

Introducing ArcGIS as integration layer for data management at Wintershall

Who we are

Wintershall specializes in energy and is a wholly owned subsidiary of BASF AG. Together with its affiliates, Wintershall is active in exploration, production and trading of crude oil and natural gas.

Wintershall has been active in the exploration and production of oil and gas for over 70 years. The company has its headquarters in Kassel and is now Germany's largest producer of crude oil and natural gas.

In its exploration and production activities, Wintershall is deliberately focusing on selected core regions where the company possesses a wealth of regional and technological expertise. These regions include Europe, North Africa and South America, as well as Russia and the Caspian area.

In 2003 Wintershall managed to achieve income from operations in excess of one billion euros for the fourth year in succession. The company increased its income from operations from 1.23 billion euros in 2002 to 1.37 billion euros in 2003. This once again made Wintershall the highest-yielding segment within the BASF Group in 2003.

Initiative

Being active for over 70 years in the E&P (exploration and production) business all over the world means being able to fall back on vast amounts of knowledge – if you are able to find it. The Wintershall paper archive for example contains hundreds of thousands of paper documents, studies or maps and there are several terabytes of digital data stored on RAID systems, databases, disks and tapes.

During the last couple of years the E&P industry has seen an increase in the amount of available data. Measurement methods became more and more precise and produce more data than ever – based on the more detailed raw dataset, interpretations take up more space. Third party studies are available – not longer being one paper report but often a two DVD set and a lot of geological papers is available for free download on the internet.

For Wintershall's data management department one major problem was the isolated way the E&P staff worked with data. Many stand-alone applications were used to produce maps and results and a lot of effort was put into reformatting files to read them with the next, stand-alone application.

Data management was administering different databases that could not be linked to another without copying and recoding data. Query often resulted in lists with thousands of entries that frustrated users and made comparison almost impossible.

Map creation was done with PowerPoint or CorelDraw and a lot of time was spent on creation of maps and presentation rather than spending it on data itself.

Datamanagement Study

By the end of 2002 a data management study was presented which based on a questionnaire given out to all E&P Staff (about 200). About 70% returned their opinion on data management and gave a good reflection of user view/status-quo on data management. The study showed impressively that although many different functions exist within Wintershall as E&P company, typical GIS activities like data search, map creation and reporting are performed throughout the functions.

