City of Cincinnati
GIS-Based Customer Service Request System

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ABSTRACT

This presentation will discuss the technical aspects of developing and implementing the Cincinnati Customer Service Request system. The system was created by the Cincinnati Area Geographic Information System (CAGIS) with assistance from the Telecom and CINSY sections of the Regional Computer Center. The system leverages CAGIS's extensive integration of the GIS with transactional data stored in an Accela Permits Plus database. Cincinnati is in the middle of a three-year project to implement the system. As CAGIS works with each department on its service requests, data and workflow hurdles are identified and analyzed. As a result, new projects are created to ensure that the vision of progressive improvement in customer service delivery, not just customer service tracking, becomes a reality. Supporting projects underway include the automation and enterprise tracking of city-owned property and right-of-way, inventory of poles and signage, and improvement of data to link requests to infrastructure features.

Introduction

In April 2002 Cincinnati City Council requested a report on the feasibility of a single inter-departmental customer service request system for essential city services. This request grew from the growing realization that the City was experiencing significant problems in its customer service delivery. A review of the City's performance in many areas showed all of the symptoms of departments and agencies not acting like a "team," although a team approach was exactly what was required to meet the needs of citizens and the demands of economic competitiveness.

By late 2002, City Council had approved implementation of a Customer Service Request (CSR) system to improve the coordination and management of services provided to City residents, companies, workers, and visitors and between City agencies. Although several vendors' CSR systems were evaluated, the decision was made to develop the system in-house, to ensure tight integration with the City's four primary systems; Accela workflow tracking, Maximo and Indus work-order tracking, and the Cincinnati Area Geographic Information System (CAGIS) Gen7 desktop GIS product.

This project is a joint technology development effort by the CAGIS and CINSY Divisions of the Regional Computer Center. CAGIS is responsible for managing and developing, where necessary, the integration interfaces to the four primary systems. In addition, CAGIS provides: system and database administration; overall project management; application development; consulting in change-management and city workflows; GIS training; and development of GIS products in support of improving management service-delivery goals. CINSY staff provides user needs identification and user training.

In developing the project scope, three goals were identified:

1. View all City work at any particular location.
2. Enable an organization-wide view of service requests and responses so we can better identify our needs to invest in department responses and community initiatives.
3. Create a system that improves our intra and inter-department coordination in meeting community goals and service needs.

The system provides City employees with the tools they need to manage effectively a service request throughout its entire "life," from its initial intake to the final outcome. The system also makes it easier for call takers to respond to requests for information that do not result in further work orders. Key functions of the system include:

- Automation of the intake and routing of service requests and the resulting departmental activities in one coordinated system
- Tracking of service requests from the public and internal requests from one City agency to another
- Integration of these service requests and activities with the existing citywide database of automated workflows (Accela Permits Plus) and the Cincinnati Area Geographic Information System (CAGIS)
- Online "dynamic knowledge base" of telephone numbers, department facts, city and regional events, reference information, tips and "how-to" facts searchable by topic, category and keyword.
- Automatic work-order dispatching through existing Work Order systems
- Computer and text message capabilities for field personnel
- Automated creation of correspondence, notices, e-Mails etc.
- Management tools including custom reports and maps

System Components

CSR Administrator
The CSR Administrator allows departments to create service requests and groups, enter the questions they feel will best identify the problem as theirs and provide the information needed for mobilization, and create the activities that must be accomplished to effect resolution.
- Create departmental groups
- Register members by assigning groups and security profiles
- Create and configure service request types
- The department that a user is permitted to manage will be automatically set in the configuration manager, based on departmental business rules.
- Create work order linkages to specific service request actions.
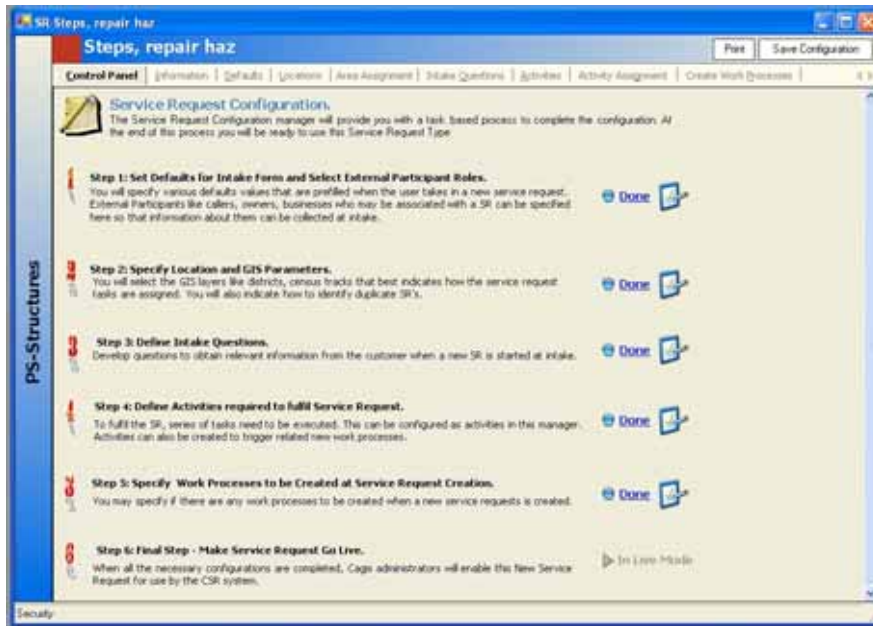
Cincinnati CSR Administrator

