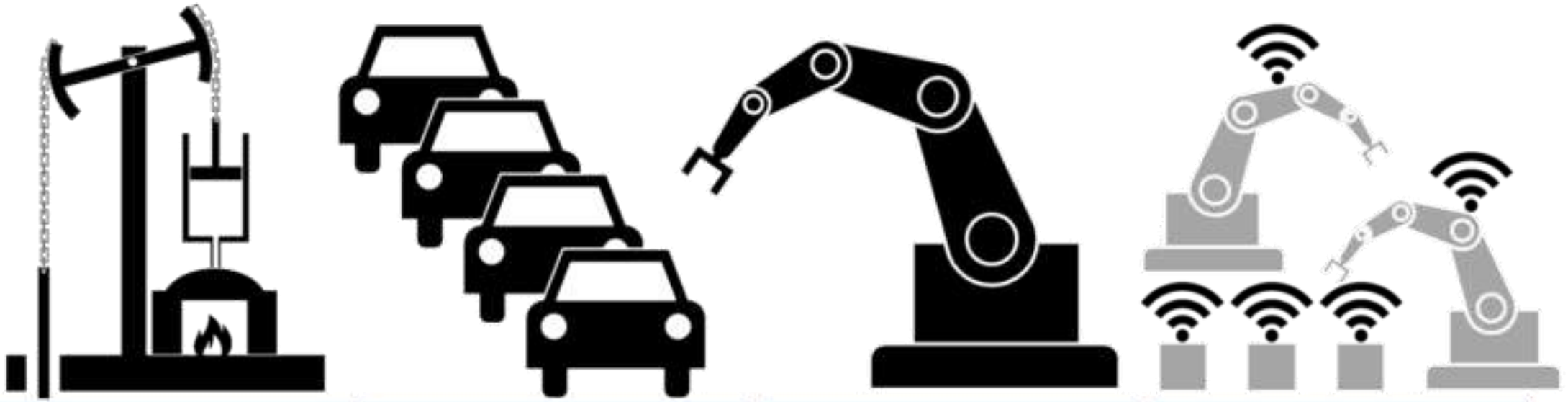
GEOSPATIAL WORLD FORUM

An innovative AEC/GIS integration platform that can service millions of 3D objects on a web browser!

Sanghee Shin(shshin@gaia3d.com)

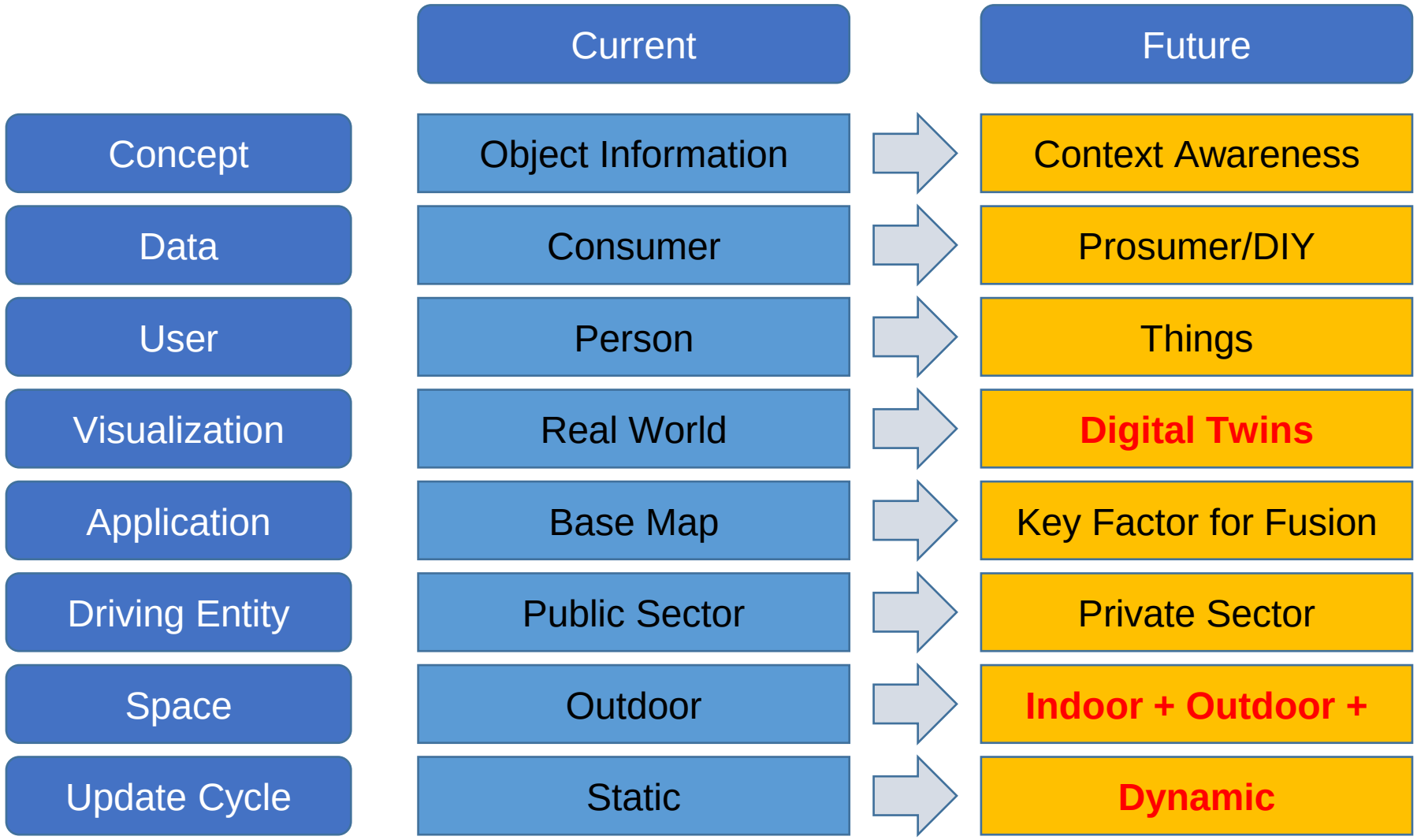
Gaia3D
The GeoSpatial Company



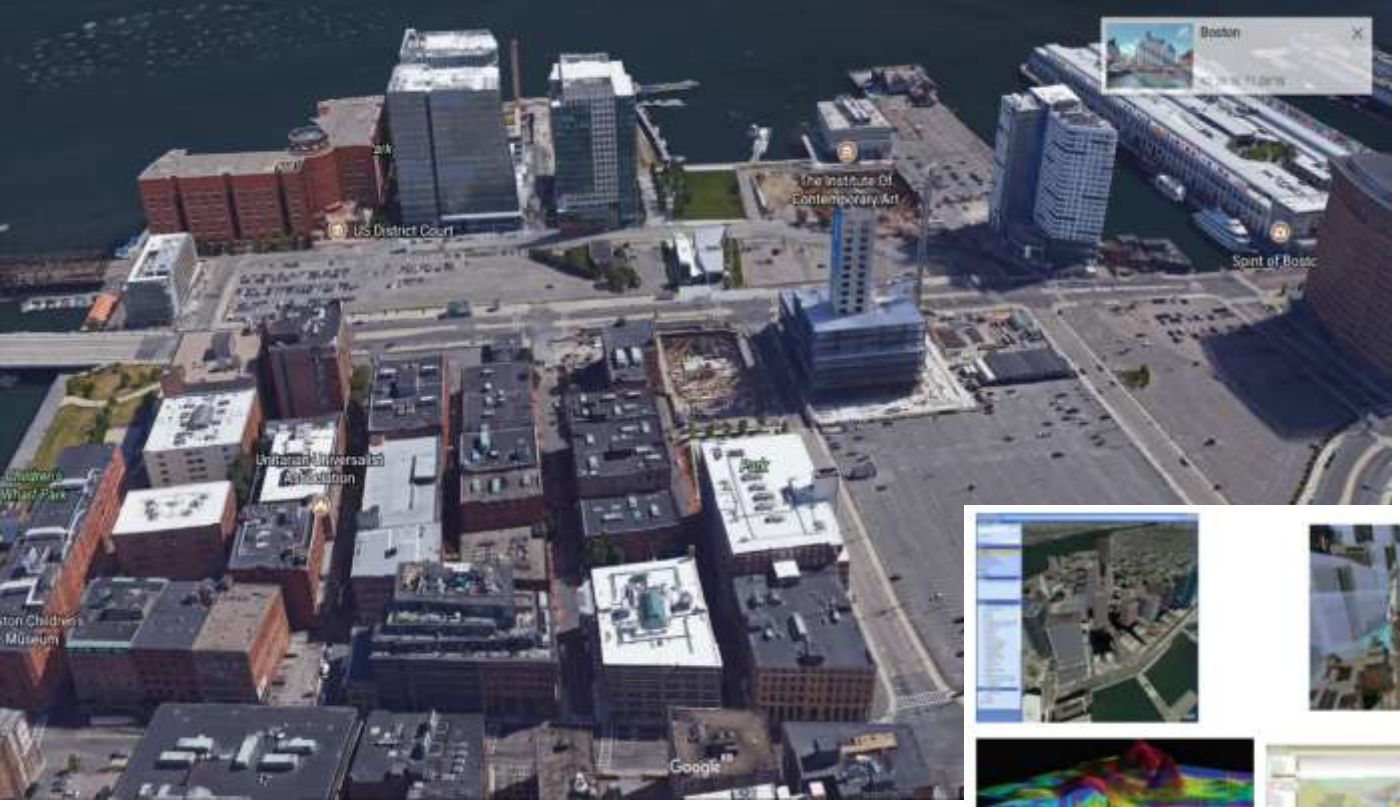
1st	2nd	3rd	4th
Mechanization, water power, steam power	Mass production, assembly line, electricity	Computer and automation	Cyber Physical Systems

