

Oracle® Spatial Studio

Guide



Release 22.2
F60394-01
September 2022



Oracle Spatial Studio Guide, Release 22.2

F60394-01

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Preface

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Audience

This document is intended for users of the Spatial Studio tool who have one or more of the following responsibilities:

- **Administering Spatial Studio.** Such users install the tool, and create and manage database users of the tool.
- **Using Spatial Studio.** Such users are typically data analysts or application developers, or both.

Tip:

If you choose to print the PDF version of this book, and if you do not want to include the licensing details in the printout, print **only pages 1 (title page) through the last page of the last chapter**. (Most of the content of the book consists of license details in Appendix A.)

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Related Resources

For more information, see these Oracle resources:

- Oracle Technical Resources (formerly called Oracle Technology Network) page: <https://www.oracle.com/database/technologies/spatialandgraph.html> (and look for Spatial Studio)
- *Oracle Spatial Developer's Guide*

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
<i>italic</i>	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
monospace	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

Changes in this Release for this Guide

New Features for Oracle Spatial Studio Release 22.2

- Added internationalization support for the Spatial Studio user interface by adding nine different languages besides the default English.
See [About Internationalization in Spatial Studio](#) for more information.
- Enhanced Nearest-Neighbor analysis for SDO_NN filter which is replaced with SDO_NN_V2 filter.
See [Determining the N-Nearest Geometries](#) for more information.
- Enhanced Reverse Geocoding process to find the closest street name if a set of latitude and longitude coordinates do not match a named street.
See [Reverse Geocoding a Dataset](#) for more information.
- Enhanced Geocoding process to be performed in batches of 50 addresses and improved diagnosis of geocoding issues and exceptions.
See [Figure 3-16 in Geocoding a Dataset](#) for more information.
- Added the following support for shapefiles:
 - Automatically determining the character set of the file attributes from the .cpq file included in a shapefile.
 - Assigning best-matched geodetic SRID for custom Geographic Coordinate System (GEOGCS) in the .prj file.See [Uploading a Shapefile](#) for more information.
- Added support for streaming-only access tokens that grant restricted access to Spatial Studio REST endpoints.
See [Generating an Access Token](#) for more information.
- Added the following support for Jobs page:
 - Explicitly terminate a processing job.
 - View specific details for each job such as progress, input parameters, logs and exceptions.See [Spatial Studio Jobs Page](#) for more information.
- Improved the organization and layout for the Active Project page in order to increase the screen real estate available for various visualizations.
See [Spatial Studio Active Project Page](#) for more information.

1

Introduction to Oracle Spatial Studio

Oracle Spatial Studio is a graphical tool for working with spatial data in Oracle Spatial and Graph format.

- [About Oracle Spatial Studio](#)
Oracle Spatial Studio, also referred to as Spatial Studio, is a free tool that lets you connect with, visualize, explore, and analyze geospatial data stored in and managed by Oracle Spatial.
- [Spatial Studio Terminology](#)
This section introduces the key concepts and domain objects of Oracle Spatial Studio.
- [Spatial Studio Metadata and Connection Management](#)
This section provides conceptual information about the metadata schema and the connections object in Spatial Studio.
- [Spatial Studio Best Practices](#)
This section describes the best practice recommendations when working with Spatial Studio.

1.1 About Oracle Spatial Studio

Oracle Spatial Studio, also referred to as Spatial Studio, is a free tool that lets you connect with, visualize, explore, and analyze geospatial data stored in and managed by Oracle Spatial.

Spatial Studio is a multiuser Java EE application that can be used as a standalone tool (Quick Start) or deployed to WebLogic Server.

Before you can use Spatial Studio, you must download the kit from Oracle Technical Resources (formerly called Oracle Technology Network), install the software, and perform certain administrative actions like creating database users that are authorized to use the tool, and managing those users.



Note:

Spatial Studio is **not** the Spatial map visualization component (formerly called "MapView"), which is not an end-user "tool" but rather a separate and distinct component.

The map visualization component is documented in [Spatial Map Visualization Guide](#).

1.2 Spatial Studio Terminology

This section introduces the key concepts and domain objects of Oracle Spatial Studio.

- **Connection:** Connections are user-created; they provide details so that the Spatial Studio can load user data from an external data source, typically a specific database schema.
- **Dataset:** A dataset is the basic organizational unit of a user's data.
- **Project:** A project is where data visualization and analysis occur. It represents a "workspace" that can be saved and reopened.
- **Published Project:** A published project is a snapshot of the visualizations and analyses that a user has created in a project. It provides an easy way of sharing what users have created within their organization.
- **Analysis:** An analysis is typically one or more (spatial) operations performed on one or more datasets. The operation types and their parameters for an analysis are all stored as part of a *project*. The result of any analysis can be visualized, just like any other dataset.
- **Metadata schema (repository):** The metadata schema for Spatial Studio is an Oracle Database that contains the repository where all Spatial Studio metadata is centrally managed.
- **User:** Spatial Studio's end users, which are typically business analysts and administrative users. These users are NOT database schema owners; rather they are application users, whose information is typically stored in an LDAP-like directory and whose authentication is carried out by WebLogic Server.
- **Public Dataset:** A public dataset is one with a GeoJSON endpoint that can be accessed without having to log onto the Spatial Studio first. A public dataset is always visible to all the Spatial Studio users and can be used in their projects.
- **Public Published Project (PPP):** A public published project is a published project where all the datasets involved are public datasets, and the published project itself is also made public. You can embed the visualizations of a public published project in other web applications, or can be viewed standalone in a web browser, without having to log onto Spatial Studio server first.

1.3 Spatial Studio Metadata and Connection Management

This section provides conceptual information about the metadata schema and the connections object in Spatial Studio.

Spatial Studio stores all of its own metadata (such as the definitions of all the datasets and connections created by different users) in a single Oracle Database schema known as the metadata schema, or repository.

This metadata schema is one that Spatial Studio must be able to connect to during initial start up, because all of its essential metadata and states are stored there. This metadata schema can be an Oracle Database devoted solely to Spatial Studio use, or it can be any schema potentially used for other purposes as well, as long as the schema is provisioned for use by Spatial Studio, with the minimum necessary privileges.

The main types of connections are created by Spatial Studio's end users so that they can gain access to a set of data tables stored in potentially several different database schemas, and explore them together in a single project. For each such user-created connection, only its connection details are stored in Spatial Studio's metadata schema, while no actual (raw) data is ever copied or extracted into the metadata schema.

If a schema user name and password are specified when a connection is created in Spatial Studio, this information is securely encrypted before being stored in the metadata schema tables. When a user opens a project that depends on datasets originated from such a connection, then the password is decrypted at that time and a new JDBC connection pool is established. This connection pool is then used by Spatial Studio to run queries against the target table(s) from that connection whenever needed.

By default a connection is **private**, meaning that only the user that created the connection can access it (either in a project or anywhere else). For example, if User A creates a connection, then User B will not be able to see or use that connection or any data from the connection. The only exception is if User B is an admin user, in which case all connections and datasets are fully accessible by User B.

1.4 Spatial Studio Best Practices

This section describes the best practice recommendations when working with Spatial Studio.

Standardize Longitude/Latitude Data on SRID 4326

In Oracle Database, spatial data includes a SRID (spatial reference identifier), which uniquely identifies the coordinate system associated with the data. If you want to perform any spatial analysis operations involving multiple data sets, it is recommended that the data sets have the same SRID.

Many SRIDs can be used for longitude/latitude data, but probably the most widely used is 4326. Oracle recommends that you use SRID 4326 for longitude/latitude geometries unless there is information to indicate otherwise. Also, if you have Oracle tables with longitude/latitude geometries and if the SRID is not consistent across the tables, you are advised to standardize on SRID 4326.

(For detailed information about SRIDs and coordinate system support in Oracle Spatial, see the Coordinate Systems (Spatial Reference Systems) chapter in the Spatial manual.)

The following example transforms geometries that do not use SRID 4326 so that they use SRID 4326. You would need to do these actions for each existing table that does not use SRID 4326. The example assumes a geometry table named TABLE_1 with a geometry column named GEOM. It also drops the existing spatial index named table_1_idx, and later re-creates it.

```
-- Drop the existing spatial index.
DROP INDEX table_1_idx FORCE;

-- Update the spatial metadata.
INSERT INTO user_sdo_geom_metadata
VALUES (
  'TABLE_1', -- table name
  'GEOM',    -- geometry column name
  SDO_DIM_ARRAY(
    SDO_DIM_ELEMENT('Longitude', -180, 180, 0.05), -- 0.05 meter tolerance
    SDO_DIM_ELEMENT('Latitude', -90, 90, 0.05) -- 0.05 meter tolerance
  ),
  4326 -- SRID for 'Longitude / Latitude (WGS 84)' coordinate system
);

-- Update (transform) geometry data to use SRID 4326.
update table_1 set geom = sdo_cs.transform(geom, 4326);
```

```
-- Re-create the spatial index.  
CREATE INDEX table_1_idx  
ON table_1 (geom)  
INDEXTYPE IS MDSYS.SPATIAL_INDEX_V2;
```

 **Note:**

In the CREATE INDEX statement, SPATIAL_INDEX_V2 is recommended if the Oracle Database is Release 18 or later. If it is earlier than Release 18, specify just SPATIAL_INDEX.

2

Administering Oracle Spatial Studio

Administering Oracle Spatial Studio involves certain actions that must be performed before non-administrative users can work with spatial data. If you are an administrative user of Spatial Studio, you must:

- Download the Oracle Spatial Studio application from Oracle Technical Resources (formerly called Oracle Technology Network) and install it.
- Set up a database schema to be the Spatial Studio schema, that is, to hold metadata for Spatial Studio.
The Spatial Studio schema can be either an existing database schema in which Spatial Studio metadata will be added, or a newly created schema that will be used only for Spatial Studio.
- Configure the newly installed Spatial Studio application.
When the installation and configuration actions are completed, users can connect to the database, start Spatial Studio, and use its features.

Note:

The Spatial Studio application can be downloaded in either of the following formats:

- Quick Start: A ready-to-run standalone application packaged in a zip file containing what you need to launch the Spatial Studio web application on your desktop. (You will still need to have JDK 8 64-bit, update 181 or later installed on your desktop, because no Java kit is bundled with this kit.) Quick Start is well suited for personal and development use.
- A WLS-optimized EAR (Enterprise Application Archive) file. This `.ear` file can be deployed to an existing WebLogic Server domain administered by an organization's WLS or middleware administrator. This is the recommended installation and deployment method if you intend for multiple end users to access the same Spatial Studio web application.

A given person or database user can be *both* an administrative user and a non-administrative user, *or* can be *only* an administrative user or a non-administrative user.

- [Prerequisites and Recommendations for Spatial Studio](#)
This section describes the prerequisites and recommendations that apply for using Spatial Studio.
- [Downloading and Installing Spatial Studio](#)
Spatial Studio must be downloaded and installed before anyone can use it to perform interesting work on spatial data.
- [Setting Up the Spatial Studio Metadata Schema](#)
You must set up a database schema to be the Spatial Studio schema, which will hold metadata used by the Spatial Studio application.

- [Connection Requirements for Database Users of Spatial Studio](#)
This section describes the connection requirements for database users to work on Spatial Studio.
- [Changing the Configuration Using the sgtech_config.json File](#)
This section describes the configuration of important properties in sgtech_config.json file.
- [Enabling IDCS as Identity Provider in Spatial Studio](#)
Starting from Oracle Spatial Studio Release 22.2, you can log into your Spatial Studio instance using users already managed by your own Oracle Cloud tenancy's IDCS identity domain.

2.1 Prerequisites and Recommendations for Spatial Studio

This section describes the prerequisites and recommendations that apply for using Spatial Studio.

Oracle Spatial must be installed on the database to which any users will connect to perform actions with Spatial Studio. (It is not sufficient to have only Oracle Locator installed.)

The following additional requirements and recommendations apply:

- Java versions: Java 8 (64-bit, update 181 or later); or JDK 11 (64-bit).
- Oracle Database 19c or later. This applies both to the Spatial Studio metadata schema and to all database connections that will be used by Spatial Studio users.

Note:

Oracle Spatial Studio Releases are backward compatible with supported Oracle Database versions.

- Oracle WebLogic Server 12.2.1.3 or later.
- All the privileges listed in section [Setting Up the Spatial Studio Metadata Schema](#) are required for each database user that works with Spatial Studio.
- Quota on the default tablespace for each database user that works with Spatial Studio. ALTER USER statement format: ALTER USER [username] QUOTA [quota value] ON [default tablespace name];
For example, for a user named test_user with default tablespace users:

```
ALTER USER test_user QUOTA unlimited ON users;
```
- The default tablespace for the Spatial Studio repository schema should not use compression.

2.2 Downloading and Installing Spatial Studio

Spatial Studio must be downloaded and installed before anyone can use it to perform interesting work on spatial data.

Go to <https://www.oracle.com/database/technologies/spatial-studio/get-started.html> to see more information for downloading and installing Spatial Studio.

- [Installing and Configuring the Spatial Studio Quick Start](#)
Quick Start is an easy method for getting started, and is well suited for personal and development use.
- [Installing Spatial Studio to a WebLogic Server Domain](#)
Spatial Studio can be deployed to a WebLogic Server domain, the recommended approach if multiple end users will access the same Spatial Studio application.
- [Installing Spatial Studio from Oracle Cloud Marketplace](#)
You can provision Spatial Studio to Oracle Cloud from Oracle Cloud Marketplace.

2.2.1 Installing and Configuring the Spatial Studio Quick Start

Quick Start is an easy method for getting started, and is well suited for personal and development use.

The Quick Start is packaged in a single zip that contains everything you need to start using Spatial Studio, except for Java 8 (64-bit, update 181 or later) and your own database schemas.

The following are general steps for getting started:

1. Download the Quick Start zip archive `OracleSpatialStudio_qs.zip`.
2. Unzip (extract) it, which results in a directory named `Oracle_Spatial_Studio`.
3. Ensure that the `JAVA_HOME` environment variable exists on your system, and points to a full JDK installation of Java SE Development Kit 8u181 (64-bit) or later. JDK 11 can also be used.
4. Ensure that the ports 8080 and 4040 are not being used by any other (web) applications. (You can direct Spatial Studio to use different ports, but 8080 and 4040 are the default.) Port 8080 is to used with the `http://` protocol, while port 4040 is for the `https://` protocol.
Note that by default, Spatial Studio only allows access using `https`.
5. From a command window (Windows) or terminal (Linux or Mac), go to (`cd`) the `Oracle_Spatial_Studio` directory. This directory contains several `.bat` or `.sh` files.
6. Use `start.sh` or `start.bat` to start the application. (On Linux or Mac you may need to ensure that the `.sh` files are executable by first running the command: `chmod u+x *.sh`) Leave the terminal or command window open.
7. In your browser, go to the URL: `https://localhost:4040/spatialstudio`
The default admin user login credentials are `admin/welcome1`. It is strongly recommended that you immediately change the password.

The admin user's and the two built-in regular users' passwords are all stored in encrypted form. For how to change the (encrypted) password of a Spatial Studio user, see the README file for the Quick Start. This README file also contains information about starting and restarting the Quick Start.

 **Note:**

The following considerations apply to using the Quick Start:

- The default port is 4040, but you can change it by editing the file `conf/server.json` in `Oracle_Spatial_Studio`. You will need to restart the application after you make any change. (The same applies if you change the HTTP port value from the default 8080.)
- The Quick Start provides several predefined web user login accounts named `admin`, `manager`, `author`, `consumer`, and `limited`. These users and their login passwords are defined in the configuration file `conf/jetty-realm.properties`. You should **change the passwords immediately** after you unzip the downloaded Quick Start kit. Because the Quick Start is intended for personal use, the passwords for the end user accounts **are not encrypted**. However, all other passwords, such as those used to log into the Spatial Studio metadata schema or for any user-created connections to database schemas, **are strongly encrypted** everywhere.
- To stop the application, the preferred approach is to start a second terminal or command window, then go to the same `Oracle_Spatial_Studio` folder and run the `stop.bat` or `stop.sh` script.

2.2.2 Installing Spatial Studio to a WebLogic Server Domain

Spatial Studio can be deployed to a WebLogic Server domain, the recommended approach if multiple end users will access the same Spatial Studio application.

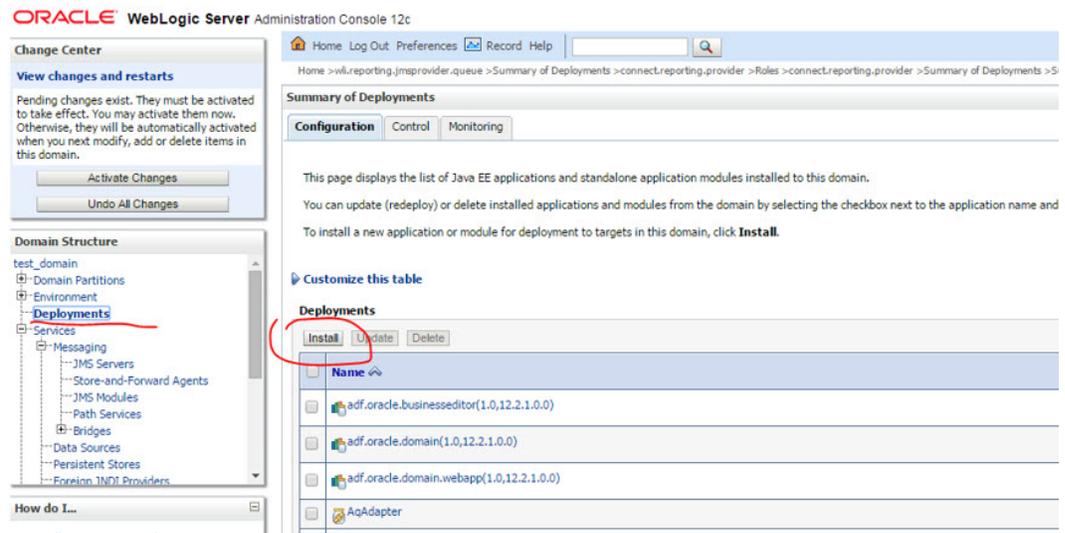
 **Note:**

A WebLogic Server license is required in order to host Spatial Studio in WebLogic Server for multiple end users.

The general approach for deploying Spatial Studio to WebLogic Server is no different from deploying any other Java EE EAR application. The easiest way to do so is by using the WebLogic Server's Admin console with the following steps. Note that in all or most steps you can accept the default values provided by the WLS Installation Application Wizard.

1. Download the Studio EAR archive from Oracle Technical Resources or eDelivery, and save it to your local system.
2. Log into the target WLS domain's Admin console.
3. Click the **Deployments** link on the left side.
4. Click **Install** button under the Deployments section, as shown in the following figure (note that the exact contents may be different for your instance of WLS).

Figure 2-1 WLS Admin Console for Deploying Spatial Studio



5. On the next page, , select the Spatial Studio EAR file downloaded previously, and install it as an application (not as a library).
 6. Click through the remaining steps, including selecting the proper target server. You should accept the default options in all cases unless you know exactly what you are doing. Finally, click **Save** to complete the deployment.
 7. If your WLS runs in production mode, you may need to activate the changes to ensure the deployment is activated.
 8. Make sure the newly deployed Spatial Studio application is marked Active; otherwise, you may need to explicitly start it from the WLS administrative console.
 9. Access the Studio application using your managed server's URL with the / spatialstudio context root. For example: `http://mycompany.com:7002/spatialstudio`
- [Preventing a Spatial Studio Admin User from General WLS Administration](#)
 If you want to prevent a Spatial Studio administrative user from performing other general WebLogic Server administrative operations, follow the instructions in this topic.

2.2.2.1 Preventing a Spatial Studio Admin User from General WLS Administration

If you want to prevent a Spatial Studio administrative user from performing other general WebLogic Server administrative operations, follow the instructions in this topic.

The Spatial Studio application by default allows all WebLogic managed admin users (those who are in WebLogic's **Administrators** group) to log into the Spatial Studio application and assume Admin role inside the Spatial Studio application as well.

However, in some scenarios, your organization may **not** want to provide the WebLogic Server admin account information to the user(s) that will be administering only the Spatial Studio application. In such cases, the WLS system administrator can create a new WLS group with the id value of "**SGTech_SystemAdmin**" in the default WLS security realm. Then, either create a new user or assign an existing non-WLS-admin user to this group. From then on, this user will assume the admin role of the Spatial Studio whenever logged in, but will not be able to administrate the WLS server in general.

Note that all WLS managed users will be able to log into Spatial Studio by default, but they will be limited to accessing only their own Spatial Studio objects such as connections, datasets, and projects. Administrative users of Spatial Studio will have full access to every Spatial Studio object created by everyone.

2.2.3 Installing Spatial Studio from Oracle Cloud Marketplace

You can provision Spatial Studio to Oracle Cloud from Oracle Cloud Marketplace.

See [Deploy Spatial Studio from Cloud Marketplace](#) for more information on deploying Spatial Studio from Cloud Marketplace.

2.3 Setting Up the Spatial Studio Metadata Schema

You must set up a database schema to be the Spatial Studio schema, which will hold metadata used by the Spatial Studio application.

The Spatial Studio schema can be either an existing database schema in which Spatial Studio metadata will be added, or a newly created schema that will be used only for Spatial Studio. The recommended practice is to create a new database user that will be used only by Spatial Studio. The database user for the Spatial Studio schema must have the following privileges:

- CONNECT
- CREATE PROCEDURE
- CREATE SEQUENCE
- CREATE SESSION
- CREATE SYNONYM
- CREATE TABLE
- CREATE TRIGGER
- CREATE TYPE
- CREATE VIEW

Note:

The `CREATE TRIGGER` privilege is required only if you intend to store and display GeoRaster data in the schema.

For example, when connected as a user with DBA privileges:

```
SQL> create user SPATIAL_STUDIO identified by <password>;  
SQL> grant connect, create procedure, create sequence, create session,  
create synonym, create table, create trigger, create type, create view  
to SPATIAL_STUDIO;
```

When the Spatial Studio application starts running for the first time, it will generate a configuration file in a folder named **.sgtech** under the current user's operating system home folder. The configuration file is named `sgtech_config.json`. This is where

Spatial Studio application will be obtaining and storing the connection details in its metadata schema.

After the connection to the metadata schema is established, the Spatial Studio application will automatically check if the required tables and other database objects are already present, and if their versions are up to date with the latest Spatial Studio application software. If these tables are not found, or if the tables require migration, the Spatial Studio application will run the necessary SQL scripts to create or migrate them, all without any intervention from the user.

The Spatial Studio schema will contain the following tables and views:

- `SGTECH_OBJECT`: stores all the domain objects for Spatial Studio.
- `SGTECH_SYS_TYPE`: defines all the known types of domain objects of Spatial Studio.
- `SGTECH_SYS_JSON_SCHEMA`: stores JSON data schema.
- `SGTECH_TASK_QUEUE`: stores long-running jobs of Spatial Studio.
- `SGTECH_TASK_BROKER`: stores job brokers for Spatial Studio.

**Note:**

Do **not** add, delete, or edit any of the Spatial Studio tables or views or the data within them. They are automatically maintained by Spatial Studio, and should not be modified by users unless directed by Oracle Support.

Managing Metadata Schema when Running Multiple Instances of Spatial Studio

Spatial Studio prevents you from running multiple application instances each having its own `sgtech_config.json` file from using the same metadata schema. In case you want to run another instance, it is recommended that you copy the `sgtech_config.json` configuration file linked to the initial instance to the system where you want to start the new instance.

Otherwise, any attempt to connect to the same metadata schema from an instance running on a different system is prevented by Spatial Studio with the following warning:

```
The selected repository is already registered to another instance of Spatial Studio. Check the system logs for more details.
```

2.4 Connection Requirements for Database Users of Spatial Studio

This section describes the connection requirements for database users to work on Spatial Studio.

Each individual user must connect as a database user who is authorized to run Spatial Studio. A Spatial Studio administrator can enable access for the database users.

You can create new database users specifically for Spatial Studio access, or you can modify existing database users to enable Spatial Studio access, or you can do a combination of these approaches.

All database users must have a minimum set of privileges. In addition, each database user that works with Spatial Studio must have quota on its default tablespace. The privilege and quota requirements are explained in [Prerequisites and Recommendations for Spatial Studio](#).

2.5 Changing the Configuration Using the `sgtech_config.json` File

This section describes the configuration of important properties in `sgtech_config.json` file.

By default, Spatial Studio will create (if it does not already exist) and use a JSON file named `sgtech_config.json` for most of its essential configuration information.

This file is typically found in the operating system user's home directory, in a subfolder named `.sgtech`. This is true whether you deployed the Studio EAR to a WebLogic domain or are just using the Quick Start.

The following topics describe some important properties in the configuration file that a system administrator should be aware of.

- [Allow HTTPS-ONLY Access](#)
- [Connecting to the Spatial Studio Metadata Schema](#)
- [Caching Metadata Objects](#)
- [Importing Additional Configuration Files in Spatial Studio](#)
- [If the Spatial Studio Repository Schema Password Has Been Changed](#)

2.5.1 Allow HTTPS-ONLY Access

One of the top level properties in the `sgtech_config.json` config file is ***https_only***. When this value is set to **true** (the default), Oracle Spatial Studio will actively monitor all incoming requests and only allow requests that were made using SSL. Normal `http://` requests will be denied.

Thus, if you tried to access the Spatial Studio application using an `http://` URL such as `http://localhost:8080/spatialstudio`, and if the value of `https_only` is set to `true`, then you will not be able to log in. In fact, you will not even see the login page itself, because none of the page resources will be accessible by your browser. Similarly, all RESTful requests will be blocked unless accessed using HTTPS.

If your environment (such as WebLogic Server) supports only `http` access, then you can change the value of `https_only` to `false`, and make sure to restart the Spatial Studio application or the JavaEE container where Spatial Studio is deployed.

2.5.2 Connecting to the Spatial Studio Metadata Schema

Spatial Studio must have access to a set of metadata tables, such as `SGTECH_OBJECT`. These tables are collectively considered the repository of the Spatial Studio application. The database schema that hosts these tables is considered the metadata schema or repository schema of Spatial Studio.

Spatial Studio must be able to establish a connection to this metadata schema as the first step during startup, when the connection details are found in the `sgtech_config.json` file in the `metadata_schema` section.

In an emergency situation, you can also manually edit this section to change or correct the connection details. However, be careful whenever editing this file, because any syntax error can cause Spatial Studio to stop working or fail to restart.

When you manually enter the repository schema connection details in the `sgtech_config.json` file (in the `metadata_schema` section), you must first specify whether `CONTAINER` or `SPATIAL_STUDIO` is managing the physical JDBC connections:

```
"metadata_schema" : {
  "connection_manager": "CONTAINER"
}
```

Or

```
"metadata_schema" : {
  "connection_manager": "SPATIAL_STUDIO"
}
```

When `connection_manager` is set to `CONTAINER`, it means the JDBC connections to the Spatial Studio's repository schema are managed through a Java EE data source already created in Jetty (for Quick Start) or WebLogic Server. For example, if there is a data source named `jdbc/studioMetadata` in the WLS domain, and if you want Studio to connect to the target schema using this data source, the relevant section in `sgtech_config.json` should look like this:

```
"metadata_schema" {
  "connection_manager" : "CONTAINER",
  "container_managed":{
    "jndi_datasource_name" : "jdbc/studioMetadata"
  }
}
```

Note:

As of Spatial Studio Release 19.2, you cannot enter the container-managed connection details in the Spatial Studio application, so manually editing `sgtech_config.json` file is the only supported approach.

However, if you want Spatial Studio to manage the physical connections to its metadata schema, set `connection_manager` to `SPATIAL_STUDIO`, and supply the full set of JDBC connection details, which vary depending on whether the schema resides in an Oracle Autonomous database (which requires a database Wallet for establishing connections), or a regular database on-premises. You can check the inline comments inside the `sgtech_config.json` file for more details, but it is best if you simply log onto Spatial Studio as an admin user and then interactively supply the connection details for the repository schema.

Such details will then be automatically saved in `sgtech_config.json` after Spatial Studio verifies the connection.

2.5.3 Caching Metadata Objects

During run time as users create connections, datasets, and projects, Spatial Studio is creating, modifying, and storing a large amount of metadata (sometimes called Spatial Studio's "domain objects"), such as the definition of a dataset and all of its columns, or the definition of a project including the full layout of all of its visualizations.

All the metadata objects are permanently stored in the metadata table `SGTECH_OBJECT`, but if the database must be accessed frequently (such as every time you open a project or view the properties of a dataset), performance may suffer. If this occurs, the solution is to **cache** frequently accessed copies of such metadata objects in memory.

