Use of Oracle Spatial 10g for Land Management

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Overview

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

Mission Critical Uses in Cadastres Mapping Agencies, and Land Registration

- **IACS:**
  - **Ireland Ministry of Agric.**
  - **Netherlands Min of Agric.**
  - **Poland Min of Agric.**
  - **Italian Min of Agric.**
- **Cadastre:**
  - **The Netherlands**
  - **Poland**
  - **Denmark**
  - **Czech Republic**
- **Environment:**
  - **UK Environment Agency**
  - **U.S. EPA**
- Mapping Agencies:
  - **UK Ordnance Survey**
  - **Ireland Ordnance Survey**
  - **N. Ireland Ordnance Survey**
  - **SOGEI (Italy)**
  - **NGA (USA)**
  - **USGS (USA)**
  - **Australia**
- Hydrographic Agencies
  - Canada
  - Australia
  - US Navy …

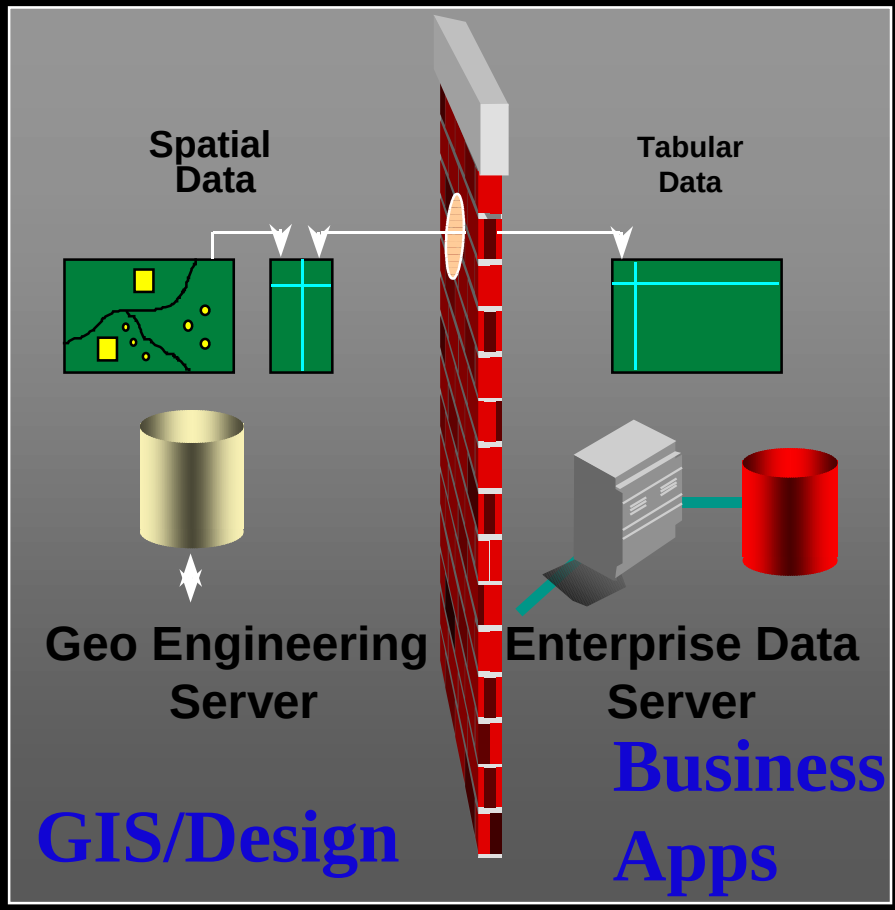
Location is becoming mainstream

- Location Aware Utilities Infrastructure
  - Networks: Outage, Network Analysis, Distribution,
  - Logistics: Real time supply chain management
  - Asset Management: Fixed, mobile, planning
- eBusiness Applications
  - CRM, Sales, Marketing, HR, Supply Chain
  - Web Portals: Google, Yahoo, AOL, Microsoft
- Location-enhanced Wireless Communications
  - Ubiquitous positioning capability