<Image Source: http://www.inhapress.com/news/photo/201706/7226_2328_957.png>

Geospatial Paradigm Shift

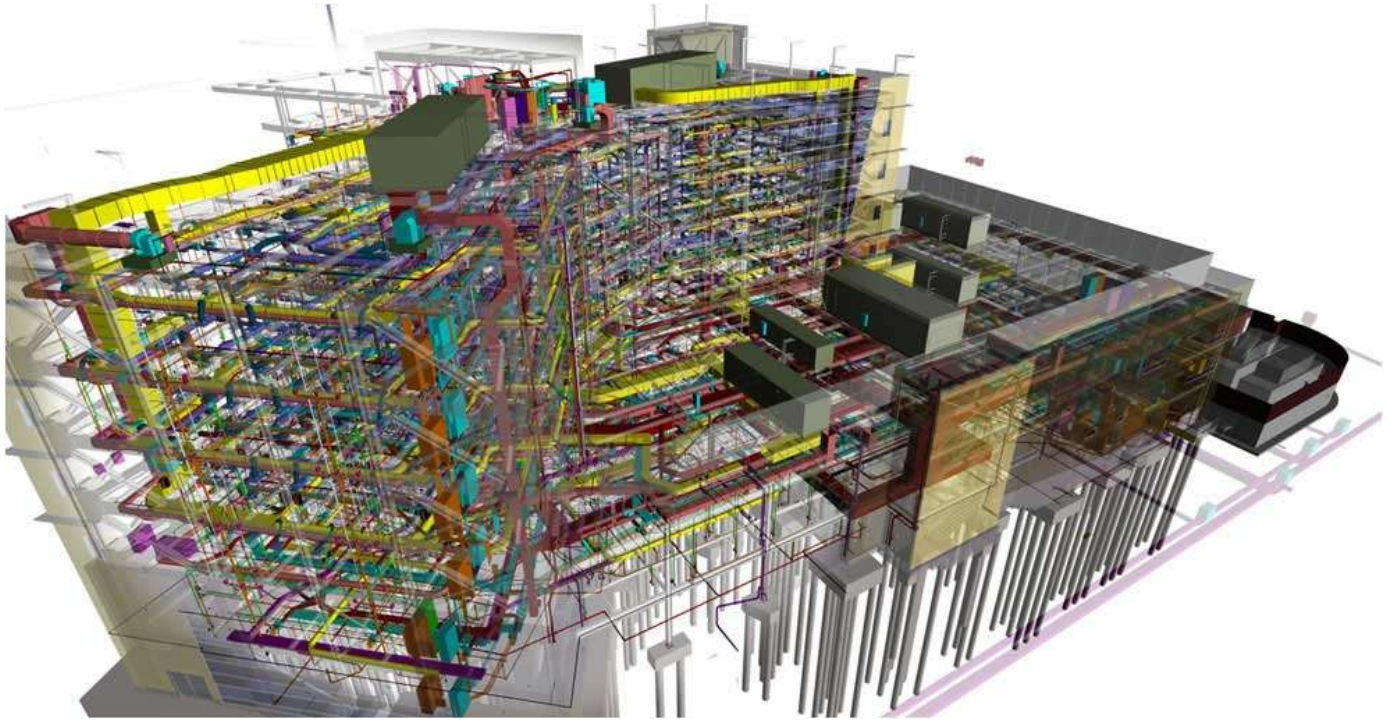


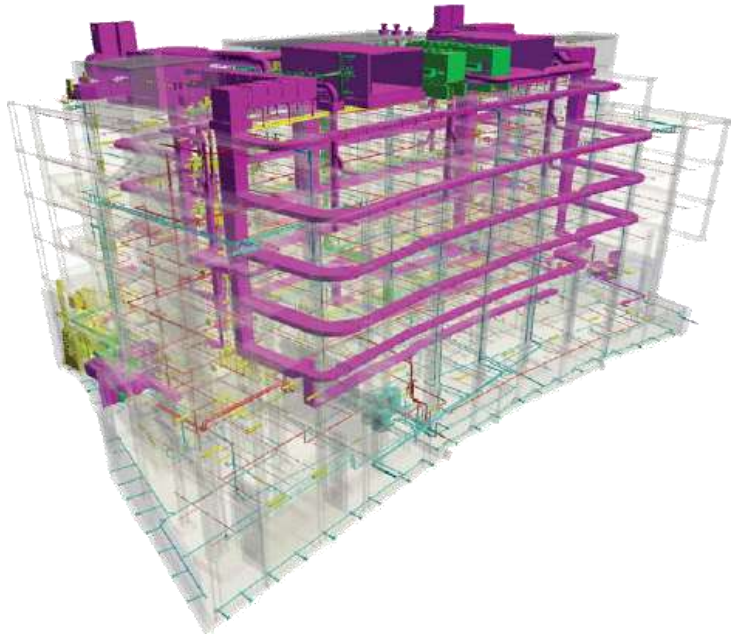
<Source: Hosang Sagong(2016), 'Policy Directions of Spatial Information for Hyper-connected Society' modified>



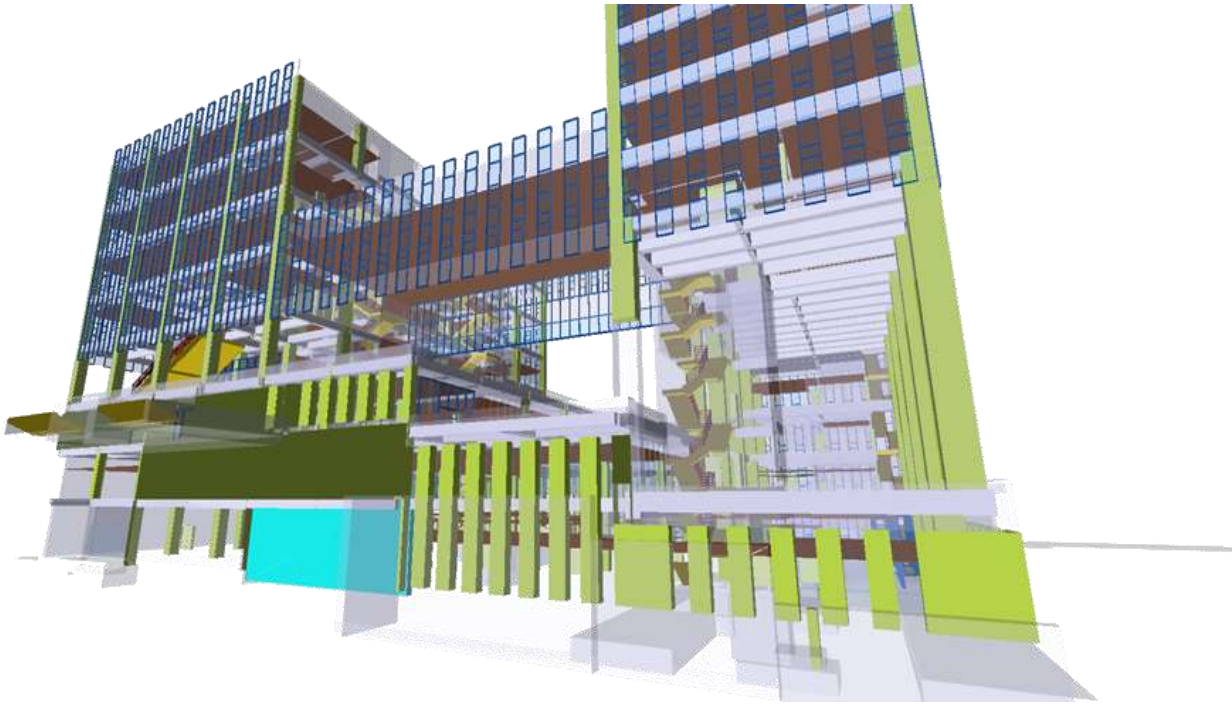
3D GIS

A system designed for acquisition, storing, processing, analysis, management, or publishing of geo-spatial data in 3D environment





<Image Source: http://geospatial.net >

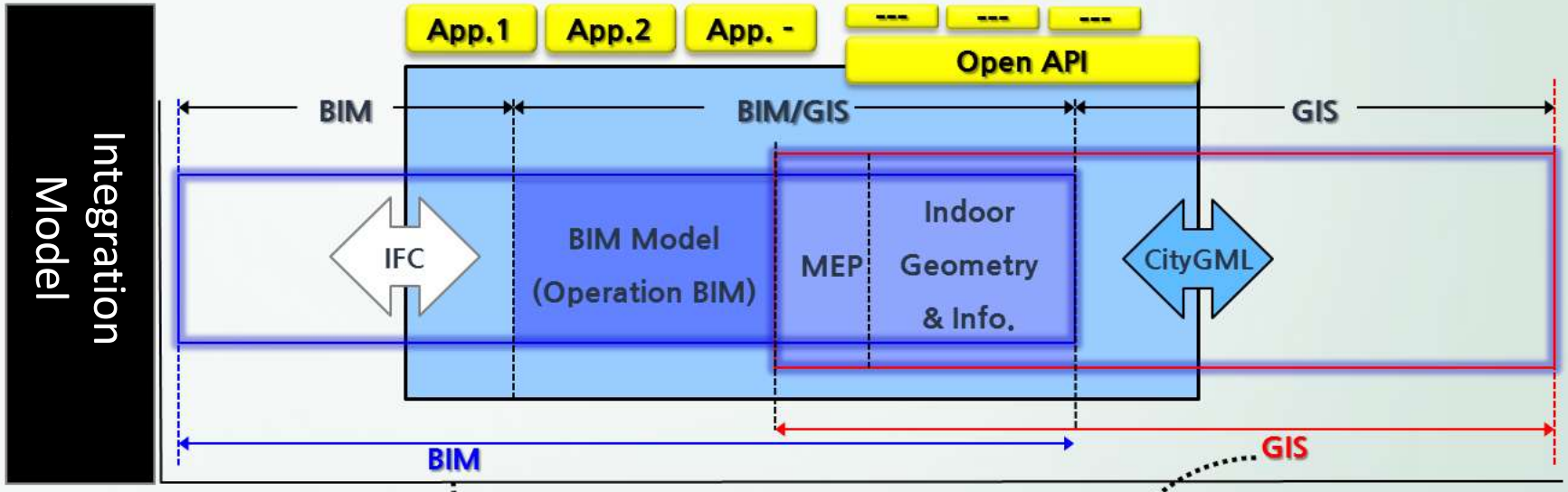


BIM/AEC

A digitalized design data of construction, infrastructure, or large-sized facilities/machineries under CAD(Computer Aided Design) environment

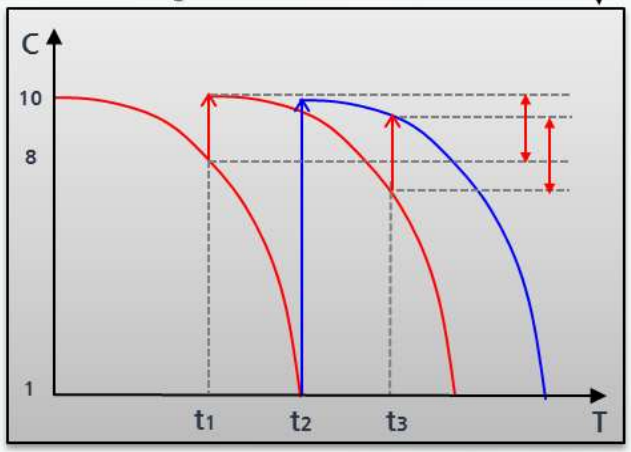
3D GIS + BIM = ?