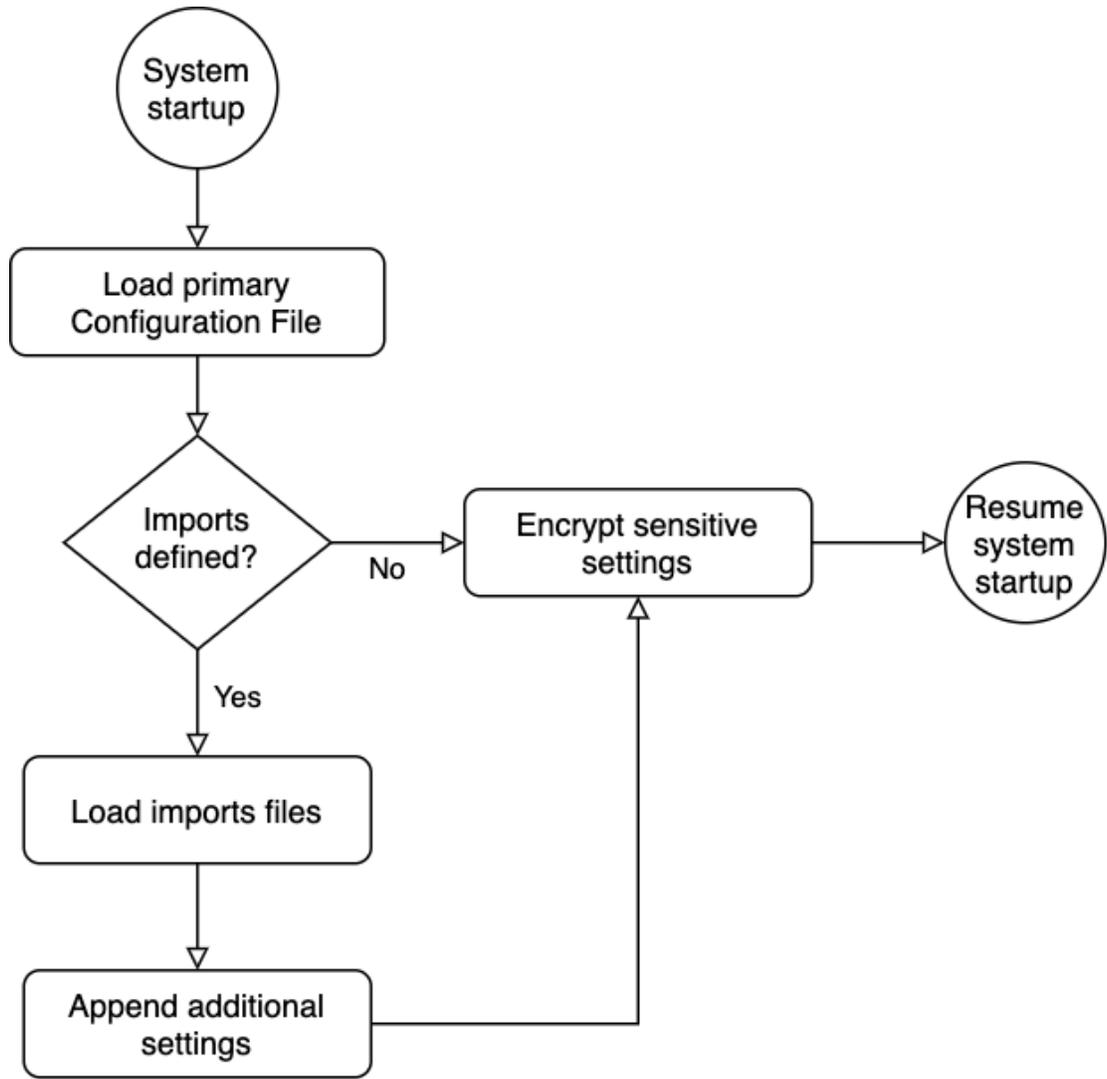
The `cache` section of the `sgtech_config.json` file lets you specify whether to enable such an in-memory cache of metadata objects. If the cache is enabled, then you can further specify how many such objects can be cached and for how long. A general rule is that `max_size` (the maximum number of metadata objects to be cached) should be no less than 1000, but probably should not exceed 10000 unless you have a very large amount of memory allocated to Spatial Studio.

2.5.4 Importing Additional Configuration Files in Spatial Studio

Spatial Studio 22.1 allows you to import different configuration files into the main `sgtech_config.json` configuration file.

The following describes the workflow for handling multiple configuration files:

Figure 2-2 Workflow to Handle Multiple Configuration Files



1. At startup, Spatial Studio loads the primary configuration file, `sgtech_config.json`. All the settings defined in `sgtech_config.json` are used as the *base settings*.
2. If the `sgtech_config.json` file contains the `imports` directive, then it loads the import files in the order (top to bottom) in which they are declared. For each loaded import file, the system reads and appends the settings to the *base settings*.
3. Once the *base settings* are all read in, the system encrypts any sensitive items and saves them back to their corresponding file.
4. Spatial Studio resumes loading the rest of the system.

Adding imports to `sgtech_config.json`

You can edit the `sgtech_config.json` file and add the new top-level `imports` directive as shown:

```
"imports" : {
  "<import_name>" : {
    "module" : "<import_file_path>",
    "description" : "<import_description>"
  }
}
```

In the preceding code:

- **<import_name>**: Name of the import file which must be unique. This is used mainly by Spatial Studio to report errors when loading `imports` files.
- **<import_file_path>**: The file path for the `imports` files must be relative to the containing directory of the main configuration file (`~/.sgtech/sgtech_config.json`).
- **<import_description>**: To describe the purpose of the import. `description` is an optional parameter for the `imports` property.

For example, configure the `metadata_schema` details as shown in the following code in **`sgtech_config.dbsettings.json`** file. The file path can be `~/.sgtech/extras/sgtech_config.dbsettings.json`:

```
{
  "metadata_schema" : {
    "connection_manager" : "CONTAINER",
    "container_managed" : {
      ...
    },
  }
}
```

Also, configure the `jobs` details separately in **`sgtech_config.jobs.json`** following the file path `~/.sgtech/extras/sgtech_config.jobs.json`:

```
{
  "jobs" : {
    "init_threads_count" : 45
  }
}
```

You can now include the preceding two configuration files in the `imports` directive in the main `sgtech_config.json` file (`~/.sgtech/sgtech_config.json`) as shown:

```
{
  "version" : "22.1.0",
  "work_dir" : "",
  "https_only" : true,
```

```

"master_seed" : "<somerandommasterseed>",
"logging" : {
  "level" : "INFO"
},
"imports" : {
  "jobs" : {
    "module" : "extras/sgtech_config.jobs.json"
  },
  "db" : {
    "module" : "extras/sgtech_config.dbsettings.json",
    "description" : "Database settings optimized for clustering"
  }
}
}

```

Import Files Requirements

It is important you adhere to the following requirements when handling multiple import files:

- Files for `imports` must be located inside the same directory as the primary `sgtech_config.json` file, or any of its subdirectories.
- Settings included in the `imports` files must not make collision with settings declared already in other configuration files, including the primary `sgtech_config.json` configuration file.
- Since `imports` files can contain sensitive data, only the file owner must have read, write or both access.
- `version`, `work_dir`, `master_seed` and `imports` are settings which are restricted to the primary configuration file, `sgtech_config.json`.

2.5.5 If the Spatial Studio Repository Schema Password Has Been Changed

If the Spatial Studio Repository Schema Password has been changed, you must update the `sgtech_config.json` configuration file, as follows:

1. Make a backup copy of the file. For example, copy `~/.sgtech/sgtech_config.json` to `~/.sgtech/sgtech_config.json_backup`.
2. On the Spatial Studio compute node, edit the file `~/.sgtech/sgtech_config.json`.
3. In the `metadata_schema` section, update `database_password` to the desired value.
4. Save the file and then restart the Spatial Studio deployment. To restart if you are using the Quick Start kit, see the `README` file for the Quick Start; to restart if this is a WebLogic Server deployment, use the WebLogic Server console.
5. Open the Studio Spatial Studio application. You should be able to log in.

You will still have all the artifacts you had created, including other (non-repository) connections, which you can edit as needed.

2.6 Enabling IDCS as Identity Provider in Spatial Studio

Starting from Oracle Spatial Studio Release 22.2, you can log into your Spatial Studio instance using users already managed by your own Oracle Cloud tenancy's IDCS identity domain.

The workflow to setup IDCS as the identity provider for Spatial Studio involves the following three steps:

1. Adding Spatial Studio roles as Groups in IDCS.
2. Creating an Application in IDCS.
3. Copying IDCS settings into Spatial Studio's configuration file.

Before you begin, see [Prerequisite Requirements for Setting Up IDCS with Spatial Studio](#) to ensure that you meet all the prerequisite requirements.

- [Prerequisite Requirements for Setting Up IDCS with Spatial Studio](#)
- [Adding Spatial Studio Role as a Group in IDCS](#)
You must add the system administrator role supported in Spatial Studio as a group in IDCS.
- [Creating an Application in IDCS](#)
This section describes the steps to add the Spatial Studio application in IDCS.
- [Copying IDCS Settings into Spatial Studio's Configuration File](#)
To integrate Spatial Studio with IDCS, you must add the IDCS settings into the `sgtech_config.json` configuration file.
- [Testing IDCS Login](#)
After all the setup steps are completed, you can test and verify the IDCS login.

2.6.1 Prerequisite Requirements for Setting Up IDCS with Spatial Studio

To integrate IDCS with Spatial Studio, you must obtain the following details:

- Identify your **IDCS tenant**: See [Retrieving IDCS Instance details](#) .
- Identify your **IDCS host**: See [Retrieving IDCS Instance details](#) .
- Identify the **Spatial Studio URL**: `https://localhost:4040/spatialstudio/` is the default.
- Setup an **IDCS admin account**: See [About Oracle Identity Cloud Service User Accounts and Groups](#) for details.
- Identify **IDCS console URL**: See [Determining the IDCS Console URL](#) for more information.

Retrieving IDCS Instance details

You can obtain the IDCS instance details by inspecting any of the IDCS URLs. For instance, you can inspect the IDCS login URL which you receive in the email when you are added as a user in IDCS. For example, consider the following sample IDCS cloud account login URL:

`https://idcs-54656e616e742d4578616d706c652121.identity.oraclecloud.com/ui/v1/signin`

You can now derive the IDCS instance details from the preceding URL as shown:

- **IDCS tenant:** `idcs-54656e616e742d4578616d706c652121`
- **IDCS host:** `identity.oraclecloud.com`
- [Determining the IDCS Console URL](#)
OCI tenancies include a default IDCS instance and you can obtain the IDCS console URL using the OCI console.

2.6.1.1 Determining the IDCS Console URL

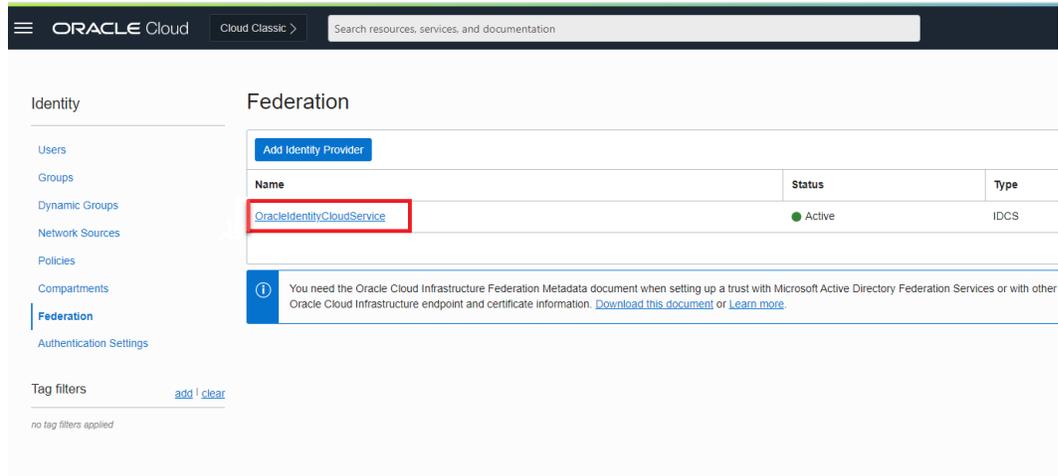
OCI tenancies include a default IDCS instance and you can obtain the IDCS console URL using the OCI console.

Perform the following steps to identify the URL to access IDCS console:

1. Sign in to the OCI console using your Oracle Cloud credentials.
2. Open the navigation menu and select **Identity and Security**.
3. Click **Federation** under **Identity**.

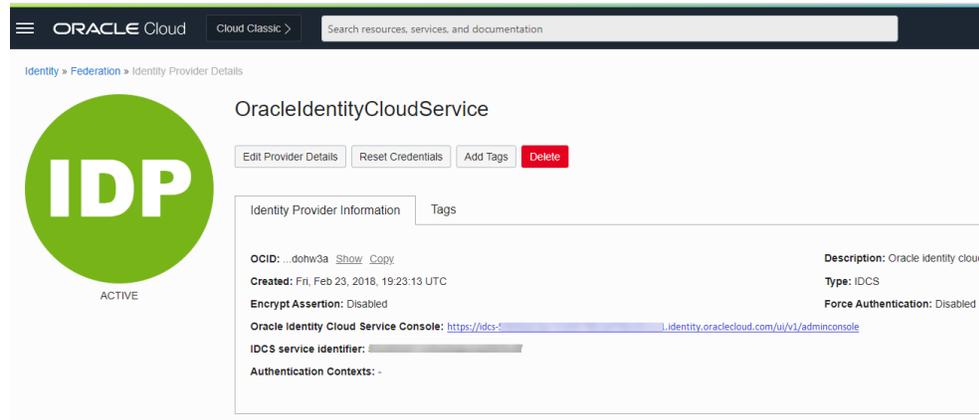
The Federation page opens as shown:

Figure 2-3 Default IDCS Instance on the Federation Page



4. Click on the default IDCS instance, shown highlighted in the preceding figure.
The **Identity Provider Details** page opens.
5. Note the IDCS console URL in the **Oracle Identity Cloud Service Console** field as shown:

Figure 2-4 IDCS Console URL



2.6.2 Adding Spatial Studio Role as a Group in IDCS

You must add the system administrator role supported in Spatial Studio as a group in IDCS.

The system administrator role in Spatial Studio is identified by **SGTech_SystemAdmin**. This implies that the administrator has full access to the entire system.

You need to add this role as an IDCS group. However, the following applies:

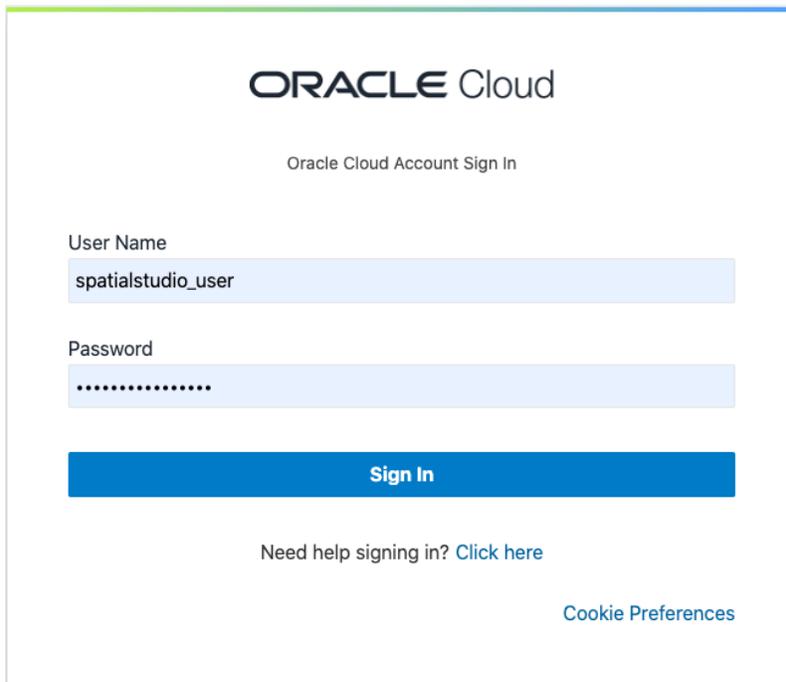
- Users assigned to this group will have admin rights in the Spatial Studio instance that is being set up.
- Users who do not belong to this group will have regular access to the Spatial Studio instance when added to the IDCS application.

As a prerequisite, you must obtain the IDCS console URL. See [Determining the IDCS Console URL](#) for details.

Perform the following steps to create the groups in IDCS:

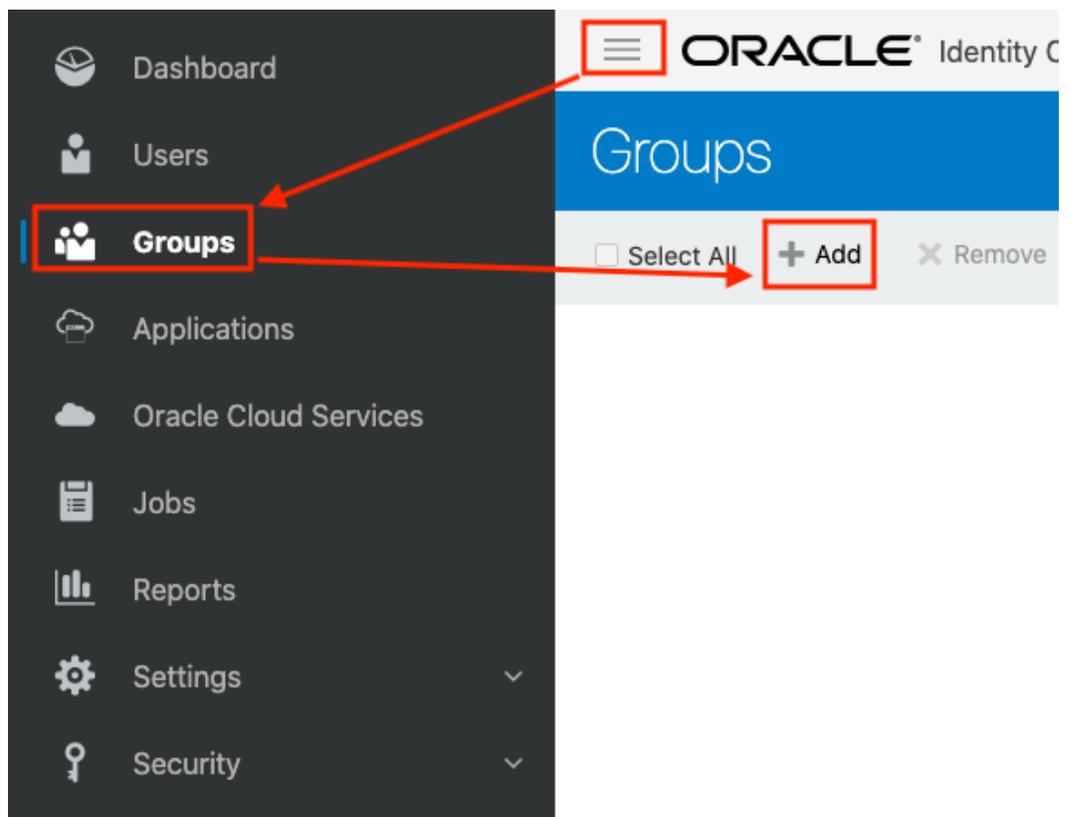
1. Open the IDCS login page using the IDCS console URL in your browser.
2. Enter the ADMIN user credentials and sign in as shown:

Figure 2-5 IDCS Login



3. Open the navigation menu on top left, select **Groups** and click **Add** to create a new group as shown:

Figure 2-6 Adding an IDCS Group



The **Add Group** dialog opens and displays the **Step 1: Group Details** page.

4. Enter **Name** as *SGTech_SystemAdmin*.
Note that the role name is case sensitive.
5. Optionally, enter a **Description**.
6. Click **Next** as shown:

Figure 2-7 Step-1: Group Details

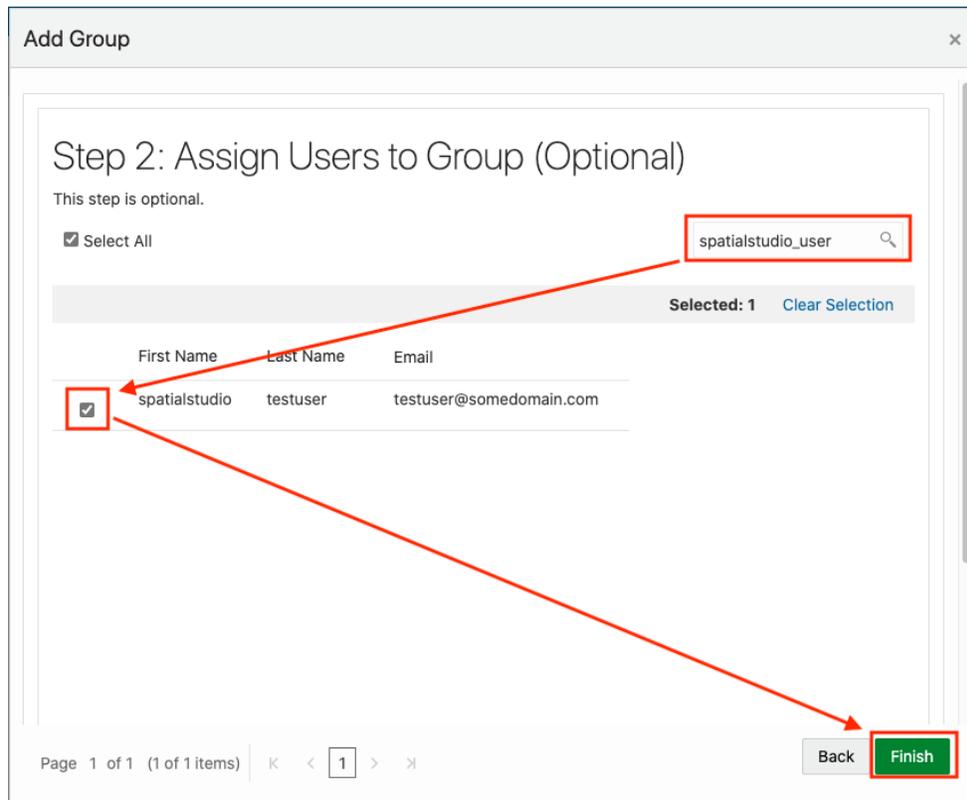
The screenshot shows a web interface for adding a group. At the top, there is a header 'Add Group'. Below it is a large white box titled 'Step 1: Groups Details'. Inside this box, there are two input fields: 'Name' with the value 'SGTech_SystemAdmin' and 'Description' with the value 'System Administrator Role'. Below these fields is a checkbox labeled 'User can request access' which is currently unchecked. At the bottom right of the dialog, there are two buttons: 'Next' and 'Finish'. The 'Next' button is highlighted with a red border.

Step 2: Assign Users to Group (Optional) page opens listing all the existing users.

7. Select the required user and click **Finish**.

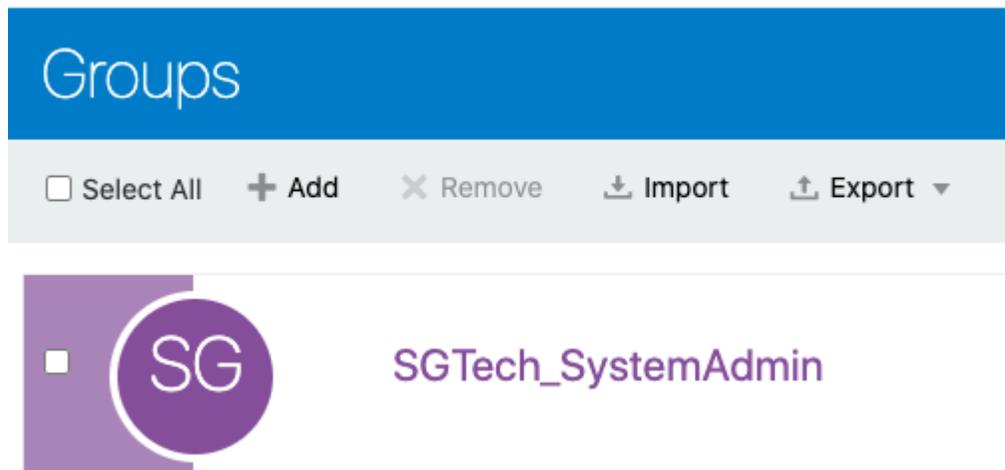
For example, the following figure shows assigning *spatialstudio_user* to the group role *SGTech_SystemAdmin*:

Figure 2-8 Step2: Assign Users to a Group



8. Verify that the newly added group is listed on the **Groups** page:

Figure 2-9 List of Groups



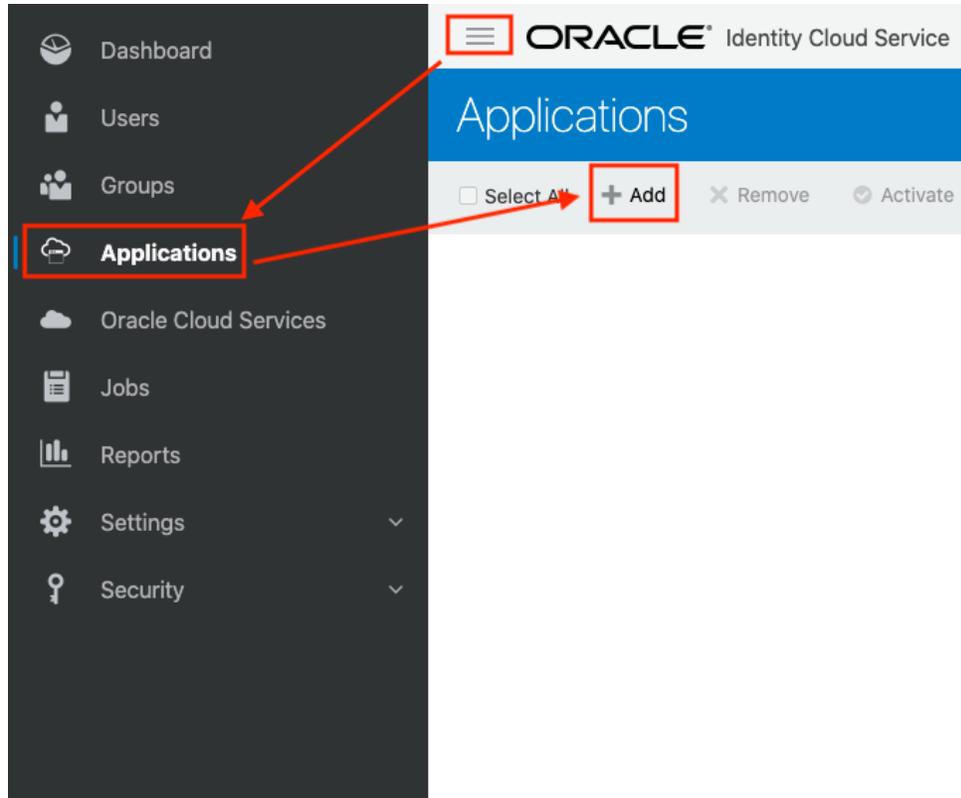
2.6.3 Creating an Application in IDCS

This section describes the steps to add the Spatial Studio application in IDCS.

1. Sign in to IDCS using ADMIN user credentials.

2. Open the navigation menu on top left, select **Applications** and click **Add** to add a new application as shown:

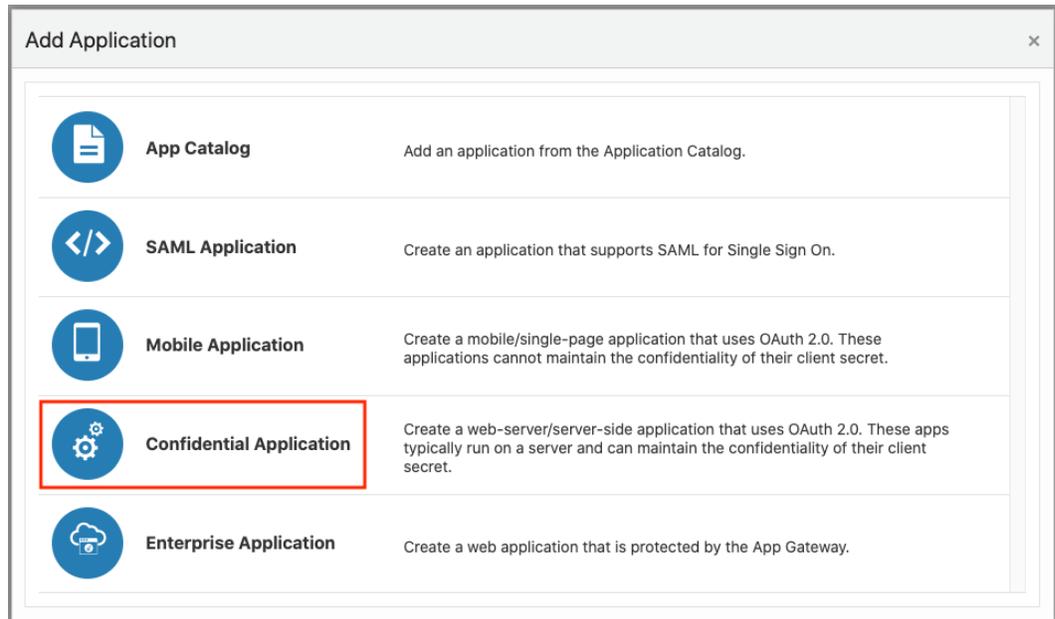
Figure 2-10 Adding an Application



The **Add Application** dialog opens.

3. Select **Confidential Application**.

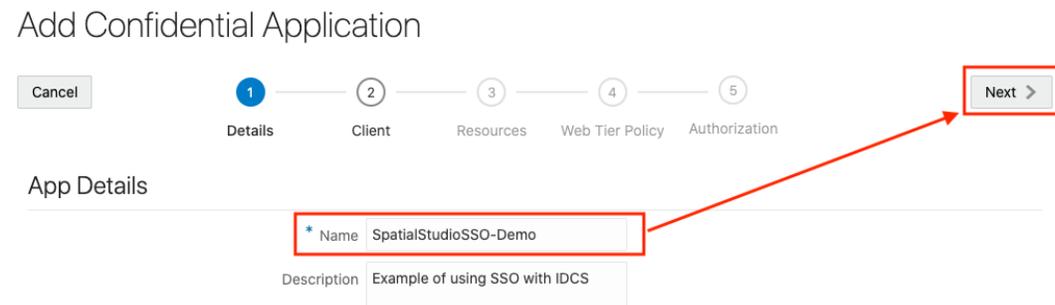
Figure 2-11 Add Application Dialog



The **Add Confidential Application** wizard opens displaying the **Details** page.

4. Enter the application **Name**.
5. Optionally, add a **Description** and click **Next**.

Figure 2-12 Add Confidential Application: Details Page



The **Client** page opens.

6. Click **Configure this application as a client now** to configure the authorization information for the new application.

Perform the following in the **Authorization** section:

- a. Enable **Client Credentials** and **Authorization Code** for **Allowed Grant Types**.
- b. Enter `<spatial_studio_url>/idcscallback` in **Redirect URL**.
- c. Enter `<spatial_studio_url>` in **Post Logout Redirect URL**.
- d. Optionally, for **Security**, you can enable **Trusted Client** to import a custom certificate.

Figure 2-13 Configuring Client Details

Perform the following in the **Token Issuance Policy** section:

- a. Click **Add** under **Grant the client access to Identity Cloud Service Admin APIs** to enable the application to access IDCS APIs. The **Add App Role** window opens listing the application roles.
- b. Select *Me* and *Authenticator Client* and click **Add** to assign these application roles to the application as shown:

Figure 2-14 Configuring Token Issuance Policy

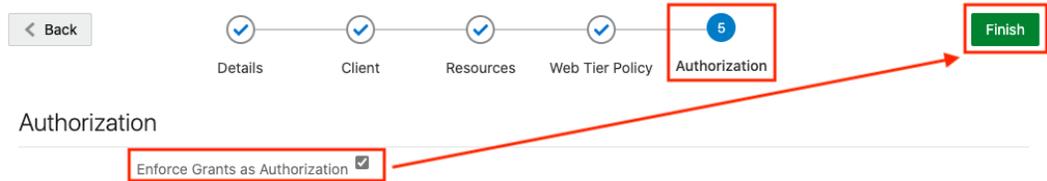
Resource	Protected	Scope
No data to display.		

