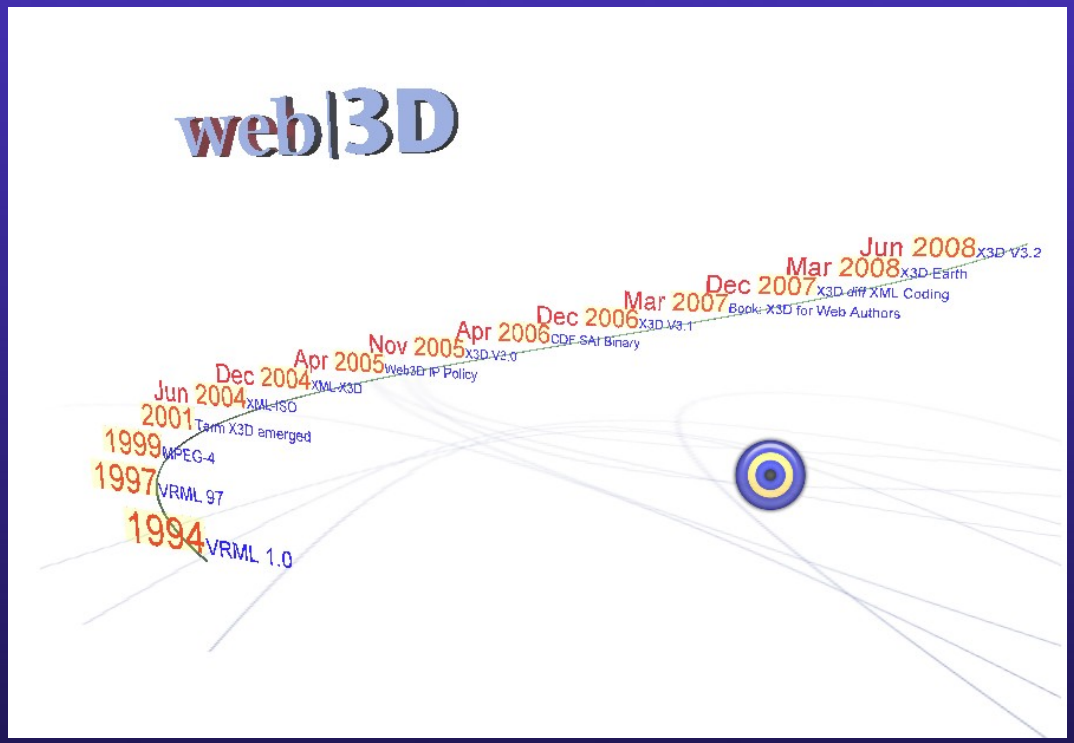
Bitmanagement Software GmbH

Web based Visualization of 3D City Data

Peter Schickel
Bitmanagement Software, Germany
Vice President Web3D Consortium, USA

Web3D Consortium Standardization Roadmap



OGC-Web3D Liaison
Closer Collaboration Prospects

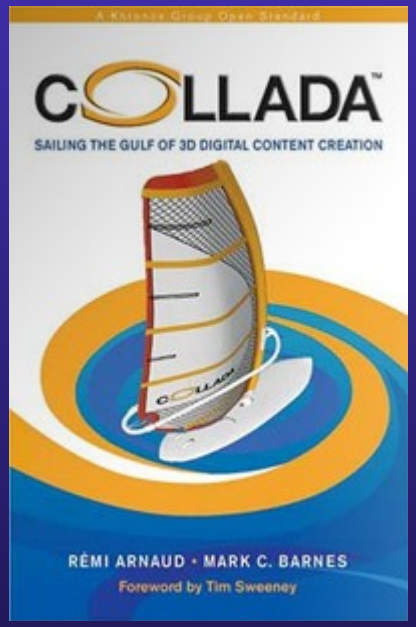
- Joint outreach and marketing materials
- Foster collaboration between the member organizations.
- Coordinate work programs
- Regularly briefings. OGC groups of mutual interest include CityGML, Web Map Tiling Services, Web3D Service and Oblique Imagery Domain. Web3D groups of mutual interest include X3D-Earth, Computer-Aided Design (CAD) and X3D Working Groups.
- Allow members from Web3D and OGC to participate in each other's working groups reviewed by the assigned liaison person or the Executive Director.
- Develop and publish exemplar hybrid content

BS Contact GEO Standard Software CityGML, VRML, X3D, Google KMZ, Collada, Open JT

