

PyramidMap Geotools Visualized Toolset Instructions

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1 Introduction

1.1: Function overview

As the world enters the information and digital era, the development of communication and Internet technology has completely changed the way people communicate and perceive the world. GIS (Geographic Information System) has developed from original paper map to holographic digital electronic map. GIS is synchronized with the software and hardware support of operating system, communication interconnection and mobile terminal, and has penetrated into all aspects of social production and people's life. From space launch, satellite remote sensing, express delivery and bus service, almost every link is shining with the glory of GIS. GIS can integrate spatial and dynamic information into holographic digital visual effects, and provide timely and accurate visual services for geographical research, geographical decision-making and residents' lives. The rich and colorful services of GIS come from its massive data support and powerful analysis and processing capabilities. However, the production, storage, analysis, processing and service provision of map data is an extremely professional, arduous and complex work, which has professional requirements for workflow and operators, and the technical cost is very high. Therefore, many enterprises with this demand but weak technology are discouraged. PyramidMap is a simple and practical GIS data processing workflow platform for small and medium-sized enterprises to solve this problem.

PyramidMap GeoTools visual map tool set is launched by PyramidMap (www.Pyramidmap.com). It is based on GeoTools component technology, which can be used as an independent map processing tool, as well as oriented to GeoServer and used as its client. It constitutes a simple and easy-to-use map service system covering mapping, editing and assignment, rendering, database storage, service release and management. It is simple and easy to use, covering mapping, editing and assignment, rendering, database storage, service publishing, and management. The purpose of PyramidMap is to transform the professional and even daunting GIS data processing into an approachable, easy to use, relaxed and pleasant workflow. On this basis, the original complex process of GeoServer and Geodatabase connection and map service publishing is transformed into a fully guided visualization process, reducing the user threshold and improving the efficiency of map operation. Thus, GIS users are given the ability to independently complete the whole process from map mapping to web map services. Its ultimate goal is to provide efficient data processing process for WebGIS applications. That is to say, PyramidMap tool provides you with the most basic data assurance processing process for WebGIS applications. It belongs to the core layer of map data processing and is also the most complex process. PyramidMap is fully qualified for this work. The process is shown in Figure 1-1.

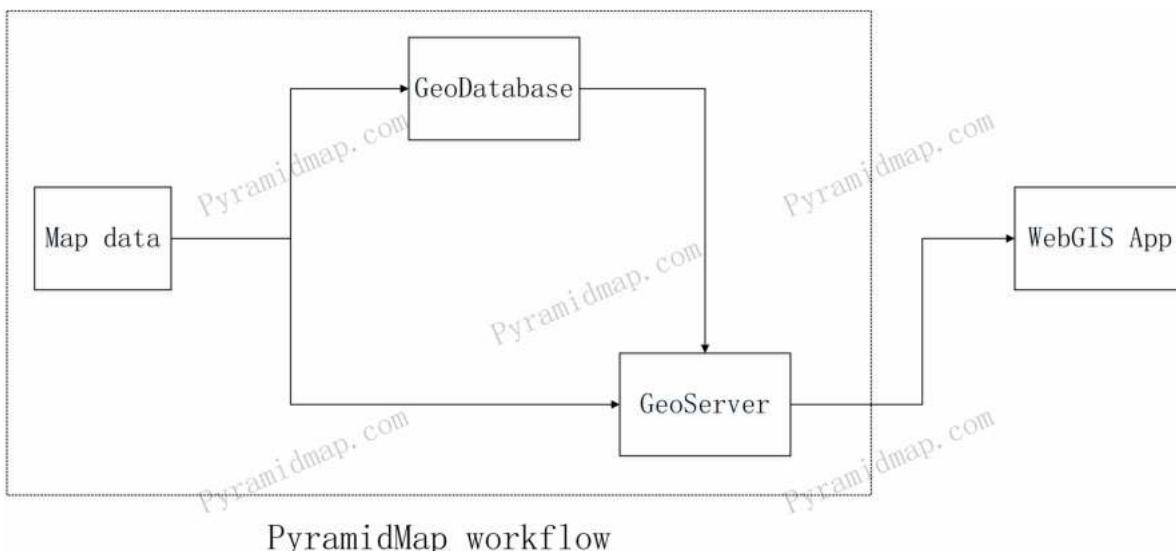


Figure 1-1: Diagram of PyramidMap Total Energy

PyramidMap is positioned at the key link of the whole WebGIS implementation process, and completes the processing and storage of key map data before the feasibility of WebGIS. Traditionally, it is highly dependent on the skills of professional GIS personnel. Now it can be easily completed by PyramidMap, which greatly reduces the access threshold for GIS users and improves the efficiency of map data processing.

1.2 Contact us

PyramidMap focuses on GIS application services and is committed to building a complete ecosystem of efficient GIS data processing, enterprise level geographic data storage, distributed map services, web and mobile map applications. It can help you achieve map data processing more easily and quickly, until the terminal displays the entire process of the application as a streamlined service. Welcome visiting to: <http://www.pyramidmap.com> obtaining beta software and technical information. For more technical support, please contact PyramidMap studio.

Email: service@pyramidmap.com

Tele: (086)0535-82957588

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WeChat: A18660789051

QQ: 29862351

2 Software deployment

2.1 Deployment mode

PyramidMap integrates all the dependencies required for operation internally. You only need to decompress the software to use it (Chinese path is not supported for the moment). Double click the PyramidMapView.exe executable to run it. The deployment mode is shown in Figure 2-1.

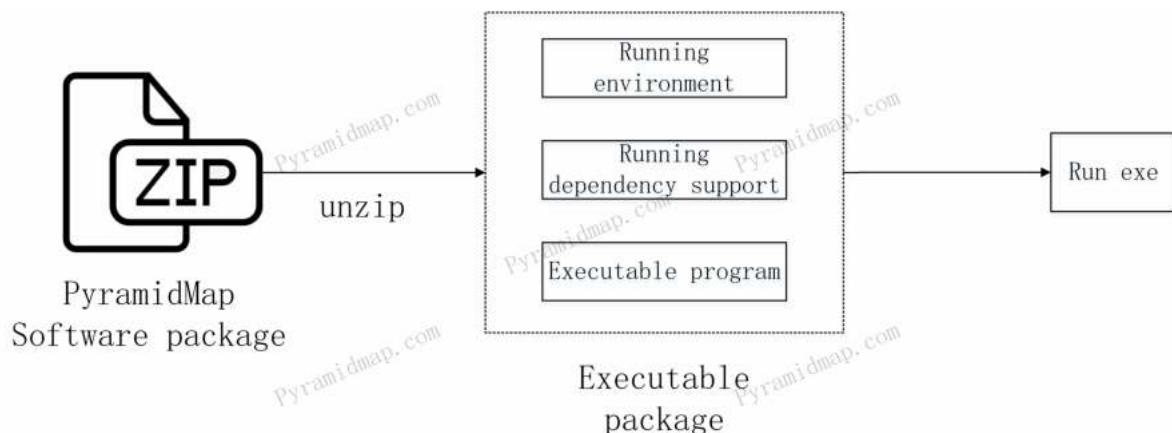


Figure 2-1: Schematic Diagram of PyramidMap Deployment Operation Mode

The PyramidMap GeoTools visualization toolset is only supported running in a Windows environment currently , with a minimum resolution requirement of 1920 * 1200.

2.2 Running mode

- Client/Server mode

PyramidMap can complete independent mapping, map editing, symbol definition rendering, Geodatabase geographic database connection, access, map data input and output, GeoServer map server space management, map service publishing, hosting and access and other full process processing. PyramidMap can independently complete all functions from mapping to editing, support multiple spatial geographic databases, including but not limited to Oracle, Postgre, MySQL, and complete the input, output, access and storage of map data. PyramidMap can be seamlessly connected with GeoServer map server, and can be used as a visualization client tool of GeoServer to complete workspace and data storage management of remote server, layer publishing, map symbol production and publishing, server layer and symbol data management, preview and other serialized operations on the client. To sum up, PyramidMap provides map users with a full process function from mapping to Web side use. PyramidMap supports deployment in Internet and intranet environments. It has all the dependencies required for integrated operation. It can be used after decompression without installation (Chinese path is not supported temporarily).The role and operation mode of PyramidMap in WebGIS network architecture are shown in Figure 2-2.

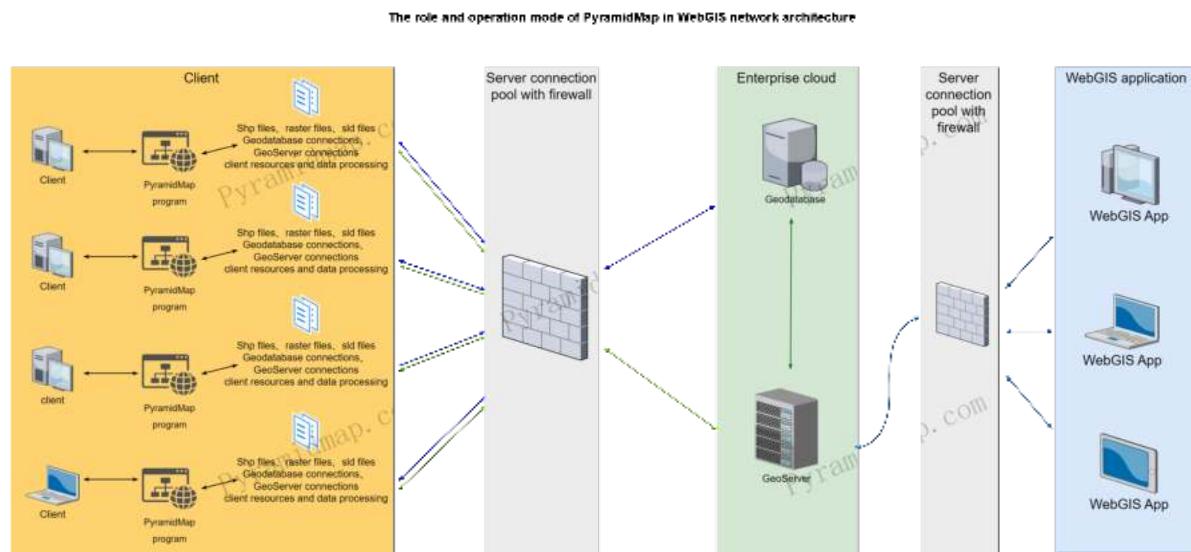


Figure 2-2: The role and operation mode of PyramidMap in WebGIS network architecture

2.3 Function list

Classify	Item	Function description
Map view	Map main view	Map preview and editing operations, support Shp file type, Geodatabase geographic database type, WMS, WFS, WCS, WMTS and other standardized map services from GeoServer, as well as various online map resources that follow standardized specifications, complete the complete process of map preview, editing, submission, and storage, and realize the symbolic management and rendering of maps.
	Layers displaying node control	The layers in the main view of the map will be classified and managed as nodes. It supports the display and right-click menu control on layer nodes through Checkbox, and the corresponding operations are implemented according to the layer type.

Classify	Item	Function description
	GeoDatabase layers node control	Database connection pool node. Double click the database node to dynamically load its internal layer. The layer node can be dragged to the main view or displayed by double clicking the mouse. Different levels of nodes have corresponding shortcut menus. The database node menu completes database connection testing, editing, layer list management, and deletion; The layer node menu supports layer export, conversion and deletion.
	GeoServer layers node control	GeoServer connection pool node. Double click the server node to dynamically load the server's internal workspace and layer nodes; Layer nodes can be dragged to the main view or displayed by double clicking. The nodes at different levels have corresponding shortcut menus. The GeoServer level node menu completes the map server connection test, editing the connection, obtaining the server synchronization data (the GeoServer server workspace, data storage and its database connection configuration), workspace management (the workspace parameters are localized and modified and synchronized to the server), refreshing nodes, and deleting; The workspace node menu completes the data storage management and layer import. In particular, in the data storage list, you can edit and modify the database connection and maintain the layer list for each item in the list, including the details of the layer and the maintenance of addition and deletion.
Map query		It supports SQL queries on layer data tables in the main map view and each independent map view, and the query results are highlighted on the map. Support Shp vector file, Geodatabase layer, GeoServer layer and other data types.
Features Selection		In the main map view and each independent map view, you can select map features, highlight and open the data table, edit, modify, save and submit attribute data. Support Shp vector file, Geodatabase layer, GeoServer layer and other data types.
Map editing	Cartography	In the main map view and each independent map view, according to the geometric type of the current layer, the mouse can be used to dot, draw lines, and save images. Support Shp vector file, Geodatabase layer, WFS map service in GeoServer and other data types.

Classify	Item	Function description
	Features assignment	In the main map view and each independent map view, you can modify and edit attribute data in the map feature form, and submit it for saving. Support Shp vector file, Geodatabase layer, WFS map service in GeoServer and other data types.
	Data conversion	Shp to Csv, Shp to Kml, Shp to GeoJson, Csv to Shp, Kml to Shp, GeoJson to Shp.
	Data processing	Vector and raster coordinate system conversion, raster NoData processing, raster tiles slice and mosaic merge.
Create Shp	Create original Shp	Realize the full process processing of the design, editing, drawing, data saving, importing into the database, and publishing to GeoServer of the original Shp format vector layer.
	Transfer external data to Shp	Realize the conversion of structured data such as Csv, Kml and GeoJson to Shp vector layer.
	Geodatabase export Shp	Support, but not limited to, the export of geographic database features such as Oracle, PostGIS (PostgreSQL+GIS function extension), MySQL, and SQLServer to Shp.
Figure 3-25: Geodatabase node popup menu	GeoServer export Shp	Support the export of vector layers in GeoServer as Shp.
Layer resource management	Vector layers resource management	The client vector layer is brought into the program resource management system by selecting files to achieve a unified resource management pool for the client vector layer.
	Raster layers resource management	The client grid image layer is included in the program resource management system by selecting files, so as to achieve a unified resource management pool for client grid images.
Import layers into Geodatabase		Import the Shp layer in the client's vector layer resource management pool to Oracle, PostGIS, MySQL, SQLServer and other geographic databases.
Layers published to GeoServer	Publish Shp vector file	Publish the Shp layer in the client's vector layer resource management pool to GeoServer, store it in the data cache directory specified by GeoServer in the form of a file, and output such standardized map services as wms/wfs/kml , and provide visual map services for WebGIS.

Classify	Item	Function description
	Publish raster file	Publish the image layers in the grid layer resource management pool of the client to GeoServer, store them in the data cache directory specified by GeoServer as files, output the standardized map services such as wms/wcs/wmts, and provide visual map services for WebGIS.
	Publish Geodatabase vector layer	Import the shp files in the shp resource pool into the geodatabase, each shp will be converted into a feature data table, and then all the feature tables will be data source for the GeoServer which integrates the built-in JDBC engine driver, such then realize the access and processing of the map data in geodatabase, and output the standardized map services such as wms/wfs/kml, and provide visual map services for WebGIS.
Symbol system management	Create sld symbol file	Create sld layer style definition files of different feature types of point、multiPoint、lineString、multiLineString、polygon、multiPolygom to define the rendering mode of the layer.
	Manage sld symbol files	The client sld symbols are incorporated into the program resource management system by selecting files to achieve a unified resource management pool for the client sld symbols.
	Get server sld symbols	Obtain the sld symbol files on the GeoServer, synchronize them to the local client, and incorporate them into the program resource management system to achieve a unified resource management pool for the client sld symbols.
	Edit sld symbol file	Edit the sld symbol file.
	Synchronize the sld files to the server	Submit the sld files in the client sld resource pool to GeoServer.
Geodatabase connection pool	New Geodatabase connection	PyramidMap supports direct connection access to DBMS databases with spatial spatial data storage capabilities to realize the storage and conversion of map data. It supports (but is not limited to) Oracle, PostGIS (PostgreSQL+GIS function extension), MySQL, SQLServer and other databases. After the connection parameters are configured and tested, the above database resource connection pool is created and maintained.

Classify	Item	Function description
	Maintain Geodatabase connection pool	PyramidMap manages the resource allocation of the geodatabase in the way of connection pool, which is selected when the Shp layer is imported into the database and published. In the resource list, you can select operations such as modification, connection test, and layer import/export.
	Geodatabase layers management	Import the Shp files that have been included in the PyramidMap resource pool into the geodatabase; Export the feature layers in the geodatabase to Shp or Kml, GeoJson and other format files in the specified path.
	Geodatabase layers preview	Select the feature layer under the geodatabase in the database connection pool, for data query and layer preview.
GeoServer connection pool	New GeoServer connection	PyramidMap supports direct connection access with GeoServer map server, realizes multi type layer publishing function, and provides layer service interface for WebGIS. After the connection parameters are configured and tested successfully, create and maintain the GeoServer resource connection pool.
	Manage GeoServer connections	PyramidMap manages the resource configuration of the GeoServer in the way of connection pool. You can select modification, connection test, layer import and export and other related operations in the resource list.
	Manage workspace and data storage	PyramidMap can be used as a visual client of GeoServer to assist users in managing the workspace and data storage in a graphical interface. Usually, these operations require professional GIS personnel on the web console of GeoServer. The operations are complex and require high professional skills for operators. PyramidMap helps users realize this process through visual interface guidance, making this process very simple.
	Manage Server Layers	PyramidMap can be used as a visual client of GeoServer to assist users in uploading and publishing client layers, exporting and converting server layers in a graphical interface. Usually, these operations require professional GIS personnel on the web console of GeoServer. The operations are complex and require high professional skills for operators. PyramidMap helps users realize this process through visual interface guidance, making this process very simple.

Classify	Item	Function description
	GeoServer layers preview	PyramidMap can be used as the visualization client of GeoServer. It can display the layers in GeoServer in the map view of the main interface, and export and convert the layers accordingly, thus simplifying the difficulty of secondary development and application.
	Management GeoServer sld symbols	Sld (Styled layer description), the layer rendering style description file, and the map is drawn according to the description of sld, to realize the symbolization, color matching, transparency, text annotation and other rendering display of different types of elements of points, lines, and surfaces. PyramidMap can be used as the visualization client of GeoServer. It can help users to realize the localization creation and maintenance of sld files, keep synchronization with the server, and preset the server layer and the client layer during the release process. Usually, these operations require professional GIS personnel on the web console of GeoServer. The operations are complex and require high professional skills for operators. PyramidMap helps users realize this process through visual interface guidance, making this process very simple.

Table 2-1: PyramidMap functions list

2.4 Release

Functions	Release version			Application scenarios
	Basic	Standard	Professional	
Map view	●	●	●	Shp, Tiff, database and GeoServer layer, online base map display.
Map query	●	●	●	Shp, database and GeoServer vector layer data query and list.
Map features Selection	●	●	●	Select features on the map for editing and deleting.
Map drawing(point, line, polygon)	●	●	●	Create points, lines, and polygons on the map.
Map editing(graphics and attribute)	●	●	●	Edit and delete map element attribute data.
Map saving(file, database, GeoServer)			●	Submit saving the new, modified map features or delete them.
Map data conversion		●	●	Interconversion between Shp, Csv, Kml, GeoJson and other formats.
Coordinate system conversion		●	●	Interconversion between all standardized coordinate system.
Vector and Raster spatial processing		●	●	Raster noData processing, raster tiles and mosaic together.
Design map symbols	●	●	●	Map symbols including shape, graphics, size, color and annotation.
Get GeoServer sld symbols	●	●	●	The client obtains the sld symbols on the GeoServer.
Client slds submitted to GeoServer			●	Synchronize the client's sld symbols to the GeoServer.
Client vector layers pool	●	●	●	The list of vector layer resources maintained by the client.
Client raster layers pool	●	●	●	The list of raster layer resources maintained by the client.
Vector layer imported to Geodatabase			●	Import the client's shp files into the Geodatabase.
Publish vector layers to GeoServer			●	Publish the client's shp files to GeoServer data directory.
Publish database layers to GeoServer			●	Import the shp to the Geodatabase, and then publish to the GeoServer.
Publish raster layers to GeoServer			●	Publish the client's raster files to GeoServer data directory.
Geodatabase layers exported		●	●	The layers in Geodatabase exported to Shp, Kml, GeoJson.
GeoServer layer's exported		●	●	The layers in GeoServer exported to Shp, Kml, GeoJson.
GeoServer workspace and data storage			●	Managing GeoServer workspace and data storage in client.
Geodatabase connections pool	●	●	●	Create and maintain Geodatabase connections pool in client.
GeoServer connections pool	●	●	●	Create and maintain GeoServer connections pool in client.

Table 2-2: PyramidMap release functions list

3 Map view

The main map interface is divided into four functional areas, as shown in Figure 3-1. They are the main map view and the display container of all map data. They accept the loading and display of various map resource data from Shp files, image files, Geodatabase, GeoServer, online maps, etc; The online layer node on the left is the layer data source node that has been loaded into the main map view. It is classified according to the path layer, and has the corresponding level menu to complete the operation as instructed; On the upper right is the Geodatabase data source node, which is classified according to the data connection layer table, and has the corresponding level menu. The operation can be completed according to the instructions. The layer table can be dragged to the map view area or displayed by double clicking the mouse, and automatically added to the layer display node on the left; The lower right side is the GeoServer workspace and layer data source node, which are classified according to GeoServer connection - workspace - layer, and have the corresponding level menu. The operation is completed according to the instructions. The layer can be dragged to the map view area or displayed by double clicking the mouse, and automatically added to the layer display node on the left.

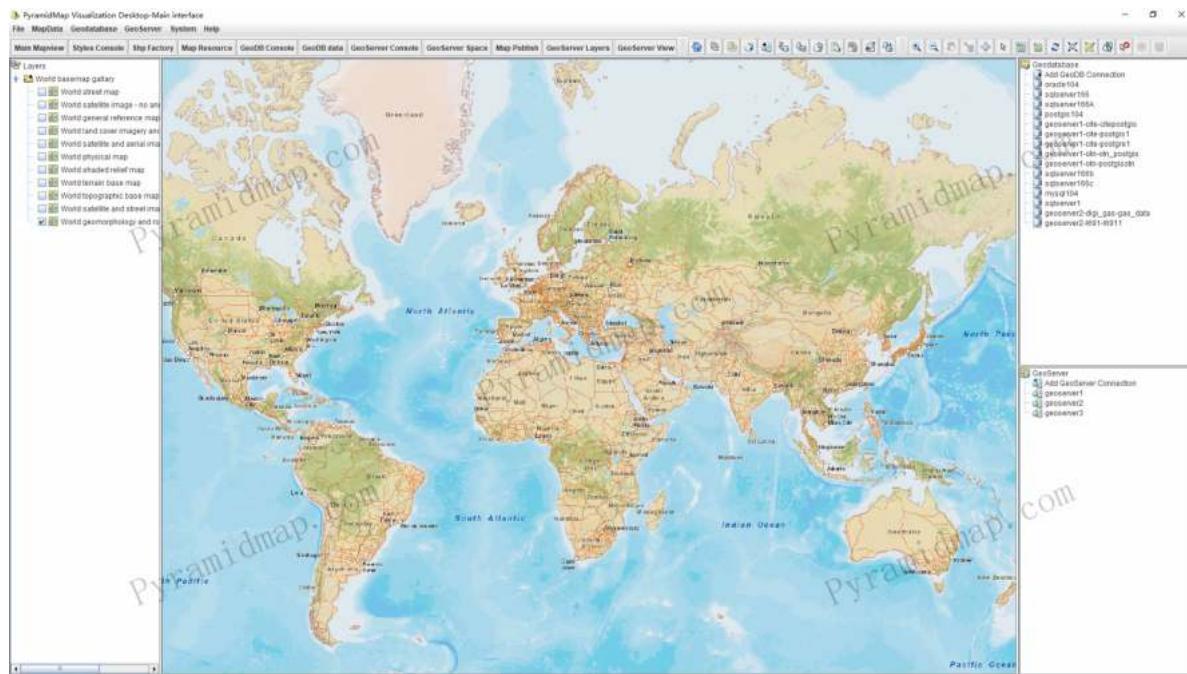


Figure 3-1: Main map viewer

3.1 Load basemap

The base map provides a reference map for the system and an environment for the content to be displayed in the map. When creating a new map, you can select an underlay to use. PyramidMap currently supports many base map resource based on Web Mercator coordinate system and others standard coordinate system. You can change the base map of the current map at any time: you can select the base map from the base map library. With the help of the base map, accurate spatial location calibration can be carried out, map data related to location can be processed, dot, line and picture can be plotted on the map, and accurate positioning and track query can be carried out. The main interface loads and switches the base map through the shortcut menu in the toolbar, as shown in Figure 3-2.

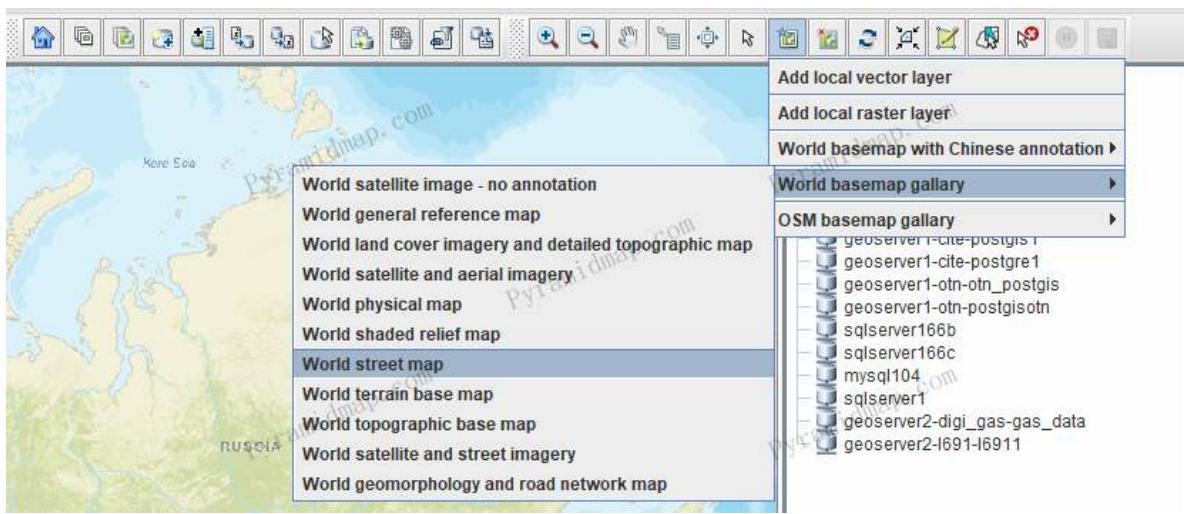


Figure 3-2: Main viewer base map menu

PyramidMap supports vector and raster type base map resources. This base map is designed to be used as a general reference map for informational purposes as well as for GIS professionals and other users to creating web maps and web mapping applications.

The world general reference map includes administrative boundaries, cities, protected areas, highways, roads, railways, water features, buildings and landmarks, overlaid on shaded relief and land cover imagery for added context. This reference map display effect is shown in Figure 3-3.

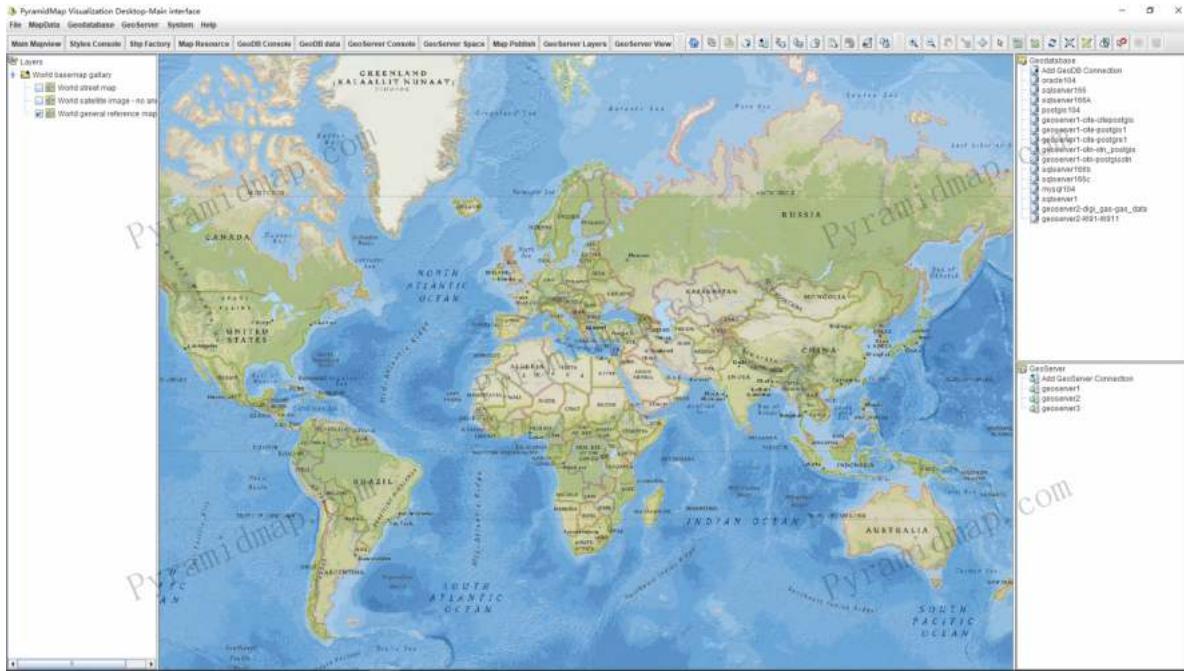


Figure 3-3: The world general reference map display effect

The local details somewhere for the world general reference map are shown in Figure 3-4.



Figure 3-4: The world general reference map somewhere local details

The world land cover imagery and detailed topographic map presents land cover imagery and detailed topographic maps for the world. This map display effect is shown in Figure 3-5.

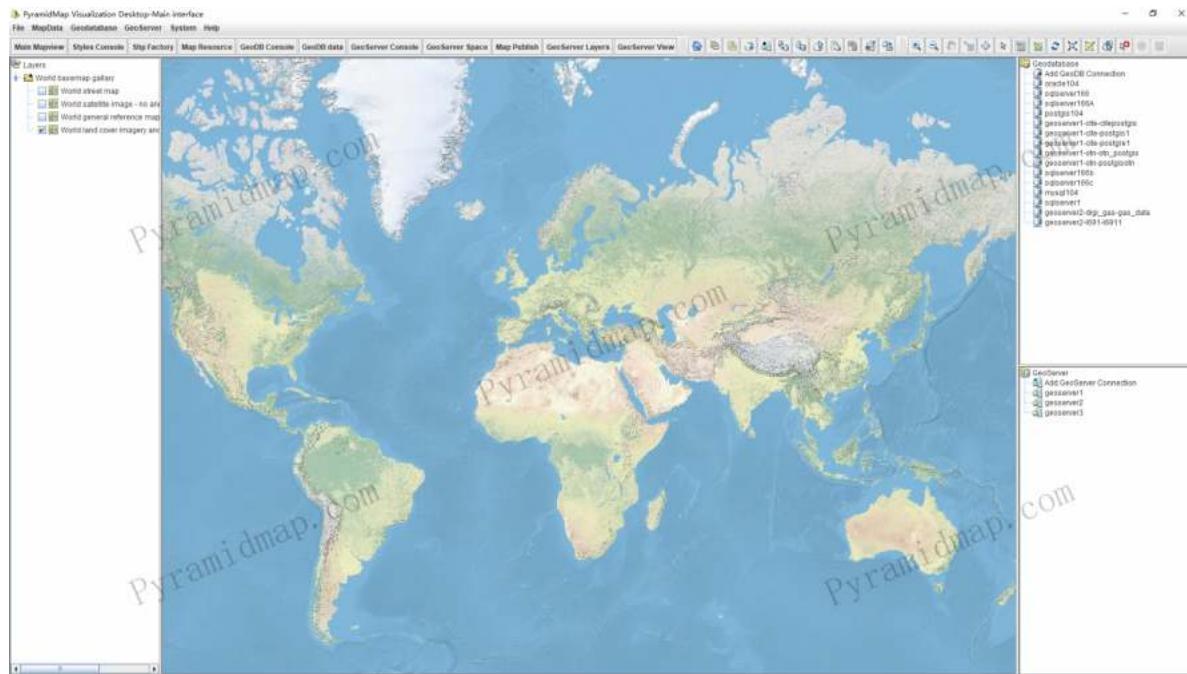


Figure 3-5: The world land cover imagery and detailed topographic map display effect

The local details somewhere for the world land cover imagery and detailed topographic map are shown in Figure 3-6.

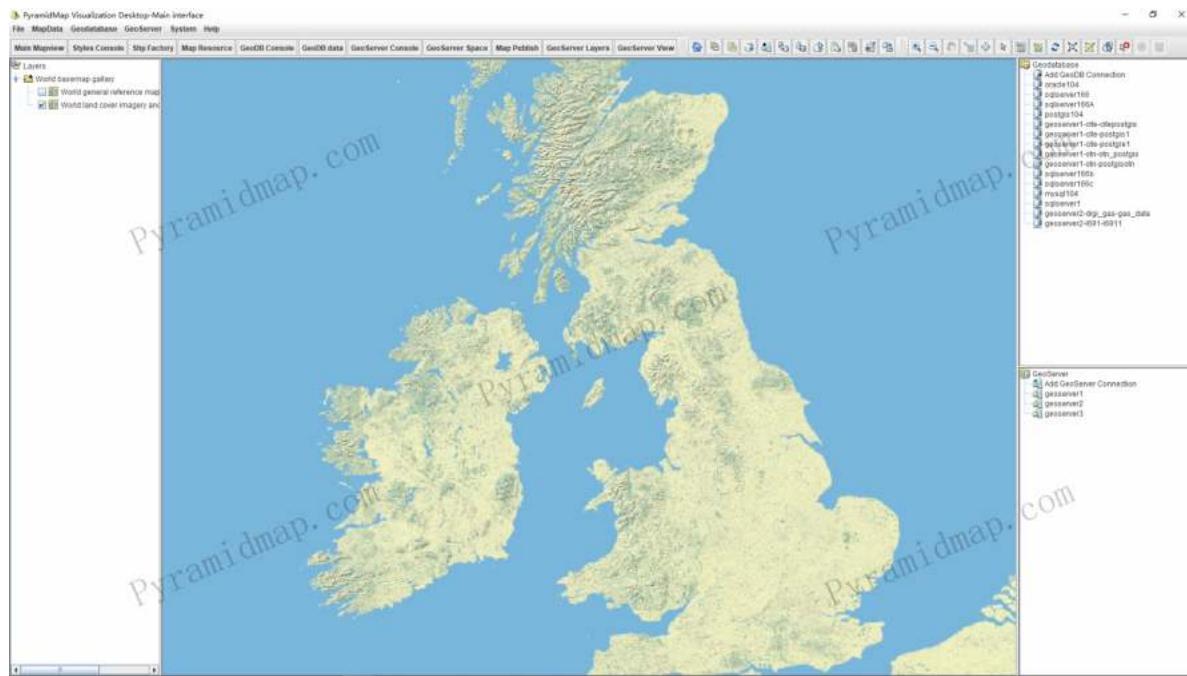


Figure 3-6: The world land cover imagery and detailed topographic map somewhere local details

The world satellite and aerial imagery map provides one meter or better satellite and aerial imagery in many parts of the world and lower resolution satellite imagery worldwide. The map includes 15m TerraColor imagery at small and mid-scales (~1:591M down to ~1:288k) for the world. The map features Maxar imagery at 0.3m resolution for select metropolitan areas around the world, 0.5m resolution across the United States and parts of Western Europe, and 1m resolution imagery across the rest of the world. The world satellite and aerial imagery map features high-resolution aerial photography contributed by the GIS User Community. This imagery ranges from 0.3m to 0.03m resolution (down to ~1:280 in select communities). The world satellite image display effect is shown in Figure 3-7.



Figure 3-7: The world satellite image map display effect

The local details somewhere for the world satellite and aerial imagery map are shown in Figure 3-8.

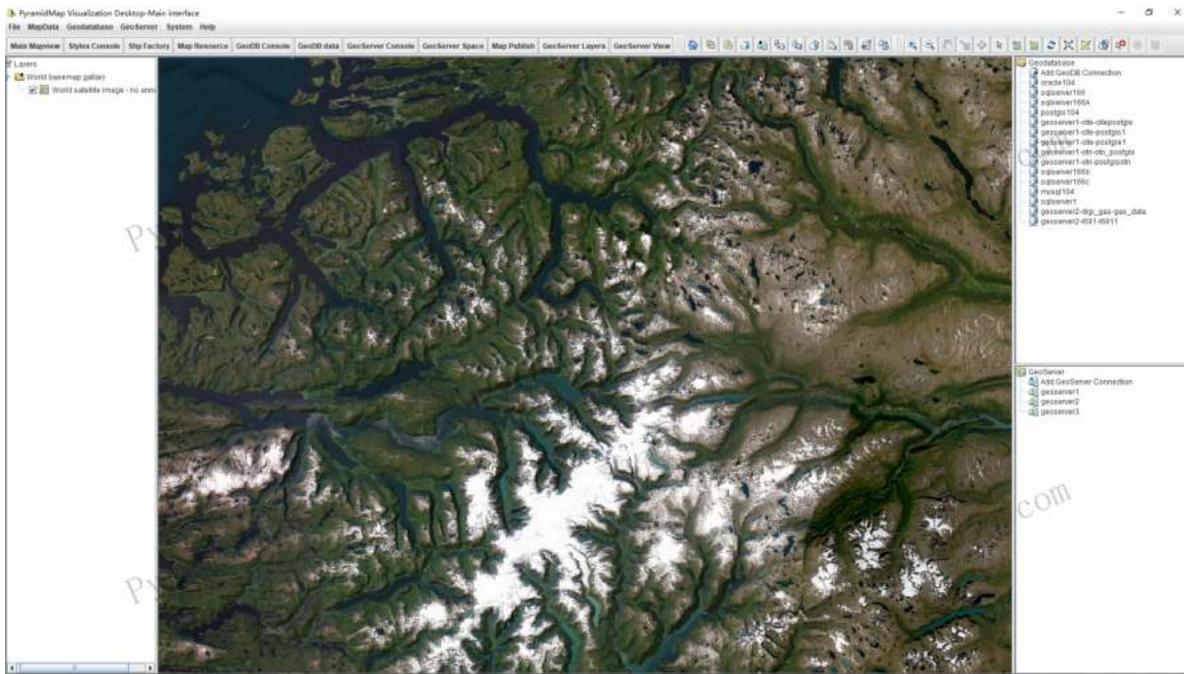


Figure 3-8: The world satellite image map somewhere local details

The world physical map presents the Natural Earth physical map at 1.24km per pixel for the world and 500m for the coterminous United States. This map display effect is shown in Figure 3-9.

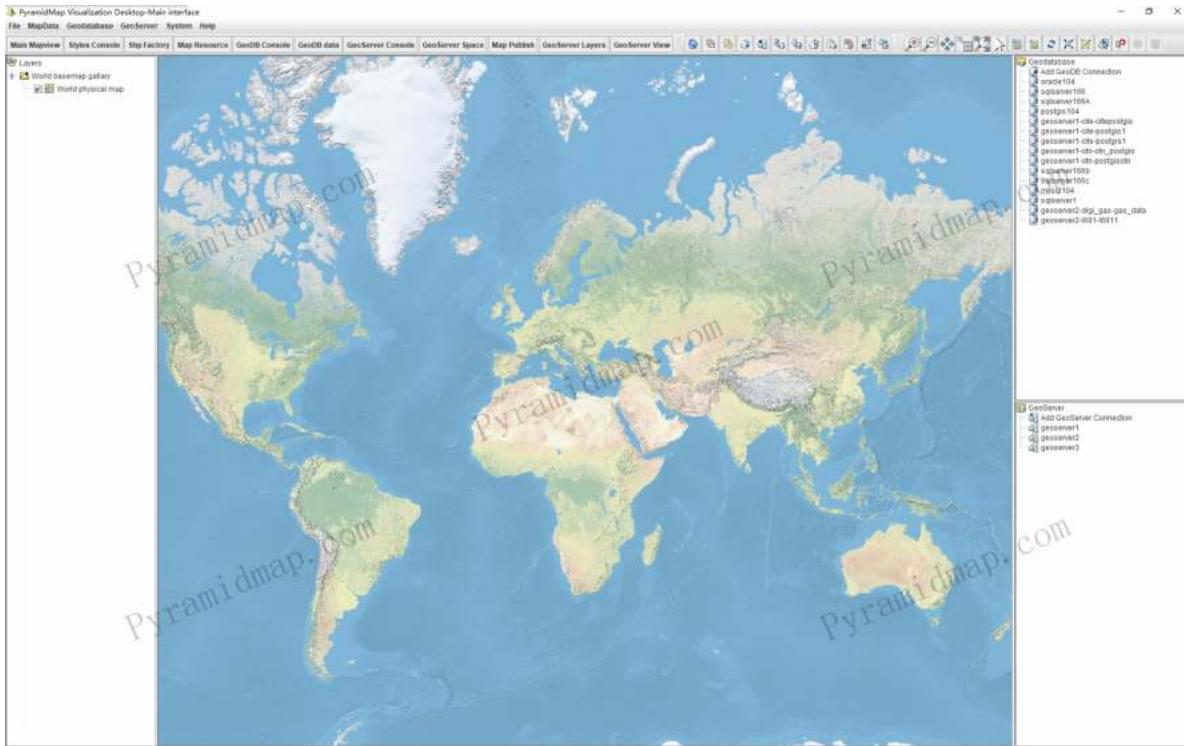


Figure 3-9: The world physical map display effect

The local details somewhere for the world physical map are shown in Figure 3-10.

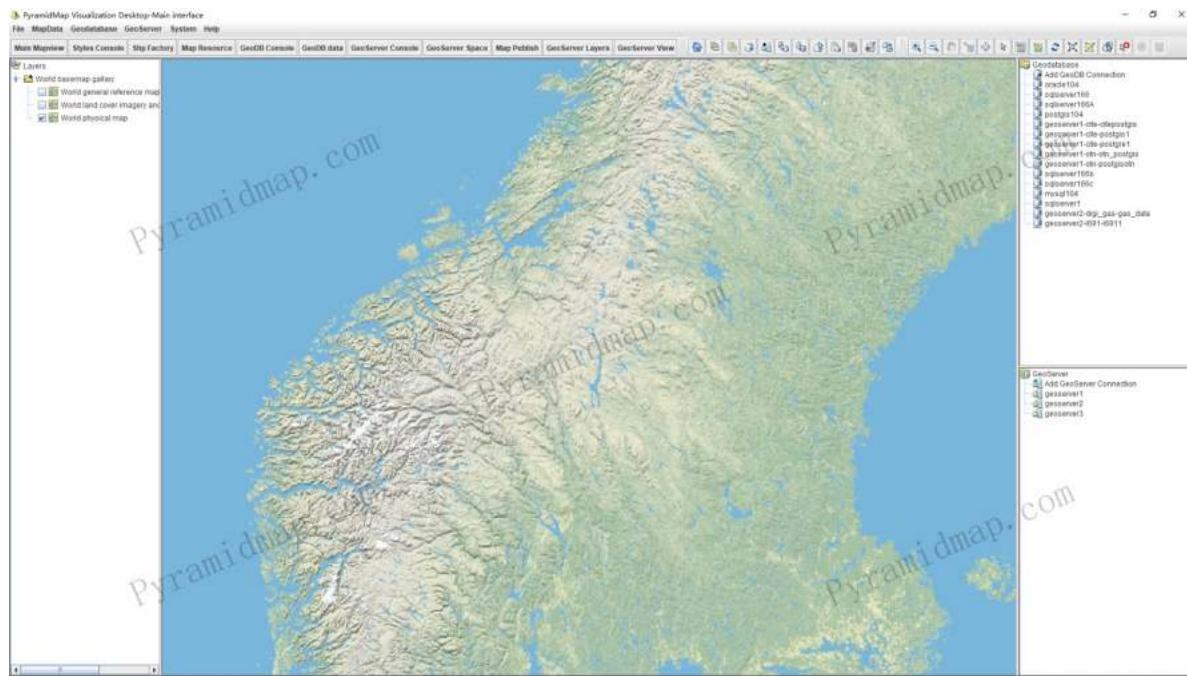


Figure 3-10: The world physical map somewhere local details

The world shaded relief map portrays surface elevation as shaded relief. This map is used as a basemap layer to add shaded relief to other GIS maps, such as the ArcGIS Online World Street Map. It is especially useful in maps that do not contain orthoimagery. The map resolution (cell size) is as follows: 30 Meters for the U.S. 90 Meters for all land areas between 60 degrees north and 56 degrees south latitude. 1 KM resolution above 60 degrees north and 56 degrees south. The shaded relief imagery was developed by Esri using GTOPO30, Shuttle Radar Topography Mission (SRTM), and National Elevation Data (NED) data from the USGS. The world shaded relief map display effect is shown in Figure 3-11.

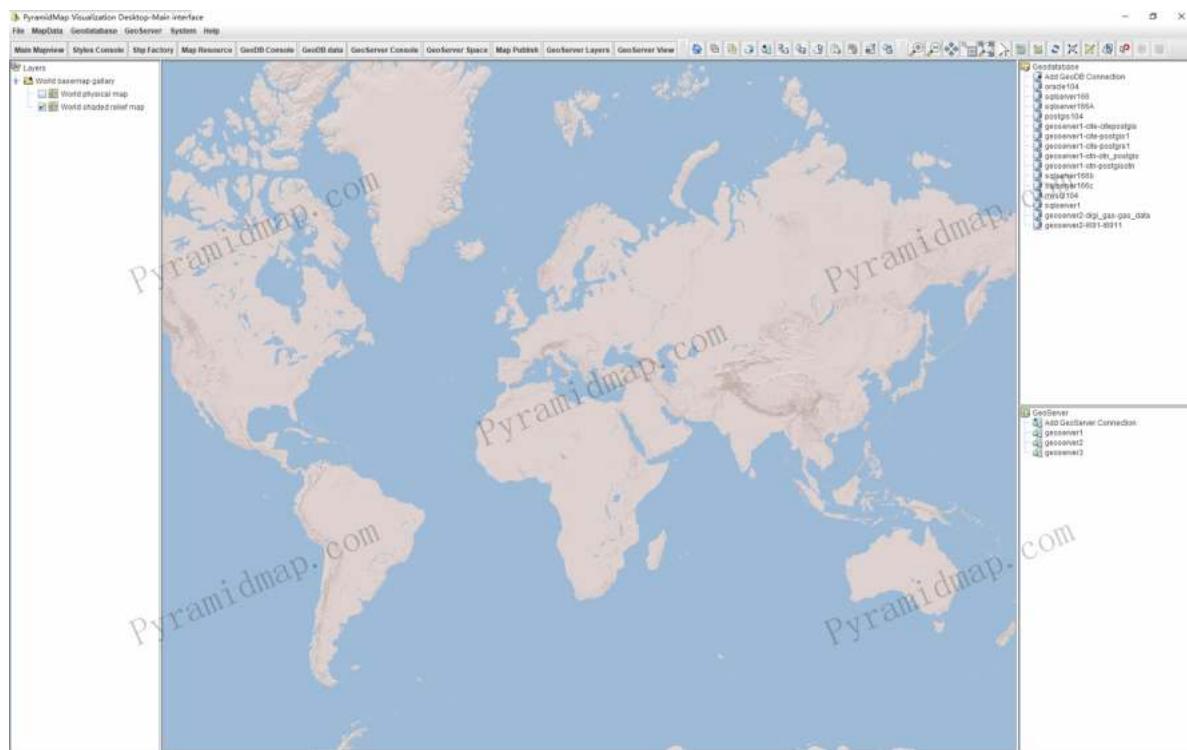


Figure 3-11: The world shaded relief map display effect

The local details somewhere for the world shaded relief map are shown in Figure 3-12.

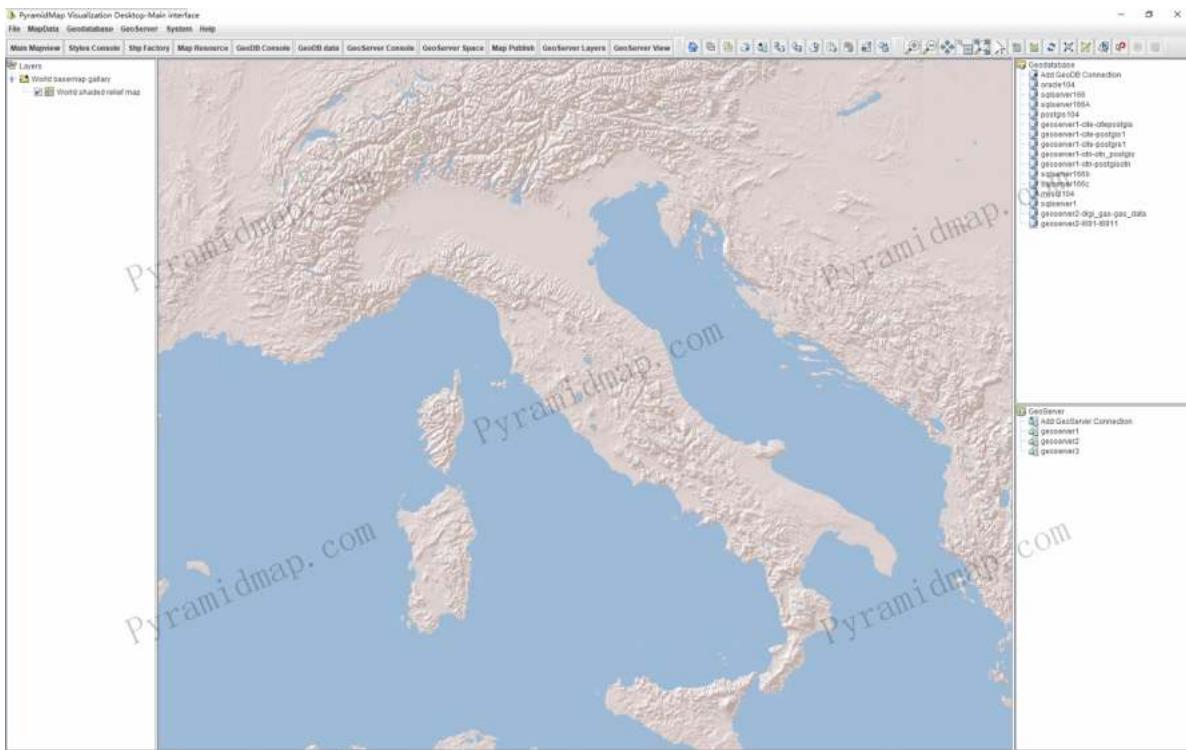


Figure 3-12: The world shaded relief map somewhere local details

The world street map presents highway-level data for the world. Street-level data includes the United States; much of Canada; Mexico; Europe; Japan; Australia and New Zealand; India; South America and Central America; Africa; and most of the Middle East. This comprehensive street map includes highways, major roads, minor roads, one-way arrow indicators, railways, water features, administrative boundaries, cities, parks, and landmarks, overlaid on shaded relief imagery for added context. Display effect is shown in Figure 3-13.

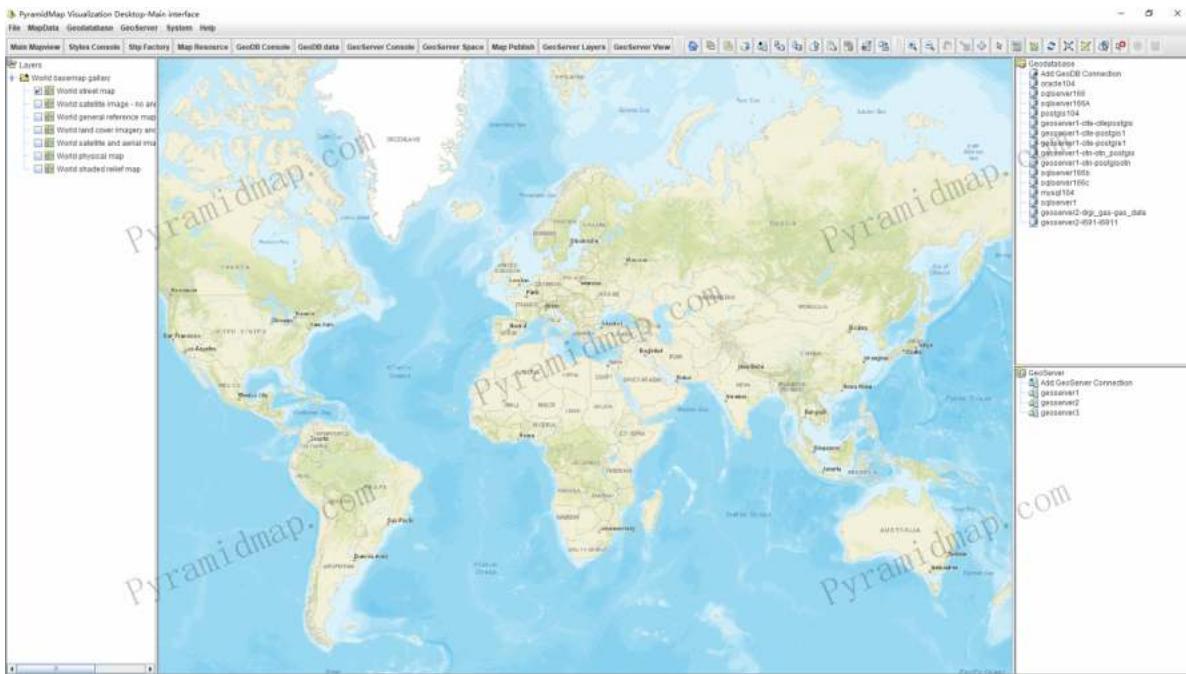


Figure 3-13: The world street map display effect

The local details somewhere for the world street map are shown in Figure 3-14.

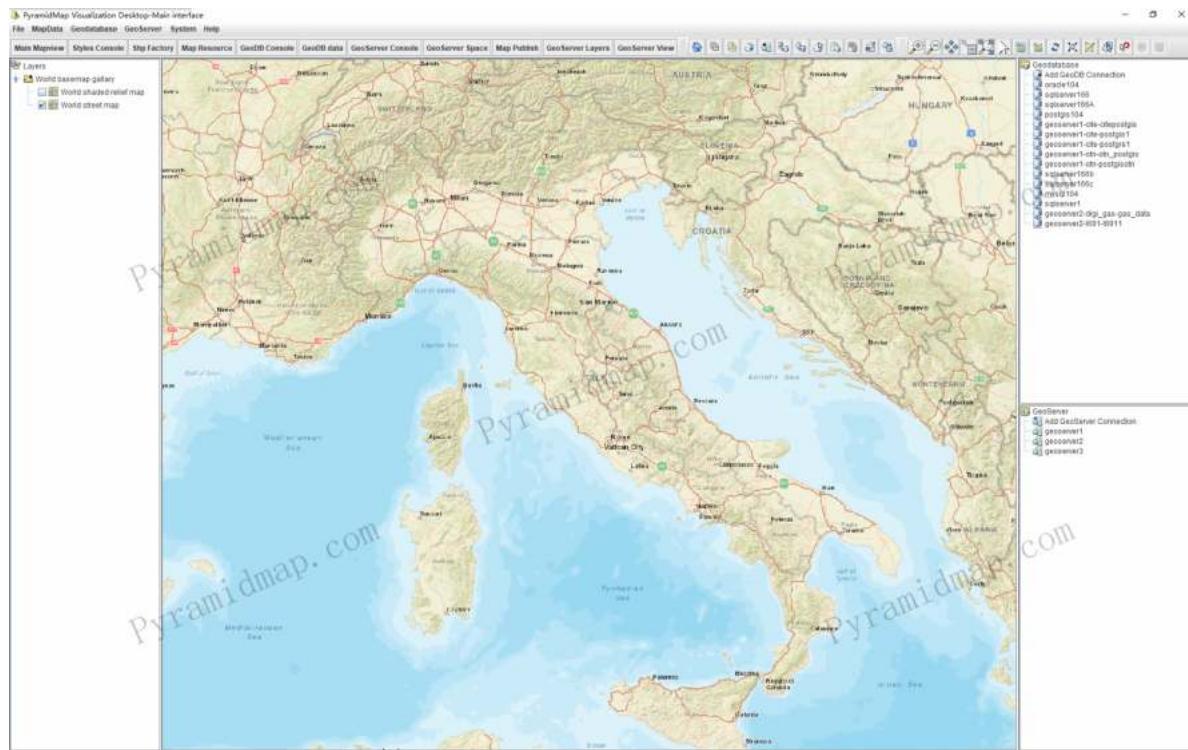


Figure 3-14: The world street map somewhere local details

The world terrain base map is designed to be used as a base map by GIS professionals to overlay other thematic layers such as demographics or land cover. The base map features shaded relief imagery, bathymetry, and coastal water features designed to provide a neutral background for other data layers. The base map currently provides coverage for the world down to a scale of ~1:1m. The world terrain base map display effect is shown in Figure 3-15.

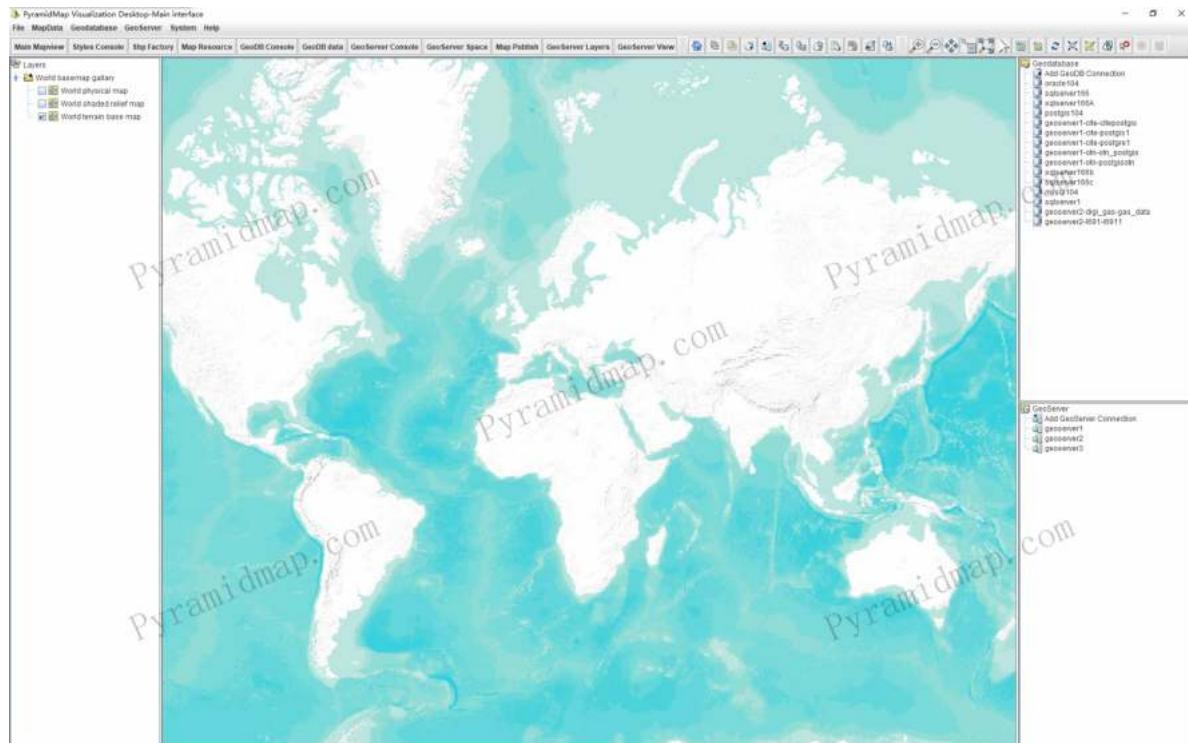


Figure 3-15: The world terrain base map display effect

The local details somewhere for the world terrain base map are shown in Figure 3-16.

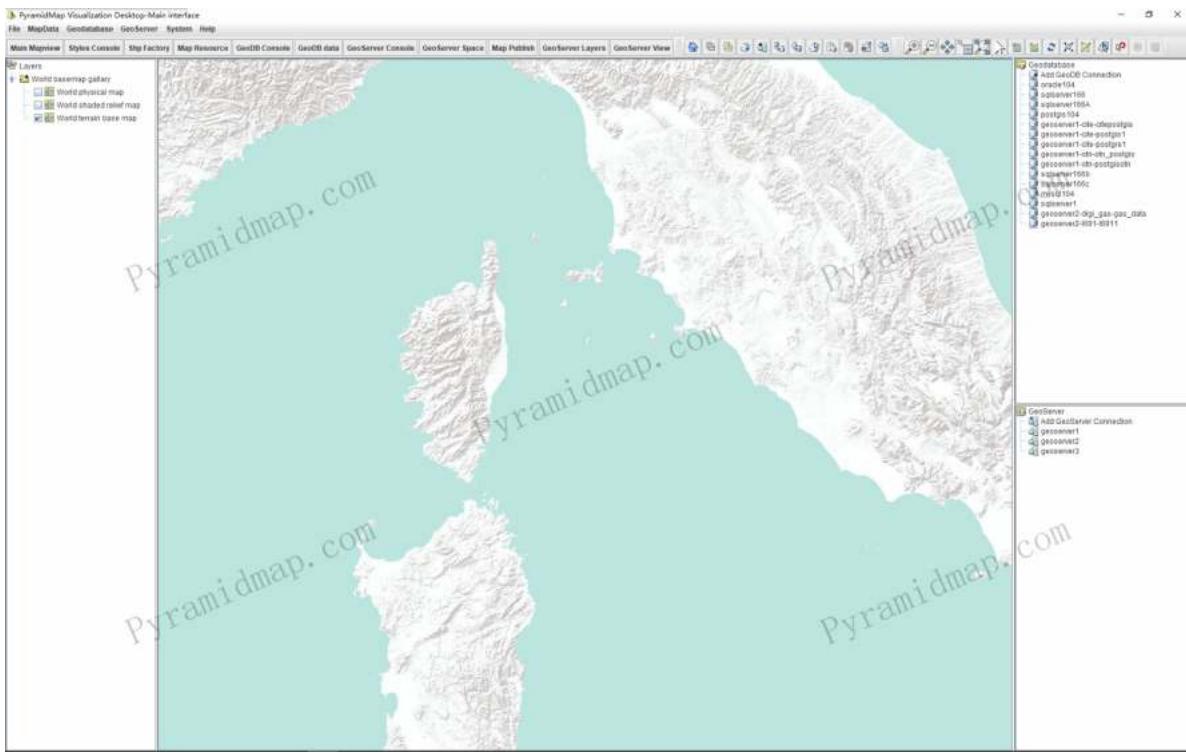


Figure 3-16: The world terrain base map somewhere local details

The world topographic base map is designed to be used as a basemap by GIS professionals and as a reference map by anyone. The map includes administrative boundaries, cities, water features, physiographic features, parks, landmarks, highways, roads, railways, and airports overlaid on land cover and shaded relief imagery for added context. The world topographic base map display effect is shown in Figure 3-17.

