

Spatially Enabling Business Intelligence

Integrating Business Intelligence and
Geographic Information Systems to Enhance
Your Decision Making Capabilities

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SYSTALEXSM

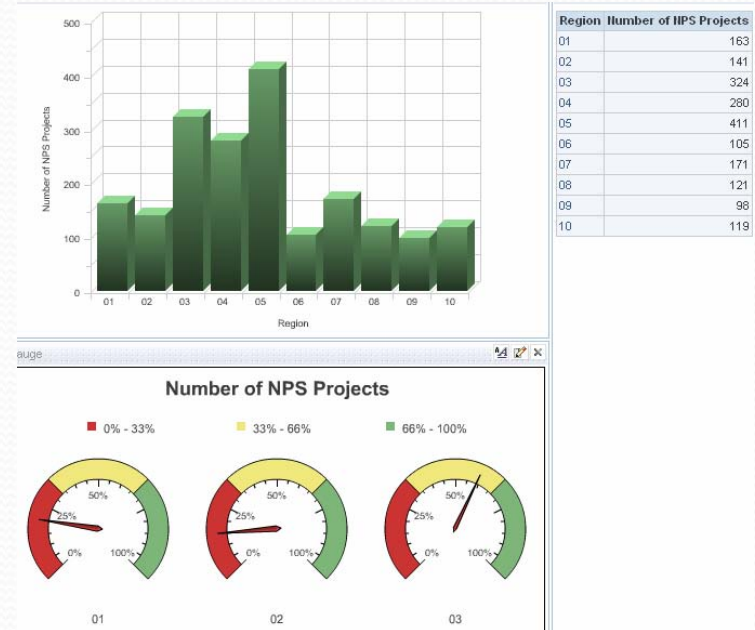


Presentation Outline

- Business Intelligence (BI) and Geographic Information Systems (GIS) overviews
- The case for spatially enabling BI (or business enabling GIS)
- An EPA Implementation:
 - EPA case study: Grants Reporting and Tracking System (GRTS)
 - System Overview
 - Systalex technical implementation with Microsoft Virtual Earth (VE) and Oracle Business Intelligence Enterprise Edition (OBIEE)
 - Integration results
- Moving Forward: Implementing your own spatially enabled BI at EPA

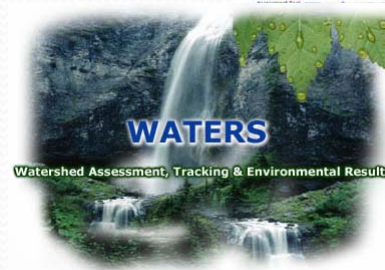
Business Intelligence Overview

- Processes to gain clearer understanding of operational behavior
- Analysis, interpretation, reporting and visualization of business application information
- Facilitates “on-the-fly” decision making
- Data typically “warehoused”
 - Provides a central view of data from a variety of sources
- Enables the creation of adhoc reports and dashboards based on related information



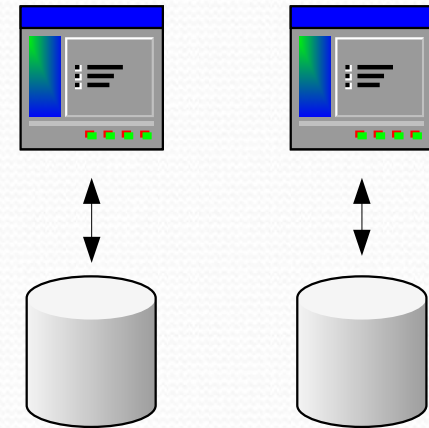
GIS Overview

- Geospatial data represent spatial locations and have attributes (where? and what?)
- Spatial data typically stored within a GIS
- GIS used for analysis, visualization, & spatial data storage
- Many EPA projects inherently spatial
- Example of GIS at EPA:
 - WATERS
 - EnviroMapper
 - Geospatial data access project
 - EPA Metadata Editor



Problem Statement

- GIS and BI applications historically separate
 - Users typically have to enter information or perform analysis using two different applications
 - Agencies typically spend money on either supporting GIS or business applications (or perhaps both)
- Business applications may contain spatial data, but no way to analyze or visualize it
- Connecting or integrating data from multiple separate systems is cumbersome and labor intensive
- GIS applications do not facilitate simplified views of data



The Solution: Spatially Enabling Business Intelligence



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- Adds another dimension to analysis and reporting
 - Additional elements to filter/query with
 - Provides ability to perform spatial analysis
 - Visualize and discover previously unknown spatial trends
 - Understand the effects location
- Maps add additional visual reporting component
- Return on your GIS investment



