ORACLE

Oracle as a Spatial Database

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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 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?

Oracle Converged Database
Multi-Model and Multi-Workload

Converged Database

Multi-Model

Multi-Workload

Multiple Data Types
(models and semantics)
Relational, Document, JSON, XML, OLAP, Spatial, Graph, Object-Oriented, Text, etc.

Multiple Application Types
(workloads and technologies)
Operational, Analytics, Transactional, IoT, ML, In-Memory, Block-Chain, HTAP, etc.

Oracle runs one Converged Database that supports multiple data types and workloads
Amazon runs many separate Specialized Databases for each data type and workload

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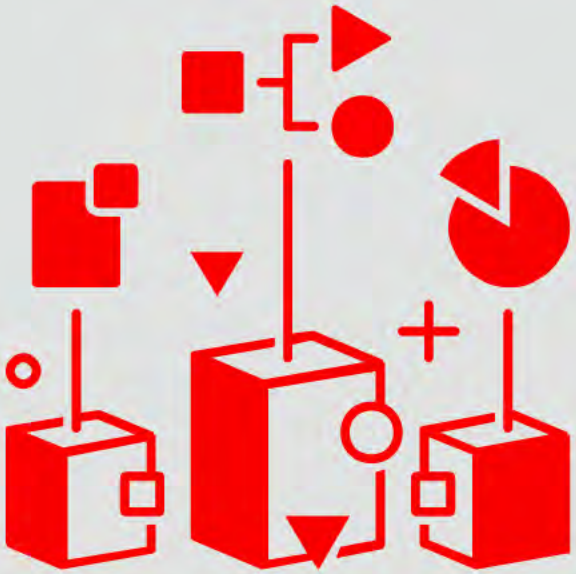
Oracle's Spatial Strategy

Enabling Spatial use cases on every platform

Spatial in Oracle Database

Exadata,
Non-Engineered Systems

Oracle Big Data Spatial and Graph



Big Data Appliance,
Commodity Hadoop, Spark

Cloud Services

Database Cloud Service,
Exadata Cloud Service,
Autonomous Database

Spatial

Introduction

- **Spatial data is an integral part of almost every database. Any business data that includes location is spatial data**

  Geographic features (roads, rivers, parks) Assets (pipelines, cables, transformers)

  Sales data (sales territory, customer registration) Street/postal address (customers, stores, factories)

- **Business apps (data warehousing) can benefit from insights from spatial analysis**
- **Sensors, satellites are generating massive spatial data sets (imagery) – which need to be managed, processed, analyzed**
- **Make data scientists and developers more productive through spatial analysis of their data**
- **Oracle Database Spatial features are a great differentiator**

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Typical Analytical Applications using Oracle Spatial features