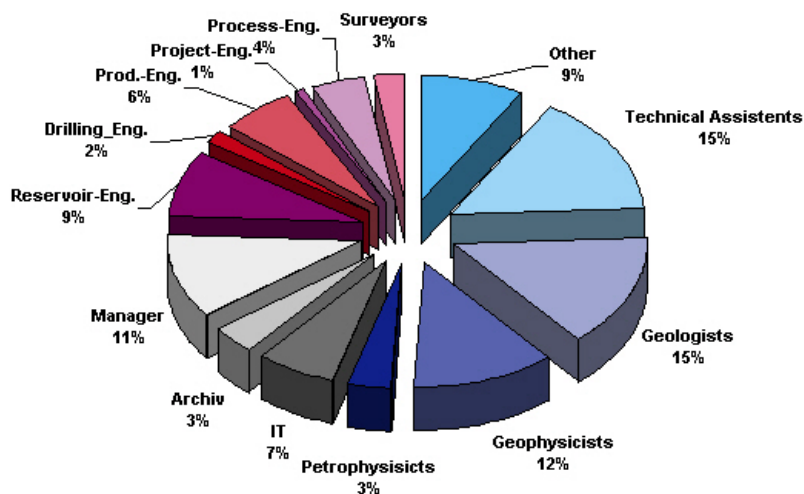


Fig.1 : Functions of data management study participants

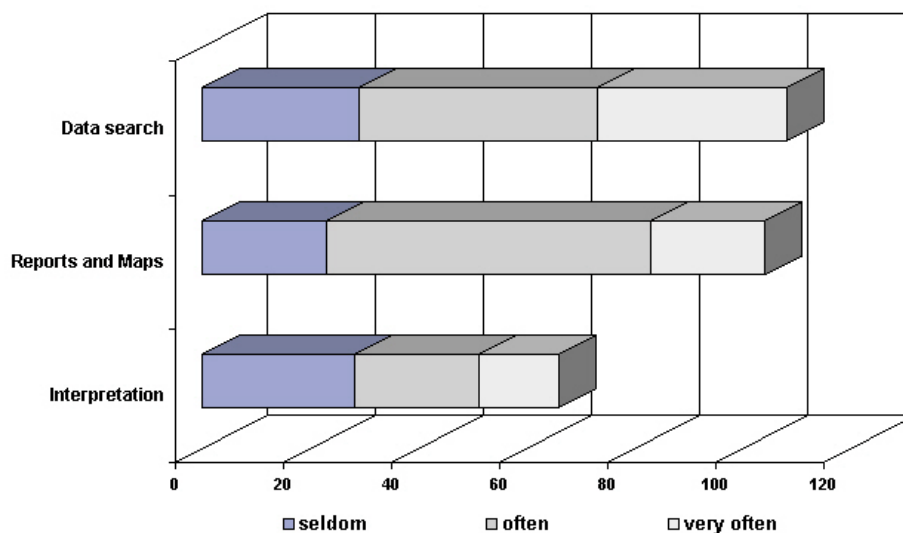


Fig.2 : Top 3 activities Fig.1 : Functions of data management study participants

One main result of the study was that corporate data stores are deemed to be strategically vital. There were certain needs identified to improve data management and data integration:

- allow integration of various data sources
- increase data availability
- enable integrated analysis of large datasets
- allow calibration of datasets and increase of quality and understanding of data

GIS Workshop

At the end of 2002 GIS became a buzzword within Wintershall and a GIS workshop was held to identify and discuss solutions and future needs in Wintershall.

Both E&P staff and data management had hopes that the introduction of GIS would solve their problems: E&P staff required a tool for quick data access and integrated analysis of data of different sources and quality. Data management was eager to implement a tool that would run on a common desktop PC and access various data bases.

The return of the workshop was immense and not only E&P and data management staff from Wintershall Kassel attended but also from Barnstorf/Germany, The Hague/Netherlands and Tripoli/Libya.

The discussion showed that many divisions had already taken steps into the GIS direction but without a corporate concept and the proper financial funding. We discovered that there was almost any GIS software on the market already in use at Wintershall and it was clear that there existed an immense interest in GIS.

The workshop participants agreed to a Wintershall GIS concept, which was worked out from the IT and data management department in Kassel – considering growing demand and allowing space for creativity.

Mid 2003 Wintershall's E&P IT department was awarded the GIS project and commenced an GIS initiative July 2003.

Considerations

Introducing a new software suite into an organization like Wintershall is not done overnight. The GIS software we were to implement had to easily integrate with our existing IT architecture and meet the internal IT standards.

Wintershall is active in many parts of the world and the GIS had to be able to support coordinate systems and transformations from all over the world – and be compliant to EPSG (European Petroleum Survey Group) standards.

After having evaluated certain GIS software products for a period of time, we decided to implement ESRI'S ArcGIS suite.

People-Tasks-Products

One consideration acknowledged that the 'common' user was not eager to learn a complete new technology suite, therefore the GIS software needed to be rather intuitive to use but scalable for growing requirements.

For the first phase of the GIS project we decided to not spend time, money and effort into customizing the software but gain expertise on GIS concepts while using the out-of-the-box standard.

Nobody within Wintershall had a deep insight into possibilities of GIS and we needed to allow time for training and familiarization with the software.

Our considerations lead to different functions and requirements that people have within Wintershall and we then attributed a certain software product, data access, roles and training.

