Using Oracle Spatial and Graph at a National Mapping Agency

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Ordnance Survey Ireland
Prime2 Spatial Data Re-engineering

BRIEF ORGANIZATIONAL OVERVIEW
Ordnance Survey Ireland is the Irish national mapping agency.
• Established in 1824, OSi is mandated to create & maintain the definitive; authoritative spatial reference platform for the Irish State

BUSINESS CHALLENGES / OPPORTUNITIES
A database platform that can provide scalability, redundancy and performance for the supply of national spatial datasets
• The use of Exadata to allow for the analyses of large data sets.
• The ability to publish our geospatial platform via the semantic web
• Replacement of current human workflows with automated processes for map generation

ORACLE TECHNOLOGIES USED
• Oracle Database 12c Enterprise Edition Exadata
  • Spatial & Graph, Workspace Manager
  • Partitioning, RAC, Tuning Pack, Diagnostics Pack
• Oracle Enterprise Manager
• Oracle Fusion Middleware
  • MapViewer, WebLogic, Bpel

BUSINESS BENEFITS REALIZED BY ORACLE SOLUTION
• The implementation of Oracle engineered systems had a number of key benefits
  • Single source for all spatial data
  • No manual update cycles for silo systems
  • Scalability, Reliability, Performance
• The new features in 12c Spatial and Graph will allow for the automation of products, dramatically reduced the number of man hours required and decreased the time to market.
• Oracle Enterprise Manager reduces the workload for our DBA & Middleware team.
National Mapping Agency
Established in 1824

HQ Dublin
Cork  Galway
Sligo  Kilkenny
Clare  Longford

900+ Terabytes
40 Terabytes per annum
Data from 1824 – 2016
Consolidation

Prime 1
- Cartographic
- Spaghetti Lines
- No Attribution
- Tile Based

Prime 2
- Real World
- Polygons
- Rich Attribution
- Seamless
Oracle Database 12c

Oracle Spatial and Graph capabilities:
• Vector Performance Acceleration
• Parametric curve support (NURBS)
• Enhanced 3D and Point Cloud Support
• Parallel GeoRaster and Enhanced Raster Operations
• New algorithms for many commonly used Spatial functions like RELATE, VALIDATE
• Graph Features – RDF Semantic Graph

3D geometry

NURBS Curve

LiDAR / Contour Data

Linked Data
New Data Collection

Digital Aerial Sensor
3D Point Cloud from image matching 43.9 billion points

Create table
Create union table of RGB and CIR data (joining 43,985,178,918 rows on X,Y and Z columns)
3 hours 22 min

Tile query
1,068,692 points access via SQL 0.78 sec
10,073,403 points access via SQL 6.92 sec

Polygon point cloud query
MAX,MIN,AVG height and COUNT of POINTS per building polygon
Approach: Pipeline parallel table.
38.75 buildings per sec running for 43,985,178,918 points

Determine neighboring points
28,224 points per sec using spatial KNN 3 meter radios spatial query
Providing the Link between the national authoritative geospatial platform “Prime2” and semantic web
Thank You.