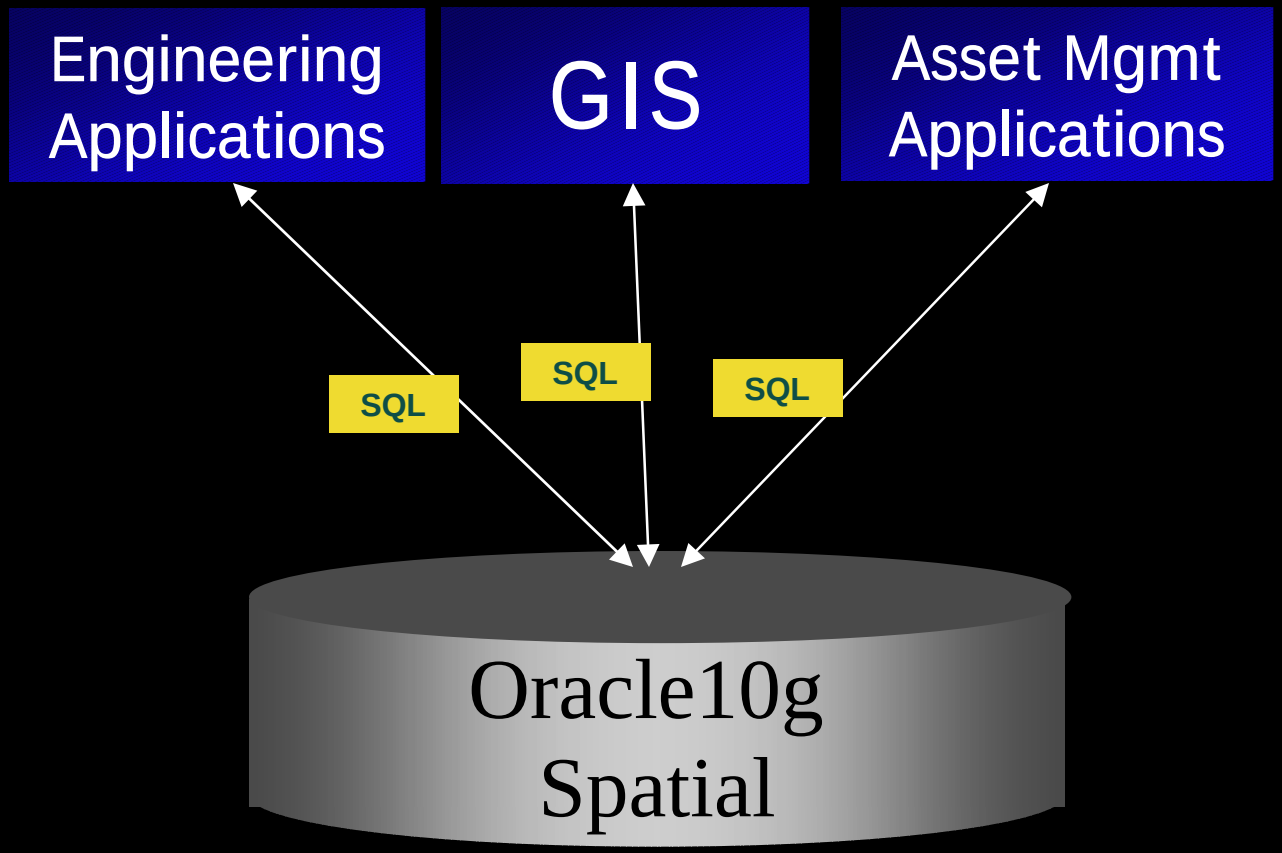
Amazon.com Example

Challenge of Integrating Spatial and Enterprise Applications

- Specialty GIS servers
  - Data isolation
  - High systems admin and management costs
  - Scalability problems
  - High training costs
  - Complex support problems
- Spatial data tightly coupled to specific application
- Information not aligned with Business Processes



