

Use of Oracle Spatial 10g for Land Management

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Overview

- ÿ **Geospatial is ubiquitous and mission critical**
- ÿ **Oracle Spatial Technologies**
- ÿ **Case Examples**
- ÿ **Oracle10g New Features**

Mission Critical Uses in Cadastres Mapping Agencies, and Land Registration

Y IACS:

Ireland Ministry of Agric.
Netherlands Min of Agric.
Poland Min of Agric.
Italian Min of Agric.

Y Cadastre:

The Netherlands
Poland
Denmark
Czech Republic

Y Environment:

UK Environment Agency
U.S. EPA

Y Mapping Agencies:

UK Ordnance Survey
Ireland Ordnance Survey
N. Ireland Ordnance Survey
SOGEI (Italy)
NGA (USA)
USGS (USA)
Australia

Y Hydrographic Agencies

- Canada
- Australia
- US Navy ...

Location is becoming mainstream

Y Location Aware Utilities Infrastructure

- Networks: Outage, Network Analysis, Distribution,
- Logistics: Real time supply chain management
- Asset Management: Fixed, mobile, planning

Y eBusiness Applications

- CRM, Sales, Marketing, HR, Supply Chain
- Web Portals: Google, Yahoo, AOL, Microsoft

Y Location-enhanced Wireless Communications

- Ubiquitous positioning capability

Amazon.com Example

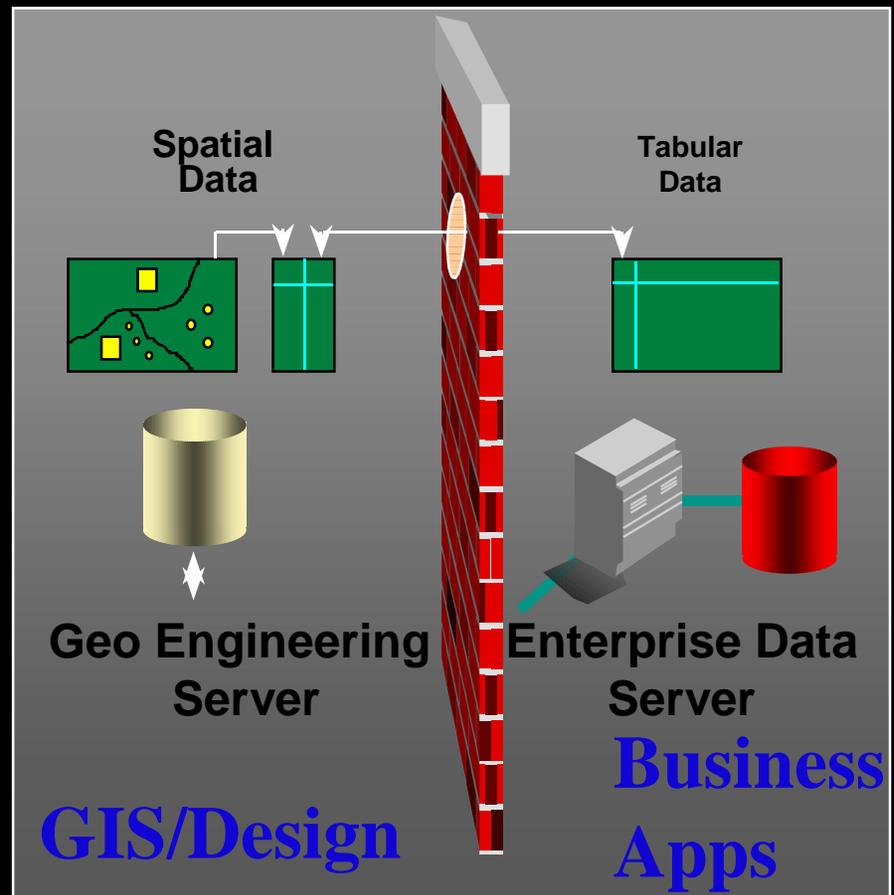
Challenge of Integrating Spatial and Enterprise Applications