App Roles	Protected
Authenticator Client	No
Me	No

- c. Click **Next** on the top right of the page to continue.

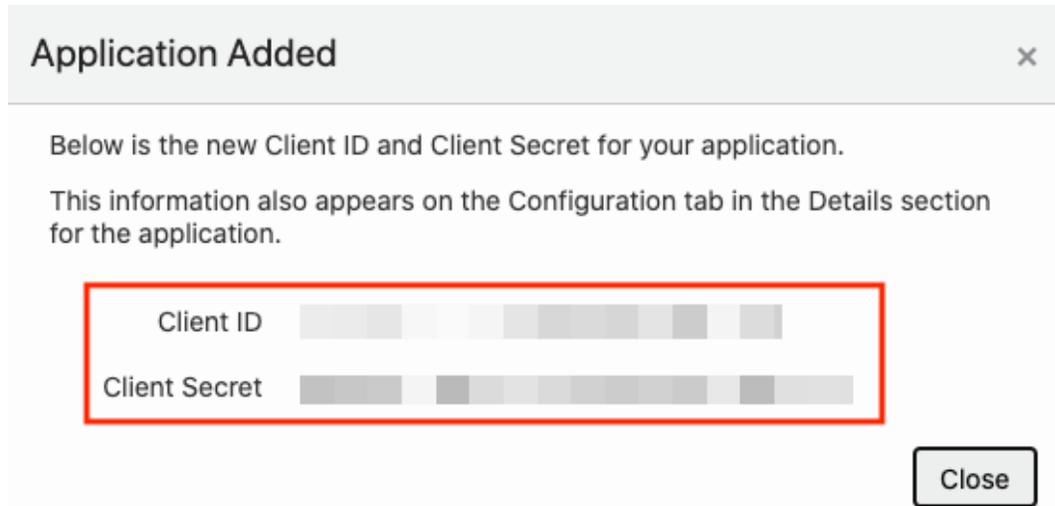
7. Skip **Resources** and **Web Tier Policy** by clicking the **Next** button and navigate to the **Authorization** page.
8. Enable the **Enforce Grants as Authorization** option.
9. Click **Finish**.

Figure 2-15 Configuring Authorization



The application is added and the **Application Added** dialog box opens.

Figure 2-16 Confirmation Dialog



10. Note the **Client ID** and **Client Secret** to be used later to complete the configuration.

Tip:

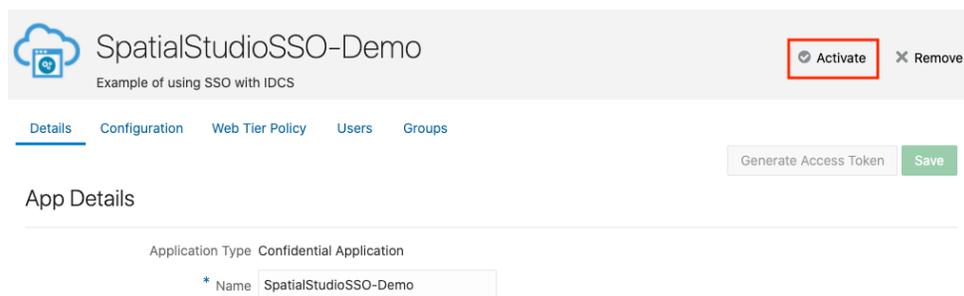
You can also obtain the client credentials for the application from the **Configuration** tab in the **General Information** section, once the application is activated.

11. Click **Close**.

The new application's **Details** page is displayed.

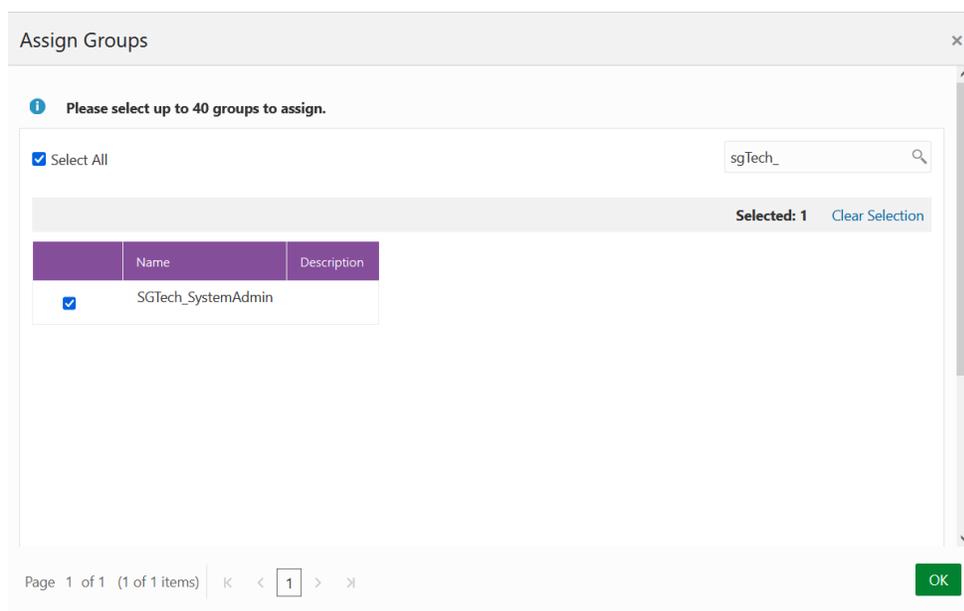
12. Click **Activate** to grant users access to the application and confirm the operation on the prompt that follows.

Figure 2-17 Confirmation for Activating Application



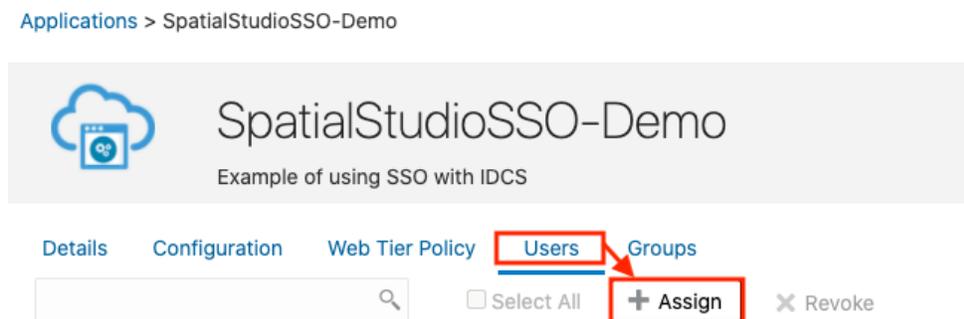
13. Click the **Groups** tab and then click **Assign** to add the group created in [Adding Spatial Studio Role as a Group in IDCS](#) as shown:

Figure 2-18 Assigning Groups to an Application



14. Optionally, add non-admin users through the **Users** tab or using other groups.

Figure 2-19 Assigning Non-Admin Users



2.6.4 Copying IDCS Settings into Spatial Studio's Configuration File

To integrate Spatial Studio with IDCS, you must add the IDCS settings into the `sgtech_config.json` configuration file.

The configuration file is located at `~/.sgtech/sgtech_config.json` path. You can directly append the IDCS settings into the `sgtech_config.json` file. However, the best practice is to have the IDCS settings in a separate configuration file and then import this file into the main configuration file.

Perform the following steps to create a configuration file for the IDCS settings and to import this configuration in `sgtech_config.json`:

1. Create a new empty JSON configuration file in the `~/.sgtech` directory.

For example:

```
~/.sgtech/sgtech_config.idcs.json
```

2. Edit the created file with a file editor of your choice and add the IDCS settings information as shown:

```
{
  "idcs" : {
    "Host" : "identity.oraclecloud.com",
    "ClientTenant" : "<tenant_id>",
    "ClientId" : "<client_id>",
    "ClientSecret" : "<client_secret>",
    "redirectURL" : "https://localhost:4040/spatialstudio/idcscallback",
    "postLogoutRedirectURL" : "https://localhost:4040/spatialstudio/"
  }
}
```

In the preceding file:

- **Host**: IDCS host.
 - **Client Tenant**: IDCS tenant.
 - **ClientId**: Generated when creating the IDCS application.
 - **ClientSecret**: Generated when creating the IDCS application.
 - **redirectURL**: Same as the Redirect URL used when creating the IDCS application.
 - **postLogoutRedirectURL**: Same as the Post Logout Redirect URL used when creating the IDCS application.
3. Save the `sgtech_config.idcs.json` file.
 4. Edit the main `sgtech_config.json` file and add the import configuration as shown:

```
{
  "version" : "22.1.0",
  "work_dir" : "",
  ...
  "jobs" : {
    "init_threads_count" : 15
  },
}
```

```
"imports" : {  
  "idcsclient" : {  
    "module" : "sgtech_config.idcs.json"  
  }  
}
```

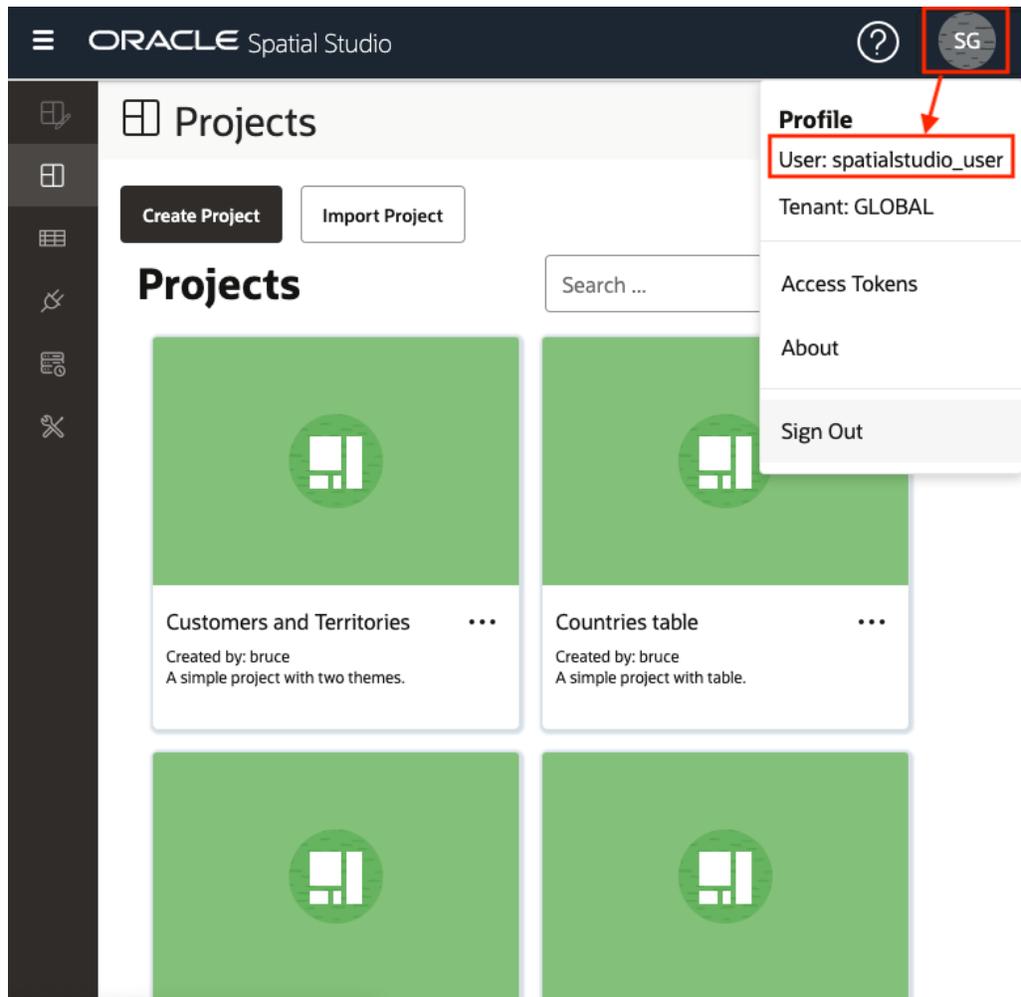
5. Save the `sgtech_config.json` file.

2.6.5 Testing IDCS Login

After all the setup steps are completed, you can test and verify the IDCS login.

1. Ensure you have logged out from IDCS.
2. Ensure all Spatial Studio instances are stopped.
You can stop a Spatial Studio instance by executing `stop.sh` for Linux and `stop.cmd` for Windows.
3. Run Spatial Studio by executing `start.sh` (Linux) or `start.cmd` (Windows).
4. Open the main URL in your browser, once Spatial Studio is running. For example:
`https://localhost:4040/spatialstudio/`
The IDCS login screen as shown in [Figure 2-5](#) opens instead of Spatial Studio's standard login screen.
5. Enter your credentials and click **Sign In**.
You will be automatically redirected to the Spatial Studio instance. You can verify the logged in user by clicking on the **Avatar** icon as shown:

Figure 2-20 Profile Menu



6. Click **Sign out** in the **Profile** menu to logout from Spatial Studio.
Note, this will also log you out from any other application that is running on IDCS.

3

Using Oracle Spatial Studio

Using Oracle Spatial Studio, you can create one or more projects, each of which can define one or more spatial datasets on which you can perform various spatial operations.

It is important you understand the following terminologies when working on Spatial Studio:

- A **project** contains Spatial Studio objects, such as datasets, that are logically related to some intended usage. For example, a project might be named New England Sales Territories, or Sales Territories and Customers, or Ohio Airports and Counties. When creating a project, you should know the purposes for which you want to identify and analyze spatial data in a geographic area.
- A **dataset** is a collection of spatial features of a specific usage type and geometry type. For example, datasets might include Airports represented by polygon geometries, or Roadways represented by LRS line string geometries, or Accidents represented by point geometries.
- A **connection** specifies information for connecting to an Oracle Database schema where spatial data of interest resides: user name, password, system, port, database name, and so on. (It is similar to a SQL Developer connection.)

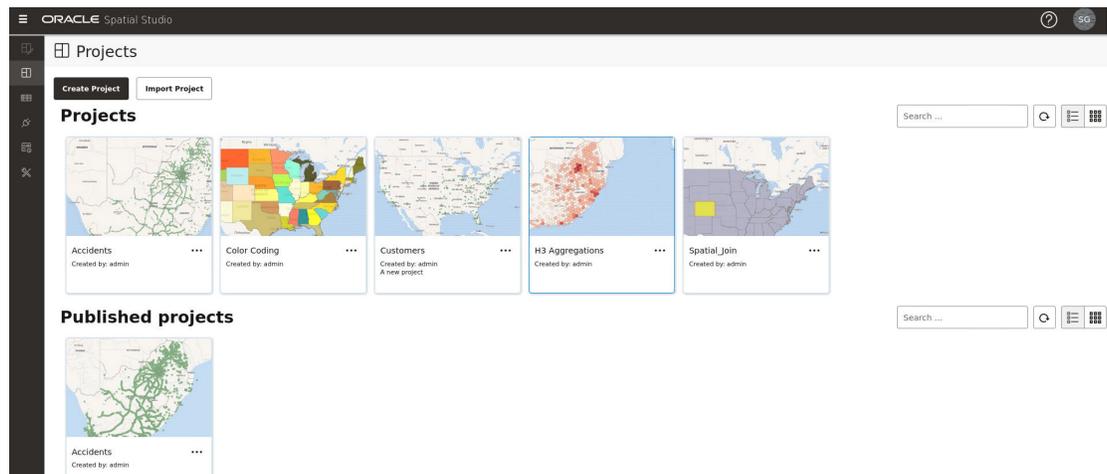


Note:

See also [Spatial Studio Terminology](#) for more information.

The main landing page for Spatial Studio for a new user is as shown:

Figure 3-1 Spatial Studio Main Page



The overall layout of the Spatial Studio user interface comprises of:

- **Header:** The header at the top of the page contains the following buttons:
 - : to display or hide the side navigation menu
 - : to help you get started on Spatial Studio by providing an overview of the tool and links to other tutorial resources
 - : displays the user profile details
- **Side Navigation Menu:** A navigation panel on the left displays the menu items. You can expand or collapse the navigation drawer.
- **User Workspace:** The page specific details for the selected menu option is displayed on the right.

The navigation menu consists of the following menu options:

- **Active Project:** Directs you to the Active Project page where your recent working project is displayed.
- **Projects:** Directs you to the Projects page where all your existing projects and published projects are listed.
- **Datasets:** Directs you to the Datasets page where all the datasets available to you are listed.
- **Connections:** Directs you to the Connections page where all the existing connections (data sources) available to you are listed.
- **Jobs:** Directs you to the Jobs page where the various background jobs started by Spatial Studio to process various requests are listed.
- **Administration:** Directs you to the Administration page where you can monitor the status and activity of Spatial Studio. It contains tabs for Settings, Maintenance, and Monitoring.
- [Logging in to Spatial Studio](#)
Once you have installed Spatial Studio, either as a standalone tool (Quick Start) or as a Java EE deployment, you can log in to the application.
- [Getting Started Using Spatial Studio](#)
Spatial Studio includes a page with information and links to help you get started using the tool.
- [Generating an Access Token](#)
You can generate an access token to access REST endpoints of Spatial Studio.
- [Spatial Studio Active Project Page](#)
The Active Project page displays your current working project.
- [Spatial Studio Projects Page](#)
The Projects page lists all the projects that have been created, both unpublished and published.
- [Spatial Studio Datasets Page](#)
The Datasets page lets you view and edit existing datasets, and create new ones.
- [Spatial Studio Connections Page](#)
The Connections page displays all the existing connections and also allows you to create a new connection.

- [Spatial Studio Administration Page](#)
You can monitor the status and activity of Spatial Studio in the Administration Page. You can also view server logs, change global system configurations, manage custom basemaps, and configure safe domains.
- [Spatial Studio Jobs Page](#)
The Jobs page displays details of all the background jobs that run in Spatial Studio.
- [Visualization in Oracle Spatial Studio](#)
You can visualize your spatial data in Oracle Spatial Studio using different modes of visualization.
- [Performing Analyses in Spatial Studio](#)
You can perform various spatial analyses (such as filtering by proximity, nearest neighbor analysis and so on) and visualize the results in Spatial Studio.

3.1 Logging in to Spatial Studio

Once you have installed Spatial Studio, either as a standalone tool (Quick Start) or as a Java EE deployment, you can log in to the application.

To log in to Spatial Studio:

1. Launch Spatial Studio in your browser using the URL provided for your installation.
 - See [Installing and Configuring the Spatial Studio Quick Start](#) for the URL to access Spatial Studio as a stand alone tool.
 - See [Installing Spatial Studio to a WebLogic Server Domain](#) for the URL details when Spatial Studio is deployed to a WebLogic server.

For example, if you are using the Quick Start deployment, then open the URL, `https://localhost:4040/spatialstudio`, in your browser.

Spatial Studio login page appears as shown:

Figure 3-2 Spatial Studio Login Page

Welcome to Oracle Spatial Studio

Please provide login credentials

User Name Required

Password Required

Language
English ▼

Login

2. Enter the **User Name**.
3. Enter the **Password**.
4. Select your preferred language to be used in Spatial Studio from the **Language** drop-down list.
5. Click **Login**.

You are now logged in to Spatial Studio.

- [About Internationalization in Spatial Studio](#)
Oracle Spatial Studio supports internationalization of its user interface.

3.1.1 About Internationalization in Spatial Studio

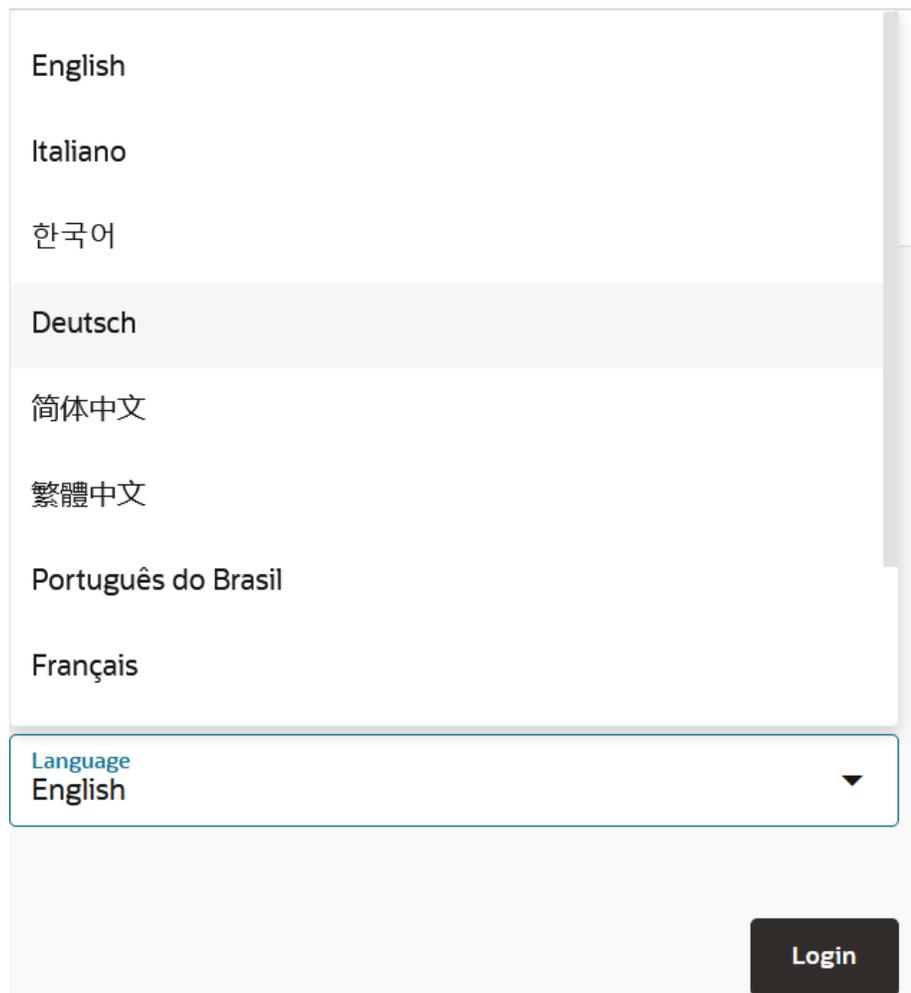
Oracle Spatial Studio supports internationalization of its user interface.

You can choose to adapt the Spatial Studio user interface to use one of the following supported languages when logging in to the application:

- English (default)
- German
- Spanish
- French
- Italian
- Japanese

- Korean
- Portuguese-BR
- Simplified Chinese
- Traditional Chinese

Figure 3-3 Internationalization Support in Spatial Studio



Note, however, any server generated messages or errors will continue to be displayed in English. If you want to switch to a different language after logging in, then you must first log out and select the required language when logging in again.

In case you have configured Spatial Studio to use IDCS as the login provider, then there is no explicit language selector. This is because the login dialog belongs to IDCS. In this case, Spatial Studio will check the locale and language settings in your IDCS profile, and use that to automatically select the best matched language from the list of supported languages. For instance, if your IDCS profile has `Canadian French` set as the preferred language, then Spatial Studio will use `French` to display its UI as it does not support `Canadian French`.

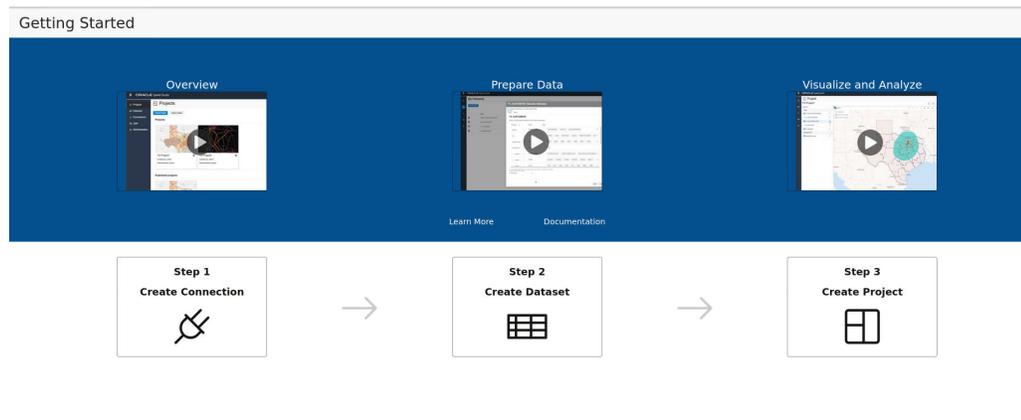
3.2 Getting Started Using Spatial Studio

Spatial Studio includes a page with information and links to help you get started using the tool.

To display this page, click the small question mark icon (?) in the top right area of most pages (above the Create button) and click **Getting Started** from the context menu.

The Getting Started page opens as shown:

Figure 3-4 Getting Started Page



You can learn more about Spatial Studio by clicking one of the following options:

- **Overview:** Watch this video to understand the user interface and see how to perform the available actions.
- **Prepare Data:** Enable your business data for mapping and spatial analysis.
- **Visualize and Analyze:** Explore geographic patterns and relationships in your business data.
- **Learn More:** Visit our video library to learn more about Oracle Spatial Cloud.
- **Documentation:** See *Oracle Spatial Studio Guide* documentation to learn more about administering and using Spatial Studio.
- Get started using Spatial Studio through the following workflow:
 1. **Step1 - Create Connection:** Begin by creating your database connection.
 2. **Step2 - Create Dataset:** Create a Dataset and load spatial data.
 3. **Step3 - Create Project:** Create a Project for visualizing and analyzing the spatial data.

3.3 Generating an Access Token

You can generate an access token to access REST endpoints of Spatial Studio.

Spatial Studio supports two types of tokens:

- **General-purpose token:** Full access to all resources. The token grants read-only or read-write access as required.
- **Streaming-only token:** Access only to REST endpoints related to dataset streaming. Also, the token grants read-only access that be used only with HTTP GET methods.

To generate an access token:

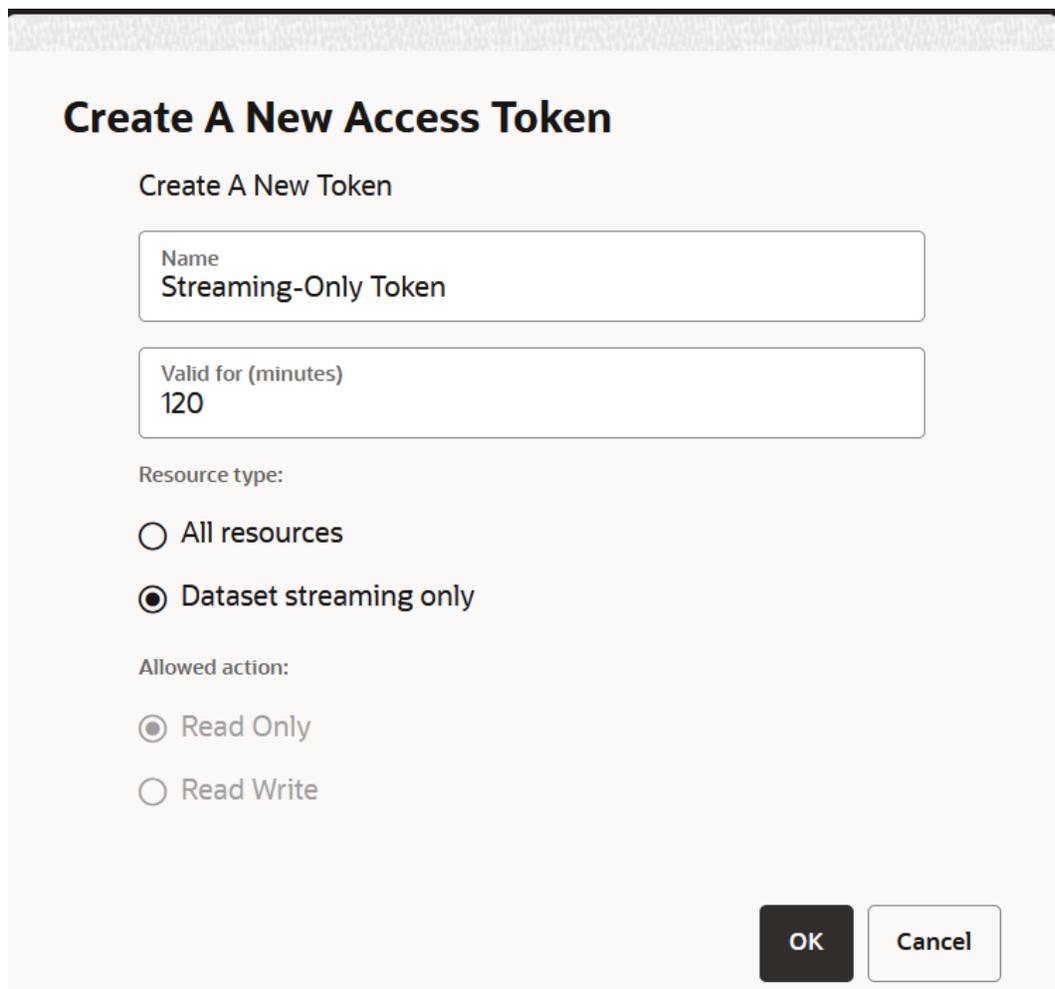
1. Click  on the top right corner of the page.
2. Click **Access Tokens** from the drop-down menu.

The **Access Tokens** dialog opens and the existing tokens are displayed.

3. Click **Create New Token**.

Create A New Access Token dialog opens as shown:

Figure 3-5 Creating a New Access Token



Create A New Access Token

Create A New Token

Name
Streaming-Only Token

Valid for (minutes)
120

Resource type:

All resources

Dataset streaming only

Allowed action:

Read Only

Read Write

OK Cancel

4. Enter the token **Name**.
5. Enter the time **Valid for (minutes)** after which the token expires.

If you specify -1, then Spatial Studio will never expire the token, unless you explicitly revoke it.

6. Select **Resource type**.
 7. Optionally, select the **Allowed action** for granting access to a general-purpose token.
 8. Click **OK** to create the token.
- The token gets created successfully.