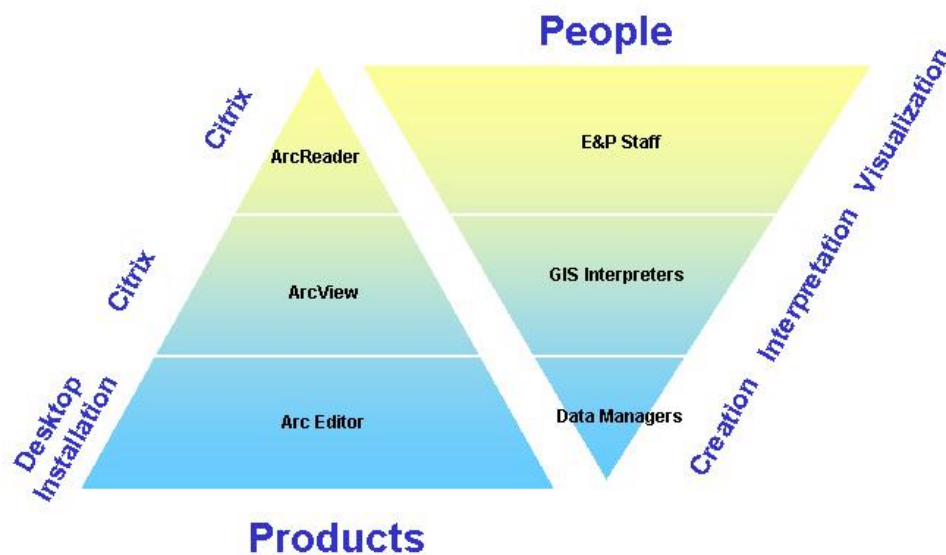


Fig.3: People's tasks with ArcGIS products

Implementation

Tactics

It was clear that ArcGIS could not be introduced as other software products that are brought into an organization to fulfill a clearly defined requirement. There was too much promising functionality to GIS that could not only be released to a small group of specialists but could simplify and facilitate many tasks within Wintershall.

A GIS team as part of Wintershall's data management group collected and distributed ideas, workflows, best practices and participated actively in project teams.

Considering people and their daily work was the main driving force at the beginning of the project. There were clear milestones defined for the technical implementation but it was less clear how the future users would decide to make GIS fit into their workflow.

This planned freedom is unusual for an IT project where usually an IT group and the users specify their requirements thoroughly before implementation. Just because it is software, GIS can not necessarily be considered IT, it is rather a way integrating various sources of spatial data into one common user interface.

There was a certain fear that by implementing ArcGIS, users would not uptake on the software or the concepts behind, making GIS just another specialists tool. After the first experiences with ArcGIS, seeing how quickly users took up on the software and developed own ideas on integrating GIS into their daily work, there was one point less to worry about. Using maps created with ArcGIS in presentations soon convinced management to support GIS.

During the implementation phase the number of licenses were kept scarce on purpose, which increased the demand and made the software more interesting. In the beginning we upgraded the number of ArcView licenses quarterly by three. With this slow growth rate the data management and 'core' GIS users could assist the growing number of users. Many of the 'early bird' users are today focal points for GIS usage in their project teams

Training

We found that the standard ESRI ArcGIS beginners training was of limited use to us, since the ArcGIS user has to work in his own PC environment and access to data is what makes GIS interesting.

The GIS team contracted a company that had its focus on using the ESRI software products in projects and their staff showed to be excellent ArcGIS users. Together with the 'core' GIS team the training was customized. The aim ist that the user learns the software from the perspective of data access in our IT environment, gets to know the IT people involved, gets educated about data management issues and will be able to start right away after the course on his or her PC desktop.

After the training our users do not only have a basic know how of using ArcGIS, but also know common problems and most important: know the people who can help.

Contractors

From the very beginning we had contracted two consulting companies: FrOG Tech (former SRK)/Australia and ProDV/Germany.

The roles of the two companies were clearly set. ProDV supported the whole process of hardware and software installation and acted as a mentor in all GIS related questions. FrOG Tech monitored the red line of the project, they brought in a profound knowledge of GIS in the E&P industry.

Our aim from the very beginning was not to leave the consultants alone in order to not be left alone when they are gone.

Components

The main technical components of the Wintershall GIS setup are ArcSDE and Citrix application servers.

The Citrix servers at Wintershall are connected to the internal network – a fast backbone that enables ArcView run with incredible speed compared to a PC desktop installation.

The ArcGIS/ArcReader Citrix server went productive in August 2003, today there are about 40 users who use ArcView, ArcReader and numerous extensions available. Since Citrix is a standard installation on every Wintershall desktop PC, it is easy make ArcGIS accessible.

Our first ArcSE Oracle Database went productive in 15 th of Febuary 2004. So far there are three ArcSDE instances installed and users have already access to about 200 GB of geodata for regions all over the world:

WINGS

WINGS, the Wintershall geodata server contains several SDE accounts for all regions in which Wintershall is active. Interpretations, areas of interest and georeferenced raster data maps are stored.

Data models were developed using CASE tools (Visio) and a workflow for controlling codes and domains was introduced.

WINGS will become the corporate knowledge base for Wintershall.

EDGE

As part of IHS Energy's database management system, IRIS21, the EDGE database provides a relational model for accessing IHS Energy's comprehensive international E&P data. Wintershall backed the strategy of IHS Energy to migrate their EDGE/IRIS21 database to ArcGIS 8.3.

The ArcGIS Comanche extension allows access to about 200000 wells and E&P specific datasets worldwide.

FINDER

Finder 9 is a Schlumberger/SIS product that is with its version 9.3 ArcSDE enabled. Users have full access to Wintershall's corporate relational database, with information on wells, seismic, fields and reservoirs.

