# SkylineGlobe - Products Overview

Skyline Software Systems, Inc. is a leading provider of 3D earth visualization software and services. The company offers a comprehensive platform of applications, tools and services that enable the creation and dissemination of interactive, photo-realistic 3D environments. The SkylineGlobe software suite sets the standard for 3D desktop and web-based applications, enabling an enterprise to build, edit, navigate, query, and analyze realistic 3D environments, and rapidly and efficiently distribute them to users.
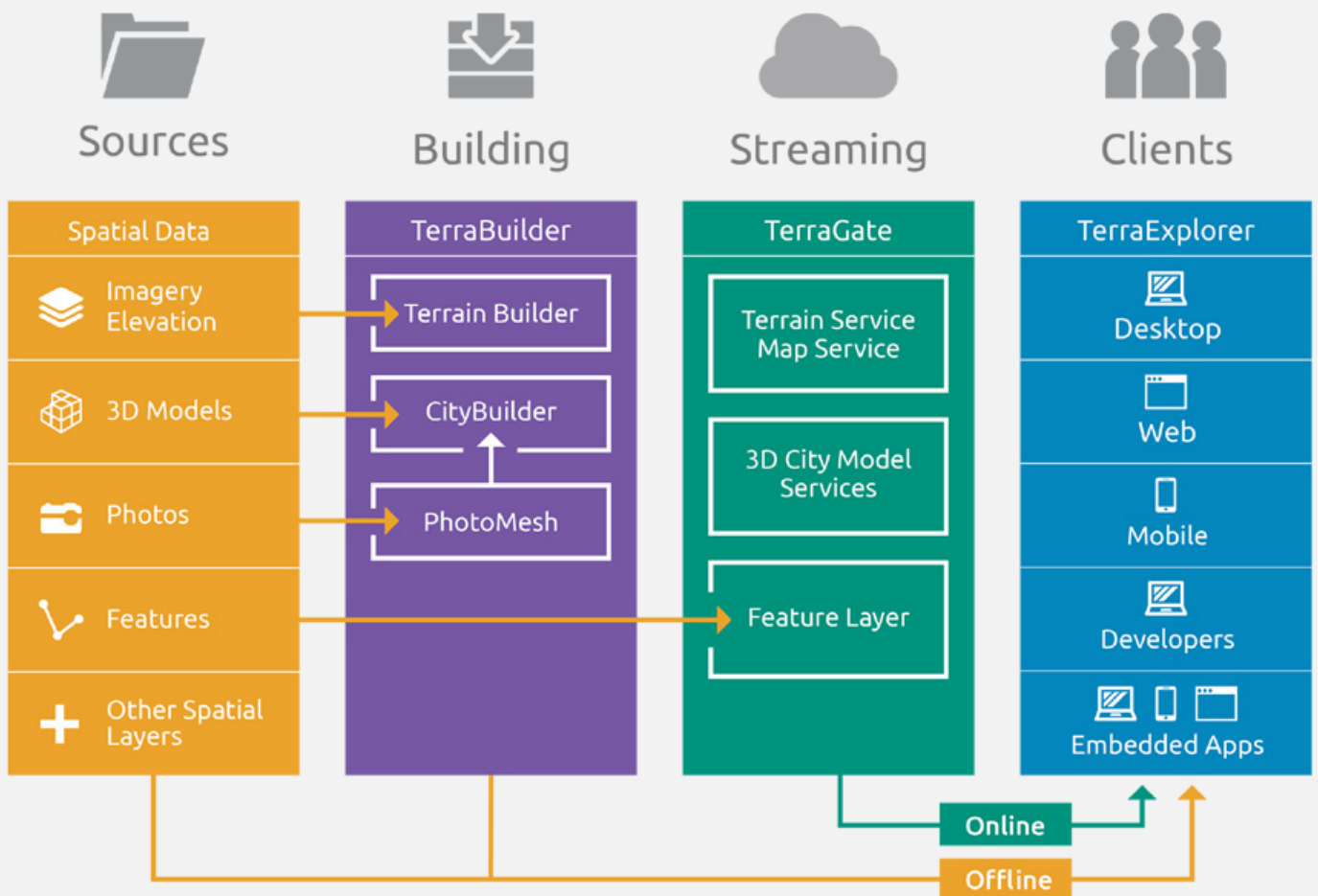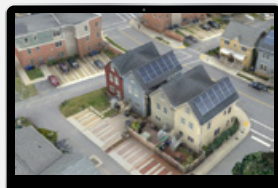
Building - TerraBuilder

TerrainBuilder

Merges aerial photos, satellite images, and digital elevation models of different sizes and resolutions into a photo-realistic, geographically accurate terrain database.