Y Specialty GIS servers

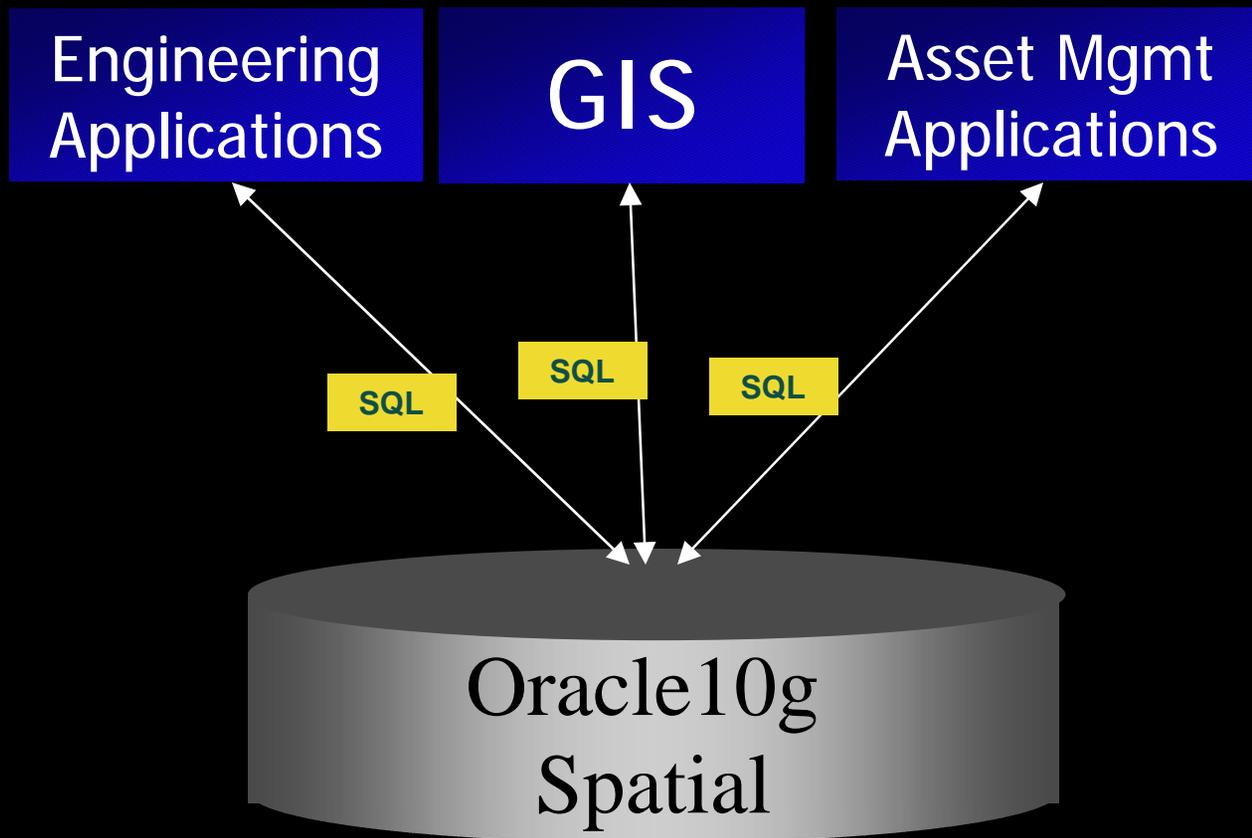
- Data isolation
- High systems admin and management costs
- Scalability problems
- High training costs
- Complex support problems