2D → 3D → X3D

INTERACTIVE
INTERNET READY
ISO STANDARD

The Rich Media Strategy



Bitmanagement Customers

Bitmanagement
Software GmbH

do IT in 3D™

3D City Applications with BS Contact GEO

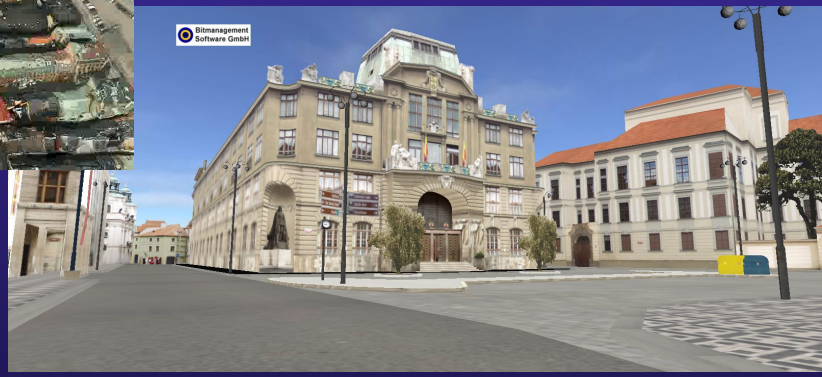
Interactive Cities on the web

109.754 Triangles

Ca 190.000 Triangles

Prague

19.947 Triangles



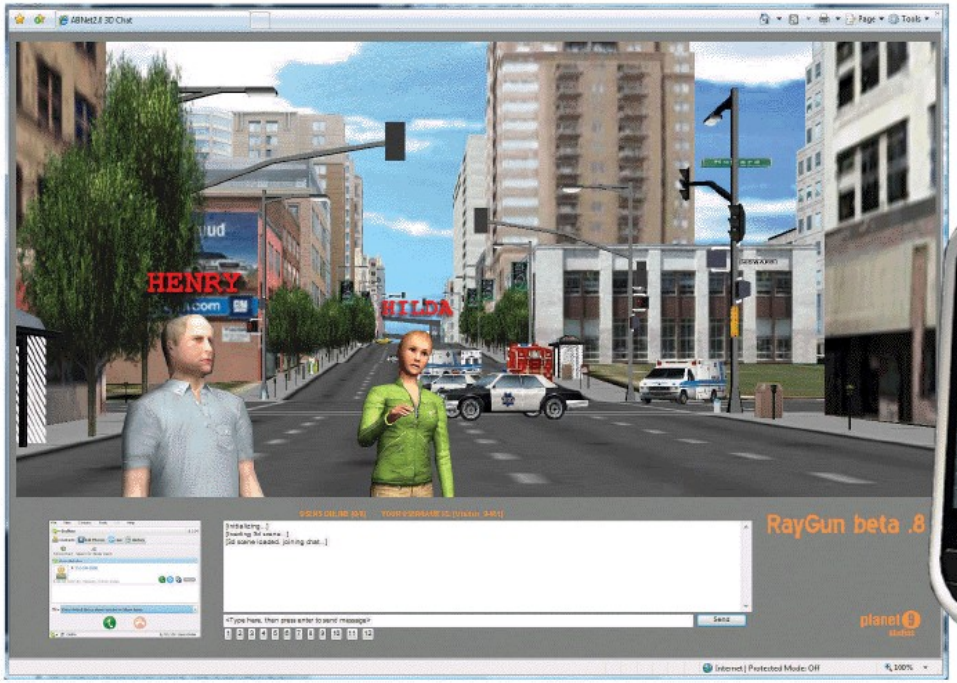
Navitainment – your web in the car

- 2D/3D map-view, 3D globe view, 3D birdsview, 3D streetlevel view, 3D interior view, LOD 1- 4
- Visualization of 3D routing
- Mixing of video, audio, flash and html embedded in 3D scenes
- Interactive zooming, panning, flyover, 6 degrees of freedom navigation of users
- Points of interest, landmarks, tourist information
- Robust and adaptive Internet retrieval, content streaming, local cashing
- Night vision and weather