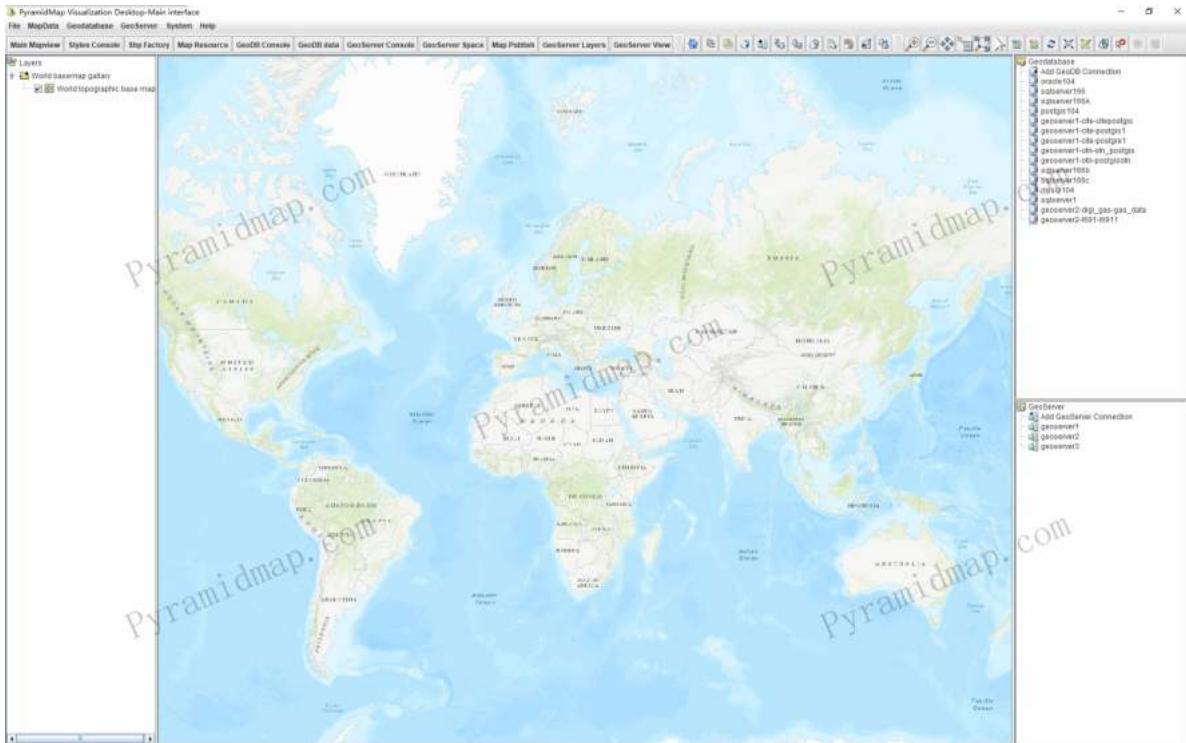


Figure 3-17: The world topographic base map display effect

The local details somewhere for the world topographic base map are shown in Figure 3-18.

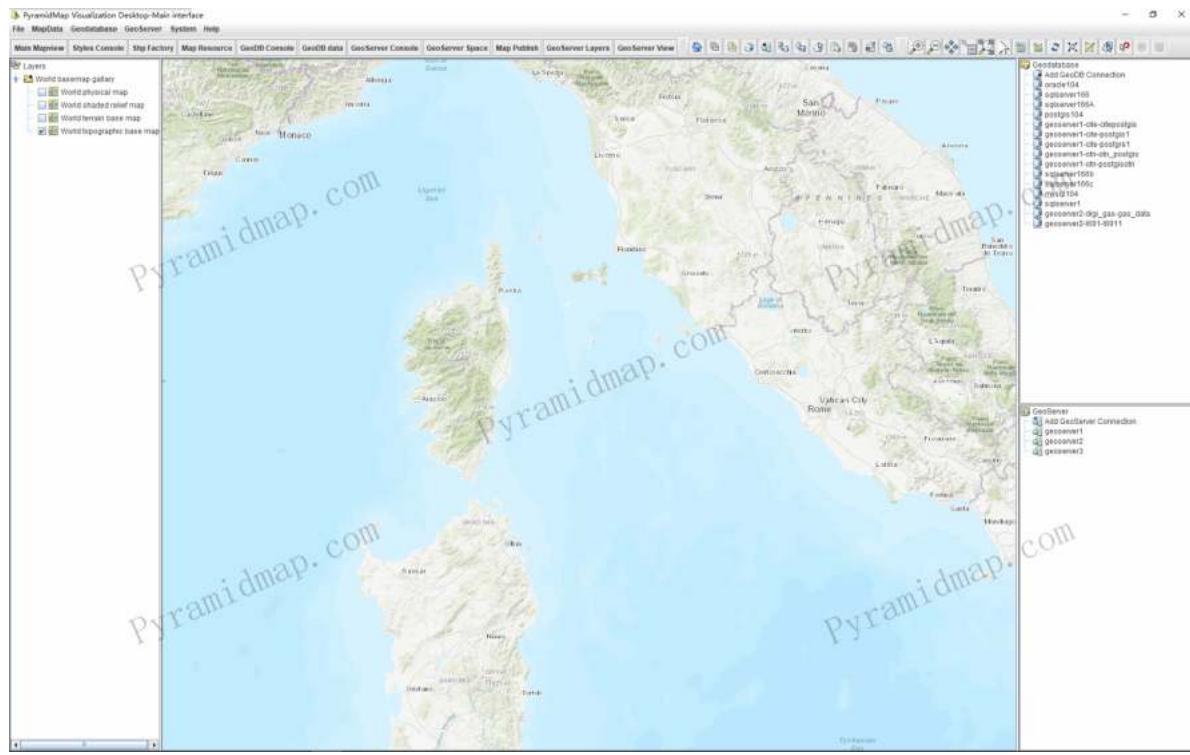


Figure 3-18: The world topographic base map somewhere local details

The world geomorphology and road network map presents highway-level data for the world. Street-level data includes the United States; much of Canada; Japan; Europe; Australia and New Zealand; India; South America and Central America; most of the Middle East; Egypt and Morocco; and parts of southern Africa including Botswana, Lesotho, Namibia, South Africa, and Swaziland. This comprehensive street map includes highways, major roads, minor roads, one-way arrow indicators, railways, water features, administrative boundaries, cities, parks, and landmarks, overlaid on shaded relief imagery for added context. This map display effect is shown in Figure 3-19.

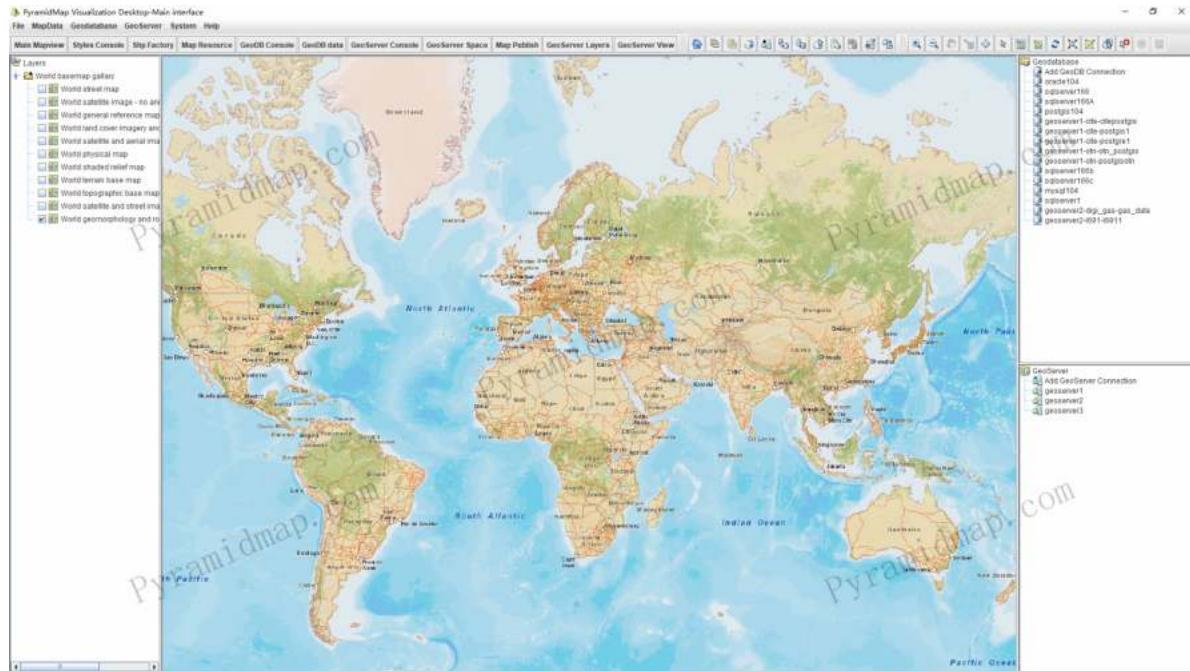


Figure 3-19: The world geomorphology and road network display effect

The local details somewhere for the world geomorphology and road network map are shown in Figure 3-20.



Figure 3-20: The world geomorphology and road network map somewhere local details

3.2 Load business layer

The map view supports the following map data: Shp file type, Geodatabase geographic database type, WMS, WFS, WCS, WMTS and other standardized map services from GeoServer, and various online map resources that follow standardized specifications. The layers added to the view are classified according to the data source path and displayed in the layer node on the left. The hierarchical operation is implemented through the right-click shortcut menu.

3.2.1 Load local Shp layer

Select "Load local vector layer" in the toolbar, as shown in Figure 3-21.

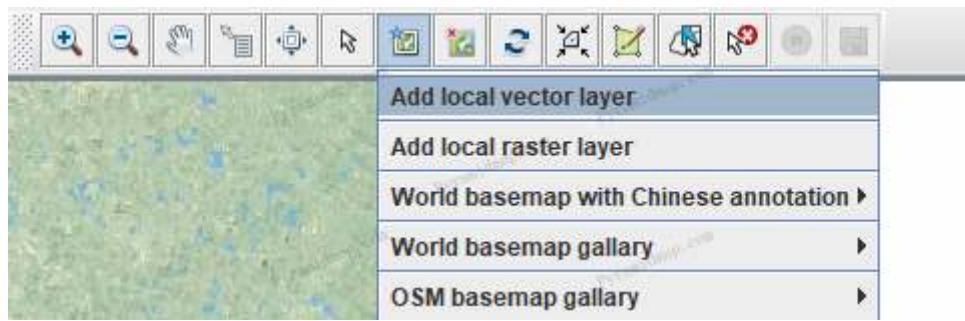


Figure 3-21: Load local vector layer

Loading the required layer through file browser. After successful loading, it will be displayed in the map view, and the layers mount node on the left will be formed, as shown in Figure 3-22.

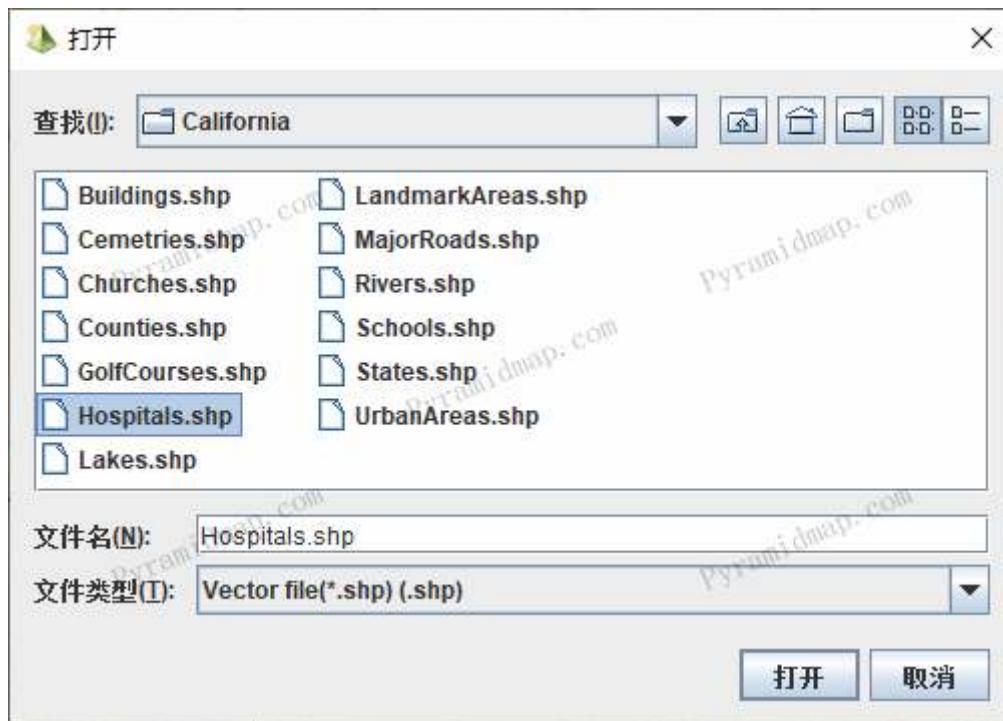


Figure 3-22: Load local shp file broswer

Then the shp selected display in the map viewer,as shown in Figure 3-23.

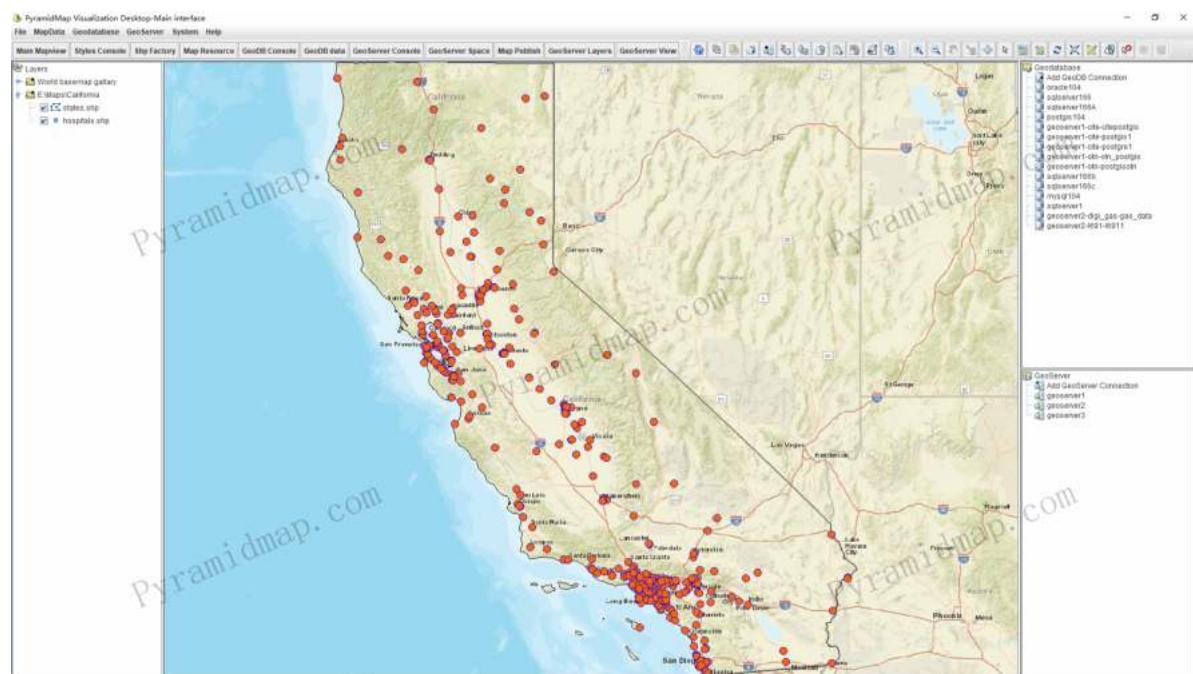


Figure 3-23: Load local shp file and display in the map viewer

At the same time, PyramidMap provides a more convenient operation, assuming the map initialization view is shown in Figure 3-24.

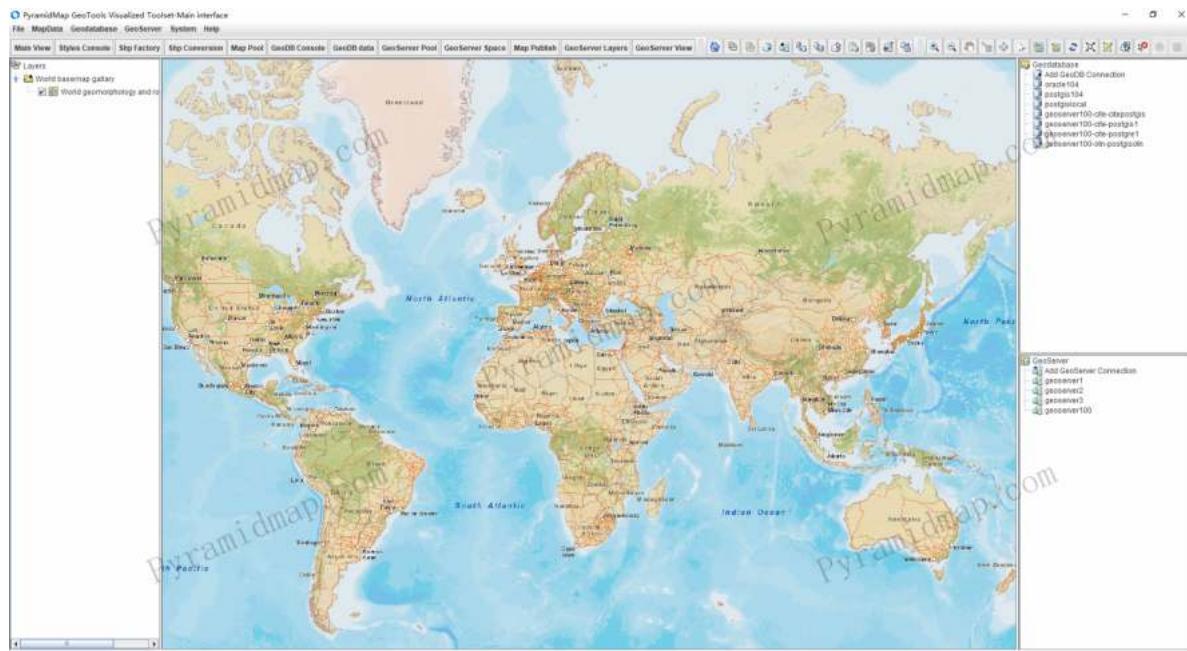


Figure 3-24: The map viewer initialization

You can drag and drop the shapefiles to the map view displaying directly, as shown in Figure 3-25.

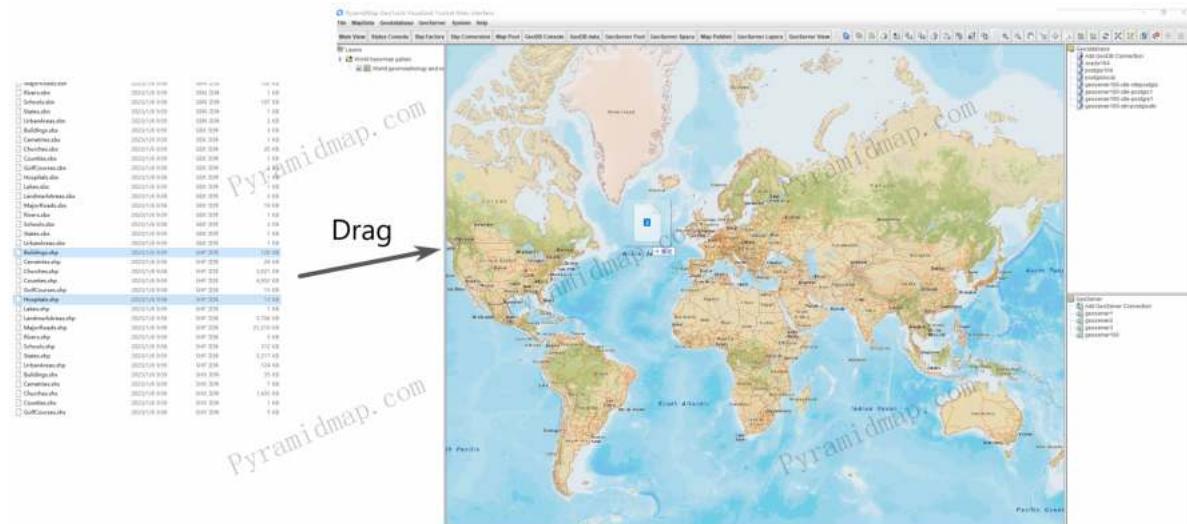


Figure 3-25: Drag and drop the shapefiles to the map view displaying directly

The display effect is shown in Figure 3-26.

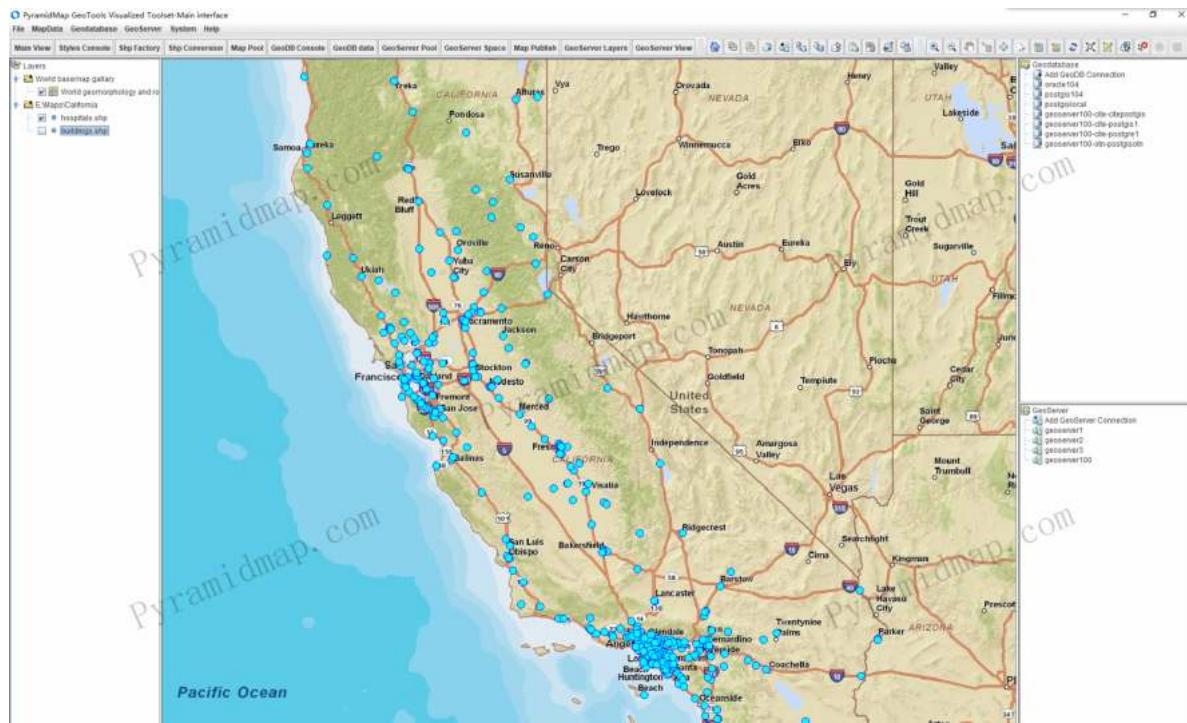


Figure 3-26: Drag and drop the shapefiles displaying

3.2.2 Load Geodatabase layer

In the node tree of the database connection pool on the main interface, double-click the database node to dynamically load its internal layer. Drag the layer node to the map view or double-click the mouse to display it. At the same time, the layer mount node on the left is formed, as shown in Figure 3-27.

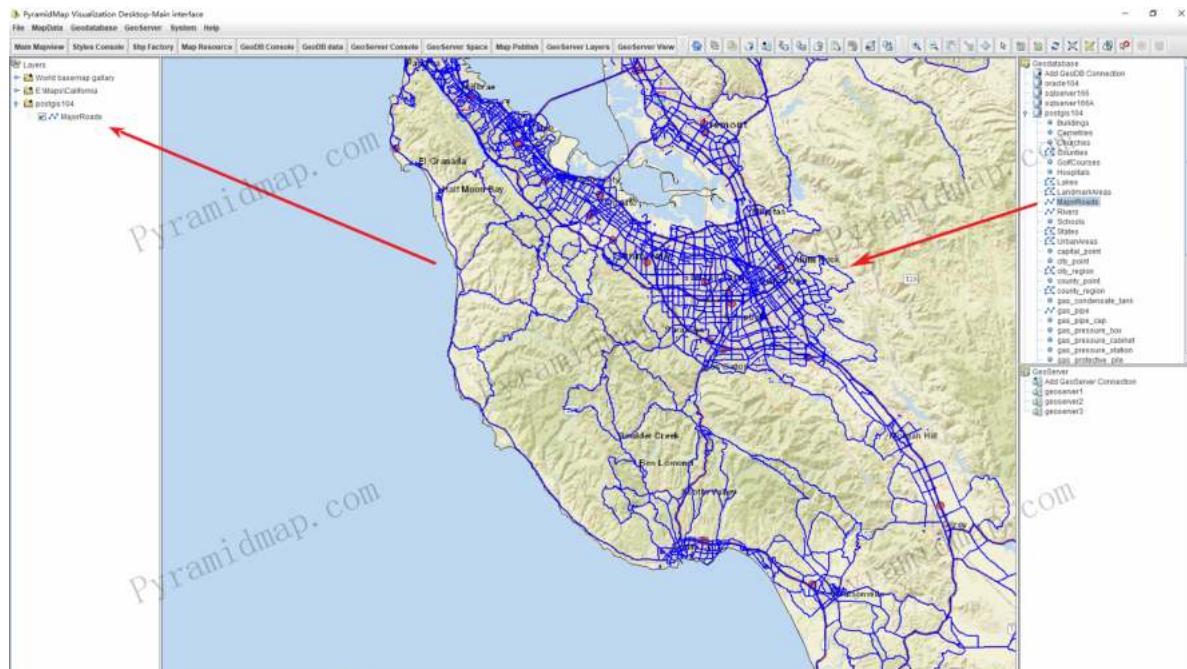


Figure 3-27: Loading and displaying vector layers in Geodatabase

3.2.3 Geodatabase node catalog and operation

On the upper right side of the main interface, there is a Geodatabase connection pool node, which provides a Geodatabase data source. Double click the database node to dynamically load its internal layers. The layer nodes can be dragged or double clicked to displaying in the map viewer. Different levels of nodes have corresponding shortcut menus. The database node menu

completes database connection test, editing, layer list management, and deletion operations, as shown in Figure 3-28.

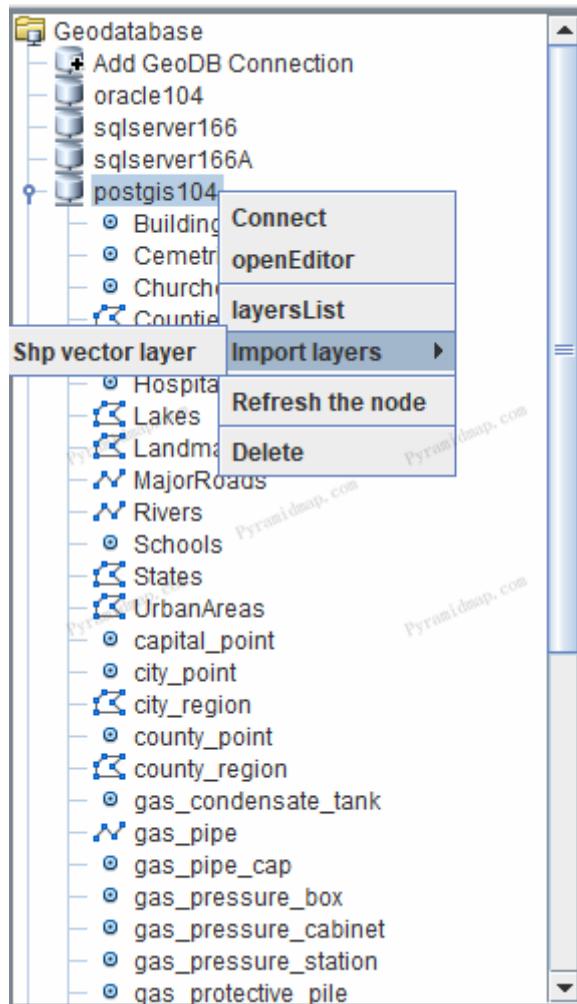


Figure 3-28: Geodatabase node popup menu

The layer node menu supports exporting database layers to Shp, Kml, Csv, GeoJson and other formats or being deleted, as shown in Figure 3-29.

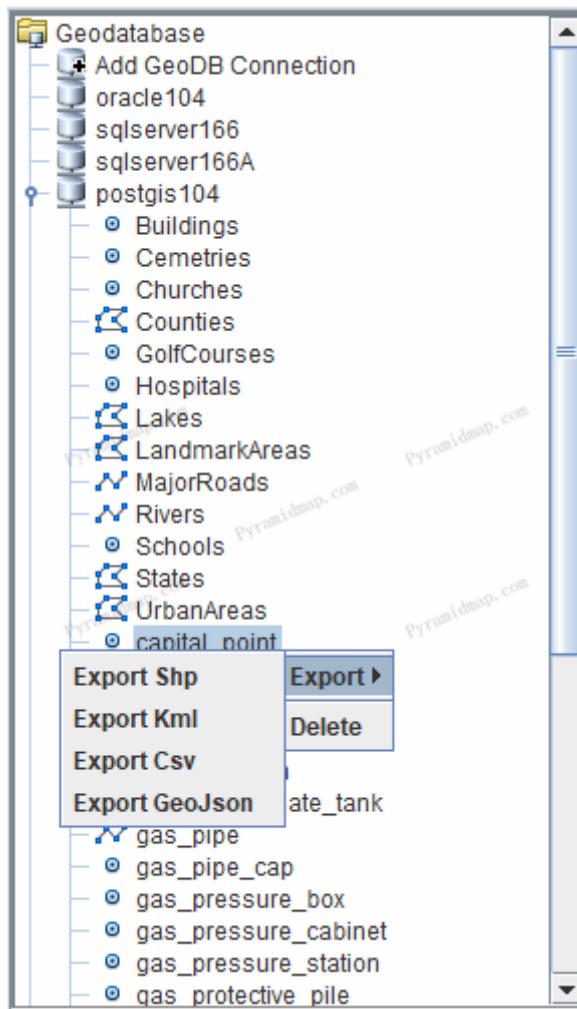


Figure 3-29: Geodatabase layer node popup menu

3.2.4 Load GeoServer layer

In the node tree of the GeoServer connection pool in the main interface, double-click the GeoServer node to dynamically load its internal workspace and its layers. The layer nodes can be dragged or double clicked to displaying in the map viewer, at the same time, the layer mount node on the left is formed, as shown in Figure 3-30.

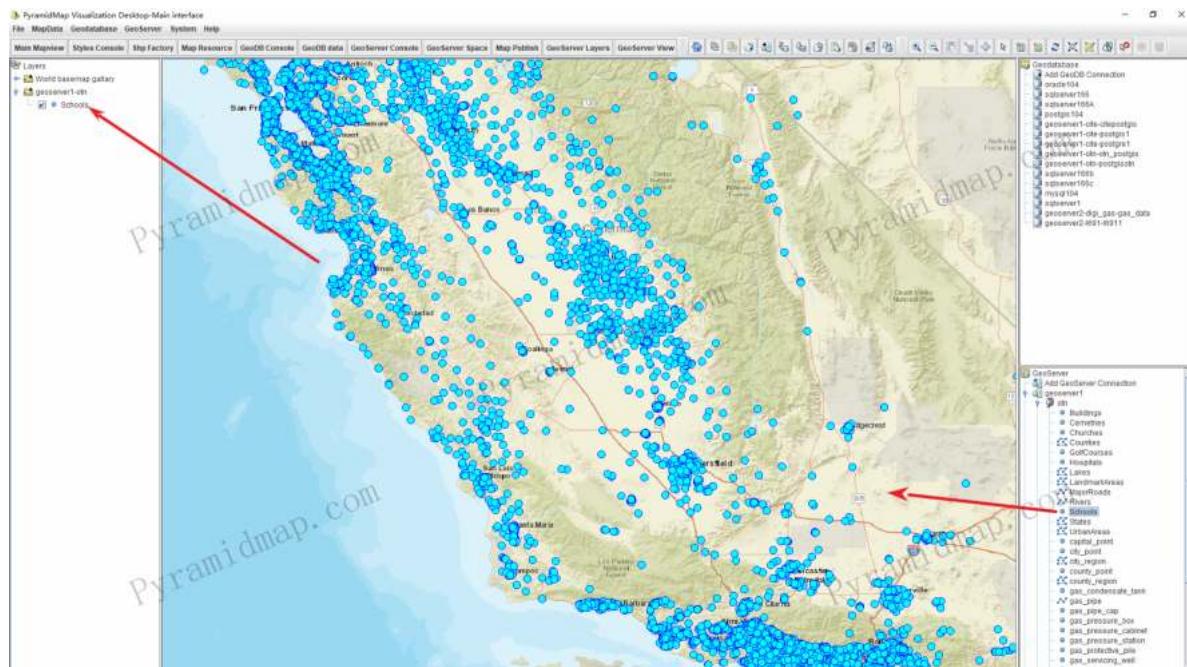


Figure 3-30: Loading and displaying vector layers in GeoServer

3.2.5 GeoServer node catalog and operation

On the lower right side of the main interface, the GeoServer connects to the pool node, providing the GeoServer data source. Double click the GeoServer node, then dynamic loading the internal workspace and layer nodes. Nodes at different levels have corresponding shortcut menus. The GeoServer node menu completes the server connection test, connection editing, obtaining server synchronization data (configuring the GeoServer workspace and data storage and its database connection), workspace management (localizing and modifying the workspace parameters and synchronizing them to the server), refreshing the layer list, connection deletion, and other operations, as shown in Figure 3-31.

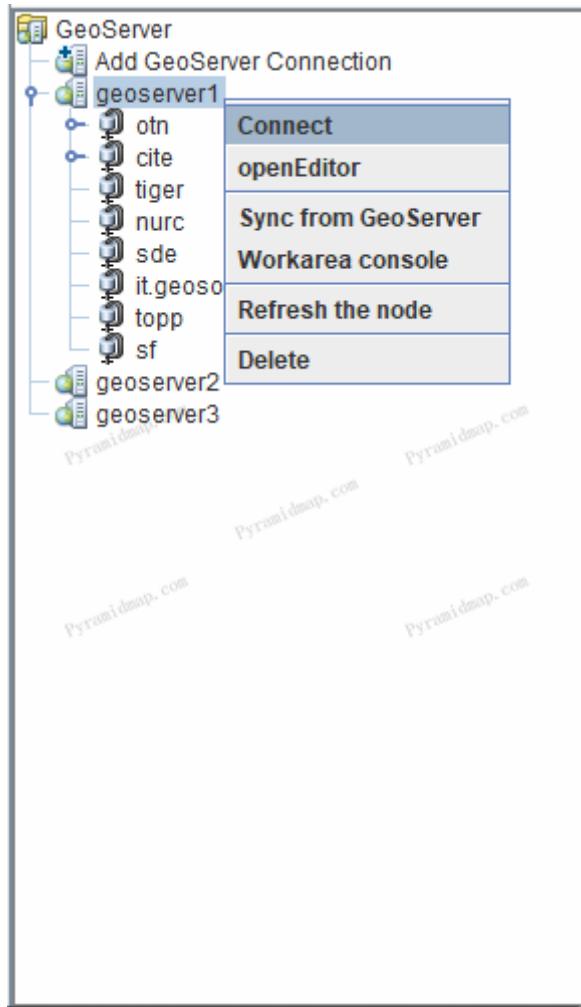


Figure 3-31: GeoServer node popup menu

Under the GeoServer node is the workspace node. The workspace node menu completes data storage management, layer node refresh, map import, workspace deletion and other operations, as shown in Figure 3-32.

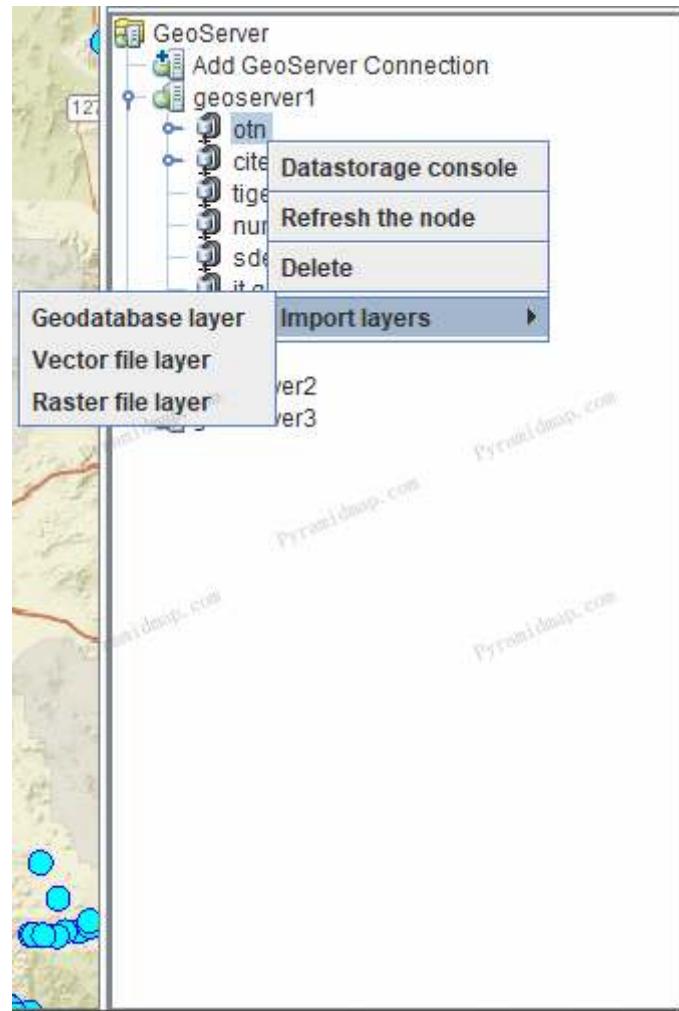


Figure 3-32: GeoServer workspace node popup menu

In particular, in the data storage list, you can edit and modify the database connection and maintain the layer list for each item in the list, including the details of the layer and the addition and deletion maintenance. The layer nodes can be dragged or double clicked to displaying in the map viewer and can be setted sld symbols, exported and deleted, as shown in Figure 3-33.

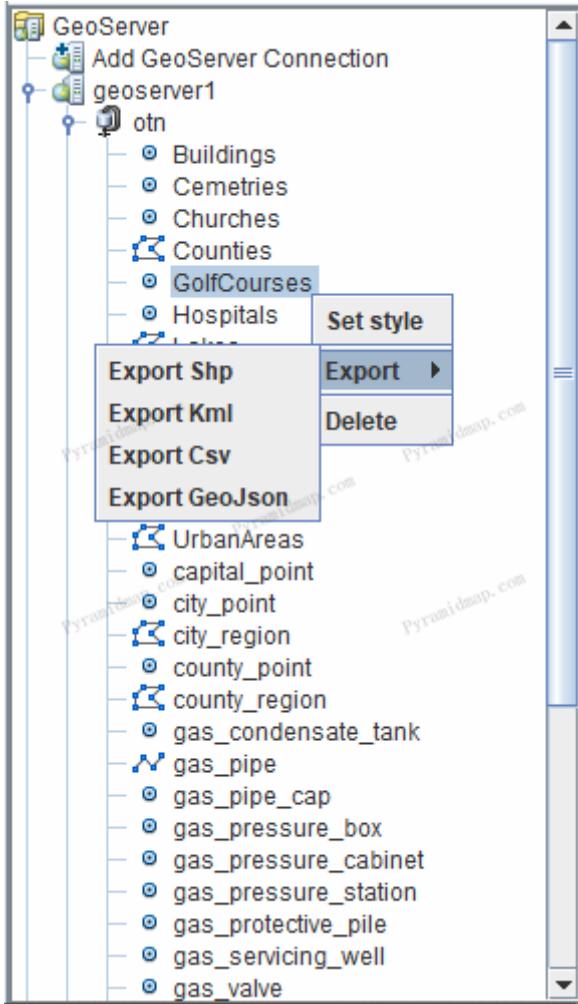


Figure 3-33: GeoServer layer node popup menu

Especially in the layer node under the GeoServer workspace, right click to set the binding relationship between the layer and the sld display symbol in the GeoServer, as shown in Figure 3-34.

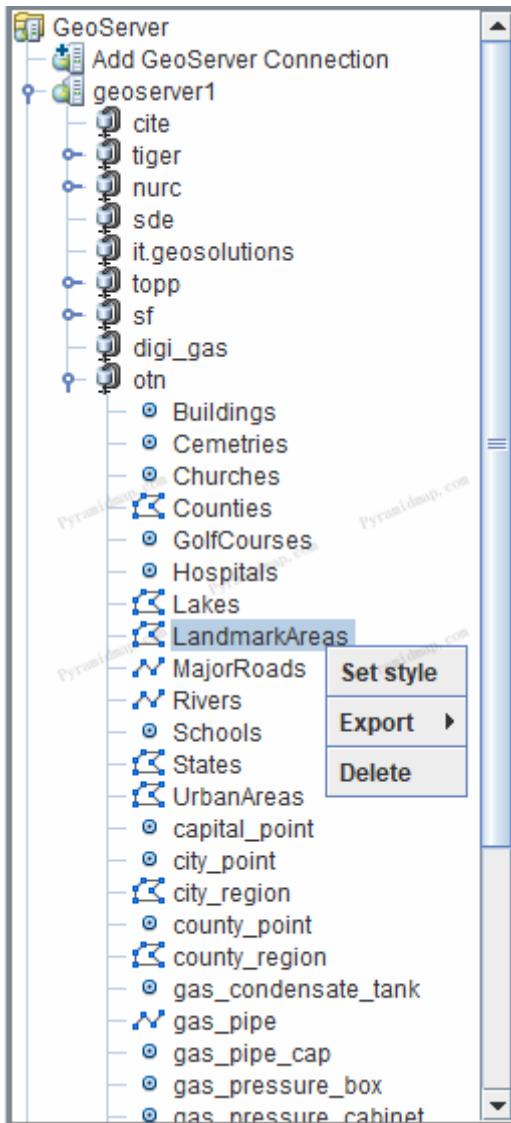


Figure 3-34: Set the binding relationship between the layer and the sld symbol in the GeoServer

PyramidMap will return the sld symbol selection list of the same geometry type on the server according to the selected layer, as shown in Figure 3-35.

No	style	workArea	GeometryType	Symbol	Size(pixel)	StrokeWidth(pixel)	StrokeColor	StrokeOpacity	FillColor	FillOpacity	LabelField	Check
1	cite_lakes				5.0	1		1		1.0		<input type="radio"/>
2	giant_polygon				5.0	1.0		1.0		1.0		<input type="radio"/>
3	grass				5.0	1		1.0		1.0		<input type="radio"/>
4	green				5.0	1.0		1.0		1.0		<input type="radio"/>
5	polygon				5.0	1		1.0		1.0		<input type="radio"/>
6	provinceregion				5.0	1.0	0.579999993319	1	0.579999993319	1		<input checked="" type="radio"/>
7	restricted				5.0	1		1.0		0.7		<input type="radio"/>

Figure 3-35: Return sld symbol list of the same geometry type on the server according to the selected layer

Click "OK", the selected layer and sld symbol are bound successfully. Subsequently, the WMS service of this layer output by the GeoServer server will be rendered according to this symbol, as shown in Figure 3-36.

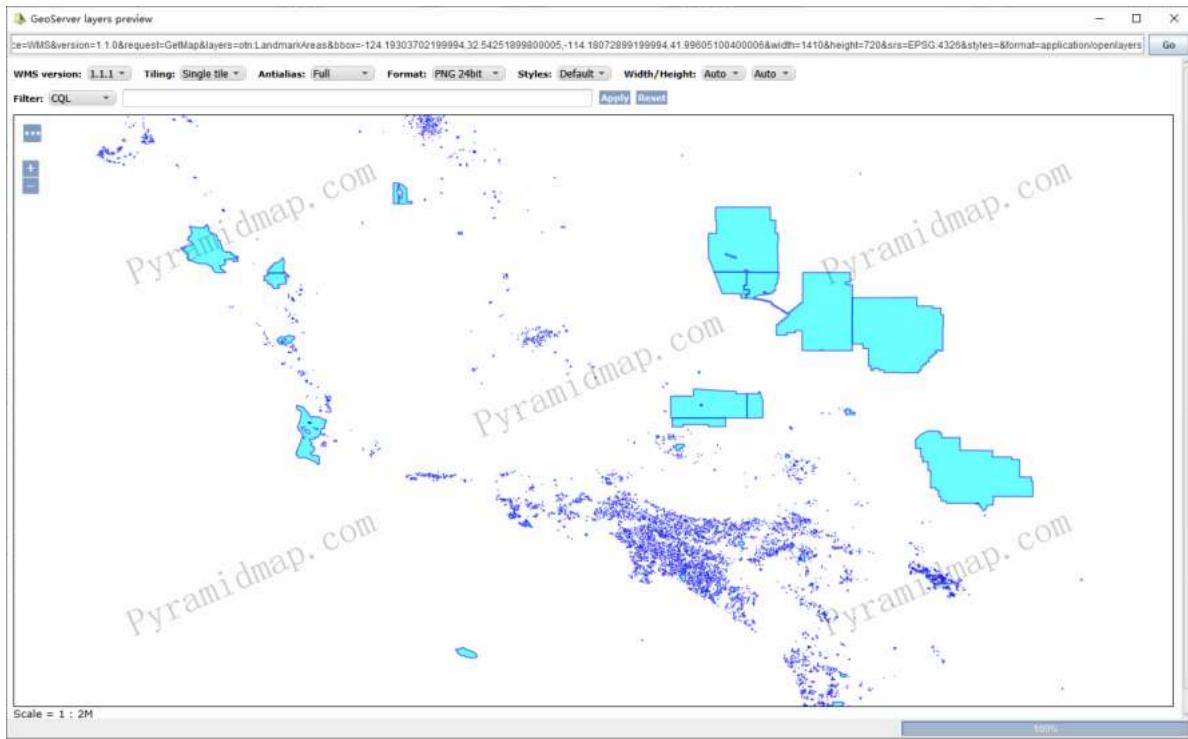


Figure 3-36: The WMS service of this layer output by the GeoServer server will be rendered according to this symbol

3.3 Visible layer node operations

3.3.1 Layer control

The layers in the main map view are classified and managed in checkbox tree nodes. It supports the popup menu and checked visible controlling on each layer node, and the corresponding operations are implemented according to the layer type. The following is layer checkbox node classification and operation for vector layers, as shown in Figure 3-37.

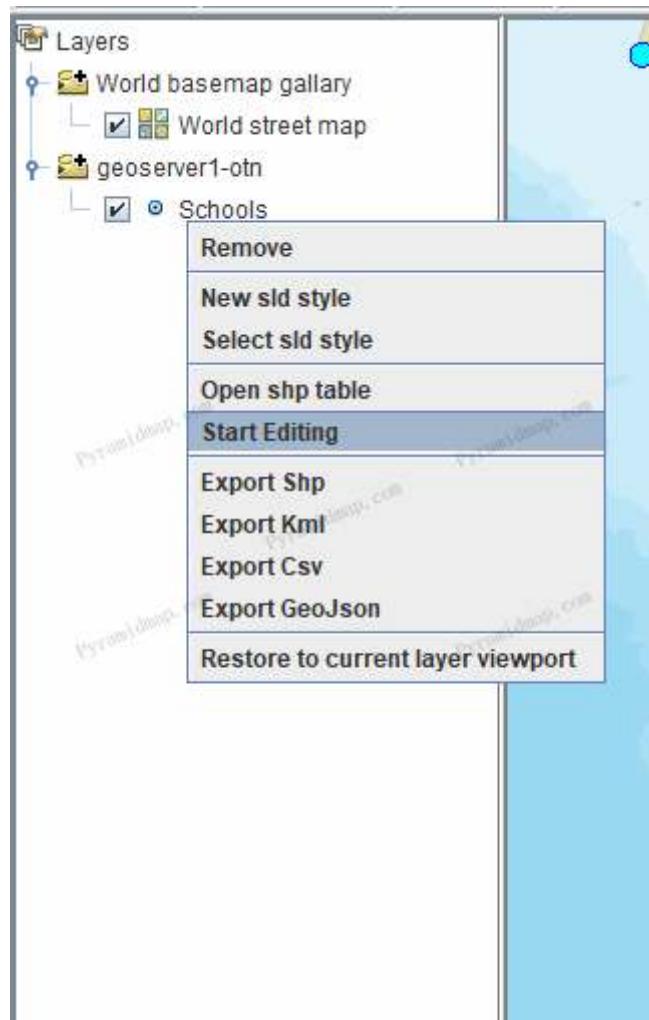


Figure 3-37: Vector layer checkbox node classification and operation

The following is layer checkbox node classification and operation for raster layer, as shown in Figure 3-38.

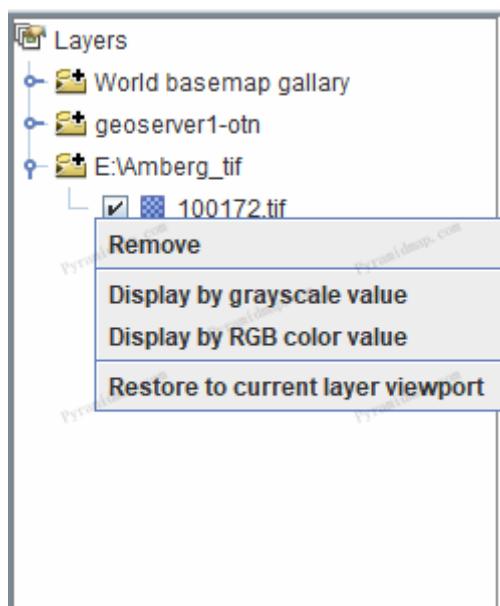


Figure 3-38: Raster layer checkbox node classification and operation

You can control the visibility of layers and the data processing of different types of layers with the classification and operation of layer checkbox nodes.

3.3.2 Symbol rendering

Select New sld Symbol from the shortcut menu of the vector layer display node to enter the sld symbol definition interface, as shown in Figure 3-39.

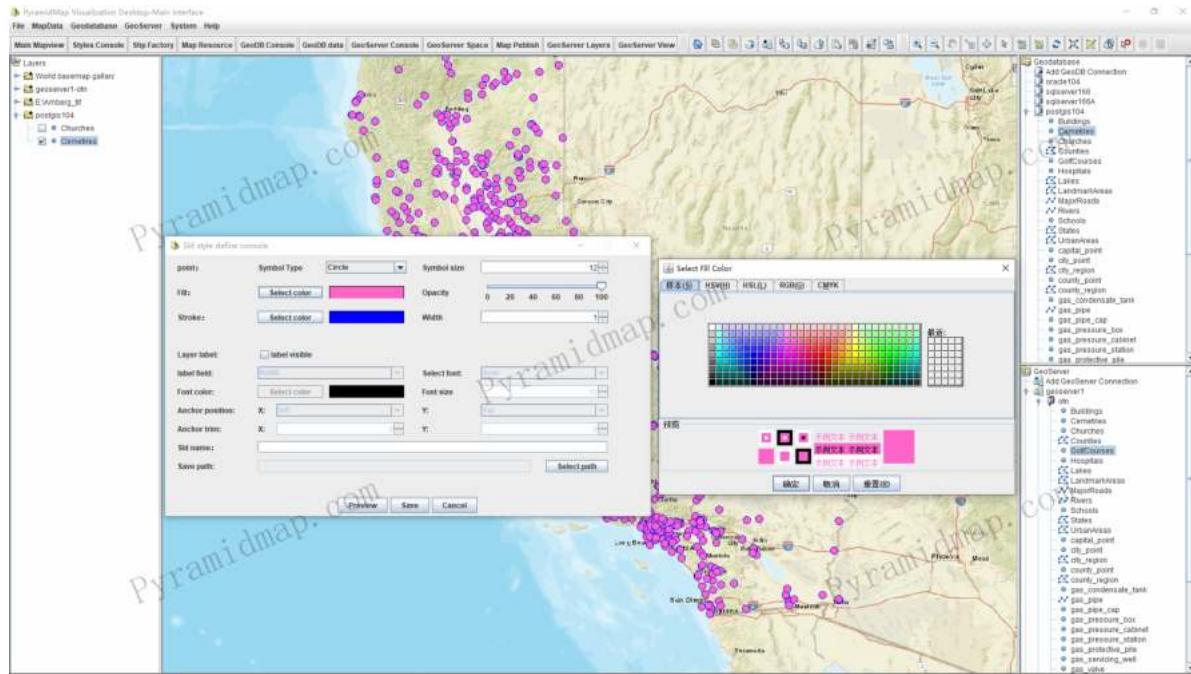


Figure 3-39: Definition and effect of map Sld symbols

With this operation, create a style definition file for point (Point, MultiPoint), line (LineString, MultiLineString), polygon (Polygon, MultiPolygon) type layers, and set the annotation field and font type, size, color, and annotation location. After the effect preview is satisfactory, save it as an sld file and include it in the PyramidMap resource pool for maintenance, The SLD resource pool maintained by PyramidMap client can provide feature symbol selection for layers. Select the SLD symbol on the layer node, as shown in Figure 3-40.

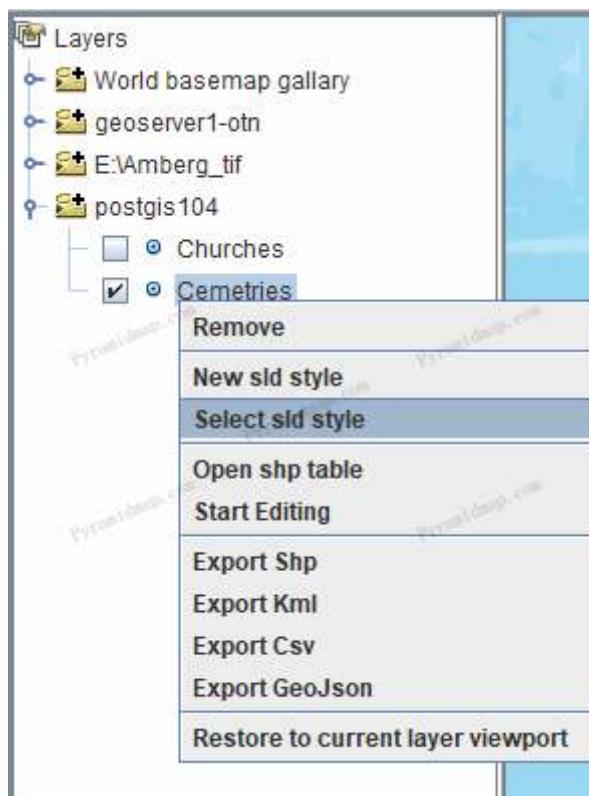


Figure 3-40: Select sld symbol on layer node

PyramidMap will automatically match the Sld data according to the geometry type of the selected layer, and provide a selection list of sld resources of the same geometry type, as shown in Figure 3-41.

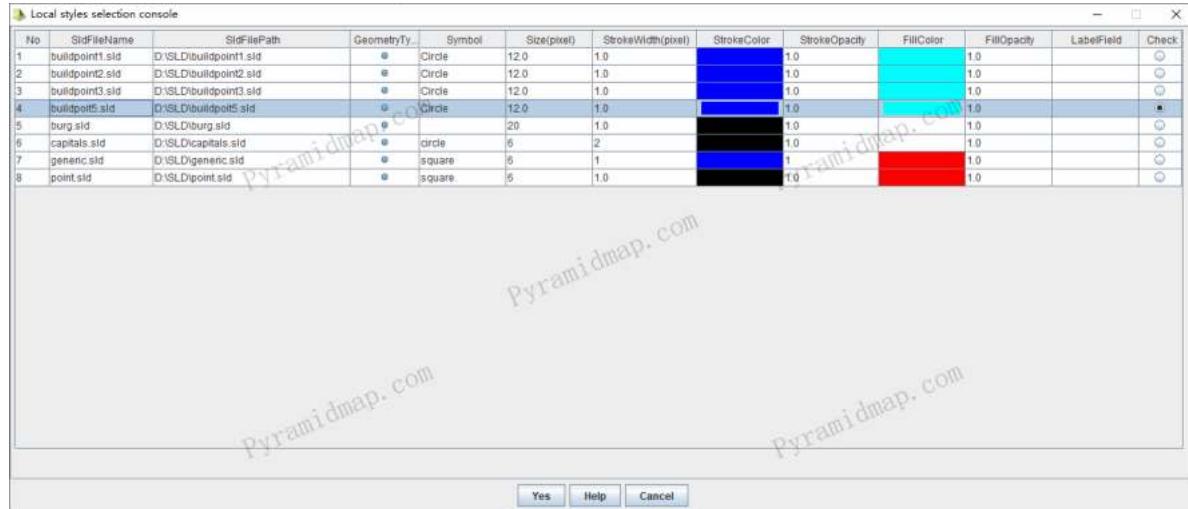


Figure 3-41: SLD resource list of the same geometry type as the selected layer

The rendering effect of the selected sld is applied to the layer, as shown in Figure 3-42.

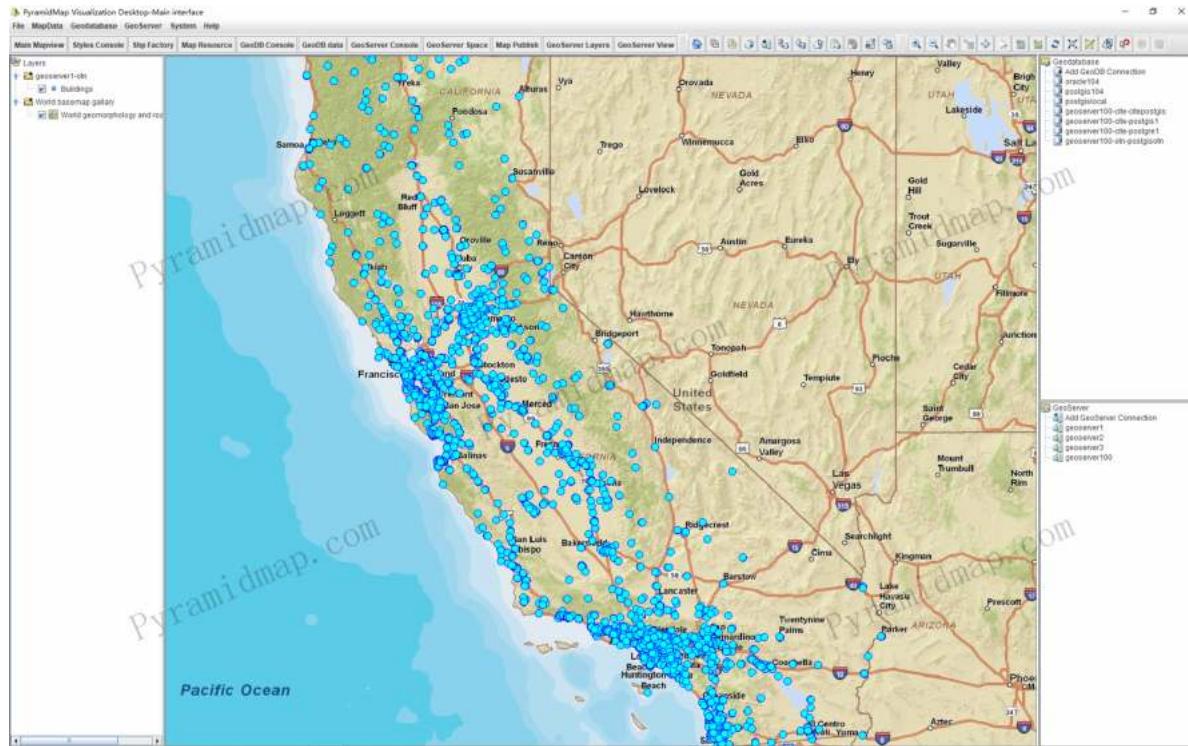


Figure 3-42: Rendering effect of layer after applying the selected sld

3.3.3 Feature data table

Select the "Open shp table" option in the layer node on the left, as shown in Figure 3-43.

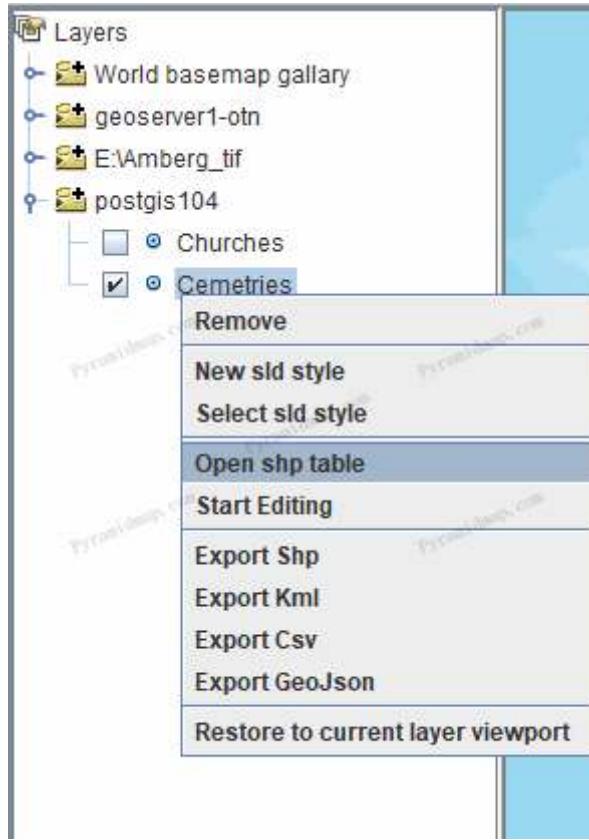


Figure 3-43: Open shp table

The feature data table and query page of the selected layer are shown in Figure 3-44.

