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What's New in Location Analytics

Jayant Sharma
Director, Product Mgmt

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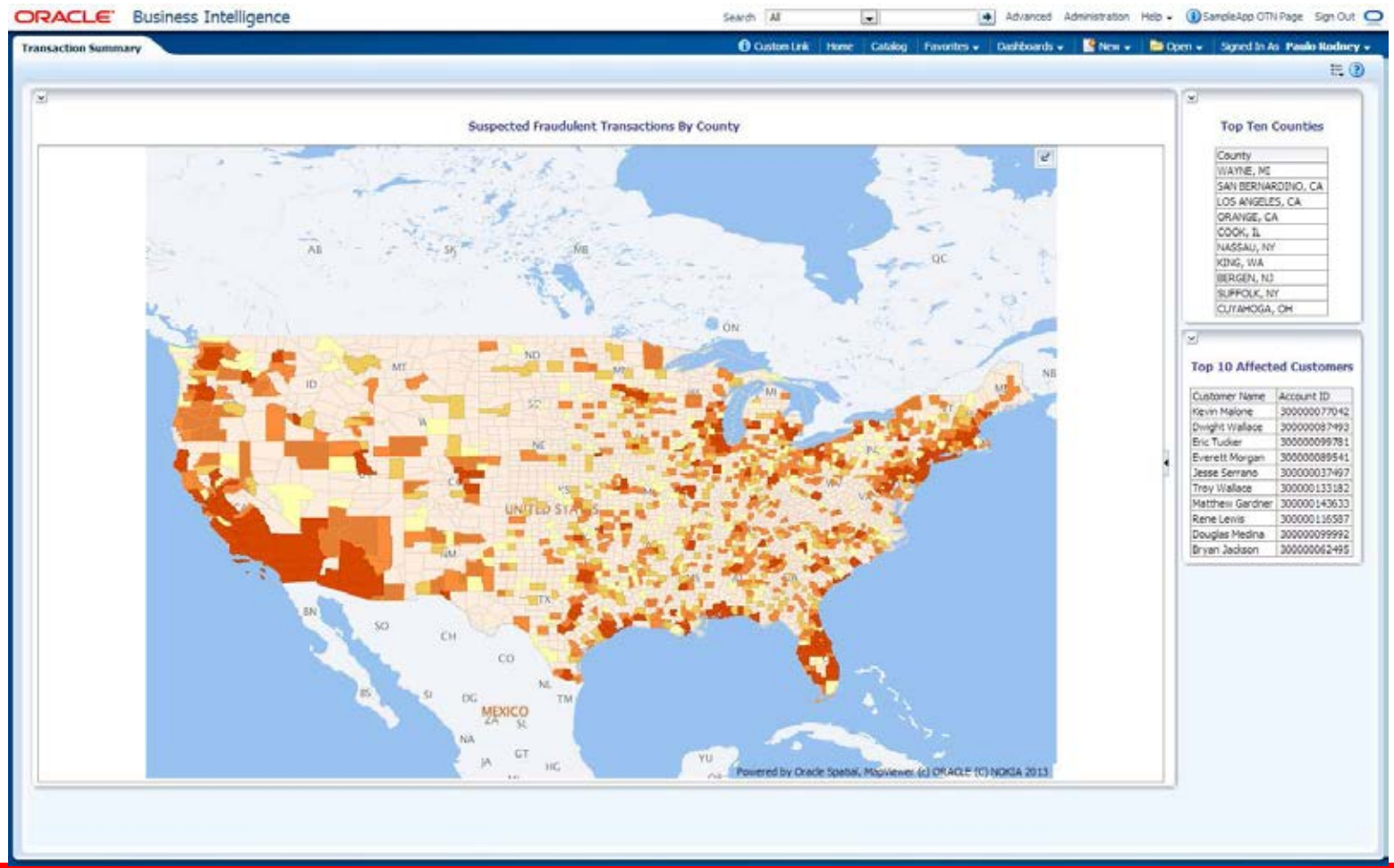

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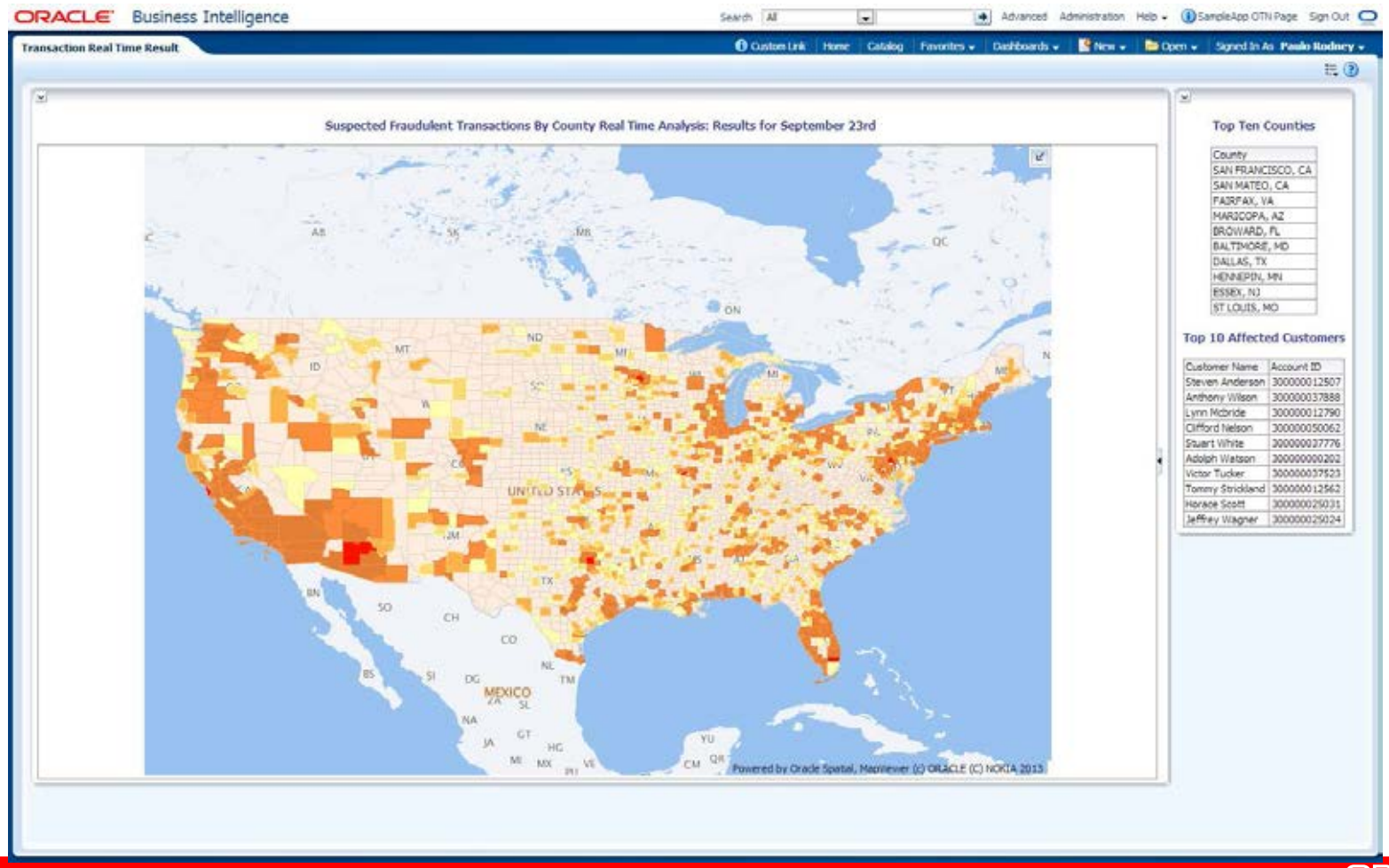

