GIS in Integrated Systems:

Improving Field Service Efficiency through Effective System Integration at the Sacramento Suburban Water District (SSWD)

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Sacramento Suburban Water District

- Location: suburban Sacramento, Ca
- Population served: approx. 170,000
- Staff: 57 full time
- 709 Miles of Mains
- 91 Production Wells
- 44,909 Service Connections
- 2007 Annual budget: O&M $16,800,000
  CIP $18,600,000
Integration, Integration, Integration

- Systems selected for integration compatibility
  - Cogsdale corporation: customer information
  - Microsoft great plains: financial information
  - Azteca systems CityWorks: work order management
  - ESRI ArcGIS: mapping & infrastructure
  - Tokay: Data pushed from CIS
  - AVL: MS Access database integration to SDE
  - Microsoft systems and database software
Integration Goals

• Reduce or eliminate redundant data entry tasks

• Leverage best components of each application without the burden of overlapping functionality
System Architecture
Service Requests

• Integrated with customer information system
• Complete customer history of service calls
• Wireless field access to service requests and USA tags
• No more “Lost” service requests
• Less travel time (more efficient time in field)
• Ability to create work order from service request
• Display service requests on map
Work Orders

- Real-time, centralized access to all work order information
- Reduced amount of manual work (writing, calculating, etc.)
- Improved accuracy of work orders (materials, labor, contractor)
- Easier and quicker to make changes
- Better reporting
- Greater access to historical work order data
- No more “Lost” work orders
- Better tracking of work order status
- Accessible to employees in the field
- Integrated with mapping and infrastructure application
Integration Diagram

Legend

- View
- Table
- Server
- Insert Trigger
- Update Trigger
- Delete Trigger
- Add Trigger

(1) Compress GeoDatabase
  - CompressGeoDatabase
  - Every day, at 4:00am

(2) Request Attachment WorkOrdering
  - CITYWORKS
  - REQUESTATTACHMENT
  - WORKORDERING
  - Every day, at 5:00am

(3) Customer Account C2CMIS replication
  - CITYWORKS
  - CUSTOMERACCOUNT
  - Every day, at 6:00am

(4) Rebuild Materials Hierarchy
  - CITYWORKS
  - MATERIALS
  - HIERARCHY
  - Every day, at 10:00am

(5) Rebuild Project Hierarchy
  - CITYWORKS
  - PROJECT
  - HIERARCHY
  - Every day, at 10:00am

(6) SWEOP - Close Cogasile Service Request
  - SWEOP
  - CLOSESERVICEREQUEST
  - Every day, at 10:00am

(7) Convert Geospatial Service Request
  - SWEOP
  - CONVERTGEOSPATIALSERVICE
  - Every day, at 10:00am

MS Access
  - SWEOP
  - MSAccess
  - Every day, at 10:00am

SSWEOP - Usage Data Replication
  - SWEOP
  - USAGE
  - DATA
  - Every day, at 10:00am

SSWEOP - Convert Geospatial Service Request
  - SWEOP
  - CONVERT
  - GEOSPATIALSERVICE
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Note: Numbered items indicate order of daily tasks
Core Applications

- Financial Information System (FIS)
  - Microsoft Great Plains
- Customer Information & Billing System (CIS)
  - Cogsdale Corporation CSM
- Mapping & Infrastructure (GIS)
  - ESRI ArcGIS (Geographic Information System)
- Maintenance Management System (CMMS)
  - Azteca Systems CityWorks
- Backflow
  - Tokay Systems
- Automated Vehicle Location (AVL)
  - Airlink and Airlink AVL
Technology

- Low- to mid-range standard Dell laptops
- Combination GPS / Cell data device mounted in trucks
- Microsoft Terminal Services on mid-range Dell servers
- NetMotion Mobility XE for VPN and network stability
- ESRI ArcSDE
- Microsoft SQL Server
- Microsoft DTS (Data Transformation Services) jobs
- SQL Views
- Microsoft T-SQL Database Triggers
- Custom Visual Basic Applications
In-Depth Look at CIS to GIS Integration

• Goal: Bring customer and meter data in the CIS into the GIS for display and analysis

• Components
  • Two SQL Server databases (ESRI ArcSDE and Cogsdale CIS)
  • SQL Server Database Link
  • SQL View in Cogsdale CIS, matching registered table in SDE
  • Daily scheduled Microsoft DTS Job to load data
  • Daily scheduled batch file to recreate ArcSDE Geospatial View
  • GIS Relationship Class between ServicePoint and new table (sswd_connectionID_data) – name indicates one-to-one relationship based on unique connection identifier
Source SQL View (Cogsdale CIS)

... 3-page long Complex SQL Statement
To pull various customer data and meter components from over 24 tables
Destination Table in ArcSDE

- One-to-one column mapping from view to matching table, to keep DTS job setup and debugging simple
Microsoft SQL Server DTS job to load data
Batch file to recreate SDE Geospatial View

sdetable -o delete -t ServicePointCISView -N -q -u sde

sdetable -o create_view -T ServicePointCISView -t ServicePoint,sswd_ConnectionID_data -c ServicePoint.OBJECTID,ServicePoint.Entity,ServicePoint.Handle,ServicePoint.Layer,ServicePoint.Color,ServicePoint.Linetype,ServicePoint.Elevation,ServicePoint.Thickness,ServicePoint.Text,ServicePoint.ACCTNO,ServicePoint.ADDRESS,ServicePoint.SERNO,ServicePoint.SIZE,ServicePoint.TYPE,ServicePoint.Shape,ServicePoint.SubType,ServicePoint.FacilityID,ServicePoint.LegacyID,ServicePoint.Location,ServicePoint.WarrantyDate,ServicePoint.InstallDate,ServicePoint.Condition,ServicePoint.ConditionDate,sswd_ConnectionID_data.UMLocationID,sswd_ConnectionID_data.UMLocClass,sswd_ConnectionID_data.UMLocID,sswd_ConnectionID_data.UMLocClass,sswd_ConnectionID_data.UMLocStatus,sswd_ConnectionID_data.UMRouteID,sswd_ConnectionID_data.UMConnectionDate,sswd_ConnectionID_data.UMDisconnectDate,sswd_ConnectionID_data.APN,sswd_ConnectionID_data.CFirstName,sswd_ConnectionID_data.CLastName,sswd_ConnectionID_data.CPlaceOfWork,sswd_ConnectionID_data.FACILITYID=sswd_ConnectionID_data.ConnectionID -w "ServicePoint.FACILITYID=sswd_ConnectionID_data.ConnectionID" -u sde
GIS Relationship Class for customer drill-down from map
Question and Answer / Discussion
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