

Oracle® Spatial Studio

Guide



Release 20.1

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The Oracle logo, consisting of a solid red square with the word "ORACLE" in white, uppercase, sans-serif font centered within it.

ORACLE®

Oracle Spatial Studio Guide, Release 20.1

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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.

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 and Graph.
- [Spatial Studio Terminology](#)
The key concepts and domain objects of Oracle Spatial Studio are the following.
- [Spatial Studio Metadata and Connection Management](#)
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.
- [Spatial Studio Best Practices](#)
The following are recommended practices for use 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 and Graph.

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 and Graph 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 [Oracle Spatial and Graph Map Visualization Guide](#).

1.2 Spatial Studio Terminology

The key concepts and domain objects of Oracle Spatial Studio are the following.

- **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. 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

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 startup, 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

The following are recommended practices for use 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
    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](#)
Some prerequisites and recommendations 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](#)
Individuals who analyze spatial data or create spatial applications will want to be able to use Spatial Studio after the tool has been installed.
- [Changing the Configuration Using the `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.

2.1 Prerequisites and Recommendations for Spatial Studio

Some prerequisites and recommendations apply for using Spatial Studio.

Oracle Spatial and Graph 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 12.2 or later. This applies both to the Spatial Studio metadata schema and to all database connections that will be used by Spatial Studio users.
- Oracle WebLogic Server 12.2.1.3 or later.
- At least the following privileges for each database user that works with Spatial Studio:
`connect`, `create session`, `create table`, `create view`, `create sequence`, `create procedure`, `create type`, `create synonym`, `create trigger`

Note:

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

- 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/spatialandgraph.html> and find the instructions 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.

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.

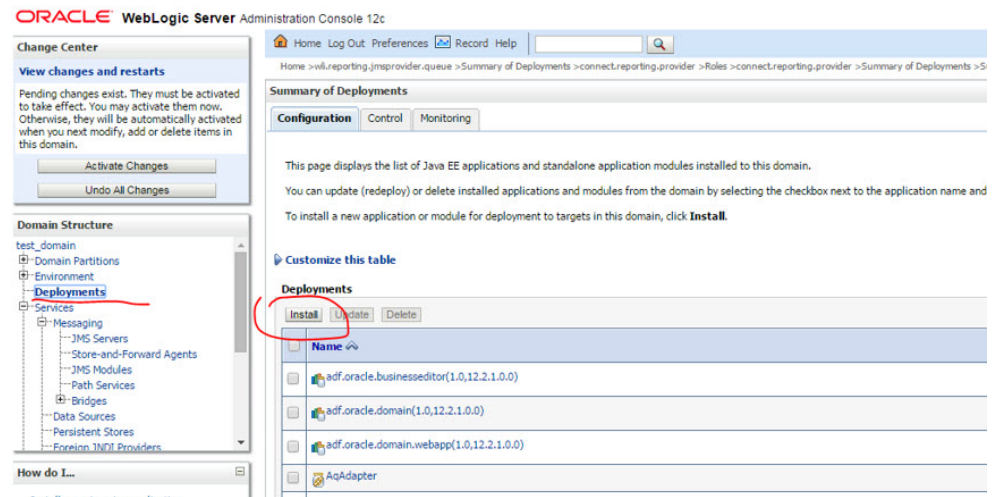
 **Note:**

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.

2.3 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.

2.4 Connection Requirements for Database Users of Spatial Studio

Individuals who analyze spatial data or create spatial applications will want to be able to use Spatial Studio after the tool has been installed.

Each such individual will need to connect as a database user that is authorized to run Spatial Studio. For each such database user, you as the Spatial Studio administrator must enable such access.

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.

In order to be used for Spatial Studio connections, 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

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](#)
- [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 `SPATAL_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 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.