Y Spatial data tightly coupled to specific application

Y Information not aligned with Business Processes



Role of Spatial DBMS: Provides Security, Performance, Scalability



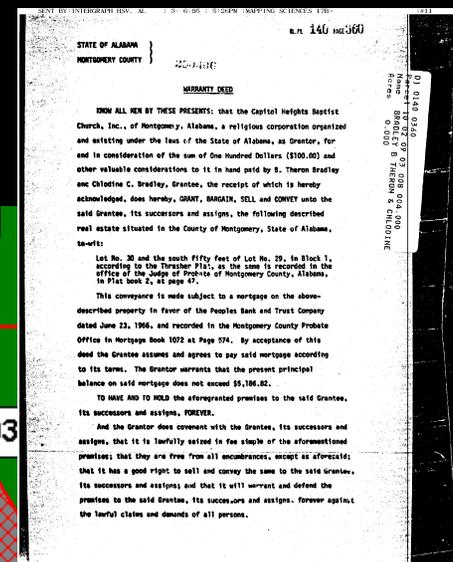
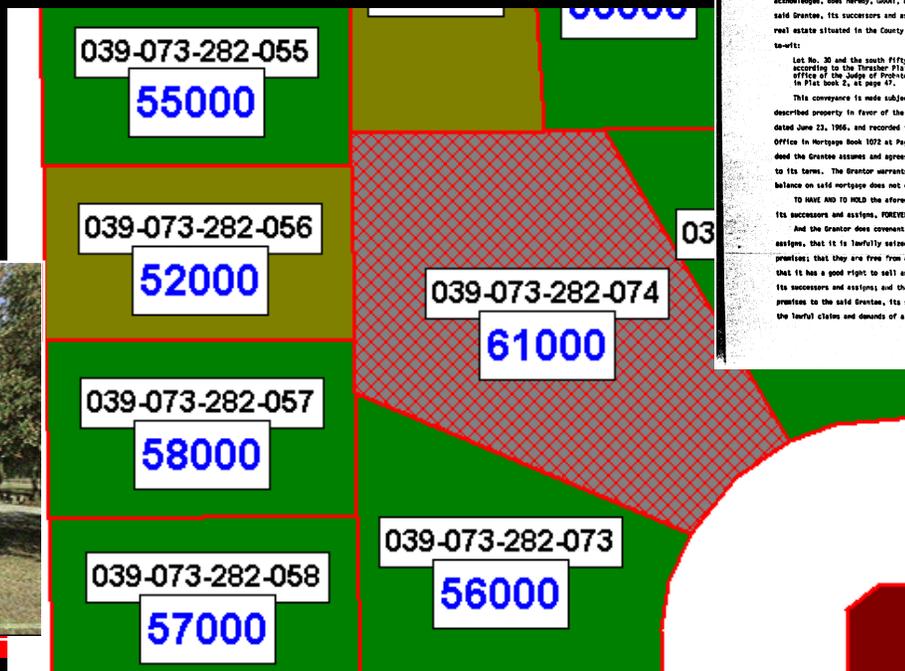
- Editing
- Geocoding
- Mapping
- Analysis/BI
- Workflows
- Business Logic

- Data Types
- Indexing
- Security
- Query
- Analysis
- Versioning
- Scalability

DBMS Supports all Information Types

Y Relate associated information to spatial locations

- 2 Records
- 2 Images
- 2 Satellite imagery
- 2 2D & 3D Vector data
- 2 Networks
- 2 Documents
- 2 Video
- 2 XML



LE

Partners Supporting Oracle Spatial/Locator

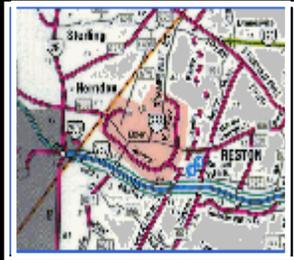


Enterprise Customer Requirements

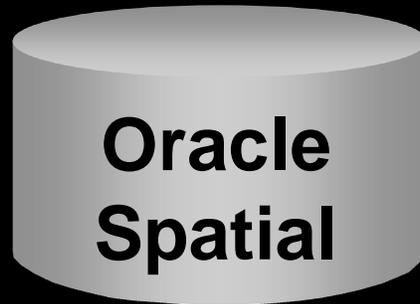
- Y Cost reduction, consolidation
- Y Eliminate stovepipes
- Y Decision making based on all available data
- Y Eliminate duplicate data
- Y Support multiple data types
- Y Simplified programming
- Y Use common IT platforms
- Y Support best of breed tools
- Y 1000's of users
- Y 10's Terabytes
- Y 24x7 systems
- Y Minimize of Isolated systems
- Y Support near real-time data and sensor inputs
- Y Database security
- Y Support SOA architecture

