Oracle Spatial and Graph in Oracle Database 19c: Spatial Features

ORACLE

Multimodel Database

- Oracle Database supports multiple models
  - Relational, In-memory, Sharded
  - Document Store
    - JSON
    - XML
    - Text
    - OLAP
  - Spatial Database
  - Graph Database and Triple Store

- Oracle Database support multiple languages and access protocols

Spatial Analysis – It is about relationships

- Are things in the same location? Who is the nearest? What tax zone is this in? Where can deliver in 35 minutes? What is in my sales territory? Is this built in a flood zone?

Oracle Spatial and Graph 19c

Three major features

Spatial

Property Graph

RDF Graph

Oracle Spatial and Graph

On Premises, Cloud and in Autonomous Database

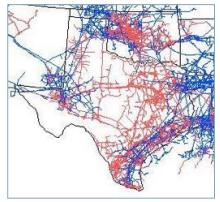
Oracle Spatial and Graph

Location and graph analysis with secure storage for enterprise data

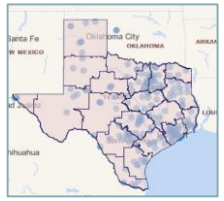
Deployable Services

Mapping	Geocoding	Routing	Web Services (OGC)

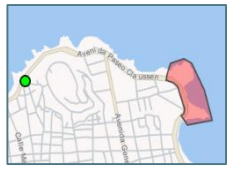
Points



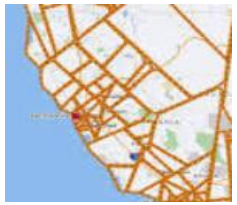
Lines



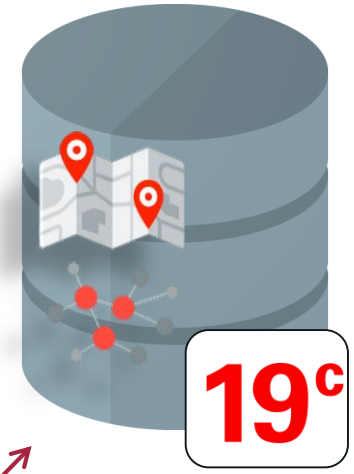
Polygons

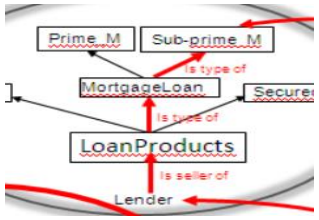


Location Tracking (Geofencing)

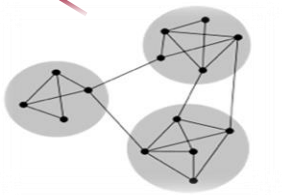


Networks





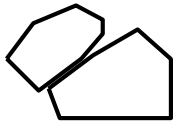
RDF Graphs



Property Graphs

Raster

3D / LiDAR

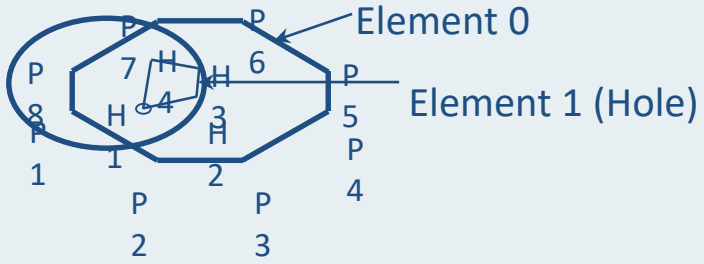


Topologies

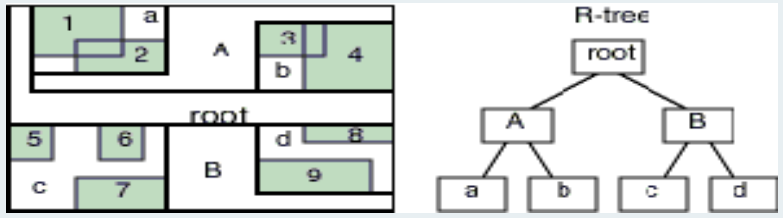
Spatial Processing in Oracle Database

Native Geometry Data Types

Points, Lines, Polygons, etc.