GeoBIM Platform



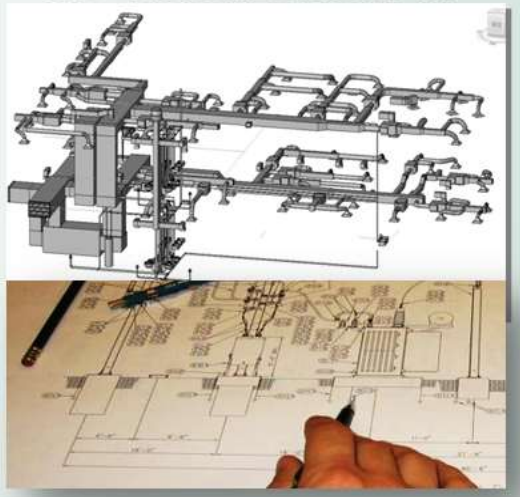
Facility Management

Time Optimization

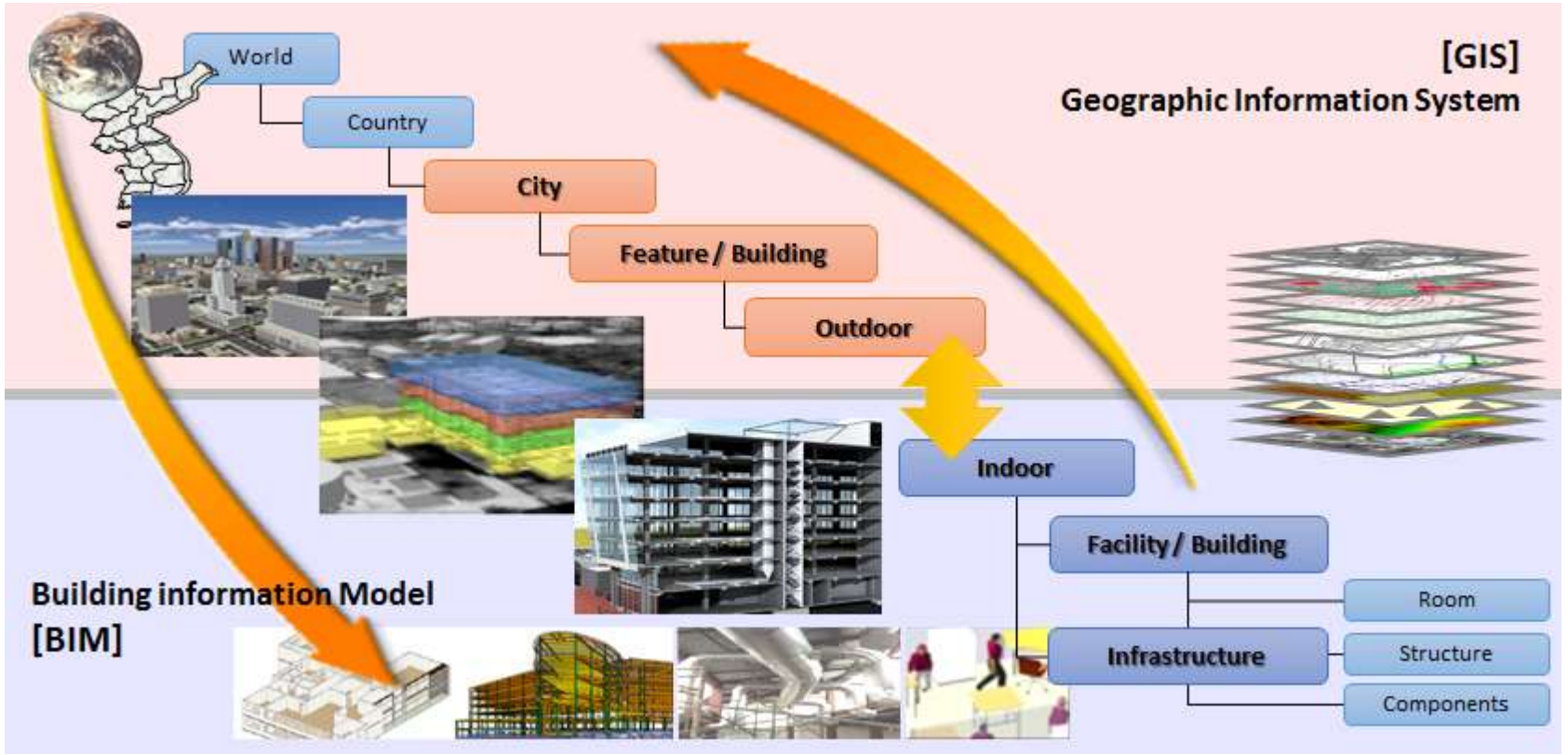


Spatial Optimization

3D Visualization/AR



From Standard,



GIS	Geospatial Information
CityGML	GIS Standards
In/Out door GI Model (Geospatial Information Model)	Outdoor Model
	Indoor Model
IFC	BIM Standards
BIM	Construction Drawings Info.

buildingSMART
International Alliance for Interoperability

OGC®
Making location count.

National Institute of BUILDING SCIENCES

From Industry,

Autodesk & Esri

Global leaders partnering to drive the integration of spatial intelligence and 3D design model information. Connecting The Science of Where to Make Anything.

Main Common Questions

Ready to make anything, anywhere

A new collaboration between Autodesk and Esri will put GIS and BIM at the center of construction projects, driving smarter decisions, optimized designs, accelerated project approvals, reduced cost, creating smarter cities and resilient infrastructure. Building the bridge between GIS and BIM will change the way we plan, design, and build our future.

AGI and Bentley Systems Announce Cesium Consortium

Bentley Advancing Infrastructure CESIUM agi

Bentley Systems Joins the Creators of Cesium to Accelerate Open-Source Development for Cesium's Virtual Globe Technology

EXTON, Pa., U.S.A. – Analytical Graphics Inc. (AGI) and Bentley Systems are pleased to announce Bentley Systems as a co-founder of the new Cesium Consortium. Cesium is an open source, browser-based virtual globe, first developed by AGI in 2011 for the aerospace and defense communities. Cesium's unparalleled performance in streaming very large datasets through a browser to desktops, tablets, and smart phones has enabled it to become the virtual globe of choice for geospatial viewing. The consortium will now enable AGI and Bentley to collaborate on the Cesium roadmap to better accelerate and support the requirements for building infrastructure modeling (BIM) and for owners of infrastructure assets. In addition, the consortium will support feature development, priority bug fixes, expansion of outreach efforts, and the hosting of social coding events such as code sprints and bug bashes.

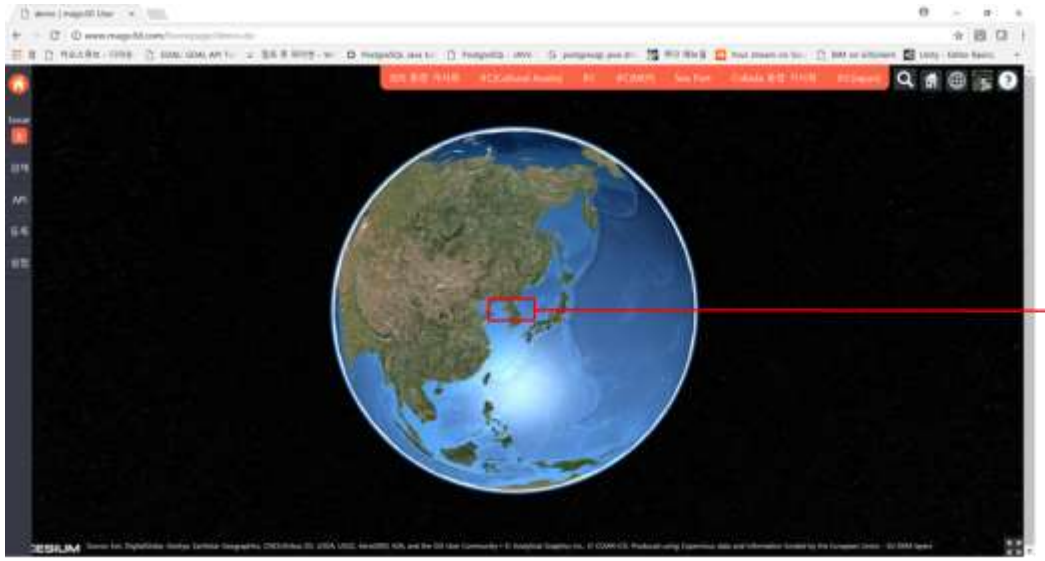
Bentley Systems is adopting Cesium to visualize and interact with highly detailed infrastructure engineering models set in the reality context of their surrounding environment. The digital engineering models are created with Bentley's *MicroStation* and BIM applications, and the context is provided through reality meshes, created from digital photography and scanning devices using Bentley's *ContextCapture*.

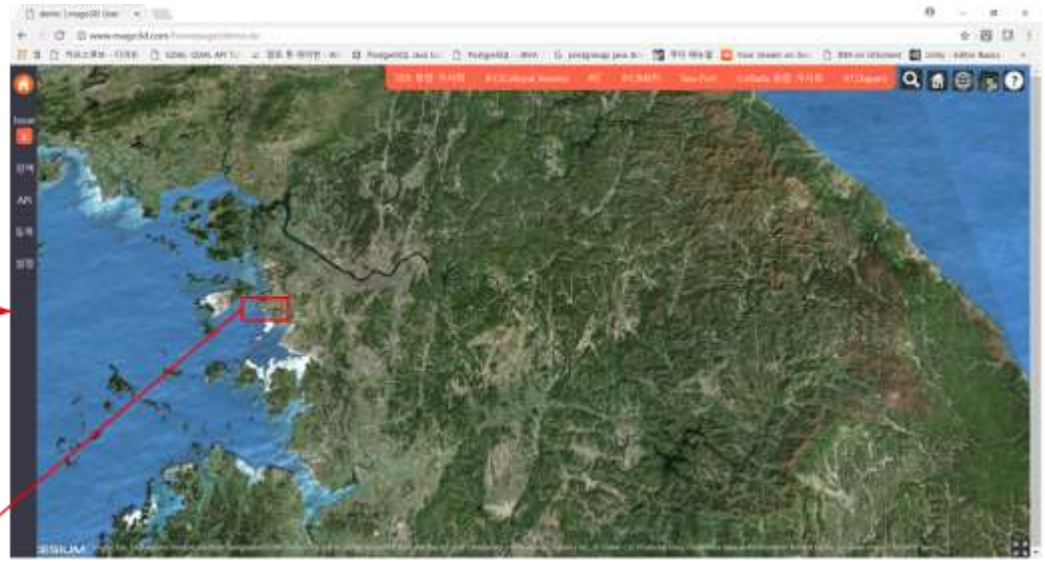
And From Open Source...