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Program Agenda

- MapViewer: new features
- Spatial & Graph 12c: new features
- Demos
- Discussion

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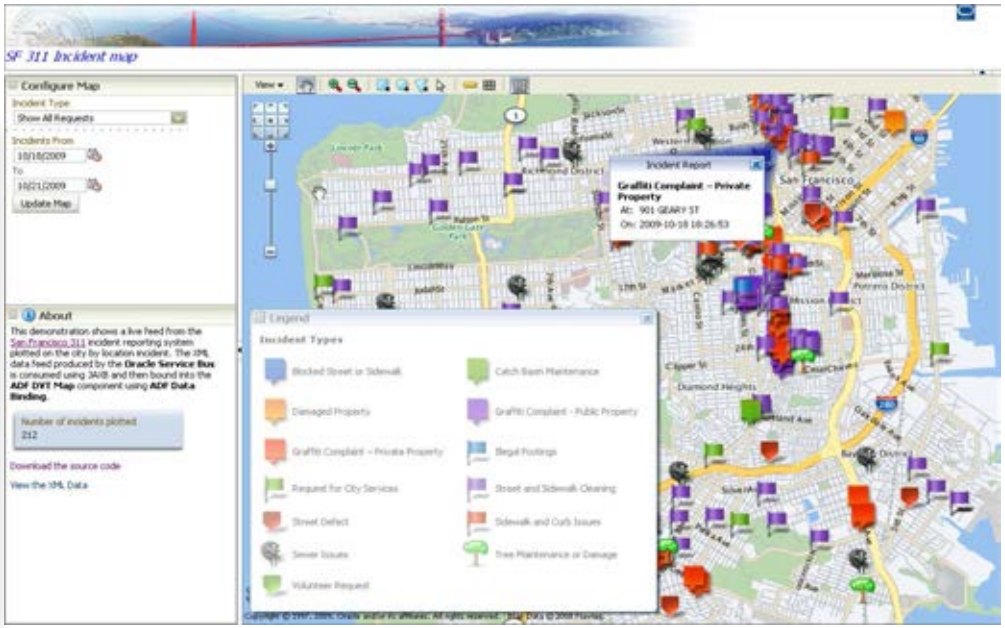
Oracle Fusion Middleware MapViewer

J2EE Mapping Component

- A JEE component (.ear) for developing web mapping applications. Usually deployed in WLS.
- Renders geospatial content stored in Oracle databases and other sources.
- Provides JavaScript (HTML5) and REST/XML APIs
- Built-in support of OGC standards
- Easy mash-up with 3rd party map services
- Companion desktop tool (MapBuilder)



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Primary Focus Areas

For enhancements

- Rich client interactivity
- Map data editing
- 3rd party data sources
- Separate MVDEMO samples app

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Rich client interactivity

- HTML5 based Javascript API
- Complete re-write of the Oracle Maps JavaScript API
- Based on HTML5 (canvas & svg) standards
- Much richer client-side rendering & interaction
- Mobile support
- Supports lightweight data editing and region management
- Provides a robust, cleaner and richer mapping client for app developers.

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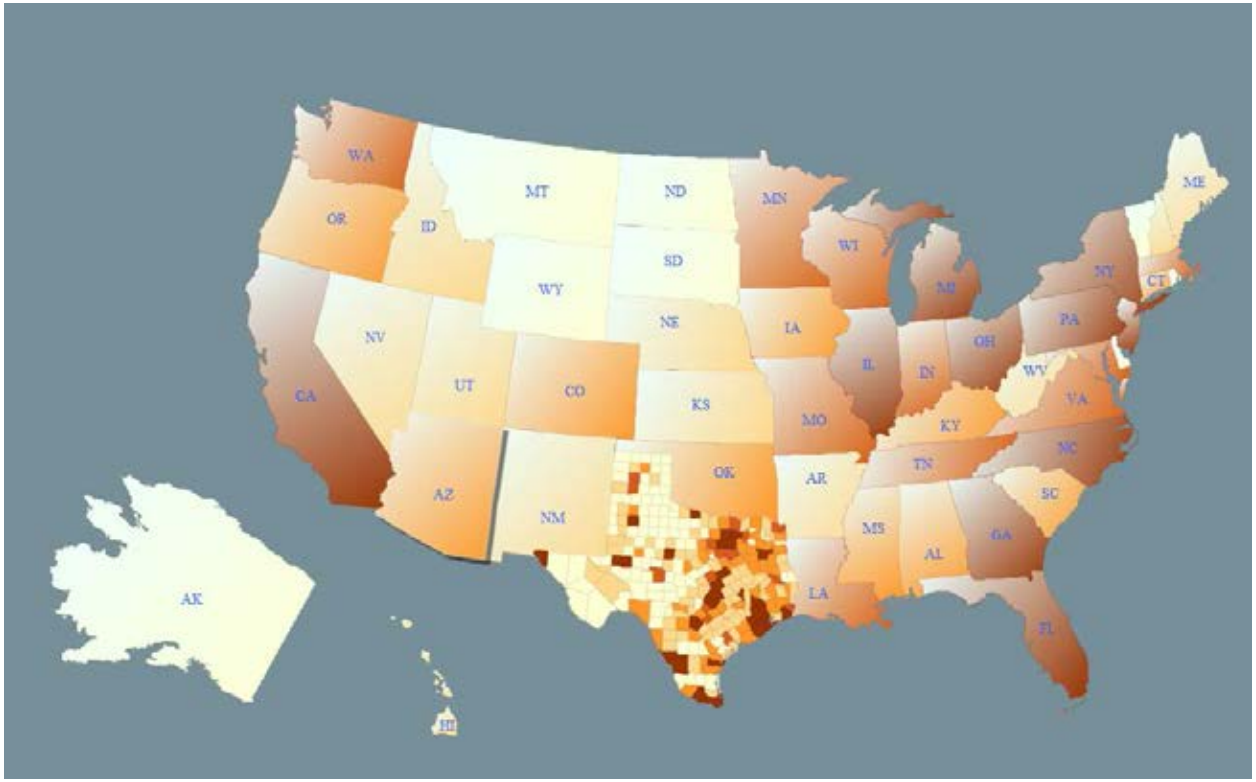
New Javascript (HTML5 Canvas) API