Spatial Indexing



Operators and Functions

Select, within distance, nearest neighbor, intersection, union, centroid, ...

Geometries in Oracle Tables

ROADS

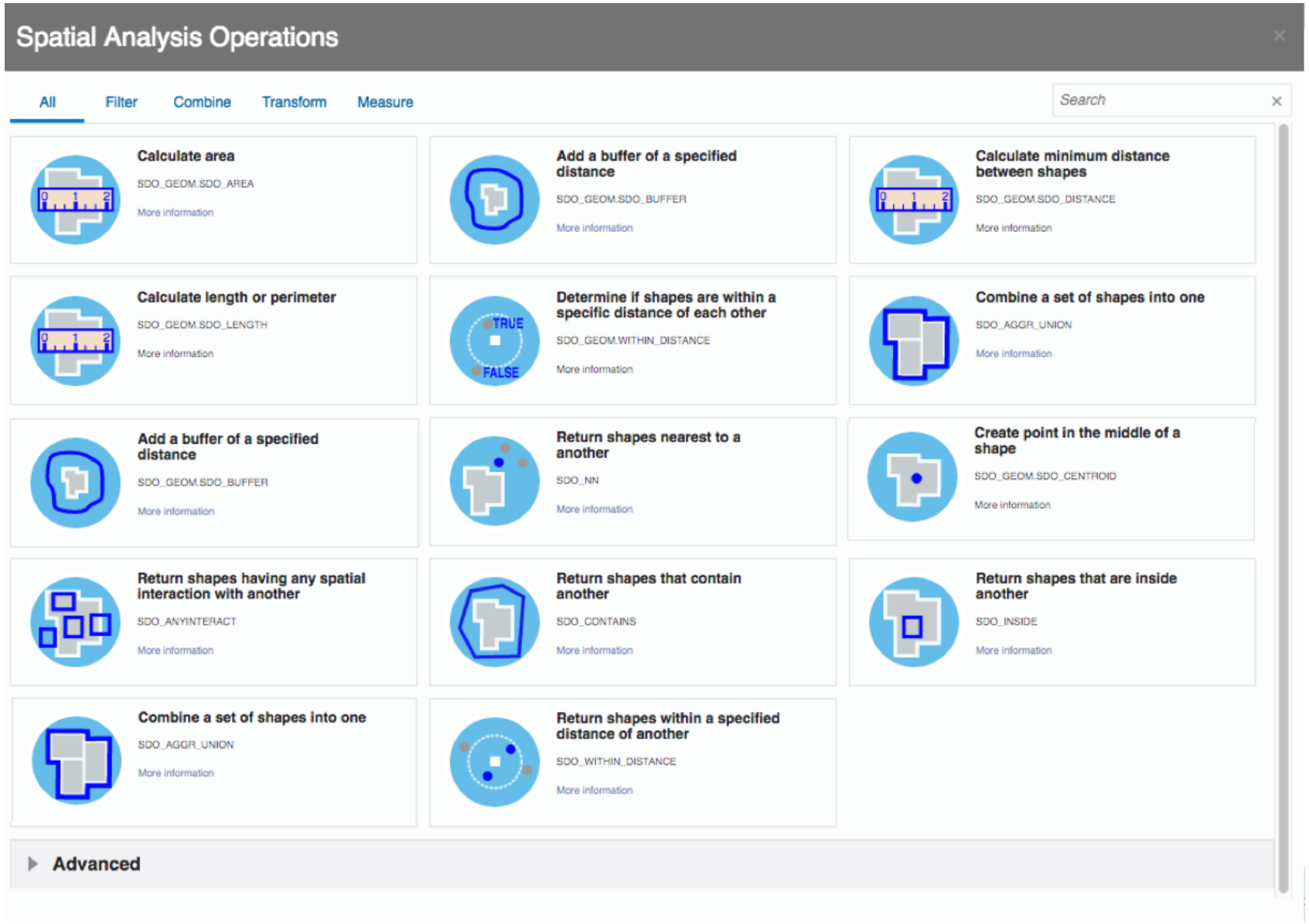
RNAME	ID	TYPE	LANES	GEOM1	GEOM2
M40	140	HWY	6		
M25	141	HWY	4		

