Integration of GIS, Asset Management and Call Center Technology

Presented by:
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City of Greensboro

Agenda

- Background on Greensboro's project environment
- Asset Management project
- GIS Integration
- Call Center Integration
- Project Challenges

Project Background: Scope

- Population: ±220,000
- Area: 120 sq. mi.
- Typical range of municipal services
- Roughly 2,800 employees
- FY 2004-05 Budget of $350M

- Included in Project:
  - Transportation
  - Storm Water
  - Solid Waste
  - Water and Sewer
  - Parks and Recreation
  - Building Maintenance
- Excluded from Project
  - Building Inspections
  - Fleet Maintenance

Project Background: Objectives

- Create single enterprise-wide asset management system, including:
  - Infrastructure (pipes, streets, playgrounds)
  - Buildings maintenance, plant operations (water/sewer)
- Integration of:
  - GIS
  - Datastream 7i (Work Order/Asset mgmt)
  - One Call Center
  - Lawson ERP (Inventories, HR, Financials)
- Project “Driver:” Improved customer service

Project Background: GIS

ESRI Environment

- ArcMap 9.0
- ArcSDE (SQL Server)
- ArcIMS
- Enterprise wide, centralized GIS management

System Metrics

- Roughly 100 users of ArcMap
- Numerous ArcIMS users
- ±200 SDE Layers
  - 104,000 address points
  - 17,000 street segments
  - 90,000 parcels
  - 50,000 storm water inlets
  - 45,000 street signs

Project Background: Datastream

Asset Management Environment

- Datastream 7i Extended
- SQL Server
- GIS Module
- Databridge (integration with ERP inventories, etc.)
- Web Services (integration with One Call Center)
- Datastream 7i Mobile

System Metrics

- Current Datastream 7i features: ± 500K
- Ultimate number of Datastream 7i features: ±1.5M (estimated)
- Number of concurrent daily users: ±50
- Average number of work orders entered weekly: 1100

Project Background: Call Center

Contact Center Environment

- Developed in-house (ASP.NET)
- SQL Server (on Enterprise SQL Servers)
- Enterprise application servers (Windows2003)
- Integrated with Cisco VoIP telephones

System Metrics

- 8 CSR's handle 530 calls/day
- Source for 75% of work orders
- 450 phone numbers reduced to "373-CITY"
- Customer Hold Times
  - Before: (departmental centers) Avg. 73 sec
  - Today: Avg. 6 sec.
- Abandon Rates
  - Before: (departmental centers) Avg. 15.9%
  - Today: Avg. 3.2%

Project Background: ERP

ERP Environment

- Lawson
  - Financials
  - HR
  - Procurement
  - Inventory
- IBM AIX based servers
- Oracle RDBMS

Integrating:
GIS and Asset Management

- **Goals**
  - GIS doesn't manage assets; but GIS provides an inventory of what and where the municipality has assets
  - Provide supervisors with a map "front end" into asset inventory
    - Identify/Select assets for maintenance
    - Identify location of active/past work orders
  - Allow for spatial analysis of work order trends
  - Accomplished through Datastream's GIS module

Datastream 7i - Microsoft Internet Explorer provided by City of Greensboro

Datastream 7i

START CENTER | MY ACCOUNT | HELP | ABOUT | LOGOUT

Work | Materials | Equipment | Operations | Administration

GIS Map Search

Map Search

Search For: Address

Street: 5656 W MARKET ST

Zone:

