

Spring
conference
on computer
graphics

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Barcelona, Spain

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3D GRAPHICS ON THE WEB

upf.

**Universitat
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GTI

Interactive
Technologies
Group



SEARCH FOR: POHJOISESPLANADI 25-27



Aleksanterinkatu 3







WebGL™






Alun Evans, Marco Romeo, Arash Bahrehmand,
Javi Agenjo, Josep Blat

3D Graphics on the Web: A Survey

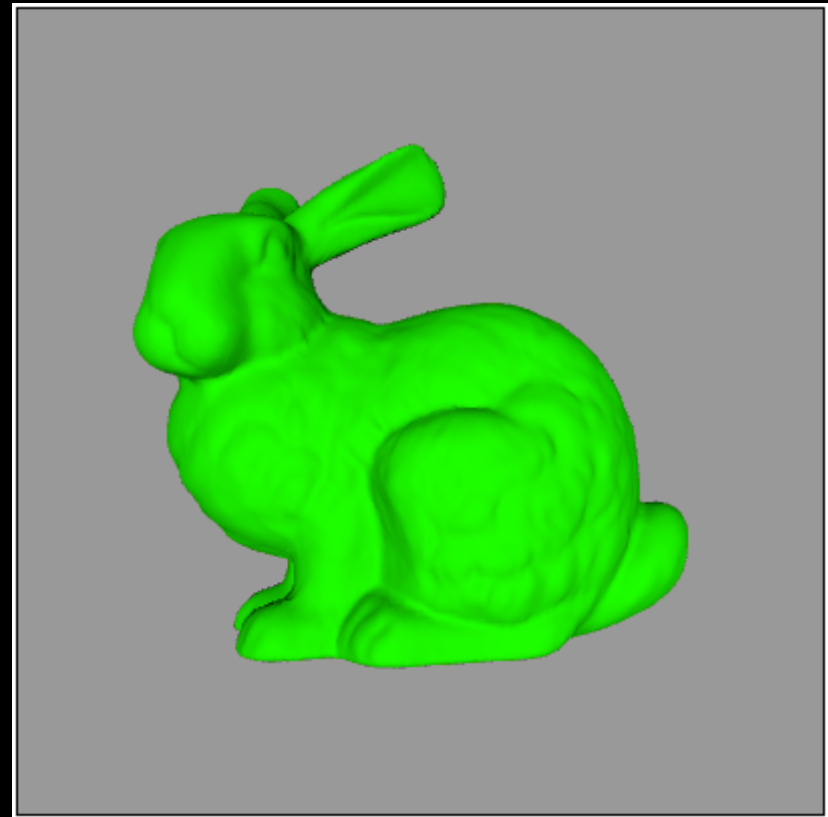
Computers & Graphics **41** pp43-51



	2D	3D
<p><u>Declarative</u> Scene Graph Part of HTML Document DOM Integration CSS/Events</p>		<p>Declarative 3D for the Web Architecture Community Group</p> 
<p><u>Imperative</u> Procedural API Drawing Context Flexible</p>	<p><canvas></p>	

X3D(OM) and XML3D

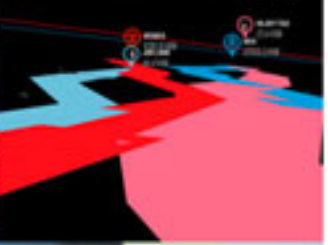
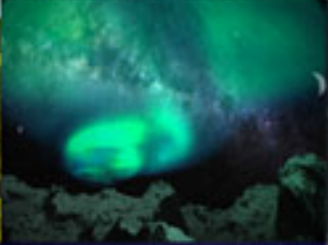
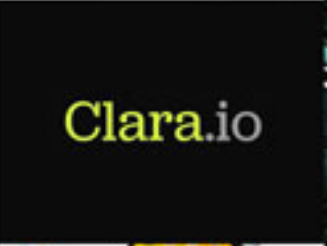
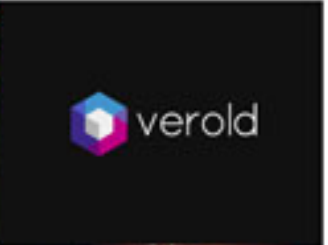
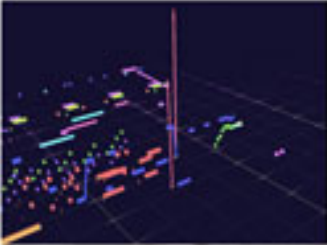
```
<body>
<X3D
xmlns="http://www.web3d.org/specifications/x3d-namespace"
width="400px" height="400px">
<Scene DEF='scene'>
<Viewpoint position='0 0 300'
orientation="0 0 1" />
<Background skyColor='0.6 0.6 0.6'/>
<Transform translation='0 10 0' >
<Shape>
<Appearance DEF='App_0'>
<Material diffuseColor="0 1 0" shininess='0.15625'/>
</Appearance>
<IndexedFaceSet creaseAngle='4' coordIndex='
[indexed vertex coordinates for model]
' />
</IndexedFaceSet>
</Shape>
</Transform>
</Scene>
</X3D>
<script type="text/javascript" src="x3dom.js"></script>
</body>
```