SQL Query and Analysis

```
SELECT a.owner_name, a.acquisition_status
FROM properties a, projects b
WHERE sdo_within_distance
(a.property_geom1, b.project_geom,
        'distance = .1 unit = mile') = 'TRUE' and
b.project_id=189498;
```

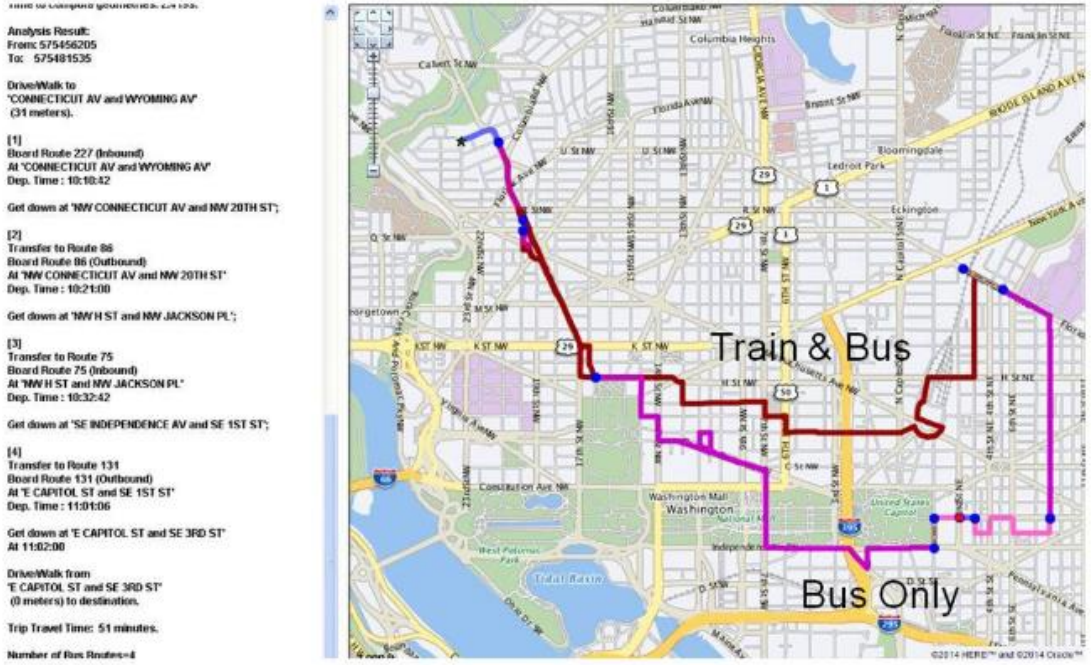
Spatial Analysis

- 100's of SQL spatial analysis operators
  - Filter
  - Combine
  - Transform
  - Measure