CityBuilder

Merges 3D mesh models together with classification layers, and other model layers into a multi-resolution and stream-optimized 3D Mesh Layer database (3DML).
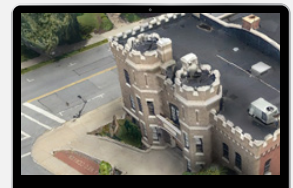
PhotoMesh

Fully automates the generation of high-resolution, textured, 3D mesh models from standard 2D photographs.

Streaming - TerraGate

Terrain

Powerful network data server technology for streaming 3D terrain geographic data from terrain databases (MPT) or directly from the original sources to thousands of concurrent remote users.

3D City Model

Powerful network data server technology for streaming multi-resolution, stream-optimized 3D Mesh Layers to remote TerraExplorer clients.


Feature Layer

Powerful network data server technology for streaming feature layers from databases or pre-cached layers to TerraExplorer or WFS clients, that also provides remote clients with read-write access to edit and save changes to the data source.

3D Clients – TerraExplorer

TerraExplorer for Desktop

Cutting-edge 3D GIS desktop viewer and creator for viewing, querying, analyzing, and presenting geospatial data in a high resolution 3D environment, as well as creating and publishing realistic 3D views.
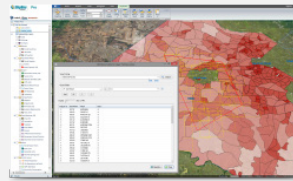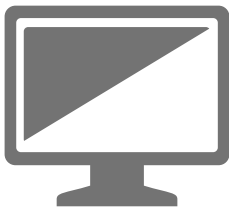
TerraExplorer for Web

Powerful web-based 3D GIS viewer and editor with advanced capabilities for viewing, analyzing, presenting, and creating 3D views in a high resolution 3D environment.
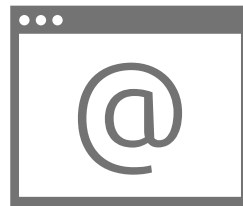
TerraExplorer for Mobile

Advanced 3D GIS viewer and editor for Android and iOS mobile devices with professional-grade tools for viewing, querying, analyzing and editing massive online or offline datasets in a high resolution 3D environment.

Developer

Desktop

TerraExplorer's rich API provides a complete, straightforward way to develop powerful, customized 3D desktop applications.

Web

TerraExplorer's powerful 3D GIS viewer and editor can be embedded in a website, and its robust capabilities supplemented by custom functionalities created using TerraExplorer's comprehensive API.

Mobile

TerraExplorer's mobile app provides a full API for custom feature development, along with easy-to-implement localization, branding and UI customization options.

SkylineGlobe Supported Formats

Feature Layers
- ESRI Shapefile
- File Geodatabase (*.gdb)
- MapInfo file (Tab, Mif, Mid)
- GeoPackage
- Microstation DGN
- DXF File
- SQLite (*.sqlite, *.db)
- TerraGate SFS server
- OGC WFS server
- ESRI ArcSDE server
- Oracle database
- ODBC database (.accdb, .xlsx, .txt)
- Microsoft SQL database
- PostgreSQL database

Complex Layers
- TerraExplorer project (.fly)
- OGC KML (.kml , .kmz)
- BIM (.fbx)
- Point Cloud (.las, .cpt)

Imagery and Elevation Layers
- Jpeg (.jpg, .jp2, .j2k, .jpc)
- Tiff (.tif, .itiff)
- Gif (.gif)
- BMP (.bmp)
- MrSid (.sid)
- GeoPackage (.gpkg)
- Erdas Imagine (.img)
- ER-Mapper (.ecw, .ecwp)
- Web Map Service (WMS)
- Web Map Tile Service (WMTS)
- Oracle Spatial Database
- ECW Image Web Server
- TerraGate Server
- ArcSDE Raster Server

3D Models
- .3dml
- .dae
- .ply
- .obj
- .x
- .3ds
- .flt

TerraBuilder - TerrainBuilder

TerraBuilder TerrainBuilder is a 3D terrain database creator with professional-grade tools for manipulating and merging aerial photos, satellite images, and digital elevation models of different sizes and resolutions. The resulting photo-realistic, geographically accurate terrain database can be made available to local TerraExplorer clients or published to remote clients (using the TerraGate Terrain service).

Interoperability
Supports wide range of layer types
» Load local and remote files
» Support for extensive range of formats
» Dynamic plug-in mechanism for easy installation of updated plug-ins from Skyline
» Automatic reprojection of layers that use different coordinate systems
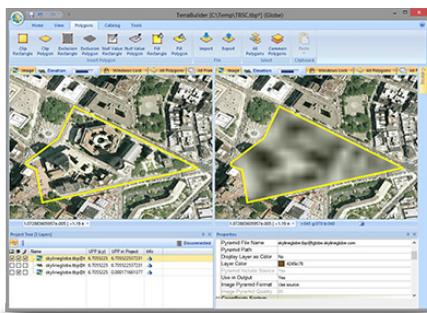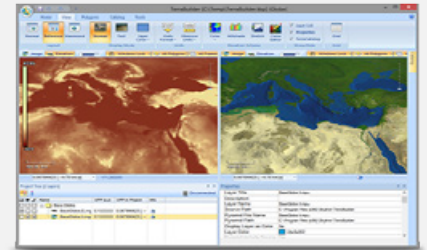

