



**ESRI**

TM

# ESRI, GIS & the Telecommunications Enterprise: Solutions, Status and Vision

Kees van Loo  
Business Development Manager  
ESRI





# Agenda

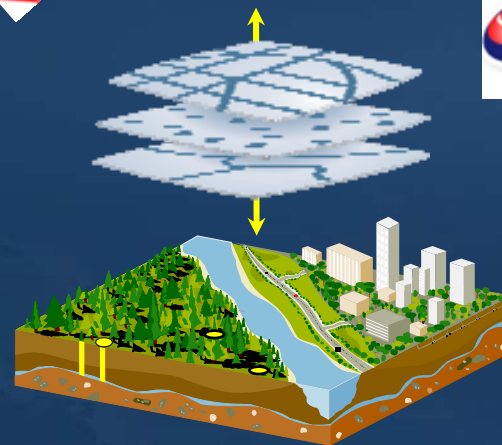
- Introduction
- Update ESRI in Telco
- Telecom GIS
- Architecture





# Telecom in 2004/2005

- **New Users:**
  - MCI WorldCom
  - T-Mobile USA
  - Vodafone (UK)
  - France Telecom
  - Telecom Poland
  - Time Telecom (Malaysia)





# Telecom in 2004/2005

- **ESRI Major Users:**
  - **SBC**
  - **Vodafone (9 Countries, including Verizon Wireless)**
  - **BellSouth**
  - **Reliance InfoCom**
  - **T-Mobile (4 Countries)**
  - **British Telecom**
  - **France Telecom Group (w/Orange)**
  - **Telecom Italia Mobile**
  - **Telefonica Moviles**
  - **Telefonica del Peru**
  - **Bouygues Telecom**
  - **9 Telecom**



# GIS Integrates Data

- GeoReferencing
- Map Overlay
- Spatial Analysis
- Visualization



**... Integrating Measurements And Disciplines**





# Telecom Reality:

## LANDBASE

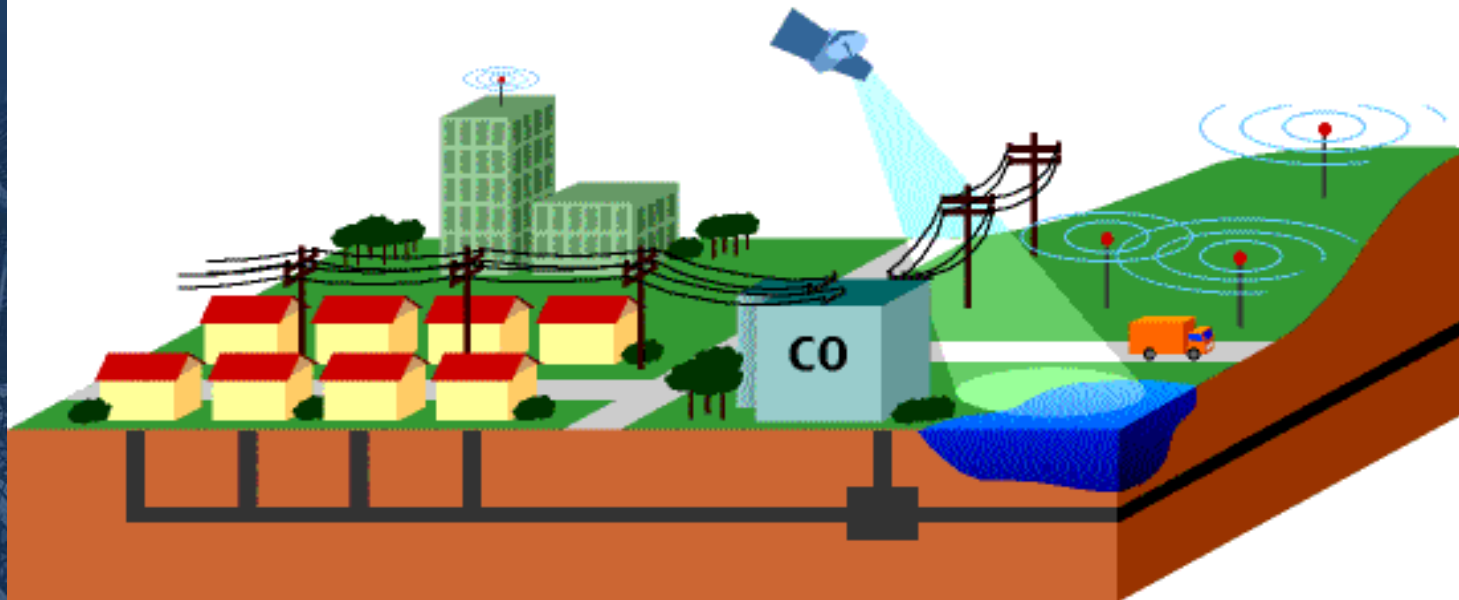
- Clutter
- Satellite Imagery
- Aerial Photography
- Streets
- Parcels
- Land Use
- Zoning
- Elevation
- Building Heights

## FACILITIES/ OPERATIONS

- CO Locations
- Outside Plant Records
- Antenna Locations
- Signal Quality Models
- Network Test Data
- Forecast Model
- Trouble Calls
- Outlets
- Customer Locations

## OTHER

- MTAs
- BTAs
- LATAs
- Tax Boundaries
- Municipalities
- County
- State
- Census Tracts
- Zip Codes
- Right of Ways

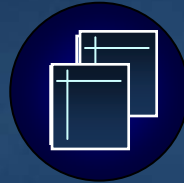




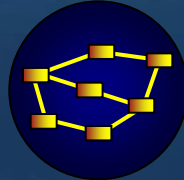
# GIS Captures and Stores Reality Through 5 Basic Elements



**Data Models**



**Geodata Sets**



**Process and Workflow Models**



**Maps and Globes**



**Metadata**



## Geodata Sets:

- Span
- Splice
- Pole
- Manhole
- Base Station
- Right of Way
- Tax Zones



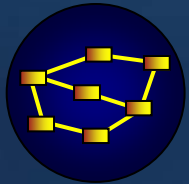




## Data Models:

- Fiber
- Copper
- HFC
- GSM
- UMTS
- LMDS

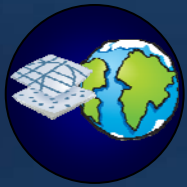




## Process and Workflow Models:

- Outage Management
- Design & Construction
- Dispatch
- Market Segmentation
- Sales Campaigns





- Maps and Globes:**
- **Operations Center**
  - **Cartographic Production**
  - **Corporate Communication**





- Metadata:**
- Author
  - Scale
  - Projection
  - Updated
  - Description
  - Project
  - Department
  - Purpose