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HTML5 API

Map Template

- Introduced in 11.1.1.7.1
- Set of related geoJSON files + a configuration file
- Config file lists metadata: layers, styles, initial map display et al
- geoJSON files generated by Map Data Server
- MapViewer server not required at run time

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HTML5 API

A sample Map Template config file

```
"init": {
      "center": [-100, 38],
      "zoomLevel": 4,
      "layers": ["us_states"],
      "tileLayer": "Oracle maps"
   },
   "vectorLayers": [
      {
         "dn": "us_counties",
         "uri": "/mvdemo/datapacks/usa_counties.json",
         "cn": ["US counties", "United States Counties", "Counties of USA"],
         "pl": ["us_states"],
         "styles": {
            "normal": "mutedColor1",  "mouseOver": "hoverColor1",
         }
      },
      {
         "dn": "us_states",
         "uri": "/mvdemo/datapacks/usa_states.json",
         "cn": ["USA States", "US states", "States of USA", "States"],
         "cl": ["us_counties", "us_airports"],
      }
   ],
```

```
"tileLayers": [
      {
         "dn": "Oracle maps",
         "vendor": "oracle"
      },
      {
         "dn": "Nokia maps",
         "vendor": "nokia",
         "mapTypes": "normal,terrain,satellite",
         "key": "<your_nokia_key>",
      }
   ],
   "styles": [
      {
         "dn": "mutedColor1",
         "type": "color",
         "def": {
            "fill": "#cccccc",
             "stroke": "#444444",
             "fillOpacity": 0.4
         }
      },
```


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Map data editing

- Web-based editor

- A web-based spatial data editing tool
- Supports versioned, concurrent editing through editing “sessions”.
- Supports geometry model only. Others (topology, ndm editing) planned for future releases.
- Supports WFS-T
- All aspects of an editing session are saved in database
- Admin tool to visually review editing sessions, as well as resolve conflicts and merges sessions.

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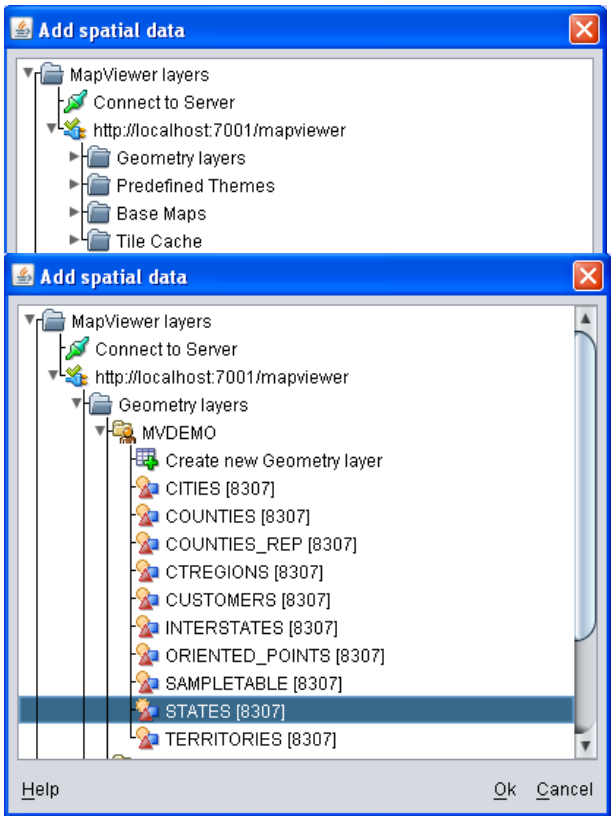
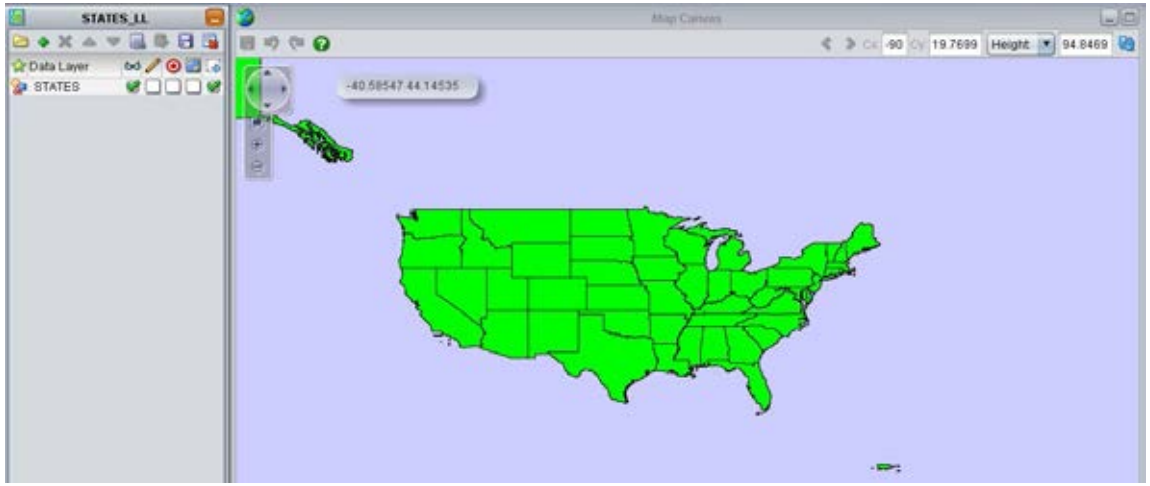
Editor: Select layer





