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Deep Dive
Program Agenda

• Editing spatial data with redline tool
• Tuning
• Using binding variables in themes
• Importing and displaying CAD data
• Using Bing mashups
• Generating heat maps
• Redline tool used to create geometries in MapViewer applications
  • Create circles, rectangles, and polygons

• Why use the redline tool?
  • Simple changes to geometries can be made without desktop tools
  • Changes are persisted to database; improves:
    • Transaction control
    • History retention
    • Security
Editing Spatial Data w/ Redline Tool

- **MVRedlineTool**
  - Key methods
    - addVertex
    - attachEventListener
    - getPolygon
    - init

- **MVFOI**
  - new MVFOI
  - setVisible
function startEditing(point, foiData) {
  currentEditingRowid = foiData.id;

  // Get the real geometry from the database
  var jsonObject = JSON.parse(getGeom(foiData.id));

  var jsonGeom = jsonObject.geom;
  var geom = new MVSdoGeometry(jsonGeom.gType, jsonGeom.srid, jsonGeom.sdo_elem_info, jsonGeom.sdo_ordinates);
  var ordinates = geom.getOrdinates();

  // Initialize the redline tool
  redline.init();
  redline.attachEventListener(MVEvent.CLEAR, clearEdit);
  redline.attachEventListener(MVEvent.FINISH, finishEdit);

  // Populate the redline tool with data from the geometry
  for (var i=0;i < ordinates.length-2;i=i+2) {
    redline.addVertex(i/2, ordinates[i], ordinates[i+1]);
  }

  // Make sure user's don't try clicking on other features
  buildingTheme.setClickable(false);
}
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Editing Spatial Data
With the Redline Tool
Tuning

General Tips

• Monitor MapViewer logs and look at loading times
  • Long load times might mean the DB is getting saturated

• Monitor JVM behavior, especially GC activities
  • Use tools such as Jconsole, Jrockit Mission Control
  • Excessive GC will dramatically reduce MapViewer performance

• Completely disabling in-memory spatial data cache might help for large data sets

• Tune the number of mappers (more mappers = more concurrent requests handled, but may flood CPU and DB)

• Use /mapviewer/admin.html for quick health monitoring
Tuning
/mapviewer/admin.html

- Provides overall JVM status and JDBC connection usages per data source
- Lists top 10 most time-consuming theme queries
Tuning
/mapviewer/admin.html

- Provides overall status, JVM heap, and DB connection usages
• Provides top theme queries (time spent and number of features loaded)
Tuning

You can reset top theme query statistics easily:

/mapviewer/admin.html
Using Binding Variables in Themes

- Provides easy filtering of a theme’s feature set
- Promotes reuse of theme definitions; reduces clutter
- Eases database tuning
- More secure; always prefer pre-defined themes with binding variables
Using Binding Variables in Themes

• Pre-defined theme can also have a full-query string in its definition
• Can bind a list of values to a variable
• Can also bind a geometry to a variable
Using Binding Variables in Themes

• Step 1: Create a pre-defined theme and set binding variable(s) in the query condition

*Note that this theme has two binding variables*
Using Binding Variables in Themes

• Step 2: At runtime, set the value(s) for the binding variable(s)

```javascript
var layer = new MVThemeBasedFOI('themefoil', 'mvdemo.dynamic_customers');
layer.setQueryParameters('SAN FRANCISCO', '100');
mapview.addThemeBasedFOI(layer);
```

Note that two values—SAN FRANCISCO and 100—were passed into the setQueryParameters() call
Using Binding Variables in Themes

• An example of advanced use of binding variables

  What if you enter the following in the theme’s definition?

  \[(\text{county}=? \text{ or } 1=? \text{ and } (\text{sales}>? \text{ or } 1=?))\]

• Two query conditions (red, green); more can be used

• Application can dynamically short-circuit any or all of the query conditions

• Red is ignored if the 2\text{nd} binding variable is set to 1; green is ignored if the 4\text{th} binding variable is set to 1

• Provides great flexibility in filtering a theme’s data set
Demonstration

Using Binding Variables in Themes
Importing & Displaying CAD Data

• Why CAD in Oracle Spatial?
  • Drives organizations toward standardization of CAD layers
  • Provides an easy way for non-CAD users to view data
  • Object data can be materialized into a database and made queryable
Importing & Displaying CAD Data

• Challenges
  • CAD layers might not be standard across all drawings
  • Precision of data may be high
  • Object data may be missing
  • If there is no object data, text may not be on poly layer
  • Font size ranges
  • Out-of-view objects – temporary layers