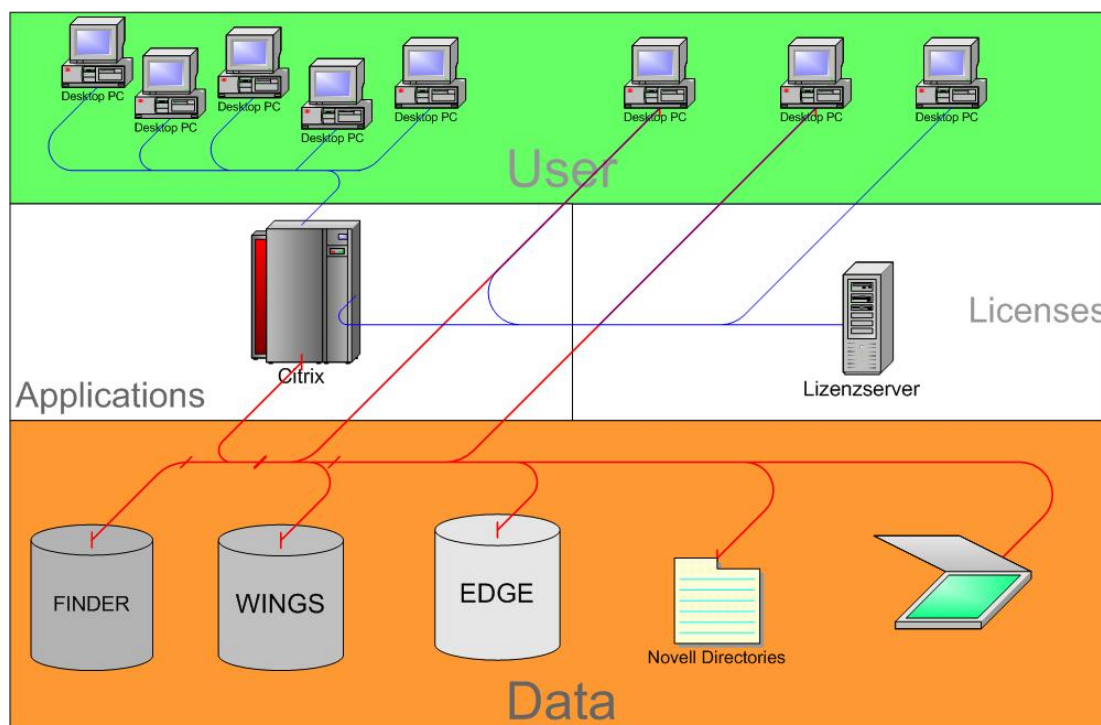


Fig. 4: Schematic view of the ArcGIS IT architecture

The databases EDGE and FINDER have been elements of Wintershall's corporate data repositories for many years, having a focus on relational data and acted before the introduction of ArcGIS as stand alone products. WINGS is a true geodatabase, where all the functionalities of ArcSDE are used to serve geodata.

Another component of our data space is the GIS directory structure, where we use a complex system enforced data access model to control the data that gets created and edited by the GIS users. There are read only and read and write areas, the user being able to read everything inside his or her the business branch, but can only write in a dedicated directory. The idea is that the data management controls the read only area and provides map and layer files for quick data access, with a standardized layout. The common user does not have to worry about data structure and layout, but will find a set of files that point to various ArcSDE data bases.

Benefits from using ArcGIS

Our whole organization experienced a steep learning curve during the last twelve month, when we went from many different GIS-like, stand alone products to using a complex GIS infrastructure. Being able to work as quickly and profoundly with ArcGIS as we experienced it in our organization was only possible because a network of GIS users within Wintershall established.

With the implementation of ArcGIS data management cut time for unloading, reformatting and loading data from one stand-alone software product into the next and quality by organizing our cultural data, which now is GIS-wide accessible and centrally managed. As a direct result there is not as much management of different versions of data any more.

The E&P staff enhanced their data analysis capacities by being able to work with larger scaled data sets, compare structured data with unstructured data and produce nicer looking maps for presentations in shorter time.

There is now corporate access available for our corporate data stores, what also means that data gets used and looked at more often. There were more data errors reported than ever and more requests for data to be loaded into our corporate data stores.

We capture our knowledge in GIS databases and use metadata to keep as much information with the data as possible.

Introducing ArcGIS at Wintershall was truly beneficial. Since we introduced ArcGIS we see:

- Enhanced communication between team members
- Building of information bases and capturing of knowledge
- Advanced organization of spatial data and creation of a map repository
- Better understanding of data with GIS analysis methods