GeoAnalytics

Spatial Intelligence

The Intersection of Data Warehousing, Business Intelligence, Predictive Analytics, and Geographic Information Systems

An Evolving Sensibility

GeoAnalytics

Intelligence

Understanding

Knowledge

Information

Data

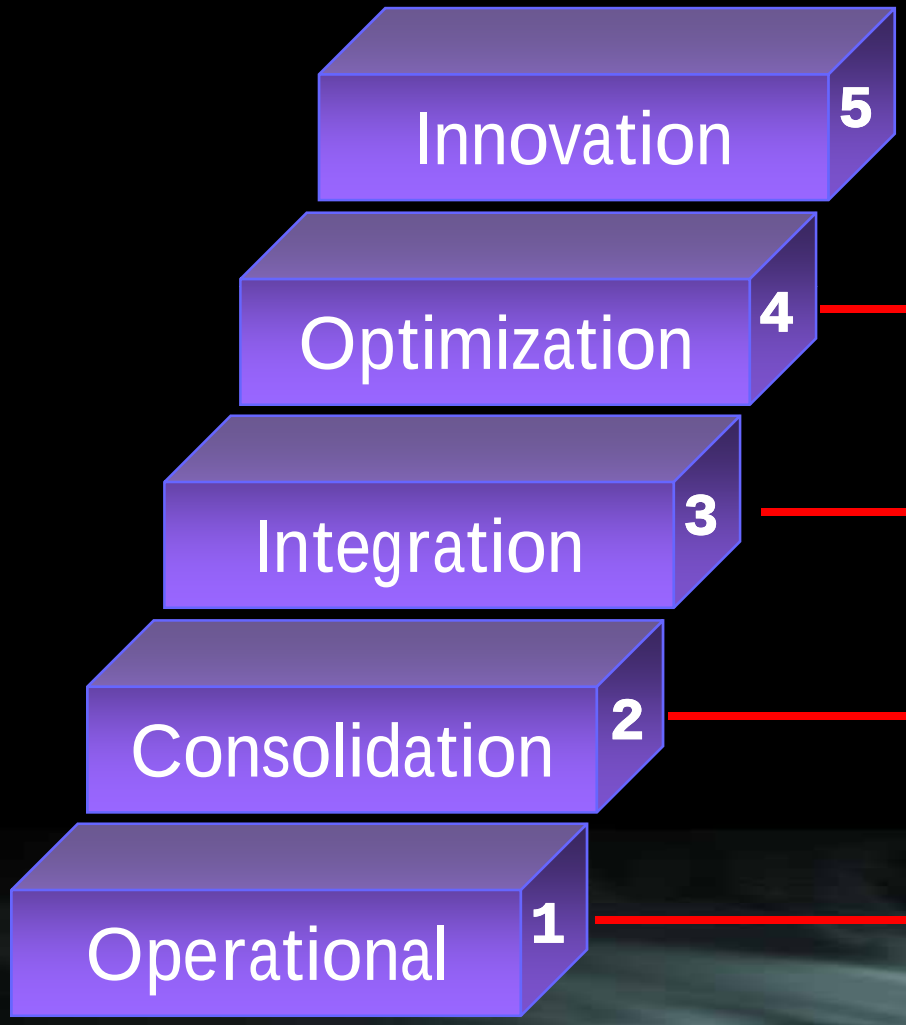
GeoAnalytics

"Organizations must evolve from *'What We Think'* to *'What We Know'*."

Gary Lovemann, CEO Harrah's Entertainment

The Information Evolution Model

Adapted from: *The Information Revolution*, Davis et. al, 2006



Enterprise *Intelligence* and Analytics to Create New Value

Enterprise *Information* and Analytics to Create Efficiency

Enterprise *Infrastructure* to Enable Knowledge Management

Workgroup Data and Analysis – *"Us Versus Them"*

Individual Data and Analysis – the *"Information Maverick"*

Key Concepts – *Knowledge Management*

- 'Knowledge Management' is a conscious strategy of getting the right knowledge to the right people at the right time

  O'Dell, Grayson, *If Only We Knew What We Know: The Transfer of Internal Knowledge and Best Practice,* 1998

- How an organization manages knowledge is a fairly good predictor of both best practice and organizational success

Key Concepts – *Business Intelligence and Analytic Intelligence*

- *Business Intelligence* is the use of information that enables organizations to best decide, measure, manage and optimize performance to achieve efficiency and financial benefit (*Gartner Business Intelligence Summit 2007*)

- *Analytic (Predictive) Intelligence* builds on previous experience, metrics, relevant variables, and circumstances to model future outcomes

IDC's Business Analytics Taxonomy, 2007

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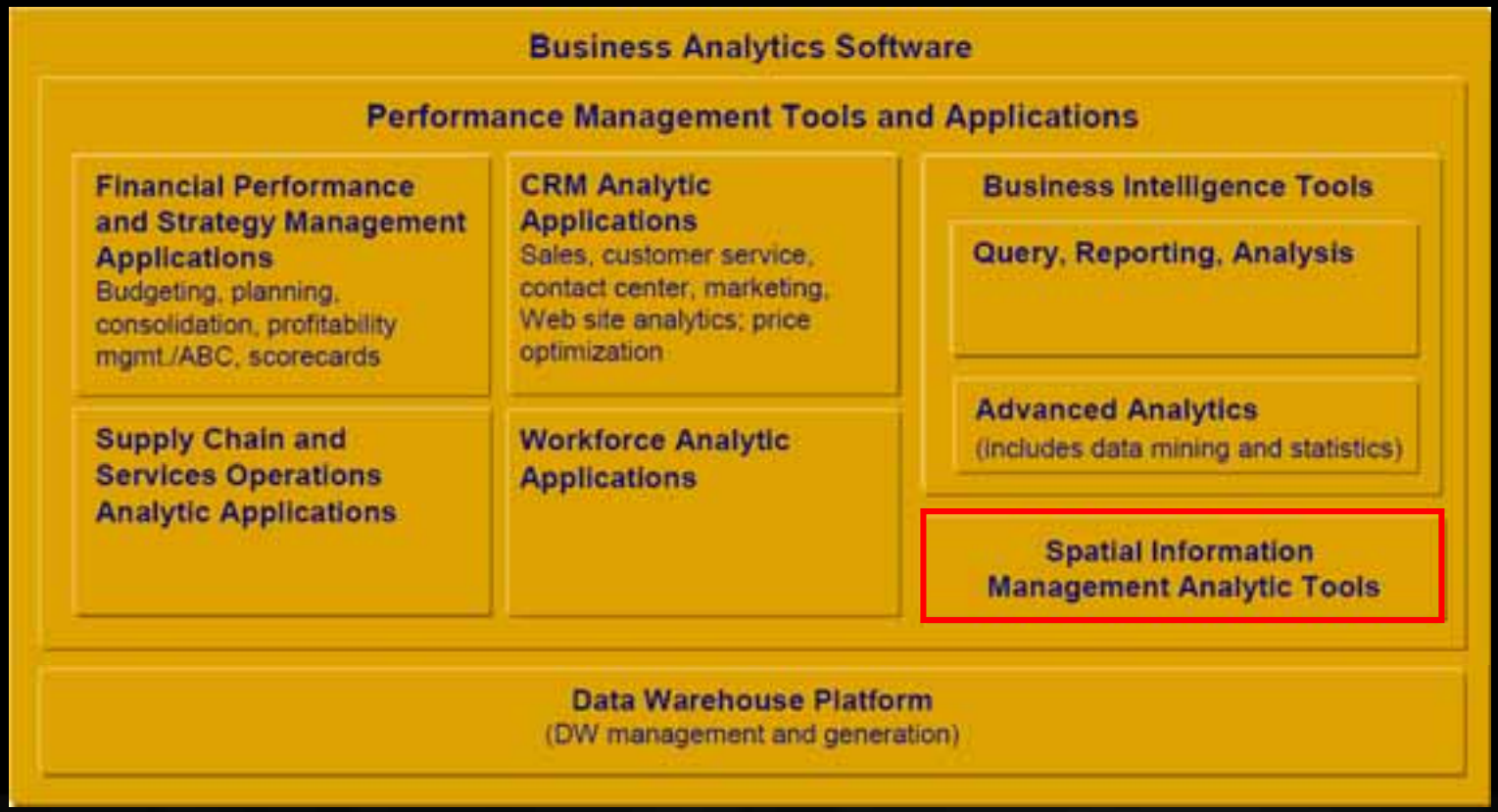
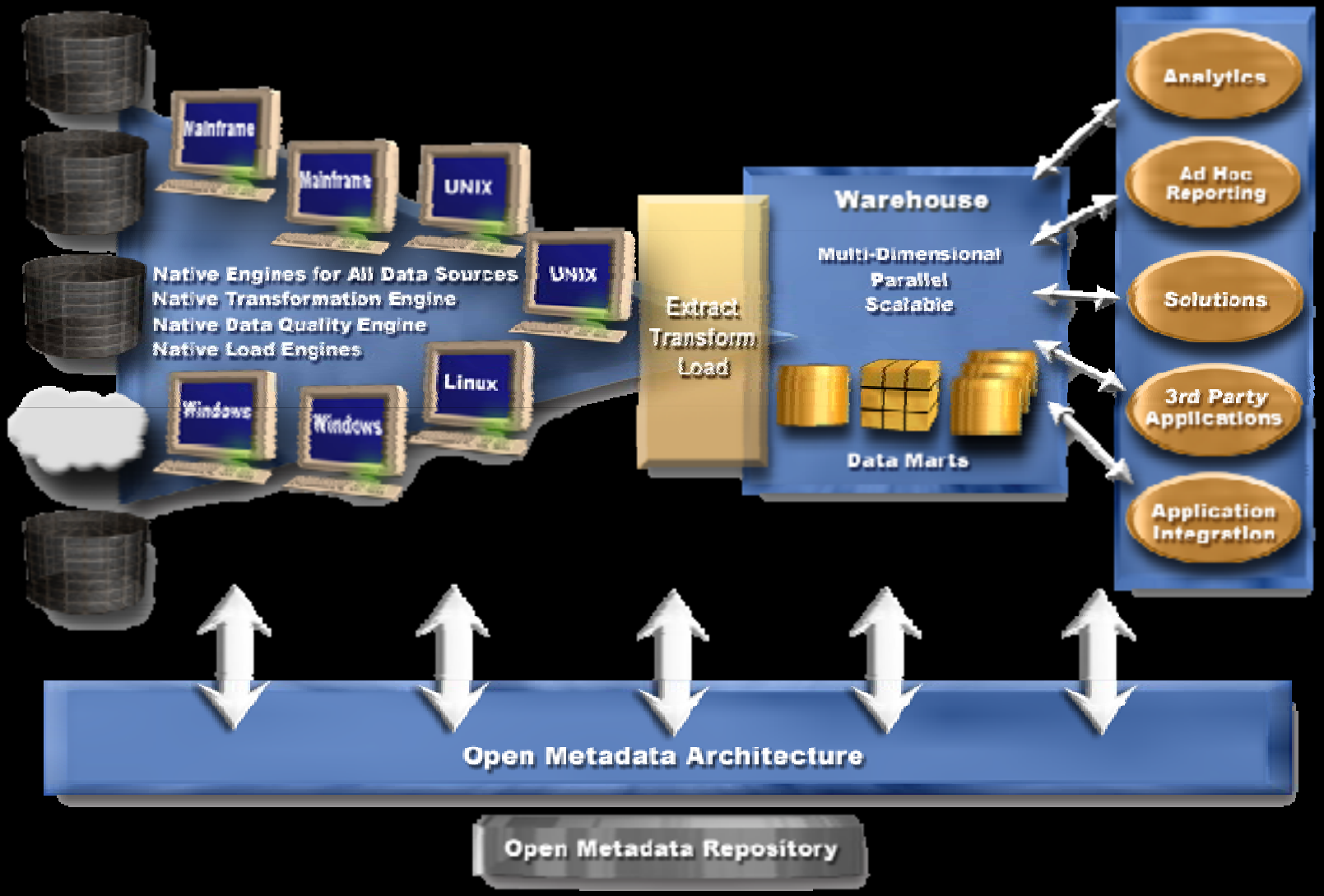


Technology/Solution Providers

- SAS Institute
- Teradata
- SAP/Business Objects
- IBM/Cognos
- Oracle/Hyperion
- Microsoft
- Information Builders
- Others…..