Feature/Identifier	the_geom	NAME	STCTYFIPS	ELEV_METER	LABEL_FLAG
Buildings 1	POINT (-114.61523004299994 32)	Yuma Territorial Prison	04027	47.0	0
Buildings 2	POINT (-114.30717395799994 32)	Colorado River Water Pollution Con.	04012	115.0	0
Buildings 3	POINT (-114.28967332099994 34.1)	La Paz County Courthouse	04012	128.0	0
Buildings 4	POINT (-114.29439572499994 34.1)	Parker City Hall	04012	127.0	0
Buildings 5	POINT (-114.62106359199993 32)	Yuma City Hall	04027	49.0	0
Buildings 6	POINT (-114.62273023209994 32)	Yuma Courthouse	04027	52.0	0
Buildings 7	POINT (-114.30384053399994 34.1)	Colorado River Indian Agency Head	04012	126.0	0
Buildings 8	POINT (-123.10528074899992 38)	McDonald Mountain House	06045	380.0	0
Buildings 9	POINT (-116.61064282799993 35)	Breckenridge Lodge	06029	1924.0	0
Buildings 10	POINT (-120.10541561299993 36)	Eleven P Office	06031	383.0	0
Buildings 11	POINT (-119.10312471699994 34.0)	Maryvale Orphanage	06037	106.0	0
Buildings 12	POINT (-121.36226623399994 36.4)	Soledad State Prison	06053	63.0	0
Buildings 13	POINT (-116.448138802399998 34)	Los Angeles City Fire Station	06037	386.0	0
Buildings 14	POINT (-122.49663861699992 37)	Anglers Lodge	06075	37.0	0
Buildings 15	POINT (-122.41691584999994 37)	Anne Bremner Memorial Library	06075	25.0	0
Buildings 16	POINT (-122.41135999699992 37)	Bohemian Club	06075	34.0	0
Buildings 17	POINT (-122.43302691299994 37)	Bourn Mansion	06075	80.0	0
Buildings 18	POINT (-122.41747103699993 37)	Brooks Exhibit Hall	06075	19.0	0
Buildings 19	POINT (-122.41163774899993 37)	Cable Car Barn and Museum	06075	61.0	0
Buildings 20	POINT (-122.42841565399991 37)	California Historical Society	06075	88.0	0
Buildings 21	POINT (-122.42969317199993 37)	Casa Cielo	06075	98.0	0
Buildings 22	POINT (-122.42356255799993 37.7)	Century Club of California	06075	59.0	0
Buildings 23	POINT (-122.39163733999993 37)	China Basin Building	06075	1.0	0
Buildings 24	POINT (-122.40469325399994 37)	Chinese Cultural and Trade Center	06075	12.0	0
Buildings 25	POINT (-122.41719336599994 37)	Civic Center Auditorium	06075	18.0	0
Buildings 26	POINT (-122.40469325399994 37)	Columbus Tower	06075	8.0	0
Buildings 27	POINT (-122.40224897599993 37)	Davies Symphony Hall	06075	20.0	0
Buildings 28	POINT (-122.4030428489993 37)	DeYoung Building	06075	13.0	0
Buildings 29	POINT (-122.39830436199993 37)	Embarcadero Center	06075	3.0	0
Buildings 30	POINT (-122.414170346199993 37)	Far West Library for Educational Re.	06075	7.0	0
Buildings 31	POINT (-122.39552642399991 37)	Federal Reserve Bank of San Franc.	06075	3.0	0
Buildings 32	POINT (-122.40469325399994 37)	Fire Station Number Two	06075	18.0	0

Figure 3-44: Shp table and query interface

In the layer data table interface, you can build a combined query condition based on all fields through the query tool to realize simple and complex queries on layers, as shown in Figure 3-45.

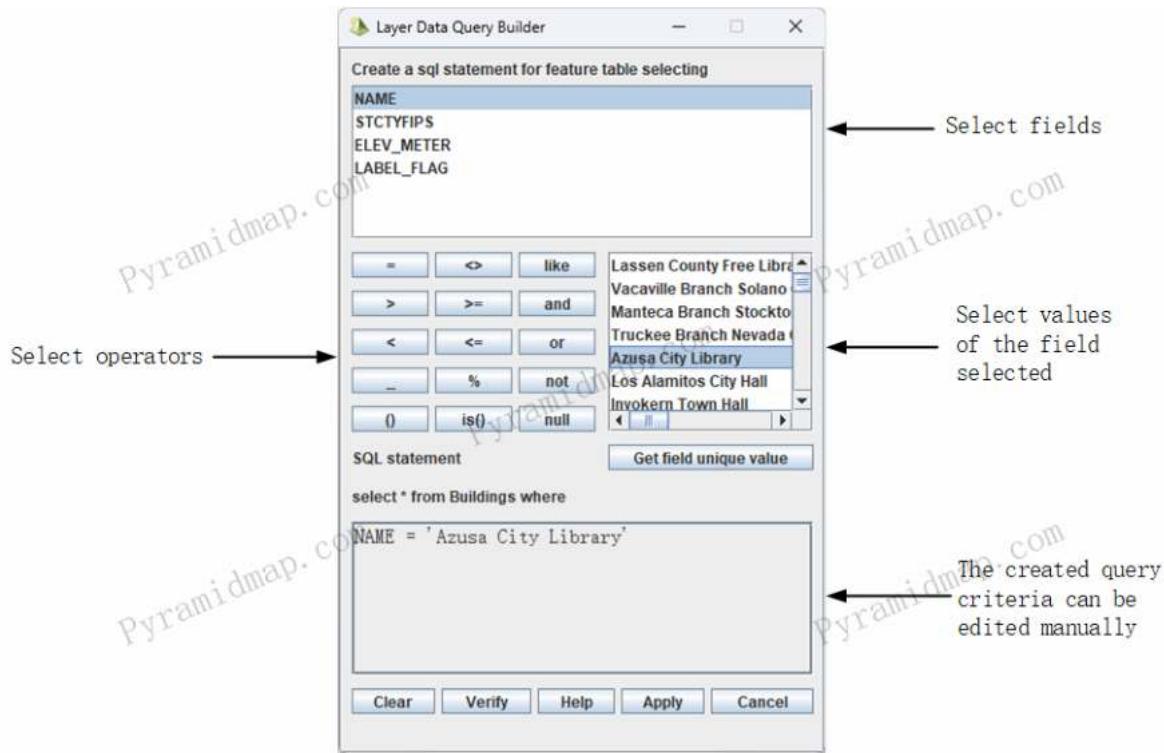


Figure 3-45: Layer table query constructor

In the query constructor, you can verify the validity of the built query statements, as shown in Figure 3-46.

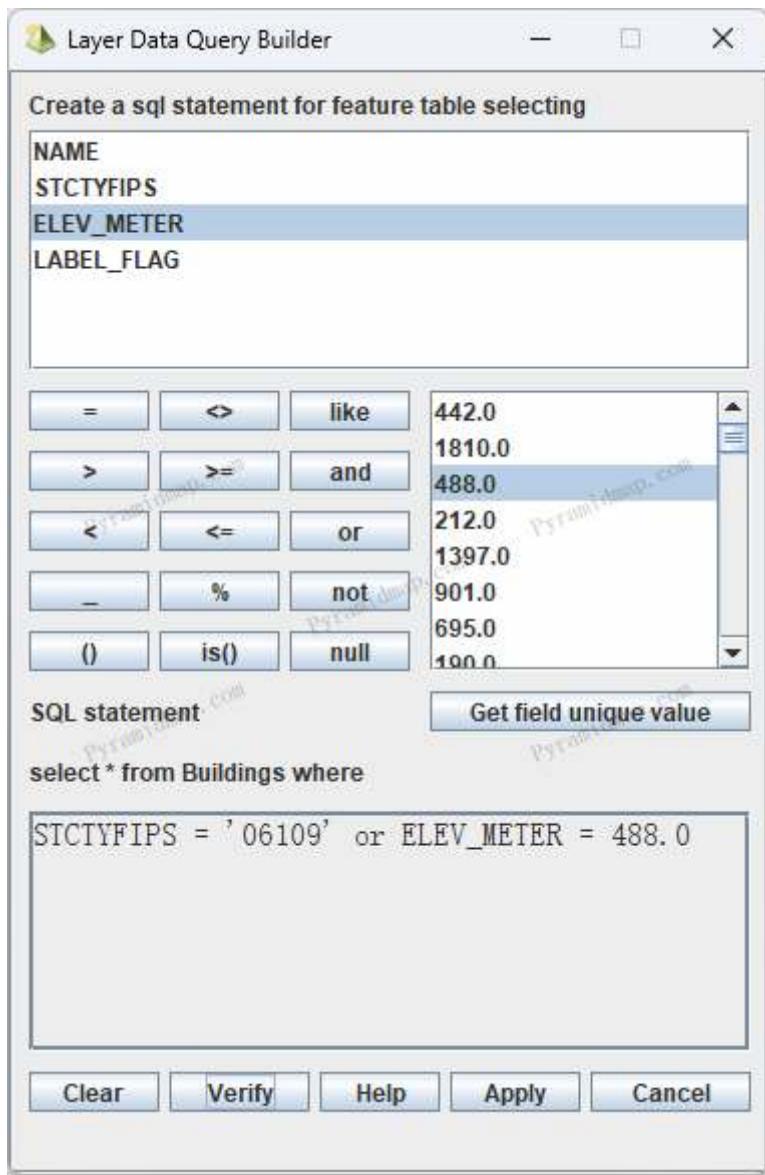


Figure 3-46: Query statement validation

The validation results are shown in Figure 3-47.



Figure 3-47: Query statement validation results

Click "Apply" to execute the query. Based on the above construction conditions, the data table query results are shown in Figure 3-48.

FeatureIdentifier	the_geom	NAME	STCTYFIPS	ELEV_METER	LABEL_FLAG
Buildings_1867	POINT (-120.38602709899993 37.9)	Morgan Mansion	06109	565.0	0
Buildings_1868	POINT (-120.3849159539999 37.98)	Sonora City Hall	06109	565.0	0
Buildings_1869	POINT (-120.38158251899989 37.9)	Sugg House	06109	547.0	0
Buildings_1870	POINT (-120.38408263399992 37.9)	Tuolumne County Courthouse	06109	557.0	0
Buildings_1871	POINT (-120.38408263399992 37.9)	Tuolumne County Law Library	06109	557.0	0
Buildings_1872	POINT (-120.38574927399992 37.9)	Tuolumne County Museum	06109	548.0	0
Buildings_1873	POINT (-120.23796654499989 37.9)	Memorial Hall	06109	790.0	0
Buildings_1874	POINT (-120.36768313199994 37.9)	Tuolumne County Free Library	06109	826.0	0
Buildings_1875	POINT (-120.39991375299994 37.8)	Moccasin Creek Power House	06109	263.0	0
Buildings_2272	POINT (-120.38824984799993 38.0)	Columbia College Library	06109	698.0	0
Buildings_2273	POINT (-120.40047274799991 38.0)	Columbia Fire House	06109	651.0	0
Buildings_2274	POINT (-120.40019492399995 38.0)	Claverle Building	06109	655.0	0
Buildings_2275	POINT (-120.40047274799991 38.0)	Franlin and Wolfe Building	06109	647.0	0
Buildings_2276	POINT (-120.40102824399992 38.0)	Hildebrand Building	06109	648.0	0
Buildings_2277	POINT (-120.40047274799913 38.0)	J Levy Building	06109	645.0	0
Buildings_2278	POINT (-120.40047274799991 38.0)	Knapp Building	06109	650.0	0
Buildings_2279	POINT (-120.40102824399992 38.0)	Leavitt and Walker Building	06109	649.0	0
Buildings_2280	POINT (-120.40047274799991 38.0)	Magendi Building	06109	652.0	0
Buildings_2281	POINT (-120.4015838929999 38.03)	Masonic Hall	06109	647.0	0
Buildings_2282	POINT (-120.4015838929999 38.03)	McChesney Building	06109	649.0	0
Buildings_2283	POINT (-120.40102824399992 38.0)	McChesney and Mills Building	06109	647.0	0
Buildings_2284	POINT (-120.4021387759999 38.0)	Mississippi House	06109	641.0	0
Buildings_2285	POINT (-120.3868610319999 38.03)	Miwok Cultural Center	06109	706.0	0
Buildings_2286	POINT (-120.40047274799991 38.0)	North Brainard Building	06109	647.0	0
Buildings_2287	POINT (-120.40047274799991 38.0)	Schwartz Building	06109	551.0	0
Buildings_2288	POINT (-120.40102824399992 38.0)	Soderer and Marshall Building	06109	648.0	0
Buildings_2289	POINT (-120.40047274799991 38.0)	South Brainard Building	06109	648.0	0
Buildings_2290	POINT (-120.40130606899993 38.0)	Tuolumne Engine Company Number	06109	649.0	0
Buildings_2291	POINT (-120.22713322699991 38.0)	Twain Harte Community Center	06109	1124.0	0
Buildings_3134	POINT (-116.9067246096899993 33.7)	Hemet Public Library	06065	488.0	0
Buildings_3321	POINT (-116.86724657999991 32.8)	Crest Branch San Diego County Libr	06073	488.0	0

Figure 3-48: The data table query results

The query results are displayed on the map synchronously, as shown in Figure 3-49.

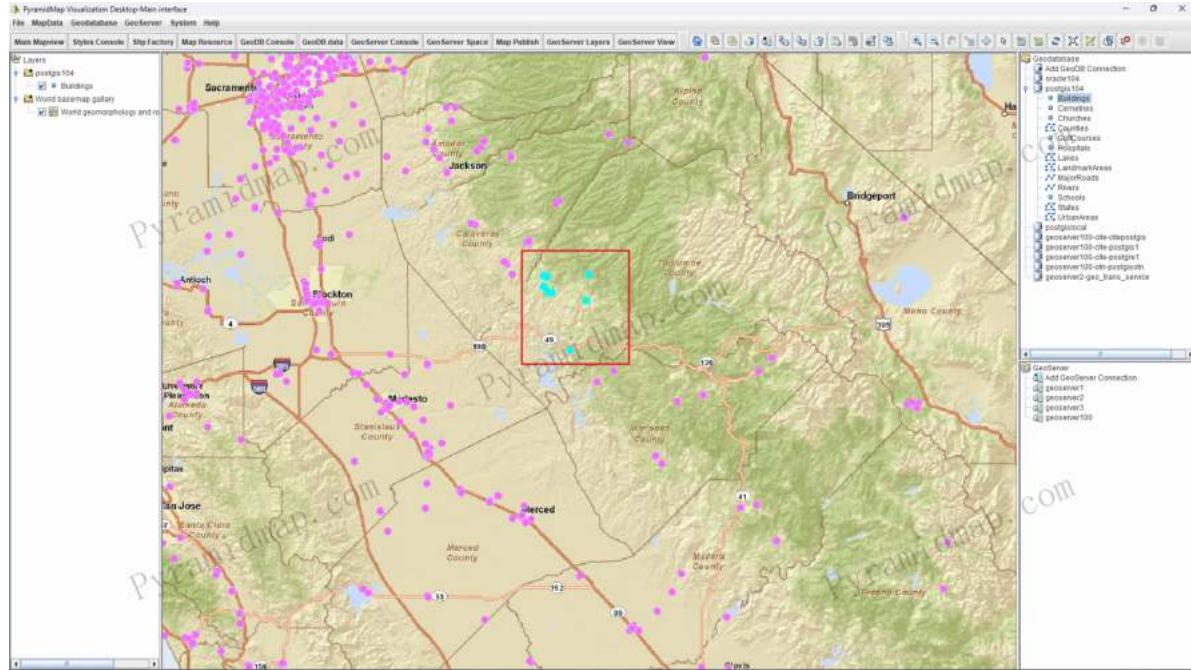


Figure 3-49: The query results are displayed on the map synchronously

In particular, the feature data table interacts with the map. Further, the editing, modification and deletion of feature attribute data can be completed in the data table, and the data can be submitted and saved according to the layer data source type. It supports the Shp vector file type, Geodatabase geographic database type, and GeoServer map server type.

4 Map editing

4.1 Create Shp

In PyramidMap, you can create your own Sh-style vector layer. Users can independently select the feature geometry type, map coordinate system, create layer fields and data types, and create vector layers that fully meet their needs. The design interface is shown in Figure 4-1.

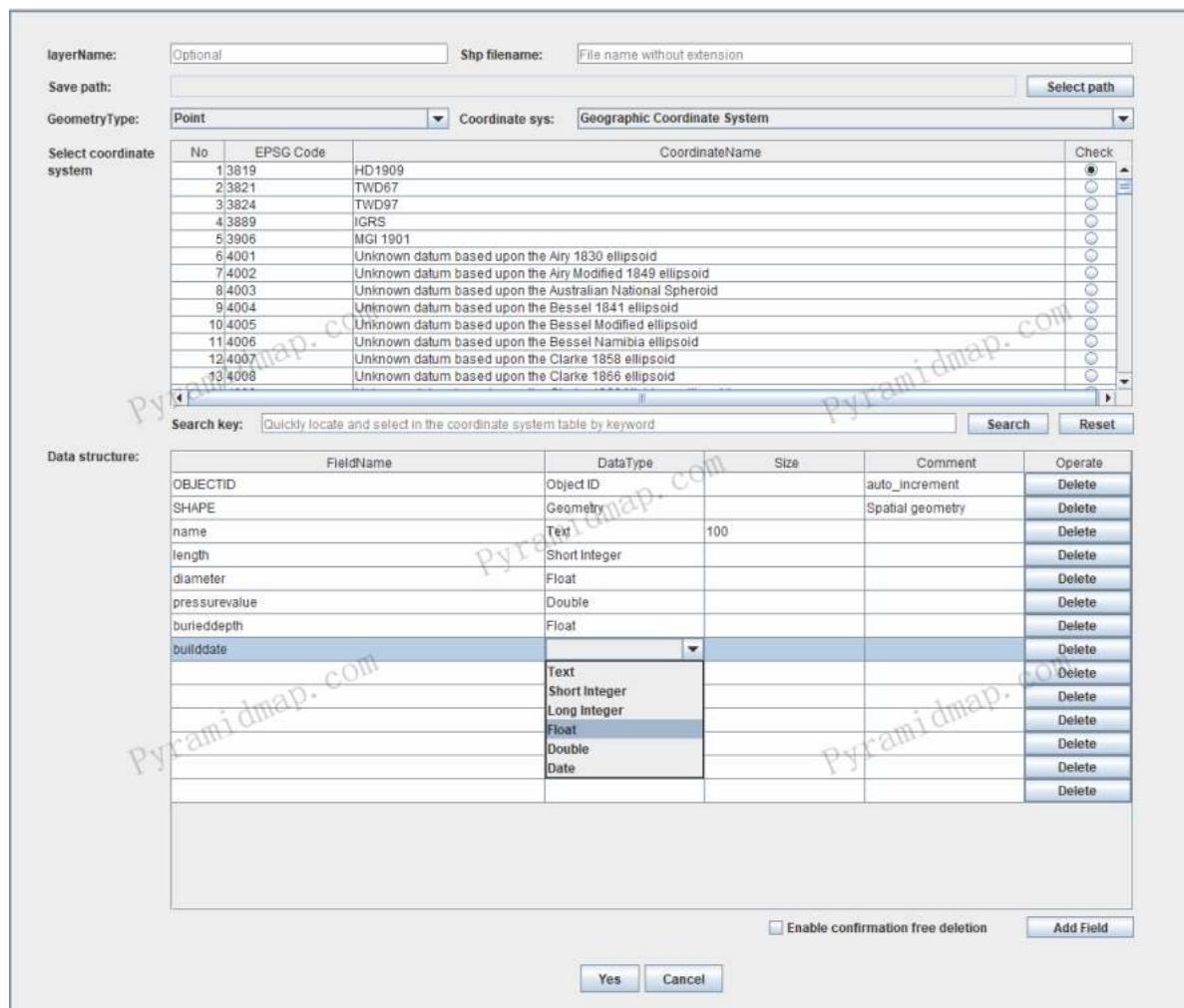


Figure 4-1: Shp layer data structure design

The Shp layer data structure includes three aspects: geometric type, coordinate system, and attribute data. The geometric type indicates the geometric shape of map features, including point (Point/MultiPoint), line (LineString/MultiLineString), and polygon (Polygon/MultiPolygon) types; The coordinate system is responsible for defining and describing the coordinate positions of map features, so as to display them in the correct positions and ranges. At the same time, digital maps not only have spatial data, but also can carry various types of attribute data, which is the unity of spatial and attribute data. PyramidMap covers most commonly used standard coordinate systems at present, including the GCS geographic coordinate system and the PCS projection coordinate system. GCS is responsible for the description of the spatial three-dimensional position, such as WGS84. PCS can understand the projection of the spatial position on the plane, and is responsible for the description of the plane position, such as WGS84 Web Mercator, which is the main coordinate system adopted by the current Web map. PyramidMap realizes the selection of coordinate system through classification list, and provides keyword mode to realize quick query and selection, as shown in Figure 4-2.

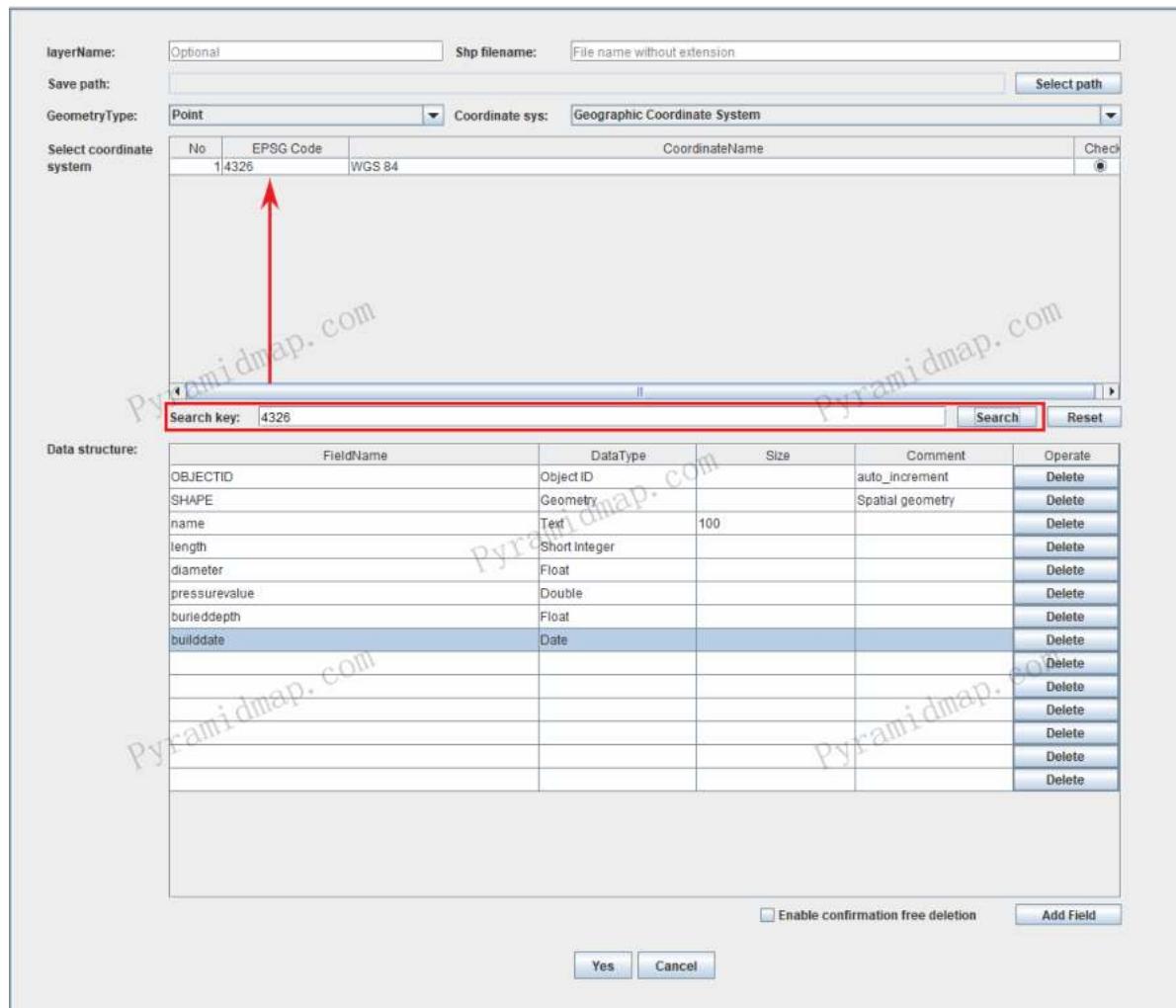


Figure 4-2: Fast selection of coordinate system through keywords

For a Shp type layer, it can have field information, including field naming, data type, and so on, like common database tables, to store all common types of data except spatial data, and realize the attribute information description of a map feature. Attribute data types include text, long integer, short integer, floating point type, double precision type and date time type. The creation process is shown in Figure 4-3.

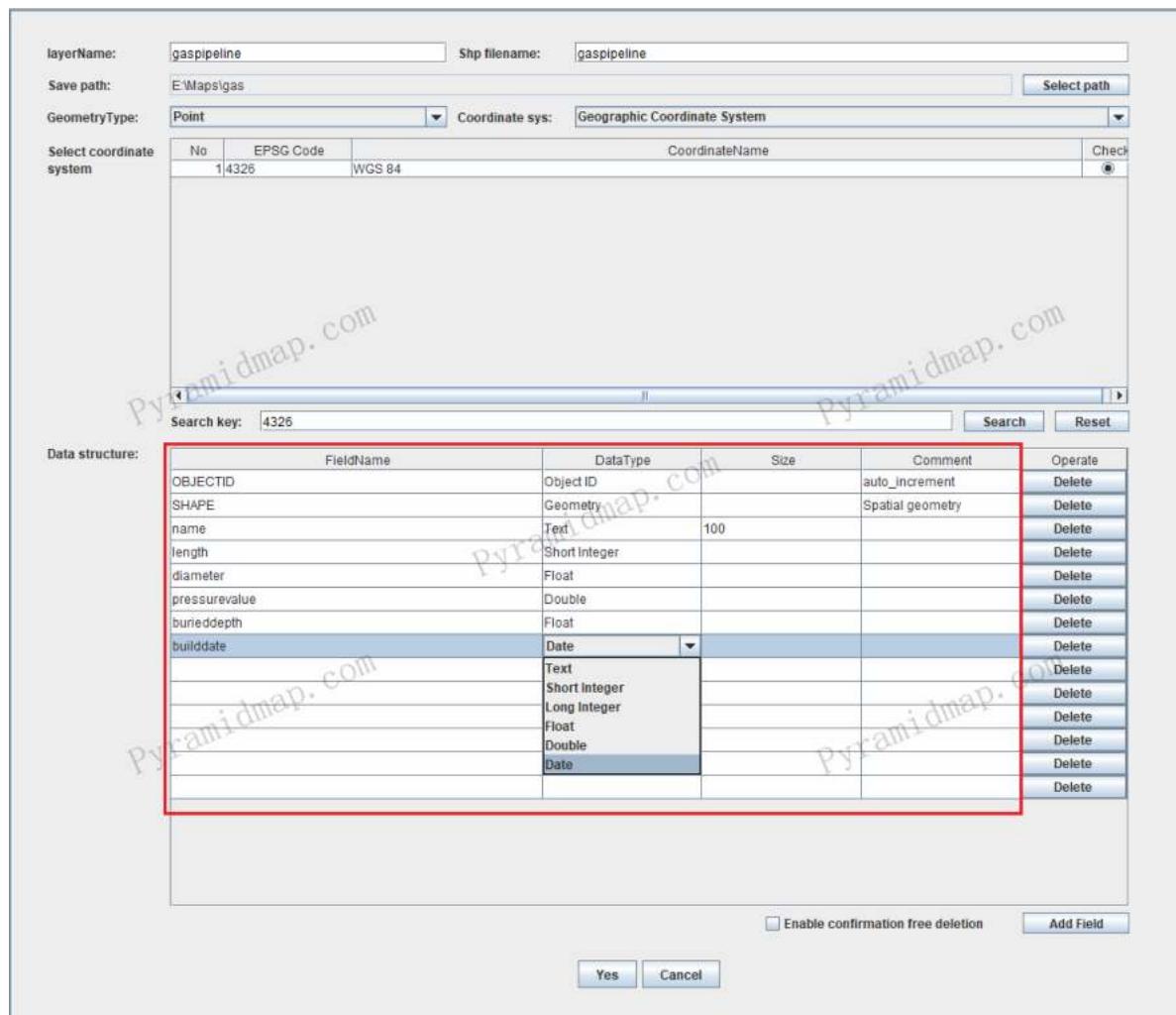


Figure 4-3: Design the field structure of Shp layer table

The created Shp layer is automatically added to the layer resource pool of PyramidMap for unified management, and can be selected from the resource pool list for all-purpose , as shown in Figure 4-4.

No	LayerFilename	LayerFilePath	DataSources	GeomGraphic	GeomType	UCS(SRID)	Counts	State	Check
4	Buildings.shp	E:\Maps\California\Buildings.shp	From local directory	Multi-Polygon	Polygon	GCS_WGS_1984_EPSG_4326	59	Normal	
5	Corfice.shp	E:\Maps\California\Corfice.shp	From local directory	Point	Point	GCS_WGS_1984_EPSG_4326	537	Normal	
6	Hospitals.shp	E:\Maps\California\Hospitals.shp	From local directory	Point	Point	GCS_WGS_1984_EPSG_4326	438	Normal	
7	Lakes.shp	E:\Maps\California\Lakes.shp	From local directory	Multi-Polygon	Polygon	GCS_WGS_1984_EPSG_4326	2	Normal	
8	LandmarkAreas.shp	E:\Maps\California\LandmarkAreas.shp	From local directory	Multi-Polygon	Polygon	GCS_WGS_1984_EPSG_4326	19467	Normal	
9	MajorRoads.shp	E:\Maps\California\MajorRoads.shp	From local directory	Multi-LineString	LineString	GCS_WGS_1984_EPSG_4326	72033	Normal	
10	Rivers.shp	E:\Maps\California\Rivers.shp	From local directory	Multi-LineString	LineString	GCS_WGS_1984_EPSG_4326	4	Normal	
11	Schools.shp	E:\Maps\California\Schools.shp	From local directory	Point	Point	GCS_WGS_1984_EPSG_4326	11361	Normal	
12	States.shp	E:\Maps\California\States.shp	From local directory	Multi-Polygon	Polygon	GCS_WGS_1984_EPSG_4326	1	Normal	
13	UrbanAreas.shp	E:\Maps\California\UrbanAreas.shp	From local directory	Multi-Polygon	Polygon	GCS_WGS_1984_EPSG_4326	191	Normal	
14	CAPITAL_POINT.shp	E:\Maps\layers\layers\POINT\POINT.shp	From db grade104	Point	Point	WGS_84_EPSG_4326	1	missing	
15	CITY.POINT.shp	E:\Maps\layers\layers\POINT.shp	From db grade104	Point	Point	WGS_84_EPSG_4326	308	missing	
16	CITY_REGION.shp	E:\Maps\layers\layers\CITY_REGION.shp	From db grade104	Multi-Polygon	Polygon	WGS_84_EPSG_4326	365	missing	
17	COUNTY.POINT.shp	E:\Maps\layers\layers\COUNTY.POINT.shp	From db grade104	Point	Point	WGS_84_EPSG_4326	2862	missing	
18	COUNTY_REGION.shp	E:\Maps\layers\layers\COUNTY_REGION.shp	From db grade104	Multi-Polygon	Polygon	WGS_84_EPSG_4326	2916	missing	
19	GAS_CONDENSATE_TANK.shp	E:\Maps\layers\layers\GAS_CONDENSATE_TANK.shp	From db grade104	Point	Point	WGS_84_EPSG_4326	8	missing	
20	GAS_PIPE.shp	E:\Maps\layers\layers\GAS_PIPE.shp	From db grade104	Multi-LineString	LineString	WGS_84_EPSG_4326	7946	missing	
21	GAS_PIPE_CAP.shp	E:\Maps\layers\layers\GAS_PIPE_CAP.shp	From db grade104	Point	Point	WGS_84_EPSG_4326	12290	missing	
22	GAS_PRESSURE_BOX.shp	E:\Maps\layers\layers\GAS_PRESSURE_BOX.shp	From db grade104	Point	Point	WGS_84_EPSG_4326	30	missing	
23	GAS_PRESSURE_CABINET.shp	E:\Maps\layers\layers\GAS_PRESSURE_CABINET.shp	From db grade104	Point	Point	WGS_84_EPSG_4326	122	missing	
24	GAS_PRESSURE_STATION.shp	E:\Maps\layers\layers\GAS_PRESSURE_STATION.shp	From db grade104	Point	Point	WGS_84_EPSG_4326	1	missing	
25	GAS_PROTECTIVEPILE.shp	E:\Maps\layers\layers\GAS_PROTECTIVEPILE.shp	From db grade104	Point	Point	WGS_84_EPSG_4326	54	missing	
26	GAS_SERVICING_WELL.shp	E:\Maps\layers\layers\GAS_SERVICING_WELL.shp	From db grade104	Point	Point	WGS_84_EPSG_4326	2	missing	
27	GAS_VALUE.shp	E:\Maps\layers\layers\GAS_VALUE.shp	From db grade104	Point	Point	WGS_84_EPSG_4326	1	missing	
28	GAS_VALUE_WELL.shp	E:\Maps\layers\layers\GAS_VALUE_WELL.shp	From db grade104	Point	Point	WGS_84_EPSG_4326	892	missing	
29	PROVINCE_POINT.shp	E:\Maps\layers\layers\PROVINCE_POINT.shp	From db grade104	Point	Point	WGS_84_EPSG_4326	33	missing	
30	PROVINCE_REGION.shp	E:\Maps\layers\layers\PROVINCE_REGION.shp	From db grade104	Multi-Polygon	Polygon	WGS_84_EPSG_4326	1089	missing	
31	gaspipeline.shp	E:\Maps\gas\gaspipeline.shp	Self-built Shp file	Point	Point	WGS_84_EPSG_4326	0	Normal	
32	capital_point.shp	E:\Maps\OTN\capital_point.shp	From local directory	Point	Point	WGS_84_EPSG_4326	1	Normal	
33	city_point.shp	E:\Maps\OTN\city_point.shp	From local directory	Point	Point	WGS_84_EPSG_4326	310	Normal	
34	city_region.shp	E:\Maps\OTN\city_region.shp	From local directory	Multi-Polygon	Polygon	WGS_84_EPSG_4326	373	Normal	
35	county_point.shp	E:\Maps\OTN\county_point.shp	From local directory	Point	Point	WGS_84_EPSG_4326	2982	Normal	
36	county_region.shp	E:\Maps\OTN\county_region.shp	From local directory	Multi-Polygon	Polygon	WGS_84_EPSG_4326	2918	Normal	
37	province_point.shp	E:\Maps\OTN\province_point.shp	From local directory	Point	Point	WGS_84_EPSG_4326	33	Normal	
38	province_region.shp	E:\Maps\OTN\province_region.shp	From local directory	Multi-Polygon	Polygon	WGS_84_EPSG_4326	1089	Normal	
39	gas_condensate_tank.shp	E:\Maps\gas\gas\shp\gas_condensate_tank.shp	From local directory	Point	Point	GCS_WGS_1984_EPSG_4326	8	Normal	
40	gas_pipe.shp	E:\Maps\gas\gas\shp\gas_pipe.shp	From local directory	Multi-LineString	LineString	GCS_WGS_1984_EPSG_4326	8062	Normal	
41	gas_pipe_cap.shp	E:\Maps\gas\gas\shp\gas_pipe_cap.shp	From local directory	Point	Point	GCS_WGS_1984_EPSG_4326	626	Normal	
42	gas_pressure_box.shp	E:\Maps\gas\gas\shp\gas_pressure_box.shp	From local directory	Point	Point	GCS_WGS_1984_EPSG_4326	36	Normal	
43	gas_pressure_cabinet.shp	E:\Maps\gas\gas\shp\gas_pressure_cabinet.shp	From local directory	Point	Point	GCS_WGS_1984_EPSG_4326	119	Normal	
44	gas_pressure_station.shp	E:\Maps\gas\gas\shp\gas_pressure_station.shp	From local directory	Point	Point	GCS_WGS_1984_EPSG_4326	1	Normal	
45	gas_protective_pile.shp	E:\Maps\gas\gas\shp\gas_protective_pile.shp	From local directory	Point	Point	GCS_WGS_1984_EPSG_4326	54	Normal	
46	gas_serving_well.shp	E:\Maps\gas\gas\shp\gas_serving_well.shp	From local directory	Point	Point	GCS_WGS_1984_EPSG_4326	2	Normal	
47	gas_value.shp	E:\Maps\gas\gas\shp\gas_value.shp	From local directory	Point	Point	GCS_WGS_1984_EPSG_4326	1	Normal	
48	gas_value_well.shp	E:\Maps\gas\gas\shp\gas_value_well.shp	From local directory	Point	Point	GCS_WGS_1984_EPSG_4326	901	Normal	

Figure 4-4: The created Shp layer is added to the map resource pool

Select a layer in the resource pool list to draw map elements and assign data values, as shown in Figure 4-5.

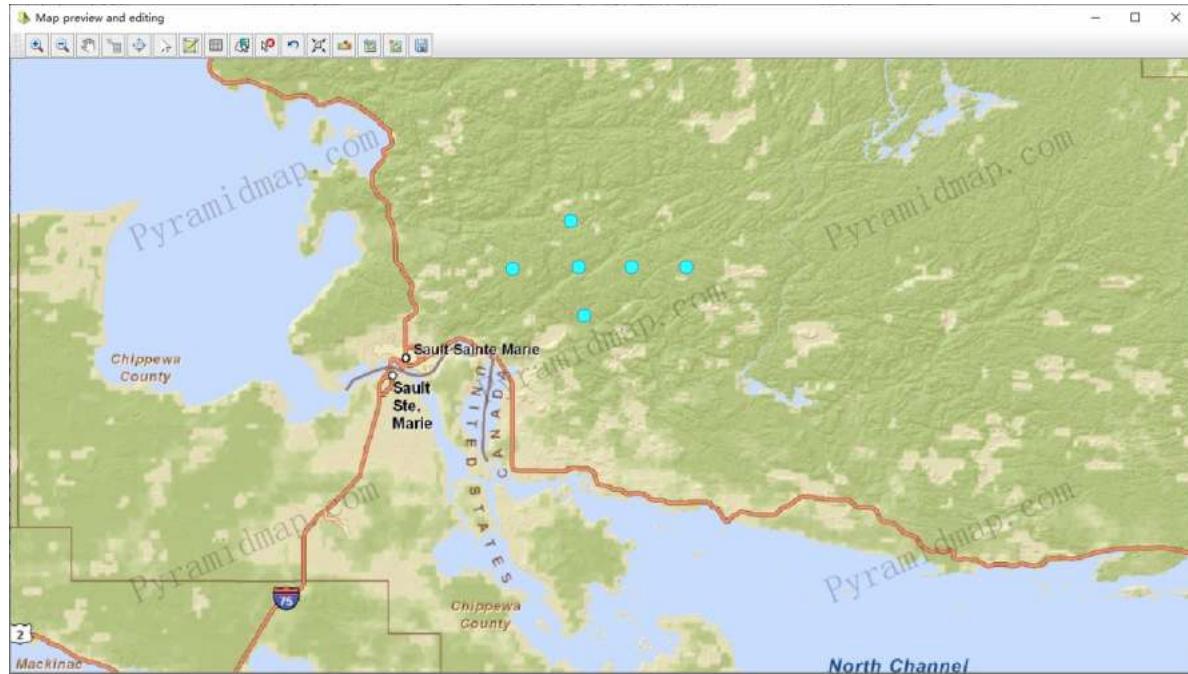


Figure 4-5: Map feature drawing and data assignment for the created Shp layer

This is the complete workflow of creating a map instance and adding it to the resource management pool, mapping, and adding map data.

4.2 Graphical Editing

Map data consists of geometric shapes representing space vectors and feature attributes data. Therefore, map editing includes two parts, they are graphical editing and attributes data editing.

4.2.1 Main view editor

PyramidMap supports the implementation of mouse dotting, line and polygon drawing, and submitting the saving according to the geometric type of the current layer in the main map view and each independent map view. Support Shp vector file, Geodatabase layer, wfs data in GeoServer and other data types. In the main view interface, activate the editing status of the selected layer through the layer node shortcut menu "Open Editing" option, as shown in Figure 4-6.

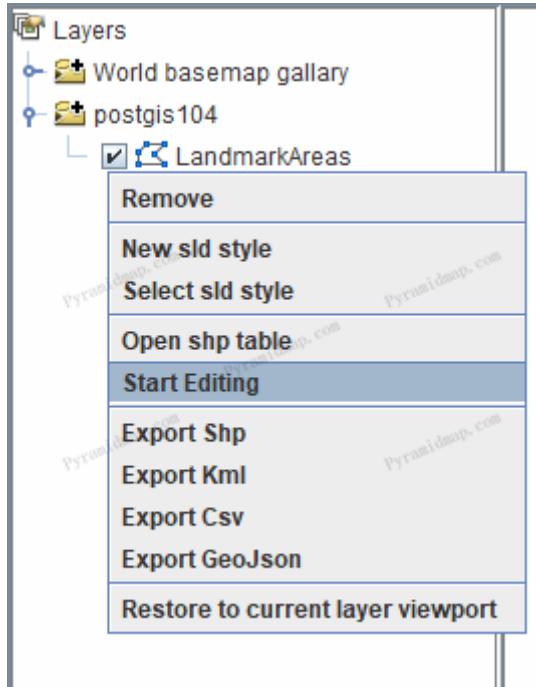


Figure 4-6: Layer on editing

Click the "Draw" button in the toolbar, as shown in Figure 4-7.

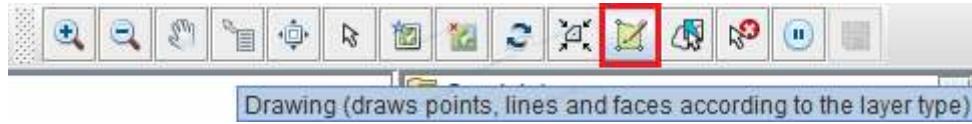


Figure 4-7: For vector layer editing, the "Draw" button in the toolbar

The selected layer enters the editing state, interacts with the mouse, and implements operations such as dotting, drawing lines, and drawing polygons according to the geometric type of the layer, as shown in Figure 4-8.

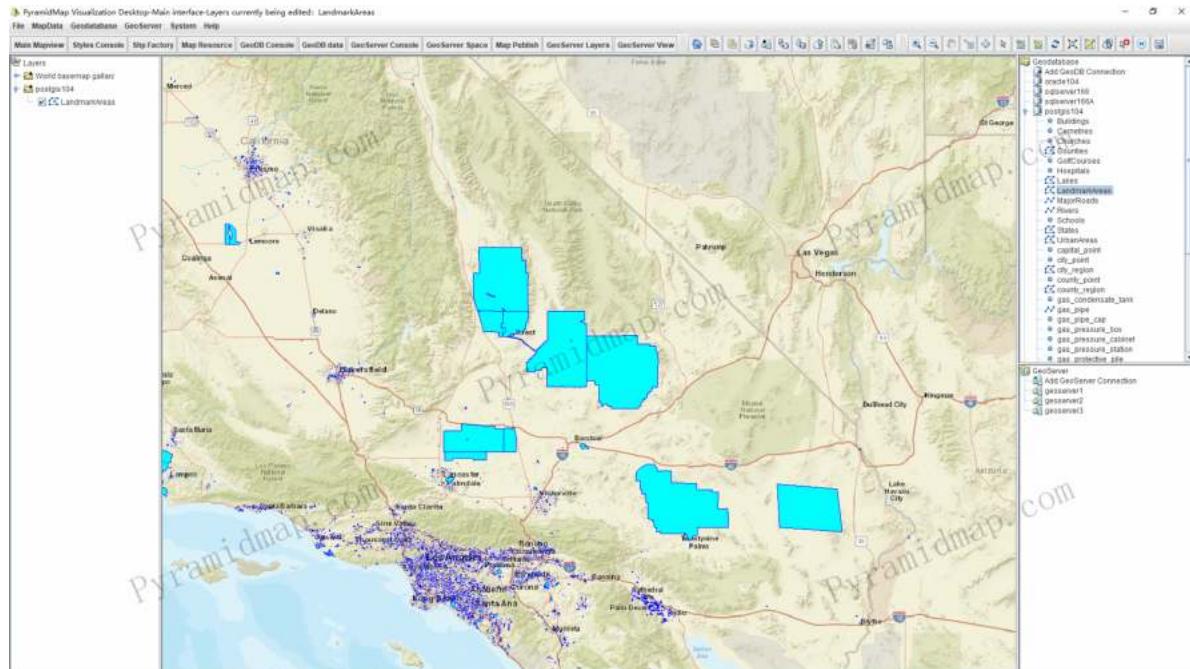


Figure 4-8: Drawing feature graphic on map

After drawing, click the "Save" button in the toolbar, as shown in Figure 4-9.

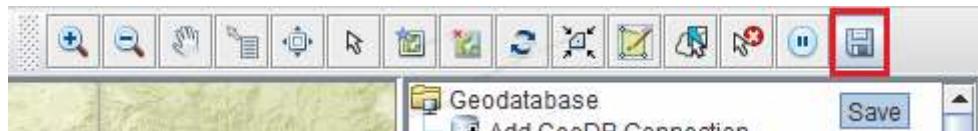


Figure 4-9: For the edited map data, the "Save" button in the toolbar

PyramidMap saves and submits the drawn feature data to the layer data source, and supports Shp vector file, Geodatabase vector layer, and GeoServer WFS layer. After successful saving, the system returns a prompt, as shown in Figure 4-10.

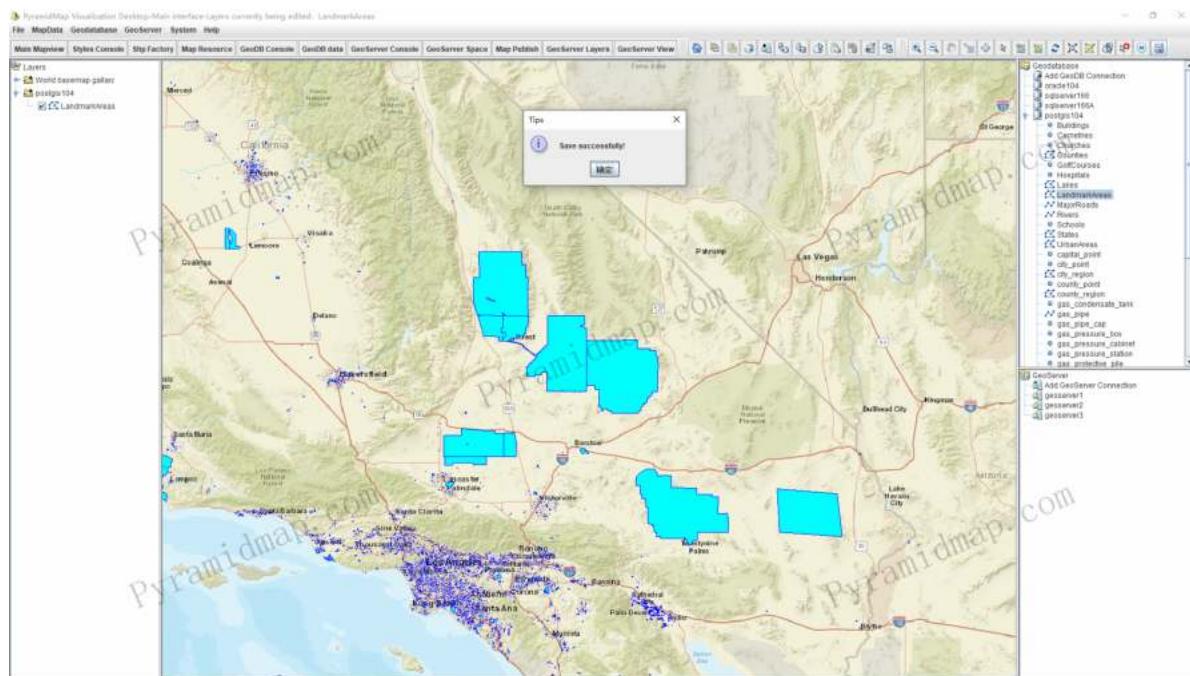


Figure 4-10: Drawing and saving map features

4.2.2 Independent view editor

In the Shp layer resource management and Geodatabase layer resource management modules, the independent display view of each layer can be opened through the "Preview and Edit" button to complete the editing operation function, as shown in Figure 4-11.

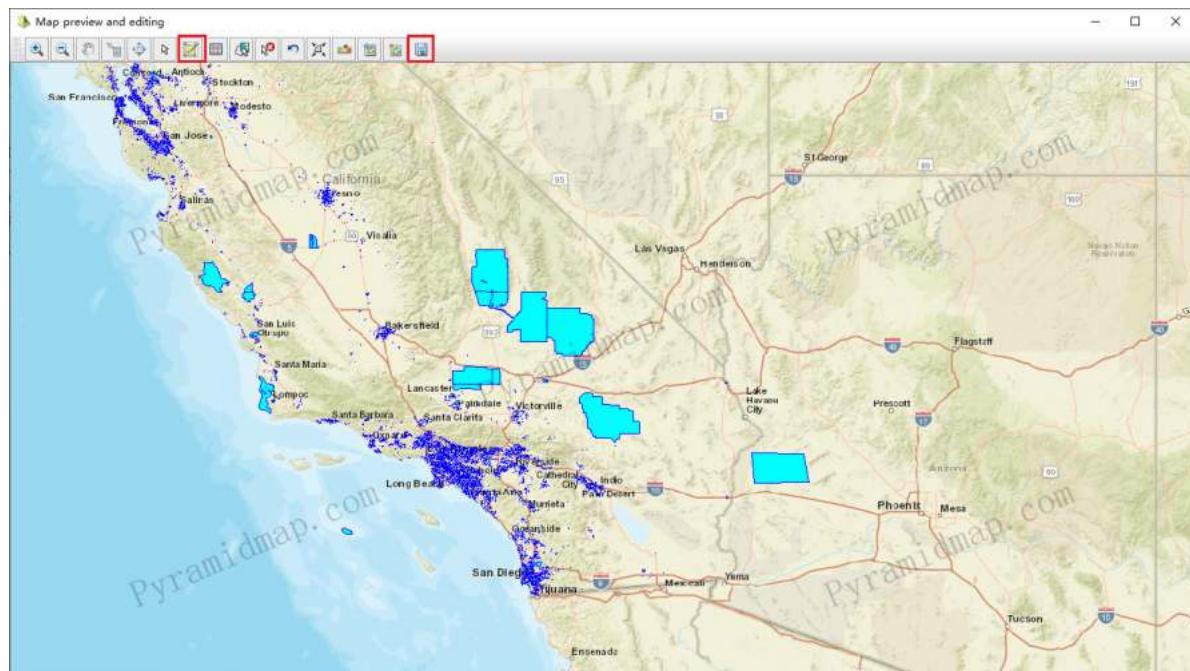


Figure 4-11: Layer independent display editing function page

Click the drawing button to realize the interactive drawing of the mouse on the map view. After that, click the "Save" button to update and save the data to the data source corresponding to the layer, Shp to the layer file, and the database layer to the feature table.

4.3 Attribute data editing

PyramidMap implements digital editing of the layer attribute table, which is respectively implemented in the main interface visualization layer node and the preview and editing in the Shp or Geodatabase geographical database layer list.

4.3.1 Editing in main map view

Visualize the "Open shp table" option in the right-click shortcut menu of the layer node on the main interface, as shown in Figure 4-12.

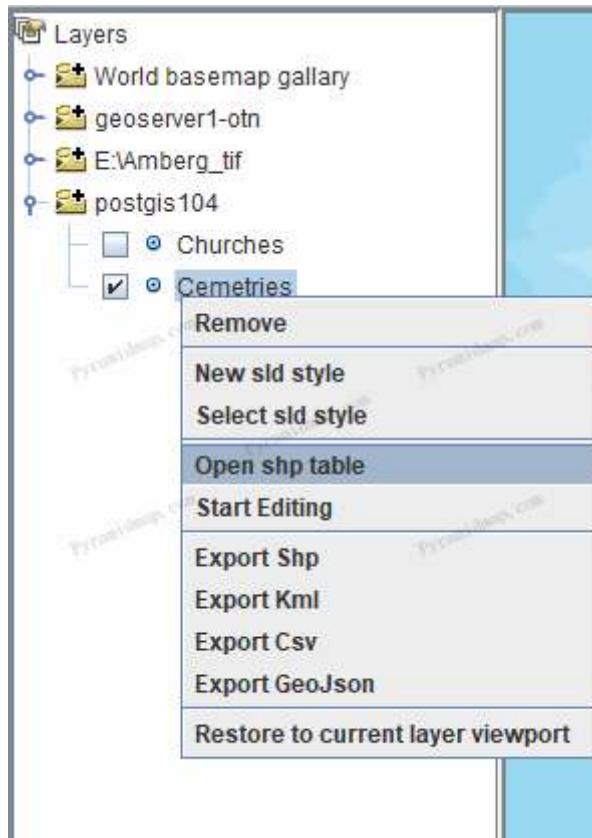


Figure 4-12: Visualize the "Open shp table" in the right-click shortcut menu of the layer node

The opened layer data table is shown in Figure 4-13.

Layer features table

Feature/Identifier	the_geom	NAME	STCTYFIPS	ELEV_METER	LABEL_FLAG
Schools.1	POINT (-114.29022872399992 34)	Wallace School	04012	127.0	0
Schools.2	POINT (-114.29578464799994 34)	Blake School	04012	128.0	1
Schools.3	POINT (-114.28856226299999 34)	Parker High School	04012	127.0	1
Schools.4	POINT (-114.39106511689993 34)	Colorado River Day School	04012	106.0	0
Schools.5	POINT (-114.60079793499995 34)	Mohave Elementary School	04015	148.0	0
Schools.6	POINT (-114.43412116299993 33)	Poston School	04012	96.0	0
Schools.7	POINT (-120.3860276389999 38)	Columbia College	06109	699.0	0
Schools.8	POINT (-121.7488521999999 39)	Steinendorf School	06101	22.0	0
Schools.9	POINT (-120.62029078999995 39)	Blossom School (historical)	06045	316.0	0
Schools.10	POINT (-123.68418331599992 39)	Bridgeport School (historical)	06045	90.0	0
Schools.11	POINT (-121.50564383299991 39)	Hansen School (historical)	06045	340.0	0
Schools.12	POINT (-123.27306526299994 39)	Hearst School (historical)	06045	530.0	0
Schools.13	POINT (-121.03638923099993 38)	McDonald School (historical)	06045	268.0	0
Schools.14	POINT (-123.71417899799991 39)	McKay School (historical)	06045	173.0	0
Schools.15	POINT (-123.7427918489999 39)	Navajo Ridge School House (histo	06045	150.0	0
Schools.16	POINT (-123.27889600799995 39)	Pine Ridge School (historical)	06045	819.0	0
Schools.17	POINT (-123.51973285499992 39)	Signal School (historical)	06045	403.0	0
Schools.18	POINT (-119.509007865299991 35)	Semitropic School (historical)	06029	78.0	0
Schools.19	POINT (-121.62356192199991 37)	Byron Hot Springs School (historical)	06013	13.0	0
Schools.20	POINT (-121.64161851699993 37)	Excelsior School (historical)	06013	9.0	0
Schools.21	POINT (-121.67773107599992 37)	Iron House School (historical)	06013	4.0	0
Schools.22	POINT (-121.7505042299993 37)	Lone Tree School (historical)	06013	41.0	0
Schools.23	POINT (-123.18472672399992 39)	McTeal School (historical)	06045	218.0	0
Schools.24	POINT (-117.4342721499994 33)	Sherman Indian Institute	06065	245.0	1
Schools.25	POINT (-116.20173680199991 33)	Star King School	06037	19.0	1
Schools.26	POINT (-119.26733337099989 34)	Ventura Junior College	06111	37.0	1
Schools.27	POINT (-122.40830432899992 37)	Academy of Art College	06075	35.0	0
Schools.28	POINT (-122.41308993699993 37)	Cathedral School for Boys	06075	99.0	1
Schools.29	POINT (-122.40608211699993 37)	Cogswell College	06075	29.0	0
Schools.30	POINT (-122.4199702299991 37)	Collegio De La Mission	06075	24.0	0
Schools.31	POINT (-122.4088600789991 37)	Commodore Stockton School	06075	44.0	1
Schools.32	POINT (-122.43302692899994 37)	Dental School of the University of th	06075	66.0	0

Open filter constructor Restore

Save Delete Cancel

Figure 4-13: Edit attribute data in the shp data table

Double click the table Cell (except for the Id and Geometry fields) to switch to the editing and input status, and the selected features are highlighted on the map at the same time, as shown in Figure 4-14.

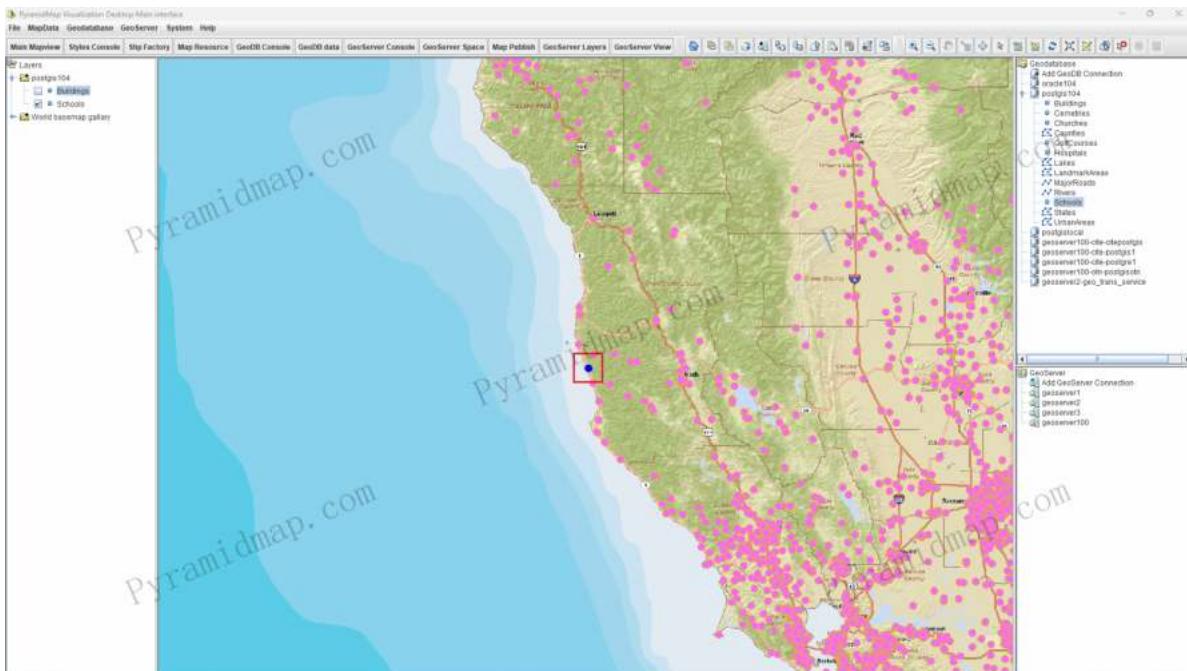


Figure 4-14: The selected features in the data table are highlighted on the map

Batch modification, submission and saving are supported.

4.3.2 Editing in individual map view

Layers in the Shp resource pool and database resource pool can be previewed and edited in an independent display interface, as shown in Figure 4-15.

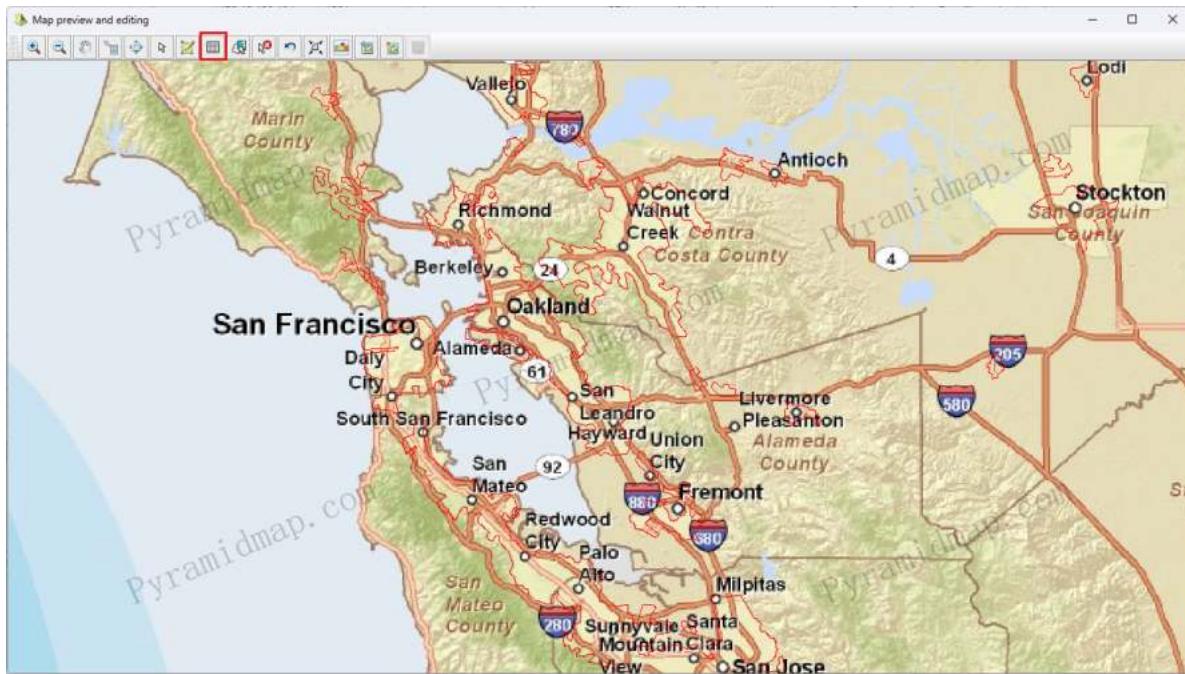


Figure 4-15: Open the data table in the independent view of each layer

Click "Open shp table" to open the layer feature data table, as shown in Figure 4-16.