# Enterprise GIS for Telecom:

Enterprise Support

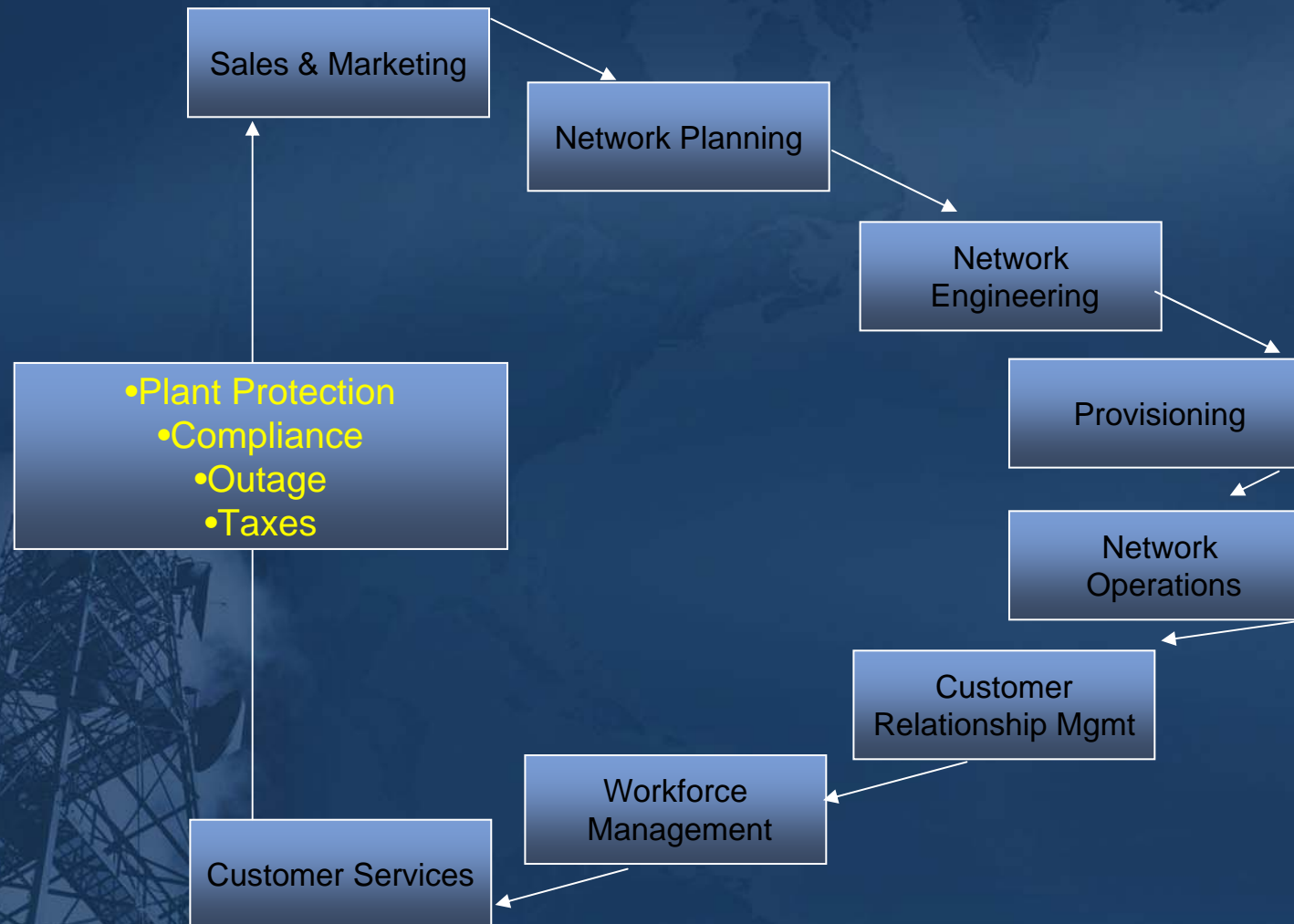






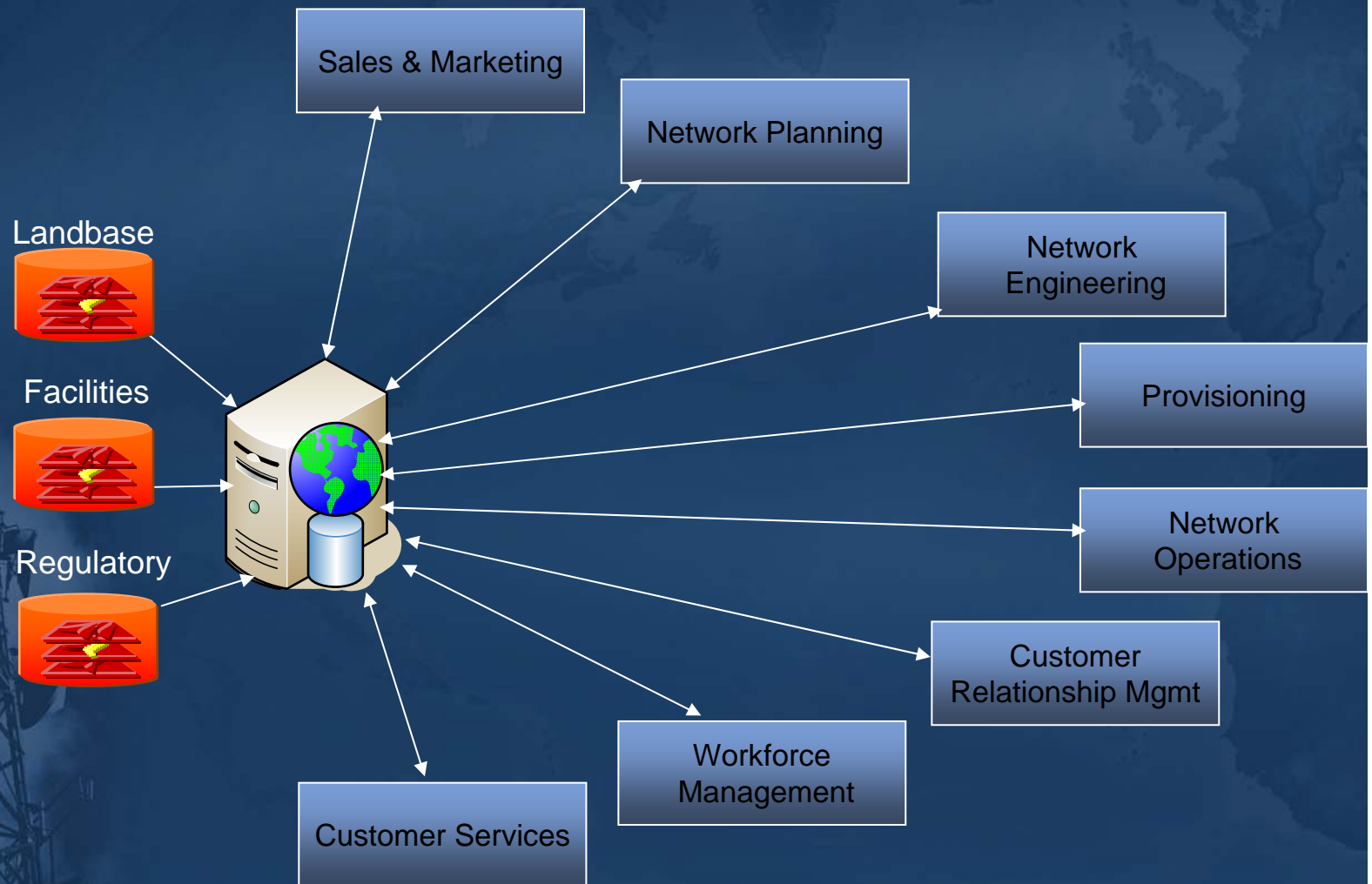
# Enterprise GIS for Telecom

## Logical Workflow





# Enterprise GIS for Telecom Data Flow





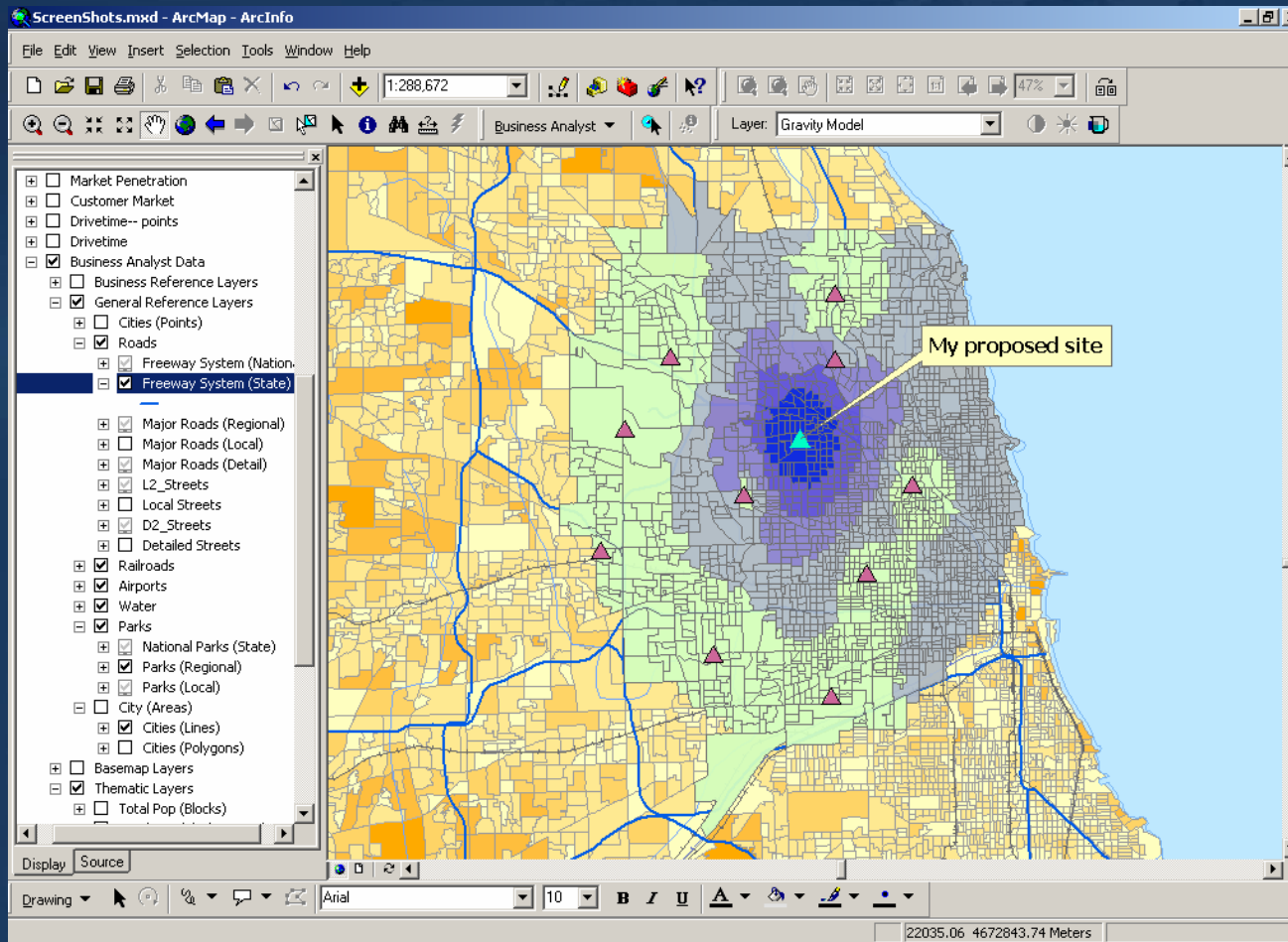
# Enterprise GIS for Telecom:

Applications: Departmental





# Marketing & Sales

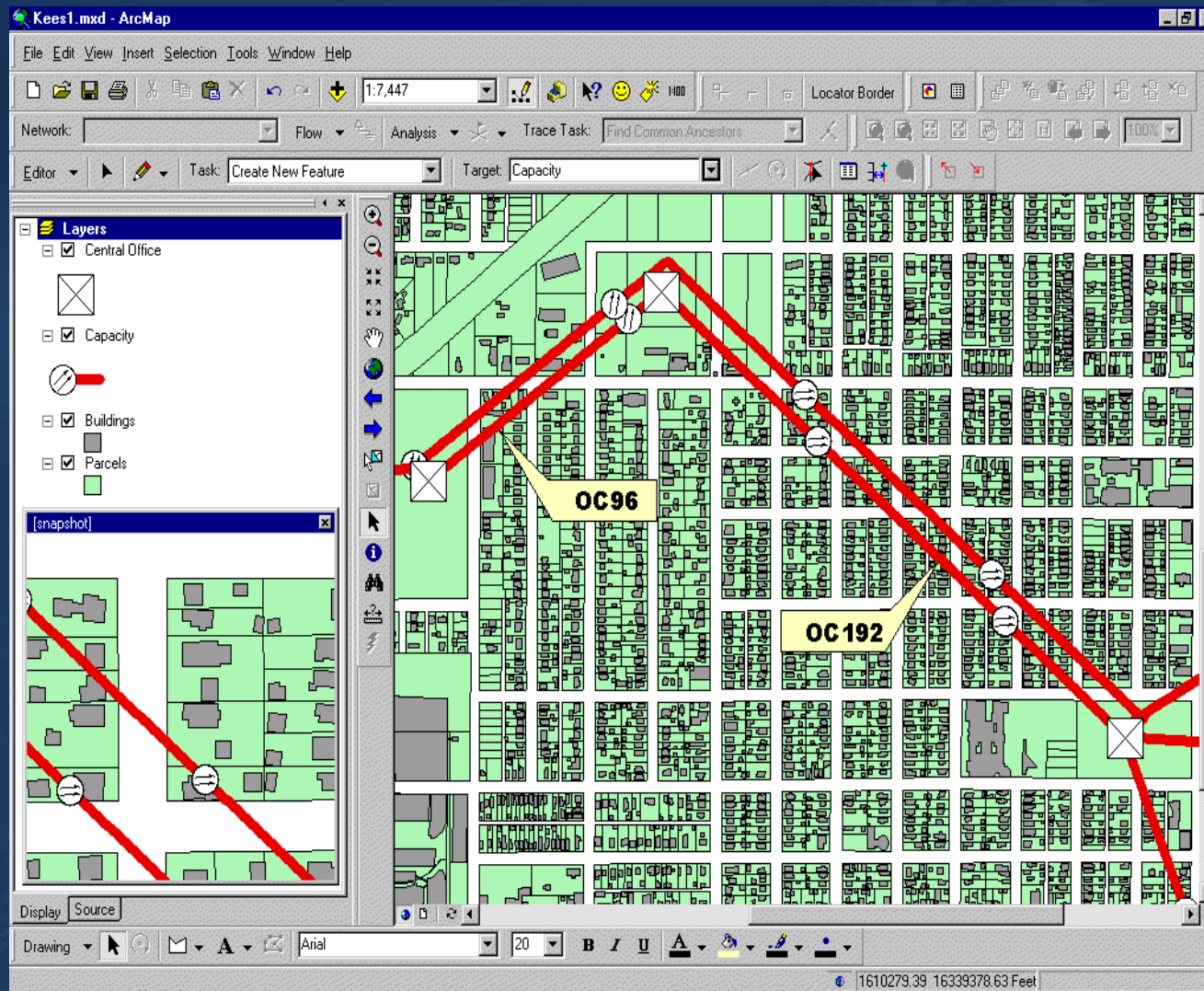


- Input into Capacity Planning
- Integrate w/other Marketing Systems (SAS, Business Objects)
- Targeted Marketing Campaigns
- Uses Demographics, Customer Data, Facilities Database
- Used for Future Store-Outlet Siting





# Network Planning (Capacity Planning)

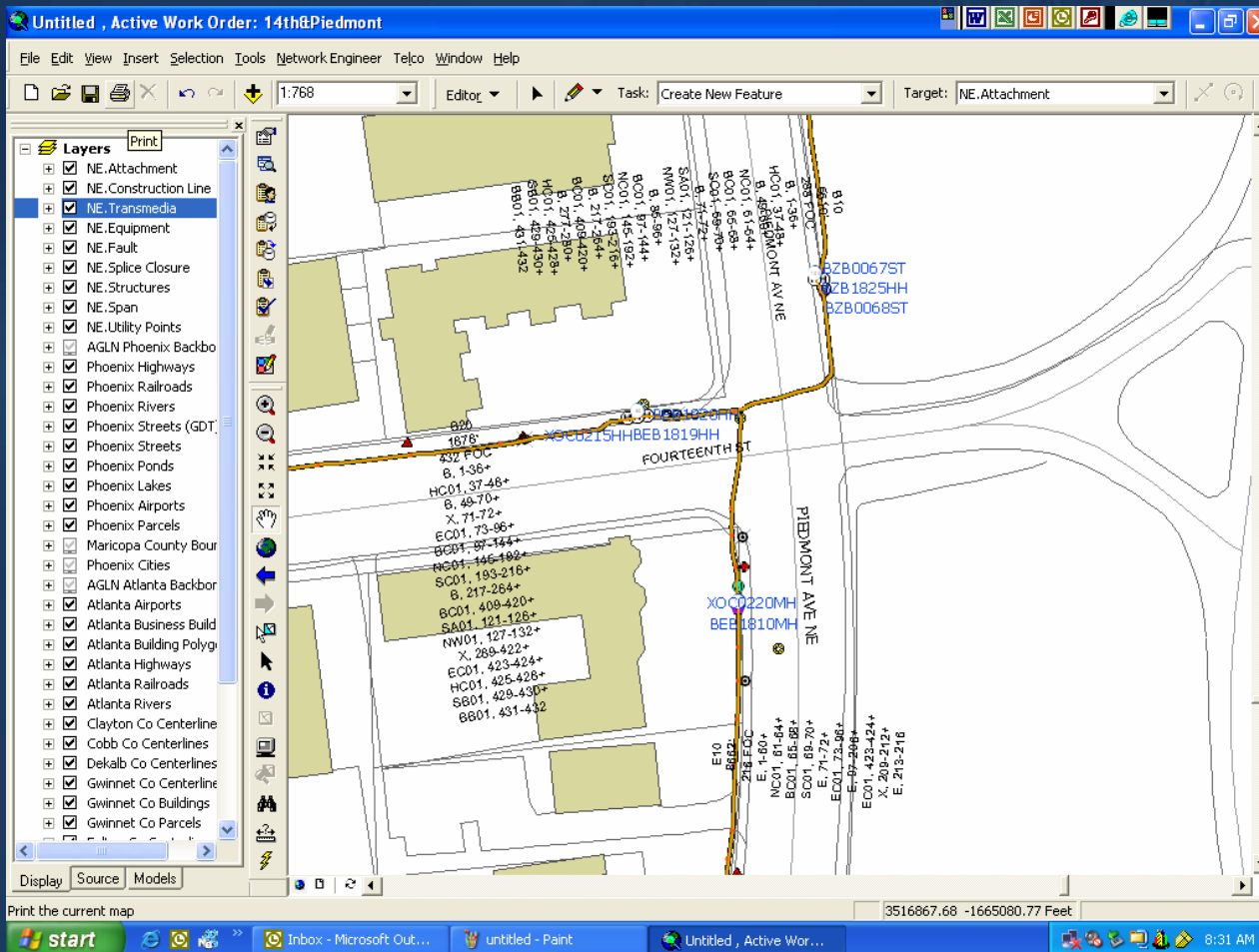


- Display Network Congestion
- Calculate Capacity
- Generate Schematic Network Layout
- Input for Engineering





# Engineering Outside Plant



- Partner Tech. Leverages ESRI Platform
- Complete OSP Network Design
- Facilities Management
- Reporting
- Data Model