Business and Analytic Intelligence Platform



Location is Integral to Knowledge Management and Intelligence

GeoAnalytics

- Outcomes and Performance are inherently geographic whether localized, regional, or global
- Events rarely occur in a vacuum –
  - They affect surrounding people, economic and natural ecosystems, institutions, and communities

(Predicting where things will happen is powerful)

GeoAnalytics

"Everything is related to everything else, but near things are more related than distant things"

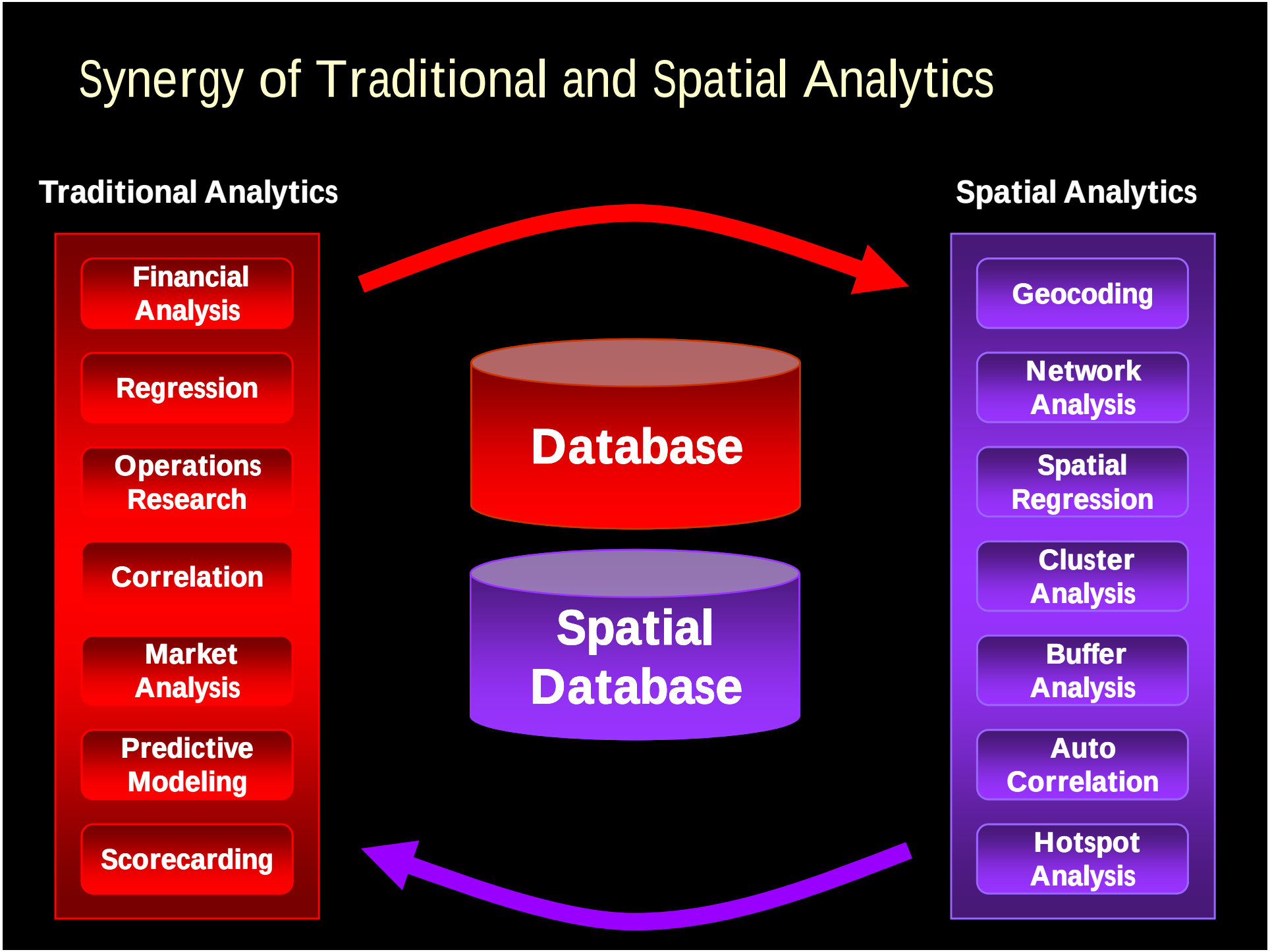
Waldo Tobler

On understanding the science of location and geography

Key Concepts – *Spatial Analytics*

- Spatial analytics and geographics is the science of location, adjacency, and direction between physical and cultural features on the landscape
  - Proximity analysis
  - Network analysis
  - Buffer analysis
  - Cluster analysis
  - Gravity modeling

Synergy of Traditional and Spatial Analytics



Key Concepts – *Spatial Intelligence*

GeoAnalytics

- *Spatial Intelligence* is the fusion of analytical GIS, Business Intelligence and Predictive Intelligence
  - Builds on descriptive analytics
  - Provides the context for inferential analytics

- Spatial Intelligence adds the geographic dimension to data management, analytics, and visualization

Spatial Intelligence in a Commercial Organization

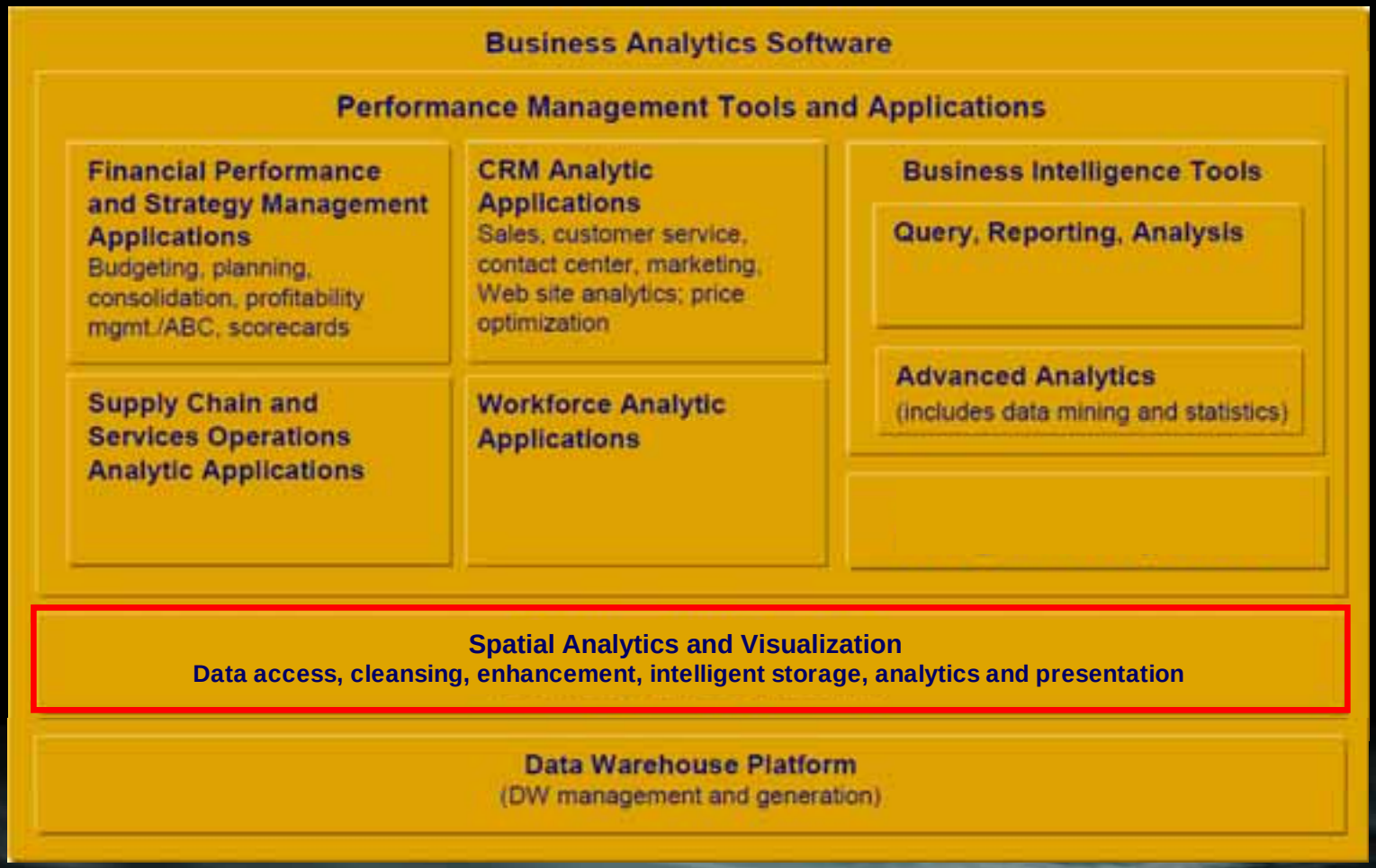
GeoAnalytics

- Spatial intelligence and predictive analytics can be integral to corporate strategies for:
  - Growth
  - Enhanced profitability in core business areas
  - Delivering needed products and services to customers – conveniently and affordably
  - Providing a competitive advantage

IDC's Business Analytics Taxonomy, 2007

An Evolving Perspective

GeoAnalytics



Enterprise Spatial Intelligence Platform

BUSINESS AND VALUE ADDED DATA SOURCES

SOURCE 1
Spatial
Non-Spatial
Internal

SOURCE 2
Spatial
Non-Spatial
Internal

SOURCE 3
Spatial
Non-Spatial
External

MASTER DATA MANAGEMENT

SOA / XML

ETL NON-SPATIAL

Data:
- Access
- Assessment
- Cleanse
- Quality
- Enhancement
- Transformation

SPATIAL

Data Repository

Dimensional Data Stores

Data Marts

Data Marts

TRADITIONAL AND SPATIAL ANALYTICS

TRADITIONAL
- Statistics
- Econometrics
- Operations Research
- Forecasting

SPATIAL
- Autocorrelation
- Interpolation
- Hotspot Analysis
- Regression
- Gravity Modeling
- Cluster Analysis

