

# Integrating GIS and Asset Management at GCWW



## Author:

Bryan May

Project Manager

Greater Cincinnati Water Works

bryan.may@gcww.cincinnati-oh.gov

## Abstract:

Managing the maintenance activities of a large municipal water system with over 235,000 accounts is a monumental challenge. The water infrastructure assets number more than 500,000 and span a service area of over 400 square miles. The legacy software of the 90's was inadequate at tracking work on our distributed assets. In early 1999, the Greater Cincinnati Water Works (GCWW) began looking for a comprehensive Enterprise Asset Management (EAM) system. Through an exhaustive process, the GCWW selected a leading EAM solution. While the selected software was the best overall fit for our various requirements, it lacked baseline support for GIS and addresses. This represented a significant functionality gap for the GCWW.

The GCWW designed and built an application to fill the gap between our existing GIS system and the new EAM software. The integrated solution satisfies the GCWW's GIS needs without compromising a baseline implementation of the EAM system.



## Greater Cincinnati Water Works (GCWW)

GCWW provides high quality drinking water to most of the greater Cincinnati region

- Most of Hamilton County (Ohio)
- Parts of Butler and Warren Counties (Ohio)
- Boone County (Kentucky)

### Vision

*Greater Cincinnati Water Works will be the standard for excellence in the water industry*

### Mission

*To provide our customers with a plentiful supply of the highest quality water and outstanding services in a financially responsible manner*



## GCWW Statistics

- **589,000 assets (in GIS)**
  - 226,000 Branches
  - 185,000 Water Mains (> 3,000 miles)
  - 68,000 Valves
  - 30,000 Fire Hydrants
  - 80,000 Fittings
- **235,000 customers**
- **150,000 work orders per year**
- **50 billion gallons of water distributed annually**
- **5,000 supply division facility assets**
- **9,500 preventative maintenance work orders**
- **335 EMPAC (EAM) users**



## EAM Background

- Oct 1994 implemented RJN Cassworks "pilot"
- 1999 / 2000 – performed RFI, RFP in search of replacement
- Best overall fit: Indus EMPAC
- Major gap – GIS
- Constraints – no customization of baseline product
- Solution: in-house development of bridging application that effectively integrates GIS with EMPAC
- Distribution Work Creation (DWC)
- Went live with EMPAC / DWC in late 2001
- Currently on DWC v5



## Alternatives Considered

### GEN7 (extensive ArcView 3 project)

#### Pros:

- Some existing code to leverage
- Some familiarity with development environment (Avenue)

#### Cons:

- Complex UI
- Limited integration with external systems
- Expensive to license
- Aging technology
- Limited control of development
- Client server difficult to support, deploy



## Alternatives Considered

### ArcIMS

#### Pros:

- Web deployment

#### Cons:

- Learning curve
- Lack of confidence in maturity of product
- Performance concerns
- Very few web development resources



## Alternatives Considered

### Visual Basic / MapObjects

#### Pros:

- Ease of Use
- Full control of development
- Mainstream technology – not legacy, not bleeding edge
- Lots of developer support (everyone knows VB)
- Strong systems integration possible
- “Just enough” GIS functionality