Bertelsmann – 3D Earth

Life Logging – 3D Cellphone Tracking

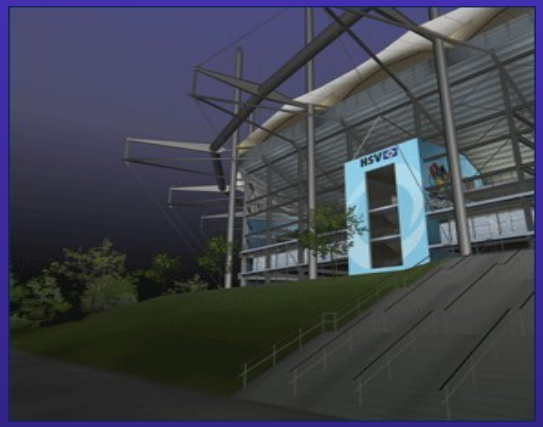
Motorola



RayGun™ desktop display

Mitac Mio

Interactive 3D PoIs - HSV Soccer Arena

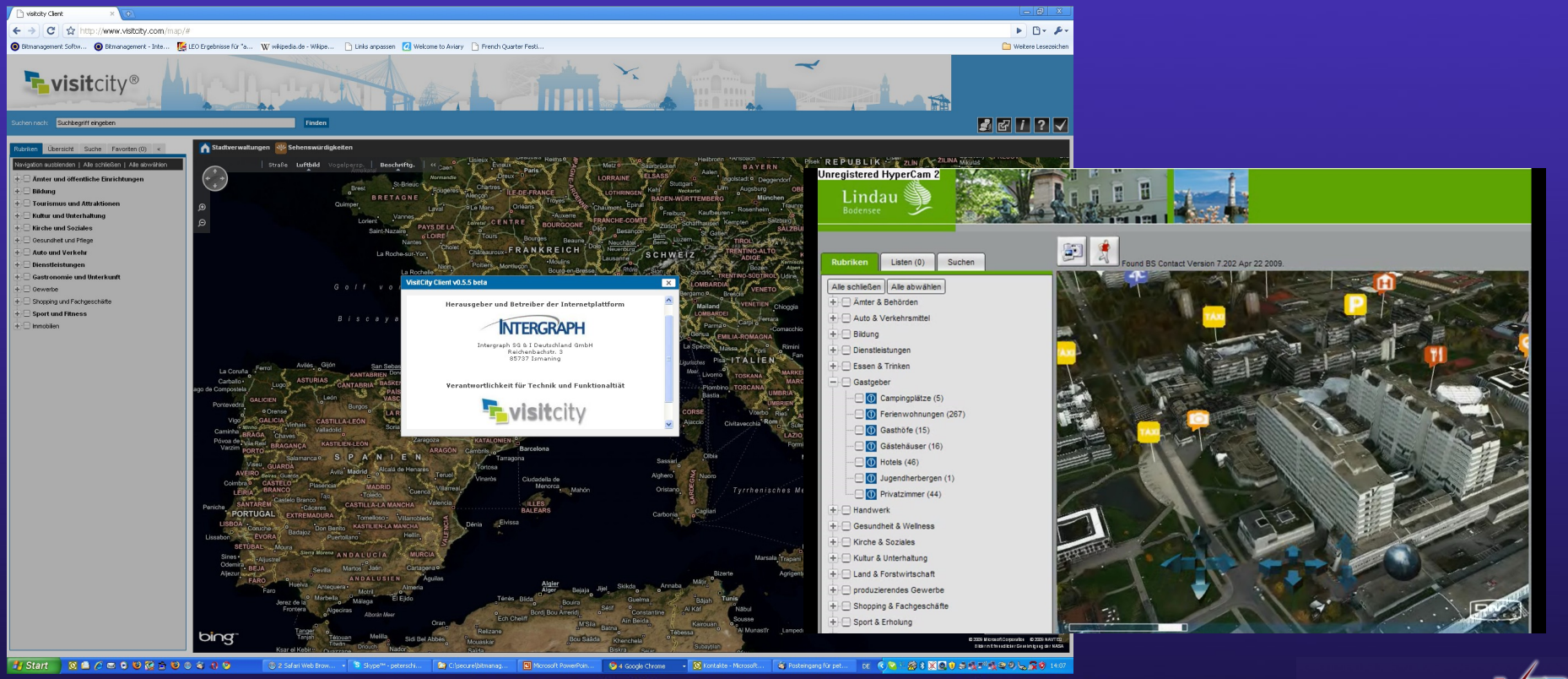


Interior visualization

Bitmanagement Software GmbH

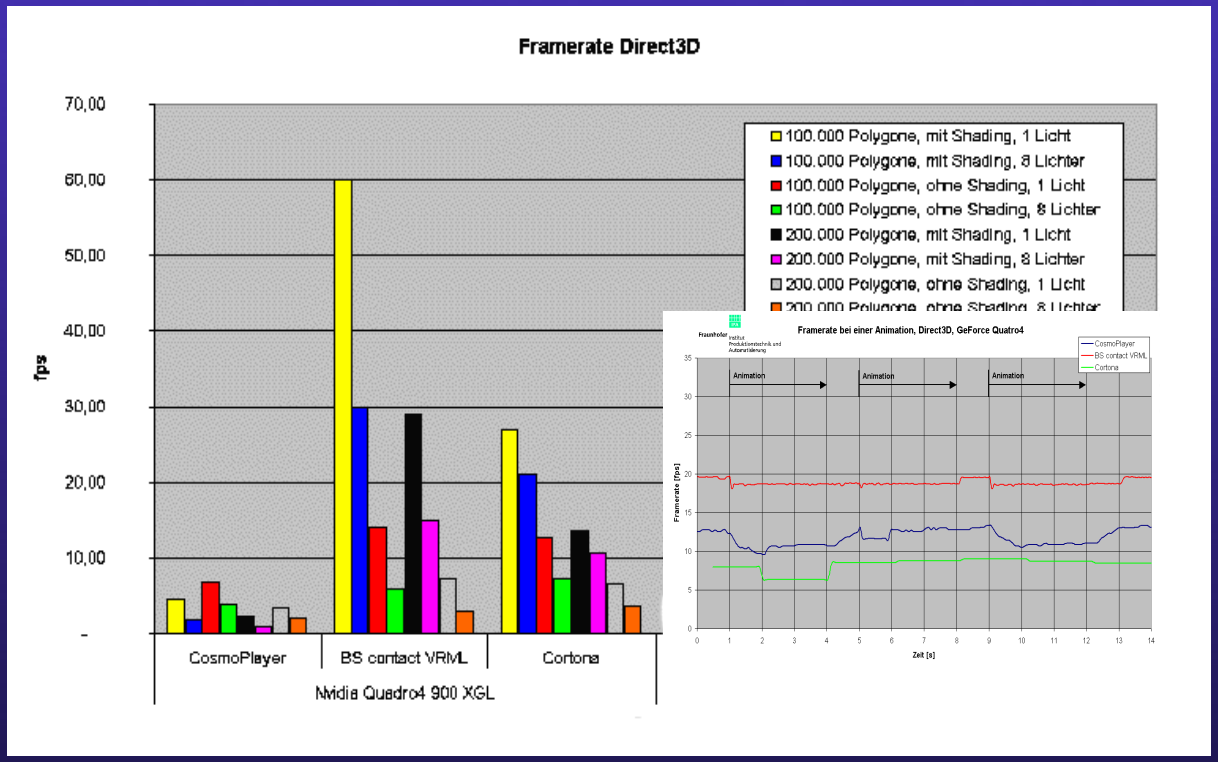
VisitCity

powered by Intergraph,
Microsoft Bing and Bitmanagement



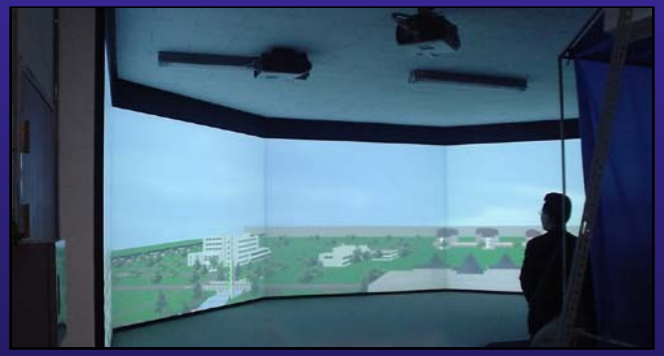
BS Contact GEO Viewer Software