PRESENTATION VISUALIZATION

Dashboards

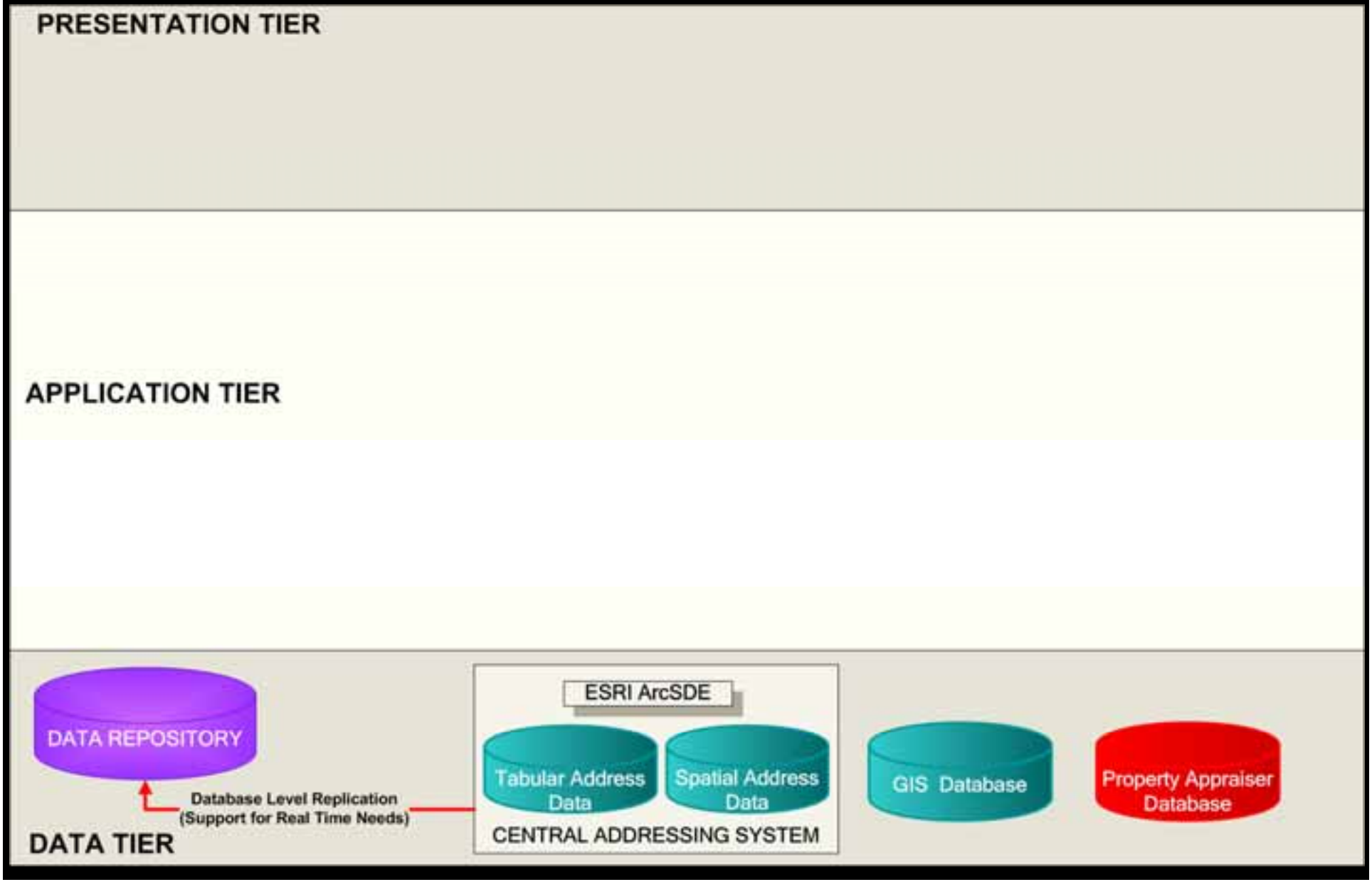
Reports

Data / Application Services

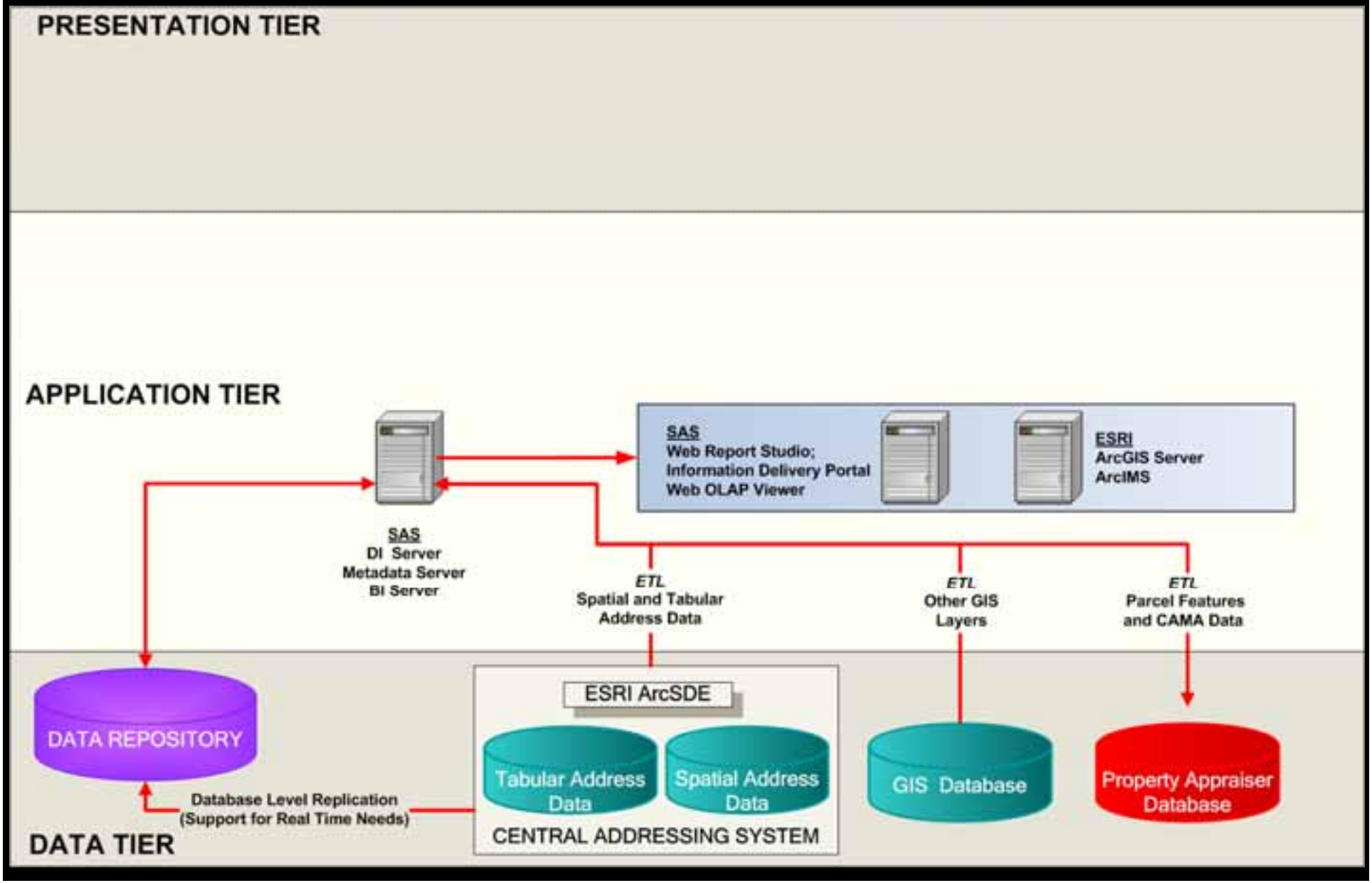
OLAP

Metadata

Orange County, FL EAS Output Architecture



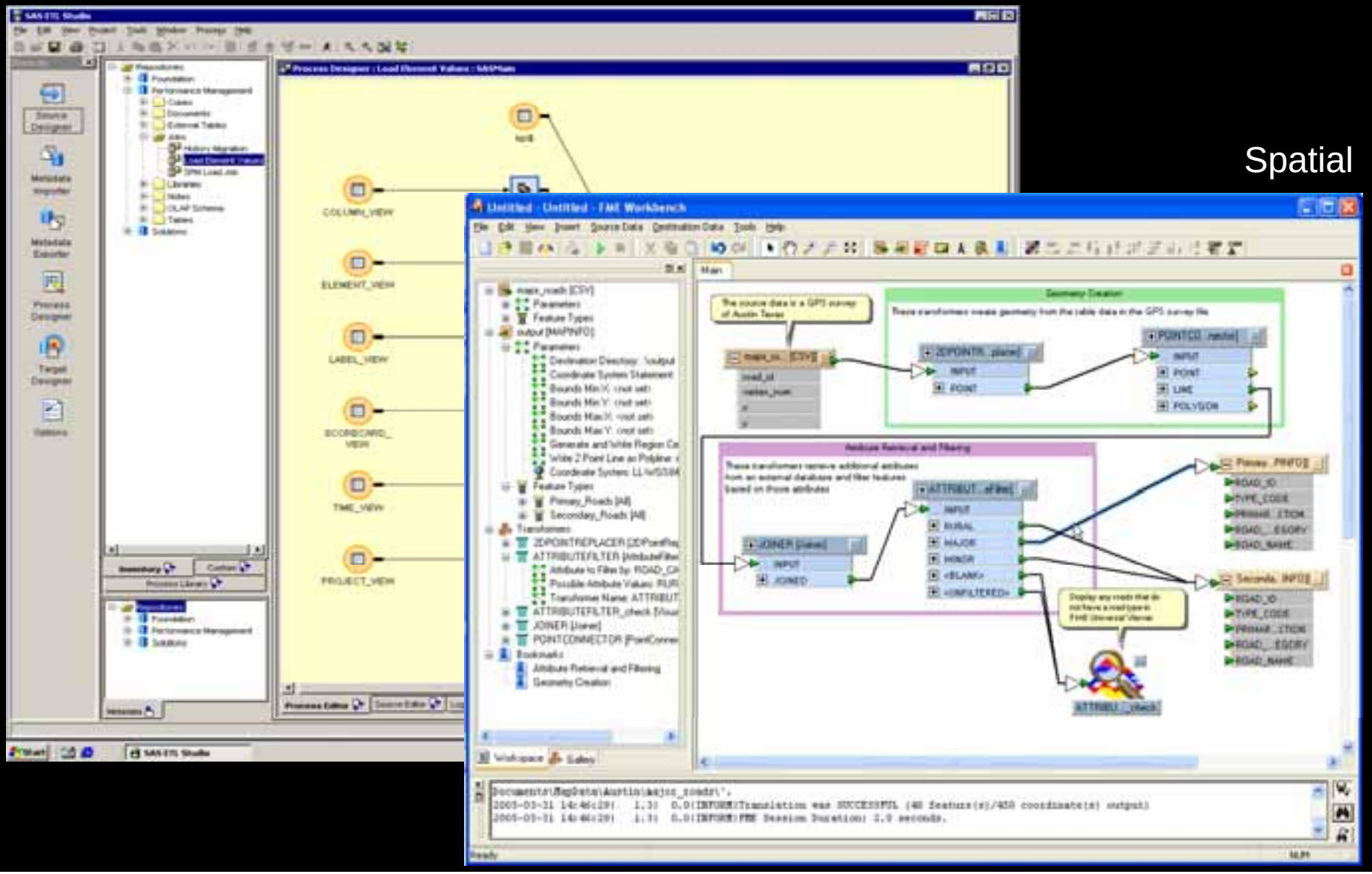
Orange County, FL EAS Output Architecture