Oracle Spatial Capabilities

Spatial Data Types

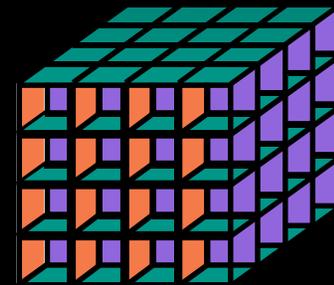


All Spatial Data
Stored in the Database

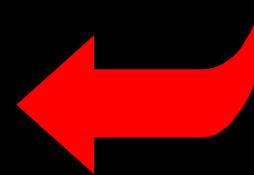


Oracle
Spatial

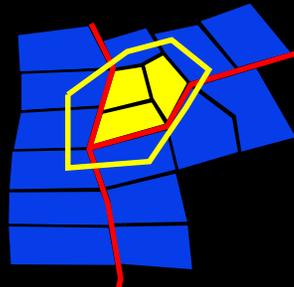
Spatial Indexing



Fast Access to
Spatial Data



Spatial Access Through SQL



Query/Analysis

Select, join, buffer, within distance,
nearest neighbor, intersection, union,
convex hull, centroid, ...

Every Oracle10g Database is a Spatial DBMS

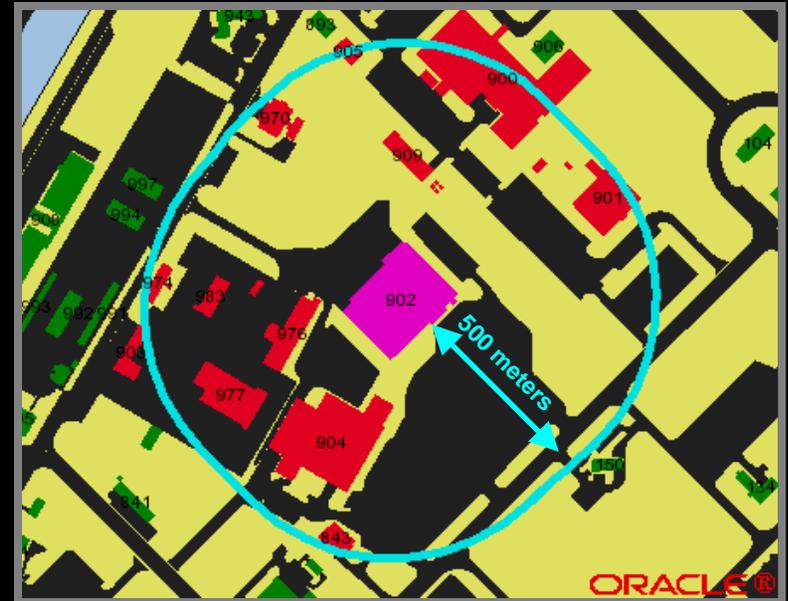
Oracle10g Locator Feature:

- ÿ SQL Spatial Type
- ÿ R-tree index
- ÿ Spatial Operators
- ÿ Spatial Reference System
- ÿ Geodetic (lat/long) Support
- ÿ Versioning/Long Transactions
- ÿ Parallel Index, Query, Load
- ÿ Partitioning
- ÿ GML Support
- ÿ Annotation Support

Spatial Query Via SQL

Find all building within 500 meters of building 902

```
SQL> SELECT a.building_id
2>   FROM base_buildings a,
3>        base_buildings b
4>  WHERE b.building_id = 902
5>        AND MDSYS.SDO_WITHIN_DISTANCE(
6>          a.Location, b.Location,
7>          'distance=500') = 'TRUE';
```