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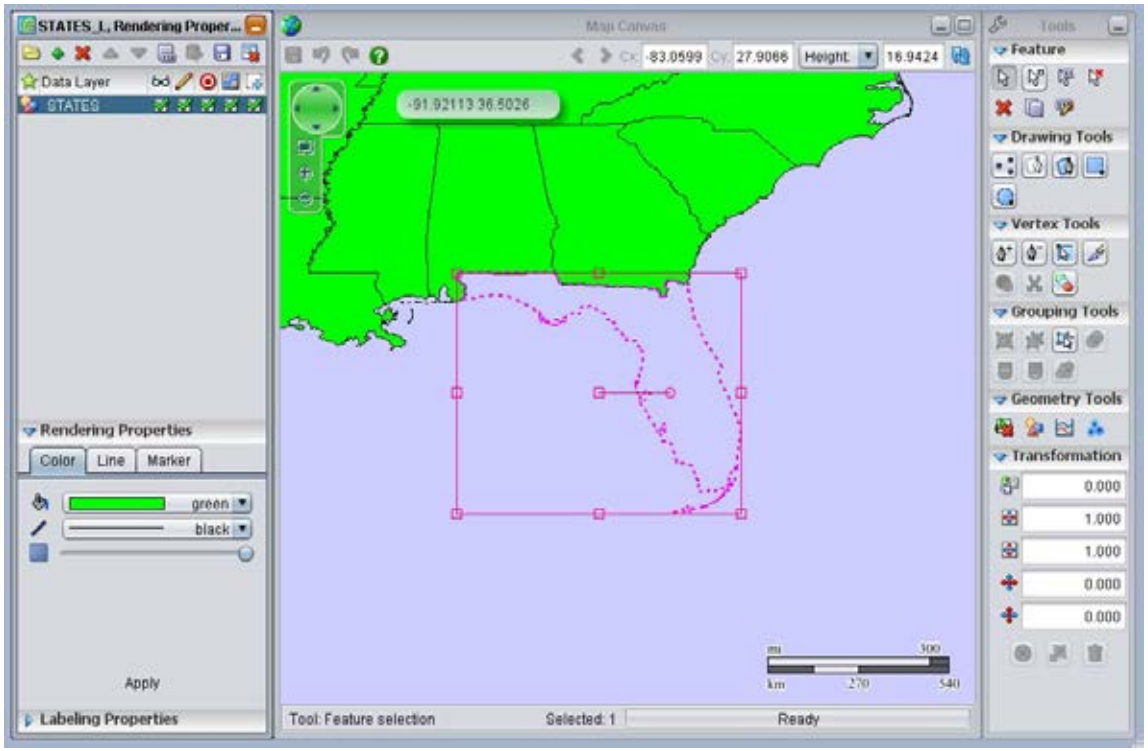
Select a feature and edit it



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3rd party data sources

- MapViewer as a mashup component
- MapViewer as a component for consuming and aggregating third party spatial data sources
- Support various standards, such as WMTS (Tile Service), TMS, WFS, WMS, GeoJSON, and GeoRSS.
- Bundles GDAL /OGR for support of even more external data sources

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Additional 3rd party map tile layer support

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GeoJSON layer

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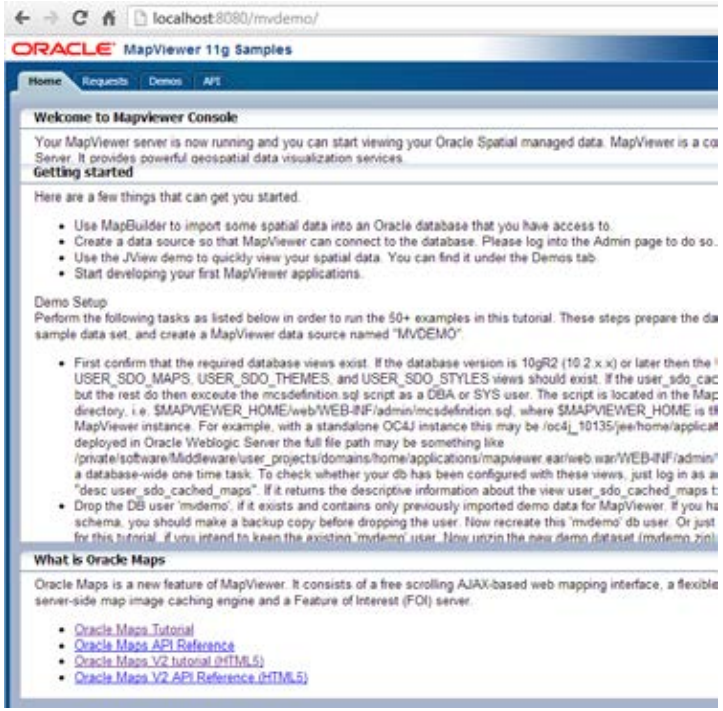
The MVDEMO samples app

Overview

- A separately deployed JEE app
- Requires MapViewer in the same domain
- Requires the new MVDEMO sample data set
- Content: JS & Java API docs, Demos, Tutorials, Sample REST/XML requests



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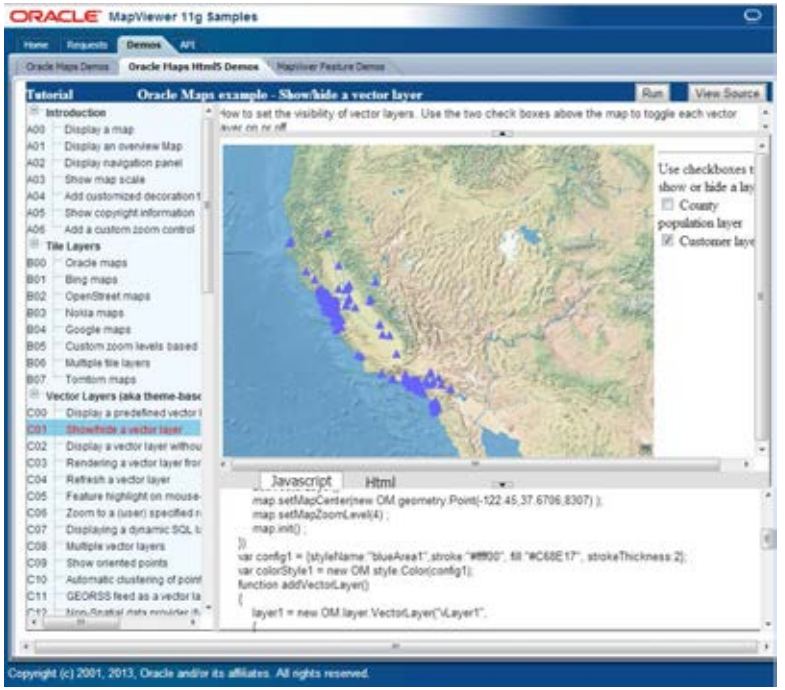
The MVDEMO samples app

The new HTML5 tutorials

- A rich set of V2 API tutorials
- Modify and run tutorial code on the fly, fiddler-style
- Great for learning the new API



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Advances with Oracle Database 12c