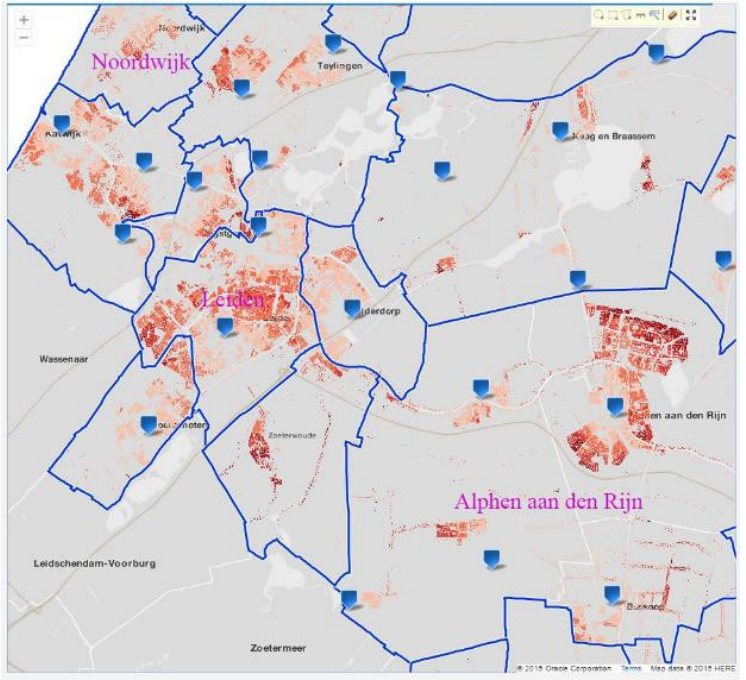


Advanced Spatial Data Models

- Spatial networks for roads, transport, pipelines, telcos and other geographically connected analysis



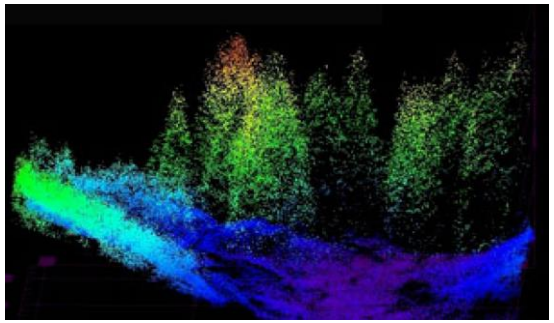
- Topology for mapping, land management and cadastre applications



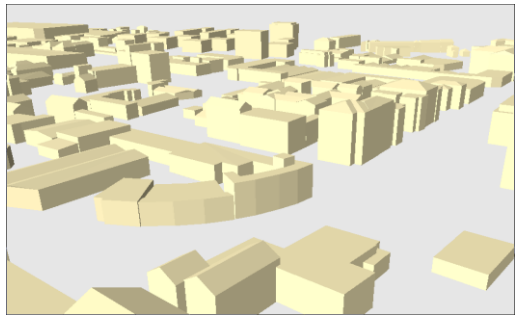
Raster, 3D, Point Clouds and LiDAR support