Oracle Spatial Option

Y Includes **Locator** features plus :

- Geometry operations
- Spatial aggregates
- Linear referencing
- Coordinate system transformation
- User-defined coordinate systems

- Network Management
- Topology
- Raster integration
- Geocoder
- Spatial Data Mining



An option of Oracle Enterprise Edition

Large data volumes, high user population

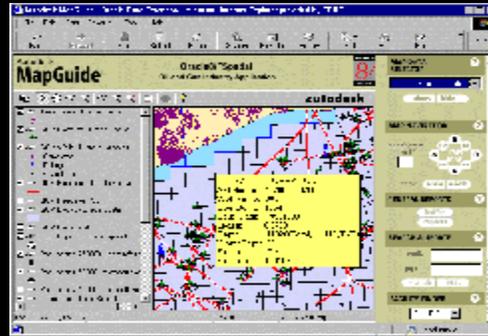
Complex queries, Advanced manipulations.

DBMS Enables Geospatial Platforms

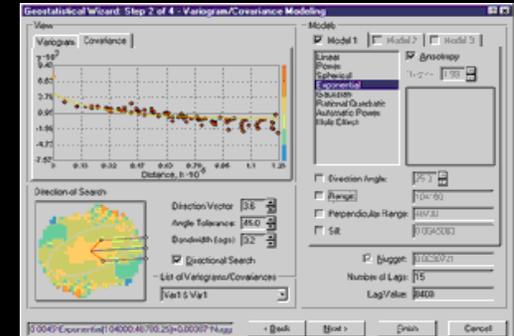
Land Management



Transportation



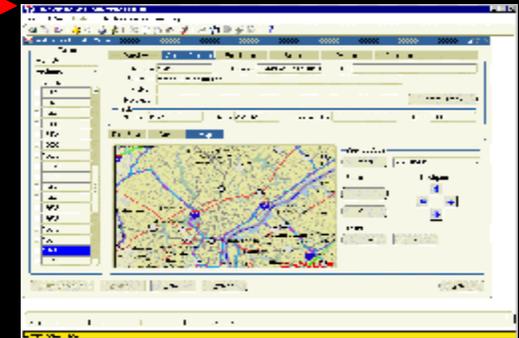
Modeling/Analysis



Homeland Security



Logistics



*Multiple Apps
Multiple Users*

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Ireland Dept. of Agriculture

The screenshot displays the IMap Spatial Applet interface within a Microsoft Internet Explorer browser window. The browser's address bar shows the URL: `http://localhost:8080/imap/servlet/ControllerServlet/servlet/SpatialServlet?action=getnode`. The applet interface includes a menu bar (File, Edit, View, Favorites, Tools, Help) and a toolbar with navigation icons. Below the browser window, the applet has a control panel with the following elements:

- Form Fields:** "Herd No" (text input), "Year" (dropdown menu set to 2002), and "RemoteSensing" (radio button).
- Navigation/Action Buttons:** "Locate", "Digitizing", "Farmer", "Spatial Query", "Eligibility", and "Print".
- Query Details Section:**
 - Radio buttons for "Parcels" and "Herd Numbers".
 - "Shape" dropdown menu set to "SQUARE".
 - Input fields for "Radius/Extent", "X", and "Y".
 - "Query Mask" dropdown menu set to "TOUCH".
 - "Query Type" dropdown menu set to "JOIN".
 - "Buffer" input field.
 - "Open SQL" and "View SQL" buttons.
 - "OK" and "Cancel" buttons.
- Thematics Section:**
 - "Name" dropdown menu set to "Thematic by Area".
 - "Print Legend" checkbox and "Legend" button.
 - "OK" and "Reset Map" buttons.
 - "View Summary Results" button.

