



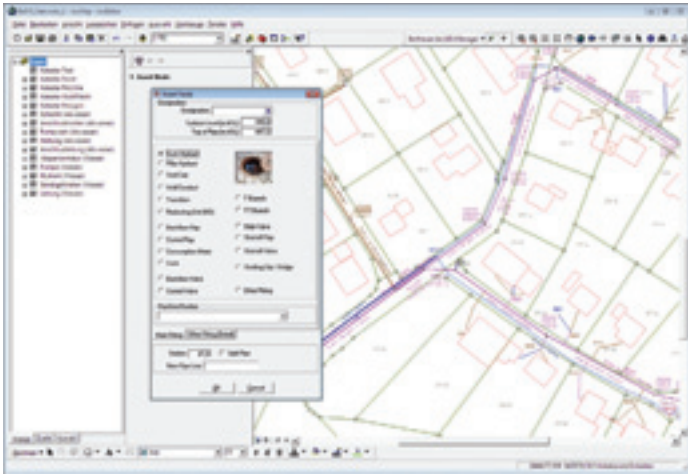
MANAGING A SUPPLY NETWORK OPERATION

BARTHAUER SOFTWARE GMBH BASYS ADDRESSES THE INTEROPERABILITY ISSUES IN WATER SUPPLY NETWORK MANAGEMENT, LINKING GIS, CAD AND DATABASE MANAGEMENT SYSTEMS

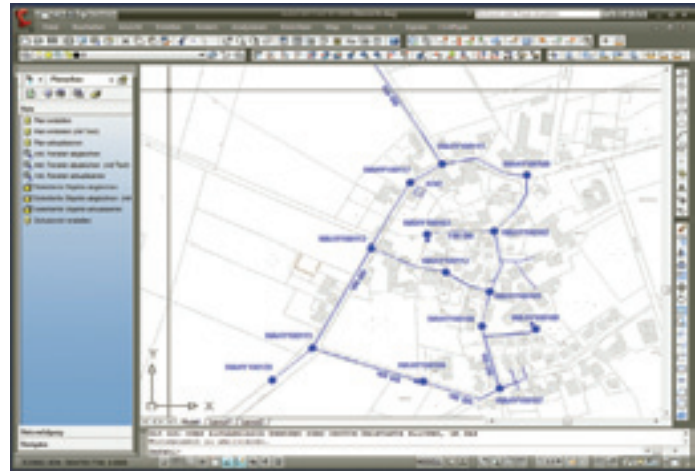
In organizations that operate supply networks, such as for gas, electricity and water utilities, requirements of different subdivisions in the company or with local authorities often refer to the same data source. The tasks in these networks may cover planning and dimensioning, management, inspection and sanitation as well as asset management and more. The application must fulfill these needs and these functions efficiently. It is also important to avoid financial losses or damage to network companies arising from natural hazards and to ensure supply to the customers. Another important issue is system scalability. Not all users require all functions offered by the application. Often these diverse tasks are performed using different software products, thus avoiding comprehensive usage of a single data source. In this case the data must be passed between applications using data exchange formats which can cause data loss or inaccuracy. Many times these applications belong to different vendors. With BaSYS (Version 8.1 soon to be released) the German software company Barthauer Software GmbH follows a comprehensive approach to fulfill the above requirements successfully. The following article shows how BaSYS 8.1 addresses interoperability in a typical network company.

Common Tasks in a Network Organization

First, take a closer look at the tasks to be accomplished. The existing network has to be digitally surveyed and/or new segments of the network planned. Besides the topological planning of locations, the network must be sized to supply the



Inserting a node in a fresh water system in BaSYS Plan E which uses ArcGIS as a graphical frontend



Map of a fresh water system generated in BaSYS Plan A, the graphical frontend based on AutoCAD.

citizens with fresh water or for the removal of waste water. Additionally, the hydraulic capabilities of the existing network must be modeled. Another important issue is the maintenance of these networks because of their vital role in the community. The inspection of networks must be planned and completed, followed by loading inspection results into the system and performing classification of the state of the network. Based on such classification, sanitation actions are planned. After finishing the sanitation, the new data must be loaded into the system for further operation of the network. Asset valuation of the existing network is also a very common task in these companies.