Role of Spatial DBMS: Provides Security, Performance, Scalability

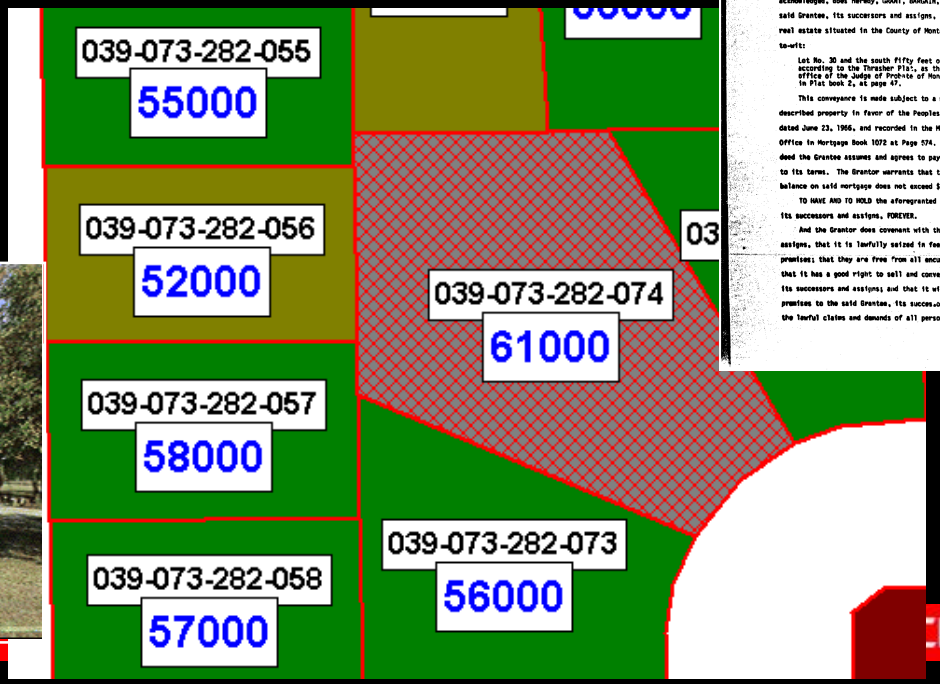


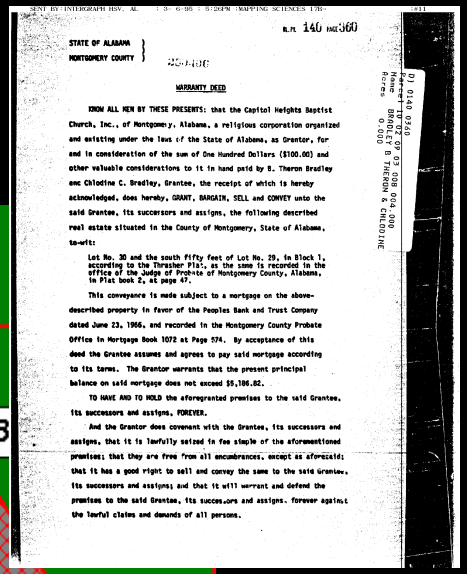
- Editing
- Geocoding
- Mapping
- Analysis/BI
- Workflows
- Business Logic

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

DBMS Supports all Information Types

- Relate associated information to spatial locations
  - Records
  - Images
  - Satellite imagery
  - 2D & 3D Vector data
  - Networks
  - Documents
  - Video
  - XML