Flexible Layer Manipulation
Range of editing tools for maximum precision
» Easily crop, resize, and move layers
» Adjust geographic coordinates using tie points
» Adjust color and elevation parameters
» Easily edit using Clip, Exclusion, & Fill polygons
» Edit multiple layers simultaneously
» Polygon feathering

High Performance
Efficient terrain creation process
» Preview mode - lets you preview and correct potentially problematic areas before MPT creation
» Use of network fusers dramatically reduces processing time
» Automatic creation of source resolution pyramids
» Multi-core/ multi-computer processing supported to accelerate massive data set publishing
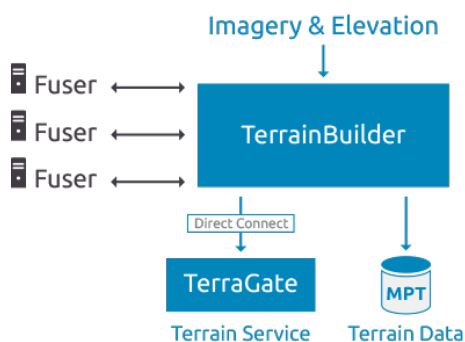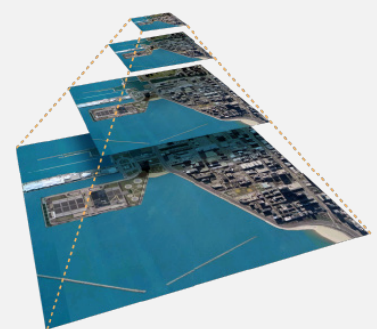
Near Real-Time Updates
Avoid time-consuming re-creation of complete MPT files using DirectConnect
» Optimize DirectConnect project by referencing pre-processed optimized versions of sources in their native formats
» Multi-core and multi-computer processing supported to accelerate massive data set publishing
» Serve unprocessed terrain databases to remote TerraExplorer Pro and WMS clients using TerraGate server

TerraBuilder PhotoMesh fully automates the generation of high-resolution, textured, 3D mesh models from standard 2D photographs. This breakthrough application combines unlimited scalability with superior precision to produce consistent and accurate 3D models that enhance the realism of any 3D visualization.
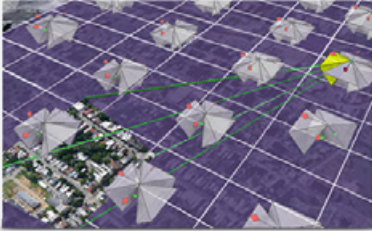
Unlimited Scalability

Grid computing and tiling mechanism support ever-increasing dataset sizes

›› Elaborate tiling mechanism enables efficient handling of massive quantities of input imagery

›› Use of network fusers dramatically accelerates processing time by enabling multiple computers to share the processing load

Superior Precision

Accurate representation of intricate features, details, geometry, and color

›› Full-3D mesh model
›› Advanced color balancing produces seamless, realistic models
›› High-quality texturing
›› Seamless fusion of multi-resolution source data
›› Powerful compression algorithms avoid any unwanted loss of geometric accuracy
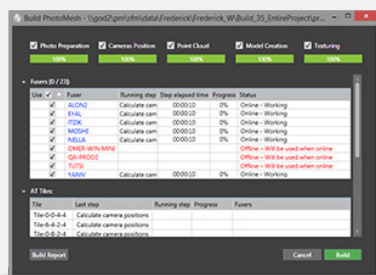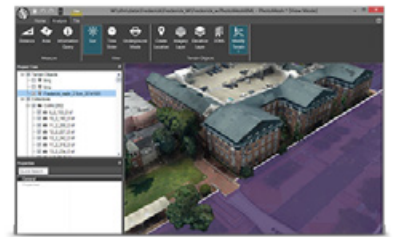
High Performance

Powerful and fast

›› Exploits the power of graphics processing units for general purpose computation
›› Multi-core and multi-computer processing allow for unlimited source data and dramatically reduce processing time
›› Powerful engines can handle enormous quantities of input and output data

Interoperability

Compatible with vast number of CAD and 3D solutions

›› Produce georeferenced 3D models in any coordinate system
›› Produce dense point clouds with detailed color information that can be used in most point cloud analysis software
›› Create 3D mesh models with level-of-detail and paging directly compatible with TerraExplorer
›› Generate true-orthophotos and DSM compatible with all standard GIS tools
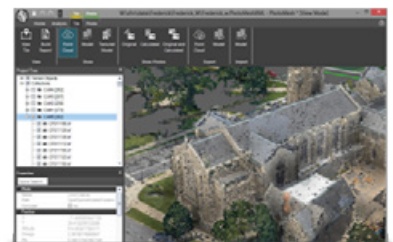
Exceptional Usability
Straightforward photo acquisition and automatic processing