What does this mean for a network operation company? If all functions belonging to one network are performed in a single database in a single application suite, this will lead to integrated working of different divisions of the company. As changes are made to a single database, these changes are accessible in real time for all users working on the same data. No data and time loss will occur as may happen using data exchange formats. Of course the software must fit into the existing systems landscape of the company.

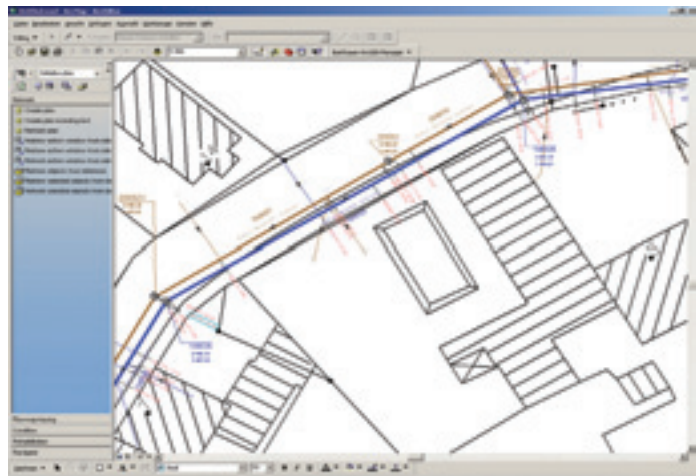
The architecture of BaSYS 8.1

To understand how BaSYS 8.1 offers a high level of interoperability, it is important to understand the main concept behind its design. BaSYS 8.1 consists of several modules for working with network objects. The core of the system is the project database, which is hosted on a relational database management system (RDBMS), and several modules are designed around this database. In this database, all information about the network objects is stored, e. g. geometries and attributes. The licensing of the software is highly scalable, so every subdivision can use parts of the software as needed. Often tap and waste water networks are managed by the same company - these and gas or cable networks can be managed with BaSYS 8.1 as well. In BaSYS 8.1, all sorts of networks can be recorded in a single database so further data, like streets, can be used for all networks without redundancy.

Interoperability in BaSYS 8.1

The most obvious feature for the high level of interoperability in BaSYS 8.1 is the opportunity to use all major CAD and GIS software as a graphical frontend. BaSYS 8.1 supports ArcGIS from ESRI, AutoCAD (AutoDesk), Bentley Microstation and Geomedia from Intergraph.

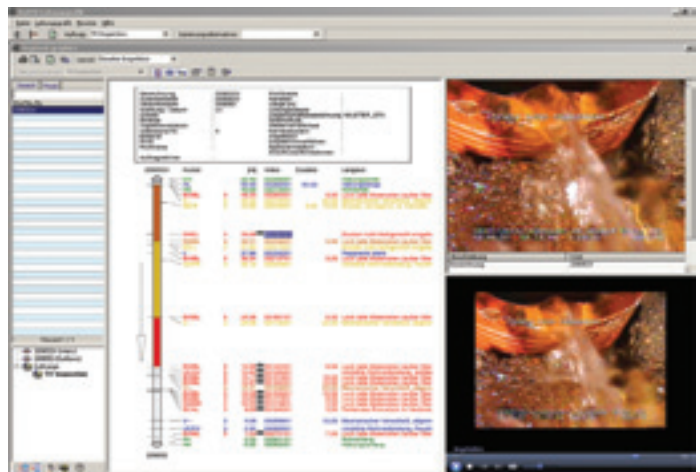
First, the network has to be planned or digitally surveyed. This is mostly done with the help of a CAD system because of its advantages in the construction of network objects. The objects created are written to the database immediately so they are accessible by other BaSYS users in real time. For the field work, a mobile solution of BaSYS exists (BaSYS mobile). Data derived by field



Map of sewer segment damages based on the inspection data inside the BaSYS project database.

surveys can be easily synchronized with the project data in the office.

For geospatial analysis or the visualization of networks, GIS software is often used because of its mapping and geo-processing capabilities. A typical application is the display of supply networks in a spatial area or to combine the maps with other data sources like orthophotos or topographic information such as cadastral maps. This separation of CAD and GIS can still be observed, although there has been a rising convergence of CAD and GIS software in the recent years. Even the text position of the labels of



Pipe graphic showing the damage of a sewer segments. If an inspection video or pictures of the damages are accessible the user can easily navigate to the corresponding photo or timestamp in the video.

the objects can be stored in the database so a nearly identical layout for different graphic front-ends can be created.

