



University

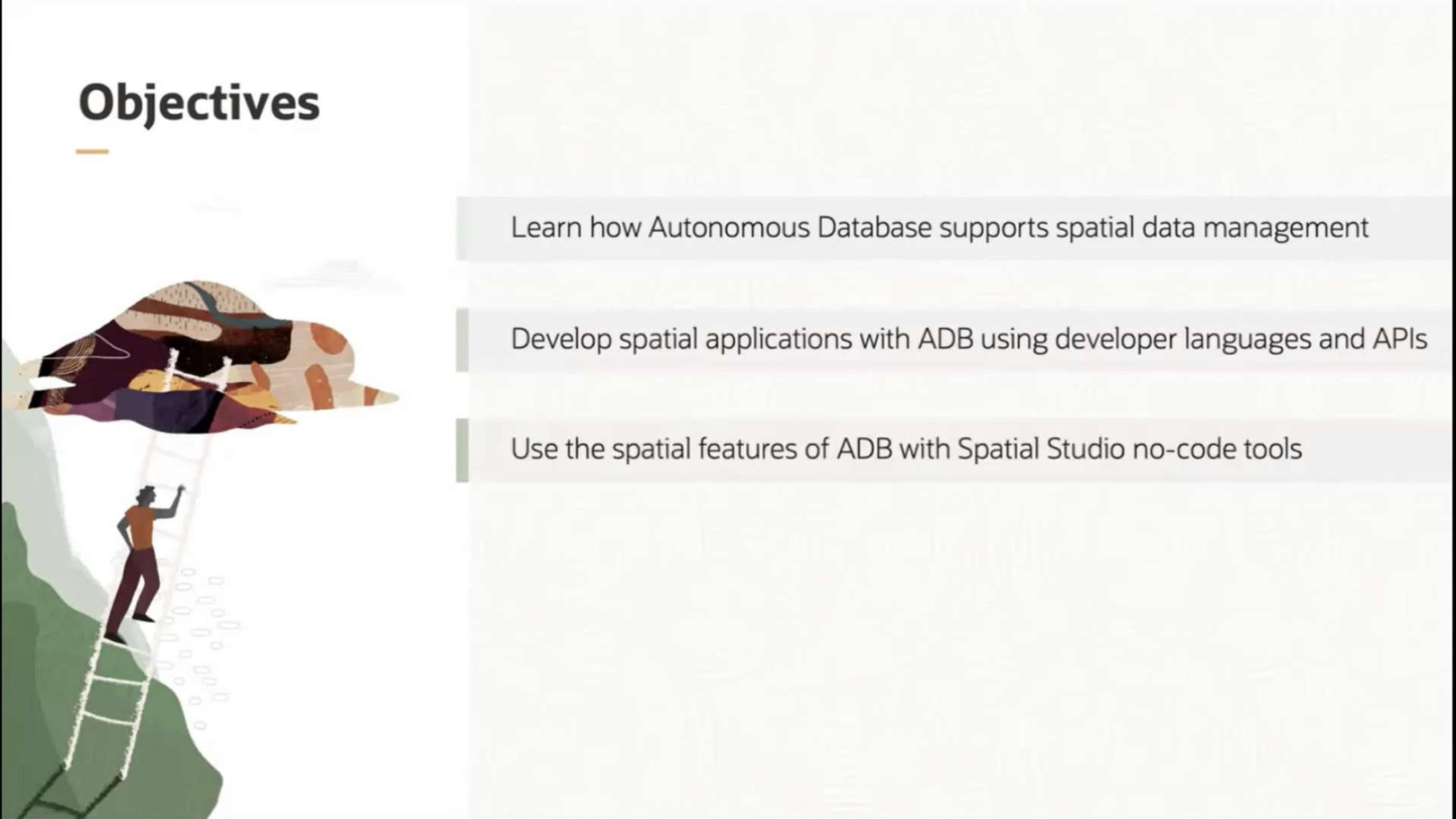
## Oracle Cloud Infrastructure

### Developing on Oracle Autonomous Database



# Objectives

---

A stylized illustration in the background shows a person climbing a steep, rocky mountain. The mountain's surface is covered in a pattern of binary digits (0s and 1s). The climber, dressed in an orange shirt and purple pants, is shown from behind, using a long pole for support as they ascend the right side of the mountain.