Partners Supporting Oracle Spatial/Locator

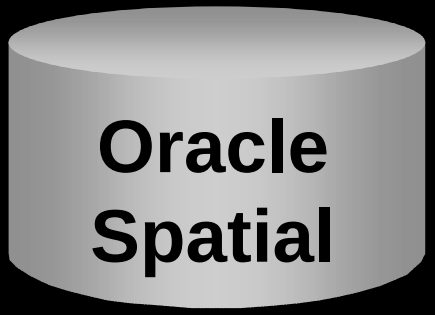
Enterprise Customer Requirements

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

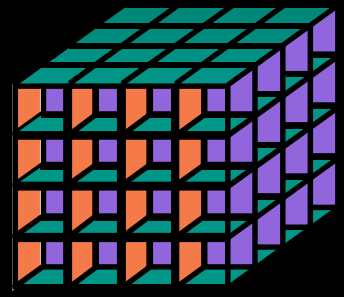
Oracle Spatial Capabilities

Spatial Data Types

All Spatial Data
Stored in the Database

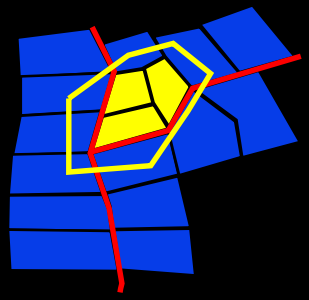


Spatial Indexing



Fast Access to
Spatial Data

Spatial Access Through SQL



Query/Analysis

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

Every Oracle10*g* Database is a Spatial DBMS

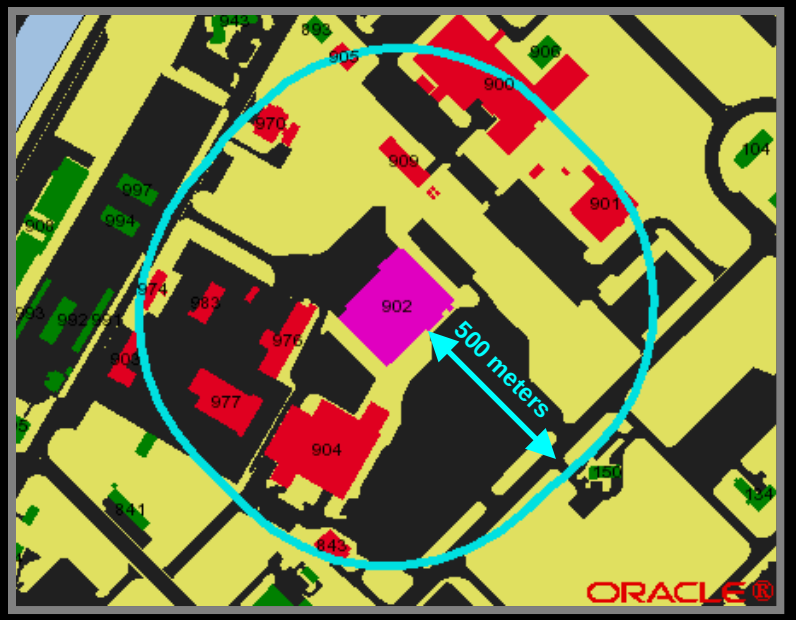
Oracle10g Locator Feature:

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

Spatial Query Via SQL

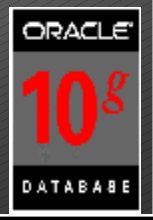
Find all building within 500 meters of building 902

```
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

- 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



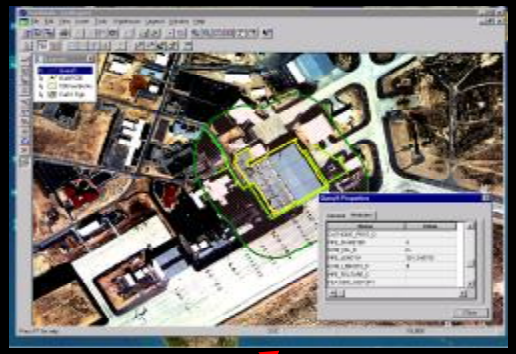
An option of Oracle Enterprise Edition

Large data volumes, high user population

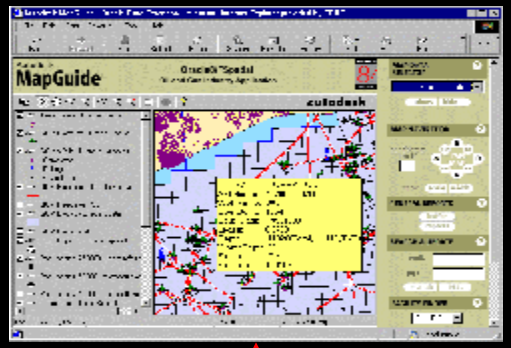
Complex queries, Advanced manipulations.

DBMS Enables Geospatial Platforms

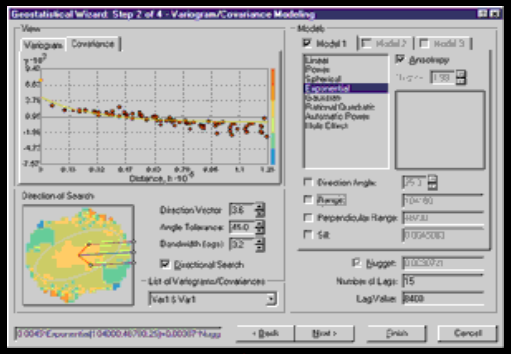
Land Management



Transportation

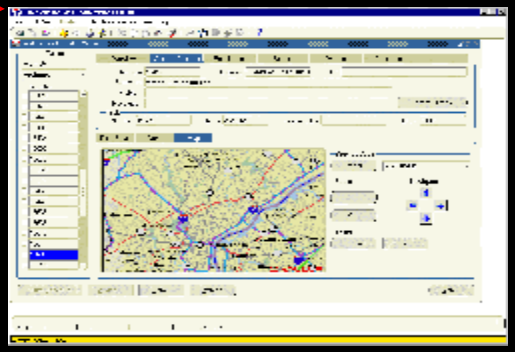


Modeling/Analysis



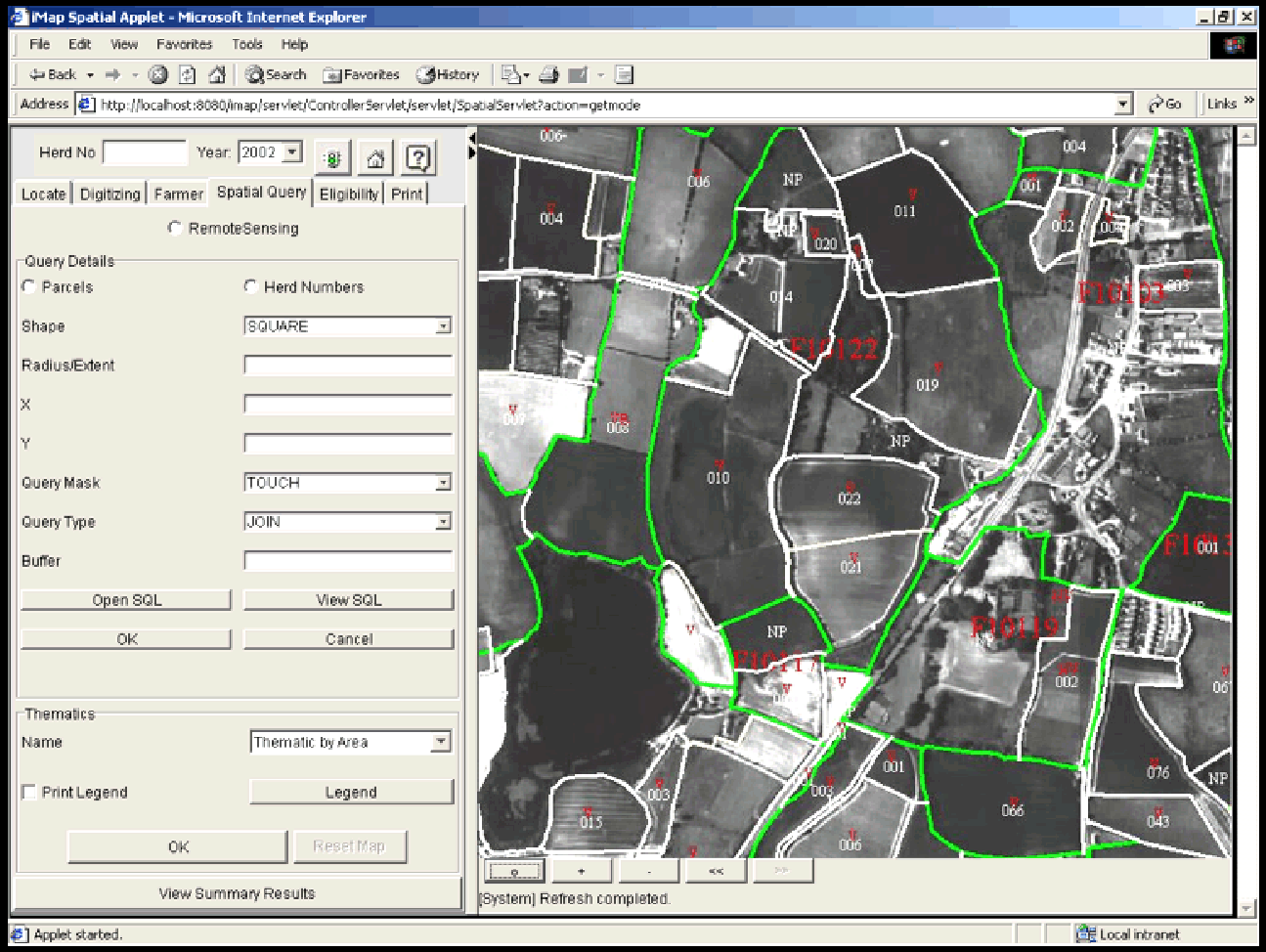
Homeland Security

Logistics

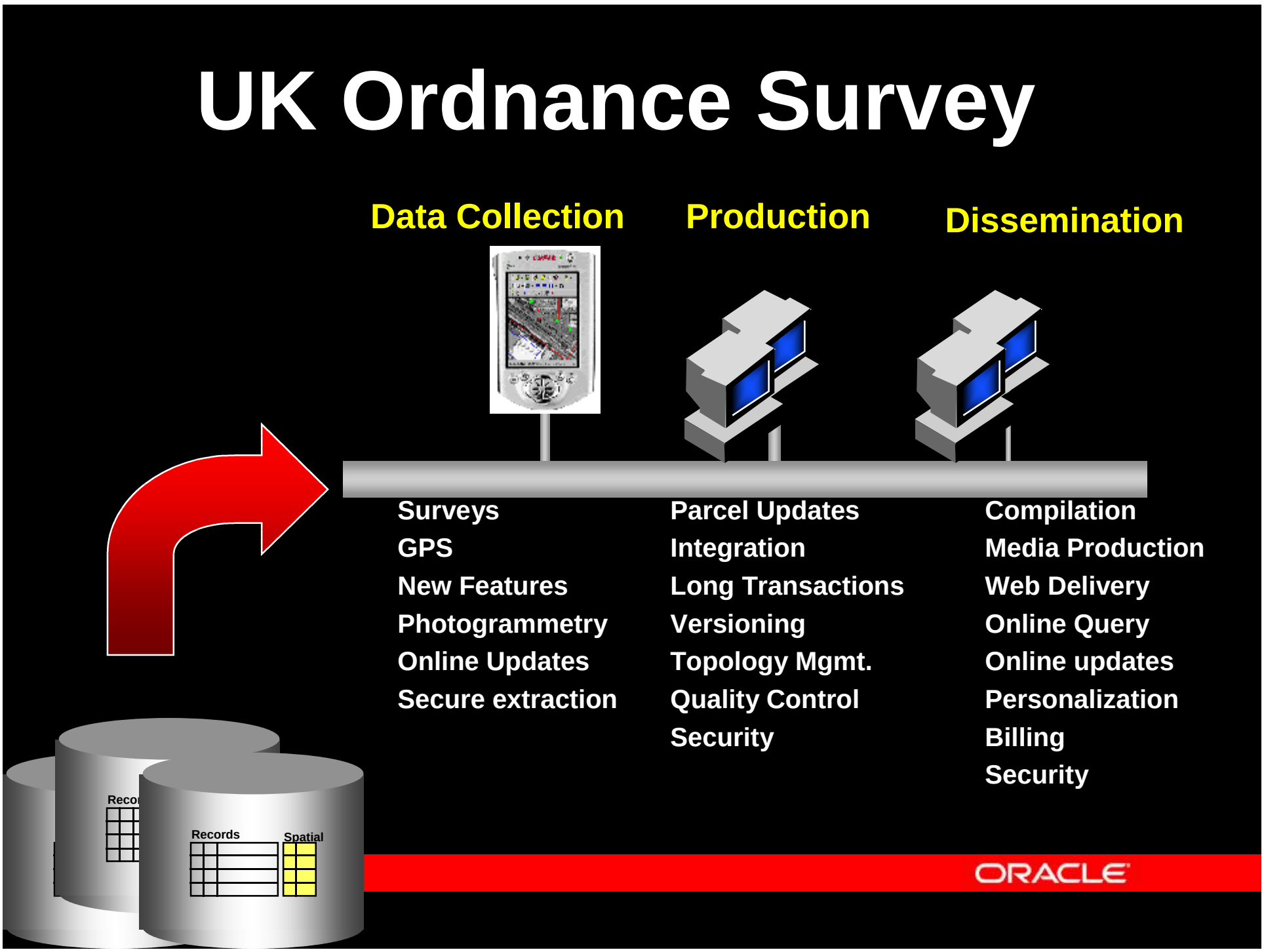


Multiple Apps
Multiple Users