Knowledge Database Application

A Knowledge Database of telephone numbers, department facts, city and regional events, reference information, tips and "how-to" facts searchable by topic, category and keyword.

- Database is not limited to City of Cincinnati programs and departments, because City employees are frequently asked for information about programs and events that are not directly associated with any City department.
- City departments are able to change, update and add information to this database.
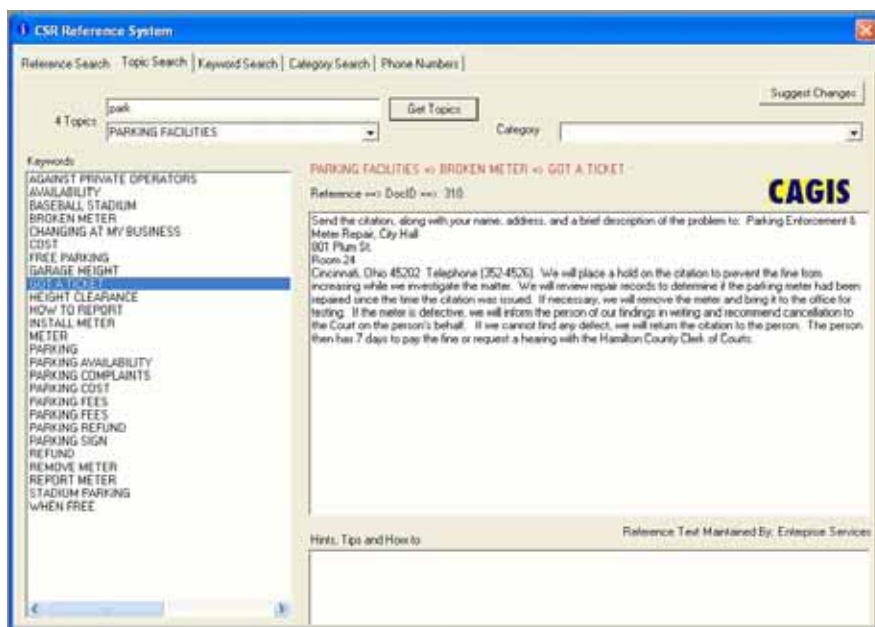
Cincinnati CSR Knowledge Database

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Call Intake

A call intake screen identifies the service request type, provides questions to guide the customer service representative automatically to the correct Department/Division/ Section, collect all of the data that will enable immediate response, and assign the appropriate priority.

- Create, update, store and categorize requests based on the types of requests that the registered user is authorized to manage.
- Guides the user to collect all required and appropriate data associated with the request, based on settings made in the Control Panel Application and departmental business rules.
- Collects information about the people, companies or objects associated with the request, linking caller information to the database of callers who have already called into the system and/or new caller ID equipment.
- Notifies the call taker automatically of potentially duplicate requests, based on type, date, time, date, status and location.
- Verifies addresses or intersections entered by the call taker and identifies the nearest address, parcel ID, property owner and United States National Grid (USNG) coordinate. Provides tools for adding comments to identify the location of the request.
- Maps the request along with potentially duplicate requests and gathers geographic information (such as neighborhood, service district, zip code, inspection district, zoning and census tract) from the CAGIS map in the background without the call taker re-entering any data.
- Enables the call taker to label the current request as a duplicate and add the caller's name as an additional caller to an earlier service request.
- Posts the request automatically to crew calendars for workflows that have been automated within the City's existing Permits Plus database or notifies the appropriate department/division/crew that there are services requests.

Cincinnati CSR Intake Screen

Query

A Query screen allows users to query service requests previously entered into the system. This module provides city departments the ability to track the status of services being provided by all city departments using the CSR system.