Independent study confirms performance and stability



Fraunhofer IPA
Institut Produktionstechnik und Automatisierung

Hardware Independent



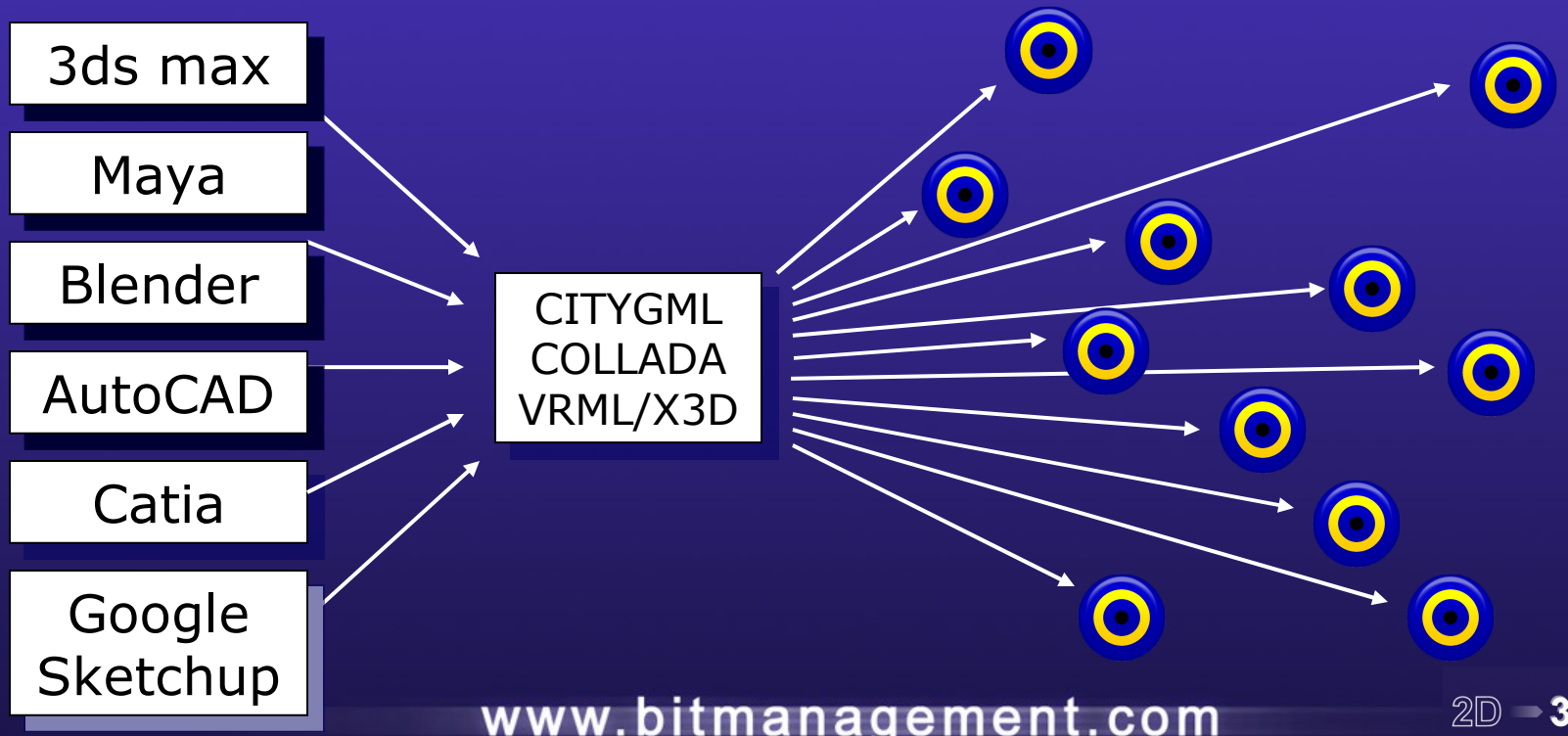
Native 3D Display Support

3D monitors from

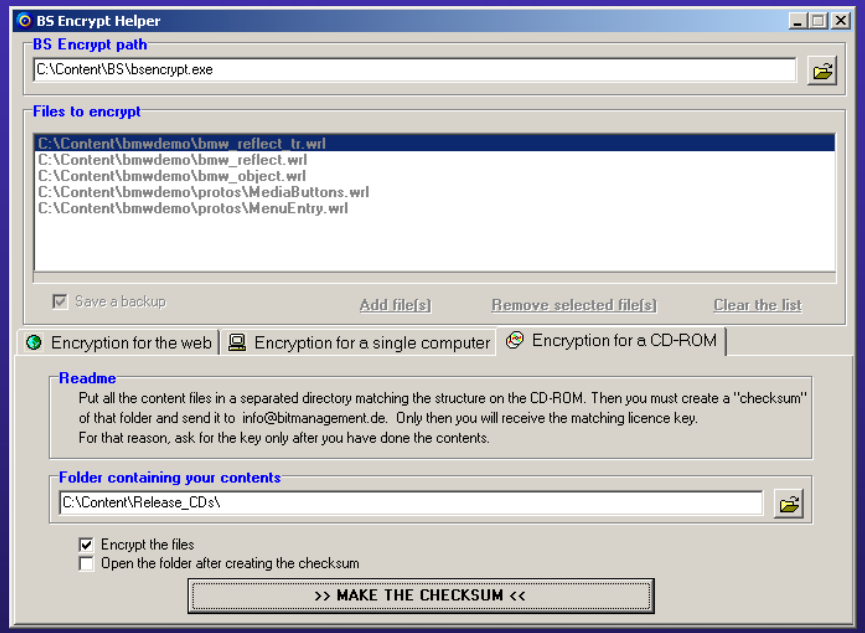
Philips
Sharp
Seereal
Opticality
SpatialView
…
and many more

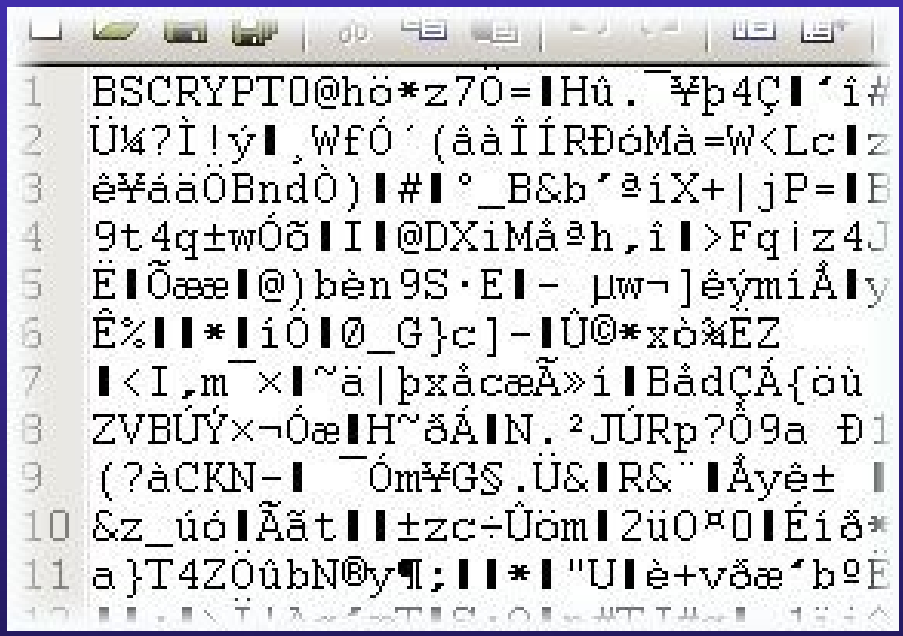
Tool Independent Workflow

Content Authoring + Robust Standards + BS Editor BS SDK = Rich Media 3D Applications