Layer features table

FeatureIdentifier	the_geom	NAME	STATE	FIPS	POPULATION	Shape_Leng	Shape_Area
UrbanAreas_1	MULTIPOLYGON ((-124.0...	Arcata	CA	06	16432	0.0856182444102	5.093162931376E-4
UrbanAreas_2	MULTIPOLYGON ((-124.0...	Crescent City	CA	06	5207	0.11336017569	7.02886583916E-4
UrbanAreas_3	MULTIPOLYGON ((-124.1...	Eureka	CA	06	27025	0.237178691593	0.00186189011481
UrbanAreas_4	MULTIPOLYGON ((-123.8...	Fort Bragg	CA	06	6078	0.066892726559	2.4830579547E-4
UrbanAreas_5	MULTIPOLYGON ((-124.1...	Fortuna	CA	06	10119	0.0921948015015	3.41729353922E-4
UrbanAreas_6	MULTIPOLYGON ((-124.1...	McKinleyville	CA	06	11111	0.0941052819447	4.73180787832E-4
UrbanAreas_7	MULTIPOLYGON ((-124.0...	Rio Dell	CA	06	3012	0.0718199331669	2.6812960847E-4
UrbanAreas_8	MULTIPOLYGON ((-124.1...	Samoa	CA	06	0	0.0457700041088	1.30868868023E-4
UrbanAreas_9	MULTIPOLYGON ((-123.0...	Camden	CA	06	15976	0.0879829958946	3.23808914053E-4
UrbanAreas_10	MULTIPOLYGON ((-121.9...	Carmel-by-the-Sea	CA	06	4239	0.09653932377869	4.1441850328E-4
UrbanAreas_11	MULTIPOLYGON ((-122.2...	Alameda	CA	06	76459	0.270808674192	0.020588684133
UrbanAreas_12	MULTIPOLYGON ((-121.9...	Concord	CA	06	349025	1.77684091175	0.0222974338136
UrbanAreas_13	MULTIPOLYGON ((-121.9...	Dublin	CA	06	23229	0.106006083791	4.61695388742E-4
UrbanAreas_14	MULTIPOLYGON ((-121.8...	Komandorski Village	CA	06	50553	0.112939740389	5.07237042344E-4
UrbanAreas_15	MULTIPOLYGON ((-122.0...	Oakland	CA	06	920303	1.91205791714	0.0307256708871
UrbanAreas_16	MULTIPOLYGON ((-122.4...	San Francisco	CA	06	821112	0.728209282744	0.0110278961393
UrbanAreas_17	MULTIPOLYGON ((-122.4...	Sausalito	CA	06	16831	0.131695300207	3.82024802665E-4
UrbanAreas_18	MULTIPOLYGON ((-121.9...	Fremont	CA	06	211200	0.595098636365	0.00409017252937
UrbanAreas_19	MULTIPOLYGON ((-122.5...	Mill Valley	CA	06	13038	0.138503050577	5.13458202338E-4
UrbanAreas_20	MULTIPOLYGON ((-121.9...	Monterey	CA	06	48071	0.206289678759	0.00127477679267
UrbanAreas_24	MULTIPOLYGON ((-122.0...	Union City	CA	06	53782	0.128686949979	6.88310104428E-4
UrbanAreas_25	MULTIPOLYGON ((-123.0...	Cloverdale	CA	06	16605	0.034682758852	7.27381994441E-5
UrbanAreas_26	MULTIPOLYGON ((-122.6...	Colusa	CA	06	9143	0.0823201962168	3.71281458973E-4
UrbanAreas_27	MULTIPOLYGON ((-122.6...	Cotati	CA	06	5714	0.160818989659	9.1083859123E-4
UrbanAreas_28	MULTIPOLYGON ((-122.8...	Healdsburg	CA	06	15095	0.0839332264899	4.21364358202E-4
UrbanAreas_29	MULTIPOLYGON ((-122.5...	Novato	CA	06	47585	0.224157081923	7.83675058605E-4
UrbanAreas_30	MULTIPOLYGON ((-122.6...	Petaluma	CA	06	45797	0.297221561892	0.00194528733243
UrbanAreas_31	MULTIPOLYGON ((-122.5...	San Rafael	CA	06	94573	0.72638293813	0.00326767289261
UrbanAreas_21	MULTIPOLYGON ((-121.7...	San Jose Metro Area	CA	06	1846132	3.09002064608	0.0684612110638
UrbanAreas_22	MULTIPOLYGON ((-121.9...	Santa Cruz	CA	06	67289	0.266640532798	0.00232680809656
UrbanAreas_23	MULTIPOLYGON ((-121.8...	Seaside	CA	06	38901	0.140815487534	7.4104929063E-4
UrbanAreas_32	MULTIPOLYGON ((-122.6...	Santa Rosa	CA	06	135987	0.273807766776	0.00255214588816

Open filter constructor Restore

Save Delete Cancel

Figure 4-16: Edit attribute data in the shp independent view

Double click the table Cell (except for the Id and Geometry fields) to switch to the editing input status, and the selected features will be highlighted on the map view at the same time, as shown in Figure 4-17.

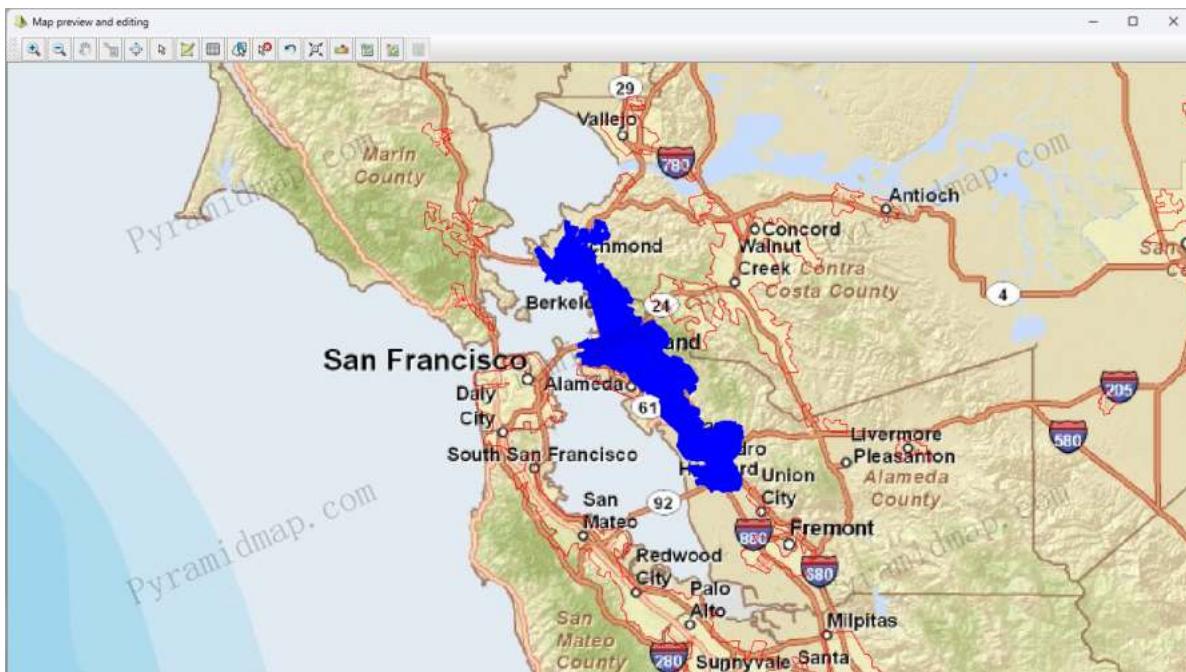


Figure 4-17: Layer feature highlight by being selected in independent view

Batch modification, submission and saving are supported.

5 Geodatabase and GeoServer

5.1 Geodatabase connection pool

PyramidMap supports direct connection access with geographic databases to realize the import, export, storage and conversion of map data, and supports (but is not limited to) Oracle, PostGIS (PostgreSQL+GIS function extension), MySQL, SQLServer and other databases. After PyramidMap creates a database connection, it is managed in the database connection pool mode to import, export, preview, edit and other operations of the map. PyramidMap provides two ways to create a geographic database connection: 1. create a database connection through the map database node on the main map display interface; 2. create a database connection on the database configuration page through "System" - "Geodatabase console" entrance.

5.1.1 Geodatabase data source node

In the geographic database node of the main interface, double-click New Database Connection, as shown in Figure 5-1.

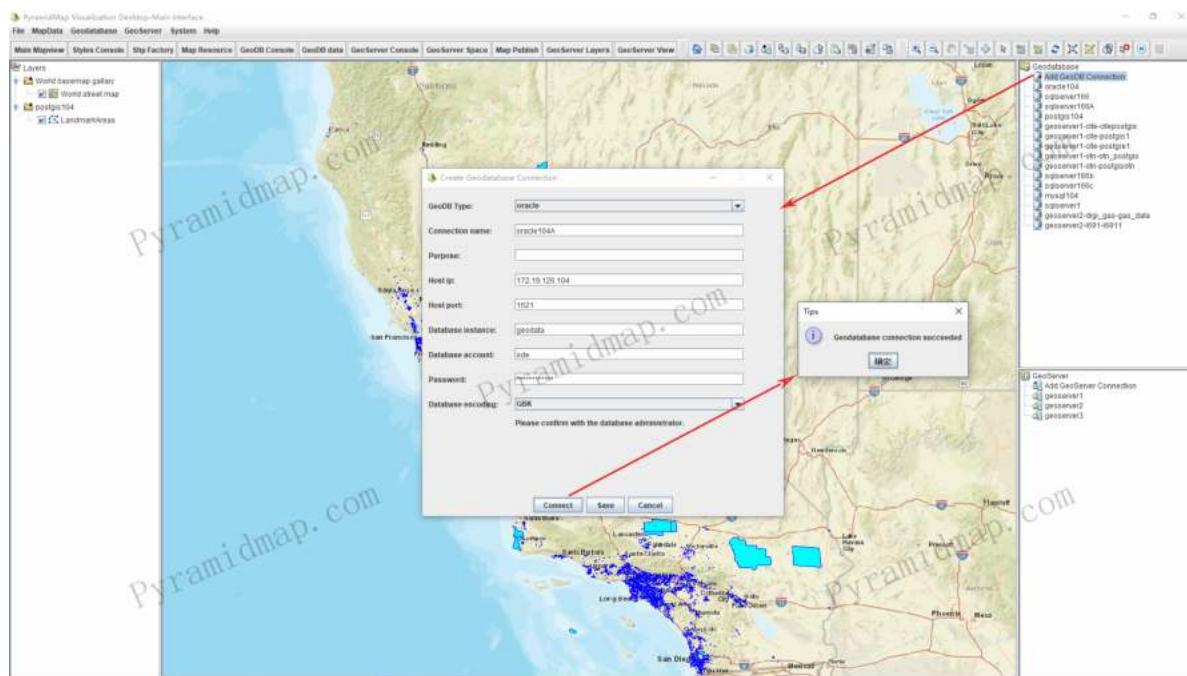


Figure 5-1: Main interface create new Geodatabase connection

Open the geographic database connection configuration interface, select the geographic database type, and enter the correct connection parameters. After the connection test is successful, it can be saved and created as an effective geographic database connection, included in the PyramidMap geographic database resource connection pool, and dynamically added to the geodatabase node and the inside layers node, as shown in Figure 5-2.

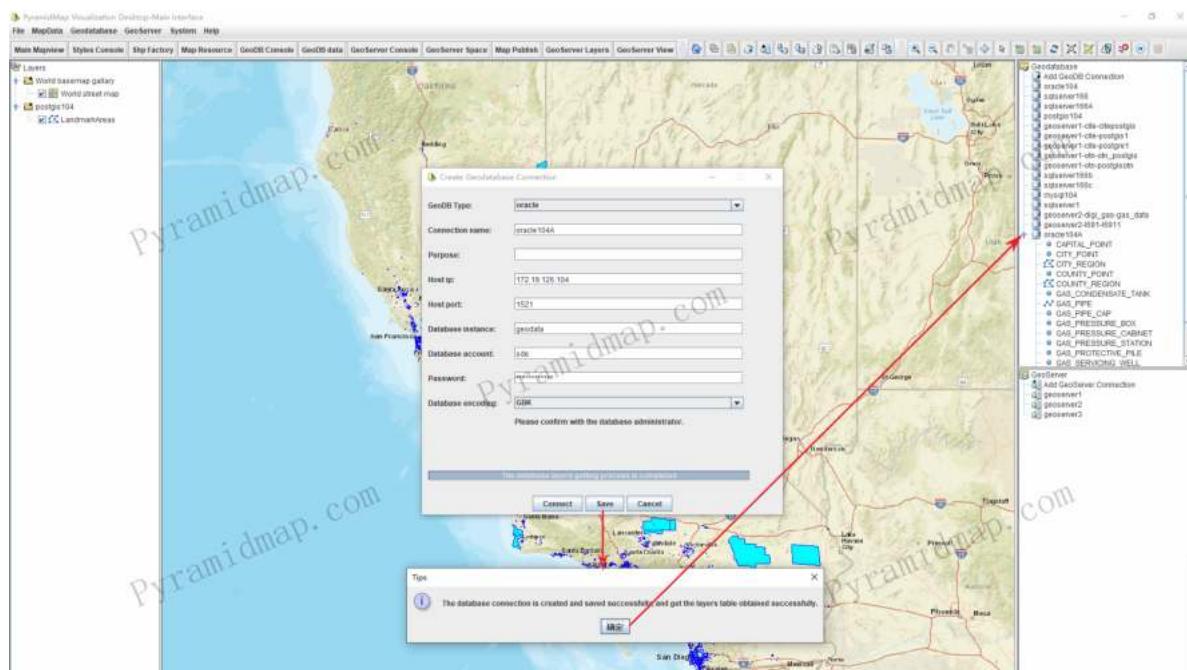


Figure 5-2: Geodatabase connection created successfully

Description of interface input parameters:

- GeoDB type: Select a database type (Oracle, PostGIS, MySQL)
- Connection name: Customize the Geodatabase connection name.
- Purpose: Customize the Geodatabase connection purpose describe.
- Host IP: IP address of the server where the Geodatabase is hosted.
- Port: The port number used by the database. (Default port number: Oracle 1521, Postgre 5432, MySQL 3306)
- Database instance: the name of the database's service instance to connect to.

- Schema: The schema to be connected is mainly for PostGIS, and others can be ignored. In Oracle, this parameter is consistent with the user name.
- The connection button: test whether the newly created database connection is valid.
- The save button: save the new database connection.
- The cancel button: Exit the interface without performing any operation.

5.1.2 Geodatabase connection pool

Open the Geodatabase connection pool interface through "System" - "Geodatabase console", or directly click the "GeoDB console" button in the toolbar, as shown in Figure 5-3.



Figure 5-3: Create a Geodatabase connection through the system settings portal

The geodatabase connection configuration page is shown in Figure 5-4.

The screenshot shows a detailed configuration page for database connections. At the top, there is a table listing various database connections with columns for No., DBConnection, Description, DBType, HostIP, Port, Schema, Instance, Encoding, Status, Test, Editor, and Check. Several connections are listed, including oracle104, sqlserver168, sqlserver168A, and multiple entries for postgres. A red arrow points from a success message dialog box to the configuration form below. The configuration form includes fields for GeoDB Type (set to postgres), Host IP (127.0.0.1), Database account (postgres), Connection name (postgis-local), Host port (5432), Password (redacted), Purpose (The local digitized map data), Database instance (geo_data), Encoding (GBK), and Schema (public). Buttons for Connect, Save, and Cancel are at the bottom of the form.

Figure 5-4: Geodatabase Connection Configuration and pool

The connections in the pool can be retested, edited and deleted, as shown in Figure 5-5.

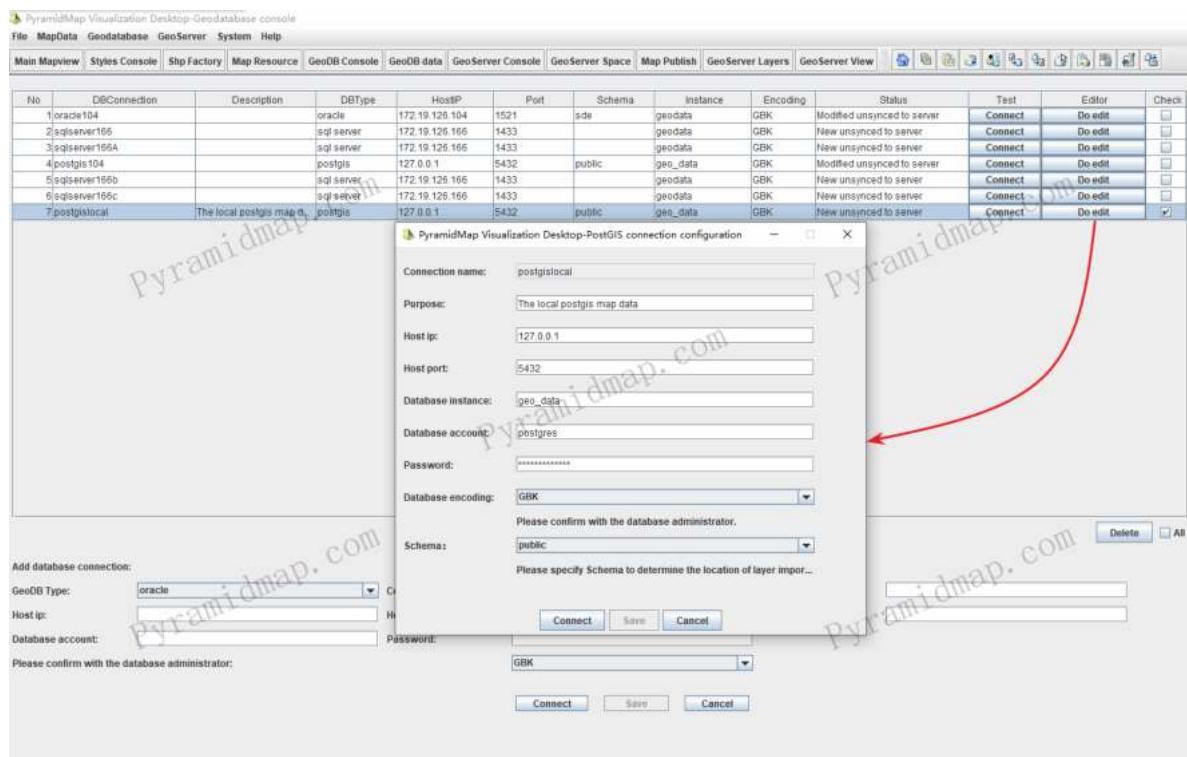


Figure 5-5: The connections in the pool can be retested, edited and deleted

Use the connection pool list to test, edit, modify, and delete the Geodatabase connection. Each connection has two button options : Connect and Do Edit.

.Connect: test whether the database connection is successful.

.Do edit: Re edit the Geodatabase connection to make it available.

5.2 GeoServer connection pool

PyramidMap supports direct connection access with GeoServer, realizes multi type layer publishing function, and provides layer service interface for WebGIS. After the connection parameters are configured and tested successfully, create and maintain the GeoServer resource connection pool. PyramidMap provides two ways to create a GeoServer connection: 1. Through the GeoServer tree node on the main interface; 2. Implement it on the GeoServer connection configuration module through "System" - "GeoServer console".

5.2.1 GeoServer data node

In the GeoServer connection node of the main interface, double-click Add GeoServer Connection, as shown in Figure 5-6.

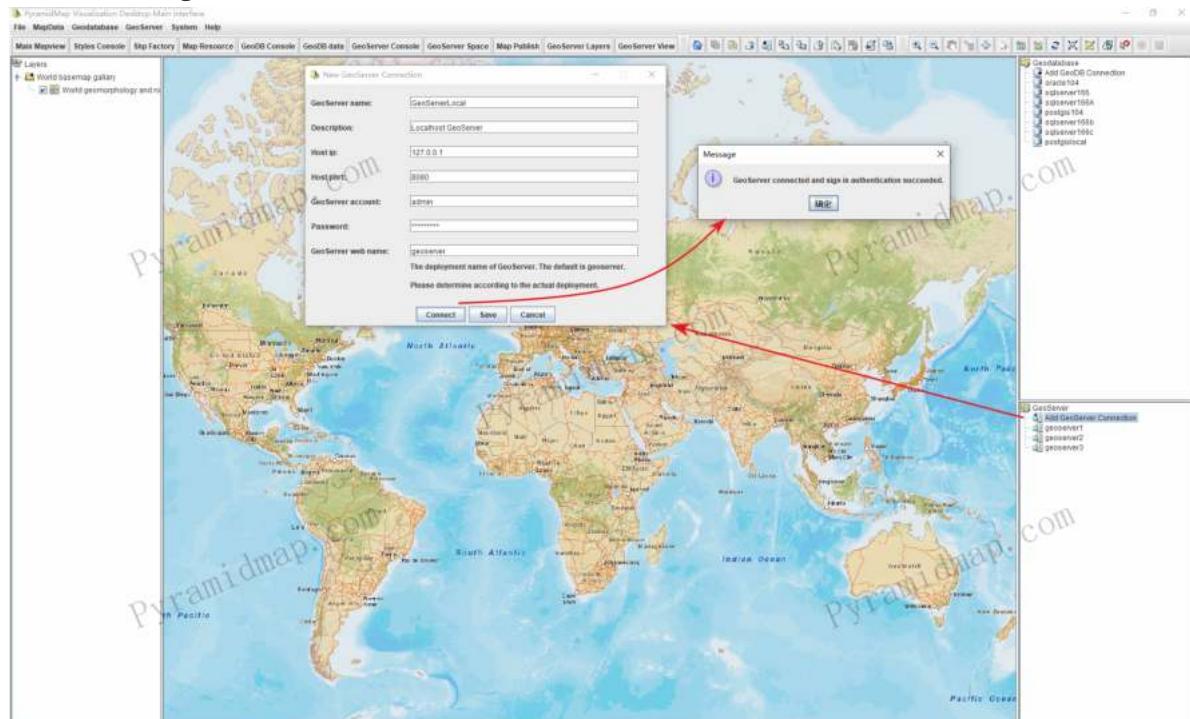


Figure 5-6: Create GeoServer connection through double-clicking on the GeoServer node in the main interface

Open the GeoServer connection configuration interface, enter the correct connection parameters, after the connection testing successful, you can save and create a valid GeoServer connection and hosting the connection in resource pool, and dynamically add it to the GeoServer connection node. Description of interface input parameters:

- GeoServer name: Customize the GeoServer server connection naming.
- Description: Customize the GeoServer connection purpose describe.
- Host IP: IP address of the server where the GeoServer is hosted.
- Port: GeoServer port number. (The port number of the web server hosting GeoServer, such as Tomcat)
- GeoServer account: GeoServer administrator account, default admin, please contact the web administrator for confirmation.
- Password: GeoServer administrator password, please contact the web administrator for confirmation.
- GeoServer web name: The deployment name of GeoServer in the web service. The default is geoserver. Please contact the web administrator for confirmation.

5.2.2 GeoServer connection pool

Open the GeoServer connection pool management interface through "System" - "GeoServer console", or directly click the "GeoServer console" button in the toolbar, as shown in Figure 5-7.



Figure 5-7: Create GeoServer connection menu

In the GeoServer connection pool management interface, create a new GeoServer connection and incorporate it into the unified resource management pool. The workflow is shown in Figure 5-8.

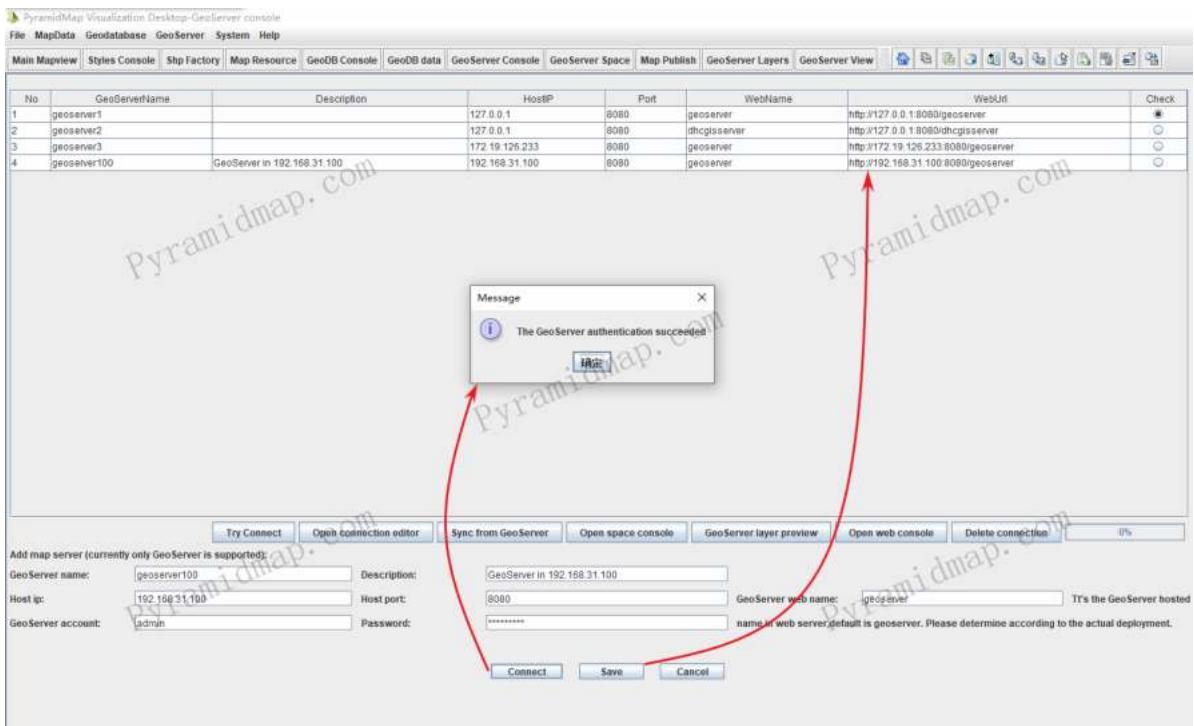


Figure 5-8: Create GeoServer connection and connections pool

The GeoServer connection created successfully is added to the resource connection pool.

5.2.3 Manage GeoServer connections

PyramidMap maintain the GeoServer connections in resource pool, manage the server internal workspace, data storage and layers in the function

modules, as shown in Figure 5-9.

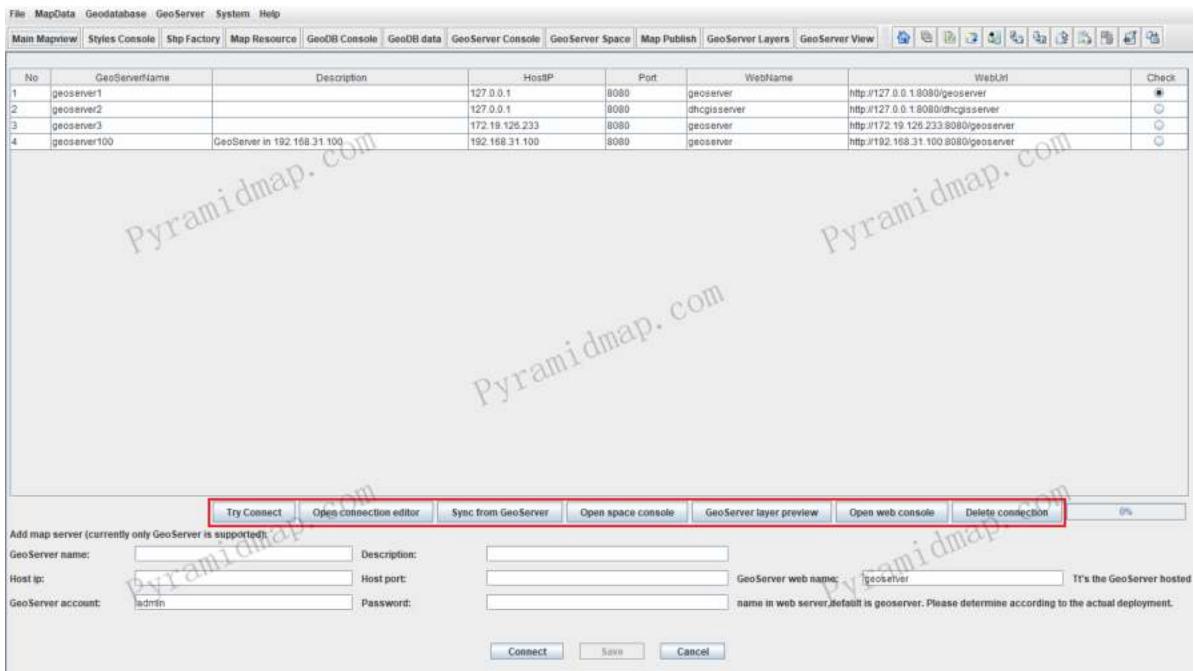


Figure 5-9: Internal management of GeoServer

GeoServer internal management identify:

- Try connect: test whether the selected map server connection is available.
- Open Connection editor: Edit the selected GeoServer connection properties.

- Sync from GeoServer: obtain the selected GeoServer workspace, data storage and database connection properties data, and synchronizing them to the client.
- Open space console: query, edit and modify, delete the workspace and data storage of the selected GeoServer.
- GeoServer layer preview: get the list of selected GeoServer layers and preview them.
- Delete connection: Delete the selected GeoServer connection.

5.3 GeoServer internal operate

The internal space of GeoServer is divided into three levels: workspaces, data storages and layers. As the client of GeoServer, PyramidMap can visually maintain these modules. PyramidMap provides multiple forms of access management to GeoServer server space.

5.3.1 GeoServer Workspace

Through the GeoServer node tree in the main interface, you can right-click on the GeoServer node layer and the workspace node layer to provide management access to the workspace and data storage. The management entry of the GeoServer node to the workspace is shown in Figure 5-10.

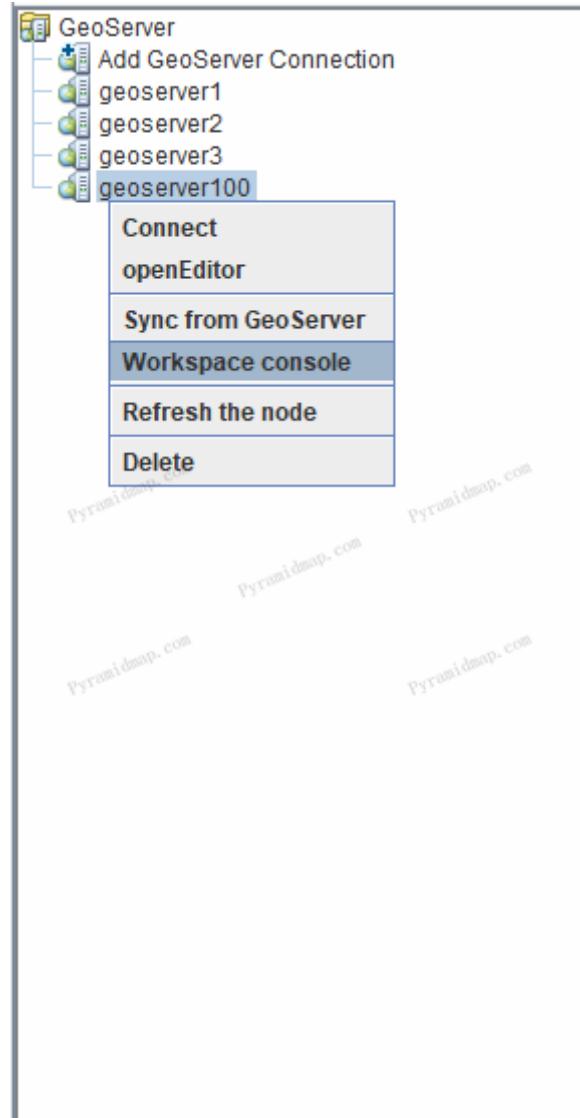


Figure 5-10: GeoServer node entrance to workspace

Enter the workspace management module, as shown in Figure 5-11.

WorkSpace	NameSpace	wms	wfs	wcs	wmts	GeoServerConnection	SynchState	Check	OpenEditor	Delete
cite	http://www.opengeospatial.net/cite	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	geoserver100	synced from Server	<input type="checkbox"/>	Do edit	Delete
tiger	http://www.census.gov	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	geoserver100	synced from Server	<input type="checkbox"/>	Do edit	Delete
nrc	http://www.nrc.nato.int	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	geoserver100	synced from Server	<input type="checkbox"/>	Do edit	Delete
sde	http://geoserver.sfg.net	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	geoserver100	synced from Server	<input type="checkbox"/>	Do edit	Delete
it_geosolutions	http://www.geo-solutions.it	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	geoserver100	synced from Server	<input type="checkbox"/>	Do edit	Delete
topp	http://www.openplans.org/topp	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	geoserver100	synced from Server	<input type="checkbox"/>	Do edit	Delete
sf	http://www.openplans.org/spearfish	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	geoserver100	synced from Server	<input type="checkbox"/>	Do edit	Delete
digi_gas	http://www.digi_gas.com	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	geoserver100	synced from Server	<input type="checkbox"/>	Do edit	Delete
dn	http://www.dn.com	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	geoserver100	synced from Server	<input type="checkbox"/>	Do edit	Delete

Figure 5-11: The GeoServer's workspaces pool manage interface

In the workspace module, you can perform the following operations: create a new workspace, synchronize the server workspace to the client, and submit the client workspace to the server. In particular, in the workspace list management pool, you can provide independent attribute editors and delete each workspace in the list table. The new workspace interface and and data interaction with GeoServer is shown in Figure 5-12.

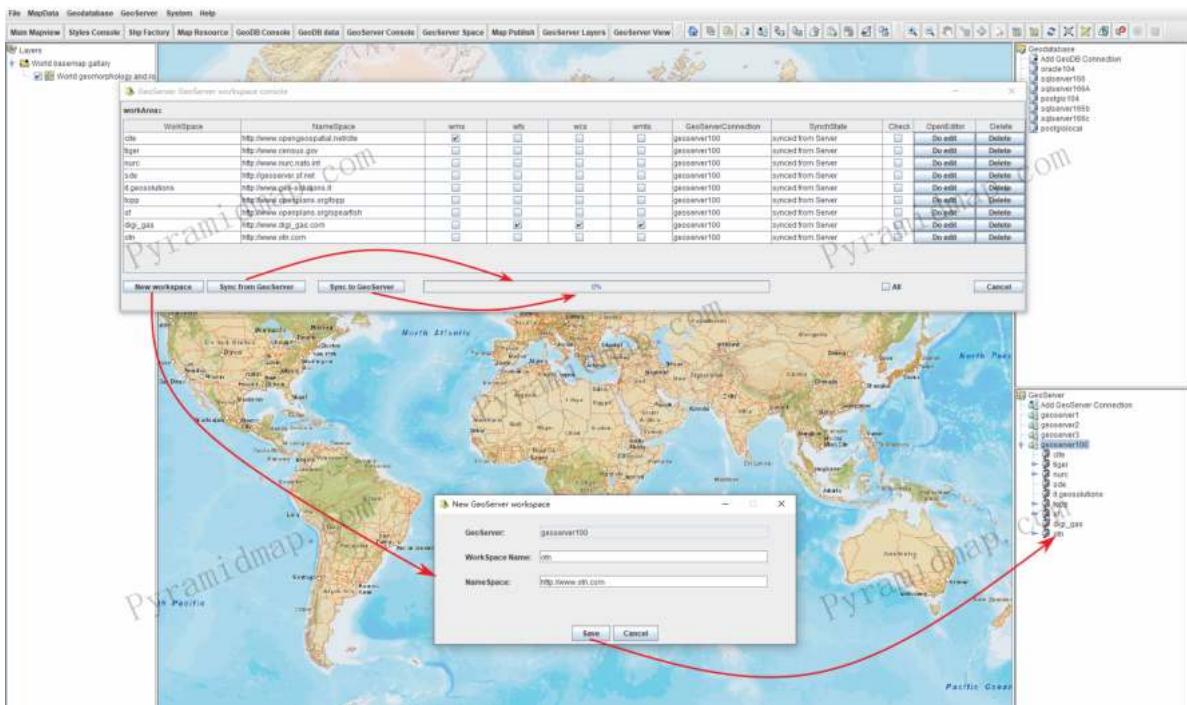


Figure 5-12: The new workspace interface and and data interaction with GeoServer

The new workspace will be automatically attached to the GeoServer node.

5.3.2 GeoServer data storage

In the workspace node, a data storage entry is provided, as shown in Figure 5-13.

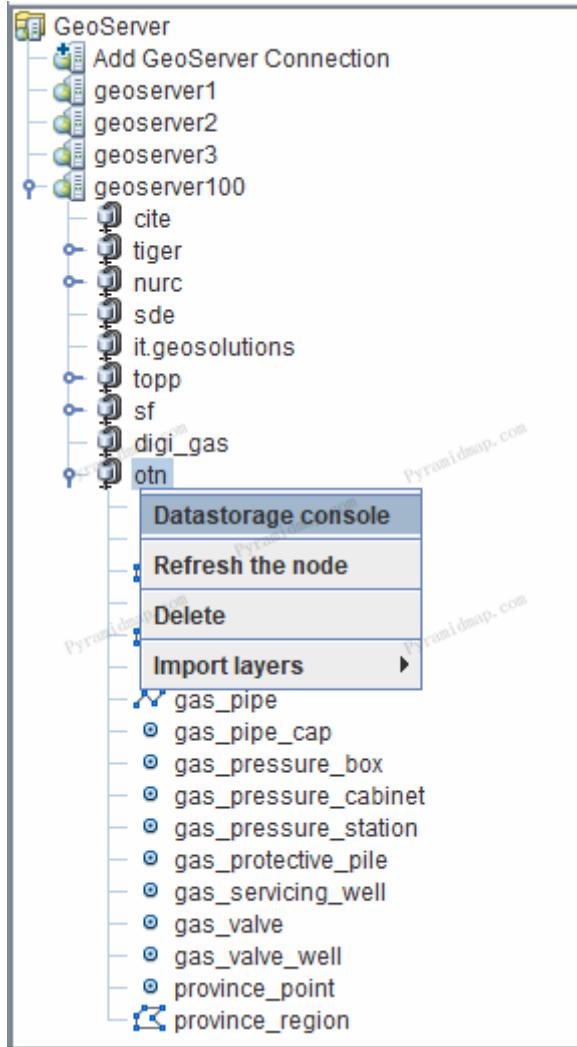


Figure 5-13: Workspace node to data storage management entrance

Then enter the data storage management module, as shown in Figure 5-14.

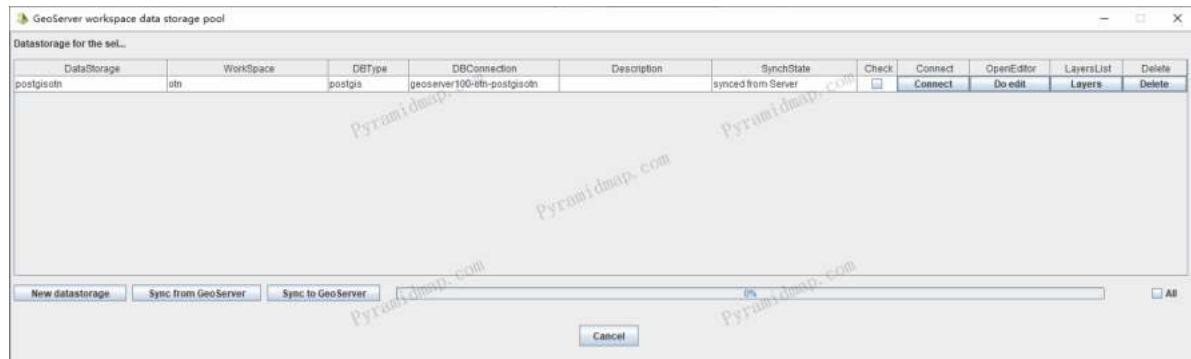


Figure 5-14: The data storage pool interface from the workspace node

In the data storage module, you can perform the following operations: create a new data storage, synchronize the server side data storage to the client, and submit the client side data storage cache to the server. In particular, in the data storage list management pool, you can provide independent editing and deletion operations for each data storage, as shown in Figure 5-15.

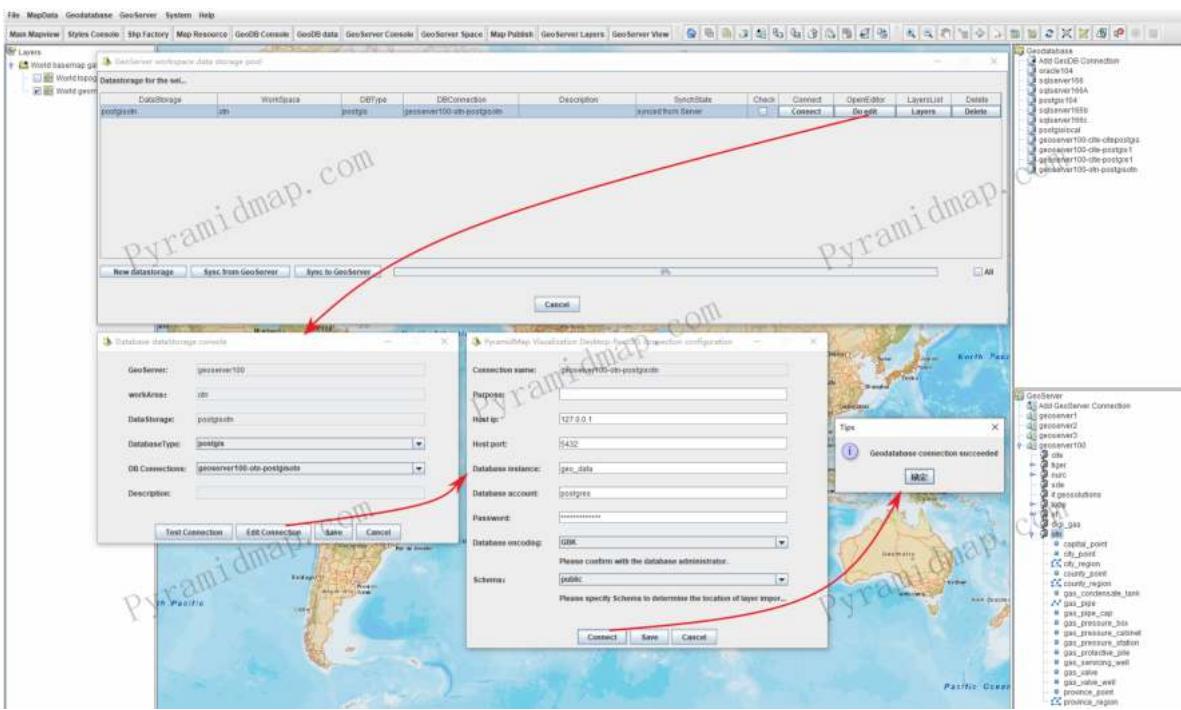


figure5-15: Data storage management pool of GeoServer workspace

In the New Data Storage module. You can select the database type corresponding to the data storage, and select the geodatabase connection that matches the type to automatically bring in the configuration of database connection parameters. The selected database connection can be dynamically edited, as shown in Figure 5-16.

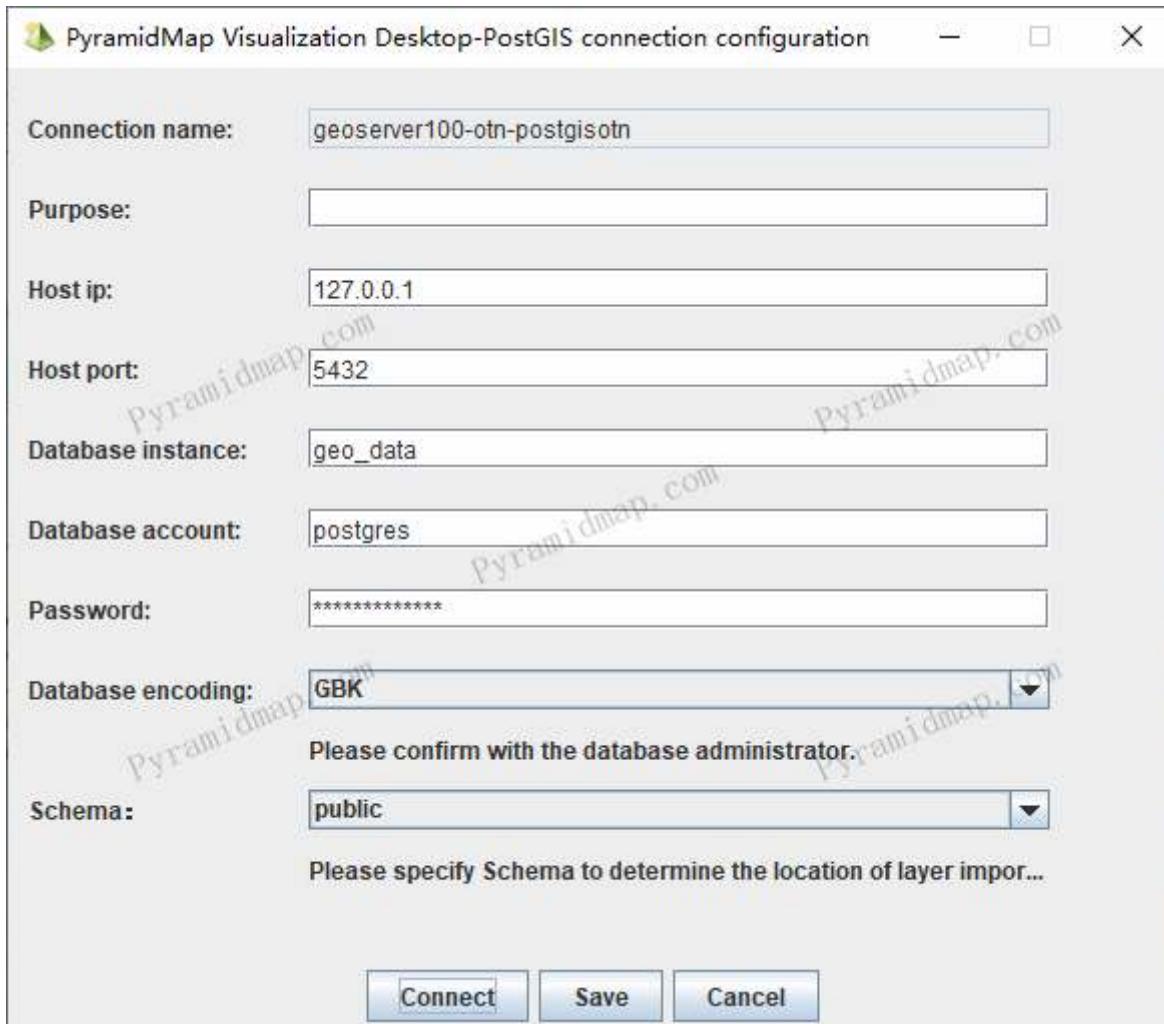


Figure 5-16: Edit the database connection for the datastorage

The predefined geodatabase connection serves as an independent resource management pool to provide data sources for GeoServer data storage.

5.3.3 GeoServer pool console

PyramidMap centrally manages GeoServer connections in the form of resource management pools, as shown in Figure 5-17.



Figure 5-17: GeoServer connections resource management pool entrance

PyramidMap creates and maintains the GeoServer resource connection pool, and manages and maintains its internal service space for each GeoServer connection. The module is shown in Figure 5-18.

A screenshot of the 'GeoServer' module in PyramidMap. The top menu bar includes File, MapData, Geodatabase, GeoServer, System, Help, and several sub-menu items like Main Mapview, Styles Console, Shp Factory, Map Resource, GeodB Console, GeodB data, GeoServer Console, GeoServer Space, Map Publish, GeoServer Layers, and GeoServer View. Below the menu is a toolbar with various icons. The main area contains a table titled 'GeoServer connections pool' with the following data:

No	GeoServerName	Description	HostIP	Port	WebName	WebUrl	Check
1	geoserver1		127.0.0.1	8080	geoserver	http://127.0.0.1:8080/geoserver	<input checked="" type="radio"/>
2	geoserver2		127.0.0.1	8080	dhcpserver	http://127.0.0.1:8080/dhcpserver	<input type="radio"/>
3	geoserver3		172.19.126.233	8080	geoserver	http://172.19.126.233:8080/geoserver	<input type="radio"/>
4	geoserver100	GeoServer in 192.168.31.100	192.168.31.100	8080	geoserver	http://192.168.31.100:8080/geoserver	<input type="radio"/>

Below the table are several buttons: Try Connect, Open connection editor, Sync from GeoServer, Open space console (which is highlighted with a red box), GeoServer layer preview, Open web console, Delete connection, and a progress bar at 0%. At the bottom, there are fields for adding a map server: Geo Server name, Description, Host ip, Host port, GeoServer account, Password, and a note about the GeoServer web name. There are also 'Connect', 'Save', and 'Cancel' buttons.

图5-18: GeoServer connections pool and operation options

Select the GeoServer and click "open space console" button, as shown in Figure 5-19.

Figure 5-19: GeoServer workspace and storage managing pool

The GeoServer workspace and data storage managing pool module displays the list of all workspaces of the server and the data storages list of each workspace. The client side and the server side maintain two-way synchronization to achieve visual management of the server side data by the client side.

In particular, PyramidMap implements a client cache maintenance mechanism for GeoServer. New and modified workspaces and data stores are temporarily stored on the client. When necessary, they are submitted to the GeoServer server in batches. At the same time, the GeoServer server data can be synchronized to the client at any time. This is the two-way synchronization mechanism between PyramidMap and GeoServer.

6 Map data and conversion

PyramidMap supports five types of map data sources, namely Shp file vector layer, file image layer, Geodatabase vector layer, GeoServer vector layer and raster tile layer.

6.1 Shp layers pool

PyramidMap imports the client's Shp file vector layers into the resource pool through a file browser to form a Shp management list pool and supports various operations with corresponding buttons, as shown in Figure 6-1.

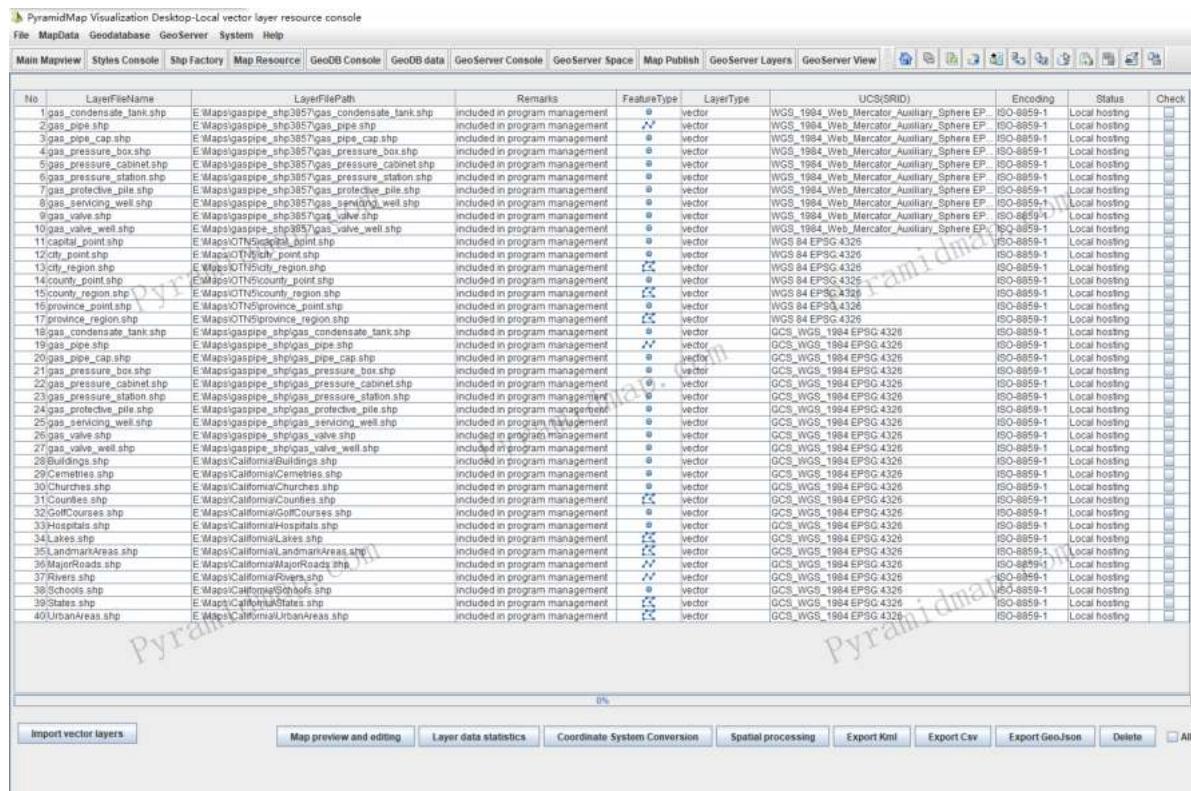


Figure 6-1: Shp layers resource pool

Support various operations on Shp layer resources, including:

- Import vectorlayers: import client Shp files and GeoJson files into the resource management pool.
- Map preview and editing: preview and edit the Shp layer in independent view of each layer in the list pool.
- Layer data statistics: perform the features data statistics of the shp layer in the list pool.
- Coordinate system conversion: perform coordinate system conversion on the shp layer in the list pool.
- Spatial processing: perform spatial processing on shp layers in the list pool, including merging and intersection.
- Data conversion: Shp to Kml, Shp to Csv, Shp to GeoJson.
- Delete: Delete the shp layer in the list pool.

In particular, through the map preview and editing options, the selected layer file will be opened in an independent map view to preview and edit the layer, as shown in Figure 6-2.

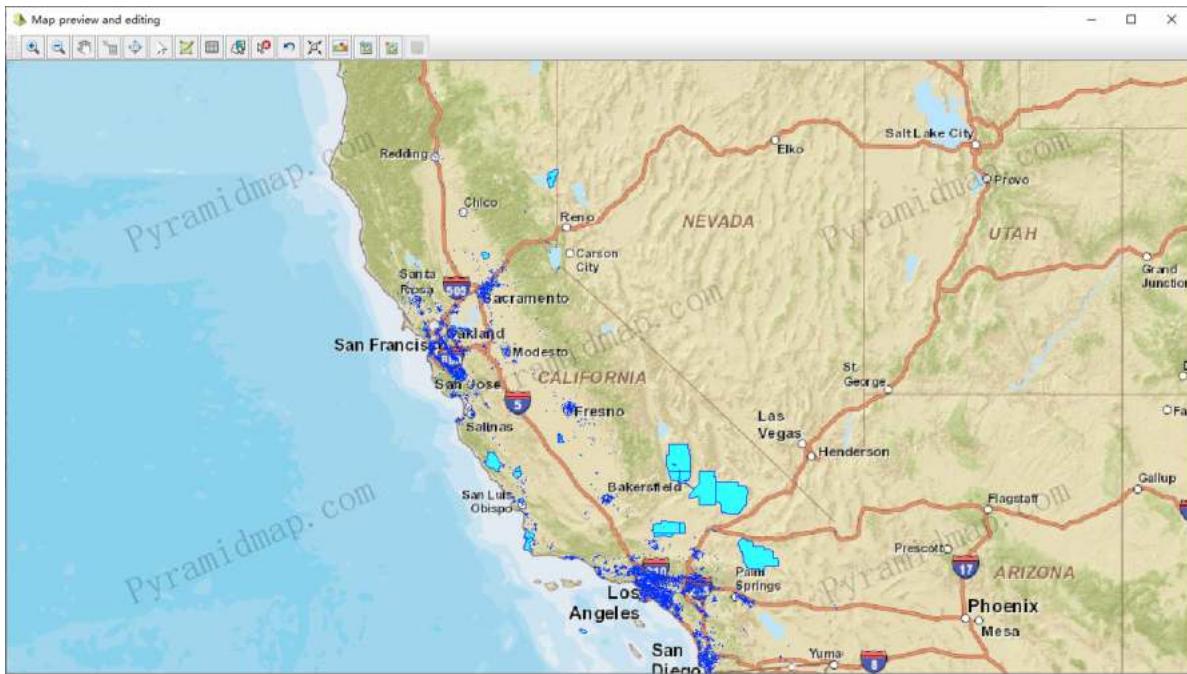


Figure 6-2: Open independent preview and editing view of single shp vector layer

Independent map view provides each layer with separate display, rendering, base map selection and overlay, graphical editing, attribute data editing in table, feature selection and deletion operations. It is a comprehensive map service for a single layer.

6.2 Raster layers pool

PyramidMap imports raster image layers of client file types into the raster resource pool through a file browser to form an raster file management list, which supports various operations with corresponding buttons, as shown in Figure 6-3.

No	LayerFileName	LayerFilePath	Nodata Value	LayerType	Size(byte)	UCS(SRID)	Bands	PixelDepth	Check
1	NE2_50M_SR.tif	D:\maps\NE2_50M_SR\NE2_50M_SR.tif	nothing	WGS 84	175039752	WGS 84	3	16bit	
2	NE2_50M_SR_W.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W.tif	nothing	WGS 84	175040488	WGS 84	3	16bit	
3	1009160.tif	D:\maps\1009160.tif	nothing	Transverse Mercator	42644193	WGS 84	3	16bit	
4	1009161.tif	D:\maps\1009161.tif	nothing	Transverse Mercator	41536109	WGS 84	3	16bit	
5	1009162.tif	D:\maps\1009162.tif	nothing	Transverse Mercator	42695523	WGS 84	3	16bit	
6	1009163.tif	D:\maps\1009163.tif	nothing	Transverse Mercator	44796823	WGS 84	3	16bit	
7	1009176.tif	D:\maps\1009176.tif	nothing	Transverse Mercator	41599867	WGS 84	3	16bit	
8	1009177.tif	D:\maps\1009177.tif	nothing	Transverse Mercator	41253301	WGS 84	3	16bit	
9	1009178.tif	D:\maps\1009178.tif	nothing	Transverse Mercator	42925649	WGS 84	3	16bit	
10	1110019.tif	D:\maps\1110019.tif	nothing	Transverse Mercator	46050367	WGS 84	3	16bit	
11	1110208.tif	D:\maps\1110208.tif	nothing	Transverse Mercator	47656531	WGS 84	3	16bit	
12	1110209.tif	D:\maps\1110209.tif	nothing	Transverse Mercator	44084735	WGS 84	3	16bit	
13	1110210.tif	D:\maps\1110210.tif	nothing	Transverse Mercator	44494537	WGS 84	3	16bit	
14	1110211.tif	D:\maps\1110211.tif	nothing	Transverse Mercator	43123937	WGS 84	3	16bit	
15	NE2_50M_SR_W_0.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W_0.tif	0.0	WGS 84	180000000	WGS 84	3	16bit	
16	NE2_50M_SR_W_0_1.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W_0_1.tif	0.0	WGS 84	189852	WGS 84	3	16bit	
17	NE2_50M_SR_W_0_10.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W_0_10.tif	0.0	WGS 84	189088	WGS 84	3	16bit	
18	NE2_50M_SR_W_0_11.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W_0_11.tif	0.0	WGS 84	189852	WGS 84	3	16bit	
19	NE2_50M_SR_W_0_12.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W_0_12.tif	0.0	WGS 84	189852	WGS 84	3	16bit	
20	NE2_50M_SR_W_0_13.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W_0_13.tif	0.0	WGS 84	189852	WGS 84	3	16bit	
21	NE2_50M_SR_W_0_14.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W_0_14.tif	0.0	WGS 84	189852	WGS 84	3	16bit	
22	NE2_50M_SR_W_0_15.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W_0_15.tif	0.0	WGS 84	189852	WGS 84	3	16bit	
23	NE2_50M_SR_W_0_16.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W_0_16.tif	0.0	WGS 84	189088	WGS 84	3	16bit	
24	NE2_50M_SR_W_0_17.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W_0_17.tif	0.0	WGS 84	189852	WGS 84	3	16bit	
25	NE2_50M_SR_W_0_18.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W_0_18.tif	0.0	WGS 84	189852	WGS 84	3	16bit	
26	NE2_50M_SR_W_0_19.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W_0_19.tif	0.0	WGS 84	189852	WGS 84	3	16bit	
27	NE2_50M_SR_W_0_20.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W_0_20.tif	0.0	WGS 84	189852	WGS 84	3	16bit	
28	NE2_50M_SR_W_0_20.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W_0_20.tif	0.0	WGS 84	189852	WGS 84	3	16bit	
29	NE2_50M_SR_W_0_21.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W_0_21.tif	0.0	WGS 84	166168	WGS 84	3	16bit	
30	NE2_50M_SR_W_0_3.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W_0_3.tif	0.0	WGS 84	189852	WGS 84	3	16bit	
31	NE2_50M_SR_W_0_4.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W_0_4.tif	0.0	WGS 84	189852	WGS 84	3	16bit	
32	NE2_50M_SR_W_0_5.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W_0_5.tif	0.0	WGS 84	189088	WGS 84	3	16bit	
33	NE2_50M_SR_W_0_6.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W_0_6.tif	0.0	WGS 84	189852	WGS 84	3	16bit	
34	NE2_50M_SR_W_0_7.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W_0_7.tif	0.0	WGS 84	189852	WGS 84	3	16bit	
35	NE2_50M_SR_W_0_8.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W_0_8.tif	0.0	WGS 84	189852	WGS 84	3	16bit	
36	NE2_50M_SR_W_0_9.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W_0_9.tif	0.0	WGS 84	189852	WGS 84	3	16bit	
37	NE2_50M_SR_W_10_0.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W_10_0.tif	0.0	WGS 84	189088	WGS 84	3	16bit	
38	NE2_50M_SR_W_10_1.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W_10_1.tif	0.0	WGS 84	189852	WGS 84	3	16bit	
39	NE2_50M_SR_W_10_10.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W_10_10.tif	0.0	WGS 84	189088	WGS 84	3	16bit	
40	NE2_50M_SR_W_10_11.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W_10_11.tif	0.0	WGS 84	189852	WGS 84	3	16bit	
41	NE2_50M_SR_W_10_12.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W_10_12.tif	0.0	WGS 84	189852	WGS 84	3	16bit	
42	NE2_50M_SR_W_10_13.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W_10_13.tif	0.0	WGS 84	189852	WGS 84	3	16bit	
43	NE2_50M_SR_W_10_14.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W_10_14.tif	0.0	WGS 84	189852	WGS 84	3	16bit	
44	NE2_50M_SR_W_10_15.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W_10_15.tif	0.0	WGS 84	189852	WGS 84	3	16bit	
45	NE2_50M_SR_W_10_16.tif	D:\maps\NE2_50M_SR\NE2_50M_SR_W_10_16.tif	0.0	WGS 84	189088	WGS 84	3	16bit	

Figure 6-3: Raster layer resource management pool

Support various operations on raster layer resources pool, including:

- Import raster Layer: import the client raster layer file into the resource management pool.
- Map preview and editing: preview and edit the raster layers in the list pool.

- Coordinate system conversion: perform coordinate system conversion on raster layers in the list pool.
- Deal noData: process the invalid value of noData for the raster layer in the list pool, mainly to remove the black background and other invalid pixels of the image.
- Raster mosaic: A mosaic combines multiple raster images to obtain a seamless raster.
- Raster tile: This is a process that reverses with the raster Mosaic, divide a whole image into multiple slice images according to rules.
- Layer's center: calculate the center point position of the raster.
- Delete: Delete the raster layer in the list pool.

In particular, through the map preview and editing options, the selected layer file will be opened in an independent map view to preview and edit the layer, as shown in Figure 6-4.