3

Using Oracle Spatial Studio

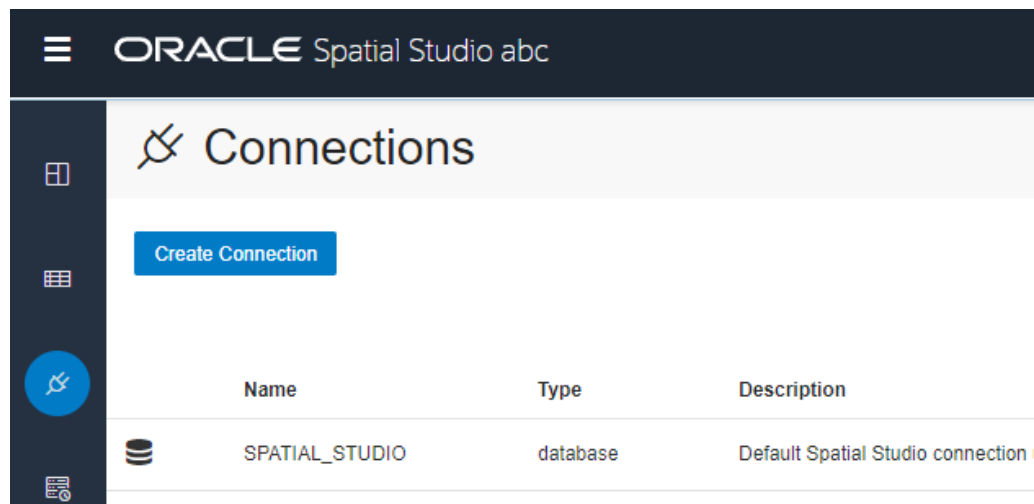
As a user, you can create one or more projects, each of which can define one or more spatial datasets on which to perform various spatial operations.

- 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)

(Be sure that you understand these terms and others that are defined in [Spatial Studio Terminology](#).)

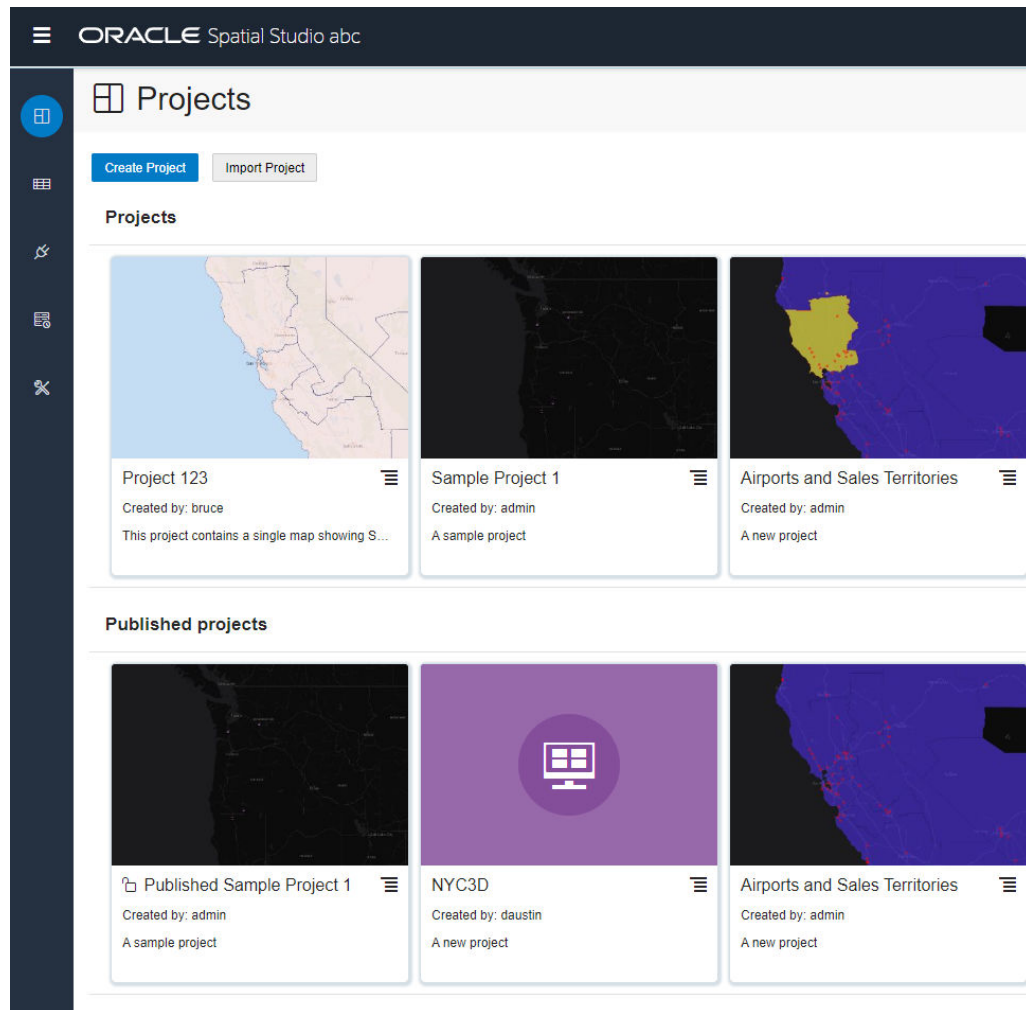
The project, dataset, and the connection page each contain a **Create** button that allows you to create the corresponding type of Studio object.