Learn how Autonomous Database supports spatial data management

Develop spatial applications with ADB using developer languages and APIs

Use the spatial features of ADB with Spatial Studio no-code tools

# Spatial Data Management in ADB

---

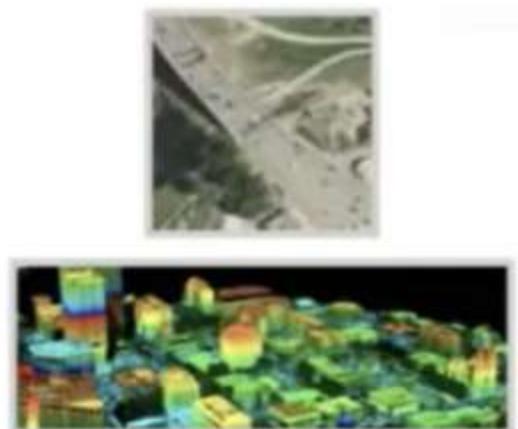
- What is Spatial Data?
- How is it used?



# What is Spatial Data?



Locations based on GPS, addresses, commercial map data, sensor readings, and so on. These are represented as geometries like points, lines, polygons, circles, and arcs.



Satellite imagery and  
sensor-based (LiDAR) models



Networks that model road  
systems, telco, energy,  
transportation, and other  
infrastructure