- New Spatial Features

Dramatic Performance

Simplified Application Development

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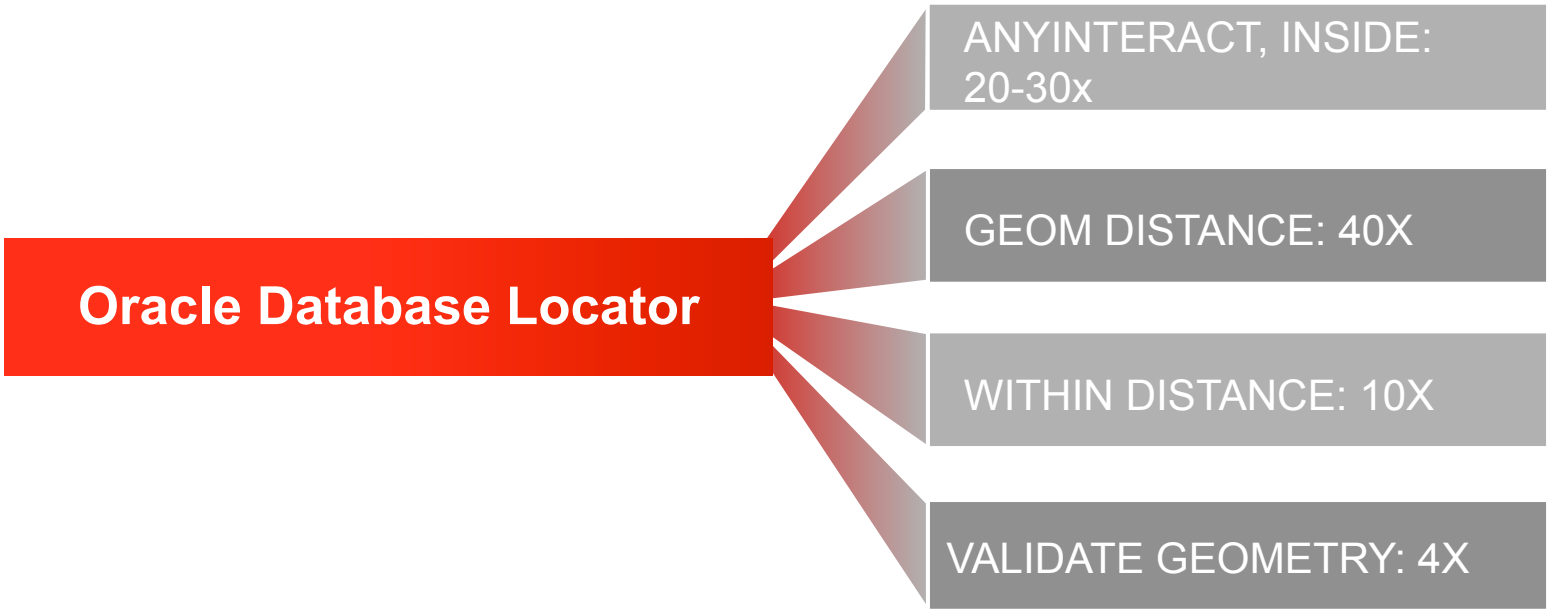
Core Spatial Functions and Operations

Performance



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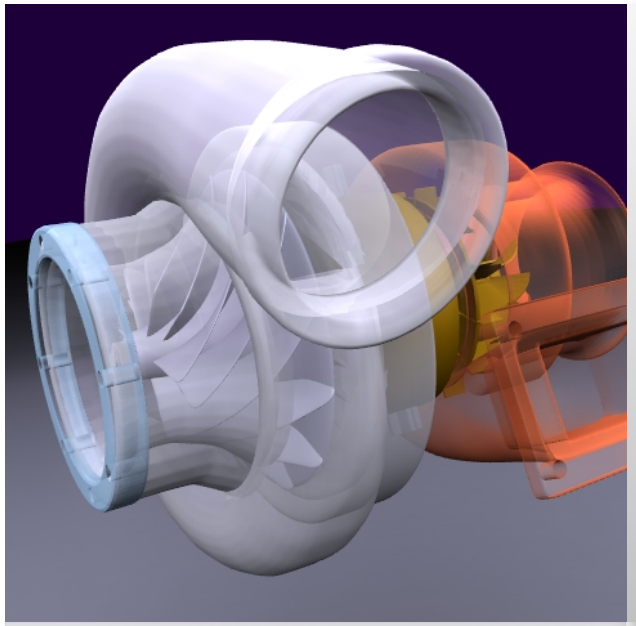
Vector Performance Acceleration

Oracle Spatial and Graph “Turbo-charger” feature



OPTIMIZED METADATA QUERIES

- Kernel level caching
- Performance gains for DMLs and Spatial function calls
- Optimization especially noticeable in workflows with many fast running queries

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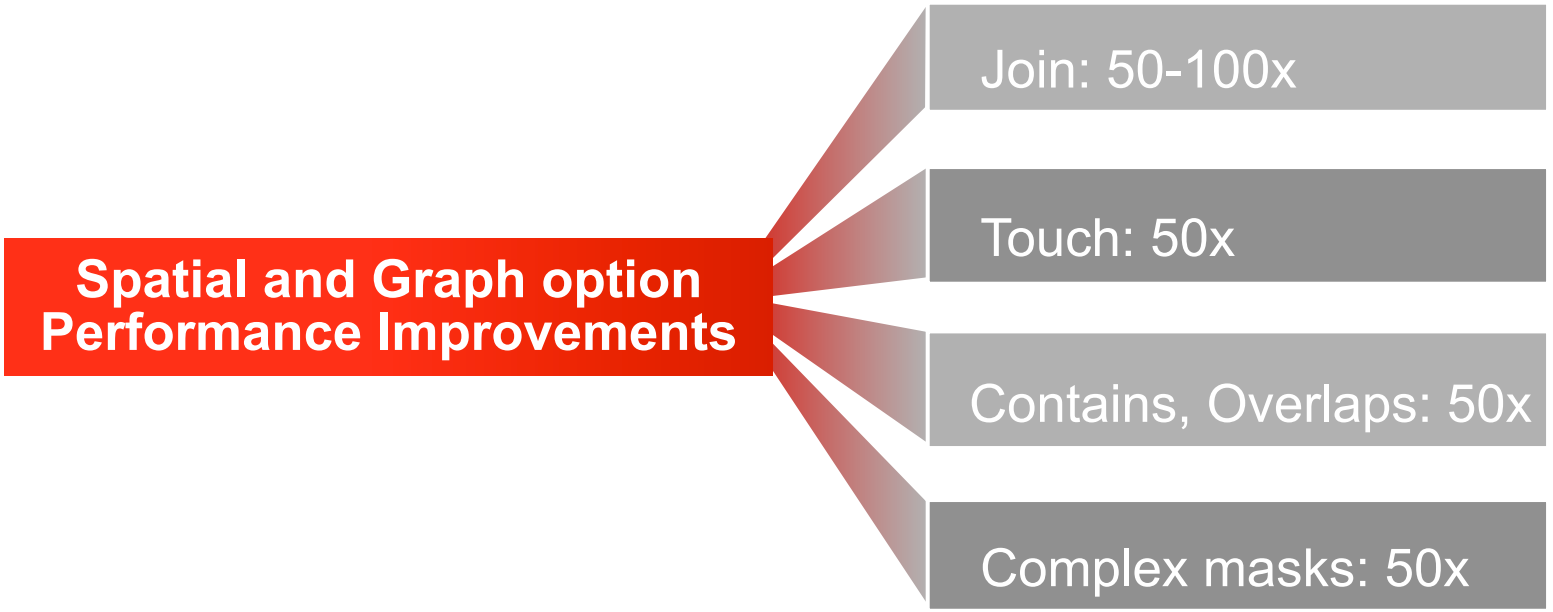
Vector Performance Acceleration