Data Flow Management (ETL)

Non-spatial

Spatial



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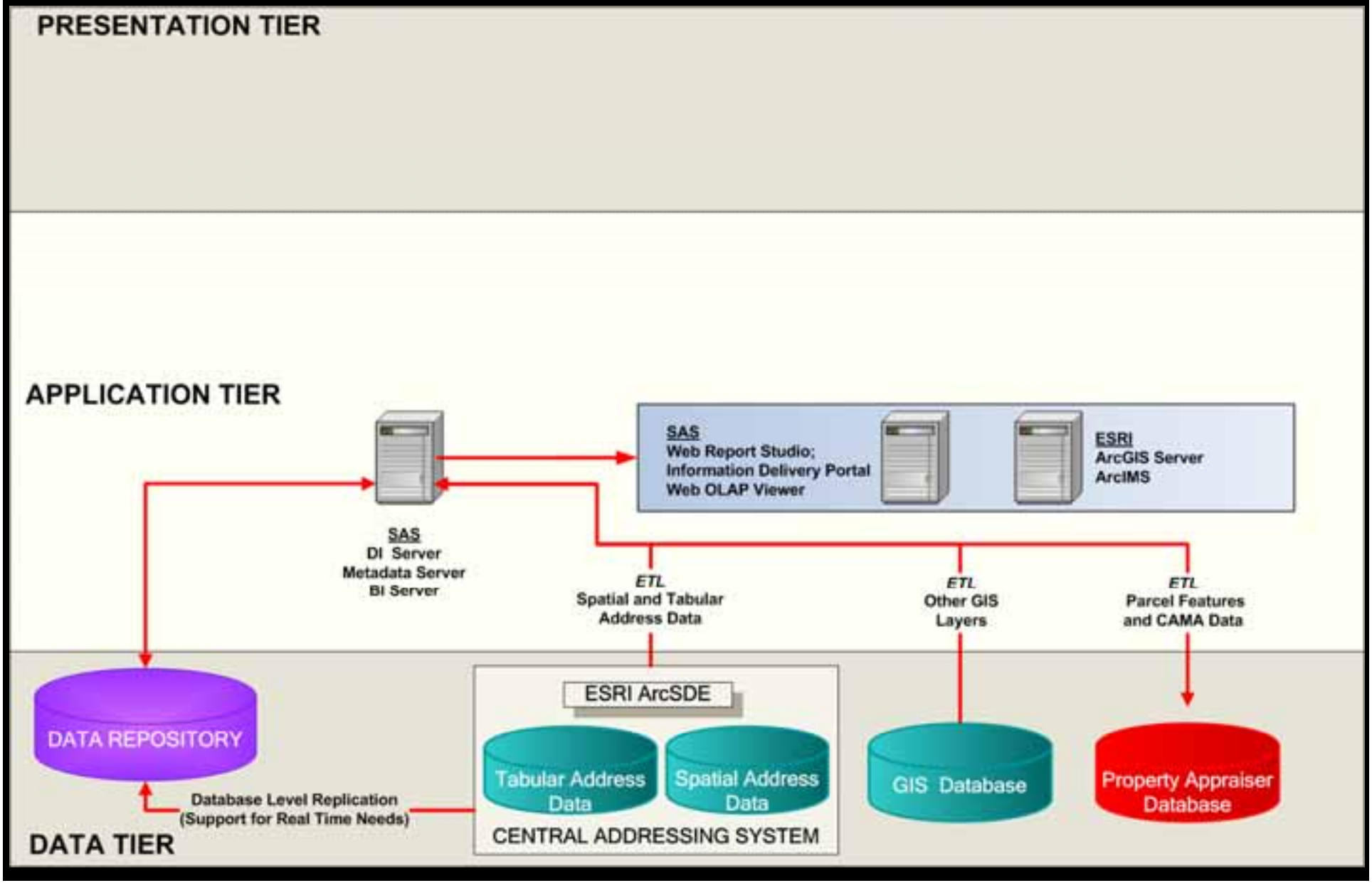
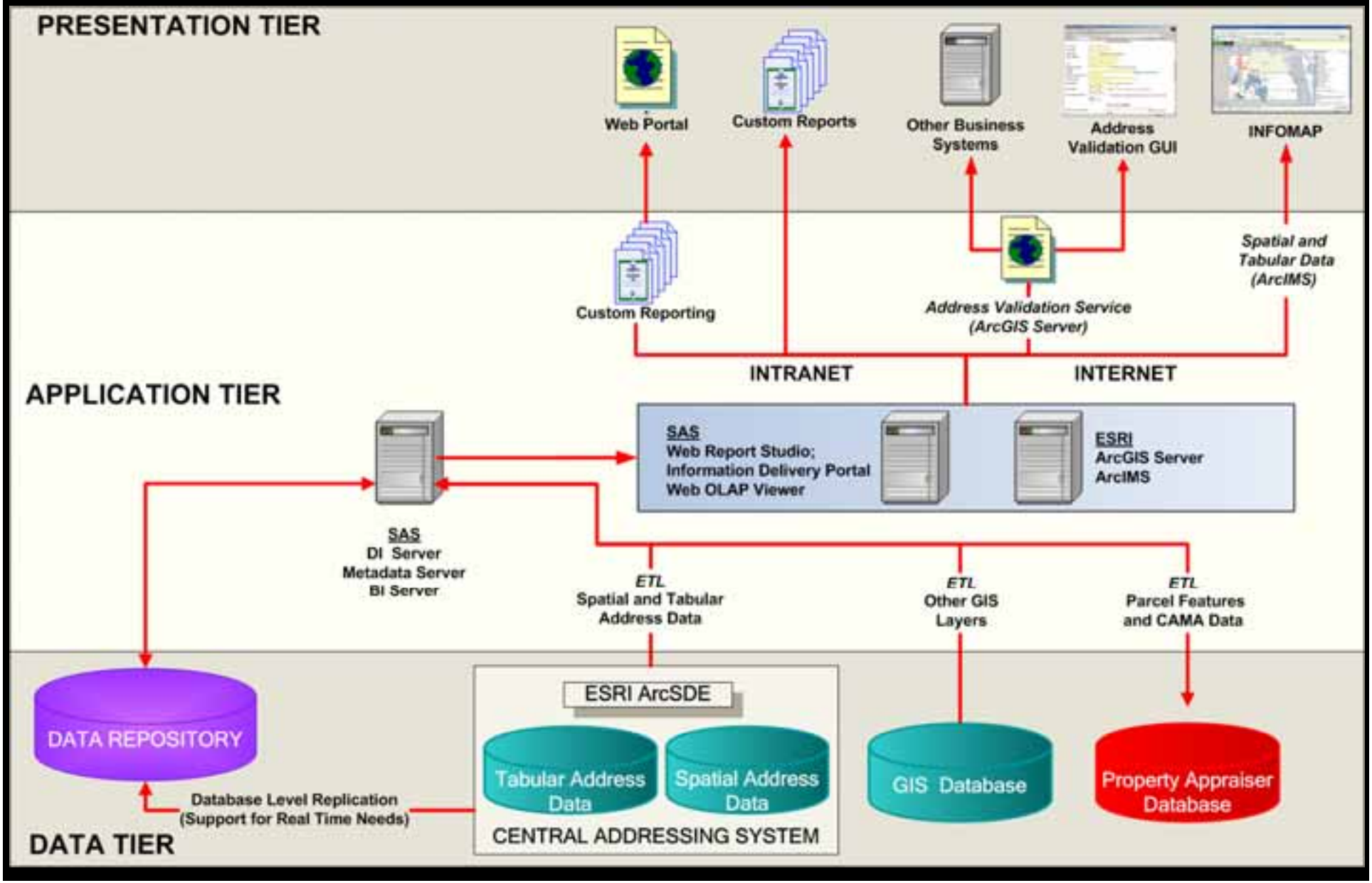
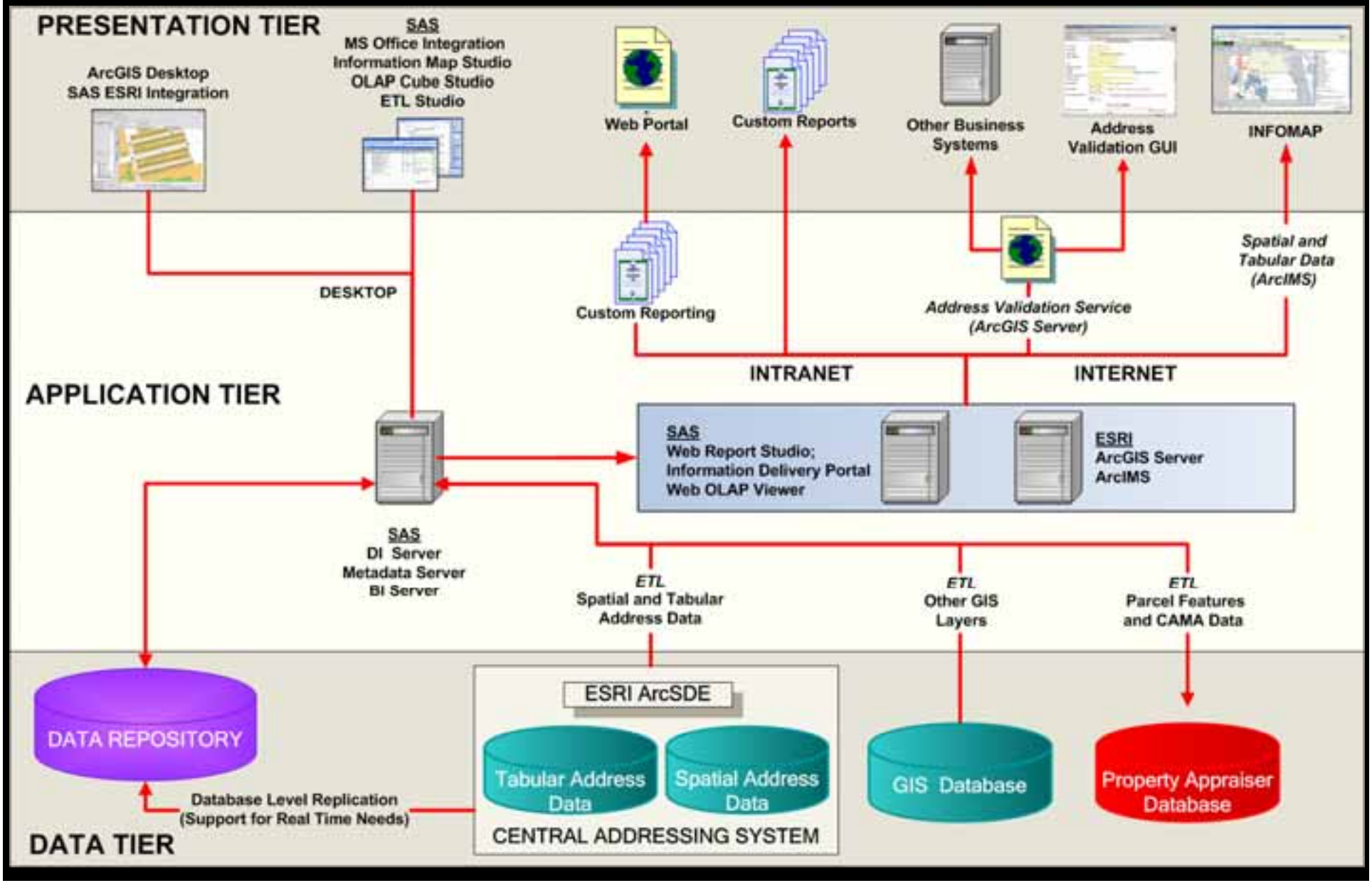
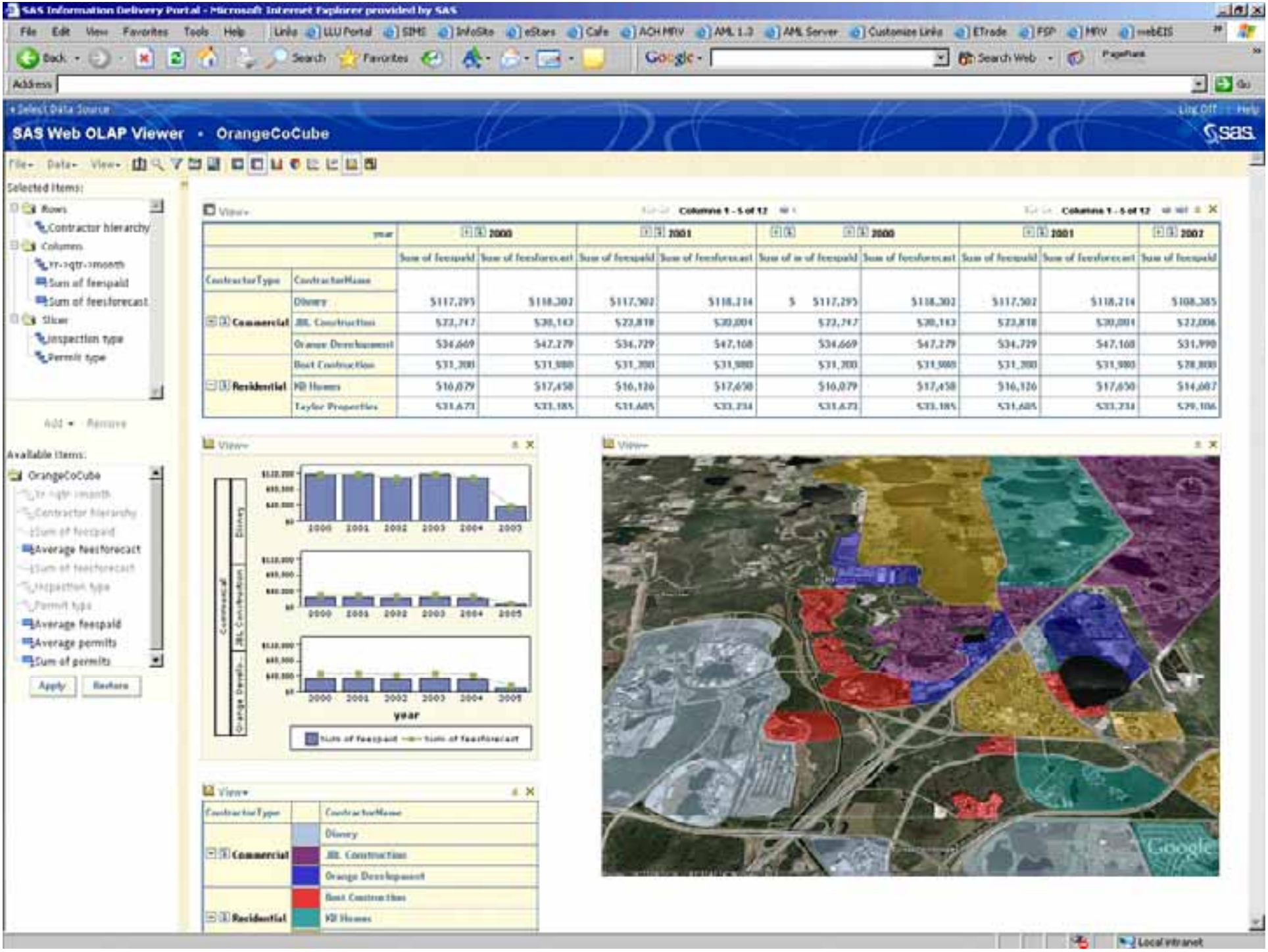