**Location is a “universal key” relating otherwise unrelated entities**

# Spatial: It is About Location and Spatial Relationships

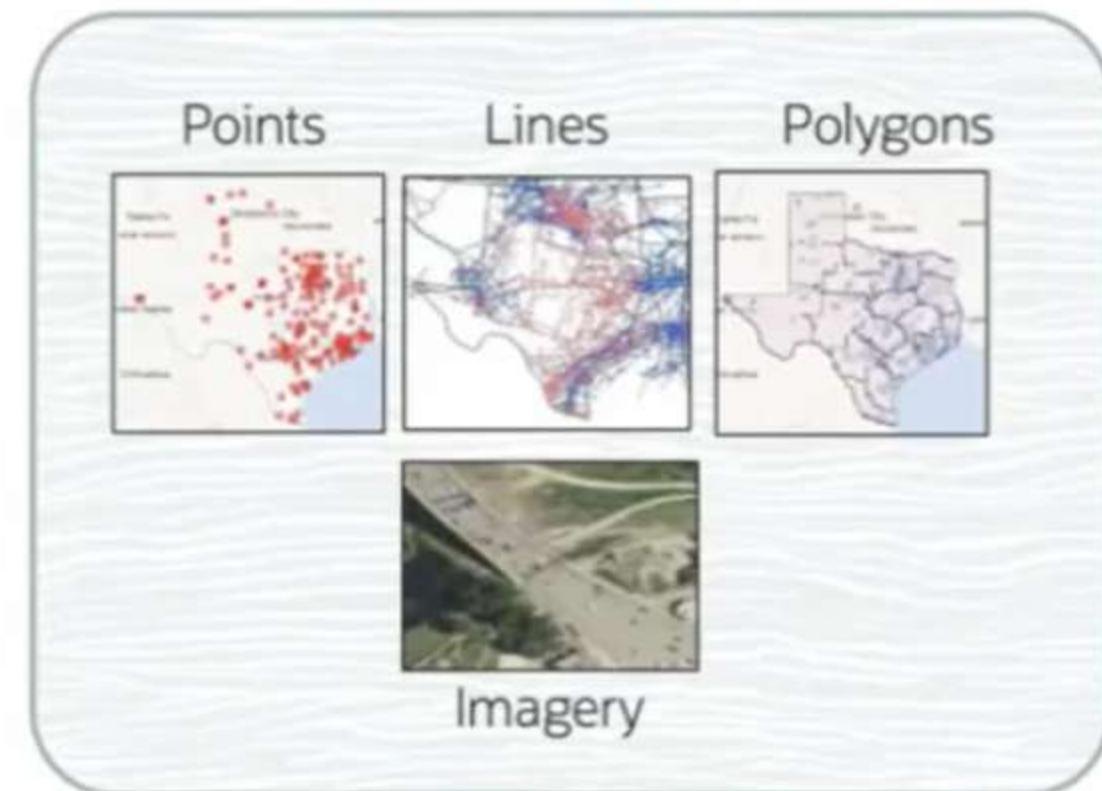
---



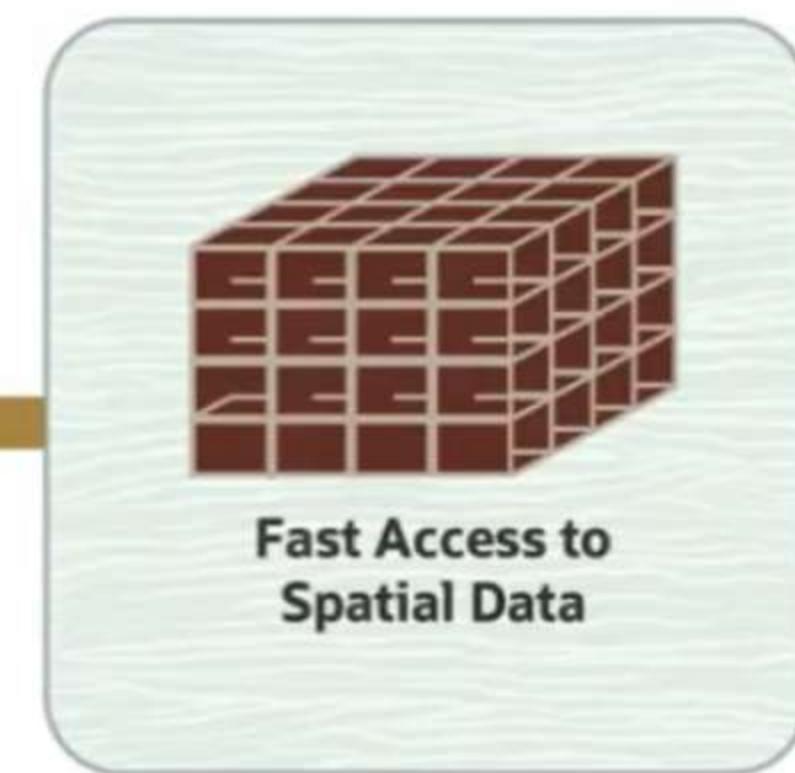
Are things in the same location? Who is the nearest?  
What tax zone is this in? **Where can I deliver in 35 minutes?**  
What is in my sales territory? Is this built in a flood zone?  
Do I have a clear **Line of Sight**?  
Which part of the road has the most accidents?