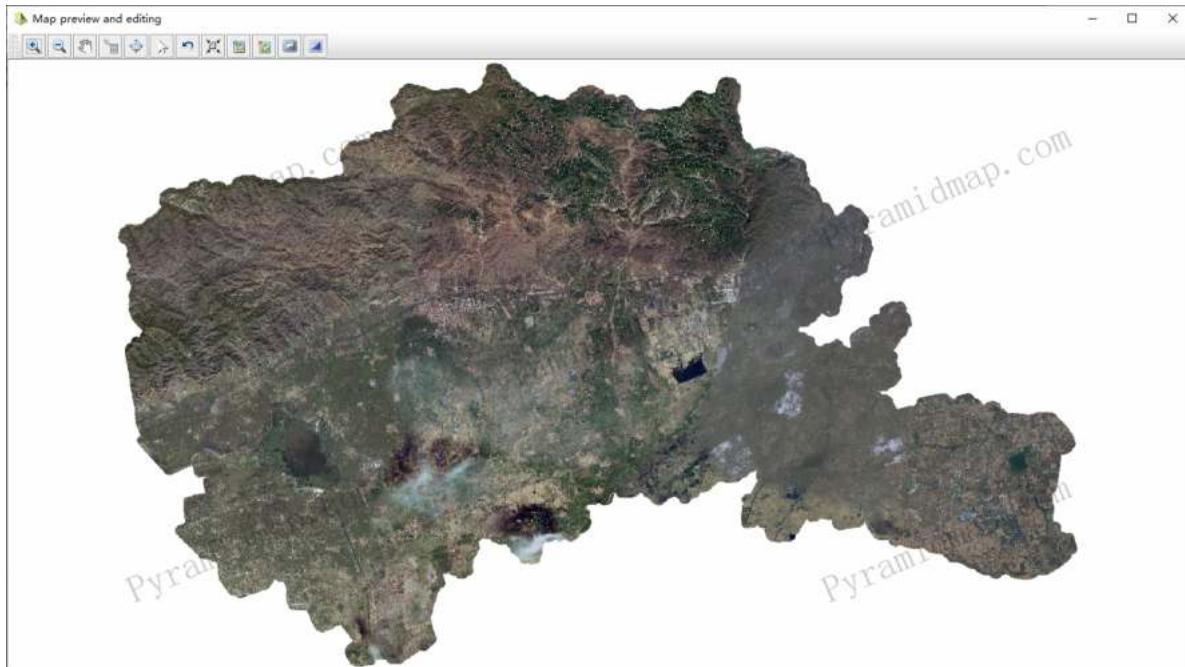


Figure 6-4: Open independent preview and editing view of single tiff raster layer

Independent map view provides each layer with separate display, rendering, base map selection and overlay, image-based editing, data table editing, feature selection and deletion operations. It is a comprehensive map service for a single layer.

6.2.1 NoData processing

In general, raster images will have NoData values. These NoData are invalid values that do not have actual value and will interfere with image data analysis. Black image frame is a common NoData error, which is particularly common for UAV images and raster data sets after geographical reference processing. In this example, we remove the black border of raster image through NoData invalid value processing. The processing process is shown in Figure 6-5.

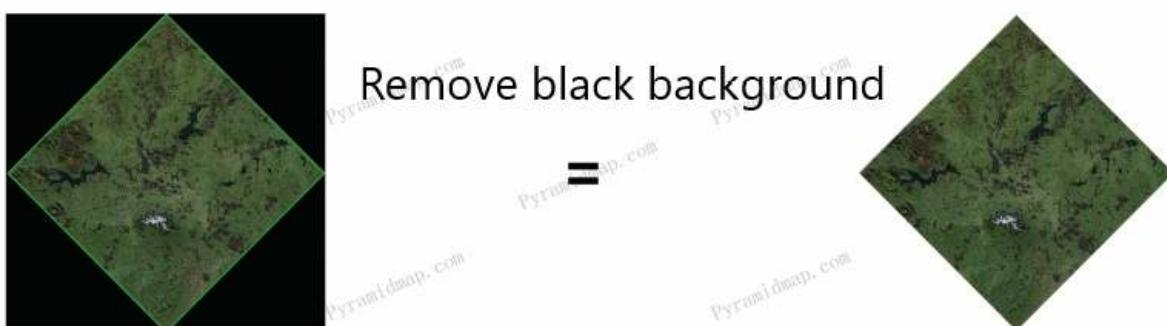
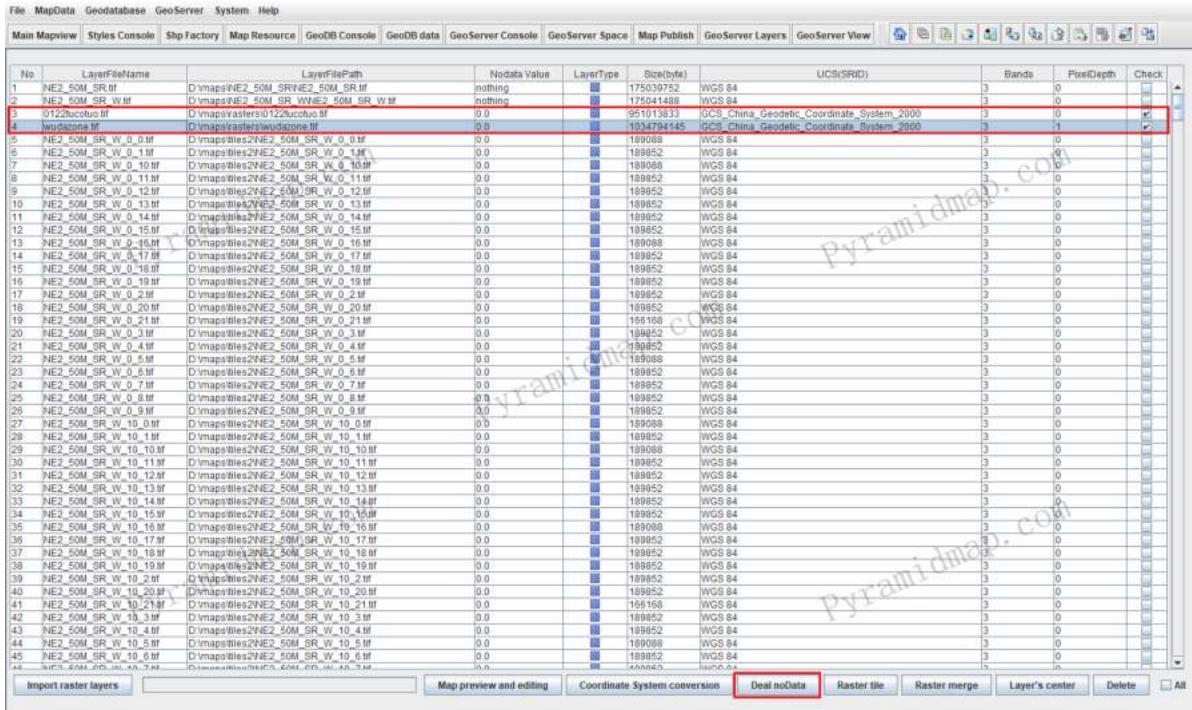


Figure 6-5: Remove the black border of raster image through NoData invalid value processing

PyramidMap perform batch NoData processing on images in the resource pool, as shown in

Figure 6-6.



No	LayerFileName	LayerFilePath	NoData Value	LayerType	Size(byte)	UCS(SRID)	Bands	PixelDepth	Check
1	NE2_50M_SR.tif	D:\maps\NE2_50M_SR\NE2_50M_SR.tif	nothing	栅格	175039752	WGS 84	3	0	
2	NE2_50M_SR_W.tif	D:\maps\NE2_50M_SR_W\NE2_50M_SR_W.tif	nothing	栅格	175041488	WGS 84	3	0	
3	01229ucuo.tif	D:\maps\raster\01229ucuo.tif	0.0	栅格	951013833	IGCS_China_Geodetic_Coordinate_System_2000	3	0	
4	lwdzqz0.tif	D:\maps\raster\lwdzqz0.tif	0.0	栅格	1034794145	IGCS_China_Geodetic_Coordinate_System_2000	3	1	<input checked="" type="checkbox"/>
5	NE2_50M_SR_W_0_0.tif	D:\maps\tiles\NE2_50M_SR_W_0_0.tif	0.0	栅格	189852	WGS 84	3	0	
6	NE2_50M_SR_W_0_1.tif	D:\maps\tiles\NE2_50M_SR_W_0_1.tif	0.0	栅格	189852	WGS 84	3	0	
7	NE2_50M_SR_W_0_10.tif	D:\maps\tiles\NE2_50M_SR_W_0_10.tif	0.0	栅格	189088	WGS 84	3	0	
8	NE2_50M_SR_W_0_11.tif	D:\maps\tiles\NE2_50M_SR_W_0_11.tif	0.0	栅格	189852	WGS 84	3	0	
9	NE2_50M_SR_W_0_12.tif	D:\maps\tiles\NE2_50M_SR_W_0_12.tif	0.0	栅格	189852	WGS 84	3	0	
10	NE2_50M_SR_W_0_13.tif	D:\maps\tiles\NE2_50M_SR_W_0_13.tif	0.0	栅格	189852	WGS 84	3	0	
11	NE2_50M_SR_W_0_14.tif	D:\maps\tiles\NE2_50M_SR_W_0_14.tif	0.0	栅格	189852	WGS 84	3	0	
12	NE2_50M_SR_W_0_15.tif	D:\maps\tiles\NE2_50M_SR_W_0_15.tif	0.0	栅格	189852	WGS 84	3	0	
13	NE2_50M_SR_W_0_16.tif	D:\maps\tiles\NE2_50M_SR_W_0_16.tif	0.0	栅格	189088	WGS 84	3	0	
14	NE2_50M_SR_W_0_17.tif	D:\maps\tiles\NE2_50M_SR_W_0_17.tif	0.0	栅格	189852	WGS 84	3	0	
15	NE2_50M_SR_W_0_18.tif	D:\maps\tiles\NE2_50M_SR_W_0_18.tif	0.0	栅格	189852	WGS 84	3	0	
16	NE2_50M_SR_W_0_19.tif	D:\maps\tiles\NE2_50M_SR_W_0_19.tif	0.0	栅格	189852	WGS 84	3	0	
17	NE2_50M_SR_W_0_20.tif	D:\maps\tiles\NE2_50M_SR_W_0_20.tif	0.0	栅格	189852	WGS 84	3	0	
18	NE2_50M_SR_W_0_21.tif	D:\maps\tiles\NE2_50M_SR_W_0_21.tif	0.0	栅格	189852	WGS 84	3	0	
19	NE2_50M_SR_W_0_22.tif	D:\maps\tiles\NE2_50M_SR_W_0_22.tif	0.0	栅格	189852	WGS 84	3	0	
20	NE2_50M_SR_W_0_23.tif	D:\maps\tiles\NE2_50M_SR_W_0_23.tif	0.0	栅格	189852	WGS 84	3	0	
21	NE2_50M_SR_W_0_24.tif	D:\maps\tiles\NE2_50M_SR_W_0_24.tif	0.0	栅格	189852	WGS 84	3	0	
22	NE2_50M_SR_W_0_25.tif	D:\maps\tiles\NE2_50M_SR_W_0_25.tif	0.0	栅格	189088	WGS 84	3	0	
23	NE2_50M_SR_W_0_26.tif	D:\maps\tiles\NE2_50M_SR_W_0_26.tif	0.0	栅格	189852	WGS 84	3	0	
24	NE2_50M_SR_W_0_27.tif	D:\maps\tiles\NE2_50M_SR_W_0_27.tif	0.0	栅格	189852	WGS 84	3	0	
25	NE2_50M_SR_W_0_28.tif	D:\maps\tiles\NE2_50M_SR_W_0_28.tif	0.0	栅格	189852	WGS 84	3	0	
26	NE2_50M_SR_W_0_29.tif	D:\maps\tiles\NE2_50M_SR_W_0_29.tif	0.0	栅格	189852	WGS 84	3	0	
27	NE2_50M_SR_W_0_30.tif	D:\maps\tiles\NE2_50M_SR_W_0_30.tif	0.0	栅格	189088	WGS 84	3	0	
28	NE2_50M_SR_W_0_31.tif	D:\maps\tiles\NE2_50M_SR_W_0_31.tif	0.0	栅格	189852	WGS 84	3	0	
29	NE2_50M_SR_W_0_32.tif	D:\maps\tiles\NE2_50M_SR_W_0_32.tif	0.0	栅格	189088	WGS 84	3	0	
30	NE2_50M_SR_W_0_33.tif	D:\maps\tiles\NE2_50M_SR_W_0_33.tif	0.0	栅格	189852	WGS 84	3	0	
31	NE2_50M_SR_W_0_34.tif	D:\maps\tiles\NE2_50M_SR_W_0_34.tif	0.0	栅格	189852	WGS 84	3	0	
32	NE2_50M_SR_W_0_35.tif	D:\maps\tiles\NE2_50M_SR_W_0_35.tif	0.0	栅格	189852	WGS 84	3	0	
33	NE2_50M_SR_W_0_36.tif	D:\maps\tiles\NE2_50M_SR_W_0_36.tif	0.0	栅格	189852	WGS 84	3	0	
34	NE2_50M_SR_W_0_37.tif	D:\maps\tiles\NE2_50M_SR_W_0_37.tif	0.0	栅格	189852	WGS 84	3	0	
35	NE2_50M_SR_W_0_38.tif	D:\maps\tiles\NE2_50M_SR_W_0_38.tif	0.0	栅格	189088	WGS 84	3	0	
36	NE2_50M_SR_W_0_39.tif	D:\maps\tiles\NE2_50M_SR_W_0_39.tif	0.0	栅格	189852	WGS 84	3	0	
37	NE2_50M_SR_W_0_40.tif	D:\maps\tiles\NE2_50M_SR_W_0_40.tif	0.0	栅格	189852	WGS 84	3	0	
38	NE2_50M_SR_W_0_41.tif	D:\maps\tiles\NE2_50M_SR_W_0_41.tif	0.0	栅格	189852	WGS 84	3	0	
39	NE2_50M_SR_W_0_42.tif	D:\maps\tiles\NE2_50M_SR_W_0_42.tif	0.0	栅格	189852	WGS 84	3	0	
40	NE2_50M_SR_W_0_43.tif	D:\maps\tiles\NE2_50M_SR_W_0_43.tif	0.0	栅格	189852	WGS 84	3	0	
41	NE2_50M_SR_W_0_44.tif	D:\maps\tiles\NE2_50M_SR_W_0_44.tif	0.0	栅格	189852	WGS 84	3	0	
42	NE2_50M_SR_W_0_45.tif	D:\maps\tiles\NE2_50M_SR_W_0_45.tif	0.0	栅格	189852	WGS 84	3	0	
43	NE2_50M_SR_W_0_46.tif	D:\maps\tiles\NE2_50M_SR_W_0_46.tif	0.0	栅格	189852	WGS 84	3	0	
44	NE2_50M_SR_W_0_47.tif	D:\maps\tiles\NE2_50M_SR_W_0_47.tif	0.0	栅格	189088	WGS 84	3	0	
45	NE2_50M_SR_W_0_48.tif	D:\maps\tiles\NE2_50M_SR_W_0_48.tif	0.0	栅格	189852	WGS 84	3	0	
46	lwdzqz0.tif	D:\maps\raster\lwdzqz0.tif	0.0	栅格	1034794145	IGCS_China_Geodetic_Coordinate_System_2000	3	1	<input checked="" type="checkbox"/>

Figure 6-6: Batch NoData processing of images in the resource pool

The image with black background before processing is shown in Figure 6-7.

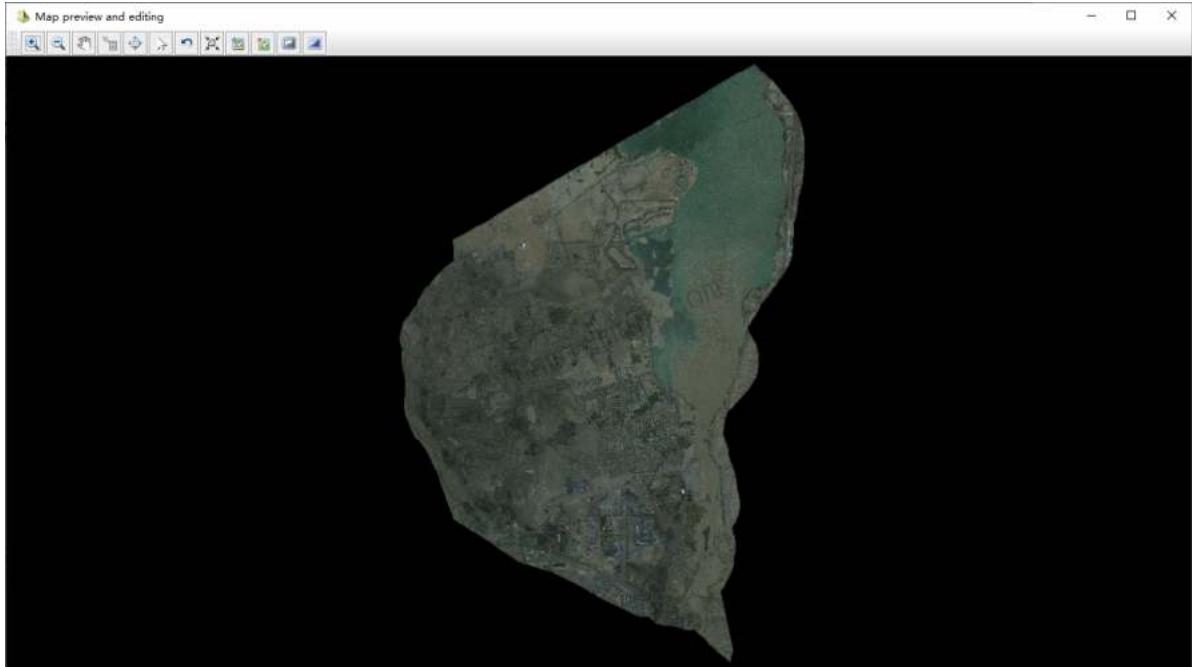


Figure 6-7: The image with black background before processing

After processing, remove the black background, as shown in Figure 6-8.



Figure 6-8: Eliminate black background after NoData processing

6.2.2 Raster tile processing

The significance of raster tiles is that a very large remote sensing image (a single image may exceed 100G, or even larger) can be cut into a number of slices that meet the requirements according to self-defined rules. The raster tiling is shown in Figure 6-9.



Figure 6-9: Schematic diagram of raster tile

PyramidMap can slice rasters in the resource pool in batches, as shown in Figure 6-10.

No	LayerFileName	LayerFilePath	Nodata Value	LayerType	Size(bw)	UCS(SRID)	Bands	PixelDepth	Check
1	NE2_50M_SR.tif	D:\maptiles\NE2_50M_SR\NE2_50M_SR.tif	nothing	0	175039752	WGS 84	3	0	
2	NE2_50M_SR_W.tif	D:\maptiles\NE2_50M_SR_W\NE2_50M_SR_W.tif	nothing	0	175041488	WGS 84	3	0	<input checked="" type="checkbox"/>
3	0122cc0c0.tif	D:\maptiles\0122cc0c0.tif	0.0	0	951013833	GC5, China Geodetic Coordinate System_2000	3	0	
4	wuadzone.tif	D:\maptiles\wuadzone.tif	0.0	0	1034794145	GC5, China Geodetic Coordinate System_2000	3	1	
5	NE2_50M_SR_W_0_0.tif	D:\maptiles\NE2_50M_SR_W_0_0.tif	0.0	0	189088	WGS 84	3	0	
6	NE2_50M_SR_W_0_1.tif	D:\maptiles\NE2_50M_SR_W_0_1.tif	0.0	0	189088	WGS 84	3	0	
7	NE2_50M_SR_W_0_10.tif	D:\maptiles\NE2_50M_SR_W_0_10.tif	0.0	0	189088	WGS 84	3	0	
8	NE2_50M_SR_W_0_11.tif	D:\maptiles\NE2_50M_SR_W_0_11.tif	0.0	0	189088	WGS 84	3	0	
9	NE2_50M_SR_W_0_12.tif	D:\maptiles\NE2_50M_SR_W_0_12.tif	0.0	0	189088	WGS 84	3	0	
10	NE2_50M_SR_W_0_13.tif	D:\maptiles\NE2_50M_SR_W_0_13.tif	0.0	0	189088	WGS 84	3	0	
11	NE2_50M_SR_W_0_14.tif	D:\maptiles\NE2_50M_SR_W_0_14.tif	0.0	0	189088	WGS 84	3	0	
12	NE2_50M_SR_W_0_15.tif	D:\maptiles\NE2_50M_SR_W_0_15.tif	0.0	0	189088	WGS 84	3	0	
13	NE2_50M_SR_W_0_16.tif	D:\maptiles\NE2_50M_SR_W_0_16.tif	0.0	0	189088	WGS 84	3	0	
14	NE2_50M_SR_W_0_17.tif	D:\maptiles\NE2_50M_SR_W_0_17.tif	0.0	0	189088	WGS 84	3	0	
15	NE2_50M_SR_W_0_18.tif	D:\maptiles\NE2_50M_SR_W_0_18.tif	0.0	0	189088	WGS 84	3	0	
16	NE2_50M_SR_W_0_19.tif	D:\maptiles\NE2_50M_SR_W_0_19.tif	0.0	0	189088	WGS 84	3	0	
17	NE2_50M_SR_W_0_2.tif	D:\maptiles\NE2_50M_SR_W_0_2.tif	0.0	0	189088	WGS 84	3	0	
18	NE2_50M_SR_W_0_20.tif	D:\maptiles\NE2_50M_SR_W_0_20.tif	0.0	0	189088	WGS 84	3	0	
19	NE2_50M_SR_W_0_21.tif	D:\maptiles\NE2_50M_SR_W_0_21.tif	0.0	0	189088	WGS 84	3	0	
20	NE2_50M_SR_W_0_3.tif	D:\maptiles\NE2_50M_SR_W_0_3.tif	0.0	0	189088	WGS 84	3	0	
21	NE2_50M_SR_W_0_4.tif	D:\maptiles\NE2_50M_SR_W_0_4.tif	0.0	0	189088	WGS 84	3	0	
22	NE2_50M_SR_W_0_5.tif	D:\maptiles\NE2_50M_SR_W_0_5.tif	0.0	0	189088	WGS 84	3	0	
23	NE2_50M_SR_W_0_6.tif	D:\maptiles\NE2_50M_SR_W_0_6.tif	0.0	0	189088	WGS 84	3	0	
24	NE2_50M_SR_W_0_7.tif	D:\maptiles\NE2_50M_SR_W_0_7.tif	0.0	0	189088	WGS 84	3	0	
25	NE2_50M_SR_W_0_8.tif	D:\maptiles\NE2_50M_SR_W_0_8.tif	0.0	0	189088	WGS 84	3	0	
26	NE2_50M_SR_W_0_9.tif	D:\maptiles\NE2_50M_SR_W_0_9.tif	0.0	0	189088	WGS 84	3	0	
27	NE2_50M_SR_W_0_10.tif	D:\maptiles\NE2_50M_SR_W_0_10.tif	0.0	0	189088	WGS 84	3	0	
28	NE2_50M_SR_W_0_11.tif	D:\maptiles\NE2_50M_SR_W_0_11.tif	0.0	0	189088	WGS 84	3	0	
29	NE2_50M_SR_W_0_10.tif	D:\maptiles\NE2_50M_SR_W_0_10.tif	0.0	0	189088	WGS 84	3	0	
30	NE2_50M_SR_W_0_11.tif	D:\maptiles\NE2_50M_SR_W_0_11.tif	0.0	0	189088	WGS 84	3	0	
31	NE2_50M_SR_W_0_12.tif	D:\maptiles\NE2_50M_SR_W_0_12.tif	0.0	0	189088	WGS 84	3	0	
32	NE2_50M_SR_W_0_13.tif	D:\maptiles\NE2_50M_SR_W_0_13.tif	0.0	0	189088	WGS 84	3	0	
33	NE2_50M_SR_W_0_14.tif	D:\maptiles\NE2_50M_SR_W_0_14.tif	0.0	0	189088	WGS 84	3	0	
34	NE2_50M_SR_W_0_15.tif	D:\maptiles\NE2_50M_SR_W_0_15.tif	0.0	0	189088	WGS 84	3	0	
35	NE2_50M_SR_W_0_16.tif	D:\maptiles\NE2_50M_SR_W_0_16.tif	0.0	0	189088	WGS 84	3	0	
36	NE2_50M_SR_W_0_17.tif	D:\maptiles\NE2_50M_SR_W_0_17.tif	0.0	0	189088	WGS 84	3	0	
37	NE2_50M_SR_W_0_18.tif	D:\maptiles\NE2_50M_SR_W_0_18.tif	0.0	0	189088	WGS 84	3	0	
38	NE2_50M_SR_W_0_19.tif	D:\maptiles\NE2_50M_SR_W_0_19.tif	0.0	0	189088	WGS 84	3	0	
39	NE2_50M_SR_W_0_20.tif	D:\maptiles\NE2_50M_SR_W_0_20.tif	0.0	0	189088	WGS 84	3	0	
40	NE2_50M_SR_W_0_20.tif	D:\maptiles\NE2_50M_SR_W_0_20.tif	0.0	0	189088	WGS 84	3	0	
41	NE2_50M_SR_W_0_21.tif	D:\maptiles\NE2_50M_SR_W_0_21.tif	0.0	0	189088	WGS 84	3	0	
42	NE2_50M_SR_W_0_3.tif	D:\maptiles\NE2_50M_SR_W_0_3.tif	0.0	0	189088	WGS 84	3	0	
43	NE2_50M_SR_W_0_4.tif	D:\maptiles\NE2_50M_SR_W_0_4.tif	0.0	0	189088	WGS 84	3	0	
44	NE2_50M_SR_W_0_5.tif	D:\maptiles\NE2_50M_SR_W_0_5.tif	0.0	0	189088	WGS 84	3	0	
45	NE2_50M_SR_W_0_6.tif	D:\maptiles\NE2_50M_SR_W_0_6.tif	0.0	0	189088	WGS 84	3	0	
46	0122cc0c0.tif	D:\maptiles\0122cc0c0.tif	n.n.	0	400000	WGS 84	3	0	

Figure 6-10: Select the raster in the resource pool for creating tiles

The generating raster tiles mode dialog box is shown in Figure 6-11.

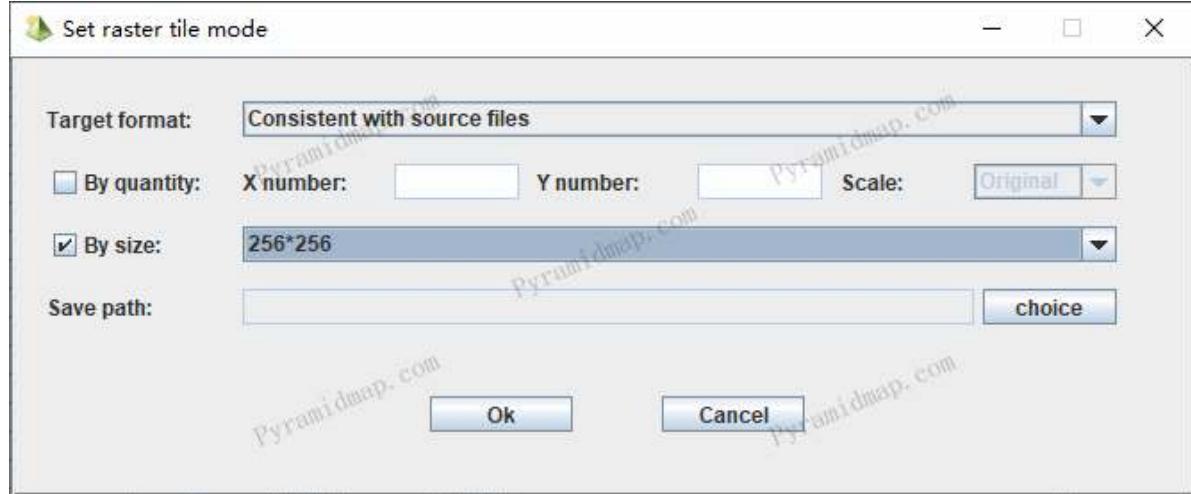


Figure 6-11: The generating raster tiles mode dialog box

Select the tile file format, which can be consistent with the source file, or select Tiff, png, jpg, webp and other different data formats. You can creating tiles according to the number and size strategies, and finally output to the specified save path.

With the NE2_50M_SR_W.tif in the resource pool as an example, the whole image is shown in Figure 6-12.

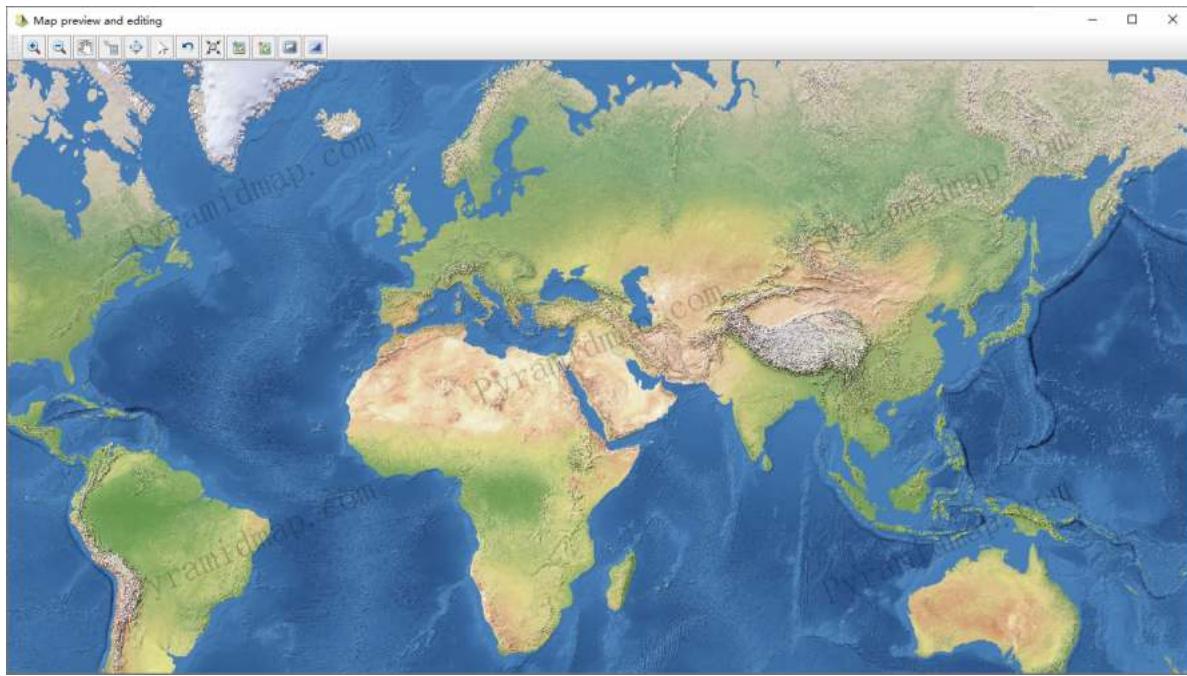


Figure 6-12: the whole raster image

Taking the 256 * 256 (pixel) slicing strategy as an example, the generated tiles is shown in Figure 6-13.



Figure 6-13: The effect of tiles generated by the whole raster

6.2.3 Raster mosaic processing

In a sense, raster mosaicing is the reverse process of the raster tiling. Mosaicing is to combine multiple raster images through mosaic to obtain a seamless raster image. The image merging diagram is shown in Figure 6-14.



Figure 6-14: Schematic diagram of raster mosaicing

PyramidMap batch mosaicing rasters in the resource pool, as shown in Figure 6-15.

No	LayerFileName	LayerFilePath	Nodata Value	LayerType	Size(MB)	UCS(SRID)	Bands	PixelDepth	Check
1	NE2_50M_SR.tif	D:\map\biles\NE2_50M_SR\NE2_50M_SR.tif	nothing	grid	175039752	WGS 84	3	0	
2	NE2_50M_SR_W.tif	D:\map\biles\NE2_50M_SR_W\NE2_50M_SR_W.tif	nothing	grid	175041488	WGS 84	3	0	
3	0122ucuo.tif	D:\map\biles\0122ucuo.tif	0.0	grid	951013833	GCS_China_Geodetic_Coordinate_System_2000	3	0	
4	wuadzono.tif	D:\map\biles\wuadzono.tif	0.0	grid	1034794145	GCS_China_Geodetic_Coordinate_System_2000	3	1	
5	NE2_50M_SR_W_0.tif	D:\map\biles\NE2_50M_SR_W_0.tif	0.0	grid	189088	WGS 84	3	0	
6	NE2_50M_SR_W_0_1.tif	D:\map\biles\NE2_50M_SR_W_0_1.tif	0.0	grid	189088	WGS 84	3	0	
7	NE2_50M_SR_W_0_11.tif	D:\map\biles\NE2_50M_SR_W_0_11.tif	0.0	grid	189088	WGS 84	3	0	
8	NE2_50M_SR_W_0_12.tif	D:\map\biles\NE2_50M_SR_W_0_12.tif	0.0	grid	189088	WGS 84	3	0	
9	NE2_50M_SR_W_0_13.tif	D:\map\biles\NE2_50M_SR_W_0_13.tif	0.0	grid	189088	WGS 84	3	0	
10	NE2_50M_SR_W_0_14.tif	D:\map\biles\NE2_50M_SR_W_0_14.tif	0.0	grid	189088	WGS 84	3	0	
11	NE2_50M_SR_W_0_14.tif	D:\map\biles\NE2_50M_SR_W_0_14.tif	0.0	grid	189088	WGS 84	3	0	
12	NE2_50M_SR_W_0_15.tif	D:\map\biles\NE2_50M_SR_W_0_15.tif	0.0	grid	189088	WGS 84	3	0	
13	NE2_50M_SR_W_0_16.tif	D:\map\biles\NE2_50M_SR_W_0_16.tif	0.0	grid	189088	WGS 84	3	0	
14	NE2_50M_SR_W_0_17.tif	D:\map\biles\NE2_50M_SR_W_0_17.tif	0.0	grid	189088	WGS 84	3	0	
15	NE2_50M_SR_W_0_18.tif	D:\map\biles\NE2_50M_SR_W_0_18.tif	0.0	grid	189088	WGS 84	3	0	
16	NE2_50M_SR_W_0_19.tif	D:\map\biles\NE2_50M_SR_W_0_19.tif	0.0	grid	189088	WGS 84	3	0	
17	NE2_50M_SR_W_0_2.tif	D:\map\biles\NE2_50M_SR_W_0_2.tif	0.0	grid	189088	WGS 84	3	0	
18	NE2_50M_SR_W_0_20.tif	D:\map\biles\NE2_50M_SR_W_0_20.tif	0.0	grid	189088	WGS 84	3	0	
19	NE2_50M_SR_W_0_21.tif	D:\map\biles\NE2_50M_SR_W_0_21.tif	0.0	grid	189088	WGS 84	3	0	
20	NE2_50M_SR_W_0_3.tif	D:\map\biles\NE2_50M_SR_W_0_3.tif	0.0	grid	189088	WGS 84	3	0	
21	NE2_50M_SR_W_0_4.tif	D:\map\biles\NE2_50M_SR_W_0_4.tif	0.0	grid	189088	WGS 84	3	0	
22	NE2_50M_SR_W_0_5.tif	D:\map\biles\NE2_50M_SR_W_0_5.tif	0.0	grid	189088	WGS 84	3	0	
23	NE2_50M_SR_W_0_6.tif	D:\map\biles\NE2_50M_SR_W_0_6.tif	0.0	grid	189088	WGS 84	3	0	
24	NE2_50M_SR_W_0_7.tif	D:\map\biles\NE2_50M_SR_W_0_7.tif	0.0	grid	189088	WGS 84	3	0	
25	NE2_50M_SR_W_0_8.tif	D:\map\biles\NE2_50M_SR_W_0_8.tif	0.0	grid	189088	WGS 84	3	0	
26	NE2_50M_SR_W_0_9.tif	D:\map\biles\NE2_50M_SR_W_0_9.tif	0.0	grid	189088	WGS 84	3	0	
27	NE2_50M_SR_W_0_10.tif	D:\map\biles\NE2_50M_SR_W_0_10.tif	0.0	grid	189088	WGS 84	3	0	
28	NE2_50M_SR_W_0_10.tif	D:\map\biles\NE2_50M_SR_W_0_10.tif	0.0	grid	189088	WGS 84	3	0	
29	NE2_50M_SR_W_0_11.tif	D:\map\biles\NE2_50M_SR_W_0_11.tif	0.0	grid	189088	WGS 84	3	0	
30	NE2_50M_SR_W_0_12.tif	D:\map\biles\NE2_50M_SR_W_0_12.tif	0.0	grid	189088	WGS 84	3	0	
31	NE2_50M_SR_W_0_13.tif	D:\map\biles\NE2_50M_SR_W_0_13.tif	0.0	grid	189088	WGS 84	3	0	
32	NE2_50M_SR_W_0_14.tif	D:\map\biles\NE2_50M_SR_W_0_14.tif	0.0	grid	189088	WGS 84	3	0	
33	NE2_50M_SR_W_0_14.tif	D:\map\biles\NE2_50M_SR_W_0_14.tif	0.0	grid	189088	WGS 84	3	0	
34	NE2_50M_SR_W_0_15.tif	D:\map\biles\NE2_50M_SR_W_0_15.tif	0.0	grid	189088	WGS 84	3	0	
35	NE2_50M_SR_W_0_16.tif	D:\map\biles\NE2_50M_SR_W_0_16.tif	0.0	grid	189088	WGS 84	3	0	
36	NE2_50M_SR_W_0_17.tif	D:\map\biles\NE2_50M_SR_W_0_17.tif	0.0	grid	189088	WGS 84	3	0	
37	NE2_50M_SR_W_0_18.tif	D:\map\biles\NE2_50M_SR_W_0_18.tif	0.0	grid	189088	WGS 84	3	0	
38	NE2_50M_SR_W_0_19.tif	D:\map\biles\NE2_50M_SR_W_0_19.tif	0.0	grid	189088	WGS 84	3	0	
39	NE2_50M_SR_W_0_20.tif	D:\map\biles\NE2_50M_SR_W_0_20.tif	0.0	grid	189088	WGS 84	3	0	
40	NE2_50M_SR_W_0_20.tif	D:\map\biles\NE2_50M_SR_W_0_20.tif	0.0	grid	189088	WGS 84	3	0	
41	NE2_50M_SR_W_0_21.tif	D:\map\biles\NE2_50M_SR_W_0_21.tif	0.0	grid	189088	WGS 84	3	0	
42	NE2_50M_SR_W_0_21.tif	D:\map\biles\NE2_50M_SR_W_0_21.tif	0.0	grid	189088	WGS 84	3	0	
43	NE2_50M_SR_W_0_22.tif	D:\map\biles\NE2_50M_SR_W_0_22.tif	0.0	grid	189088	WGS 84	3	0	
44	NE2_50M_SR_W_0_5.tif	D:\map\biles\NE2_50M_SR_W_0_5.tif	0.0	grid	189088	WGS 84	3	0	
45	NE2_50M_SR_W_0_6.tif	D:\map\biles\NE2_50M_SR_W_0_6.tif	0.0	grid	189088	WGS 84	3	0	
46	NE2_50M_SR_W_0_7.tif	D:\map\biles\NE2_50M_SR_W_0_7.tif	n/a	grid	n/a	n/a	n/a	n/a	

Figure 6-15: PyramidMap mosaicing rasters in the resource pool in batches

The raster mosaicing mode dialog box is shown in Figure 6-16.

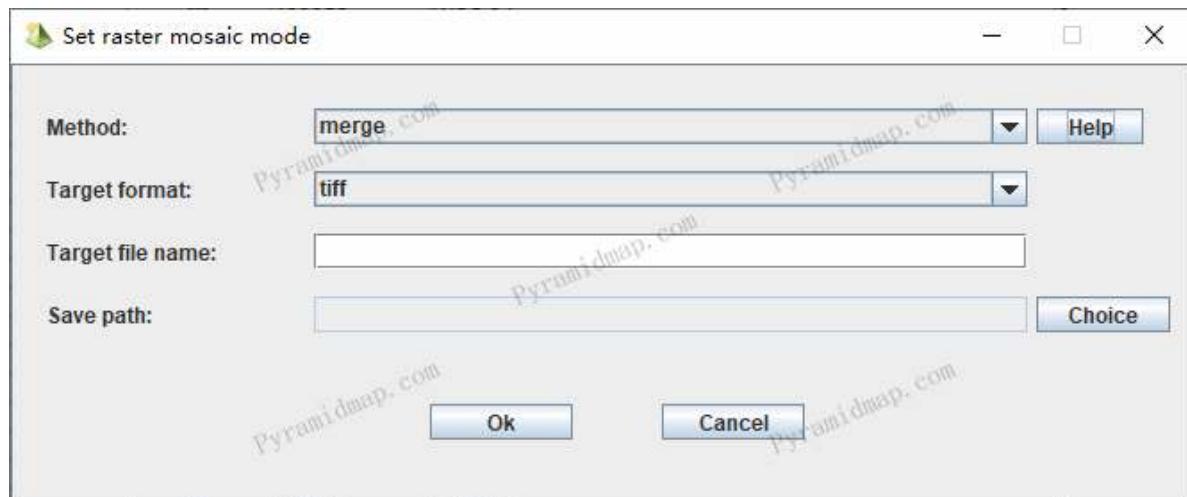


Figure 6-16: The raster mosaicing mode dialog box

The effect of rasters mosaicing is shown in Figure 6-17.

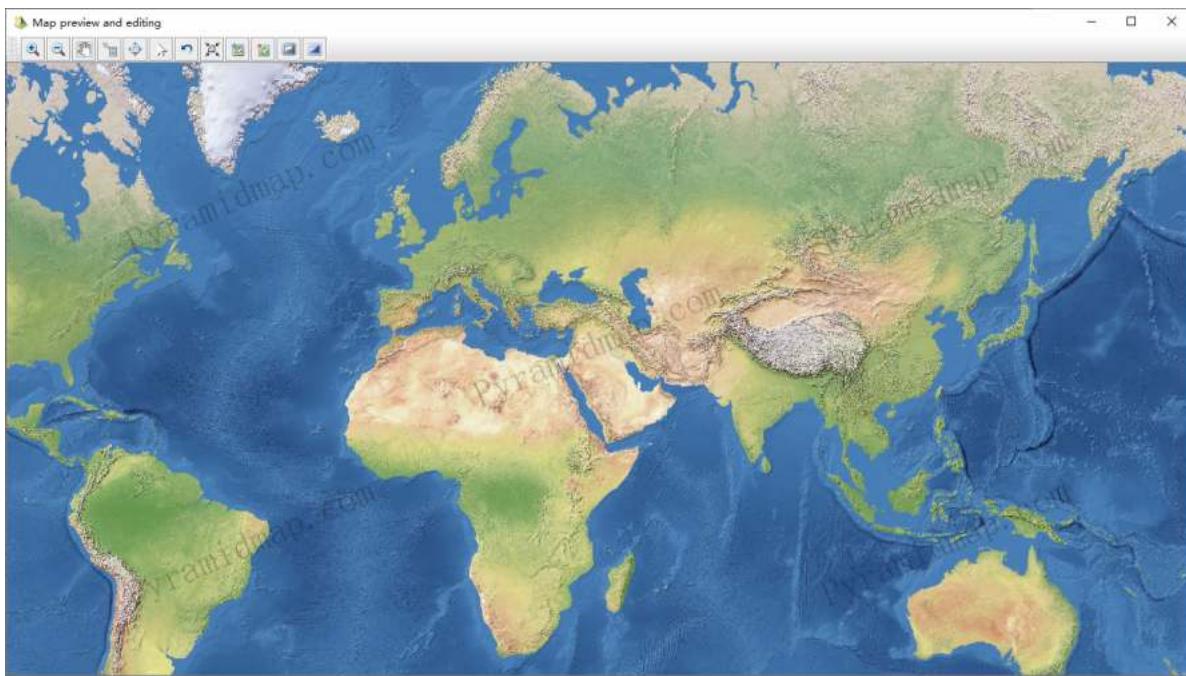


Figure 6-17: The effect of rasters mosaicing

Two common methods for combining adjacent or overlapping raster layers are MERGE and MOSAIC. The following is an explanation of the differences between these two types of work. The MOSAIC and MERGE functions work similarly, but there are also differences between them. When the input grids do not have any overlapping area, there is no difference in the output from either MERGE or MOSAIC. The difference is only in the processing of overlapping areas. In the case of MERGE, the sequence of input grids determines the values assigned to cells, giving priority to those entered first. The merge processing mode is shown in Figure 6-18.

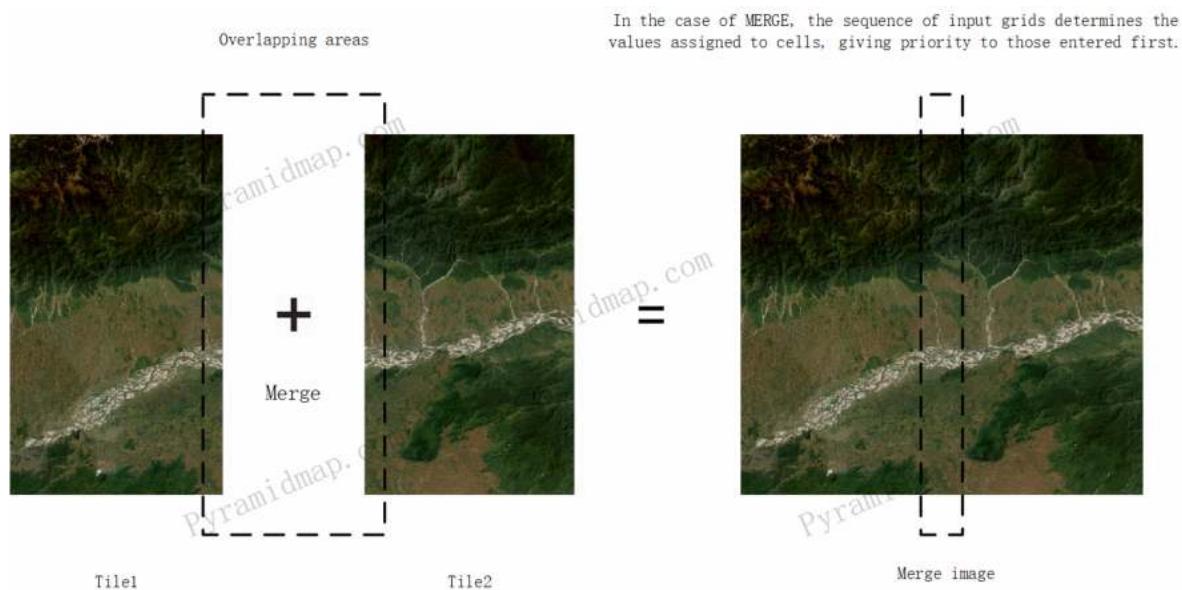


Figure 6-18: The merge processing mode

For MOSAIC, overlapping areas were *blended* to make a smooth transition and the sequence of entry is irrelevant. MOSAIC is typically used for **continuous** data (such as the spatially adjacent grids representing Digital Elevation Models, satellite images acquired in a slightly different time, containment plumes, etc.) The Mosaic processing mode is shown in Figure 6-19.

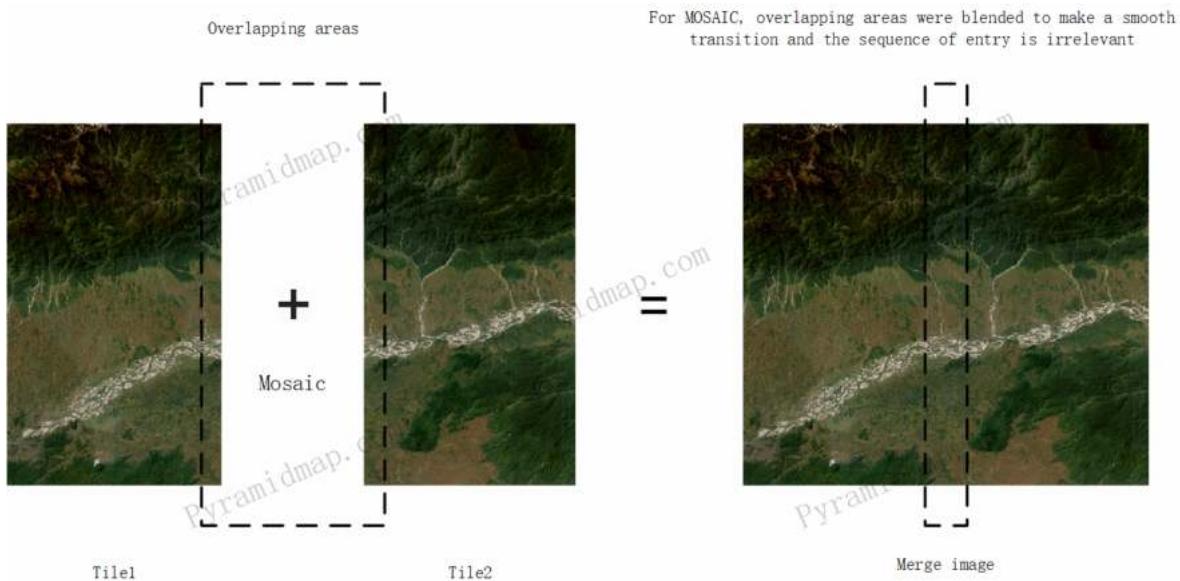


Figure 6-19: The mosaic processing mode

6.3 Geodatabase layers pool

PyramidMap imports client shp vector layers into Geodatabase through database connection pool, obtains layer list through database connection pool, and supports various operations with corresponding buttons.

6.3.1 Importing Shp into Geodatabase

PyramidMap maintains the Geodatabase connection pool and the Shp vector layer resource pool to import the Shp vector layer into the Geodatabase in batches. It supports but is not limited to Oracle, PostGIS and MySQL. The import interface and process are shown in Figure 6-20.

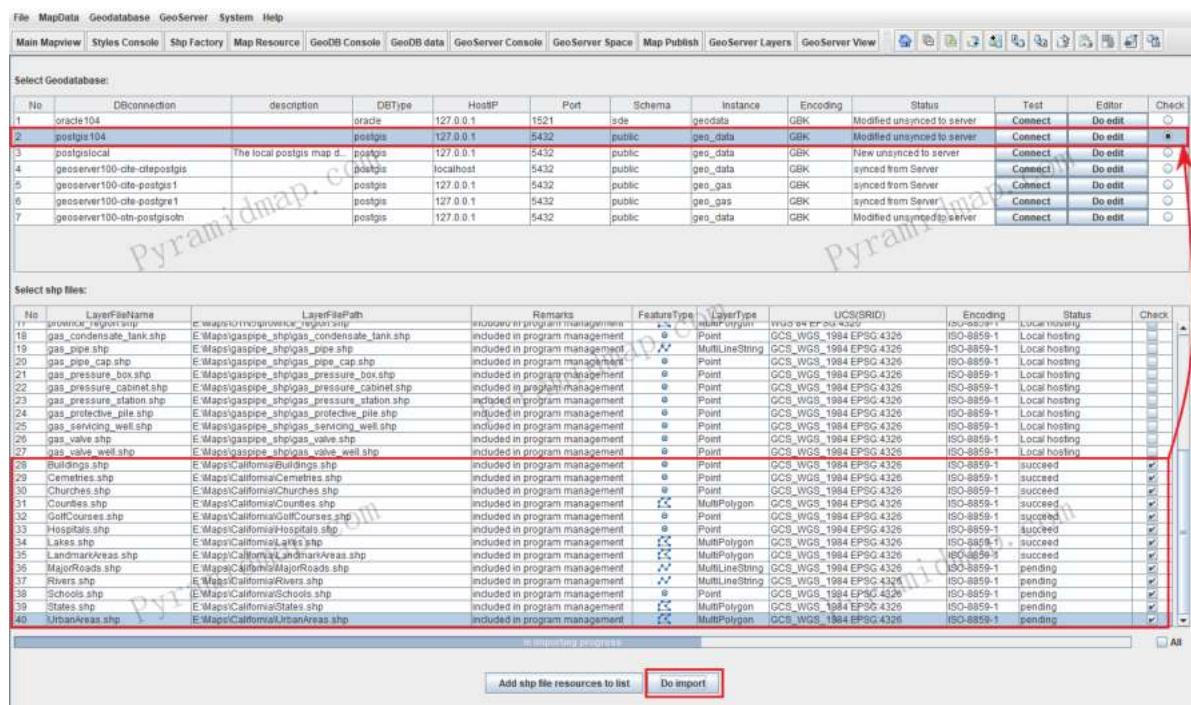


Figure 6-20: Shp vector layerS imported to Geodatabase workflow

In this module, users can selectively import Shp vector layers into Geodatabase in batches. After importing, each Shp layer generates a layer feature table with the same name. As a reciprocal process, the layer feature table in Geodatabase can also be exported to different geographic feature data such as Shp, Csv, Kml, Geojson, etc.

6.3.2 Geodatabase exporting out shp

As a reciprocal process, the features table in Geodatabase can also be exported to different geographical element data such as Shp, Csv, Kml, GeoJson, etc. The operation interface and flow are shown in Figure 6-21.

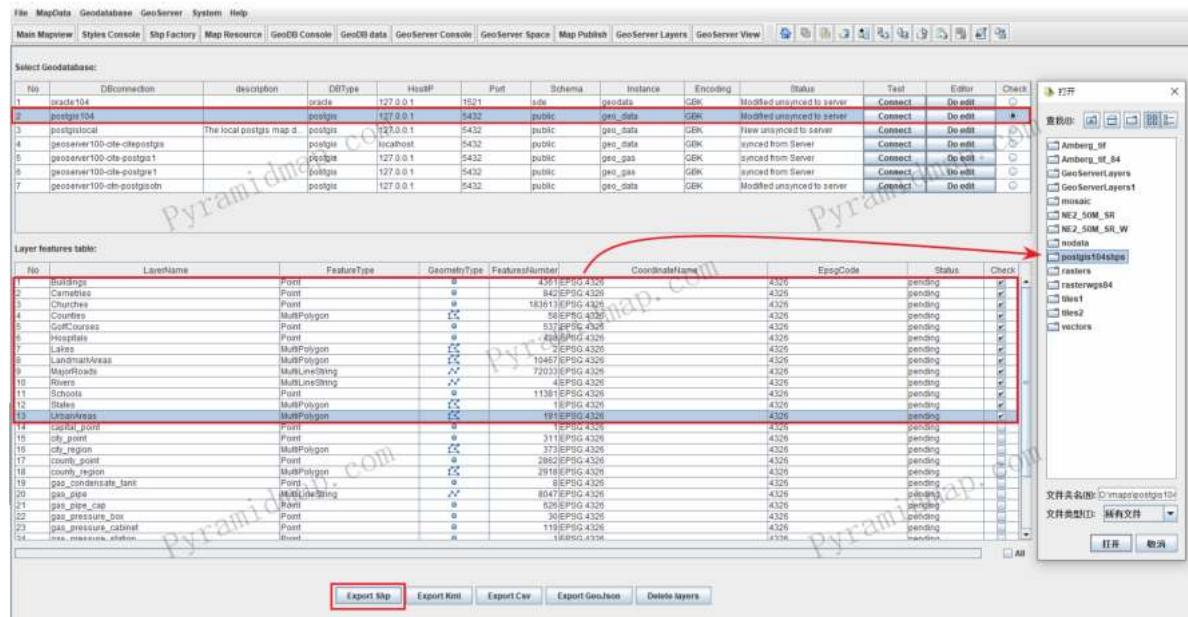


Figure 6-21: Geodatabase layer table export interface and workflow chart

In this module, users can selectively export the layer tables in Geodatabase as Shp, Csv, Kml and GeoJson under the specified path. Taking the exported Shp file as an example, the export process, export status and export file are shown in Figure 6-22.

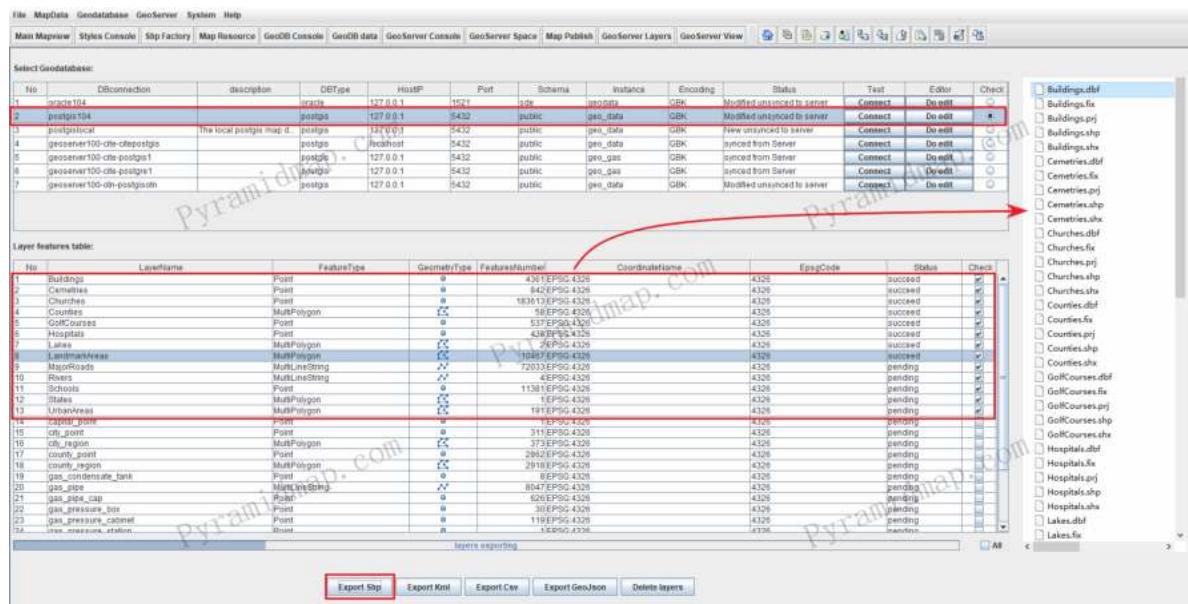


Figure 6-22: Geodatabase layer table export process, export status and export file flow chart

Select the database connection, dynamically obtain its internal layer resources, perform corresponding processing, and support various operations on layer resources with corresponding buttons, including:

- Export Shp: Export Geodatabase layers to shp files.
- Export Kml: Export Geodatabase layers to kml files.
- Export Csv: Export Geodatabase layers to csv files.
- Export GeoJson: Export Geodatabase layers to geojson files.

- Delete layers: Bulk delete the selected Geodatabase layers.

Reload and display the exported Shp layer in the map view, as shown in Figure 6-23.

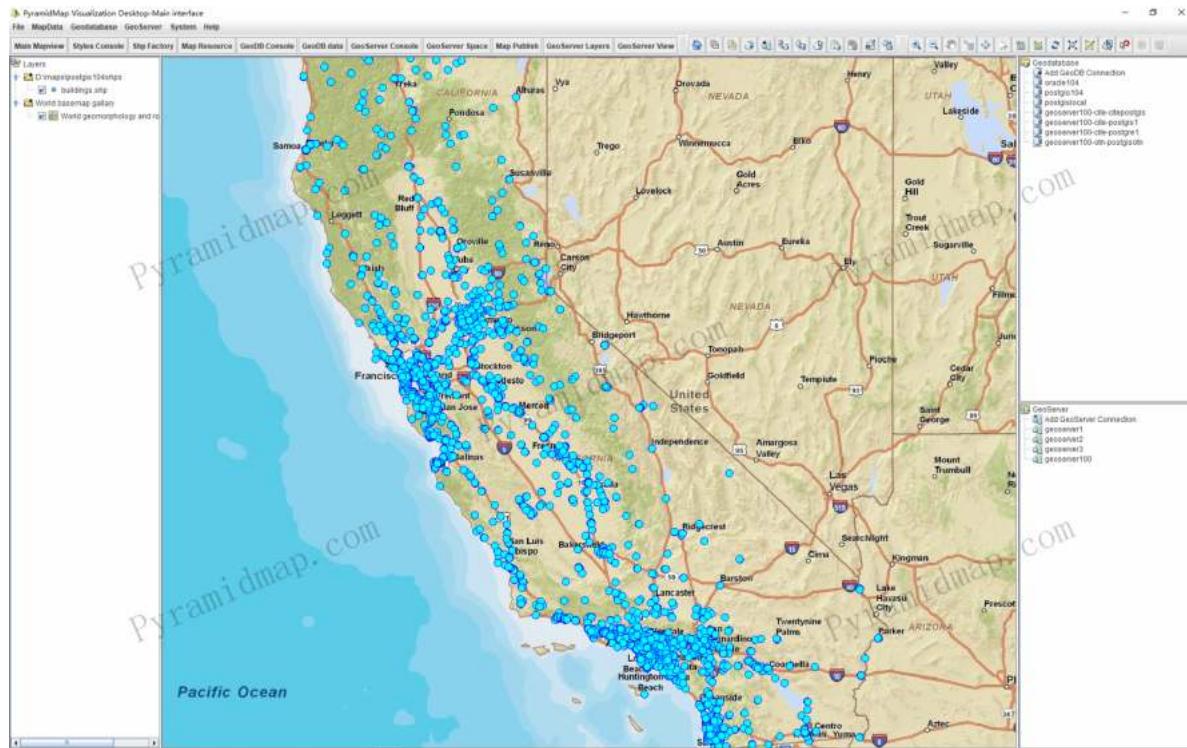


Figure 6-23: Display of Shp layer exported from Geodatabase

6.3.3 Geodatabase layers preview and edit

The layer table in Geodatabase can be queried and previewed directly. The operation interface and flow diagram are shown in Figure 6-24.