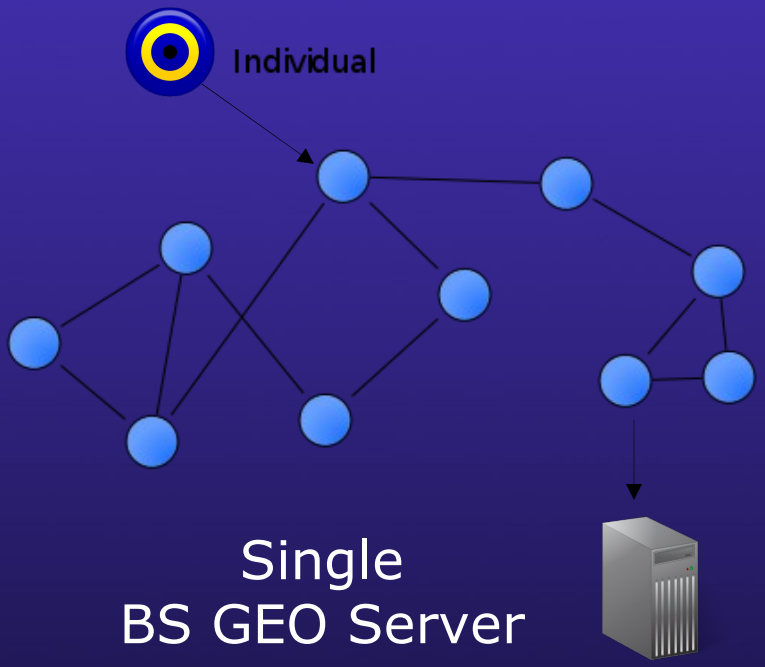
BS Encrypt – Content Encryption with 128 bit security