# Native Spatial Data Management, Processing, and Analysis

## Spatial types



## Spatial index



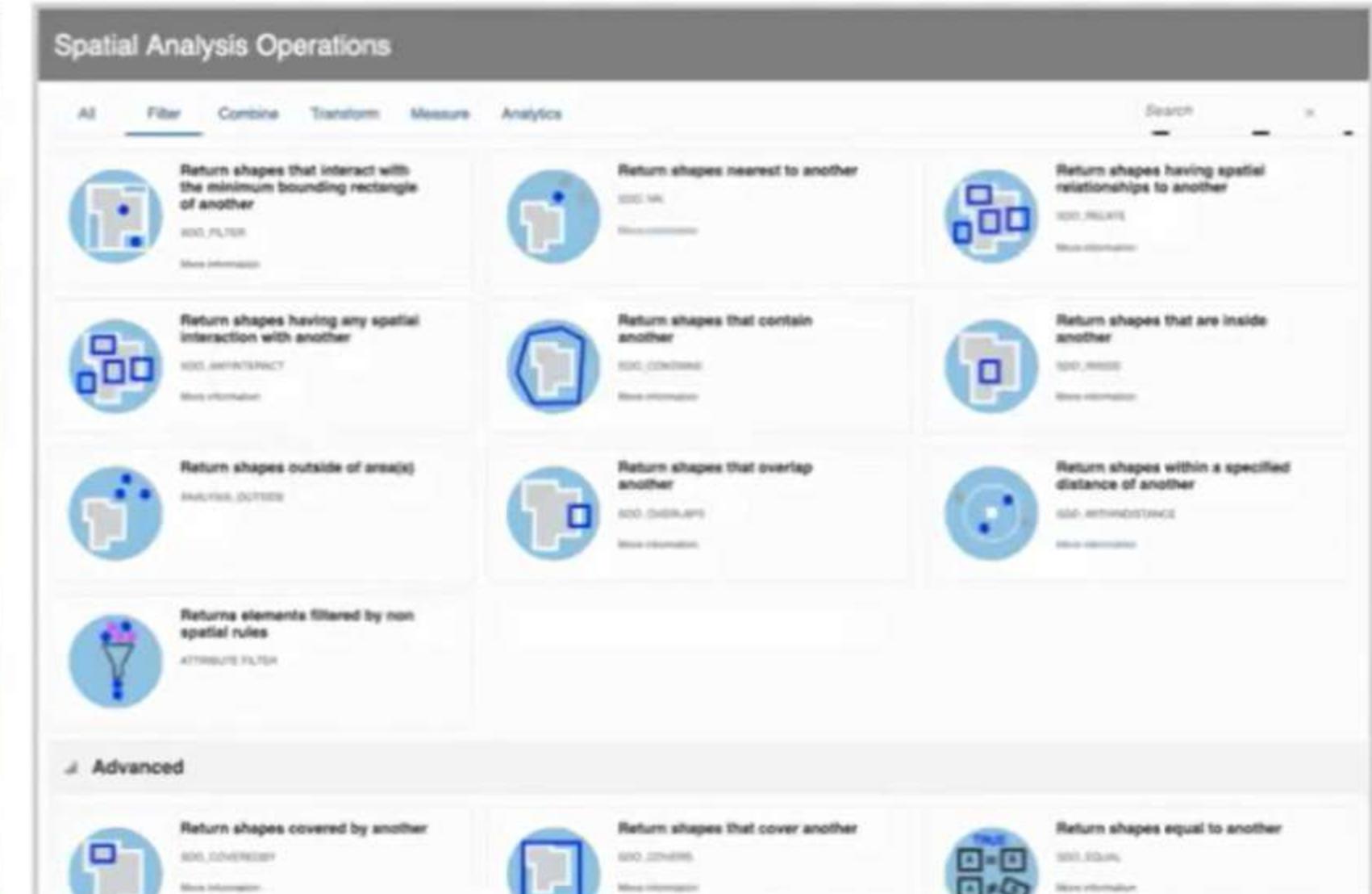
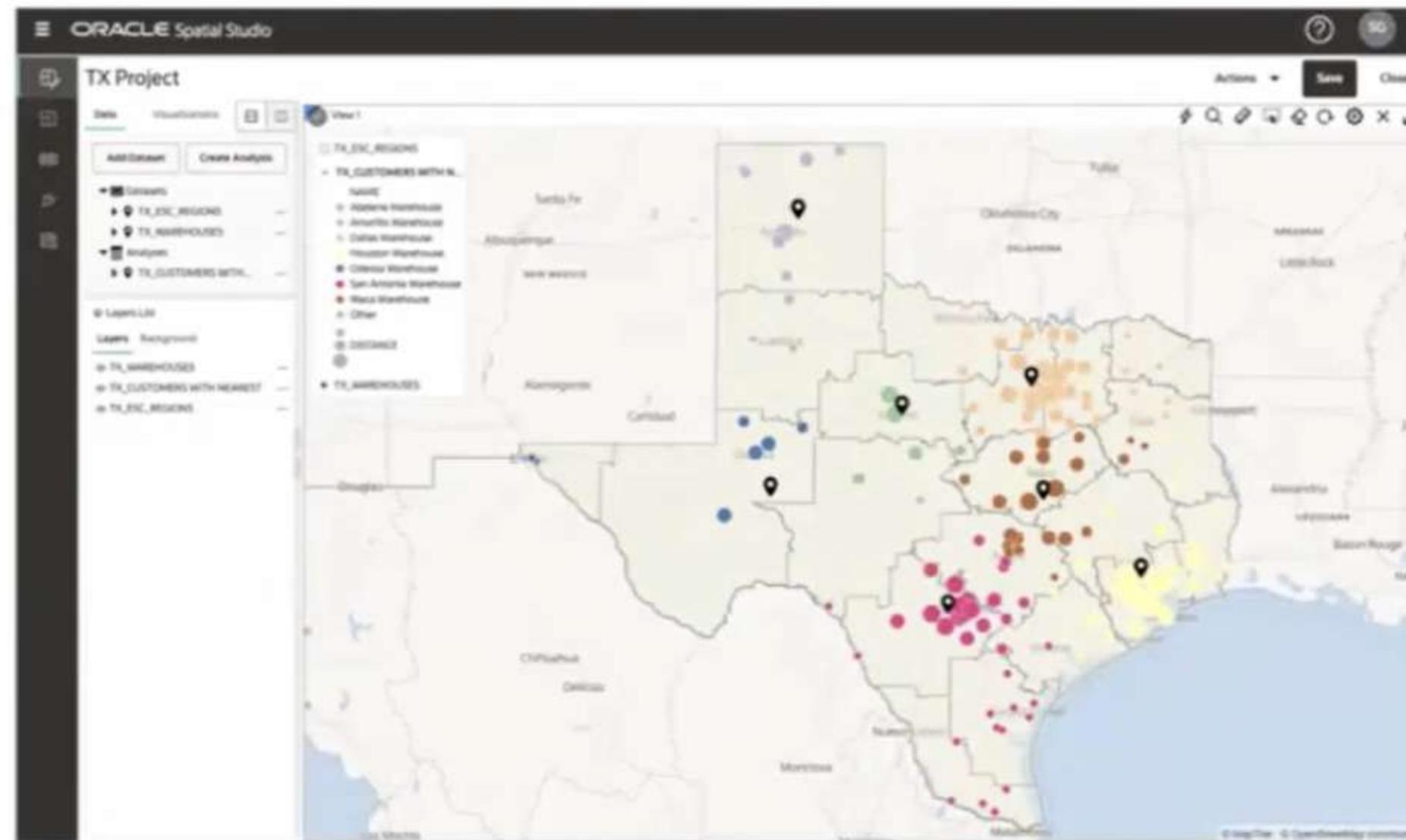
## Spatial Analysis Through SQL

```
SELECT a.customer_name, a.phone_number  
FROM policy_holders a  
WHERE sdo_within_distance( a.geom, hurricane_path_geom,  
    'distance = 10 unit = mile') = 'TRUE';
```