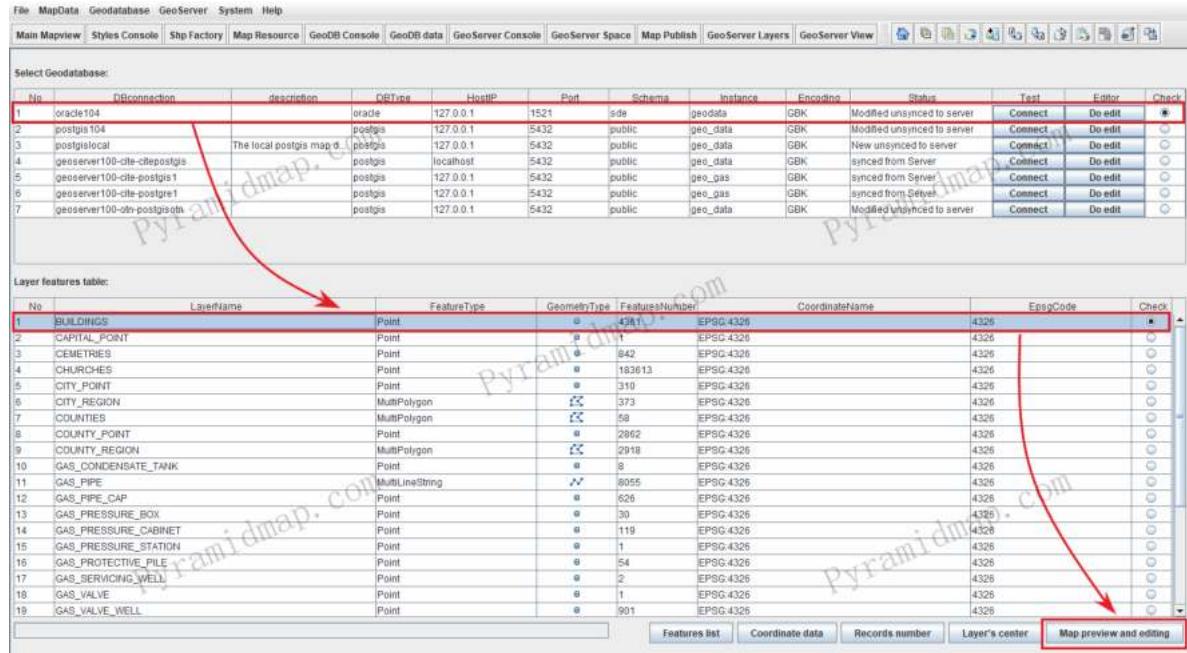


Figure 6-24: Geodatabase layer table query and preview

Select the database connection, dynamically obtain its internal layer resources, perform corresponding processing, and support various operations on layer resources with corresponding buttons, including:

- Feature List: forms the feature list of the selected layer.

- Coordinate data: form a list of geographical coordinates of the selected layer.
- Records number: perform data statistics on the features in the layer.
- Layer's center: calculates the center point location of the layer.
- Map preview and edit: preview and edit the layers in the management pool.

In particular, through the map preview and editing options, the selected layer file will be opened in an independent map view to preview and edit the layer, as shown in Figure 6-25.

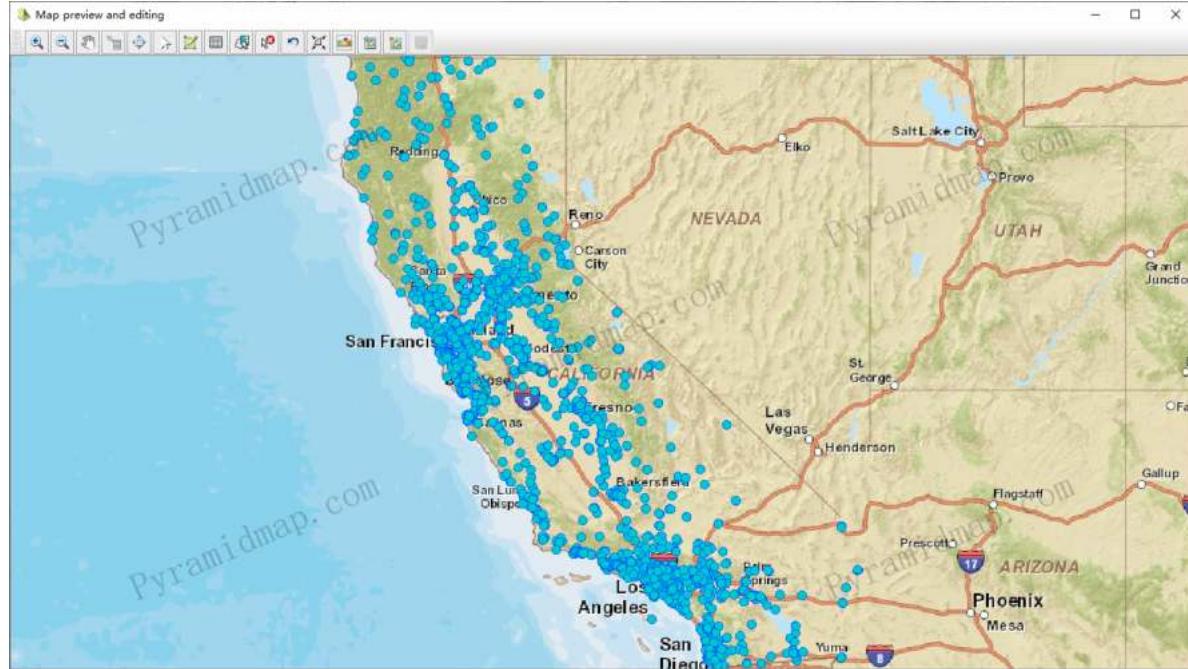


Figure 6-25: Open the independent preview and editing view of the single geodatabase layer

Independent map view provides each layer with separate display, rendering, base map selection and overlay, image-based editing, data table editing, feature selection and deletion operations. It is a comprehensive map service for a single layer.

6.4 GeoServer vector layers pool

PyramidMap publishes vector layers of client Shp file to GeoServer through GeoServer connection, and obtains the Internal layers through GeoServer connection in the pool, supporting various operations with corresponding buttons.

6.4.1 GeoServer layers preview

Select the GeoServer connection to dynamically acquire its internal layers and perform corresponding processing., as shown in Figure 6-26.

The screenshot shows the 'GeoServer Layers' tab selected in the top navigation bar. Below it, the 'GeoServer layer preview' and 'GeoServer layers console' tabs are visible. The main area displays two tables: 'Select GeoServer:' and 'layersList:'.

Select GeoServer:

No	GeoServerName	Description	HostIP	Port	WebUIName	WebUI	Check
1	geoserver1		127.0.0.1	8080	geoserver	http://127.0.0.1:8080/geoserver	<input checked="" type="checkbox"/>
2	geoserver2		127.0.0.1	8080	dcgisserver	http://127.0.0.1:8080/geoserver	<input type="checkbox"/>
3	geoserver3		172.19.120.233	8080	geoserver	http://172.19.120.233:8080/geoserver	<input type="checkbox"/>
4	geoserver100	GeoServer in 192.168.31.100	192.168.31.100	8080	geoserver	http://192.168.31.100:8080/geoserver	<input type="checkbox"/>

layersList:

No	LayerTitle	LayerName	WorkSpace	GeoServerUrl	DataStorage	Style	UCS	Geometr	LayerType	Min X	Max X	Min Y	Max Y	Check
1	Buildings	Buildings	otn	http://127.0.1.8080/geoserver	Buildings	point	EPSG:4326	<input checked="" type="checkbox"/>	point	-124.265630988	-114.289673032	32.5547790440	-42.0004039190	<input checked="" type="checkbox"/>
2	Cemeteries	Cemeteries	otn	http://127.0.1.8080/geoserver	Cemeteries	point	EPSG:4326	<input checked="" type="checkbox"/>	point	-124.26199944	-114.49633767	32.568672900	-42.120942250	<input type="checkbox"/>
3	Churches	Churches	otn	http://127.0.1.8080/geoserver	Churches	point	EPSG:4326	<input checked="" type="checkbox"/>	point	-170.73222219	-163.028333300	-14.335655999	64.9540207530	<input type="checkbox"/>
4	Counties	Counties	otn	http://127.0.1.8080/geoserver	Counties	polygon	EPSG:4326	<input checked="" type="checkbox"/>	polygon	-124.40972100	-114.13121199	32.5341569920	-42.0095189850	<input type="checkbox"/>
5	GolfCourses	GolfCourses	otn	http://127.0.1.8080/geoserver	GolfCourses	point	EPSG:4326	<input checked="" type="checkbox"/>	point	-124.18867133	-114.600079785	32.6403330870	-41.8354129110	<input type="checkbox"/>
6	Hospitals	Hospitals	otn	http://127.0.1.8080/geoserver	Hospitals	point	EPSG:4326	<input checked="" type="checkbox"/>	point	-124.19111769	-114.30398999	32.6167757466	-41.7727103980	<input type="checkbox"/>
7	Lakes	Lakes	otn	http://127.0.1.8080/geoserver	Lakes	polygon	EPSG:4326	<input checked="" type="checkbox"/>	polygon	-120.15212727	-115.59562327	32.1103213640	-39.2493473640	<input type="checkbox"/>
8	LandmarkAreas	LandmarkAreas	otn	http://127.0.1.8080/geoserver	LandmarkAreas	polygon	EPSG:4326	<input checked="" type="checkbox"/>	polygon	-124.19303702	-114.18072899	32.5425189960	-41.9960510040	<input type="checkbox"/>
9	MajorRoads	MajorRoads	otn	http://127.0.1.8080/geoserver	MajorRoads	line	EPSG:4326	<input checked="" type="checkbox"/>	linestring	-124.40275454	-114.12942727	32.5421545450	-42.0132272730	<input type="checkbox"/>
10	Rivers	Rivers	otn	http://127.0.1.8080/geoserver	Rivers	line	EPSG:4326	<input checked="" type="checkbox"/>	linestring	-124.05229327	-118.33676227	39.3913315450	-42.0067957370	<input type="checkbox"/>
11	Schools	Schools	otn	http://127.0.1.8080/geoserver	Schools	point	EPSG:4326	<input checked="" type="checkbox"/>	point	-124.32227960	-70.687523682	32.5433900720	-41.9879431430	<input type="checkbox"/>
12	States	States	otn	http://127.0.1.8080/geoserver	States	polygon	EPSG:4326	<input checked="" type="checkbox"/>	polygon	-124.40972100	-114.13121199	32.5341569920	-42.0095189850	<input type="checkbox"/>
13	UrbanAreas	UrbanAreas	otn	http://127.0.1.8080/geoserver	UrbanAreas	polygon	EPSG:4326	<input checked="" type="checkbox"/>	polygon	-124.21915192	-114.27694199	32.5559449940	-41.9910320880	<input type="checkbox"/>
14	capital_point	capital_point	otn	http://127.0.1.8080/geoserver	postgis104	point	EPSG:4326	<input checked="" type="checkbox"/>	point	118.50550800	-116.50570800	40.1324461100	-40.132461100	<input type="checkbox"/>
15	city_point	city_point	otn	http://127.0.1.8080/geoserver	postgis104	point	EPSG:4326	<input checked="" type="checkbox"/>	point	79.8433047485	-131.40618894	15.9973377487	-52.6016996291	<input type="checkbox"/>
16	city_region	city_region	otn	http://127.0.1.8080/geoserver	postgis104	polygon	EPSG:4326	<input checked="" type="checkbox"/>	polygon	73.1794815063	-135.405303955	11.0382738113	-53.77307674743	<input type="checkbox"/>
17	county_point	county_point	otn	http://127.0.1.8080/geoserver	postgis104	point	EPSG:4326	<input checked="" type="checkbox"/>	point	80.9064548950	-134.551940917	18.3353710174	-53.1429176330	<input type="checkbox"/>
18	county_region	county_region	otn	http://127.0.1.8080/geoserver	postgis104	polygon	EPSG:4326	<input checked="" type="checkbox"/>	polygon	77.717613202	-135.382736206	17.19404836932	-53.7387313842	<input type="checkbox"/>
19	gas_condensate_tank	gas_condensate_tank	otn	http://127.0.1.8080/geoserver	postgis104	point	EPSG:3857	<input checked="" type="checkbox"/>	point	1345.17860254	-1346.93368513	360.50658333	3625.1046929	<input type="checkbox"/>
20	gas_pipe	gas_pipe	otn	http://127.0.1.8080/geoserver	postgis104	line	EPSG:3857	<input checked="" type="checkbox"/>	linestring	13446.1039767	-1346.98239277	360.3543771	3629.1632984	<input type="checkbox"/>
21	gas_pipe_cap	gas_pipe_cap	otn	http://127.0.1.8080/geoserver	postgis104	point	EPSG:3857	<input checked="" type="checkbox"/>	point	134485.345507	-1346.934553	360.387877072	3628.60991408	<input type="checkbox"/>
22	gas_pressure_box	gas_pressure_box	otn	http://127.0.1.8080/geoserver	postgis104	point	EPSG:3857	<input checked="" type="checkbox"/>	point	134464.355725	-1346.5645325	360.44671919	3628.6942044	<input type="checkbox"/>
23	gas_pressure_cabinet	gas_pressure_cabinet	otn	http://127.0.1.8080/geoserver	postgis104	point	EPSG:3857	<input checked="" type="checkbox"/>	point	134462.821718	-1346.94492785	360.37215808	3629.00425859	<input type="checkbox"/>
24	gas_pressure_station	gas_pressure_station	otn	http://127.0.1.8080/geoserver	postgis104	point	EPSG:3857	<input checked="" type="checkbox"/>	point	134533.684608	-1346.33706468	360.69120380	360.69140386	<input type="checkbox"/>
25	gas_protective_pill	gas_protective_pile	otn	http://127.0.1.8080/geoserver	postgis104	point	EPSG:3857	<input checked="" type="checkbox"/>	point	134519.10117E7	-1346.24784687	360.7336.8577	3623.375.6472	<input type="checkbox"/>
26	gas_servicing_well	gas_servicing_well	otn	http://127.0.1.8080/geoserver	postgis104	point	EPSG:3857	<input checked="" type="checkbox"/>	point	134593.083535	-1346.44039188	361.0205.9532	3617.492.7543	<input type="checkbox"/>
27	gas_valve	gas_valve	otn	http://127.0.1.8080/geoserver	postgis104	point	EPSG:3857	<input checked="" type="checkbox"/>	point	134593.050139	-134593.070139	3617.491.1813	3617.493.6193	<input type="checkbox"/>

Buttons at the bottom: Preview and Set style.

Figure 6-26: GeoServer connections pool and its internal layers pool

Various operations on layer resources are supported, including:

- Preview: preview the selected layer through WMS service mode.
- Set Style: set the sld display symbol matching its geometric type for the selected layer, as shown in Figure 6-27.

The screenshot shows the 'GeoServer Styles selection console' window. It contains a table with columns: No, style, workArea, GeometryType, Symbol, Size(pixel), StrokeWidth(pixel), StrokeColor, StrokeOpacity, FillColor, FillOpacity, LabelField, and Check.

No	style	workArea	GeometryType	Symbol	Size(pixel)	StrokeWidth(pixel)	StrokeColor	StrokeOpacity	FillColor	FillOpacity	LabelField	Check
1	burg		circle	circle	20	1.0	1.0	1.0				<input checked="" type="checkbox"/>
2	capitals		square	square	6	2	1.0	1.0				<input type="checkbox"/>
3	generic		circle	circle	6	1	1.0	1.0				<input type="checkbox"/>
4	IB101		circle	circle	30.0	5.0	0.379999995231...	0.37999999523...				<input type="checkbox"/>
5	IB1701		circle	circle	5.0	1.0	1.0	1.0				<input type="checkbox"/>
6	IB21		cross	cross	35.0	5.0	0.310000002384...	0.310000002384...				<input type="checkbox"/>
7	IB501		square	square	35.0	5.0	1.0	1.0				<input type="checkbox"/>
8	IB801		star	star	30.0	4.0	1.0	1.0				<input type="checkbox"/>
9	point		circle	circle	6	1.0	1.0	1.0				<input type="checkbox"/>

Buttons at the bottom: Yes and Cancel.

Figure 6-27: Get the internal styles in the GeoServer selected and form styles list pool

Select style in the list and assign it to the selected layer.

In particular, through the map preview and editing options, the selected layer file will be opened in the independent GeoServer map view to preview the layer. The editing function is not supported temporarily, as shown in Figure 6-28.

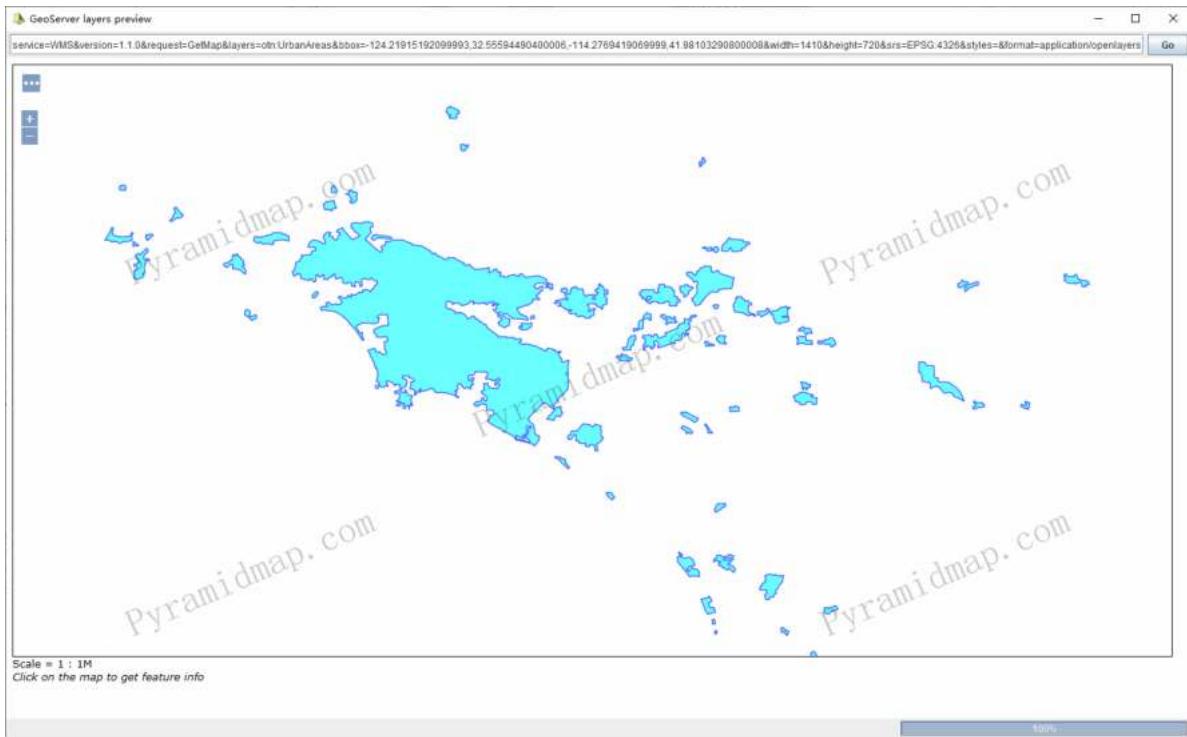


Figure 6-28: The GeoServer vector layer is previewed according to the preset sld style

6.4.2 GeoServer layers exporting

As a reciprocal process with layers publishing, the layers hosted in GeoServer can be exported to different geographic feature data such as Shp, Csv, Kml, GeoJson, etc. The operation interface and flow are shown in Figure 6-29.

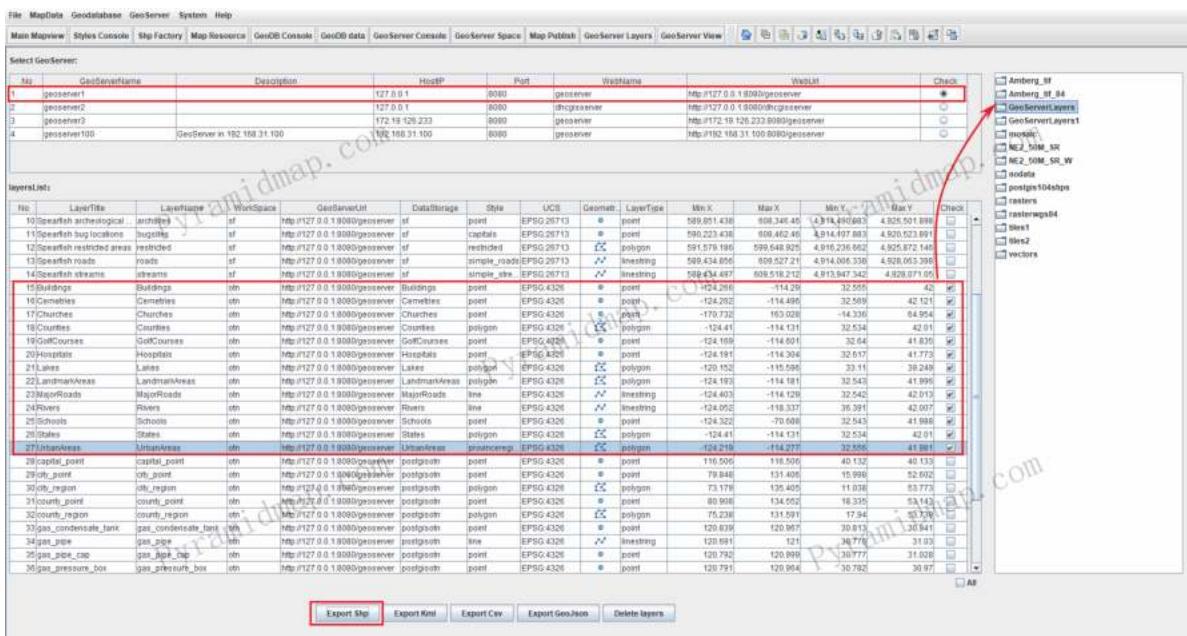


Figure 6-29: GeoServer layer export selection and specified export path

In the GeoServer layer resource list, select a layer and export it to the specified path in batch. The export process is displayed with a progress bar, and the flow diagram is shown in Figure 6-30.

No	GeoServerName	Description	HostIP	Port	Webname	Weburl	Check
1	geoserver1		127.0.0.1	8080	geoserver	http://127.0.0.1:8080/geoserver	<input checked="" type="checkbox"/>
2	geoserver2		127.0.0.1	8080	geoserver	http://127.0.0.1:8080/geoserver	<input type="checkbox"/>
3	geoserver3		172.19.126.233	8080	geoserver	http://172.19.126.233:8080/geoserver	<input type="checkbox"/>
4	geoserver100	GeoServer in 192.168.31.100	192.168.31.100	8080	geoserver	http://192.168.31.100:8080/geoserver	<input type="checkbox"/>

LayersList

No	LayerTitle	Layername	Workspace	GeoServerName	DatasetStorage	Shp	UCS	Geometry	LayerType	Min X	Max X	Min Y	Max Y	Check
7	Tasmania roads	tasmania_roads	topp	http://127.0.0.1:8080/geoserver	tz_shapes	simple	EPSG:4326	ZZ	lineString	145.198	148.273	-49.424	-40.853	<input type="checkbox"/>
8	Tasmania state boundari	tasmania_state_bound	topp	http://127.0.0.1:8080/geoserver	tz_shapes	green	EPSG:4326	ZZ	polygon	143.835	148.479	-43.648	-39.574	<input type="checkbox"/>
9	Tasmania water bodies	tasmania_water_bodies	topp	http://127.0.0.1:8080/geoserver	tz_shapes	cte_lakes	EPSG:4326	ZZ	polygon	145.972	147.22	-43.032	-41.776	<input type="checkbox"/>
10	Spatial# archaeological	archsites	af	http://127.0.0.1:8080/geoserver	af	point	EPSG:26713	*	point	589.851438	808.34948	4,914,490.883	4,928,591.898	<input type="checkbox"/>
11	Spatial# bug locations	bugsites	af	http://127.0.0.1:8080/geoserver	af	point	EPSG:26713	*	point	590.223438	608.46249	4,914,107.883	4,920,623.891	<input type="checkbox"/>
12	Spatial# restricted areas	restricted	af	http://127.0.0.1:8080/geoserver	af	rectangle	EPSG:26713	ZZ	polygon	591.579186	509.948295	4,916,238.682	4,928,572.148	<input type="checkbox"/>
13	Spatial# roads	roads	af	http://127.0.0.1:8080/geoserver	af	simple	EPSG:26713	ZZ	lineString	580.434856	609.52721	4,914,006.338	4,928,063.398	<input type="checkbox"/>
14	Spatial# streams	streams	af	http://127.0.0.1:8080/geoserver	af	simple	EPSG:26713	ZZ	lineString	580.434497	809.118212	4,913,647.342	4,928,371.05	<input type="checkbox"/>
15	BulkMap	Buildings	dmn	http://127.0.0.1:8080/geoserver	Buildings	point	EPSG:4326	*	point	-124.298	-114.298	32.555	42	<input checked="" type="checkbox"/>
16	Cemeteries	Cemeteries	dmn	http://127.0.0.1:8080/geoserver	Cemeteries	point	EPSG:4326	*	point	-124.262	-114.495	32.568	42.121	<input type="checkbox"/>
17	Churches	Churches	dmn	http://127.0.0.1:8080/geoserver	Churches	point	EPSG:4326	*	point	-170.732	165.026	-14.330	64.954	<input type="checkbox"/>
18	Counties	Counties	dmn	http://127.0.0.1:8080/geoserver	Counties	polygon	EPSG:4326	ZZ	polygon	-124.41	-114.131	32.514	42.01	<input checked="" type="checkbox"/>
19	GolfCourses	GolfCourses	dmn	http://127.0.0.1:8080/geoserver	GolfCourses	point	EPSG:4326	*	point	-124.168	-114.801	32.84	41.935	<input type="checkbox"/>
20	Hospitals	Hospitals	dmn	http://127.0.0.1:8080/geoserver	Hospitals	point	EPSG:4326	*	point	-124.191	-114.304	32.617	41.773	<input type="checkbox"/>
21	Jakes	Lakes	dmn	http://127.0.0.1:8080/geoserver	Lakes	polygon	EPSG:4326	*	point	-120.152	-115.598	33.11	39.249	<input type="checkbox"/>
22	LandmarkAreas	LandmarkAreas	dmn	http://127.0.0.1:8080/geoserver	LandmarkAreas	polygon	EPSG:4326	*	point	-124.193	-114.181	32.543	41.899	<input type="checkbox"/>
23	MajorRoads	MajorRoads	dmn	http://127.0.0.1:8080/geoserver	MajorRoads	line	EPSG:4326	ZZ	lineString	124.193	-114.181	32.542	42.013	<input type="checkbox"/>
24	Rivers	Rivers	dmn	http://127.0.0.1:8080/geoserver	Rivers	line	EPSG:4326	ZZ	lineString	124.062	-114.217	36.391	42.013	<input type="checkbox"/>
25	Schools	Schools	dmn	http://127.0.0.1:8080/geoserver	Schools	point	EPSG:4326	*	point	124.322	-70.688	32.542	41.888	<input type="checkbox"/>
26	States	States	dmn	http://127.0.0.1:8080/geoserver	States	polygon	EPSG:4326	ZZ	polygon	124.41	-114.131	32.534	42.01	<input type="checkbox"/>
27	Unknowns	Unknowns	dmn	http://127.0.0.1:8080/geoserver	Unknowns	polygon	EPSG:4326	ZZ	polygon	124.311	-114.337	32.634	41.881	<input checked="" type="checkbox"/>
28	capital_point	capital_point	dmn	http://127.0.0.1:8080/geoserver	capital_point	point	EPSG:4326	*	point	118.506	118.506	40.132	40.122	<input type="checkbox"/>
29	cty_point	cty_point	dmn	http://127.0.0.1:8080/geoserver	cty_point	point	EPSG:4326	*	point	79.648	131.408	15.998	53.807	<input type="checkbox"/>
30	cty_region	cty_region	dmn	http://127.0.0.1:8080/geoserver	cty_region	polygon	EPSG:4326	ZZ	polygon	73.179	135.405	11.038	53.773	<input type="checkbox"/>
31	county_point	county_point	dmn	http://127.0.0.1:8080/geoserver	county_point	point	EPSG:4326	*	point	80.996	134.552	88.369	93.143	<input type="checkbox"/>
32	county_region	county_region	dmn	http://127.0.0.1:8080/geoserver	county_region	polygon	EPSG:4326	ZZ	polygon	75.238	131.591	17.34	53.739	<input type="checkbox"/>
33	gas_condensate_tank	gas_condensate_tank	dmn	http://127.0.0.1:8080/geoserver	gas_condensate_tank	point	EPSG:4326	*	point	120.838	120.967	30.813	30.841	<input type="checkbox"/>

Export Shp Export Kmz Export Csv Export Geosjon Delete layers

BUILDINGS.dbf
BUILDINGS.firebaseio
BUILDINGS.prj
BUILDINGS.shx
CEMETRIES.dbf
CEMETRIES.firebaseio
CEMETRIES.prj
CEMETRIES.shx
CHURCHES.dbf
CHURCHES.firebaseio
CHURCHES.prj
CHURCHES.shx
GOLF_COURSES.dbf
GOLF_COURSES.firebaseio
GOLF_COURSES.prj
GOLF_COURSES.shx
HOSPITALS.dbf
HOSPITALS.firebaseio
HOSPITALS.prj
HOSPITALS.shx
LAKES.dbf
LAKES.firebaseio
LAKES.prj
LAKES.shx
LANDMARKAREAS.dbf
LANDMARKAREAS.firebaseio
LANDMARKAREAS.prj
LANDMARKAREAS.shx

Figure 6-30: GeoServer layer export process diagram

The selected layer is exported to the specified target path, and the export progress is displayed through the progress bar. The exported map is reloaded into the map view in the form of Shp vector file, as shown in Figure 6-31.

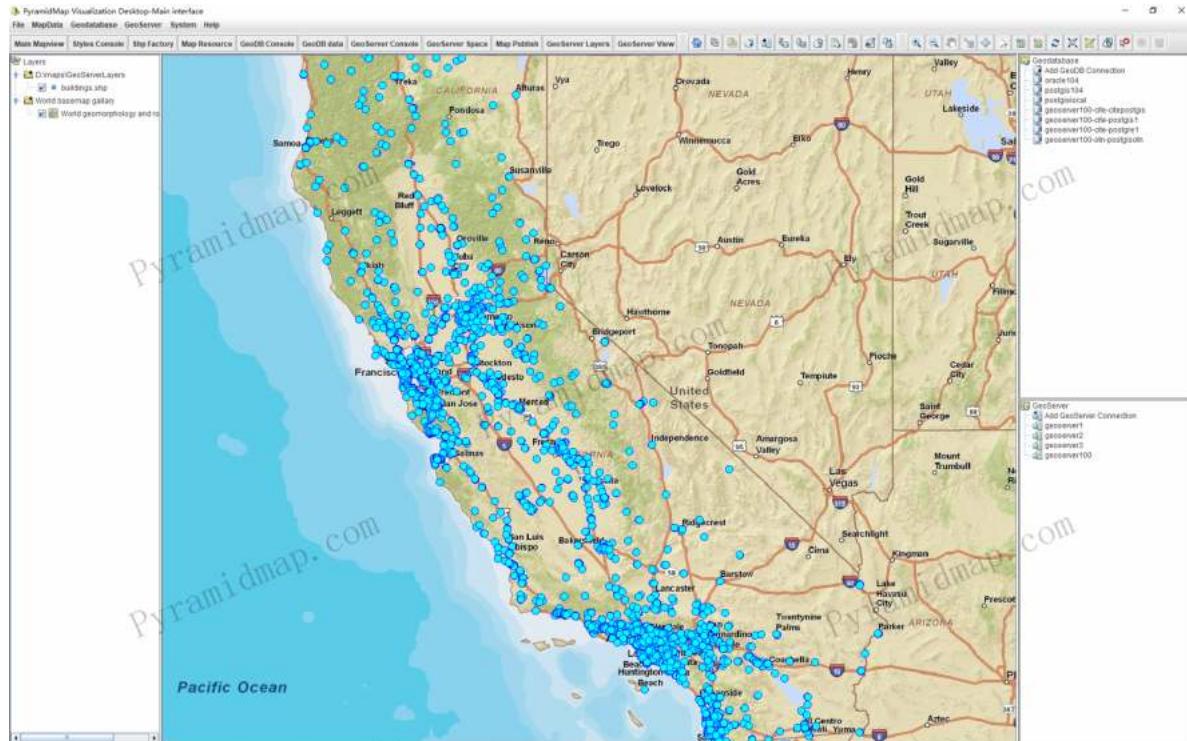


Figure 6-31: The exported Shp vector layer of GeoServer is reloaded to the map view for display

6.5 GeoServer raster layer pool

Select the raster layer in the Figure 6-8 GeoServer map server connection pool and its list, and the selected layer file will be opened in the independent GeoServer map view to preview the layer. The editing function is not supported temporarily, as shown in Figure 6-32.

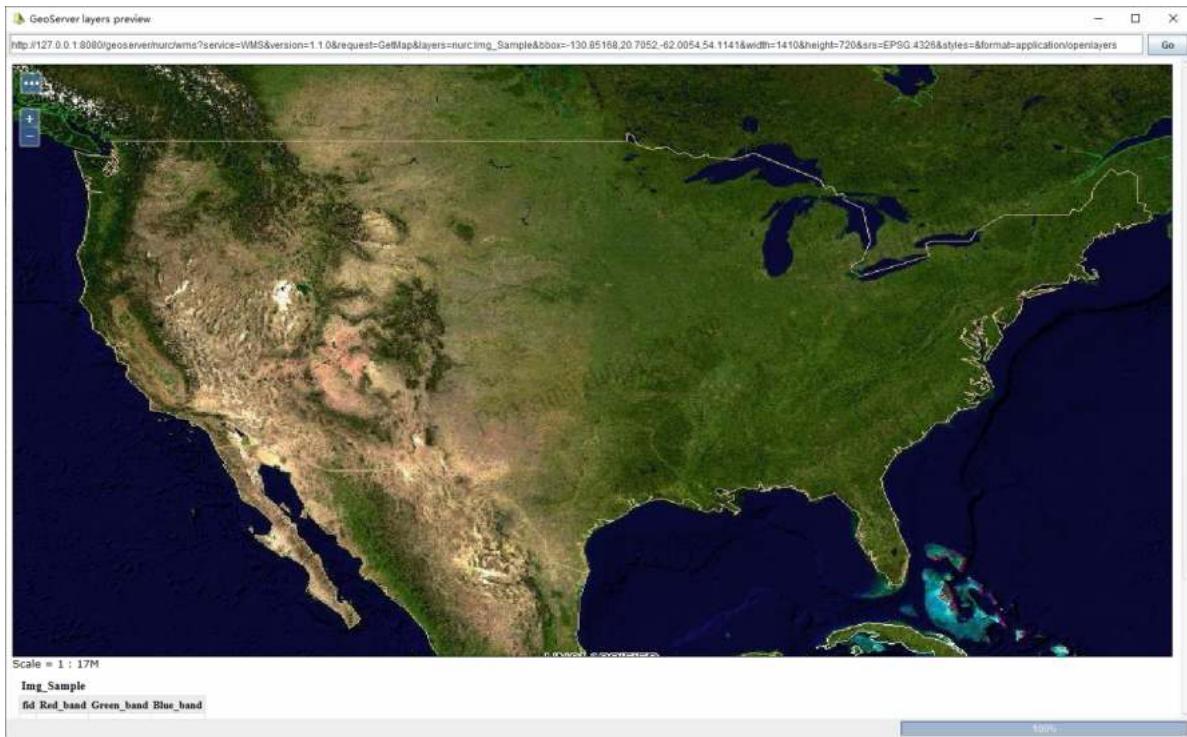


Figure 6-32: The GeoServer raster layer is previewed

6.6 Coordinate System Conversion

PyramidMap supports coordinate system conversion of Shp vector file and raster file layers. Select a layer from the above two types in the resource pool, and select "Coordinate System Conversion" button, as shown in Figure 6-33.

No	LayerFileName	LayerFilePath	Remarks	FeatureType	LayerType	UCS(SRID)	Encoding	Status	Check
1	gas_condensate_tank.shp	E:\Maps\gaspipe_shp\3857\gas_condensate_tank.shp	included in program management	vector	WGS_1984_World_Mercator_Auxiliary_Sphere EP	ISO-8659-1	Local hosting	<input checked="" type="checkbox"/>	
2	gas_pipe.shp	E:\Maps\gaspipe_shp\3857\gas_pipe.shp	included in program management	vector	WGS_1984_World_Mercator_Auxiliary_Sphere EP	ISO-8659-1	Local hosting	<input checked="" type="checkbox"/>	
3	gas_pipe_cap.shp	E:\Maps\gaspipe_shp\3857\gas_pipe_cap.shp	included in program management	vector	WGS_1984_World_Mercator_Auxiliary_Sphere EP	ISO-8659-1	Local hosting	<input checked="" type="checkbox"/>	
4	gas_pressure_box.shp	E:\Maps\gaspipe_shp\3857\gas_pressure_box.shp	included in program management	vector	WGS_1984_World_Mercator_Auxiliary_Sphere EP	ISO-8659-1	Local hosting	<input checked="" type="checkbox"/>	
5	gas_pressure_stations.shp	E:\Maps\gaspipe_shp\3857\gas_pressure_stations.shp	included in program management	vector	WGS_1984_World_Mercator_Auxiliary_Sphere EP	ISO-8659-1	Local hosting	<input checked="" type="checkbox"/>	
6	gas_pressurization_stations.shp	E:\Maps\gaspipe_shp\3857\gas_pressurization_stations.shp	included in program management	vector	WGS_1984_World_Mercator_Auxiliary_Sphere EP	ISO-8659-1	Local hosting	<input checked="" type="checkbox"/>	
7	gas_protective_pipe.shp	E:\Maps\gaspipe_shp\3857\gas_protective_pipe.shp	included in program management	vector	WGS_1984_World_Mercator_Auxiliary_Sphere EP	ISO-8659-1	Local hosting	<input checked="" type="checkbox"/>	
8	gas_servicing_well.shp	E:\Maps\gaspipe_shp\3857\gas_servicing_well.shp	included in program management	vector	WGS_1984_World_Mercator_Auxiliary_Sphere EP	ISO-8659-1	Local hosting	<input checked="" type="checkbox"/>	
9	gas_valve.shp	E:\Maps\gaspipe_shp\3857\gas_valve.shp	included in program management	vector	WGS_1984_World_Mercator_Auxiliary_Sphere EP	ISO-8659-1	Local hosting	<input checked="" type="checkbox"/>	
10	gas_valve_well.shp	E:\Maps\gaspipe_shp\3857\gas_valve_well.shp	included in program management	vector	WGS_1984_World_Mercator_Auxiliary_Sphere EP	ISO-8659-1	Local hosting	<input checked="" type="checkbox"/>	
11	capital_point.shp	E:\Maps\OTN\Geopolitical\point.shp	included in program management	vector	WGS_84_EPSG_4326	ISO-8659-1	Local hosting	<input type="checkbox"/>	
12	city_point.shp	E:\Maps\OTN\City\point.shp	included in program management	vector	WGS_84_EPSG_4326	ISO-8659-1	Local hosting	<input type="checkbox"/>	
13	city_region.shp	E:\Maps\OTN\City\region.shp	included in program management	vector	WGS_84_EPSG_4326	ISO-8659-1	Local hosting	<input type="checkbox"/>	
14	county_point.shp	E:\Maps\OTN\County\point.shp	included in program management	vector	WGS_84_EPSG_4326	ISO-8659-1	Local hosting	<input type="checkbox"/>	
15	county_region.shp	E:\Maps\OTN\County\region.shp	included in program management	vector	WGS_84_EPSG_4326	ISO-8659-1	Local hosting	<input type="checkbox"/>	
16	province_point.shp	E:\Maps\OTN\Province\point.shp	included in program management	vector	WGS_84_EPSG_4326	ISO-8659-1	Local hosting	<input type="checkbox"/>	
17	province_region.shp	E:\Maps\OTN\Province\region.shp	included in program management	vector	WGS_84_EPSG_4326	ISO-8659-1	Local hosting	<input type="checkbox"/>	
18	gas_condensate_tank.shp	E:\Maps\gaspipe_shp\3857\gas_condensate_tank.shp	included in program management	vector	GCS_WGS_1984_EPSG_4326	ISO-8659-1	Local hosting	<input type="checkbox"/>	
19	gas_pipe.shp	E:\Maps\gaspipe_shp\3857\gas_pipe.shp	included in program management	vector	GCS_WGS_1984_EPSG_4326	ISO-8659-1	Local hosting	<input type="checkbox"/>	
20	gas_pipe_cap.shp	E:\Maps\gaspipe_shp\3857\gas_pipe_cap.shp	included in program management	vector	GCS_WGS_1984_EPSG_4326	ISO-8659-1	Local hosting	<input type="checkbox"/>	
21	gas_pressure_box.shp	E:\Maps\gaspipe_shp\3857\gas_pressure_box.shp	included in program management	vector	GCS_WGS_1984_EPSG_4326	ISO-8659-1	Local hosting	<input type="checkbox"/>	
22	gas_pressure_cabinet.shp	E:\Maps\gaspipe_shp\3857\gas_pressure_cabinet.shp	included in program management	vector	GCS_WGS_1984_EPSG_4326	ISO-8659-1	Local hosting	<input type="checkbox"/>	
23	gas_pressure_station.shp	E:\Maps\gaspipe_shp\3857\gas_pressure_station.shp	included in program management	vector	GCS_WGS_1984_EPSG_4326	ISO-8659-1	Local hosting	<input type="checkbox"/>	
24	gas_protective_pipe.shp	E:\Maps\gaspipe_shp\3857\gas_protective_pipe.shp	included in program management	vector	GCS_WGS_1984_EPSG_4326	ISO-8659-1	Local hosting	<input type="checkbox"/>	
25	gas_servicing_well.shp	E:\Maps\gaspipe_shp\3857\gas_servicing_well.shp	included in program management	vector	GCS_WGS_1984_EPSG_4326	ISO-8659-1	Local hosting	<input type="checkbox"/>	
26	gas_valve.shp	E:\Maps\gaspipe_shp\3857\gas_valve.shp	included in program management	vector	GCS_WGS_1984_EPSG_4326	ISO-8659-1	Local hosting	<input type="checkbox"/>	
27	gas_valve_well.shp	E:\Maps\gaspipe_shp\3857\gas_valve_well.shp	included in program management	vector	GCS_WGS_1984_EPSG_4326	ISO-8659-1	Local hosting	<input type="checkbox"/>	
28	Buildings.shp	E:\Maps\California\Buildings.shp	included in program management	vector	GCS_WGS_1984_EPSG_4326	ISO-8659-1	Local hosting	<input type="checkbox"/>	
29	Cemeteries.shp	E:\Maps\California\Cemeteries.shp	included in program management	vector	GCS_WGS_1984_EPSG_4326	ISO-8659-1	Local hosting	<input type="checkbox"/>	
30	Churches.shp	E:\Maps\California\Churches.shp	included in program management	vector	GCS_WGS_1984_EPSG_4326	ISO-8659-1	Local hosting	<input type="checkbox"/>	
31	Counties.shp	E:\Maps\California\Counties.shp	included in program management	vector	GCS_WGS_1984_EPSG_4326	ISO-8659-1	Local hosting	<input type="checkbox"/>	
32	Golfcourses.shp	E:\Maps\California\GolfCourses.shp	included in program management	vector	GCS_WGS_1984_EPSG_4326	ISO-8659-1	Local hosting	<input type="checkbox"/>	
33	Hospitals.shp	E:\Maps\California\Hospitals.shp	included in program management	vector	GCS_WGS_1984_EPSG_4326	ISO-8659-1	Local hosting	<input type="checkbox"/>	
34	Lakes.shp	E:\Maps\California\Lakes.shp	included in program management	vector	GCS_WGS_1984_EPSG_4326	ISO-8659-1	Local hosting	<input type="checkbox"/>	
35	LandmarkAreas.shp	E:\Maps\California\LandmarkAreas.shp	included in program management	vector	GCS_WGS_1984_EPSG_4326	ISO-8659-1	Local hosting	<input type="checkbox"/>	
36	MajorRoads.shp	E:\Maps\California\MajorRoads.shp	included in program management	vector	GCS_WGS_1984_EPSG_4326	ISO-8659-1	Local hosting	<input type="checkbox"/>	
37	Rivers.shp	E:\Maps\California\Rivers.shp	included in program management	vector	GCS_WGS_1984_EPSG_4326	ISO-8659-1	Local hosting	<input type="checkbox"/>	
38	Schools.shp	E:\Maps\California\Schools.shp	included in program management	vector	GCS_WGS_1984_EPSG_4326	ISO-8659-1	Local hosting	<input type="checkbox"/>	
39	States.shp	E:\Maps\California\States.shp	included in program management	vector	GCS_WGS_1984_EPSG_4326	ISO-8659-1	Local hosting	<input type="checkbox"/>	
40	UrbanAreas.shp	E:\Maps\California\UrbanAreas.shp	included in program management	vector	GCS_WGS_1984_EPSG_4326	ISO-8659-1	Local hosting	<input type="checkbox"/>	

Figure 6-33: Select a layer for coordinate system conversion

The coordinate system conversion interface pops up, as shown in Figure 6-34.

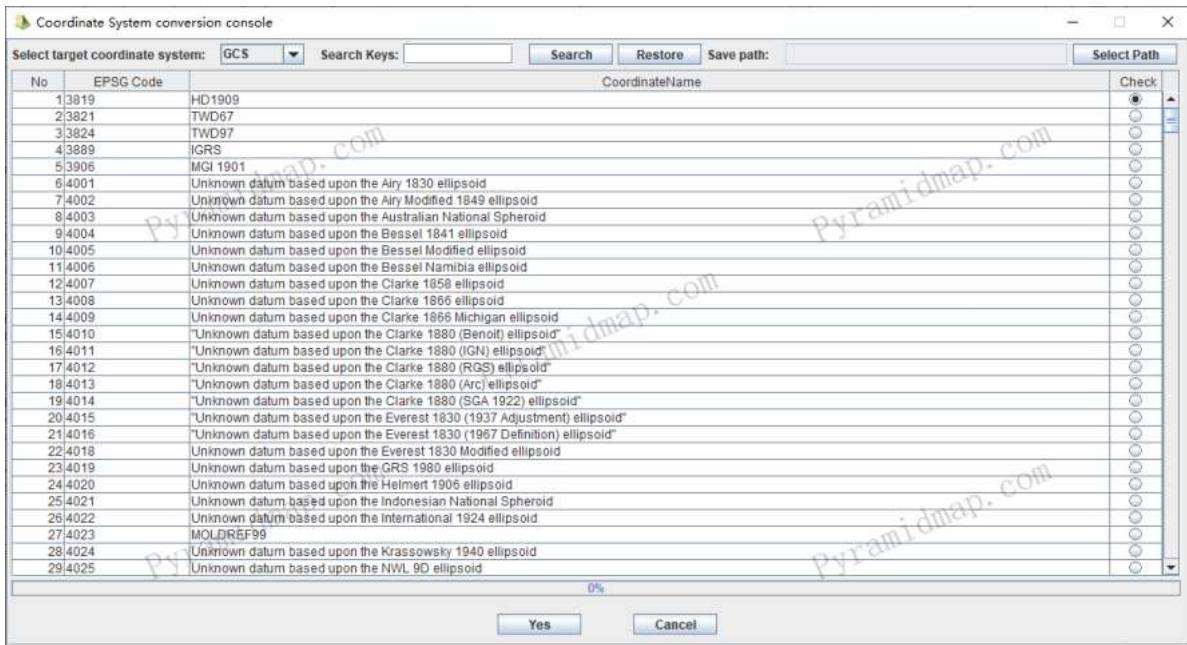


Figure 6-34: Select in coordinate system resource pool for conversion

In the coordinate system conversion interface, select the type of target coordinate system, which is divided into two types: spatial coordinate system and plane coordinate system, as well as many standardized coordinate systems to which it belongs. It supports global search by name and EPSG code. Taking WGS84 as an example, we can perform global keyword search according to coordinate system code 4326 to accurately obtain the target coordinate system we want, as shown in Figure 6-35.

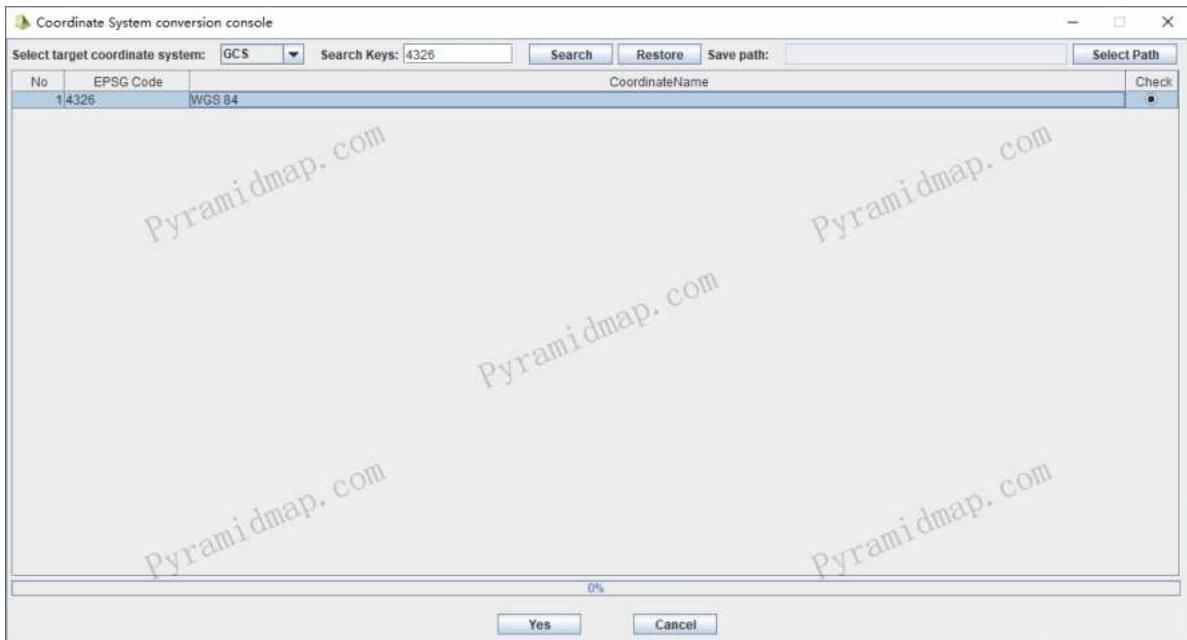


Figure 6-35: Select in coordinate system with global keyword searching according to coordinate system code

Select the target storage path and click "OK" to perform coordinate system conversion. The selected layers will be converted and saved to the target path according to the specified coordinate system. The progress bar displays the conversion progress, as shown in Figure 6-36.

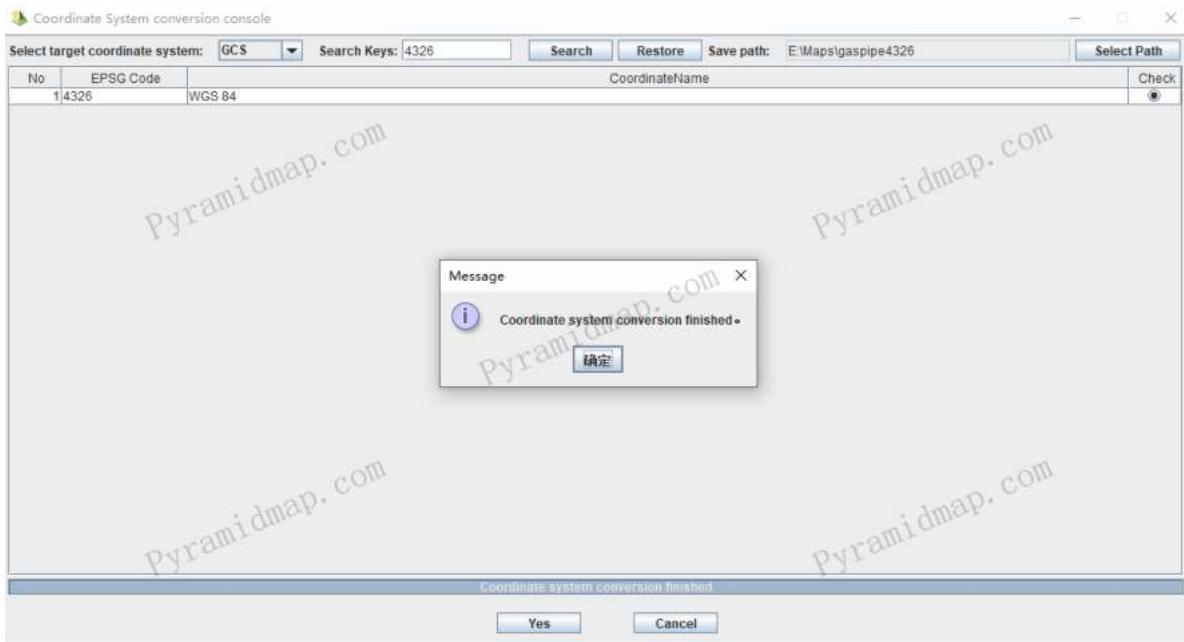


Figure 6-36: Converts the selected layer to the specified coordinate system under the target path

6.7 Data conversion

PyramidMap supports the mutual conversion between multi-source heterogeneous data and Shp layers, giving map application systems the ability to diversify data sources and convert maps into diversified production data. PyramidMap supports bidirectional conversion between Shp and Csv, Excel, GeoJson, as well as unidirectional conversion from Shp to Kml/Kmz. The functional entrances for converting Csv, Excel, and GeoJson to Shp are shown in Figure 6-37.

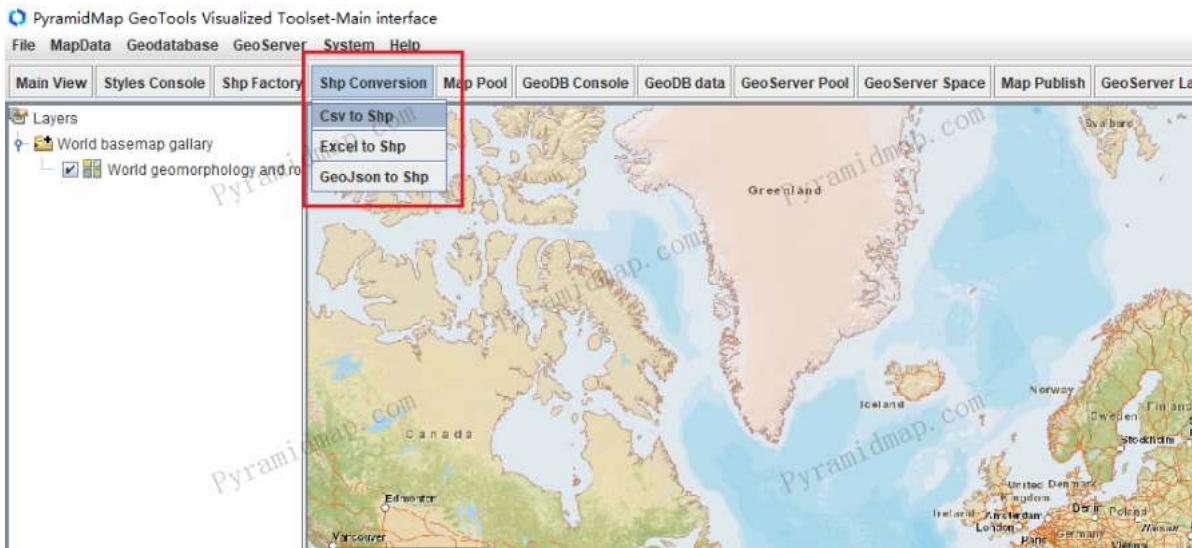


Figure 6-37: Csv, Excel, GeoJson to Shp Function Entry

6.7.1 Csv to Shp

PyramidMap supports the conversion of CSV which meets contractual specifications into Shp graphics, and the data source supports feature types such as Point/MultiPoint, LineString/MultiLineString, Polygon/MultiPolygon, etc. PyramidMap parses CSV according to the agreed specifications and converts it into SHP. The PyramidMap converter reads from CSV format and uses a column named WKT as geometric data. The WKT column contains geometry as well known text. If you are writing data to CSV format, make sure to create geometry and write it to the WKT column. The WKT data format that meets the specifications is shown in Figures 6-38.

fx | WKT

R	S	T	U	V	W	X	Y	Z
WKT								
MULTIPOLYGON	((120.41966 36.090991, 120.410955 36.092223, 120.405539 36.088717,							
MULTIPOLYGON	((120.41966 36.090991, 120.420219 36.094797, 120.434309 36.097592,							
MULTIPOLYGON	((119.717048 36.04185, 119.713138 36.040507, 119.708576 36.034802,							
MULTIPOLYGON	((120.484492 36.215752, 120.497775 36.211479, 120.511275 36.208688,							
MULTIPOLYGON	((120.343439 36.208341, 120.351539 36.20287, 120.358739 36.200331,							
MULTIPOLYGON	((120.57066 36.327374, 120.566191 36.327846, 120.559705 36.331624,							
MULTIPOLYGON	((120.656037 36.322163, 120.663004 36.331782, 120.666899 36.332726,							
MULTIPOLYGON	((119.717048 36.04185, 119.720353 36.040649, 119.721315 36.036462,							
MULTIPOLYGON	((120.008077 36.498223, 120.031974 36.481695, 120.038025 36.485246,							
MULTIPOLYGON	((120.634452 36.588998, 120.635631 36.596796, 120.638921 36.599337,							

Figure 6-38: WKT data format that meets specifications

Other columns will be written to Shp as attribute data. Specifically, for Point type files, PyramidMap also supports, and only supports using longitude | latitude named fields to represent coordinate values. In other words, for Point type CSV files that without WKT columns but instead use longitude | latitude (case insensitive) named fields to represent coordinate values, PyramidMap also supports conversion to Shp. The data format example is shown as below.

```

1 LATITUDE, LONGITUDE, CITY, NUMBER
2 46.066667,11.116667,Trento,140
3 44.9441,-93.0852,st Paul,125
4 13.752222,100.493889,Bangkok,150
5 45.420833,-75.69,Ottawa,200
6 44.9801,-93.251867,Minneapolis,350
7 46.519833,6.6335,Lausanne,560
8 48.428611,-123.365556,Victoria,721
9 -33.925278,18.423889,Cape Town,550
10 -33.859972,151.211111,Sydney,436
11 41.383333,2.183333,Barcelona,914
12 39.739167,-104.984722,Denver,869
13 52.95,-1.133333,Nottingham,800
14 45.52,-122.681944,Portland,840
15 37.5667,129.681944,Seoul,473
16 50.733992,7.099814,Bonn,700

```

The Csv to Shp conversion view is shown in Figure 6-39.

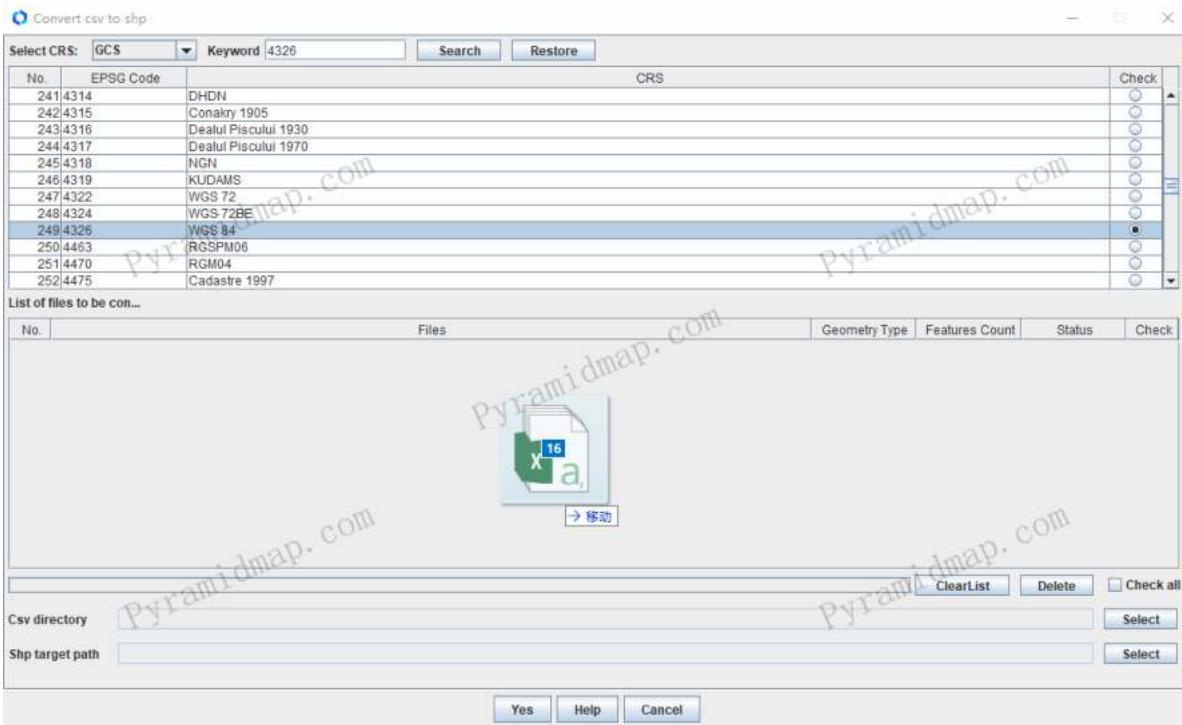


Figure 6-39: Csv to Shp Conversion Interface

PyramidMap supports two methods of selecting CSV data: file selector and drag and drop. Taking the drag and drop mode as an example, it is shown in Figure 6-40.

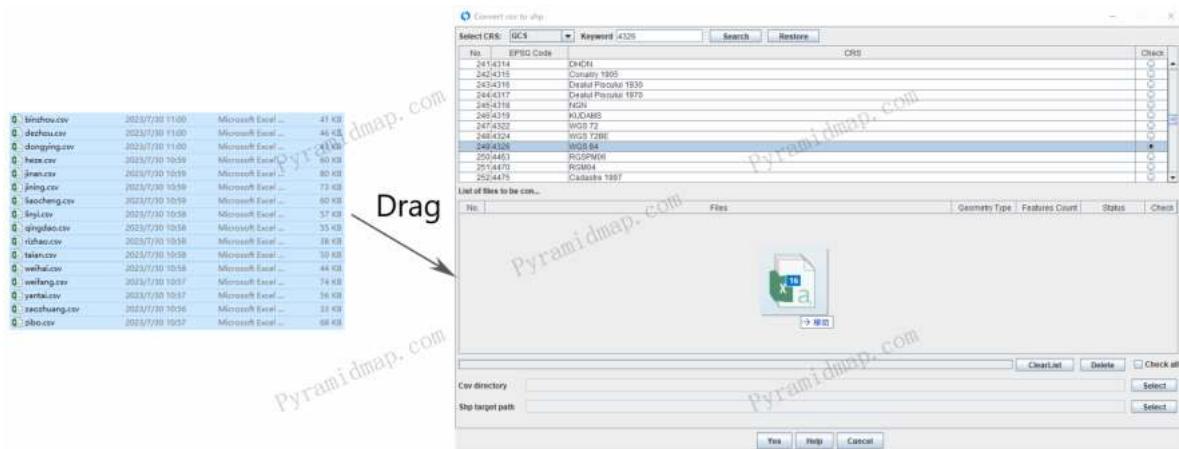


Figure 6-40: Selecting and dragging CSV files to the conversion interface

Form a list of files to be converted, as shown in Figure 6-41.