- **Public sector**

  Crime mapping, predictive policing, emergency services reachability analysis

- **Retail**

  Location-based marketing, site planning, indoor customer flow analysis

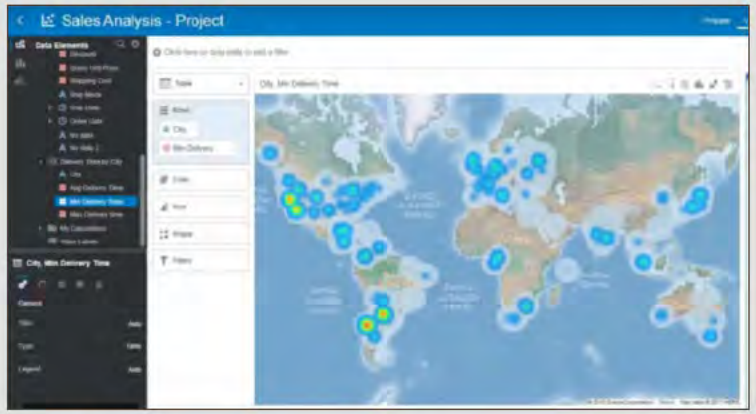
- **Financial services**

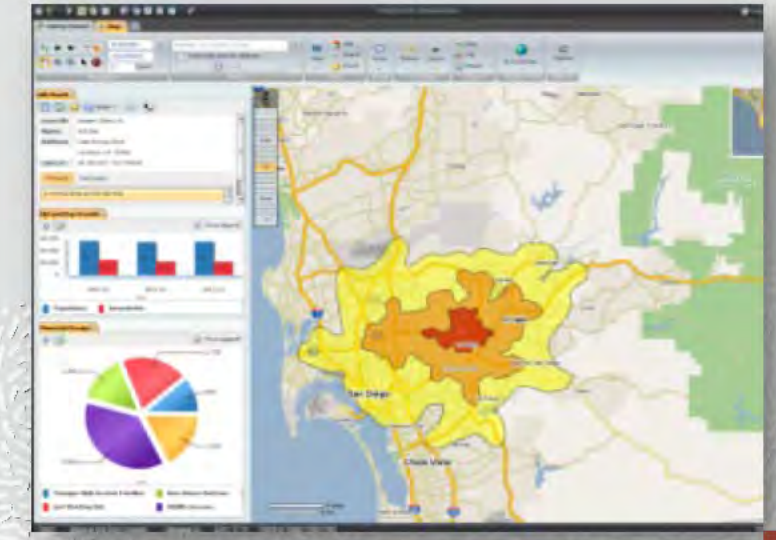
  Targeted marketing, risk zone analysis

- **Utilities**

  Outage analytics, field service planning

- **… and many more**





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Typical GIS Applications using Oracle Spatial features

- **Public sector**

  Cadastre management, EU agricultural subsidies, 3D city modeling, city planning, hydrographic map production, meteorological data management

- **Telco and utilities**

  Mobile network planning, utilities facilities management

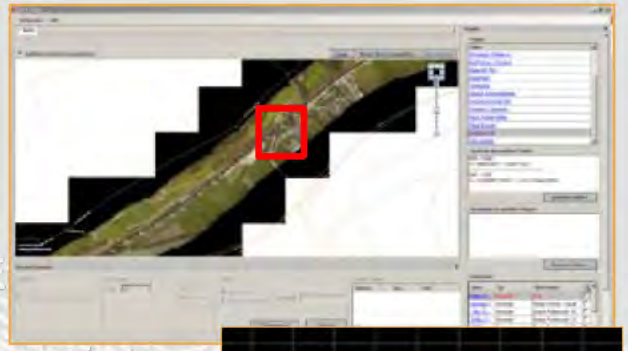
- **Transportation and logistics**

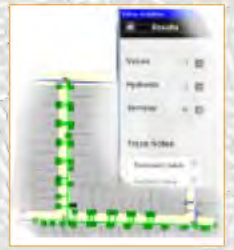
  Railway asset maintenance, airport asset management, waste logistics, air traffic management, parcel delivery

- **Engineering and construction**

  Building information modeling (BIM)

- **... and many more**





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Oracle Database Spatial features

Open, interoperable geospatial data management and analysis platform

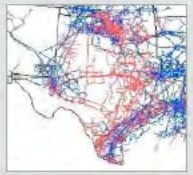
Deployable Services

Mapping	Geocoding	Routing	Web Services (OGC)	Studio

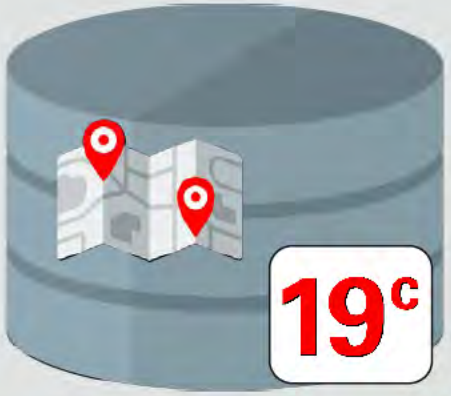
Points

Lines

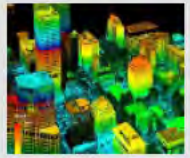
Polygons



Location Tracking (Geofencing)