## Field Engineering

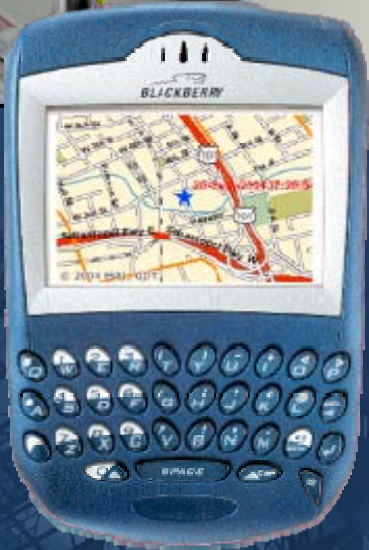
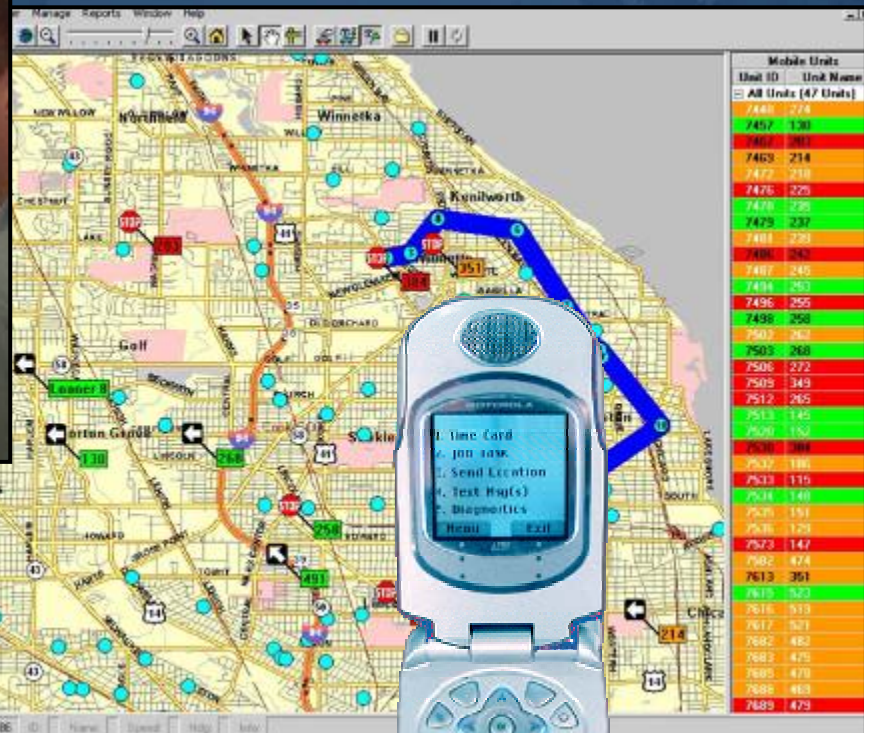
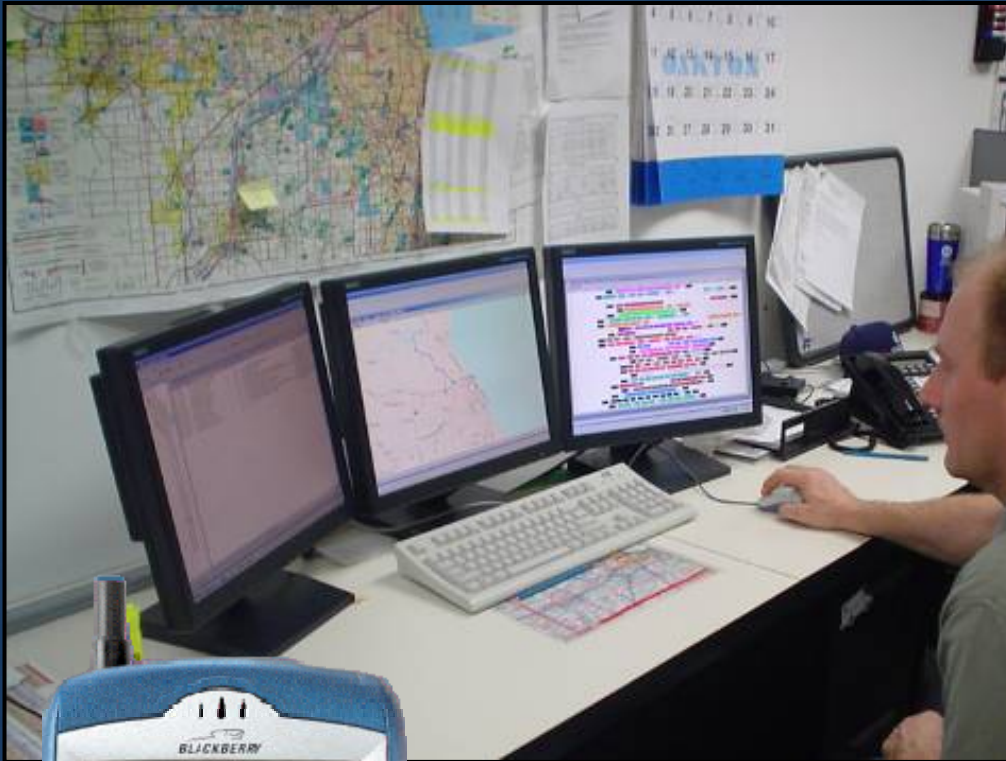
- Laptop
- Tablet PC (with editing capability)
- Windows CE
- J2ME
- Rich, Focused Functionality
- Check out-Check in Database Capability







# Location Tracking/Routing



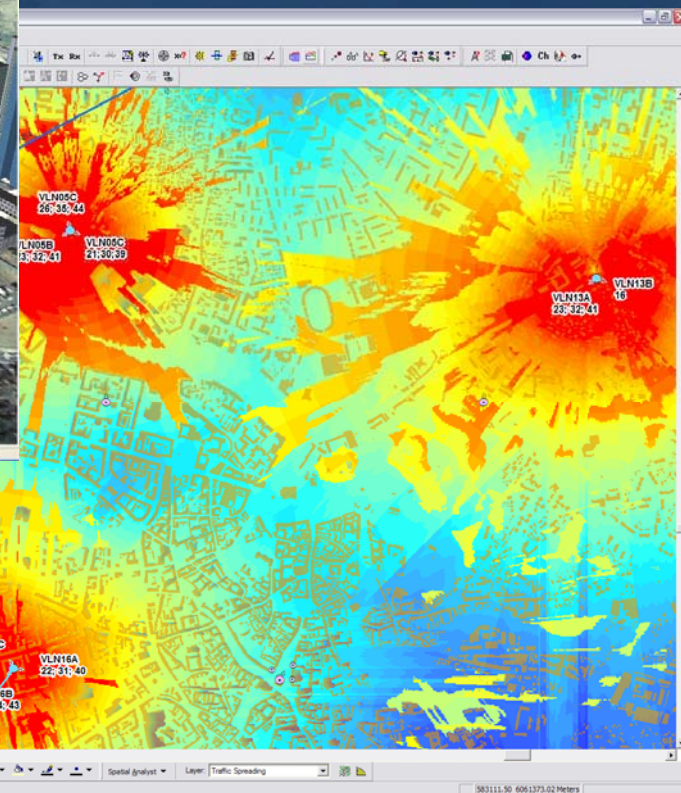
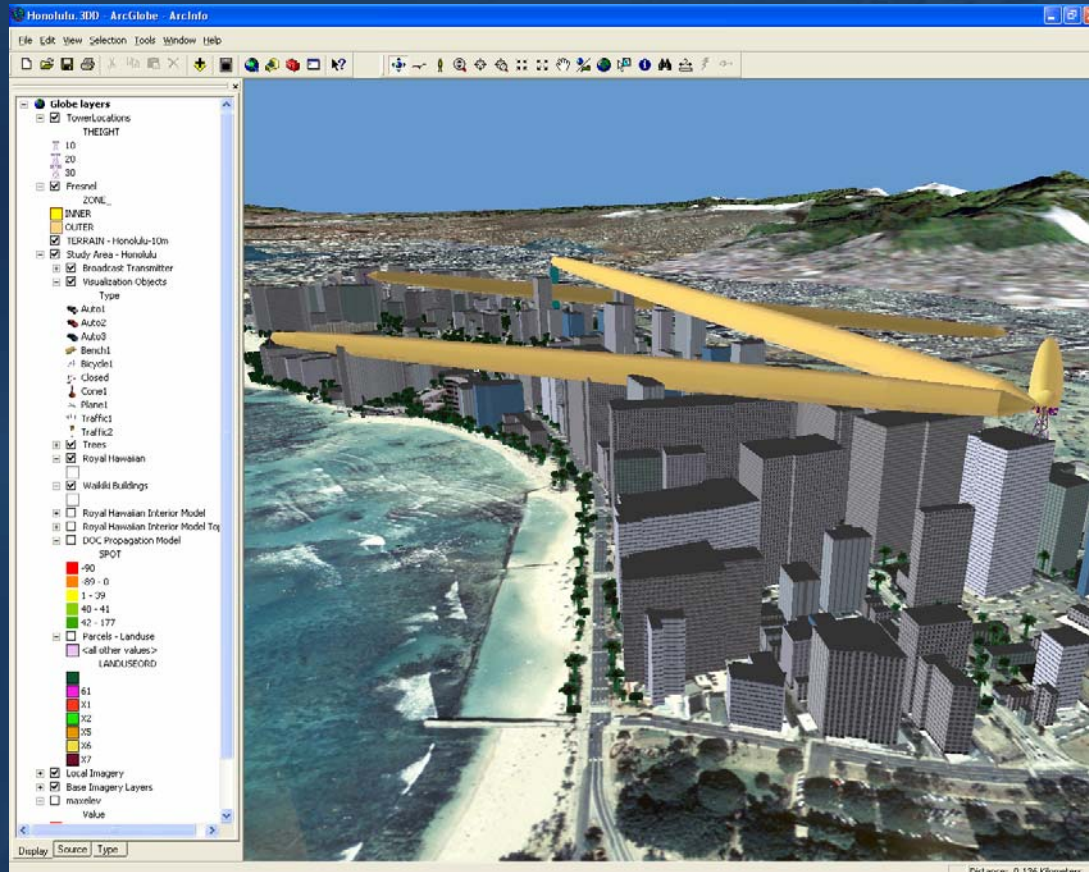
Location Services





# Wireless Network Engineering

- Wave Propagation Modeling Integrated
- 3D Rendering: ArcScene & ArcGlobe
- Spatial Analysis







# Wireless Network Optimization

The screenshot displays the CellOpt software interface, which is used for wireless network optimization. The interface is divided into several sections:

- Radio Selection Table:** A table with columns for site, secto, radi, latitude, longitud, azimut, heig, til, beamwid, antennatype, servedtraf, servedar, po\_control, combin, group\_strate, and geogg ar. The table contains data for various radio sites, including their coordinates, antenna types, and traffic statistics.
- Map View:** A map showing the geographic distribution of radio sites and signal strength grids. The map is overlaid with a network of streets and other geographic features.
- Network Analysis based on Quality of Service KPIs:** A panel for configuring network analysis. It includes options for Frequency Plan, Compare with, Sum by, and Chosen KPIs. The Chosen KPIs list includes CA T, FER, A, and %T, FER>2%.
- Legend:** A legend on the left side of the map view, listing various geographic features and their corresponding colors and values. The legend includes items like RiverIn-1\_polyline, mstreets-1\_polyline, mroads-1\_polyline, Squares-1\_polyline, sofia\_5m, sofia15m, vwf\_terr, and sofia\_map\_0828\_regi.