"Turbo-charger" feature for spatial functions and operators



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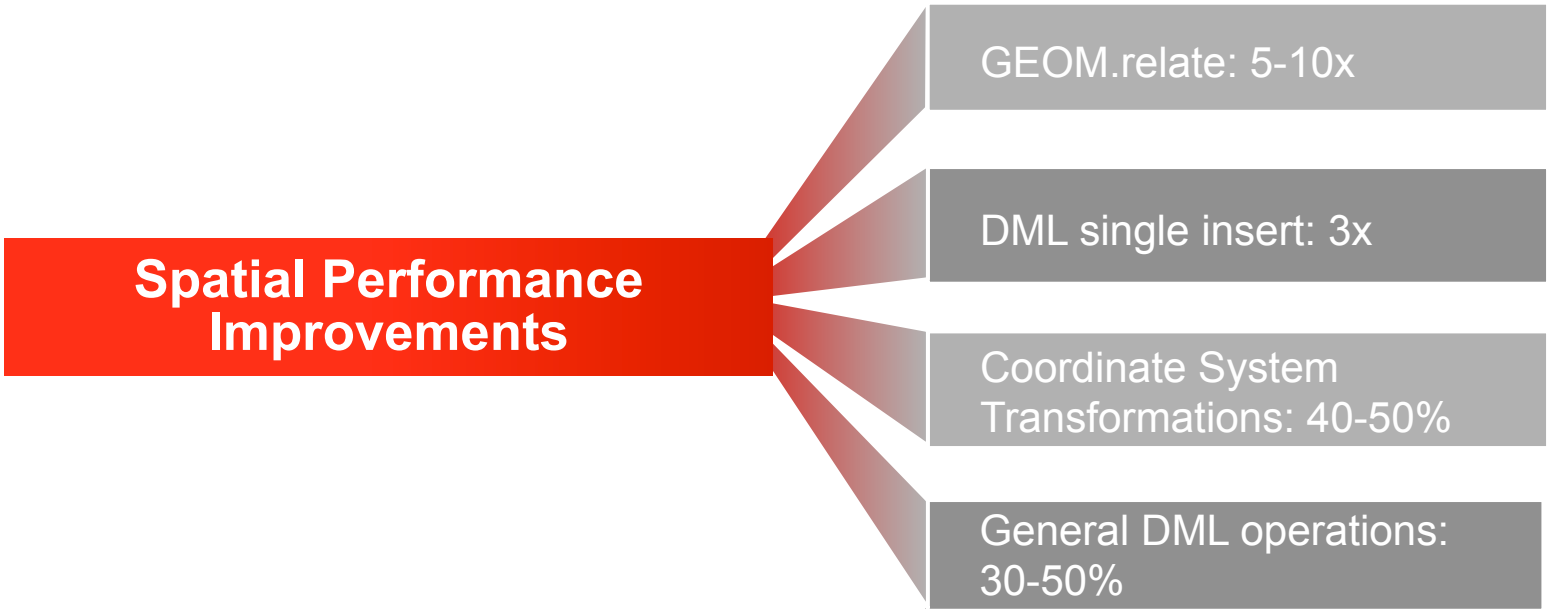
Vector Performance Acceleration

"Turbo-charger" feature for spatial functions and operations



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New PointInPolygon Function

Fast Point in Polygon without Spatial index

- SDO_PointInPolygon Function
  - Arg1: cursor that select a set of points
    - Very flexible as the data can come from a table, or result of another query
    - E.g., select * from point_data where c1 < 10 and c2 > 100 …
  - Arg2: is any Polygon geometry
  - Returns all the points that are inside the polygon
- Useful when large number of points have to be classified based on a set of polygons
- Parallel enabled
- Can easily process 30K points per second in serial case

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Parallel Raster Operations

- MANY RASTER FUNCTIONS CAN PARALLELIZE
- SERIAL OPERATIONS PERFORM UP TO 3X FASTER
- SCALES TO OVER 100X FASTER ON HIGHLY PARALLEL SYSTEMS

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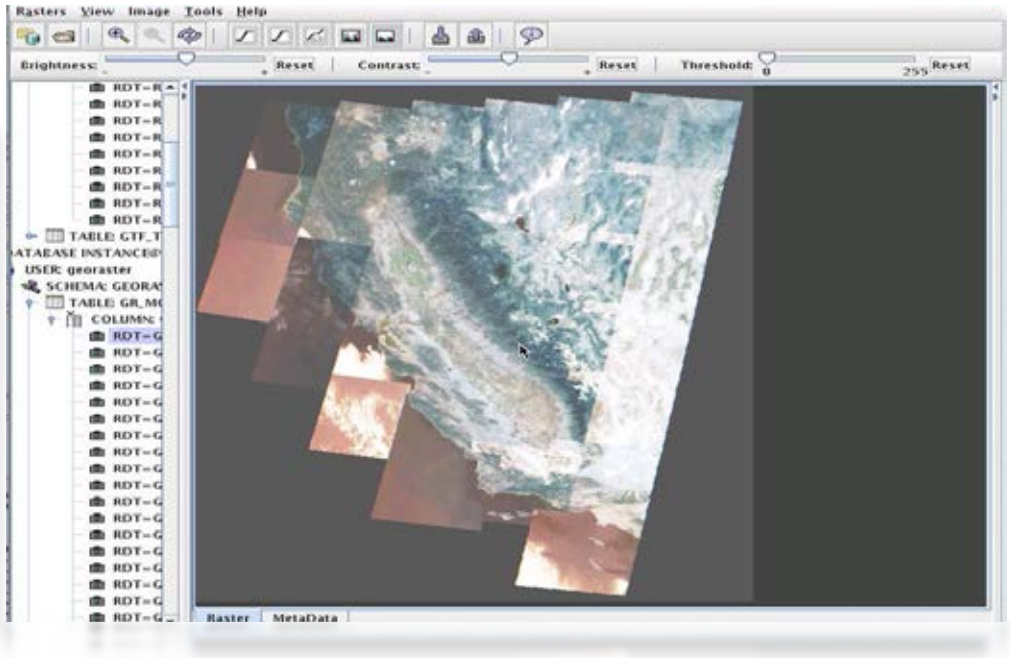
Virtual Mosaic and Image Processing

In Database Processing

- Virtual Mosaic of collections of any georeferenced GeoRaster objects
- Advanced spatial queries and on-the-fly transformation and mosaics
- Raster Algebra operations to create new map products
- Image Processing: Masking, stretching, segmentation, rectification