Figure 3-1 Create Button



Spatial Studio has an initial (main) page that provides an overview of the tool and links to tutorial resources, and several pages devoted to major user operations. The following figure shows the main page, with the navigation drawer expanded to show the left side menu of major objects that you can work on.

Figure 3-2 Spatial Studio Main Page



Navigation Drawer ("hamburger" icon, upper left):

- **Projects** (initially selected): Includes any existing Projects and Published Projects.
- **Dataset**: This page lists all the existing datasets available to the current user.
- **Connections**: This page lists all the existing connections (data sources) available to the current user.
- **Console**: Lets you monitor the status and activity of Spatial Studio, with tabs for Settings, System Status, and About.
- **Tasks**: Tabs for various "tasks" (background jobs started by Spatial Studio to implement user requests)
- [Getting Started Using Spatial Studio](#)
Spatial Studio includes a page with information and links to help you get started using the tool.
- [Spatial Studio Projects Page and Active Project](#)
The Projects page lists all projects that have been created, both unpublished and published.

- [Spatial Studio Data Page](#)
The Data page lets you view and edit existing datasets, and create new ones.
- [Spatial Studio Console](#)
The console lets you monitor the status and activity of Spatial Studio. You can view server logs, change global system configurations, manage custom basemaps, and white list the safe domains.
- [If the Spatial Studio Repository Schema Password Has Been Changed](#)

3.1 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). The Get Started with Spatial Studio page includes:

- **Watch Overview:** Watching this video is perhaps the best way to grasp the user interface and see how to perform available actions.
- **Prepare Data:** Enable your business data for mapping and spatial analytics.
- **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.

3.2 Spatial Studio Projects Page and Active Project

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

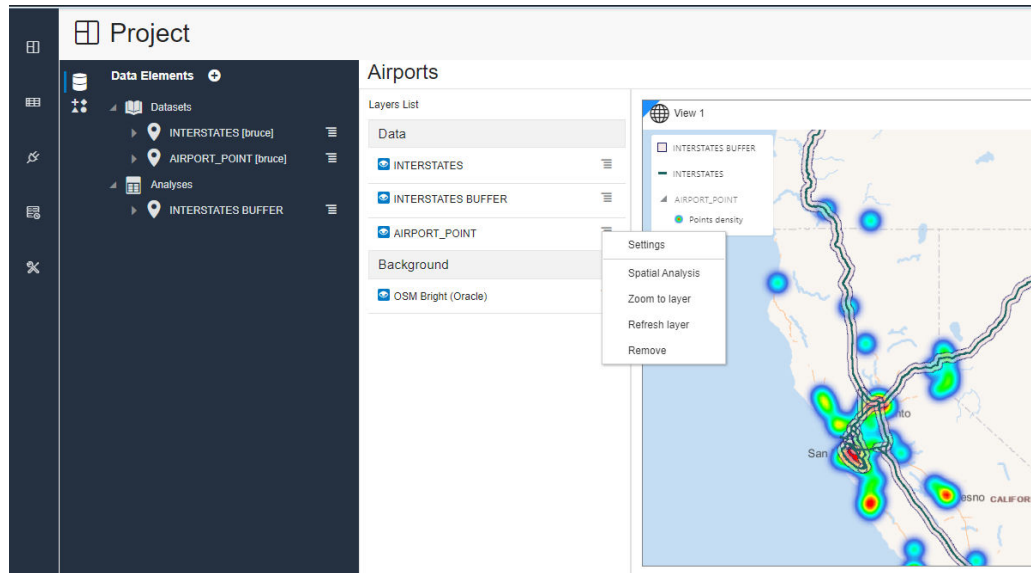
To work on or see details about a project, click its icon, which makes it the Active Project. Starting Oracle Spatial Studio release 20.1, you no longer have a separate Active Project page. When you click and open an existing project page, it replaces the project list page.

Layers List - Data: For a selected active project, shows lists of datasets added. Right-click any Data item to see this context menu including: Spatial Analysis, Zoom to Layer, Cut, Paste Before, Paste After, Delete, Symbol Style, Heatmap Style, Properties.