Orange County, FL EAS Output Architecture

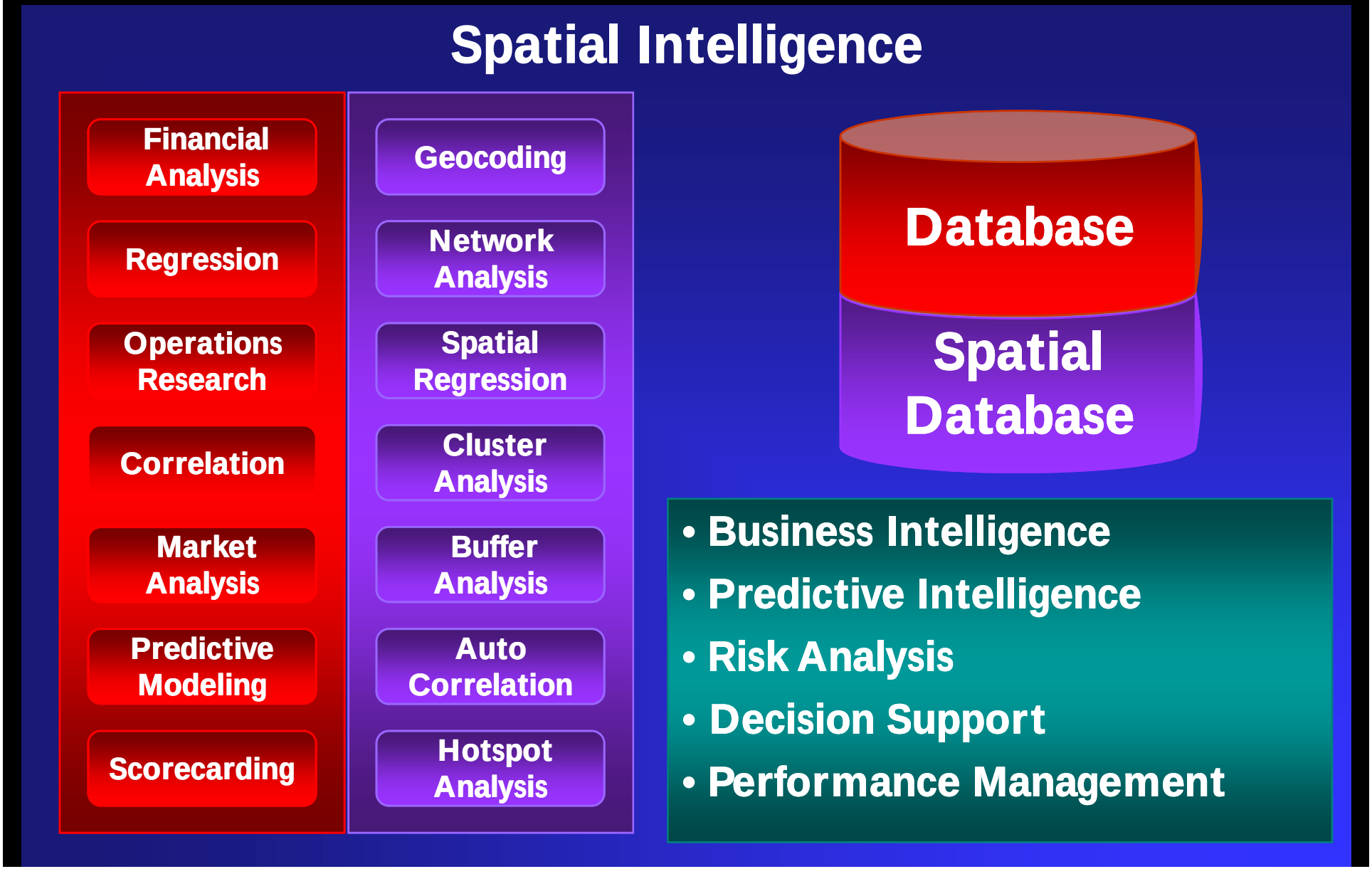


Orange County, FL Address System Architecture



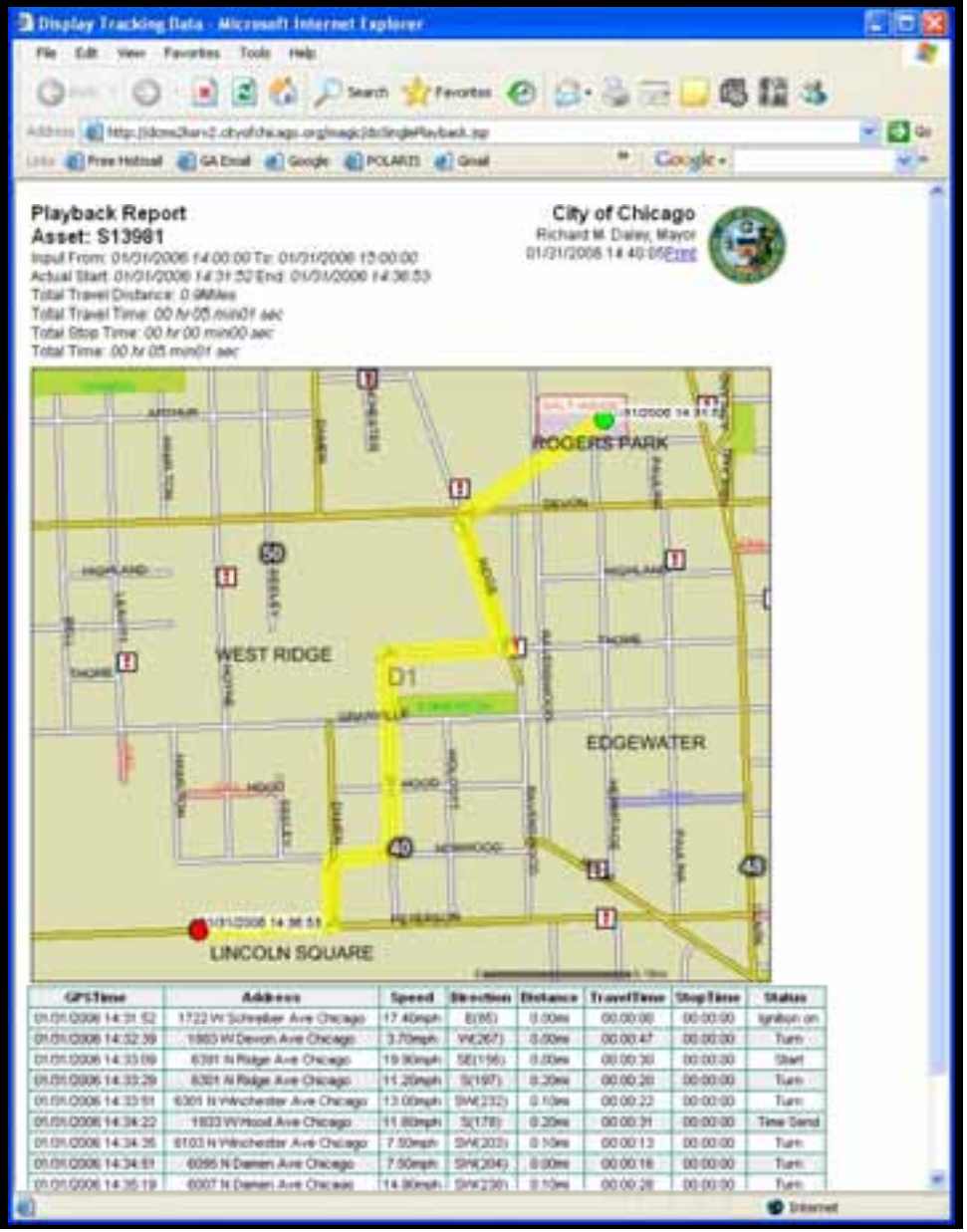

SAS Information Delivery Portal - Microsoft Internet Explorer provided by SAS
SAS Web OLAP Viewer • OrangeCoCube
Selected Items:
Rows
Contractor hierarchy
Columns
yr-qtr-month
Sum of feespaid
Sum of feesforecast
Slicer
Inspection type
Permit type
Add
Remove
Available Items:
OrangeCoCube
Average feesforecast
Average feespaid
Average permits
Sum of permits
Apply
Restore
year
2000
2001
2002
2003
2004
2005
Commercial
Residential
Disney
JBL Construction
Orange Development
Boat Construction
KB Homes
Taylor Properties
Google
Local intranet

Synergy of Traditional and Spatial Analytics



Spatial Intelligence in Mobile Asset Management

- Optimization
  - Distance vs. Time vs. Priority
  - Qualification
  - Cost
- Fleet Management
  - Model and optimize maintenance
  - Model and optimize life-cycle costs and benefits



Spatial Intelligence in Retail

- Market forecasting and management
- Target store sales predictions
- Competition gravity modeling
- Sales territory modeling/resource prioritization
- Supply chain modeling and optimization
- Store layout and product placement
- Customer analytics (recruit, retain, value mgmt, etc.)