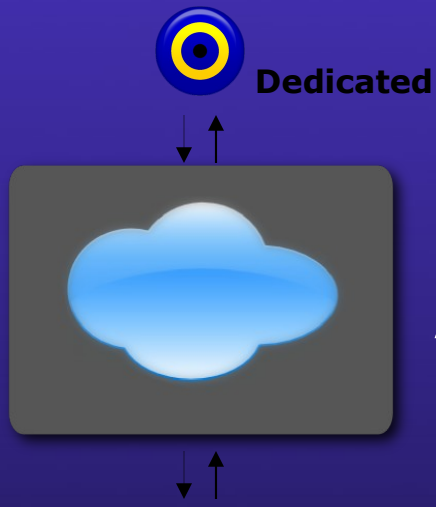
BS Geo Server Acceleration

Traditional Network Access



Single BS GEO Server

Accelerated Network Access

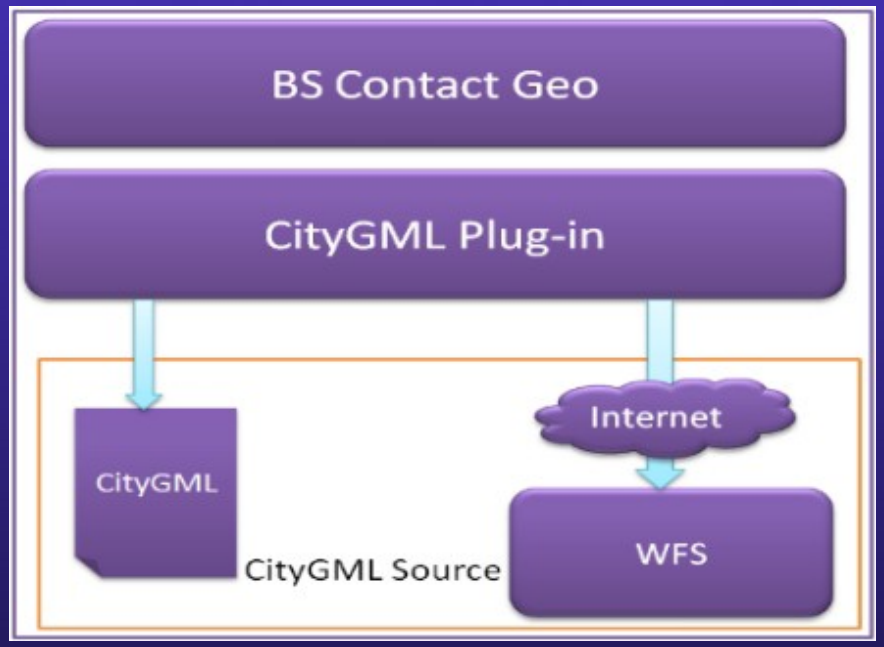


Fast Application Network

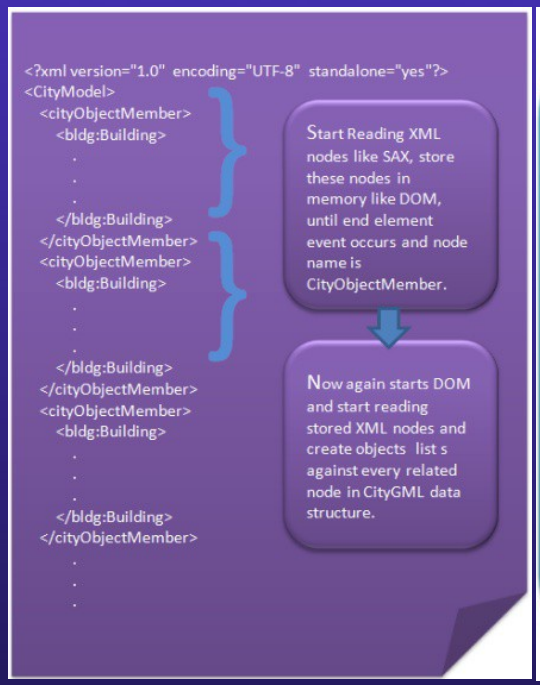
BS GEO Server Grid

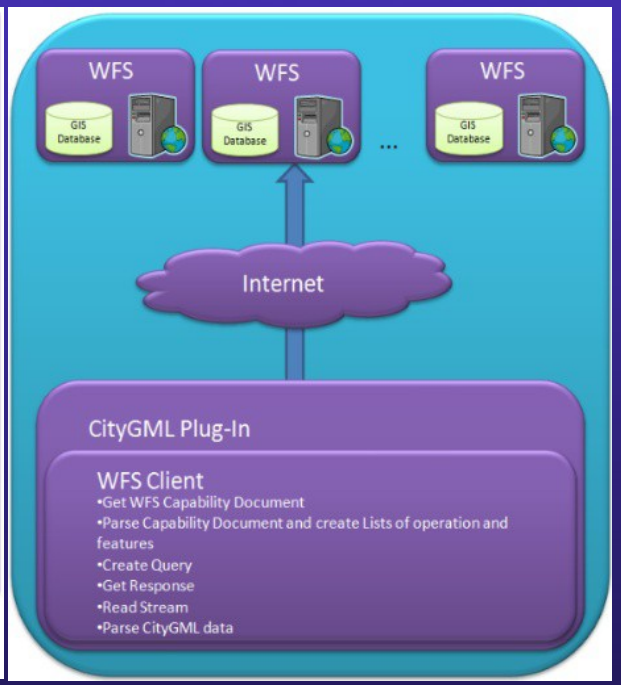
CityGML Implementation

Reading native CityGML Streams - online and offline

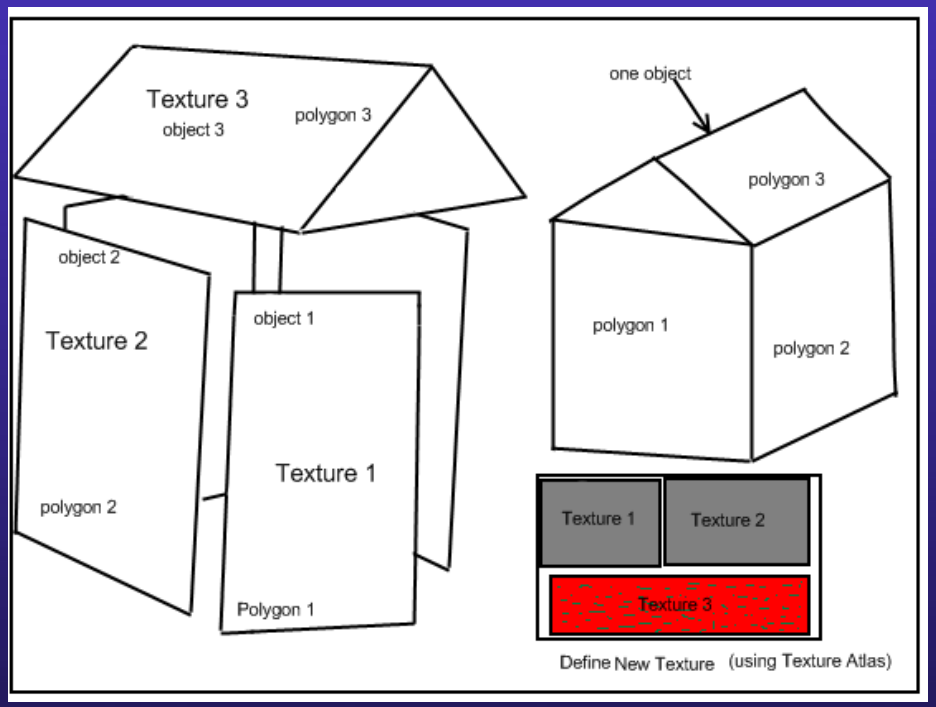


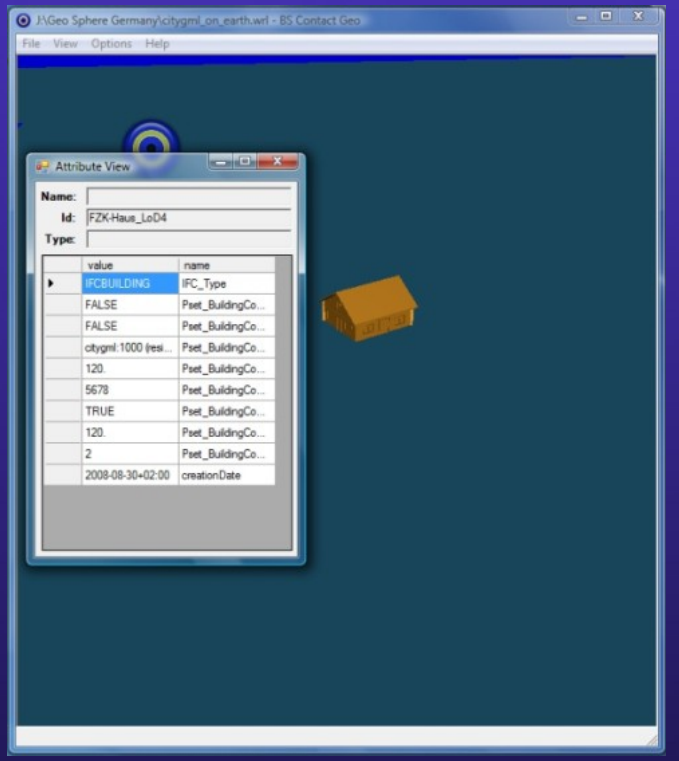
Parcing of large CityGML data, on the 3D earth.



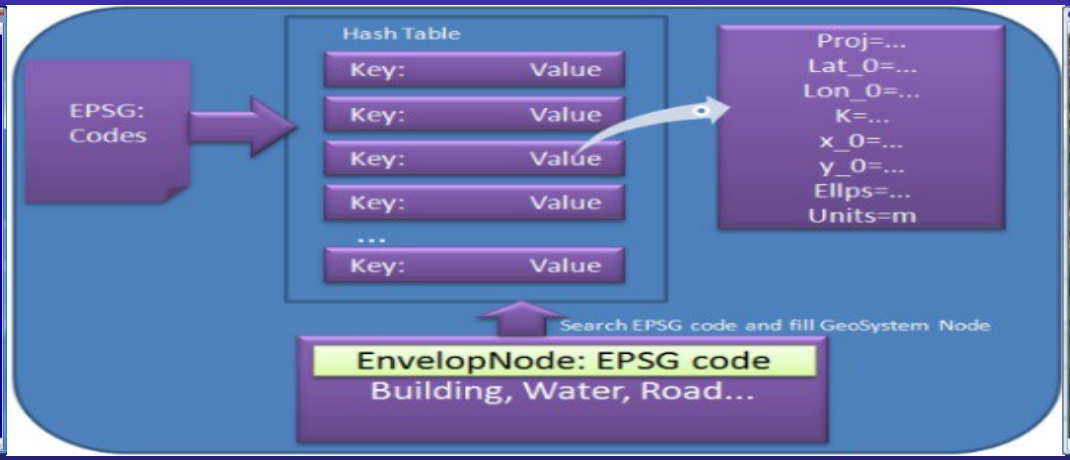


Fast Rendering Optimization for CityGML: Combining Textures in one texture atlas keeping Metainformation and attributes