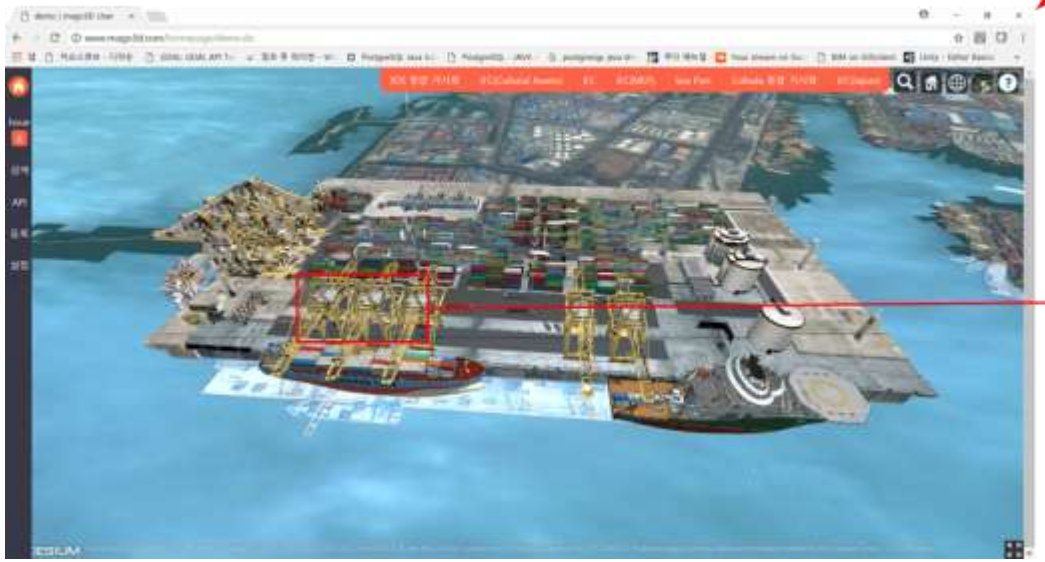
mago3D

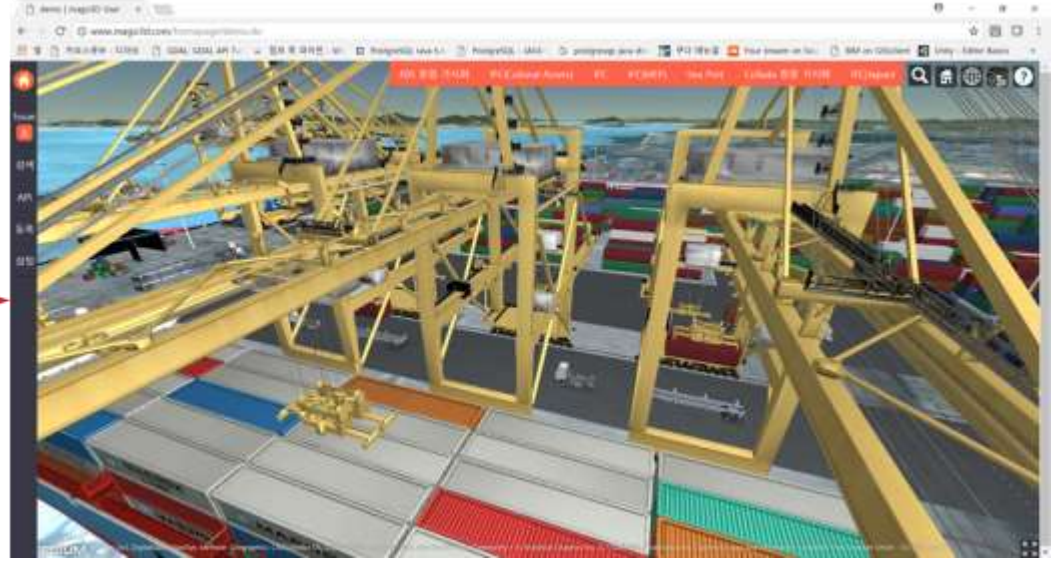
Web Based Open Source GeoBIM!

mago3D = GIS + BIM + Open Source



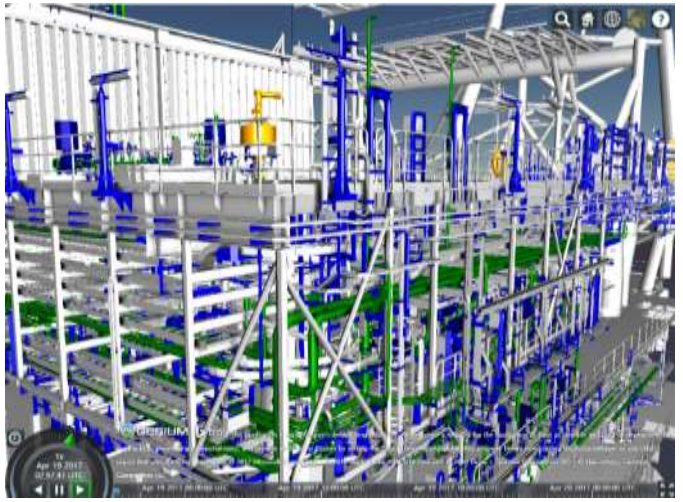




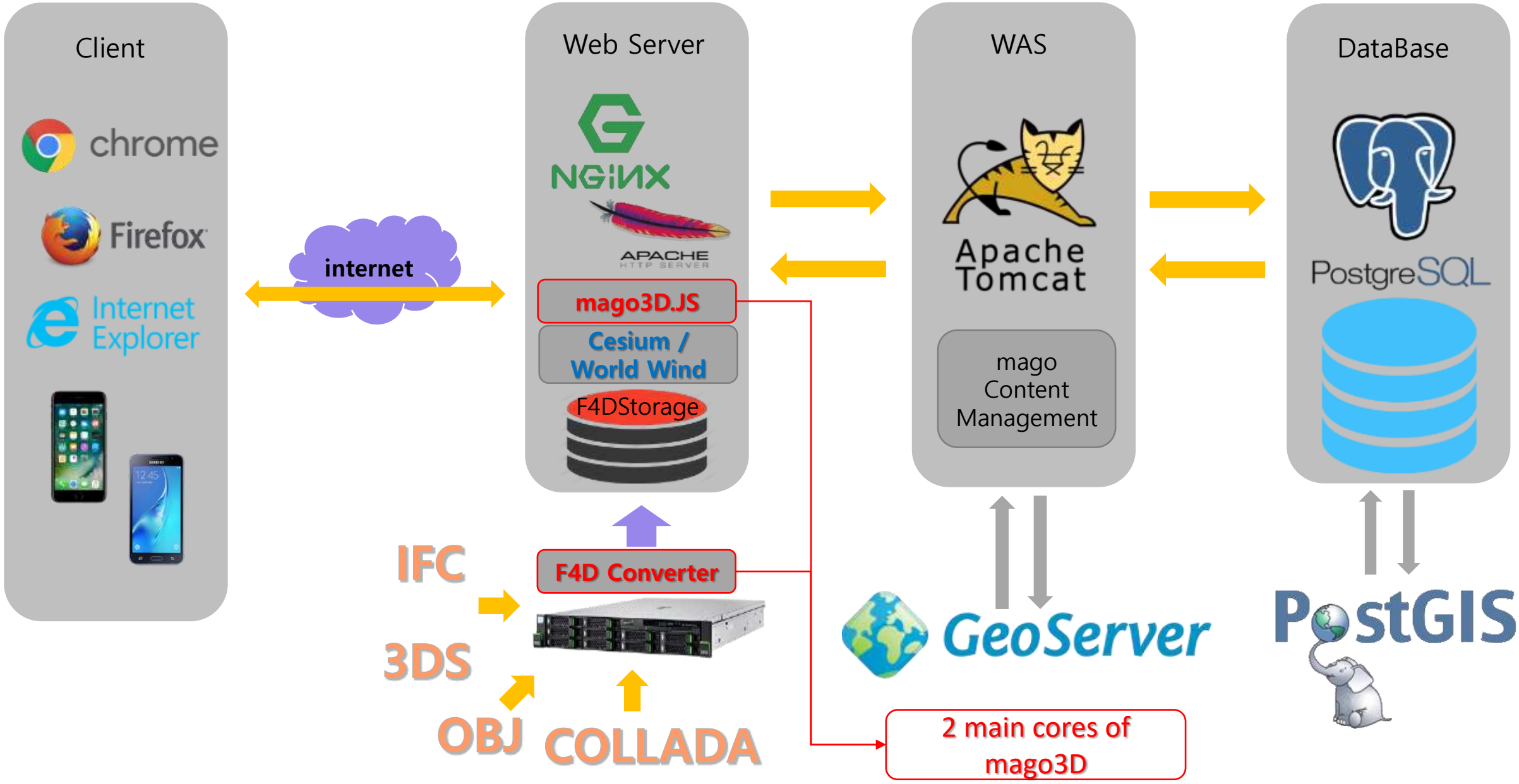


mago3D is a platform for ...

1. Visualizing massive and complex 3D objects including BIM on a web browser
2. Seamless integration of BIM/AEC and 3D GIS in a single space
3. 'Digital Twin' that can create parallel worlds in a virtual reality with numerous IoT, sensor data
4. Web based collaborative issue/process management