Ireland Dept. of Agriculture



UK Ordnance Survey

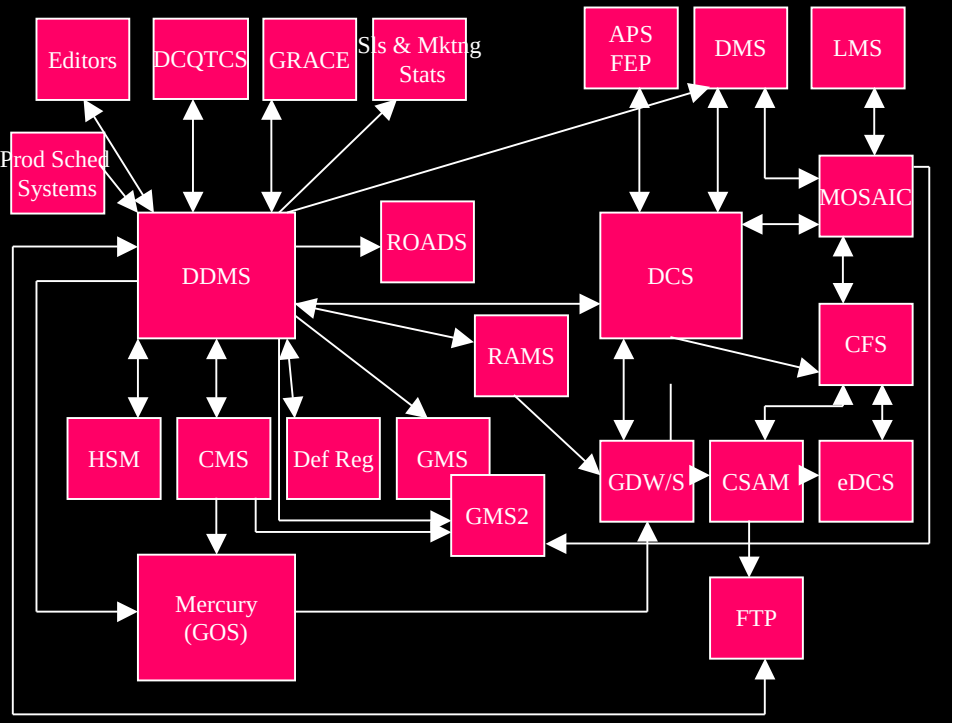


UK Ordnance Survey

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

450 million features

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

NYC DoITT
the department of information technology and telecommunications

- 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

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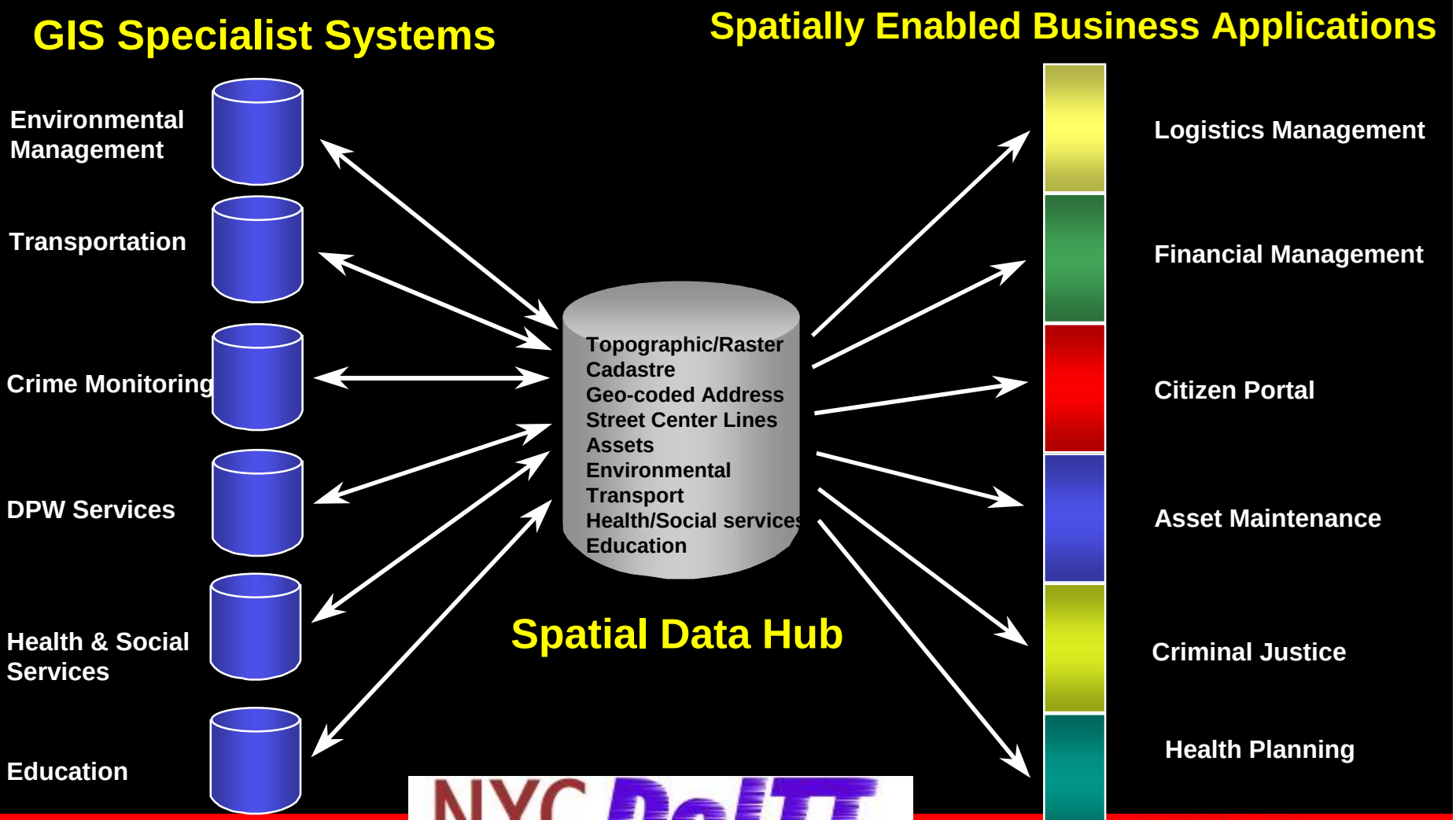