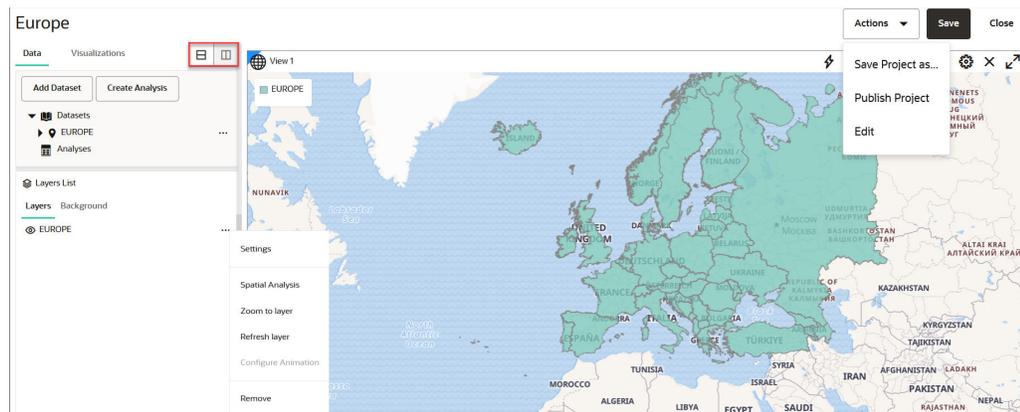
3.4 Spatial Studio Active Project Page

The Active Project page displays your current working project.

You can switch to your working project at any time from the other pages when working in Spatial Studio.

The following figure shows a layout of the Active Project page:

Figure 3-6 Active Project Page



You can perform the following actions on the Active Project page:

- Creating a table or map visualization.
- Adding or removing datasets from your project.
- Adding or removing data from a visualization layer.
- Organizing the **Layers List** panel to be arranged vertically below or to the right of the project **Data** and **Visualizations** panel using the icons shown highlighted in the preceding figure.
- Adjusting the style setting or the zoom resolution for your visualization layer. You can click the menu selector next to the map layer in the **Layers** tab to display the following available options:
 - **Settings:** Shows display options for Style, Filter, Interaction, and Legend.
 - **Spatial Analysis:** Allows you to perform many spatial operations (All, or filtered by type: Filter, Combine, Transform, Measure), such as Add a buffer of a specified distance, Return shapes having spatial relationship to another, and Calculate area.
 - **Zoom to Layer:** Zooms the display (out or in) to fit the entire layer.

- **Refresh Layer:** Refreshes the layer to reflect all user actions.
- **Configure Animation:** Allows you to configure animation settings to visualize a moving object.
- **Remove:** Removes the layer from the project.
- Using the project management options displayed on the top-right area of the Active Project page:
 - **Actions:** The drop-down menu allows you to:
 - * **Save Project as:** Creates a new copy of the project.
 - * **Publish Project:** Publishes the project.
 - * **Edit:** Allows you to edit the project details (such as, Name, Created By and Description).
 - **Save:** Saves your updates to the project.
 - **Close:** Closes the project.

3.5 Spatial Studio Projects Page

The Projects page lists all the projects that have been created, both unpublished and published.

Figure 3-1 shows the layout of the Projects page.

You can perform the following actions on the Projects page:

- You can select a project to work or for viewing the details.
- You can create a new project by clicking **Create Project**.
- You can import a project by clicking **Import** and selecting a project zip file in the **Import Project** dialog.
- You can open, export or delete a project by clicking the ******* icon for any of the listed projects.
- You can alter the display settings to have the projects listed as cards or in a tabular format.
- You can search for both unpublished and published projects.

Note:

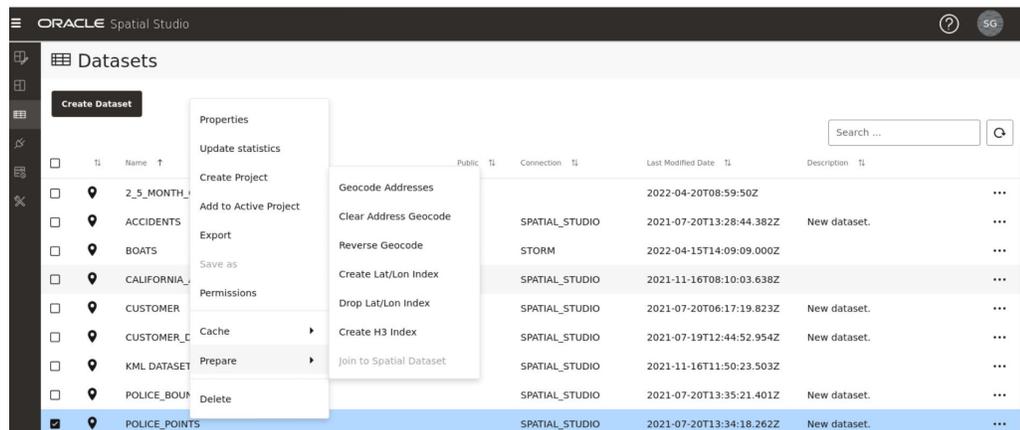
For the first two actions, the project will be opened in the **Active Project** page.

3.6 Spatial Studio Datasets Page

The Datasets page lets you view and edit existing datasets, and create new ones.

The following figure shows the Datasets page:

Figure 3-7 Datasets Page



You can perform the following actions on the Datasets page:

- You can create a new dataset, by clicking **Create Dataset**.
You can create a dataset from the following sources:
 - Oracle Database table or view using a database connection
 - By uploading dataset files with different formats to the database, such as :
 - * Spreadsheet file
 - * Shapefile
 - * GeoJSON file
 - * CSV file
 - * KML file
 - By importing 3D Tiles Tileset

By clicking ******* against any displayed dataset or by right-clicking a dataset row, you can perform the following actions :

- **Properties:** View or modify properties of the dataset
- **Update Statistics:** Update the dataset statistics
- **Create Project:** Create a new project using the dataset
- **Add to Active Project:** Add the dataset to the project in the Active Project page
- **Export:** Export the dataset (in GeoJSON or CSV file format)
- **Save as:** Make a new copy of the dataset
- **Permissions:** Configure dataset sharing and permissions
- **Cache:** Control map tiles pre-caching activities
- **Prepare:** Prepare a dataset for any of the following options:
 - **Geocode Addresses:** Add geocoded information such as geographic coordinates to the dataset
 - **Clear Address Geocode:** Remove geocoded information from the dataset

- **Reverse Geocode:** Add address information from a set of geographic coordinates to the dataset
- **Create Lat/Lon Index:** Create latitude/longitude index
- **Drop Lat/Lon Index:** Remove latitude/longitude index
- **Create H3 Index:** Prepare an H3 aggregation dataset
- **Join to Spatial Dataset:** Prepare a non-spatial dataset for map visualization by joining to a spatial dataset
- **Delete:** Delete the dataset
- [Creating a Dataset](#)
- [Datasets with Issues](#)
- [Geocoding a Dataset](#)
- [Reverse Geocoding a Dataset](#)
- [Preparing a Non-Spatial Dataset for Analysis](#)

3.6.1 Creating a Dataset

The following steps enable you to add a new dataset.

1. Navigate to the **Datasets** page.
2. Click **Create Dataset**.

The **Create Dataset** window opens:

Figure 3-8 Creating a Dataset

Create Dataset

From file upload

Upload to database and create dataset



Selected files:

From table/view

From Cesium datasets

From GeoJSON URL



3. Click on one of the data source options and perform the steps appropriate to your selection as shown in the following:

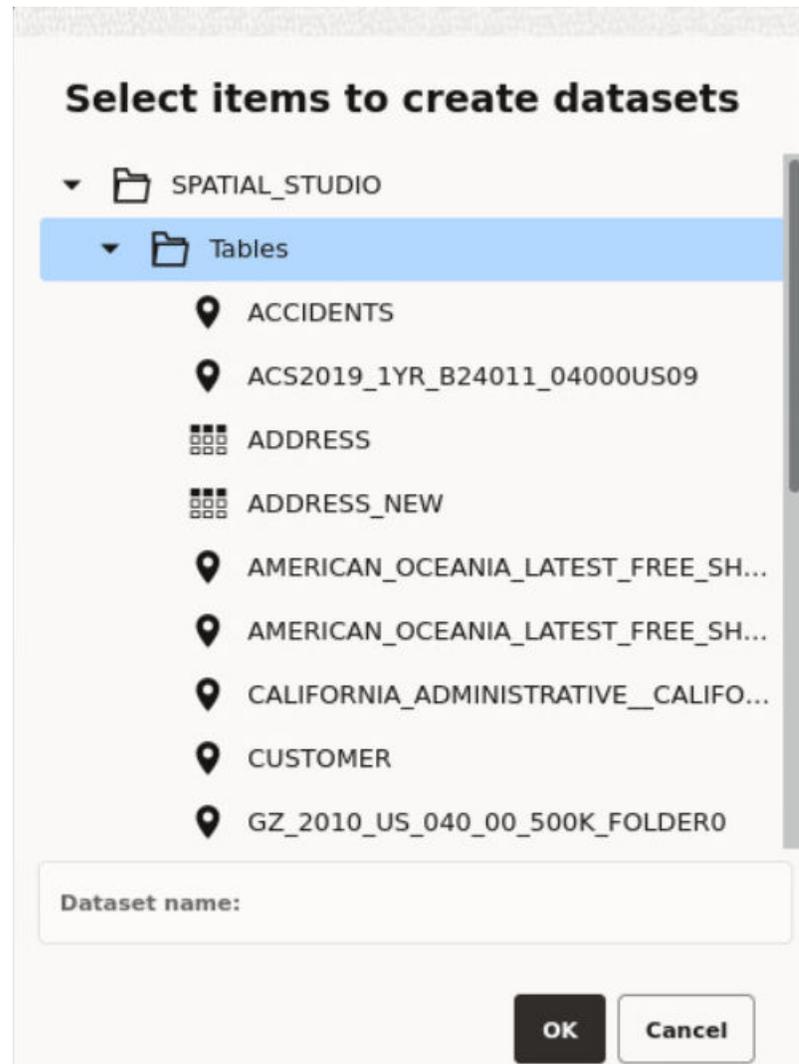
From file upload:

- a. Upload one of the supported file types.
- b. Click **Create**.

From table/view:

- a. Select a connection from the **Select Connection** drop-down.
- b. Click **Create**.
The **Select items to create datasets** window opens listing all the tables, views and GeoRaster data present in the database.

Figure 3-9 Select the Data Source



- c. Select an item from the list and click **OK**.

From Cesium datasets:

- a. Create a dataset for Cesium map visualization by selecting a 3D dataset file or a CZML file.

Figure 3-10 Options for Creating a Cesium Dataset

From Cesium datasets
Select a dataset that already on the server or upload a new one. Supported formats are .b3dm (Batched 3D Model), .pnts (Point Cloud), and .czml

3D dataset location
--Select--

Upload czml file

Upload tileset

Czml file located on server

Tileset located on server

You can choose one of the following options:

- **Upload czml file:** Upload a .czml file.
- **Upload tileset:** Upload a tileset zip file. The supported formats are:
 - .b3dm: Batched
 - .pnts: Point Cloud

 **Tip:**

You can increase the default size limit for zip files larger than 50 MB by updating the `dataset_max_size` attribute for the `upload` property defined in `<user_home_folder>/sgtech/sgtech_config.json` file.

- **Czml file located on server:** Specify the czml file to be uploaded from the server by entering the **Name** of the .czml file and the **Directory** path.
- **Tileset located on server:** Specify the tileset file to be uploaded from the server by entering the **Name** of the `tileset.json` file and the **Directory** path.

 **Note:**

When uploading a CZML file or a tileset file from the server:

- If the file is not under `<SGTECH_HOME>/cesiumdata` or `<SGTECH_HOME>/3d-tilesets` as it may apply, then you must manually migrate the datasets when migrating Spatial Studio.
- You can update the unzipped file limits in the General tab in the Administration page. The following two advanced settings parameters need to be modified:
 - Maximum unzipped item
 - Maximum unzipped total

- b. Click **Create**.

From GeoJSON URL:

It is important to note the following prior to creating a GeoJSON URL dataset:

- A GeoJSON URL based dataset accesses its data directly from the source URL. There is no database table managed in Spatial Studio for this dataset.
- A GeoJSON URL based dataset does not support Spatial Analysis.
- A GeoJSON URL based dataset is subject to the same upload size limit, or 100MB, whichever is smaller.
- If a GeoJSON URL does not support CORS (Cross-Origin Resource Sharing), then Spatial Studio will act as a proxy to the browser requesting the GeoJSON URL data.

The following steps enable you to create a GeoJSON URL dataset:

- a. Specify the **GeoJSON URL** to access GeoJSON data from an external domain for map visualization.

Note:

Ensure you add the external domain used for accessing GeoJSON data to the list of entries in the Safe Domains list.

- b. Click **Create**.
Create dataset from GeoJSON window opens as shown:

Figure 3-11 Creating a Dataset from GeoJSON

Create dataset from GeoJSON

GeoJSON URL: Dataset name:

Geometry type: Safe Domain needed:

Features preview

mag	place	time	updated	url
3.67	105 km NNW of Charlotte Amalie, U.S. Virgin Islands	1650371534350	1650379869040	https://earthquake.us
2.68	1 km W of Indios, Puerto Rico	1650369119500	1650370400330	https://earthquake.us
2.45	7 km S of Indios, Puerto Rico	1650362518780	1650365000950	https://earthquake.us
2.47000003	4 km SSW of Pāhala, Hawaii	1650357558510	1650357888320	https://earthquake.us
3.91	85 km E of Cruz Bay, U.S. Virgin Islands	1650356709400	1650358522657	https://earthquake.us

- c. Optionally, enter a **Dataset name**.
- d. Click **Submit**.
The GeoJSON URL dataset gets created with the warning, No key column was found. You must resolve the warning in order to use the dataset as a map layer for visualization. See [Datasets with Issues](#) for more details to resolve the warning.

The new dataset is added and listed on the Datasets page.

- [Uploading a Shapefile](#)
You can create a dataset by uploading a shapefile.

3.6.1.1 Uploading a Shapefile

You can create a dataset by uploading a shapefile.

A shapefile contains the geospatial data which can be referenced in multiple files with specific file extensions. The following lists a few selected files that contribute to shapefile format:

- **.shp** - Stores the geometry data
- **.shx** - Stores the index of the geometry
- **.dbf** - Stores the attribute information of geometry features
- **.prj** - Stores the coordinate system information
- **.cpk** - Specifies the character set to be used

1. Navigate to the **Datasets** page and click **Create Dataset**.

Create Dataset window opens as shown in [Figure 3-8](#).

2. Select **From file upload**.

3. Click  to upload the shape file.

The **File Upload** window opens.

4. Select all the required files from your system.

 **Note:**

It is mandatory to upload **.shp**, **.shx**, and **.dbf** files.

The **Create dataset from shapefile** dialog opens as shown:

Figure 3-12 Create dataset from shapefile

Create dataset from shapefile

File: map.shp

Upload to connection: SPATIAL_STUDIO

Table name: MAP

Dataset name: MAP

Geometry column name: geom

Coordinate System: 4322 WGS 72

Create Spatial Index:

Character set: UTF-8

Attribute Data Columns

MM_UID	CODE	NAME1	NAME2	DIVISION
393	ID.NT.RN	Nusa Tenggara Timur	Rote Ndao	Province
392	ID.NT.ST	Nusa Tenggara Timur	Sumba Timur	Province

Submit Cancel

- Select the connection to upload the shapefile from the **Upload to connection** drop-down list.
- Optionally, change the **Table name**.
- Optionally, change the destination **Dataset name**.
- Optionally, select the **Coordinate System** to be used.
 - If your shapefile includes a `.prj` file referencing a custom Geographic Coordinate System (GEOGCS), then Spatial Studio will assign a best-matched geodetic SRID from the target Spatial database, as shown in the preceding figure.
 - If your shapefile does not contain a `.prj` file, then the system uses the default EPSG:4326 GEOGCS.
- Optionally, select the required **Character set**.

Spatial Studio automatically detects the character set to be used in the following order of priority:

- Extracts the `charset-name` from a `.cpg` file, if present.
- Uses the character set specified in the `.dbf` file header.
- Otherwise, uses the default ISO-8859-1.

You can preview the file attributes using the detected character set. However, you can still choose to switch to a different **Character set** and preview the refreshed contents.

- Click **Submit**.

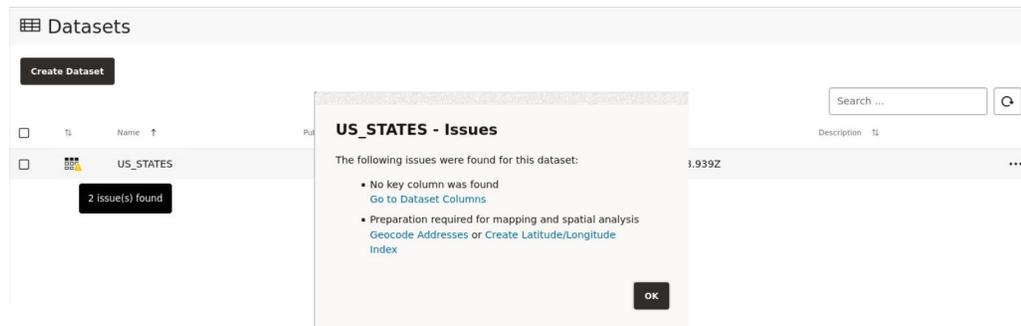
The dataset gets created from a shapefile.

3.6.2 Datasets with Issues

All datasets must meet certain data requirements in order to be used for map visualization and analysis. Otherwise, Spatial Studio highlights these datasets with a warning on the Datasets page.

You may click on the warning icon to view the issues. You can then click on the resolution link under the issue to prepare the dataset as required for analysis, as shown:

Figure 3-13 Warnings on a Dataset



The following table lists a few common issues that are highlighted on a dataset.

Table 3-1 Selected List of Dataset Issues

Issue	Cause	Spatial Studio Resolution
No key column was found	Primary key is missing on the dataset.	<ul style="list-style-type: none"> Click Go to Dataset Columns to create a dataset key. The Dataset Properties configuration window opens. Select a column containing unique values and switch ON Use as Key. Click Validate key. Click Apply.
This dataset needs spatial metadata and index	The geometry column in the dataset does not have the spatial metadata or a spatial index or both.	Click Create Spatial Metadata and Index to create the spatial metadata and index for the geometry column.
Preparation Required for mapping and spatial analysis	It can be due to one of the following reasons: <ul style="list-style-type: none"> The dataset contains address information but the geographic coordinates are missing. Latitude and Longitude index are missing for latitude/longitude data in the dataset. 	Depending on the cause, you may need to perform one of the following: <ul style="list-style-type: none"> Click Geocode Addresses Click Create Latitude/Longitude Index

- [Enabling Spatial on a View-Based Dataset with Latitude and Longitude Columns](#)

3.6.2.1 Enabling Spatial on a View-Based Dataset with Latitude and Longitude Columns

Spatial Studio allows you to create spatial index on a dataset created from a view containing latitude and longitude columns, thereby enabling you to visualize and analyze views.

The following steps enable you to create latitude/longitude index on a view-based dataset. The instructions assume:

- You have created a dataset from a view having latitude and longitude columns. See [Creating a Dataset](#) for more information on creating a dataset from a view.
- This view-based dataset is listed on the Datasets page with a warning icon since the dataset is not spatially enabled for visualization.

1. Navigate to the **Datasets** page.
2. Click on the warning icon to view the issues on the view-based dataset.
3. Click **Create Latitude/Longitude Index**.

The **Latitude and Longitude Columns** window opens as shown:

Figure 3-14 Creating a Latitude/Longitude Index on a View-Based Dataset

STATES_VIEW: Latitude & Longitude Columns

Creating spatial index for the following pair of latitude/longitude columns.

Latitude Column
LATITUDE

Longitude Column
LONGITUDE

Reuse lat/lon index on the base table

* Ensure the base table has a lat/lon index on the selected columns

OK Cancel

4. Select the **Latitude Column**.
5. Select the **Longitude Column**.
6. Select the **Reuse lat/lon index on the base table** checkbox.

As displayed in the preceding figure, ensure that the base table on which the view is created has a spatial index on the latitude and longitude columns.

7. Click **OK**.

A background task of type **Create lon-lat** index gets executed. A successful completion of this task on the **Jobs** page indicates that the dataset is spatially enabled for visualization.

You can now use this view-based dataset for visualization on the **Active Project** page.

3.6.3 Geocoding a Dataset

Geocoding is the process of deriving the latitude and longitude coordinates from location details that are geo address types.

You can geocode a dataset in Spatial Studio to store the resulting latitude and longitude information as a `SDO_GEOMETRY` column. Optionally, you can also store them in a latitude and longitude numeric columns in the underlying database table referenced by the dataset.

Prior to geocoding a dataset, if the Spatial Studio server is running behind a firewall, then ensure you have the correct **Web Proxy** information configured in the Administration page. This is because the Spatial Studio application uses an external Oracle hosted geocoding service which is on the public internet.

You can perform the following steps to geocode a dataset.

The instructions assume that a dataset containing location columns such as address details is already existing in Spatial Studio .

1. Navigate to the **Datasets** page.
2. Right-click on the **dataset name** on which you want to apply geocoding.
Ensure that the dataset has a valid key column defined.
3. Select **Geocode Addresses** from the **Prepare** context menu.

Geocode Addresses dialog opens as shown:

Figure 3-15 Geocode Addresses

CUSTOMER_DATA: Geocode Addresses

Use address components to create geometries

Setup Status

Save coordinates in columns

Latitude column
LATITUDE

Longitude column
LONGITUDE

Verify or adjust address components to be used to geocode

Address Components	Column	Values
Postal Code	POSTALCODE	21229 34643 60657 64054 73190 >
--- Select ---	COUNTRY	United States
--- Select ---	ID	499 500 501 502 503 504 505 >
--- Select ---	LAST_NAME	Bunting Bushby Cutcliffe Emanuel >
--- Select ---	FIRST_NAME	Aldis Ediva Jeffy Jozef Miner Nial >

You have not selected Country as an address component in your data. If United States

You have not selected State/Province as an address component in your --- Select ---

Apply Close

4. Click **Setup** tab.
 5. Select the **Geo-type** for the geo-attributes to be used for geocoding.
You must provide sufficient geographic data for successful geocoding. If the address components do not include the country or state attributes, then you must explicitly select either the country or the state in the respective drop-down list shown highlighted in the preceding figure.
 6. Optionally, switch ON **Save coordinates in columns** to save the geocoordinates to the dataset and to the underlying database table.
 7. Optionally, enter **Latitude column** name and **Longitude column** name, if you switched ON **Save coordinates in columns** in the preceding step.
 8. Click **Apply**.
- The geocoding process gets initiated and can be monitored on the **Jobs** page. Also, note the following:
- The geocoding process is performed in batches and the default batch size is 50. At any time, you can change the default geocoding batch size under the **General** settings in the **Administration** page.
 - If any batch fails, the overall geocoding job will not fail. You will be notified on the failed batch at the end of job completion.

- At the end of the geocoding process, you can view the results in the **Status** tab as shown:

Figure 3-16 Geocoding Status

CUSTOMER_DATA: Geocode Addresses

Use address components to create geometries

Setup **Status**

Summary	Ambiguous (231)	Partial Match (0)	Unknown (92)	Failures
Summary				
Geocoded:	YES			
Number of rows:	1000			
Matched:	677			
Ambiguous:	231			
Partial:	0			
Unknown:	92			

Failed rows info

Number of failed rows: 0

Retry failed rows

Query all unmatched rows:

```
SELECT *
FROM CUSTOMER_DATA dst
JOIN SGTech$TABLEB6F686CEC230FE23F937BC4CC6E9C245 temp
ON dst.ID = temp.ID
WHERE temp.GC_STATUS != 'MATCH'
```

Geocoding status is stored in a companion metadata table for this dataset. You may purge this geocoding metadata to save storage. However the geocoding issues summarized above will no longer be available and geocoding would need to be cleared and performed again to recapture this information.

Purge geocode result metadata

Close

- On successful completion of a geocoding job, you can verify that geocoding has been applied by viewing the latitude and longitude columns in the dataset properties and in the input source database table along with the `GC_GEOMETRY` column of data type `SDO_GEOMETRY`.

3.6.4 Reverse Geocoding a Dataset

Reverse geocoding is the process of deriving the address information from a set of latitude and longitude coordinates. You can reverse geocode a dataset in Spatial Studio to add address information to the dataset's table using the following steps.



Note:

Reverse Geocoding is supported only in point or latitude and longitude datasets.

The instructions assume that a dataset containing the coordinates details is already existing in your database schema.

1. Navigate to the **Datasets** page.
2. Right-click on the **dataset name** on which you want to apply reverse geocoding.
3. Select **Reverse Geocode** from the **Prepare** context menu.
4. Optionally, select and modify the required **Location attributes** as shown in [Figure 3-17](#).

The Input text fields for Location attributes are the column names to be created in the underlying database table for the target dataset.

5. Select the **Advanced** option as required.

The default **Reverse geocode to named roads only** option ensures that for all latitude and longitude coordinates that do not match a named road, the closest street or road name will be obtained while geocoding.

6. Click **Apply**.

You can monitor the **Reverse geocode dataset** background task on the **Jobs** page. A successful completion of the job indicates that reverse geocoding is applied for the data in the dataset.

You can verify that reverse geocoding has been applied to your dataset by viewing the additional address related columns in the dataset properties.

Figure 3-17 Reverse Geocoding

CUSTOMER_DATA: Reverse Geocode

Derive location attributes from point locations

Point locations:

Lat-Lon Columns

Latitude column LATITUDE	▼
Longitude column LONGITUDE	▼

Location attributes:

<input checked="" type="checkbox"/>	Street STREET
<input checked="" type="checkbox"/>	House number HOUSE_NUMBER
<input checked="" type="checkbox"/>	Settlement (City, Town) SETTLEMENT
<input checked="" type="checkbox"/>	Municipality (County, District) MUNICIPALITY
<input checked="" type="checkbox"/>	Region (State, Province) REGION
<input checked="" type="checkbox"/>	Postal Code POSTAL_CODE
<input type="checkbox"/>	Country COUNTRY

Advanced:

Reverse geocode to named roads only (default)

Allow reverse geocode to unnamed roads

Apply **Close**

3.6.5 Preparing a Non-Spatial Dataset for Analysis

Spatial Studio allows you to prepare a non-spatial dataset for mapping and analysis by joining to a spatial dataset.

Also, note the following highlights about joining two datasets:

- You can only join a non-spatial dataset to a spatial dataset and not conversely.
- It is essential that the non-spatial data in one dataset is linked to the spatial data in the other dataset through a common primary key column.
- You can choose the columns for the newly created joined dataset from the attributes of the datasets associated in the join operation.

The instructions assume that a spatial dataset and a non-spatial dataset having a common primary key data is already existing in your database schema.

1. Navigate to the **Datasets** page.
2. Right-click on the non-spatial **dataset** which you want to join to a spatial dataset.
3. Select **Join to Spatial Dataset** from the **Prepare** context menu.

The following window opens:

Figure 3-18 Joining to a Spatial Dataset

Join Non-spatial Dataset to Spatial Dataset

Prepare a non-spatial dataset for mapping and spatial analysis by joining to a spatial dataset

Name of join result dataset
US_STATES_POPULATION_JOINED

Non-spatial dataset *
US_STATES_POPULATION

Spatial dataset *
US_STATES(SSUSER)

Non-spatial dataset join-column *
CODE

Spatial dataset join column *
STATE_CODE

▼ Select columns from non-spatial dataset

<input type="checkbox"/>	Column Name	Data Type
<input checked="" type="checkbox"/>	POPULATION	NUMBER
<input type="checkbox"/>	NAME	VARCHAR2

▼ Select columns from spatial dataset

<input type="checkbox"/>	Column Name	Data Type
<input checked="" type="checkbox"/>	LONGITUDE	NUMBER
<input type="checkbox"/>	STATE_CODE	VARCHAR2

OK Cancel

4. Optionally, enter a dataset name for **Name of join result dataset**.
5. Select the **Spatial dataset** for the join.

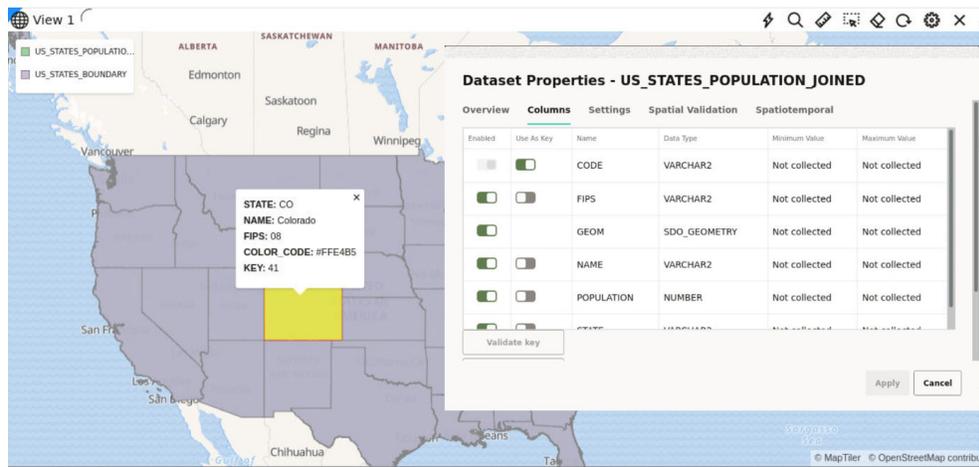
On selection, the primary key associated with the spatial dataset is validated against the non-spatial dataset key. If the datasets key values are not suitable for a join operation, then the following error is displayed:

Dataset key columns to join must be the same data type

6. Optionally, select the required columns for the joined result dataset from the non-spatial and spatial datasets.
7. Click **OK**.

The joined dataset is created and it appears as a row on the Datasets Page. This dataset will contain all the column properties selected from both the spatial and non-spatial datasets. You can verify the properties of the joined dataset both in the **Dataset Properties** window on the Datasets page and when using the dataset for map visualization and analysis on the Active Projects page, as shown:

Figure 3-19 Appended Non-spatial and Spatial Properties

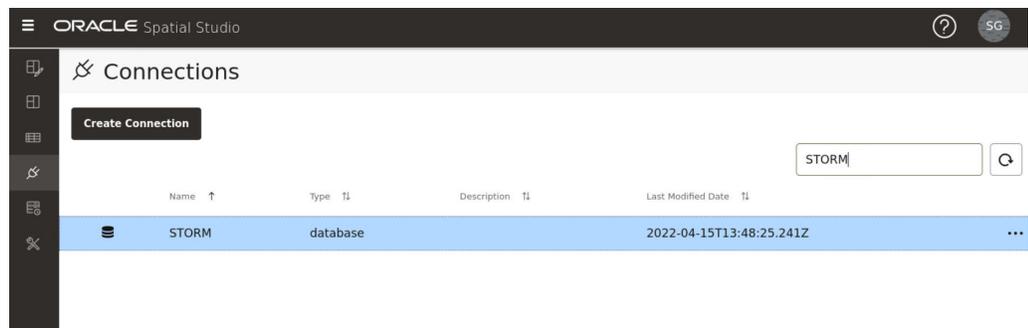


3.7 Spatial Studio Connections Page

The Connections page displays all the existing connections and also allows you to create a new connection.