# What is Spatial Studio?

It is a self-service application, to create interactive maps and perform spatial analysis on business data quickly and easily.

Users can visualize, explore, and analyze geospatial data stored in and managed by Oracle in the cloud or on-premises.



# How to Get Spatial Studio with ADB



Included at no additional cost with  
Oracle Autonomous Database

However, requires additional  
compute resources to deploy



Available as a deployable JEE application and self-contained Quickstart

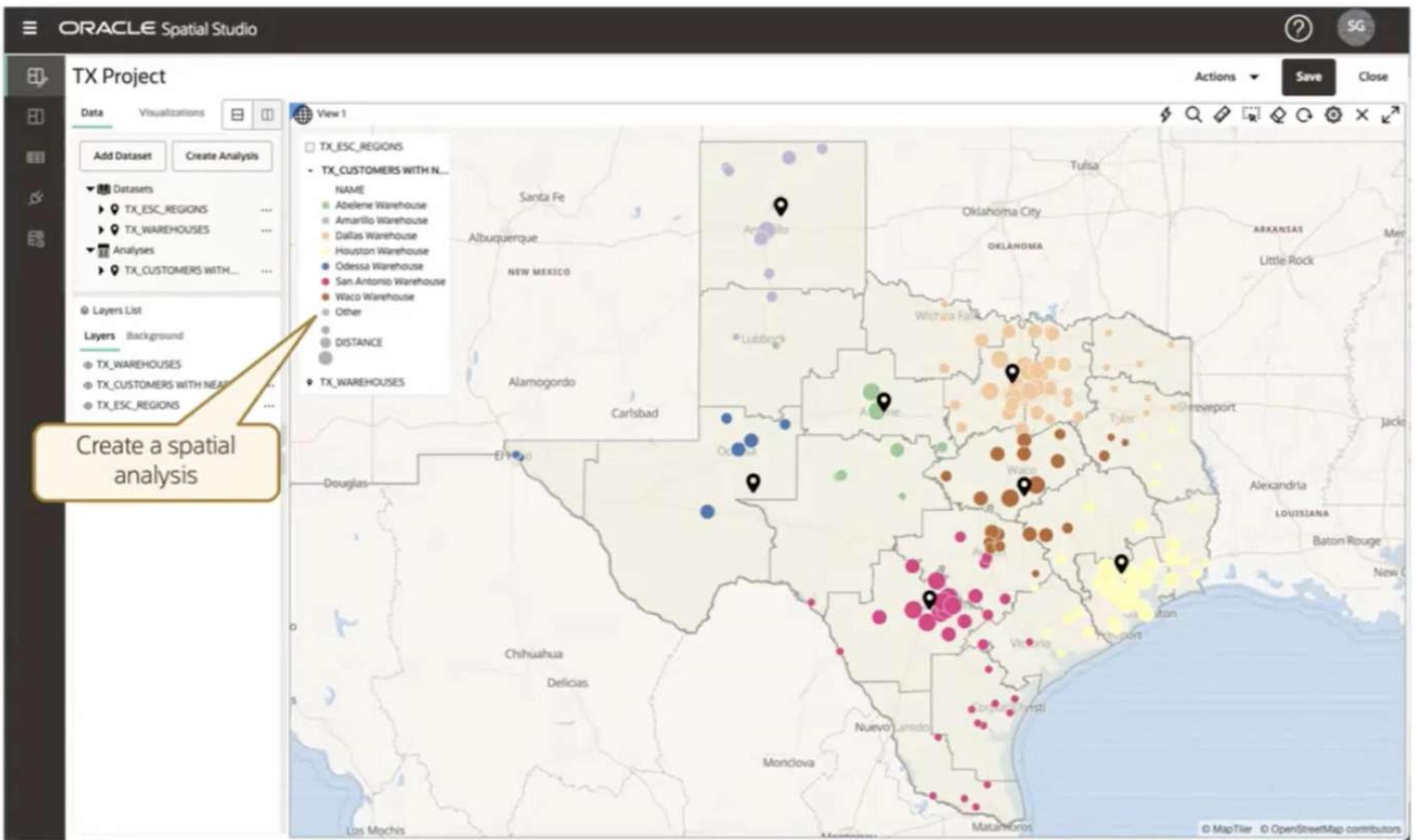


On the Oracle Cloud Marketplace

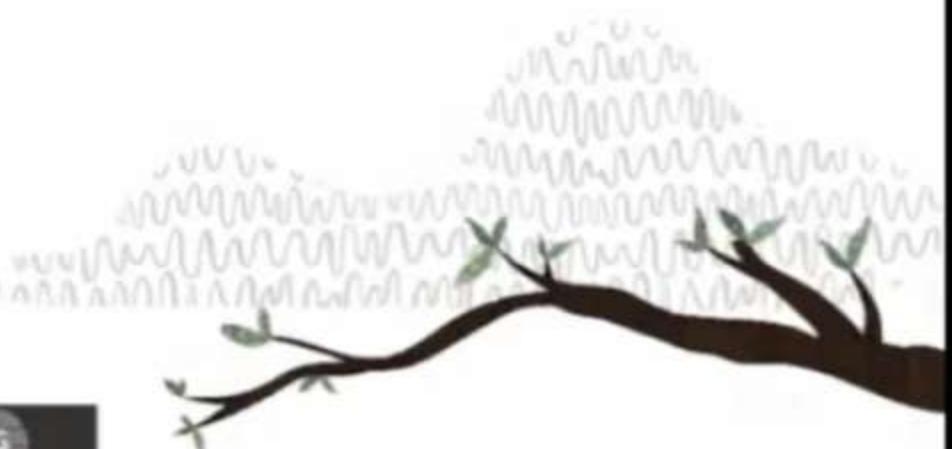


Step-by-step instructions can be found on Oracle LiveLabs at:  
<https://developer.oracle.com/livelabs> Search for: Spatial Studio

# Performing Spatial Analysis



# Performing Spatial Analysis



ORACLE Spatial Studio

TX Project

Data Visualizations Actions Save Close

Add Dataset Create Analysis

View 1

TX\_ESC\_REGIONS

TX\_CUSTOMERS WITH NEAR

NAME

- Abelene Warehouse
- Amarillo Warehouse
- Dallas Warehouse
- Houston Warehouse
- Odessa Warehouse
- San Antonio Warehouse
- Waco Warehouse
- Other

DISTANCE

TX\_WAREHOUSES

TX\_CUSTOMERS WITH NEAR

TX\_ESC\_REGIONS

Create a spatial analysis

Spatial Analysis Operations

All Filter Combine Transform Measure Analytics

Search X

Return shapes that interact with the minimum bounding rectangle of another  
SDO\_FILTER