Radius: 200 Feet

Active Layer: SWS Man Hole

Dataspy: All Equipment

GIS Filter: All Features

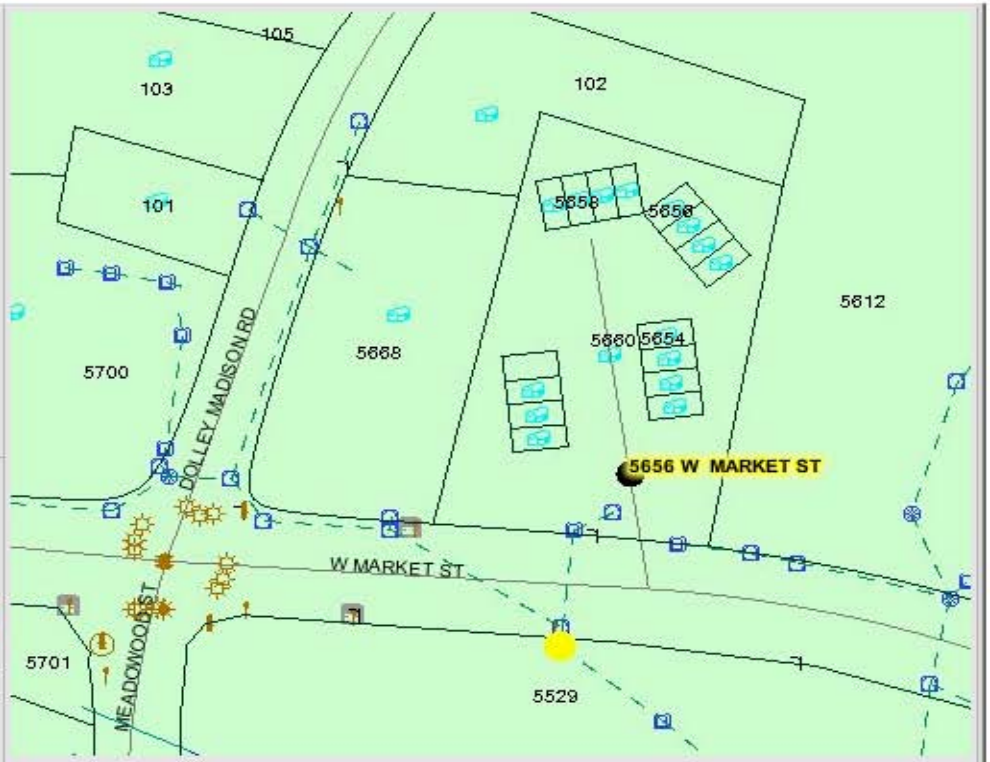
Search | Clear

Equipment Within Search Area

--No Filter--

Equipment	Description	Department	Class
137782	SWS manhole GIS Tag # 20012 (city)	GDOTSTOR	Storm Water Manhole