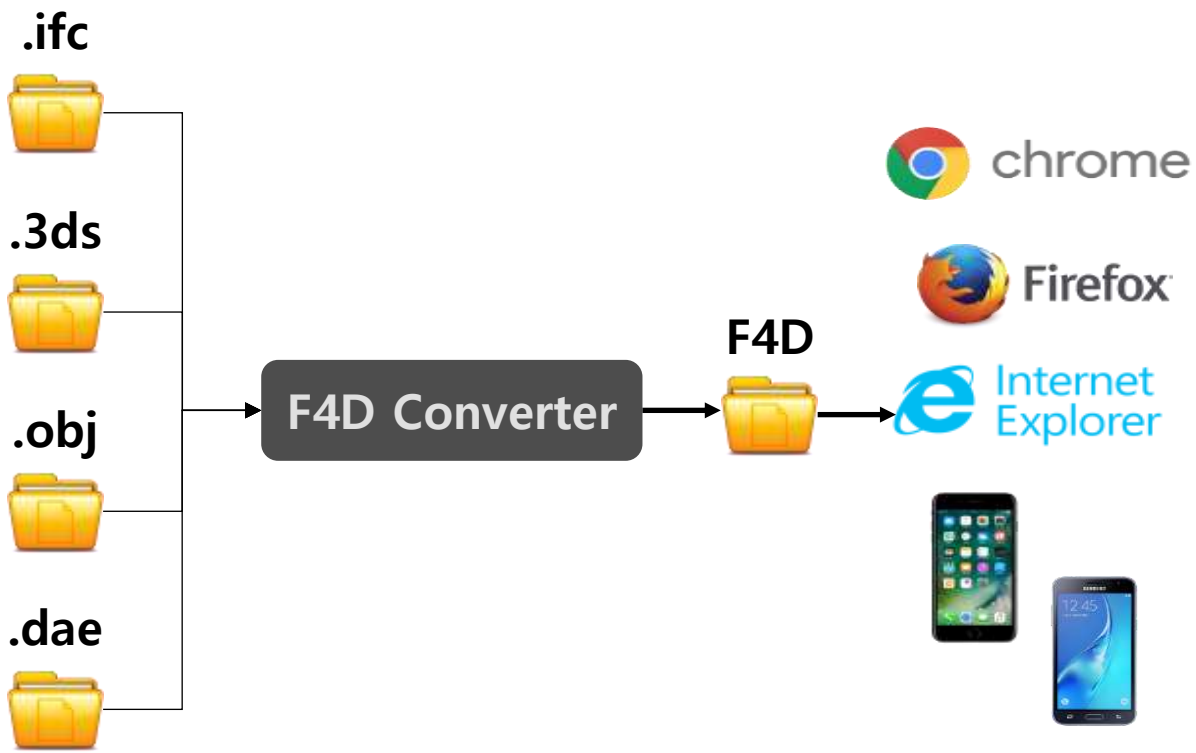
Overall System Architecture



2 Main Cores of mago3D...

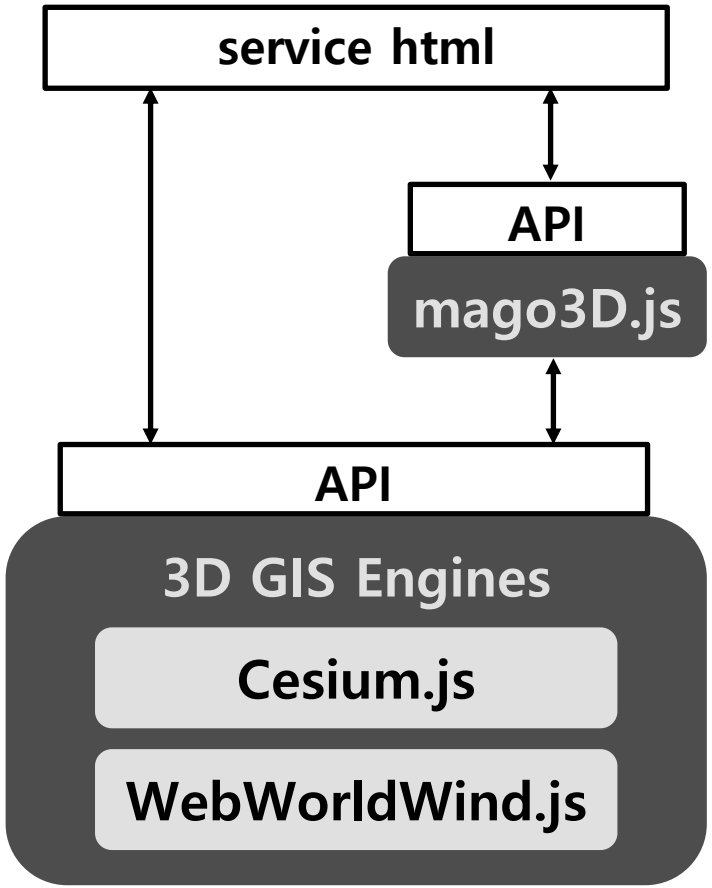
F4D Converter

F4D Converter converts 3D formats(IFC, 3DS, OBJ, DAE, JT) to 3D internet service format F4D. It carries out data size reducing and pre-processing for fast rendering.



mago3D.js

JavaScript that expands existing WebGL Globe's features to support BIM and indoor space.



mago3D runs on any device

BIM Integration

Scene from indoor to outdoor through windows

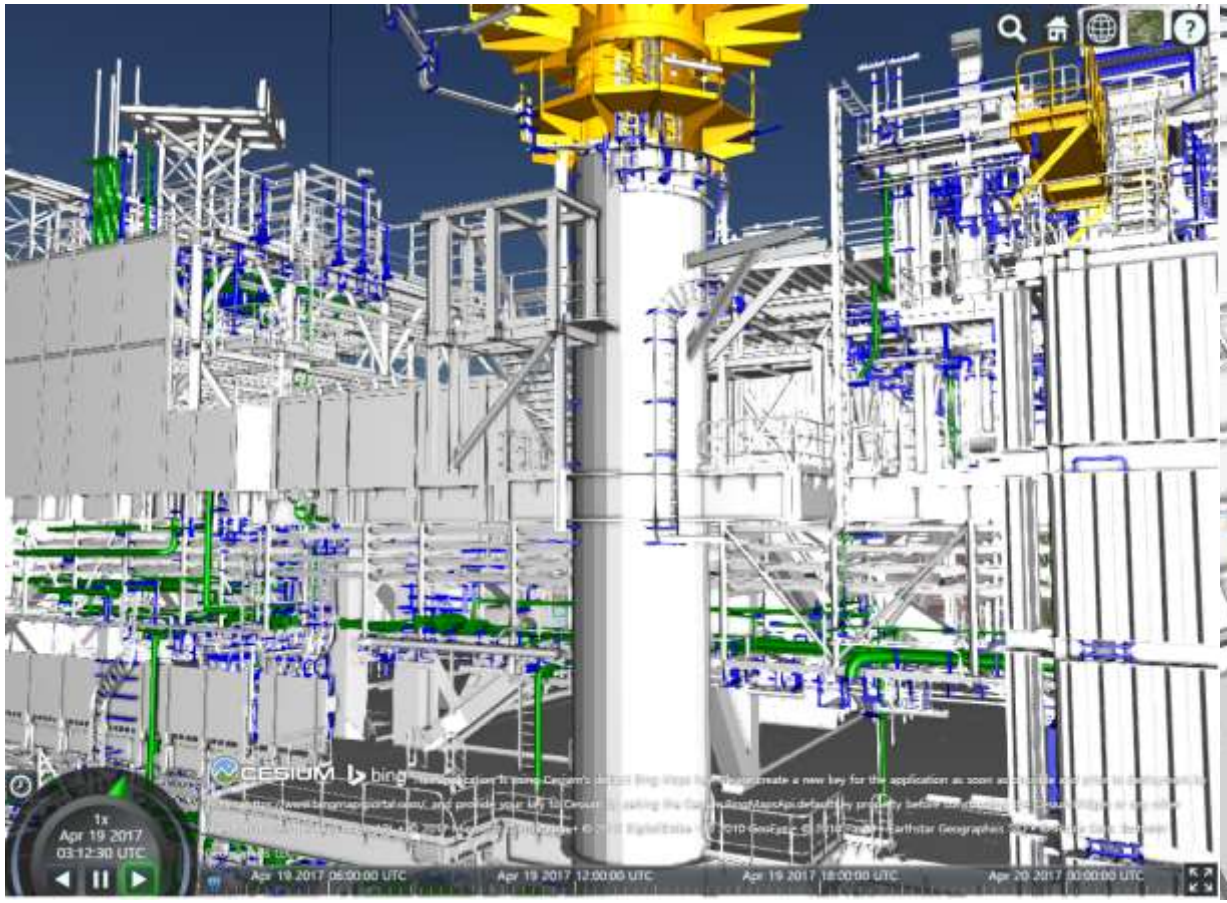
Scene from outdoor to indoor through windows

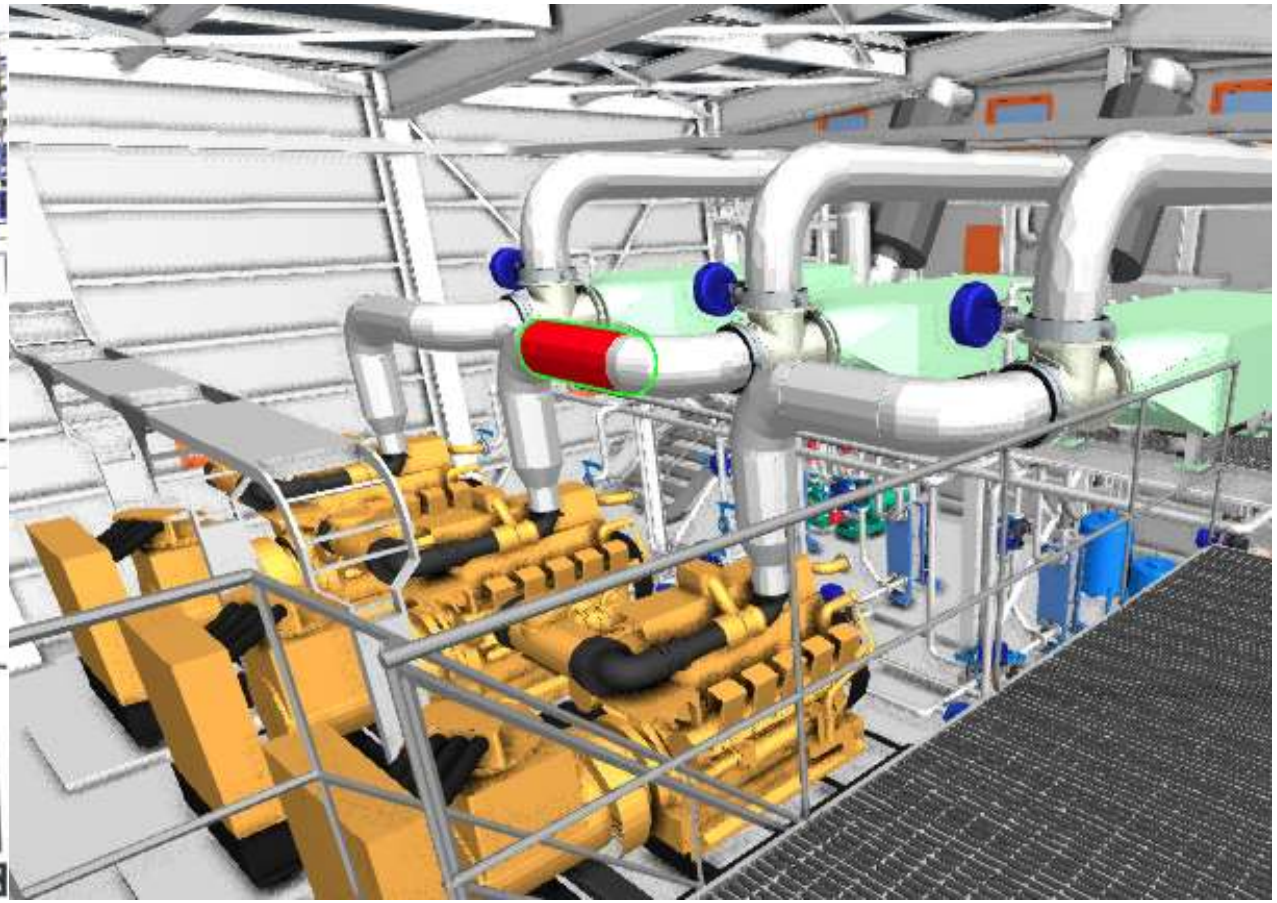
Seamless integration of **BIM and 3D GIS**
on the same platform