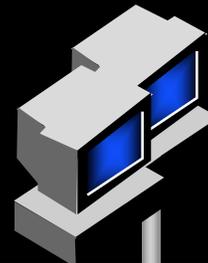
The main map area shows a grayscale aerial photograph overlaid with a white vector map of agricultural parcels. Several parcels are highlighted with a thick green border. Red text labels are overlaid on the map, including "F10117", "F10122", "F10111", "F10113", and "F10115". Various parcel numbers (e.g., 006, 004, 011, 019, 010, 022, 021, 001, 002, 003, 008, 014, 015, 006, 076, 043) and "NP" labels are visible. At the bottom of the applet, a status bar displays the message "[System] Refresh completed." and "Local intranet".

UK Ordnance Survey

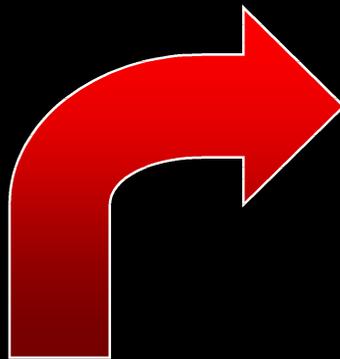
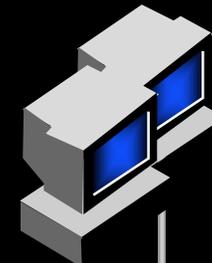
Data Collection



Production



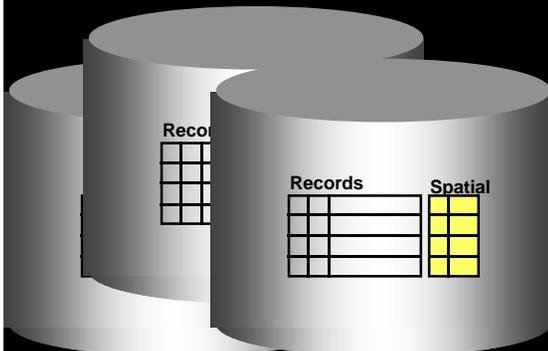
Dissemination



Surveys
GPS
New Features
Photogrammetry
Online Updates
Secure extraction

Parcel Updates
Integration
Long Transactions
Versioning
Topology Mgmt.
Quality Control
Security

Compilation
Media Production
Web Delivery
Online Query
Online updates
Personalization
Billing
Security



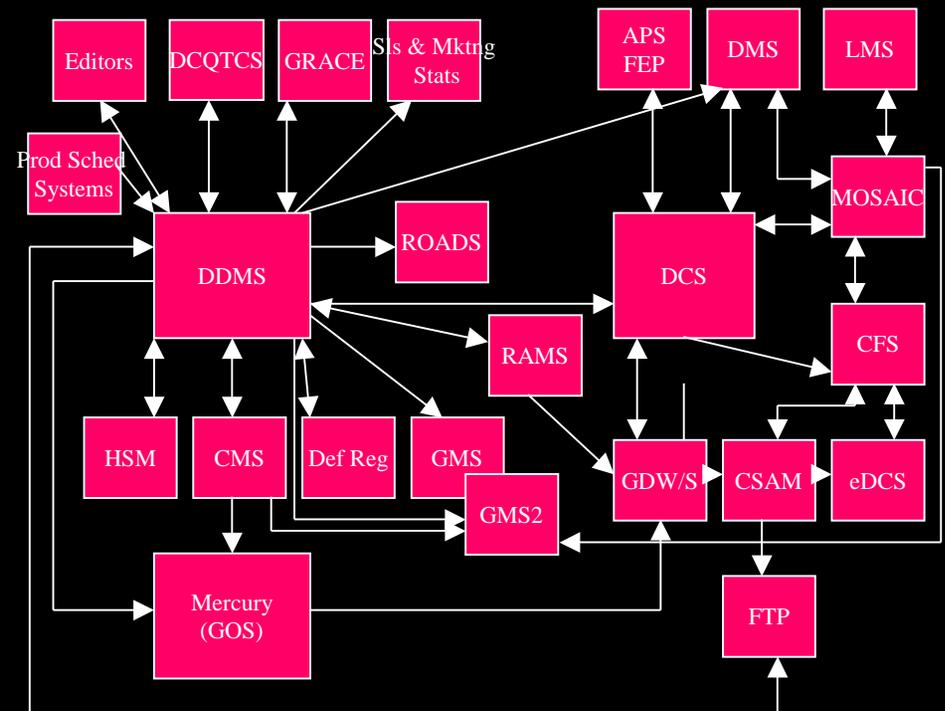
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UK Ordnance Survey