- Adjust Network Parameters
- Improve Network Performance
- Integrated with Planning Tools
- Visualization & Analysis with ArcGIS Engine





# Operation Support Systems: Outage Management

FaultViewer - Microsoft Internet Explorer

Address: [http://netengg.ril.com/website/faultviewer/viewer.htm?ActiveLayer=0&Query=FAULT\\_ID%3D6708&QueryZoom=Yes](http://netengg.ril.com/website/faultviewer/viewer.htm?ActiveLayer=0&Query=FAULT_ID%3D6708&QueryZoom=Yes)

FaultViewer

100,000

6685

Scale 1:

Zoom

Layers

Visible Active

- FAULT
- Equipment
- Attachment
- Splice\_Closure
- Structure
- Transmedia
- Span
- OFCRouteMarker
- HorizontalDirection
- DuctProtection
- DuctRoadCrossing
- DuctHwyCrossing

Reliance Digital World

Rec	OBJECTID	FAULT_ID	PORT_RK	OPTICAL_DISTANCE	MEASURED_LENGTH	GRAPHICAL_LENGTH	INDIA_XGI
1	93547	6685	{5BE86524-0042-11D7-B705-	62881.109	62620.109	59143.58	1025

Zoom In

Internet

- Integrate with Industry-Standard Fault-Management Systems

- (Near) Real-Time View of Network Status

- Tracking Network Use



# Operation Support Systems: Outage Management

Telecom.mxd - ArcMap

File Edit View Insert Selection Tools Window Help

1:11,357

Editor Task: Create New Feature Target: Focus Site : BTS

Network: GSMnetwork Flow Analysis Trace Task: Find Common Ancestors

Layers Overview

Site Operation

Attributes

Property	Value
OID_1	7
OID	7
LINK_ID	1MAD0104M-1
SITE_ID_A	BSC001-1
SITE_ID_B	1MAD0639
TYPE	MW
STATUS	Installed
LOS	Yes
EQUIPMENT	MINI LINK 3
CAPACITY	4x2
CONFIG	
FREQU_BAND	0
TX_POWER_A	0
RSL_A	0

1 features

428751.70 4467495.92 Meters

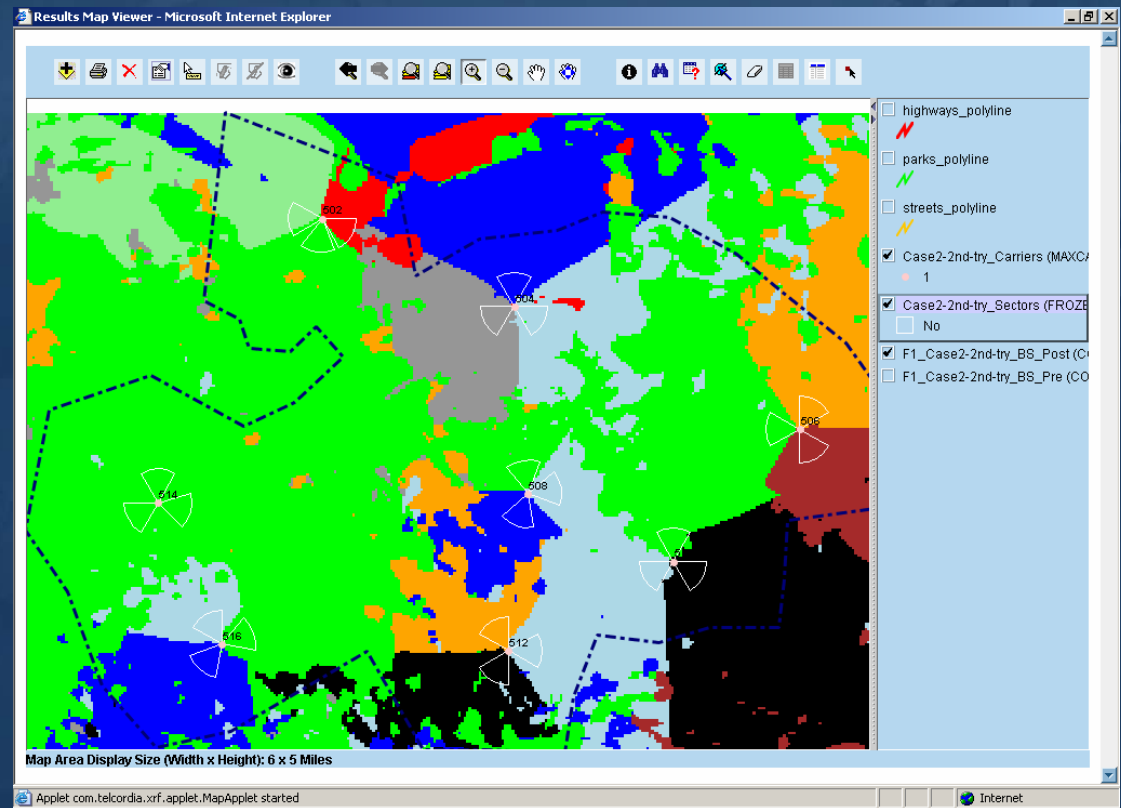
- Real-Time View of Network Status
- Object Replication
- Call Behavior
- Tracking Network Use



# Operation Support Systems: Network Performance

## *Multiple Analyses Types Possible*

- Aggregate Billing Data to Privacy Regulation
- Pull Together Network Outage Data to ID Network Trouble Spots
- Integrate Billing data with Market Segmentation and Network Performance
- Unprecedented Insight into A Companies Operations





# Workforce Management

Ticket Manager - Web Services Version - Microsoft Internet Explorer

Address: http://localhost:8080/WSApp/WSApp.jsp

Refresh Options Info: . . . (,)

Call Center  
Dispatcher  
Location History

ESRI  
Mobile Task Manager

Ticket #	Subject	Address				Priority	Assigned To	Status	Event Timestamp		
		Street	City	State	ZIP				Submitted	Start	Stop
CR-9517040	Check phone line	1 Rue Lac	Cannes	--	06400	3	H Woods	Inactive	1/14/04 10:30 AM	---	---
CR-9470870	Line repair	10 Rue Jean Jaures	Cannes	--	06400	1	T Rankin	Inactive	1/14/04 10:30 AM	---	---
CR-9670939	Line upgrade	6 Rue Campezza	Cannes	--	06400	4	---	Inactive	1/14/04 10:30 AM	---	---
CR-9747889	Noisy line	34 Rue Meynadier	Cannes	--	06400	2	---	Inactive	1/14/04 10:30 AM	---	---

Reset Ticket Info

Local intranet

- Intelligent Workforce Notification Systems
- Uses GIS & Mobile Network to Efficiently Deploy Resources
- Respond to Trouble Tickets More Quickly; Improve Customer Experience





# Customer Services

## Online Services

- Wireless Coverage Locator
- DSL Prequalifier
- Store Locator
- WiFi Hotspot Locator

Broadband Zone Locator - Sentech - connecting you - Microsoft Internet Explorer

**BROADBAND ZONE LOCATOR**

Reload Map About The Site Online Help Contact Us

Check Coverage

Find by Street Find by Suburb

Number  (e.g. 32 not 32a)

Street  (e.g. sei for amh)

Suburb  (e.g. eden for Eden Glen)

Town  (e.g. ger for Germiston)

Search

Welcome to the Broadband Zone Locator

Sentech's MyWireless service is currently being rolled-out with radio based networks in Johannesburg, Midrand, Pretoria, Durban and Cape Town.

This facility is intended to assist you in determining MyWireless coverage at a specific location. Please proceed by selecting the 'Find by Street / Find by Suburb' facility to localize/identify a specific stand or street segment. Please also refer to the help instruction to ensure the most accurate search results.

Following this, use the 'Check coverage' button to query Sentech's current MyWireless coverage of the stand or street segment.

Your search result might yield an operational coverage, a planned coverage or a 'None, not scheduled' response, in which case, your enquiry will contribute towards Sentech's ongoing identification of areas into which the MyWireless service needs to be expanded.

For help on how to use this tool, please click on the help button on the main toolbar.