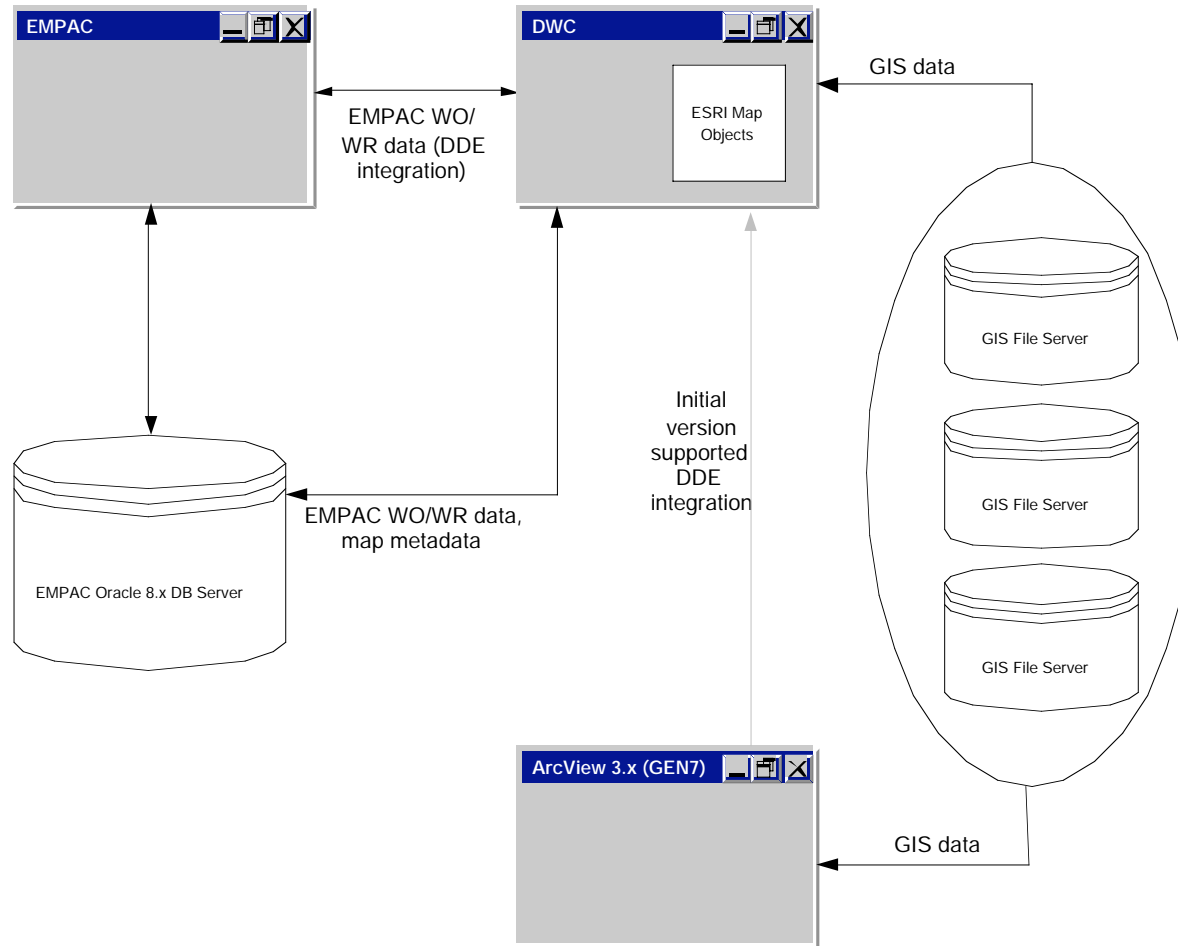
#### Cons:

- Client server difficult to support, deploy

# Integrating GIS and Asset Management at GCWW



## Technical Architecture







## Major Functionality

- Standardized address validation
- Easy selection of GIS assets (water main, valve, hydrant, branch line)
- Ability to alert user of open, nearby work during work creation
- Simplified work creation
- Table-driven map configuration (layers, labels, identify, symbology...)
- Quick identify
- Display work (work orders and work requests) on the map
- Valve card (what valves and customers are affected by shutdown)
- Event Board (high visibility work)
- MOAQ (Mother of All Queries) – searches across several data sources
- Simplified scheduling

# Integrating GIS and Asset Management at GCWW



## Sample Screenshots – WO (Default View)

**Distribution Work Creation - [DWC - Work Order (04-033772-002)]**

File View Modules Services Administration Window Help

05-000002-001 | 04-066432-001 | 04-066032-001 | 04-065909-001 | 04-063835-001 | 04-065168-001 | 04-064689-001 | 04-063958-001

Work Order: 04-033772-002    No Associated Event    Work Order Status: Closed

Prim. Work Request:    Entered By: ACAPLINGER    6/19/2004 9:23:06 PM

Preplan: 30442:15    Planner: WASHINGTON, DAVID

Action Taken: Leak/Main 12" & Below

Work Description: Leak/Main 12" & Below  
[676 HIDDENPOINT LN & HIDDEN GLEN DR]  
Leak/Main 12" & Below  
OUPS # 621-500-505

Caller Information:

Caller Name: 2402    Caller Phone:   

Problem Description: Check Leak in Area/ Street /Grass  
leak sample result on 4/20/04 - poss. filtered.