MEP Integration

Integration of large size MEP and 3D GIS
on a web browser

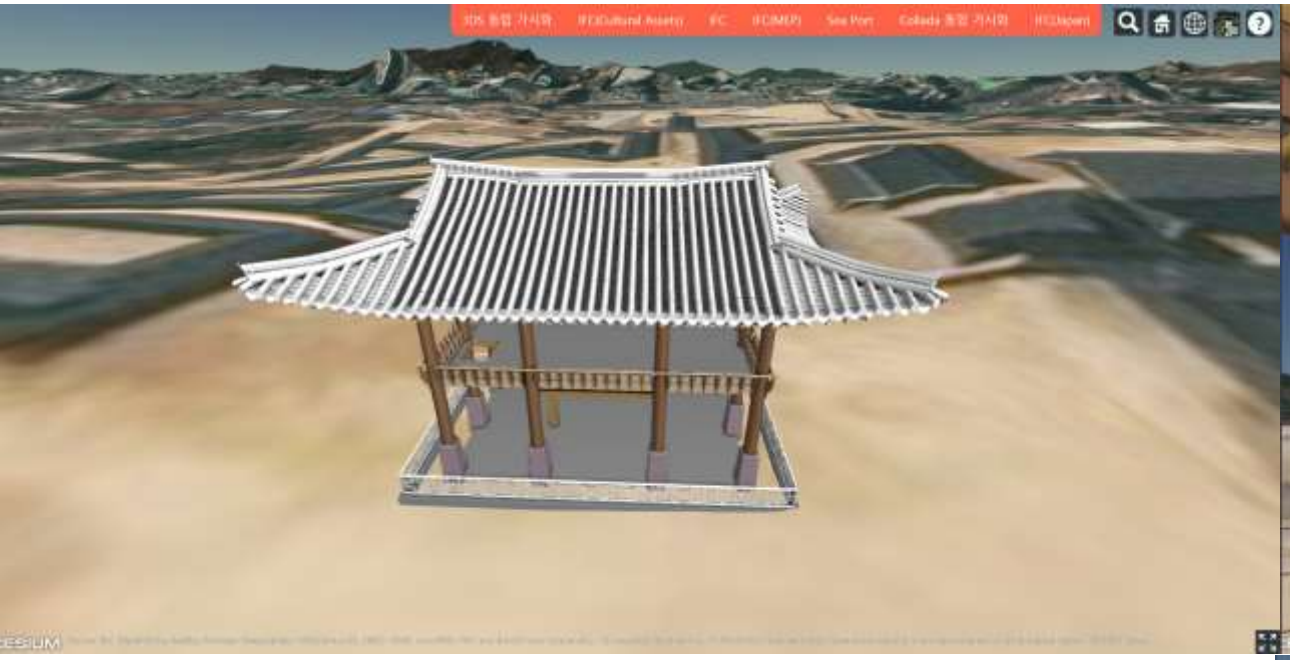
AEC Integration

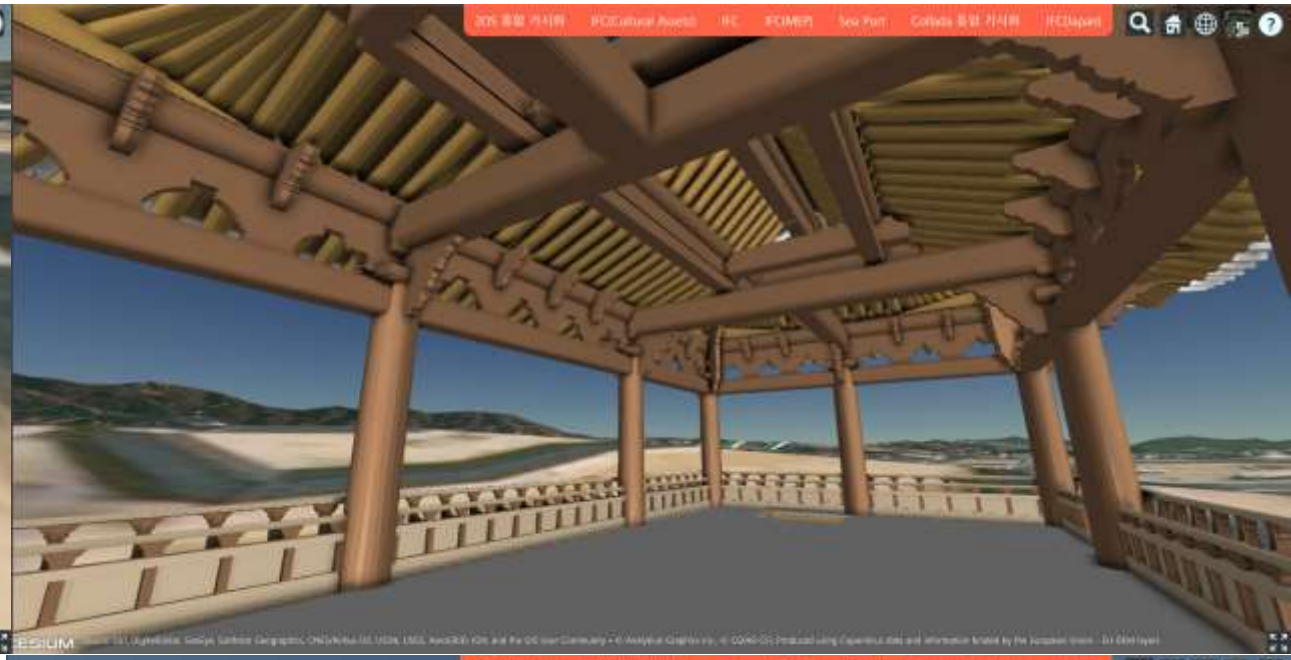




Integration of large size AEC and 3D GIS
on a web browser

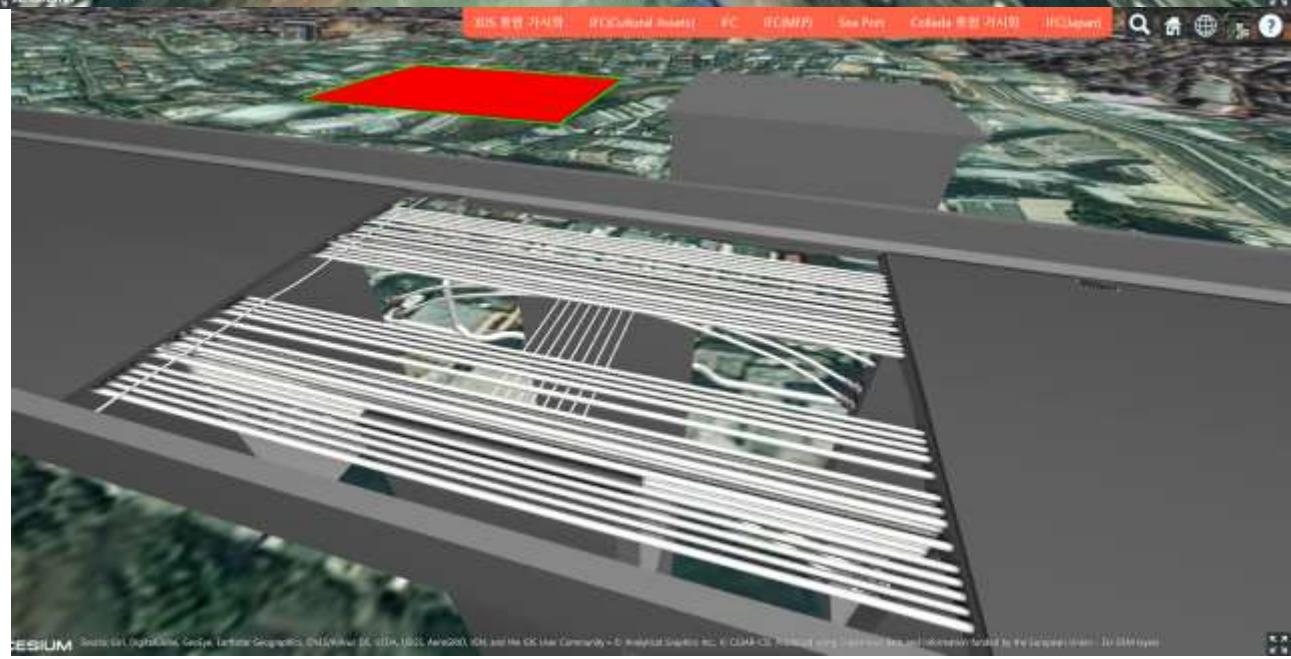
Cultural Heritage in Korea





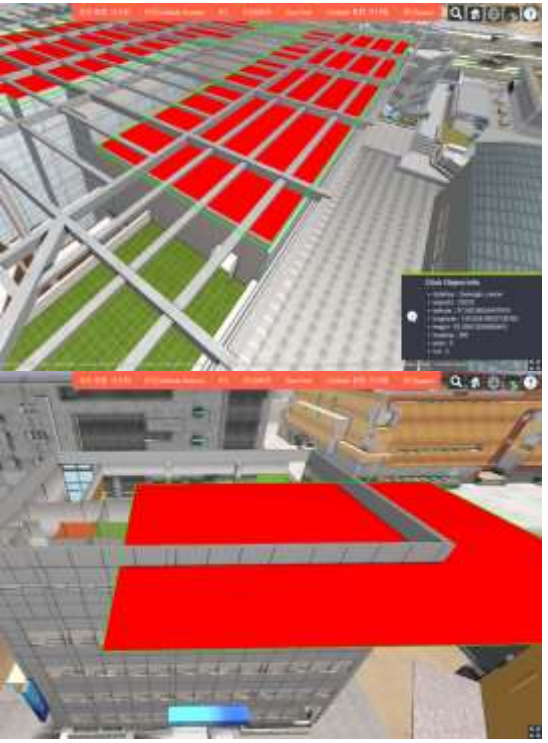
Cultural Heritage in Korea

Tunnel, Bridge in Japan

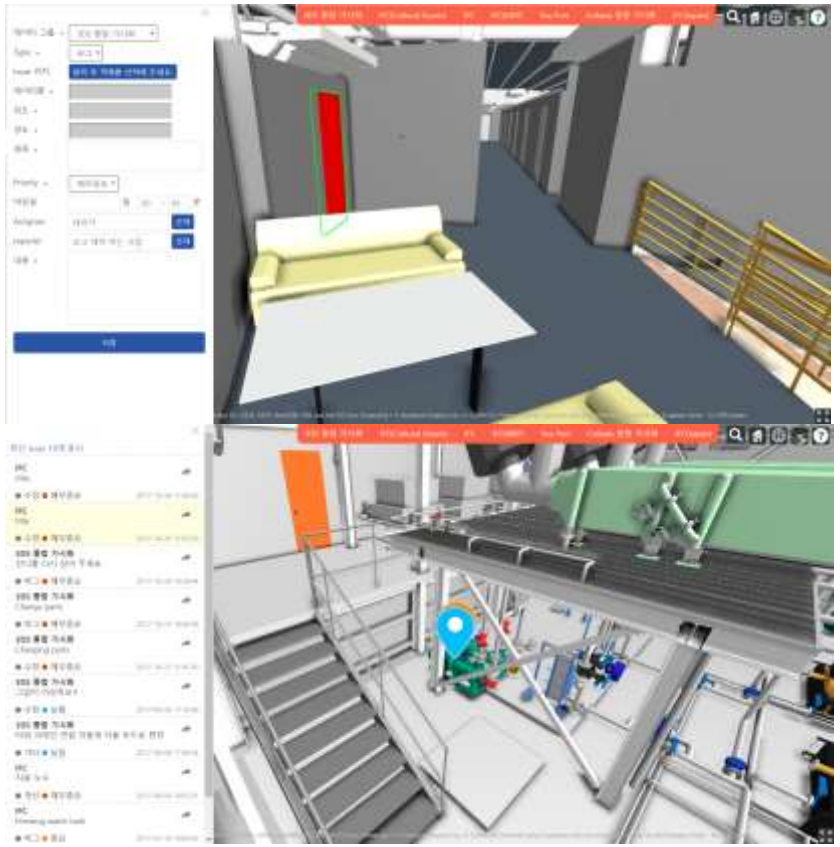


Tunnel, Department store, Bridge, Overpass offered by CUG(Civil User Group) in Japan