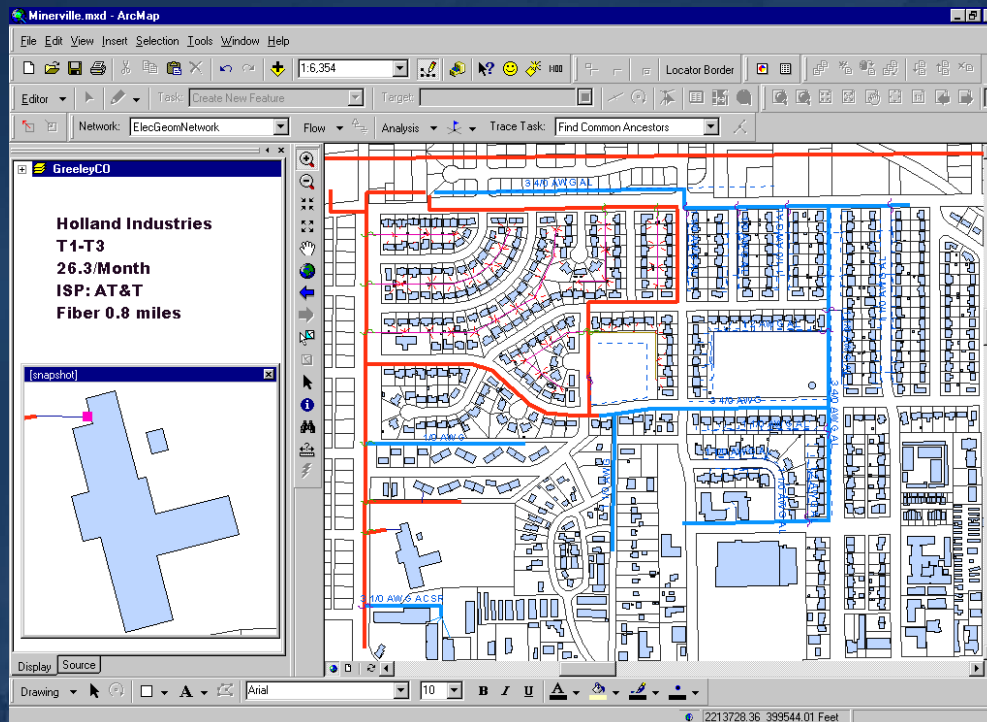
Scale 0 to 0.000 000 0 200.000

Done Internet





# Sales Support



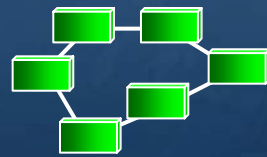
## Functions:

- *Map Out Existing Customers*
- *Map Out Prospects*
- *Pre-Defined Queries*
- *Prospect-to-Backbone Distance Calculations*
- *Visualization for Prospects*
- *Automated Reports, Maps*
- *Traveling Salesman*



# GIS Integrates Workflows

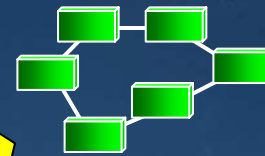
Planning



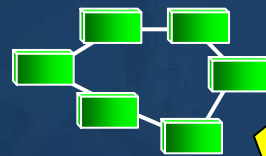
Management



Science



Operations



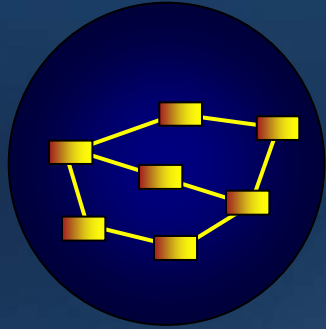
Engineering



... Supporting Collaboration

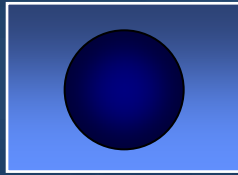


# Geodatabases Support Models

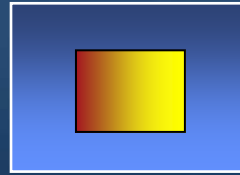


**That Describe Geographic Processes And GIS Workflows**

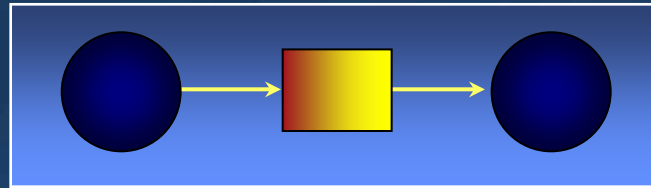
Data



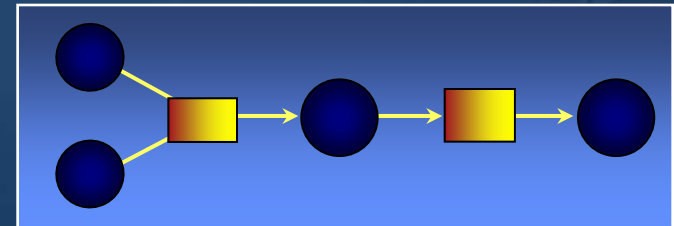
Tools



Models



Combined Models



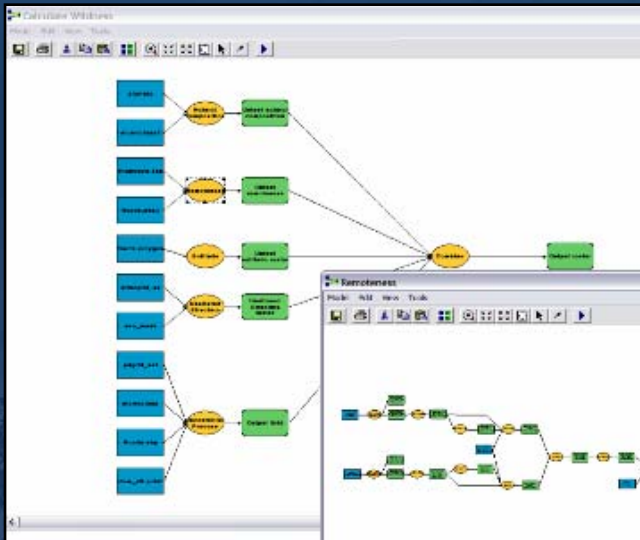
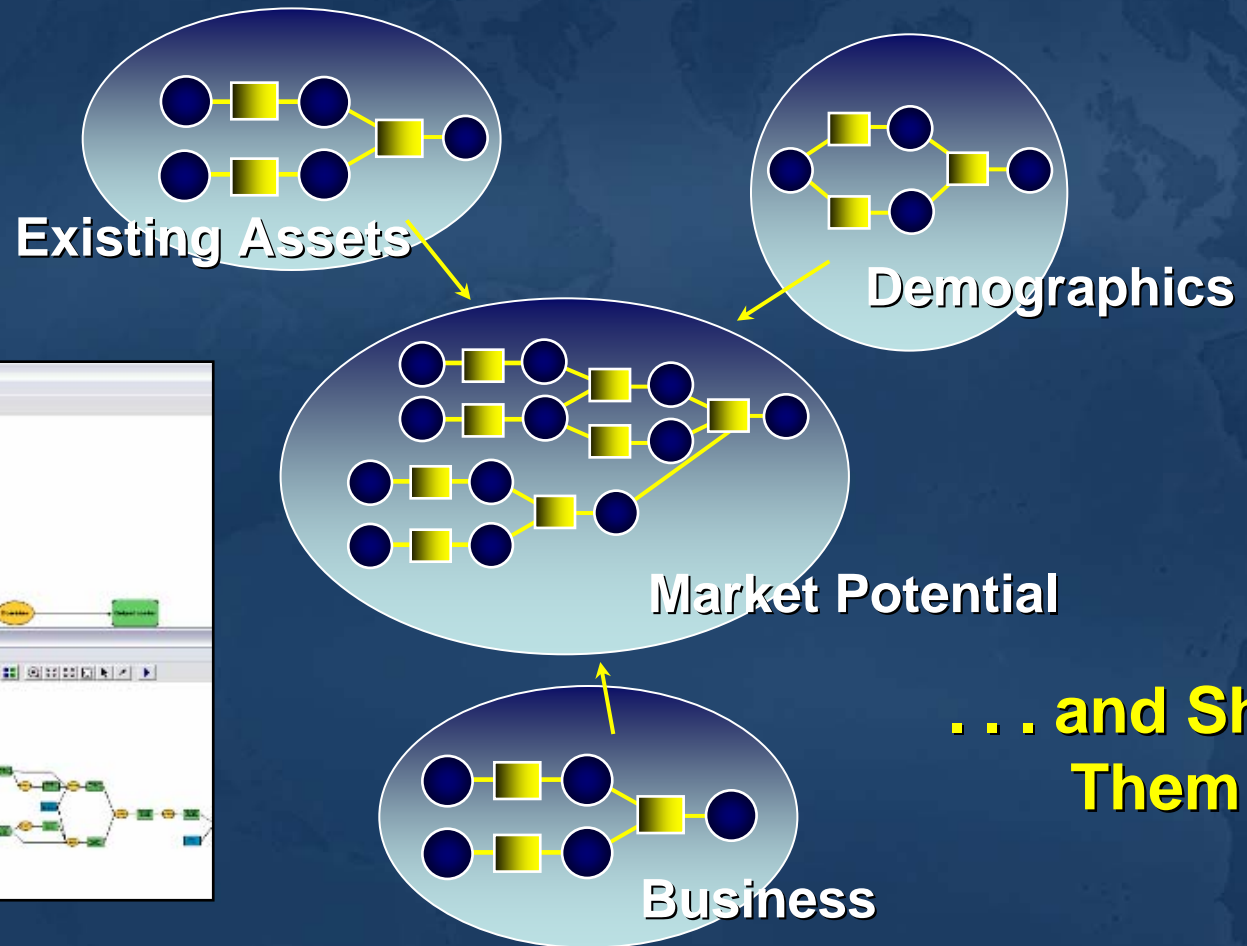
**Sequences of Tools and Data . . .**