Intelligence in Gaming

GeoAnalytics

GAMECENTER

Integrated Gaming Repository & Analytic Platform

ENGINES

Recruitment & Acquisition Engine

Customer Lifetime Value Optimization Engine

Relationship Cementing Engine

Re-Engagement Engine

Churn Identification & Minimization Engine

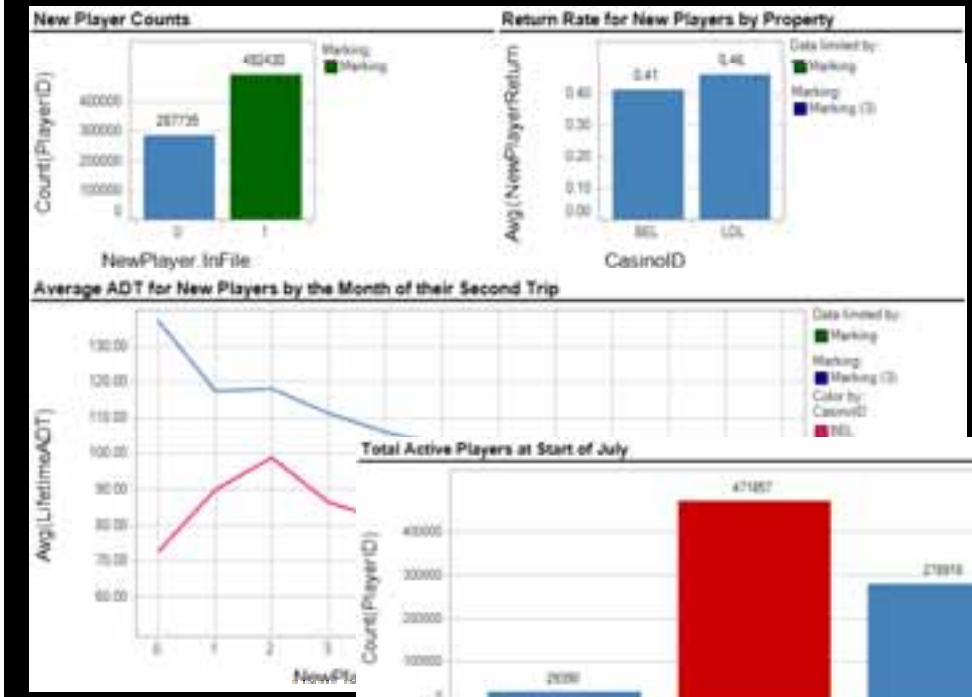
CONTENT AND INTELLIGENCE

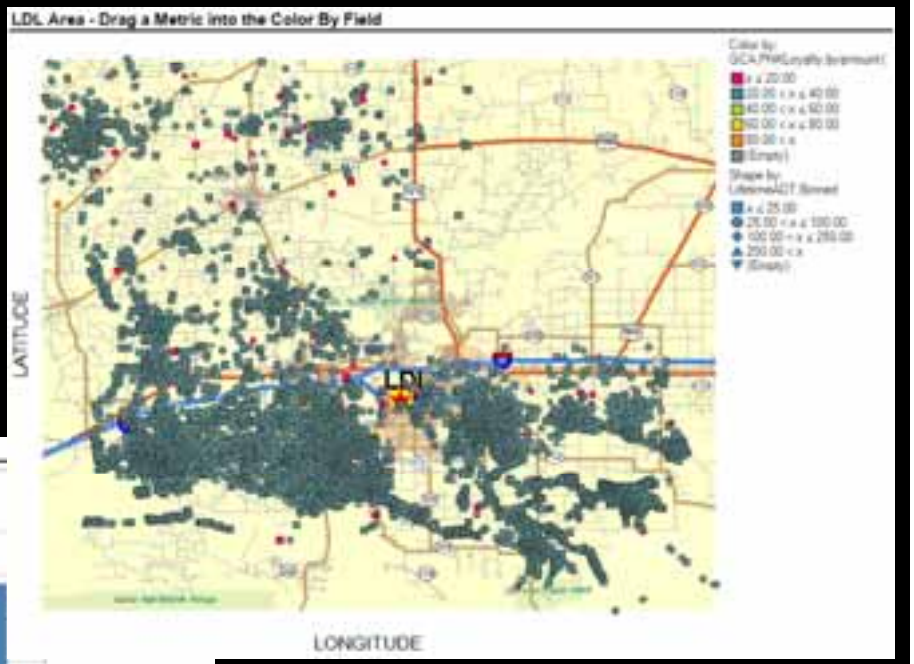
Operational Dashboard

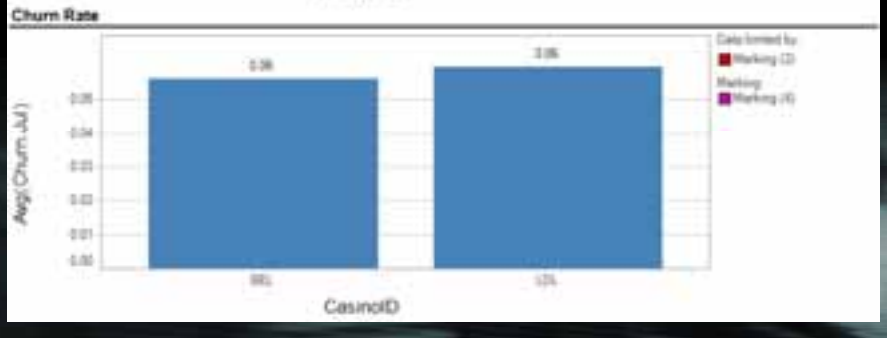
Web Service Data Feeds

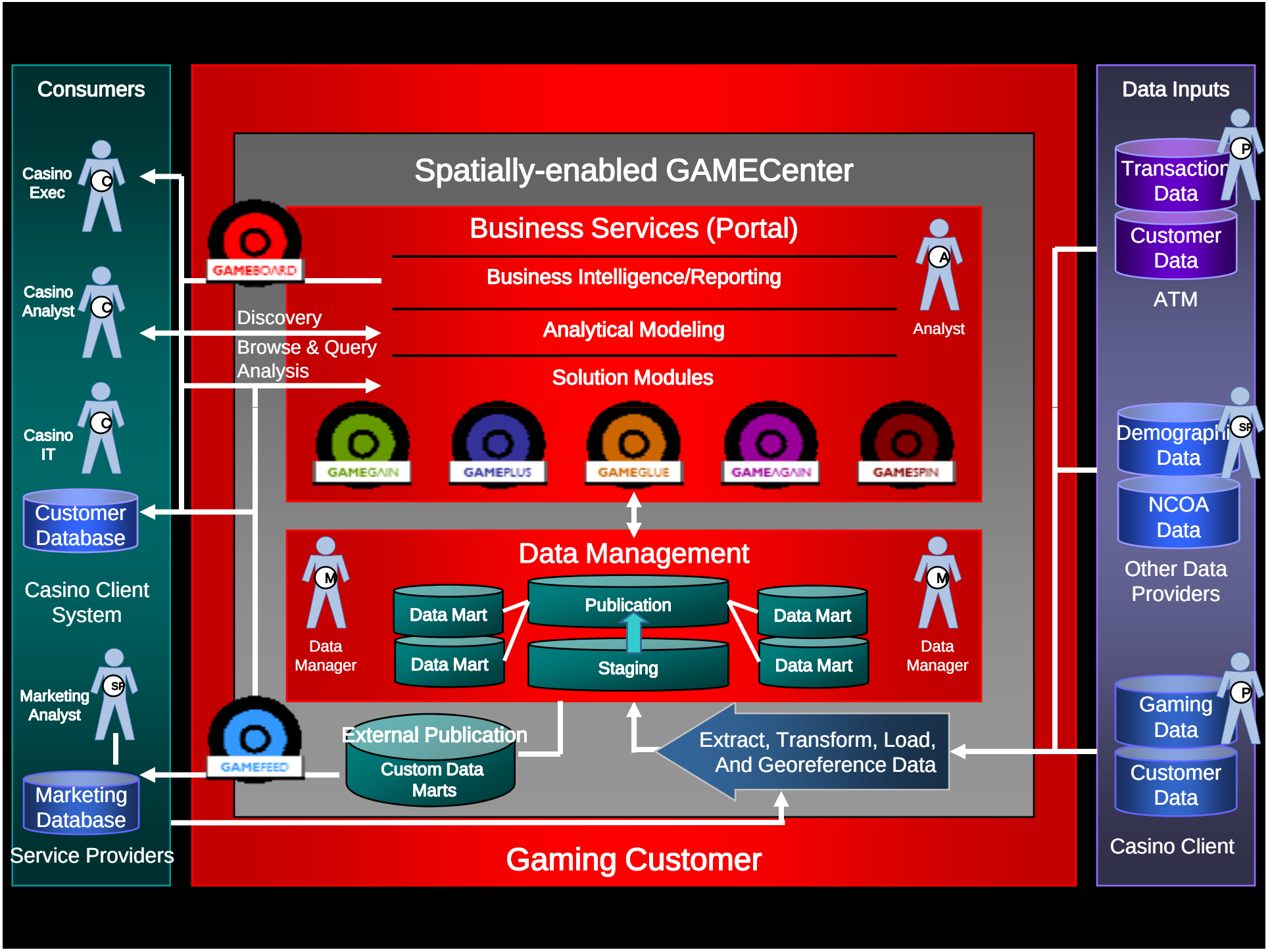
Spatial Intelligence in Gaming

GeoAnalytics



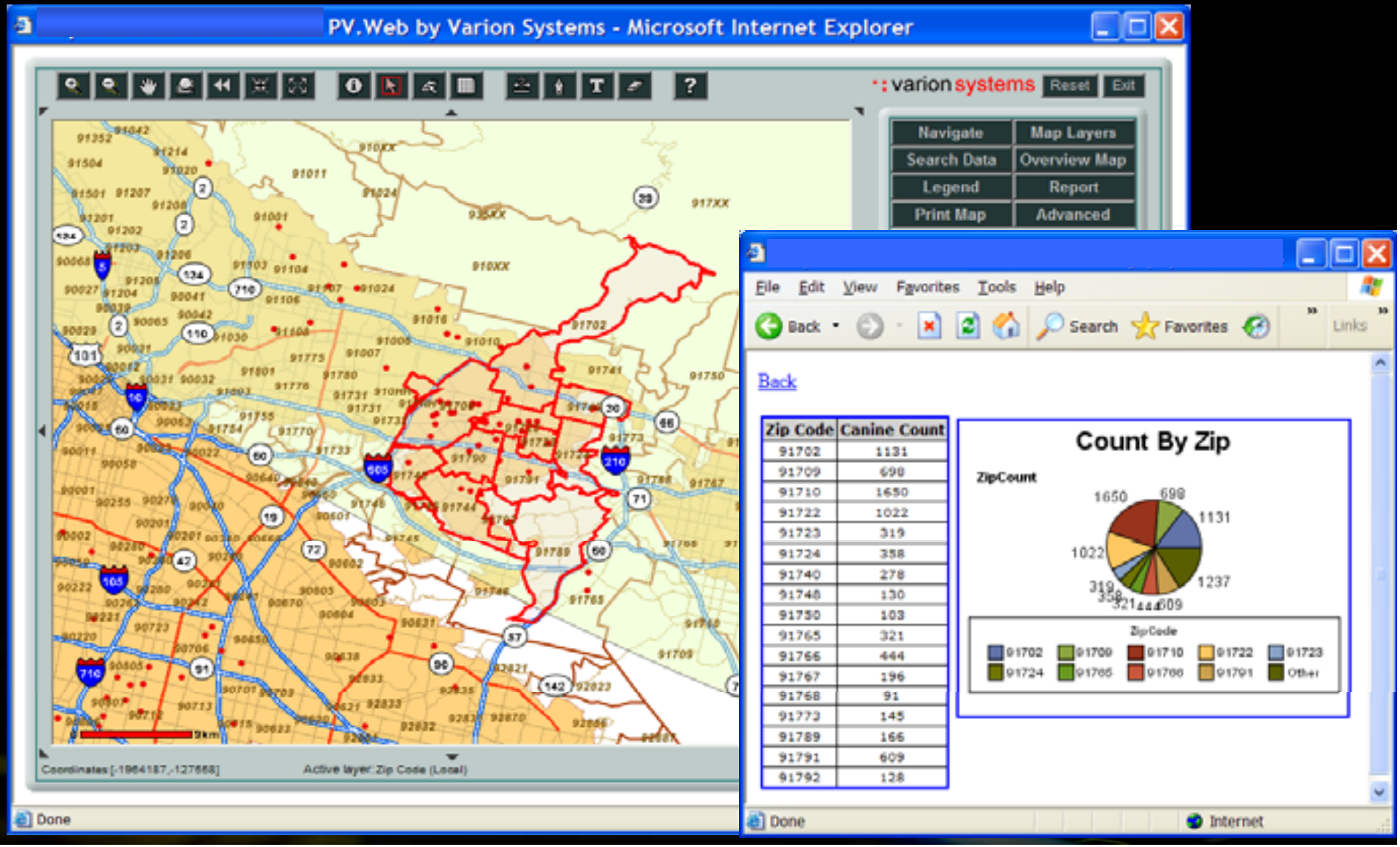





Consumers
Casino Exec
Casino Analyst
Casino IT
Customer Database
Casino Client System
