The Business Benefits of Integrating SCADA and GIS at Water Utilities

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San Diego, California

DISTRIBUTECH® CONFERENCE & EXHIBITION

Presentation Outline

- The new demands on asset oriented businesses to meet increasing customer, regulatory and business challenges
- What SCADA and GIS are good at and what they are not so good at
- What can be integrated and how will it help

Photo Courtesy Google Images Website Water Drop as of 10/18/2006

SCADA and GIS Integration Demand Drivers

Changing Demands

...Business Process & Automation Optimization Drivers

- **Customer**
  - More demanding...rapid response to service calls
  - Reduced feeling of loyalty
- **Regulatory**
  - Continuously increasing requirements...water quality, leakage reduction, etc.
  - Bigger fines, less time to react
- **Business**
  - Demands on operating expenditure...lower costs, while increasing productivity and asset utilization
  - Workplace Trends...aging workforce/reducing skill base due to retirements
  - Damage to brand from high profile incidents

Integrating SCADA and GIS

- **Customer service response**
  - Reviewing low pressure concern calls from customers
  - Locating large water main breaks that have not surfaced
- **Maintain compliance**
  - Determining when and where a spill from a storm sewer will cross water plant intake
- **Streamline business processes**
  - Use GIS-derived model to develop operations plans during major equipment or transmission main outages

Leveraging SCADA and GIS Inherent Capabilities

SCADA and GIS Best Practices

Feature	SCADA	GIS
Live system availability	√	×
Real time data management	√	×
Spatial data representation	×	√

Options for Integrated SCADA/GIS

- **Build it within the SCADA System**...Spatial data display limitations
- **Build it within the GIS System**...Real-time data management and availability guarantee limitations
- **Build as an integrated solution**...Middleware use

Photo Courtesy Google Images Website Water Utilities as of 10/18/2006

Integration Methods

- **Leverage Middleware Software to integrate applications**
- **Web Services/GML**
  - overlay XML SCADA real time data over GML map from GIS
- **Data historian/warehouse**
  - Link databases
  - Table updates in real time
- **Web-portal**
  - Link web pages/components together in one view

Example Web Portal: GE Fanuc's Proficy Real-Time Information Portal is a next-generation flexible web client

- Digitize plant operations in a “virtual plant”
- Customized information to operations, management, plant supervisors, quality managers, and even water system clients
- Transform plant data into meaningful information using business rules and analyses
- Provide web-based visibility and analysis for real-time decision-making
- Integrate quality evaluation and data-driven alarming

Photo Courtesy GE FANUC 2004 Pitch...A Better Way to Access, Collect and Manage Data

Improved Customer Services

- Overlay SCADA alarm data on GIS map
- Get SCADA data for underground asset via map