Or Business Enabling GIS

- Integrate GIS with enterprise data systems
- Leverage strong BI tools:
 - Reporting, including “canned” reports
 - Charting
 - Analytics
 - Inherent Summaries and Totals
 - Conditional Formatting
 - Parameter-driven analysis
- Return on your BI investment



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An EPA Implementation

Grants Reporting and Tracking System
(GRTS)



GRTS Challenge

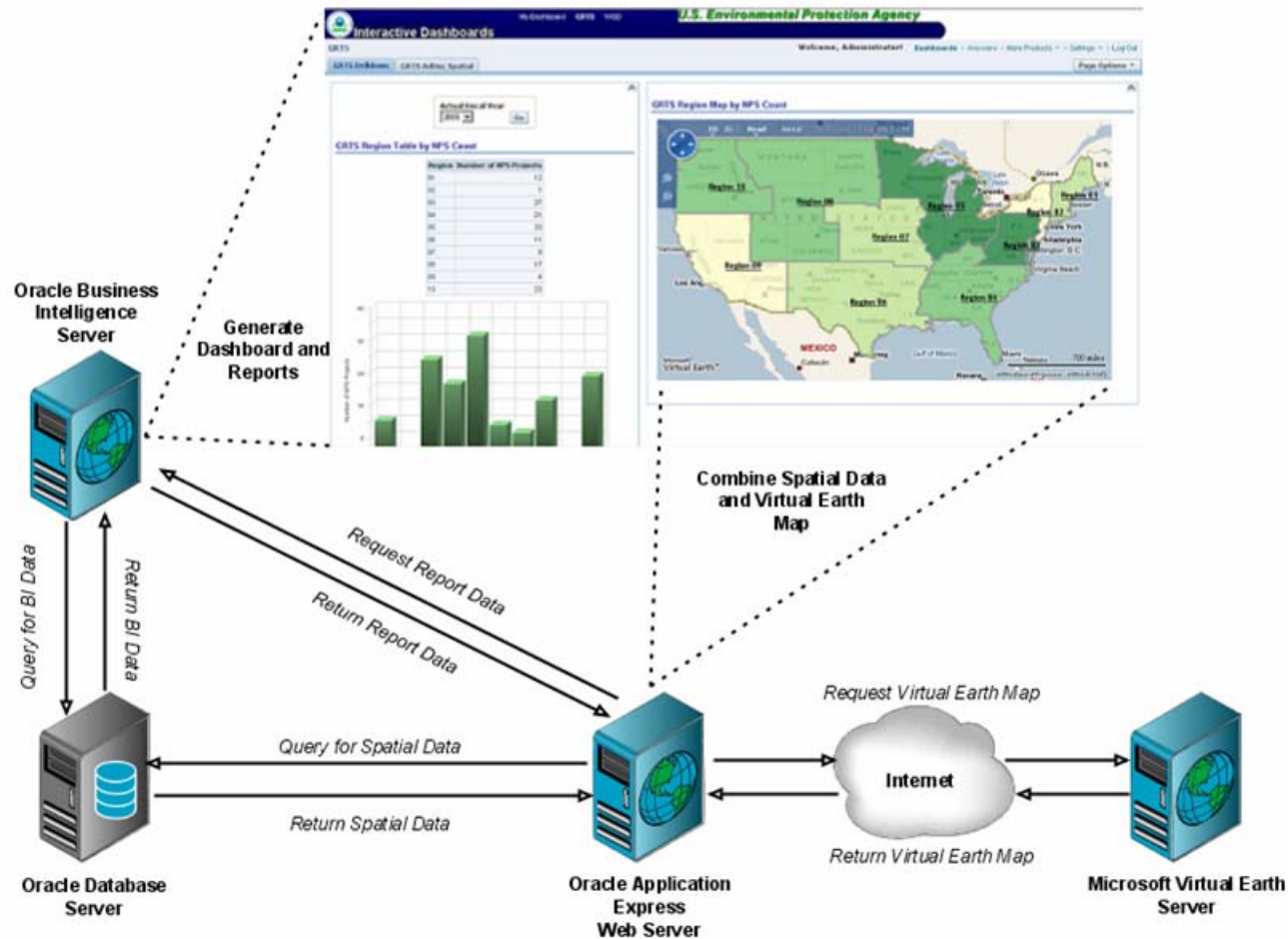
- Utilize the existing GRTS business and spatial information to develop a solution that:
 - Creates reports, charts and maps that visualize GRTS information
 - Facilitate on-the-fly decisions of GRTS data
 - Identify where projects exist and enable the discovery of spatial trends
 - Interface with other business and spatial information to facilitate contextual interpretations