Raster



3D / LiDAR

Topologies

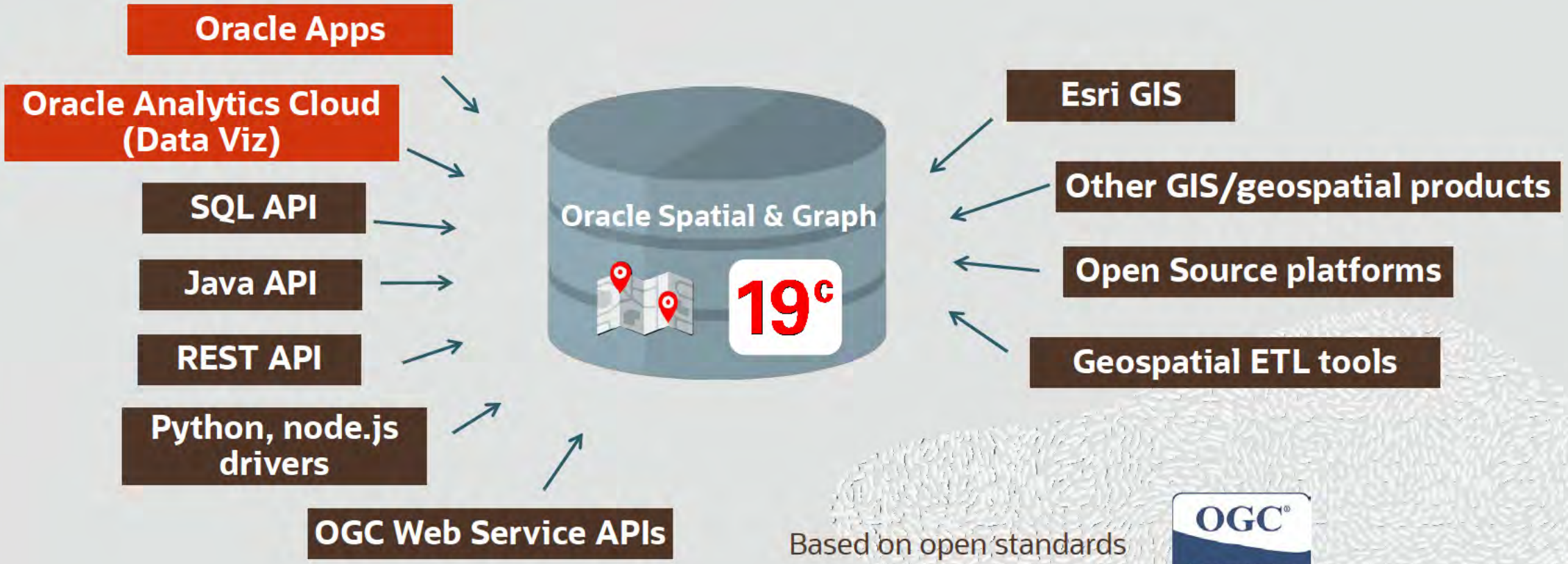
Networks

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';
```

Oracle Database Spatial features

Open, interoperable geospatial data management and analysis platform

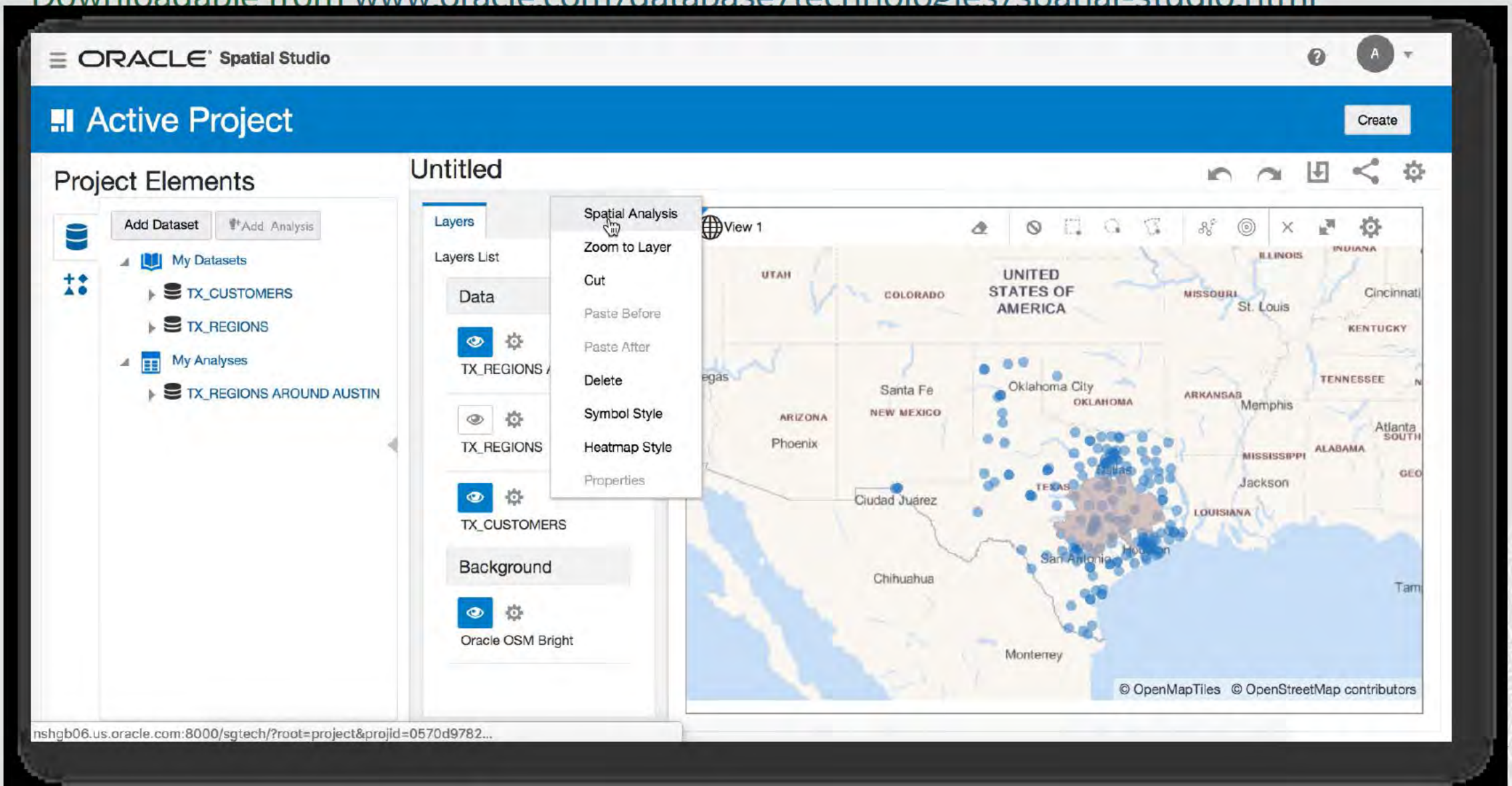


Based on open standards

OGC® Principal Member

Spatial Studio – Geospatial Analysis Made Simple

Downloadable from www.oracle.com/database/technologies/spatial-studio.html



Oracle as a Spatial Database

- **Extend value of Oracle investment**
  Database, middleware, apps – on prem or cloud
- **Increase value and utilization of geospatial data and analytics**
  Easily enabled for all business workflows and tools