The following figure shows a layout of the Connections page:

Figure 3-20 Connections Page



You can perform the following actions on the Connections page:

- You can create a new connection, by clicking **Create Connection**. You can create a connection from the following sources:

- **Oracle Database:** by providing host, port, schema, and other database authentication details
- **Oracle Autonomous Database:** by providing wallet details
- You can also perform the following actions by clicking the hamburger icon against any displayed connection or by right-clicking a connection row :
 - **Properties:** View or modify properties of the connection
 - **Edit:** Update the connection details

 **Note:**

You cannot edit the SPATIAL_STUDIO connection on the Connections page. Instead, refer to [If the Spatial Studio Repository Schema Password Has Been Changed](#) section.

- **Test:** Validate the connection
- **Delete:** Delete the connection along with all its datasets

 **Note:**

You cannot delete the SPATIAL_STUDIO connection.

3.8 Spatial Studio Administration Page

You can monitor the status and activity of Spatial Studio in the Administration Page. You can also view server logs, change global system configurations, manage custom basemaps, and configure safe domains.

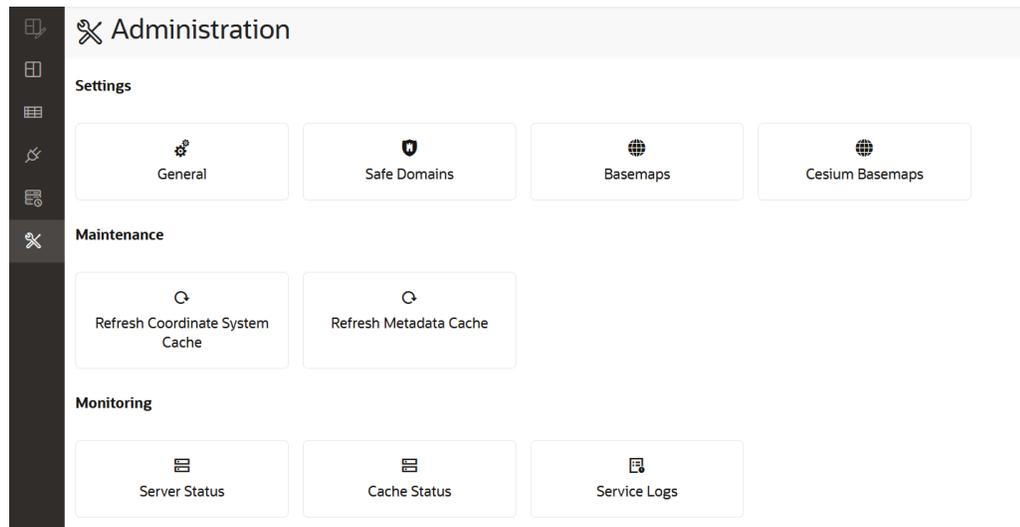
The Administration menu link directs you to the Administration page.

 **Note:**

You must be logged in as an administrator of Spatial Studio to access this menu option.

The layout the Administration page is as shown:

Figure 3-21 Administration Page



The Studio console page comprises of the following sections:

Settings

- **General:** This section allows changing the GeoCoding service URL, the geocoding batch size, and the web proxy used by the Studio server. It also allows you to customize the frontend branding area of the application.
- **Safe Domains:** This section allows the administrator to manage the white listing of the domains (host names or IP addresses) that are considered safe for loading various types of the resources from the Studio application. Typically, it is used to add the domain of a custom basemap to the Content Security Policy directives of the Studio. After making the changes to the safe domains list, you must reload or refresh the browser page to reload the new Content Security Policy.
- **Basemaps:** This section allows a quick view of the existing custom basemaps, and in adding or editing custom basemaps. Custom basemaps can be made of either raster or vector tiles, typically hosted on a third party tile server. Additionally, you can also create a custom basemap using a WMS OGC web service.
- **Cesium Basemaps:** This section gives you a quick view of the existing custom basemaps used exclusively for the 3D Cesium Map visualization. It also allows you to add new basemaps to be used by the 3D Map visualizations.

Note:

Each listed host entry for Basemaps and Cesium Basemaps must be present as one of the entries in the Safe Domains list. If the host basemap comes from a domain that is not present in the Safe Domains list, then the basemap may not render correctly when visualizing the map.

Maintenance

- **Refresh Coordinate System cache:** Use this only when needed to rebuild the text index of the repository database schema's supported Spatial Reference Well Known Text (WKText) definitions. For the shapefile upload, this WKText index is used to automatically match the best SRID.
- **Refresh Metadata Cache:** Spatial Studio typically caches all of the frequently used metadata such as the definitions of Datasets, Connections, and Projects. Sometimes it is required to refresh the whole cache in case some cached metadata becomes stale or out of sync in rare events.

Monitoring

- **Server Status:** This section provides read-only information about the general health and system status of the Spatial Studio server.
- **Cache Status:** This section provides the details of the cache maintained by Spatial Studio.
- **Service Logs:** This section allows loading and viewing a desired number of server-side logs. To reduce the clutter, you can filter the result using the desired logging level .

In a cluster deployment, both the preceding options display only the information of the particular Spatial Studio instance to which the current session is connected.

- [Adding a Custom Basemap](#)
- [Editing a Custom Basemap](#)

3.8.1 Adding a Custom Basemap

The following steps enable you to add a custom basemap.

1. Navigate to the **Administration** page.
2. Click **Basemaps** under Settings.
The **Basemaps** window listing all the available basemaps opens.
3. Click **Add Basemap** and click on one of the following basemap types:
 - XYZ Raster tiles
 - OGC WMS
 - Vector tiles
4. Enter **Name** and **URL** for the selected basemap type.
5. Optionally enter **Attribution** and **API Key**.

Tip:

Once you have entered all the required fields, you can preview the basemap by clicking **Quick View**.

6. Click **Save** to add the base map.

For example, the following figure show the **OGC WMS** basemap configuration window:

Figure 3-22 Adding a OGC WMS Map

OGC WMS

Add an OGC WMS basemap.

 The WMS service must support coordinate system EPSG:3857. The service URL entered below should be a normal WMS request with "bbox={bbox-epsg-3857}"

Name
Weather

Attribution

OGC WMS URL
<https://my.sample.com/{apikey}/mywms?bbox={bbox-epsg-3857}&service=WMS&...>

API Key

Quick View

Save Cancel

 **Note:**

It is important to add the domain name to **Safe Domains** in order to enable the Spatial Studio application to access the required service for the basemap.

3.8.2 Editing a Custom Basemap

The following steps enable you to edit a custom basemap.

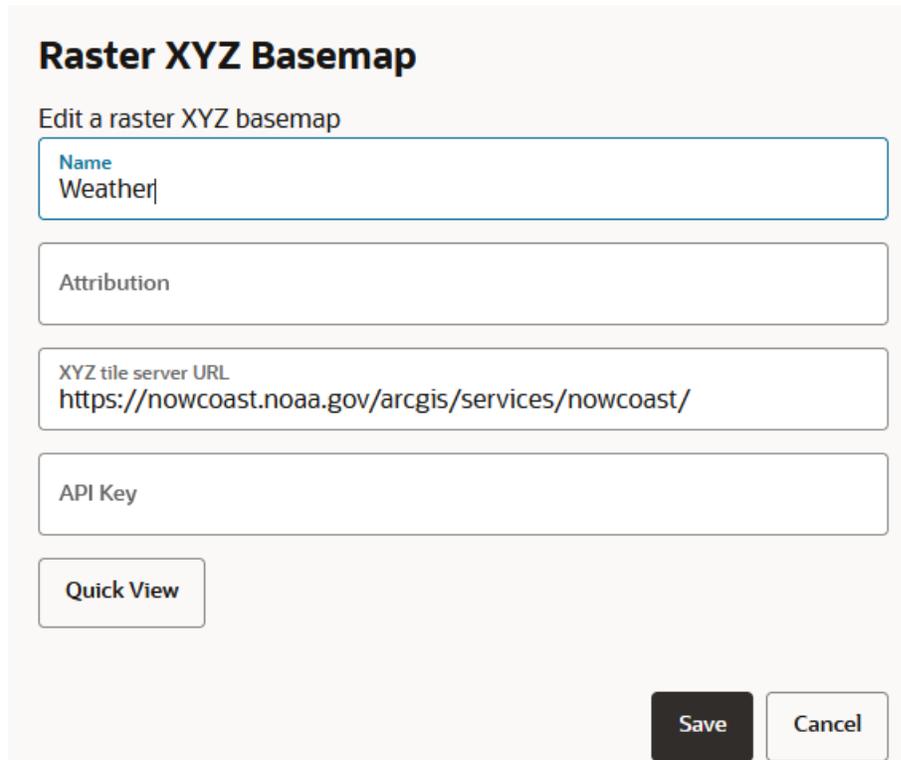
1. Navigate to the **Administration** page.
2. Click **Basemaps** under Settings.
The **Basemaps** window listing all the available basemaps opens.
3. Click ******* against the required custom basemap and click **Edit** from the context menu.

 **Note:**

Edit is disabled for predefined Spatial Studio maps.

The custom basemap configuration details are displayed for editing as shown:

Figure 3-23 Editing a Custom Basemap



Raster XYZ Basemap

Edit a raster XYZ basemap

Name
Weather

Attribution

XYZ tile server URL
https://nowcoast.noaa.gov/arcgis/services/nowcoast/

API Key

Quick View

Save Cancel

4. Modify the required parameters, such as **Name**, **Attribution**, **URL** or **API Key**.
5. Click **Save**.

The custom basemap details are modified and the updates are shown in the **Basemaps** window.

3.9 Spatial Studio Jobs Page

The Jobs page displays details of all the background jobs that run in Spatial Studio.

The following figure shows a layout of the Jobs page:

Figure 3-24 Jobs Page

Type	Object	Created By	Start Time	End Time	Status
Geocode	ADDRESS	admin	Today, 8:59 AM	Today, 8:59 AM	Terminated
Reverse geocode dataset	ACCIDENT	admin	7/22/2022, 8:33:00 AM	7/22/2022, 8:37:16 AM	Done

You can perform the following actions on the Jobs page:

- Select a job to be displayed in the grid: **Active, Past or All.**
- Select a refresh interval for the jobs grid.
- View details of a specific job.
- Terminate a job.

Also, note the following about terminating a job:

- You can terminate a `Processing` or `Pending` job.
- You can terminate all job types except `Create lon-lat index` jobs.
- Upon termination of a job, partial execution results of the job are maintained. You can choose to clear the partial results. For example, you can perform `Clear Address Geocode` after terminating a `Geocode` job.
- Only jobs related to H3 aggregations such as `Build H3 Index` are completely rolled back when terminated.

The grid table displays the following properties for each job entry row:

- **Type:** The job type, such as "Geocode", "Reverse geocode dataset" and so on.
- **Object:** The entity being altered by the job, which can be a Dataset, Table, Index or other.
- **Created by:** The user that submitted the job.

 **Note:**

System maintenance jobs are created by "\$system" account

- **Start Time:** The scheduled next run time for jobs with `Pending` status or the actual job start time for any other job status.
- **End Time:** The time at which a job completed.
- **Status:** Indicates the state or progress of a job, which can be:
 - Pending
 - Processing
 - Done
 - Error

- Terminating
- Terminated

By clicking *** against any job row, you can perform the following actions :

- **View Details:** To view extra information, such as the step at which a `Processing` job is currently running or error details for `Error` or `Terminated` jobs. Also, you can terminate a `Processing` job by clicking **Terminate** when viewing the job details.
- **Terminate:** To terminate a `Processing` or `Pending` job directly. It remains disabled for any other job status.

3.10 Visualization in Oracle Spatial Studio

You can visualize your spatial data in Oracle Spatial Studio using different modes of visualization.

Spatial Studio supports the following visualization methods:

- Table
- Map
- Cesium-Map

You can save your visualization as a Project in Spatial Studio. You can rework on a project or publish a project to share the results with other users.

The following sections explain in detail how you can use the various visualization techniques:

- [Using a Table Visualization](#)
- [Using a Map Visualization](#)
- [Using a Cesium Map Visualization](#)
- [Styling a Map Layer](#)
- [Visualizing Map Data Over Time](#)

3.10.1 Using a Table Visualization

Spatial Studio allows you to visualize your data from the dataset in tables.

To display your data in a tabular view, you must perform the following steps.

The instructions assume that the dataset for visualization is already added to the project in the Active Project page.

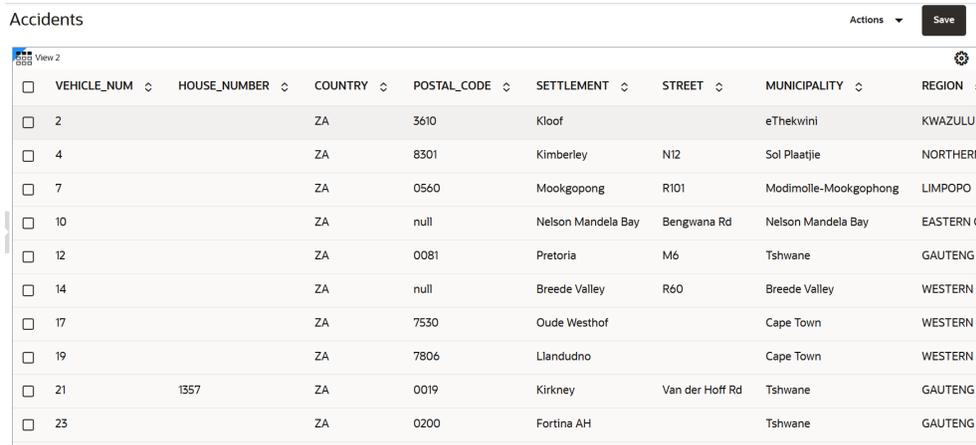
1. Click the **Visualizations** tab on the left pane in the Active Project page.
This lists the various visualization options.
2. Click and drag **Table** from the list to the visualization window on the right to create a table visualization.
This opens an empty layer in the visualization window.
3. Click the **Data** tab on the left pane in the Active Project page.
This lists all the **Datasets** that are loaded for the project.
4. Click and drag the desired **dataset** from the list to the empty layer on the right.

 **Note:**

You can view only one dataset in a table view. If you want to view multiple datasets, you must create one table view for each dataset.

This opens the data in tabular format for visualization as shown:

Figure 3-25 Tabular Visualization



VEHICLE_NUM	HOUSE_NUMBER	COUNTRY	POSTAL_CODE	SETTLEMENT	STREET	MUNICIPALITY	REGION
2		ZA	3610	Kloof		eThekweni	KWAZULU
4		ZA	8301	Kimberley	N12	Sol Plaatjie	NORTHERN
7		ZA	0560	Mookgopong	R101	Modimolle-Mookgophong	LIMPOPO
10		ZA	null	Nelson Mandela Bay	Bengwana Rd	Nelson Mandela Bay	EASTERN
12		ZA	0081	Pretoria	M6	Tshwane	GAUTENG
14		ZA	null	Breede Valley	R60	Breede Valley	WESTERN
17		ZA	7530	Oude Westhof		Cape Town	WESTERN
19		ZA	7806	Llandudno		Cape Town	WESTERN
21	1357	ZA	0019	Kirkney	Van der Hoff Rd	Tshwane	GAUTENG
23		ZA	0200	Fortina AH		Tshwane	GAUTENG

You can easily scroll up or down the table to view the data rows as the table supports infinite scrolling.

You can delete the table visualization by clicking the **X** icon on the top-right.

3.10.2 Using a Map Visualization

Spatial Studio supports the following types of map visualizations:

- Geometry Data Visualization:
 - Point type
 - Line type
 - Polygon / Area type
- GeoRaster Data Visualization
- Hexagonal Data Visualization using H3 Aggregations

The following sections describe how to get started on these visualizations:

- [Visualizing a Point Map](#)
- [About GeoRaster Data Visualization](#)
- [About Hexagonal Data Visualization Using H3 Aggregations](#)
- [About Custom Map Regions Visualization](#)

- [Visualizing a Moving Object](#)
Starting from Oracle Spatial Studio Release 22.1.0, you can visualize moving objects using a spatiotemporal dataset.

3.10.2.1 Visualizing a Point Map

Spatial Studio allows you to visualize the location of geographic data as points on maps.

To display your geographic data as maps, you must perform the following steps.

The instructions assume that the dataset for visualization is already added to the project in the Active Project page.

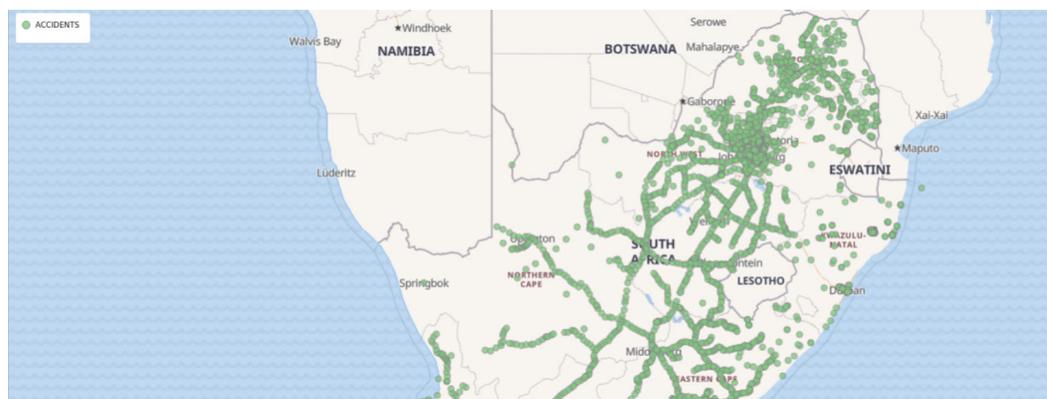
1. Click the **Visualizations** tab on the left pane in the Active Project page.
This lists the various visualization options.
2. Click and drag **Map** from the list to the visualization window on the right to create a map visualization.
A default base map is displayed with no data visualization layers.
3. Click the **Data** tab on the left pane in the Active Project page.
This lists all the **Datasets** that are loaded for the project.
4. Click and drag the desired **dataset** from the list to the map view on the right.

Tip:

You can drag and drop multiple datasets in a single action to your map view.

The map gets updated with the data points for visualization as shown:

Figure 3-26 Map Visualization



You can render your map using different rendering styles. See [Applying a Render Style For a Point Layer](#) for more information.

You can delete the map visualization by clicking the **X** icon on the top right.

3.10.2.2 About GeoRaster Data Visualization

Oracle Spatial Studio allows you to visualize GeoRaster data stored in spatial GeoRaster type in Oracle Database.

Geo-referenced raster data, including satellite imagery, aerial photos from drones, and gridded data, is very useful for mapping applications. It can be directly analyzed, or layered with vector data as a background map for additional context. See *Spatial GeoRaster Developer's Guide* for more information on GeoRaster data.

The following sections describe how you can create and visualize GeoRaster data in Spatial Studio.

- [Creating a GeoRaster Dataset](#)
- [Visualizing GeoRaster Data on a Map](#)

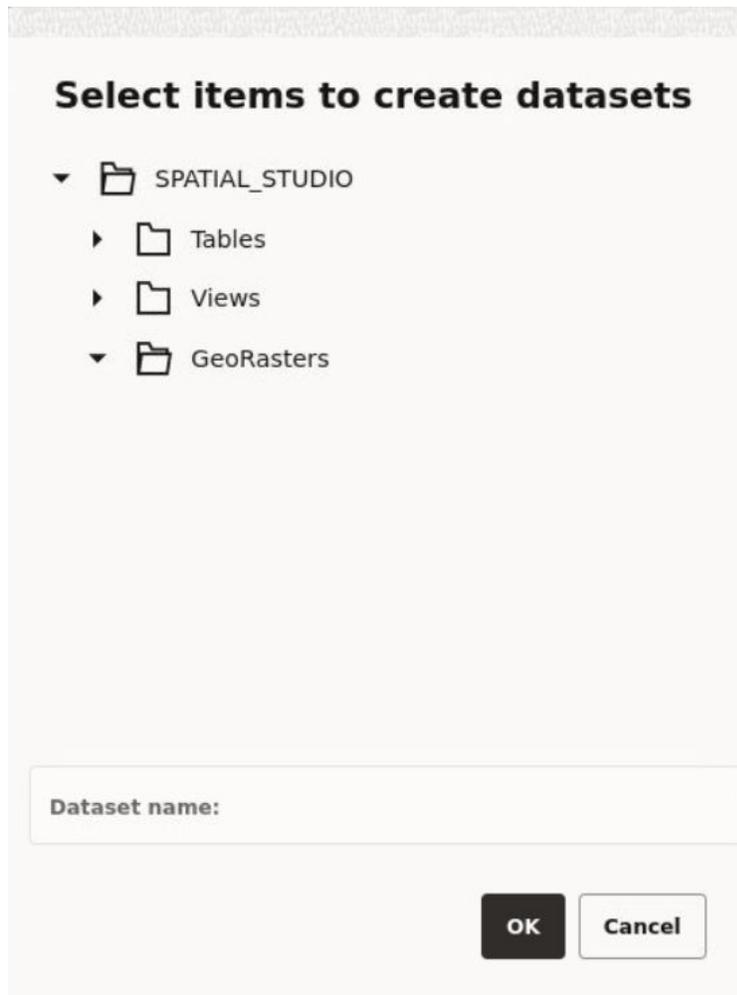
3.10.2.2.1 Creating a GeoRaster Dataset

You can create a GeoRaster dataset using the following steps.

The instructions assume that the GeoRaster data is already existing in your database schema.

1. Navigate to the **Datasets** page and click **Create Dataset**.
2. Click **From table/view**, select a **Connection** and click **Create**.
3. Click **GeoRasters**, select the required **GeoRaster** table and click **OK** as shown:

Figure 3-27 Creating a GeoRaster DataSet



The **Geo-raster Configuration** dialog opens.

4. Choose a **Selection Mode**.

The values for the selection mode are:

- Single Raster
- Virtual Mosaic

5. Select the GeoRaster column for visualization if you have chosen the **Single Raster** mode. Otherwise, you can skip this step.

 **Note:**

If you have chosen the **Virtual Mosaic** mode, all the Georaster columns are included in the visualization.

6. Click **OK**.

The GeoRaster dataset is configured and the newly created GeoRaster dataset is displayed as a row in the Datasets page.

3.10.2.2.2 Visualizing GeoRaster Data on a Map

You can visualize georaster data on a map using the following steps.

The instructions assume that the GeoRaster dataset is already added to the project in the Active Project page. To create a GeoRaster dataset, see [Creating a GeoRaster Dataset](#) for more information.

1. Click the **Visualizations** tab on the left pane in the Active Project page.
This lists the various visualization options.
2. Click and drag **Map** from the list to the visualization window on the right to create a map visualization.
A default base map is displayed with no data visualization layers.
3. Click the **Data** tab on the left pane in the Active Project page.
This lists all the **Datasets** that are loaded for the project.
4. Click and drag the desired **GeoRaster dataset** from the list to the map view on the right.

A GeoRaster layer is created on the map as shown:

Figure 3-28 GeoRaster Data Visualization



You can delete the map visualization by clicking the X icon on the top right.

**Tip:**

You can enhance your visual display by modifying your Layer Settings using the **Style** tab and **Raster** tab. See [Applying Style for a GeoRaster Layer](#) for more information.

3.10.2.3 About Hexagonal Data Visualization Using H3 Aggregations

Oracle Spatial Studio allows you to visualize point-type map data using hexagons with H3 (Hexagonal Hierarchical Spatial Index) aggregations.

Visualizing your map data as hexagons has several advantages:

- It helps you to identify patterns or clusters in a larger point dataset
- Easier interpretation of data, as in a hexagonal cell, all the points are equidistant from the hexagon center-point
- Hexagonal cells are color coded based on the number of datapoints they hold, which enables you to easily understand data patterns

The following sections describe how you can use H3 aggregations in Spatial Studio:

- [Preparing an H3 Aggregation Dataset](#)
- [Visualizing Data With H3 Aggregations](#)

3.10.2.3.1 Preparing an H3 Aggregation Dataset

You can prepare an H3 aggregation dataset by performing the following steps.

The instructions assume that a dataset containing geometric data columns is already loaded to Spatial Studio.

1. Navigate to the **Datasets** page.
All the datasets loaded to Spatial Studio are shown listed on this page.
2. Select the required dataset **name** and right-click to open the context menu.
3. Click **Create H3 Index** on the **Prepare** submenu.

The **Creating H3 Index** dialog opens as shown:

Figure 3-29 Creating an H3 Aggregation Dataset

The screenshot shows a dialog box titled "Creating H3 Index: POLICE_POINTS". It has a "Geometry Column" dropdown menu with "GEOM" selected. Below that is a "Summarize using" section with two radio buttons: "Count" (selected) and "Sum". Under "Sum" is a "Column to sum" dropdown menu. At the bottom is an "H3 Index Name" text field containing "POLICE_POINTS_H3". There are "OK" and "Cancel" buttons at the bottom right.

4. Select the **Geometry Column** for H3 aggregations.
5. Click a **Summarize using** option.
The values for summarizing are:
 - **Count:** buckets the number of datapoints in each hexagon
 - **Sum:** adds up the values for a specific column in the data set, for all the points that fall in a specific hexagon
6. Select the **Column to sum**, if you have chosen **Sum** to summarize your dataset. Otherwise, you can skip this step.
7. Optionally, modify the **H3 Index Name**.
8. Click **OK**.

An H3 aggregation dataset is created and added as a new row in the Datasets page.

3.10.2.3.2 Visualizing Data With H3 Aggregations

To visualize your map data with H3 aggregations, you must perform the following steps.

The instructions assume that an H3 aggregation dataset is already added to the project in the Active Project page.

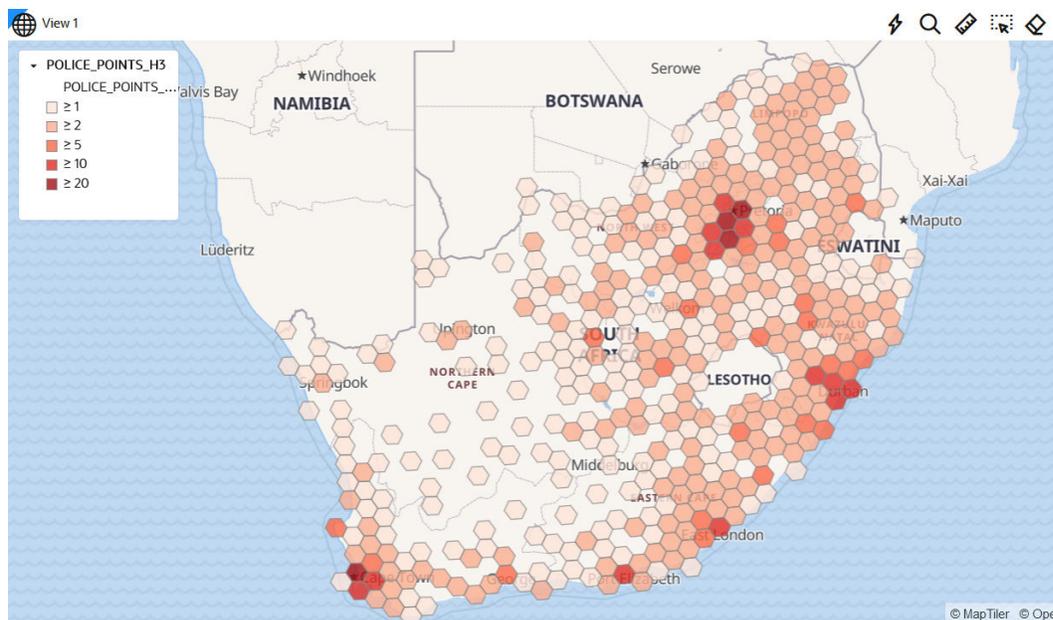
To prepare a dataset for H3 aggregation, see [Preparing an H3 Aggregation Dataset](#) for more information.

1. Click the **Visualizations** tab on the left pane in the Active Project page.
This lists the various visualization options.
2. Click and drag **Map** from the list to the visualization window on the right to create a map visualization.

A default base map is displayed with no data visualization layers.

3. Click the **Data** tab on the left pane in the Active Project page.
This lists all the **Datasets** that are loaded for the project.
4. Click and drag the desired **H3 Aggregation dataset** from the list to the map view on the right.
A layer showing the hexagonal binning of the data points is displayed on the map as shown:

Figure 3-30 Map Data Visualization Using Hexagonal Binning



See [Applying Data-Driven Style to a Map with H3 Aggregations](#) for more information on applying styling for a H3 map layer.

3.10.2.4 About Custom Map Regions Visualization

Oracle Spatial Studio allows you to create custom map regions on map layers that support polygon type geometry.

You can create a new map region by selecting multiple polygon shapes and combining them with a new key-value. You can then append or insert this new map region with the new key-value into a target dataset containing all of your other custom map regions.

These newly created custom shapes are persisted on the underlying database table of the target dataset, and therefore can be used for data visualization or reporting just like any other dataset.

The following are the main characteristics for this feature support:

- The source dataset, that is the dataset whose polygon shapes you will be selecting and then combining into a custom map region, must always be based on an Oracle Database table.
Datasets from Oracle views and Studio's Analyses are not currently supported.

- The new regions may or may not be contiguous.
- The target dataset, that is the dataset on which you want to store the newly created custom map regions, will store them in its geo-reference system.
- Only the key value and new geometry value are inserted into the target table.
- The target dataset must meet the following requirements:
 - The geometry metadata information for the target dataset must be available in the SDO_GEOM_METADATA view.
 - A spatial index must exist on the geometry column.

 **Note:**

If a spatial index is not created on the geometry column, then the target data layer cannot be dragged on to the map visualization canvas. See [Creating a Target Dataset](#) for more information.