Marketing Analyst
Marketing Database
Service Providers
Spatially-enabled GAMECenter
GAMEBOARD
Business Services (Portal)
Business Intelligence/Reporting
Analytical Modeling
Solution Modules
Analyst
Discovery
Browse & Query
Analysis
GAMEGAIN
GAMEPLUS
GAMEGLUE
GAMEAGAIN
GAMESPIN
Data Management
Data Manager
Data Mart
Data Mart
Publication
Staging
Data Mart
Data Mart
Data Manager
GAMEFEED
External Publication
Custom Data Marts
Extract, Transform, Load, And Georeference Data
Gaming Customer
Data Inputs
Transaction Data
Customer Data
ATM
Demographic Data
NCOA Data
Other Data Providers
Gaming Data
Customer Data
Casino Client

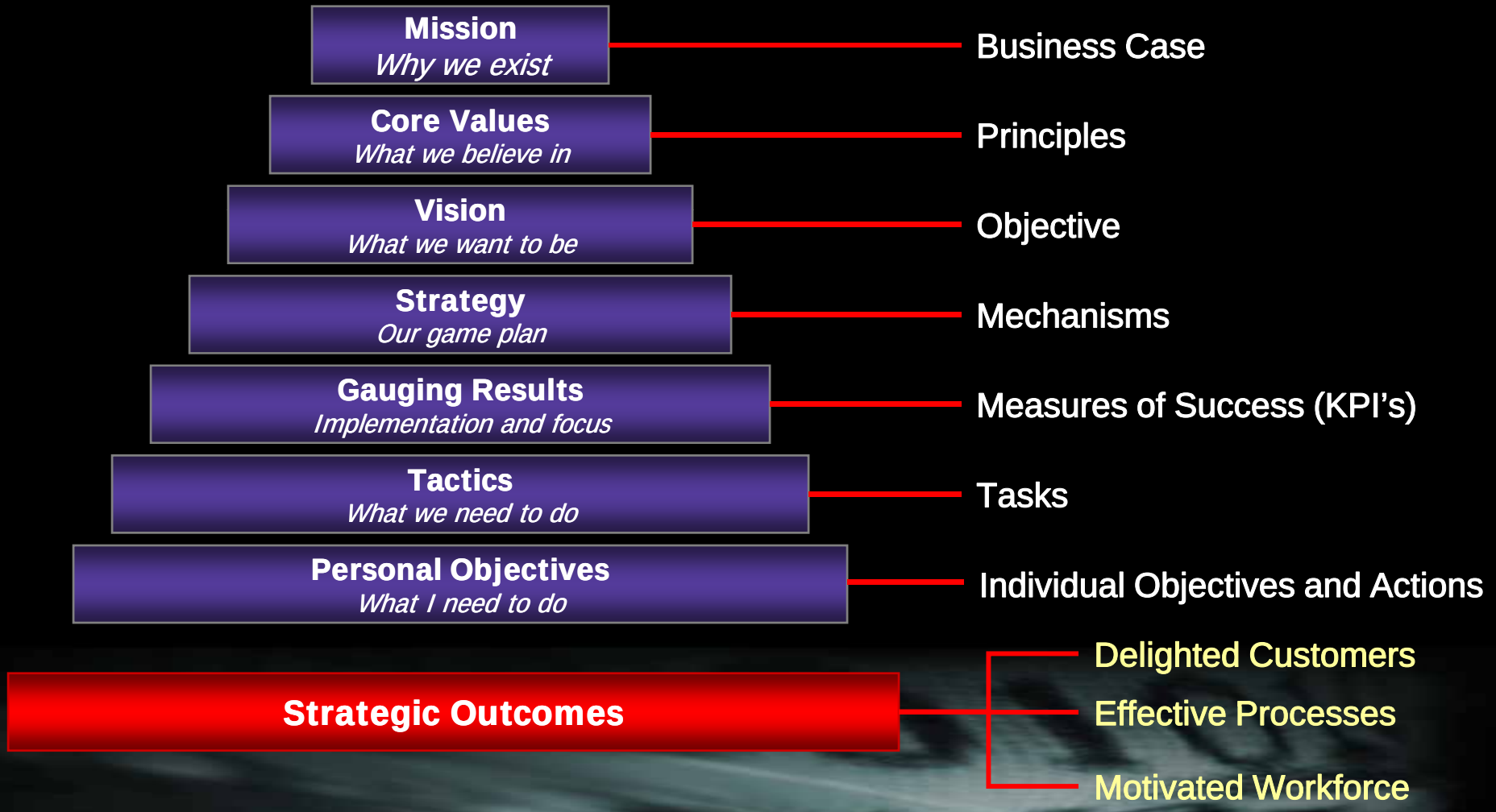
Spatial Intelligence in Disease Detection