To see data layer-related options, click the menu selector next to the layer name to display available options:

- **Settings:** Shows display options for Style, Interaction, and Legend.
- **Spatial Options:** Lets you 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.
- **Remove:** Removes the layer from the project.

Figure 3-3 Active Project Page



In the top right area of the Active Project display are icons for **Save**, **Save As**, **Share** (for publishing), **Project Settings** (Name, Created By, Description), and **Close** the active project:

Figure 3-4 Active Project Page Icons

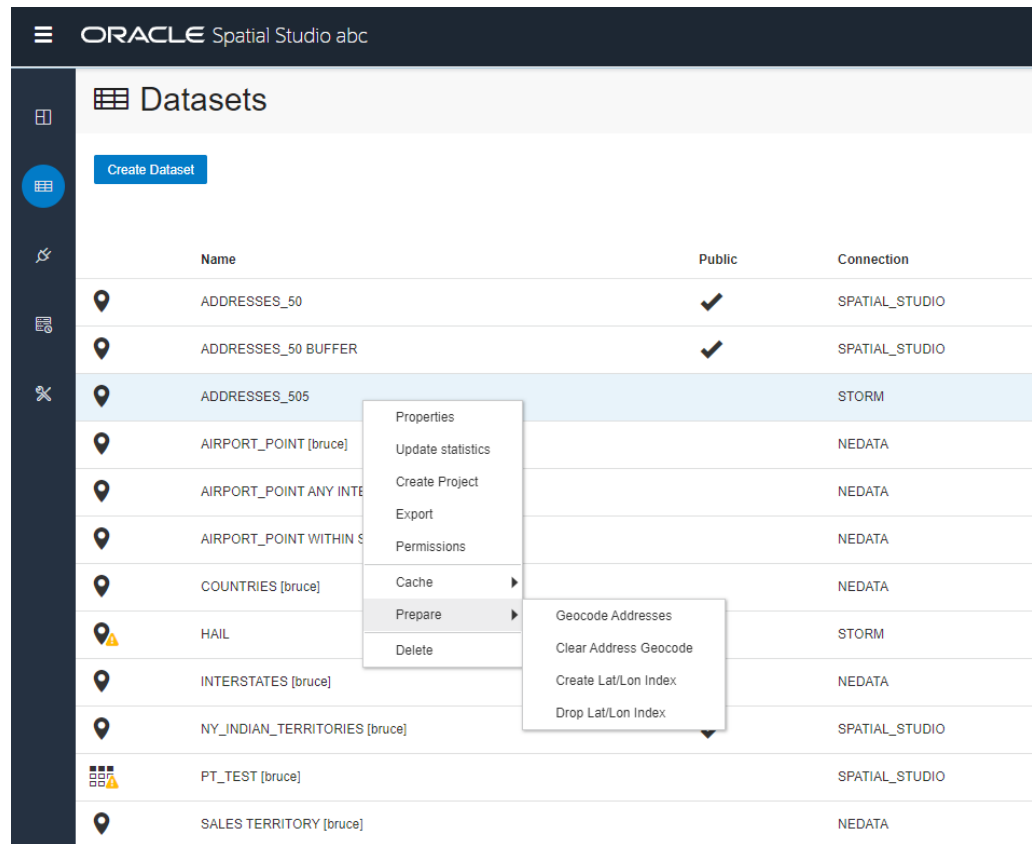


3.3 Spatial Studio Data Page

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

The following figure shows the Data page:

Figure 3-5 Data Page, Including Dropdown Menus



To create a new dataset, click **Create Dataset**. You can create a dataset from a:

- Spreadsheet file
- Shapefile
- GeoJSON file
- Connection
- 3D Tiles tileset files

For any dataset in the display, you can click the down-arrow after Last Modified Date and select from the following:

- **Properties:** View or modify properties of the dataset.
- **Create Project:** Create a new project.
- **Delete Dataset:** Delete this dataset.
- **Export Dataset:** Export this dataset (GeoJSON or CSV file format).
- **Prepare** (Addresses, Clear enrichment, Create Lon/Lat index, Drop Lon/Lat Index)

3.4 Spatial Studio Console

The console lets you monitor the status and activity of Spatial Studio. You can view server logs, change global system configurations, manage custom basemaps, and white list the safe domains.