Key Technical Components

- GRTS spatially-enabled BI solution developed by Systalex
 - BI: Oracle Business Intelligence Enterprise Edition
 - GIS: Microsoft Virtual Earth and Oracle Spatial
 - Database: Oracle 10g
 - Web server: Oracle Application Server

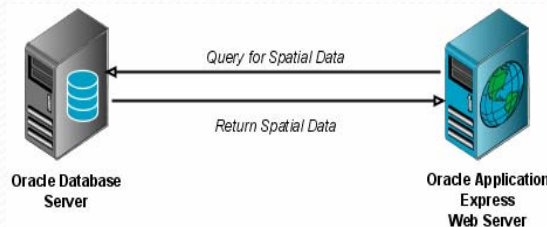
Technical Implementation Overview



BI/GIS Integration 1: Spatial Query Drives BI Request



- Map as an analysis tool

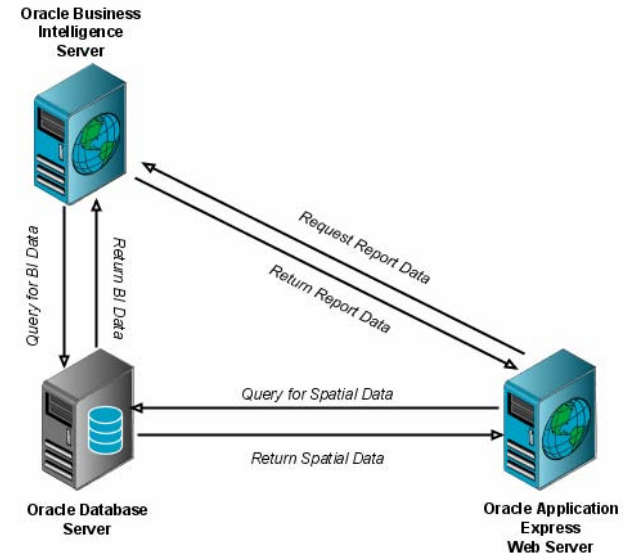


GRTS HUIC12 Table by NPS Count

WUC12	WUC12 Watershed	Number of NPS Projects
020700000904	Golden Isles-Pulaski River	1
020700000905	Sagehen Run	1
020700001001	Potomac River MD Only	1

BI/GIS Integration 2: BI Request Drives Spatial Query

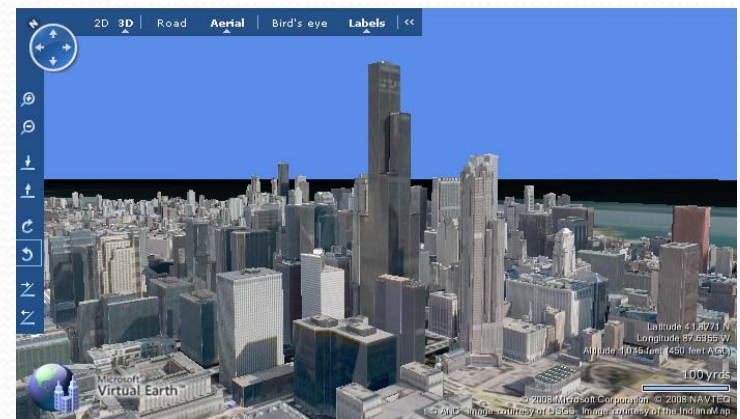
- Map as visualization tool



GRTS OBIEE/VE Functionalities 1:

VE as Geovisualization tool

- Microsoft Virtual Earth a familiar geovisualization tool
- User-friendly, intuitive and responsive interface
- Base map (roads, imagery) already created
- Features such as 3-D and Bird's Eye mode enhance experience
- Customizations through Javascript API