GeoAnalytics

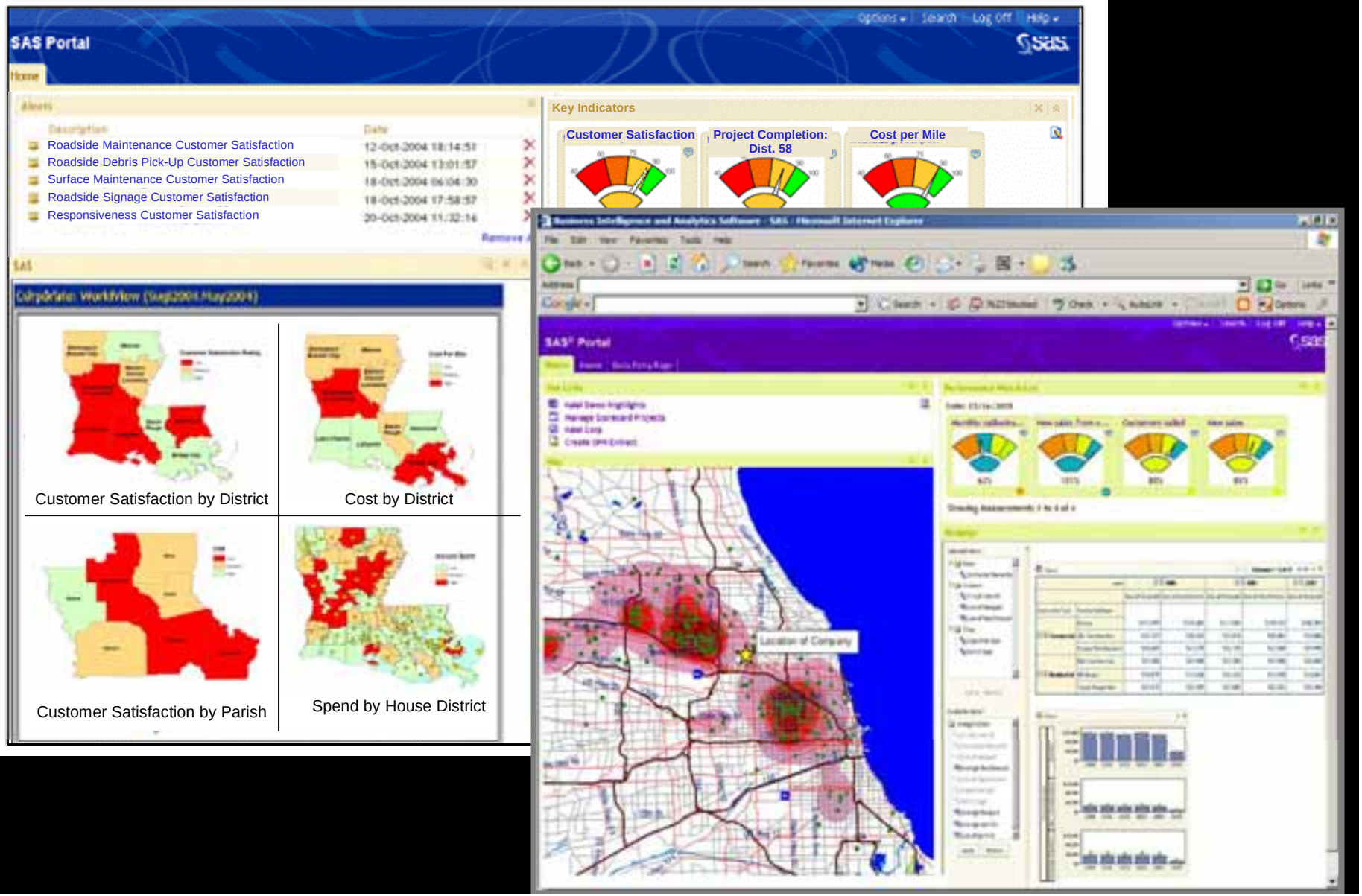


Strategic Alignment and Execution

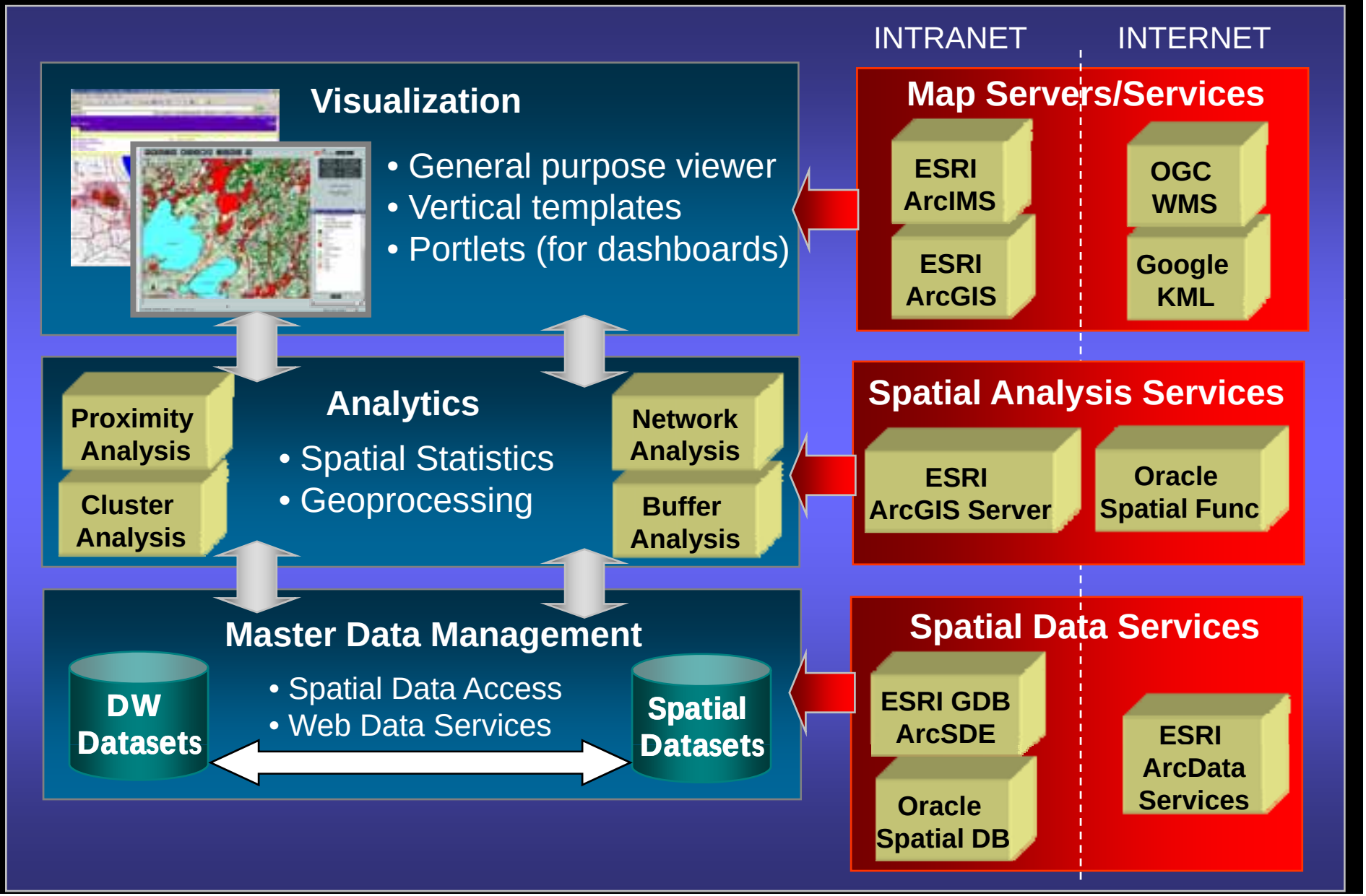
Adapted From: *The Strategy Focused Organization*, Kaplan and Norton, 2001



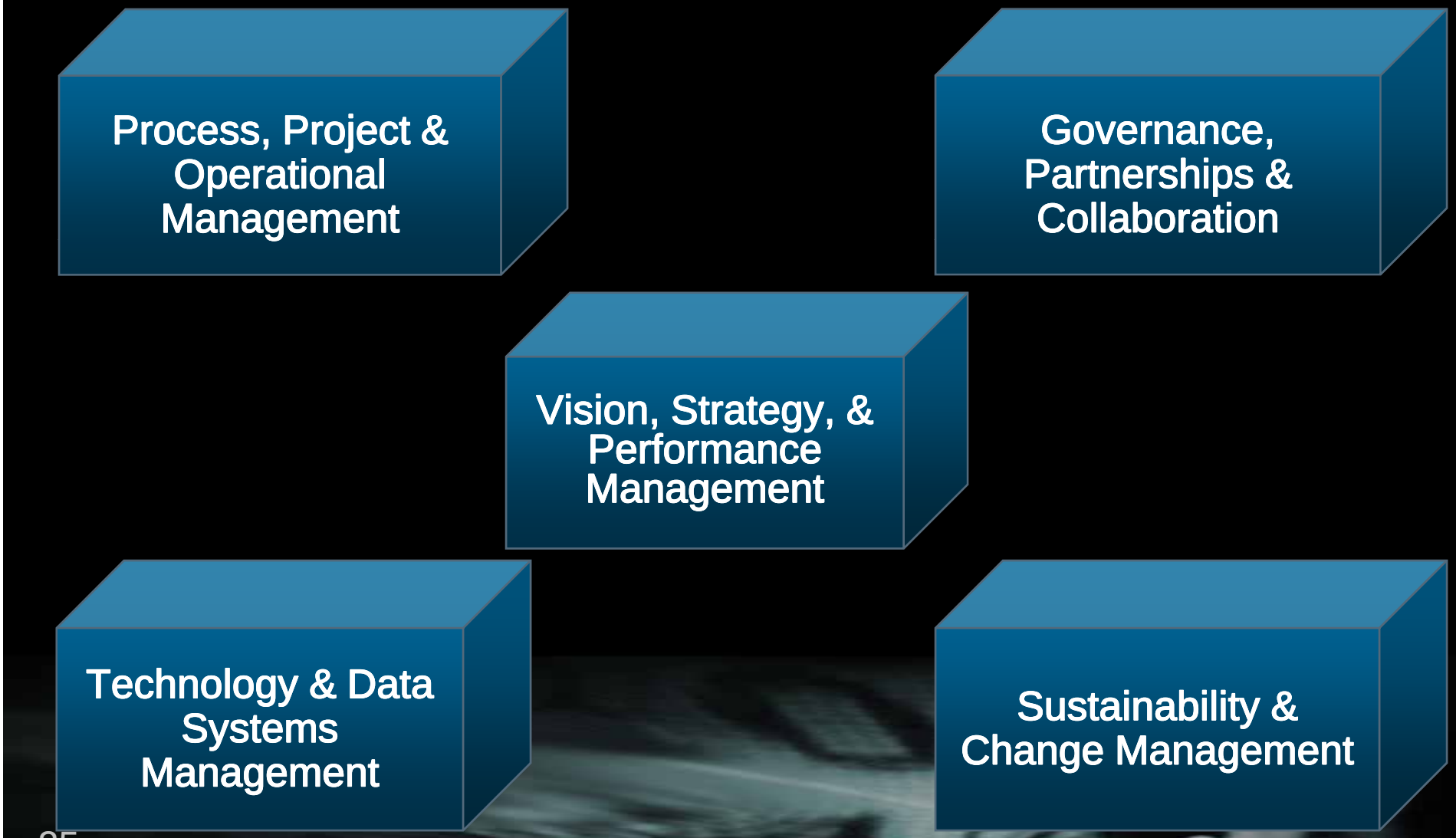
Spatial Intelligence – Performance Management and KPI's



Integration Points for Spatial and DW-BI-PA Platforms



Enterprise Spatial Intelligence – Organizational Considerations



Management and Control

- Management Models
  - Centralized versus decentralized
- Support Service Delivery Options
  - Business Unit (e.g. Market Planning, Logistics)
  - Service department (IT/GIS)
  - Executive office (CFO, CEO)
- Considerations
  - Budget autonomy and power
  - Visibility
  - Impartiality

Contact Information

GEOANALYTICS, INC.

Peter Thum – President

pgthum@geoanalytics.com

GEOANALYTICS.COM