Mosaic of Landsat Images

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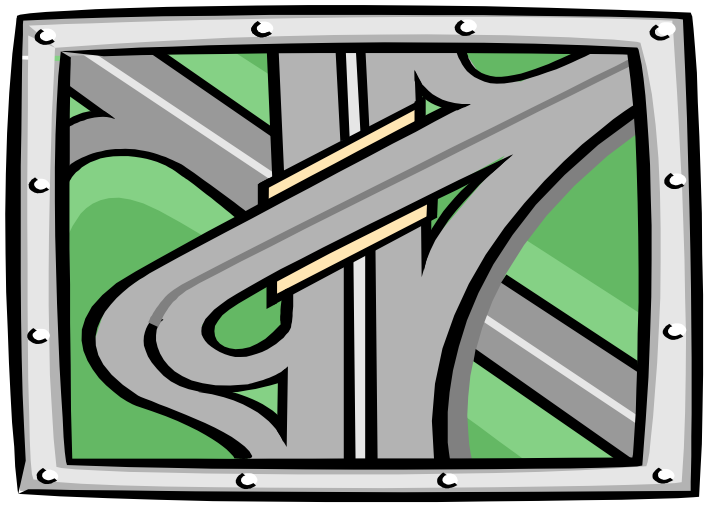
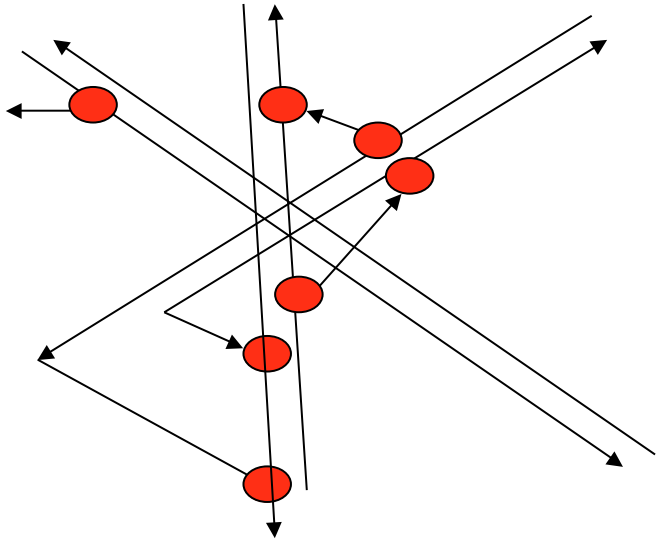
Real World Feature Modeling in NDM Graph

Feature Representation



Network Representation



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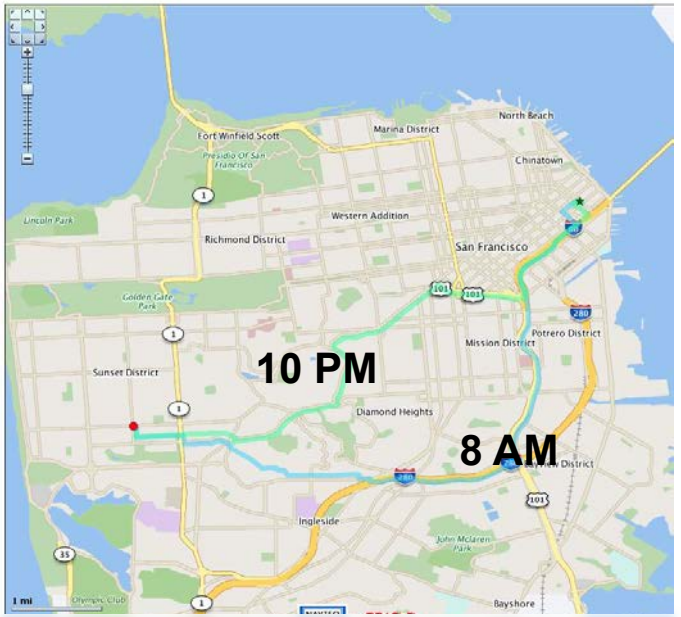
Network Data Model Graph

Temporal Modeling/Analysis

- Traffic Patterns
  - Record historical travel
  - Based on time of day and day of the week
- NDM can use traffic patterns to compute shortest paths
- Support NAVTEQ Traffic Patterns format out of the box



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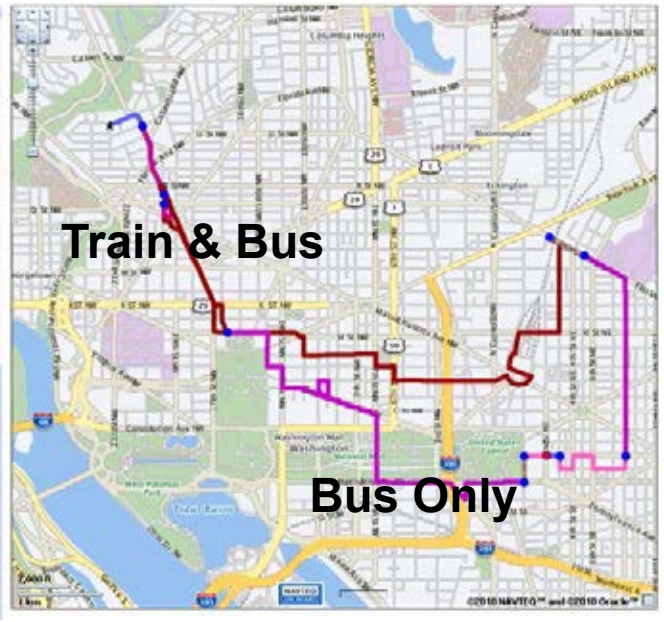
Network Data Model Graph

Multi-Modal Routing

- Each mode (car, bus, rail, bike, etc) modeled as a separate network
- Single logical network represents all modes of transportation
- Transition nodes where networks meet
- NDM APIs can specify the modes
- Out of the box support for transit data published by transit authorities



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Network Data Model Graph

Large Scale Drive Time/Distance Analysis

Big Data Analysis

- Millions of customers, find closest store within a specified drive time
- Single database query to find closest store and drive time/distance for each customer
- Customers geocode as based on graph segment
- Network Buffer generates all possible paths

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Performance and In-Database Analysis

RDF Semantic Graph

Reasoning	**Faster, more efficient, and secure reasoning engine**
SPARQL 1.1	**Richer query language with improved path analysis. Less application code.**
GeoSPARQL	**Query language for spatial "linked data." Less application code.**
Named Graphs	**Standard Mechanism to distinguish graphs models in large graphs.**

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Summary of New Spatial & Graph Features

- Vector Performance Acceleration
- High-performance point-in-polygon processing
- Parallel GeoRaster and Enhanced Raster Operations
- NDM: Feature modeling, multi-modal, temporal
- RDF: views, enhanced reasoning & security, performance