Raster

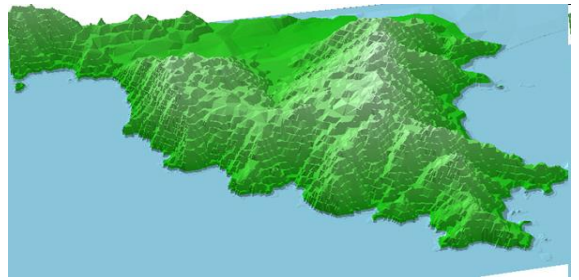
Point Clouds



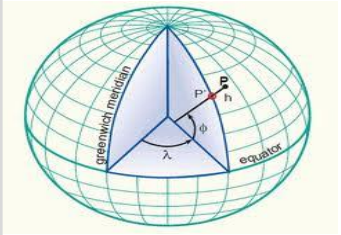
Solids

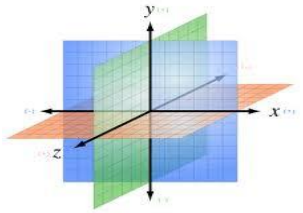


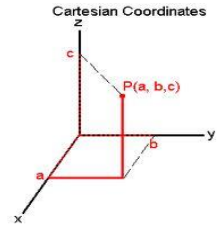
Triangular Irregular

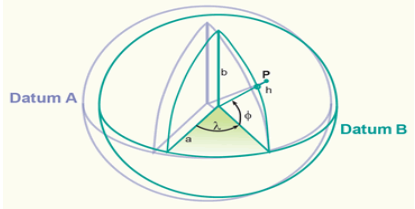


3D Coordinate Systems

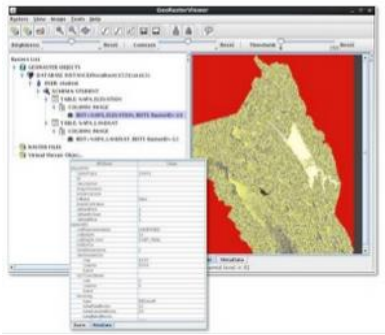




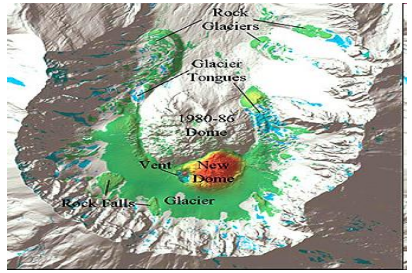




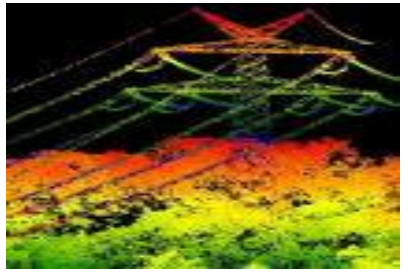
Raster and 3D Queries



Raster Analysis and Operations



Volumetric Analysis



Visibility queries

Major New Spatial Features

Ease of Use

- JSON and Oracle REST Data Services improvements
- Improved web services user interface, CSW and WFS enhancements
- Self-service development tool

Performance

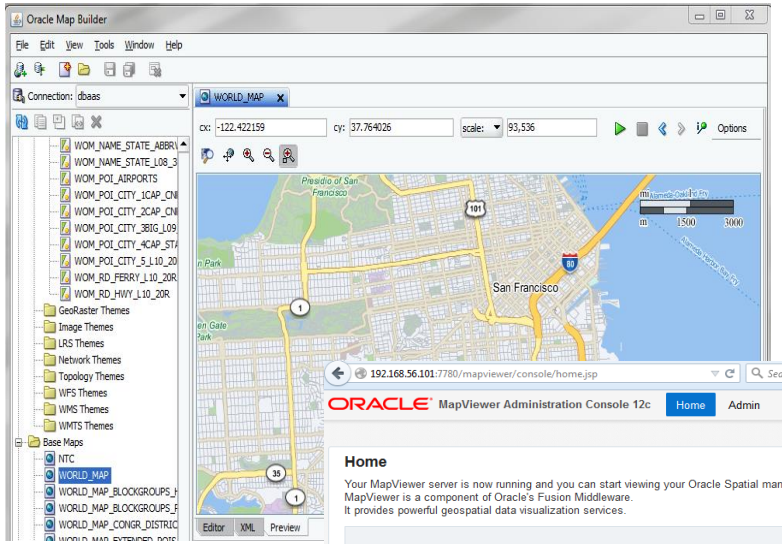
- Ability to use spatial operators without a spatial index
- Spatial index performance improvements
  - Enhancements to CBTree index to use the data layer directly for Spatial index access.
  - 3x faster query performance for large point data sets.

Improved Database Support

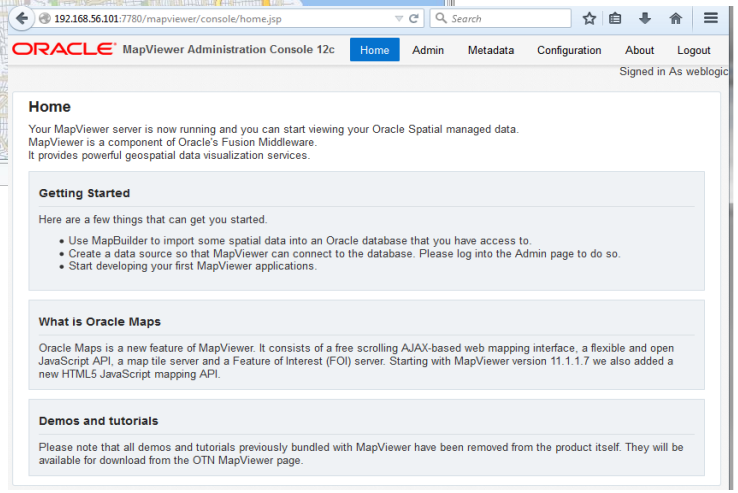
- Spatial support for distributed transactions
- Spatial support for database sharding