Problem Address:

House #	Street Name	Cross Street	Problem Area
676	HIDDENPOINT LN	HIDDEN GLEN DR	ANDETP

Asset Information:

Empac Asset: DSMN, ANDETP    DUAL SERVICE MAINS GROUP    ANDETP    Category: Default Category

Asset Number: D-241934    6" CAST IRON water main    Asset Area: ANDETP

Inside Diameter: 6    Pipe Material: CAST IRON

Service Area: Mount Washington    Main Sub Type:

Req. Date: 06/03/2005    Pave. (WO Ref): Sod

WO Priority: routine    Project No:   

Project Line No:    Bill To:   

Scheduling: D2662C Unscheduled

# Integrating GIS and Asset Management at GCWW



## Sample Screenshots – WO (Map View)

What features are under my cursor?

The screenshot shows a software window titled "Distribution Work Creation - [DWC - Work Order (04-033772-002)]". The interface includes a menu bar (File, View, Modules, Services, Administration, Window, Help), a toolbar with various icons, and a scale indicator of "1 inch = 200 feet". A list of work order IDs is displayed at the top. The main area is split into a left-hand information panel and a right-hand map view. The information panel contains the following details:

- Work Description:** Leak/Main 12" & Below [676 HIDDENPOINT LN & HIDDEN GLEN DR] Leak/Main 12" & Below DUPS # 621-500-505
- Address:** 676 Hiddenpoint Ln [ANDETP]
- Asset No:** D-241994 6" CAST IRON water main
- Quick Identity:** 6 inch Gate Valve in Sod 6" CAST IRON water main.

The map view shows a street layout with a blue line representing a water main. A green circle with a crosshair cursor is positioned over a specific point on the main, which corresponds to the "Quick Identity" information in the panel. Other red circular markers are visible along the main line. The status bar at the bottom of the window shows "467B", "WO Map is NOT filtered", and "ANDETP".

Where is this WO?

# Integrating GIS and Asset Management at GCWW



## Sample Screenshots – Work Request (Map View)

The screenshot displays the 'Distribution Work Creation - [DWC - Work Request (05-000003)]' application window. The interface includes a menu bar (File, View, Modules, Services, Administration, Window, Help) and a toolbar. The main form contains the following fields:

- Work Request: 05-000003
- Entered By: BMAY
- WR Status: Approved by...
- WO Number: (empty)
- Date Entered: 6/3/2005 2:37:15 PM
- Caller Information:
  - Caller Name: Pat Cooper
  - Caller Phone: 555-1235
- Problem Description: Caller reports a huge amount of water running down her street
- Problem Address:
  - House #: 1002
  - Street Name: JERSEY AV
  - Cross Street: (empty)
  - Problem Area: SAYLER
- Asset Number: SAYLER
- Category: Default Category

The bottom half of the window shows a map view with a street grid. A blue line highlights the street layout, and several red circular markers with a cross are placed at various points along the streets. A green circular marker with a cross is also visible on the map.



## Future

- Indus has converged product lines – EMPAC will go off support Dec 2006
- New Indus product – Indus Asset Suite (IAS)
- Will consider IAS as well as other EAM solutions
- Likely re-development of DWC as new solutions are web-based



## Lessons Learned

- Sometimes your best solution is the one that is “least bad”
- There is a cost to custom development
- Flexibility matters
- End User involvement critical at all stages: concept, design, development, testing, training, deployment, support
- No news is NOT good news
- Executive management support critical
- Mainstream technology beats bleeding edge
- Scope control critical
- Plan for a longer, more expensive project than you expect - and then increase it
- Focus on business process and not technology