W3C Community Group

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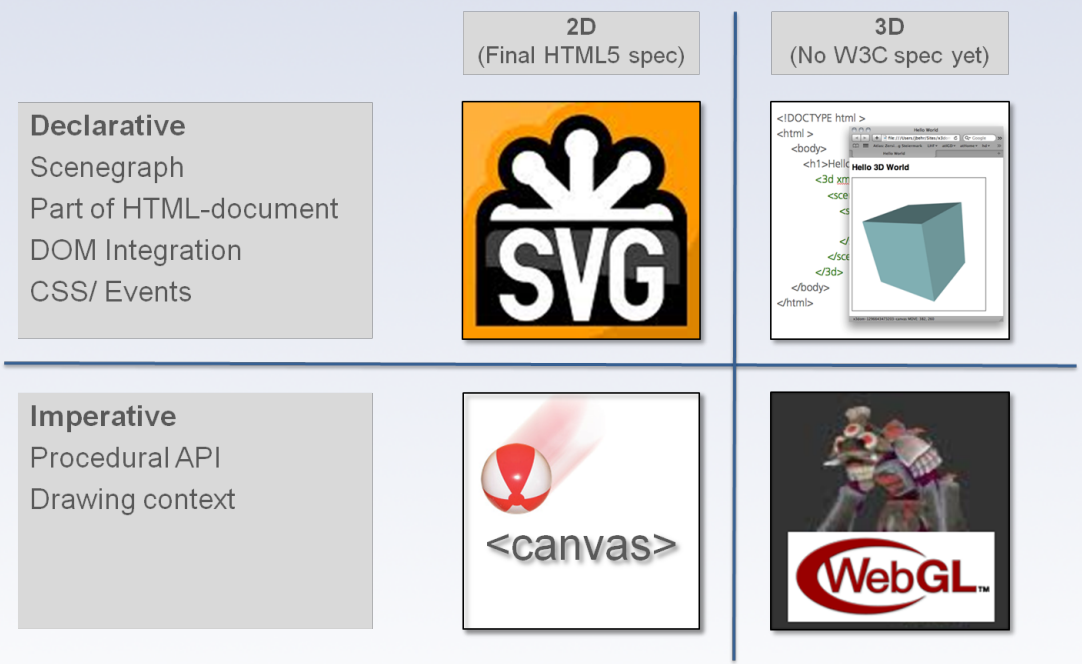
Declarative 3D Community Group

- 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/

Goals

"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. "



Declarative 3D in HTML

Completes todays graphics technologies

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

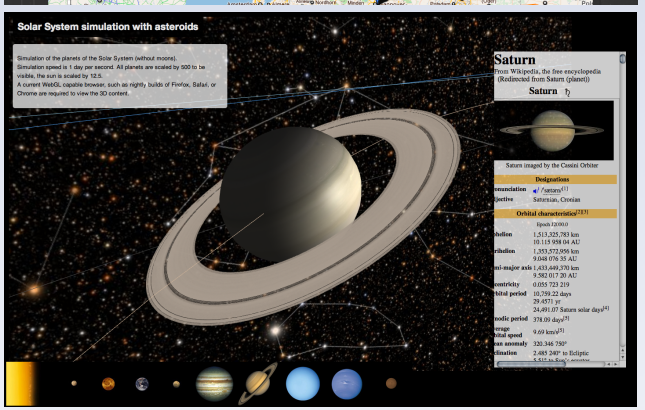
- Tasks:
  - Collect use cases
  - Evaluate and rate use cases to develop suitable requirements
  - Extract core 3D features from the requirements
  - Propose new feasible concepts and technical solutions
  - Demonstrate
  - Report

► 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 (simular 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!**