**. . . That Define Process Knowledge**



# Process Models Can Be Integrated

... To Create New Models



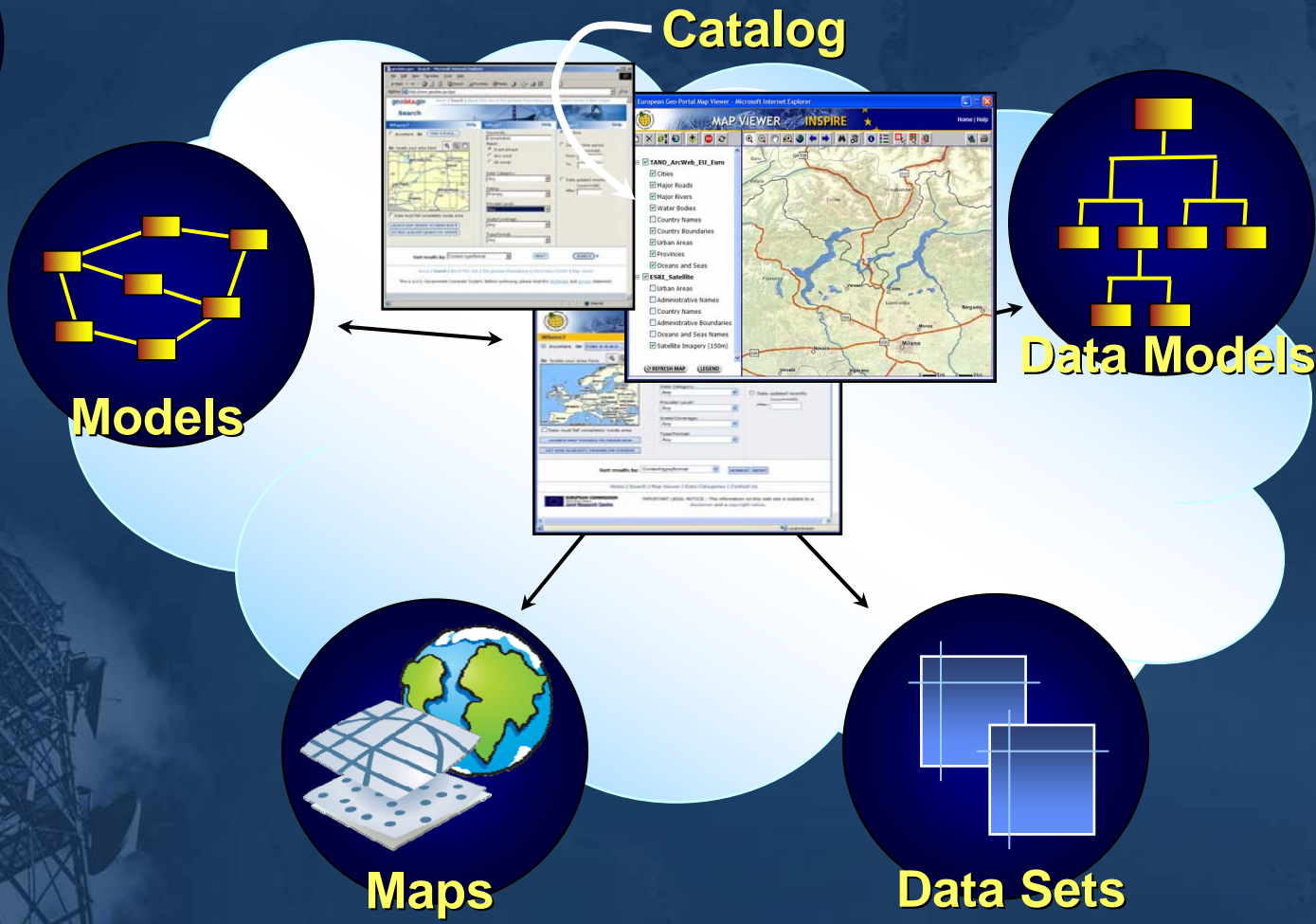
... and Share Them

Leveraging Common Knowledge





# Geographic Knowledge is Organized in Metadata Catalogs



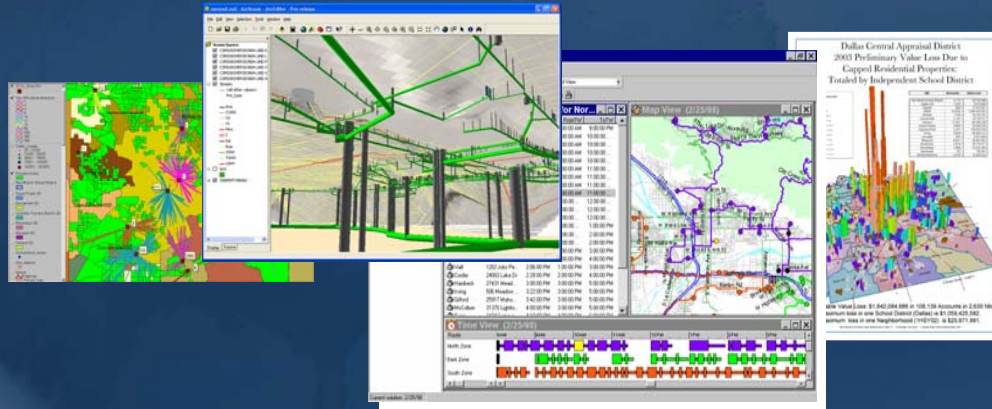
... Metadata Describes Content and Relationships



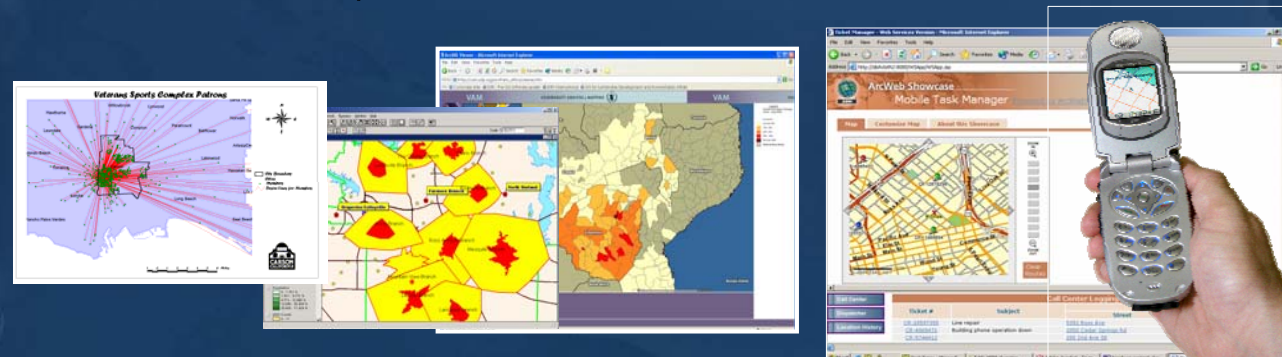
# Growing Enterprise Solutions

## Two Kinds Of Systems

- Geo-Centric Workflows Managing GeoObjects  
(Telecom, Utilities, Land Records, Planning, Military)



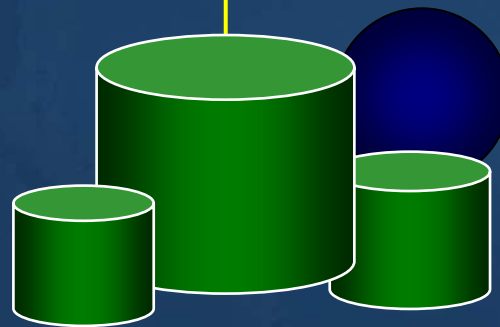
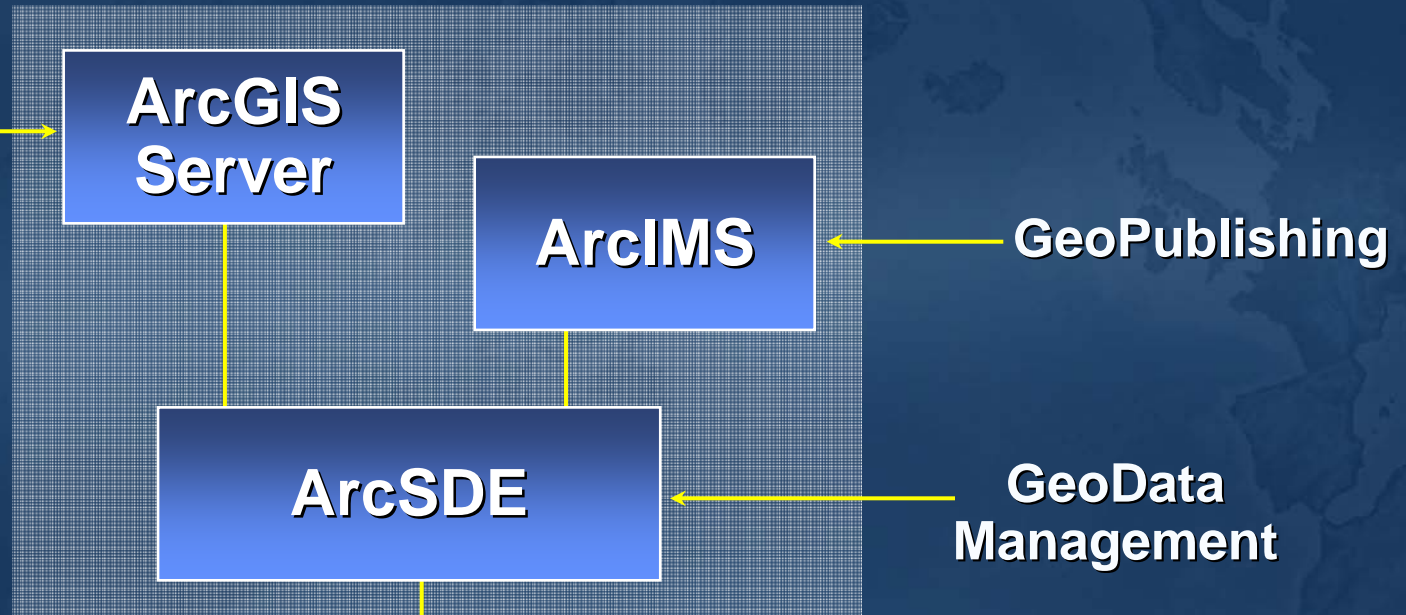
- Geospatially Enabling Business Systems  
(ERP, CRM, BI . . .)