- **Develop spatial applications without special GIS skills**
  SQL, Java, Rest APIs for developers, Spatial Studio for business analysts
- **Enterprise security, scalability, performance for mission critical Spatial data sets**
  Extreme performance, Exadata integration
- **Complements GIS** (eg Esri) **and supported by partner ecosystem**
  Certified platform while opening data to full potential

NEW IN 18c

NEW IN 19c

Major New Spatial Features

Ease of Use Improvements

- JSON and Oracle REST Data Services
- Web services user interface, CSW and WFS enhancements
- Use spatial operators without a spatial index
- GeoRaster
- Map visualization
- Spatial Studio: New self-service development tool

Performance

- Spatial index performance improvements

  3x faster queries for large point data sets

- Map visualization dynamic tile layer

  Faster map rendering, save storage overhead on large, complex queries

Expanded Database Support

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

Autonomous Database Cloud Support

- Core spatial features included in Autonomous Data Warehouse and Transaction Processing

Summary

By managing spatial data the same as other business data, Oracle enables enterprises to realize these benefits:

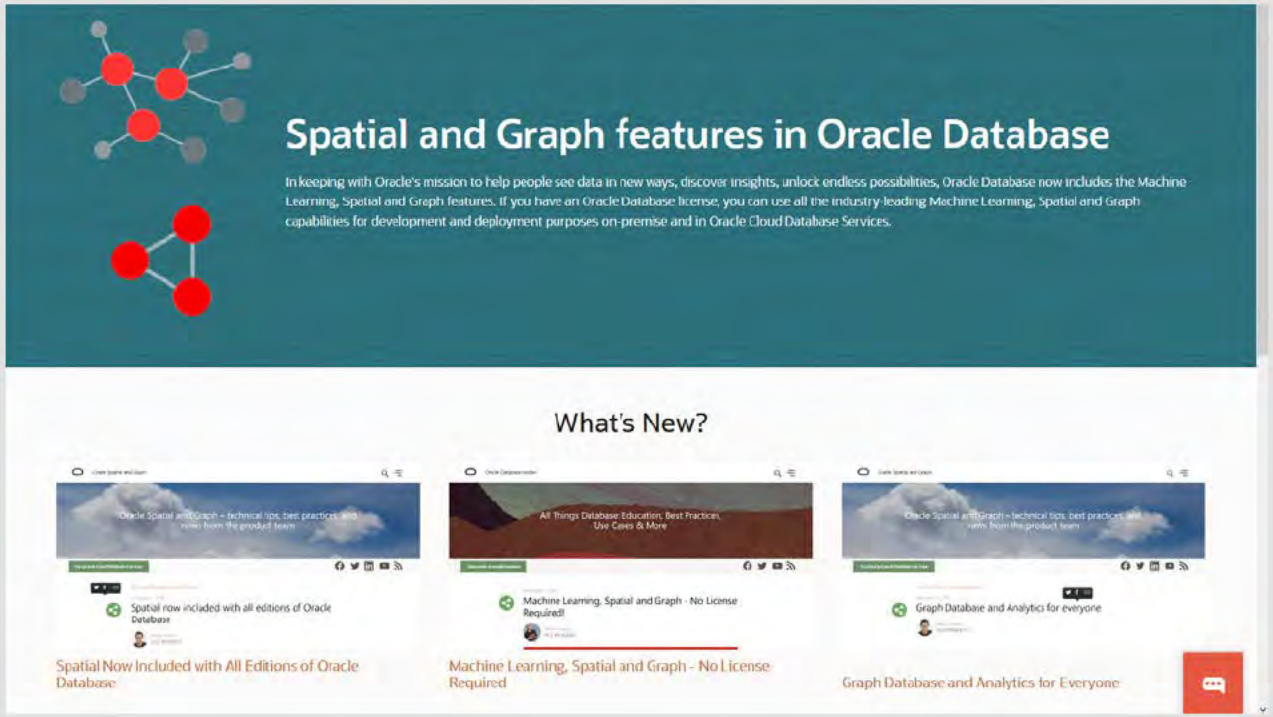
Integrate analysis in the IT infrastructure

Reduce operational costs

Minimize strategic risk

Reduce development effort

Resources on Spatial



www.oracle.com/goto/spatial