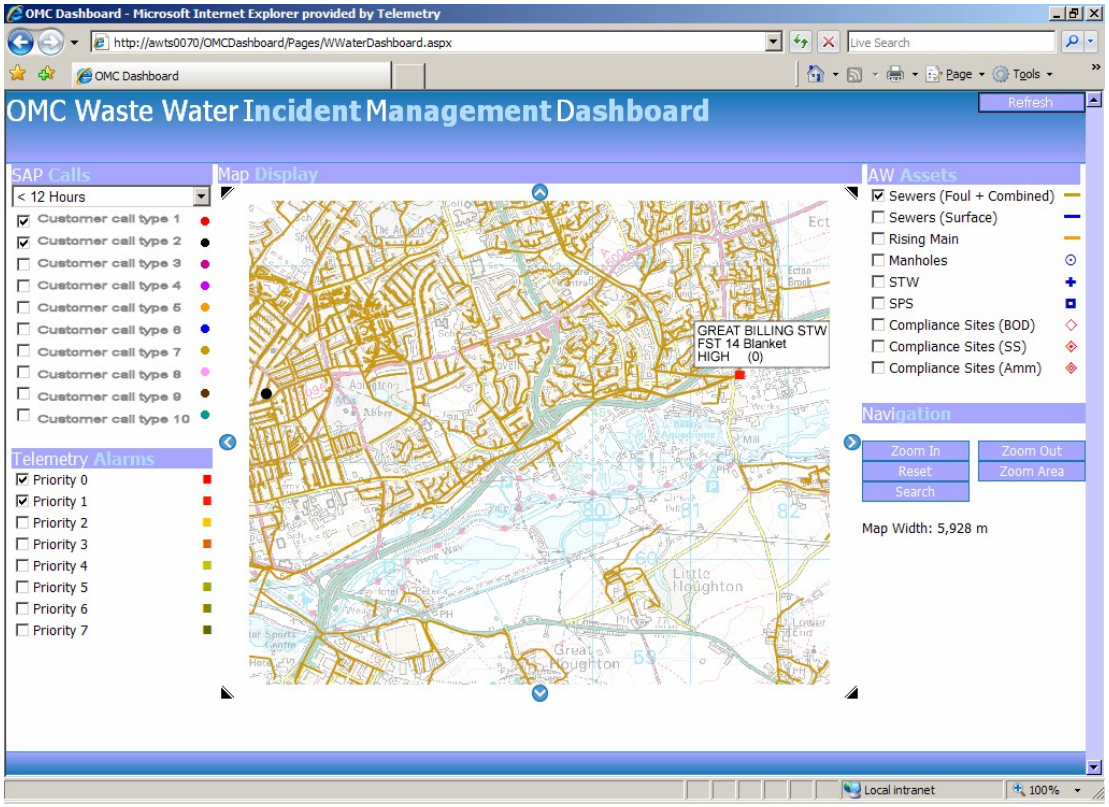


Photo Courtesy Anglian Water via MetaSphere Ltd. from UK as of 10/18/2006

Global Water Utilities
SCADA and GIS Integration
“Thought Leadership”

Innovative Water Utilities
...SCADA and GIS Business Process Integration

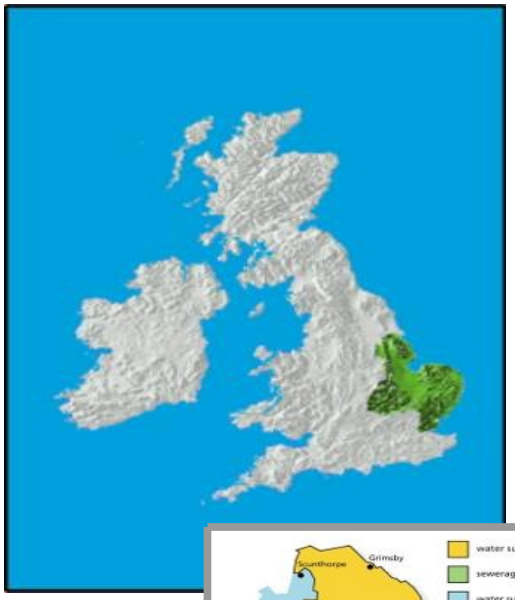
REGION	Utility	Integrated SCADA and GIS Business Process
Americas	EPCOR (CDN)	Yes: Using the SCADA and Network Model and GIS to locate large water main breaks that have not surfaced (usually these are flowing direct to a storm sewer) so they have large pressure losses but no water on the surface
	San Diego Water (USA)	Pending: Its SPLASH GIS application laying foundation to develop integrated SCADA and GIS business processes. The SPLASH Utility GIS Application is based upon GE's Smallworld geospatial technology
Europe	Anglian Water (UK)	Yes: Project integrating GIS, SCADA and CRM information into dashboard well developed
Asia-Pacific	Sydney Water (AUS)	Pending: SCADA and network model integrated to manage production and distribution of clean water. Next step is to use GIS to help visualize current network status

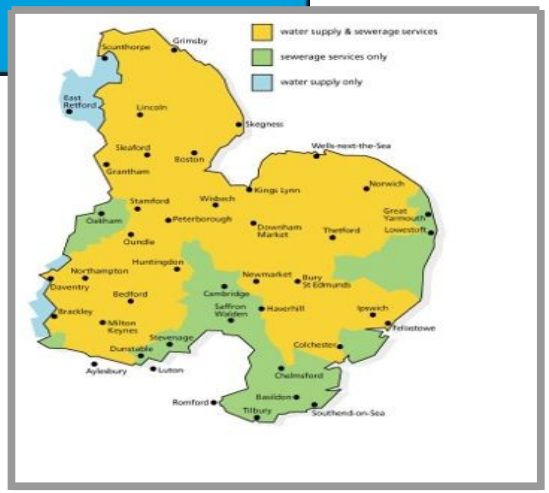
Anglian Water Example

Water Utility Profile

- Territory: 27,500 sq km
  - Largest in UK
- Customers Served: 5.6 million properties
  - >2 million customer calls pa
- Network
  - 36,462 km of Water Mains

