

# 3D-GIS

3D GIS in the Cloud

**WHITE PAPER**



**Sivan** design  
[www.sivandesign.com](http://www.sivandesign.com)

OVERVIEW

GIS in 3D enable users to view and analyze data in detail and precision that cannot be achieved in 2D. 3D allows real world views that improve user orientation and increase the ability to perform wide variety of tasks such as infrastructures management and city planning.

Sivan Design’s **3D-GIS** is a cloud system (private or public) that provides GIS experts, professional users, and public users with 3D views and 3D analysis tools, enabling them to use spatial information in 3D. The system runs as an iPad App or on a web browser that requires no installation.

FROM 2D GIS TO 3D GIS IN A FEW STEPS

**3D-GIS** enables easy migration of existing 2D GIS projects (and data) into 3D GIS environment in a few simple steps. The **3D-GIS Studio** provides an intuitive web interface for creating 3D GIS projects. The 3D GIS project can be published on the web and accessed by both internal and external users anywhere.



Figure 1: 3D-GIS Technology Scheme

WEB APPLICATIONS – 3D-GIS STUDIO AND 3D-GIS EXPLORER

**3D-GIS** is a set of web services installed on the server. Running on standard web browsers (e.g. Internet Explorer, Safari), the 3D-GIS client is a Silverlight state-of-the-art web application. Built on Silverlight technology, the **3D-GIS Studio** provides an interface that allows you to manage, migrate

and create 3D GIS projects. The **3D-GIS Explorer**, which is also based on Silverlight technology, enables navigating and exploring the data in a web browser environment.

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### CLOUD COMPUTING APPROACH

**3D-GIS** is a web application running as a suit of web services, which requires no installation on the client side (no add-ons, ActiveX or execution files). This effectively eliminates many of the problems associated with the installation process (either as a full application or a web add-on) such as security problem, and keeping current users updated. The Web Thin Client approach also enables easy usage of the system from mobile devices and browsing kiosks, integrating these services with the enterprise system.

Due to its cloud computing architecture, the system runs its “heavy duty” processes such as 3D graphic rendering and database queries on the server. This design has the considerable advantage of placing relatively low demands on the resources of the user’s computer or mobile device.

The system’s web services architecture allows easy integration with other enterprise systems.

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### VIEWING, ANALYZING AND EXPLORING IN 3D

The **3D-GIS Explorer** web application provides an intuitive 3D navigation environment, which combines the classical 2D GIS mapping capabilities with a real 3D world. Other standard GIS capabilities such as layers control, measure and attributes query are also supported. The system also enables analyzing the data through 3D Geo-spatial queries – spatial and attributes selection, 3D buffer, 2D polygon, 3D boundaries etc.

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### 3D FEATURES

In addition to the conventional 2D features (Point, Line and Polygon), **3D-GIS** includes some new 3D features such as the 3D Parcel, Pipeline and Road. While the pipeline feature is an improved version of the regular line, the 3D Parcel is a whole new feature represented as a B-rep (Boundary Representation).

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### DOMAIN SPECIFIC SOLUTION

**3D-GIS** provides specific solutions for underground infrastructures, roads and cadastre. *3D modeling* of features related to these domains such as road carriage-ways and shoulders are included in the system. Pipe textures and diameters are samples of the *3D symbology*, which is also a part the system. The application also provides a set of specific *3D topology* rules and tools such as the correlations between an underground 3D parcel and the surface 2D parcels.

## BUILDING THE 3D WORLD

Building the 3D world using **3D-GIS Studio** is a simple task – all it takes to convert 2D projects into the 3D world is browsing for the geo-spatial data source and setting the relevant 3D modeling parameters. For example, structures can be easily modeled using a polygonal layer and its attributes (heights, cover). 3D roads can be created using regular 2D lines (e.g. center lines) and some attributes (number of lanes, width etc.), and the rest is done by the system.

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## SUPPORT FOR THE MOST COMMON DATA FORMATS AND GEO-SPATIAL PROTOCOL

**3D-GIS** supports the most common GIS data formats such as shapefiles, ArcSDE database, SQL Server FDO database, GeoTiff Raster images and DTM. The system also supports the main OGC Geo-Spatial protocols such as WMS (Web Map Service) and WFS (Web Feature Service).

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## 3D GEO-SPATIAL DATABASE

The **3D Geo-Spatial Database** is a unique database structure that hosts the 3D World. While the system uses the original Geo-Spatial data sources for queries and data attributes, a 3D geo-spatial database is created to work in conjunction with these sources, storing and managing the DTM, raster images, 3D Models, 3D topology and Symbology etc.

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## ABOUT SIVAN DESIGN

Sivan Design was incorporated in 1996 and rapidly became a world leader provider of tailor made GIS solutions integrated with ERP capabilities, 3D simulation tools and user-friendly civil engineering CAD products.

The company has expertise in:

- GIS-ERP integrated solutions for land, roads and underground infrastructures management
- Development of 3D GIS for underground infrastructures, roads and cadastre management
- Surveying, mapping, CAD and 3D simulation software for civil professionals

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