# A Big Change

**Telecom  
Business  
Logic**



## **Supports Any DBMS**

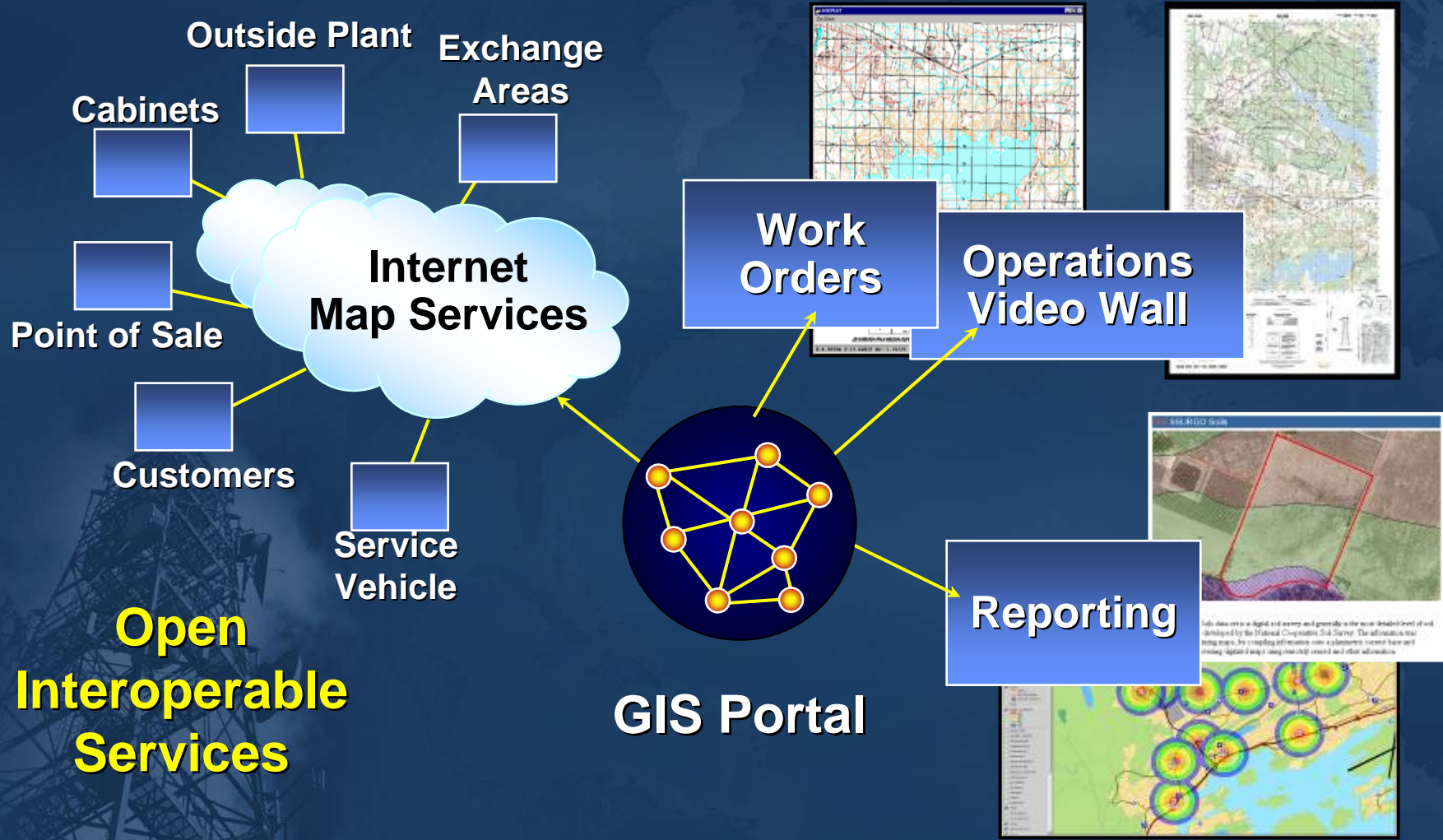
- SQL Server
- Oracle
- Informix
- DB2

**... Supporting Multi-user Implementations**





# ESRI GIS Servers Can Operate In A Distributed Services Oriented Architecture



... Providing The Foundation For GIS Networks





# ArcGIS Server Integrates with Other Enterprise Systems *at the Application Level*

**Web Services & Messaging**



**... Open, Flexible and Standards Based**



# ArcGIS Integration With SAP And Business Objects

The screenshot displays a GIS application interface with several components:

- Top Bar:** City of Phoenix Street Transportation Department logo, search fields for "Zoom to QS" (010-27) and "Zoom to Addr" (200 W Washington St), and a "GO" button.
- Main Map:** Aerial view of a residential area with street names "011-27" and "W MCKINLEY ST" visible.
- Legend:** A panel on the right titled "Legend" showing "CIP Projects" with a "Status Type" of "Approval" marked by a red star.
- i-MapNJ:** A window in the bottom left showing a regional map with various townships and a "Layers" list.
- ArcPad - ArcPad:** A window on the right showing a detailed street map with a "Create Work Request" dialog box open.

The "Create Work Request" dialog box contains the following information:

- Create** and **Comments** buttons.
- Location Information:** 15532 CAMTO PLOMADA
- Priority:** High
- Notification Status:** Open
- Problem Description:** Hydrant Knockover, Low Pressure, Main Break Down, Yard Flood
- Buttons:** OK and Cancel

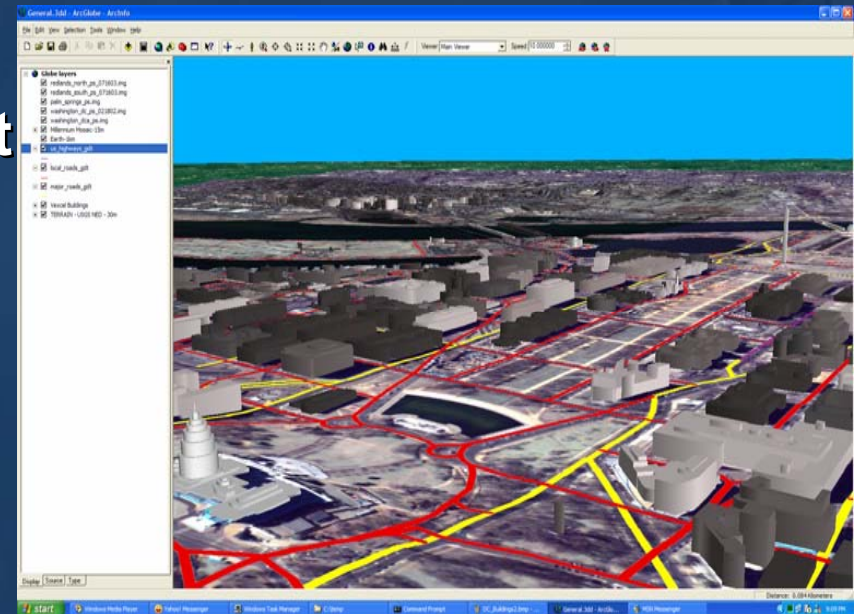
Cybertech Systems & Software Inc.





# Why GIS for Telecom ?

- **What is the Business Case?**
  - **Business Process Automation**
    - Reduce Cost
    - Better Decision Making
    - Faster Network Rollout
    - Competitive Advantage





# Enterprise GIS for Telecom:

## Benefits

### Automation:

### Return:

•Engineering/Asset Management	X
•Capacity Planning	3X
•Field Crew	60X
•Customer Service	300X
•OSS	600X





# ESRI & The Telecommunications Community





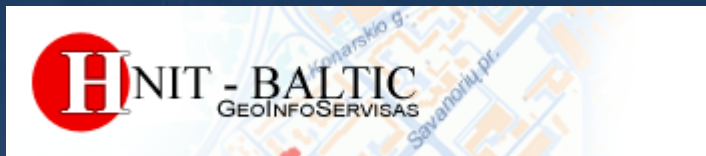
## Memberships

- **ITU** (International Telecommunications Union)
- **TIA** (Telecommunications Industry Association)
- **CTIA** (Cellular Telecom Industry Association)
- **GITA** (GeoSpatial Industry Trade Association)
- **USTA** (United States Telecom Association)



## ESRI Telecom Business Partners

- 100+ Partners Around the World
- Creating GIS-based Solutions for the Telecom Industry





TM

**ESRI**

TM