- Capability to query service requests already entered into the system using various selection criteria, including name, time, data, type, status, priority, neighborhood and census tract.
- Ability to filter who can query specific types of service requests, based on security authorization and group memberships.
- Ability to view detailed information and jump to the Resolution / Activity screen for selected service requests that are returned as the result of a query.
- View selected service requests on a CAGIS map.

Cincinnati CSR Query Screen

Acceptance / Routing

An Acceptance/Routing screen used by departments to identify all newly created service requests that need attention.

- Departments can accept and/or reroute each service request and dispatch work crews to begin the resolution process.
- Users have the ability to check on all service requests that have not been updated or edited, for all groups of which they are members.
- This module also automatically refreshes itself to display new service requests created while users are dispatching the workers and assigned staff.

Cincinnati CSR Acceptance and Routing Screen

Dispatch

A Dispatch screen that allows Public Services to dispatch and track departmental activities in the CSR system.

- View service requests waiting for dispatch or that have been dispatched
- Search for pending service requests based on their proximity to available work crews, status or length of time in the queue
- Change the status of a request that is waiting for dispatch or that has been dispatched
- Transfer a service request to another agency
- View a service request on the map in relation to other similar requests.
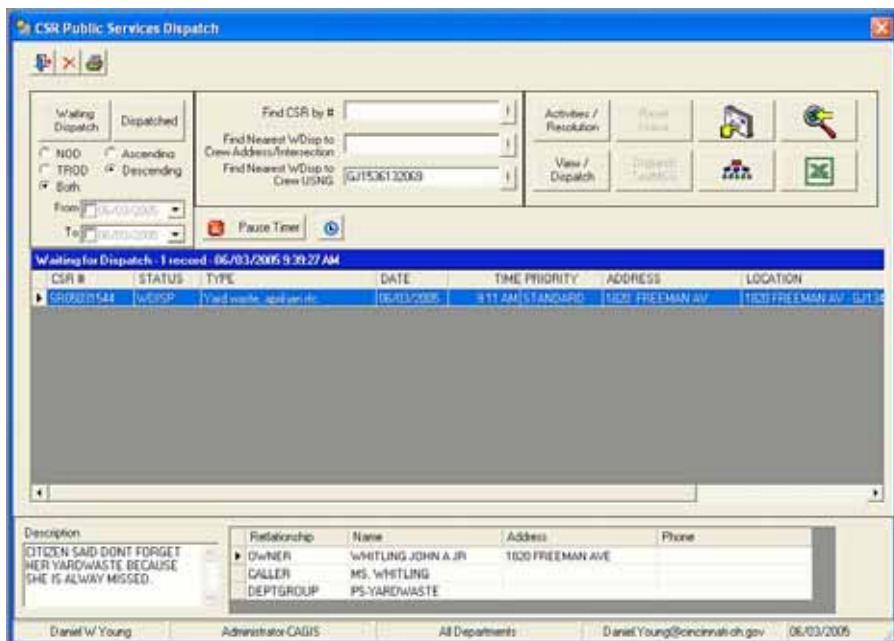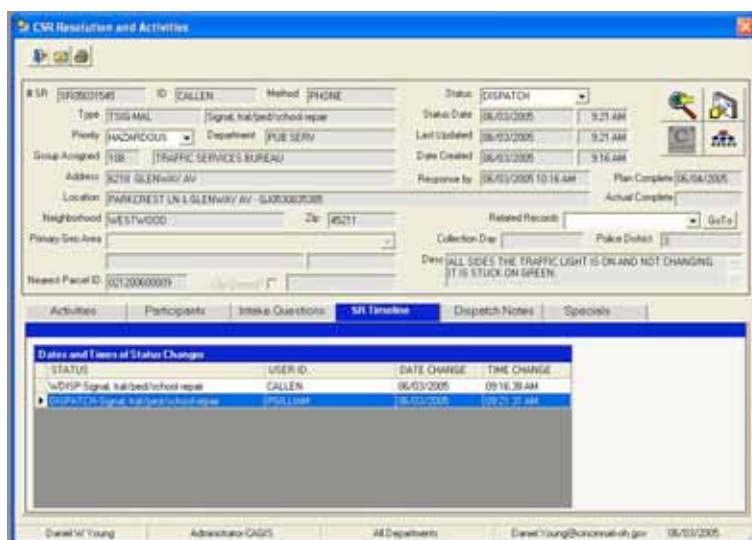

Cincinnati CSR Query Screen

Resolution and Activities

The CSR Resolution and Activities module is used to process and resolve service requests. From this module, all city departments are able to add and complete activities accomplished to resolve the request, print work orders and print any correspondence. A complete record of resolution activities is then available to department managers at a glance. Additionally, follow-up letters to the citizen can be automatically generated and be available for printing within minutes after the completion of the request by the departments.