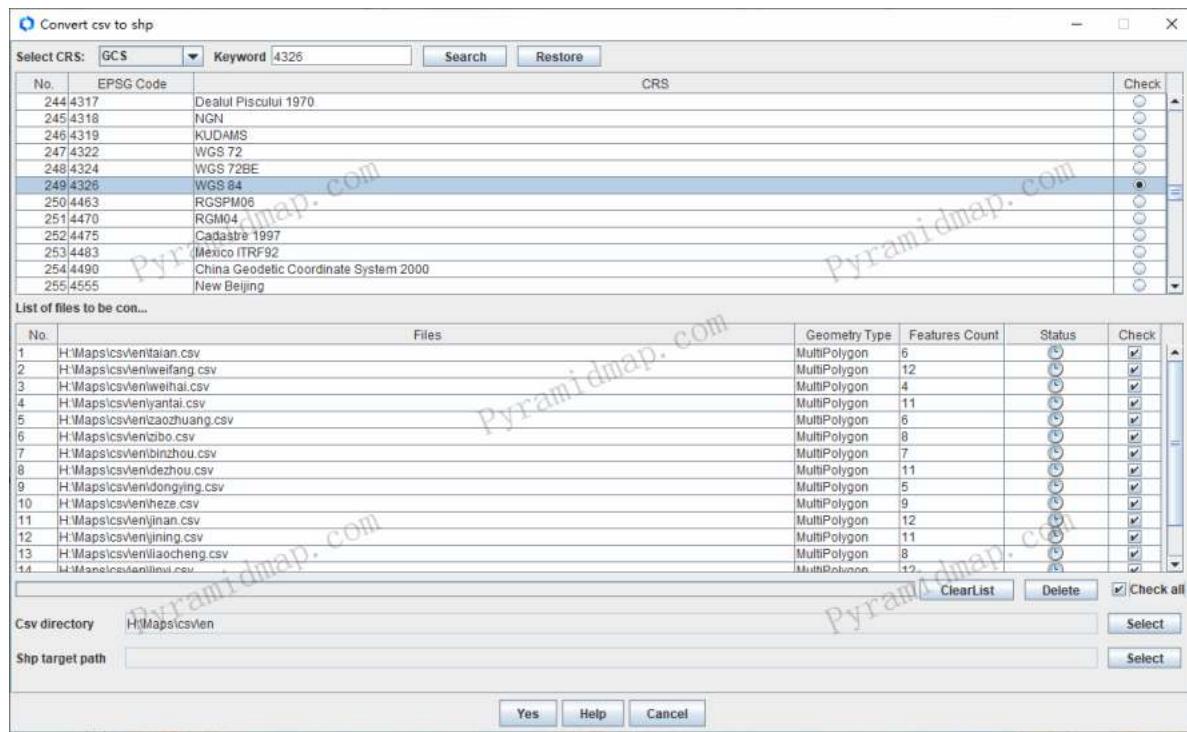


Figure 6-41: Dragging and Dropping CSV Files to Form a Conversion List

Specifically, in general, the wkt data in CSV does not explicitly indicate coordinate system information, so the output file should be specified with a ** Spatial Reference System ** (SRS). PyramidMap supports a wide range of SRSs (approximately 5000), and we are constantly updating them. Specify the ** Spatial Reference System ** (SRS) for the output file, as shown in Figures 6-42.

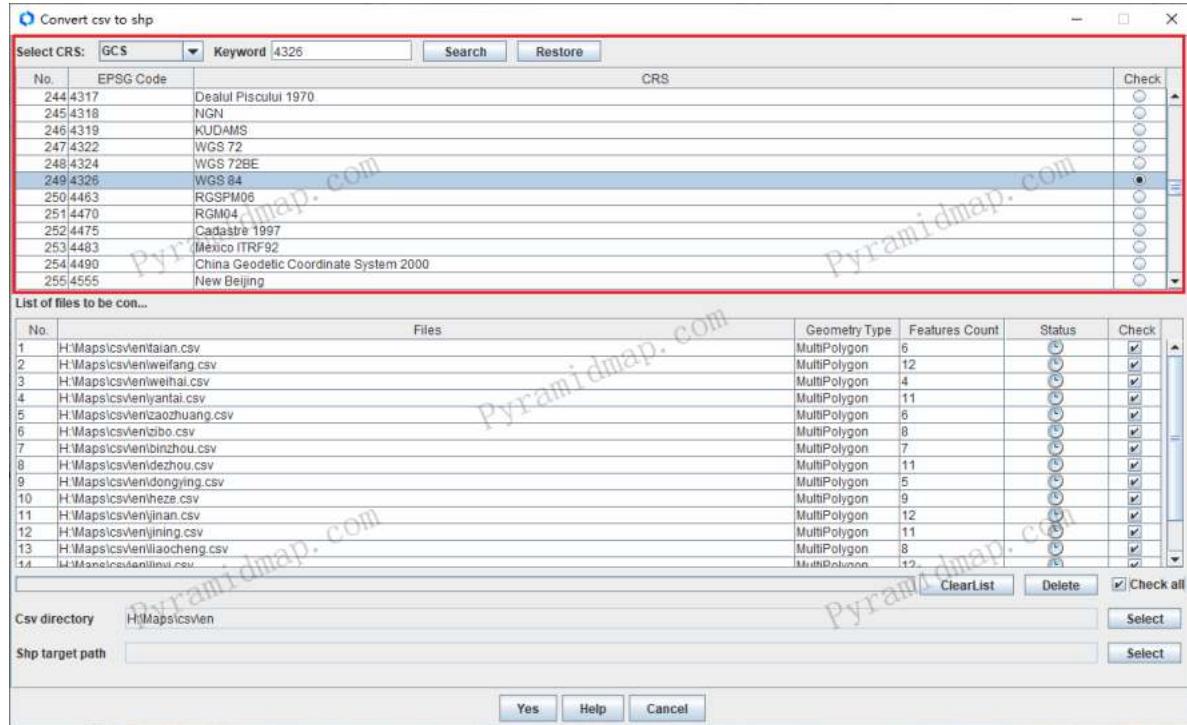


Figure 6-42: Specifying a Spatial Reference System (SRS) for Output Files

The spatial reference system (SRS) is divided into the Geographic coordinate system (GCS) representing three-dimensional space and the projection coordinate system (PCS) representing right angles to the plane. We classify them in these two ways, and conduct Full-text search through keywords. Perform the conversion process, as shown in Figure 6-43.

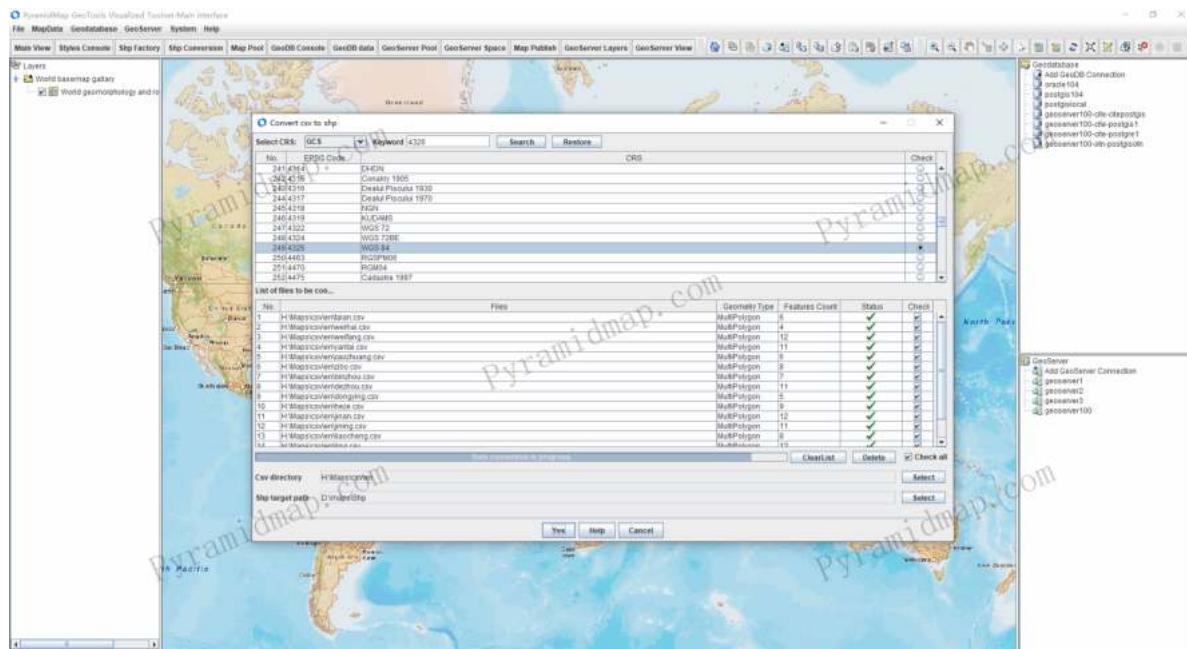


Figure 6-43: Performing conversion on CSV file list

The conversion is complete, as shown in Figure 6-44.

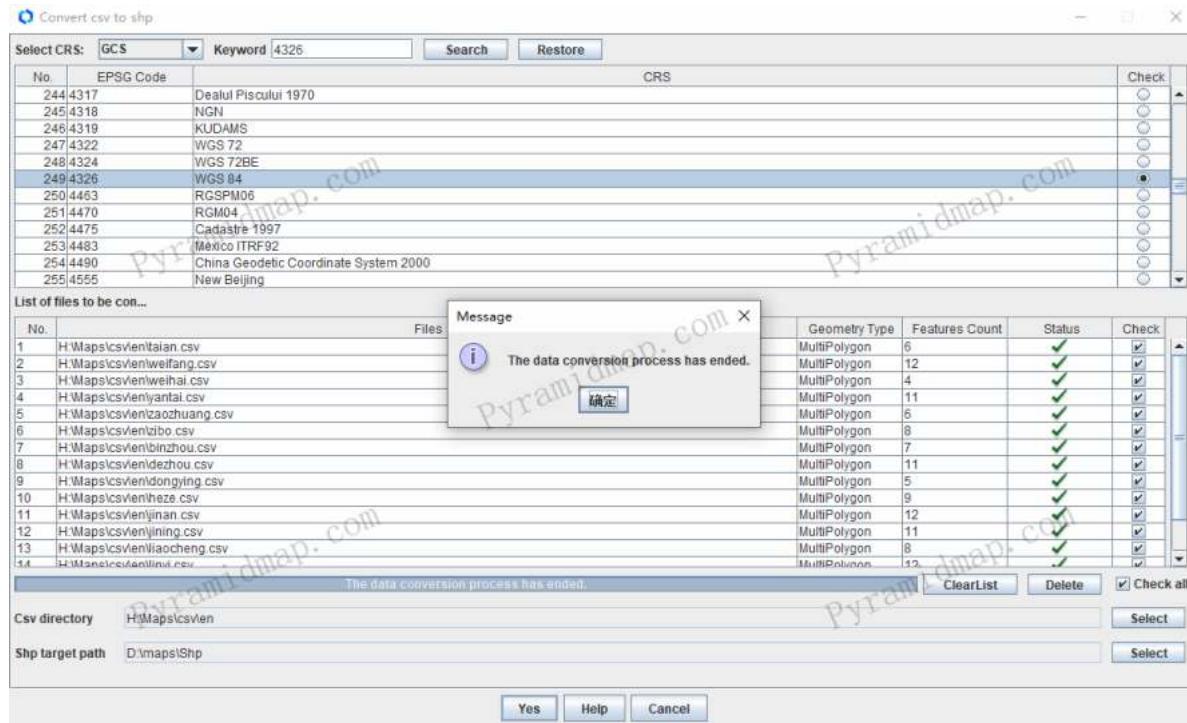


Figure 6-44: CSV file list conversion completed

Form a shp and overlay it onto the map view. The preview effect is shown in Figure 6-45.

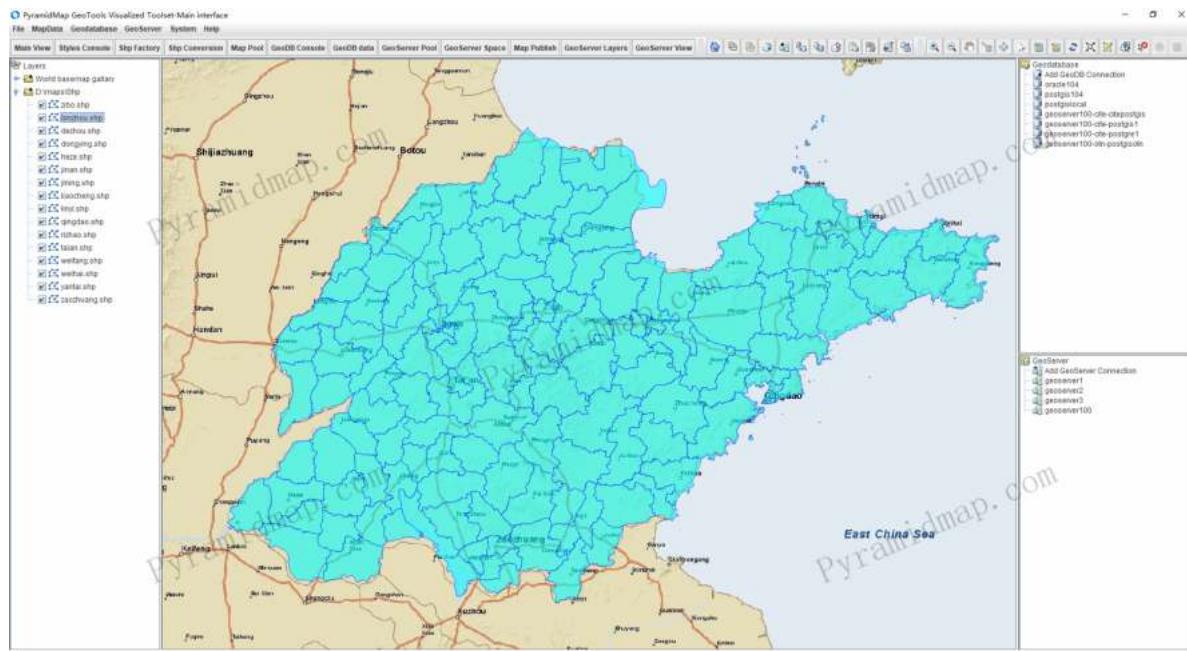


Figure 6-45: Superimposing the formed shp onto the map view, preview effect

6.7.2 Excel to Shp

PyramidMap supports Excel conversion to Shp graphics that meet contractual specifications, and the data source supports feature types such as Point/MultiPoint, LineString/MultiLineString, Polygon/MultiPolygon. PyramidMap parses Excel according to the agreed specifications and converts it into shp. The PyramidMap converter reads from Excel format and uses a column named WKT as geometric data. The WKT column contains geometry as well known text. If you are writing data in Excel format, please ensure that the geometry is created and written into the WKT column. The WKT data format that meets the specifications is shown in Figures 6-46.

	R	S	T	U	V	W	X	Y	Z
WKT									
MULTIPOLYGON (((120.41966 36.090991, 120.410955 36.092223, 120.405539 36.088717,									
MULTIPOLYGON (((120.41966 36.090991, 120.420219 36.094797, 120.434309 36.097592,									
MULTIPOLYGON (((119.717048 36.04185, 119.713138 36.040507, 119.708576 36.034802,									
MULTIPOLYGON (((120.484492 36.215752, 120.497775 36.211479, 120.511275 36.208688,									
MULTIPOLYGON (((120.343439 36.208341, 120.351539 36.20287, 120.358739 36.200331,									
MULTIPOLYGON (((120.57066 36.327374, 120.566191 36.327846, 120.559705 36.331624,									
MULTIPOLYGON (((120.656037 36.322163, 120.663004 36.331782, 120.666899 36.332726,									
MULTIPOLYGON (((119.717048 36.04185, 119.720353 36.040649, 119.721315 36.036462,									
MULTIPOLYGON (((120.008077 36.498223, 120.031974 36.481695, 120.038025 36.485246,									
MULTIPOLYGON (((120.634452 36.588998, 120.635631 36.596796, 120.638921 36.599337,									

Figure 6-46: WKT data format that meets specifications

Other columns will be written to Shp as attribute data. Specifically, similar to the section on converting Csv to Shp in 6.7.1, PyramidMap also supports Point type files and only supports the use of longitude | latitude named fields to represent coordinate values. In other words, PyramidMap also supports the conversion to Shp for Point type Excel files that without WKT columns but instead use longitude | latitude (case insensitive) named fields to represent coordinate values.

The Excel to SHP conversion interface is shown in Figure 6-47.

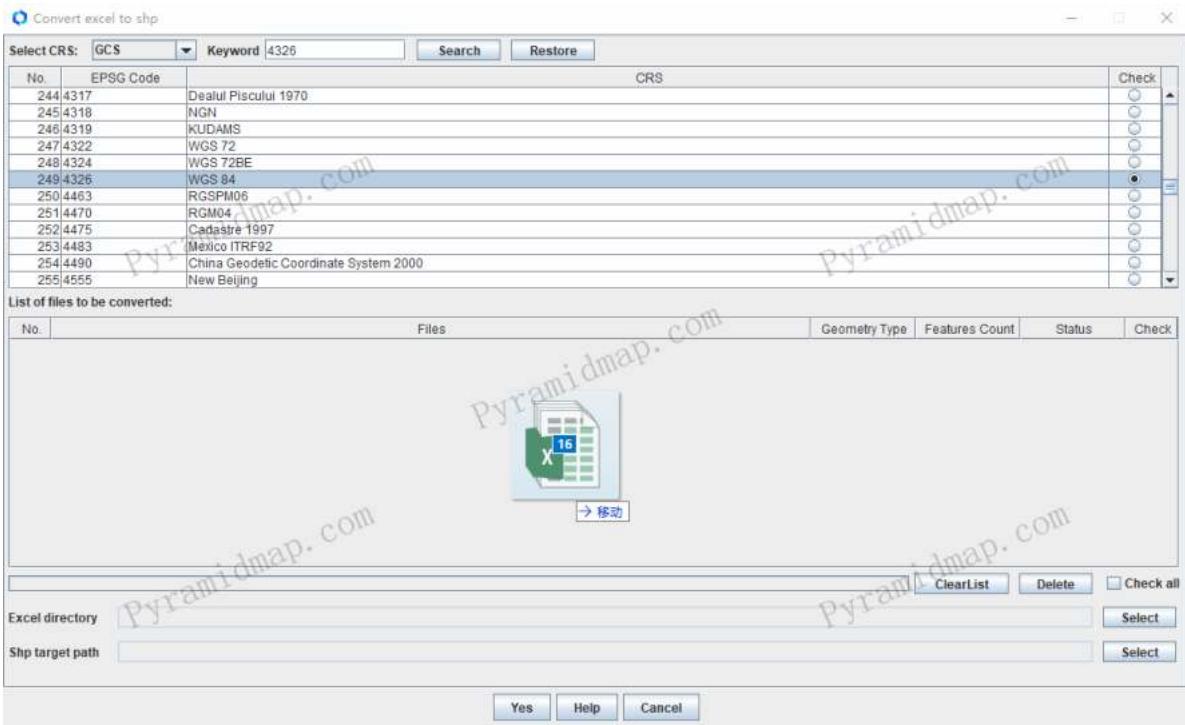


Figure 6-47: Excel to SHP Conversion Interface

PyramidMap supports two methods of selecting Excel data: file selector and drag and drop. Taking the drag and drop mode as an example, it is shown in Figure 6-48.

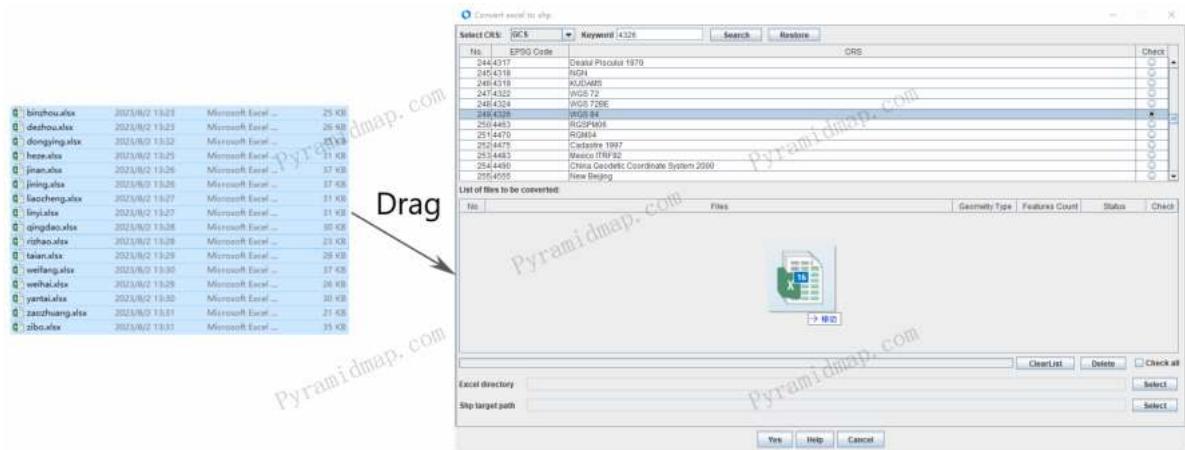


Figure 6-48: Select and drag an Excel file to the conversion interface

Form a list of files to be converted, as shown in Figures 6-49.

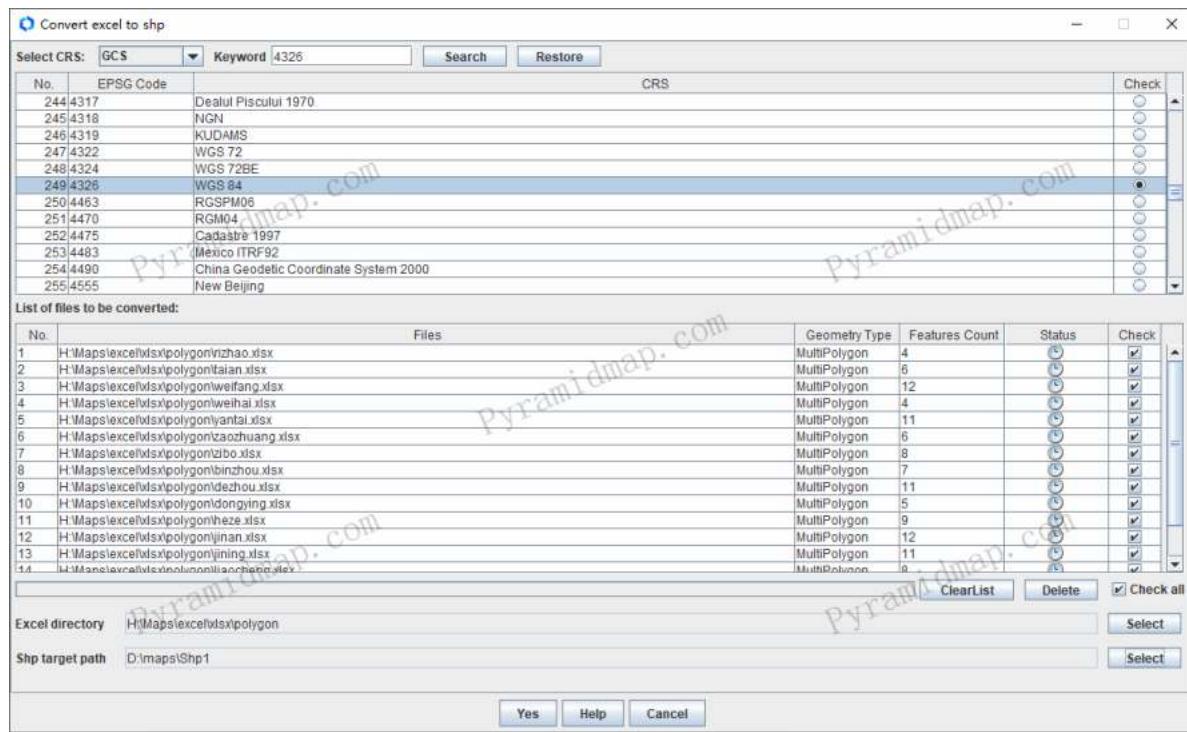


Figure 6-49: Dragging and Dropping Excel Files to Form a Conversion List

Specifically, in general, the wkt data in Excel does not explicitly indicate coordinate system information, so a * * Spatial Reference System * * (SRS) should be specified for the output file. PyramidMap supports a wide range of SRSs (approximately 5000), and we are constantly updating them. Specify the * * Spatial Reference System * * (SRS) for the output file, as shown in Figures 6-50.

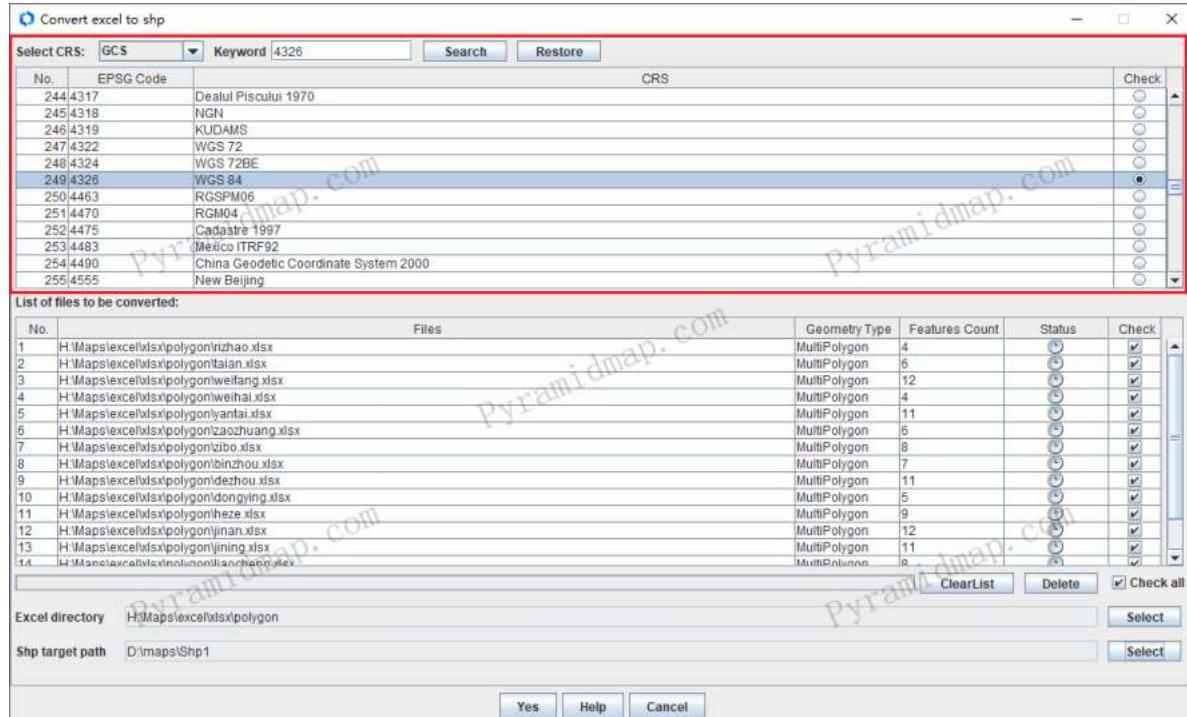


Figure 6-50: Specifying a Spatial Reference System (SRS) for Output Files

The spatial reference system (SRS) is divided into the Geographic coordinate system (GCS) representing three-dimensional space and the projection coordinate system (PCS) representing right angles to the plane. We classify them in these two ways, and conduct Full-text search through keywords. Perform the conversion process, as shown in Figure 6-51.

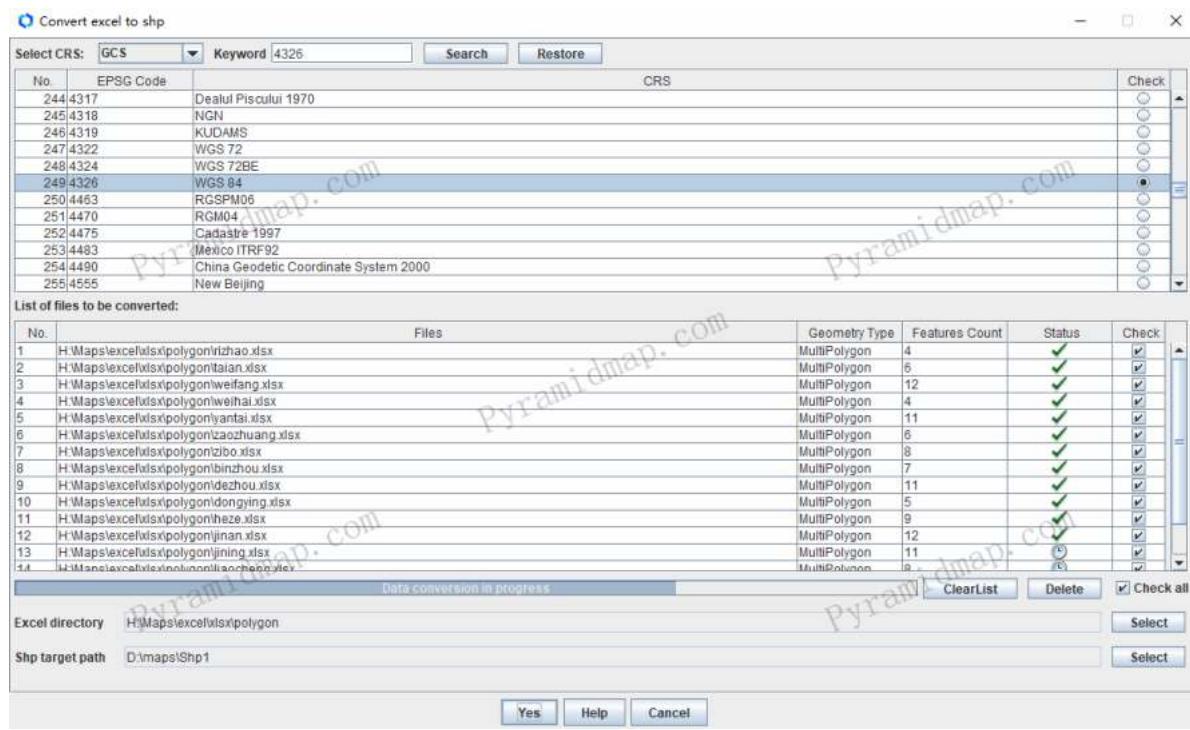


Figure 6-51: Performing Conversion on Excel File List

The conversion is complete, as shown in Figure 6-52.

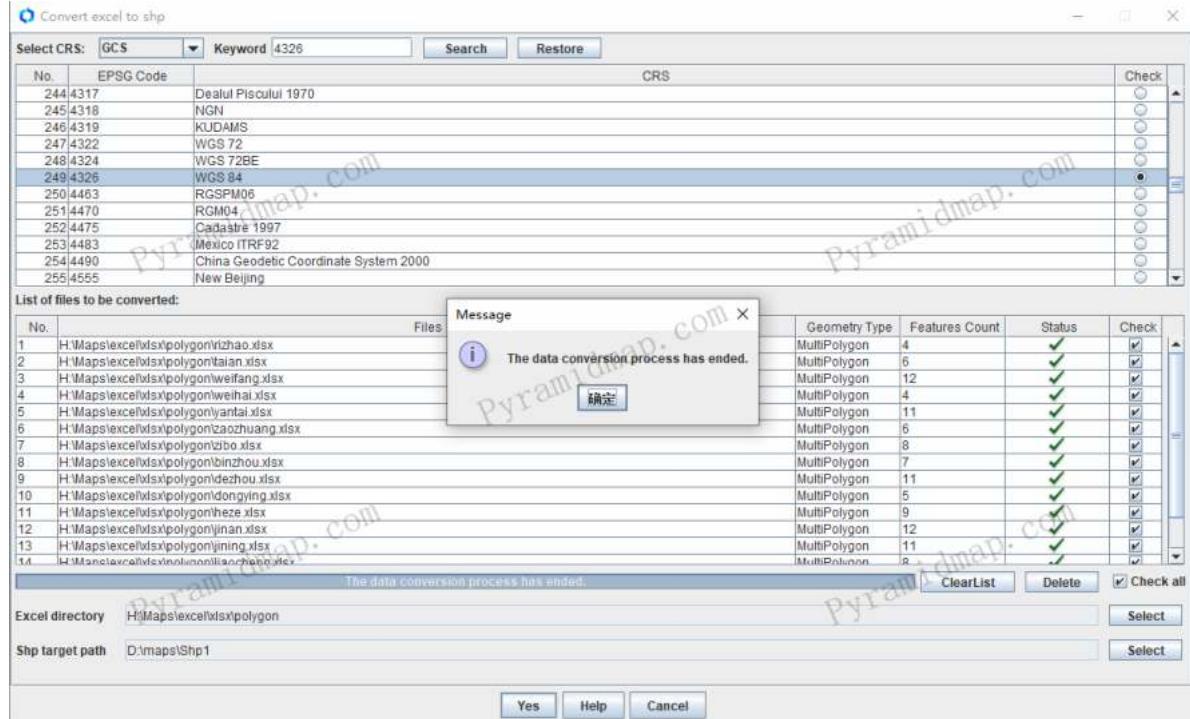


Figure 6-52: Excel file list conversion completed

Form a shp and overlay it onto the map view. The preview effect is shown in Figure 6-53.

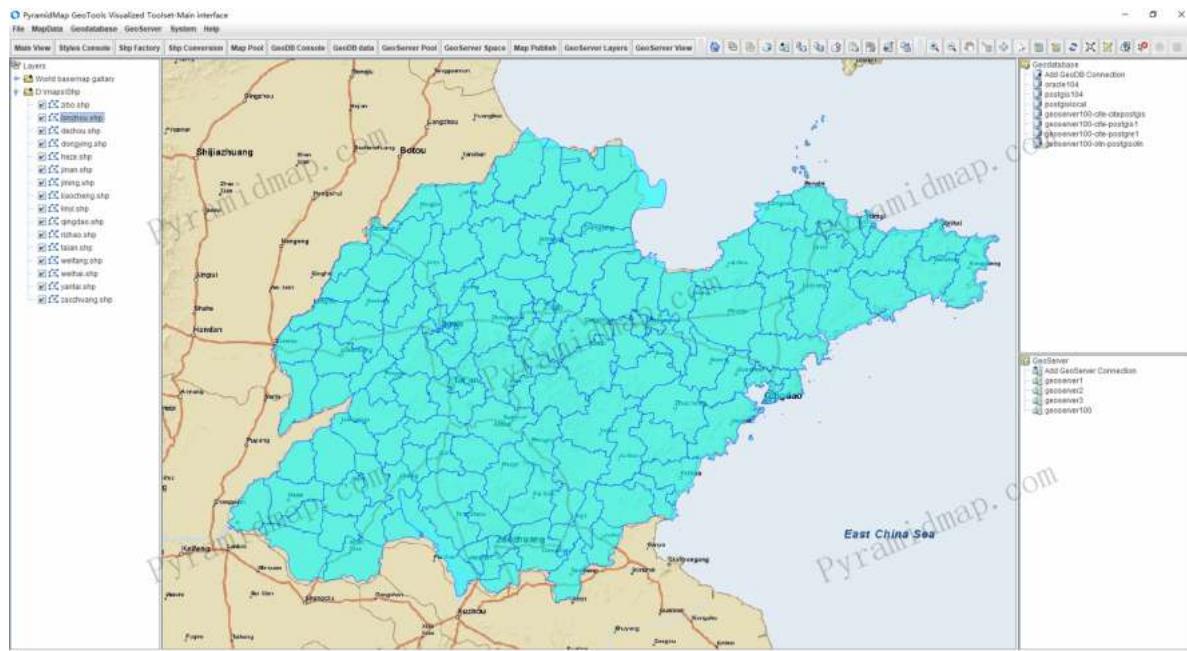


Figure 6-53: Superimposing the formed shp onto the map view, preview effect

6.7.3 GeoJSON to Shp

GeoJSON is an open standard geospatial data exchange format that can represent simple geographic features and their non-spatial attributes. It has become a de facto data standard and is increasingly widely used in data exchange between GIS systems and platforms. GeoJSON is based on JavaScript Object Representation (JSON) and is a format used for encoding various geographic data structures. GeoJSON uses geographical coordinate Frame of reference to define six basic types of geometry: Point, LineString, Polygon, MultiPoint, MultiLineString, and MultiPolygon. GeoJSON geometry can be combined with attribute data to define the features of features and provide data support for conversion to Shp format. The following is an example of a valid GeoJSON file:

```

1  {
2      "type": "FeatureCollection",
3      "features": [
4          {
5              "type": "Feature",
6              "properties": {
7                  "adcode": 370281,
8                  "name": "***city",
9                  "center": [120.006202, 36.285878],
10                 "centroid": [119.953343, 36.24043],
11                 "childrenNum": 0,
12                 "level": "district",
13                 "acroutes": [100000, 370000, 370200],
14                 "parent": {
15                     "adcode": 370200
16                 }
17             },
18             "geometry": {
19                 "type": "MultiPolygon",
20                 "coordinates": [
21                     [
22                         [
23                             [
24                                 [119.717048, 36.041844],
25                                 ...
26                             ]
27                         ]
28                     ]
29                 ]
30             }
31         }
32     ]
33 }
```

```

23             [119.72035, 36.040649],
24             [119.721314, 36.036459],
25             [119.724365, 36.037674],
26             [119.729332, 36.037267],
27             [119.730267, 36.035008],
28             [119.731875, 36.035606],
29             [119.733143, 36.034548],
30             [119.734037, 36.032421],
31             [119.734633, 36.028226],
32             [119.717048, 36.041844]
33         ]
34     ]
35   }
36 }
37 ]
38 }

```

PyramidMap will parse and convert GeoJSON into shp according to standard specifications, verify the validity of the file, and display error messages when the file is invalid. To treat a GeoJSON file as a valid file in PyramidMap, it must start with the required type parameter set to FeatureCollection. You can convert GeoJSON into Shp for loading in project or layer form in the map. Specifically, if the coordinate system CRS parameter is not specified in the data, the coordinate data will be processed as WGS84:4326 by default.

The GeoJSON to shp conversion interface is shown in Figure 6-54.

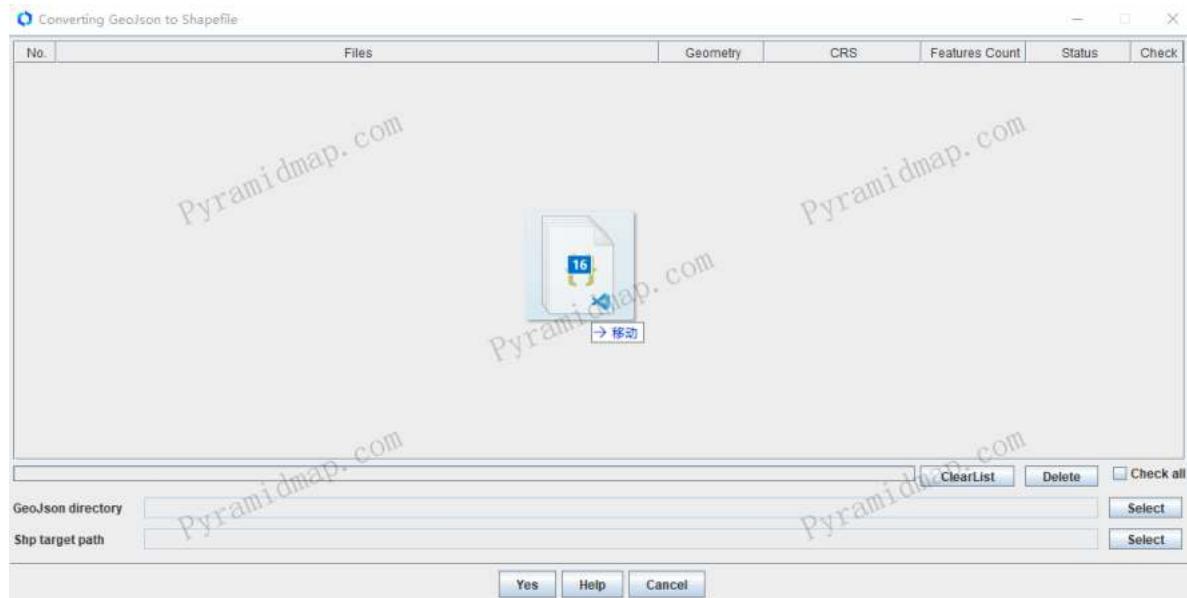


Figure 6-54: GeoJSON to shp conversion interface

PyramidMap supports two methods of selecting GeoJSON data: file selector and drag and drop. Taking the drag and drop mode as an example, it is shown in Figure 6-55.

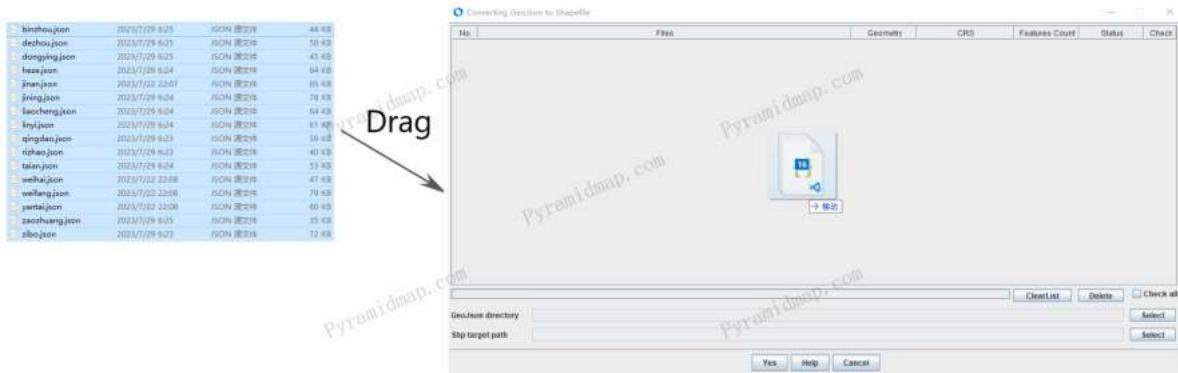


Figure 6-55: Selecting and dragging GeoJSON files to the conversion interface

Form a list of files to be converted, as shown in Figure 6-56.

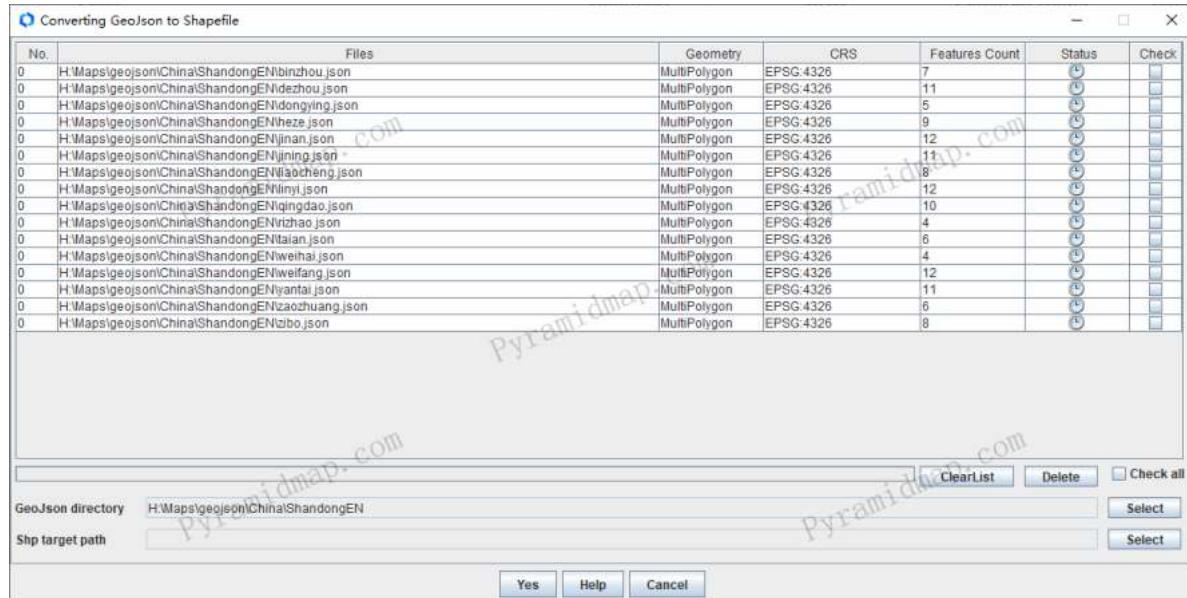


Figure 6-56: Dragging and Dropping GeoJSON Files to Form a Conversion List

GeoJSON uses geographical coordinate Frame of reference to define six basic types of geometry: Point, LineString, Polygon, MultiPoint, MultiLineString, and MultiPolygon. GeoJSON geometry can be combined with attribute data to define the features of features and provide data support for conversion to Shp format. Perform the conversion process, as shown in Figures 6-57.

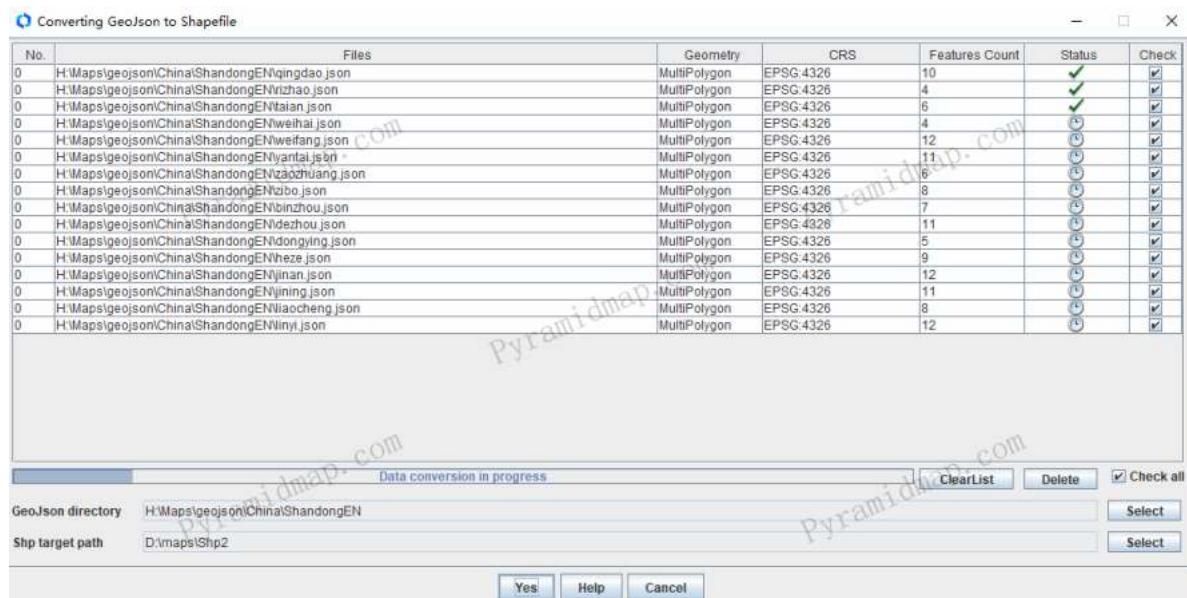


Figure 6-57: Performing conversion on GeoJSON file list

The conversion is complete, as shown in Figure 6-58.

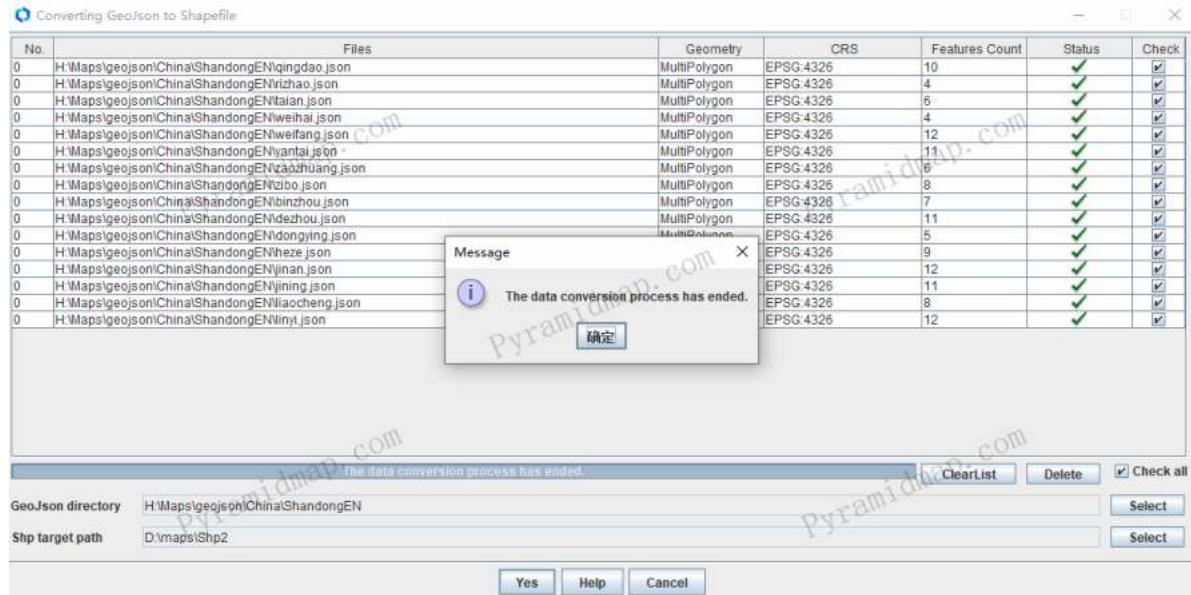


Figure 6-58: GeoJSON file list conversion completed

Form a shp and overlay it onto the map view. The preview effect is shown in Figure 6-59.

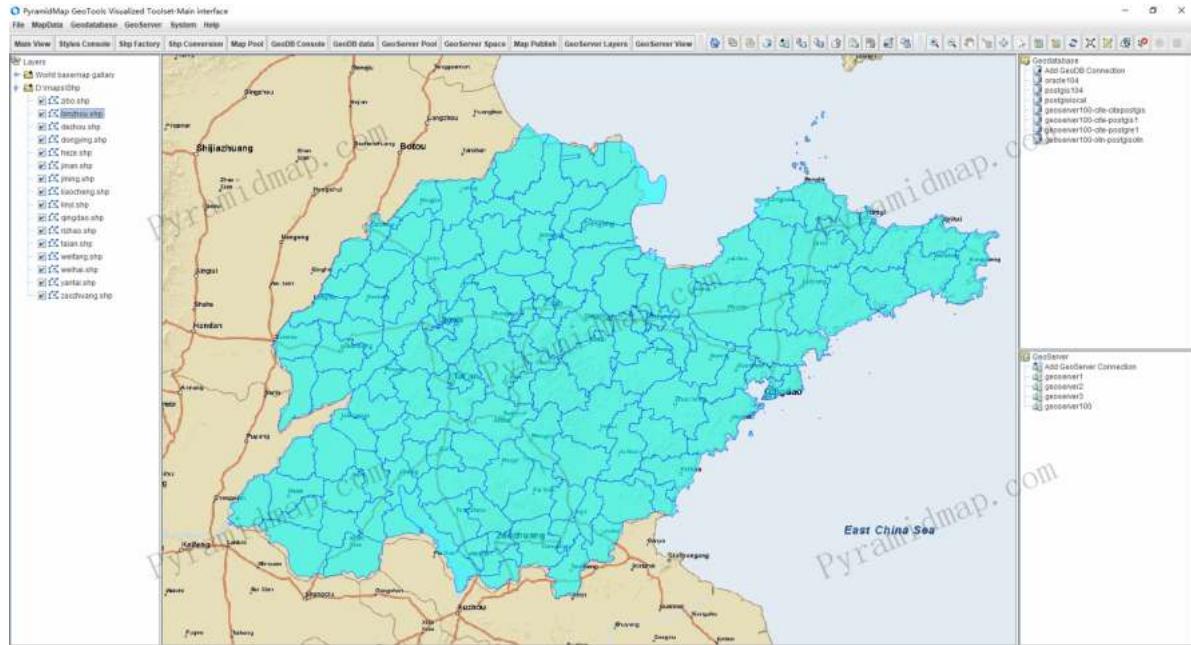


Figure 6-59: Superimposing the formed shp onto the map view, preview effect

6.7.4 Shp to Csv GeoJSON

PyramidMap supports the conversion of Shp vector layers to structured data types such as Kml, Csv, GeoJson, etc. On the vector layer node of PyramidMap Home screen, the data conversion operation is realized through the right-click menu, as shown in Figure 6-60.

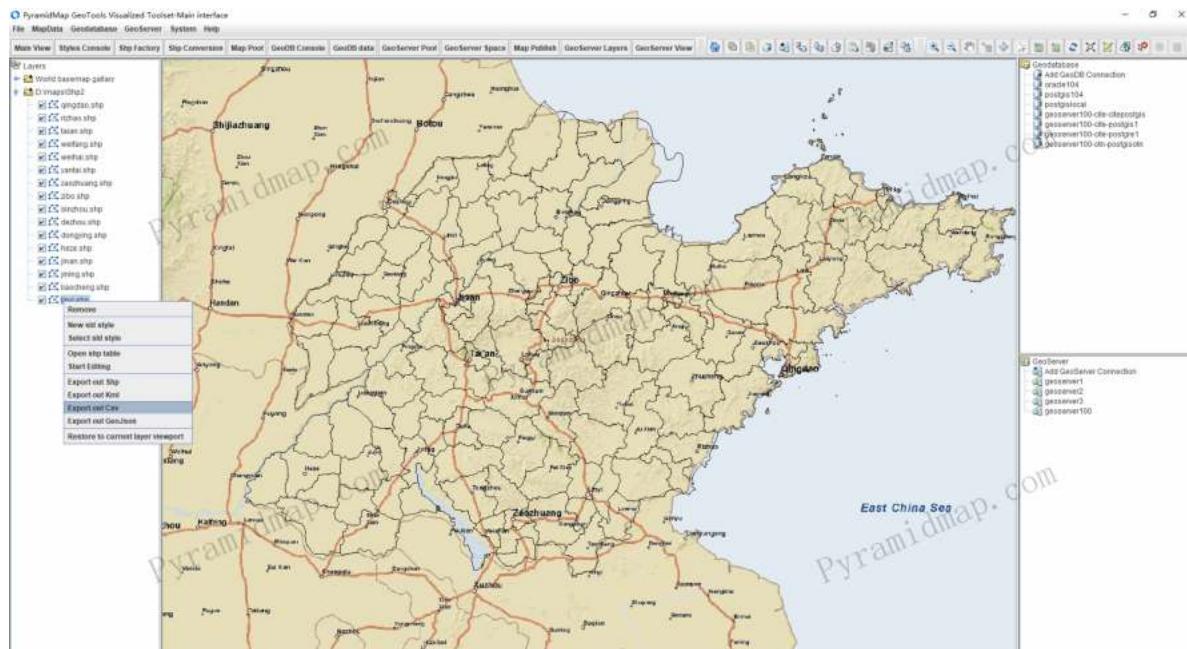


Figure 6-60: PyramidMap vector layer node right-click to converting operation

By using the loaded vector layer nodes, it is easy to export maps to multiple types of structured data such as Shp, Csv, Kml, GeoJSON, etc. The operation of the same industry can also be completed in the vector map resource pool, as shown in Figure 6-61.

No.	LayerName	LayerFilepath	DataSources	GeomType	(CLOBBER)	Counts	Status	Check
1	beihai.shp	D:\images\shp\beihai.shp	From local directory	Multipolygon	WGS 84 EPSG:4326	7	Normal	
2	beijing.shp	D:\images\shp\beijing.shp	From local directory	Multipolygon	WGS 84 EPSG:4326	11	Normal	
3	chengdu.shp	D:\images\shp\chengdu.shp	From local directory	Multipolygon	WGS 84 EPSG:4326	5	Normal	
4	heze.shp	D:\images\shp\heze.shp	From local directory	Multipolygon	WGS 84 EPSG:4326	9	Normal	
5	hangzhou.shp	D:\images\shp\hangzhou.shp	From local directory	Multipolygon	WGS 84 EPSG:4326	12	Normal	
6	jining.shp	D:\images\shp\jining.shp	From local directory	Multipolygon	WGS 84 EPSG:4326	11	Normal	
7	laicheng.shp	D:\images\shp\laicheng.shp	From local directory	Multipolygon	WGS 84 EPSG:4326	9	Normal	
8	lensh.shp	D:\images\shp\lensh.shp	From local directory	Multipolygon	WGS 84 EPSG:4326	12	Normal	
9	linchuan.shp	D:\images\shp\linchuan.shp	From local directory	Multipolygon	WGS 84 EPSG:4326	10	Normal	
10	linhai.shp	D:\images\shp\linhai.shp	From local directory	Multipolygon	WGS 84 EPSG:4326	4	Normal	
11	taian.shp	D:\images\shp\taian.shp	From local directory	Multipolygon	WGS 84 EPSG:4326	8	Normal	
12	taizhou.shp	D:\images\shp\taizhou.shp	From local directory	Multipolygon	WGS 84 EPSG:4326	12	Normal	
13	wenzhou.shp	D:\images\shp\wenzhou.shp	From local directory	Multipolygon	WGS 84 EPSG:4326	4	Normal	
14	zhenhai.shp	D:\images\shp\zhenhai.shp	From local directory	Multipolygon	WGS 84 EPSG:4326	11	Normal	
15	zaoluang.shp	D:\images\shp\zaoluang.shp	From local directory	Multipolygon	WGS 84 EPSG:4326	8	Normal	
16	zjds.csv	D:\images\shp\zjds.csv	From local directory	Multipolygon	WGS 84 EPSG:4326	8	Normal	

Import vector layers Map process and editing Layer data statistics Coordinate System Conversion Spatial processing Export not Raster Export not Csv Export not Gisources Details Check all

Keep the same coordinate system and without attribute data
Keep the same coordinate system and select attribute data
Convert coordinate system and without attribute data
Convert coordinate system and select attribute data

Figure 6-61: Vector layer resource pool and data conversion

Taking Csv data as an example, the transformed data fragments are shown below.

```

1 LATITUDE, LONGITUDE, CITY, NUMBER
2 46.066667, 11.116667, Trento, 140
3 44.9441, -93.0852, St Paul, 125
4 13.752222, 100.493889, Bangkok, 150
5 45.420833, -75.69, Ottawa, 200
6 44.9801, -93.251867, Minneapolis, 350
7 46.519833, 6.6335, Lausanne, 560
8 48.428611, -123.365556, Victoria, 721
9 -33.925278, 18.423889, Cape Town, 550
10 -33.859972, 151.211111, Sydney, 436

```

```

11 41.383333, 2.183333, Barcelona, 914
12 39.739167, -104.984722, Denver, 869
13 52.95, -1.133333, Nottingham, 800
14 45.52, -122.681944, Portland, 840
15 37.5667,129.681944,Seoul,473
16 50.733992,7.099814,Bonn,700,2016

```

6.7.5 Shp to Kml

Keyhole Markup Language (KML) is an XML based format used to store geographic data and related content, and is an official Open Geospatial Consortium (OGC) standard. The KML format is easy to publish on the Internet and can be viewed through many free applications such as Google Earth and ArcGIS Explorer, making it commonly used for sharing geographic data with non GIS users. KML files have an extension of *.kml ** or *.kmz ** (representing compressed KML files).

Same as the method of exporting Csv and GeoJSON, PyramidMap implements data conversion from vector layer to Kml through layer nodes and map resource pool selection list in the Home screen. The layer node conversion of the Home screen is shown in Figure 6-62.

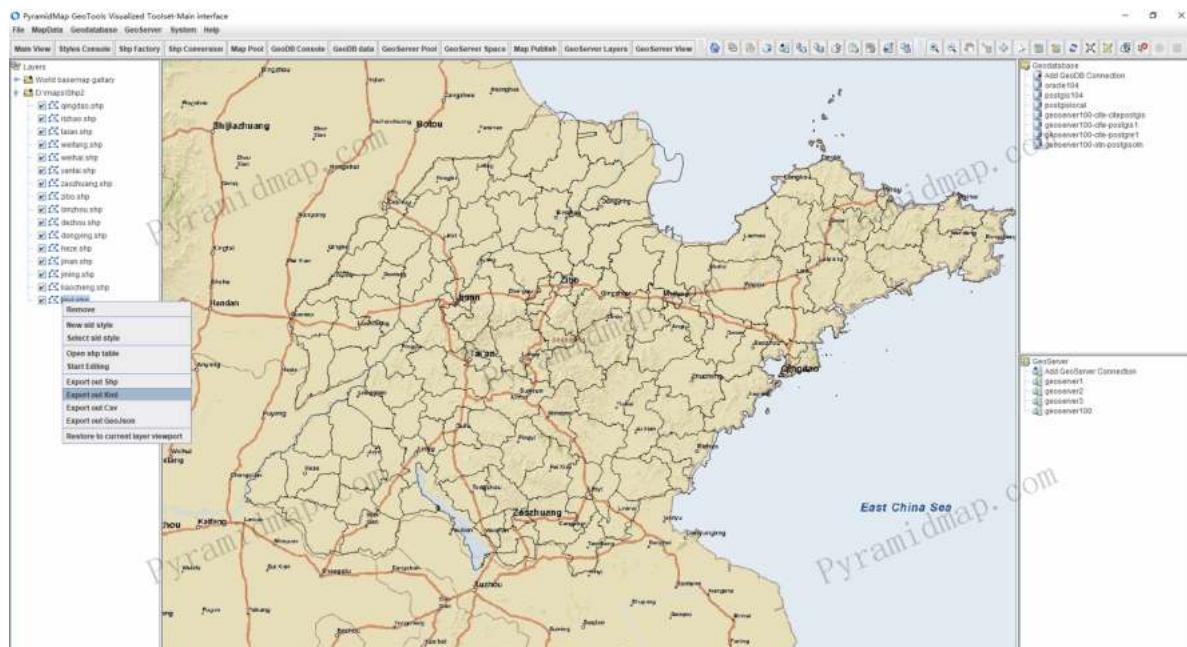


Figure 6-62: PyramidMap vector layer node right-click kml conversion operation

The same conversion operation can also be completed in the vector map resource pool, as shown in Figure 6-63.