  ...lowest leakage in industry
  - 279 reservoirs, 138 WTW
- SCADA: MetaSphere Master Control regional telemetry
- GIS: Intergraph G Technology
- CRM: SAP





Photos Courtesy Anglian Water Website Corporate as of 10/18/2006

Anglian Water Initiative

SCADA and GIS Integration Report:

- Operational Management Centre - bringing information together into unified view
- Assist in rapid response to customer calls from SAP & telemetry alerts by viewing geospatially – identify clustering of problems
- Available to Anglian Water users anywhere via web

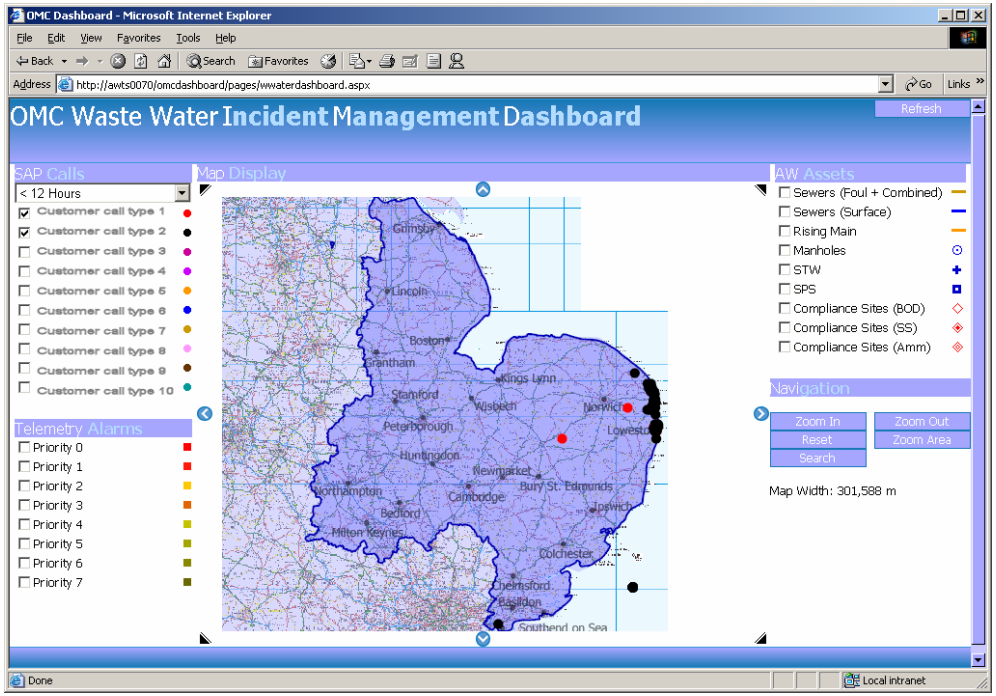


Photo Courtesy Anglian Water via Metasphere Ltd. from UK as of 10/18/2006

Clean Water Dashboard

Categorisation of calls received on CRM system

Customer call details overlaid on GIS map

Overlay selection based on asset type

List of work orders open on WM system for area selected

Categorisation of alarms received on SCADA system