- [examples, more](#)
- [download](#)
- [getting started](#)
- [documentation](#)
- [google+](#)
- [chat](#)
- [help](#)

- [github](#)
- [contributors](#)
- [wiki](#)
- [issues](#)

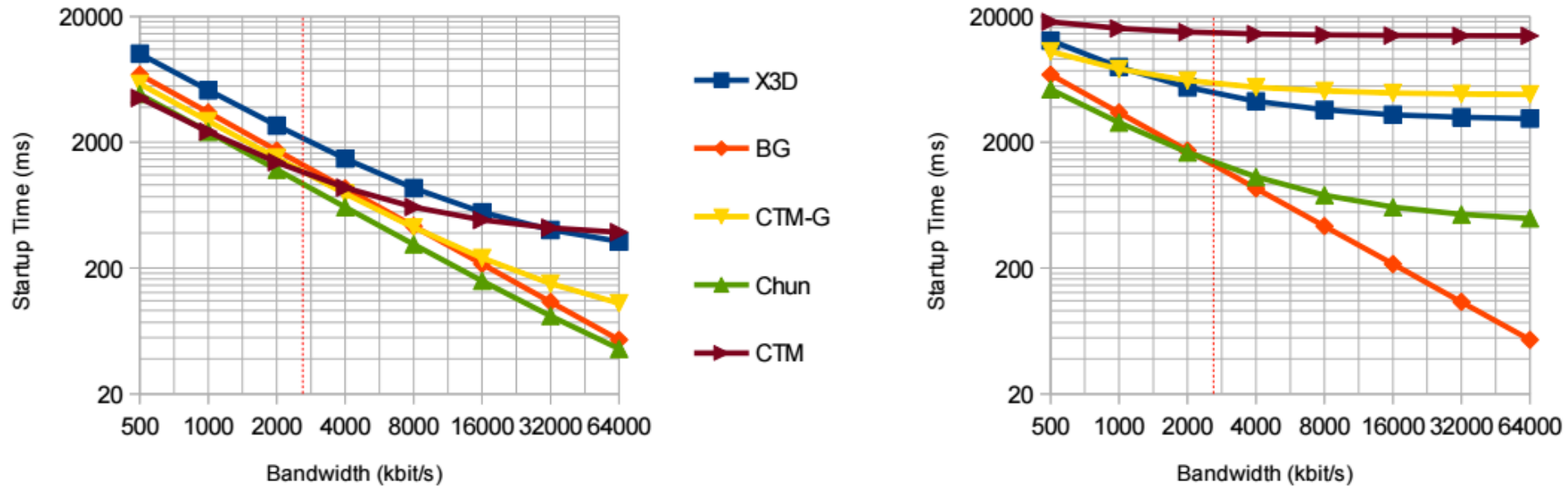
[editor \(beta\)](#)



Challenges for Web3D

- Bandwidth – large models are slow
 - But compression provides problems too
- Power – greater variability, and lower
- Avoid standards mess