- Automatic or manual assignment of assigned staff, inspectors, or work crews by work division area (geographic)
- Manual assignment of resolution activities to staff, work crews, or vendors
- Capture activities that have been performed on the service request (e.g., letters, work orders, phone calls)
- Capability to enter and change service-request information and status as resolution activities are processed.
- Change the priority of an existing service request (i.e. from "Standard" to "Hazardous")
- Generate a pre-formatted correspondence or work orders on demand
- Ability to view the transaction history of assigned transactions
- Pop-up window to capture and view images associated with service request
- Send an email alert for past due activities
- Capability to view requests linked to other companion or follow-on service requests
- Add flex questions, edit flex question answers, and add participants
- Copy a service request to create a new one
- A tracking feature that enables the user to view a time line of major milestones during the life-cycle of the service request
- Print a summary report of the service request
- View duplicate service requests
- The functionality to change the service request type and re-route or transfer it to a different department/agency.

Cincinnati CSR Resolution and Activities Screen

GIS Integration

The Cincinnati CSR system displays an integration with the City's GIS that is unusual for applications like this. While similar applications are capable of mapping service requests in ArcView or ArcGIS, the Cincinnati CSR relies on two-way communication between the application and the GIS to create, manage and resolve service requests. Examples of this integration include:

- The location of a request for services (either address or nearest intersection) is verified in the geographic framework database, providing standardized street addresses, street names and coordinates.
- Through geographic analysis, the GIS provides data to the CSR application that would not be available in any other manner: nearest address, parcel ID, and street segment ID; Public Services, Police, Fire, Health, Transportation & Engineering, and Buildings & Inspections service districts; zoning and special over-lay districts; an indicator of City-owned properties and the department in control; the United States National Grid (USNG) coordinate; zip code and census tract; and the City of Cincinnati community
- The GIS provides additional descriptors of the location of the service request, available only through geographic analysis, which the call taker can add to the record in the CSR. For instance, a request for service at 1332 Michigan Avenue returns the following list of additional, possible descriptions:

    o MICHIGAN AV and OBSERVATORY AV
    o At Address 1332 MICHIGAN AV
    o Nearest Address is 1332 MICHIGAN AV
    o 1332 MICHIGAN AV (Front Of)
    o 1332 MICHIGAN AV (Rear Of)
    o 1332 MICHIGAN AV (Next To)
    o 1332 MICHIGAN AV (Lower)
    o 1332 MICHIGAN AV (Upper)
    o 1332 MICHIGAN AV (Across From)
    o 1332 MICHIGAN AV (Across Street From)
    o Near Address 1332 MICHIGAN AV in Creek
    o 0.0515388' W of 1332 MICHIGAN AV
    o 0.0515388' 284.036^ from 1332 MICHIGAN AV
    o Segment Location: 1351 MICHIGAN AV
    o 80.96' from Segment Location: 1351 MICHIGAN AV
    o S of OBSERVATORY AV
    o Just S of MICHIGAN AV and OBSERVATORY AV
    o 419.28' S of MICHIGAN AV and OBSERVATORY AV
    o 419.28' 174.704^ from MICHIGAN AV and OBSERVATORY AV
    o On MICHIGAN AV Between HAMPSHIRE AV and OBSERVATORY AV
    o Close to 1332 MICHIGAN AV
    o EC of MICHIGAN AV and OBSERVATORY AV
    o SC of MICHIGAN AV and OBSERVATORY AV
    o NC of MICHIGAN AV and OBSERVATORY AV
    o WC of MICHIGAN AV and OBSERVATORY AV
    o SWC of MICHIGAN AV and OBSERVATORY AV
    o SEC of MICHIGAN AV and OBSERVATORY AV
    o NEC of MICHIGAN AV and OBSERVATORY AV
    o NWC of MICHIGAN AV and OBSERVATORY AV

- The CSR application notifies the person entering the request for service of potential duplicate records based on geographic criteria specified by the department that receives that type of request. The three possible geographic criteria are: located at the same address, located along the same street segment or located within a given distance.
- The person inputting the service request can interact with the GIS to "fine tune" the location of a request and the data that is returned to the CSR system. For example, a citizen may be calling to request repairs to the park around the corner from where she lives, although she does not know what the park's address is. The call taker can locate the caller's address or the nearest intersection in the system, activate the view in ArcView, and then click on the proper location using a tool that is activated by the CSR system. In turn, the appropriate GIS data for the park is returned to the CSR application.
- A custom CSR ArcView Extension permits the user to map service requests "on-the-fly," based on a variety of criteria. After the records are mapped, the records are displayed in a dialog box, from which the user can pan the view from one record to the next, label records in the view, and open the selected record directly in the CSR application.

