Scalable geospatial
3D client applications in X3D -
Interactive, online and in real-time

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Presentation

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www.bitmanagement.com
Technology: Mapping geospatial 2D and 3D data at the correct location on a 3D globe automatically.

Perception: Seamless zooming from map overview to ground level and Building interior with The same online software.
Bitmanagement Customers

Industry adoption
375+ direct customers

Users of applications in the millions

Involved in future-oriented R&D
Create once – run anywhere

Hardware Independent

Windows

Linux

Cave Systems

iPhone, iPad, iPod

Mac

Android

Stereoscopic devices

web browsers

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BS Contact GEO from Bitmanagement.com

Fast C++ 64-bit 3D Client plug-in for online city content on Windows, Linux, Mac

Native X3D:
Geo node support with Octrees and tiling scheme.

Native CityGML:
EPSG code positioning and 200 map projections on the fly.

LOD 4 city visualization:
Highly detailed city visualization >= 10 cm detail.
Speed comparison
Reference implementation vs Industry product

X3DOM
Java Script WebGL
Frames per second: 36

BS Contact
C++
Frames per second: 3365

X3DOM
25 pans
Frames per second: 1

BS Contact
25 pans
FPS: 1902

BS Contact
215 pans
FPS: 637
BS Contact Mobile
Android and Apple iOS viewing

BS Contact Mobile from Bitmanagement.com
for iOS and Android

See the video demo


BS Contact iOS:
Fast X3D online visualization on Apple iPhone, iPod, iPad with SDK.

BS Contact Android:
Fast X3D online visualization on Google Android devices.
BS Content Studio Tool
Production tool for easy animation of 3D from CAD and GIS

With “BS Contact Studio” working time to create 3D environments is reduced by 80 % and less skills in 3D graphics are required.”

Author once - deploy anywhere –

Windows, Mac, Linux, iOS, Android, IE, FF, Chrome, Safari, HTML5 / WebGL.
Reduce 1.5 GB original size to 15 MB
- Lossless – interactive - collaborative

Bounding Box Representation
Interactive Full Model View
Full Details preserved
1.5 GB original

BS Contact 3D Engine
Best in class online X3D viewer

Huge Models
Automated Geometry instancing
Geometry Culling
Real-time walk-through of full model
Full detail and Meta-data preserved

Output for the Interactive 3D Web
Daimler Automotive
Internet Vehicle Navigation

- 2D/3D map-view, 3D globe view, 3D bird's view, 3D street-level 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 caching
- Night vision and weather
Siemens add on to WinCC
3D power facilities
Webinterface to ACIS Kernel

Technology:
The ACIS Kernel sends X3D models to the BS Contact client for visualization. The scene graph can be manipulated remotely.
Municipality of Vienna
Interactive Citymodel

Technology:
Complete cities can be visualized in realtime with BS Contact Geo on the Internet.

Perception:
Highly detailed appearance of the 3D city. High accuracy showing trees, building sites and fully textured houses.
Selected Geospatial Applications
Interactive Cities on the web

Las Vegas
109,754 Triangles

Stockholm
Ca 190,000 Triangles

Prague
19,947 Triangles

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3D cities – realtime view

Technology:
Complete cities can be mapped in 3D automatically by flyover and visualized in realtime with BS Contact Geo on the Internet.

Perception:
Highly detailed appearance of the 3D city. High accuracy showing trees, building sites and fully textured houses.
Bertelsmann – 3D Earth

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Interactive Soccer Game - HSV Soccer Arena
Visualization Outdoors and Indoors

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Interior visualization

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BS Encrypt – Content Encryption with strong security
Rapid Environment Building

Technology:
3D environments can been constructed within hours semi-automatically from 2D Satellite Images.

Usage:
Missions can be rehearsed in multi-user sessions over the internet.

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Comparison 3D PDF vs X3D

<table>
<thead>
<tr>
<th></th>
<th>3D PDF</th>
<th>X3D</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAD Viewer</td>
<td>Acrobat XI Pro</td>
<td>BS Contact</td>
</tr>
<tr>
<td>CAD Files</td>
<td>BREP and Tesselation</td>
<td>BREP, Spline and Tesselation</td>
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<tr>
<td>ISO Standard</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Security</td>
<td>Encryption</td>
<td>Encryption</td>
</tr>
<tr>
<td>3D Measurements</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>3D Comments</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Compression</td>
<td>Only zip grade.</td>
<td>X3D binary better</td>
</tr>
<tr>
<td>Web enabled</td>
<td>No. All Data needs to be</td>
<td>Yes. Data distributed on</td>
</tr>
<tr>
<td></td>
<td>local.</td>
<td>servers.</td>
</tr>
<tr>
<td>Interactivity</td>
<td>Only basic</td>
<td>Fully interactive</td>
</tr>
<tr>
<td>Platform support</td>
<td>Windows, iOS (?)</td>
<td>Windows, Linux, iOS, Android,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mac</td>
</tr>
<tr>
<td>Taylor made APPs</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Multi-User</td>
<td>No</td>
<td>Yes with BS Collaborate Server</td>
</tr>
</tbody>
</table>

Bitmanagement’s X3D Technology can do similar things as 3DPDF and much more.

**Advantages:**

- Fully Interactive
- Fully Web-Enabled
- Cross-platform:
  - Windows, Mac
  - iOS, Android
- Cross-browser:
  - IE, Chrome, FF, SF
BS Tiler
Automated preparation of data

- Automatic tile building and optimization for fast rendering of data derived from point clouds, models and imagery
- Import of elevation grid data, grid textures and vectors
- Import of ESRI *.shp-files
- Triangulation and tile building
- Automatic level of detail (LOD) optimization
- Data reduction
- Tile edge optimization
- Output texture formats: JPEG, JPEG 2000, PNG, TGA
- and publish exemplar hybrid content

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Reading native CityGML Streams - online and offline
Parcing of large data, on the 3D earth.
Fast Rendering Optimization
Combining Textures - keeping Metainformation
Automated coordinate Transform and positioning on 3D Globe using EPSG Codes
CityGML databases and X3D visualization go hand in hand
Bitmanagement is uniquely suited with existing know-how and X3D software to elaborate a central and holistic view on your 3D data.

This makes the life cycle of your data, with actual states, planning states and alternatives interactive, web-enabled, visible and usable.

www.bitmanagement.com
Bitmanagement 3D Software – Your 3D engine and tools

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