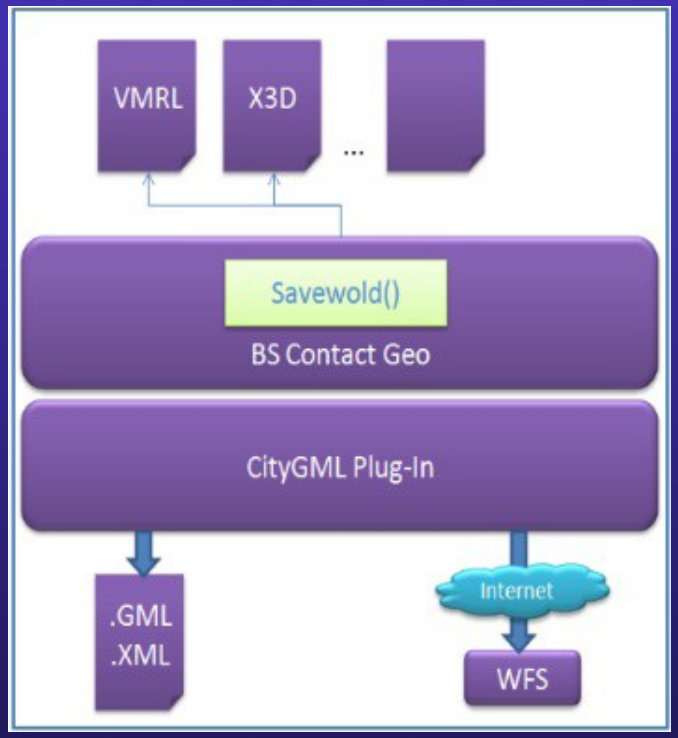




Automated coordinate Transform and positioning on 3D Globe using EPSG Codes



Transcoding of CityGML Info Possible in BS Contact GEO, e.g. to ISO Standard X3D



3D Performance Test for CityGML

Test Computer 1

. Intel Core 2 Qaud.

. Processor 2.33GHz.

. RAM 4GB.

. Operating System Windows

Vista Home Premium SP1.

Test Computer 2

. AMD Turion 64 Mobile.

. Processor 1.79GHz.

. RAM 1GB.

. Operating system Windows XP

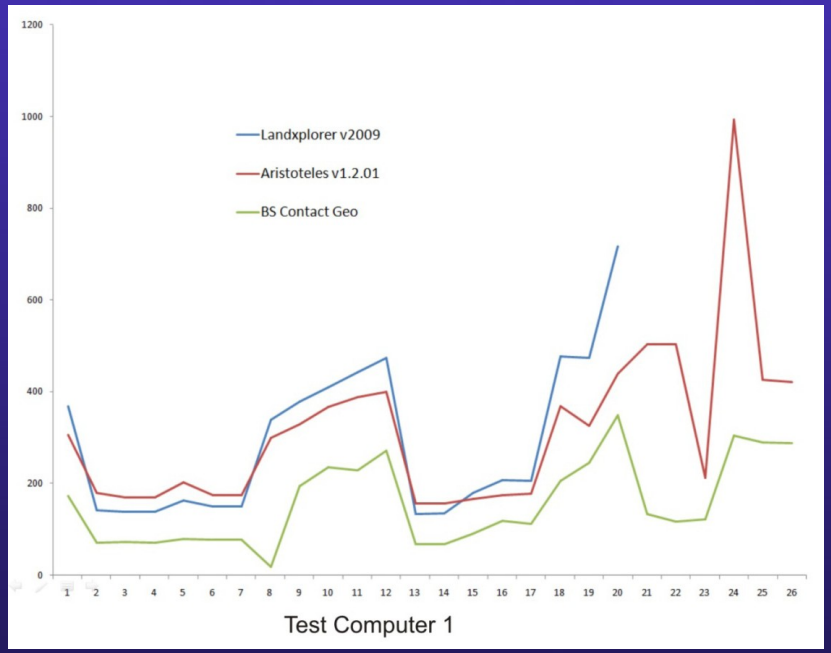
Home Edition SP2.