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Oracle Exadata

Extreme Scalability for Millions of Spatial Objects

- Millions of spatial objects evaluated in minutes
  - Point in polygon analysis
  - Polygon to polygon analysis
  - Deviation from route
  - Distance covered
- Millions of Spatial objects ingested in minutes
  - Weather readings
  - Traffic readings
  - Sensor readings

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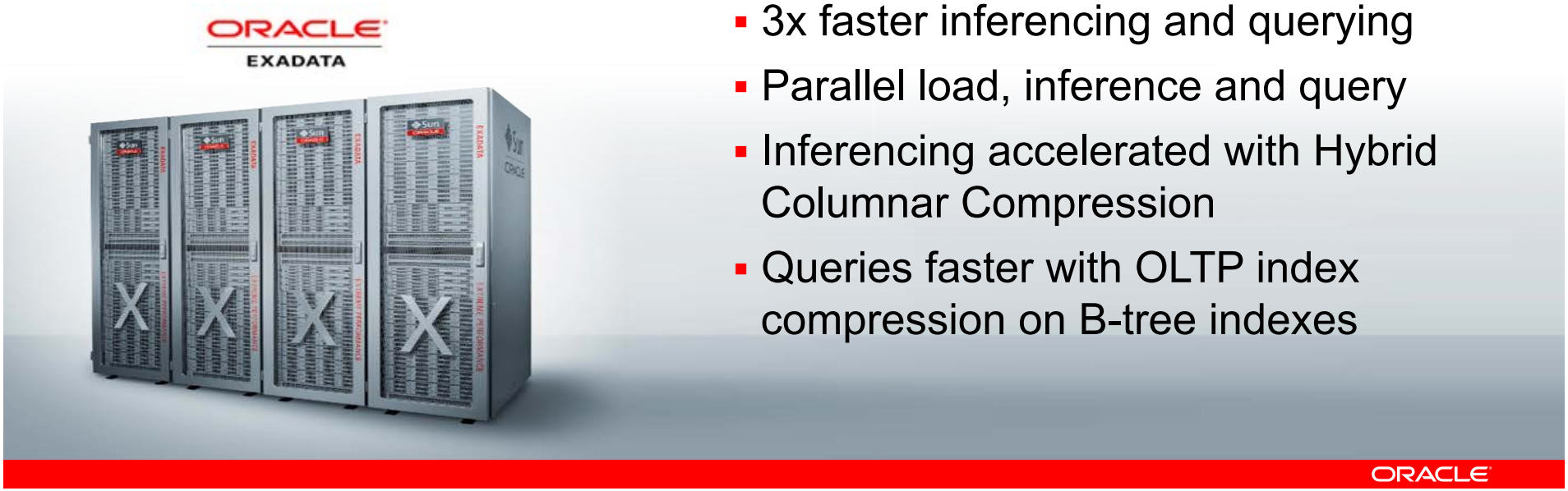
Oracle Exadata
High Performance RDF Graph Workloads



- RDF Semantic Graph is designed for the Exadata architecture
- 3x faster inferencing and querying
- Parallel load, inference and query
- Inferencing accelerated with Hybrid Columnar Compression
- Queries faster with OLTP index compression on B-tree indexes

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Oracle Spatial and Graph

Proven, industry-leading technology

Dramatically improved performance

Simpler, more scalable applications

Engineered for Exadata

HTML5 support in MapViewer

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Resources

- **Oracle Technology Network**

  Get software downloads, sample code, tech info, updates, documentation, partner resources

  - **Oracle Spatial and Graph**
    www.oracle.com/technetwork/database-options/spatialandgraph/overview/spatialfeatures-1902020.html
  - **Oracle Fusion Middleware MapViewer**
    www.oracle.com/technetwork/middleware/mapviewer/

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User Groups & Certification

- **Oracle Spatial & Graph Special Interest Group:**
  Connect and exchange knowledge with the user community
  - ***Meet the SIG Board at OOW: Wed 9/25, 2:00-3:00pm***
    OTN Lounge, Moscone South Lobby
  - Join our groups: LinkedIn, Google+, IOUG SIG
  - Visit **OTN Spatial – Community**
    Search online for **"Oracle Spatial and Graph Community"**
  - Email **oraclespatialsig@gmail.com**

- **Individual Certification, Partner Specialization**
  - www.oracle.com/technetwork/database-options/spatialandgraph/learnmore/spatial-partners-423197.html
  - Talk to Oracle team this week at OPN Lounge or Oracle Spatial & Graph demopod in Moscone South

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Spatial and Graph at OOW 2013 - Sessions

Date/Time	Title	Location
Monday, Sept 23		
1:45 PM - 2:45 PM	Best Development Practices with Maps, Spatial, and Graph Analytics	Marriott Marquis - Golden Gate C2
3:15 PM - 4:15 PM	Latest Spatial Features in Oracle Database 12c	Moscone South - 303
4:45 PM - 5:45 PM	Fast Data with Oracle Event Processing	Moscone North - 130
4:45 PM - 5:45 PM	Newest Graph Features in Oracle Database 12c	Moscone South - 303
7:15 PM - 8:00 PM	What's New in Location Analytics: HTML5, Mobile, and Spatial in Oracle Database 12c **[Birds of a Feather]**	Marriott Marquis - Foothill G
Tuesday, Sept 24		
12:00 PM - 1:00 PM	Enhancing City Public Transportation	St. Francis - Elizabethan C/D
Wednesday, Sept 25		
11:45 AM -12:45 PM	Customer Experiences with Oracle Spatial and Graph	Moscone South - 300

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Spatial and Graph at OOW 2013 – Demos

Date/Time	Title	Location
Monday - Wednesday	Oracle's Spatial Technologies	Moscone South Exhibition Hall Oracle Database DEMOgrounds (Left - SL-070)
Monday - Wednesday	Graph Database for the Enterprise	Moscone South Exhibition Hall Oracle Database DEMOgrounds (Left - SL-069)
Mon, 12:00-12:20pm Wed, 10:30-10:50am	Location-Based Services (Big Data Theater)	Moscone South Exhibition Hall Room 106 - Industry Showcase Theater

Partners

Date/Time	Title	Location
Monday - Wednesday	HERE, a Nokia Business	Moscone South Exhibition Hall Booth #2232
Monday - Wednesday	Esri	Moscone South Exhibition Hall Booth #640

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Spatial and Graph at OOW 2013 – Hands On Lab

Date/Time	Title	Location
Tuesday, Sept 24		
10:30 AM - 11:30 AM	Fast Data Best Practices and Design Patterns with Oracle Event Processing	Marriott Marquis - Salon 12/13

Meet-Ups

Date/Time	Title	Location
Wednesday, Sept 25		
2:00 PM - 3:00 PM	Oracle Spatial and Graph Special Interest Group Meet-Up	OTN Lounge - Moscone South Lobby
2:00 PM - 3:00 PM	RDF Graph User Meet-Up with Oracle Product Team	OTN Lounge - Moscone South Lobby

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