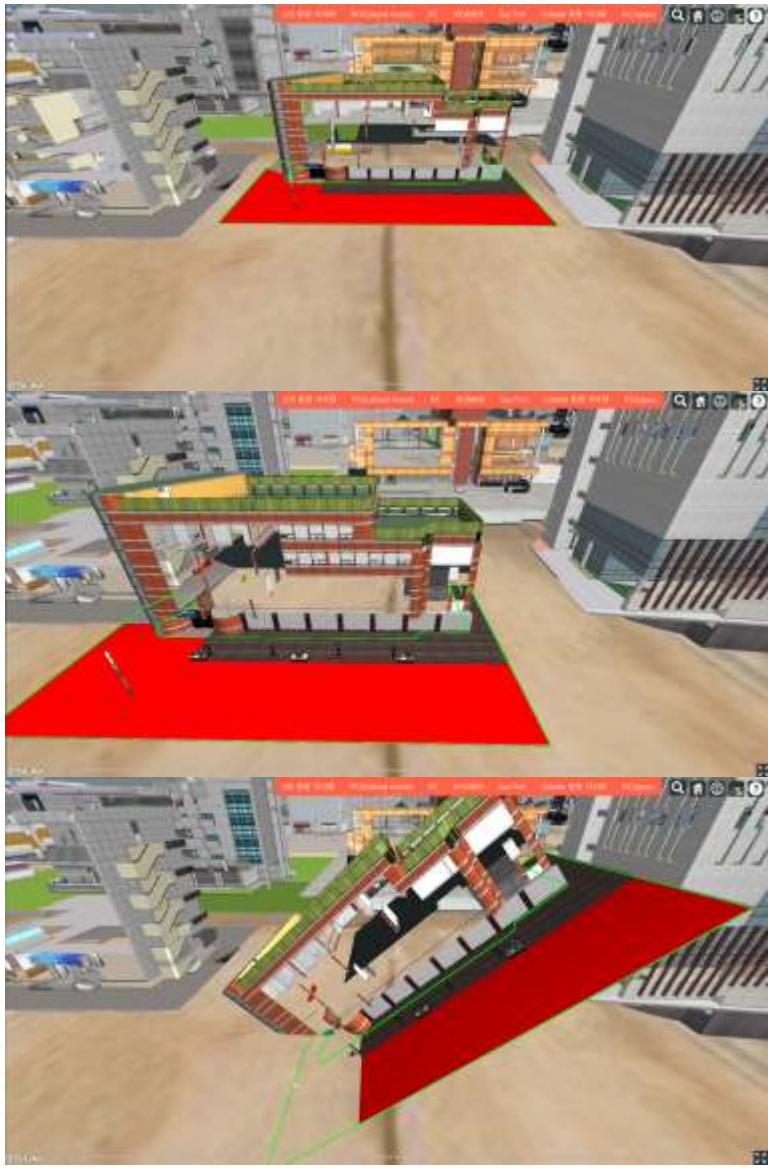
OpenAPIs



moving objects &
viewing attributes



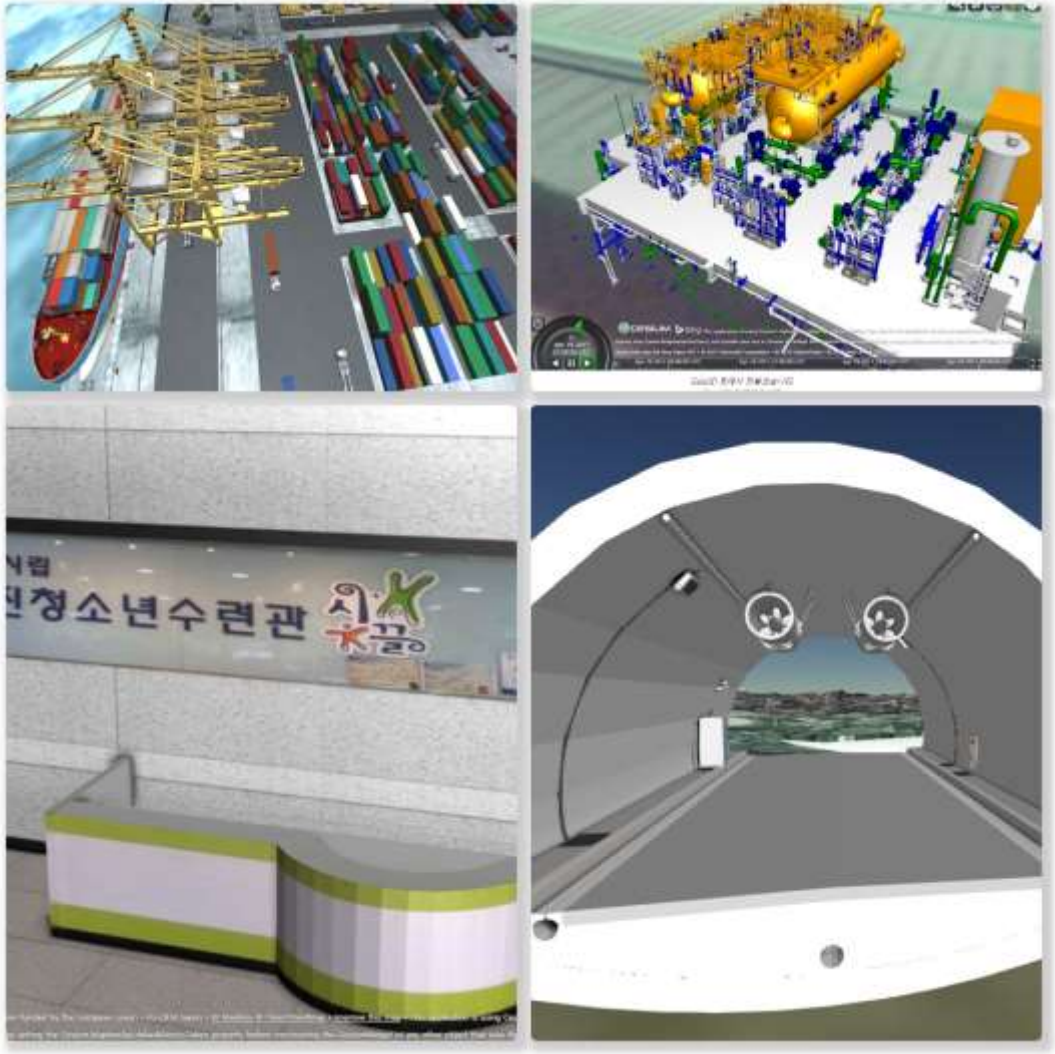
registration/monitoring/search of issues



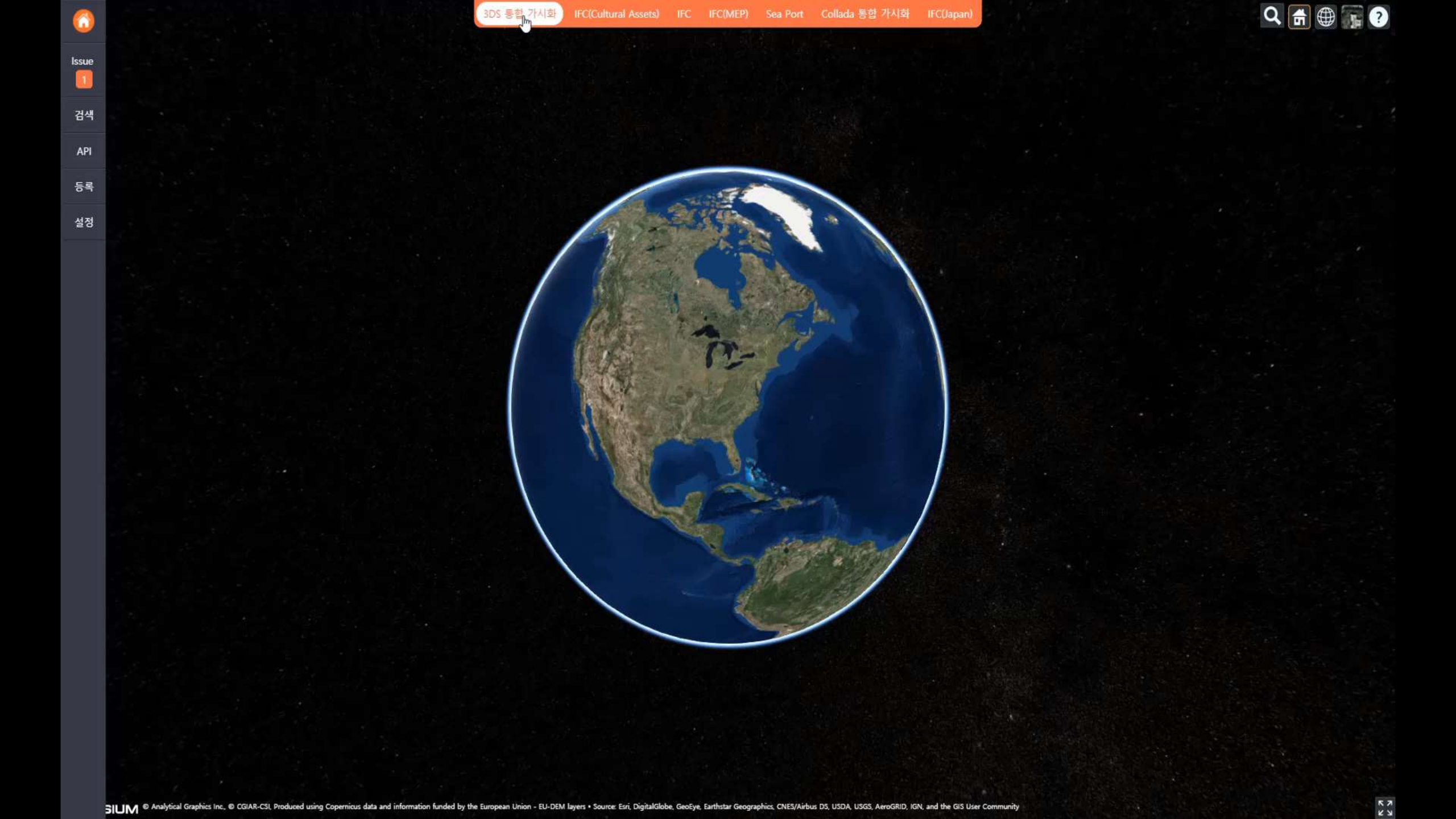
moving/rotating
a full building

APIs are supported for developing application systems(currently 29 APIs)

Geospatial Context Matters!