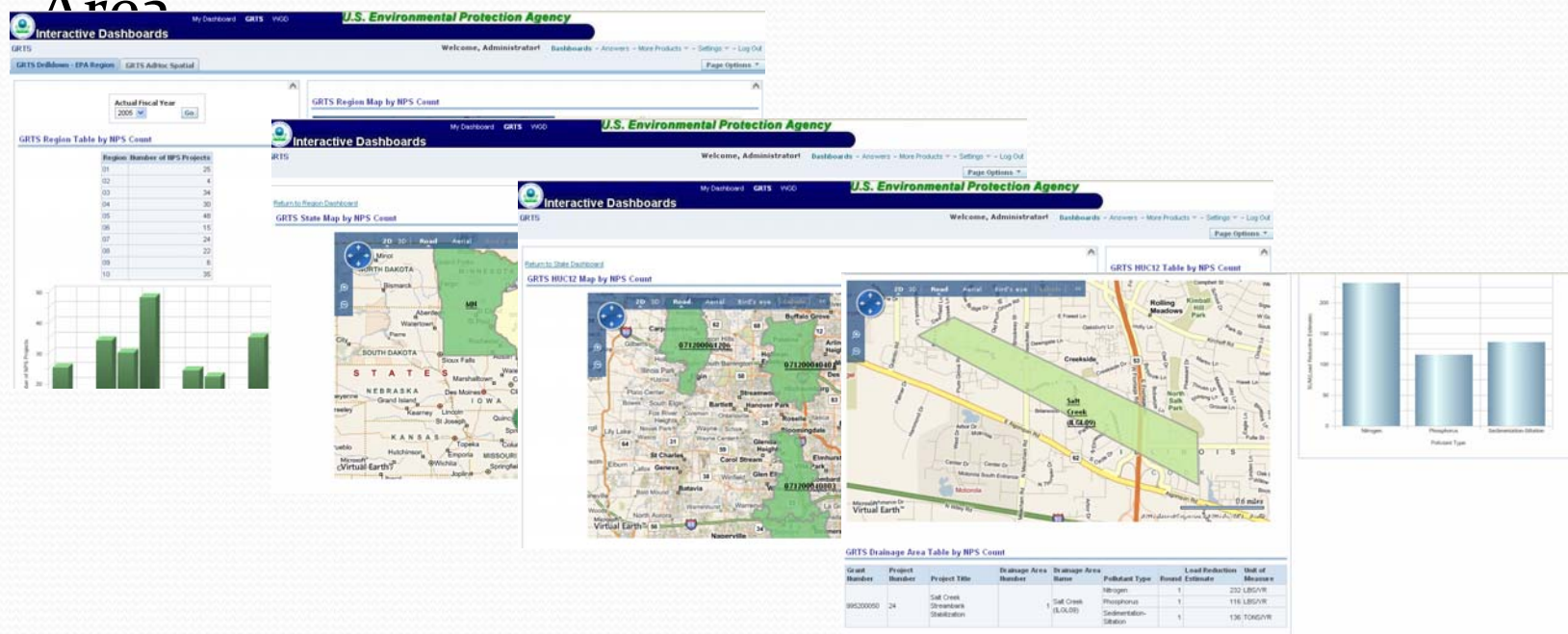
GRTS OBIEE/VE Functionalities 2: Thematic Mapping

- Maps used as data visualization tool (a different way of viewing data other than tables/charts/etc.)
- Used to quickly identify where data trends may exist and exceptions



GRTS OBIEE/VE Functionalities 3: Spatial Drilldown

- Spatial component to OBIEE drilldown functionality
- Drilldown using spatial units. In GRTS example, we use EPA Region, State, HUC12 and GRTS Drainage Area



GRTS OBIEE/VE Functionalities 4: Display of GRTS Spatial Data

- GRTS application spatial data can be displayed within OBIEE
- Eliminates the need to use another geospatial visualization tool or application to view subject data while performing analysis with OBIEE.

GRTS Drainage Area Map by NPS Count

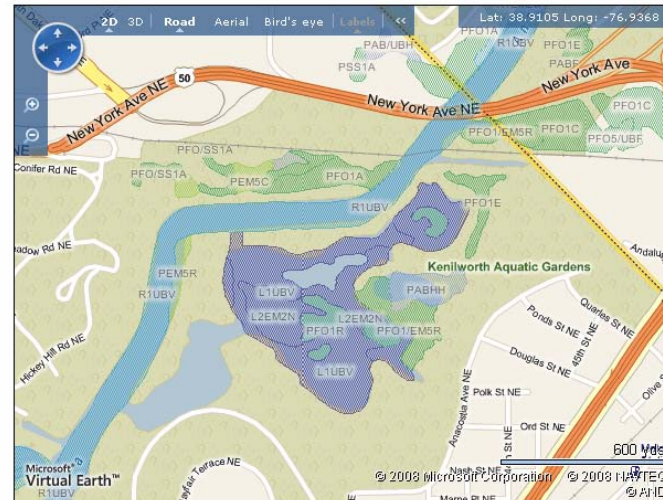


GRTS Drainage Area Table by NPS Count

Grant Number	Project Number	Project Title	Drainage Area Number	Drainage Area Name	Pollutant Type	Round	Load Reduction Estimate	Unit of Measure
995200050	19	Jackson Creek Watershed Planning	1	Jackson Creek (ILGC03)	Nitrogen	1	1	LBS/YR
					Phosphorus	1	1	LBS/YR
					Sedimentation-Siltation	1	1	TONS/YR

