GIS @ ÖBB-Infrastruktur AG

A Story about Integration
Past, Present & Future

4th Annual International Rail GIS Summit
UIC, Paris
May 16-17, 2013

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This organization chart shows a selection of key companies of the ÖBB Group.
16,000 employees (1/1/13)

6.310 trains (daily), 142 million train kilometres

More than 1,100 stations and stops

10 self-owned hydroelectric power stations

247 tunnels

72 billion gross tonne-kilometres (1990: 47 bn)

4,894 km rail network
Our Responsibilities

Plan, build and operate Austria’s Railway Infrastructure

Cleanliness and service

Punctuality and safety

State of the art, eco-friendly railway technology

More than 2 bn euro of investments p.a.

Non-discriminatory, customer-oriented network access

Inspection, maintenance and troubleshooting on and around the rail network

Safe, reliable operation of the rail network

Climate protection thanks to traction power from hydro-electricity

Professional, railway-specific construction services

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20 Years on the GIS Timescale
We Have Consumed…

Technology
Strategies
Organizations

Lots of:
Politicians
Maybe Some Drinks
Board Members
Coffee

Klassifizierungsstufe: ÖBB-Infrastruktur/Stab IT(extern)
GIS @ ÖBB Infrastructure

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16.5.2013
Time Until 1993:

Analyzing Information Needs

Office & Communication Software

Build a Basic IT Infrastructure

Design a Uniform Business Model

First Multi User Applications

Share Data via Intranet
Simple Generic Data Model

PERSON

FACILITY

WORLD

LOCATION / GEOMETRY
Restructuring of the Enterprise 1995

Still an Integrated Company

150+ Years Documented on Paper
Still Limited Computer Equipment
Few Electronic Communication

10+ Referencing Schemes

Relational Data Model
Geographical Driven Functions

GIS = Expert Tool
The First Oracle Forms 3.0 Application is Released

Documentation of Track Equipment

Interface to SAP/R2 is Implemented

Multiuser Application
All Over the Country via Oracle Web Server 2.1

And the First GIS-Map was born on Intergraph’s GeoMedia WebMap
Geometry produced with MGE and Stored in Oracle SDO
Getting Things in a Map without Coordinates

- **ORACLE SDO**
  - Spatial queries mapping

- **ORACLE SDO**
  - Attributes enriched with coordinates

- **Segmentation & Mapping**
  - Base Geometry

- **Reference Scheme Translator RST**
  - Rail Network Identification Register

- **Intergraph GeoMedia**
  - Rails, sleepers, switches, substructure, track quality indices, bridges, platforms, protection buildings, responsibilities, costs, etc.
  - Applications or external data sources

- **Attributes with descriptive location according to a registered reference scheme**
So 1999 the Status was:

- All attributes are stored in an Oracle RDBMS
- The geometry data are stored in Oracle Spatial (SDO)
  - You can handle both data types (alphanumeric AND geographic) simultaneously with relational data functions
- The 1st productive GIS system implemented in 1998 at ÖBB was Intergraph GeoMedia
  - OGC standard
  - Good Integration with the Oracle database
  - Native Oracle spatial functions
  - More functionality in the line topology
2000-2004 Intermezzo

- Good working system over years – BUT
  - At some moment in time no technology improvements at Intergraph
  - Even promised enhancement haven’t shown up

- Another restructuring phase from an integrated rail company into the ÖBB-Group happened
  - Splitting up to different incorporated companies and close companies
  - The infrastructure was split up in two incorporations

- So the IT evolution including GIS was on hold.
ÖBB-Real Estate Management Company

SAP/RE

Mapping Becomes More Important

The Restart of the GIS Evolution

Over All Demand

2005: The First Specific GIS Demand Appeared

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2005

Eierlegende Wollmichsau

Jack of All Trades Device

Oviparous Wool-Milk-Sow

1993

1995

1997

1999

2000

2004

2006

2007

2011

2012

2013

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Real Estate Information System

Modular and Step by Step

- BUSINESS / LAW
- SAP - INTERFACE
- ADDRESS SEARCH
- INFRASTRUCTURE
- BASEMAPS
- LAND USE PLAN
- SUBSURFACE INSTALLATIONS
- LAND REGISTER
- GIS / BUILDINGS
- IMAGERY
• first release of LIS was based on Intergraph GeoMedia and Oracle SDO

• custom based application layer (ms.gis core3) for:
  • configuration of WEB application
  • option to consume different GIS technologies (Intergraph, Esri)

• Still missing functions in the Intergraph environment
  • search functions, mixing raster and vector, mobile data capturing, etc.