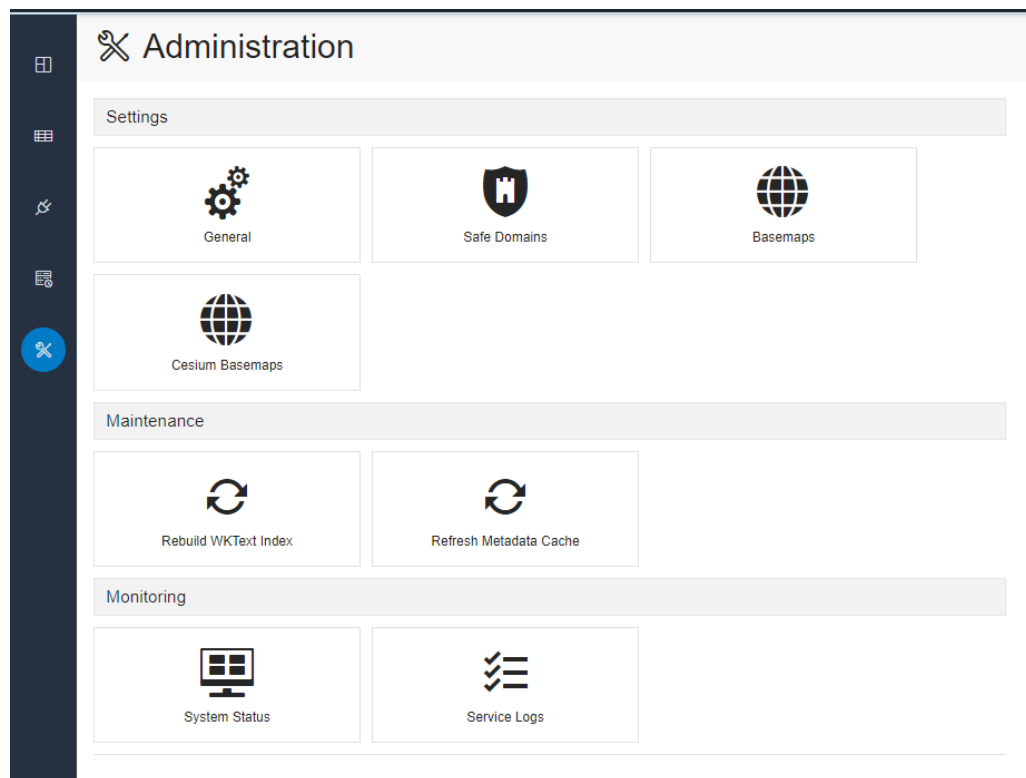
To display the console, from the Navigation Drawer select **Console** sections as shown in the following figure:



Note:

You must be logged in as an administrator of Spatial Studio.

Figure 3-6 Studio Console Page



The Studio console page comprises of the following sections:

Settings

- **General:** This section allows changing the GeoCoding service URL, 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 new custom basemaps. Custom basemaps can be made of either raster or vector tiles, typically hosted on a third party tile server.
- **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.

Maintenance

- **Rebuild WKText Index:** This section is used only when you need to rebuild the text index of the repository database schema's supported Spatial Reference Well Known text definitions. For the shapefile upload, this well known text 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

- **System Status:** This section provides read-only information about the general health and system status of the Spatial Studio server. In a cluster deployment, this section displays only the information of the particular Studio instance to which the current session is connected.
- **Service Logs:** This section allows you to load and view a desired number of server-side logs. To reduce the clutter, you can filter the result using the desired logging level.

3.5 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.

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 SQL Developer Data Modeler supports accessibility features. 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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a method in class "org.apache.commons.math3.util.MathArrays") was
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The textbook (containing a proof that the shuffle is uniformly random) is
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HttpComponents HttpClient 4.5.12

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JavaScript Extension Toolkit (JET) 6.0.0

Oracle JET

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File: atomicops_internals_generic_gcc.h
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```

Quartz Job Scheduler 2.3.0

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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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guava 27.1

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mapbox-gl-js 1.8.0

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whoots-js

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gl-matrix

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Csscolorparser

<https://github.com/deanm/css-color-parser-js/blob/master/README>

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feature-filter

<https://github.com/mapbox/feature-filter/blob/90333b6d917471e1e92b119d0c73034c98d0dcea/LICENSE>

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grid-index

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shelf-pack

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"name": "unflowify",
+ "version": "1.0.0",
+ "description": "Browserify transform for removing Flow type annotations.",
+ "author": "Lee Byron <lee@leebyron.com> (http://leebyron.com/)",
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https://github.com/garthenweb/bubleify/commit/

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