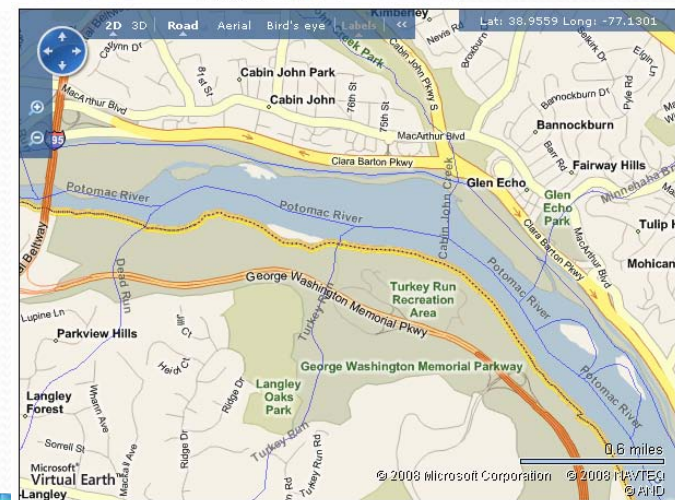
GRTS OBIEE/VE Functionalities 5: Mashups With Other Spatial Data

- Mashups with other spatial data (such as WMS, KML, GeoRSS, etc) enable visualization of subject data with contextual information



NWI

NHD



GRTS OBIEE/VE Functionalities 6: AdHoc Spatial Analysis

- Create BI reports/charts/etc. for areas of interest

U.S. Environmental Protection Agency
Interactive Dashboards
GRTS
GRIS Drilldown - EPA Region | GRTS AdHoc Spatial

Welcome, Administrator! | Dashboards - Answers - More Products - Settings - Log Out


Page Options

GRTS AdHoc Spatial Definition Tool

Enter Location (e.g., Washington DC): Search Map

Instructions

1. Use the map tool and search box to zoom into your area of interest and activate the tools below.
2. Select the fiscal year:
2007
3. Select HUC12 or GRTS features to create the report:
 HUC12 GRTS
4. Use one of the following tools to define your spatial area of interest:



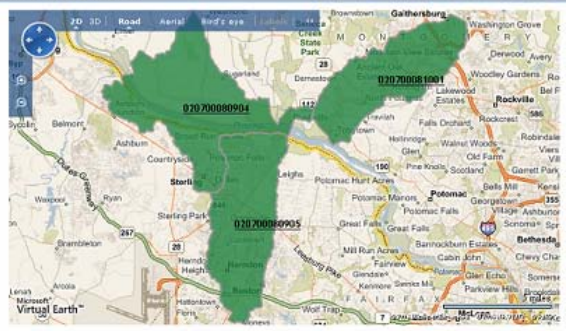
U.S. Environmental Protection Agency
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Back to AdHoc Spatial Menu

GRTS HUC12 Map by NPS Count



GRTS HUC12 Table by NPS Count

HUC12	HUC12 Watershed	Number of NPS Projects
020700080904	Selden Island-Potomac River	1
020700080905	Sugarland Run	1
020700081001	Potomac River MD Only	1



Meeting the GRTS Challenge

- Visualize tangible results
 - Displays of spatial data and business reports
- Verify project results against project goals
 - Including where?
- Interface with other data
 - Spatial data
 - Business data
- Link spatial data with other data sources to aid in report interpretations

Summary of GRTS OBI/VE Implementation



- GRTS a “real-world” EPA example that has already benefited its users
- Advantages of Oracle / VE
 - Virtual Earth a user friendly, intuitive and technically “lightweight” geospatial visualization tool
 - Oracle Spatial is fast and efficient at spatial data storage and analysis
 - Business Intelligence extremely powerful analysis, charting and reporting tool
 - Ajax and Java technologies enable fast and responsive applications
 - Low cost
 - Ease of implementation, integration and openness



Moving Forward: Implementing your own Spatially Enabled BI at EPA

- Spatially enabled BI not tied to any specific technologies!
 - And technologies continue to evolve making integration simpler
- EPA technologies currently available:
 - BI: Oracle (OBIEE), Business Objects
 - GIS: ESRI, Oracle Spatial, Virtual Earth, Google Maps
- OBI/VE approach has already been deployed to production by Systalex
- Data requirements: spatial (locations), business data for analysis, and a question!
- Systalex recommendations:
 - Choose technologies with strong and flexible APIs
 - Make solution flexible to adapt to change reporting and GIS requirements

Thank you

Time for a quick live demo?
Please check us out at our booth!

msmith@systalex.com

SYSTALEXSM