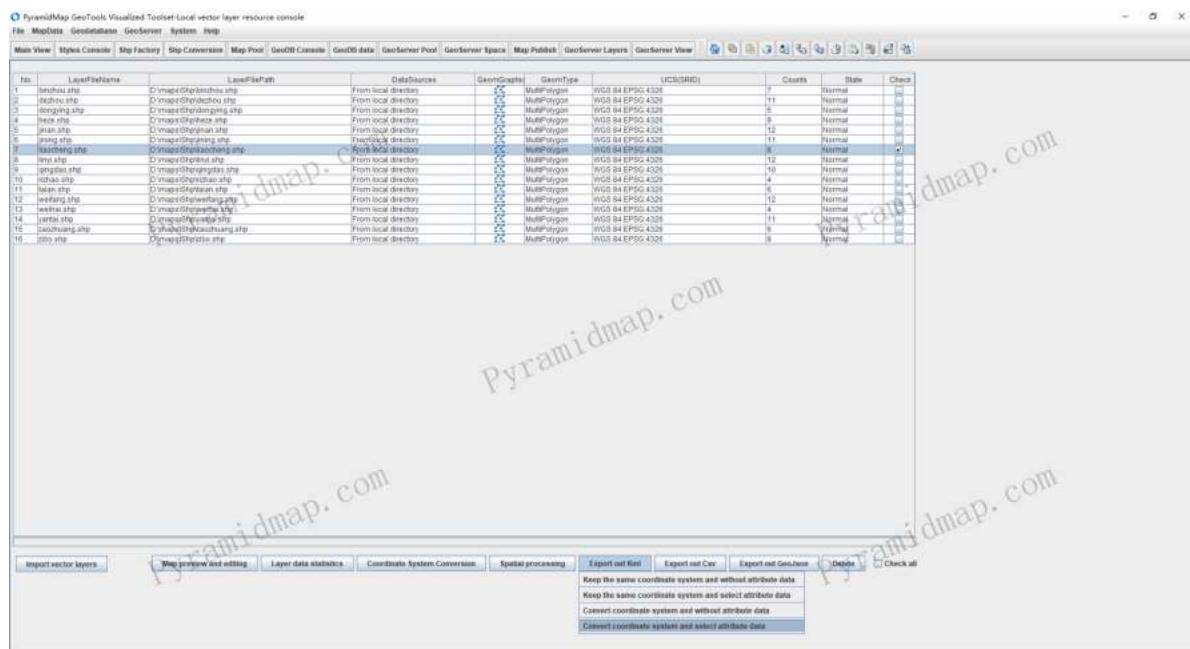


Figure 6-63: Vector layer resource pool and kml data conversion

Select the Shp layer in the list, select the target data format and options, and take the "Convert Coordinate System to Select Attribute Data" option as an example. The execution interface is shown in Figure 6-64.

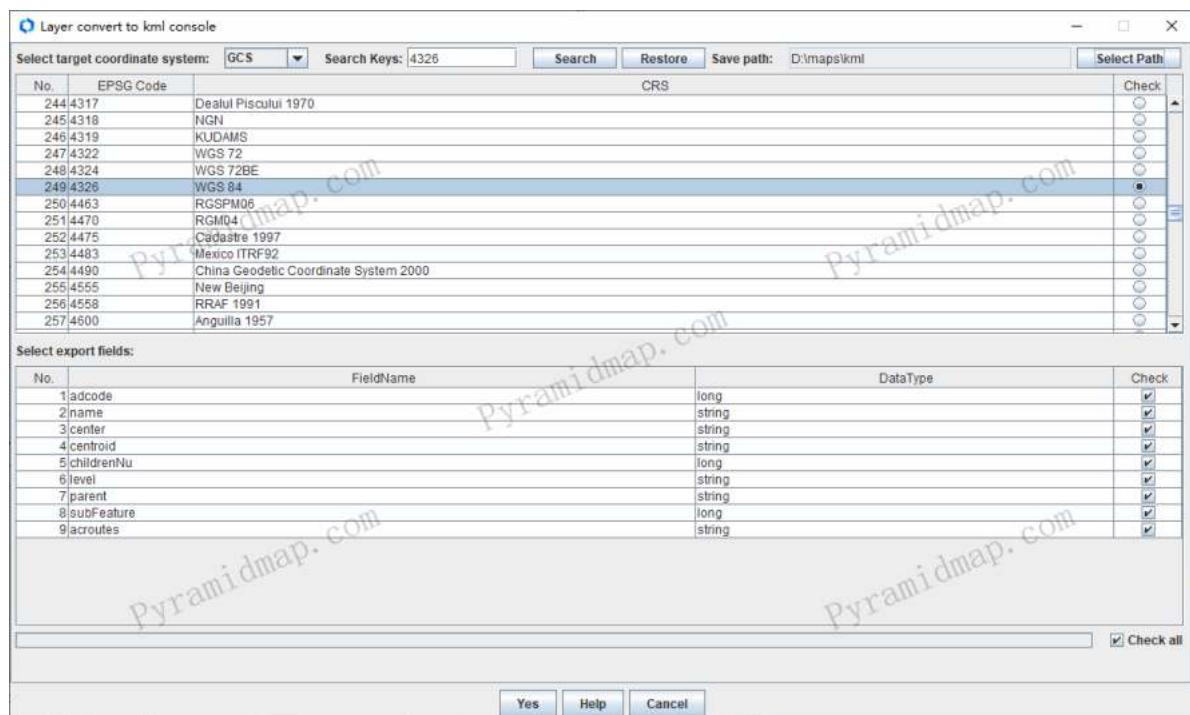


Figure 6-64: Shp to Kml Setting Coordinate System and Attribute Data Options

Select the target coordinate system and the fields to be exported, click "OK", and the selected shp layer will be selected according to the specified coordinate system and fields, and exported as a kml file under the target path. The exported kml data fragment is as follows:

```

1  <?xml version="1.0" encoding="UTF-8"?><kml
2   xmlns:xs="http://www.w3.org/2001/XMLSchema"
3   xmlns:kml="http://earth.google.com/kml/2.1">
4   <Document id="featureCollection">
5     <Placemark id="fid-79657dd2_189aaf861b2_-7ffd">
6       <name>**city</name>

```

```
5 <MultiGeometry>
6 <Polygon>
7 <outerBoundaryIs>
8 <LinearRing>
9 <coordinates>121.737819,37.128871 121.740542,37.12828 121.743526,37.12536
121.737819,37.128871</coordinates>
10 </LinearRing>
11 </outerBoundaryIs>
12 </Polygon>
13 <Polygon>
14 <outerBoundaryIs>
15 <LinearRing>
16 <coordinates>121.484626,36.732883 121.490872,36.738411 121.491364,36.742102
121.484626,36.732883</coordinates>
17 </LinearRing>
18 </outerBoundaryIs>
19 </Polygon>
20 </MultiGeometry>
21 </Placemark>
22 </Document>
23 </kml>
```

7 Map rendering and sld symbol

The map symbol system determines the rendering effect of map elements, and refined symbol design allows you to make beautiful maps. PyramidMap visual symbol design tool can make your map more colorful and vivid. Through the color palette, you can create map symbols of different geometric types for points, lines and surfaces. The symbol features include: stroke color, stroke width, fill color, transparency, size, icon, label field, label font, font color, font size, font normal or bold, label position, fine adjustment offset, etc. Finally, you can save them as an sld file. The Sld file describes the display mode of map elements. PyramidMap realizes sld localization creation, editing in maintenance pool, maintains two-way synchronization with the GeoServer server, and remotely sets the sld symbol of the GeoServer layers internal at client.

7.1 Define sld symbols at client

7.1.1 Create sld on visualizing layer nodes

At the visualization layer node on the left of the main map interface, create the sld symbol through the right-click shortcut menu, as shown in Figure 7-1.

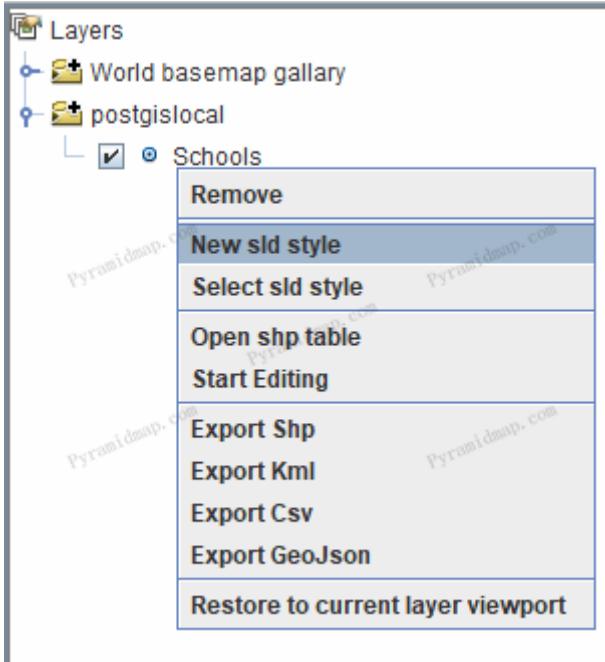


Figure 7-1: Creating sld symbols on visualization layer node

PyramidMap will implement the sld symbol definition method through the visual palette according to the geometric type (point, line, polygon) of the selected layer, as shown in Figure 7-2.

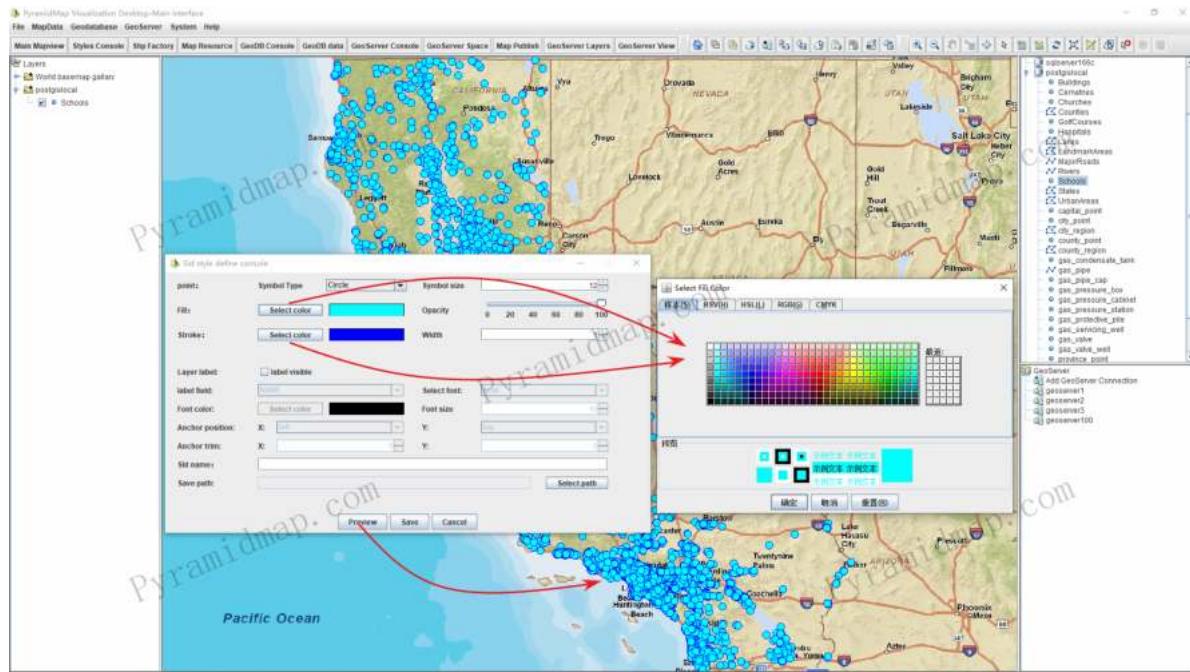


Figure 7-2: Create sld symbol definition on layer node through palette

In the sld definition module, create map symbols for different geometric types of points, lines, and surfaces through the color palette. The symbol features include: stroke color, stroke width, fill color, transparency, size, icon, annotation field, font, font color, size, normal or bold, annotation position, fine adjustment offset, etc. The display effect can be previewed in real time on the layer, saved as an sld file, and maintained in the sld resource pool at the same time, As shown in Figure 7-3.

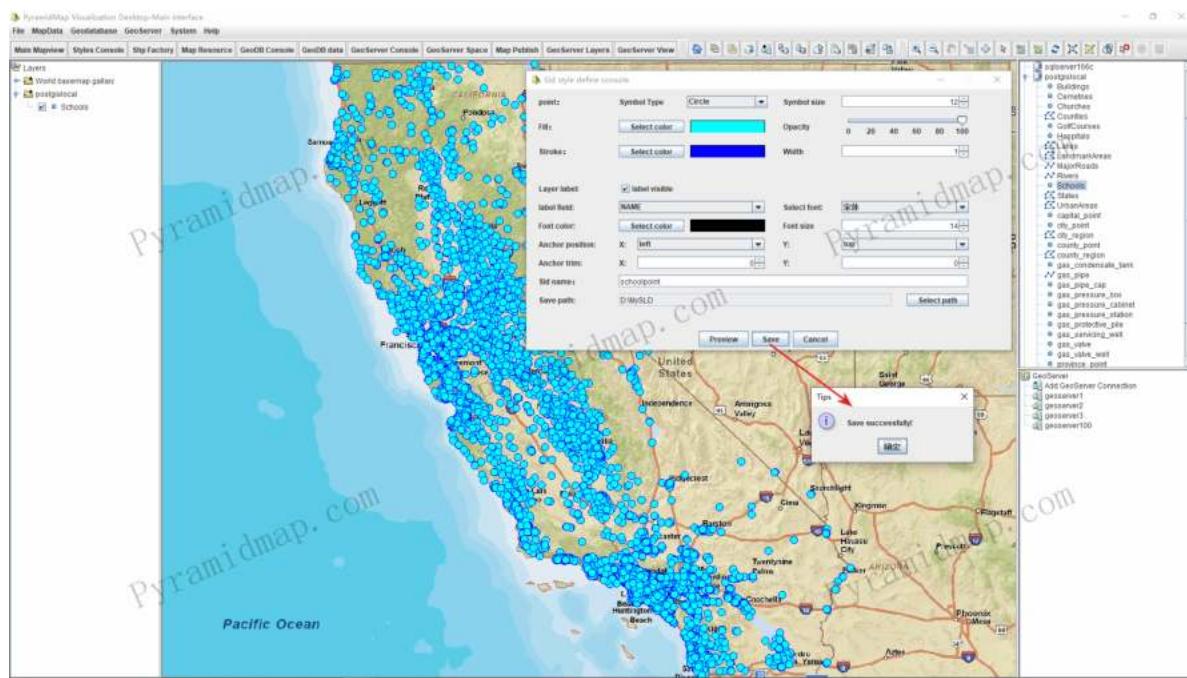


Figure 7-3: Create and save sld symbol definition on layer node through palette

7.1.2 Create map symbols in the sld resource pool

PyramidMap performs centralized and unified management of client SLDs in the way of resource management pool. Enter through the "Styles console" entry of the main interface menu to open the SLD resource management pool module, as shown in Figure 7-4.

Figure 7-4: Sld symbol resource pool and creation module

PyramidMap maintains a local SLD resource pool itself, and uniformly and centrally manages the SLD files created by the client and obtained from the GeoServer. There are two ways to obtain the Sld data source, one is from the GeoServer, the other is created at the PyramidMap client. All work flows are completed in the SLD unified resource management pool module, as shown in Figure 7-5.

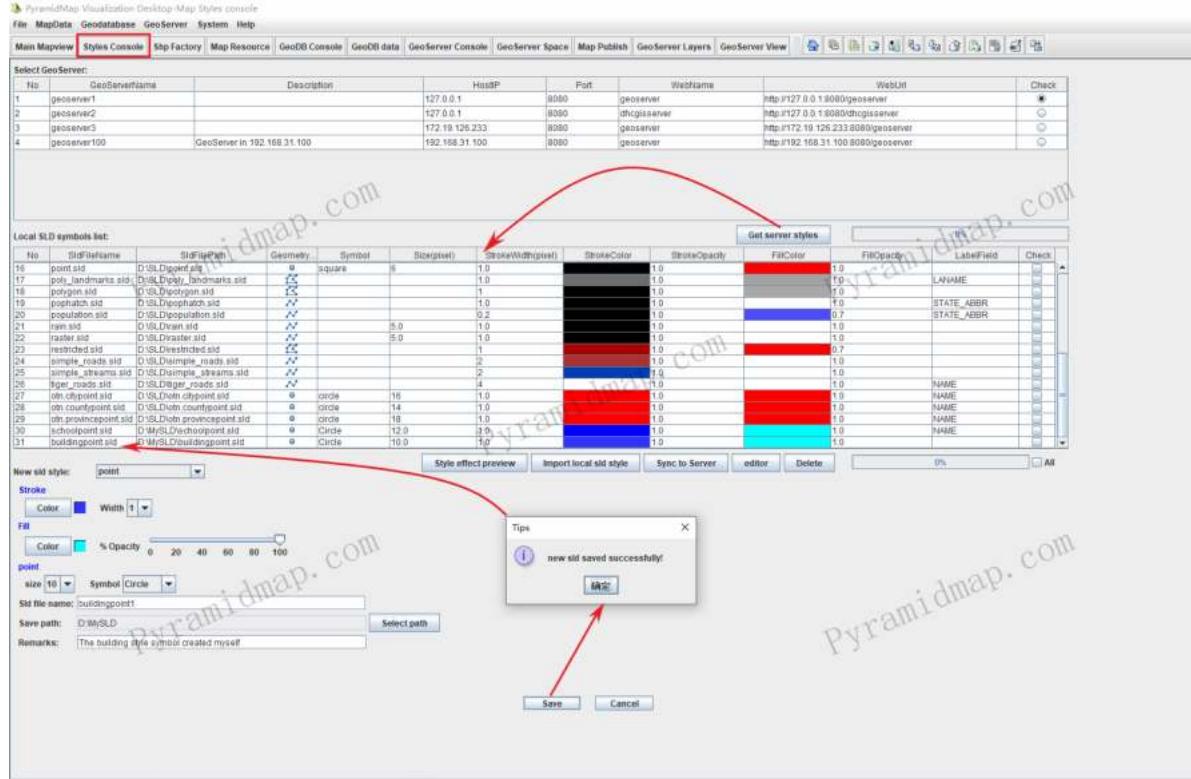


Figure 7-5: Complete the sld symbol creation and management workflow in the sld unified resource management pool

The defined sld file is included in the resource management list to realize resource sharing. You can select symbols in the sld resource pool to preview the effect, as shown in Figure 7-6.

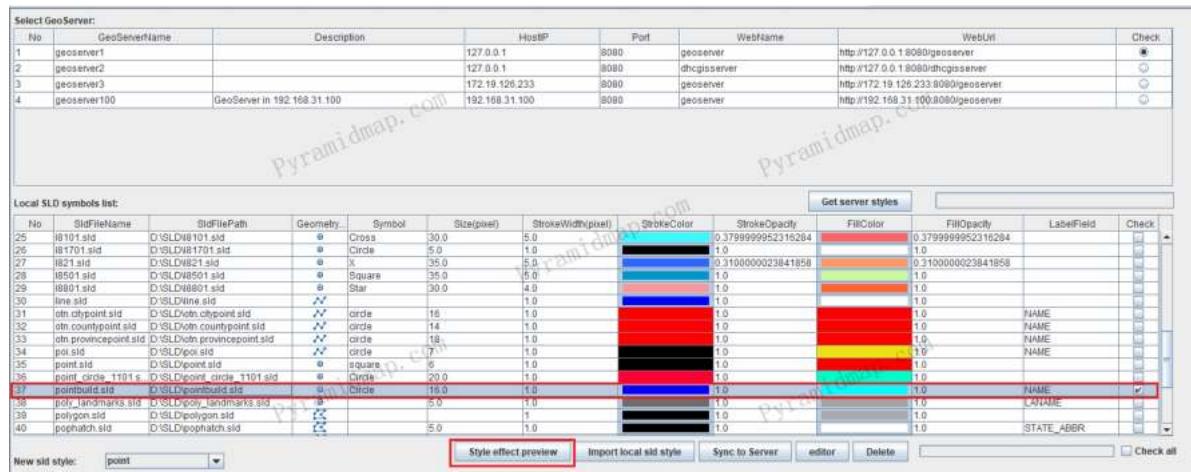


Figure 7-6: Select the map symbol in the sld resource pool for effect preview

PyramidMap will match in the layer resource pool according to the geometry type of the selected sld symbol, and return the list of layers of the same type, as shown in Figure 7-7.

Preview the selected style

No	Layer/fileName	LayerFile/Path	DataSources	GeomGraphic	GeomType	UCS/CRID	Counts	Status	Chk
1	Buildings.shp	E:\Maps\California\Buildings.shp	From local directory	Point	GCS_WGS_1984_EPSG_4326	4381	Normal		
2	Cemeteries.shp	E:\Maps\California\Cemeteries.shp	From local directory	Point	GCS_WGS_1984_EPSG_4326	842	Normal		
3	Churches.shp	E:\Maps\California\Churches.shp	From local directory	Point	GCS_WGS_1984_EPSG_4326	183613	Normal		
4	GolfCourses.shp	E:\Maps\California\GolfCourses.shp	From local directory	Point	GCS_WGS_1984_EPSG_4326	537	Normal		
5	Hospitals.shp	E:\Maps\California\Hospitals.shp	From local directory	Point	GCS_WGS_1984_EPSG_4326	438	Normal		
6	Schools.shp	E:\Maps\California\Schools.shp	From local directory	Point	GCS_WGS_1984_EPSG_4326	11381	Normal		
7	CAPITAL_POINT.shp	E:\Maps\oraclelayers\CAPITAL_POINT.shp	From db oracle104	Point	WGS 84 EPSG 4326	1	missing		
8	CITY_POINT.shp	E:\Maps\oraclelayers\CITY_POINT.shp	From db oracle104	Point	WGS 84 EPSG 4326	308	missing		
9	COUNTY_POINT.shp	E:\Maps\oraclelayers\COUNTY_POINT.shp	From db oracle104	Point	WGS 84 EPSG 4326	2862	missing		
10	GAS_CONDENSATE_TANK.shp	E:\Maps\oraclelayers\GAS_CONDENSATE_TANK.shp	From db oracle104	Point	WGS 84 EPSG 4326	8	missing		
11	GAS_PIPE.shp	E:\Maps\oraclelayers\GAS_PIPE.shp	From db oracle104	Point	WGS 84 EPSG 4326	12290	missing		
12	GAS_PRESSURE_BOX.shp	E:\Maps\oraclelayers\GAS_PRESSURE_BOX.shp	From db oracle104	Point	WGS 84 EPSG 4326	30	missing		
13	GAS_PRESSURE_CABINETS.shp	E:\Maps\oraclelayers\GAS_PRESSURE_CABINETS.shp	From db oracle104	Point	WGS 84 EPSG 4326	122	missing		
14	GAS_PRESSURE_STATIONS.shp	E:\Maps\oraclelayers\GAS_PRESSURE_STATIONS.shp	From db oracle104	Point	WGS 84 EPSG 4326	1	missing		
15	GAS_PROTECTIVE_PILE.shp	E:\Maps\oraclelayers\GAS_PROTECTIVE_PILE.shp	From db oracle104	Point	WGS 84 EPSG 4326	54	missing		
16	GAS_SERVICING_WELL.shp	E:\Maps\oraclelayers\GAS_SERVICING_WELL.shp	From db oracle104	Point	WGS 84 EPSG 4326	2	missing		
17	GAS_VALVE.shp	E:\Maps\oraclelayers\GAS_VALVE.shp	From db oracle104	Point	WGS 84 EPSG 4326	1	missing		
18	GAS_VALVE_WELL.shp	E:\Maps\oraclelayers\GAS_VALVE_WELL.shp	From db oracle104	Point	WGS 84 EPSG 4326	882	missing		
19	PROVINCE_POINT.shp	E:\Maps\oraclelayers\PROVINCE_POINT.shp	From db oracle104	Point	WGS 84 EPSG 4326	33	missing		
20	gaspipeline.shp	E:\Maps\gas\gaspipeline.shp	Self-built Shp file	Point	EPSG 4326	0	missing		
21	capital_point.shp	E:\Maps\OTH\capital_point.shp	From local directory	Point	WGS 84 EPSG 4326	1	Normal		
22	city_point.shp	E:\Maps\OTH\city_point.shp	From local directory	Point	WGS 84 EPSG 4326	310	Normal		
23	country_point.shp	E:\Maps\OTH\country_point.shp	From local directory	Point	WGS 84 EPSG 4326	2862	Normal		
24	provinces_point.shp	E:\Maps\OTH\provinces_point.shp	From local directory	Point	WGS 84 EPSG 4326	33	Normal		
25	gas_condensate_tank.shp	E:\Maps\gas\shp\gas_condensate_tank.shp	From local directory	Point	GCS_WGS_1984_EPSG_4326	8	Normal		
26	gas_pipe_cap.shp	E:\Maps\gas\shp\gas_pipe_cap.shp	From local directory	Point	GCS_WGS_1984_EPSG_4326	12290	Normal		
27	gas_pressure_box.shp	E:\Maps\gas\shp\gas_pressure_box.shp	From local directory	Point	GCS_WGS_1984_EPSG_4326	30	Normal		
28	gas_pressure_cabinet.shp	E:\Maps\gas\shp\gas_pressure_cabinet.shp	From local directory	Point	GCS_WGS_1984_EPSG_4326	122	Normal		
29	gas_pressure_stations.shp	E:\Maps\gas\shp\gas_pressure_stations.shp	From local directory	Point	GCS_WGS_1984_EPSG_4326	1	Normal		
30	gas_protective_pile.shp	E:\Maps\gas\shp\gas_protective_pile.shp	From local directory	Point	GCS_WGS_1984_EPSG_4326	54	Normal		
31	gas_servicing_well.shp	E:\Maps\gas\shp\gas_servicing_well.shp	From local directory	Point	GCS_WGS_1984_EPSG_4326	2	Normal		
32	gas_valve.shp	E:\Maps\gas\shp\gas_valve.shp	From local directory	Point	GCS_WGS_1984_EPSG_4326	1	Normal		
33	gas_valve_well.shp	E:\Maps\gas\shp\gas_valve_well.shp	From local directory	Point	WGS 84 EPSG 4326	882	Normal		

Apply Help Cancel

Figure 7-7: Returns the list of layers with the same geometry type as the selected sld

Click "Apply" to preview the effect, as shown in Figure 7-8.



Figure 7-8: Sld symbol map effect preview

7.1.3 Get GeoServer sld symbols

Obtain sld symbols from the GeoServer through connection pool and add to the local SLD resource pool, as shown in Figure 7-9.

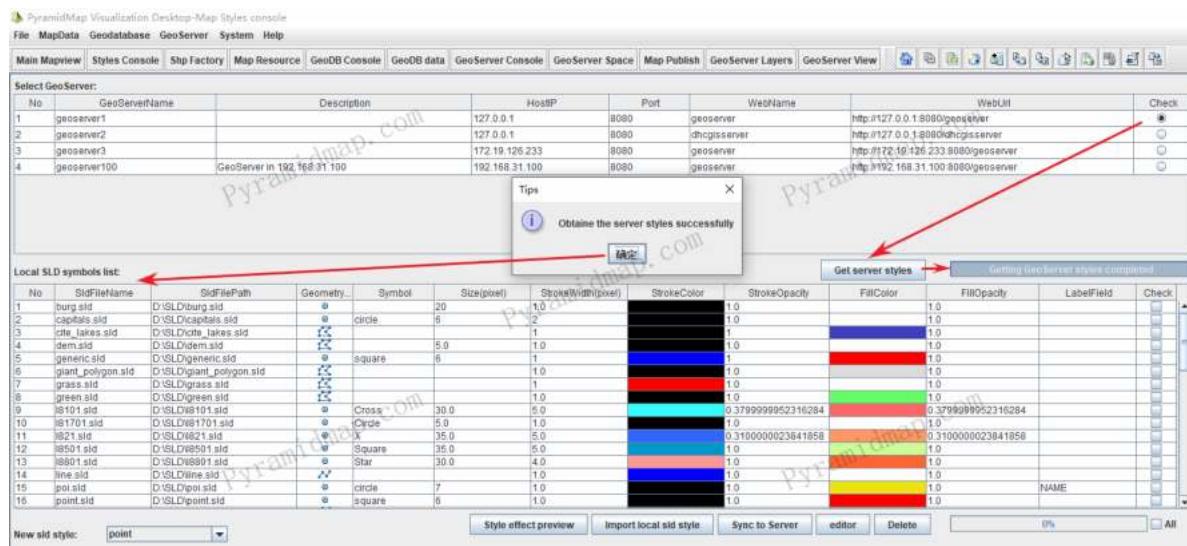


Figure 7-9: Obtain sld symbols from the GeoServer through connection pool

Select the GeoServer connection, click "Get server styles", PyramidMap gets the global SLDs in GeoServer and the SLDs in each workspace, and downloads them to the client resource pool for sharing.

7.2 Map rendering effect with sld

At the visualization layer node on the left side of the main interface, right-click the shortcut menu to Open the sld selection list. In this module, the sld resource files of the same type will be automatically filtered from the sld symbol resource pool maintained by the system according to the geometric type (point, line, and face) of the selected layer to form a selectable list. You can select the corresponding sld symbol definition to achieve the desired map rendering effect ,all of the workflow as shown in Figure 7-10.

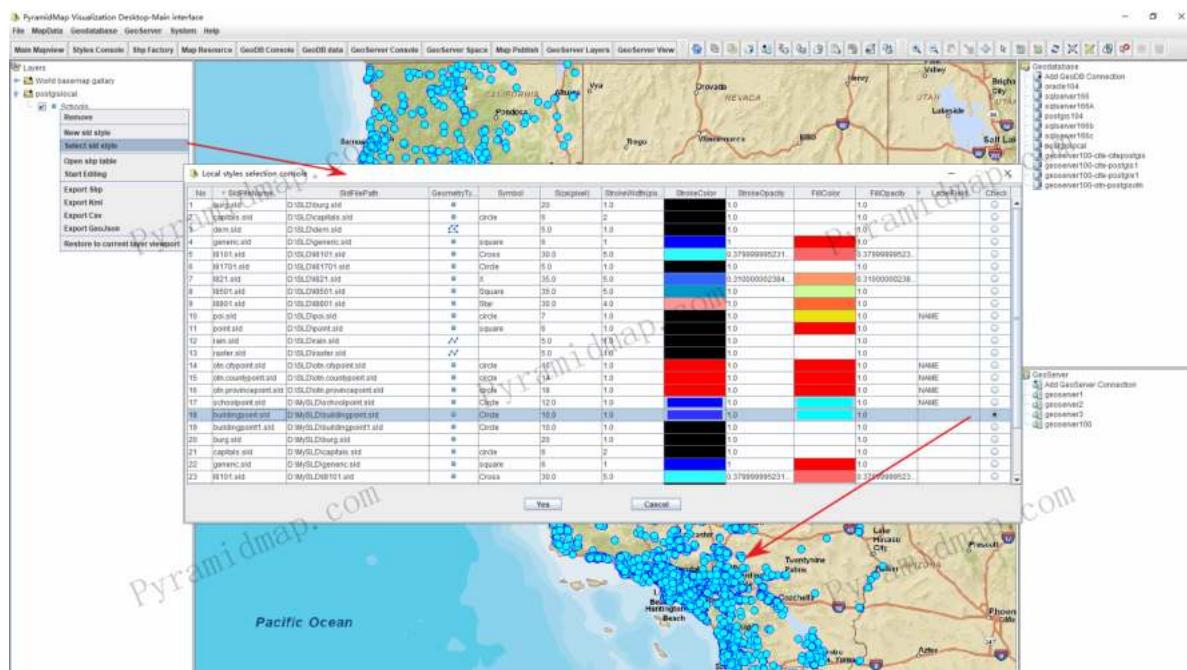


Figure 7-10: Select sld for visualization layer node to achieve map rendering effect

7.3 Client sld symbols submitted to GeoServer

PyramidMap submits the client sld symbols to the GeoServer through the connection pool, as shown in Figure 7-11.

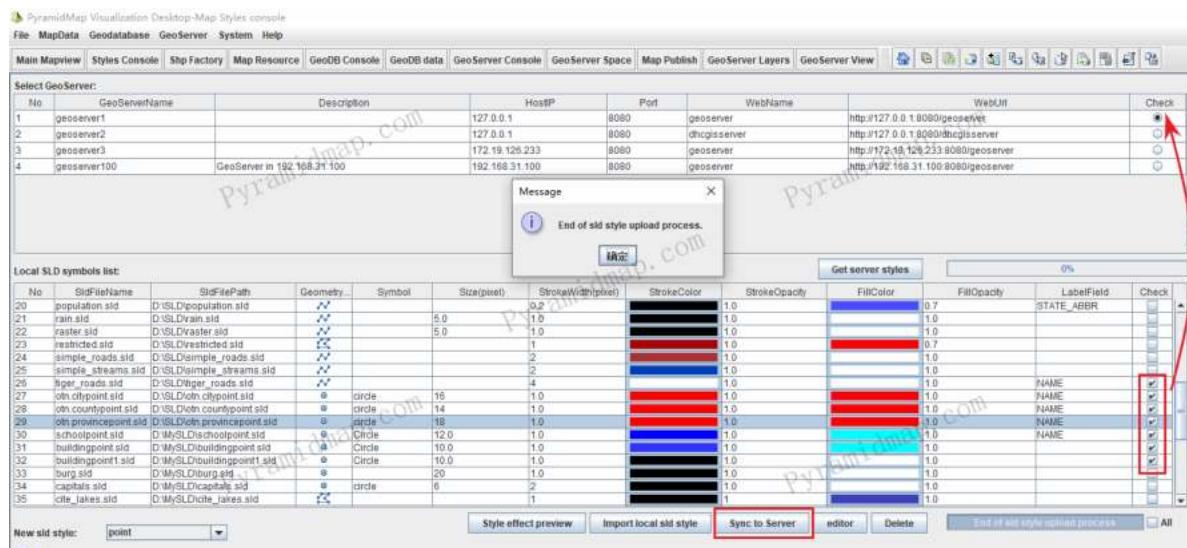


Figure 7-11: Client sld resources submitted to the GeoServer

Select all or part of the sld files and click “Sync to Server” to synchronously submit the selected sld symbols to the global space inside the GeoServer.

8 Publishing map service

WebGIS is the trend of map application development and the most extensive map application mode at present, including browser end, mobile end and embedded terminal application. Vector layer, raster layer and Geodatabase layer must be published as map service url to be applied in WebGIS terminal which hosted in map server such as GeoServer that provides web map service. GeoServer is based on the OpenGIS Web server specification, follows the OGC open standard, and can run in any J2EE/servlet based container, such as tomcat, webLogic, and webSphere, etc. GeoServer has complete functions and supports multiple map service functions, such as WMS/WFS/WCS/WMTS/KML. In the traditional way, using the GeoServer console to publish map services is very complicated and requires highly professional staff.

The significance of PyramidMap is to provide a visual guidance process to publish the layers in the local resource pool to the GeoServer server, which is simpler and easier to use than the traditional web console mode of GeoServer. The human-computer interaction is more friendly and intuitive, and the operation is convenient, which greatly reduces the professional skill requirements for operators. Even companies and individuals without GIS capabilities can easily use it, which is the biggest feature of the software. PyramidMap supports three types of layer publishing: Shp file type layer, image file type layer, and geographic database type layer. The main interface provides shortcut menu entries, as shown in Figure 8-1.



Figure 8-1: Main interface map service publishing shortcut menu entry

GeoServer supports the following three data storage modes of layer services: Geodatabase layer type, Shp vector file type, and raster image file type.

8.1 Publish Shp vector layers

Publish the local Shp vector layer to the shapefile directory on the GeoServer and use it as a data storage. GeoServer allows to store shp in file mode and output map services to web client. This is a complex process to package and submit client Shp files to the data cache path preset by GeoServer, and output them as rest map services for WebGIS access. PyramidMap simplifies this process through high integration, and makes it easier through visual guidance, the operation flows is shown in Figure 8-2.

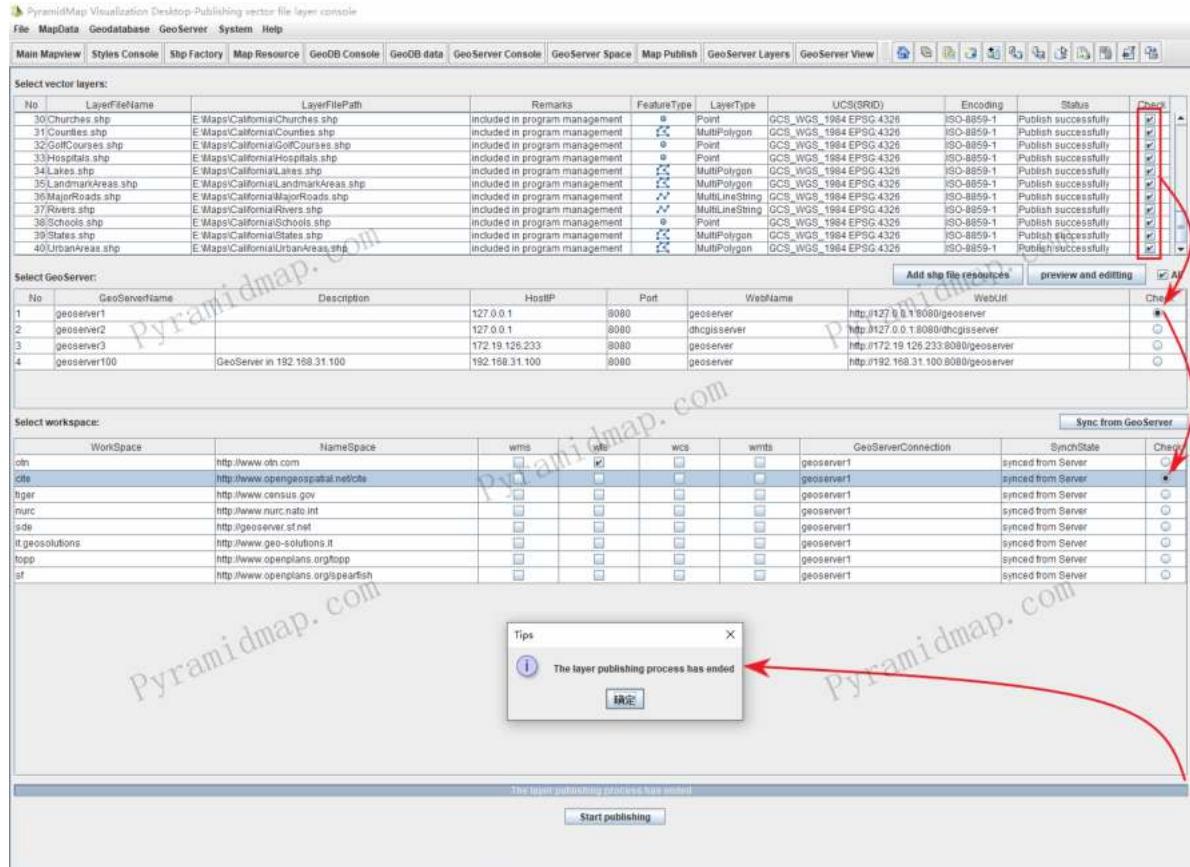


Figure 8-2: Workflow of publishing Shp vector layer to shapefile directory on GeoServer

The Shp file is uploaded to the shapefile directory preset by GeoServer, stored as a file, and exported to the map rest service.

8.2 Publish raster layers

Like the Shp vector layer publishing process, GeoServer allows raster layers being stored in file directory mode and output services to web client. Select the layers to publish in the local raster files resource pool, and then select the target GeoServer and workspace to publish. As shown in Figure 8-3.

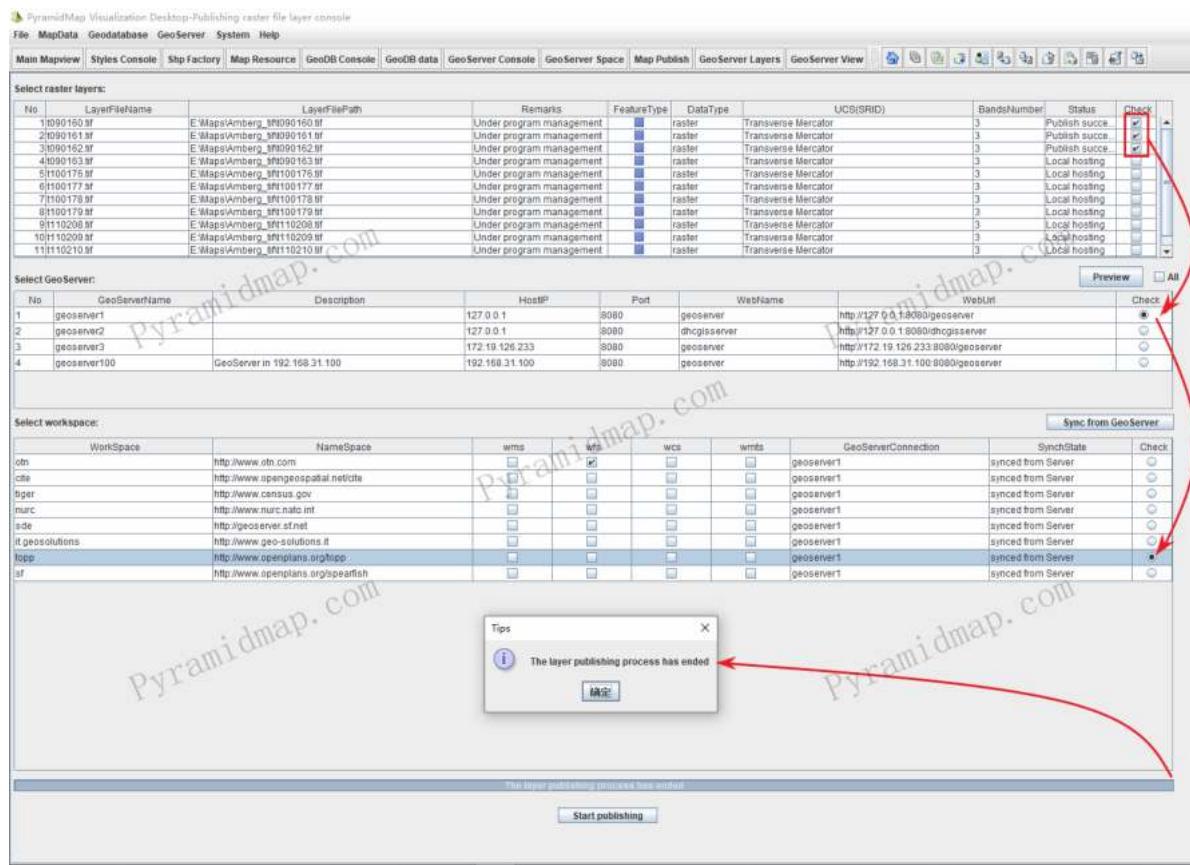


Figure 8-3: Workflow of publishing raster layer to raster file directory on GeoServer

8.3 Publish Geodatabase layers

The more powerful service function of GeoServer is that it can adapt to most DBMS geographic database systems, publish the map data as a service, and provide flexible web map services in a more extensive way to meet large-scale industrial map applications. Based on this, PyramidMap integrates the adaptation interface to the geographic database supported by GeoServer, supports but is not limited to publishing the layers in Oracle, PostGIS, MySQL and other geographic databases to GeoServer, and outputs WMS/WFS and other types of map services, as shown in Figure 8-4.

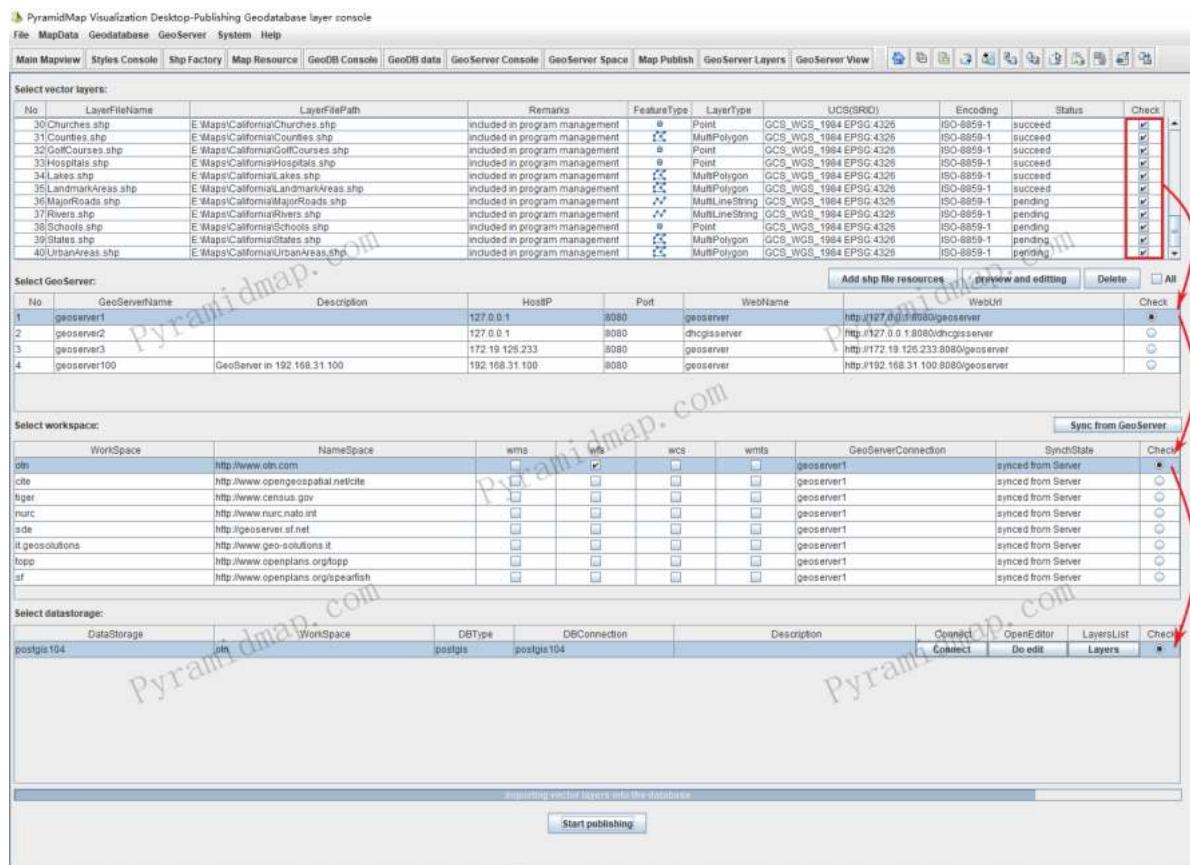


Figure 8-4: Workflow of publishing geodatabase layer to GeoServe

Select the vector layer to publish in the local vector layer resource pool, and then select the GeoServer target server to publish, the workspace in the server, and the data store. The map will first be imported into the geographic database corresponding to the data store, and then published as a map service in zaiGeoServer. PyramidMap realizes the traditional complicated publishing process through an integrated visual process, greatly reducing the difficulty of work and improving the efficiency.

8.4 Manage GeoServer layers

As the visualization client of GeoServer map server, PyramidMap implements unified management of layers in GeoServer, including layer preview and query. PyramidMap's management of GeoServer layers includes three main functions: GeoServer data source node in the main interface, as shown in Figure 8-5.

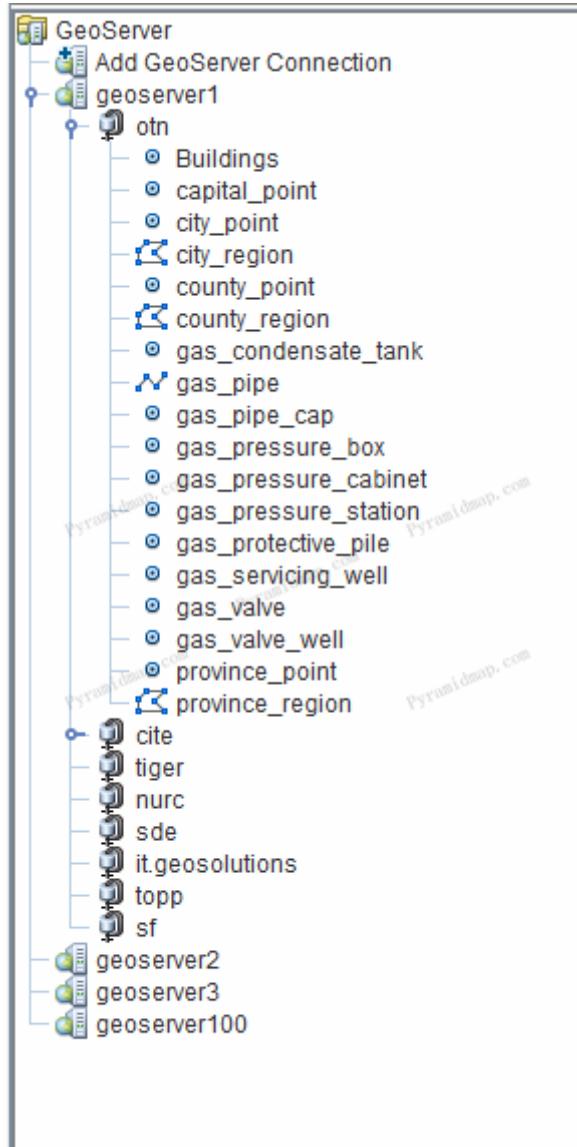


Figure 8-5: GeoServer data source node in the main interface

Through the GeoServer data source node, you can complete various hierarchical operations on the GeoServer workspace, data storage, and layers. PyramidMap provides access to GeoServer layer preview list and GeoServer layer management list through toolbar menu items, as shown in Figure 8-6.



Figure 8-6: Main interface GeoServer layers operation entrance

Through the above menu items, the layer preview and management of GeoServer can be realized.

8.4.1 GeoServer layers preview

PyramidMap previews the layers published by the server through the GeoServer resource connection pool. The list of layers is shown in Figure 8-7.

The screenshot shows the 'GeoServer layer list' section of the PyramidMap interface. It displays a table with 27 rows, each representing a vector layer. The columns include: No, LayerTitle, LayerName, WorkSpace, GeoServerUrl, DataBaseStorage, Style, UTM, Geometr, LayerType, Min X, Max X, Min Y, Max Y, and Check. The 'LayerTitle' column contains names like 'Buildings', 'capital_point', 'city_point', etc. The 'LayerName' column contains names like 'Buildings', 'capital_point', 'city_point', etc. The 'GeoServerUrl' column shows URLs such as 'http://127.0.0.1:8080/geoserver/postgis/104'. The 'Style' column shows values like 'EPSG:4326' or 'EPSG:3857'. The 'Geometr' column shows types like 'point', 'line', or 'polygon'. The 'LayerType' column shows types like 'point', 'line', or 'polygon'. The 'Min X' and 'Max X' columns show geographic coordinates. The 'Min Y' and 'Max Y' columns show geographic coordinates. The 'Check' column has checkboxes. At the bottom of the table are 'Preview' and 'Set style' buttons.

Figure 8-7: GeoServer layer list

The GeoServer layer list includes two types: vector and image. The vector layer is divided into point, line and face types. Select the vector layer and click Preview. PyramidMap will load and display the selected vector layer through WMS, as shown in Figure 8-8.

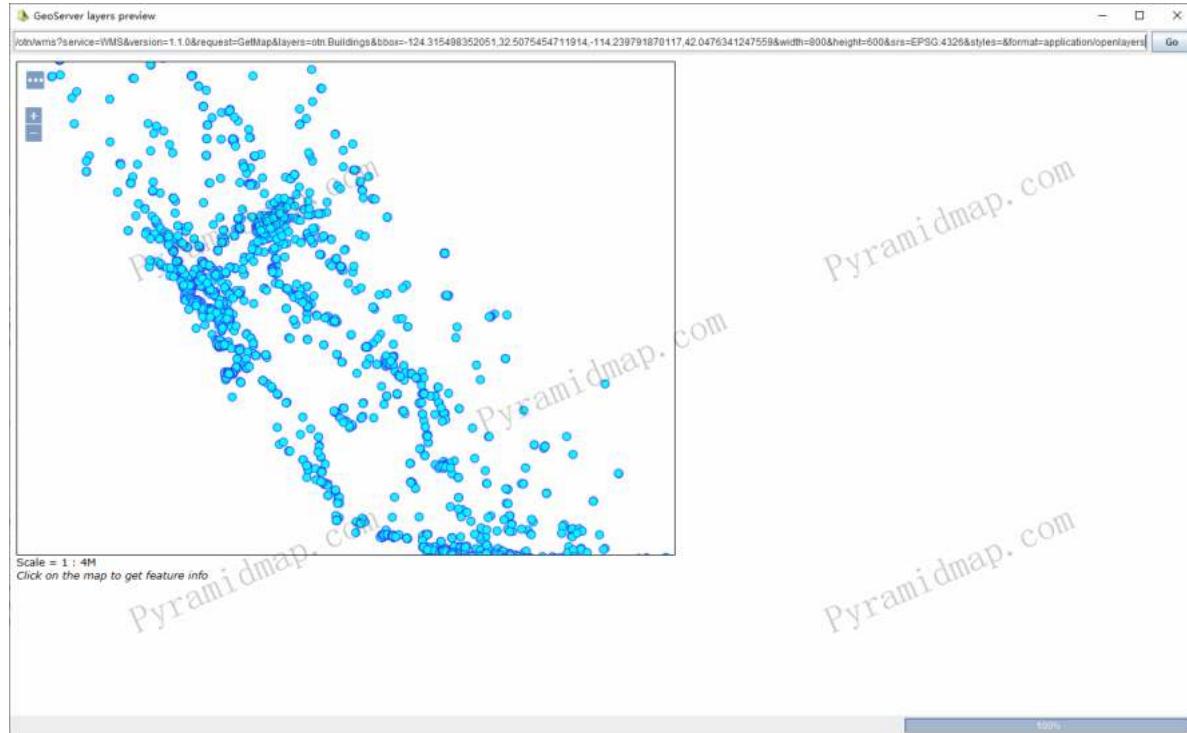


Figure 8-8: GeoServer vector layer preview

Select an raster layer and click Preview. PyramidMap will load and display the selected raster layer in WMS mode, as shown in Figure 8-9.

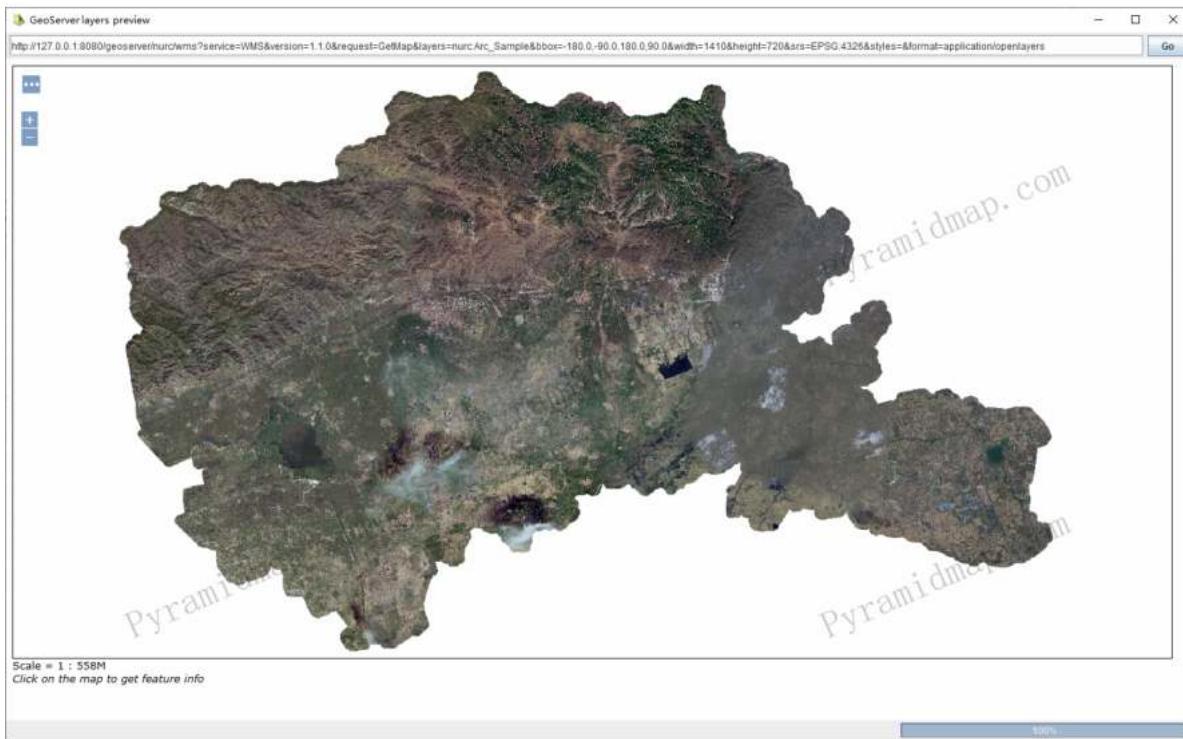


Figure 8-9: GeoServer raster layer preview

8.4.2 GeoServer layers export and conversion

PyramidMap provides some column export and data conversion operations for the layers in GeoServer, which is not available in regular GeoServer, giving more flexibility and operable space to map data. As shown in Figure 8-10.

The screenshot shows the 'PyramidMap Visualization Desktop-GeoServer layers console' interface. The main window displays a 'layersList' table with two tabs: 'GeoServer' and 'Local'. The 'GeoServer' tab is selected, showing a list of layers from a GeoServer instance at 'http://127.0.0.1:8080/geoserver'. The table includes columns for layer name, workspace, geometry type, style, and various coordinate values. Below the table are buttons for 'Export Shp', 'Export Kml', 'Export Csv', 'Export Gejson', and 'Delete layers'.

No	LayerName	WorkSpace	GeoServerUrl	DataStorage	Style	UCS	Geometr	LayerType	Min X	Max X	Min Y	Max Y	Check
1	Buildings	otn	http://127.0.0.1:8080/geoserver	postgis104	buildingpoint	EPSG:4326	point	lineString	-124.316	-114.24	32.508	42.048	<input checked="" type="checkbox"/>
2	capital_point	otn	http://127.0.0.1:8080/geoserver	postgis104	point	EPSG:4326	point	point	116.596	116.506	40.132	40.133	<input type="checkbox"/>
3	city_point	otn	http://127.0.0.1:8080/geoserver	postgis104	point	EPSG:4326	point	point	79.648	131.406	15.998	52.602	<input type="checkbox"/>
4	city_region	otn	http://127.0.0.1:8080/geoserver	postgis104	polygon	EPSG:4326	polygon	polygon	73.179	135.405	11.038	53.773	<input type="checkbox"/>
5	county_point	otn	http://127.0.0.1:8080/geoserver	postgis104	point	EPSG:4326	point	point	80.908	134.552	18.335	53.143	<input type="checkbox"/>
6	county_region	otn	http://127.0.0.1:8080/geoserver	postgis104	polygon	EPSG:4326	polygon	polygon	77.718	135.383	17.94	53.739	<input type="checkbox"/>
7	gas_condensate_tank	otn	http://127.0.0.1:8080/geoserver	postgis104	point	EPSG:3857	point	lineString	13.451786.025	13.465.936.851	3.608.506.983	3.625.104.693	<input type="checkbox"/>
8	gas_pipe	otn	http://127.0.0.1:8080/geoserver	postgis104	line	EPSG:3857	line	lineString	13.446.103.957	13.498.625.026	3.603.643.771	3.629.163.299	<input checked="" type="checkbox"/>
9	gas_pipe_cap	otn	http://127.0.0.1:8080/geoserver	postgis104	point	EPSG:3857	point	point	13.446.534.551	13.469.534.535	3.603.878.707	3.628.609.141	<input type="checkbox"/>
10	gas_pressure_box	otn	http://127.0.0.1:8080/geoserver	postgis104	point	EPSG:3857	point	point	13.446.435.572	13.465.645.325	3.604.467.192	3.628.694.204	<input type="checkbox"/>
11	gas_pressure_cabinet	otn	http://127.0.0.1:8080/geoserver	postgis104	point	EPSG:3857	point	point	13.446.282.172	13.468.949.279	3.603.721.581	3.629.004.256	<input type="checkbox"/>
12	gas_pressure_station	otn	http://127.0.0.1:8080/geoserver	postgis104	point	EPSG:3857	point	point	13.463.368.647	13.463.370.647	3.608.912.039	3.608.914.039	<input type="checkbox"/>
13	gas_protective_pile	otn	http://127.0.0.1:8080/geoserver	postgis104	point	EPSG:3857	point	point	13.451.919.117	13.466.247.646	3.607.336.858	3.623.375.647	<input type="checkbox"/>
14	gas_servicing_well	otn	http://127.0.0.1:8080/geoserver	postgis104	point	EPSG:3857	point	point	13.459.306.353	13.464.403.932	3.610.205.953	3.617.492.754	<input type="checkbox"/>
15	gas_valve	otn	http://127.0.0.1:8080/geoserver	postgis104	point	EPSG:3857	point	point	13.459.305.014	13.459.307.014	3.617.491.618	3.617.493.618	<input type="checkbox"/>
16	gas_valve_well	otn	http://127.0.0.1:8080/geoserver	postgis104	point	EPSG:3857	point	point	13.446.105.105	13.469.622.632	3.603.643.826	3.629.154.988	<input type="checkbox"/>
17	province_point	otn	http://127.0.0.1:8080/geoserver	postgis104	point	EPSG:4326	point	point	85.544	126.174	19.213	46.943	<input type="checkbox"/>
18	province_region	otn	http://127.0.0.1:8080/geoserver	postgis104	polygon	EPSG:4326	polygon	polygon	73.441	135.067	18.16	53.562	<input type="checkbox"/>
19	capital_point	otn	http://127.0.0.1:8080/geoserver	capital_point	point	EPSG:4326	point	point	116.506	116.506	40.133	40.133	<input type="checkbox"/>
20	city_point	otn	http://127.0.0.1:8080/geoserver	city_point	point	EPSG:4326	point	point	75.987	131.151	16.179	52.42	<input type="checkbox"/>
21	city_region	otn	http://127.0.0.1:8080/geoserver	city_region	polygon	EPSG:4326	polygon	polygon	73.488	135.097	0.253	53.562	<input type="checkbox"/>
22	county_point	otn	http://127.0.0.1:8080/geoserver	county_point	point	EPSG:4326	point	point	75.221	134.268	18.508	52.971	<input type="checkbox"/>
23	county_region	otn	http://127.0.0.1:8080/geoserver	county_region	polygon	EPSG:4326	polygon	polygon	73.486	135.097	18.118	53.562	<input type="checkbox"/>
24	gas_condensate_tank	otn	http://127.0.0.1:8080/geoserver	gas_condensate_tank	point	EPSG:3857	point	lineString	120.839	120.967	30.813	30.941	<input type="checkbox"/>
25	gas_pipe	otn	http://127.0.0.1:8080/geoserver	gas_pipe	line	EPSG:3857	line	lineString	120.788	120.999	30.776	30.972	<input type="checkbox"/>
26	gas_pipe_cap	otn	http://127.0.0.1:8080/geoserver	gas_pipe_cap	point	EPSG:3857	point	point	120.745	121.297	30.627	30.992	<input type="checkbox"/>
27	gas_pressure_box	otn	http://127.0.0.1:8080/geoserver	gas_pressure_box	point	EPSG:3857	point	point	120.791	120.964	30.782	30.97	<input type="checkbox"/>

Figure 8-10: GeoServer layers export and conversion

PyramidMap can export the layers in GeoServer to Shp, Kml, Csv, Geojson and other formats, realizing the visual transformation of map data and expanding the utilization space of map data.