Bandwidth vs Compression

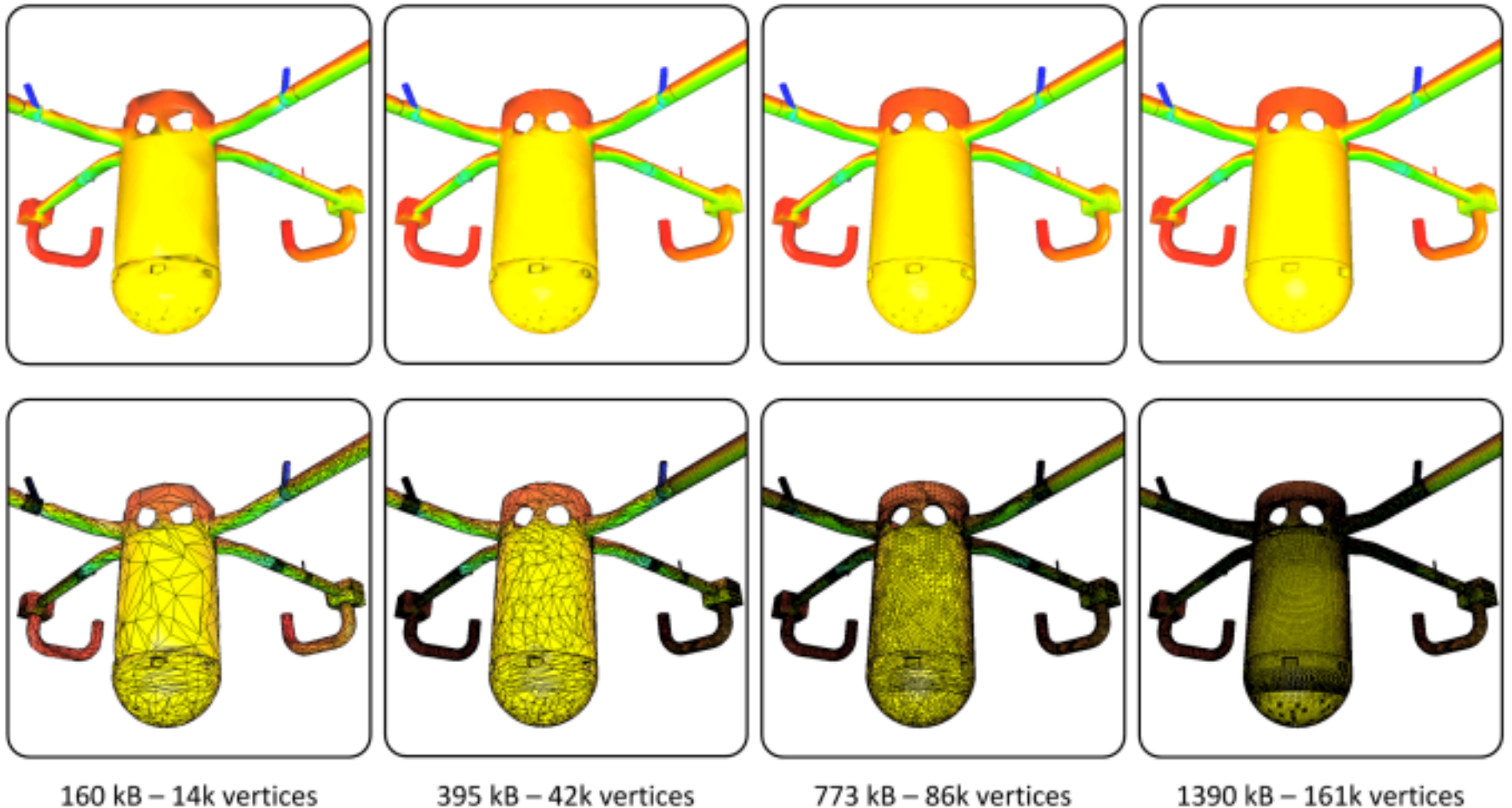


Purple: LZMA compression

Orange: Uncompressed Binary data

Limper, Max, Stefan Wagner, Christian Stein, Yvonne Jung, and André Stork. "Fast delivery of 3D web content: a case study." In Proceedings of the 18th International Conference on 3D Web Technology, pp. 11-17. ACM, 2013.

Progressive Meshes in WebGL



Lavoué, Guillaume, Laurent Chevalier, and Florent Dupont. "Streaming compressed 3D data on the web using JavaScript and WebGL." In Proceedings of the 18th International Conference on 3D Web Technology, pp. 19-27. ACM, 2013.

Progressive Data loading



Evans, Alun, Javi Agenjo, and Josep Blat. "Web-based visualisation of on-set point cloud data." In Proceedings of the 11th European Conference on Visual Media Production, p. 10. ACM, 2014.

Need to vary quality



Avoiding messy standards?

Popularity of X3D and Three.js in different online platforms. Github is an online source code repository used for collaboratively creating software projects, 'stars' can be given by users to a particular project (maximum one star per project per registered user). The ACM and IEEE digital libraries are databases of academic papers published in journals and affiliated conferences for these two institutions.

Keyword	GitHub stars	ACM Digital Library	IEEEXplore
X3DOM (X3D)	143 (n/a)	71 (547)	9 (127)
Three.js	13616	14	1



FI-WARE

Open APIs for Open Minds

Web3D presents opportunities

- Multiplatform
- Ease of development and release
- New collaborative workflows
- Take advantage of the cloud

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Thanks for listening!



<http://alunevans.info>

IMPART