For hydraulic modeling of these networks, there are modules inside BaSYS like AquaFIN for the calculation of the hydraulics of fresh water networks, or HydroCAD (simulation of the hydraulic capabilities of sewer networks) and KanZEIT (for the dimensioning of sewer networks).

During the operational life span of the networks, they must be inspected. These inspections (e.g. TV inspections for sewer networks) can be planned with BaSYS 8.1 and the results can be used to classify the state of the network - BaSYS 8.1 offers several modules for these classifications. Based on these classifications, the sanitation must be planned, using for example BaSYS Pisa for sewer networks. This data can be directly used to derive damage control plans to visualize the current state of the network.

Interoperability of the Database

The project database can be hosted on an Oracle database or a Microsoft SQL Server. Both relational database management systems can be mounted into BaSYS 8.1 simultaneously. In BaSYS 8.1, it is possible to copy the data from one project database hosted on one system to another one hosted on the other RDBMS. The project databases on different systems can be compared and queries which are created in

BaSYS 8.1 based on a database hosted on Microsoft SQL Server can be used on databases hosted on ORACLE.

Because of the business philosophy of Barthauer Software, the data inside the project database is accessible without any restrictions. As a result, the data in the RDBMS can be accessed by any other software that can connect to the database, e. g. via ODBC – Open Database Connectivity.

Interoperability with Other Software

Most BaSYS 8.1 modules offer the opportunity to export the data so it can be used in standard office products, like Microsoft Office. In addition, the results of queries in BaSYS 8.1 can be exported as ASCII files. To import ASCII data, a free definable ASCII import interface exists. There is also a shape file export function. The network objects can be exported as a KML file for display in Google Earth. A Web GIS can be used to view the data in combination with the Web Spectator, an alphanumeric viewer of the attributes of network objects.

For sewer networks, BaSYS 8.1 supports the European DIN-EN 13508 standard for the condition of drain and sewer systems outside buildings.

Conclusion

In a common supply network operation chain, several tasks need to be fulfilled. Therefore, a network information system is

needed offering a high level of interoperability. Most operations concerning the handling of fresh or waste water networks can be done inside BaSYS 8.1 because of its comprehensive approach toward combining all these functions inside one software suite based on one data source.

Besides the modules already mentioned above, additional modules exist like the rain manager to process rain data from meteorological surveys for hydraulic modeling of the network. Even if there is a function not covered by BaSYS 8.1, interoperability with other software is possible because of the free access to the project database or by its numerous export functions. With its underlying trend-setting technology, BaSYS 8.1 offers the user a comprehensive and highly scalable software suite with which nearly all tasks for efficiently running water supply networks can be performed. BaSYS 8.1 has demonstrated its ability for managing fresh or waste water networks for many years and is used by many local authorities in Germany and Austria.

Article by Malte Halbey-Martin who works as a supporter and software trainer for Barthauer Software GmbH. Email contact: m.halbey-martin@barthauer.de. Web site: www.barthauer.de.

“ From Land Mobile Radio... to Wireless Mobility... Voice... Video... Data... and everything in-between – IWCE is the pre-eminent event for education, networking and collaboration in the convergent communications systems marketplace. ”

Convergent Communications Spoken Here

Join the conversation at IWCE 2010. Connect with more than 350 cutting-edge exhibitors to see, up close, the products and technologies that power integrated communications systems. Network with partners and peers, and collaborate with industry thought leaders in an educational environment that provides new insight into how to do your job more effectively.

The convergent communications industry is rapidly evolving—and there's never been a better time to be a part of IWCE. Don't miss your once-a-year opportunity to be a part of the dialogue! To register or for more information, visit www.iwceexpo.com or call 800-927-5007 or 508-743-0105.

College of Technology Exhibits and Conference	March 8-9
Las Vegas Convention Center	March 10-12
	Las Vegas, NV

FREE EXHIBIT HALL PASS
Use code: V35

IWCE **Converge. Collaborate. Communicate.**
iwceexpo.com

Organized By: **PENTON**
www.penton.com

Official Publication: **URGENT COMMUNICATIONS**
www.urgentcomm.com