›› Directly output a geometrically precise, photo-textured 3D model, without mapping texture to 3D geometry

›› Photograph subject from any mobile phone, compact digital, DSLR, photogrammetric, or multi-camera system

›› Reconstruct subjects, ranging in size from centimeters to kilometers

Geospatially Enabled
Transform mesh models into powerful geospatial data with TerraBuilder CityBuilder

›› Fully enable spatial and attribute queries by merging your mesh model with classification information

›› Combine mesh models with other model data sets

›› Optimize models for desktop, web, and mobile use

TerraBuilder - CityBuilder

CityBuilder merges 3D PhotoMesh city models together with classification layers, individually modeled layers, and BIM datasets, into a stream-optimized, fully textured, and geospatially-enabled mesh layer (3DML). Generated 3DMLs can be made available to local TerraExplorer clients or published to remote clients (using the TerraGate SFS 3DML service) for a seamless integration into TerraExplorer's terrain that supports powerful visualization and advanced geospatial analysis.


Merge and Optimize City Model
**Unified and efficient 3D mesh layer**

›› Merges any number of mesh models with BIM and other model data sets

›› Reprojects layers that use different coordinate systems

›› Generates fully textured model

›› Optimizes models for desktop, web, & mobile

Geospatially Enabled Mesh Models
Transform PhotoMesh mesh models into powerful geospatial data

›› Fully enable spatial operations and attribute queries by merging PhotoMesh-generated mesh models with classification information such as building footprints

›› Generated 3DML layers are integrated seamlessly in TerraExplorer's terrain, and can be measured, analyzed, and queried using TerraExplorer's advanced capabilities
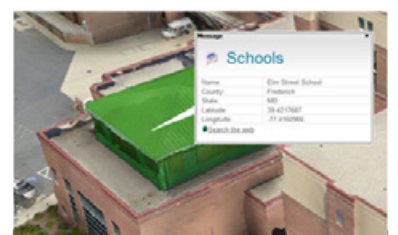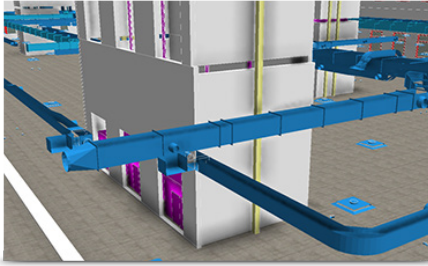
Individually Referenced Models

CityBuilder stream-optimizes entire city layers, modeled either manually or semi-automatically

» Integrates point feature layers that reference individual models of complete cities

» Optimizes model layers for viewing and streaming on desktop and mobile applications

Building Information Modeling (BIM)

BIM layers provide crucial support for the entire building life cycle

» Reads FBX format, the industry standard for BIM data

» Converts BIM from FBX to 3DML format that can be viewed and analyzed in its geographical context using TerraExplorer, while preserving all geometry and attribute data

» Stream-optimizes BIM data

» Supports spatial and attribute queries
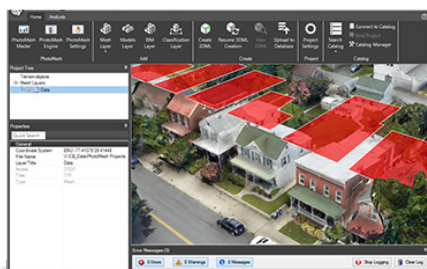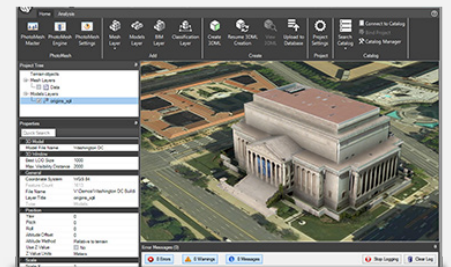
Rich Editing Environment

Efficient model creation process

» Support for multi-threading allows full utilization of computer resources

» Easily search TerraCatalog for required data

» Immediate preview of created 3DMLs from CityBuilder's 3D View

Efficient Data Management

Manage and share enterprise information across your organization

» Find up to date model data by querying TerraCatalog

» Upload 3DMLs to the TerraGate 3DML service directly from CityBuilder
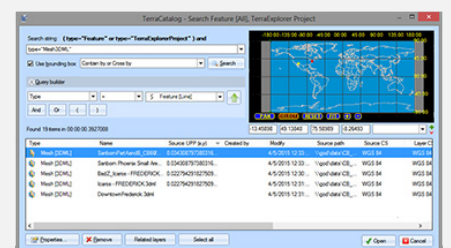
TerraExplorer for Desktop

A cutting-edge 3D GIS desktop viewer and creator that provides powerful tools and a high resolution 3D environment in which to view, query, analyze and present geospatial data.
With TerraExplorer's robust and extensive capabilities and ever-increasing interoperability, stunningly realistic 3D visualizations can be created by overlaying the terrain with unlimited data layers, 3D models, virtual objects and more.