Return shapes nearest to another  
SDO\_NN

Return shapes having spatial relationships to another  
SDO\_RELATE

Return shapes that contain another  
SDO\_CONTAINS

Return shapes that are inside another  
SDO\_INSIDE

Return shapes outside of area(s)  
ANALYSIS\_OUTSIDE

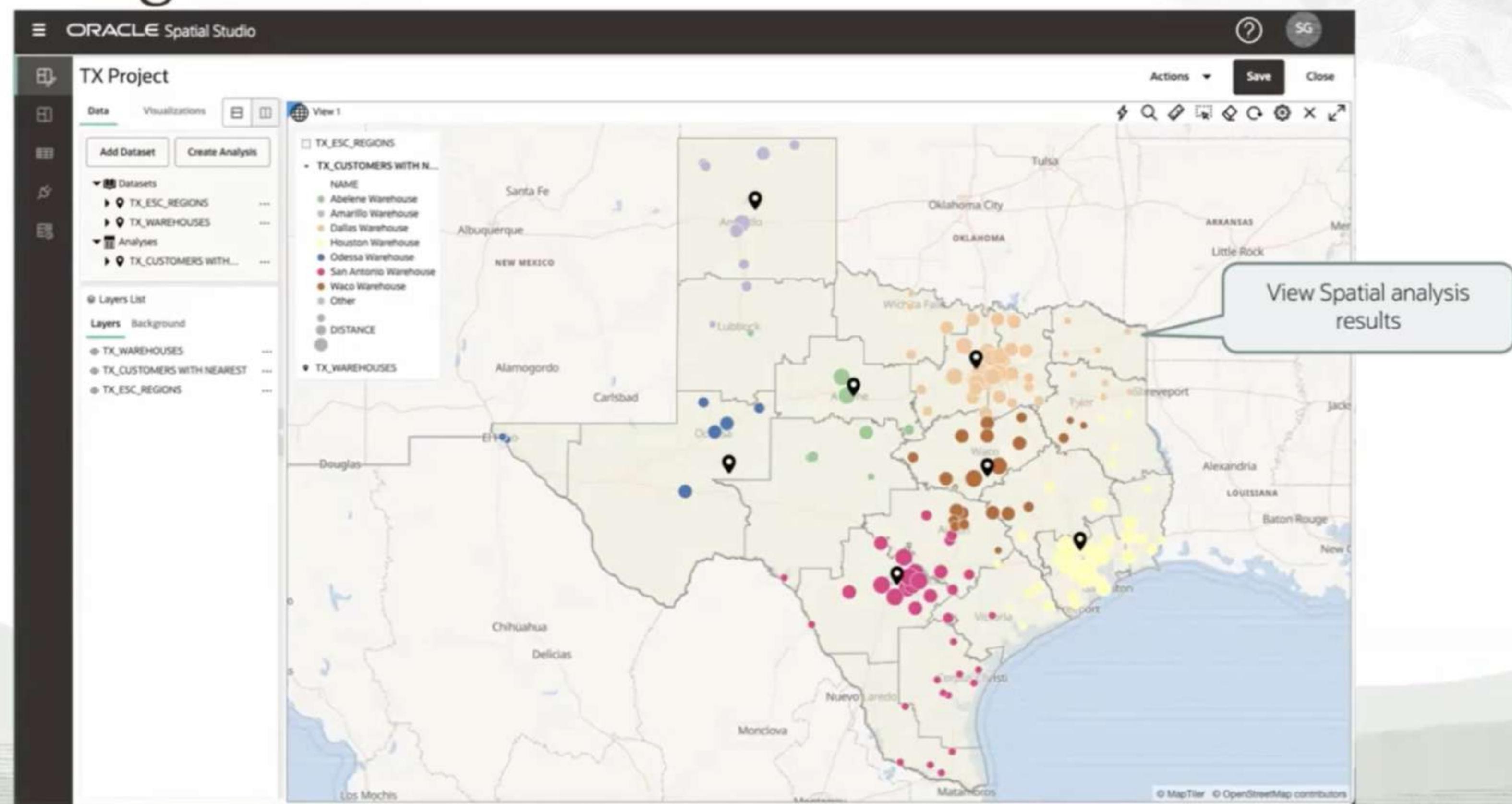
Return shapes that overlap another  
SDO\_OVERLAPS

Returns elements filtered by non spatial rules  
ATTRIBUTE FILTER

Advanced

The screenshot shows the Oracle Spatial Studio interface. On the left, there's a sidebar with project details and a 'Create a spatial analysis' button highlighted with a yellow callout. The main area displays a map of the Southwestern US, specifically focusing on Texas and New Mexico, with several warehouse locations marked. A central modal window titled 'Spatial Analysis Operations' lists eight different spatial analysis operations, each with an icon, a brief description, and a 'More information' link.

# Visualizing Results



# Publishing and Sharing

The screenshot displays the Oracle Spatial Studio interface. The top navigation bar includes the Oracle Spatial Studio logo, a help icon, and a user profile icon. The left sidebar contains navigation links: Projects (selected), Datasets, Connections, Jobs, and Administration. The main content area is titled "Projects" and shows two sections: "Previously saved Projects" and "Published projects".

**Previously saved Projects:**

- Boston Project1: A map showing spatial data with red and blue points.
- Boston Project2: A map showing spatial data with yellow points.
- Contact Trace: A map showing a contact trace with a green line and red dots.
- TX Project1: A map of Texas with county-level data.

**Published projects:**

- A map showing spatial data with red and blue points.
- A map showing a contact trace with a green line and red dots.
- A map of Texas with county-level data.

Each project card includes a "More" button (three vertical dots) and a "Created by: admin" and "A new project" status indicator.