

# GeoSAP

– Geo-enabled web service applications based on GeoXtension –

## Deutsche Bahn AG (German Rail)

German Rail manage their facility and infrastructure maintenance data with SAP systems. Typically, these data are purely alphanumeric having no geo coordinates attached to them. FICHTNER CONSULTING & IT (FCIT) has developed a solution for German Rail to upload and automatically geocode selected SAP elements and projects on-the-fly. Within seconds, the result is displayed in the geographical map context. SAP elements can thus be evaluated and analyzed more efficiently. The solution enables German Rail for example to analyze trouble and accident hotspots and take specific precautionary measures.

At the solution's core is GeoXtension – a product designed by FCIT to integrate geodata in business workflows via standard browser interface, requiring no additional software installation. The underlying state-of-the-art 3-tier application server architecture is based on an open standardized ORACLE spatial database.

### Customer

DB Netz AG is the infrastructure manager of German Rail, responsible for the operation and maintenance of the railway network. Their prime objective is to ensure safe and reliable operation on the more than 35,000 kilometers of routes in Germany.

### Situation

Supported by FCIT, the DB Netz AG manage geographical information systems (GIS) containing their entire network infrastructure with corresponding data.

In addition, DB Netz AG use SAP systems for facility and project management. DB Systems GmbH, the internal IT service provider, maintain and upgrade these systems on request of German Rail.

So far, these systems were connected by typical peer-to-peer interfaces allowing information queries on SAP equipment in the GIS environment and vice versa.

However, most data in the systems are neither geocoded nor directly connected to any equipment. In general, they are related to organizational or political entities such as railway stations, districts or counties. Technical equipment is usually referenced to kilometer station and direction along the tracks.

### Objective

The DB Netz AG favored a browser-based solution to avoid extra installation and administration costs. Other requirements included:

- Easy-to-operate and intuitive application requiring no extra end user training
- Online geocoding of SAP elements in multi-level logic with excellent performance
- Display of SAP data related to infrastructure equipment and the geocoded SAP elements upon a mouse click
- Clear arrangement of map elements and logical legend display
- Customizable navigation for rail-specific queries like track stationing, dispatching ID, railway station name and other relevant attributes
- Thematic display of SAP data (e.g. failure priority, dispatching type)



## Implementation

The solution is based on an SAP export of selected elements implemented by DB Systems GmbH and the call of FCIT's GeoXtension web service components. These components are already enhancing a number of business process workflows at German Rail.

FCIT has designed the overall architecture and implemented the data integration, the geocoding intelligence and the GeoXtension web component for map display of the results.

## GeoXtension

GeoXtension is deployed on ORACLE's Application Server utilizing data from an OpenGIS®-Warehouse. This technology allows GIS data to be integrated with other German Rail or third-party data thus creating valuable decision support and allowing navigation and queries based on the intuitive map display.

GeoXtension has been developed in the leading web architecture J2EE allowing cost-effective and manageable integration of valuable geodata with other enterprise systems such as ERP, CRM, Billing, Dispatching and others.

GeoXtension takes advantage of leading standards to protect investment and allow a wide range of available standard tools to be utilized. The geodata are displayed in the W3C®-XML definition SVG (scalable vector graphics). The base data are kept in OpenGIS® *Simple Feature Specification* format. The Application Server architecture ensures maximum scalability in terms of end user numbers, data volumes and system distribution.

This helps boost the efficiency of geo-related business processes via web service enterprise applications – from small installations with only a limited number of users all the way to full-scale professional internet services.

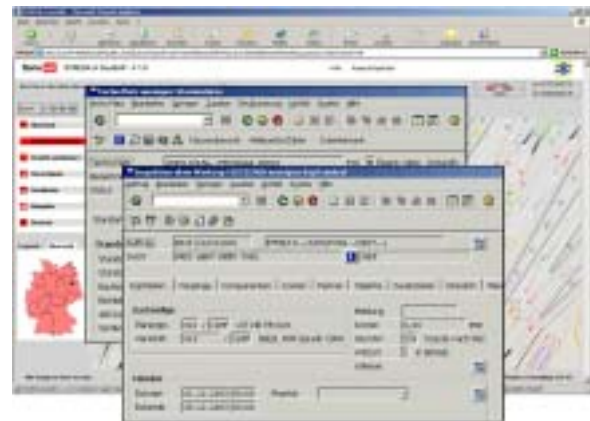
## Benefits

The GeoSAP web application implemented by FCIT and DB Systems GmbH enables SAP users to visualize the location and surrounding situation of relevant SAP elements. Thematic maps can be dynamically created without any GIS know how.

This integration opens up new benefits from existing data, at the same time adding efficiency and speed to corporate workflows. Valuable information on local conditions can be gained upon a mouse click to support decision making processes, e.g. maintenance forward planning.

One of the major advantages is GeoSAP's ease-of-use. The browser-based front-end provides just those functions and options required for the individual process. The actual source of the data is hidden from the user to ensure a clear and intuitive appearance of the application.

GeoXtension is a zero client and does not load plug-ins or applets. This kind of architecture saves costs in administration and ensures that the service is available even for users behind restrictive firewalls.



## Outlook

Today, many user groups within German Rail take advantage of a variety of task-oriented solutions based on GeoXtension in order to support and speed up their business processes. Some examples are:

- Web-publishing of network statements
- Upgrade planning of signaling equipment
- Data capture and editing of department-specific infrastructure information
- Review, correction and publishing of data
- Linking of specialist documents
- Connection to other systems

Due to GeoXtension's open, configurable and scalable architecture, upgrades and applications can be deployed with minimum cost and time.