Spatial Visualization

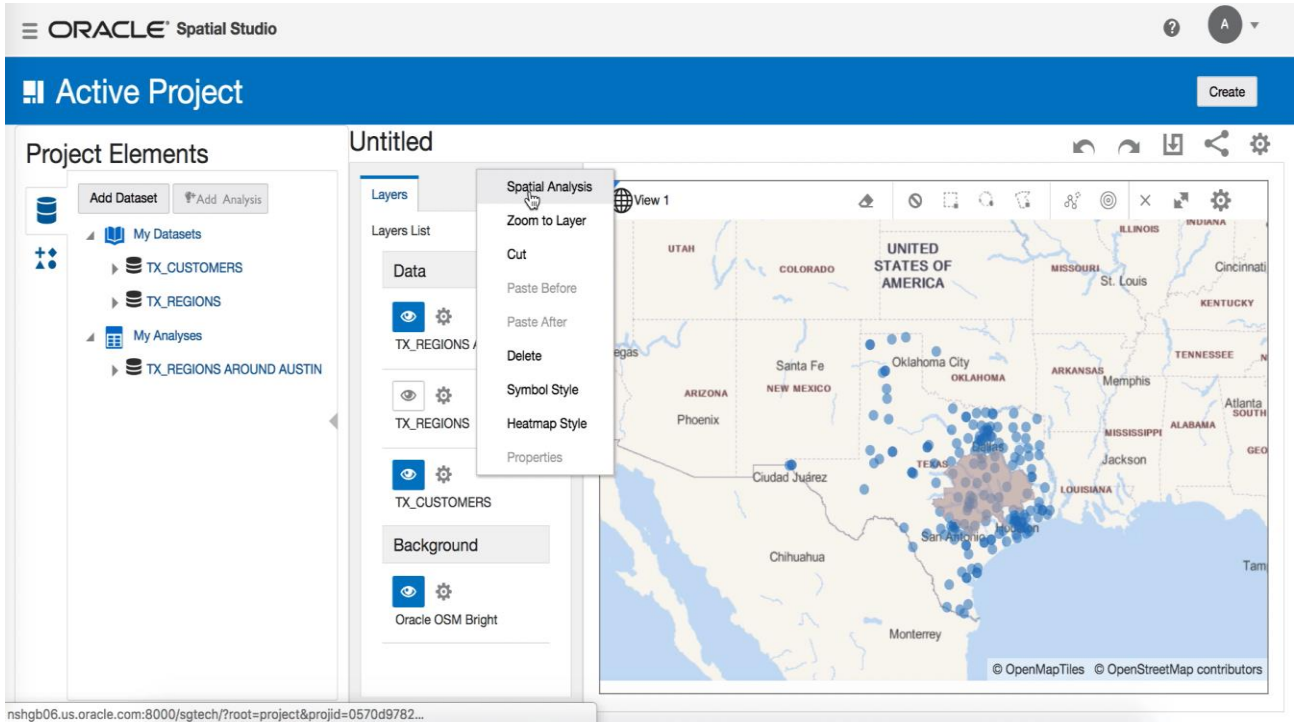
Map authoring tool



Web-based admin



Self-service spatial analytics



Summary

By treating spatial and graph data the same as other business data, Oracle Spatial and Graph enables enterprises to realize these benefits:

- Integrate analysis in the IT infrastructure
- Reduce operational costs
- Minimize strategic risk
- Reduce development effort

Resources

Oracle Spatial and Graph – Spatial Features

- Product homepage: oracle.com/database/technologies/spatialandgraph.html
- Blog: blogs.oracle.com/oraclespatial
- Forum: community.oracle.com/community/database/oracle-database-options/spatial
- Oracle Spatial and Graph Group: linkedin.com/groups/1848520/
- YouTube Channel: youtube.com/c/OracleSpatialandGraph
- Twitter: @SpatialHannes