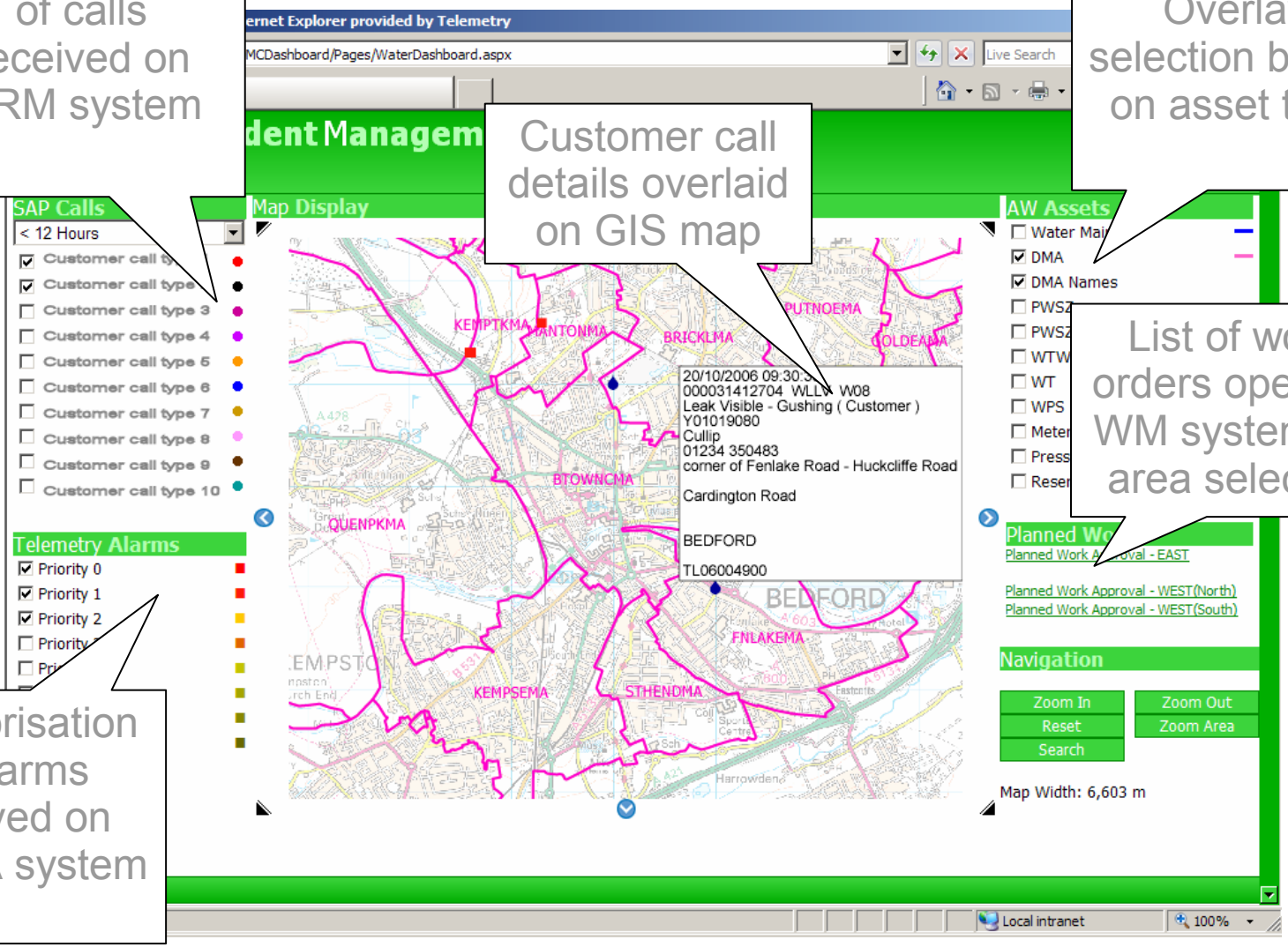


Photo Courtesy Anglian Water via Metasphere Ltd. from UK as of 10/18/2006

Waste Water Dashboard

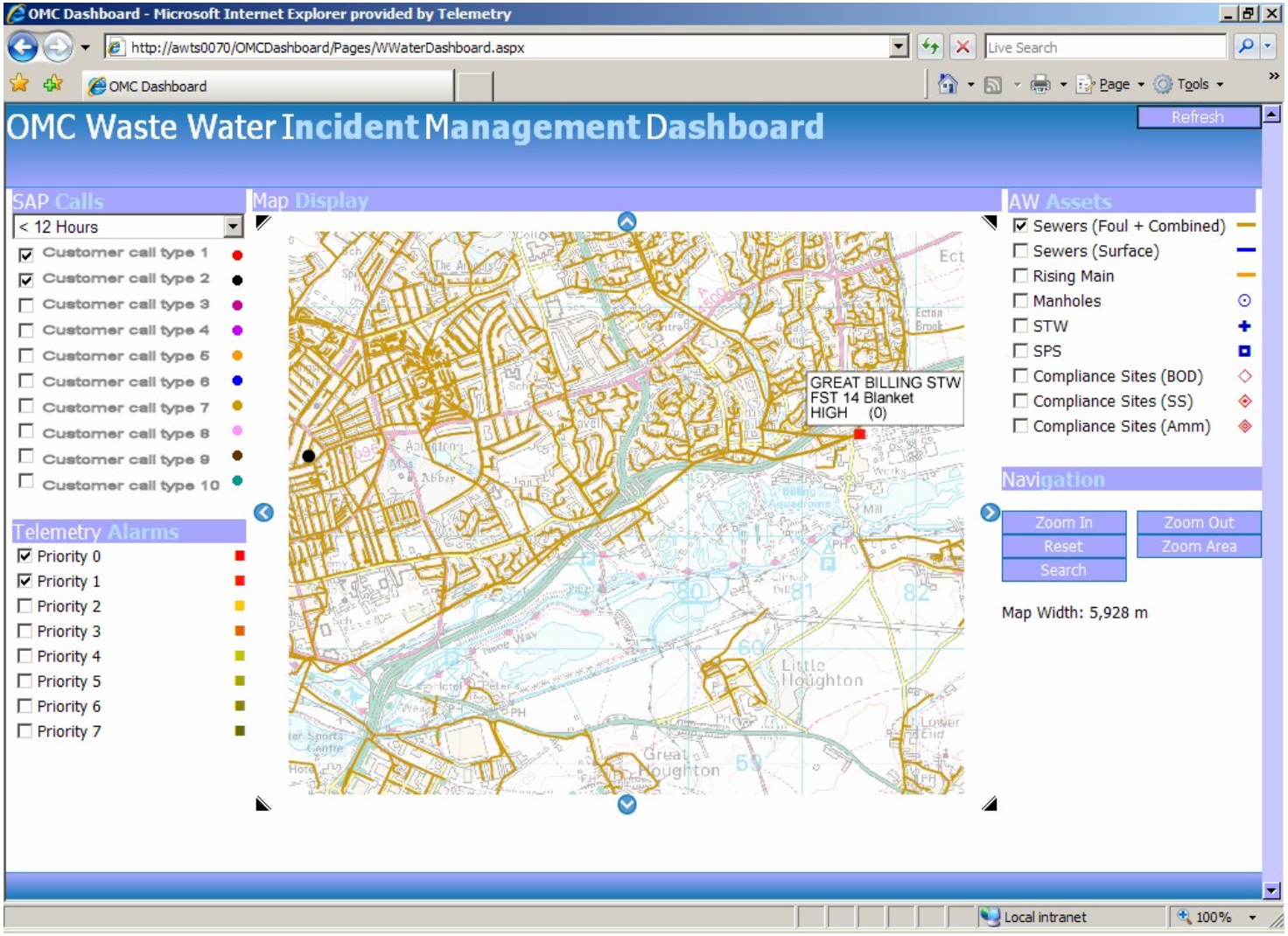


Photo Courtesy Anglian Water via Metasphere Ltd. from UK as of 10/18/2006

Summary

- Changing demands on water companies requires new systems and solutions
- Integrating SCADA and GIS can yield significant business process benefits
- Better to integrate best of breed systems