TerraExplorer Viewer

Users can navigate through high resolution 3D world environments created by fusing aerial and satellite photography, terrain elevation data and other 2D and 3D information layers.
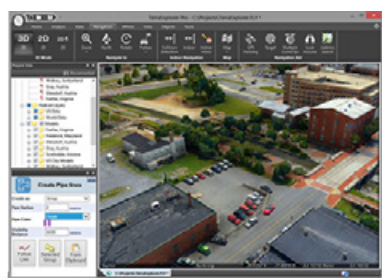
TerraExplorer Plus

Adds feature and raster layer importing, advanced editing, basic catalog functionality and the advanced Pro API interfaces.

TerraExplorer Pro

Adds publishing capability, feature layer editing and querying, advanced objects and drawing tools, as well as a set of tools for professional usage.

Navigate

Wide range of navigation options
>> Free flight
>> Presentations with predefined flight paths
>> Locations and favorites
>> GPS tracking
>> Online address geocoding and reverse geocoding
>> Underground navigation

Analyze the Terrain

Increase understanding and improve decision making with a wide range of powerful terrain analysis tools

>> Distance	>> Flood
>> Area	>> Volume
>> Contour	>> Terrain Profile
>> Slope	
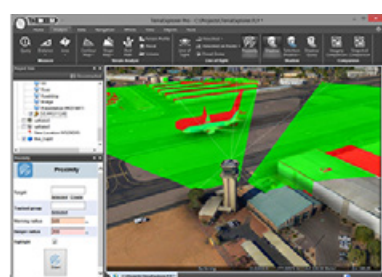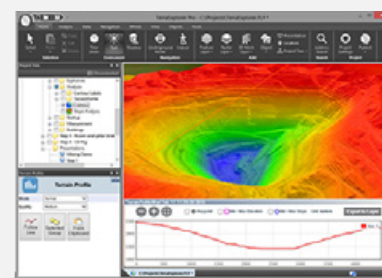
Calculate Visual Exposure

Versatile and configurable tools provide precise, actionable data

>> 2D Viewshed	>> Viewshed Query
>> 3D Viewshed	>> Line of Sight
>> Viewshed on Route	>> Threat Dome

Share

Easily share your 3D visualizations

›› Create presentations with customized flight routes
›› Use Collaboration tool for remote guided tours
›› Publish and extract projects to web, desktop, and mobile devices

Create

Fuse object, feature, raster and other local and remote sources

›› Terrain
›› GIS feature layers
›› Open Street Map

›› Urban model layers
›› Imagery and elevation raster layers
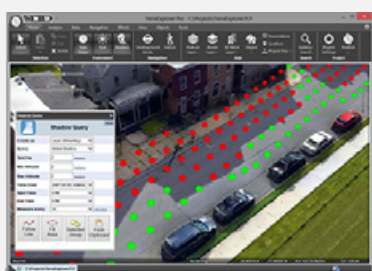›› 2D, 3D, and dynamic objects

Interoperability

Supports wide range of formats

›› WFS/WFS-T
›› WMS/WMTS
›› Tiff, JPEG, MrSID, ECW, IMG...
›› More...

›› Shapefile, KML/KMZ, SQLite...
›› DAE, 3DS, X, FLT...
›› FBX

Edit

Robust feature editing supported

›› Spatial queries
›› Edit geometry
›› Modify attribute information
›› Save layer changes to data source or new file
›› Add and delete features

Visual Effects

Full range of animated effects (fog, rain, snow, fire, explosion, water movement)

›› Sun as light source
›› Shadow effect
›› Dynamic objects
›› Video on terrain

10

TerraExplorer for Mobile

A cutting-edge 3D GIS desktop viewer and creator that provides powerful tools and a high resolution 3D environment in which to view, query, analyze and present geospatial data. With TerraExplorer's robust and extensive capabilities and ever-increasing interoperability, stunningly realistic 3D visualizations can be created by overlaying the terrain with unlimited data layers, 3D models, virtual objects and more.
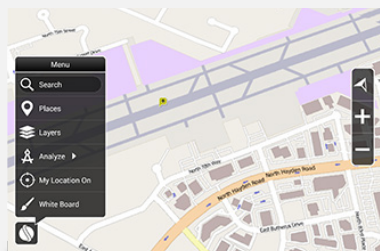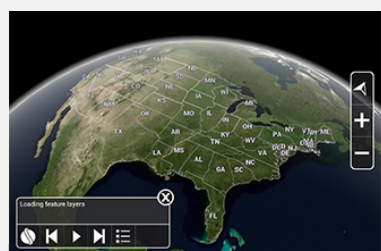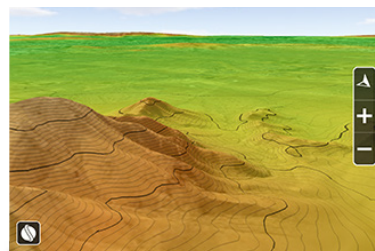
Explore