Options: Highlight on Map | Submit

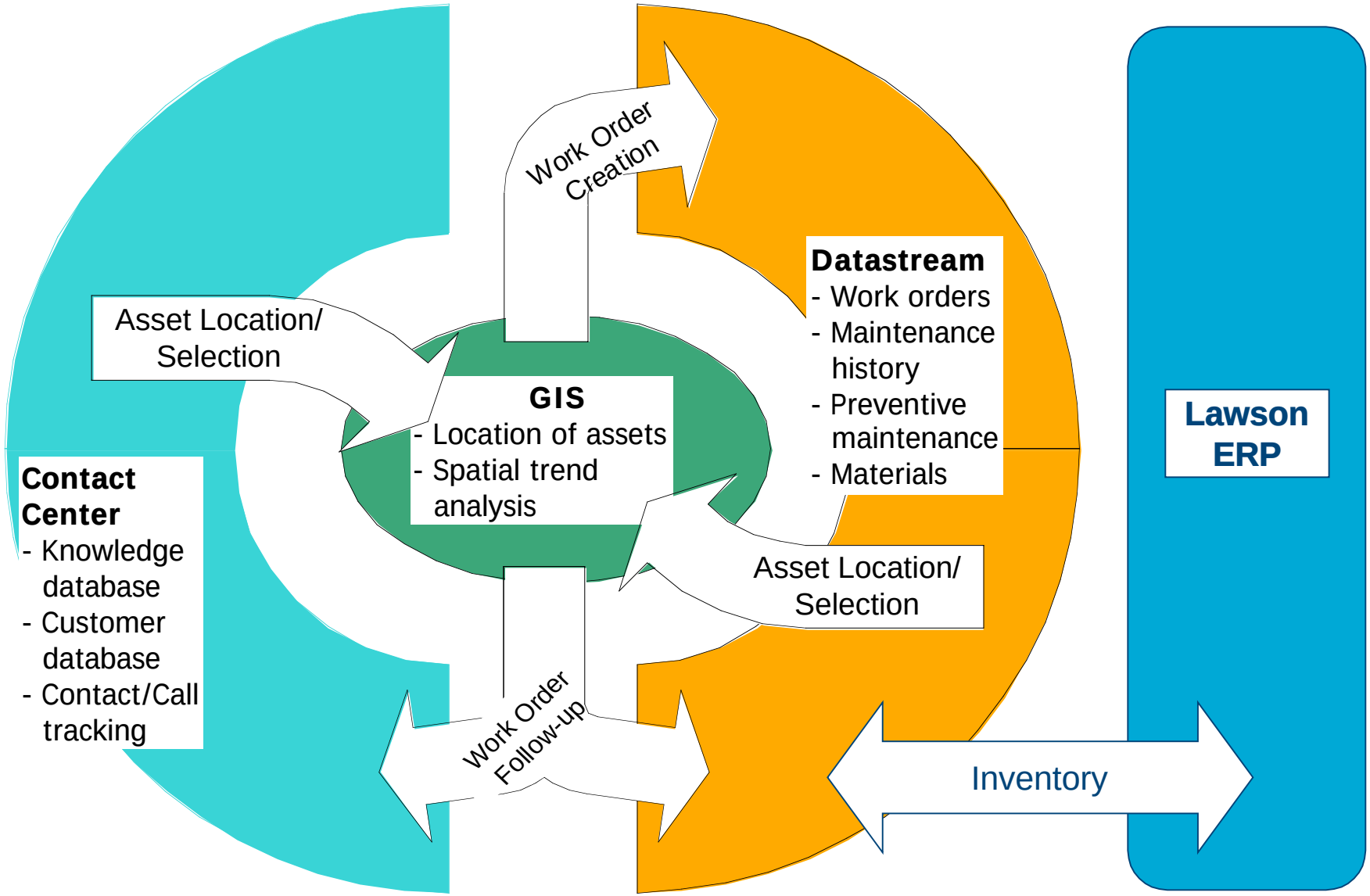


Visible Layers | Show Legend

Integration:
GIS, Contact Center and Datastream

- Goals
  - Provide citizens a single point of contact for all non-emergency service needs
    - Information
    - Comments
    - Service/work request
  - Provide CSR's a single application
    - Eliminate need to know multiple standalone applications
    - Ease of training

Integration Model



Contact Center Application

- Custom written by City MIS
- Modules
  - Knowledge base (every CSR is an “expert”)
  - Customer contact management (under construction)
  - Call tracking
- Datastream integration
  - Work order creation
  - Work order retrieval
- GIS map integrated throughout application

Contact Center Application

- Web services allow programs written in **different languages** on **different platforms** to communicate in a standards-based way via XML documents
- XML documents contain:
  - "Start tag" – defines what's coming
  - "End tag" – concludes the document
  - "Content" – the information between the two tags
    - Elements can be annotated with attributes that contain metadata about the element and its contents
- Web Services allows "disconnected" participating system upgrades

Contact Center Application

Asset Management Challenges

- Business process review
- Hierarchies
- Data Acquisition
- Data Maintenance

Defining Business Processes

- **Challenge:**
  - Few processes are documented
  - Most handed down from generation to generation
- **Approach:**
  - Analysts ride/interview supervisors & crew leaders
  - Heavy emphasis on being in the field and seeing work
  - Ultimately conducted several rounds of hands-on prototyping with users
- **Outcome:**
  - Flow chart/documentation that mapped to Datastream via combinations of problem codes and job status codes
  - Users often described more structure to workflow than actually there – needed to do more end user prototyping

Hierarchies

- **Challenge:**
  - Used to define relationships for cost roll-ups and reporting
    - Motor ➡ Pump ➡ HVAC ➡ Building
  - Easy to misinterpret coincidental location as relationship
    - Sidewalks ⛔➡ Street Segment
    - Street lights ⛔➡ Addresses
- **Approach:**
  - Only true child/parent relationships modeled
  - Spatial analysis via GIS collects coincidental relationship costs, etc.
- **Outcome:**
  - Extensive hierarchy diagram
  - Contributed to data loads

Initial Data Acquisition

- **Challenge:**
  - Batch upload of assets and systems from GIS tables to Datastream 7i, including custom fields
- **Approach:**
  - Pre-existing GIS features source for almost all assets
  - Required assignment of unique ID, spanning all GIS layers
  - Use of Datastream API to perform upload
- **Outcome: Uploaded ± 500,000 Objects**
- **Subsequent Datastream releases simplify this process**

Ongoing Data Maintenance

- **Challenge:**
  - Timely data maintenance essential for work order processing
  - Changes occur daily in field
  - Not always viewed as high priority
- **Approach:**
  - New features created in GIS
  - Post-processing (model builder) w/in GIS
  - Resulting asset records uploaded to Datastream
- **Outcome**:
  - Remains a challenge
- **Subsequent Datastream releases simplify this process with automatic synchronization at table/field level**

Summary

- **GIS integration is core aspect of our implementation**
  - Provides a “front-end” to all assets
  - Holds promise for in-depth operations focused analysis
- **Web Services provides multi-purpose integration path**
  - Provided “toolkit” for tying Datastream to custom written Call Center application
- **Municipal implementations are different**
  - Business process complexity
  - Hierarchies and GIS
  - Data maintenance becomes crucial

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