- ÿ Store and maintain once, use many times
- ÿ Reduce deployment costs
- ÿ Reduce maintenance costs
- ÿ Improve data integration
- ÿ Improve systems integration
- ÿ Facilitate new product opportunities
- ÿ Increase business agility
- ÿ Standards and COTS based

Previous Environment

- Existing systems lack agility
- Difficult to integrate/interoperate
- Very costly to maintain
- Complex bespoke developments



Sizing

Type of Data	Size (GB)
Raw Data	350
Spatial Indexes	70
Transient Tables required during Spatial Index Creation / Re-Build	40

450 million features

Transient Tables required during Spatial Index Creation / Re-Build	10
History Non-Spatial Indexes	10
Database Structures (system, undo, etc.)	100
Contingency at 25%	200
Total	995 GB

US Census Bureau 2010 TIGER

- World's largest Topology Maintenance Project
- Census standardized on Oracle10g Spatial for 2010 Topology Modernization Project
- Using Oracle10g Topology
 - Data Maintenance
 - Referential Integrity
 - Persistent Topology
 - Open Solution



New York City

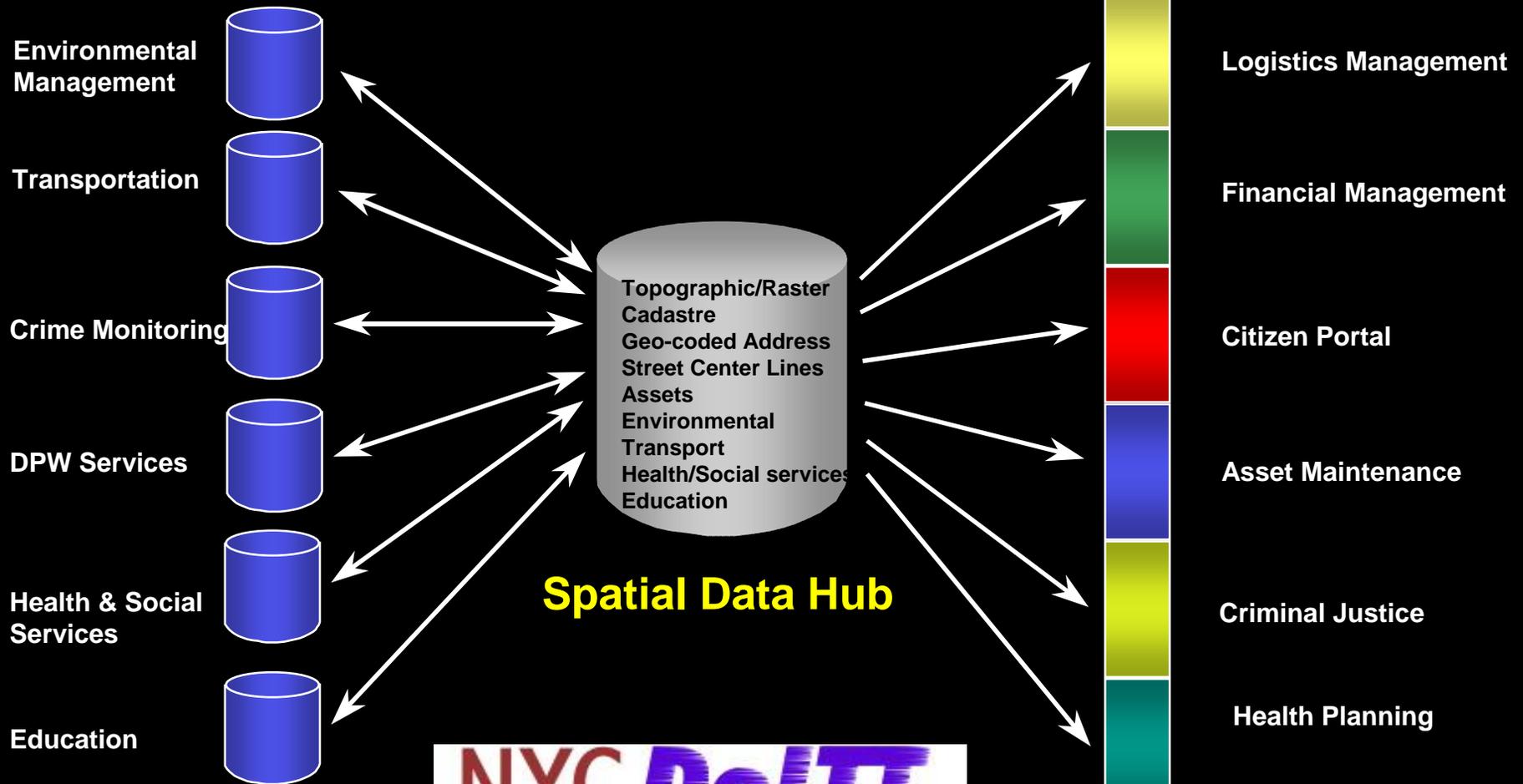
- Centralized GIS Utility based on Oracle Spatial
- Developed standardized digital basemap for all agencies
 - 6,000 miles of underground pipes
 - 1 million water/sewer connections
 - 32,000 sq. miles of Infrastructure Data
 - 7,500 digital photographs
- Multiple GIS applications: ESRI, Bentley, MapInfo, GE Smallworld
- Core component of city's 311 application