• Implementation
  • FME for data cleansing and import
  • Oracle MapViewer for rendering
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Importing and Displaying CAD Data
Using Bing Mashups

• I thought this was a MapViewer presentation!
• Oracle MapViewer supports Bing and Google maps; WMS
• MapViewer uses Bing API to retrieve tiles
• The Bing API is already loaded, so use it
Using Bing Mashups

• To get to the underlying Bing API, see example

• Find method
  • Can be used to return one or more lookup results
  • Returns the name, center, and MBR of the search result
  • Only works with Bing v6
  • For Bing v7 use SearchManager

```javascript
var bingMap = new MVBingTileLayerV6();
bingMap.setKey("your key");
mapview.addMapTileLayer(bingMap);
var realBingMap = bingMap.map;
```
Using Bing Mashups

- Simplest example
  - Search form with a button
  - Returns only first result
  - Map zooms to the MBR of the first result

```javascript
function bingSearch() {
  // Get the search text from the input box
  var queryTerm = document.getElementById('queryTerm').value;

  // Grab a handle to the bing map api
  var veMap = mapView.getMapTileLayers()[0].map;

  // Invoke find with a callback to center/zoom
  veMap.Find(null, queryTerm, null, null, null, 1, null, false, false, false,
             function(layer, resultsArray, places, hasMore, veErrorMessage) {
               if (places) {
                 var place = places[0];
                 var bboxMinX = place.LatLongRect.TopLeftLatLong.Longitude;
                 var bboxMinY = place.LatLongRect.BottomRightLatLong.Latitude;
                 var bboxMaxX = place.LatLongRect.BottomRightLatLong.Longitude;
                 var bboxMaxY = place.LatLongRect.TopLeftLatLong.Latitude;
                 var bbox = MVSdoGeometry.createRectangle(bboxMinX, bboxMinY,
                                                            bboxMaxX, bboxMaxY, 8307);
                 mapView.zoomToRectangle(bbox);
               }
           });
  return false;
}
```
Using Bing Mashups

- MVCustumTileLayer
  - Loading the Bing API cost client CPU cycles
  - If you don’t need the API
    - MVCustumTileLayer
      - Faster
      - Fewer client CPU cycles
      - Easier to print
  - Also works for ESRI base maps

```javascript
function getBingTileURL(tx, ty, tw, th, zoomLevel) {
    var tileX = Math.abs(((-20037508 - tx)/tw));
    var tileY = Math.abs(((20037508 - ty)/th) - 1);
    var quadKey = TileXYToQuadKey(tileX, tileY, zoomLevel);
    return "http://ecn.t0.tiles.virtualearth.net/tiles/r" + quadKey + ".png?q=563&mkt=en-us&lbl=l1&n=z";
}

// Converts tile XY coordinates into a QuadKey at a specified level of detail.
function TileXYToQuadKey(tileX, tileY, zoomLevel) {
    var quadKey = "";
    var msZoomLevel = zoomLevel+1;
    for (var i = msZoomLevel; i > 0; i--) {
        var digit = 0;
        var mask = 1 << (i - 1);
        if ((tileX & mask) != 0) {
            digit++;
        }
        if ((tileY & mask) != 0) {
            digit++;
            digit++;
        }
        quadKey += digit;
    }
    return quadKey;
}
```
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Using Bing Mashups
Generating Heat Maps

• A heat map is:
  • A continuous probability surface
  • A theme with a heat-map style

• Any point data set can be rendered as heat map
Generating Heat Maps

A heat-map style defines:

- **Algorithm**: default is kernel based; IDW is inverse distance weighted plus a designated attribute whose values at known points also contribute to the final result
- **A container theme**: defines the boundary of the heat map rendering (so the heat does not extend into the ocean, for instance)
- **A spotlight radius**: for any target location on the map, only point data within this radius contribute to the intensity of the target location
- **A grid sample factor**: the probability grid surface is scaled down by this factor from the actual map window size; determines granularity of computation
- **# of color steps**: number of steps between probability 0 to 1
- **Alpha**: the overall transparency of the heat map surface (so that underlying features can still be seen)
Generating Heat Maps

• After a heat-map style is defined, assign it to a theme
  • Theme's geometries must be point type

• Benefits:
  • Can handle millions of points when generating a heat map
  • Can be used as a FOI layer on a slippy map
  • Takes advantage of much-improved performance in the new 12c development builds
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Generating Heat Maps
Q&A