- [Creating Custom Regions for Visualization](#)
- [Creating a Target Dataset](#)

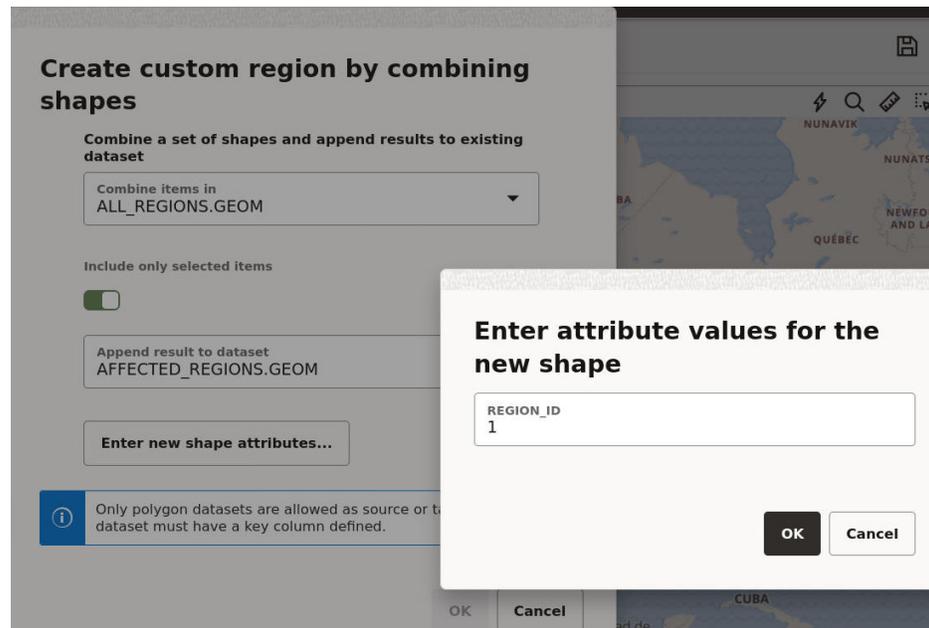
3.10.2.4.1 Creating Custom Regions for Visualization

You can create custom polygon regions on the source dataset that contains polygon type geometries and apply them on a target dataset using the follow steps:

The instructions assume that the source and target datasets are already added to your Project in the ActiveProject page.

1. Click the **Visualizations** tab on the left pane in the Active Project page.
This lists the various visualization options.
2. Click and drag **Map** from the list to the visualization window on the right to create a map visualization.
A default base map is displayed with no data visualization layers.
3. Click the **Data** tab on the left pane in the Active Project page.
This lists all the **Datasets** that are loaded for the project.
4. Click and drag the desired **source dataset** from the list to the map view on the right.
A map layer with polygon shapes is created.
5. Create the required custom regions by performing the following steps as many times as required:
 - a. Select the regions for aggregation using the polygon selection tool in the map tool bar.

Figure 3-32 Create a Custom Region



- c. Select the source and target dataset and optionally switch on or off the **Include only selected items** toggle button:
 - **Combine items in:** source dataset
 - **Append result to dataset:** target dataset

⚠ Caution:

The whole source dataset may be aggregated into one region if **Include only selected items** is switched off. In this case the process may run for a long time depending on the number of features in the source dataset. Therefore, use this option only if required.

- d. Click **Enter new shape attributes** and enter a unique number for **REGION_ID**.
- e. Click **OK** to create the custom map region.

Repeat steps **a** to **d** until you create the number of required custom regions.

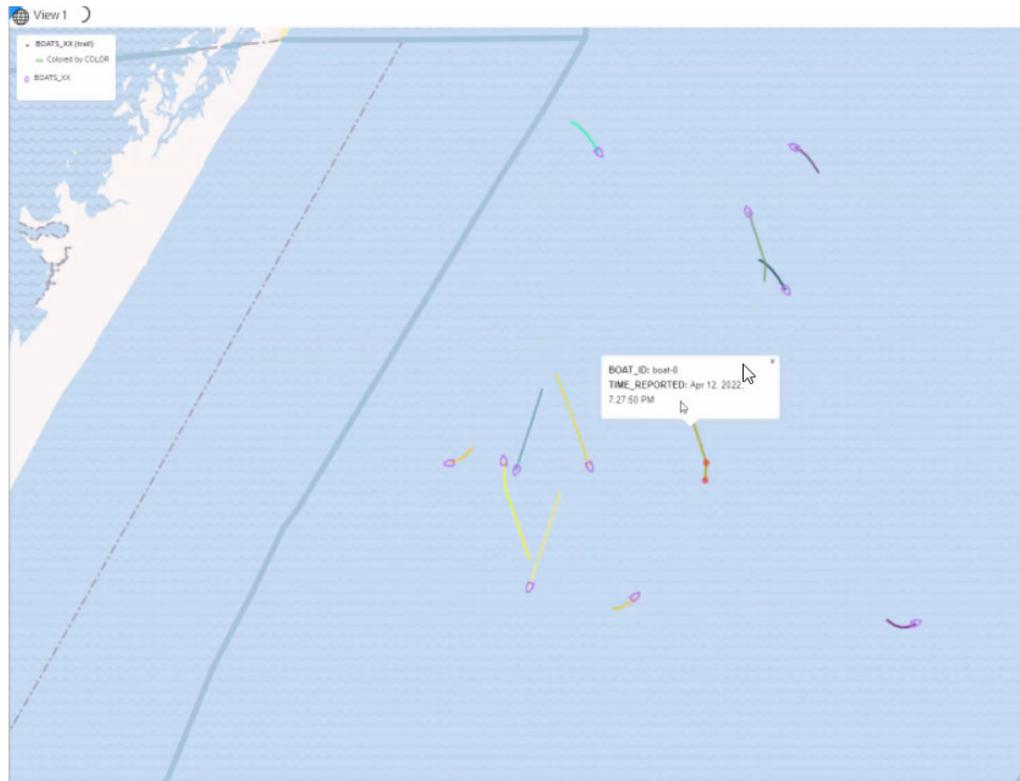
6. Drag and drop the **target dataset** to the map view on the right to view the newly created custom regions.

The following figure shows the newly defined custom region that was inserted into the target dataset.

3.10.2.5 Visualizing a Moving Object

Starting from Oracle Spatial Studio Release 22.1.0, you can visualize moving objects using a spatiotemporal dataset.

Figure 3-34 Moving Objects Visualization



To get started on visualizing moving objects in Spatial Studio, you must:

1. Enable a dataset as a spatiotemporal dataset by defining the essential space, time and entity information.
2. Configure animation settings after adding the spatiotemporal dataset to a map for visualization.

The following sections describe in detail how you can perform the preceding two steps:

- [Enabling Spatiotemporal for a Dataset](#)
In order to visualize and animate moving objects, you must enable **Spatiotemporal** for the dataset containing spatiotemporal data on the Datasets page.
- [Configuring Animation for a Moving Object](#)
To visualize moving objects on a map in Spatial Studio, you must configure the animation settings on the map layer.
- [Characteristics of Spatiotemporal Map Layers](#)
This section describes the distinct characteristics of the spatiotemporal map layers when visualizing a spatiotemporal dataset.

3.10.2.5.1 Enabling Spatiotemporal for a Dataset

In order to visualize and animate moving objects, you must enable **Spatiotemporal** for the dataset containing spatiotemporal data on the Datasets page.

Spatial Studio considers a dataset to contain spatiotemporal data only if it meets the following requirements:

- It must be based on a geometry table or view with a geometry column or pair of latitude/longitude columns.
- There must be one or more “moving objects” or entities uniquely identified by one of the columns.
- There must be a column of the type `TIMESTAMP`, that stores the UTC datetime of the entities as they are being observed and recorded.
- The dataset's underlying table or view must have ongoing inserts with recently obtained location data of entities being observed or monitored.

You can perform the following steps to enable spatiotemporal for a dataset. The instructions assume that the dataset containing spatiotemporal data is already existing in your database schema.

1. Navigate to the **Datasets** page.
2. Right-click on the spatiotemporal dataset and click **Properties**.

The **Dataset Properties** dialog opens.

3. Click the **Spatiotemporal** tab.

The tab display opens as shown:

Figure 3-35 Enabling Spatiotemporal for a Dataset

Dataset Properties - BOATS

Overview Columns Settings Spatial Validation **Spatiotemporal**

Enable Spatiotemporal

Entity ID Column
BOAT_ID

Timestamp Column
TIME_REPORTED

i Only UTC timestamp values are supported

Data Change Rate
1,000

i Spatiotemporal datasets are based on tables/views with constant ongoing inserts including location (SDO_GEOMETRY or coordinates) and time (UTC TIMESTAMP). Only datasets meeting this condition may be enabled as a spatiotemporal dataset.

Apply Cancel

4. Switch ON **Enable Spatiotemporal**.
5. Select the **Entity_ID Column** that identifies a set of unique entities.
The **Entity_ID Column** is not a unique column as each entity can have many recordings of its locations in the same table.
6. Select the **Timestamp Column**.
Spatial Studio supports only UTC (Coordinated Universal Time) or GMT (Greenwich Mean Time) time zone for visualizing moving objects.
7. Specify **Data Change Rate** to indicate the approximate frequency of the live feed updates in the table.
8. Click **Apply**.

Your dataset is now enabled for spatiotemporal data visualization.

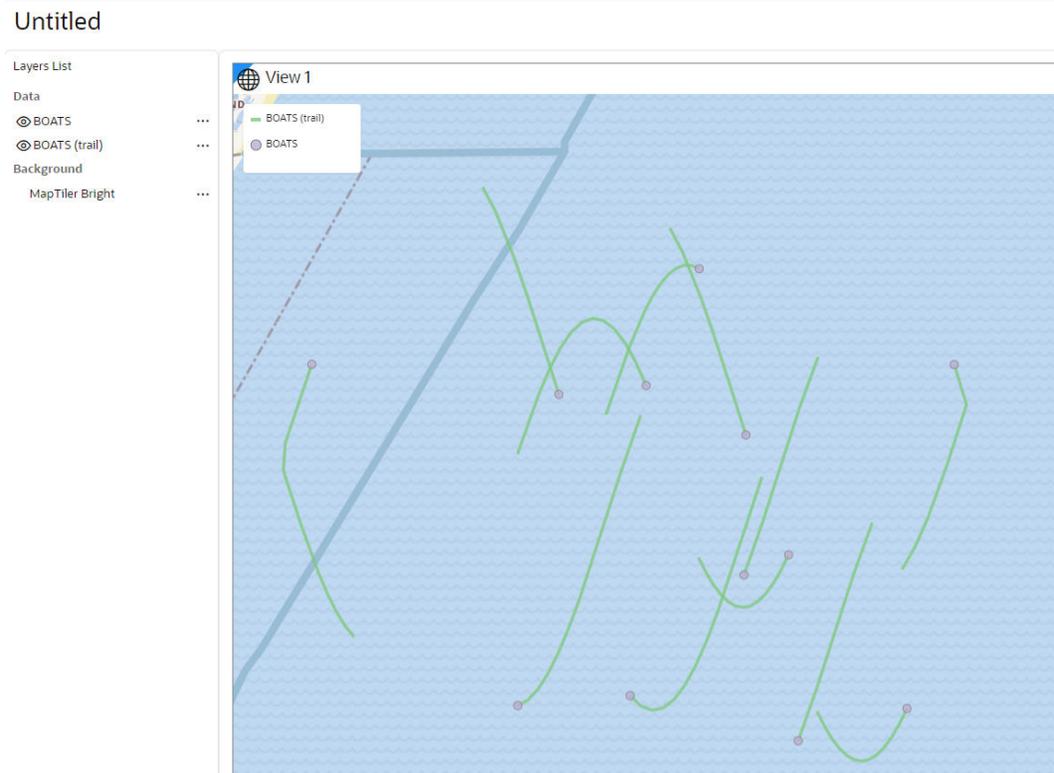
3.10.2.5.2 Configuring Animation for a Moving Object

To visualize moving objects on a map in Spatial Studio, you must configure the animation settings on the map layer.

The following instructions assume that you have enabled spatiotemporal for the dataset and the dataset is already added to the project in the Active Project page. See [Enabling Spatiotemporal for a Dataset](#) for more information.

1. Click the **Visualizations** tab on the left pane in the Active Project page.
This lists the various visualization options.
2. Click and drag **Map** from the list to the visualization window on the right to create a map visualization.
A default base map is displayed with no data visualization layers.
3. Click the **Data** tab on the left pane in the Active Project page.
This lists all the **Datasets** that are loaded for the project.
4. Click and drag the desired spatiotemporal dataset from the list to the map view on the right. Two map layers are created on the map as shown:

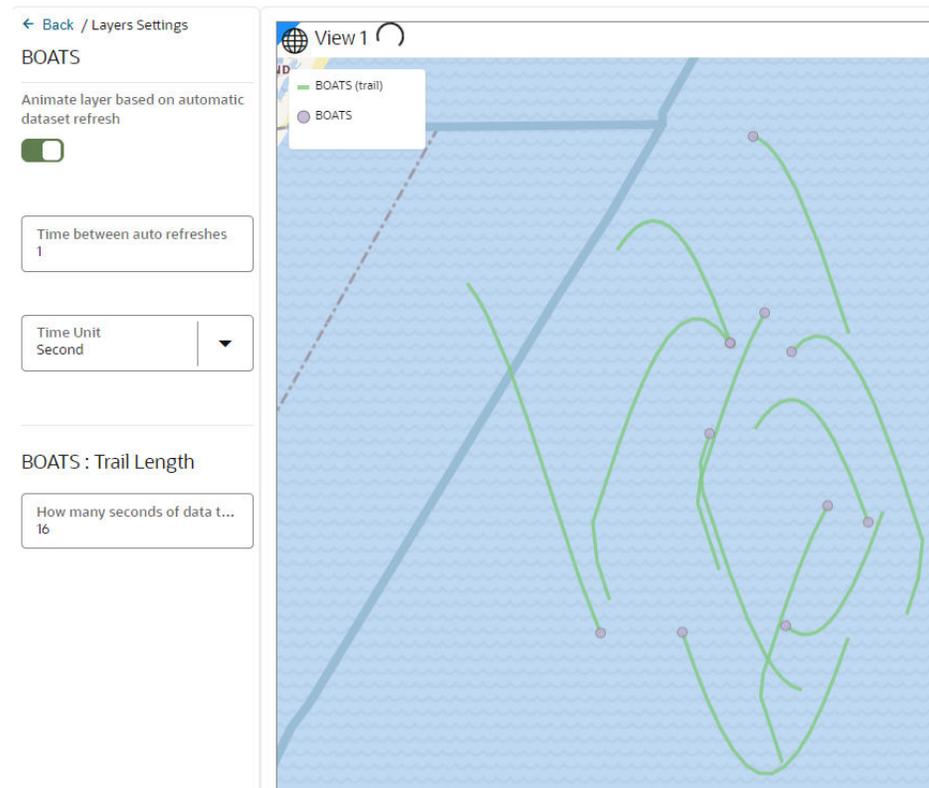
Figure 3-36 Map Visualization Using a Spatiotemporal Dataset



The second layer representing the trails of the moving object is added automatically in Spatial Studio. See [Characteristics of Spatiotemporal Map Layers](#) for more information on the two map layers.

5. Perform the following steps to enable animation of the object along the trails:
 - Click **...** against the initial layer in the **Data** tab of the **Layers** list.
 - Select **Settings** in the context menu and click **Configure Animation**. The animation settings for the map layer opens as shown:

Figure 3-37 Configuring Animation Settings



- Switch ON **Animate layer based on automatic dataset refresh**.
- Specify **Time between auto refreshes** to indicate the frequency of data refresh from the backend. This configuration also determines the smoothness and speed of the temporal animation. Note that Spatial Studio displays a default frequency value which is same as the **Data Change Rate** value configured on the Spatiotemporal dataset used for the visualization.
- Specify a **Time Unit**.
- Specify the **Trail Length** of your moving object. A trail length value of N indicates that Spatial Studio must fetch the recent N seconds of data of the moving object during every refresh.

Tip:

If the underlying database table or view contains millions of records, you can limit the map animation to display only the most recent N seconds of data as configured in **Trail Length**.

Note that Spatial Studio displays a default trail length value which is 15 times the **Data Change Rate** value configured on the Spatiotemporal dataset and is rounded to the nearest integer.

The animation settings are configured and you can view the animation of moving objects on the map.

 **Note:**

You can choose a symbol and color for your moving object. However, ensure that the symbol you select adheres to the conditions explained in [Characteristics of Spatiotemporal Map Layers](#).

3.10.2.5.3 Characteristics of Spatiotemporal Map Layers

This section describes the distinct characteristics of the spatiotemporal map layers when visualizing a spatiotemporal dataset.

- The trails map layer is considered the *secondary* layer to the main layer. If you delete the main layer from the map, then the trails map layer is automatically deleted as well.
- The main layer which shares the same name as the dataset is always a Point-type layer, that you can visualize using either as circle or using symbols or icons. When you use symbols, Spatial Studio will also automatically rotate the symbol based on the direction your object is moving.
Also note, the current release of Spatial Studio supports only those symbols that naturally point North (or point up) or those that do not represent an inherent direction or angle, such as any rounded symbols.
- The main layer will keep its animation even when you toggle the secondary layer invisible. However, if you toggle the main layer invisible, the trail layer will remain static as no new data is fetched from the backend.
- You cannot switch the main layer to Heatmap or Cluster type.
- You cannot use sticky Tooltip or popup as they cannot stick to the moving object when it moves to new locations.
- Spatial Studio drives the animation of moving objects and their trails by constantly refreshing the main layer's data from the backend. This implies that the base table is queried and the last *N* seconds of data is fetched by filtering the records based on the `TIMESTAMP` column.
- If you are working in a multi-user or multi-visualization environment or both, you must take care to avoid overloading the database with many animating layer's data refresh queries. For instance, ensure a layer is not refreshing its data too frequently, or fetching too many seconds of data on each refresh, or both.

3.10.3 Using a Cesium Map Visualization

Spatial Studio uses a CesiumJS plugin to enable you to view 3D visualizations using 3D Tiles or CZML data on a Cesium map.

Cesium map allows you to display your real-world geospatial 3D data in a 3D environment. In order to build interactive 3D visualizations using Cesium maps, you can upload one of the following files to Spatial Studio:

- **3D Tileset:** Supports formats are:
 - Point Cloud (.pnts)
 - Batched 3D Model (.b3dm)
- **CZML file:** CZML formatted data in .czml files

It is important to note the following when using a Cesium map visualization:

- Generating 3D Tiles or CZML formatted data file for your geospatial 3D data must be carried out using any third party software outside of Oracle Spatial Studio.
- 3D Tiles and CZML files are stored in the file system on Spatial Studio's server, not in Oracle Database.
- Currently this feature supports only displaying 3D Tiles and CZML data on maps. It does not support 3D analysis.
- [Visualizing a 3D Tileset Using a Cesium Map](#)
- [Visualizing CZML Data Using a Cesium Map](#)

3.10.3.1 Visualizing a 3D Tileset Using a Cesium Map

You can visualize your dataset with 3D Tiles on a Cesium map using the following steps.

The instructions assume that the 3D Tiles are uploaded and the dataset is already added to the project in the Active Project page. To create a dataset with 3D Tiles, see [Creating a Dataset](#) for more information.

1. Click the **Visualizations** tab on the left pane in the Active Project page.
This lists the various visualization options.
2. Click and drag **Cesium-Map** from the list to the visualization canvas on the right to create a Cesium map visualization.

A default Cesium map is displayed.

 **Tip:**

You can configure new background Cesium maps by adding maps from the following two sources:

- URL template
- WMTS service

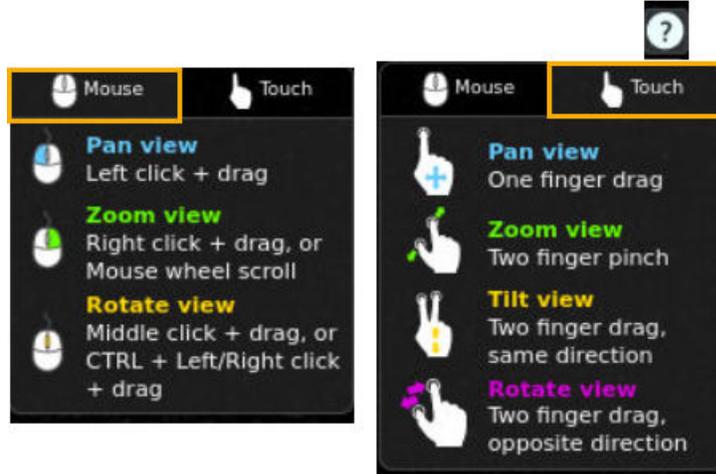
3. Click the **Data** tab on the left pane in the Active Project page.
This lists all the **Datasets** that are loaded for the project.
4. Click and drag the desired **3D Tiles dataset** from the list to the map view on the right.

A 3D layer is created on the map as shown:

Figure 3-38 3D Cesium Map Visualization



To interact with the map, click the ? icon and use either of the following options shown:



3.10.3.2 Visualizing CZML Data Using a Cesium Map

You can visualize your CZML dataset on a Cesium map using the following steps.

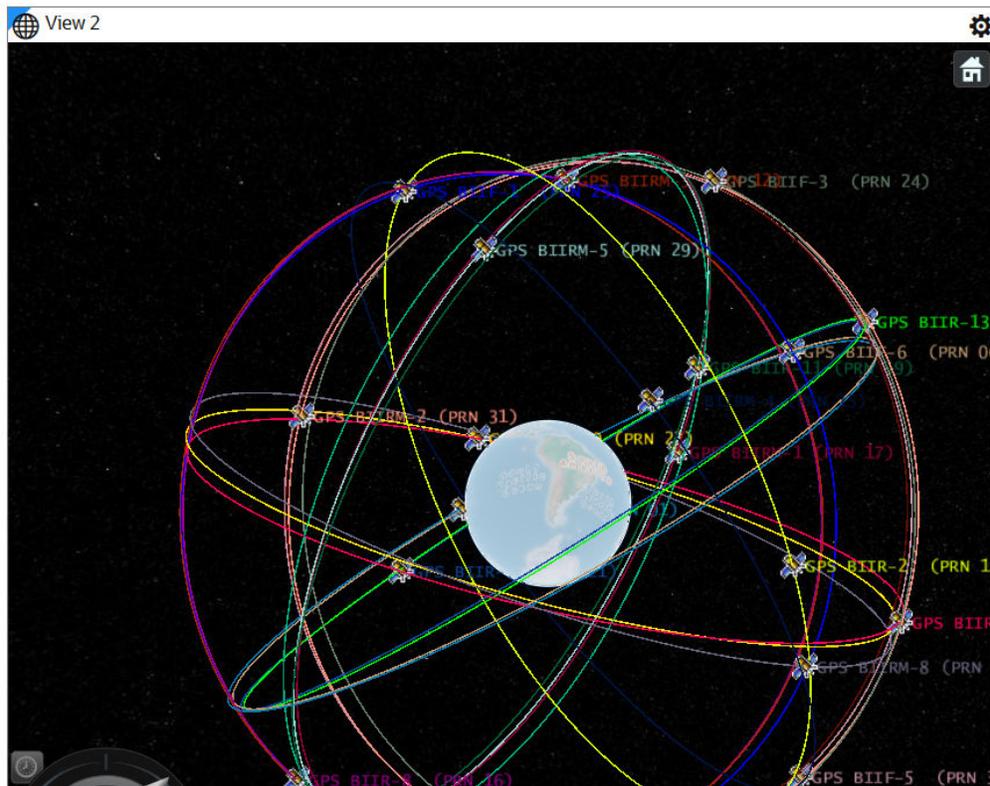
The instructions assume that the CZML formatted data is uploaded and the CZML dataset is already added to the project in the Active Project page. To create a dataset using .czml file, see [Creating a Dataset](#) for more information.

1. Click the **Visualizations** tab on the left pane in the Active Project page.
This lists the various visualization options.

2. Click and drag **Cesium-Map** from the list to the visualization canvas on the right to create a Cesium map visualization.
3. Click the **Data** tab on the left pane in the Active Project page.
This lists all the **Datasets** that are loaded for the project.
4. Click and drag the desired **CZML dataset** from the list to the map view on the right.

A 3D layer is created on the map as shown:

Figure 3-39 Cesium Map Visualization Using a CZML Dataset



3.10.4 Styling a Map Layer

Spatial Studio allows you to explore different styling options for your map layers, in order to enhance visualization and analysis.

The styling options provided to you may vary depending on the type of data you are mapping.

The following sections describe a few styling techniques for the different data types:

- [Applying a Render Style For a Point Layer](#)
- [Applying Style for a GeoRaster Layer](#)
- [Applying Data-Driven Style to a Map with H3 Aggregations](#)
- [Applying Predefined Colors to a Map Layer](#)

- [Applying Predefined Symbols to a Map Layer](#)
- [Setting Selection Tolerance on a Map Layer](#)
- [Adding a Pin on a Map](#)
- [Applying Map Backgrounds](#)

3.10.4.1 Applying a Render Style For a Point Layer

You can render a point map layer using one of the following render style options:

- Circle (default)
- Symbol
- Heatmap
- Cluster

The following steps enable you to apply your preferred render style option.

The instructions assume that you have point map layer displayed on your Active Project page.

1. Click  against the map layer in the **Layers** tab of the **Layers List**.
2. Select **Settings** in the context menu.
3. Configure **Style** and select a **Render Style** option from the drop-down list.

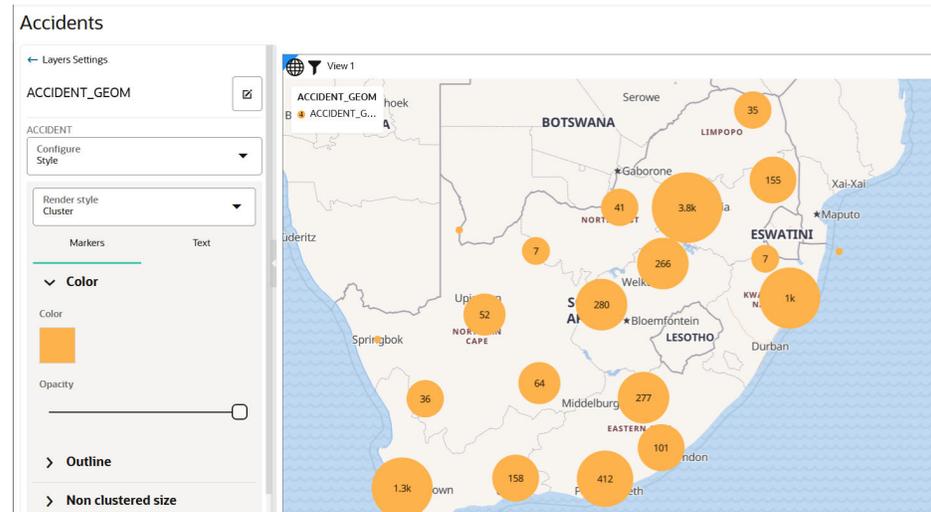
By default, a point map layer always uses Circle to represent the data points.

 **Note:**

Each render style has its own settings.

- If you select **Cluster** as the render style option, the data points on your map are shown clustered depending on the cluster circle size.

Figure 3-40 Applying a Cluster Style



Optionally, you can change the color and the style of the text labels representing the number of points in each cluster.

- If you select **HeatMap** as the render style option, the data points on your map are rendered with continuous colors based on the concentration of points as shown:

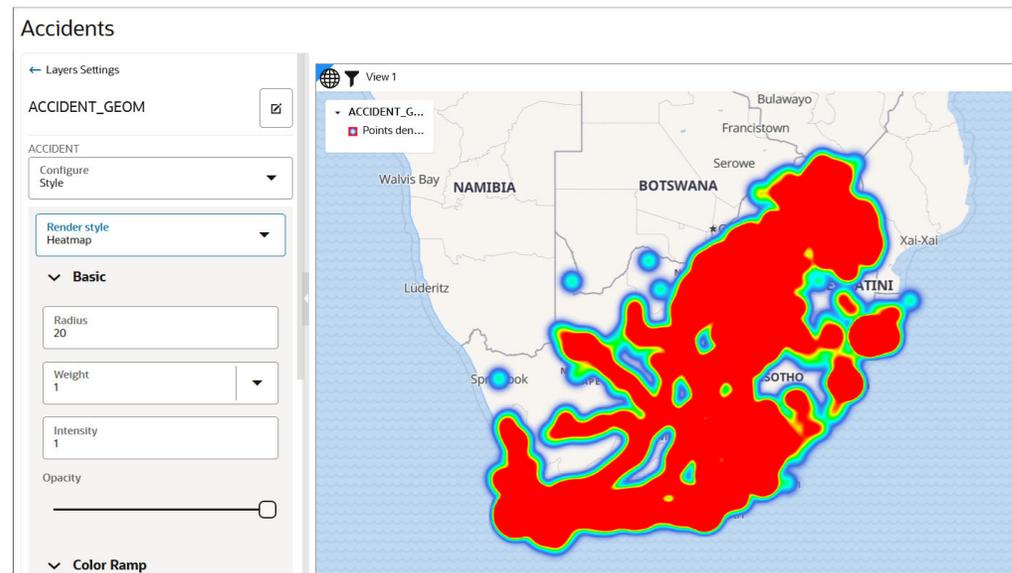
 **Note:**

Hot colors represent concentration of points, and cool colors represent sparsity of points.

 **Tip:**

It is recommended that you reduce the default value of the **Radius** parameter to observe a more localized view of point concentrations.

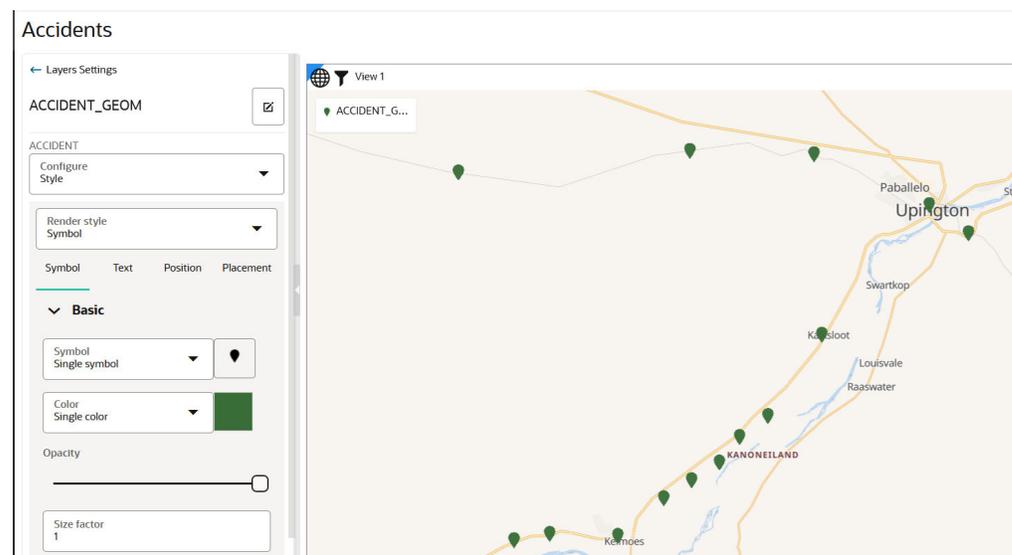
Figure 3-41 Applying a HeatMap Style



- If you select **Symbol** as the render style option, the data points on your map are rendered with your chosen symbol as shown:

 **Tip:**
You can optionally select a color for your symbol.

Figure 3-42 Applying a Symbol Style



The map layer gets rendered with the appropriate style.