Integrated NYC Spatial Architecture

GIS Specialist Systems

Spatially Enabled Business Applications



Oracle10g Value Proposition

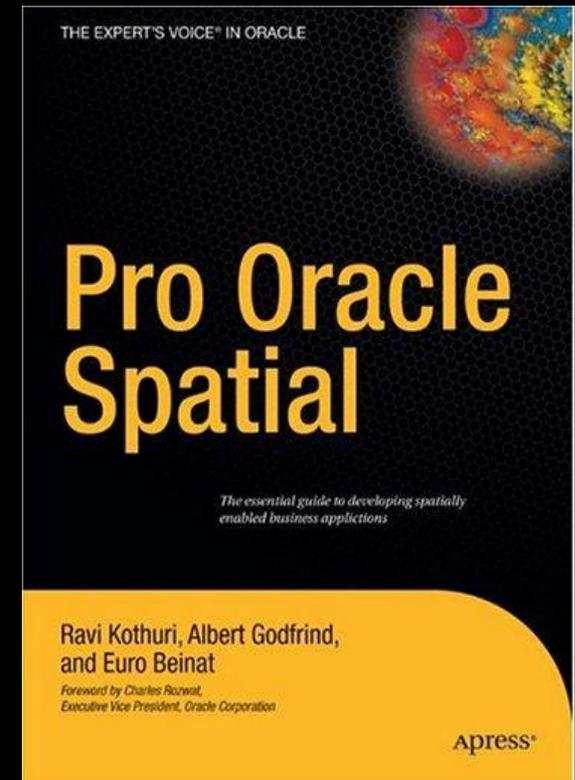
Integrated and Assured Information Sharing

- ÿ Single source of truth
- ÿ Strong Security
- ÿ Real-time information updates
- ÿ Interoperable data and location aware processes
- ÿ Integrated spatial information from multiple sources
- ÿ Enhanced Business and Operational Intelligence
- ÿ Creation of a Network Centric, Spatially Enabled, Real Time Enterprise



To find out more...

Y <http://otn.oracle.com/products/spatial>



Y Examples, white papers, downloads, discussion forum, sample data ...

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