Geospatial layers seamlessly fused for photo-realistic visualization
>> Terrain
>> GIS feature layers
>> Urban model layers
>> Image and elevation raster layers

Analyze the Terrain

Increase understanding and improve decision making with a comprehensive set of powerful analysis tools
>> Distance and area measurement
>> 3D viewshed
>> Shadow analysis
>> Terrain profile

On the Go

Extends the reach of 3D GIS from the office to the field
>> Online viewing and editing (WFS-T)
>> Load offline kits published by TerraExplorer Pro
>> Mobile optimized UI

Edit

Robust feature and white board editing supported
>> Local and remote geospatial layers
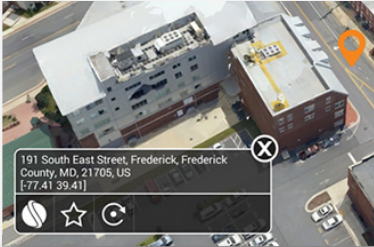>> Geometry and attributes
>> White board for local sketching

Customize
Localization, branding & functionality
›› Your language
›› Your logo and app name
›› Add and remove menu entries and forms
›› Full API for custom feature development

Navigate
**Wide range of navigation options**
›› Presentations with predefined flight paths
›› Locations and favorites
›› My device location tracking
›› Online address search
›› Underground navigation

TerraExplorer for Web

TerraExplorer's powerful 3D GIS viewer and editor can be embedded right in your own website to enable online users to explore, analyze, and annotate high-resolution, interactive 3D views using TerraExplorer's robust and extensive range of tools. TerraExplorer's capabilities can be further enhanced by creating additional custom functionalities using TerraExplorer's comprehensive API.

SkylineGlobe offers SkylineGlobe Web Package (SGWP), a complete out-of-the-box application for users who also require full hosting and customization of the TerraExplorer web application.
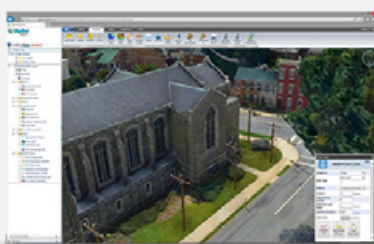
## TerraExplorer's Desktop Capabilities Online
Robust and extensive range of tools
›› Explore layers of seamlessly fused geospatial data
›› Wide range of supported formats
›› Powerful measurement and analysis tools
›› Create new 3D views by overlaying the terrain with unlimited data layers, 3D models, virtual objects and more
›› Robust feature editing
›› Enhance 3D view with full range of animated effects, video, and more
›› Share 3D visualizations through presentations, and remote collaboration
›› Publish project to web, desktop, and mobile devices

Embedded in Your Own Site
Users can navigate in TerraExplorer without ever leaving your website
›› Provide online availability
›› Match style and functionality of your general site design
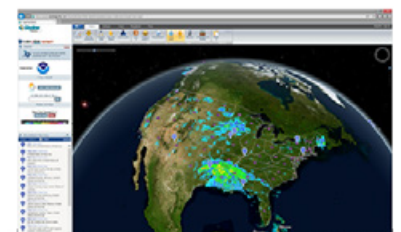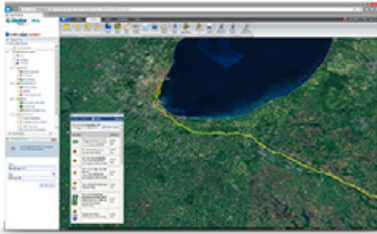
Enhance with API

Customize all components of your TerraExplorer application

›› Manage Favorites and Results panels

›› Control popup windows

›› Load user specific FLYs

›› More...

SGWP Localization and Branding

Language, logo, and more

›› Custom logo

›› Your contact and support links

›› Distinct branding for each subsite

›› Easy localization
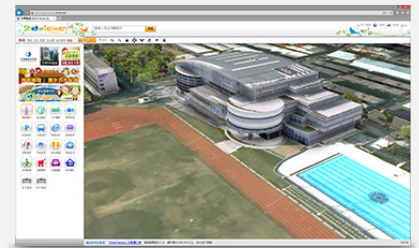
SGWP Customized Data and Functionalities