• reconsidering Esri as GIS technology because of the in meantime existing support of Oracle Spatial within their ArcSDE technology

2007: The Switch to Esri
GIS Architecture After the Switch to Esri

ArcGIS for Desktop

- WFS
- WMS

WebGIS Application core3

ArcGIS for Server ADV

SDE

SDO

Bau AG
TKOM
KW
Projekt GIS

Betrieb AG
NGM
NFM

IMMO
LIS
GEOBASIS

Sonstige DB
INFRASTRUKTUR
BASIS

DEPARTMENTAL DATA incl. META-DATA

WebServices

Files

FrontEnd

mgs

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The Evaluation of a New WebGIS

- no user interface for configuration (external services needed)
- long and expensive deliver process of features and functions
- no user management using the existing AD environment
- several performance issues while growing (up to 2000 users)
- Evaluation of existing COTS solution for WebGIS environment
- ASFiNAG (Austrian Road Administration) utilized WebOffice from SynerGIS
  - Higher Performance
  - High flexibility of configuration
  - Richer set of functionality (editing, printing…)
  - Integration Power in existing systems (LDAP, Tracking, …)
  - AND lower prices and faster ROI
The Migration to WebOffice by SynerGIS

- In-house application management (we can do it on our own)
- One configuration with different views depending on user rights
- One platform for integration with other enterprise systems by configuration
- Smart search functions by configuration
  - full text search
  - Database driven value lists
- HD and large format plots in the web environment

- Data editing and capturing
  - Mobile integration with Cartopac
  - Snapping and construction features
- Flexible and fast (in-house configuration)
  - New configuration for new users/groups
  - New data integration
  - update in case of changes
The Integrated GIS Systemarchitecture

APPLICATIONS

OPERATIV

GIS-DB

SDO

GeoBasicData
RailGeoBasicData
DeptGeoBasicData
GeoEnrichedDeptData
CaptureGeoDeptData

MASTERDATA

SERVICES (WFS, WMS, catalog service, proprietary services, etc.)

WebOffice
WEB GIS platform

Esri
ArcGIS for Server

Cartopac
Mobile GIS

GIS-Clients

Extern GeoData Sources
GeoData Delivery Store
Reference Scheme Translator
geoETL
geoenrichedETL
DWH

Spatial enabled

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20
• **Integration:** A milestone in the harmonization of the IT-infrastructure has been reached. Today all GI related themes are combined within the infra:gis. This common platform allows ÖBB an efficient data collection and integration that upscales the business value.

• **More Data:** The geographical position is relating the different objects from rail network, railway crossing, bridges, tunnels, Park&Ride Areas with low speed sections or monument protection information.

• **Flexibility:** The WebGIS infra:gis is defined as open system for all employees within the company and in the whole ÖBB-Group. Only some information that are confidential are restricted and are only be accessible from authorized persons.

GIS Conclusio: „a picture is worth a thousand words“
Evaluate GeoEvent Processor

BI/DWH Integration

ArcGIS Online – Portal for ArcGIS

Our Wish:

Optimize GIS Organization

Spatial is nothing special
So Please Put All the Stuff in the Relational Database
Thank you for your time and kind attention!

Ing. Winfried Stix
Stab Informationstechnologie
IT-Plattformen Leiter GIS CC

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WebGIS Integration with live images

Streckenbilder

Klick in die Karte übergibt Werte

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Ergebnisliste von Betriebsstellen

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</tr>
</tbody>
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