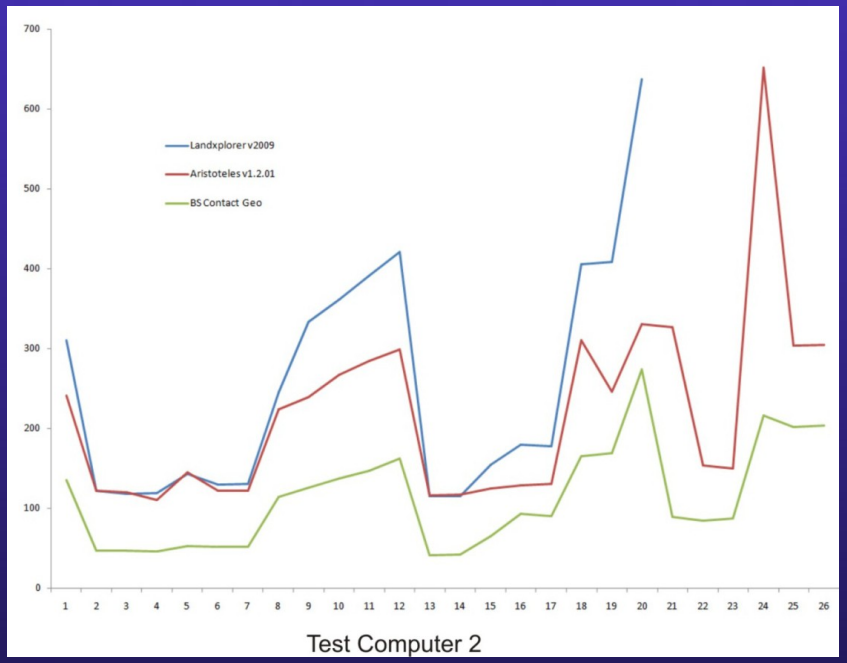
3D Performance Test for CityGML

CityGML File name & size	LandXplorer	Aristotles	BSContactGeo
Berlin alexanderplatz 35.2MB	00.00.35	00.00.08	00.00.04.74
LoD2-10x10-BoundedBy 326KB	00.00.02	00.00.01	00.00.00.46
LoD2-10x10-MultiSurface 210KB	00.00.03	00.00.01	00.00.00.40
LoD2-10x10-solid 215KB	00.00.03	00.00.01	00.00.00.45
LoD2-20x20-BoundedBy 1.28MB	00.00.03	00.00.02	00.00.00.90
LoD2-20x20-MultiSurface 858KB	00.00.03	00.00.01	00.00.00.75
LoD2-20x20-solid 876KB	00.00.03	00.00.03	00.00.00.75
Testcase-100x60 11.3MB	00.00.26	00.00.12	00.00.07.14
Testcase-100x70 13.2MB	00.00.32	00.00.20	00.00.08.17
Testcase-100x80 15.1MB	00.00.35	00.00.18	00.00.09.19
Testcase-100x90 17MB	00.00.37	00.00.18	00.00.10.47
Testcase-100x100a 18.9MB	00.00.45	00.00.18	00.00.11.57
FZK_Haus_LOD1 9KB	00.00.02	00.00.01	00.00.00.30
FZK_Haus_LOD2 56KB	00.00.02	00.00.04	00.00.00.33
FZK_Haus_LOD3 5.67MB	00.00.07	00.00.03	00.00.01.13
FZK_Haus_LOD4_BS 9.95MB	00.00.04	00.00.18	00.00.01.90
FZK_Haus_LOD4_S 9.80MB	00.00.04	00.00.18	00.00.01.75
Stadt-Ettenheim-LoD3_v1.0.0 48.7MB	00.00.50	00.00.16	00.00.06.49
Gebaudemodell_LOD1_450634 26.8MB	00.00.50	00.00.12	00.00.08.56
Gebaudemodell_LOD1_461012 50Mb	00.01.12	00.00.20	00.00.13.90
LoD2-50x50-BoundedBy 8.11Mb		00.00.06	00.00.04.02
LoD2-50x50-MultiSurface 5.29MB		00.00.01	00.00.03.25
LoD2-50x50-solid 5.40MB		00.00.03	00.00.03.27
LoD2-100x100-BoundedBy 32.5MB		00.01.06	00.00.15.43
LoD2-100x100-MultiSurface 21.2MB		00.00.20	00.00.12.20
LoD2-100x100-solid 21.7MB		00.00.18	00.00.12.52

CityGML File name & size	LandXplorer	Aristotles	BSContactGeo
Berlin alexanderplatz 35.2MB	00.00.57	00.00.18	00.00.07.78
LoD2-10x10-BoundedBy 326KB	00.00.03	00.00.03	00.00.00.85
LoD2-10x10-MultiSurface 210KB	00.00.02	00.00.02	00.00.00.53
LoD2-10x10-solid 215KB	00.00.02	00.00.02	00.00.00.53
LoD2-20x20-BoundedBy 1.28MB	00.00.03	00.00.02	00.00.01.22
LoD2-20x20-MultiSurface 858KB	00.00.03	00.00.01	00.00.01.12
LoD2-20x20-solid 876KB	00.00.03	00.00.03	00.00.01.28
Testcase-100x60 11.3MB	00.00.46	00.00.16	00.00.11.20
Testcase-100x70 13.2MB	00.01.40	00.00.22	00.00.13.08
Testcase-100x80 15.1MB	00.01.45	00.00.30	00.00.15.15
Testcase-100x90 17MB	00.02.07	00.01.38	00.00.17.26
Testcase-100x100a 18.9MB	00.01.24	00.00.40	00.00.19.46
FZK_Haus_LOD1 9KB	00.00.06	00.00.03	00.00.00.34
FZK_Haus_LOD2 56KB	00.00.02	00.00.02	00.00.00.62
FZK_Haus_LOD3 5.67MB	00.00.12	00.00.04	00.00.02.00
FZK_Haus_LOD4_BS 9.95MB	00.00.22	00.00.05	00.00.03.26
FZK_Haus_LOD4_S 9.80MB	00.00.25	00.00.06	00.00.03.15
Stadt-Ettenheim-LoD3_v1.0.0 48.7MB	00.01.20	00.00.23	00.00.12.18
Gebaudemodell_LOD1_450634 26.8MB	00.01.45	00.00.25	00.00.14.54
Gebaudemodell_LOD1_461012 50Mb	00.01.50	00.01.05	00.00.24.04
LoD2-50x50-BoundedBy 8.11Mb		00.00.53	00.00.06.65
LoD2-50x50-MultiSurface 5.29MB		00.00.08	00.00.05.20
LoD2-50x50-solid 5.40MB		00.00.08	00.00.05.09
LoD2-100x100-BoundedBy 32.5MB		00.02.06	00.00.26.04
LoD2-100x100-MultiSurface 21.2MB		00.00.35	00.00.20.81
LoD2-100x100-solid 21.7MB		00.00.30	00.00.20.93

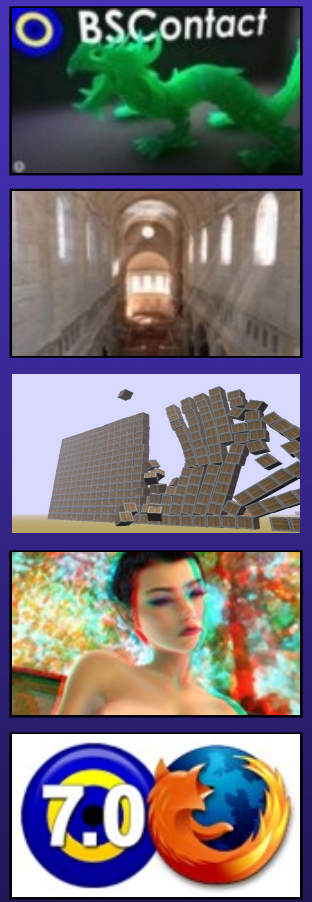
Memory Usage Test for CityGML





BS Contact 3D Client Software

- 3D Standards VRML/X3D, Collada, Google KMZ, CityGML, Open JT
- Real-time Shaders
- Lighting and Shadows
- Real-time Physics
- Stereoscopic Rendering
- Cross Platform
  Runs on Windows, Linux and Mac
- Standalone or web plug-in
  MSIE, Firefox, Opera



Please download BS Contact Geo at www.bitmanagement.com

Peter.Schickel@bitmanagement.com