3.10.4.2 Applying Style for a GeoRaster Layer

You can style a GeoRaster map layer using the following steps.

The instructions assume that you have a GeoRaster map layer displayed on your Active Project page.

1. Click **☰** against the **dataset** in the **Data** tab of the **Layers** list.
2. Select **Settings** in the context menu.
The **Layer Settings** panel opens.
3. Optionally, modify any of the following options in the **Style**:
 - **Opacity**
 - **Maximum Brightness**
 - **Minimum Brightness**
 - **Saturation**
 - **Contrast**
 - **Hue Rotate**
 - **Fade Duration**
4. Optionally, modify any of the following rendering options in the **Raster** tab:
 - **Bands:** Spatial Studio, by default supports the following bands:
 - Red
 - Blue
 - Green
 - Alpha

For GeoRaster images that have more than three layers, you can choose which three layers you want to visualize.

- **Reprojection:** represents the interpolation method to be used when transforming an image from one SRS (Spatial Reference System) to another.
- **Image Processing:** represents the subprogram to be used to enhance the visual quality of the images.
- **Rendering Hints:** represents the image interpolation value that determines how each image cell's value on a view port is interpolated using the original image pixels. For example:
 - **NEAREST NEIGHBOR:** This option has no interpolation by taking the nearest image pixel's value directly.
 - **BI-LINEAR:** This option will consider 4 neighboring pixels to determine the image cell's value on a view port.

Additionally, you can also switch on or off the **Transparent NODATA** toggle, which determines if the image cells are to be transparent or not. If the switch is on, then the layers underneath will be visible for areas that have NODATA in the image.

The GeoRaster map layer is rendered with the updated settings.

3.10.4.3 Applying Data-Driven Style to a Map with H3 Aggregations

You can apply different resolutions to your H3 map layer to enhance your visualization.

In case of an H3 aggregation dataset, the hexagonal cells and the distribution of points in these hexagons automatically change at each resolution level, as you zoom in and out of the map. This implies that the color bins for one level might not be the same as for another level.

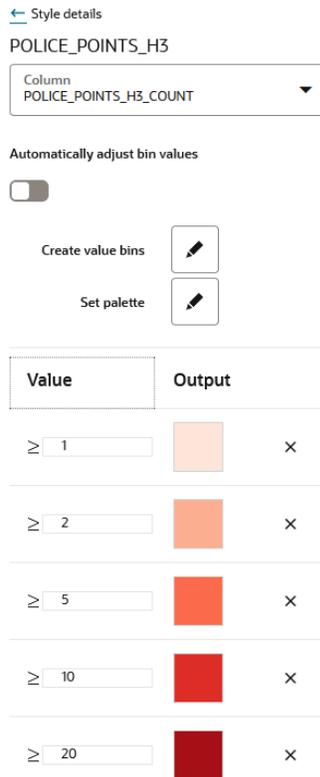
Spatial Studio provides an option to automatically calculate color bins as you alter your resolutions. You can also turn this option off if you want to test against a set of specific thresholds.

The following steps enable you to apply a data-driven styling option for your H3 map layer.

The instructions assume that you have a H3 map layer displayed on your Active Project page.

1. Click **☰** against the map layer in the **Layers** tab of the **Layers List** list.
2. Select **Settings** in the context menu.
3. Configure **Style**.
4. Select **Based on Data** for the **Color** value under **Fill**.
The **Style details** panel is displayed.
5. Select the **Column** to control styling.
6. Switch on or off the **Automatically adjust bin values** toggle button.
 - If turned on, the bin values will automatically update as you zoom in or out on the map.
 - If turned off, **Create value bins** option appears.
7. Assign colors to the bins based on data values.

The following figure shows the Style details panel options:

Figure 3-43 Applying Data-Driven Color Styling for H3 Map Layer

The color bins on the H3 map layer gets rendered appropriately for different resolutions as shown in the preceding figure.

3.10.4.4 Applying Predefined Colors to a Map Layer

Using a column with predefined color codes or values, you can create accurate and consistent choropleth map layers.

You can store a color-coded value in a column of your dataset and then use this column property to color code your map.

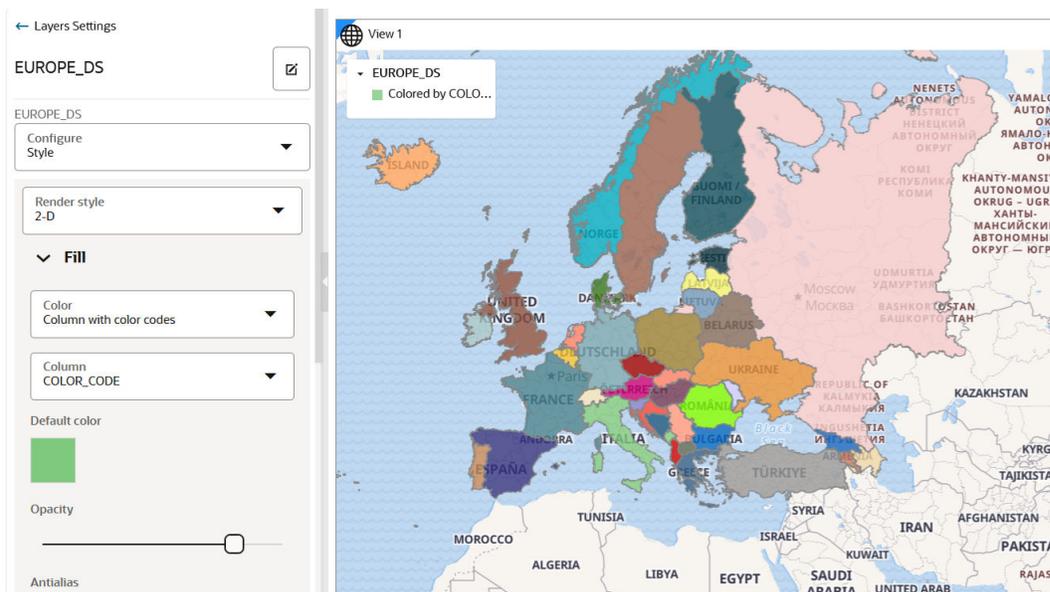
The following steps enable you to color code your map layer.

The instructions assume that the map layer displayed on your Active Project page uses a dataset having a column property that contains color-coded values.

1. Click **⋮** against the map layer in the **Layers** tab of the **Layers List**.
2. Select **Settings** in the context menu.
3. Configure **Style** by selecting **Column with color codes** for the **Color** value under **Fill**.
4. Select the **Column** that contains the color value.

The following figure shows the styling of the map layer using the color variable in the dataset:

Figure 3-44 Color Coding a Map Layer



The color code gets applied to the map layer.

3.10.4.5 Applying Predefined Symbols to a Map Layer

Using a column with predefined symbol values, you can apply data-driven symbol styling to your map layer.

However, the symbol must belong to one of the supported symbol sets. Symbols in Spatial Studio are grouped into three sets and each set is identified by a `Symbol set id` as described in the following table:

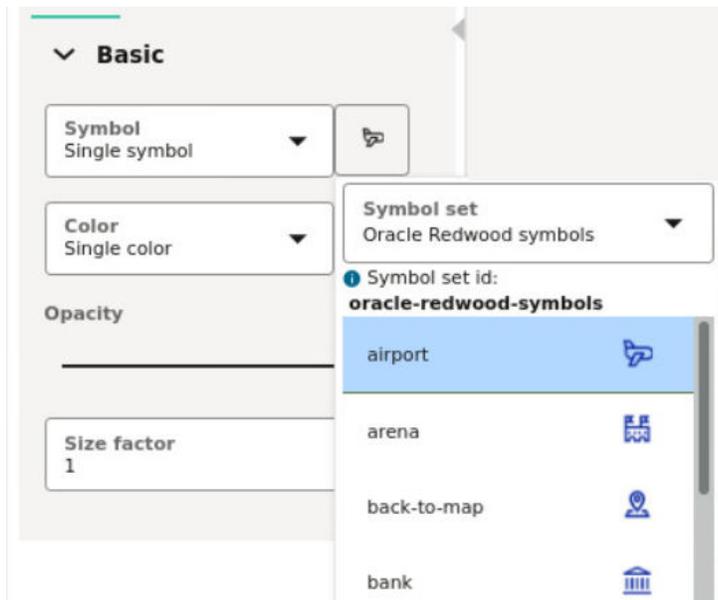
Table 3-2 Symbol Set

Symbol Set	Symbol set id
Spatial Studio default	studio
Oracle Redwood symbols	oracle-redwood-symbols
Airfields	airfields

You can store a symbol name and the symbol set to which it belongs in a column of your dataset and then use this column property to assign symbols to your map.

For example, assume you want to use the `airport` icon as shown in the following figure:

Figure 3-45 Symbols and Symbol Set



You must then use `oracle-redwood-symbols/airport` as the symbol name in your dataset column. In this case:

- `oracle-redwood-symbols`: is the symbol set id
- `airport`: is the name for the icon to be used on the map layer

The following steps enable you to apply data driven symbol styling for your map layer.

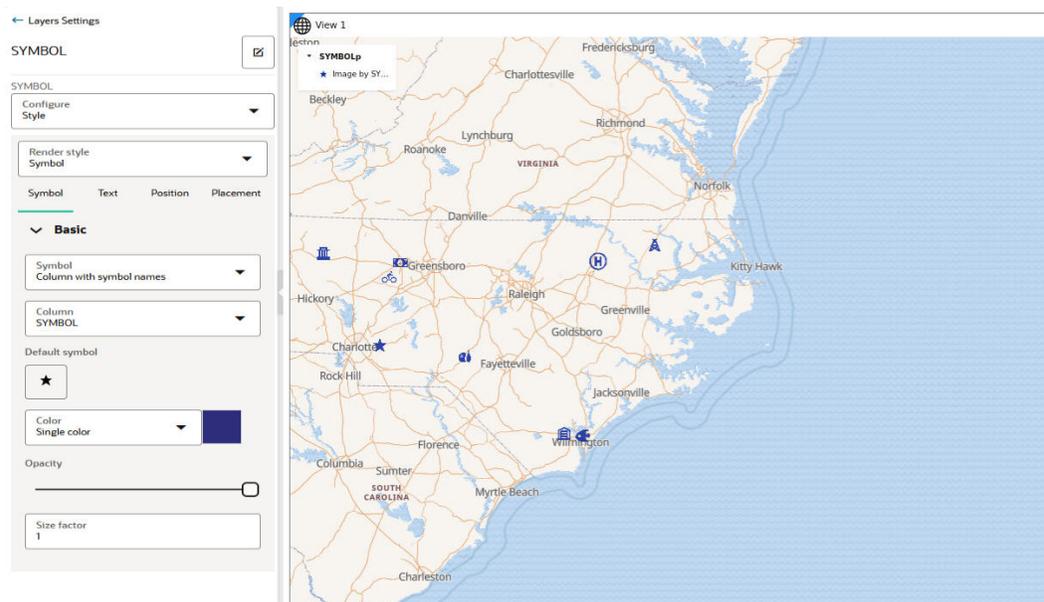
The instructions assume that the map layer displayed on your Active Project page uses a dataset having a column property that contains symbol names following the convention as explained earlier in this section.

1. Click **⋮** against the map layer in the **Layers** tab of the **Layers** list.
2. Select **Settings** in the context menu.
3. Configure **Style** and select **Symbol** as the **Render Style**.
4. Select **Column with symbol names** from the **Symbol** drop-down list in the **Basic** section of the **Symbol** tab.
5. Select the **Column** that contains the symbol name value.

The following figure shows the styling of the map layer using the symbol name variables in the dataset:

 **Note:**

If incorrect symbol names are present in the dataset column, then for those data points, the **Default symbol** is displayed on the map layer.

Figure 3-46 Custom Symbol Styling in Map Visualization

The symbols gets applied to the map layer.

3.10.4.6 Setting Selection Tolerance on a Map Layer

Spatial Studio allows you to increase or decrease the selection tolerance on a map layer, so that selecting small and linear geometry features is easier.

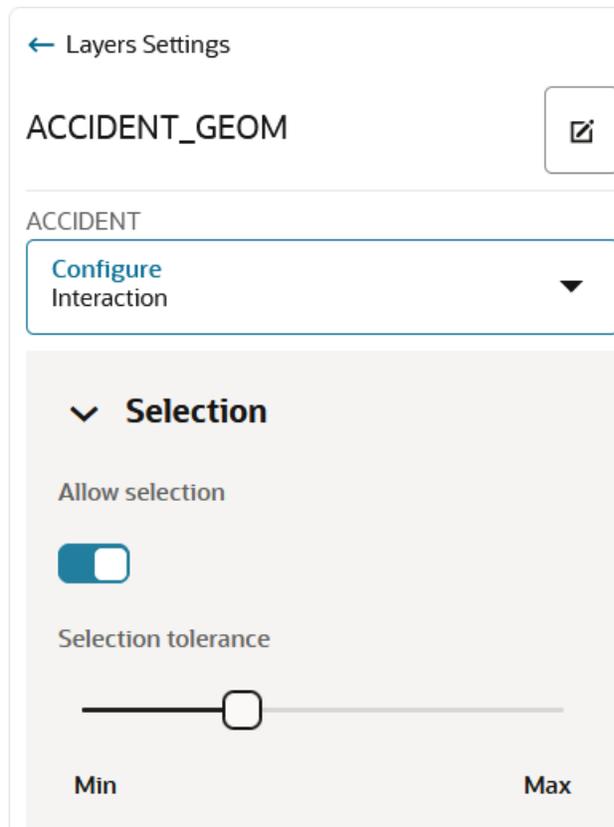
The following steps enable you to adjust and set the selection tolerance on a map.

The instructions assume that a project is open on the Active Project page.

1. Click ******* against the **dataset** in the **Data** tab of the **Layers** list.
2. Select **Settings** in the context menu and configure **Interaction**.
3. Switch on the **Allow selection** toggle button.
4. Adjust the **Selection tolerance** slider as required.

The following figure shows the **Selection** section for setting the tolerance:

Figure 3-47 Setting the Selection Tolerance



The custom selection tolerance gets applied to the map layer.

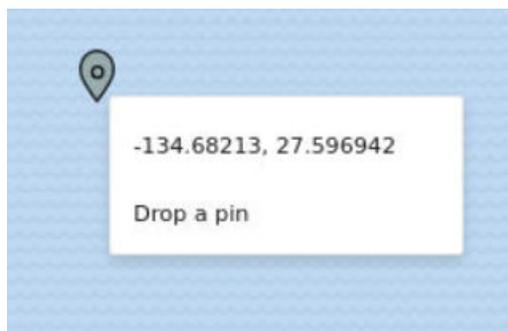
3.10.4.7 Adding a Pin on a Map

The following steps enable you to inspect the current mouse pointer's latitude and longitude coordinates and pin a location on the map layer.

The instructions assume that you have a project opened on your Active Project page and the map layer is displayed for visualization.

1. Right-click on any area on the map layer.

The coordinates for the location gets displayed as shown:

Figure 3-48 Pin a Location on the Map

2. Click **Drop a pin** to add a location marker.

The pin gets displayed on the map. Additionally, you can also copy the coordinates by clicking on the marker and then clicking the **Longitude, Latitude: click to copy** icon.

3.10.4.8 Applying Map Backgrounds

Spatial Studio provides ready-to-use map backgrounds to enhance your visualization.

You can select one of the following map backgrounds for your project visualization:

- MapTiler Vector Basemaps
- Oracle Raster Basemaps
- Blank Basemaps
- User-defined Basemaps

As an administrator, you can also register custom basemaps and use them in map visualizations. They may be raster or vector tiles that are typically hosted on third party servers, or they be created using a WMS OGC web service. See [Spatial Studio Administration Page](#) for more information on adding basemaps.

The following section describes how to apply a specific map background for your project:

- [Changing Map Backgrounds](#)

3.10.4.8.1 Changing Map Backgrounds

The following steps enable you to apply different map backgrounds in your project visualization.

The instructions assume that you have a project opened on your Active Project page.

1. Click **⋮** in the **Background** tab of the **Layers** list.
2. Select **Settings** in the context menu.
3. Click the **Change the Background Map Style** drop-down and select your required background map as shown.

Figure 3-49 Changing a Map Background

All custom basemaps appear under **User-defined Basemaps** in the drop-down list.

The selected map background gets applied to your project visualization.

3.10.5 Visualizing Map Data Over Time

Spatial Studio allows you to perform dynamic map visualizations. In order to visualize map data over time, your dataset must contain a date column or a time column or both. You can then use the time slider feature to interact with the map.

Note:

The time slider is applicable only for datasets containing event points or simple shapes over time, such as earthquakes or storm paths. It does not apply for datasets containing a fixed set of shapes with attributes varying over time, such as countries with population.

The following steps allow you to configure and use a time slider for your map visualization.

The instructions assume that you have a project linked to a dataset containing date or time data and the project is opened on your Active Project page.

1. Click the **Settings** icon in your map tool bar.
2. Switch on the **Show time slider** toggle button and click **OK**.
A time slider bar appears at the bottom of the map visualization canvas.
3. Click the **Time slider settings** icon on the time slider bar.

Figure 3-50 Time slider Settings

Time slider settings

Date columns

ACCIDENTS
DATE_TIME

Refresh columns

Time unit
Days

Time range

Time labels always on

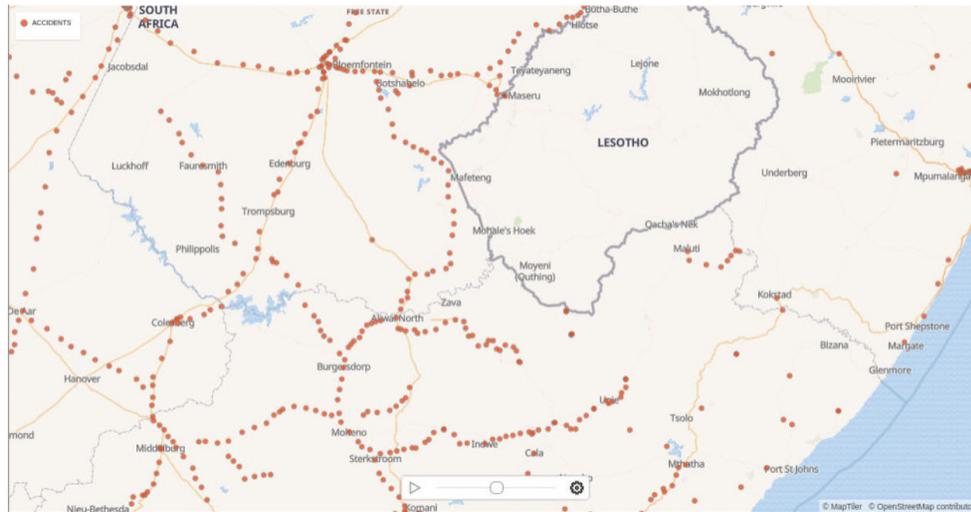
Playback speed
Normal

OK Cancel

4. Select the **Date columns** and the **Time unit** to be applied for visualization.
5. Optionally, switch on or off the **Time range** and **Time labels always on** toggle buttons.
6. Optionally, select **Playback speed**.
7. Click **OK**.

You can now interact with your map using the time slider to view the change of your data over time.

Figure 3-51 Using a Time slider in Map Visualization



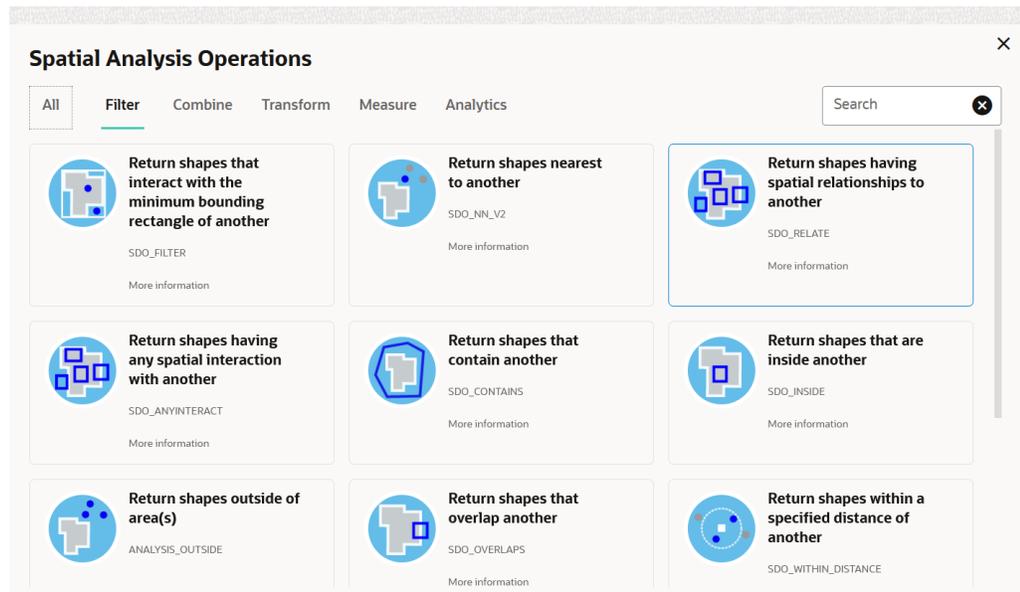
3.11 Performing Analyses in Spatial Studio

You can perform various spatial analyses (such as filtering by proximity, nearest neighbor analysis and so on) and visualize the results in Spatial Studio.

These spatial analyses are grouped under the following categories in Spatial Studio :

- Filter
- Combine
- Transform
- Measure
- Analytics

Figure 3-52 Spatial Analysis Operations



The following topics explore spatial analysis using selected filter operations:

- [Determining the Geometries Within a Specified Distance](#)
- [Determining the N-Nearest Geometries](#)
- [Editing a Spatial Analysis](#)

3.11.1 Determining the Geometries Within a Specified Distance

Using the `SDO_WITHIN_DISTANCE` filter, you can filter coordinates that are within a specific distance from a point on the map layer.

To filter points based on this proximity filter, you must perform the following steps.

The instructions assume that you have the layer to be filtered and the map layer to be used as a filter displayed on your Active Project page.

1. Click **☰** against the map layer whose coordinates needs to be filtered in the **Layers** tab.
2. Select **Spatial Analysis**.

The **Spatial Analysis Operations** window opens as shown in [Figure 3-52](#).

3. Click on the **Filter** tab and select **Return shapes within a specific distance of another**.
Within distance dialog box opens as shown:

Figure 3-53 Spatial Analysis - Within Distance Configuration

Within distance ✕

Uses the spatial index to identify the set of spatial objects that are within some specified distance of a given object, such as an area of interest or point of interest.

[More information](#)

Analysis name
ACCIDENTS WITHIN DISTANCE

Layer to be filtered
ACCIDENTS.GEOM

Include only selected items in the layer above

Layer to be used as the filter
POLICE_POINTS.GEOM

Include only selected items in the layer above

distance
200

unit
Meter

> Advanced

Run Run in background Cancel

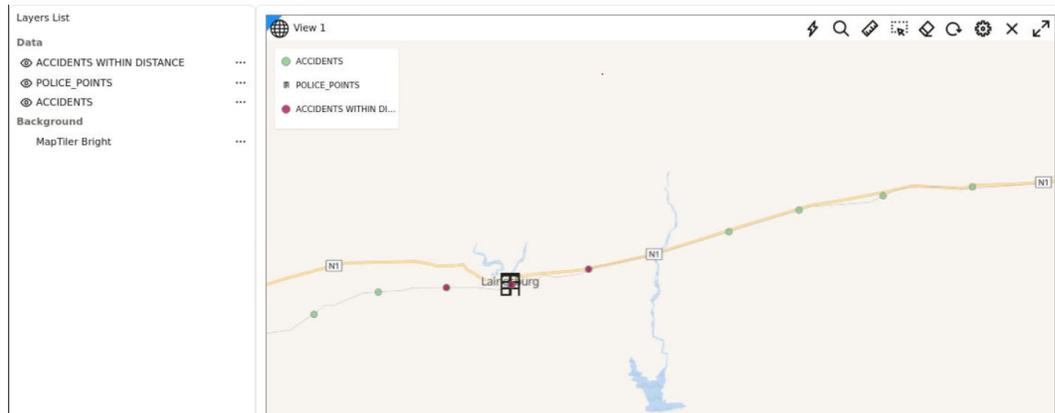
4. Enter **Analysis name**.
5. Select the **Layer to be filtered**.
6. Select the **Layer to be used as the filter**.
7. Enter **distance** and **unit**.
8. Click **Run**.

The Analysis result is listed under **Analyses** in the **Data** elements panel on the left pane of the Active Project page.

9. Drag and drop the analysis result on the map view.

This creates a new map layer highlighting the filtered coordinates within a specific distance from a point as shown:

Figure 3-54 Spatial Analysis - Within Distance Visualization



3.11.2 Determining the N-Nearest Geometries

Using the `SDO_NN_V2` filter, you can determine the N-nearest geometries to a geometry.

Note:

The `SDO_NN_V2` filter is an improved form of the `SDO_NN` filter which was used in the earlier releases of Oracle Spatial Studio. The old behavior will continue to be supported when you modify analyses that were created using the `SDO_NN` filter. However, when creating a new analysis, the current `SDO_NN_V2` filter will be used.

To find the N-nearest geometries, you must perform the following steps.

The instructions assume that you have the layer to be filtered and the map layer to be used as a filter displayed on your Active Project page.

1. Click **...** against the map layer, whose coordinates needs to be filtered, in the **Layers** tab.
2. Select **Spatial Analysis**.
The **Spatial Analysis Operations** window opens as shown in [Figure 3-52](#).
3. Click on the **Filter** tab and select **Return shapes nearest to another**.

Nearest neighbors dialog box opens as shown:

Figure 3-55 Nearest Neighbors Analysis

4. Enter **Analysis name**.
5. Select the **Layer to be filtered**.

 **Note:**

Ensure that you have run spatial validations on the map layer to be filtered and the map layer to be used as the filter in order to obtain accurate analysis results.

6. Enter **Number of results**.
7. Click **Run**.
8. Drag and drop the analysis result on the map view.

The Analysis result is listed under **Analyses** in the **Data** elements panel on the left pane of the Active Project page.

This creates a new map layer highlighting the N-nearest neighbor geometries for a geometry.

3.11.3 Editing a Spatial Analysis

You can edit an existing spatial analysis to modify certain essential parameters.

However, only the following list of spatial analysis operations allow their parameters to be modified after creation:

Filter

- SDO_FILTER
- SDO_NN_V2
- SDO_RELATE
- SDO_WITHIN_DISTANCE

Combine

- Spatial Join

Transform

- SDO_BUFFER
- SDO_MBC
- SDO_UTIL.AT_BEARING
- SDO_UTIL.SIMPLIFY
- SDO_SAM.SIMPLIFY_GEOMETRY

Measure

- SDO_GEOM.SDO_AREA
- SDO_GEOM.SDO_DIAMETER
- SDO_GEOM.SDO_LENGTH
- SDO_GEOM.WITHIN_DISTANCE
- SDO_GEOM.SDO_MAXDISTANCE
- SDO_GEOM.SDO_MAX_MBR_ORDINATE
- SDO_GEOM.SDO_MBC_RADIUS
- SDO_GEOM.SDO_MIN_MBR_ORDINATE

Analytics

- Summarize within distance
- Summarize by region

To modify the parameters in a spatial analysis, you must perform the following steps.

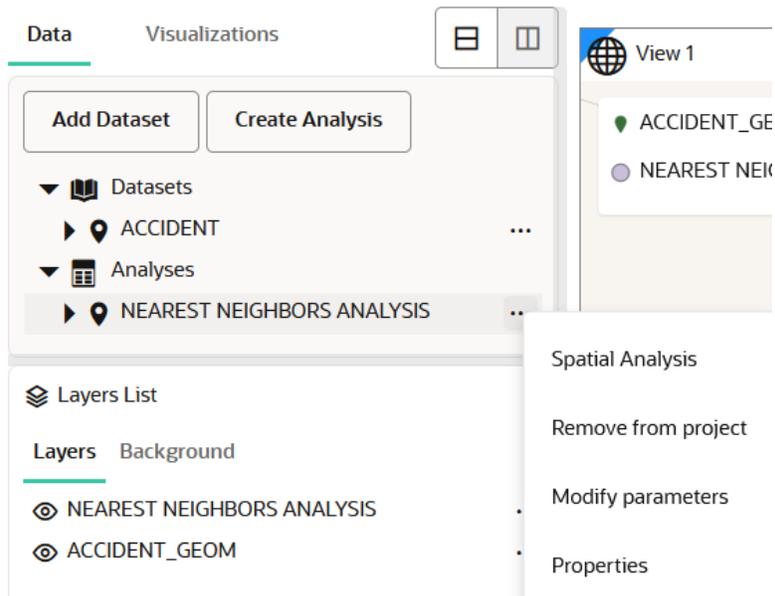
The instructions assume that the analysis to be edited is present in the Active Project page.

1. Click  against the analysis to be edited under **Analyses** tab in the **Data** elements pane of the Active Project page.
2. Select **Modify Parameters** as shown:

 **Note:**

Modify Parameters in the context menu will be disabled for spatial analysis operations that cannot be modified.

Figure 3-56 Modify Spatial Analysis Parameters



The dialog box displaying the original definition for the specific spatial analysis opens.

3. Modify the required parameters and click **Run**.

The analysis gets updated and the updates can be visualized in the map view.

4

Spatial Studio Accessibility Information

This topic provides information on the accessibility features for Oracle Spatial Studio.

It includes the following.

- [About Oracle Spatial Studio Accessibility](#)
- [Oracle Spatial Studio Features that Support Accessibility](#)
- [Highly Visual Features of Oracle Spatial Studio](#)

4.1 About Oracle Spatial Studio Accessibility

It is our goal to make Oracle Products, Services, and supporting documentation accessible to the disabled community.