➔ mago3D can handle all the 3D objects in geospatial context


3DS 통합 가시화
IFC(Cultural Assets)
IFC
IFC(MEP)
Sea Port
Collada 통합 가시화
IFC(Japan)
Issue
1
검색
API
등록
설정
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Real Case

- ❑ **Project Name: Ship Building Process Management System**
- ❑ **3D Models in Service**

Factories

Cranes

Ships

Blocks

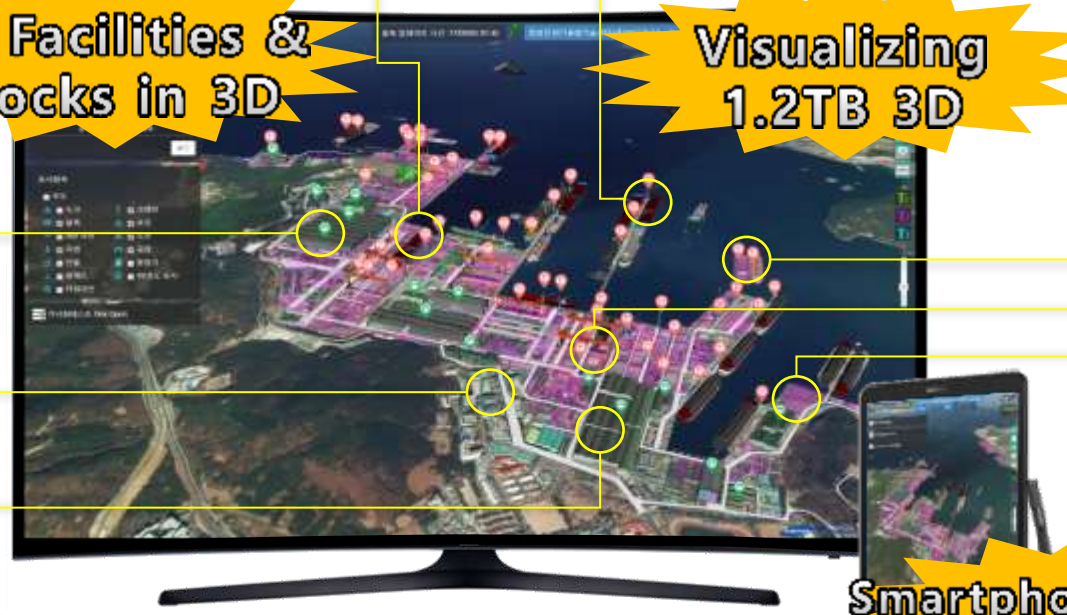
Office Buildings

All Facilities & Blocks in 3D

Visualizing 1.2TB 3D

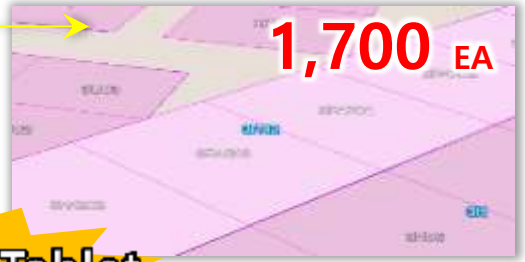
Docks

Smart Welding Machine



Virtual Yard on Web Browser!

Smartphone, Tablet, Laptop & PC



Yards

Real Case

Future Plan

Public Cloud Service

A mago3D | B mago3D | B mago3D

Supporting More 3D Formats

IFC

Revit

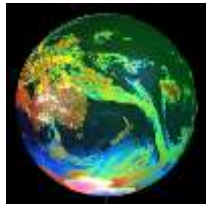
Obj

JT

3DS

CityGML

Collada



weather data

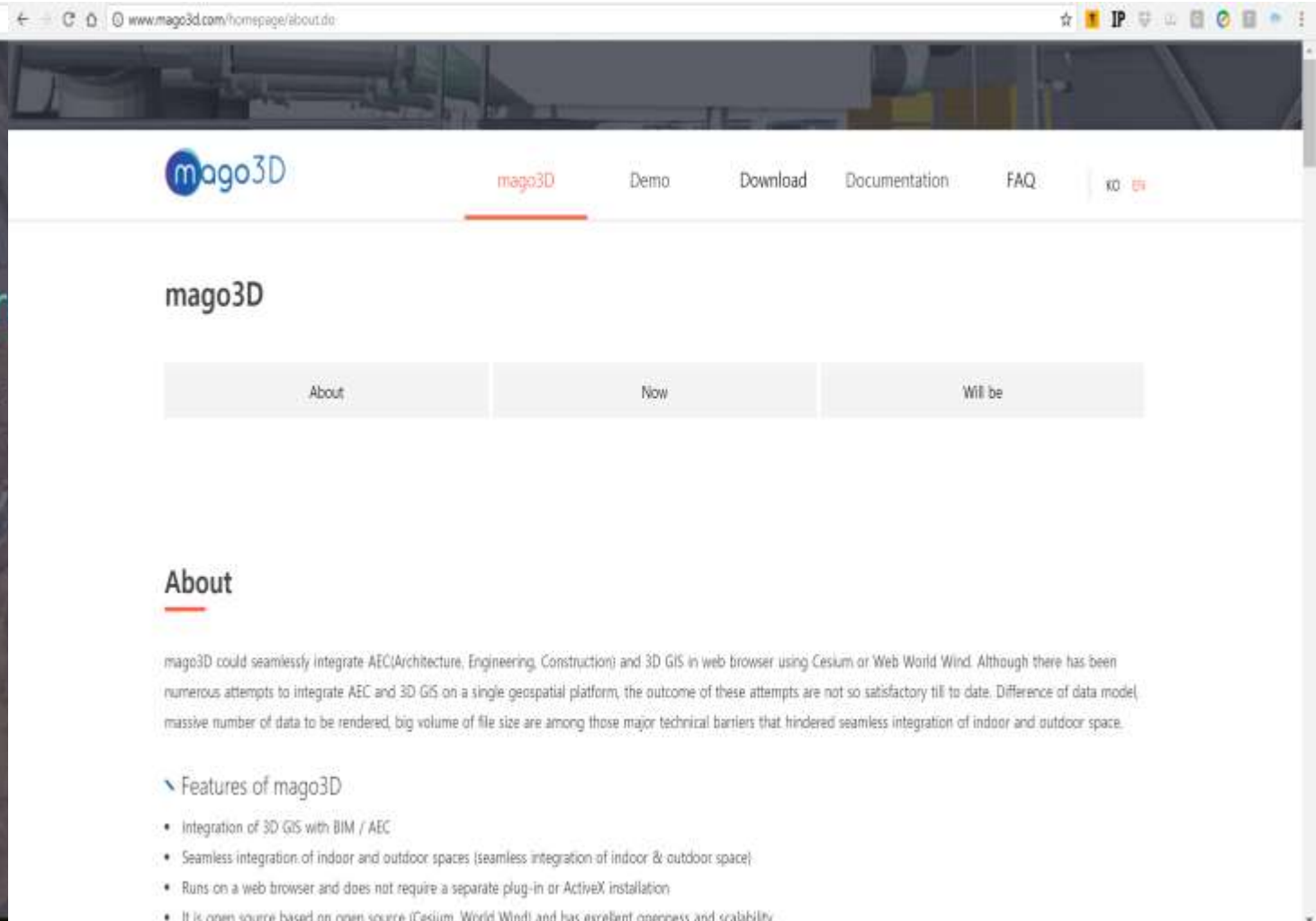
To the **Digital Twin** Platform

Participatory System

Improved CMS, OpenAPI, Statistics/Analytics

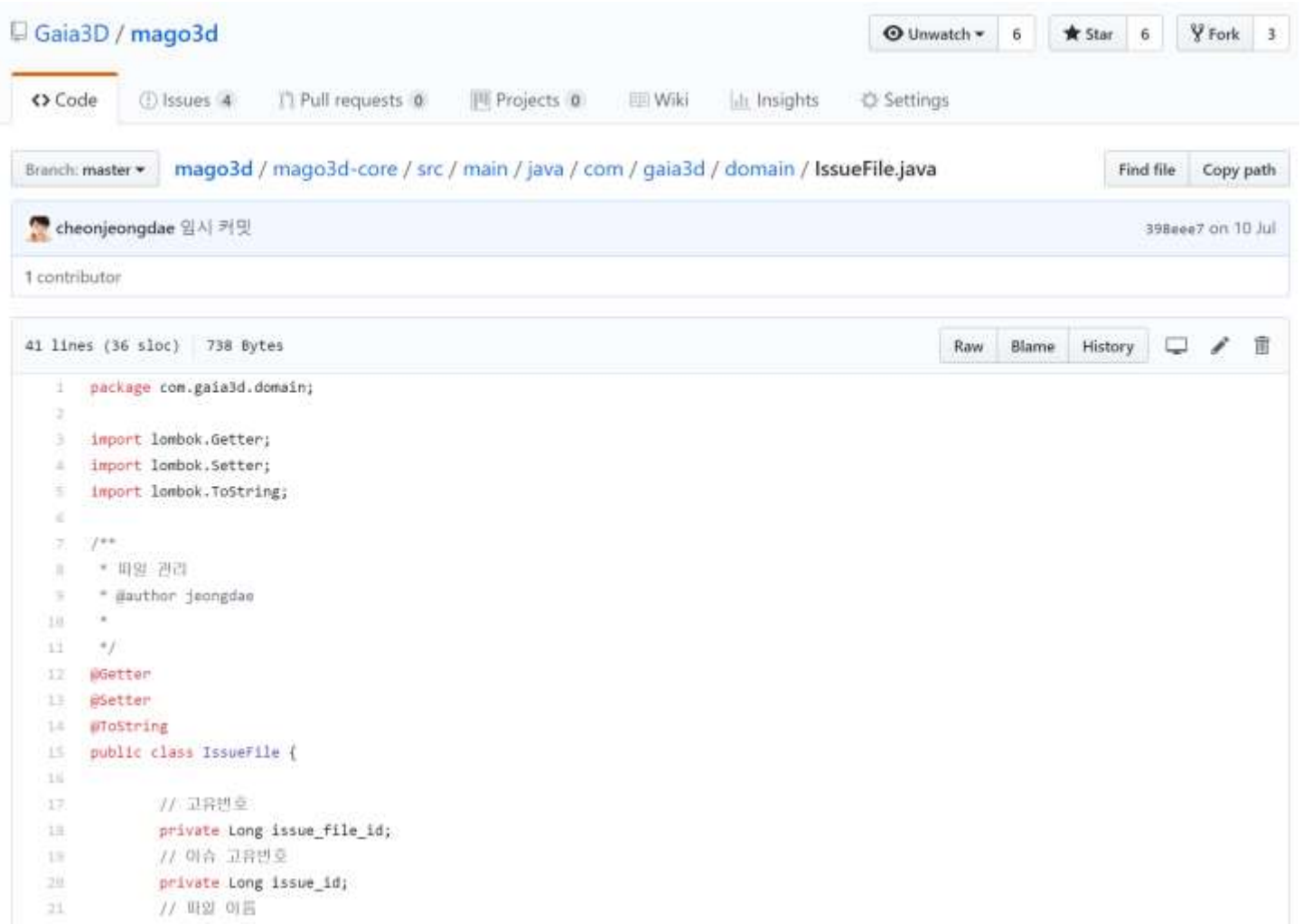
Web Page

http://www.mago3d.com



Source Code

https://github.com/gaia3d



In Summary

- mago3D is a web based 3D objects visualization and management platform that can int egrate BIM/AEC and GIS.
- It can visualize massive and complex 3D objects including BIM on a web browser witho ut installing additional program or plugins.
- It utilizes open source WebGL Globe - Cesium, World Wind or others to expand those fe atures and functions to indoor level.
- mago3D itself is a open source project with Apache and AGPL licenses.
- It supports many industry standard formats such as ifc, 3ds, obj, dae, kml, gltf...

mago3D

For more information, please visit http://mago3d.com
All the source codes are available at https://github.com/gaia3d

Thank you!

Acknowledgement : This project is funded by Ministry of Land, Infrastructure and Transportation, Korea, through R&D number:18NSIP-B080778-04

Gaia3D
The GeoSpatial Company