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Oracle Spatial User Conference
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Outage Management Using Oracle Spatial Network Data Model at Las Vegas Valley Water District (LVVWD)
Las Vegas Valley Water District

- 1.36 Million People Served
  - >375,000 Accounts
- >6,300 Miles of Pipeline
- ~110,000 Valves
- 50 Reservoirs
- 63 Pump Stations
- 74 Production Wells

Plus Six Rural Systems
We’ve got a leak and we need to know how to stop the water from flowing...
because it’s hard to work with water spraying everywhere...
or shooting straight up...
or flowing in...
and flowing in...
we would rather get the water out of the pipes in a controlled way...
So the crew can get to work fixing the leak!
Outage Management

- Provide information on impact
- Assist field crews in required work
- Communicate to customers
- Respond to Field Conditions
- Predictive planning (simulation)
- Provide better service to the community
How can our GIS aid in Outage Management?
Oracle Spatial 11g Network Data Model

- Table Structure
- PL/SQL Interface
Oracle Spatial Network Data Model

- Java based editor
Oracle Spatial Network Data Model

- Java Application Programming Interface

```java
// get xml configs
InputStream config = Thread.currentThread().getContextClassLoader().getResourceAsStream("LODConfigs.xml");
// load configs into manager
LODNetworkManager.getConfigManager().loadConfig(config);
// create connection to Oracle
Connection conn = LODNetworkManager.getConnection("jdbc:oracle:thin:@oxygen:1550:OXY", "ndmsde", "password");
// create Network IO reader
NetworkIO reader = LODNetworkManager.getCachedNetworkIO(conn, "FACNET", "FACNET", null);
// create Net Analyst
NetworkAnalyst analyst = LODNetworkManager.getNetworkAnalyst(reader);
// Run is reachable between two nodes
boolean result =
    analyst.isReachable(Long.parseLong(String.valueOf(525265)),
                        Long.parseLong(String.valueOf(485142)), 1, null);

conn.close();
conn = null;
```
Key Challenges to Implementation

1. Translating our GIS data to the logical network provided by the Oracle Spatial Network Data Model
2. Using the Java API to develop shutdown analysis algorithms
3. Architecting a simple method for user interaction
GIS data representing “As-Built” condition

Our network is not directed it’s based on hydraulic conditions

- Meter
- Valve
- Hydrant Valve
- Hydrant
Data Translation

FME Workspace
Data Translation

Translated data representing the logical relationship
Connecting to Water Sources
Custom Algorithm

Reservoir
Architecture

- Implementation:
  - Apache-Tomcat (access mechanism) Servlet
  - Called by simple http request means flexible deployment
    - http://esridev:8080/IsolationTrace/starttrace?
x=738977.259&y=26776638.034&tol=1
DEMONSTRATION

Performing a Simulated Shutdown
Q&A