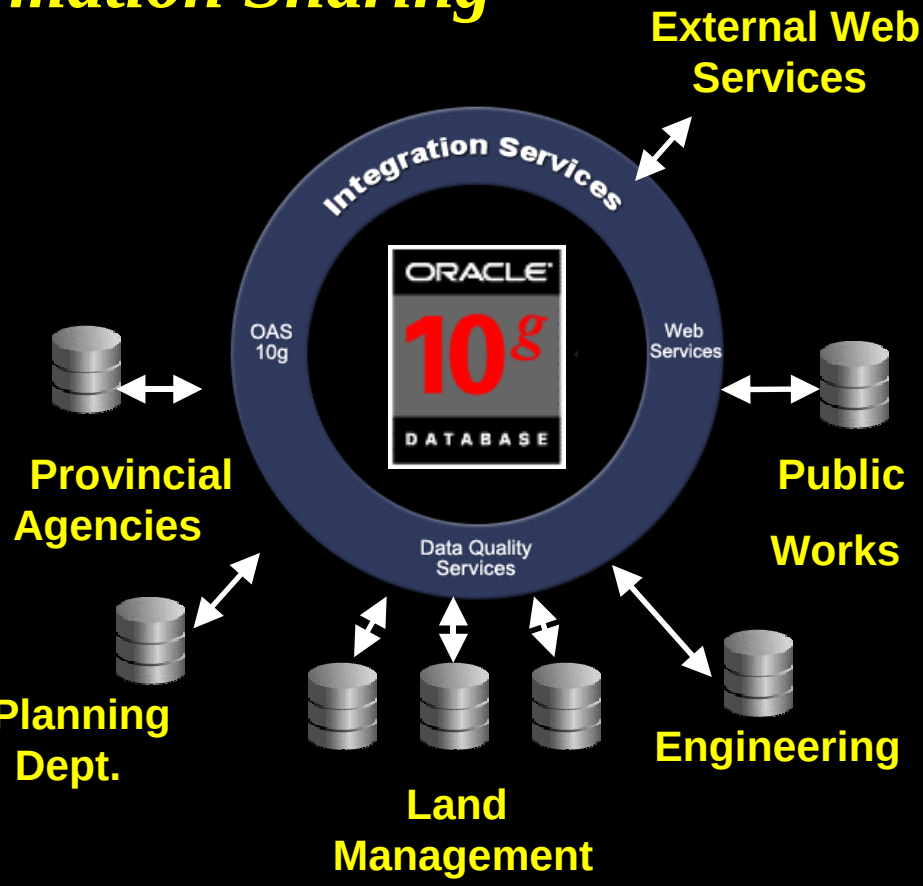
Integrated NYC Spatial Architecture



Oracle10g Value Proposition

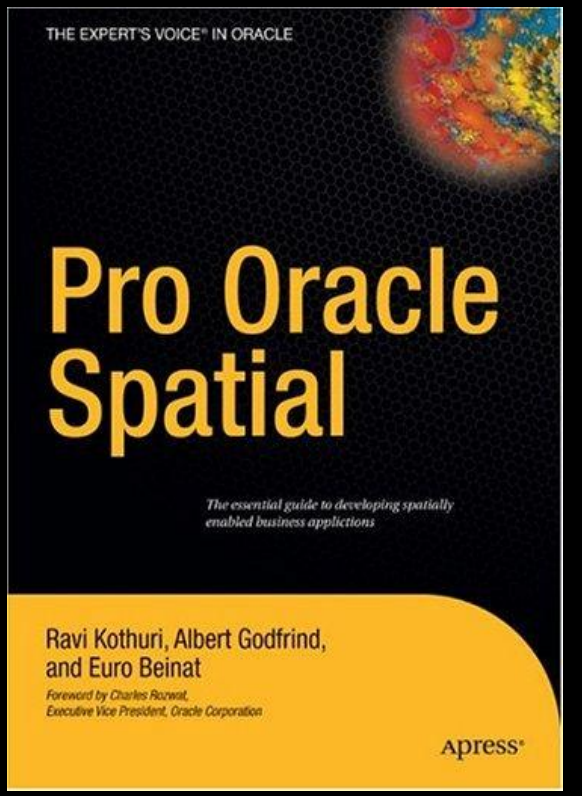
Integrated and Assured Information Sharing

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



To find out more...

- http://otn.oracle.com/products/spatial



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