Extend capabilities to match users' needs

›› Create subsites tailored to unique needs of multiple target audiences

›› Your own data layers, base FLY and startup tool

›› Customized ribbon

›› Full API for custom feature development

Collaboration in SGWP

Connect Skyline users on one collaborative network

›› Connect over Internet or intranet

›› Chat

›› Annotate terrain

›› Synchronize flight

›› Select your contacts
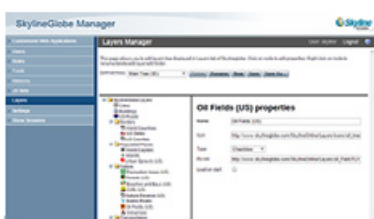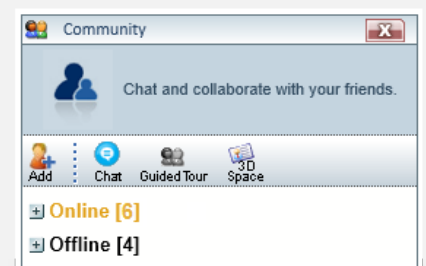
User Management in SGWP

Control user access to your custom web applications

›› Define user roles

›› Associate web applications with roles

TerraGate - Terrain Service

Powerful terrain and map service technology for streaming vast geospatial databases to thousands of remote TerraExplorer and WMS clients, with comprehensive server management and federated network capabilities.

Terrain Service
Streams 3D geographic data to thousands of concurrent users
>> Serves terrain databases (MPT) created by TerraBuilder to TerraExplorer desktop and mobile clients
>> Serves unprocessed terrain databases using the DirectConnect extension
>> Provides easy server management and control
>> Efficient handling of massive databases

OGC WMS/WMTS
Streams massive terrain databases and raster layers to all OGC WMS/ WMTS client applications
>> Increased interoperability – make your maps and data available online in an open, internationally recognized format
>> WMTS serves locally stored, pre-rendered tiles that do not require image manipulation or geo-processing
>> Serve both 3D & 2D maps from same database
>> Web-based management system

Smooth Streaming
Users can navigate through a seamless terrain
>> Streaming is unaffected by latency or breaks in connectivity
>> Users can begin accessing the 3D environment without waiting for entire frames of data to display

Serve Data on Demand
Avoid time-consuming re-creation of complete terrain database files using TerraGate DirectConnect
>> Serve fused terrain project (TBP) to remote TEP and WMS clients using TerraGate server
>> Eliminates need to recompress source files into single 3D terrain database (MPT) each time source data is updated
>> Optimize DirectConnect project by referencing pre-processed optimized versions of sources in their native formats
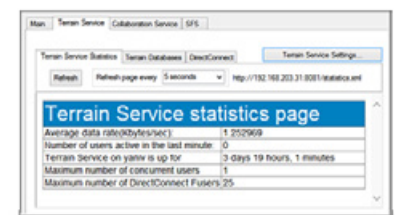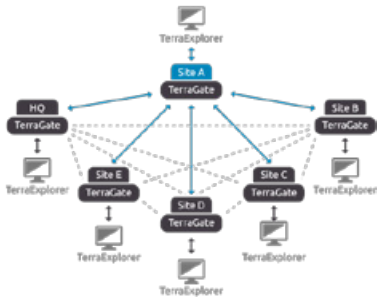
Federated Network

Provide a global view that fuses geospatial data from geographically distributed servers

» Distributed data concept enables the data for each geographic area to be provided and managed by those who have the latest data
» Data from each node is automatically fused (without a central repository) into a comprehensive, consolidated dataset
» Users connected to any of the nodes fly on the same composite globe with the most updated data from each node
» Remote caching capabilities provide critical redundancy

Access to Enterprise Data

Manage and share data across your organization

» TerraGate supports the OGC Catalog Service for Web (CSW), providing a web interface to the Skyline TerraCatalog database
» Remote users can query TerraCatalog via CSW, using geographical coordinates or by any data in any of the metadata elements
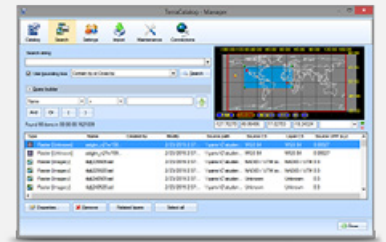
TerraGate - Web Feature Service

Powerful feature service technology for the sharing and management of feature data. The Web Feature Service streams feature layers to TerraExplorer and WFS clients, providing thousands of concurrent users with full read-write access.

Web Feature Service

Streams massive amounts of 3D feature data to thousands of concurrent users

» Streams GIS feature layers of polylines, polygons/ points to all TE & OGC WFS client applications
» Supports spatial and attribute queries
» Streams feature layers from shapefiles & Oracle, SQL server, PostGIS and ArcSDE databases
» Creates stream optimized cache databases for fast loading and efficient data streaming

OGC WFS-T

Provides users with full read-write access

» Allows remote desktop and mobile WFS clients to create, delete, and update feature data
» Changes to data layer written directly to source
» All clustered servers are simultaneously updated with any data source edits