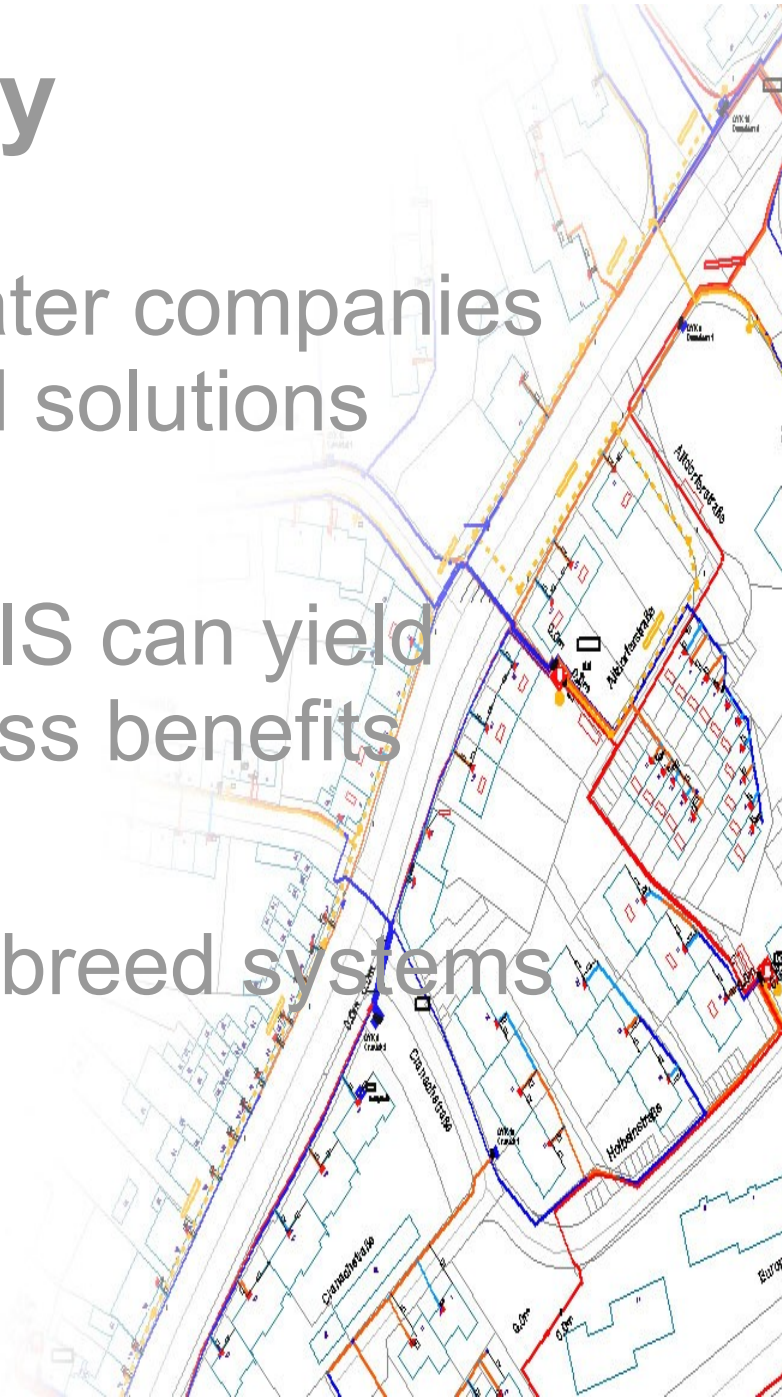


Photo Courtesy GE Smallworld GIS Pitch at AWWA IMTECH 2006 in Portland, OR on 03/20/2006

Photo Courtesy Anglian Water Website as of 10/18/2006...Drinking Water Quality Report Summary 2005

Abbreviation Key

- Assoc. - Association
- AUS – Australia
- CDN – Canada
- CRM – Customer Relationship Management system
- Etc. - et cetera, and other similar things
- GIS – Geographic Information System...a GIS is a special type of information system in which the database consists of observations on spatially distributed features and procedures to collect, store, retrieve, analyze, and display spatial data (Dueker, 1987)...sometimes referred to as Geospatial software
- GML – Geography Markup Language...emerging as a world standard for XML encoding of geographic information
- KM - Kilometres
- OMC – Operational Management Centre
- Pa – Per Annum or annually
- SAP – Systems Applications Products...SAP AG is a global enterprise software company with headquarters in Walldorf, Germany
- SCADA – Supervisory Control And Data Acquisition system
- Sq - Square
- UK – United Kingdom...sometimes referred to as Great Britain
- USA – United States of America
- WM – Work Order Management system
- WTW – Water Treatment Works...Works (Plants) which treat raw water to produce potable water for public supply
- XML – Extensible Markup Language used in Web and Middleware software applications

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Contact(s) for follow-up questions :

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Photo Courtesy GE EFS Pitch at 2006 DBIA Water/Wastewater Conference on 01/26/2006

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