Oracle Spatial Studio is based on the Oracle JET components. For more information about accessibility of Oracle JET components, see the [Oracle JET Documentation](#).

For additional accessibility information for Oracle products, see the Oracle Accessibility Program page at:

<http://www.oracle.com/accessibility/>

4.2 Oracle Spatial Studio Features that Support Accessibility

Oracle Spatial Studio provides features that are designed to support accessibility.

- [Keyboard Access with Spatial Studio](#)
- [Screen Reader Readability with Spatial Studio](#)
- [Flexibility in Font and Color Choices with Spatial Studio](#)
- [No Audio-only Feedback with Spatial Studio](#)
- [No Dependency on Blinking Cursor and Animation with Spatial Studio](#)
- [Screen Magnifier Usability with Spatial Studio](#)

4.2.1 Keyboard Access with Spatial Studio

Oracle Spatial Studio features support keyboard access to the product's functionality; a summary is provided in this section. The following menu and toolbar functionality is provided through keyboard access:

- Users can navigate to and invoke all menu items.
- All toolbar functions are accessible through menu items.
- All menus and menu items have unique and functioning mnemonic keys.
- All context menus within the navigators and source editor can be invoked.

- Frequently used menu items have unique accelerator keys.

4.2.2 Screen Reader Readability with Spatial Studio

Here is a summary of screen readability in Spatial Studio, when it is used with a screen reader.

When used with menus and toolbars:

- All menus and menu items are read.
- All toolbar items are read.
- The hint text on all toolbar items is read.

4.2.3 Flexibility in Font and Color Choices with Spatial Studio

The user interface in Spatial Studio improves usability for people who are visually impaired by offering flexibility in color and font choices. The following font and color features are included:

- Users can specify both the font and the size in which the font displays for code editors.
- All features of the product have black text on a white or gray background.
- Colored text, underlining, or images are never used as the only method of conveying information.

4.2.4 No Audio-only Feedback with Spatial Studio

In Spatial Studio, there is no situation in which the only feedback a user receives is audible feedback. All audible feedback is accompanied by a visual indicator. For example, a prompt accompanies the bell sound that occurs when an error or illegal action has taken place.

4.2.5 No Dependency on Blinking Cursor and Animation with Spatial Studio

Spatial Studio makes minimal use of a blinking cursor and animation:

- No features in Spatial Studio use blinking indicators, with the exception of the cursor in the source editor.
- No features rely on animated sequences.

4.2.6 Screen Magnifier Usability with Spatial Studio

The Spatial Studio user interface works well with screen magnifiers. All features of the product can be magnified by a screen magnifier.

4.3 Highly Visual Features of Oracle Spatial Studio

Spatial Studio includes features that are highly visual, and these features have equivalent functionality that is available to people who are blind or visually impaired,

except for the generated maps, which are only visual. However, results of an analysis can also be generated as JSON and tables, as an alternative format to the visual map.

All of the functionality is available through REST APIs.

In Spatial Studio, it is possible to create, edit, and generate an analysis result using only keystrokes.

A

REST API Endpoints for Oracle Spatial Studio

This appendix contains the OpenAPI 3.0 YAML documentation of the REST API endpoints for the Spatial Studio. You can invoke these endpoints to perform various Spatial Studio operations programmatically or through a command line tool such as curl using access tokens of the Spatial Studio.

OpenAPI 3.0 YAML Document containing the REST API Endpoints

```
openapi: 3.0.0
info:
  title: Oracle Spatial Studio REST API
  description: This file lists supported RESTful API endpoints of the Oracle
Spatial Studio
  application. It is for advanced user only. All endpoints are subject to
change without notification in
  future releases. To invoke a REST endpoint, ensure that the
corresponding path is prepended with the Studio root
  context path and the /oauth part. For instance, to get the system
status, the full URL of the endpoint should
  look like "https://localhost:4040/spatialstudio/oauth/v1/systemStatus".

  version: "1.0"
paths:
  /v1/systemStatus:
    get:
      operationId: getSystemStatus
      responses:
        default:
          description: default response
          content:
            application/json: {}
  /v1/logs:
    get:
      operationId: getSystemLogs
      parameters:
        - name: entries
          in: query
          schema:
            type: integer
            format: int32
            default: 30
        - name: entrylength
          in: query
          schema:
            type: integer
            format: int32
            default: 600
```

```

- name: cropentries
  in: query
  schema:
    type: boolean
    default: true
- name: filterlevel
  in: query
  schema:
    type: string
    default: INFO
responses:
  default:
    description: default response
    content:
      application/json: {}
/v1/softwareVersion:
  get:
    operationId: getVersionAndBuild
  responses:
    default:
      description: default response
      content:
        application/json: {}
/v1/ping:
  get:
    operationId: ping
  responses:
    default:
      description: default response
      content:
        '*/*': {}
/v1/safe_domains:
  get:
    operationId: getSafeDomains
    parameters:
      - name: reload
        in: query
        schema:
          type: boolean
          default: false
  responses:
    default:
      description: default response
      content:
        application/json: {}
  post:
    operationId: updateSafeDomains
    requestBody:
      content:
        '*/*':
          schema:
            type: string
  responses:
    default:
      description: default response

```

```

        content:
          application/json: {}
/v1/settings/{typeString}:
  get:
    operationId: getSGTechSettings
    parameters:
      - name: typeString
        in: path
        required: true
        schema:
          type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/connections/validate:
  post:
    operationId: isValidConnection
    requestBody:
      content:
        application/json:
          schema:
            type: object
            additionalProperties:
              type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/settings/update/{typeString}:
  put:
    operationId: updateSGTechSettings
    parameters:
      - name: typeString
        in: path
        required: true
        schema:
          type: string
    requestBody:
      content:
        '*/*':
          schema:
            type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/repository/status:
  get:
    operationId: getMetaDataSchemaStatus
    responses:
      default:

```

```

        description: default response
        content:
          application/json: {}
/v1/world_readable/{id}:
get:
  operationId: isWorldReadable
  parameters:
    - name: id
      in: path
      required: true
      schema:
        type: string
  responses:
    default:
      description: default response
      content:
        application/json: {}
put:
  operationId: setWorldReadable
  parameters:
    - name: id
      in: path
      required: true
      schema:
        type: string
  responses:
    default:
      description: default response
      content:
        application/json: {}
delete:
  operationId: removeWorldReadable
  parameters:
    - name: id
      in: path
      required: true
      schema:
        type: string
  responses:
    default:
      description: default response
      content:
        application/json: {}
/v1/adhocdatasets:
post:
  operationId: createNewAdHocDataset
  requestBody:
    content:
      application/x-www-form-urlencoded:
        schema:
          type: object
          properties:
            query:
              type: string
            name:

```

```

        type: string
    description:
        type: string
        default: Spatial Analysis dataset.
    operator:
        type: string
    datasourceId:
        type: string
    datasetIds:
        type: string
    keyColumn:
        type: string
    responses:
        default:
            description: default response
            content:
                application/json: {}
/v1/admin/cache:
    delete:
        operationId: cacheRebuild
        responses:
            default:
                description: default response
                content:
                    application/json: {}
/v1/datasets/{id}/columns:
    get:
        operationId: getColumns
        parameters:
            - name: id
              in: path
              required: true
              schema:
                type: string
            - name: datasetFields
              in: query
              schema:
                type: string
            - name: columnFields
              in: query
              schema:
                type: string
        responses:
            default:
                description: default response
                content:
                    application/json: {}
/v1/datasets/size/{id}:
    get:
        operationId: getDatasetSize
        parameters:
            - name: id
              in: path
              required: true
              schema:

```

```

        type: string
      - name: exactValue
        in: query
        schema:
          type: boolean
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/datasets/{id}:
  get:
    operationId: getDataset
    parameters:
      - name: id
        in: path
        required: true
        schema:
          type: string
      - name: fields
        in: query
        schema:
          type: string
      - name: expand
        in: query
        schema:
          type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
  delete:
    operationId: deleteDataSet
    parameters:
      - name: id
        in: path
        required: true
        schema:
          type: string
      - name: deleteDataTable
        in: query
        schema:
          type: boolean
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/datasets/row/{id}:
  delete:
    operationId: deleteDataSetRow
    parameters:
      - name: id
        in: path

```

```

        required: true
        schema:
          type: string
    - name: row_id
      in: query
      schema:
        type: string
  responses:
    default:
      description: default response
      content:
        application/json: {}
/v1/datasets:
  get:
    operationId: getDataSets
    parameters:
      - name: fields
        in: query
        schema:
          type: string
      - name: expand
        in: query
        schema:
          type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
  post:
    operationId: createDataSet
    parameters:
      - name: validateGeoms
        in: query
        schema:
          type: boolean
    requestBody:
      content:
        application/json:
          schema:
            type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/datasets/rows/{id}:
  get:
    operationId: getDatasetRows
    parameters:
      - name: id
        in: path
        required: true
        schema:
          type: string

```

```

- name: columns
  in: query
  schema:
    type: string
- name: filter
  in: query
  schema:
    type: string
- name: orderBy
  in: query
  schema:
    type: string
- name: offset
  in: query
  schema:
    type: integer
    format: int64
- name: limit
  in: query
  schema:
    type: integer
    format: int64
- name: totalResults
  in: query
  schema:
    type: boolean
- name: jetResponse
  in: query
  schema:
    type: boolean
responses:
  default:
    description: default response
    content:
      application/json: {}
/v1/datasets/create_key_column/{datasetId}:
  post:
    operationId: createKeyColumn
    parameters:
      - name: datasetId
        in: path
        required: true
        schema:
          type: string
      - name: columnName
        in: query
        schema:
          type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/datasets/function_based_index/{id}:
  post:

```

```

    operationId: createFunctionBasedIndex
  parameters:
    - name: id
      in: path
      required: true
      schema:
        type: string
    - name: lon
      in: query
      schema:
        type: string
    - name: lat
      in: query
      schema:
        type: string
  responses:
    default:
      description: default response
      content:
        application/json: {}
delete:
  operationId: deleteFunctionBasedIndex
  parameters:
    - name: id
      in: path
      required: true
      schema:
        type: string
    - name: lon
      in: query
      schema:
        type: string
    - name: lat
      in: query
      schema:
        type: string
  responses:
    default:
      description: default response
      content:
        application/json: {}
/v1/datasets/update_statistics/{id}:
  post:
    operationId: updateDataSetStatistics
    parameters:
      - name: id
        in: path
        required: true
        schema:
          type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}

```

```
/v1/datasets/statistics/{id}:
  get:
    operationId: getDatasetStatistics
    parameters:
      - name: id
        in: path
        required: true
        schema:
          type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/datasets/cachesettings/{id}:
  get:
    operationId: getDatasetCacheSettings
    parameters:
      - name: id
        in: path
        required: true
        schema:
          type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/datasets/refresh/{id}:
  post:
    operationId: getDatasetLastModified
    parameters:
      - name: id
        in: path
        required: true
        schema:
          type: string
      - name: lastModified
        in: query
        schema:
          type: integer
          format: int64
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/datasets/export/{id}:
  get:
    operationId: downloadExportedDataset
    parameters:
      - name: id
        in: path
        required: true
        schema:
```

```

        type: string
    - name: client_token
      in: query
      schema:
        type: string
    - name: format
      in: query
      schema:
        type: string
    - name: file_name
      in: query
      schema:
        type: string
  responses:
    default:
      description: default response
      content:
        application/zip: {}
  post:
    operationId: exportDatasetAsGeoJson
    parameters:
    - name: id
      in: path
      required: true
      schema:
        type: string
    - name: format
      in: query
      schema:
        type: string
    - name: simplify_geoms
      in: query
      schema:
        type: string
    - name: coord_precision
      in: query
      schema:
        type: string
    - name: columns
      in: query
      schema:
        type: string
  responses:
    default:
      description: default response
      content:
        application/json: {}
/v1/datasets/geom_metadata/{id}:
  post:
    operationId: createGeometryMetadata
    parameters:
    - name: id
      in: path
      required: true
      schema:

```

```

        type: string
      responses:
        default:
          description: default response
          content:
            application/json: {}
/v1/datasets/columns/{id}:
  get:
    operationId: getDatasetColumnsContentInASingleRow
    parameters:
      - name: id
        in: path
        required: true
        schema:
          type: string
      - name: columns
        in: query
        schema:
          type: string
      - name: offset
        in: query
        schema:
          type: integer
          format: int64
      - name: limit
        in: query
        schema:
          type: integer
          format: int64
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/datasources/validate/{id}:
  post:
    operationId: validateDatasource
    parameters:
      - name: id
        in: path
        required: true
        schema:
          type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/datasources:
  get:
    operationId: getDatasources
    parameters:
      - name: fields
        in: query
        schema:

```

```

        type: string
    - name: expand
      in: query
      schema:
        type: string
  responses:
    default:
      description: default response
      content:
        application/json: {}
  post:
    operationId: createDataSource
    parameters:
    - name: uploadToken
      in: query
      schema:
        type: string
    requestBody:
      content:
        '*/*':
          schema:
            type: string
    responses:
    default:
      description: default response
      content:
        application/json: {}
/v1/datasources/{id}:
  get:
    operationId: getDatasource
    parameters:
    - name: id
      in: path
      required: true
      schema:
        type: string
    - name: fields
      in: query
      schema:
        type: string
    responses:
    default:
      description: default response
      content:
        application/json: {}
  put:
    operationId: updateDataSource
    parameters:
    - name: id
      in: path
      required: true
      schema:
        type: string
    requestBody:
      content:

```

```

    '*/*':
      schema:
        type: string
  responses:
    default:
      description: default response
      content:
        application/json: {}
  delete:
    operationId: deleteDataSource
    parameters:
      - name: id
        in: path
        required: true
        schema:
          type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/enrichment/geocode/{id}:
  put:
    operationId: enrichDataSet
    parameters:
      - name: id
        in: path
        required: true
        schema:
          type: string
    requestBody:
      content:
        '*/*':
          schema:
            type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
  delete:
    operationId: clearEnrichment
    parameters:
      - name: id
        in: path
        required: true
        schema:
          type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/uploads/geojsons/{uploadToken}/rows:
  get:

```

```

    operationId: getGeoJsonRows
    parameters:
      - name: uploadToken
        in: path
        required: true
        schema:
          type: string
      - name: fromrow
        in: query
        schema:
          type: integer
          format: int32
      - name: torow
        in: query
        schema:
          type: integer
          format: int32
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/jsonstream/{id}:
get:
  operationId: streamDatasetAsGeoJson
  parameters:
    - name: id
      in: path
      required: true
      schema:
        type: string
    - name: geo
      in: query
      schema:
        type: string
  responses:
    default:
      description: default response
      content:
        application/json: {}
/v1/public/vt/{id}/{geo}/{z}/{x}/{y}.mvt:
get:
  operationId: streamDatasetAsVectorTilePublic
  parameters:
    - name: id
      in: path
      required: true
      schema:
        type: string
    - name: geo
      in: path
      required: true
      schema:
        type: string
    - name: z

```

```
    in: path
    required: true
    schema:
      type: integer
      format: int32
  - name: x
    in: path
    required: true
    schema:
      type: integer
      format: int32
  - name: "y"
    in: path
    required: true
    schema:
      type: integer
      format: int32
responses:
  default:
    description: default response
    content:
      application/vnd.mapbox-vector-tile: {}
/v1/vt/{id}/{geo}/{z}/{x}/{y}.mvt:
get:
  operationId: streamDatasetAsVectorTile
  parameters:
  - name: id
    in: path
    required: true
    schema:
      type: string
  - name: geo
    in: path
    required: true
    schema:
      type: string
  - name: z
    in: path
    required: true
    schema:
      type: integer
      format: int32
  - name: x
    in: path
    required: true
    schema:
      type: integer
      format: int32
  - name: "y"
    in: path
    required: true
    schema:
      type: integer
      format: int32
responses:
```

```

        default:
            description: default response
            content:
                application/vnd.mapbox-vector-tile: {}
/v1/public/jsonstream/{id}:
get:
    operationId: streamDatasetAsGeoJsonPublic
    parameters:
        - name: id
          in: path
          required: true
          schema:
              type: string
        - name: geo
          in: query
          schema:
              type: string
    responses:
        default:
            description: default response
            content:
                application/json: {}
/v1/it/{id}/{z}/{x}/{y}.png:
get:
    operationId: streamDatasetAsImageTile
    parameters:
        - name: id
          in: path
          required: true
          schema:
              type: string
        - name: z
          in: path
          required: true
          schema:
              type: integer
              format: int32
        - name: x
          in: path
          required: true
          schema:
              type: integer
              format: int32
        - name: "y"
          in: path
          required: true
          schema:
              type: integer
              format: int32
    responses:
        default:
            description: default response
            content:
                image/png: {}
/v1/enrichment/geotag:

```

```
get:
  operationId: getGeonameTag
  parameters:
    - name: query
      in: query
      schema:
        type: string
        default: "{}"
    - name: simpleResponse
      in: query
      schema:
        type: boolean
        default: false
    - name: matchThreshold
      in: query
      schema:
        type: number
        format: float
        default: 10
  responses:
    default:
      description: default response
      content:
        application/json:
          schema:
            type: string
post:
  operationId: postGeonameTag
  requestBody:
    content:
      application/x-www-form-urlencoded:
        schema:
          type: object
          properties:
            query:
              type: string
              default: "{}"
            simpleResponse:
              type: boolean
              default: false
            matchThreshold:
              type: number
              format: float
              default: 10
  responses:
    default:
      description: default response
      content:
        application/json:
          schema:
            type: string
/v1/enrichment/geotag/datasets:
get:
  operationId: getGeonameTagDatasets
  parameters:
```

```

- name: query
  in: query
  schema:
    type: string
    default: "{}"
- name: simpleResponse
  in: query
  schema:
    type: boolean
    default: false
- name: matchThreshold
  in: query
  schema:
    type: number
    format: float
    default: 10
responses:
  default:
    description: default response
    content:
      application/json:
        schema:
          type: string
post:
  operationId: postGeonameTagDatasets
  requestBody:
    content:
      application/x-www-form-urlencoded:
        schema:
          type: object
          properties:
            query:
              type: string
              default: "{}"
            simpleResponse:
              type: boolean
              default: false
            matchThreshold:
              type: number
              format: float
              default: 10
  responses:
    default:
      description: default response
      content:
        application/json:
          schema:
            type: string
/v1/mapstyles/{id}:
  delete:
    operationId: deleteMapStyle
    parameters:
      - name: id
        in: path
        required: true

```

```

        schema:
          type: string
      responses:
        default:
          description: default response
          content:
            application/json: {}
/v1/mapstyles:
  post:
    operationId: createMapStyle
    requestBody:
      content:
        '*/*':
          schema:
            type: string
      responses:
        default:
          description: default response
          content:
            application/json: {}
/v1/public/mapstyles/{id}:
  get:
    operationId: getMapStyle
    parameters:
      - name: id
        in: path
        required: true
        schema:
          type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/public/cesiummapstyles/{id}:
  get:
    operationId: getCesiumMapStyle
    parameters:
      - name: id
        in: path
        required: true
        schema:
          type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/public/mapstyles:
  get:
    operationId: getMapStyleList
    parameters:
      - name: fields
        in: query
        schema:

```

```

        type: string
      responses:
        default:
          description: default response
          content:
            application/json: {}
/v1/public/cesiummapstyles:
  get:
    operationId: getCesiumMapStyleList
    parameters:
      - name: fields
        in: query
        schema:
          type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/cesiummapstyles:
  post:
    operationId: createCesiumMapStyle
    requestBody:
      content:
        '*/*':
          schema:
            type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/cesiummapstyles/{id}:
  delete:
    operationId: deleteCesiumMapStyle
    parameters:
      - name: id
        in: path
        required: true
        schema:
          type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/cache/precache/{id}:
  put:
    operationId: updateDatasetOrColumnBodyFields_1
    parameters:
      - name: id
        in: path
        required: true
        schema:
          type: string

```

```

requestBody:
  content:
    '*/*':
      schema:
        type: string
responses:
  default:
    description: default response
    content:
      application/json: {}
/v1/cache/zoomLevels/{x1}/{y1}/{x2}/{y2}:
get:
  operationId: calculateZoomLevelsForBounds
  parameters:
    - name: x1
      in: path
      required: true
      schema:
        type: number
        format: double
    - name: y1
      in: path
      required: true
      schema:
        type: number
        format: double
    - name: x2
      in: path
      required: true
      schema:
        type: number
        format: double
    - name: y2
      in: path
      required: true
      schema:
        type: number
        format: double
    - name: maxTiles
      in: query
      schema:
        type: integer
        format: int32
        default: 25000
    - name: maxZoomLevel
      in: query
      schema:
        type: integer
        format: int32
        default: 14
  responses:
    default:
      description: default response
      content:
        application/json: {}

```

```

/v1/cache/purge/{id}:
  delete:
    operationId: purgeVectorTileCache
    parameters:
      - name: id
        in: path
        required: true
        schema:
          type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/projects:
  get:
    operationId: getProjects
    parameters:
      - name: fields
        in: query
        schema:
          type: string
      - name: expand
        in: query
        schema:
          type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
  post:
    operationId: createProject
    requestBody:
      content:
        '*/*':
          schema:
            type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/projects/{id}:
  get:
    operationId: getProject
    parameters:
      - name: id
        in: path
        required: true
        schema:
          type: string
      - name: fields
        in: query
        schema:

```

```

        type: string
      - name: expand
        in: query
        schema:
          type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
  put:
    operationId: updateProject
    parameters:
      - name: id
        in: path
        required: true
        schema:
          type: string
    requestBody:
      content:
        '*/*':
          schema:
            type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
  delete:
    operationId: deleteProject
    parameters:
      - name: id
        in: path
        required: true
        schema:
          type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/projects/import/{file_type}:
  post:
    operationId: importProject
    parameters:
      - name: file_type
        in: path
        required: true
        schema:
          type: string
    requestBody:
      content:
        '*/*':
          schema:
            type: string

```

```

    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/projects/export/{id}:
  get:
    operationId: downloadExportedProject
    parameters:
      - name: id
        in: path
        required: true
        schema:
          type: string
      - name: client_token
        in: query
        schema:
          type: string
      - name: file_name
        in: query
        schema:
          type: string
    responses:
      default:
        description: default response
        content:
          application/zip: {}
  post:
    operationId: createExportedProject
    parameters:
      - name: id
        in: path
        required: true
        schema:
          type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/publishedprojects{id}:
  delete:
    operationId: deleteProject_1
    parameters:
      - name: id
        in: path
        required: true
        schema:
          type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/publishedprojects/{id}:

```

```
get:
  operationId: getPublishedProject
  parameters:
    - name: id
      in: path
      required: true
      schema:
        type: string
    - name: fields
      in: query
      schema:
        type: string
    - name: expand
      in: query
      schema:
        type: string
  responses:
    default:
      description: default response
      content:
        application/json: {}
put:
  operationId: refreshProject
  parameters:
    - name: id
      in: path
      required: true
      schema:
        type: string
  responses:
    default:
      description: default response
      content:
        application/json: {}
/v1/publishedprojects:
get:
  operationId: getPublishedProjects
  parameters:
    - name: fields
      in: query
      schema:
        type: string
    - name: expand
      in: query
      schema:
        type: string
  responses:
    default:
      description: default response
      content:
        application/json: {}
post:
  operationId: createPublishedProject
  requestBody:
    content:
```

```

    '*/*':
      schema:
        type: string
  responses:
    default:
      description: default response
      content:
        application/json: {}
/v1/public/publishedprojects/{id}:
  get:
    operationId: getPublicProject
    parameters:
      - name: id
        in: path
        required: true
        schema:
          type: string
      - name: fields
        in: query
        schema:
          type: string
      - name: expand
        in: query
        schema:
          type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/uploads/shapefiles/{uploadToken}/srids:
  get:
    operationId: getShapefileMatchingSRIDs
    parameters:
      - name: uploadToken
        in: path
        required: true
        schema:
          type: string
      - name: maxResults
        in: query
        schema:
          type: integer
          format: int32
          default: 10
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/uploads/shapefiles/wktext/search:
  get:
    operationId: queryWKTextMatchingSRIDs
    parameters:
      - name: query

```

```

    in: query
    schema:
      type: string
  - name: maxResults
    in: query
    schema:
      type: integer
      format: int32
      default: 10
  responses:
    default:
      description: default response
      content:
        application/json: {}
/v1/uploads/shapefiles/wktext/srids:
get:
  operationId: getWKTextMatchingSRIDs
  parameters:
  - name: wkText
    in: query
    schema:
      type: string
  - name: maxResults
    in: query
    schema:
      type: integer
      format: int32
      default: 10
  responses:
    default:
      description: default response
      content:
        application/json: {}
/v1/uploads/shapefiles/{uploadToken}/rows:
get:
  operationId: getShapefileRows
  parameters:
  - name: uploadToken
    in: path
    required: true
    schema:
      type: string
  - name: fromrow
    in: query
    schema:
      type: integer
      format: int32
  - name: torow
    in: query
    schema:
      type: integer
      format: int32
  responses:
    default:
      description: default response

```

```

        content:
          application/json: {}
/v1/uploads/shapefiles/wktext/rebuild:
  post:
    operationId: rebuildWKTextIndex
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/uploads/spreadsheets/{uploadToken}/rows:
  get:
    operationId: getSpreadsheetRows
    parameters:
      - name: uploadToken
        in: path
        required: true
        schema:
          type: string
      - name: fromrow
        in: query
        schema:
          type: integer
          format: int32
      - name: torow
        in: query
        schema:
          type: integer
          format: int32
      - name: includeHeaders
        in: query
        schema:
          type: boolean
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/settings/system/unzipper/{settingName}:
  get:
    operationId: getZipUtilsSetting
    parameters:
      - name: settingName
        in: path
        required: true
        schema:
          type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
  post:
    operationId: setZipUtilsSetting
    parameters:

```

```

- name: settingName
  in: path
  required: true
  schema:
    type: string
requestBody:
  content:
    '*/*':
      schema:
        type: object
        additionalProperties:
          type: string
responses:
  default:
    description: default response
    content:
      application/json: {}
/v1/tables:
  get:
    operationId: getTableNames
    parameters:
      - name: datasource
        in: query
        schema:
          type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/tables/exist:
  get:
    operationId: tableExists
    parameters:
      - name: datasource
        in: query
        schema:
          type: string
      - name: table
        in: query
        schema:
          type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/tables/{table}:
  get:
    operationId: getTableColumnNamesAndTypes
    parameters:
      - name: table
        in: path
        required: true
        schema:

```

```

        type: string
    - name: datasource
      in: query
      schema:
        type: string
  responses:
    default:
      description: default response
      content:
        application/json: {}
/v1/tables/delete:
  delete:
    operationId: deleteTable
    parameters:
    - name: datasourceId
      in: query
      schema:
        type: string
    - name: tableName
      in: query
      schema:
        type: string
    - name: tableType
      in: query
      schema:
        type: string
  responses:
    default:
      description: default response
      content:
        application/json: {}
/v1/tables/rows:
  get:
    operationId: getRows
    parameters:
    - name: datasource
      in: query
      schema:
        type: string
    - name: table
      in: query
      schema:
        type: string
    - name: columns
      in: query
      schema:
        type: string
    - name: filter
      in: query
      schema:
        type: string
    - name: orderby
      in: query
      schema:
        type: string

```

```

- name: offset
  in: query
  schema:
    type: integer
    format: int64
- name: limit
  in: query
  schema:
    type: integer
    format: int64
- name: totalResults
  in: query
  schema:
    type: boolean
- name: jetResponse
  in: query
  schema:
    type: boolean
responses:
  default:
    description: default response
    content:
      application/json: {}
/v1/tasks:
  get:
    operationId: getTasks
    parameters:
      - name: status
        in: query
        schema:
          type: string
      - name: maxAge
        in: query
        schema:
          type: integer
          format: int32
      - name: maxTasks
        in: query
        schema:
          type: integer
          format: int32
      - name: includeSystem
        in: query
        schema:
          type: boolean
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/tasks/{taskId}:
  get:
    operationId: getTaskById
    parameters:
      - name: taskId

```

```

    in: path
    required: true
    schema:
      type: string
  responses:
    default:
      description: default response
      content:
        application/json: {}
/v1/uploads/{uploadToken}/stats:
  get:
    operationId: getStats
    parameters:
      - name: uploadToken
        in: path
        required: true
        schema:
          type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/uploads/store:
  post:
    operationId: storeUploadedFileInDB
    requestBody:
      content:
        '*/*':
          schema:
            type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/uploads/threedtileset/{uploadToken}/stats:
  get:
    operationId: get3DTilesetStats
    parameters:
      - name: uploadToken
        in: path
        required: true
        schema:
          type: string
      - name: filename
        in: query
        schema:
          type: string
      - name: setTilesetJsonDir
        in: query
        schema:
          type: boolean
    responses:
      default:

```

```

        description: default response
        content:
          application/json: {}
/v1/user/token:
  get:
    operationId: getUserTokens
    parameters:
      - name: fields
        in: query
        schema:
          type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/user/token/{id}:
  delete:
    operationId: deleteAccessToken
    parameters:
      - name: id
        in: path
        required: true
        schema:
          type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/views/{view}:
  get:
    operationId: getViewColumnNamesAndTypes
    parameters:
      - name: view
        in: path
        required: true
        schema:
          type: string
      - name: datasource
        in: query
        schema:
          type: string
    responses:
      default:
        description: default response
        content:
          application/json: {}
/v1/views:
  get:
    operationId: getViewNames
    parameters:
      - name: datasource
        in: query
        schema:

```

```
    type: string
  responses:
    default:
      description: default response
      content:
        application/json: {}
```

B

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Vendor: The Apache Software Foundation

Version: 8.5.1

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Vendor: Nimbus DS

Version: 9.9.1

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jackson-core

Vendor: FasterXML, LLC

Version: 2.13.2

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jackson-databind

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jackson-jaxrs-json-provider

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/*!
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 *
 * Support: IE8+, FF3+, Opera 9+, Safari, Chrome and other
 *
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 * Update: 2014-03-24 13:14
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a method in class "org.apache.commons.math3.util.MathArrays") was inspired from the algorithm description provided in "Algorithms", by Ian Craw and John Pulham (University of Aberdeen 1999). The textbook (containing a proof that the shuffle is uniformly random) is available here:

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Commons Beanutils 1.9.4

Apache Commons BeanUtils 1.9.3

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Supercluster 3.0.2

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ajv 6.5.3

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flyway 6.4.2

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