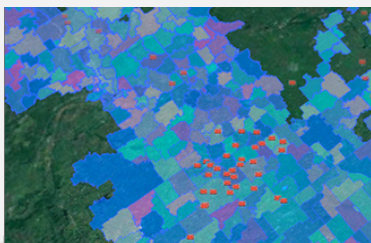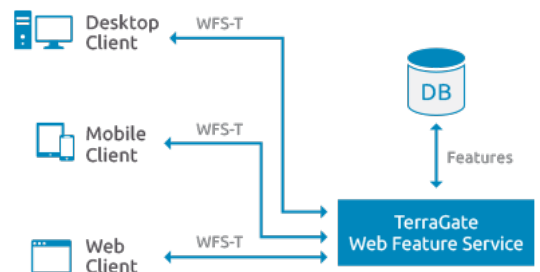## Smooth Streaming

Users can navigate through seamless 3D World

» Streaming is unaffected by latency or breaks in connectivity
» Users can begin accessing the 3D environment without waiting for entire frames of data to display.

Full Scalability

Support thousands of concurrent users

» Multiple servers can simultaneously stream vast 3D databases

» Server clustering supports efficient server management, increased scalability, load-balancing and redundancy
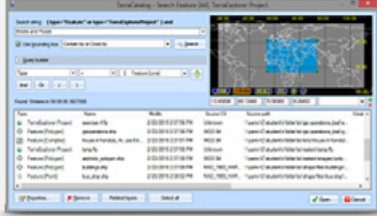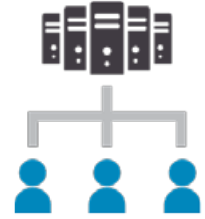
Access to Enterprise Data

Easily manage & share data across organization

» TerraGate supports the OGC Catalog Service for Web (CSW), providing a web interface to the Skyline TerraCatalog database

» Remote users can query TerraCatalog via CSW, using geographical coordinates or by any data in any of the metadata elements

TerraGate - 3D Mesh Layer Service

Powerful 3D city model service technology for sharing and managing 3D Mesh Layer (3DML) databases created from PhotoMesh city models together with classification layers, individually modeled layers, and BIM datasets. The 3D Mesh Layer Service streams fully textured and geospatially-enabled 3D city models to thousands of remote TerraExplorer mobile and desktop clients.

3DML Service

Streams optimized 3D city models to thousands of concurrent users

» Streams 3DML databases to all TerraExplorer applications

» Supports spatial and attribute queries

» Streams mesh layers from 3DML files and from the Oracle Spatial, SQL, and PostgreSQL servers

» Allows remote clients to update attribute data, writing all changes directly to the data source

Smooth Streaming

Users can navigate through a seamless 3D World

» Streaming is unaffected by latency or breaks in connectivity

» Users can begin accessing the 3D environment without waiting for entire frames of data to display

» Streamed 3DML layers are integrated seamlessly in TerraExplorer, and can be measured, analyzed, and queried using TerraExplorer's advanced capabilities

Full Scalability

Support thousands of concurrent users

» Multiple servers can simultaneously stream vast 3D databases

» Server clustering supports efficient server management, increased scalability, load-balancing and redundancy

Requirements

TerraExplorer for Desktop / Web

Operating System: Windows® 7/ 8/ 10 - 64 bit recommended
Processor: Dual-Core (4 / 8 cores recommended)
System Memory: 2 GB of RAM (4 GB or more recommended)
Video Card: 512 MB of video memory (1024 MB or more recommended). Pixel and vertex shader v3.0.
Web Browser: Microsoft Internet Explorer 7 or higher

TerraExplorer for Mobile

Operating System: Android 4.0 and above / iOS 7.0 and above
Processor: Dual-Core and higher
System Memory: 1 GB of RAM (2 GB or more recommended)

TerraBuilder - TerrainBuilder

Operating System: Windows® 7 / 8 / Server 2003 / Server 2008
Processor: Dual-Core (4 / 8 cores recommended)
System Memory: 2 GB of RAM (8 GB or more recommended)
Video Card: 256 MB of video memory (1024 MB or more recommended). Pixel and vertex shader v3.0.

TerraBuilder - PhotoMesh

Operating System: Windows® 7 / 8 - 64 bit required
Processor: 4 cores (8 cores recommended)
System Memory: 8 GB RAM (16 GB recommended)
Video 1 GB of video memory (2 GB or more recommended). Pixel and vertex shader v3.0.

TerraBuilder - CityBuilder

Operating System: Windows® 7 / 8 - 64 bit required
Processor: Dual-Core (4 / 8 cores recommended)
System Memory: 8 GB RAM (16 GB recommended)
Video Card: 256 MB of video memory (1024 MB or more recommended). Pixel and vertex shader v3.0.

TerraGate

Operating System: Windows® Server 2003 SP2 / 2003 R2 SP2 / 2008 SP 2 / 2008 R2 / 2012
Processor: Dual-Core (4 / 8 cores recommended)
System Memory: 2 GB of RAM plus additional 2 MB per concurrent user
Additional Software: Microsoft Internet Information Services IIS6, IIS7, IIS8 with .Net 4.0.

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