Technical GIS Issues

For reasons that are beyond the scope of this paper, the Cincinnati Area Geographic Information System has not yet moved its desktop GIS applications to ArcGIS. Instead, CAGIS uses a highly-customized ArcView project known as GEN7, which was developed by GIS consultant, Richard Allen, of MAGIC. The CAGIS staff has written additional ArcView scripts and extensions to receive commands from the CSR application, run Avenue scripts and return data to the CSR application.
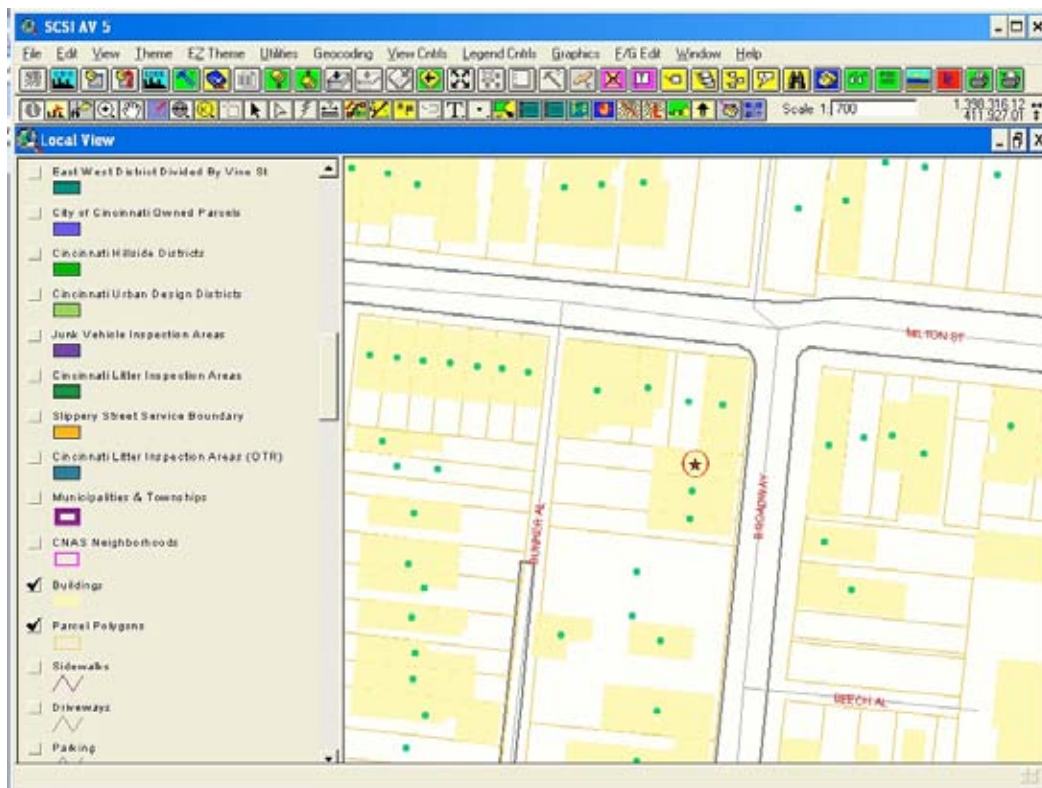
CAGIS GEN7 ArcView Interface

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The CSR application was created using the Microsoft .NET framework and is written in Visual Basic.NET. Although the CSR application is heavily reliant on the GIS, it has been designed to be GIS "neutral." Its commands to ArcView are relatively generic in nature, and the data consumed by the application is presented in a standard XML format. As changes inevitably occur in the GIS system, only relatively minor changes will be necessary in the CSR application itself.

Although it is easy to communicate with ArcView through DDE, Visual Basic.NET does not support DDE communication. To work around this, CAGIS developed a simple Visual Basic 6 application that receives command-line arguments from the CSR application, establishes a DDE conversation with ArcView, and then runs a script that processes the command-line arguments. In turn, ArcView communicates with the CSR application either by writing files to a directory that the CSR application monitors or by passing command-line arguments directly to the CSR application.

Supporting projects underway include the automation and enterprise tracking of city-owned property and right-of-way, inventory of poles and signage, and improvement of data to link requests to infrastructure features.

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